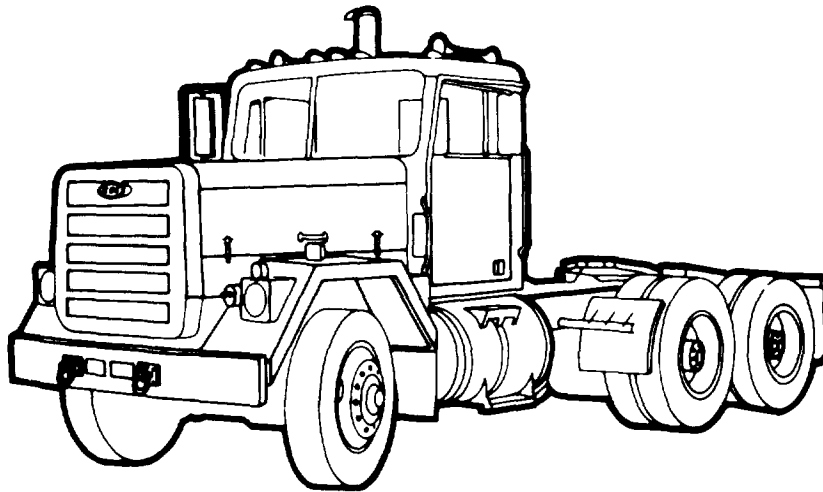


TECHNICAL MANUAL

ORGANIZATIONAL MAINTENANCE

TRUCK TRACTOR, LINE HAUL,
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TRUCK CHASSIS, 75,000 GVWR, 8 X 6,
FOR CONCRETE-MOBILE® MIXER TRUCK,
M919 (NSN 3895-01-028-4391)

AM GENERAL CORPORATION

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No. 4

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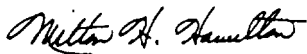
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No. 3

ORGANIZATIONAL MAINTENANCE

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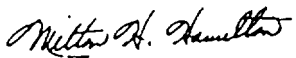
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Washington, DC, 18 June 1987

ORGANIZATIONAL MAINTENANCE MANUAL

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DEPARTMENT OF THE ARMY
Washington, DC. 18 February 1983

ORGANIZATIONAL MAINTENANCE MANUAL

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WARNING

CARBON MONOXIDE POISONING CAN BE DEADLY

Carbon monoxide is a colorless, odorless, poisonous gas, which, when breathed, deprives the body of oxygen and causes suffocation. Exposure to air contaminated with carbon monoxide produces symptoms of headache, dizziness, loss of muscular control, apparent drowsiness, or coma. Permanent brain damage or death can result from severe exposure.

Carbon monoxide occurs in the exhaust fumes of fuel-burning internal combustion engines and can become dangerous under conditions of inadequate ventilation. The following precautions must be observed to insure the safety of personnel:

- A. DO NOT operate the engine of a vehicle in an enclosed area unless it is ADEQUATELY VENTILATED.
- B. DO NOT idle the engine for long periods without maintaining ADEQUATE VENTILATION in the personnel compartments.
- C. DO NOT drive any vehicle with inspection plates, cover plates, or engine compartment doors removed unless it is necessary for maintenance purposes.
- D. BE ALERT at all times during vehicle operation for exhaust odors, and exposure symptoms. If either are present, IMMEDIATELY VENTILATE the personnel compartments. If symptoms persist, remove affected personnel from the vehicle and treat as follows:
 - (1) Exposure to fresh air.
 - (2) Keep warm.
 - (3) DO NOT PERMIT EXERCISE.
 - (4) If necessary, administer artificial respiration (see FM 21-11).

THE BEST DEFENSE AGAINST CARBON MONOXIDE POISONING IS ADEQUATE VENTILATION.

COMPRESSED AIR

Compressed air used for cleaning purposes will not exceed 30 psi. Use only with effective chip guarding and personal protective equipment (goggles/shield, gloves, etc.).

WINCH HYDRAULIC RESERVOIR (M916 AND M920)

Do not remove fill cap when hydraulic fluid is hot. The hydraulic tank is pressurized to 5 psi. Remove the fill cap slowly.

WARNING

COOLING FAN

When working in the engine compartment with the engine running, stay clear of the cooling fan. The fan may engage automatically at any time and could cause serious injury.

PUSHER AXLE (M917, M919, AND M920)

When the pusher axle is in the up position it freewheels. DO NOT USE THE PUSHER AXLE AS A STEP. You can fall and be injured. Always lower the pusher axle when the vehicle is parked.

FILLING THE RADIATOR

Let the radiator cool before removing cap. Remove radiator cap in two steps. First, place a thick cloth over the cap and slowly rotate cap left to its first stop; pause, and let pressure escape from cooling system. Then rotate cap farther left until you can remove it. Failure to follow this procedure can result in serious burns.

LIFTING THE TRUCK

Improper use of lifting equipment and attachment of cables to the truck can result in serious personnel injury and equipment damage. OBSERVE ALL STANDARD RULES OF SAFETY.

HOOD SAFETY LATCH

After raising hood, insert the S-shaped safety hook through two matching holes in the prop channels to prevent the hood from falling accidentally.

EXHAUST PIPE AND MUFFLER

During normal operation the exhaust pipe and muffler can become very hot. Be careful not to touch these components with your bare hands. Do not allow your body to come in contact with the pipe or muffler. Exhaust system components may be hot enough to cause serious burns.

Technical Manual

No. 9-2320-273-20

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, DC, 28 November 1980

ORGANIZATIONAL MAINTENANCE MANUAL

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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. Mail your letter, DA Form 2028 (Recommended Changes to Publication and blank forms), or DA Form 2028-2 located in back of this Publication direct to: US Army Tank-Automotive Command, ATTN: DRSTA-MBP, Warren MI 48090. A reply will be furnished to you.

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**This manual supersedes DRAFT TM 9-2320-273-20, 30 August 1979.*

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HOW TO USE THIS MANUAL

This manual contains the following information to help you understand how the truck/tractor works, how to service it, and how to make authorized repairs.

WHAT THIS MANUAL CONTAINS

This manual is divided into chapters which provide the following information:

CHAPTER 1 – INTRODUCTION

This chapter contains general information on different truck/tractor models covered in this manual. Included are illustrations showing the inside and outside of the vehicle.

CHAPTER 2 – PRINCIPALS OF OPERATION

This chapter contains information on how the vehicle works. It is divided into sections by function: fuel system, oil system, etc. (see Table of Contents for complete listing).

CHAPTER 3 – TRUCK/TRACTOR MAINTENANCE

This is the integrated maintenance chapter. It includes information that applies to all the maintenance chapters that follow (chapter 4 thru 11), including the following important information:

- a. When to inspect, test, and service the vehicle. (Preventive Maintenance Checks and Services.)
- b. How to find the best troubleshooting procedures for a specific problem. (Troubleshooting Symptom Index.)

CHAPTERS 4 THRU 12 - INDIVIDUAL MAINTENANCE CHAPTERS (See Table of Contents).

These chapters give you the following information:

- a. How to find out what's causing a problem. (Troubleshooting Procedures.)
- b. A list of authorized maintenance procedures. (Maintenance Task Summaries.)
- c. Detailed procedures for replacing and servicing component parts (Task Procedures). Procedures include a list of special tools that you'll need (if any), materials required and references to other manuals, if needed.

This listing includes the nomenclature cross reference list and the list of abbreviations used in this manual.

A. NOMENCLATURE CROSS REFERENCE LIST

Common Name

Air Cooler, Intercooler
 Drive Shaft
 Power Steering Cylinder
 Dual Control Valve, Treadle Valve
 Crankcase Breather
 Antifreeze, Ethylene Glycol Mixture
 Power Transfer/Differential Lockup Control
 Cold Start System
 Tail Pipe
 Float Switch
 Power Steering Pump, Power Steering Reservoir
 Ratio Valve
 Differential Lockout Engaged Switch
 Splash Shields
 Intermediate Pipe
 Brake Control Valve
 PTO Propeller Shaft U-Joint
 Jacobs Brake Cover, Valve Cover,
 Cylinder Head Cover
 Stowage Box
 Cross Tube
 Hand Control Valve for Trailer
 Exhaust Pipe

Official Nomenclature

Aftercooler
 Propeller Shaft
 Auxiliary Assist Cylinder
 Dual Brake Valve
 Breather Tube
 Coolant
 Differential Lockup Control
 Ether Quick-Start System
 Exhaust Stack
 Fuel Level Sending Unit
 Hydraulic Pump and Reservoir Assembly
 Limiting Valve
 Lockout Switch
 Mud Flaps
 Muffler Inlet Pipe
 Park Brake Valve
 PTO-to-Pump Coupling

 Rocker Arm Housing Cover
 Seat Risers and Tool Box
 Tie Rod
 Trailer Brake Valve
 Turbo Outlet Pipe

B. LIST OF ABBREVIATIONS

amp	ampere
approx	approximate
attn	attention
cm	centimeter
cu ft	cubic foot/cubic feet
cu m	cubic meter
cu yd	cubic yard
DA	Department of the Army
dia	diameter
desc	description
fig	figure
GVWR	gross vehicle weight rating
gnd	ground
in.	inch
Kg	kilogram
kph	kilometers per hour
m	meter
MI	Michigan
mph	miles per hour
MTOE	Modified Table of Organization & Equipment
No.	number
NSN	National Stock Number
para	paragraph
PMCS	Preventive Maintenance Checks & Services
P/N	part number
psi	pounds per square inch
PTO	Power Takeoff
qt	quart
ref	reference
TM	technical manual
TMDE	Test, Measurement & Diagnostic Equipment
vert	vertical

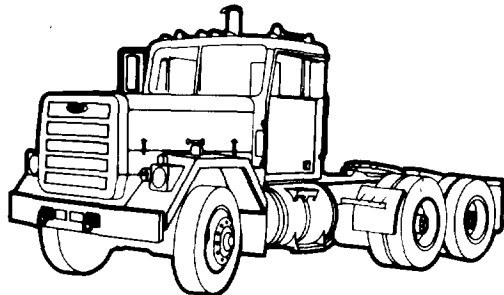
Reporting Equipment Improvement Recommendations (EIR's).

EIR's can and must be submitted by anyone who is aware of an unsatisfactory condition with the equipment design or use. It is not necessary to show a new design or list a better way to perform a procedure, just simply tell why the design is unfavorable or why a procedure is difficult. See TM 38-750. Mail EIR's directly to Commander, U.S. Army Tank Automotive Materiel Readiness Command, ATTN: DRSTA-MTC, Warren, Michigan, 48090. A reply will be furnished to you.

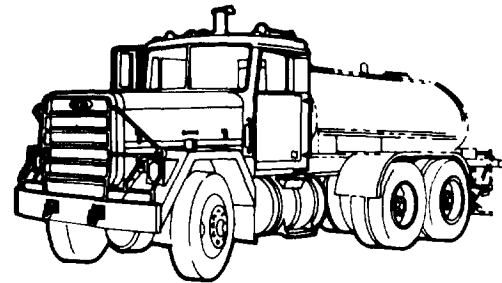
Equipment Improvement Report and Maintenance Digest (EIR MD) and Equipment Improvement Report and Maintenance Summary (EIR MS).

The quarterly Equipment Improvement Report and Maintenance Digest, TB 43-0001-39 series, contains valuable field information on the equipment covered in this manual. The information in the TB 43-0001-39 series is compiled from some of the Equipment Improvement Reports that you prepared on the vehicles covered in this manual. Many of these articles result from comments, suggestions, and improvement recommendations that you submitted to the EIR program. The TB 43-0001-39 series contains information on equipment improvements, minor alterations, proposed Modification Work Orders (MWO'S), warranties (if applicable), actions taken on some of your DA Form 2028's (Recommended Changes to Publications), and advance information on proposed changes that may affect this manual. In addition, the more maintenance significant articles, including minor alterations, field-fixes, etc., that have a more permanent and continuing need in the field are republished in the Equipment Improvement Report and Maintenance Summary (EIR MS) for TARCOM Equipment (TM 43-0143). Refer to both of these publications (TB 43-0001-39 series and TM 43-0143) periodically, especially the TB 43-0001-39 series, for the most current and authoritative information on your equipment. The information will help you in doing your job better and will help in keeping you advised of the latest changes to this manual. Also refer to DA Pam 310-4, Index of Technical Publications, and Appendix A, References, of this manual.

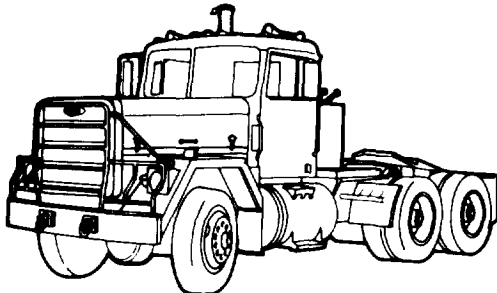
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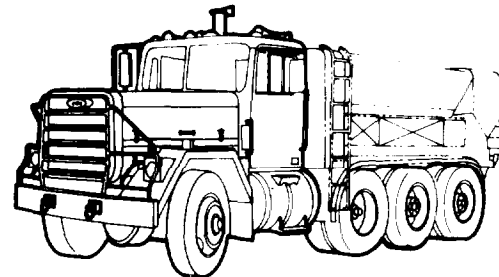
M915 LINE HAUL
TRUCK TRACTOR



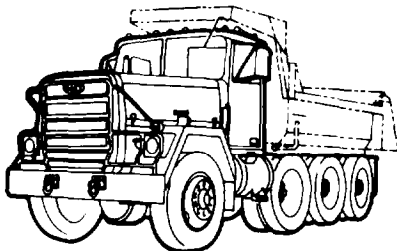
M918 BITUMINOUS
DISTRIBUTOR TRUCK



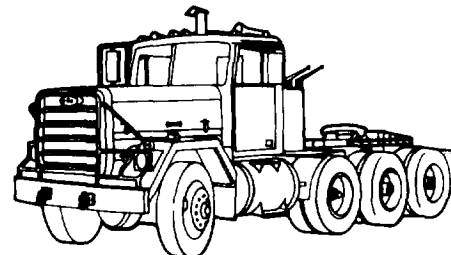
M916 LIGHT EQUIPMENT
TRANSPORTER TRUCK TRACTOR



M919 CONCRETE-
MOBILE® MIXER TRUCK



M917 20-TON DUMP TRUCK



M920 MEDIUM EQUIPMENT
TRANSPORTER TRUCK TRACTOR

Figure 1-1. M915 Series Vehicles

TA 074553

CHAPTER 1

INTRODUCTION

1-1. OVERVIEW.

This chapter provides you with the following information:

- a. Forms and record data required for maintenance.
- b. Physical description of each truck model and major equipment components.

Section I GENERAL INFORMATION

1-2. SCOPE.

Type of Manual: Organizational Maintenance.

Model Numbers and Equipment Names (fig. 1-1):

- a. M915 Line Haul Truck Tractor
- b. M916 Light Equipment Transporter Truck Tractor
- c. M917 20-Ton Dump Truck
- d. M918 Bituminous Distributor Truck
- e. M919 Concrete Mobile Mixer Truck
- f. M920 Medium Equipment Transporter Truck Tractor

Chassis Designations:

- a. Type I – Model M915
- b. Type II – Models M916 and M918
- c. Type III – Models M917, M919, and M920

1-3. MAINTENANCE FORMS, RECORDS, AND REPORTS.

Department of the Army forms and procedures used for equipment maintenance will be those prescribed by TM 38-250, The Army Maintenance Management System.

1-4. DESTRUCTION OF ARMY MATERIEL TO PREVENT ENEMY USE.

Requirements and procedures for destruction of Army materiel to prevent enemy use are given in TM 750-244-6.

1-5. ADMINISTRATIVE STORAGE.

Storage information is given in TM 740-90-1, Administrative Storage.

Section II EQUIPMENT DESCRIPTION AND DATA

1-6. PURPOSE OF EQUIPMENT.

- Model M915. Used for on-road line hauling of loads up to a gross vehicle weight rating of 50,000 lbs (22,680 Kg), 30,000 lbs (13,608 Kg) on fifth wheel.

- Model M916. Used for transporting light equipment, both on and off the road, up to a gross vehicle weight rating of 56,000 lbs (25,402 Kg), 28,000 lbs (12,700 Kg) on fifth wheel.

- Model M917. A heavy-duty, 20-ton dump truck used to haul aggregate and similar materials. Capable of operating both on and off the road, up to a gross vehicle weight rating of 75,000 lbs. Hauls 15.2 cu yds (11.62 cu m) heaped, and 19.6 cu yds (14.98 cu m) with 12 inch sideboards.

- Model M918. Used with a mounted bituminous distributor to spread 375 gallons (1,419.52 liters) of bitumen per minute at a road speed of 1.5 miles per hour (2.41 K/H).

- Model M919. Used with a mounted concrete mixer to mix and spread concrete at a maximum rate of 40 cu ft per minute. Can transport sufficient cement, sand, coarse aggregate and water to mix 8 cu yds (6.12 cu m) on-site.

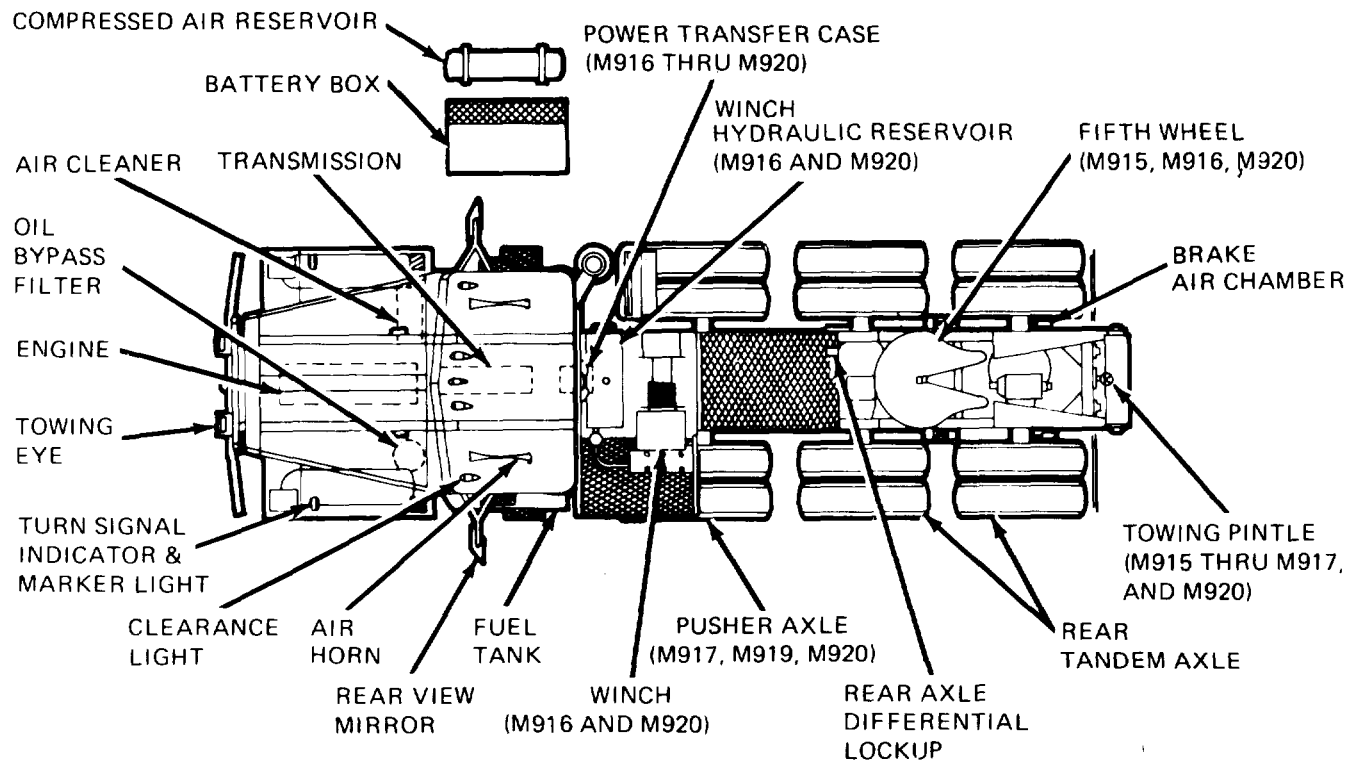
- Model M920. Used to transport medium equipment both on and off the road, up to a gross vehicle rating of 75,000 lbs (34,020 Kg), 40,000 lbs (18,144 Kg) on fifth wheel.

1-7. CAPABILITIES AND FEATURES.

- a. Interchangeable frame components (Exception: Frames for Types II and III chassis have an added 3/8-inch outer channel.)
- b. Commercial-type replacement parts for entire vehicle, available through national network of dealers and vendors.
- c. Commercial operating components that require no special maintenance procedures and a minimum of special tools:
 - (1) Six-cylinder, in-line, four-stroke, four-cycle turbocharged diesel engine.
 - (2) Semi-automatic, centrifugal clutch transmission with 16 forward and 2 reverse speeds.
 - (3) Transfer case for front wheel drive (M916 thru M920).
 - (4) Pusher axle for weight distribution (M917, M919, and M920).
 - (5) Rear tandem axle.
 - (6) Power Takeoff (PTO) for power to drive accessories (M916 thru M920).
 - (7) Winch (M916 and M920).

1-8. LOCATION OF MAJOR EXTERIOR COMPONENTS.

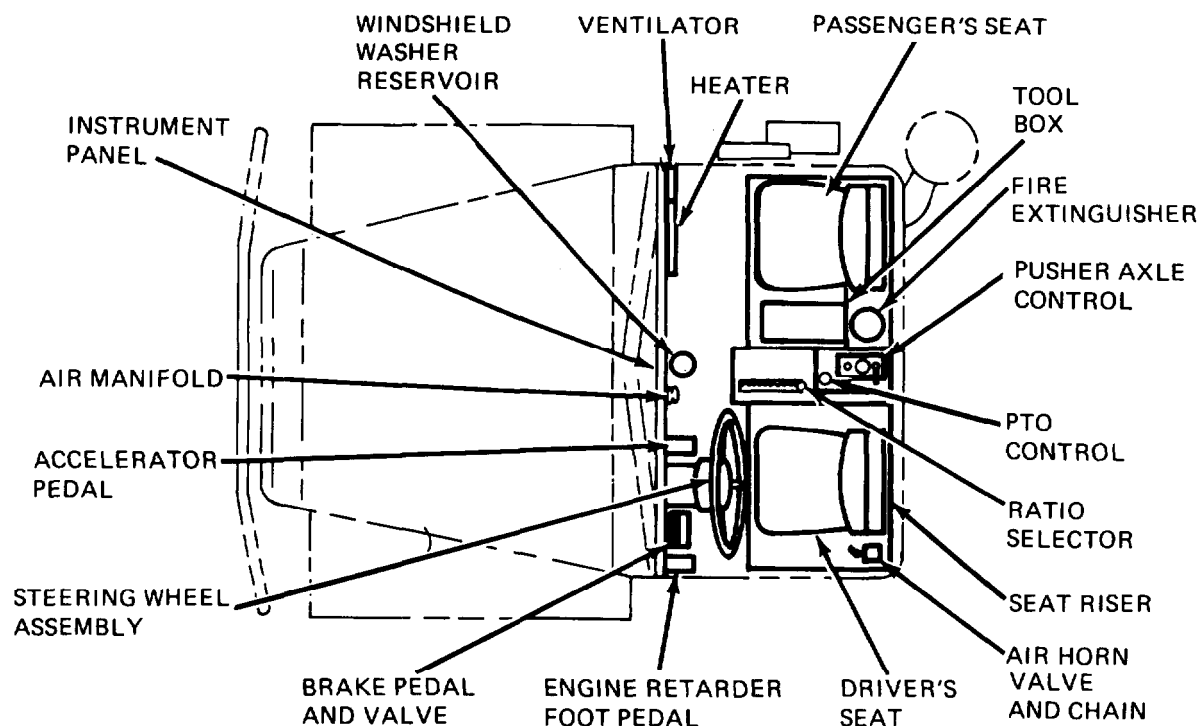
The illustration below identifies the major exterior components located on one or more models of M915 thru M920 vehicles. See table 1-1, Differences Between Models for model configuration differences and a reference to detailed information. Also see the Operator's Manual TM 9-2320-273-10.



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1-9. LOCATION OF MAJOR INTERIOR COMPONENTS.

The illustration below identifies the major interior components located on the M915 thru M920 vehicles. No identification plates, instruction plates, warranty plates, modification plates or stencils are applicable to organizational maintenance.



1-10. DIFFERENCES BETWEEN MODELS.

The major equipment and functional differences between models are given in table 1-1. For illustrations and descriptions, refer to the following:

- a. Illustration of each model (fig. 1-1).
- b. Purpose of each model (para 1-6).
- c. Differences between models (table 1-1).

Table 1-1. Differences Between Models.

EQUIPMENT/FUNCTION	VEHICLE MODEL						DESC/REF (PARA)
	M915	M916	M917	M918	M919	M920	
Type I Chassis.	X						1-2
Type II Chassis.		X		X			1-2
Type III Chassis.			X		X	X	1-2
Transfer Case.		X	X	X	X	X	2-14
Pusher Axle.			X		X	X	2-16
Driving Front Axle.		X	X	X	X	X	2-19
Spare Tire and Wheel Assembly.	X	X					10-11,10-12
Hoist for Spare.	X	X				X	—
Towing Pintle.	X	X	X			X	—
Fifth Wheel.	X	X				X	11-13
Spacer Kit for Fifth Wheel.		X				X	
Winch.		X				X	2-80
Work Lamps – Stationary.		X				X	2-48
Work Lamps – Portable.	X	X				X	5-54
Power Takeoff (PTO).		X	X	X	X	X	2-78
Hose Tender and Cable Support.	X	X				X	—
Backup Alarm.		X	X	X	X	X	—
Double Rail Frame.		X	X	X	X	X	
Front Shock Absorbers.	X						
No-Spin Differential (1)	X						
(2)		X	X	X	X	X	
Tires:							
Highway.	X						
On/Off Road.		X	X	X	X	X	
Special Bodies:							
Dump Body.			X				
Bituminous Distributor.				X			
Concrete-Mobile [®] Mixer.					X		
Auxiliary Power Steering Cylinder.		X	X	X	X	X	
Sliding Rear Window.		X				X	
Front and Rear Air Connections.	X	X				X	
Tail Roller.						X	
24V Receptacle.	X	X	X			X	

1-11. EQUIPMENT DATA.**MODEL M915 TRUCK TRACTOR****OVERALL CHARACTERISTICS:****ENGLISH****METRIC**

National Stock Number:	2320-01-028-4395	
Curb Weight:	19,630 lbs	8781 Kg
Axle Loads (Empty):		
Front Axle:	9,920 lbs	4,500 Kg
Rear Axle:	9,710 lbs	4,405 Kg
Axle Loads (with 30,000 lbs (13,608 Kg) 5th Wheel Load):		
Front Axle:	11,055 lbs	5,015 Kg
Rear Tandem:	37,660 lbs	17,083 Kg
Gross Vehicle Weight:	48,715 lbs	22,097 Kg
Gross Axle Weight Rating:		
Front Axle:	12,000 lbs	5,443 Kg
Rear Tandem:	38,000 lbs	17,236 Kg
Gross Vehicle Weight Rating:	55,000 lbs	24,941 Kg
Towed Load (M872 Trailer – 30,000 lb (13,608 Kg) on the King Pin):	86,170 lbs	39,121 Kg
Gross Combination Weight Rating:	105,000 lbs	47,627 Kg

DIMENSIONAL DATA:

Overall Length (Less Pintle Hook and Lifting Shackles):	268.50 in.	6.82 m
Overall Width (Body):	96.75 in.	2.46 m
Height (Over Horns – Empty):	114.63 in.	2.91 m
Overall Height (Over Stack-Empty):	134.63 in.	3.42 m
Cab to Axle:	86 in.	2.18 m
Bumper to Back of Cab:	119 in.	3.02 m
Bumper to Front Axle:	37.5 in.	.95 m
Wheel Base:	168.25 in.	4.30 m
Shipping Cube, Minimum:	1,674 cu ft	47.40 cu m
Tandem Axle Spacing:	52 in.	1.32 m
Tread Width:		
Front:	78.40 in.	1.99 m
Rear:	71.57 in.	1.82 m
Dual Tire Spacing:	13.75 in.	.35 m
Fifth Wheel to Rear Tandem:	8 in.	.20 m
Overall Length with M-872 Trailer:	54.92 ft	16.74 m
Angle of Approach (Loaded):	38°	38°
Minimum Turning diameter, Curb to Curb:	53.50 ft	16.31 m
Minimum Ground Clearance (Under Rear Walking Beam Bracket, Empty):	10.25 in.	.26 m
Fording Depth, Maximum:	20 in.	.51 m

PERFORMANCE:

Maximum Speed Forward (At 2,100 rpm – 16th Gear):	66.60 mph	107.16 kph
Speed on 3.9% Grade:	25 mph	40.22 kph
Maximum Grade (At GCWR):	17%	17%
Minimum Sustained Speed (At 1,300 rpm):	2.31 mph	3.72 kph
Maximum Drawbar Pull @ 0.7 Coefficient:	25,028 lbs	11,262 Kg
Maximum Side Slope (W/Adequate Tractive Surface):	10%	10%

1-11. EQUIPMENT DATA (Continued).**MODEL M916 TRUCK TRACTOR****OVERALL CHARACTERISTICS:**

	ENGLISH	METRIC
National Stock Number:	2320-01028-4396	
Curb Weight:	27,500 lbs	12,474 Kg
Axle Loads (Empty):		
Front Axle :	13,370 lbs	6,065 Kg
Rear Axle:	14,130 lbs	6,409 Kg
Axle Loads (with 25,588 lbs (11,606 Kg) 5th Wheel Load):		
Front Axle:	14,570 lbs	6,609 Kg
Rear Tandem:	40,930 lbs	18,566 Kg
Gross Vehicle Weight:	55,500 lbs	25,174 Kg
Gross Axle Weight Rating:		
Front Axle:	14,860 lbs	6,740 Kg
Rear Tandem:	52,160 lbs	23,659 Kg
Gross Vehicle Weight Rating:	56,000 lbs	25,402 Kg
Towed Load (M172A1 Trailer – 25,588 lbs (11,606 Kg) on the King Pin):	78,500 lbs	35,639 Kg
Gross Combination Weight Rating:	106,000 lbs	48,082 Kg

DIMENSIONAL DATA:

Overall Length (Less Pintle Hook and Lifting Shackle):	294.30 in.	7.48 m
Overall Width (Body):	96.75 in.	2.46 m
Height (Over Horns – Empty):	128.00 in.	3.25 m
Overall Height (Over Stack – Empty):	142.00 in.	3.61 m
Cab to Axle:	105 in.	2.67 m
Bumper to Back of Cab:	124 in.	3.15 m
Bumper to Front Axle:	43 in.	1.09 m
Wheel Base:	186 in.	4.72 m
Shipping Cube, Minimum:	2,212 cu ft	62.64 cu m
Tandem Axle Spacing:	56 in.	1.42 m
Tread Width:		
Front:	77.90 in.	1.98 m
Rear:	72.70 in.	1.85 m
Dual Tire Spacing:	13.75 in.	.349 m
Fifth Wheel to Rear Tandem:	8 in.	.20 m
Overall Length with M172A1 Trailer:	58.66 ft	17.88 m
Angle of Approach (Loaded):	42°	42°
Minimum Turning Diameter, Curb to Curb:	80 ft	24.40 m
Minimum Ground Clearance (Under Rear Walking Beam Bracket, Empty):	11.62 in.	.29 m
Fording Depth, Maximum:	20 in.	.51 m

PERFORMANCE:

Maximum Speed (Forward (At 2100 rpm – 16th Gear):	59 mph	94.93 kph
Speed on 3.9% Grade:	25 mph	40.22 kph
Maximum Grade (At GCWR):	25%	25%
Minimum Sustained Speed (At 1300 rpm):	2.23 mph	3.59 kph
Maximum Drawbar Pull @ 0.7 Coefficient:	47,725 lbs	20,576 Kg
Maximum Side Slope (W/Adequate Tractive Surfaces):	10%	10%

1-11. EQUIPMENT DATA (Continued).**MODEL M917 DUMP TRUCK CHASSIS**

OVERALL CHARACTERISTICS:	ENGLISH	METRIC
National Stock Number:	3805-01-028-4389	
Curb Weight:	34,080 lbs	15,459 Kg
Axle Loads (Empty):		
Front Axle:	18,670 lbs	8,469 Kg
Rear Axle:	15,360 lbs	6,967 Kg
Axle Loads (with 40,000 lbs (18,144 kg) Payload):		
Front Axle:	10,980 lbs	4,890 Kg
Rear Tandem:	44,200 lbs	20,049 Kg
Pusher Axle:	20,000 lbs	9,072 Kg
Gross Vehicle Weight:	74,980 lbs	34,011 Kg
Gross Axle Weight Rating:		
Front Axle:	14,860 lbs	6,740 Kg
Rear Tandem:	52,160 lbs	23,659 Kg
Pusher:	20,000 lbs	9,072 Kg
Gross Vehicle Weight Rating:	75,000 lbs	34,019 Kg
DIMENSIONAL DATA:		
Overall Length (Less Pintle Hook and Lifting Shackle):	350.60 in.	8.90 m
Overall Width (Body):	96.75 in.	2.46 m
Overall Height (Over Cab Protector):	141 in.	3.60 m
Cab to Axle:	130 in.	3.30 m
Bumper to Back of Cab:	124 in.	3.15 m
Bumper to Front Axle:	43 in.	1.09 m
Wheel Base:	211 in.	5.36 m
Shipping Cube, Minimum:	2,804 cu ft	79.40 cu m
Tandem Axle Spacing:	56 in.	1.42 m
Tread Width:		
Front:	77.90 in.	1.98 m
Pusher:	72.70 in.	1.95 m
Rear:	72.70 in.	1.85 m
Pusher Axle to Rear Tandem Forward Axle:	54 in.	1.37 m
Dual Tire Spacing (6.88 in. (.17 m) between each dual):	13.75 in.	.35 m
Angle of Approach (Loaded):	42°	42°
Minimum Turning Diameter, Curb to Curb:	89.50 ft	27.30 m
Minimum Ground Clearance (Under Rear Walking Beam Bracket, Empty):	12 in.	.30 m
Fording Depth, Maximum:	20 in.	.51 m
PERFORMANCE:		
Maximum Speed Forward (At 2100 rpm – 16th Gear):	59 mph	94.93 kph
Speed on 3.9% Grade:	25 mph	40.22 kph
Maximum Grade (At GCWR):	25%	25%
Minimum Sustained Speed (At 1300 rpm):	2.23 mph	3.59 kph
Maximum Side Slope (W/Adequate Tractive Surface):	10%	10%

1-11. EQUIPMENT DATA (Continued).**MODEL M918 BITUMINOUS DISTRIBUTOR TRUCK CHASSIS****OVERALL CHARACTERISTICS:****ENGLISH****METRIC**

National Stock Number:	3895-01-028-4390	
Curb Weight:	30,280 lbs	13,735 Kg
Axle Loads (Empty):		
Front Axle:	11,980 lbs	5,434 Kg
Rear Axle:	19,300 lbs	8,754 Kg
Axle Loads (with 13,483 lbs (6,116 Kg) Payload):		
Front Axle:	12,520 lbs	5,679 Kg
Rear Tandem:	30,760 lbs	13,953 Kg
Gross Vehicle Weight:	43,280 lbs	19,632 Kg
Gross Axle Weight Rating:		
Front Axle:	14,860 lbs	6,740 Kg
Rear Tandem:	52,160 lbs	23,659 Kg
Gross Vehicle Weight Rating:	56,000 lbs	25,402 Kg

DIMENSIONAL DATA:

Overall Length:	350.60 in.	8.90 m
Overall Width (Body):	96.75 in.	2.46 m
Height (Over Horns – Empty):	128 in.	3.25 m
Overall Height (Over Stack – Empty):	142.0 in.	3.61 m
Cab to Axle:	105 in.	2.67 m
Bumper to Back of Cab:	124 in.	3.15 m
Bumper to Front Axle:	43 in.	1.09 m
Wheel Base:	186 in.	4.72 m
Shipping Cube, Minimum:	2,544 cu ft	72.04 cu m
Tandem Axle Spacing:	56 in.	1.42 m
Thread Width:		
Front:	77.90 in.	1.98 m
Rear:	72.70 in.	1.85 m
Dual Tire Spacing:	13.75 in.	.35 m
Angle of Approach (Loaded):	42°	42°
Minimum Turning Diameter, Curb to Curb:	80 ft	24.40 m
Minimum Ground Clearance (Under Rear Walking Beam Bracket, Empty):	11.62 in.	.29 m
Fording Depth, Maximum:	20 in.	.51 m

PERFORMANCE:

Maximum Speed Forward (At 2100 rpm – 16th Gear):	59 mph	94.93 kph
Speed on 3.9% Grade:	25 mph	40.22 kph
Maximum Grade (At GCWR)	25%	25%
Minimum Sustained Speed (At 1300 rpm):	2.23 mph	3.59 kph
Maximum Side Slope (W/Adequate Tractive Surface):	10%	10%

1-11. EQUIPMENT DATA (Continued).**MODEL M919 CONCRETE MOBILE MIXER TRUCK CHASSIS**

OVERALL CHARACTERISTICS:	ENGLISH	METRIC
National Stock Number:	3895-01-028-4391	
Curb Weight:	37,540 lbs	17,028 Kg
Axle Loads (Empty):		
Front Axle:	14,280 lbs	6,477 Kg
Rear Axle:	23,260 lbs	10,551 Kg
Axle Loads (with 36,500 lbs (16,556 Kg) Payload):		
Front Axle:	9,210 lbs	4,178 Kg
Rear Tandem:	43,880 lbs	19,904 Kg
Pusher Axle:	20,000 lbs	9,072 Kg
Gross Vehicle Weight:	73,090 lbs	33,154 Kg
Gross Axle Weight Rating:		
Front Axle:	14,860 lbs	6,740 Kg
Rear Tandem:	52,160 lbs	23,659 Kg
Pusher:	20,000 lbs	9,072 Kg
Gross Vehicle Weight Rating:	75,000 lbs	34,019 Kg
DIMENSIONAL DATA:		
Overall Length:	374.40 in.	9.51 m
Overall width (Body):	96.75 in.	2.46 m
Height (Over Horns – Empty):	128 in.	3.25 m
Overall Height (Over Stack – Empty):	142.0 in.	3.61 m
Cab to Axle:	130 in.	3.30 m
Bumper to Back of Cab:	124 in.	3.15 m
Bumper to Front Axle:	43 in.	1.09 m
Wheel Base:	211 in.	5.36 m
Shipping Cube, Minimum:	2,716 cu ft	76.91 cu m
Tandem Axle Spacing:	56 in.	1.42 m
Tread Width:		
Front:	77.90 in.	1.98 m
Pusher:	72.70 in.	1.85 m
Rear:	72.70 in.	1.85 m
Pusher Axle to Rear Tandem Forward Axle:	54 in.	1.37 m
Dual Tire Spacing (6.88 in. (.17 m) between each dual):	13.75 in.	.35 m
Angle of Approach (Loaded):	42°	42°
Minimum Turning Diameter, Curb to Curb:	89.50 ft	27.30 m
Minimum Ground Clearance (Under Rear Walking Beam Bracket, Empty):	12 in.	.30 m
Fording Depth, Maximum:	20 in.	.51 m
PERFORMANCE:		
Maximum Speed Forward (At 2100 rpm – 16th Gear):	59 mph	94.93 kph
Speed of 3.9% Grade:	25 mph	40.22 kph
Maximum Grade (At GCWR):	25%	25%
Minimum Sustained Speed (At 1300 rpm):	2.23 mph	3.59 kph
Maximum Side Slope (W/Adequate Tractive Surface):	10%	10%

1-11. EQUIPMENT DATA (Continued).**MODEL M920 TRUCK TRACTOR****OVERALL CHARACTERISTICS:****ENGLISH****METRIC**

National Stock Number:	2320-01-028-4397	
Curb Weight:	30,270 lbs	13,730 Kg
Axle Loads (Empty):		
Front Axle:	14,700 lbs	6,668 Kg
Rear Axle:	15,570 lbs	7,063 Kg
Axle Loads (with 40,000 lbs (18,144 Kg) 5th Wheel Load):		
Front Axle:	8,870 lbs	4,023 Kg
Rear Tandem:	46,010 lbs	20,870 Kg
Pusher Axle:	30,000 lbs	9,072 Kg
Gross Vehicle Weight:	74,880 lbs	33,965 Kg
Gross Axle Weight Rating:		
Front Axle:	14,860 lbs	6,740 Kg
Rear Tandem:	52,160 lbs	23,659 Kg
Pusher:	20,000 lbs	9,072 Kg
Gross Vehicle Weight Rating:	75,000 lbs	34,019 Kg
Towed Load (M-870 Trailer – 40,000 lbs (18,144 Kg) on the King Pin):	99,730 lbs	45,277 Kg
Gross Combination Weight Rating:	130,000 lbs	58,968 Kg

DIMENSIONAL DATA:

Overall Length:	319.30 in.	8.11 m
Overall Width (Body):	96.75 in.	2.46 m
Height (Over Horns – Empty):	128 in.	3.25 m
Overall Height (Over Stack – Empty):	142 in.	3.61 m
Cab to Axle:	130 in.	3.30 m
Bumper to Back of Cab:	124 in.	3.15 m
Bumper to Front Axle:	43 in.	1.09 m
Wheel Base:	211 in.	5.36 m
Shipping Cube, Minimum:	2,317 cu ft	65.61 cu m
Tandem Axle Spacing:	56 in.	1.42 m
Tread Width:		
Front:	77.90 in.	1.98 m
Pusher:	72.70 in.	1.85 m
Rear:	72.70 in.	1.85 m
Pusher Axle to Rear Tandem Forward Axle:	54 in.	1.37 m
Dual Tire Spacing (6.88 in. (.17 m) Between each Dual):	13.75 in.	.35 m
Fifth Wheel to Rear Tandem:	8 in.	.20 m
Overall Length with M-870 Trailer:	60.75 ft	18.52 m
Angle of Approach (Loaded):	42°	42°
Minimum Turning Diameter, Curb to Curb:	89.50 ft	27.30 m
Minimum Ground Clearance (Under Rear Walking Beam Bracket, Empty):	11.62 in.	.29 m
Fording Depth, Maximum:	20 in.	.51 m

PERFORMANCE:

Maximum Speed Forward (At 2100 rpm – 16th Gear):	59 mph	94.93 kph
Maximum Speed on 3.9% Grade:	25 mph	40.22 kph
Maximum Grade (At GCWR):	25%	25%
Minimum Sustained Speed (At 1300 rpm):	2.23 mph	3.59 kph
Maximum Drawbar Pull @ 0.7 Coefficient:	47,403 lbs	21,501 Kg
Maximum Side Slope (W/Adequate Tractive Surface):	10%	10%

1-11 EQUIPMENT DATA (Continued).

CAB (ALL MODELS)	
Make: Type:	AM General. 2-passenger, all-steel with butterfly hood.
ENGINE (ALL MODELS)	
Make/Model/Type: Displacement: Compression Ratio: Horsepower – Gross: Torque - Gross: Lube Capacity: Coolant Capacity: Governed Speed: Retarder (Integral with Engine): Make/Model:	Cummins Diesel/NTC-400/6 -cylinder, 4 cycle. 855 cu in. (14 liters). 13.5:1. 400 @ 2100 rpm (298 Kw @ 2100 RPM). 1150 lb-ft @ 1500 RPM (1559 N•m @ 1500 RPM). 46 qts (43.5 liters). 17.25 gal (65.3 liters). 2100 rpm. Jacobs/130
TRANSMISSION (ALL MODELS)	
Make/Model/Type: Number of Gears: Ratios: 1st 2nd 3rd 4th 5th 6th 7th 8th 9th 10th 11th 12th 13th 14th 15th 16th Reverse Reverse	Caterpillar/D7155/Semi-Automatic 16 Forward, 2 Reverse. 14.77 12.21 10.07 8.33 6.89 5.70 4.70 3.89 3.14 2.60 2.14 1.77 1.47 1.21 1.00 .83 14.77 8.33
Shift: Remote – Air Control – Power Shift Lube Capacity: Weight, Net Dry (Approx) Including Control:	5.5 gal (20.8 liters). 1,090 lbs (494.86 Kg).

1-11. EQUIPMENT DATA (Continued).

TRANSFER CASE (MODELS M916 THROUGH M920)	
Make/Model: Ratio: Torque Capacity: Torque Proportioning – Front/Rear: Lock-Up – Front Axle: Lube Capacity:	Oshkosh/1,800 series F-U29. 1:1. 15,155 lb-ft (20,550 Nžm). 1:1 When Engaged. Air Operated. 5 qts (4.48 liters).
AXLES (MODEL M915)	
Front: Make/Model/Type: Rated Capacity: Steer Angle: Rear Tandem: Make/Model: Ratio: Rated Capacity (Tandem): Inter-Axle Differential: Lock-Up: Axle Differential – Forward/Rear Make/Type: Rear/Rear Make/Type: Lubrication: Lube Capacity – Forward/Rear:	Rockwell/F-F931/I-Beam. 12,000 lbs (5448 Kg). 32°. Rockwell/SQHP. 4.44:1. 38,000 lbs (17,252 Kg). Bevel Gear. Air Control. Detroit Automotive/No-Spin. Rockwell/Bevel Gear. Pressure. 40/36 pts (19/17 liters).
AXLES (MODELS M916 AND M918)	
Front: Make/Model/Type: Ratio: Rated Capacity: Steer Angle: Rear Tandem: Make/Type: Ratio: Rated Capacity (Tandem): Inter-Axle Differential: Lock-Up: Axle Differential Make/Type: Lubrication: Lube Capacity – Forward/Rear:	Rockwell/FDS/1807/Hypoid. 6.17:1. 20,000 lbs (9,080 Kg). 28°. Rockwell/SUHD 6.17:1. 58,000 lbs (26,332 Kg). Bevel Gear. Air Operated. Detroit Automotive/No-Spin. Pressure. 34/28 pts (16/13.2 liters).

1-11. EQUIPMENT DATA (Continued).

AXLES (MODELS M917, M919, AND M920)	
Front: Make/Type/Model: Ratio: Rated Capacity: Steer Angle: Pusher: Type: Rated Capacity: Singles/Duals: Rear Tandem: Make/Model: Ratio: Rated Capacity (Tandem): Inter-Axle Differential: Lock-Up: Axle Differential Make/Type: Lubrication: Lube Capacity – Forward/Rear:	Rockwell/Hypoid FDS-1807. 6.17:1. 20,000 lbs (9,080 Kg). 28 degrees. Rockwell/Granning. 20,000 lbs (9,080 Kg). Duals. Rockwell/SUHD. 6.17:1. 58,000 lbs (26,332 Kg). Bevel Gear. Air Operated. Detroit Automotive/No-Spin. Pressure. 34/28 pts (16.08/13.25 liters).
SUSPENSION (MODEL M915)	
Front: Make/Type: Rate: Static Deflection: Rear Tandem: Make/Model/Type: Static Deflection:	Rockwell/Asymmetrical Leaf Pin & Shackle. 1,861 lbs/in. (332.3 Kg/cm). 2.73 in. (6.93 cm). Hendrickson/RTE 380/Walking Beam-Steel Leaf. .97 in. (2.46 cm).
SUSPENSION (MODEL M916)	
Front: Make/Type: Rate: Static Deflection: Rear Tandem: Make/Model/Type: Static Deflection:	Rockwell/Asymmetrical Leaf Pin & Shackle. 3,245 lbs/in. (580 Kg/cm). 1.94 in. (4.93 cm). Hendrickson/RT 450/Walking Beam-Steel Leaf. 2.85 in. (7.24 cm).

1-11. EQUIPMENT DATA (Continued).

SUSPENSION (MODEL M917)	
Front: Make/Type: Rate: Static Deflection: Pusher: Make/Model/Type: Raising System: Rear Tandem: Make/Model/Type: Static Deflection:	Rockwell/Asymmetrical Leaf Pin & Shackle. 3,245 lbs/in. (580 Kg/cm). 2.11 in. (5.36 cm). Granning/T-500 AP/Trailing Arm Non-Linear (503 lbs/in.) (85.2 Kg/cm). External Positive Pneumatic. Hendrickson/RT 450/Walking Beam-Steel Leaf. 2.38 in. (6.04 cm).
SUSPENSION (MODEL M918)	
Front: Make/Type: Rate: Static Deflection: Rear Tandem: Make/Model/Type: Static Deflection:	Rockwell/Asymmetrical Leaf Pin & Shackle. 3,245 lbs/in. (580 Kg/cm). 2.26 in. (5.74 cm). Hendrickson/RT 450/Walking Beam-Steel Leaf. 4.6 in. (11.68 cm).
SUSPENSION (MODELS M919 AND M920)	
Front: Make/Type: Rate: Static Deflection: Pusher: Make/Model/Type: Raising System: Rear Tandem: Make/Model/Type: Static Deflection:	Rockwell/Asymmetrical Leaf Pin & Shackle. 3,245 lbs/in. (980 Kg/cm). 2.11 in. (5.36 cm). Granning/T-500 AP/Trailing Arm Non-Linear (503 lbs/in.) (85.2 Kg/cm). External Positive Pneumatic. Hendrickson/RT 450/Walking Beam-Steel Leaf. 2.00 in. (5.08 cm).
WHEELS (MODEL M915)	
All Positions - Make/Model: Size – Dia x Rim Width: Number of Studs/Bolt Circle: Stud Size: Offset/Dual Spacing: Rated Capacity:	Budd/47890-3. 20.00 x 8 in. (508 x 203 mm). 10/11.25 in. (10/28.6 cm). 1.125 in. Grade 8 (2.86 cm). 6.88/13.75 in. (17.5/35 cm). 7,280 lbs (3,305 Kg).

1-11. EQUIPMENT DATA (Continued).

WHEELS (MODELS M916 AND M918)	
All Positions - Make/Model: Size - Dia x Rim Width: Number of Studs/Bolt Circle: Stud Size: Offset/Dual Spacing: Rated Capacity:	Budd/R49210. 24.00 x 8 in. (610 x 203 mm). 10/11.25 in. (10/28.6 cm). 1.125 in. Grade 8 (2.86 cm). 6.88/13.75 in. (17.5/35 cm). 7,430 lbs (3.373 Kg).
WHEELS (MODELS M917, M919 AND M920)	
All Positions - Make/Model: Size - Dia x Rim Width: Number of Studs/Bolt Circle: Stud Size: Offset/Dual Spacing: Rated Capacity:	Budd/R49210. 24.00 x 8 in. (610 x 203 mm). 10/11.25 in. (10/28.6 cm). 1.125 in. Grade 8 (2.86 cm). 6.88/13.75 in. (17.5/35 cm). 7,430 lbs (3.373 Kg).
TIRES (MODEL M915)	
All Positions – Make/Model: Size: Type: Load Range/Ply Rating: Static Loaded Radius: Rated Capacity – Single/Dual:	10.00 x 20 in. (254 x 508 mm). Bias Ply - On-Highway. G/14. 19.6 in. (49.8 cm). 6,040/5,300 lbs (2742/2406 Kg).
TIRES (MODELS M916 THROUGH M920)	
All Positions – Make/Model: Size: Type: Load Range/Ply Rating: Static Loaded Radius: Rated Capacity – Single/Dual:	11.00 x 24 in. (279 x 610 cm). Bias Ply – On/Off Highway. G/14. 22.5 in. (57.1 cm). 7,430/6,520 lbs (3,373/2,936 Kg).

1-11. EQUIPMENT DATA (Continued).

BRAKES (MODELS M917, M918, AND M920)	
Service: Front Axle: Dia x Width: Pusher Axle: Dia x Width: Rear Tandem: Dia x Width: Parking: Type: Location: Actuation:	Rockwell – Air Actuated 16 sq in. (Actuator) – Wedge 17 x 6 in. (48.18 x 15.24 cm). 36 sq in. (Actuator) – “S” Cam 16.5 x 7 in. (47.72 x 17.78 cm). 30 sq in. (Actuator) – “S” Cam 16.5 x 7 in. (41.91 x 17.78 cm) Spring Chamber Rear Tandems Air Exhaust
FIFTH WHEEL (MODEL M915)	
Make/Model: Type: Rated Capacity: King Pin Size: Pitch – Forward/Aft:	Holland/3600-102-LH 36 in. (91.4 cm) Dia – Single Oscillating 40,000 lbs (18,160 Kg) Vert 150,000 lbs (68,100 Kg) Drawbar 2.0 in. (5.08 cm) 15/10°
FIFTH WHEEL (MODELS M916 AND M920)	
Make/Model: Type: Rated Capacity: King Pin Size: Pitch – Forward/Aft:	Holland/FW-70-0-15 36 in. (91.4 cm) Dia – Single Oscillating 70,000 lbs (31,780 Kg) Vert 200,000 lbs (90,800 Kg) Drawbar 3.5 in. (8.9 cm) 15/19°
PINTLE (MODELS M915, M916, M917 AND M920)	
Make/Type: Rated Capacity:	Holland/NO. 760 30 ton (27.2 metric ton)

1-11. EQUIPMENT DATA (Continued)

STEERING (MODELS M915 THROUGH M920)

Gear – Make/Type: Model: Ratio: Auxiliary Cylinder Make/Model: Piston Diameter: Wheel: Diameter: Pump Make/Type: Model: Flow Rates:	Ross/Integral Power HFB-70033 23.4:1 Ross/C44538 2.80 in. (7.1 1 cm) Sheller Globe 20 in. (50.8 cm) Eaton/Gear Driven ERS-15867-1 3.35 GPM (12.68 liters min) @ 600 RPM + 1200 psi 7.0/8.0 GPM (26.49/30.28 liters) @ 3000 RPM + 50 psi

BRAKES (MODEL M915)

Make/Type: Service: Front Axle: Dia x Width: Rear Tandem: Dia x Width: Parking: Make/Type: Location: Actuation:	Rockwell – Air Actuated 9 sq in. (Actuator) – Wedge 15 x 5 in. (38.1 x 12.7 cm) 30 sq in. (Actuator) - “S” Cam 16.5 x 7 in. (41.9 x 17.8 cm) Anchorlock – Spring Chamber Rear Tandems Air Exhaust

BRAKES (MODELS M916 AND M918)

Service: Front Axle: Dia x Width: Rear Tandem: Dia x Width: Parking: Make/Model: Location: Actuation:	Rockwell – Air Actuated 16 sq in. (Actuator) – Wedge 17 x 6 in. (43.2 x 15.2 cm) 30 sq in. (Actuator) – “S” Cam 16.5 x 7 in. (41.9 x 17.8 cm) Anchorlock Spring Chamber Rear Tandems Air Exhaust

1-11. EQUIPMENT DATA (Continued).

FRAME (MODEL M915)	
Type: Channel Section: Section Modulus: Overall Width:	Steel-Heat Treat-Bolted- 110,000 psi (758,450 kPa) 10,625 in. x 3.25 in. x .38 in. (28.99 cm x 8.25 cm x .7 cm) 17.7 cu in. (290 cm ³) 34 in. (86.4 cm)
FRAME (MODELS M916 THROUGH M920)	
Type: Channel Section: Auxiliary Section (Wrapper): Section Modulus: Overall Width:	Steel-Heat Treated-Bolted- 110,000 psi (758,450 kPa) 10.625 in. x 3.25 in. x .38 in. (28.99 cm x 8.25 cm x .7 cm) 11.50 in. x 3.625 in. x .38 in. 38.04 cu in. (623.36 cm ³) 34 in. (86.4 cm)
WINCH (MODELS M916 AND M920)	
Make/Model: Type: Capacity:	DPMFG/4045 Hydraulic Planetary 45,000 lbs (20411.64 Kg)
ELECTRICAL SYSTEM (ALL MODELS)	
Type: Batteries Make/Model/Type: Number/Volts: Alternator Make/Model: Volts/Amps: Starter: Make/Model: Volts:	Basic 12V-w/24V Starting Delco Remy/1200 Series/ Maintenance Free 4/12V Leece-Neville/2500JB 12/24V/85 Amps Leece-Neville/7406 MA Series 24V

CHAPTER 2

PRINCIPLES OF OPERATION

2-1. OVERVIEW.

This chapter explains the functioning of chassis components you will be maintaining at the Organizational level, and how these components relate to each other. The explanation is broken down into the following sections:

- a. Truck/Tractor Chassis (para 2-2 thru 2-5).
- b. Engine (para 2-6, 2-7).
- c. Engine Controls (para 2-8 thru 2-10).
- d. Transmission and Controls (para 2-11, 2-12).
- e. Power Transfer Case and Rear Axle Differential Lockup (para 2-13, 2-14).
- f. Pusher Axle and Controls (para 2-15, 2-16).
- g. Front Axle and Suspension (para 2-17 thru 2-19).
- h. Rear Axle (para 2-20 thru 2-22).
- i. Fuel and Air Intake System (para 2-23 thru 2-25).
- j. Engine Oil System (para 2-26 thru 2-28).
- k. Exhaust System (para 2-29, 2-30).
- l. Cooling System (para 2-31 thru 2-33).
- m. Relays, Circuit Breakers, and Wire Identification (para 2-34 thru 2-36).
- n. Starting and Starting Control System (para 2-37, 2-38).
- o. Ether Quick-Start (para 2-39, 2-40).
- p. Batteries and Power Generating System (para 2-41, 2-42).
- q. Service Lighting System (para 2-43 thru 2-49).
- r. Blackout Lighting System (para 2-50, 2-51).
- s. Instrumentation (para 2-52).
- t. Electric Horn (para 2-53, 2-54).
- u. Cab Heating and Ventilating Systems (para 2-55 thru 2-58).
- v. Compressed Air System (para 2-59, 2-60).
- w. Brake System (para 2-61 thru 2-70).
- x. Auxiliary Air-Powered Systems (para 2-71 thru 2-74).
- y. Steering System (para 2-75, 2-76).
- z. Power Takeoff (para 2-77, 2-78).
- aa. Winch (para 2-79, 2-80).
- bb. Winterization Kit (para 2-81, 2-82).

2-1. OVERVIEW (Continued).

You can find other basic information about the M915, M916, and M920 Truck Tractors and Chassis for the M917, M918, and M919 in:

- a. Chapter 5, section II (Circuit Descriptions).
- b. Appendix D (Schematic Diagrams).
- c. TM 9-2320-273-10 (Operating Instructions for the M915, M916, and M920 Truck Tractors and Chassis for the M917, M918, and M919).

Section I TRUCK/TRACTOR CHASSIS

2-2. INTRODUCTION.

Following is a description of the basic chassis and cab and illustrations of the power train. You will find detailed descriptions of the major components shown in subsequent sections in this chapter.

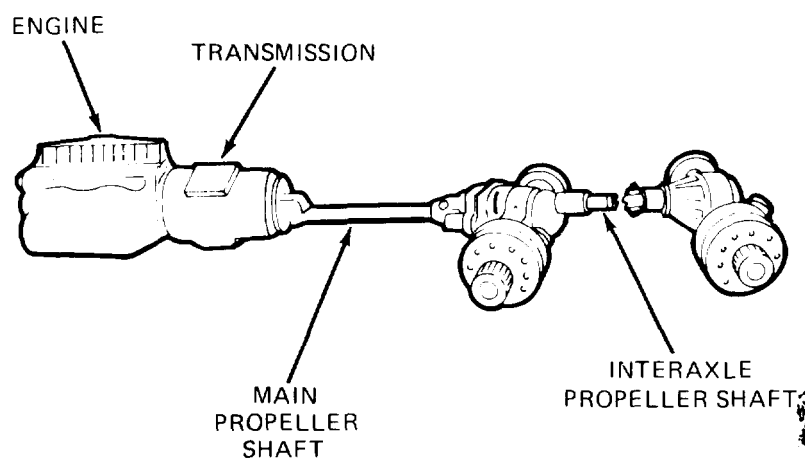
2-3. BASIC CHASSIS AND CAB.

The basic chassis and cab for all M915 thru M920 vehicles is the Crane Carrier Corporation Centaur Model T3824. Three frame types are used, each designated by its corresponding chassis.

- a. Type I for Model M915 (6 x 4 tractor).
- b. Type II for Model M916 (6 x 6 tractor).
- c. Type II for Model M918 (6 x 6 bituminous distributor).
- d. Type III for Model M917 (8 x 6 dump truck).
- e. Type III for Model M919 (8 x 6 Concrete-Mobile® mixer).
- f. Type III for Model M920 (8 x 6 tractor).

The same basic frame is used for each type design. Type II and Type III frames differ from Type I frame by the addition of a 3/8-inch outer channel. The designations given above (6 x 4, 6 x 6 and 8 x 6) refer to the number of wheel positions on the vehicle (first digit) and number of drive wheel positions (second digit). For example: 6 x 4 indicates six wheel positions (inside wheels on rear axles are not counted), and four driving wheel positions.

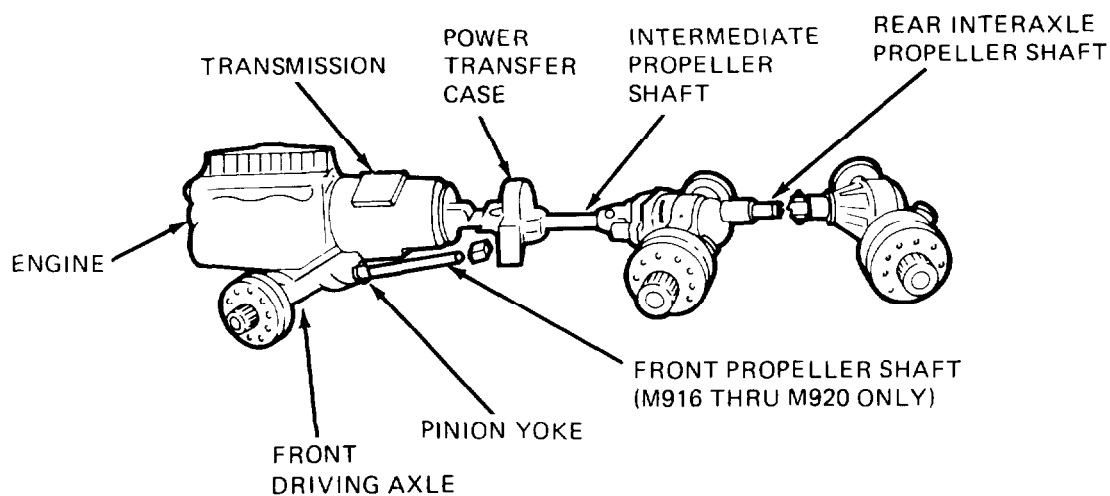
2-4. POWER TRAIN M915.



2-5. POWER TRAIN – M916 thru M920.

NOTE

Pusher Axle (not shown) on Models M917, M919, and M920 is non-driving unit.



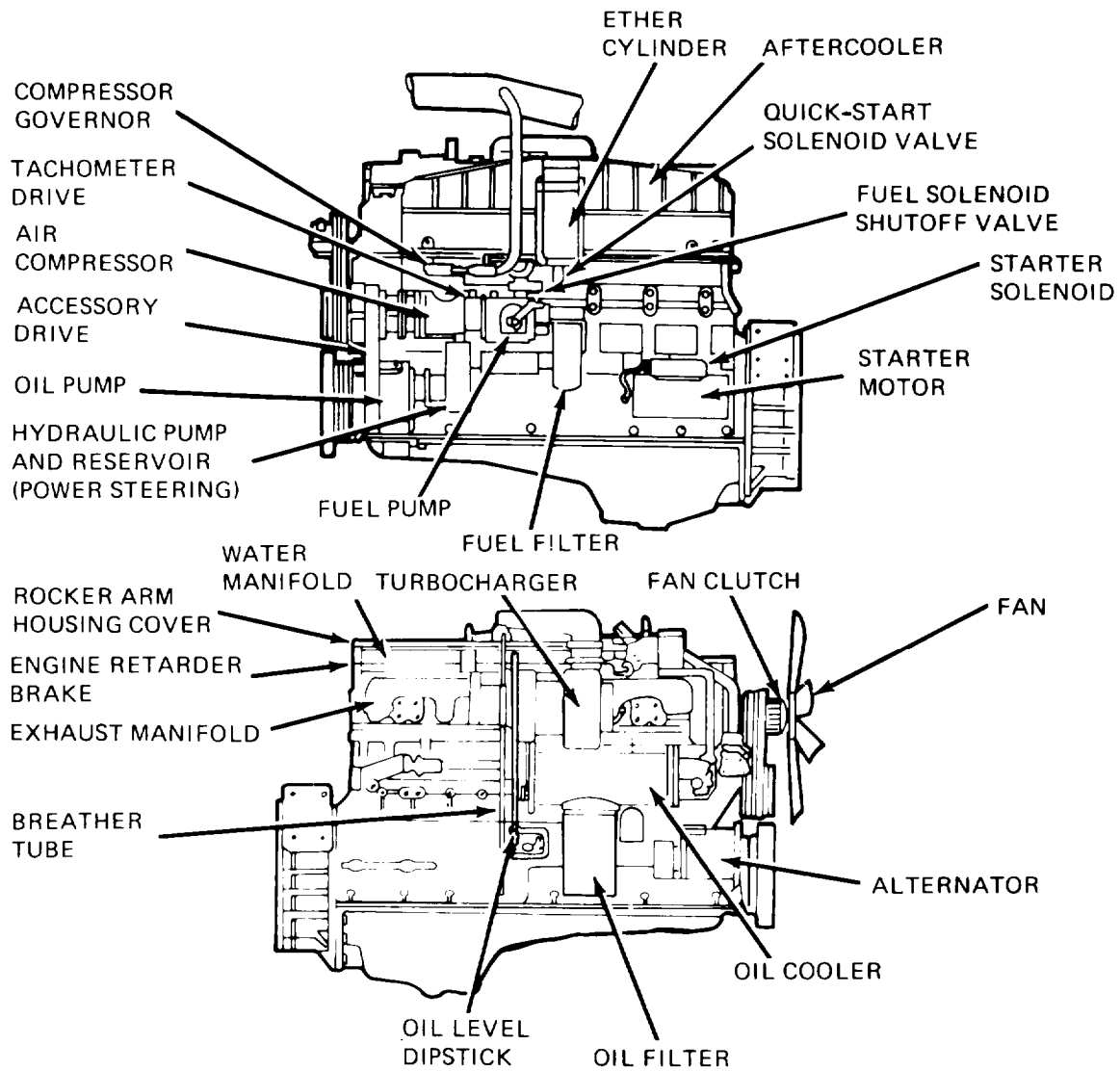
Section II ENGINE

2-6. INTRODUCTION.

The Cummins NTC-400 Engine is used on all M915 thru M920 vehicles. It is an inline, six-cylinder, four-stroke, four-cycle, turbocharged diesel engine. The engine is common to other production truck diesel engines, without special operating or maintenance requirements. This section provides you with illustrations that identify major exterior components. See one of the following associated engine systems in this chapter for details:

- a.* Engine Controls (section III).
- b.* Fuel and Air Intake System (section IX).
- c.* Engine Oil System (section X).
- d.* Exhaust System (section XI).
- e.* Cooling System (section XII).
- f.* Starting and Starting Control System (section XIV).
- g.* Ether Quick-Start System (section XV).
- h.* Batteries and Power Generating System (section XVI).

2-7. ENGINE EXTERIOR COMPONENTS.



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Section III ENGINE CONTROLS

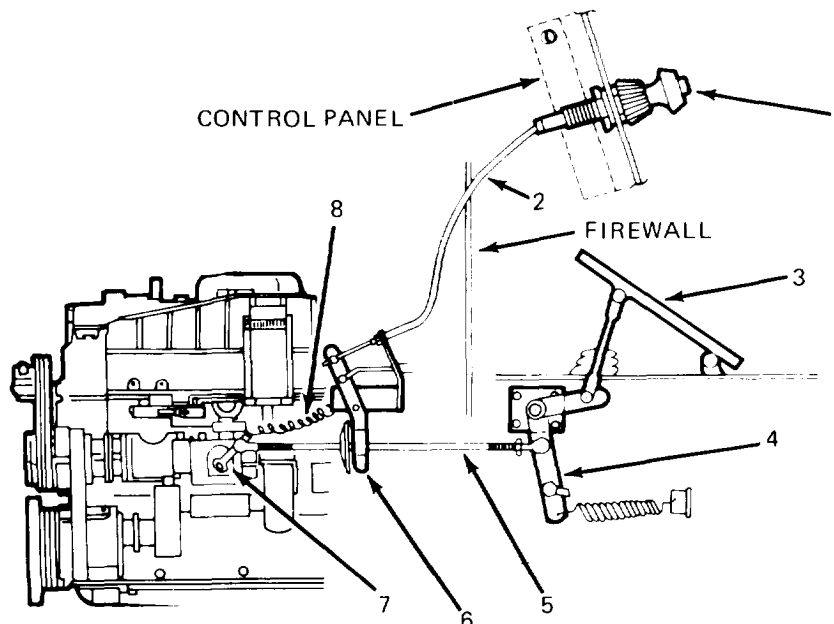
2.8. INTRODUCTION.

Cab engine controls for all M915 thru M920 vehicles are identical. Special body engine speed controls for models M917, M918, and M919 are described in the following manuals:

- a. M917 Dump Truck – TM 5-3805-274-24 & P.
- b. M918 Bituminous Distributor – TM 5-3895-371-24 & P.
- c. M919 Concrete - Mobil®Mixer – TM 5-3895-372-20.

2.9. ENGINE SPEED CONTROLS.

1. HAND THROTTLE. Allows manual control of engine rpm. Throttle motion is transferred by cable to engine mounted pivot lever (6).
2. THROTTLE CABLE. Flex cable from hand throttle to engine mounted pivot lever (6).
3. ACCELERATOR PEDAL. Connected by mechanical linkage to under cab pivot lever (4).
4. PIVOT LEVER. Mechanical linkage that connects accelerator pedal to accelerator rod.
5. ACCELERATOR ROD. Connects accelerator pedal and throttle linkage to accelerator lever on fuel pump.
6. ENGINE MOUNTED PIVOT LEVER. This lever connects the under dash hand throttle cable (ALL) and the winch throttle cable (M916 and M920) to the accelerator rod.
7. ACCELERATOR LEVER. This lever *controls the flow of fuel through the fuel pump thus setting engine speed.*
8. FUEL CONTROL RETURN SPRING. Return accelerator lever to normal position when hand throttle and accelerator pedal are not engaged.



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2-10. ENGINE RETARDER BRAKE CONTROLS.

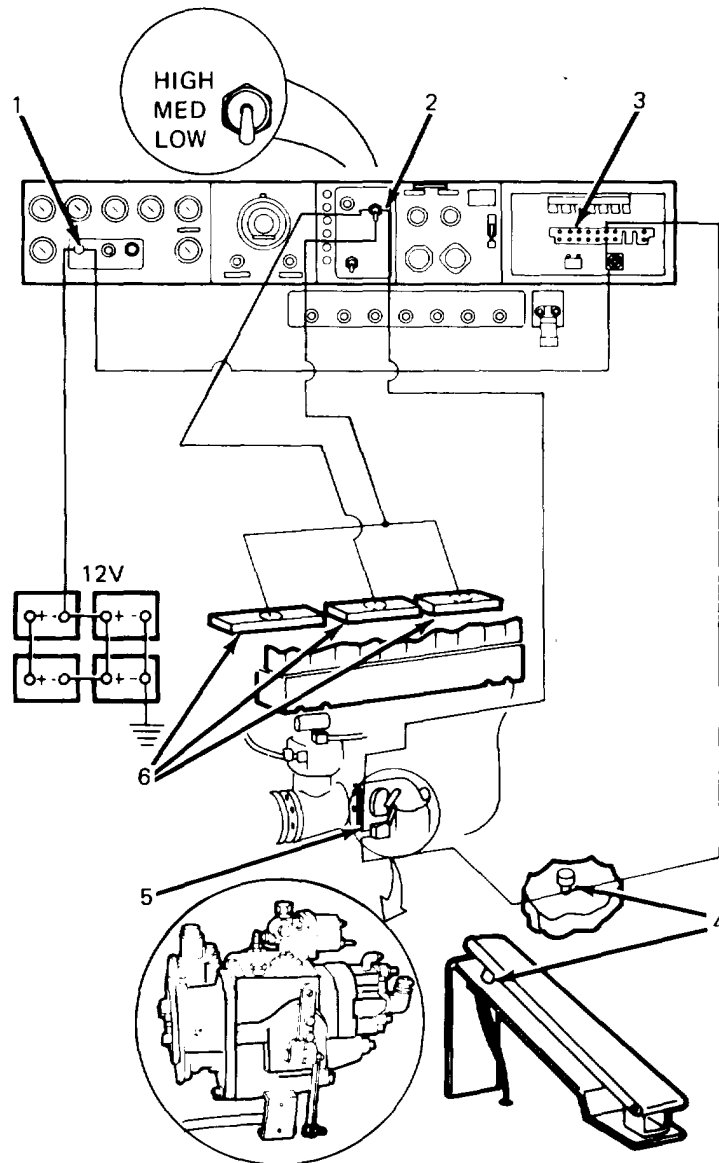
NOTE

In reading the following descriptions make sure that the throttle switch is in its normally-closed position.

1. ENGINE RUN SWITCH. Energizes the 12-volt electrical system, including engine retarder brake circuit.
2. ENGINE RETARDER SWITCH. Three-position switch allows driver to select engine braking for two cylinders (LOW), four cylinders (MED), or six cylinders (HIGH). Depressing foot pedal actuated switch completes 12-volt power circuit to energize one, two, or three solenoids.

2-10. ENGINE RETARDER BRAKE CONTROLS (Continued).

3. CIRCUIT BREAKER (CB-6). Protects electrical components of engine retarder brake circuit by opening when load exceeds 20 amps. Automatically recycles until the overload is removed.
4. FLOOR PEDAL SWITCH. Allows driver to activate engine brake circuit with his left foot. When depressed, switch supplies 12-volt power through CB-6, throttle switch, engine retarder switch, to energize the selected solenoid valve.
5. THROTTLE SWITCH. Open switch prevents activation of engine retarder brake if hand throttle is pulled out or accelerator pedal is pressed down. Activating arm on fuel pump lever closes switch when hand throttle and accelerator are both disengaged.
6. SOLENOID VALVES. When valves are activated, they operate engine braking mechanism.



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Section IV TRANSMISSION AND CONTROLS

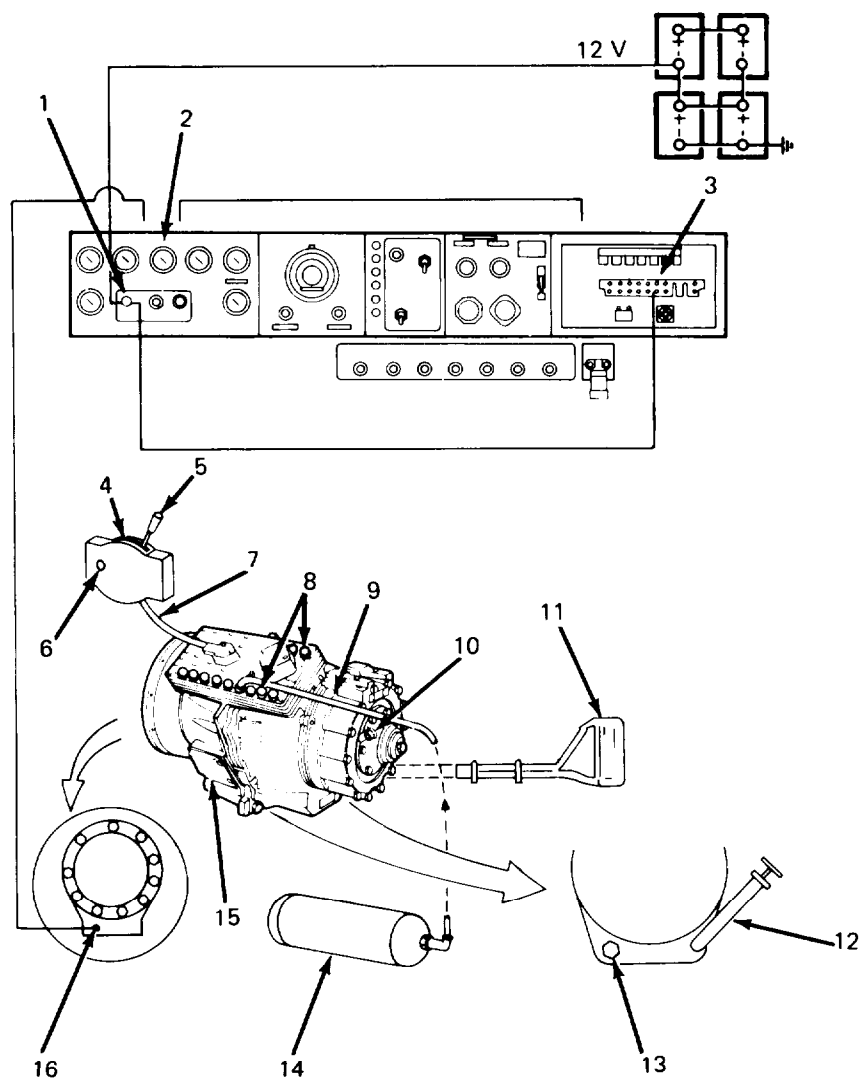
2-11. INTRODUCTION.

The Caterpillar D7155 transmission is used on all M915 thru M920 trucks. It is a mechanical drive unit with 16 forward speeds and 2 reverse speeds. The transmission is bolted directly to engine fly-wheel housing.

2-12. TRANSMISSION AND CONTROLS.

1. ENGINE RUN SWITCH. Energizes the 12-volt electrical system, including the transmission oil temperature gage circuit.
2. TRANSMISSION OIL TEMPERATURE GAGE. Signal from sending unit actuates pointer gage showing transmission oil temperature.
3. CIRCUIT BREAKER (CB-6). Protects electrical components of transmission oil temperature circuit when load exceeds 20 amps. Automatically recycles until the overload is removed.
4. RATIO SELECTOR UNIT. Floor-mounted, houses transmission controls.
5. GEAR SELECTOR. Allows operator to select desired gear.
6. TRANSMISSION AIR CHARGING VALVE. Used to charge control line when starting up.
7. CONTROL LINE. Carries pneumatic pressure which controls pressure from supply line. Normal air pressure is 90-120 psi (transmission is disengaged if air pressure drops below 60 psi).
8. BREATHERS. Prevent air pressure buildup in case.
9. SUPPLY LINE. Pneumatic pressure, controlled by line from ratio selector and sets transmission to selected gear. Normal air pressure is 90-120 psi (transmission is disengaged if air pressure drops below 60 psi).
10. SPEEDOMETER CABLE. Provides engine speed input to tachograph.
11. TRANSMISSION OIL COOLER. Two hydraulic lines carry warm oil from the transmission to an oil cooler mounted in front of radiator. Once cooled, the oil is returned to the transmission.
12. DIPSTICK AND OIL FILL PORT. Used to inspect and replenish oil supply. Normal capacity: at oil change 5.5 gallons (21 liters) of engine oil.
13. DRAIN PLUG. Provides access for draining oil. Has magnetic base to attract foreign particles in the oil and warn of unusual wear of the internal parts.
14. SUPPLY RESERVOIR. Provides air supply line. Normal air pressure is 90-120 psi (transmission is disengaged if air pressure drops below 60 psi).
15. ACCESS PLATE. Provides opening for access to oil pump suction line screen, There is an identical plate on the opposite side of the transmission.
16. TRANSMISSION OIL TEMPERATURE SENDING UNIT. Provides electrical signal to temperature gage for indicating transmission oil temperature.

2-12. TRANSMISSION AND CONTROLS (Continued).



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Section V POWER TRANSFER CASE AND REAR AXLE DIFFERENTIAL LOCKUP

2-13. INTRODUCTION.

The power transfer cases on M916 thru M920 trucks provide a means of engaging or disengaging front wheel drive. The instrument panel control for this feature also allows the driver to lock up the rear inter-axle differential so that all differentials on rear axle tandem turn the same speed. (The instrument panel control engages or disengages the front propeller shaft to the front driving axle (M916 thru M920) and the inter-axle differential located in all the forward rear tandem axles.) On M916 and M920 models only, an oil cooler is used to keep the transfer case lubricant within the proper temperature range during warm weather operation. It is disconnected in cold weather to prevent cooler damage (see para 7-9).

The M915 is a 6 x 4, activating the differential lockout control locks the inter-axle differential thereby connecting the transmission to front tandem and rear tandem axles solidly together.

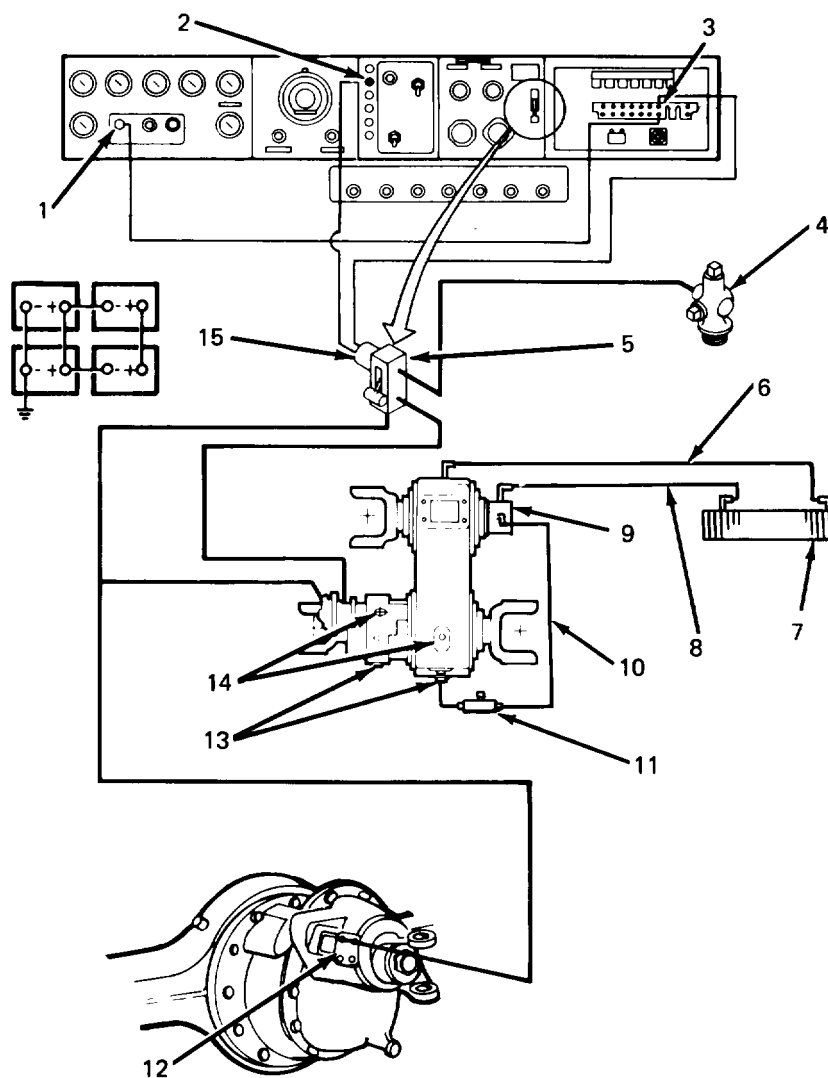
The forward rear tandem axle is equipped with a no-spin differential which automatically locks, eliminating differential action independent of the manual control, at least three wheels on the rear tandem must turn when the inter-axle differential lock is engaged.

2-14. POWER TRANSFER CASE.

1. ENGINE RUN SWITCH. Energizes 12-volt electrical system, including differential lockup indicator circuit,
2. LOCKUP INDICATOR. Illuminates when lockup switch is closed.
3. CIRCUIT BREAKER (CB-6). Protects electrical components of differential lockup circuit by opening when load exceeds 20 amps, Automatically recycles until overload is removed.
4. AIR MANIFOLD. Routes air from reservoir to control valve.
5. CONTROL VALVE. Provides control to engage or disengage front wheel drive on M916 thru M920. When front wheel drive is engaged, air pressure is applied to lockup rear axle differential. When front wheel drive is disengaged, air pressure is vented through lockup valve. On M915, this control locks up the rear differential only.
6. OIL COOLER LINE. Carries cooled oil to top of power transfer case. (M916 and M920 only).
7. OIL COOLER. By means of fresh air flow thru fins and tubing, cools warm oil from power transfer case (M916 and M920 only); suspended under winch platform.
8. OIL COOLER LINE. Brings warm oil from power transfer case to oil cooler (M916 and M920 only).
9. OIL PUMP. Driven from upper shaft of power transfer case, draws warm oil from bottom of case, pumps thru cooler, and returns to top of case (M916 and M920 only).
10. OIL PUMP LINE. Carries warm oil from bottom of case to pump (M916 and M920 only).
11. TEE. Replaces drain plug (plug is reinserted in end of tee; provides connection for line (10). (M916 and M920 only).

2-14. POWER TRANSFER CASE (Continued).

12. LOCKUP CHAMBER. When air pressure is applied to the chamber, it mechanically locks the rear axle differential in place so that drive is applied to both rear axles. Without air pressure, the differential applies drive to the axle that offers the least resistance.
13. DRAIN PLUGS. Allow draining oil during service intervals. Has magnetic base to attract foreign particles and warn of unusual wear of internal parts.
14. FILLER PLUGS. Provide means of checking and replenishing oil supply.
15. LOCKUP SWITCH. Normally open; closed by 60 psi air pressure to activate lockup indicator circuit.



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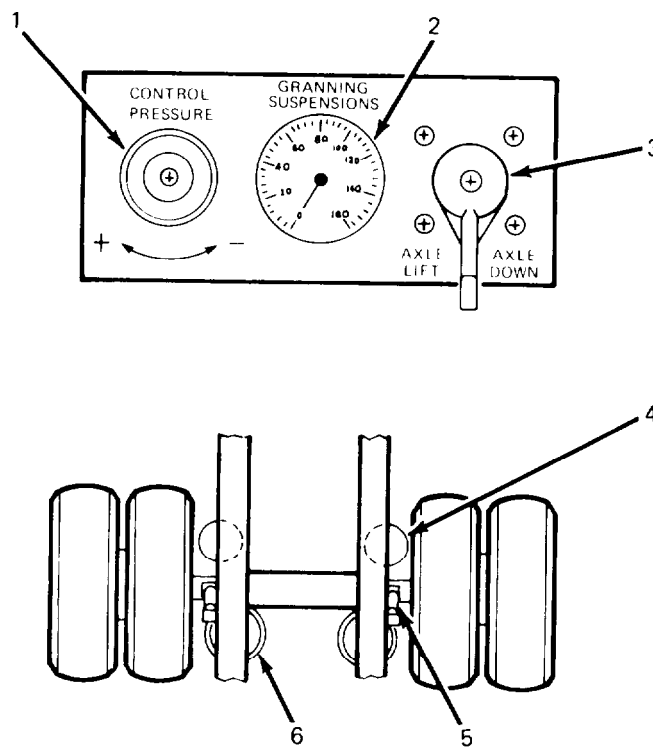
Section VI PUSHER AXLE AND CONTROLS

2-15. INTRODUCTION.

A pusher axle is provided on M917, M919, and M920 vehicles.

2-16. PUSHER AXLE.

1. PRESSURE REGULATOR VALVE. Allows operators to regulate air pressure to air bags.
2. PRESSURE GAGE. Air-actuated gage indicates pressure in lines to air bags.
3. UP-DOWN SELECTOR VALVE. In DOWN position, directs air pressure to air bags which lower axle. In UP position, directs pressure to air cylinders which raise axle.
4. AIR CYLINDERS. Provide force to raise axle to stowed position.
5. SHOCK ABSORBERS. Stabilize fluctuations in air bags caused by road surface variations.
6. AIR BAGS. Provide force to lower axle to road position.



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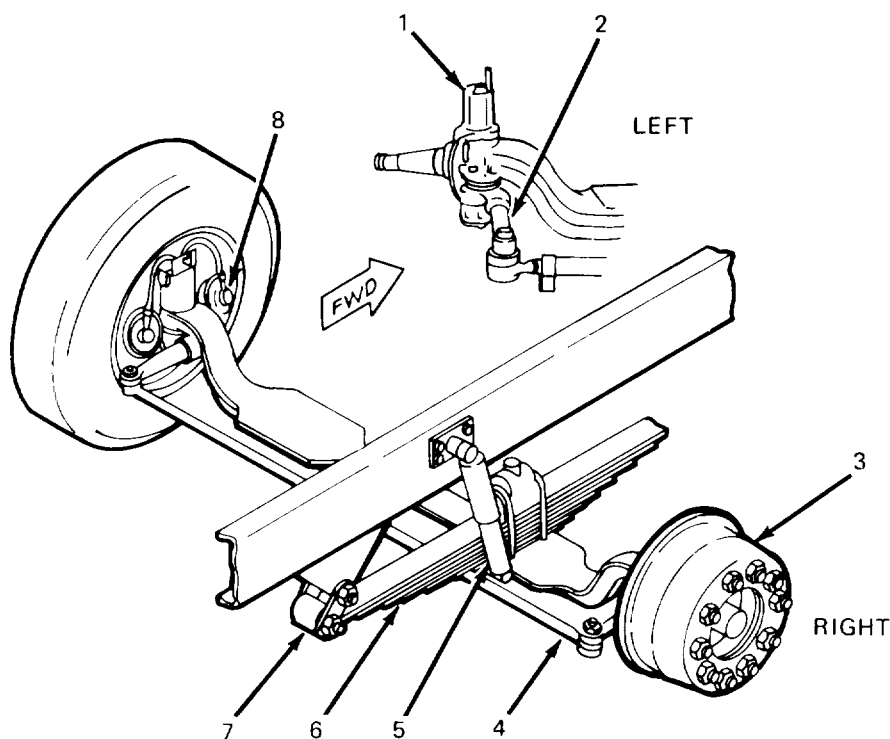
Section VII FRONT AXLE AND SUSPENSION

2-17. INTRODUCTION.

The Model M915 is equipped with a non-driving front axle; the Models M916 thru M920 have a driving front axle. (See power train illustrations in paragraphs 2-4 and 2-5.) Shock absorbers are used only on the Model M915.

2-18. NON-DRIVING FRONT AXLE (M915).

1. KNUCKLE AND KINGPIN ASSEMBLY (Shown with drum removed). Movable joint between the wheel and axle I-beam.
2. STEERING ARM. Connects to power steering drag link (see para 2-76).
3. DRUM. Houses the wheel brakes. Serves as mount for front wheels.
4. TIE ROD ASSEMBLY. Connects left and right knuckles for synchronized movement of both wheels.
5. SHOCK ABSORBERS (M915). Supplement spring and stabilize spring fluctuations caused by road surface variations.
6. LEAF SPRINGS. Absorb and minimize the amount of road shock transmitted to the vehicle frame.
7. SHACKLE. Swinging support that permits the leaf spring to vary in length as it is deflected.
8. BRAKE AIR CHAMBER. When pressure is supplied to the chambers from the air system, they mechanically activate the brake mechanism.



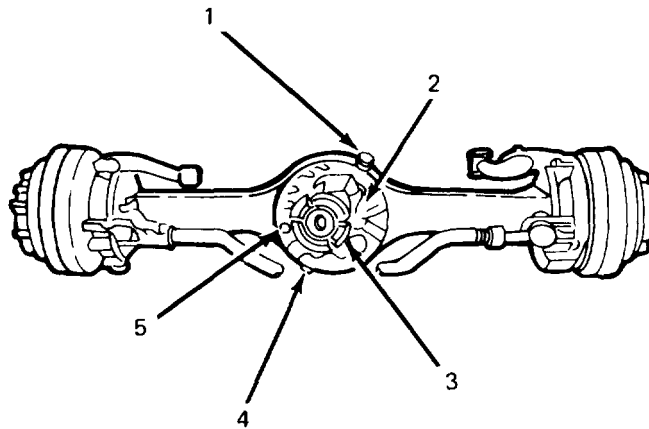
TA 074563

2-19. DRIVING FRONT AXLE (M916 THRU M920).

NOTE

See illustration in para 2-18 for identification and description of common components.

1. BREATHER. Allows fumes from hot oil to escape.
2. CARRIER. Houses differential drive and driven gears.
3. PINION YOKE. Attaches to transfer case propeller shaft universal. (See illustration in para 2-5.)
4. DRAIN PLUG. Allows draining oil at service intervals.
5. FILLER PLUG. Provides access for checking oil level and replenishing oil supply.



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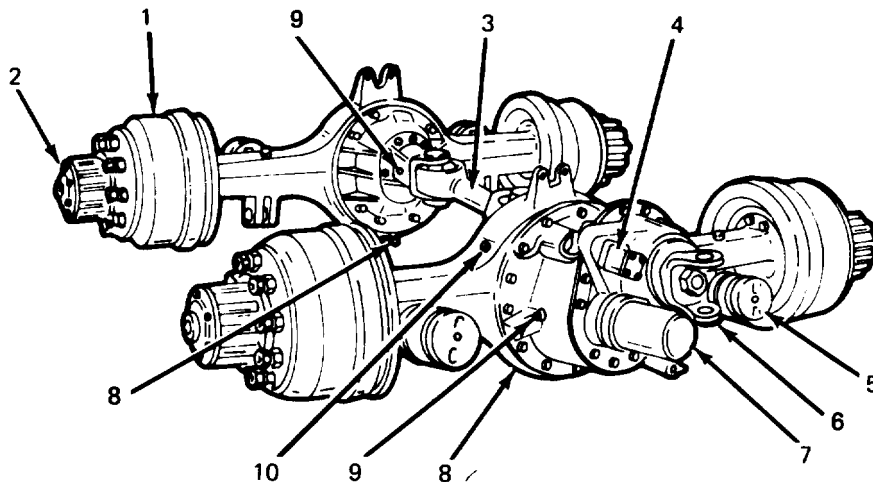
Section VIII REAR AXLE

2-20. INTRODUCTION.

Two similar rear axle assemblies are used in the M915 thru M920 vehicles. The Model M915 uses one type; the Models M916 thru M920 use a different assembly. (Specifications for both axles are given in para 1-11.)

2-21. REAR AXLE (M915).

1. HUB AND DRUM ASSEMBLY. Serves as mount for rear wheels. Houses the brake shoe assemblies which can be mechanically forced against it to slow or stop the vehicle.
2. AXLE SHAFT. Transmits power from the differential gear assembly to the hub assembly inside of axle housing.
3. INTER-AXLE PROPELLER SHAFT. Transmits power to rear axle.
4. DIFFERENTIAL LOCKUP CHAMBER. Air actuated by lockup switch located in cab interior. (Refer to para 2-14 for description.)
5. BRAKE AIR CHAMBER. (Refer to para 2-64 for description.)
6. PINION YOKE. Connects to propeller shaft from transmission.
7. OIL FILTER. Oil filter (under cover) removes impurities from oil in forward rear axle. Filter is replaceable, automobile-type unit (Refer to LO 9-2320-273-12.)
8. DRAIN PLUG. Allows draining oil at service intervals.
9. FILLER PLUG. Used to inspect oil level and replenish oil supply.
10. BREATHER. Allows fumes from hot oil to escape.

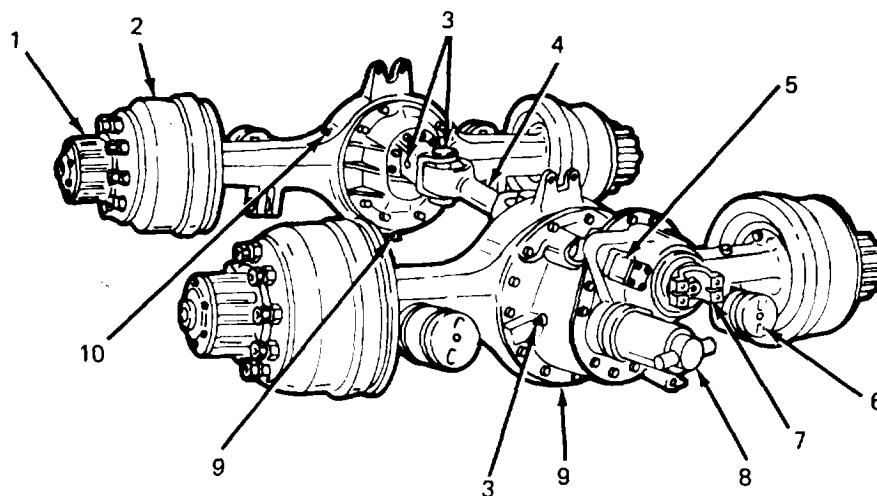


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2-22. REAR AXLE (M916 THRU M920).**NOTE**

See illustration in paragraph 2-21 for identification and description of common components. For organizational maintenance purposes, the basic difference between the axles shown in paragraphs 2-21 and 2-22 is that the axle shown below does not have an oil filter. Quantity and placement of fill and drain plugs also differ from one configuration to the other.

1. AXLE SHAFT. Transmits power from the differential gear assembly to the hub assembly inside of axle housing.
2. HUB AND DRUM ASSEMBLY. Serves as mount for rear wheels. Houses the brake shoe assemblies which can be mechanically forced against it to slow or stop the vehicle.
3. FILLER PLUG. A plug used to gain access for inspecting oil level and replenishing oil supply.
4. INTER-AXLE PROPELLER SHAFT. Transmits power for forward-rear to rear-rear axle.
5. DIFFERENTIAL LOCKUP CHAMBER. Air actuated by lockup switch located in cab interior. (Refer to para 2-14 for description.)
6. BRAKE AIR CHAMBER. (Refer to para 2-64 for description.)
7. PINION YOKE. Connects to propeller shaft from power transfer case.
8. DIFFERENTIAL INTERNAL LUBRICATION PUMP. Circulates gear lubricant under pressure thru differential gears.
9. DRAIN PLUG. A magnetic plug which allows draining oil at service intervals. Also, draws metallic particles from the oil.
10. BREATHER. Allows fumes from hot oil to escape.



TA 074566

Section IX FUEL AND AIR INTAKE SYSTEM

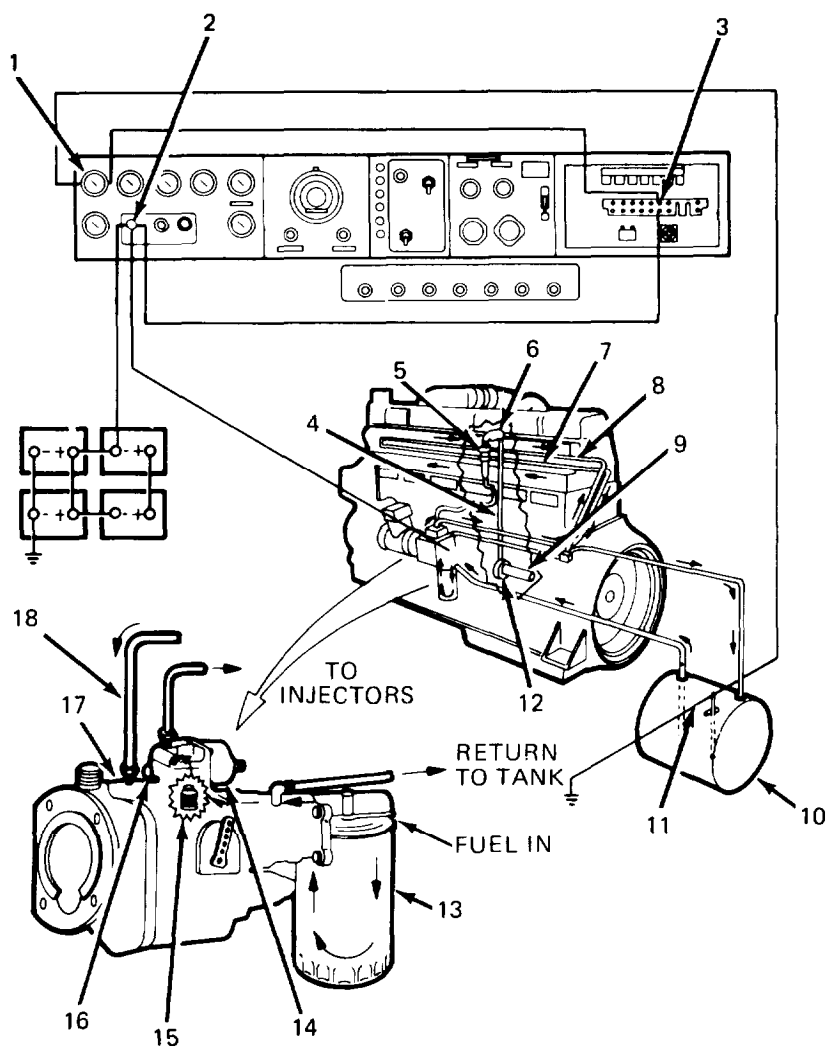
2-23. INTRODUCTION.

This system is comprised of two basic subsystems: fuel delivery and air intake. The systems are identical in all M915 thru M920 vehicles.

2-24. FUEL DELIVERY.

1. FUEL GAGE. Needle actuated by electrical signal from sending unit which shows level of fuel in tank.
2. ENGINE RUN SWITCH. Energizes 12-volt electrical system, including circuits to solenoid shutoff valve and fuel level sending unit.
3. CIRCUIT BREAKER (CB-6). Protects electrical components of fuel system by opening circuit when load exceeds 20 amps. Automatically recycles until overload is removed.
4. PUSH TUBE. Transmits motion from cam follower to rocker arm assembly.
5. INJECTOR. Cam timed to meter and inject fuel into each cylinder.
6. ROCKER ARM. Transmits directional movement from push tube to injector.
7. FUEL DELIVERY LINE. Carries fuel under pressure from fuel pump to fuel manifold.
8. BYPASS LINE. Carries excess fuel from manifold back to tank.
9. CAMSHAFT. Determines valve and injector timing.
10. TANK. 118-gallon (446.63 liters) capacity (110-gallon (416.35 liters) draw).
11. FUEL LEVEL SENDING UNIT. Provides electrical signal to fuel gage for indicating fuel quantity in tank.
12. CAM FOLLOWER. Mechanical lever transmits cam lobe movement from cam shaft to push tube.
13. FILTER. Throwaway filter removes impurities from fuel. Petcock in bottom allows operator to drain off water filtered from fuel.
14. SOLENOID SHUTOFF VALVE. Normally closed, shutting off fuel supply to engine. Open when engine run switch is ON.
15. SCREEN FILTER. Located in fuel pump. Provides additional filtration for fuel prior to entering engine.
16. MANUAL OVERRIDE FOR FUEL SHUTOFF SOLENOID. Normally closed, can be screwed open to allow operation of engine when solenoid is not working.
17. FUEL PUMP. Gear driven from compressor drive. Built-in governor meters fuel through screen filter, solenoid shutoff valve, and into injectors. Excess fuel from pump is returned to the tank, The tachometer drive is located on the pump housing.
18. AIR ACTUATING LINE. Carries pressurized air from intake manifold to fuel pump. Pressure from line opens valve in pump and allows full fuel flow.

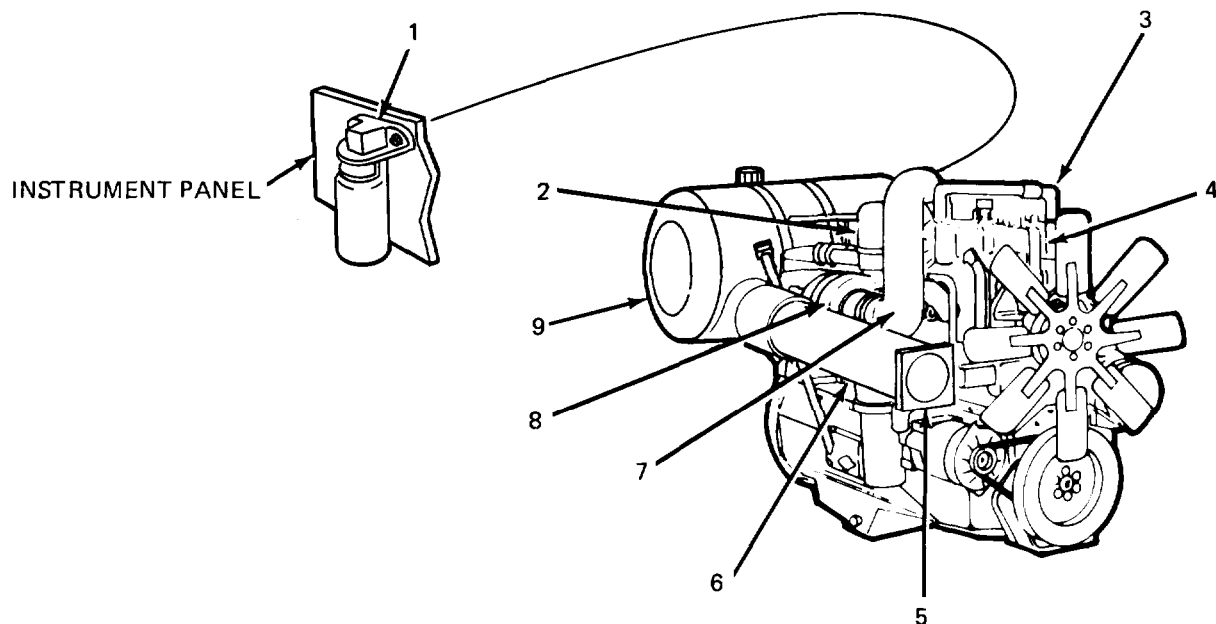
2-24. FUEL DELIVERY (Continued).



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2-25. AIR INTAKE.

1. **AIR RESTRICTION INDICATOR.** Mounted on instrument panel. A red signal shows on indicator housing when air cleaner needs servicing. A tube connects the indicator to the air cleaner outlet. When air flow through the cleaner is restricted, the red signal becomes visible. The unit is factory set to signal at a specific filter restriction. Resetting is accomplished by pushing a button which is recessed in the bottom.
2. **CROSSOVER TUBE.** Directs compressed air from turbocharger, through aftercooler, to intake manifold.
3. **AFTER COOLER.** Cools air entering intake manifold from turbocharger. Water flow from engine cooling system absorbs heat. (See illustration of cooling system in paragraph 2-32.)
4. **ENGINE INTAKE MANIFOLD.** Directs compressed air charge to each cylinder after it has been cooled by aftercooler.
5. **PLENUM.** Directs outside air to the air intake tube.
6. **AIR INTAKE TUBE.** Draws outside air through grille mounted plenum and into air cleaner.
7. **INLET TUBE.** Directs air from air cleaner to turbocharger.
8. **TURBOCHARGER.** Driven by exhaust gases (para 2-30). Compresses air in the intake manifold to increase engine power.
9. **AIR CLEANER.** Mounted on fire wall. Removes impurities from air entering turbocharger. Has replaceable dry, two-stage element.



TA 074568

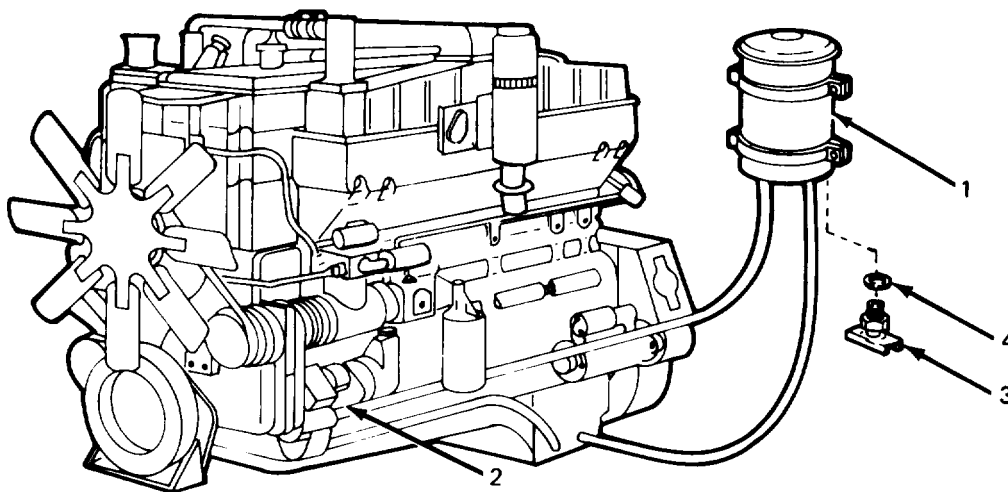
Section X ENGINE OIL SYSTEM

2-20. INTRODUCTION.

The engine oil system is identical on all M915 thru M920 vehicles. The system provides lubricating oil for moving internal engine parts and the turbocharger. In addition, engine oil is used by the Jacobs® brake (engine retarder).

2-27. COMPONENTS AND PIPING ARRANGEMENT.

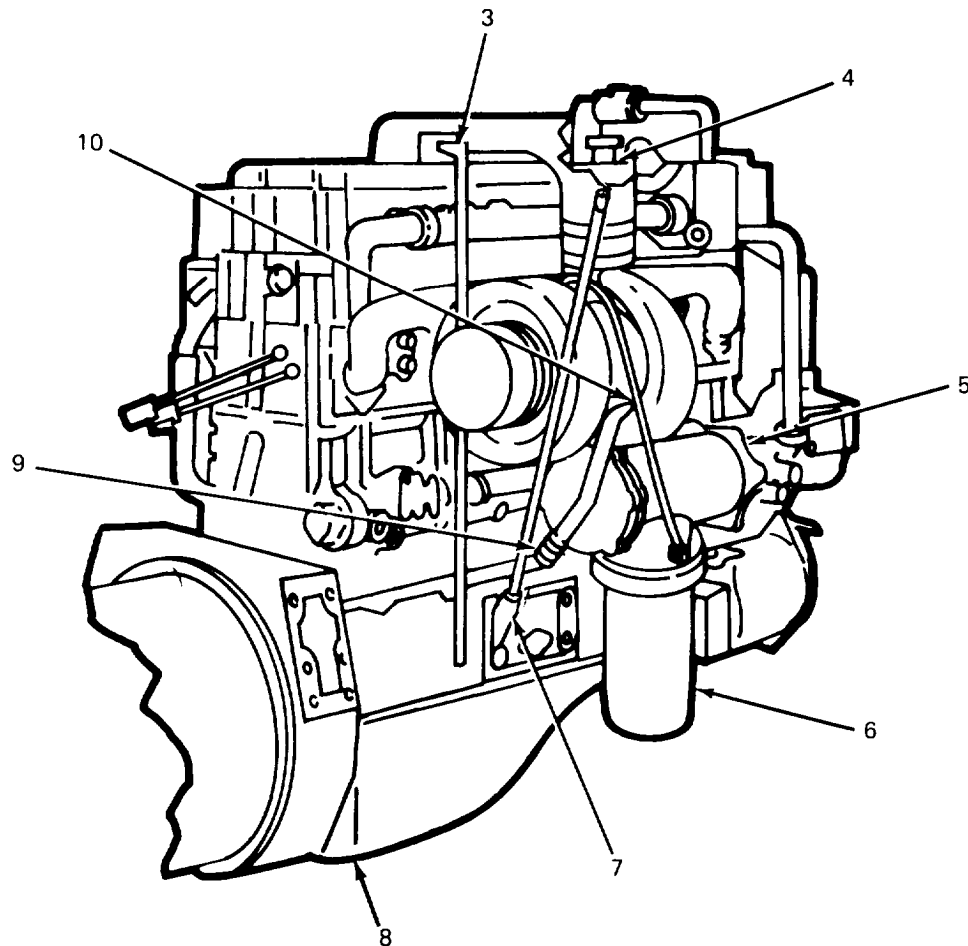
1. OIL BYPASS FILTER. Provides additional filtration, allowing a longer period between oil changes. Oil from pump circulates through the filter, then to the sump.
2. OIL PUMP. Circulates oil through engine to provide cooling and lubrication.
3. DRAINCOCK. Provide passage for draining oil.
4. FLATWASHER. Provides seal between draincock and oil bypass filter.



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2-27. COMPONENTS AND PIPING ARRANGEMENT (Continued).

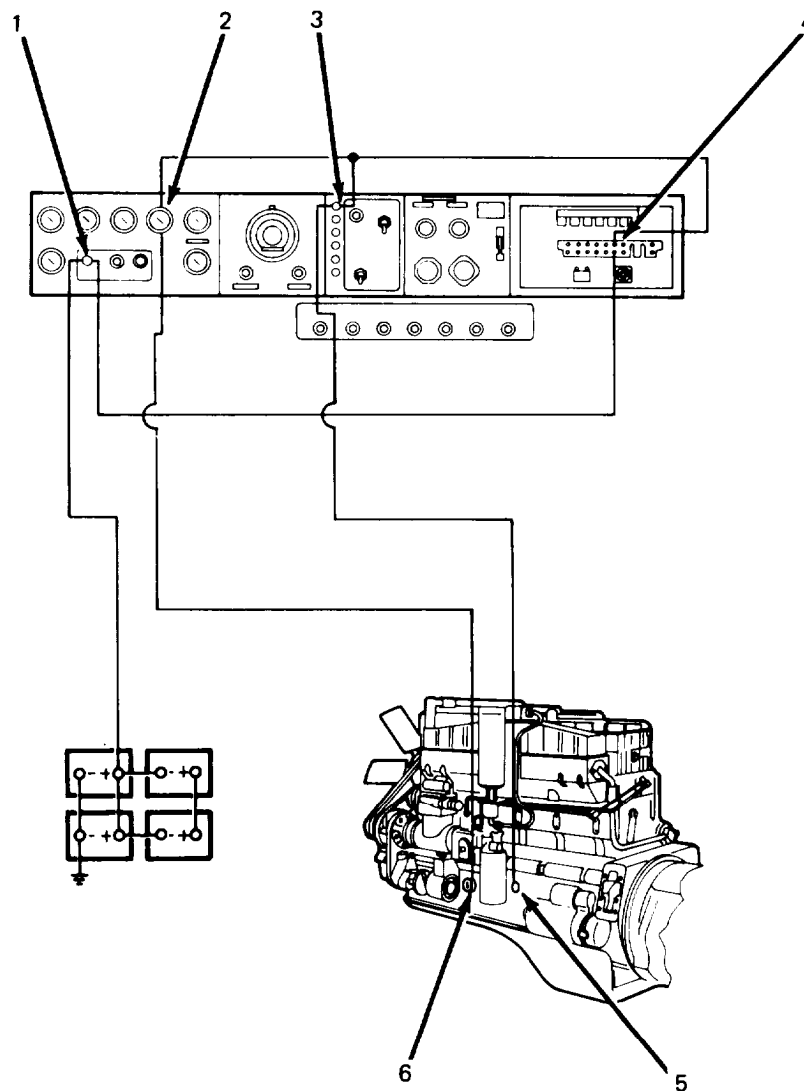
3. BREATHER TUBE. Allow fumes from hot oil to escape.
4. OIL FILLER. Located in engine cover. Used for replenishing engine oil supply.
5. OIL COOLER. Coolant circulates through internal tubes of oil cooler and carries away heat from engine oil.
6. PRIMARY OIL FILTER. Throwaway filter removes dirt and foreign particles from oil.
7. DIPSTICK. Engine oil level indicator.
8. DRAIN PLUG. Located in bottom of engine oil pan, Used to drain oil from engine.
9. OIL RETURN LINE. Carries return oil from turbocharger to engine block.
10. OIL SUPPLY LINE. Carries oil under pressure to cool and lubricate turbocharger.



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2-28. OIL MONITORING SYSTEM.

1. ENGINE RUN SWITCH. Energizes 12-volt electrical system, including oil pressure gage and warning light circuits.
2. OIL PRESSURE GAGE. Needle activated by electrical signal from oil pressure sending unit indicates engine oil pressure.
3. OIL WARNING LIGHT. Indicator light is activated by 12-volt power from pressure switch when engine oil pressure drops below 5 psi (34 kPa).
4. CIRCUIT BREAKER (CB-6). Protects electrical components of oil system by opening circuit when load exceeds 20 amps. Automatically recycles until overload is removed.
5. PRESSURE SWITCH. Closes when oil pressure drops below 5 psi (34 kPa) and supplies 12-volt power to oil warning indicator.
6. OIL PRESSURE SENDING UNIT. Provides electrical signal to oil pressure gage to indicate oil pressure.



TA 074571

Section XI EXHAUST SYSTEM

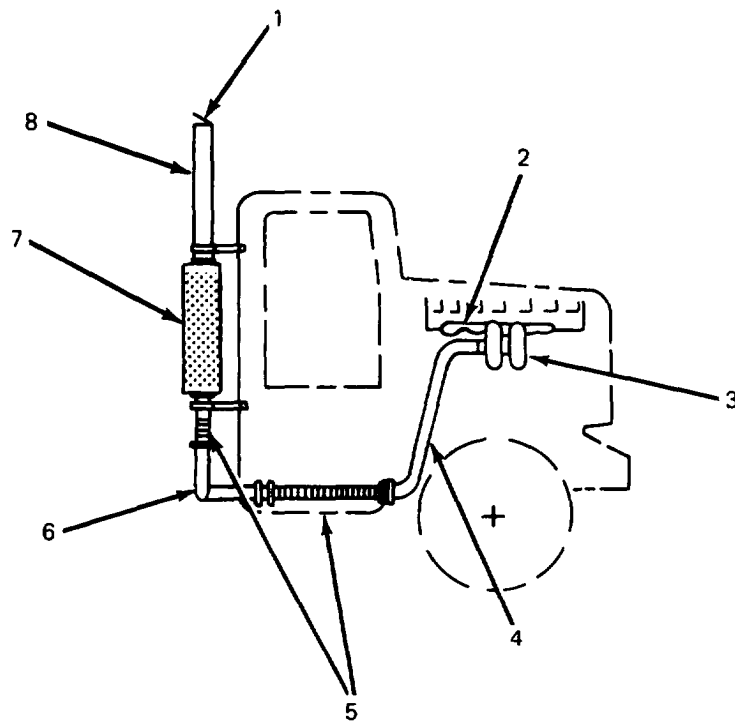
2-29. INTRODUCTION.

The exhaust system is identical in all M915 thru M920 vehicles, except for minor variations in arrangement.

2-30. EXHAUST SYSTEM.

1. RAIN CAP. Prevents entry of rain and dirt into exhaust pipes when engine is not in use.
2. EXHAUST MANIFOLD. Bolted to exhaust ports on cylinder heads. Collects exhaust from ports and directs it to turbocharger.
3. TURBOCHARGER. See illustration and description in paragraph 2-25.
4. TURBO OUTLET PIPE. Carries hot exhaust away from turbocharger.
5. FLEX PIPE(S). Connect turbo outlet pipe, muffler inlet pipe, and muffler. Pipes are flexible to allow for vibrations and expansion in system.
6. MUFFLER INLET PIPE. Connects flex pipes.
7. MUFFLER. Directs exhaust through baffles to deaden noise.
8. EXHAUST STACK. Directs exhaust from muffler.

2-30. EXHAUST SYSTEM (Continued).



TA 074572

Section XII COOLING SYSTEM

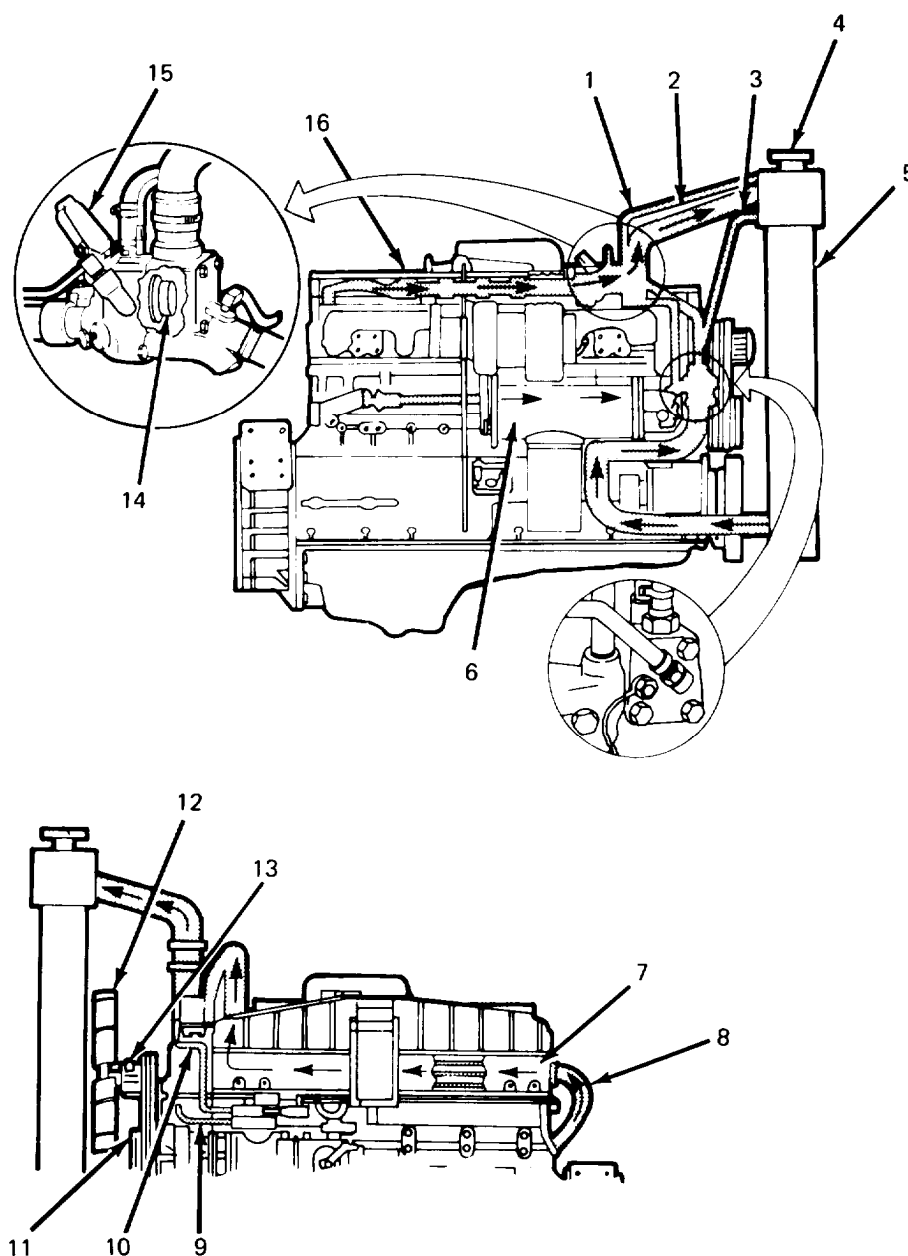
2-31. INTRODUCTION.

The cooling system is identical in all M915 thru M920 vehicles. The system provides coolant for the engine block, oil cooler, aftercooler, fuel injectors, and air compressor.

2-32. COMPONENTS AND PIPING ARRANGEMENT.

1. THERMOSTAT DEAERATION LINE. Escape route for air trapped in radiator top or thermostat housing.
2. RADIATOR INLET HOSE. Channels hot coolant into radiator when thermostat is open.
3. ENGINE SHUNT LINE. Allow air bubbles from coolant in pump to escape into radiator, to prevent pump cavitation.
4. RADIATOR CAP. Closes off filler opening and keeps system under pressure up to a maximum of 10 psi.
5. RADIATOR. Coolant is circulated through a series of fins and baffles so that outside air flow can dissipate heat.
6. OIL COOLER. Engine coolant circulates through internal tubes of cooler and carries away heat from engine.
7. AFTERCOOLER. Coolant flowing through core cools hot air entering intake manifold ports from turbocharger.
8. WATER LINE. Carries water under pressure from block to aftercooler.
9. WATER LINE. Carries hot water from air compressor to thermostat housing.
10. WATER LINE. Carries coolant from water pump to air compressor.
11. ACCESSORY DRIVE. Powers the fan and water pump.
12. FAN. Forces air through radiator to control coolant temperature.
13. FAN CLUTCH. Air pressure from actuator engages fan when coolant temperature rises above 190°F (88°C).
14. THERMOSTAT. Shuts off coolant flow to radiator until temperature reaches 185°F (85°C). Coolant is then directed through radiator inlet hose to the radiator.
15. FAN CLUTCH ACTUATOR. When coolant temperature rises above 190°F (88°C), actuator directs compressed air into fan clutch causing fan to engage.
16. WATER MANIFOLD. Collects coolant from cylinder heads and directs it to thermostat housing.

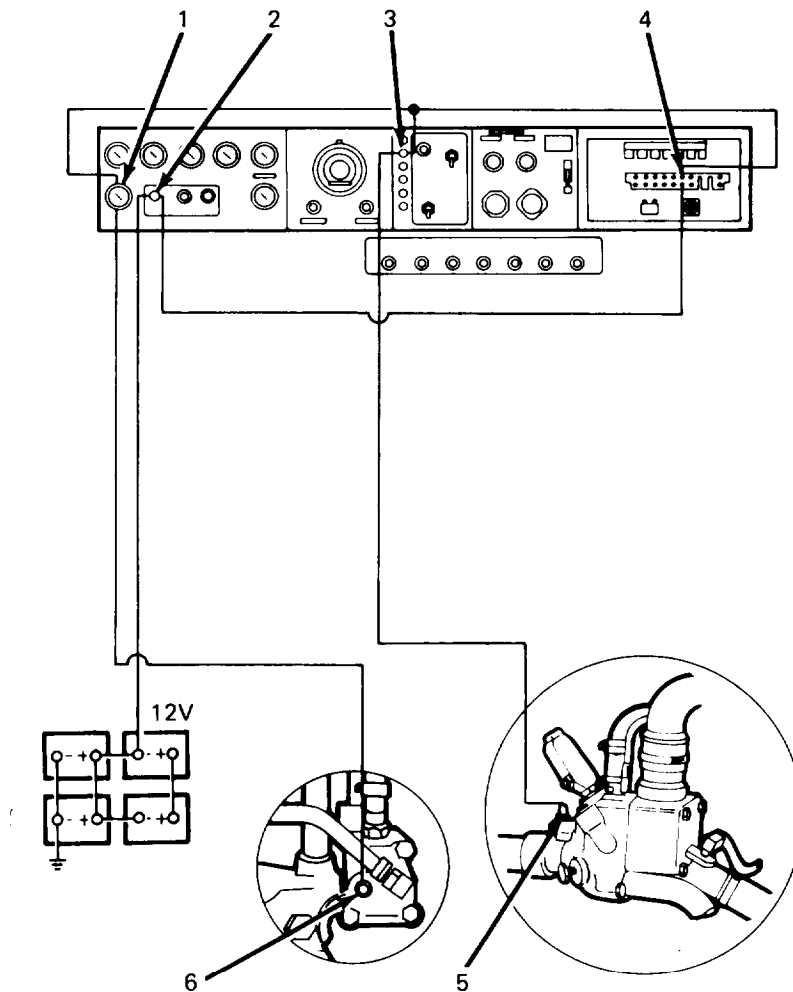
2-32. COMPONENTS AND PIPING ARRANGEMENT (Continued).



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2-33. COOLANT TEMPERATURE MONITORING SYSTEM.

1. WATER TEMPERATURE GAGE. Shows coolant temperature actuated by electrical signal from water temperature sending unit.
2. ENGINE RUN SWITCH. Energizes 12-volt electrical system, including temperature gage and temperature indicator light circuits.
3. ENGINE COOLANT TEMPERATURE WARNING LIGHT. Activated by 12-volt power from water temperature switch when engine temperature exceeds 225°F (107°C).
4. CIRCUIT BREAKER (CB-6). Protects electrical components and wiring of coolant system by opening circuit when load exceeds 20 amps. Automatically recycles until overload is removed.
5. WATER TEMPERATURE SWITCH. Normally open, closes to activate indicator light when coolant temperature exceeds 225°F (107°C).
6. WATER TEMPERATURE SENDING UNIT. Provides electrical signal to temperature gage.



TA 073922

Section XIII RELAYS, CIRCUIT BREAKERS, AND WIRE IDENTIFICATION

2-34. INTRODUCTION.

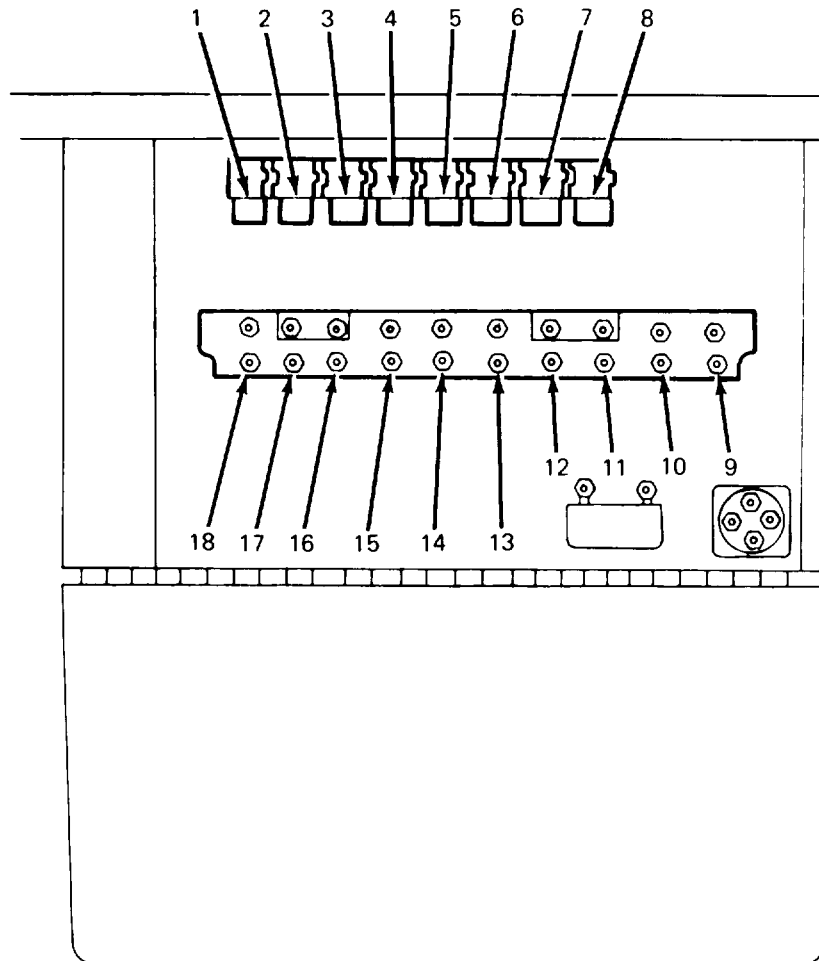
- a. The electrical relays are identical in all M915 thru M920 vehicles, except for minor variations in arrangement. The M917, M918, and M919 use two relays, the M915 use seven relays; while the M916 and M920 use eight.
- b. The circuit breakers are identical in the M915 thru M920 vehicles, except for minor variations in arrangement. The M917, M918, and M919 use six circuit breakers to protect their electrical systems, the M915 uses eight; while the M916 and M920 use nine. These circuit breakers are rated at 20 amps continuous load. If an overload does occur, the circuit breaker automatically recycles (opens and closes) until the overload is removed.

2-35. RELAYS AND CIRCUIT BREAKERS.

1. RELAY (K1). (M915 thru M920) Normally open contacts: Provides 12-volt power to the electric horn when energized.
2. RELAY (K2). (M915, M916, and M920) Normally open contacts: Provides 24-volt power to trailer left turn signal light when energized.
RELAY (K2). (M918 and M919) Normally closed contacts: Provides 12-volt power to the backup alarm when energized.
RELAY (K2). (M917) Normally closed contacts: Disconnects 12-volt power from tractor backup lights when the Operation switch is in BLACKOUT position,
3. RELAY (K3). (M915, M916, and M920) Normally open contacts: Provides 24-volt power to trailer right turn signal light when energized.
4. RELAY (K4). (M915, M916, and M920) Normally open contacts: Provides 24-volt power to trailer blackout stop lights when energized.
5. RELAY (K5). (M915, M916, and M920) Normally open contacts: Provides 24-volt power to trailer blackout tail lights when energized.
6. RELAY (K6). (M915, M916, and M920) Normally open contacts: Provides 24-volt power to trailer marker and tail lights when energized.
7. RELAY (K7). (M915, M916, and M920) Normally closed contacts: Disconnects 12-volt power from tractor backup lights when operation switch is in BLACKOUT position.
8. RELAY (K8). (M916 and M920) Normally closed contacts: Provides 12-volt power to work lamps when WORK LAMPS switch is ON.
9. ENGINE TEMPERATURE DIODE. Provides a circuit to illuminate engine temperature indicator when engine is cranking, and prevents engagement of the starter by feedback voltage in the event the water temperature switch closes.
10. CIRCUIT BREAKER (CB-9). Protects the 12-volt work lamps circuit in the M916 and M920 vehicles.
11. CIRCUIT BREAKER (CB-8). Protects the 24-volt blackout stop, marker, and tail light circuits for trailers used with the M915, M916, and M920 vehicles.
12. CIRCUIT BREAKER (CB-7). Protects the 24-volt left and right turn signals and blackout tail light circuits for trailers used with the M915, M916, and M920 vehicles.
13. CIRCUIT BREAKER (CB-6). Protects the 12-volt engine retarder brake, instrument gages, low air, park brake, and differential lockout circuits in the M915 thru M920 vehicles.
14. CIRCUIT BREAKER (CB-5). Protects the 12-volt backup lights and ether start circuits in the M915 thru M920 vehicles.
15. CIRCUIT BREAKER (CB4). Protects the 12-volt heater fan motor circuit in the M915 thru M920 vehicles.
16. CIRCUIT BREAKER (CB-3). Protects the 12-volt cigar lighter and dome light circuits in the M915 thru M920 vehicles.
CIRCUIT BREAKER (CB-3). Protects the 12-volt utility outlets on the M915, M916, and M920 vehicles.

2-35. RELAYS AND CIRCUIT BREAKERS (Continued).

17. CIRCUIT BREAKER (CB-2). Protects the 12-volt electric horn and turn signal flasher circuits in the M915 thru M920 vehicles.
18. CIRCUIT BREAKER (CB-1). Protects the 12-volt stop light, operation switch, turn signal, and instrument lighting circuits in the M915 thru M920 vehicles.



2-36. WIRE IDENTIFICATION.

The electrical wiring on the M915 thru M920 vehicles is contained in braided or loomed harness assemblies. The wires are permanently hot-stamped with individual circuit numbers. The circuit numbers appear two inches from each termination end and every six inches throughout the length. Refer to Appendix D for wiring harness drawings and electrical system diagrams, for circuit numbers and terminations.

Section XIV STARTING AND STARTING CONTROL SYSTEM

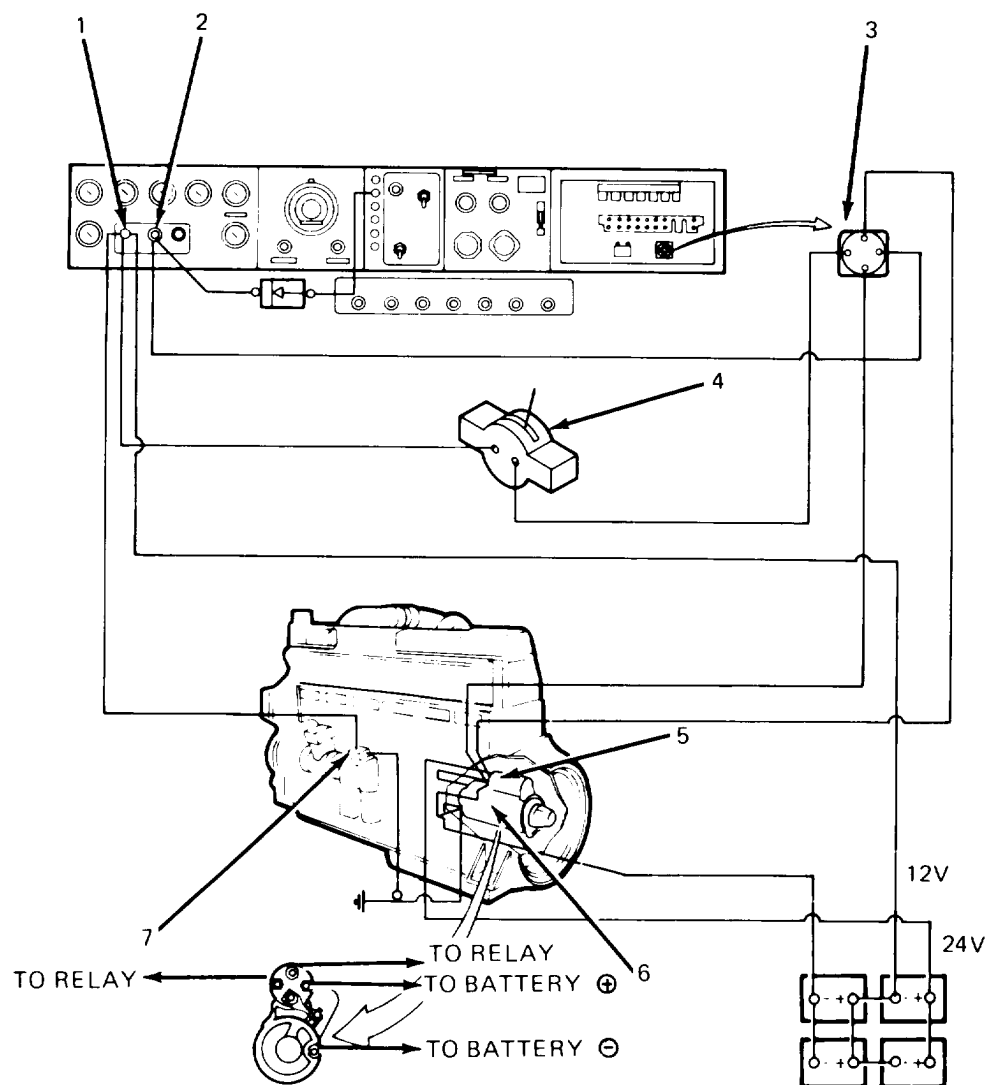
2-37. INTRODUCTION.

The starting and starting control system is identical in all M915 thru M920 vehicles.

2-38. STARTING AND STARTING CONTROL SYSTEM.

1. ENGINE RUN SWITCH. Directly controls fuel solenoid shutoff valve and allows remainder of starting circuit to be placed into operation when the start button is depressed.
2. ENGINE START BUTTON. Activates starting circuit by energizing the starter relay.
3. STARTER RELAY. With ENGINE RUN switch on, transmission ratio selector lever in neutral, and ENGINE START button depressed, the relay energizes and closes the starter solenoid circuit.
4. NEUTRAL SAFETY SWITCH. Switch is normally open. Starting circuit cannot be activated when ratio selector lever is in any position other than neutral.
5. STARTER SOLENOID. 12-volt power is applied to the starter solenoid when starter relay is energized. The solenoid closes and supplies 24-volt power, which energizes the starter motor.
6. STARTER MOTOR. When energized, the motor engages the flywheel to start the engine.
7. FUEL SOLENOID SHUTOFF VALVE. When the ENGINE RUN switch is turned on, valve is energized and opens to allow fuel to pass to the injectors. (See paragraph 2-24 for description of fuel system.)

2-38. STARTING AND STARTING CONTROL SYSTEM (Continued).



TA 073921

Section XV ETHER QUICK-START

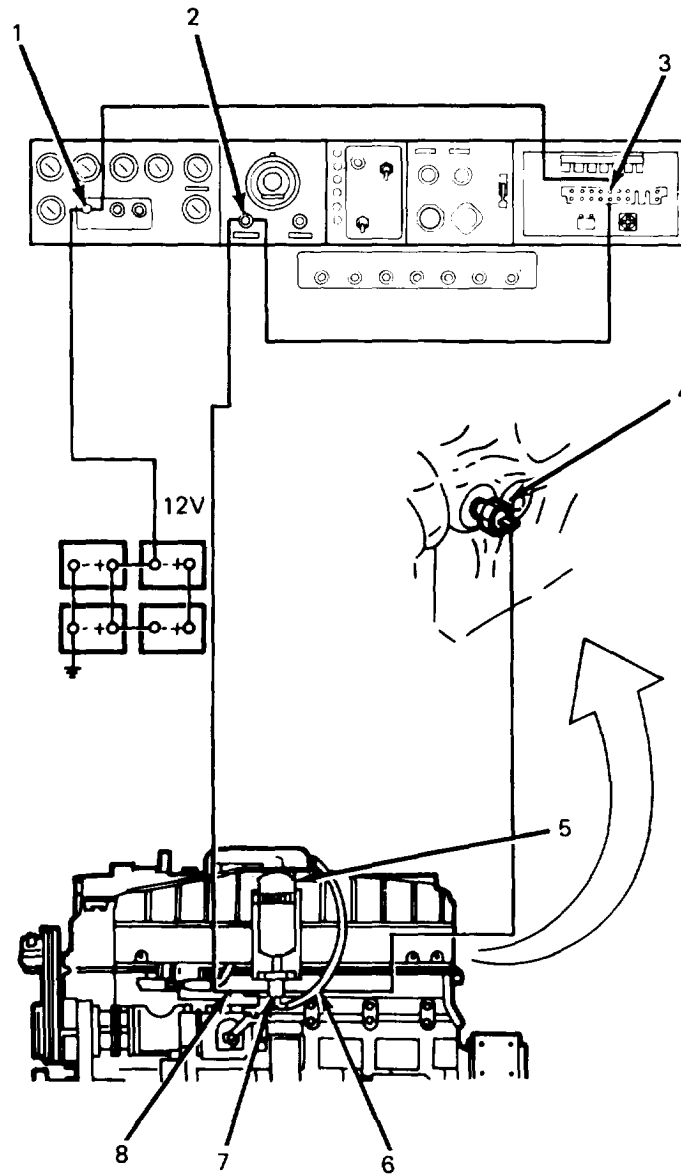
2-39. INTRODUCTION.

The quick-start system is identical in all M915 thru M920 vehicles.

2-40. ETHER QUICK-START.

1. ENGINE RUN SWITCH. Energizes 12-volt electrical system, including quick-start solenoid valve circuit.
2. ETHER BUTTON. Activates solenoid valve. Will not work if thermal switch is open.
3. CIRCUIT BREAKER (CB-5). Protects electrical components and wiring of quick-start system by opening circuit when load exceeds 20 amps. Automatically recycles until overload is removed.
4. THERMAL SWITCH. Opens when coolant temperature is above 50°F (10°C), and prevents solenoid valve from activating.
5. ETHER CYLINDER. Replaceable 18-02 (710 cc) ether container.
6. ETHER TUBE. Carries ether from solenoid valve thru atomizer to engine air intake manifold.
7. ATOMIZER. Sprays fine ether mist into intake manifold.
8. SOLENOID VALVE. Controls release of ether from cylinder. When solenoid is energized, ether flows to atomizer.

2-40. ETHER QUICK-START (Continued).



TA 074574

Section XVI BATTERIES AND POWER GENERATING SYSTEM

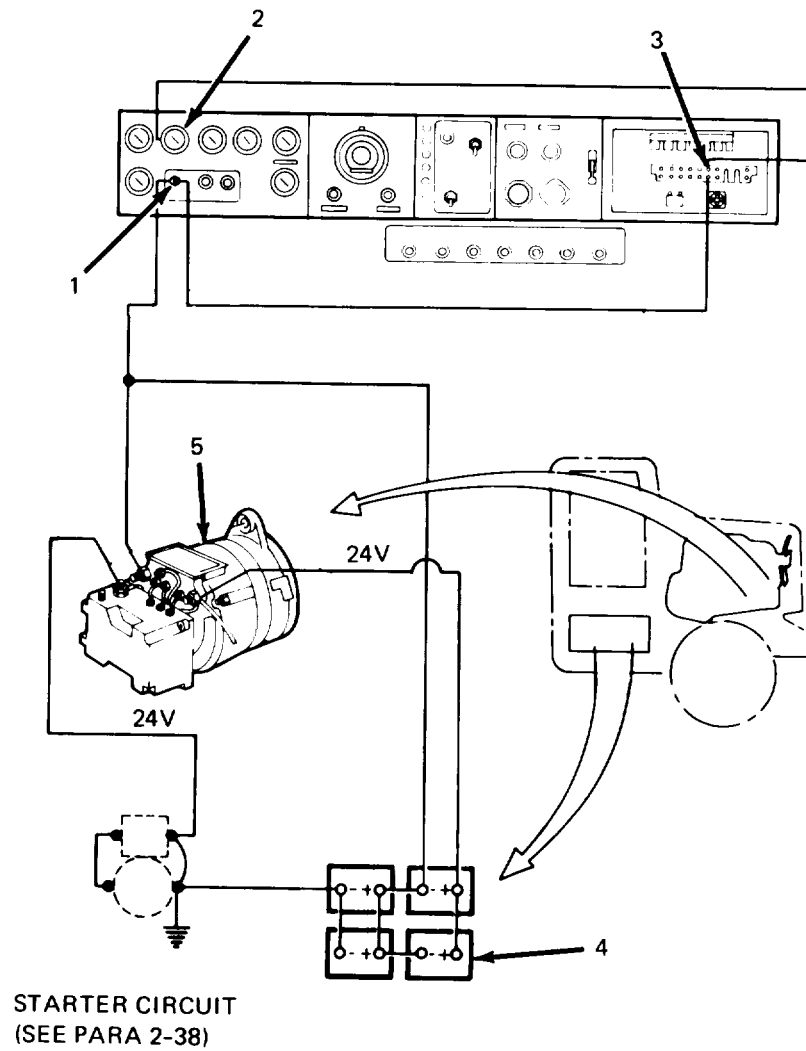
2-41. INTRODUCTION.

The battery and generating system provides 12- and 24-volt power to electrical systems in M915 thru M920 vehicles. The power generating system is identical for all vehicles.

2-42. BATTERIES AND POWER GENERATING SYSTEM.

1. ENGINE RUN SWITCH. Supplies 12-volt power from batteries through switch, circuit breaker, to voltmeter.
2. VOLTMETER. 10- to 16-volt gage indicates voltage provided by battery pack, and alternator.
3. CIRCUIT BREAKER (CB-6). Protects electrical components of volt meter circuit by opening when load exceeds 20 amps. Automatically recycles until overload is removed.
4. BATTERY PACK. Comprised of four 12-volt, maintenance-free batteries. Two batteries wired in parallel in each set. Each set connected in series for 24-volt output. Battery pack is used for both 12- and 24-volt output.
5. AC GENERATOR (ALTERNATOR). Generates voltage for recharging battery pack. Has external 24-volt transformer rectifier.

2-42. BATTERIES AND POWER GENERATING SYSTEM (Continued).



Section XVII SERVICE LIGHTING SYSTEM

2-43. INTRODUCTION.

The service lighting system provides illumination required while operating the vehicles. This system is comprised of the following subsystems:

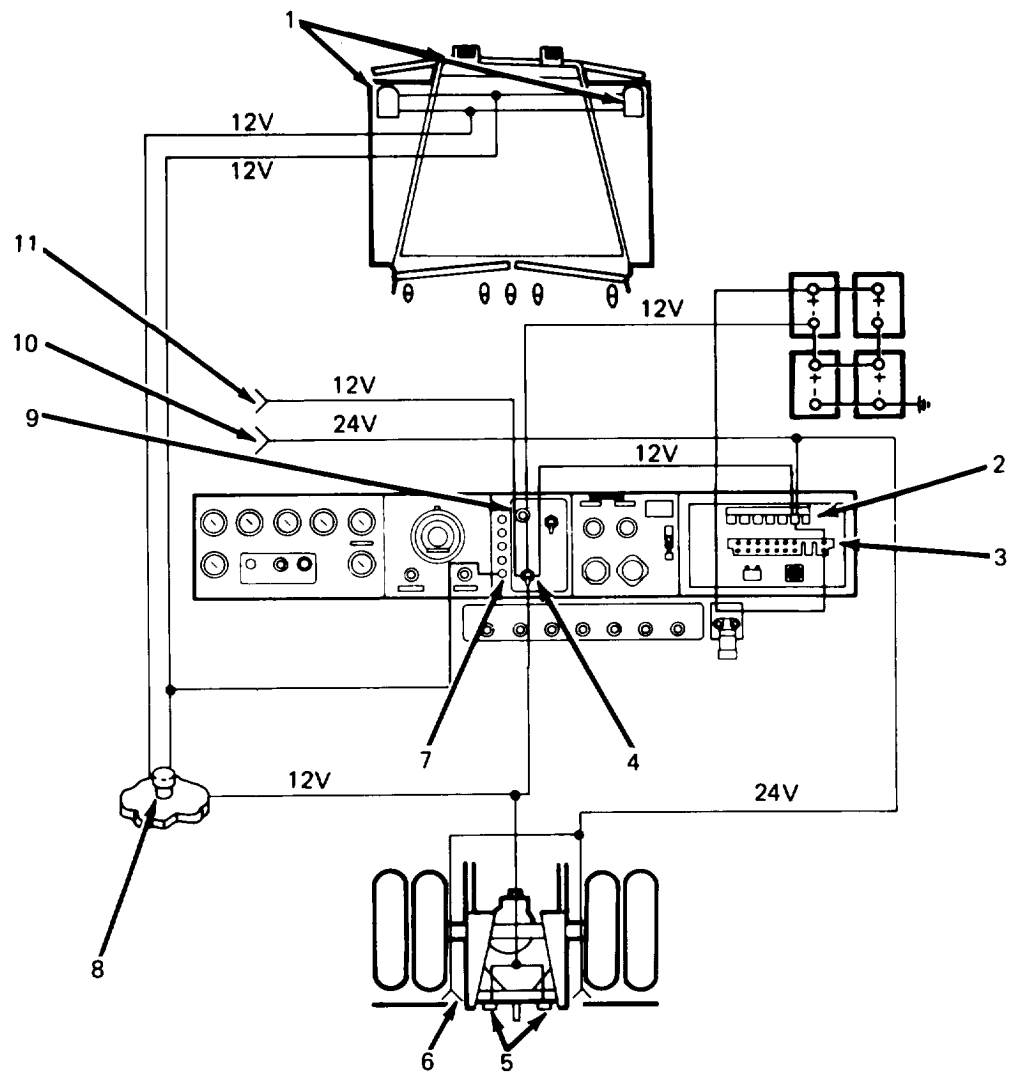
- a. Headlamps and Tail Lamps (para 2-44).
- b. Marker and Clearance Lamps (para 2-45),
- c. Turn Signals and Hazard Warning Lamps (para 2-46).
- d. Backup Lamps (para 2-47).
- e. Work Lamps (para 2-48).
- f. Instrument and Cab Dome Lamps (para 2-49).
- g. Stop Lamps (See brake switches and indicators (para 2-63)).

Individual circuit descriptions, except stop lamps, follow in this section. You can find a complete electrical schematic diagram and wiring harness diagrams in Appendix D.

2-44. HEADLAMPS AND TAIL LAMPS.

When headlamp switch is on, and operation lamp switch is in NORMAL, battery power is supplied to illuminate the headlamps and tail lamps as well as the trailer tail lamps on the M915, M916, M917, and M920. The trailer tail lamps are powered through tractor chassis receptacles.

1. HEADLAMPS. Each assembly has two filaments in a sealed unit, a high beam and a low beam. Selection of high or low beam is controlled by the dimmer switch.
2. RELAY (K6). Normally open contacts; energized by 12-volt power from operation lamp switch when in NORMAL and headlamp switch is in on position. When relay is closed, 24-volt power is applied to trailer tail lamps, through circuit breaker and tractor receptacles.
3. CIRCUIT BREAKER (CB-8). Protects electrical components of 24-volt relay circuit by opening when load exceeds 20 amps. Automatically recycles until overload is removed.
4. OPERATION LAMP SWITCH. Two-position safety switch for NORMAL and BLACKOUT modes of operation. To select mode, switch is pulled out and placed to either position. Set to NORMAL, 12-volt power from the lamp switch passes through operation lamp switch contacts to energize; tail lamps, headlamps (through dimmer switch), and coil of relay. Set to BLACKOUT, 12-volt power is removed from regular service lamps, electric horn, and backup alarm, while 12-volt power from the lamp switch is supplied through the switch to blackout tail lamps, marker lamps, and headlamp.
5. TAIL LAMPS. Each assembly contains two bulbs: A double-element bulb provides tail lamp, turn signal lamp, and stop lamp. A separate bulb is used for the backup lamp. The tail lamp circuit is energized through the operation lamp switch when headlamp switch is in either ON position. (The circuits for turn signals, stop lamps, and backup lamps are described in paragraph 2-46 and 2-47).

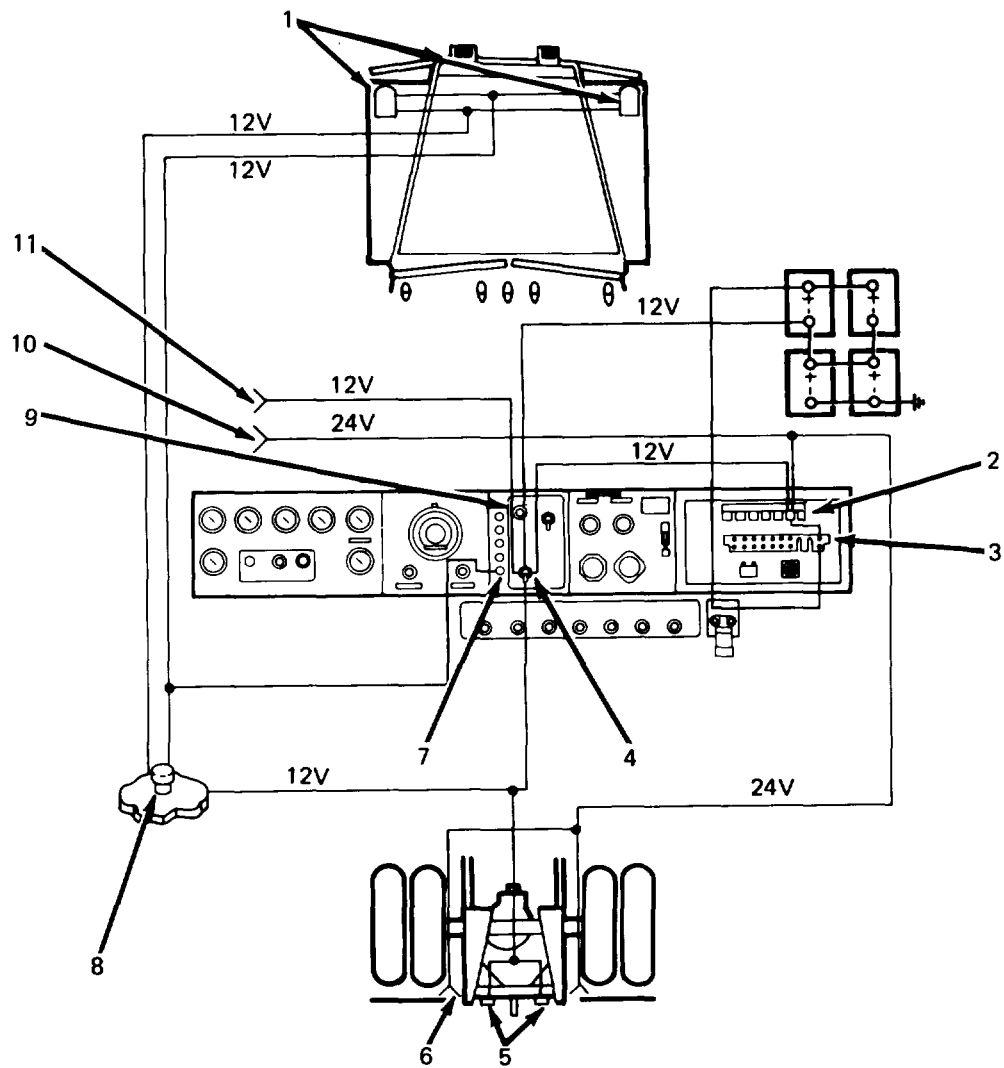
2-44. HEADLAMPS AND TAIL LAMPS (Continued).

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2-44. HEADLAMPS AND TAIL LAMPS (Continued).

6. 24-VOLT TRAILER RECEPTACLE (M915, M916, M917, and M920). Tractor chassis mounted 12-pin connector to provide power to lunette-towed vehicles. (This receptacle is 12-volts on the M917).
7. HIGH-BEAM INDICATOR. When power is supplied to each high-beam filament in the headlamps, the high-beam indicator is illuminated via the same circuit.
8. DIMMER SWITCH. Two-position, floor-mounted switch. The switch is always closed in one of two positions to energize either the low-beam or high-beam filament.
9. HEADLAMP SWITCH. Three-position with one OFF position and two ON positions, When the switch is pulled out to the second detented ON position, 12-volt power is supplied to the lighting systems through operation lamp switch. (The first detented position on the switch energizes the circuit for tail lamps, but not the headlamps.) The switch has an integral circuit breaker that opens to protect the complete circuit in the event of a "short" or faulty wiring. The circuit breaker is a recycling type; that is, it opens when the circuit is overloaded and cycles until the fault is removed.
10. 24-VOLT TRAILER RECEPTACLE (M915, M916, and M920). Tractor chassis mounted 12-pin connector, provides 24 volts to trailer for lighting and tail lamps.
11. 12-VOLT TRAILER RECEPTACLE (M915, M916, and M920. Tractor mounted seven-pin connector provides 12 volts to trailer for lighting.

2-44. HEADLAMPS AND TAIL LAMPS (Continued).

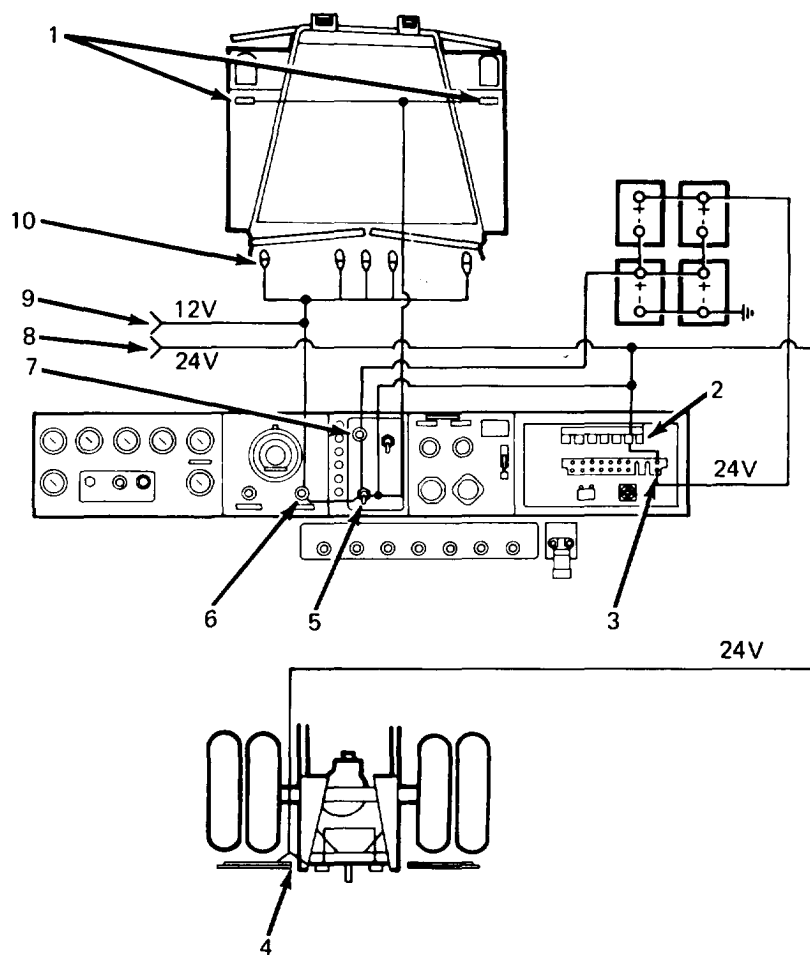


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2-45. MARKER AND CLEARANCE LAMPS.

When headlamp switch is in either ON position, the operation lamp switch is in NORMAL position, 12-volt power is supplied to illuminate clearance lamps and front marker lamps as well as the trailer marker lamps on M915, M916, M917, and M920 vehicles. The trailer marker lamps receive power through receptacles mounted on the tractor chassis.

1. **MARKER LAMP ASSEMBLY.** Each assembly has two bulbs that illuminate whenever headlamp switch is ON and operation lamp switch is in NORMAL. One bulb is used as a marker lamp, and the other is for turn signals (para 2-46).
2. **RELAY (K6).** Normally open contacts; 12-volt power energizes relay when operation light switch is in NORMAL and headlamp switch is ON. When contacts of relay close, 24 volts from circuit breaker CB-8 is supplied to tractor chassis receptacles.
3. **CIRCUIT BREAKER (CB-8).** Protects electrical components for 24-volt tractor receptacle circuits by opening when load exceeds 20 amps, Automatically recycles until overload is removed.
4. **24-VOLT TRAILER RECEPTACLE (M915, M916, M917, and M920).** 12-pin connector for 24-volt power used for lunette-towed vehicles. (This receptacle is 12-volts on the M917).
5. **OPERATION LAMP SWITCH.** With the switch set to NORMAL and the headlamp switch ON, 12-volt power is supplied to marker lamps, clearance lamps, and 12-volt tractor receptacle.
6. **CLEARANCE LAMP SWITCH.** Provides the capability of flashing the clearance lamps on the cab and the 12 volt supplied to the tractor receptacle, when switch is depressed and released. 12-volt power is supplied to the switch when headlamp switch is ON and operation switch is in NORMAL.
7. **HEAD LAMP SWITCH.** Supplies 12-volt power, when in either ON position, through operation lamp switch in NORMAL, to clearance lamps, marker lamps, and 12-volt tractor receptacle.
8. **24-VOLT TRAILER RECEPTACLE (M915, M916, and M920).** 12-pin connector containing 24-volt circuit for trailer marker lamps.
9. **12-VOLT TRAILER RECEPTACLE (M915, M916, and M920).** Seven-pin connector containing 12-volt circuit for trailer clearance and marker lamps.
10. **CLEARANCE LAMPS.** Each unit has a replaceable single-element bulb that illuminates when headlight switch is in either ON position, and operation lamp switch is in NORMAL. The clearance lamps will flash when clearance lamp switch is depressed and released.

2-45. MARKER AND CLEARANCE LAMPS (Continued).

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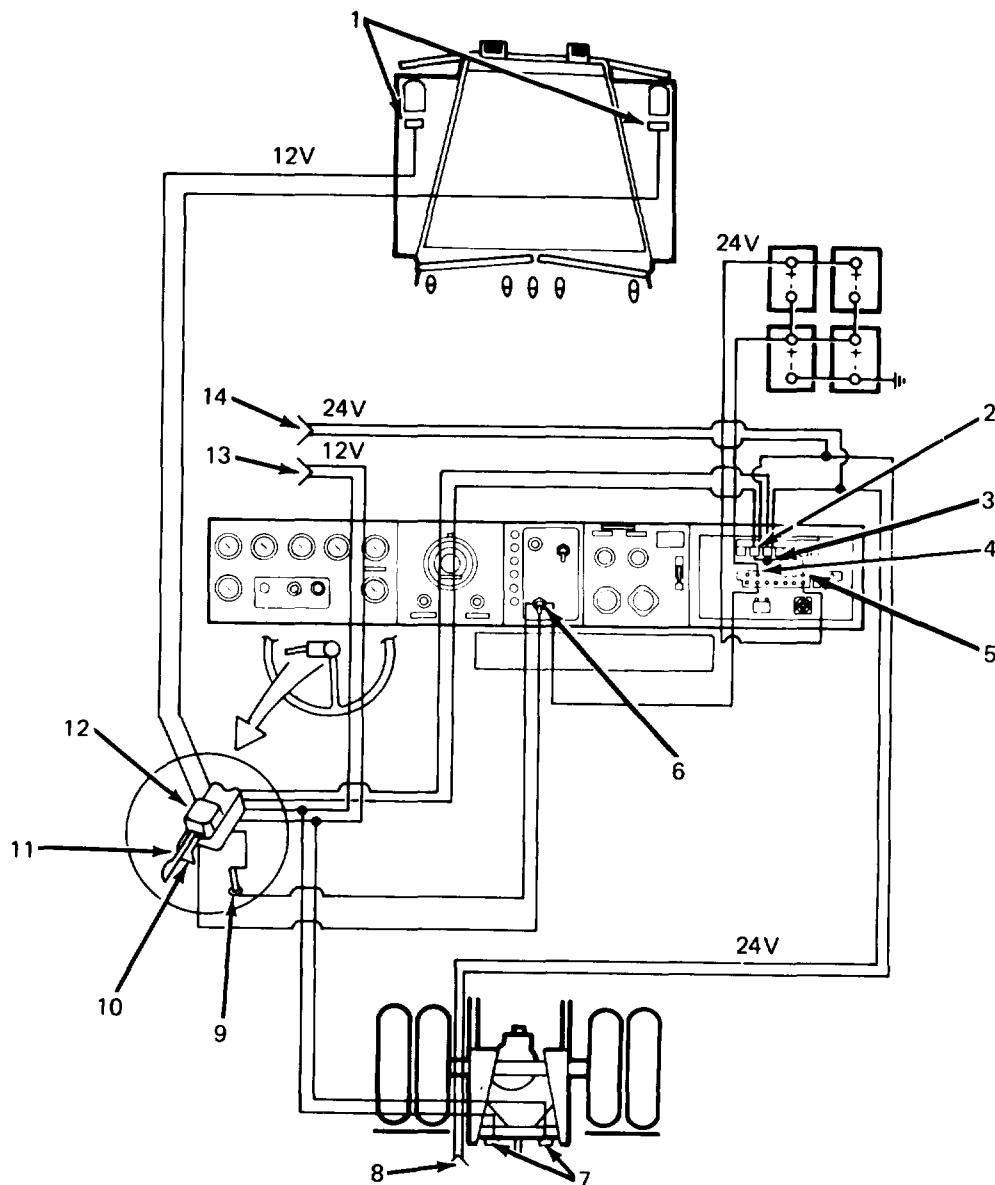
2-46. TURN SIGNAL AND HAZARD WARNING LAMPS.

When the operation lamp switch is in NORMAL position, battery power is applied to the turn signal control to illuminate right or left: front turn signals, rear turn signals as well as trailer turn signals on M915, M916, M917, and M920 vehicles through tractor-mounted receptacles. Also, the turn signal control contains a hazard warning switch, that allows the operator to flash all lamps in the turn signal system simultaneously.

1. MARKER AND TURN SIGNAL LAMP ASSEMBLY. Each assembly has a replaceable single filament bulb that flashes when turn signal control or hazard warning switch is on.
2. RELAY (K2). Normally open contacts; closed by 12 volts from left turn signal control or hazard warning switch. When relay is energized, 24 volts is applied to tractor mounted receptacles for trailer left turn signals.
3. RELAY (K3). Normally open contacts; closed by 12 volts from right turn signal control or hazard warning switch. When relay is energized, 24 volts are applied to tractor mounted receptacles for trailer right turn signals.
4. CIRCUIT BREAKER (CB-2). Protects electrical components of flasher, turn signal control, and hazard warning switch circuits by opening when load exceeds 20 amps. Automatically recycles until overload is removed.
5. CIRCUIT BREAKER (CB-7). Protects electrical components of 24-volt relay and circuits by opening when load exceeds 20 amps. Automatically recycles until overload is removed.
6. OPERATION LAMP SWITCH. Two-position switch for normal and blackout modes of operation. When set to NORMAL, 12-volt battery power from circuit breaker (CB-2) passes through switch contacts to turn signal control, flasher unit, and hazard warning switch.
7. REAR TAIL LAMPS. Each assembly contains two bulbs; the tail lamp turn signal and stop lamp circuits all use the same bulb. When either the turn signal control or hazard warning switch are on, the turn signal and stop lamp filaments flash. When the turn signal control is activated, only the bulb on the side selected flashes. If the brakes are engaged at the same time that the hazard warning switch is on, both bulbs flash. When the brakes are engaged and the turn signal control is activated, one bulb will flash and the other bulbs will remain on constantly.
8. 24-VOLT TRAILER RECEPTACLE (M915, M916, M917, and M920). Tractor mounted 12-pin connector provides 24 volts power to lunette-towed vehicles. This receptacle is 12-volts on the M917.
9. FLASHER UNIT. This unit receives 12-volt power from operation lamp switch in NORMAL position and supplies this power alternately on and off to turn signal control or hazard warning switch when either one is engaged.
10. HAZARD WARNING SWITCH. When this switch is engaged, it receives 12-volt power from the operation lamp switch and energizes all components in the turn signal circuits simultaneously.
11. TURN SIGNAL CONTROL. When this control is engaged, it receives 12-volt power from flasher unit. (The flasher unit receives 12-volt power through operation lamp switch and circuit breaker CB-2.) Power is then supplied to:
 - a. Front left or right turn signals.
 - b. Rear left or right turn signals.
 - c. 12-volt Trailer Receptacle.
 - d. Relays K2 and K3 (To energize relay and supply power to both tractor mounted 24-volt receptacles for trailer turn signals.)

2-46. TURN SIGNAL AND HAZARD WARNING LAMPS (Continued).

12. INDICATOR LAMPS. Three bulbs to indicate left turn (green), right turn (green), or hazard (red). The bulbs are energized, by selection, with 12-volt power from the flasher unit.
13. 12-VOLT TRAILER RECEPTACLE (M915, M916, and M920). Tractor mounted seven-pin connector provides 12-volt power to the trailer turn signal lamps.
14. 24-VOLT TRAILER Receptacle (M915, M916, and M920). Tractor mounted 12-pin connector provides 24-volts power to the trailer turn signal lamps.



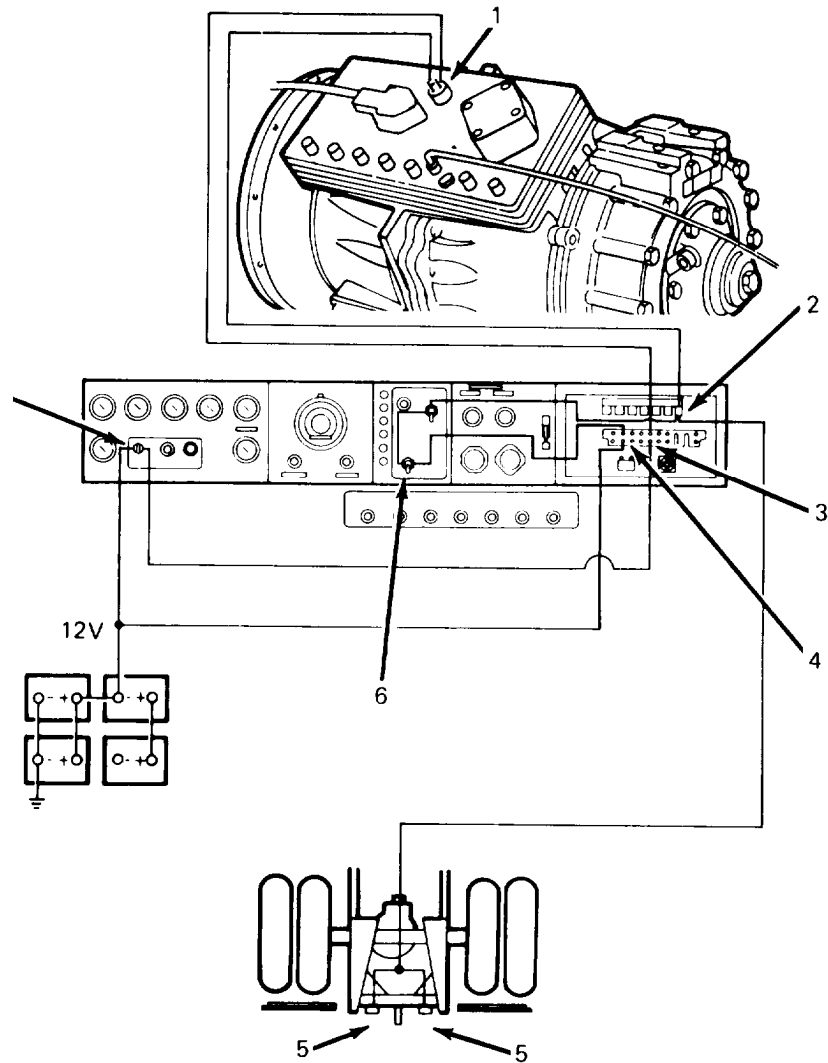
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2-47. BACKUP LAMPS.

When the operator places the gear ratio selector lever in reverse position (R1 or R2), air pressure within the transmission closes backup switch. When operation lamp switch in NORMAL position and engine run switch ON, the circuit is energized to illuminate each backup bulb in tail lamp assembly.

1. **BACKUP SWITCH.** The switch is normally open. When closed, it receives 12-volt battery power through circuit breaker CB-5 and supplies power through normally closed contacts of relay K7 to energize backup lamps in tail lamp assemblies.
2. **RELAY (K7).** The relay is normally closed. When the operation lamp switch is placed to BLACKOUT position, 12-volt power is supplied to coil of K7, energizing the relay, and opens the contacts. This prevents the backup lamps from coming on whenever the operation lamp switch is in BLACKOUT mode.
3. **CIRCUIT BREAKER (CB-5).** Protects electrical components of backup switch circuit by opening when load exceeds 20 amps. Automatically recycles until overload is removed.
4. **CIRCUIT BRAKER (CB-2).** Protects electrical components of relay K7 circuits by opening when load exceeds 20 amps. Automatically recycles until overload is removed.
5. **TAIL LAMP.** Each assembly contains two bulbs: A tail, turn signal, and stop lamp bulb which contain two filaments and backup bulb which contains one filament. When the backup switch closes, the backup lamp illuminates.
6. **OPERATION LAMP SWITCH.** Two-position switch for NORMAL AND BLACKOUT modes of operation. In this circuit, the switch is used to prevent operation of the backup lamp. In BLACKOUT position, 12-volt power from circuit breaker CB-2 passes through the switch and energizes coil of relay K7, thus preventing the backup lamps from possibly coming on.
7. **ENGINE RUN SWITCH.** This switch controls 12-volt power to the backup switch through circuit breaker CB-5. When the switch is off the backup lamp circuit is de-energized.

2-47. BACKUP LAMPS (Continued).

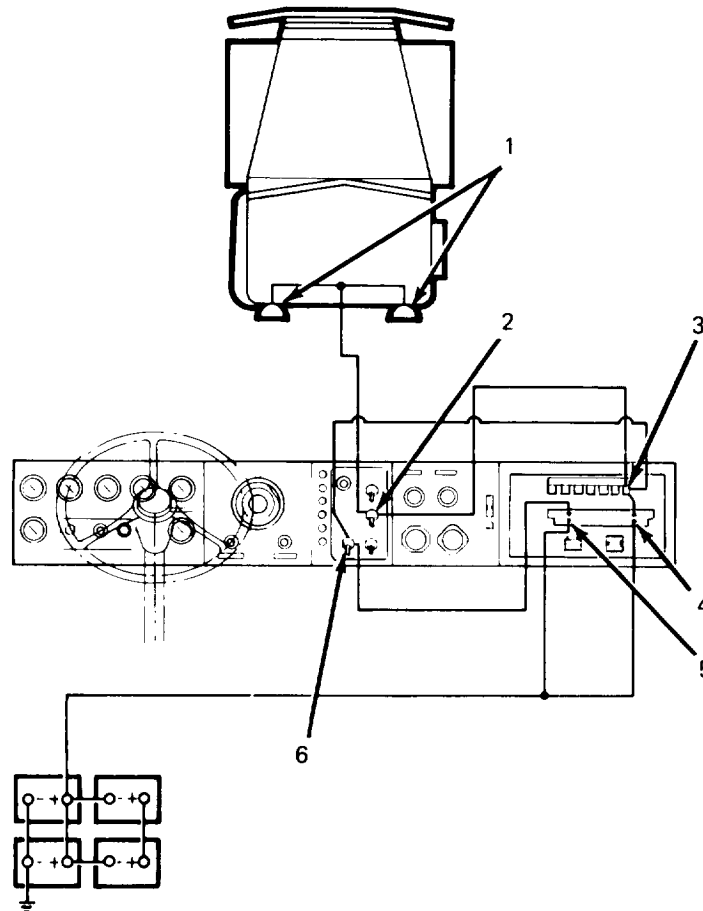


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2-48. WORK LAMPS (M916 AND M920).

When the operation switch is in NORMAL position, and the operator places the work lamps switch to ON, 12-volt power is supplied to the work lamps on the M916 and M920 vehicles.

1. WORK LAMPS. Each assembly contains a single filament sealed beam unit. When the operation switch is in NORMAL and the work lamps switch is ON, the work lamps come on.
2. WORK LAMPS SWITCH. Two-position switch for ON and OFF mode of operation. When the switch is ON, 12-volt power is supplied through CB-2, normally closed contacts of relay K8, to the work lamps.
3. RELAY (K8). The relay is normally closed. When the operation switch is placed to BLACK-OUT, 12-volt power is supplied to coil of K8, energizing the relay, and opens the contacts. This prevents the work lamps from coming on whenever the operation switch is in the BLACKOUT mode.
4. CIRCUIT BREAKER (CB-9), Protects electrical components of work lamps circuit by opening when load exceeds 20 amps. Automatically recycles until overload is removed.
5. CIRCUIT BREAKER (CB-2). Protects electrical components of relay K8 circuits by opening when load exceeds 20 amps. Automatically recycles until overload is removed.
6. OPERATION SWITCH. Two-position switch for NORMAL and BLACKOUT modes of operation. In this circuit, the switch is used to prevent operation of the work lamps. In BLACKOUT position, 12-volt power from circuit breaker CB-2 passes through the switch and energizes coil of relay K8, thus preventing the work lamps from being turned on.



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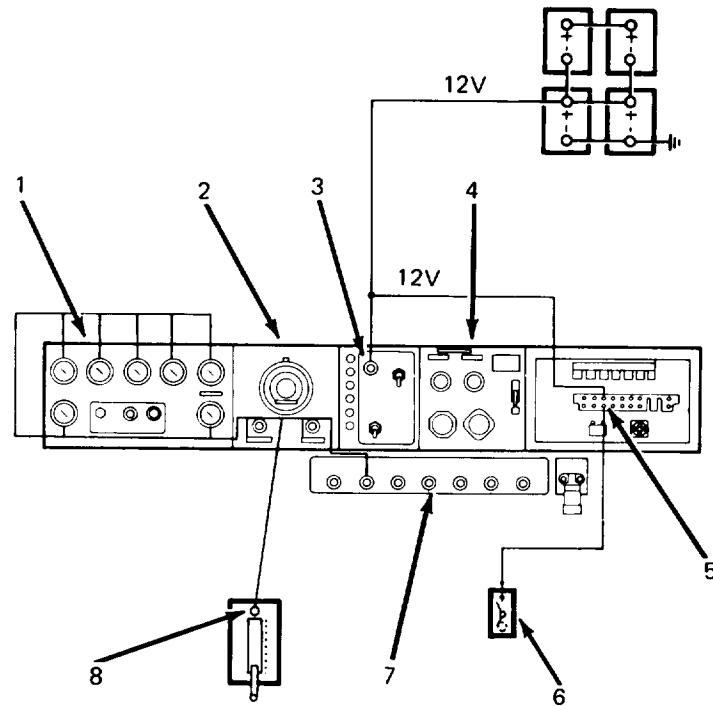
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2-49. INSTRUMENT AND CAB DOME LAMPS.

- a. With the headlamp switch in either ON position, the instrument lamps illuminate. The dome lamp illuminates whenever the dome lamp switch is ON.
 - b. The low air pressure warning lamp on left-hand cluster, clearance lamp on center cluster and six indicator lamps on the right-hand cluster are described with their respective circuits in this chapter. That is, the high engine temperature warning indicator is described with the cooling system; low oil pressure warning indicator with the oil system, etc., (see table of contents).
1. LEFT HAND INSTRUMENT CLUSTER. The instrument gage lamps on this panel receive 12-volt power from headlamp switch when it is in either ON position. Each gage contains its own illumination bulb.
2. CENTER INSTRUMENT CLUSTER. The center cluster contains the tachograph which is illuminated when the headlamp switch is in either ON position.
3. HEADLAMP SWITCH. Three-position switch with one OFF position and two ON positions. In either ON position, 12-volt battery power passes through the switch to energize the following lamp in this circuit:
 - a. Instrument lamps on left-hand instrument cluster.
 - b. Clearance switch and tachograph illumination lamps on center cluster.
 - c. Switch and functional indicators on right-hand instrument cluster.
 - d. Illumination lamps on heater panel.
 - e. Illumination lamps on ratio selector.

The headlamp switch has a variable rheostat that allows the operator to adjust the brightness of all lamps in this circuit by turning the switch knob.

4. RIGHT-HAND INSTRUMENT CLUSTER. The instrument lamps on this cluster receive 12-volt power from the headlamp switch and illuminate the windshield wiper, and windshield washer indicator.
5. CIRCUIT BREAKER (CB-3). Protects electrical components of dome lamp circuit by opening when load exceeds 20 amps. Automatically recycles until overload is removed.
6. DOME LAMP AND SWITCH ASSEMBLY. When the assembly integral switch is ON, the lamp is energized by 12-volt battery power through circuit breaker (CB-3).
7. HEATER PANEL LAMPS. When the headlamp switch is in either ON position, the lamps are energized by 12-volt battery power and illuminates the heater control panel.
8. GEAR RATIO SELECTOR LAMP. When the headlamp switch is in either ON position, the lamp is energized by 12-volt battery power and illuminates the gear ratio selector.

2-49. INSTRUMENT AND CAB DOME LAMPS (Continued).

Section XVIII BLACKOUT LIGHTING SYSTEM

2-50. INTRODUCTION.

The blackout lighting system prevents operation of the horn, backup alarm, and all service lighting (para 2-43), except instrument lamps, and dome lamp. The system provides the following intensity lighting for blackout operation on all M915 series vehicles:

- a. One headlamp.
- b. Two front marker lamps.
- c. Two tail and stop lamps.
- d. Trailer tail, stop, and marker lamps on M915, M916, M917, and M920 at the 12-pin trailer receptacles.

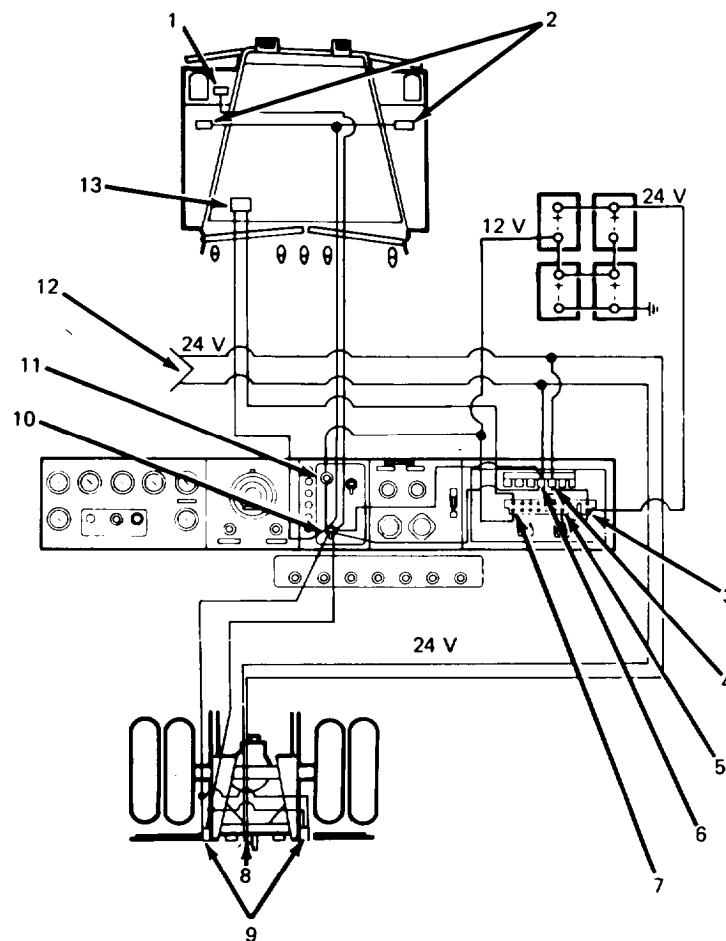
2-51. BLACKOUT LIGHTING SYSTEM.**NOTE**

In reading the following component description you should remember that the OPERATION switch is in BLACKOUT position.

1. BLACKOUT HEADLAMP. The lamp consists of a single, replaceable sealed beam unit. With the headlamp switch in the ON position, the blackout headlamp is energized by a 12-volt battery power.
2. BLACKOUT MARKER LAMPS. Each lamp consists of a replaceable bulb which is energized by 12-volt battery power when the headlamp switch is in either ON position.
3. CIRCUIT BREAKER (CB-8). Protects electrical components for 24-volt blackout stop lamp relay circuit by opening when load exceeds 20 amps. Automatically recycles until overload is removed.
4. RELAY (K5). Normally open contacts: Closed by 12-volt power when the operation switch is in BLACKOUT. When relay is energized, 24-volt power is supplied from circuit breaker CB-7 through 24-volt trailer receptacle for blackout tail lamps.
5. CIRCUIT BREAKER (C B-7). Protects electrical components for 24-volt blackout tail lamp relay circuit by opening when load exceeds 20 amps. Automatically recycles until overload is removed.
6. RELAY (K4). Normally open contacts: Closed by 12-volt power when the operation switch is in BLACKOUT. When relay is energized, 24-volt power is supplied from circuit breaker CB-8 through 24-volt trailer receptacle.
7. CIRCUIT BREAKER (CB-1). Protects electrical components for stop switch circuit by opening when load exceeds 20 amps. Automatically recycles until overload is removed.
8. 24-VOLT TRAILER RECEPTACLE (M915, M916, M917, and M920). Tractor mounted 12-pin connector to provide 24-volt battery power to lunette - towed trailers for blackout tail and stop lamps. This receptacle is 12-volts on M917.

2-51. BLACKOUT LIGHTING SYSTEM (Continued).

9. REAR BLACKOUT LAMPS. Contains the bulbs for blackout tail and stop lamps. The blackout tail lamp is energized when the operation switch is in BLACKOUT and the headlamp switch is in either ON position. The stop lamps are energized when the stop lamp switch is actuated.
10. OPERATION LAMP SWITCH. Two-position switch for NORMAL and BLACKOUT modes of operation. With this switch in the BLACKOUT position, 12-volt battery power is available from the headlamp switch to energize: blackout headlamp, marker lamps, tail lamps, and relay K4 and K5.
11. HEADLAMP SWITCH, Three-position switch with one OFF position and two ON positions. The switch supplies 12-volt battery power to the OPERATION lamp switch.
12. 24-VOLT TRAILER RECEPTACLE (M915, M916, and M920). Tractor mounted 12-pin connector to provide 24-volt battery power to trailer blackout tail and stop lamps.
13. STOP LAMP SWITCH. The stop lamp switch is part of the brake system and is shown and described in paragraph 2-63. In this circuit, the switch receives 12-volt battery power from circuit breaker CB-1. When the brakes are engaged, the switch closes and supplies 12-volt power through the operation lamp switch to energize relay K4. With this relay closed, 24-volt battery power is supplied through circuit breaker CB-8 to the 24-volt tractor mounted trailer receptacles.



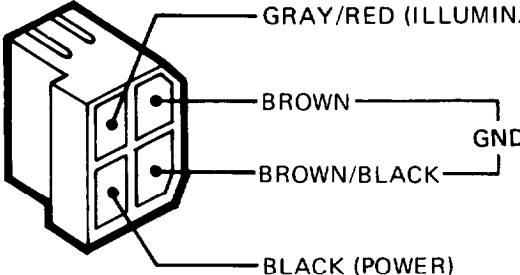
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Section XIX INSTRUMENTATION

2-52. INTRODUCTION.

Table 2-1 lists the instruments and major input connections for all M915 thru M920 vehicles. Connections for instrument gage lamps have been omitted. (See wiring diagram in Appendix D.) You will find an illustration or schematic diagram for each listed instrument by using the Reference/Illustration column of the table.

Table 2-1. Instruments.

Instrument	Input Connections	Reference Illustration (Para)
TACHOGRAPH	Tachometer cable from fuel pump on engine provides engine speed input. Speed cable from transmission provides vehicle speed input. 	2-7 2-12
FRONT WHEEL BRAKE AIR PRESSURE GAGE	Pneumatic line from front brake system.	2-62
REAR WHEEL BRAKE AIR PRESSURE GAGE	Pneumatic line from rear brake system.	2-62
PUSHER AXLE AIR PRESSURE GAGE (M917, M919, M920)	Pneumatic line from air bag pressure system.	2-16
VOLTMETER	Power wire from circuit breaker.	2-42
FUEL GAGE	Signal wire from sending unit in fuel tank. Power wire from circuit breaker.	2-24
OIL PRESSURE GAGE	Signal wire from sending unit on engine. Power wire from circuit breaker.	2-28
WATER TEMPERATURE GAGE	Signal wire from temperature transmitter on engine. Power wire from circuit breaker.	2-33
TRANSMISSION OIL TEMPERATURE	Signal wire from sending unit on transmission. Power wire from circuit breaker.	2-12

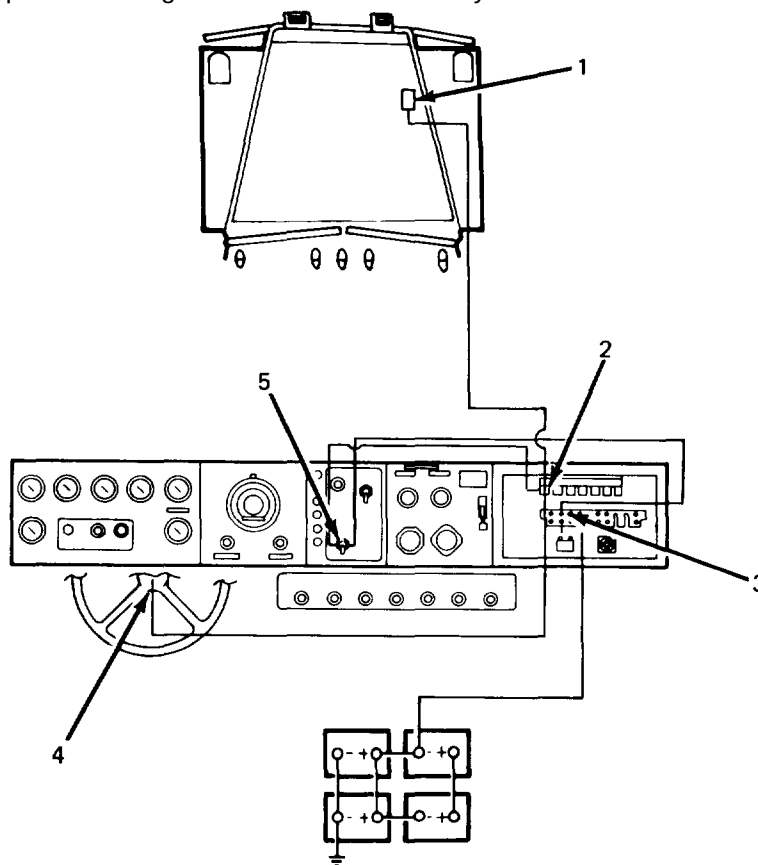
Section XX ELECTRIC HORN

2-53. INTRODUCTION.

The electric horn circuit is identical on all M915 thru M920 vehicles.

2-54. ELECTRIC HORN

1. **ELECTRIC HORN.** The horn is energized by 12-volt battery power when horn button is depressed and operation lamp switch is in NORMAL position.
2. **RELAY (K1).** When horn button is depressed, coil of relay is energized by 12-volt battery power from circuit breaker. With relay de-energized, 12 volts are supplied from a second lead from circuit breaker, through operation lamp switch, through contacts of relay to horn.
3. **CIRCUIT BREAKER (CB-2)** Protects electrical components of horn circuit by opening when load exceeds 20 amps. Automatically recycles until overload is removed.
4. **HORN BUTTON.** Pushing this button activates the horn circuit and energizes the horn.
5. **OPERATION LAMP SWITCH.** Two-position switch for normal and blackout modes of operation. With switch set to NORMAL and horn button depressed, 12-volt battery power from circuit breaker passes through switch contacts to relay.



TA 074585

Section XXI CAB HEATING AND VENTILATING SYSTEMS

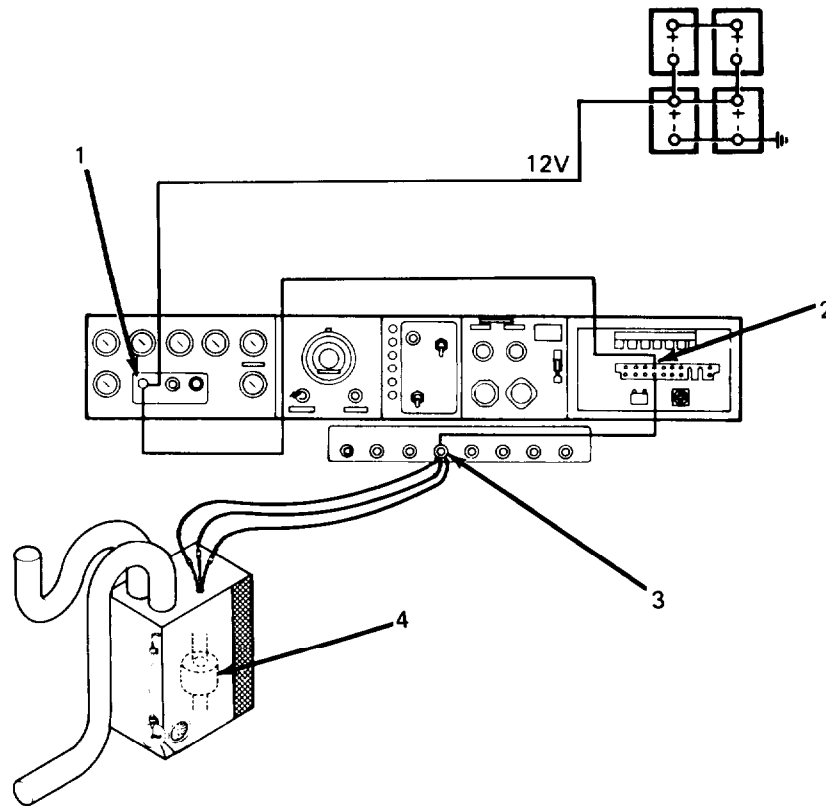
2-55. INTRODUCTION.

The cab heating and ventilating system are identical in all M915 thru M920 vehicles. This system is comprised of:

- a. Heater Electrical Control
- b. Heater Water Controls
- c. Ventilating System

2-56. HEATER ELECTRICAL CONTROLS.

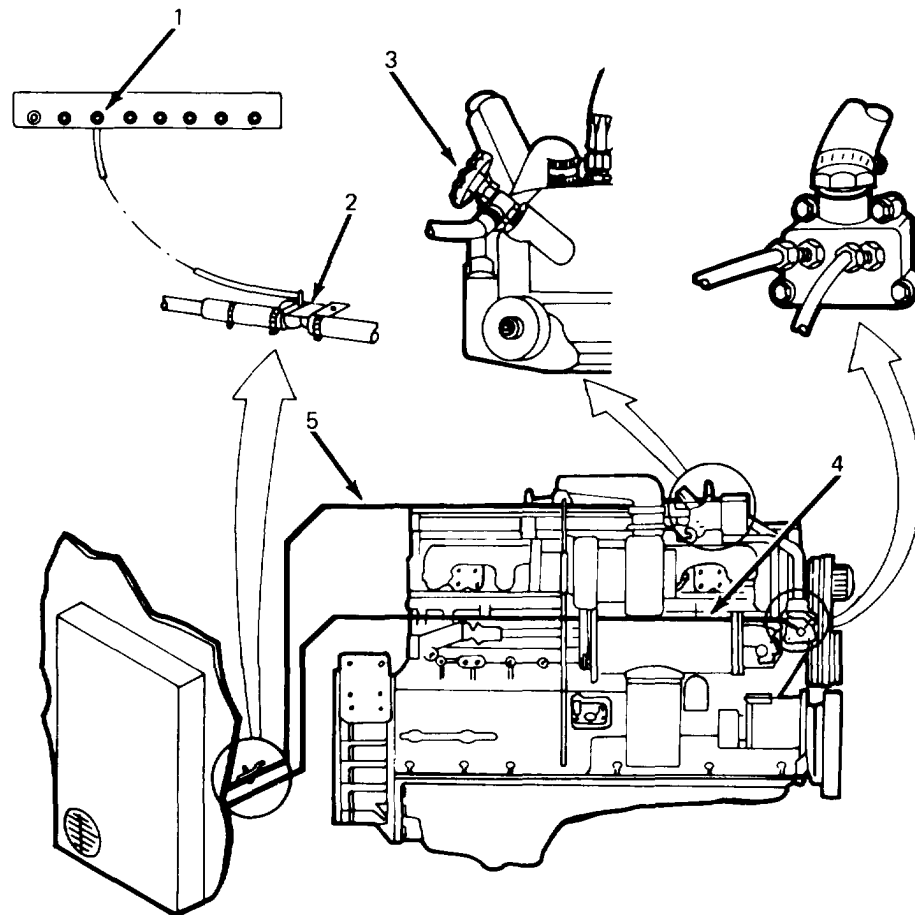
1. ENGINE RUN SWITCH. Controls 12-volt battery power to heater fan switch. When switch is OFF, fan cannot be actuated.
2. CIRCUIT BREAKER (CB-4). Protects electrical components of heater fan switch by opening when load exceeds 20 amps. Automatically recycles until overload is removed.
3. FAN SWITCH. Four-position switch with three ON positions. Supplies 12-volt battery power through circuit breaker (CB-4) to motor. Current flow increases as switch is moved from LOW to MEDIUM to HIGH.
4. MOTOR. Powers heater fan. Actuated by current from heater fan switch.



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2-57. HEATER WATER CONTROLS.

1. HEATER KNOB. Allows operator to regulate flow of coolant through control valve.
2. CONTROL VALVE. Controls heater temperature by regulating flow of hot water to heater core. Cable from heater knob in cab opens valve as knob is pulled out. Valve is spring-loaded to close as knob is pushed in. Some water passes through this valve even when it is fully closed.
3. HEATER SHUTOFF VALVE. Supplies coolant to control valve. Manual shutoff handle allows complete cutoff of coolant flow to heater.
4. HEATER RETURN TUBE. Carries coolant from heater to water pump.
5. HEATER SUPPLY TUBE. Carries coolant from control valve to heater.



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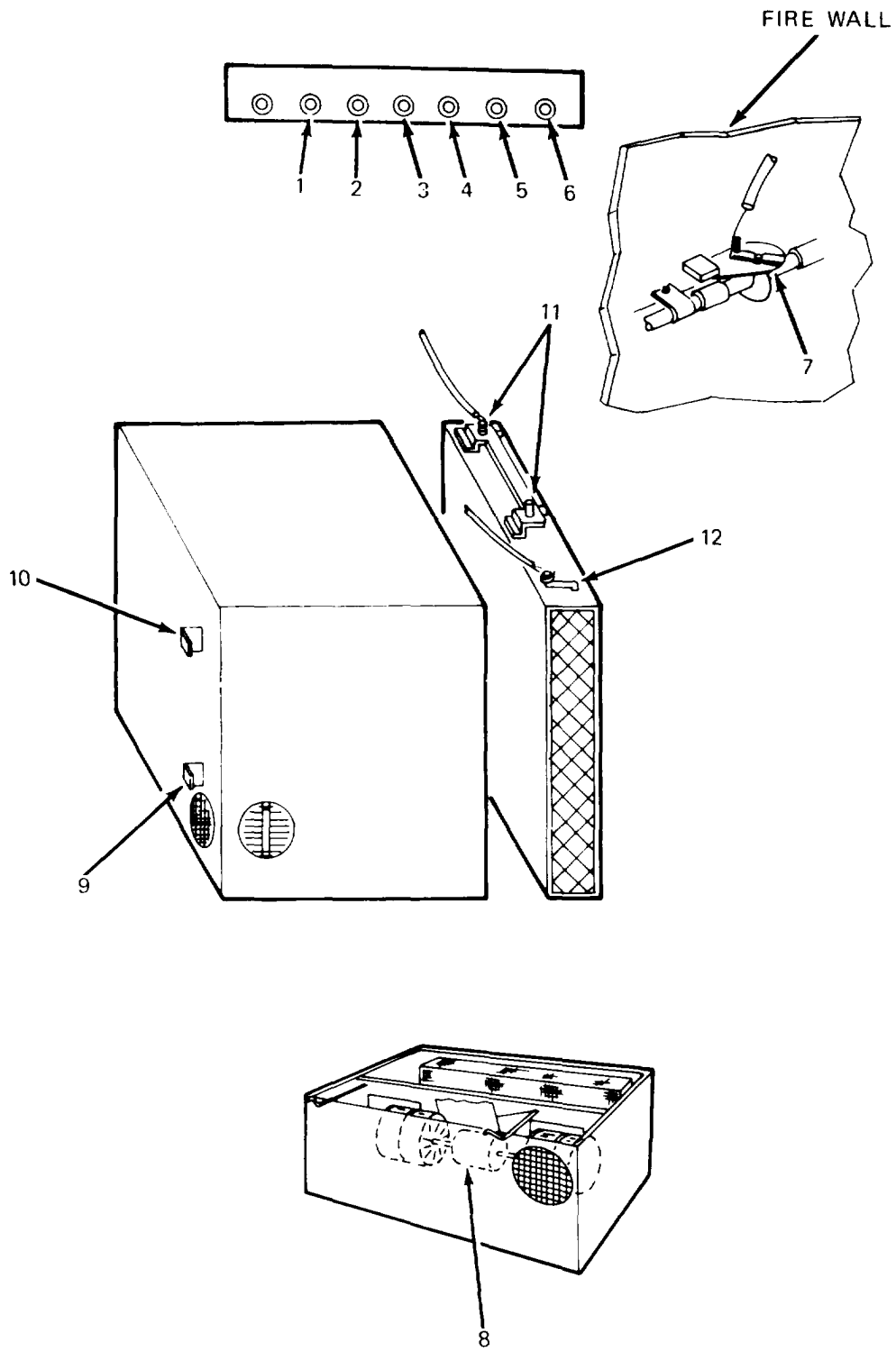
2-58. VENTILATING SYSTEM.

NOTE

The driver's fresh air vent is a manually operated unit mounted in the lower cowl side of the cab. It is not serviced at the organizational level.

1. HEAT CONTROL KNOB. Allows driver to heat cab, Connected by cable to water control valve.
2. FAN CONTROL SWITCH. Allows driver to control amount of heat in cab. Connected by electrical wires to heater motor.
3. DRIVER HEAT KNOB. Allows driver to open or close heat vent for his side of cab. Connected by cable to heat control lever.
4. PASSENGER HEAT KNOB. Allows passenger to open or close heat vent for his side of cab. Connected by cable to heat control lever.
5. FRESH VENT CONTROL KNOB. Allows driver to control fresh air vent on passenger side. Connected by cable to vent control lever.
6. RECIRCULATION VENT CONTROL KNOB. Allows driver to recirculate cab air through heater. Connected by cable to recirculation control lever.
7. WATER CONTROL VALVE. Allows flow of water through heater core. Actuated by cable from heat control knob.
8. HEATER MOTOR. Drives fan for distributing heat. Actuated by fan control switch.
9. HEAT CONTROL LEVER. Actuates flap at heat vent for passenger. Connected by cable to passenger pull knob.
10. HEAT CONTROL LEVER. Actuates flap at heat vent for driver. Connected by cable to driver pull knob.
11. RECIRCULATION CONTROL LEVER. Actuates shutter inside heater. Connected by cable to recirculation vent control knob.
12. FRESH VENT CONTROL LEVER. Actuates shutters at fresh air vent. Connected by cable to fresh vent control knob.

2-58. VENTILATING SYSTEM (Continued).



TA 074588

Section XXII COMPRESSED AIR SYSTEM

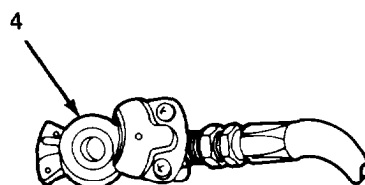
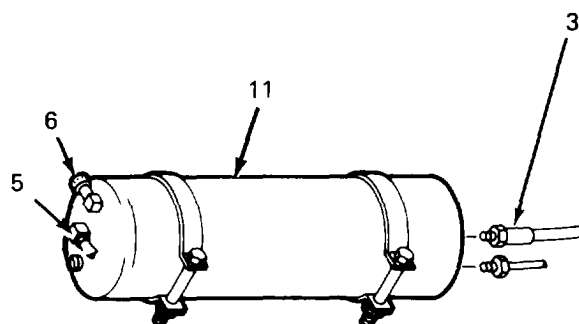
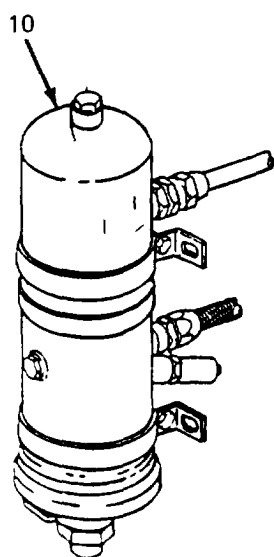
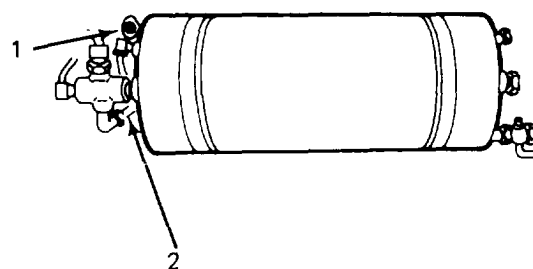
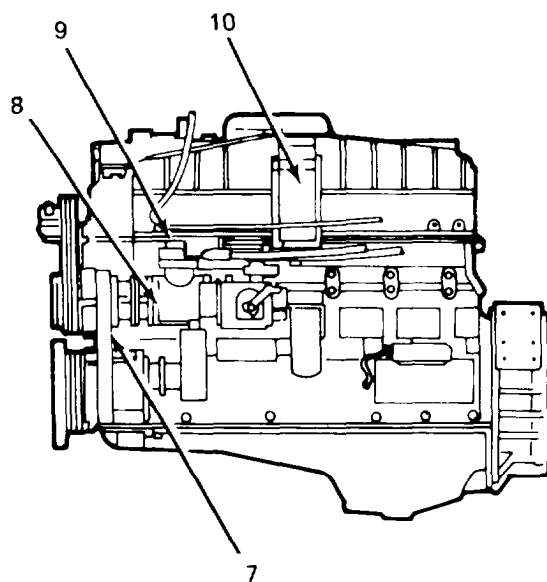
2-59. INTRODUCTION.

The compressed air supply system is the same in all M915 thru M920 vehicles.

2-60. COMPRESSED AIR SYSTEM.

1. SAFETY VALVE. Vents air when pressure in supply tank rises above 150 psi (1,034 kPa).
2. TRANSMISSION CONTROL LINE. Air supply to ratio selector valve in cab. (see para 2-12).
3. CHECK VALVE. One-way valve prevents air from flowing out of supply air reservoir back to compressor.
4. EXTERNAL AIR COUPLINGS. Tractor to trailer couplings are provided on M915, M916, and M920 models. All models are equipped with front external air couplings for brake use when the vehicle must be towed, Rear external air couplings are provided on M915, M916, M917 and M920 for brake actuation of a disabled vehicle being towed.
5. PRIMARY RESERVOIR LINE. Carries air from primary tank to supply reservoir.
6. TIRE INFLATION AIR HOSE FITTING. Used in conjunction with the tire inflation air hose and chuck.
7. ACCESSORY DRIVE. Provides power to operate compressor.
8. COMPRESSOR. Draws air from cleaner, compresses it, and directs it to supply air reservoir.
9. COMPRESSOR GOVERNOR. Opens unloading valve to vent air before compression when pressure in supply tank is above 105-125 psi (724-826 kPa).
10. AIR DRYER. Air from compressor is dried and contaminants are removed before entering the system.
11. SUPPLY AIR RESERVOIR. Receives compressed air from compressor.

2-60. COMPRESSED AIR SYSTEM (Continued).



TA 237212 ■

Section XXIII BRAKE SYSTEM

2-61. INTRODUCTION.

The brakes on all M915 thru M920 vehicles are actuated by the compressed air system (para 2-60).

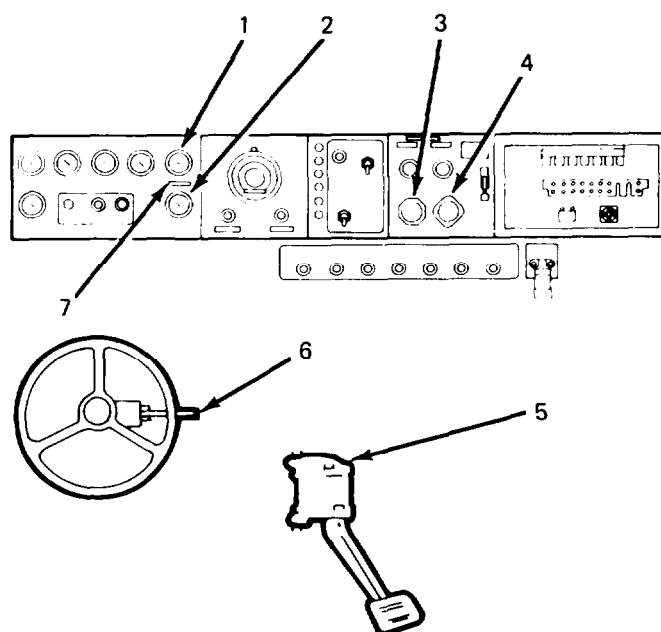
The system is comprised basically of valves and controls for dual air brakes (service and emergency). "S"- type cam brakes with two air chambers are used in the rear on all models and on the pusher axle (Models M917, M919 and M920). Wedge-type brakes with one air chamber (M916 thru M920) or two air chambers (M915 only), are used in the front. (See illustration and description of each type of brake in paragraphs 2-65 thru 2-70).

(Refer to section XXIV for description of auxiliary air powered systems.)

This section is divided into three parts: controls, switches and indicators, and system components. Since the number of air reservoirs and the arrangement of valves and lines differs with each vehicle model, a separate arrangement drawing is provided for each in paragraphs 2-65 thru 2-70. (See Appendix D for a piping schematic diagram of each vehicle model.)

2-62. CONTROLS.

1. REAR AIR PRESSURE GAGE. Direct pressure gage indicates air pressure in rear service reservoir.
2. FRONT AIR PRESSURE GAGE. Direct pressure gage indicates air pressure in front service reservoir.
3. TRAILER EMERGENCY BRAKE VALVE. In applied position, supplies pressure to trailer service and emergency air lines.
4. PARKING BRAKE VALVE. Normally supplies pressure holding spring brakes in compressed position. When knob is pulled out, valve exhausts air pressure, allowing spring brakes to apply.
5. DUAL BRAKE VALVE. Applies front and rear service brakes at the same time when brake pedal is pushed.
6. TRAILER BRAKE HAND CONTROL (M915, M916 and M920). Applies trailer brakes only. Opens connection between air supply reservoir and trailer service brake lines as it is turned clockwise.
7. LOW AIR PRESSURE WARNING INDICATOR (12-volt). Circuit normally held open, by air pressure. Closes to activate control panel indicator when pressure drops below 70 psi.

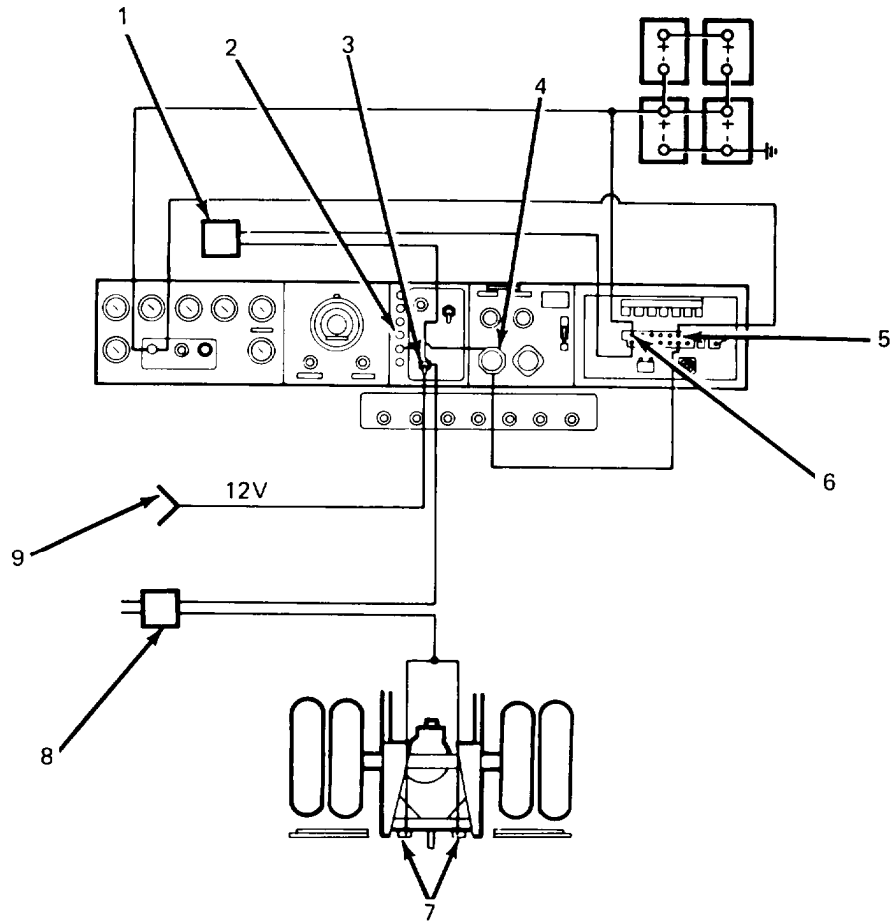


TA 074590

2-63. BRAKE SWITCHES AND INDICATORS.

1. STOP LAMP SWITCH. Normally open air actuated switch, which closes when brakes are actuated. The switch receives 12-volt battery power from circuit breaker CB-1 and supplies this power through the operation switch in NORMAL position, turn signal control to the tractor tail stop lamps. Also, with switch closed, 12-volt battery power is routed through the operation switch to the 12-volt trailer receptacle.
2. PARK BRAKE INDICATOR. Illuminates when the park brakes are applied. Indicator receives 12-volt battery power through engine run switch in ON position, circuit breaker CB-6, and actuated parking brake switch.
3. OPERATION LAMP SWITCH. Two-position switch for NORMAL and BLACKOUT modes of operation. With the switch set to NORMAL, 12-volt battery power is received from closed stop lamp switch, and circuit breaker CB-1. This 12-volt power is supplied through the turn signal control to the tractor tail stop lamp. 12-volt power is also supplied to the 12-volt trailer receptacle.
4. PARK BRAKE SWITCH. Normally open, air actuated switch on parking brake (para 2-62). Closes to energize park brake indicator when parking brakes are actuated.
5. CIRCUIT BREAKER (CB-6). Protects electrical components of parking brake circuit by opening when load exceeds 20 amps. Automatically recycles until overload is removed.
6. CIRCUIT BREAKER (CB-1). Protects electrical components of stop lamp circuit by opening when load exceeds 20 amps. Automatically recycles until overload is removed.
7. STOP TAIL LAMPS. Unit contains two bulbs, a single-filament bulb for backup, and a two-filament bulb for tail, turn signal, and stop lamps. The stop lamps receive 12-volt power through circuit breaker CB-1, closed stop lamp switch, closed contacts of operation switch, and the turn signal control.
8. CIRCUIT BREAKER (CB-6). Protects electrical components of parking brake circuit by opening when load exceeds 20 amps. Automatically recycles until overload is removed.
9. 12-VOLT TRAILER RECEPTACLE. When the stop lamp switch is closed and the operation switch is in NORMAL, 12-volt battery power is supplied to the tractor mounted receptacle for trailer stop lamps.

2-63. BRAKE SWITCHES AND INDICATORS (Continued).



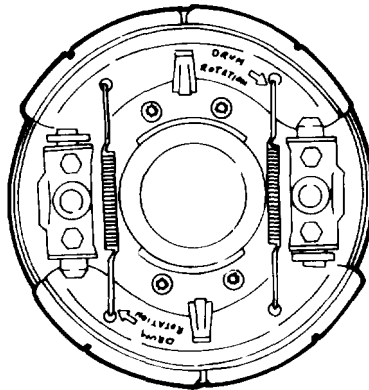
TA 074591

2-64. SYSTEM COMPONENTS.

This paragraph describes and illustrates the major components that comprise the brake system in the M915 series vehicles.

- a. Wedge Brakes.
- b. "S"- Type Cam Brake.
- c. Air Chambers.
- d. Reserve Air Reservoir. (Supply reservoir is described in compressed air system, para 2-60).
- e. Relay Valve.
- f. Double-Check Valve.
- g. Quick-Release Valve.
- h. Limiting Valve.

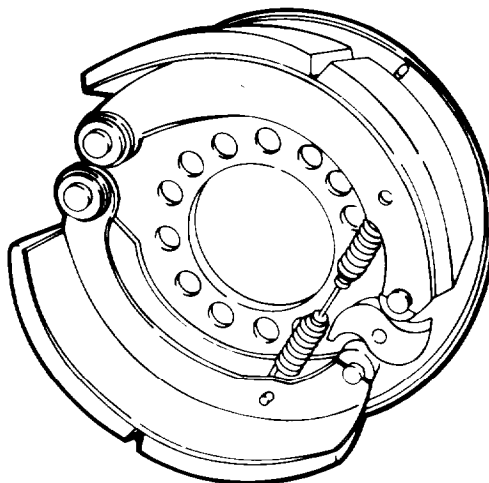
A. WEDGE BRAKES. Used on front wheels of all six vehicle models.



TA 074592

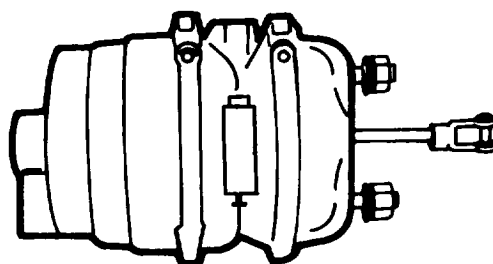
2-64. SYSTEM COMPONENTS (Continued).

- B. "S"- TYPE CAM BRAKE. Used on rear tandem axle inside wheels on all six models and pusher axle wheel on M917, M919 and M920.



- C. AIR CHAMBER. Two used on each rear tandem axle of all vehicle models. Spring loaded brake applies when air pressure drops due to:

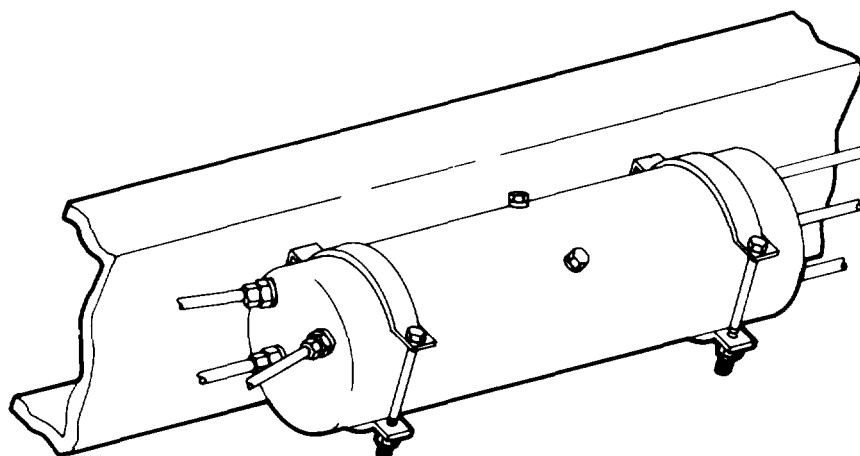
1. compressed air system failure.
2. engine shutdown.
3. application of park brakes.



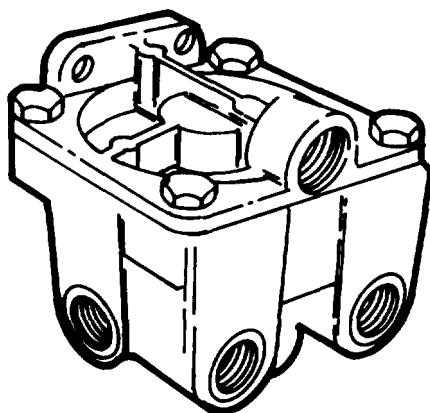
TA 074593

2-64. SYSTEM COMPONENTS (Continued).

- D. RESERVE AIR RESERVOIR. Two reserve air reservoirs are used on M915, M916, and M918; three on M917, M919, and M920. (See illustrations in para 2-65 thru 2-70.)



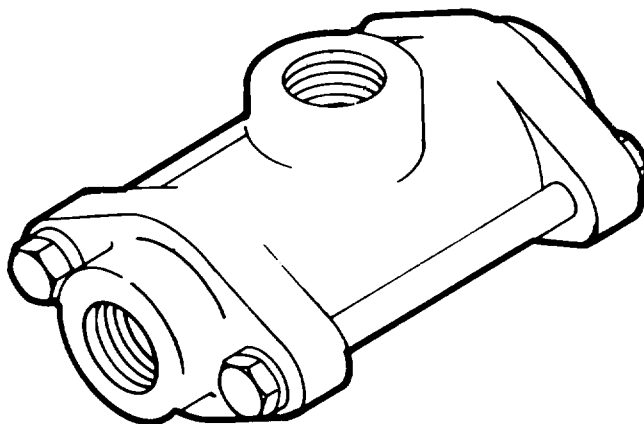
- E. RELAY VALVE. Pressure from cab brake valves control flow of air from brake reservoirs to rear axle brake chambers. Applies rear brakes faster and more firmly than if they were actuated directly by air pressure in control lines from cab.



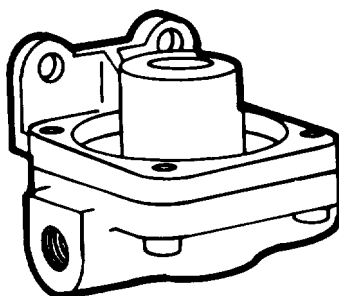
TA 074594

2-64. SYSTEM COMPONENTS (Continued).

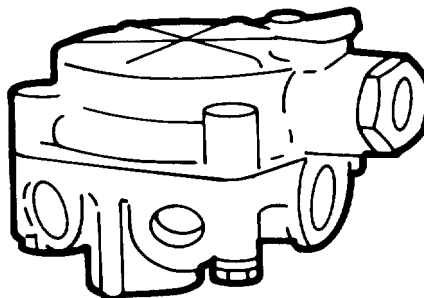
- F. DOUBLE-CHECK VALVE. Directs air flow from either of two inlet lines into a single outlet line.



- G. QUICK-RELEASE VALVE. Vents air from rear brake system when operator releases brake.

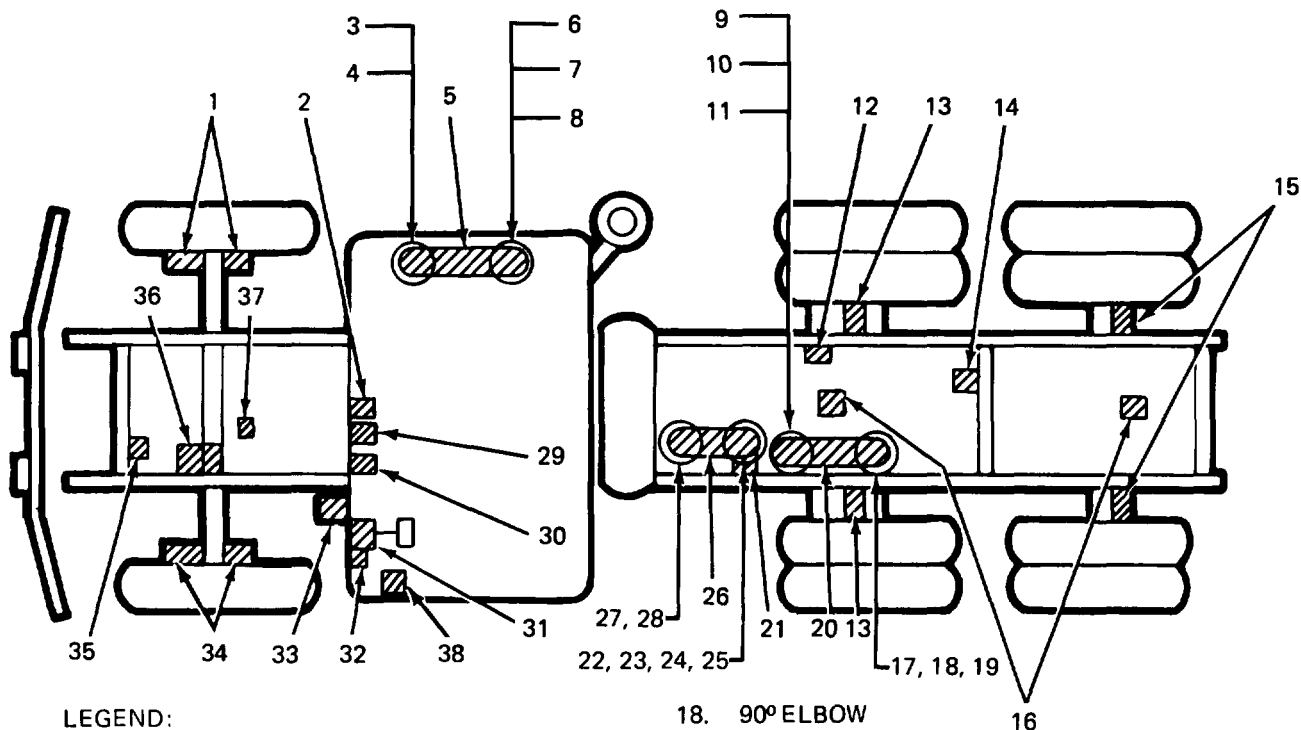


- H. LIMITING VALVE. Directs air pressure from a single incoming line to brakes on both sides of truck.



2-65. AIR SYSTEM ARRANGEMENT (M915).**NOTE**

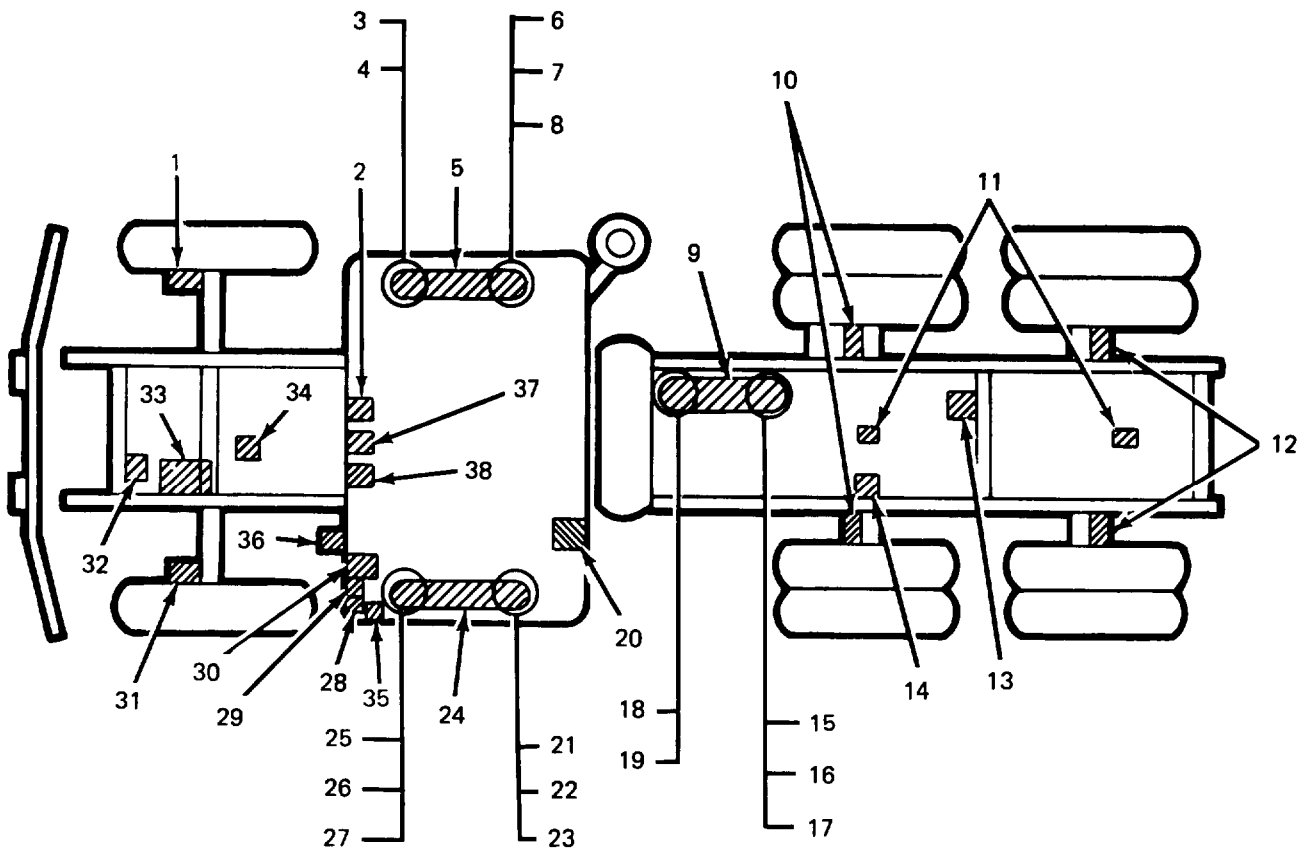
The components shown below are described in paragraph 2-64.

**LEGEND:**

1. WEDGE BRAKE AIR CHAMBER (2)	18. 90° ELBOW
2. PARKING BRAKE VALVE	19. PLUG
3. DRAIN COCK	20. PRIMARY RESERVOIR
4. PLUG (2)	21. TRACTOR PROTECTION VALVE
5. SECONDARY RESERVOIR	22. DRAIN COCK
6. DOUBLE CHECK VALVE	23. 90° ELBOW
7. 90° CHECK VALVE	24. AIR HOSE COUPLING
8. 90° ELBOW	25. SAFETY VALVE
9. DRAIN COCK	26. SUPPLY RESERVOIR
10. 45° ELBOW	27. 90° ELBOW (2)
11. 45° CHECK VALVE	28. CHECK VALVE
12. QUICK RELEASE/DOUBLE CHECK VALVE	29. TRAILER SUPPLY VALVE
13. SPRING AND SERVICE BRAKE CHAMBER (FORWARD-REAR) (2)	30. TRAILER HAND CONTROL BRAKE VALVE
14. RELAY VALVE	31. DUAL BRAKE VALVE
15. SPRING AND SERVICE BRAKE CHAMBER (REAR-REAR) (2)	32. DOUBLE CHECK VALVE
16. QUICK RELEASE VALVE	33. DOUBLE CHECK AND STOPLAMP VALVE
17. ADAPTER	34. WEDGE BRAKE AIR CHAMBER (2)
	35. LIMITING VALVE
	36. AIR COMPRESSOR/GOVERNOR
	37. CHECK VALVE
	38. AIR DRYER

TA 237213 ■

2-66. AIR SYSTEM ARRANGEMENT (M916).

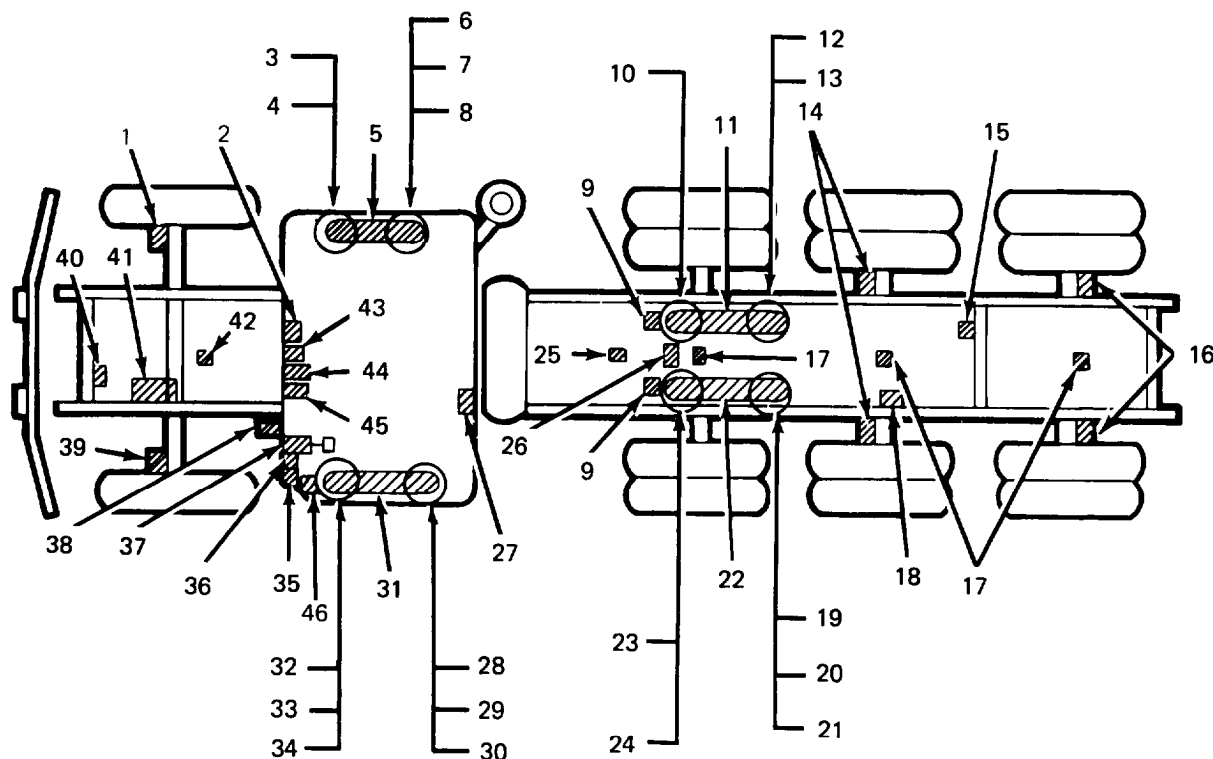


LEGEND:

1. WEDGE BRAKE AIR CHAMBER	19. CHECK VALVE
2. PARKING BRAKE VALVE	20. TRACTOR PROTECTION VALVE
3. PLUG	21. AIR HOSE COUPLING
4. DRAIN COCK	22. 90° ELBOW
5. SECONDARY RESERVOIR	23. DRAIN COCK
6. DOUBLE CHECK VALVE	24. SUPPLY RESERVOIR
7. 90° CHECK VALVE	25. SAFETY VALVE
8. 90° ELBOW	26. ADAPTER
9. PRIMARY RESERVOIR	27. CHECK VALVE
10. SPRING AND SERVICE BRAKE CHAMBER/SLACK ADJUSTER (2)	28. SPRING BRAKE CONTROL VALVE
11. QUICK RELEASE VALVE (2)	29. DOUBLE CHECK VALVE
12. SPRING AND SERVICE BRAKE CHAMBER/SLACK ADJUSTER (2)	30. DUAL BRAKE VALVE
13. RELAY VALVE	31. WEDGE BRAKE AIR CHAMBER
14. QUICK RELEASE AND DOUBLE CHECK VALVE	32. LIMITING VALVE
15. DRAIN COCK	33. AIR COMPRESSOR/GOVERNOR
16. 90° ELBOW	34. CHECK VALVE
17. PLUG	35. AIR DRYER
18. ADAPTER (2)	36. DOUBLE CHECK AND STOPLAMP VALVE
	37. TRAILER SUPPLY VALVE
	38. TRAILER HAND CONTROL BRAKE VALVE

TA 237214 ■

2-67. AIR SYSTEM ARRANGEMENT (M917).

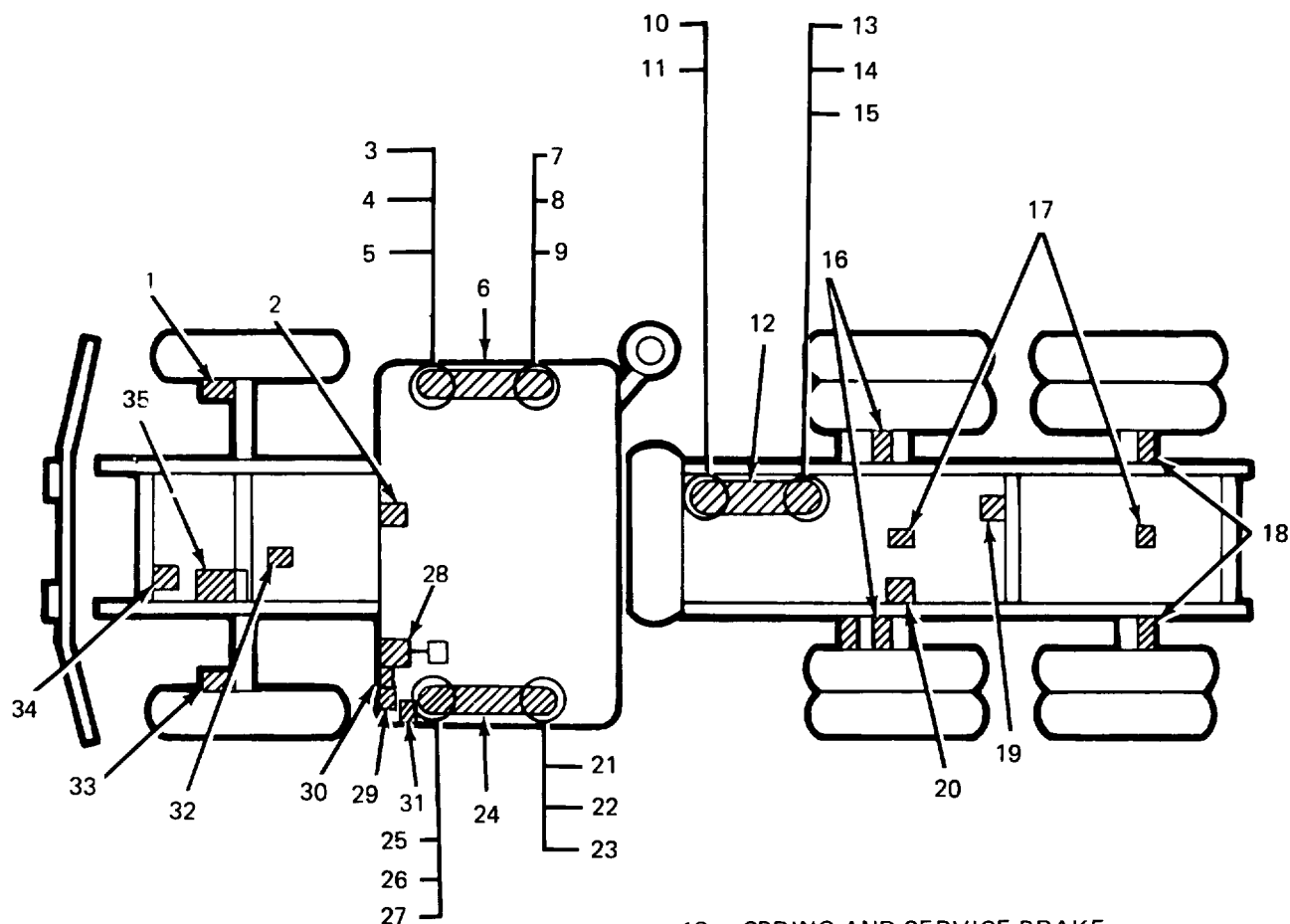


LEGEND:

1. WEDGE BRAKE AIR CHAMBER	22. PRIMARY RESERVOIR
2. PARKING BRAKE VALVE	23. CHECK VALVE
3. PLUG (2)	24. 90° ELBOW (2)
4. DRAIN COCK	25. EXHAUST VALVE
5. SECONDARY RESERVOIR	26. QUICK RELEASE VALVE
6. DOUBLE CHECK VALVE	27. TRACTOR PROTECTION VALVE
7. 90° CHECK VALVE	28. DRAIN COCK
8. 90° ELBOW	29. 90° ELBOW
9. AIR BRAKE CHAMBER/SLACK ADJUSTER (2)	30. AIR HOSE COUPLING
10. PLUG (3)	31. SUPPLY RESERVOIR
11. PRIMARY RESERVOIR	32. CHECK VALVE
12. 45° ELBOW (2)	33. ADAPTER
13. DRAIN COCK	34. SAFETY VALVE
14. SPRING AND SERVICE BRAKE CHAMBER/SLACK ADJUSTER (2)	35. SPRING BRAKE CONTROL VALVE
15. RELAY VALVE	36. DOUBLE CHECK VALVE
16. SPRING AND SERVICE BRAKE CHAMBER/SLACK ADJUSTER (2)	37. DUAL BRAKE VALVE
17. QUICK RELEASE VALVE (3)	38. DOUBLE CHECK AND STOPLAMP VALVE
18. QUICK RELEASE AND DOUBLE CHECK VALVE	39. WEDGE BRAKE AIR CHAMBER
19. DRAIN COCK	40. LIMITING VALVE
20. PLUG	41. AIR COMPRESSOR/GOVERNOR
21. 45° ELBOW	42. CHECK VALVE
	43. TRAILER SUPPLY VALVE
	44. TRAILER HAND CONTROL BRAKE VALVE
	45. PRESSURE PROTECTION VALVE
	46. AIR DRYER

TA 237215

2-68. AIR SYSTEM ARRANGEMENT (M918).

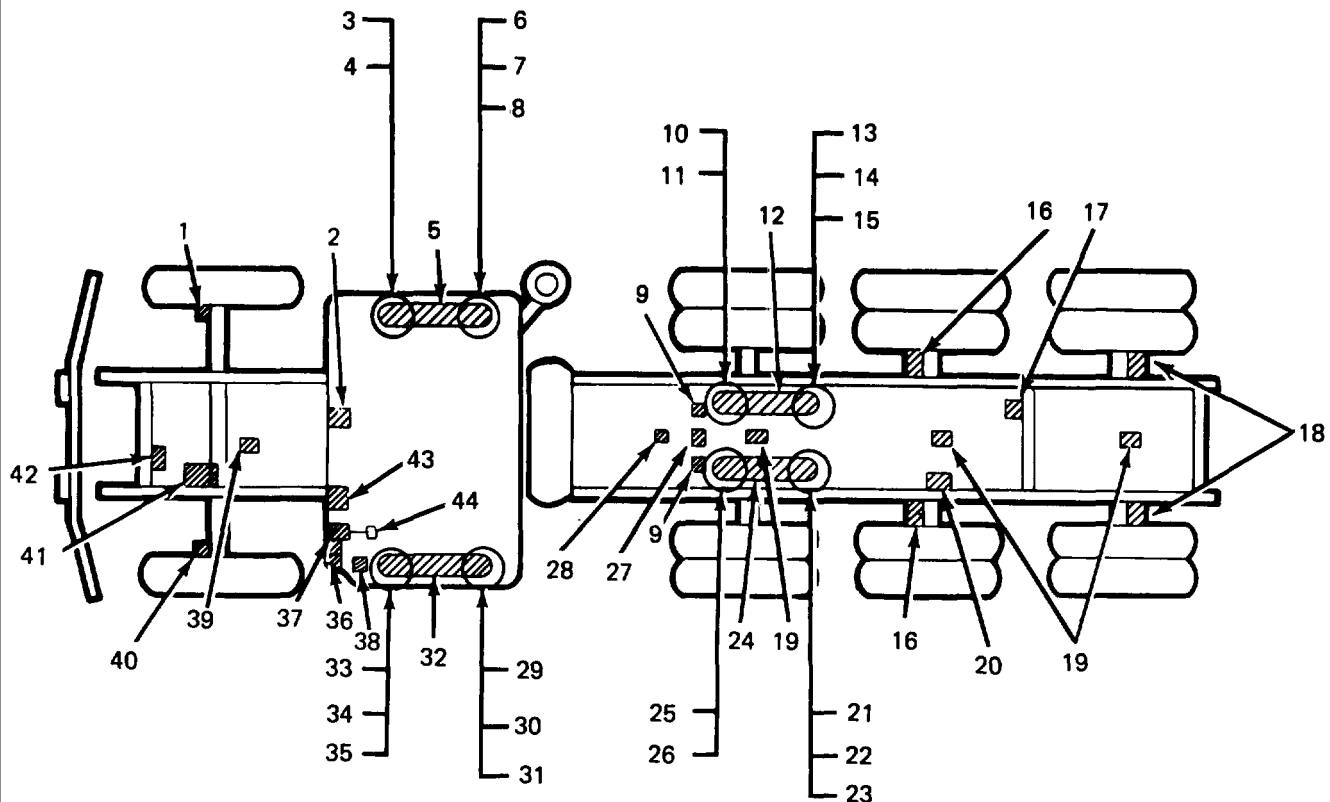


LEGEND:

1. WEDGE BRAKE AIR CHAMBER	18. SPRING AND SERVICE BRAKE CHAMBER/SLACK ADJUSTER (2)
2. PARKING BRAKE VALVE	19. RELAY VALVE
3. VALVE	20. QUICK RELEASE AND DOUBLE CHECK VALVE
4. PLUG	21. AIR HOSE COUPLING
5. DRAIN COCK	22. 90° ELBOW
6. SECONDARY RESERVOIR	23. DRAIN COCK
7. DOUBLE CHECK VALVE	24. SUPPLY RESERVOIR
8. 90° CHECK VALVE	25. CHECK VALVE
9. 90° ELBOW	26. SAFETY VALVE
10. CHECK VALVE	27. ADAPTER
11. ADAPTER (2)	28. DUAL BRAKE VALVE
12. PRIMARY RESERVOIR	29. SPRING BRAKE CONTROL VALVE
13. PLUG	30. DOUBLE CHECK AND STOPLAMP VALVE
14. 90° ELBOW	31. AIR DRYER
15. DRAIN COCK	32. CHECK VALVE
16. SPRING AND SERVICE BRAKE CHAMBER/SLACK ADJUSTER (2)	33. WEDGE BRAKE AIR CHAMBER
17. QUICK RELEASE VALVE	34. LIMITING VALVE
	35. AIR COMPRESSOR/GOVERNOR

TA 237216 ■

2-69. AIR SYSTEM ARRANGEMENT (M919).

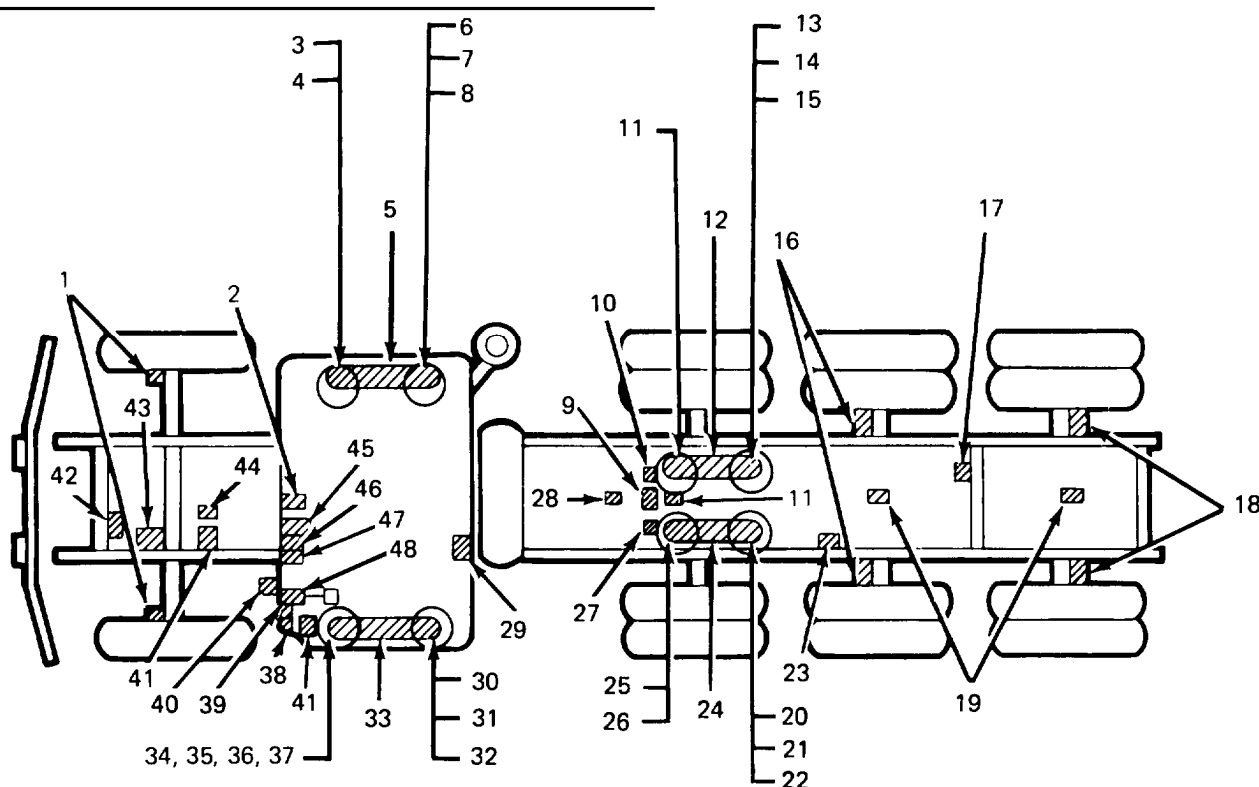


LEGEND:

1. WEDGE BRAKE AIR CHAMBER	21. DRAIN COCK
2. PARKING BRAKE VALVE	22. 90° ELBOW
3. PLUG (2)	23. PLUG
4. DRAIN COCK	24. PRIMARY RESERVOIR
5. SECONDARY RESERVOIR	25. 90° ELBOW (2)
6. 90° ELBOW	26. CHECK VALVE
7. 90° CHECK VALVE	27. QUICK RELEASE VALVE
8. DOUBLE CHECK VALVE	28. EXHAUST VALVE
9. AIR BRAKE CHAMBER/SLACK ADJUSTER (2)	29. 90° ELBOW
10. PLUG (2)	30. AIR HOSE COUPLING
11. VALVE	31. DRAIN COCK
12. PRIMARY RESERVOIR	32. SUPPLY RESERVOIR
13. DRAIN COCK	33. ADAPTER
14. 90° ELBOW	34. SAFETY VALVE
15. 45° ELBOW	35. CHECK VALVE
16. SPRING AND SERVICE BRAKE AIR CHAMBER/SLACK ADJUSTER (2)	36. SPRING BRAKE CONTROL VALVE
17. RELAY VALVE	37. DOUBLE CHECK AND STOPLAMP VALVE
18. SPRING AND SERVICE BRAKE AIR CHAMBER/SLACK ADJUSTER (2)	38. AIR DRYER
19. QUICK RELEASE VALVE (3)	39. CHECK VALVE
20. QUICK RELEASE AND DOUBLE CHECK VALVE	40. WEDGE BRAKE AIR CHAMBER
	41. AIR COMPRESSOR/GOVERNOR
	42. LIMITING VALVE
	43. PRESSURE PROTECTION VALVE
	44. DUAL BRAKE VALVE

TA 237217 ■

2-70. AIR SYSTEM ARRANGEMENT (M920).



LEGEND:

1. WEDGE BRAKE AIR CHAMBER (2)	25. 90° ELBOW (2)
2. PARKING BRAKE VALVE	26. CHECK VALVE
3. PLUG (2)	27. AIR BRAKE CHAMBER/SLACK ADJUSTER
4. DRAIN COCK	28. EXHAUST VALVE
5. SECONDARY RESERVOIR	29. TRACTOR PROTECTION VALVE
6. 90° CHECK VALVE	30. DRAIN COCK
7. DOUBLE CHECK VALVE	31. 90° ELBOW
8. 90° ELBOW	32. AIR HOSE COUPLING
9. QUICK RELEASE VALVE	33. SUPPLY RESERVOIR
10. AIR BRAKE CHAMBER/SLACK ADJUSTER	34. DOUBLE CHECK VALVE
11. PLUG (3)	35. PLUG
12. PRIMARY RESERVOIR	36. SAFETY VALVE
13. 45° ELBOW	37. CHECK VALVE
14. 90° ELBOW	38. SPRING BRAKE CONTROL VALVE
15. DRAIN COCK	39. DOUBLE CHECK VALVE
16. SPRING AND SERVICE BRAKE CHAMBER/SLACK ADJUSTER (2)	40. DOUBLE CHECK AND STOPLAMP VALVE
17. RELAY VALVE	41. AIR DRYER
18. SPRING AND SERVICE BRAKE CHAMBER/SLACK ADJUSTER (2)	42. LIMITING VALVE
19. QUICK RELEASE VALVE (3)	43. AIR COMPRESSOR/GOVERNOR
20. 90° ELBOW	44. CHECK VALVE
21. PLUG	45. TRAILER SUPPLY VALVE
22. DRAIN COCK	46. PRESSURE PROTECTION VALVE
23. QUICK RELEASE AND DOUBLE CHECK VALVE	47. HAND CONTROL TRAILER BRAKE VALVE
24. PRIMARY RESERVOIR	48. DUAL BRAKE VALVE

TA 237218 ■

Section XXIV AUXILIARY AIR-POWERED SYSTEMS

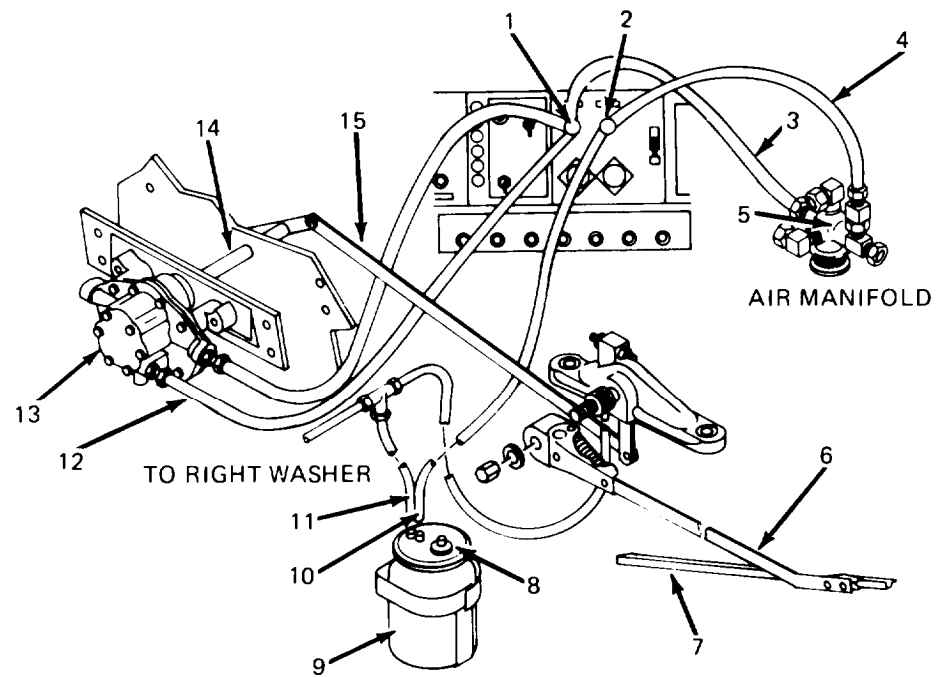
2-71. INTRODUCTION.

Air pressure from the compressed air system is used for the following: (Brakes are covered in section XXIII.)

- a. Transmission and Controls (para 2-12).
- b. Power Transfer Case (para 2-14).
- c. Pusher Axle (para 2-16).
- d. Windshield Wipers (para 2-72).
- e. Air Horn (para 2-73).
- f. Fan Clutch Control (para 2-74).

2-72. WINDSHIELD WIPERS AND WASHERS.

- | |
|--|
| <ol style="list-style-type: none"> 1. WIPER CONTROL KNOB. In OFF position, knob directs air from supply line to park line. When pulled out, it diverts air to wiper line. By turning clockwise (LOW) or counterclockwise (HIGH), desired speed is selected. Return to center and push in to park wipers. 2. WASHER BUTTON. When button is pushed, air flows from manifold to reservoir. 3. WIPER KNOB SUPPLY LINE. Carries air for wiper system from manifold to control knob. 4. WASHER AIR SUPPLY LINE. Carries air from manifold to control button. 5. COMPRESSED AIR SUPPLY MANIFOLD. Supplies compressed air to washer and wiper through supply lines. 6. WIPER ARM. Connect wiper blade to linkage blade. Moved by motor. 7. WIPER BLADE. Replaceable blade wipes windshield. 8. RESERVOIR FILLER CAP. Filter underneath cap prevents dirt from entering system. Cap closes firmly to maintain pressure in system. 9. WASHER FLUID RESERVOIR. Holds supply of washer fluid. 10. RESERVOIR AIR LINE. Carries pressurized air from button to reservoir where pressure forces fluid into washer hose, 11. WASHER FLUID HOSE. Carries washer fluid from reservoir onto windshield 12. PARK AIR LINE. When knob is pushed into PARK position, air flows through park line to motor causing wiper blades to move down to REST position. 13. WIPER MOTOR. Air-powered motor turns wipers back and forth when air comes from wiper line or moves them down windshield to PARK position when air comes through park line. 14. WIPER AIR LINE. When knob is in WIPE position, air flows through wiper line to motor which starts wiper blades in motion. 15. WIPER LINKAGE. Linkage from motor actuates two wiper arms. |
|--|

2-72. WINDSHIELD WIPERS AND WASHERS (Continued).

TA 074601

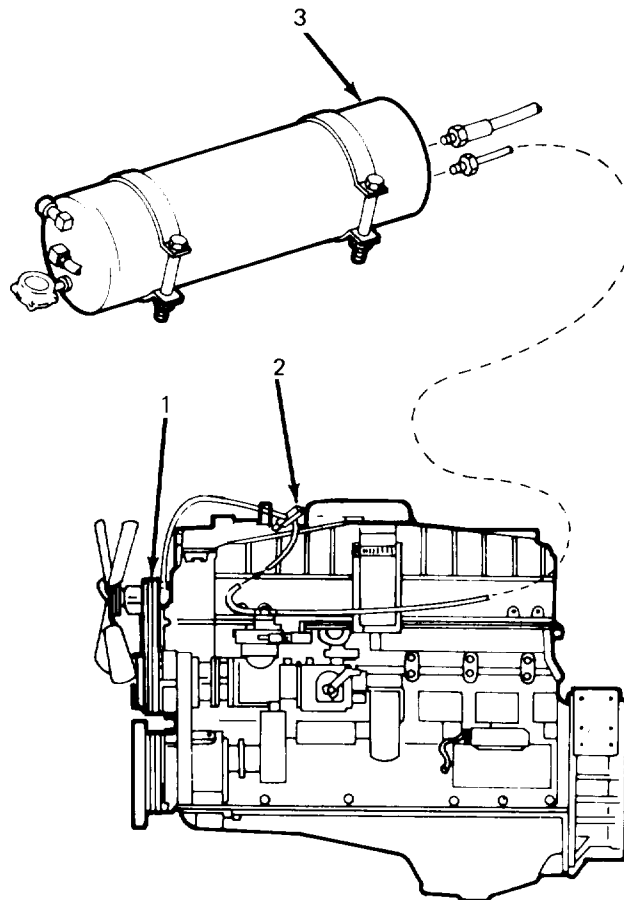
2-73. AIR HORNS.

1. AIR HORNS. Air-powered signaling devices.
2. CONTROL VALVE. Allows compressed air to flow to horns when lever is pulled downward.
3. LEVER. Actuates control valve when pulled downward by chain in cab.

TA 074602

2-74. FAN CLUTCH CONTROLS.

1. FAN CLUTCH. When actuator opens, compressed air from supply reservoir engages clutch to actuate fan.
2. FAN CLUTCH ACTUATOR. Opens air connection between supply reservoir and fan clutch when coolant temperature rises above 190°F (88°C).
3. PRIMARY RESERVOIR. Supplies air pressure to engage clutch and rotate fan when actuator opens air connection.



TA 074603

Section XXV STEERING SYSTEM

2-75. INTRODUCTION.

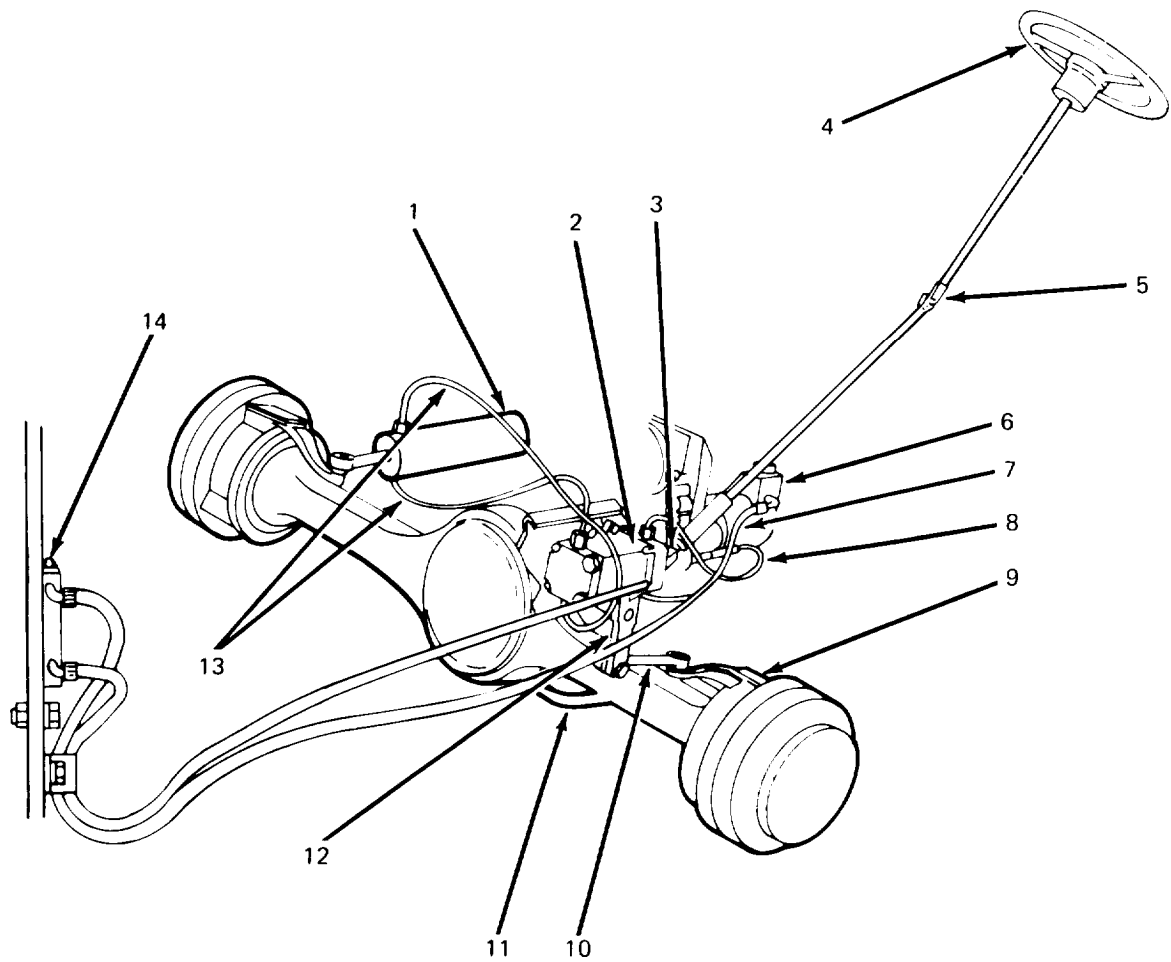
Two power steering systems are used for the M915 thru M920 vehicles: one for the M915 and one for the M916 thru M920. The systems are identical, except for the following:

Auxiliary power cylinder and associated hydraulic lines - used on the M916 thru M920 only.

2-76. STEERING SYSTEM.

1. AUXILIARY ASSIST CYLINDER. Piston moved back and forth by pressure from lines. Connects to right wheel steering arm through auxiliary drag link. (M916 thru M920 ONLY.)
2. POWER STEERING GEAR. Hydraulically multiplies input torque from steering column and transmits it to Pitman arm.
3. UNIVERSAL. Changes angle of torque from steering wheel and applies it to input shaft of power steering gear.
4. STEERING WHEEL. Provides rotational torque to steering shaft, actuating steering system.
5. UNIVERSAL. Changes angle of steering torque.
6. HYDRAULIC PUMP AND RESERVOIR. Pump supplies hydraulic pressure to power steering system. Reservoir provides a supply of oil to assure complete filling of hydraulic system.
7. STEERING GEAR RETURN LINE. Carries hydraulic fluid from steering gear back to reservoir.
8. STEERING GEAR SUPPLY LINE. Carries hydraulic fluid under pressure from pump to steering gear.
9. STEERING ARM. Transmits fore and aft movement from drag link to knuckle assembly.
10. DRAG LINK. Transfers motion of Pitman arm to steering arm and tie rod.
11. TIE ROD ASSEMBLY. Connects steering arms so that wheels turn together.
12. PITMAN ARM. Transfers steering torque (boosted by power steering gear to drag link).
13. AUXILIARY CYLINDER HYDRAULIC LINES. Carry fluid under pressure from the steering gear to operate auxiliary cylinder.
14. POWER STEERING COOLER. Cools power steering fluid by means of finned unit on vehicle grille, exposed to outside air. After the fluid is cooled, it is returned to the power steering system.

2-76. STEERING SYSTEM (Continued).



TA 074604

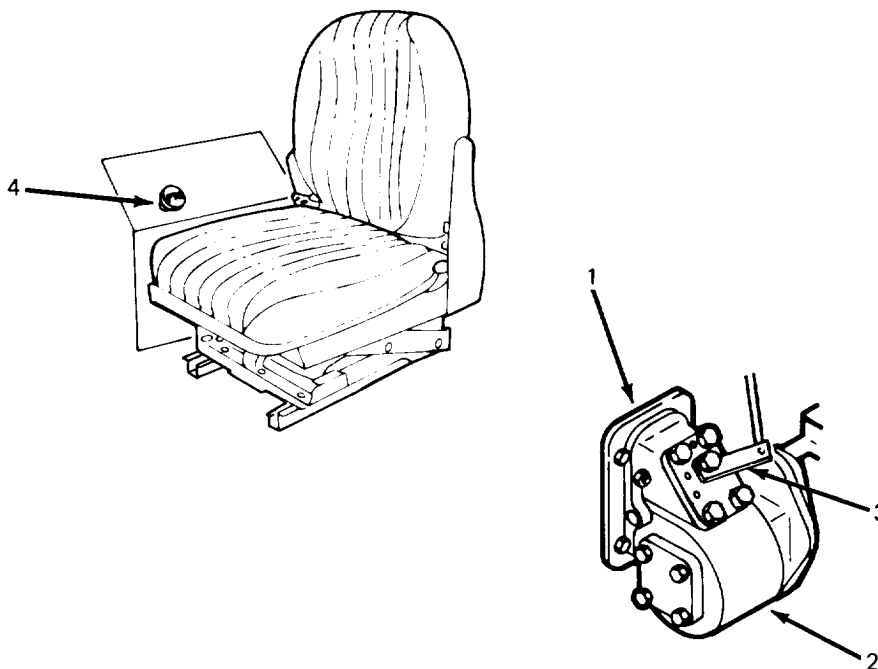
Section XXVI POWER TAKEOFF

2-77. INTRODUCTION.

The power takeoff is installed on M916 thru M920. It supplies power from the engine to auxiliary equipment.

2-78. POWER TAKEOFF.

1. PTO ADAPTER. Mounts on transmission and mates to transmission drive gear.
2. PTO. Gear driven from adapter. Provides drive for:
 - a. Winch hydraulic pump on the M916 and M920 (para 2-80).
 - b. Hoist cylinder hydraulic pump on the M917 (TM 5-3805-274-24 & P).
 - c. Hydraulic power pump on the M918 (TM 5-3895-371-24 & P).
 - d. Power train jack screw for conveyor drive on the M919 (TM 5-3895-372-20).
3. CONTROL LEVER. Engages or disengages PTO. Actuated by pulling control knob in cab.
4. PTO CONTROL KNOB. Allows movement of control lever from cab. Pulling knob out engages PTO. Pushing knob in disengages PTO.



TA 074605

Section XXVII WINCH

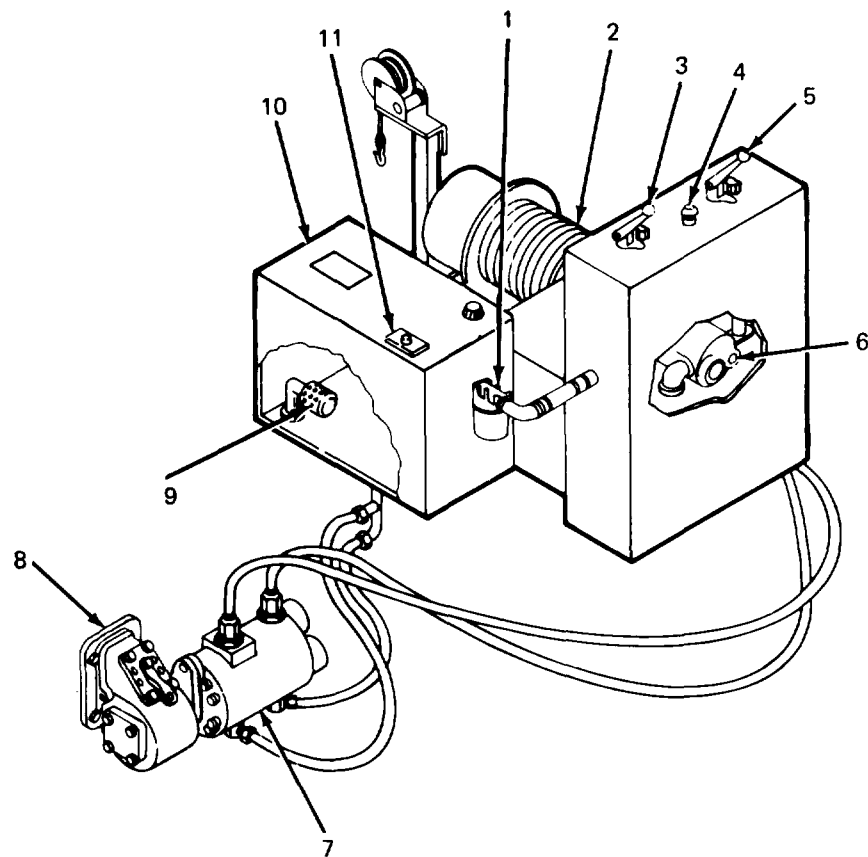
2-79. INTRODUCTION.

The winch is installed on M916 and M920. The assembly is located behind the cab with all operating controls.

2-80. WINCH.

1. **INLINE RETURN FILTER.** Throwaway filter removes water and dirt from oil returning to reservoir.
2. **WINCH CABLE.** 7/8 inch (22.2 mm) diameter wire rope, 150 feet (46 m) long. Rated at 75,000 lbs (33,600 N) minimum breaking strength.
3. **CONTROL VALVE.** Detented "up" position supplies pressure to outlet for auxiliary hydraulic system. Down position provides high speed winch operation.
4. **AUXILIARY THROTTLE.** Adjusts power input to PTO by altering engine speed.
5. **DIRECTIONAL CONTROL VALVE.** Controls winch direction. Spring-loaded valve returns to middle position when released, causing winch brakes to apply.
6. **HYDRAULIC MOTOR.** Turns winch to pay out or haul in cable. Powered by oil under pressure from pump.
7. **DUAL PUMP.** 22 gpm/gear; total of 44 gpm @ 2200 engine rpm gear type pump powered by PTO supplies 2350 psi (14,800 kPa) hydraulic pressure to motor through hydraulic valves.
8. **POWER TAKEOFF.** Drives dual pump. (See paragraph 2-78 for functional description.)
9. **INLET STRAINER.** Removes large particles from oil going to dual pump.
10. **HYDRAULIC RESERVOIR.** Supplies oil to dual pump and receives oil returning from system.
11. **COVER PLATE.** When removed allows access to interior of reservoir to service internal strainer and for general clean out.

2-80. WINCH (Continued).



TA 074606

Section XXVIII WINTERIZATION KIT

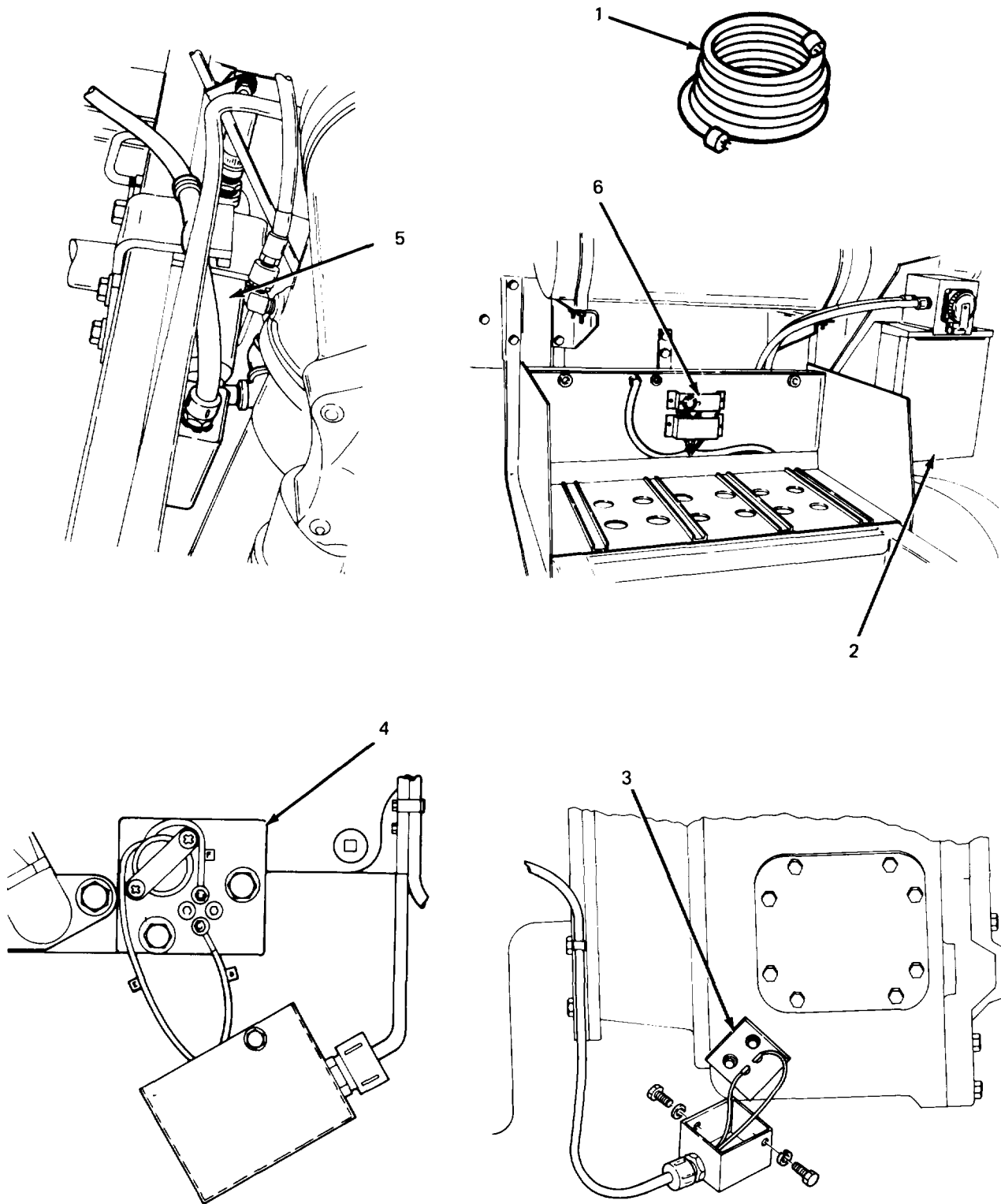
2-81. INTRODUCTION.

The Winterization Kit is an available option on all M915 thru M920 vehicles. This kit facilitates vehicle start-up at temperatures down to -50°F (-46°C.). The components of this kit are described below.

2-82. WINTERIZATION KIT.

1. 110 VAC POWER CORD. This twenty-five foot power cord is used to connect a suitable 110/115 V exterior power supply to the power receptacle mounted on top of the vehicle circuit breaker box.
2. CIRCUIT BREAKER BOX. Mounted to the vehicle right side behind the front fender and in front of the battery box, this control center channels incoming 110 VAC electrical power to any of four separate heaters. Each of the heaters is controlled and protected by an individual circuit breaker.
3. TRANSMISSION OIL HEATER. Located on the forward, lower, left side of the transmission, this immersion heater supplies 375 watts. No thermostat is used due to the relatively low wattage. When the 110 VAC power cord is plugged in, this heater can be operated by the circuit breaker so marked. The breaker is a 15 ampere.
4. ENGINE OIL HEATER. Also an immersion type heater, the unit is mounted thru the aft, lower, left side of the engine oil pan with a capacity of 750 watts, which is controlled by a thermostat set at 170°F. The thermostat mounts to a plate outside the oil pan and is protected by an insulated waterproof cover. When the 110 VAC power cord is plugged in, this heater can be operated by the circuit breaker so marked. The breaker is a 15 ampere.
5. ENGINE COOLANT HEATER. This thermo-syphon type requires no circulating pump and has a capacity of 2700 to 2800 watts. The heating unit integral with a thermostat set at 190° F, is mounted to the main right hand frame rail below the turbocharger. The heated coolant is piped to the top of the engine into the rear water manifold. The hot coolant flows down thru the engine as the cold coolant returns to the heater. When the 110 VAC power cord is plugged in, this heater can be operated by the circuit breaker so marked. The breaker is a 30 ampere.
6. BATTERY BOX HEATER. The battery box is insulated and heated by a coil, under the battery support, with a capacity of 550 watts. A thermostat mounted on the inside back wall of the box closes at +35°F and opens at +55°F. When the 110 VAC power cord is plugged in, this heater can be operated by the circuit breaker so marked. The breaker is a 15 ampere.

2-82. WINTERIZATION KIT (Continued).



TA 074607

CHAPTER 3

INTEGRATED SYSTEMS MAINTENANCE

3-1. OVERVIEW.

This chapter provides you with the following information related to overall truck tractor/truck chassis maintenance:

- a. Tools and Equipment.
- b. Service Upon Receipt.
- c. Preventive Maintenance Checks and Services (PMCS).
- d. Composite Troubleshooting Index.

Section I REPAIR PARTS, SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT

3-2. COMMON TOOLS AND EQUIPMENT.

For authorized common tools and equipment, refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

3-3. SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT.

There are no special tools, TM DE and support equipment required for the procedures in this chapter.

3-4. SPARES AND REPAIR PARTS.

Spares and repair parts are listed and illustrated in the Repair Parts and Special Tools List covering Organizational Maintenance for this equipment (TM 9-2320-273-20P).

Section II SERVICE UPON RECEIPT

3-5. CHECKING UNPACKED EQUIPMENT.

- a. Inspect the equipment for damage incurred during shipment. If the equipment has been damaged, report the damage on SF Form 364, Report of Discrepancy (ROD).
- b. Check the equipment against the packing slip to see if the shipment is complete. Report all discrepancies in accordance with the instructions of DA PAM 738-750.

3-6. SERVICE UPON RECEIPT CHECKLIST M915 THRU M920 VEHICLES.

LOCATION/ITEM	ACTION	REMARKS
1. Protective wrappings.	Remove.	
2. Engine, tires, glass panels, instruments.	Check for missing parts or shipping damage.	
3. Separately packaged kits.	Inspect for damage.	
4. Brakes and brake shoes.	Check to be sure brake shoes do not stick to brake drums.	See para 2-64 thru 2-70 for locations.
5. Breather tube, air intake, exhaust stack, transmission, alternator, brakes.	Remove all tape and wrapping.	See paras 2-12, 2-25, 2-27, 2-30, 2-42, and 2-64 thru 2-70 for locations.
6. Water pump and alternator belts.	Check tension and adjust if necessary.	See para 4-51 and 4-53.
7. Cooling system, fuel system, transmission, and differentials.	Check fluid levels.	TM 9-2320-273-10.
 CAUTION Do not allow SD-2 dry cleaning solvents to come in contact with seals or flexible hoses. These cleaners cause leather, rubber, and synthetic materials to dry out, rot, and lose pliability		
8. Machined surfaces	Remove wrappings. Clean with SD-2 dry cleaning solvent.	
9. a. Key switch, engine retarder switch, worklamps, clearance lamps, headlamp switch, cigar lighter.	Make sure all electrical switches are OFF.	See TM 9-2320-273-10 for locations.
b. Battery cables.	Connect.	See para 5-37.
10. Oil system.	If truck is due for an oil change, drain crankcase, replace filters, and refill to operating level.	See para 4-14.
11. Entire vehicle.	a. Lubricate. b. Inspect for: 1. Leaks. 2. Loose or broken hoses and lines. 3. Other damage.	See LO 9-2320-273-12.

Section III. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

3-7. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) INTRODUCTION. This section contains Unit PMCS requirements for the M915 vehicle. The PMCS tables contain checks and services necessary to ensure the vehicle is ready for operation. Using the PMCS tables, perform maintenance at the specified intervals. Preventive Maintenance Checks and Services in TM 9-2320-273-10 must be completed before doing Unit preventive maintenance.

3-8. MAINTENANCE FORMS AND RECORDS. Every mission begins and ends with paperwork. There is not much of it, but it must be kept up. The filled out forms and records have several uses. They are a record of the services, repairs, and modifications made on the vehicle; they are reports to unit maintenance and to the Commander; and they serve as a checklist to find out what is wrong with the vehicle after its last use, and whether those faults have been fixed. For information needed on forms and records, see DA PAM 738-750.

3-9. GENERAL MAINTENANCE PROCEDURES.

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 fire and use in well-ventilated area. If adhesive, solvents, or sealing compound get on skin or clothing, wash immediately with soap and water.

a. **CLEANLINESS.** Dirt, grease, oil and debris only get in the way and may cover up a serious problem. Use dry cleaning solvent on metal surfaces and soapy water on rubber.

b. **BOLTS, NUTS, AND SCREWS.** Check bolts, nuts, and screws for obvious looseness, missing, bent, or broken condition and tighten or replace as necessary. They cannot all be checked with a tool, of course, but look for chipped paint, bare metal, or rust around bolt heads.

c. **WELDS.** Look for loose or chipped paint, rust, or gaps where parts are welded together. If a bad weld is found, have it repaired.

d. **ELECTRIC WIRES AND CONNECTORS.** Look for cracked or broken insulation, bare wires, and loose or broken connectors. Tighten loose connectors and make sure the wires are in good shape.

e. **HYDRAULIC LINES AND FITTINGS.** Look for wear, damage, leaks, and make sure clamps and fittings are tight. Wet spots show leaks, of course, but a stain around a fitting or connector may indicate a leak. If a connector or fitting is loose, tighten it. If something is broken or worn out, repair or replace per applicable procedure.

3-10. FLUID LEAKAGE. It is necessary to know how fluid leakage affects the status of fuel, oil, coolant, and the hydraulic systems. The following are definitions of types/classes of leakage necessary to know in order to determine the status of the vehicle.

CAUTION

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

a. **Class 1.** Seepage or fluid as indicated by wetness or discoloration not great enough to form drops.

- b. Class II. Leakage of fluid great enough to form drops but not enough to cause drops to drip from item being checked/inspected.
- c. Class III. Leakage of fluid great enough to form drops that fall from the item being checked/inspected.

3-11. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) TABLES.

- a. Do the (S) PREVENTIVE MAINTENANCE once every six months and/or every 3000 miles (4,827 KM) whichever comes first.
- b. Do the (A) PREVENTIVE MAINTENANCE once each year and/or every 6,000 miles (9,654 KM) whichever comes first.
- c. Do the (B) PREVENTIVE MAINTENANCE once each year and/or every 12,000 miles (19,308 KM) whichever comes first.
- d. Always do the PREVENTIVE MAINTENANCE in the same order until it gets to be a habit. Once practiced, it will be easy to spot anything wrong in a hurry.
- e. If something does not work, troubleshoot with instructions in Chapter 2.
- f. If anything looks wrong and is not fixed, write a DA Form 2404.
- g. When doing preventive maintenance, take along the tools and supplies needed to make all the checks. Always take a clean cloth or two.

Table 3-1. Unit Level Preventive Maintenance Checks and Services M915-M920

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
1	Semi-Annual	Pre-Service Checks	<u>PRIOR TO ROAD TEST</u> Ensure Operator/Crew has performed -10 PMCS listed in TM 9-2320-273-10. ROAD TEST Maintenance personnel will be with vehicle operator to assist in performing -10 PMCS checks and verify pre-service checks. NOTE The following will be performed during the road test. These inspections must be performed before any -20 level PMCS regardless of interval. For road test, vehicle will be driven at least five miles over different ground to give enough time to detect any malfunctions. a. Notice if starter engages smoothly and turns the engine at normal cranking speed. b. Listen for unusual engine noise at idle, at operating speeds, and under acceleration. Be alert for excessive vibration and the smell of oil, fuel and exhaust.	a. Starter inoperative or makes excessive grinding sound. b. Engine knocks, rattles or smokes excessively.

Table 3-1. Unit Level Preventive Maintenance Checks And Services M915-M920

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
1	Semi-Annual	Pre-Service Checks Continued	c. Check for transmission response to shifting and for smoothness of operation in all speed ranges. Be alert for unusual noises and difficulty in shifting in any speed range. d. Check for transfer response to shifting and for smoothness of operation in all gear ranges. Be alert for unusual noises and difficulty in shifting in any gear range. e. Test for response to accelerator feed. Observe for sticking pedal. f. With vehicle speed approximately 5 mph (8 kph) turn steering wheel to left, then right, to detect steering backlash, shimmy or freeplay is more than 1-1/2 inches (38 mm) if either direction. Vehicle should respond instantly. With vehicle moving on straight, level terrain, lightly hold steering wheel to check for pull and wandering. g. Apply brake pedal with steady force. Vehicle should slow down and stop without pulling to one side or jerking. Release brake pedal. The brakes should release immediately and without difficulty. h. Observe vehicle response to road shocks, side sway or continuous bouncing indicates a malfunction.	c. Transmission shifts improperly, does not shift or makes excessive noises. d. Transfer jumps out of gear or makes excessive noises. e. Pedal sticking or binding. f. Steering binds, grabs, wanders or freeplay is more than 1-1/2 inch (38 mm) in either direction. g. Brakes chatter, pull to one side or inoperative. Brakes will not release. h. Handling is unstable.

Table 3-1. Unit Level Preventive Maintenance Checks and Services M915-M920

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
1	Semi-Annual	Pre-Service Checks Continued	<u>AFTER ROAD TEST</u> a. Make sure the vehicle has been cleaned of mud, gravel, etc., from the underbody, outside and crew compartment area. CAUTION Do not hold steering wheel at full left or right position for longer than 10 seconds. Oil overheating and pump damage can result. b. With vehicle stopped, turn steering wheel to extreme left, then to the extreme right to check for hard steering. c. Check engine operation at all speeds. Insure that engine does not go over engine governed speed - 600-2100 rpm. <u>WARNING</u> 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 fire and use in well-ventilated area. If adhesive, solvents, or sealing compound get on skin or clothing, wash immediately with soap and water.	b. Hard steering is evident. c. Engine governed speed - no load is below 600 rpm or exceeds 2100 rpm.
2	Semi-Annual	Fuel System	a. Clean fuel transfer pump screen by soaking in a carbon dissolving agent, or clean the screen in fuel oil and dry with compressed air. Visually inspect screen for holes or embedded metal particles in mesh.	a. Screen is worn or damaged.

Table 3-1. Unit Level Preventive Maintenance Checks And Services M915-M920

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
2	Semi-Annual	Fuel System Continued	b. Purge and clean fuel tank (TB 43-0212), if required. c. Inspect fuel injection pump, nozzle lines, and fittings for leaks and damage. d. Inspect all fuel lines for loose connections, splits, cracks, and kinks that could leak.	c. Rubber cap missing or torn on return line. Any nozzle loose or damaged. d. Any Class III leak.
3	Semi-Annual	Engine Accessory Drive Belt	a. Check for missing, broken, cracked and frayed drivebelts. Check alternator and fan belts 1/2 inch or less adjustment for looseness, dry rot, excessive fraying and cracks. b. Check fan belt (paragraph 4-45D) and alternator belt (paragraph 4-55C) for adjustment.	a. Any drivebelt is missing or broken. Belt fiber has more than one crack (1/8 inch in depth or 50% of belt thickness) or has frays more than 2 inches long. b. Belts are loose.

Table 3-1. Unit Level Preventive Maintenance Checks and Services M915-M920

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
4	Semi-Annual	Fan, Alternator, and Water Pump	a. Inspect the pulleys for alignment. b. Inspect the water pump for leaks and fan shrouds to see if they are securely mounted.	
5	Semi-Annual	Alternator Wiring and Engine Mount	a. Check for loose wiring connections or worn insulation. b. Inspect for cracked or loose engine mounts.	a. Loose connections or worn insulation. b. Cracked or loose engine mounts.
6	Semi-Annual	Air Intake System	a. Inspect air cleaner, hoses, and tubing for proper installation, cracks, breaks, or loose connections that could let unfiltered air get into air intake system. <u>WARNING</u> Compressed air used for cleaning purposes will not exceed 30 psi. Use only with effective chip guarding and personal protective equipment (goggles/shield, gloves, etc.). NOTE Outside element can be washed up to five times or blown clean with air an indefinite number of times. This outside element is costly and should be reused. Handle and clean carefully. Inside safety filter should not be washed or blown clean and should be replaced every 10,000 miles. b. Remove air filters and service (paragraph 4-24 B). After servicing, reinstall (paragraph 4-24C).	b. Air filters have holes or damaged seal.

Table 3-1. Unit Level Preventive Maintenance Checks And Services M915-M920

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
7	Semi-Annual	Engine Crank-case	NOTE COLD TEMPERATURE OPERATION For operation of equipment in expected continuous temperatures below 0° F (-18° C), remove lubricants prescribed in the key for temperature above 0° F (-18° C). Re-lubricate with lubricant specified in the key for temperatures 0° F to -50° F (-18° C to -46° C). NOTE Engine Oil Filter. After installing new filter element, fill crankcase, operate engine 5 minutes, and check housing for leaks. Shut down engine, check crankcase oil level and bring to full mark. NOTE If AOAP laboratory is not available, drain and refill engine crankcase with OE/HDO every 3,000 miles (4,800 km) or semi-annually, whichever comes first. a. Drain and refill crankcase with OE/HDO. b. Replace engine oil filter. c. Check and clean crankcase breather and attaching hoses. d. Check all oil lines and hoses for cracks and wear that could cause leaks. e. Check oil filter housing and oil pan drain plug for looseness. Make sure all oil pan bolts are tight. f. Check rocker housing covers for evidence of leaks.	"Do not operate" received from AOAP laboratory. b. Oil filter has Class III leak. d. Cracks, frays, leaks, and wear are evident. e. Drain plugs and oil pan bolts are loose. f. Class III leaks evident.

Table 3-1. Unit Level Preventive Maintenance Checks and Services M915-M920

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
8	Semi-Annual	Cab, Engine, Front/Rear Light Wiring Harness	Check all wiring harnesses for frays, splits, missing insulation or poor connections. Replace any worn wiring.	Insulation missing. Frays, splits, poor connections evident.
9	Semi-Annual	Alternator and Engine Mount	Inspect alternator mounting for looseness. Inspect bracket and attaching hardware for cracks, bends, and loose mounting.	Loose mounting, cracks, or bends evident.
10	Semi-Annual	Battery Electrical System	NOTE Refer to TM 9-61 40-200-14 for more specific details on battery maintenance. a. Inspect battery box for corrosion and debris. b. Clean slave receptacle and coat with corrosion preventive compound. c. Check and record specific gravity of each cell. d. Inspect battery cables for frays, splits, and looseness.	a. Corrosion that has made holes in metal battery box. b. Terminals corroded. c. If cell is below 1.225 specific gravity. d. Cables frayed, split, or loose.

Table 3-1. Unit Level Preventive Maintenance Checks And Services M915-M920

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
11	Semi-Annual	Power Steering Pump and Filter	a. Inspect power steering pump for leaks, cracks, and damage. b. Check steering stops for proper adjustment (paragraph 10-21.2). c. Check steering gear poppet valve for proper adjustment (paragraph 10-21.3). d. Change filter when fluid is contaminated.	a. Cracks, damage, or Class III leaks. b. Steering stops out of adjustment. c. Steering gear poppet valve is out of adjustment. d. Fluid is contaminated.
12	Semi-Annual	Compressed Air System	NOTE In areas where more than approximately 30° range of temperature is common, small amounts of water can accumulate in the air brake system due to condensation. The presence of small amounts of water due to condensation is normal. a. Drain air tanks. If any moisture is forced out, inspect air dryer and replace filter (paragraph 9-10). If moisture is milky, blue or green, serious internal malfunctions are indicated. b. Inspect air reservoirs, attaching valves, lines and connections for mounting looseness, bends, dents, and cracks that could cause leaks.	a. Moisture is milky, blue or green. b. Bends, dents, cracks, loose air lines or air leaks evident.

Table 3-1. Unit Level Preventive Maintenance Checks and Services M915-M920

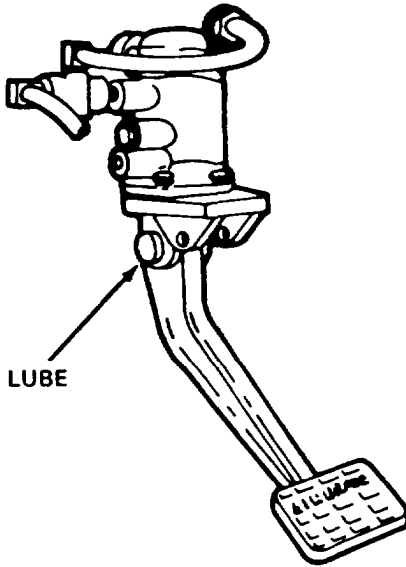
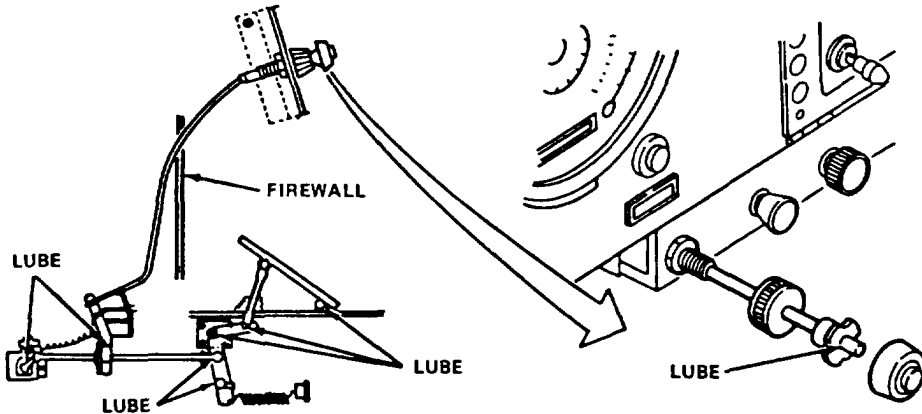
Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
13	Semi-Annual	Brake Pedal	Lubricate brake pedal with OE/HDO. 	
14	Semi-Annual	Accelerator Pedal and Linkage	Lubricate accelerator pedal and linkage with OE/HDO. 	

Table 3-1. Unit Level Preventive Maintenance Checks And Services M915-M920

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
15	Semi-Annual	Auxiliary Throttle (All models in cat M916 and M920 on Hydraulic Winch)	NOTE Do not oil control wire. The wire case has teflon paste in it for wire lubrication. Oil the body of the assembly with OE/HDO and place a drop of oil (OE/HDO) under the plunger cap.	

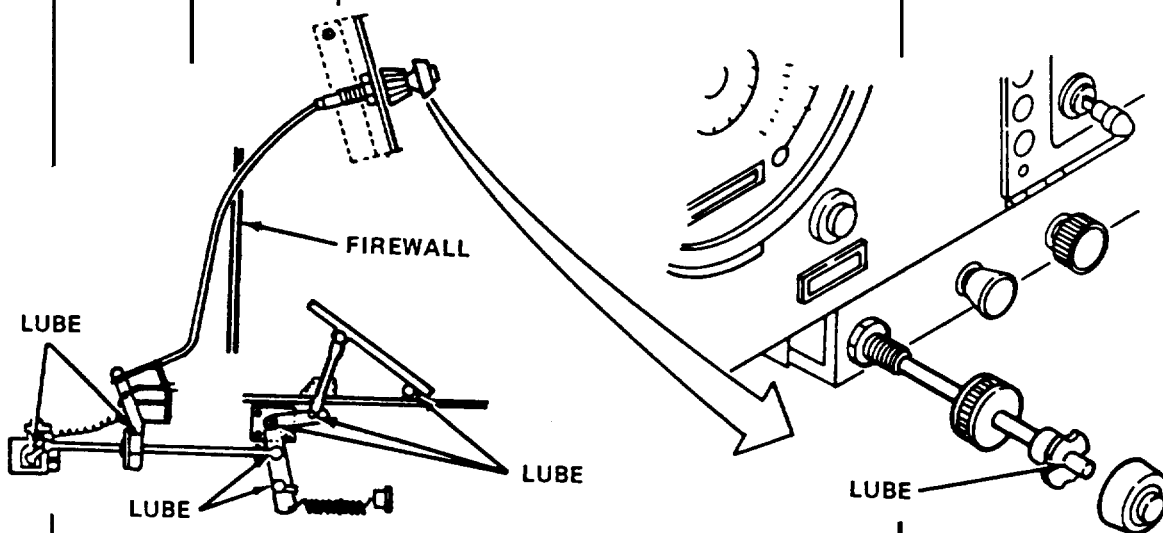


Table 3-1. Unit Level Preventive Maintenance Checks and Services M915-M920

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
16	Semi-Annual	Cooling System	<u>WARNING</u> If vehicle has been operating, use extreme care to avoid being burned when removing cooling system radiator cap. Use heavy rags or gloves to protect hands. Turn radiator cap only one-half turn counterclockwise and allow pressure to be relieved before fully removing cap. NOTE Coolant level is correct when sight glass is full (TM 9-2320-273-10). Use MIL-A-46153 in temperatures above 0°F (18° C) and MIL-A-11755 in temperatures below 0° F (-18° C). a. Check coolant condition. Test coolant to see if draining is necessary (TB 750-651). b. Check all hoses for looseness, splits, wear, and cracks that would cause leaks. c. Inspect hose clamps for wear and serviceability.	a. Coolant condition/testing shows draining is required. b. Class III leakage evident. Hoses are loose or have splits or cracks. c. Hose clamps are worn or unserviceable.

Table 3-1. Unit Level Preventive Maintenance Checks And Service M915-M920

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
17	Semi-Annual	Tires	CAUTION Do not mix radial and bias tires on the same vehicle. Make sure tires are cold when you check pressure. a. Inspect tires for unusual wear, penetrating objects, and improper matching. b. Make sure all wheel lugnuts are installed and tightened to correct torque value 450 lb-ft (610 N.m).	a. Tires improperly match. b. Any lugnut missing and/or improperly torqued.
18	Semi-Annual	Wheel Alignment	Check toe-in and adjust as necessary. Toe-in should be 1/8 inch (3.2 mm).	Toe-in out of adjustment.
19	Semi-Annual	Parking Brake	Inspect spring brake control valve, lines and double air brake chambers for leaks and damaged fittings.	Air leaks or damaged fittings.
20	Semi-Annual	Transmission	a. Check transmission to bellhousing bolts for gaps and torques. b. If any bolt shows a gap or is loose, remove bolt and apply loctite; reinstall bolt with flat washer and torque to 55 lb-ft + or - 5 lb-ft (74.6 N.m + or - 6.8 Nm); then proceed to check all the remaining bolts as follows: Torque each bolt to 50 lb-ft (67.8 N.m). If bolt turns or has a gap, remove and apply loctite, reinstall bolt and flat washer and torque 55 lb-ft + or - 5 lb-ft (74.6 N.m + or - 6.8 N.m).	

Table 3-1. Unit Level Preventive Maintenance Checks and Services M915-M920

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
20	Semi-Annual	Trans- mission Continued	c. Check transmission for cracks, loose bolts, leaks, and obvious damage. d. Inspect transmission output shaft seal for damage and leaks. e. Drain and refill transmission oil every 6,000 miles (9,654 km) or annually, whichever comes first. f. Replace transmission filter.	c. Cracks, loose bolts, or Class III leaks evident. d. Damage or Class III leaks evident. e. "Do not operate" received from AOAP lab.
21	Semi-Annual	Exhaust System	<u>WARNING</u> The exhaust pipe and muffler can become very hot during vehicle operation. Be careful not to touch these parts with bare hands, or allow body to come in contact with pipe or muffler. Exhaust system parts can become hot enough to cause serious burns. a. Inspect exhaust manifold, exhaust pipes, muffler, and tailpipe for corrosion, carbon deposits which may indicate leaks. b. Inspect for damaged pipes, loose clamps and leaking gaskets or seals. c. Inspect raincap to make sure it operates freely.	a. Evidence of corrosion or carbon deposits evident. b. Pipes damaged, clamps loose, gaskets or seals leaking. c. Raincap does not operate freely, does not close when engine is off, or missing.

Table 3-1. Unit Level Preventive Maintenance Checks And Services M915-M920

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
22	Semi-Annual	Rear Axles	NOTE COLD TEMPERATURE OPERATION For operation of equipment in expected continuous temperatures below 0° F (-18° C), remove lubricants prescribed in the key for temperatures above 0° F (-18° C). Re-lubricate with lubricants specified in the key for temperatures 0° F to -50° F (-18° C to -46° C). NOTE Pressure gun should be held on fittings until new grease appears. This will assure that all the old contaminated grease has been forced out. Take weight off suspension walking beam during lubrication to ensure uniform application of grease into the trunnion bushing.	
		Rear Axle Spring and Walking Beam	a. Lubricate with GAA the Axle Spring and Walking Beam.	a. Fitting will not purge old lubricant out of component.
		Axle Differentials (M916/M920) Front Driving and all Rear	b. Check and refill all axle differential with GO as required.	
		Axle Housing Vent Plug	<u>WARNING</u> 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 fire and use in well-ventilated area. If adhesive, solvents, or sealing compound get on skin or clothing, wash immediately with soap and water. c. Remove vent plug from axle housing. Wash vent plug in solvent and allow to air dry. d. Coat threads with pipe thread sealing compound and install axle housing breather.	c. Axle vent plug missing or cannot be cleaned.

Table 3-1. Unit Level Preventive Maintenance Checks and Services M915-M920

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
23	Semi-Annual	Front Axles	NOTE COLD TEMPERATURE OPERATION For operation of equipment in expected continuous temperatures below 0° F (-18° C), remove lubricants prescribed in the key for temperatures above 0° F (-18° C). Re-lubricate with lubricants specified in the key for temperatures 0° F to -50° F (-18° C to -46° C). NOTE Pressure gun should be held on fittings until new grease appears. This will assure that all the old contaminated grease has been forced out. Take weight off suspension walking beam during lubrication to ensure uniform application of grease into the trunnion bushing.	
		Drag Link, Front Axle Spring	a. Lubricate with GAA the Drag link, front axle spring. b. Inspect suspension/spring hanger brackets and pins for wear or damage.	a. Fitting will not purge old lubricant out of component. b. Spring hanger brackets bent or broken.
		Steering Shaft Universals	Inspect steering shaft for looseness and lubricate with GAA.	Fitting will not purge old lubricant out of component.

Table 1-1. Unit Level Preventive Maintenance Checks And Service M915-M920

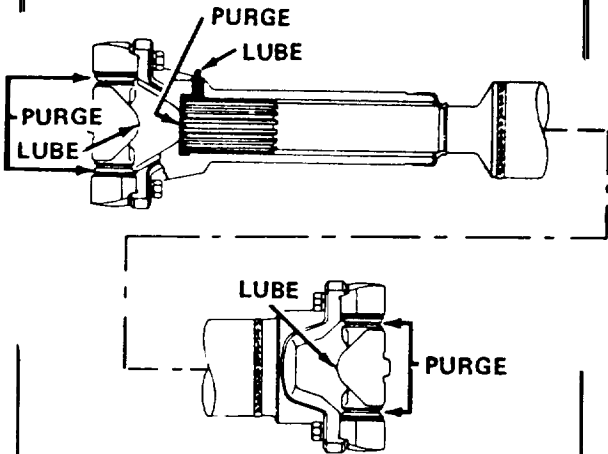
Item No	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
23	Semi-Annual	Front Axles Continued Drive Line Universal Joint, Slip Yokes and Splines	NOTE Apply grease until purging takes place at the air hole in the end slip yoke. a. Lubricate drive line universal joint with GAA and check for looseness or side play. b. Lubricate slip yokes and spline with GAA and check for looseness or side play. 	a. Fitting will not purge old lubricant out of component, loose or side play. b. Fitting will not purge old lubricant out of component, loose or side play.

Table 3-1. Unit Level Preventive Maintenance Checks and Services M915-M920

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
24	Semi-Annual	M916 and M920 Front Axle Only	NOTE COLD TEMPERATURE OPERATION For operating of equipment in expected continuous temperatures above 0° F (-18° C), remove lubricants prescribed in the key for temperatures above 0° F (-18° C). Relubricate with lubricants specified in the key for temperatures 0° F to -50° F (- 18° C to -46° C). NOTE Change lubricant in new or rebuilt axles within 1000 miles (1600 km) but no sooner than 500 miles (800 km). Following initial drain, change lubricant every 24,000 miles (18,000 km) or 2 years of service, whichever comes first. During all lubricant changes, remove metal particles from magnetic drain and filler plugs. NOTE Fill front differential to bottom of CHECK and FILL plug hole. a. Check lubricant level of axle differential. Fill as necessary with GO.	

Table 3-1. Unit Level Preventive Maintenance Checks And Service M915-M920

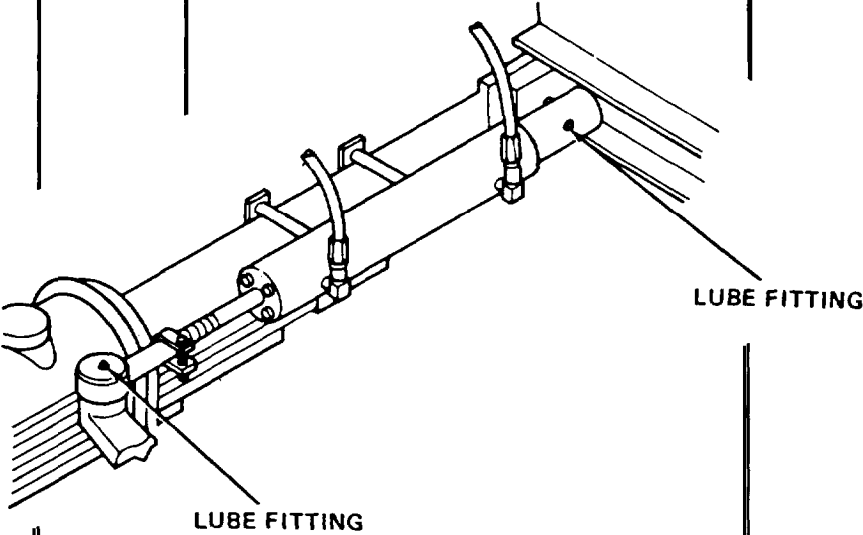
Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
25	Semi-Annual	Auxiliary Power Steering Cylinder	NOTE Pressure gun should be held on fittings until new grease appears. This will assure that all the old contaminated grease has been forced out. Lubricate the auxiliary power steering cylinder with GAA. 	Fitting will not purge old lubricant out of component.
26	Semi-Annual	Pusher Axle Lift Linkage (M920 Only)	NOTE Pressure gun should be held on fittings until new grease appears. This will assure that all the old contaminated grease has been forced out. Lubricate the pusher axle linkage with GAA.	Fitting will not purge old lubricant out of component.

Table 3-1. Unit Level Preventive Maintenance Checks and Services M915-M920

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
27	Semi-Annual	Hydraulic Steering Lines	<u>WARNING</u> Do not start engine or move vehicle when anyone is under vehicle. Severe injury or death could result. Follow routing of all hydraulic steering lines, hoses, and tubes to inspect for loose fitting, rubbing, chafing, cracks, bends, breaks, and leaks. Tighten if loose and replace hoses that are damaged.	Class III leaks evident.
28	Semi-Annual	Springs and Shocks	a. Check spring leaves for cracks and breaks. b. Check spring clips, saddles, saddle caps and spring hangers for presence, looseness, cracks, and visible damage. c. Check for missing or broken retaining hardware, bolts or parts of suspension system. d. Check all shock absorbers. Look for oil leaks and damage. e. Check rubber bushings for cracks, damage, and looseness.	a. Cracks or breaks evident. b. Missing, loose, cracks, or visible damage evident. c. Any retaining hardware, bolts or parts are missing or broken. d. Class III oil leaks or damage is present. e. Rubber bushings are cracked, damaged or loose.

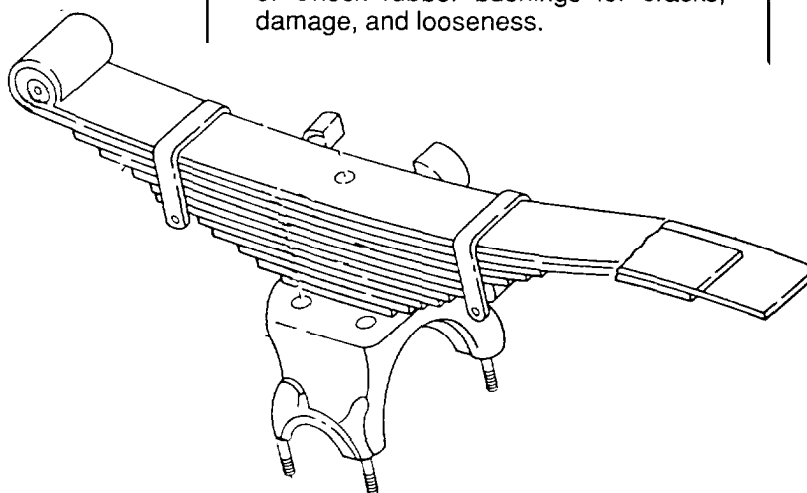


Table 3-1. Unit Level Preventive Maintenance Checks And Services M915-M920

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
29	Semi-Annual	Frame and Cross-members	a. Inspect frame side rails for cracks, breaks, bends, wear deterioration and missing and loose fasteners. b. Inspect crossmembers for cracks, breaks, bends, wear deterioration and missing and loose fasteners.	a. Cracks, bends, or breaks in frame. Any loose or missing fasteners. b. Cracks, bends, or breaks in crossmembers. Any loose or missing fasteners.
30	Semi-Annual	Torque Rods	a. Check torque rods for damage. b. Check mounting brackets for cracks, breaks, rust, and loose mounting hardware on frame.	a. Damage is evident. b. Cracks, breaks, or loose mounting hardware.
31	Semi-Annual	Propeller Shafts and Universal Joints	<u>WARNING</u> Do not start engine or move vehicle when anyone is under vehicle. Severe injury or death could result. NOTE When using a grease gun, apply lubricant to the fitting until clean lubricant squeezes out of the part being lubricated. NOTE Use the proper lubricant to purge all four bearing seals of each universal joint. This flushes abrasive contaminants from each bearing and assures all four bearings are filled properly. NOTE When vehicle is operating under severe conditions, lubricate propeller shafts and universal joints every 500 hours. a. Lubricate using GAA all axle propeller shafts and universal joints.	a. Fitting will not purge old lubricant out of component.

Table 3-1. Unit Level Preventive Maintenance Checks and Services M915-M920

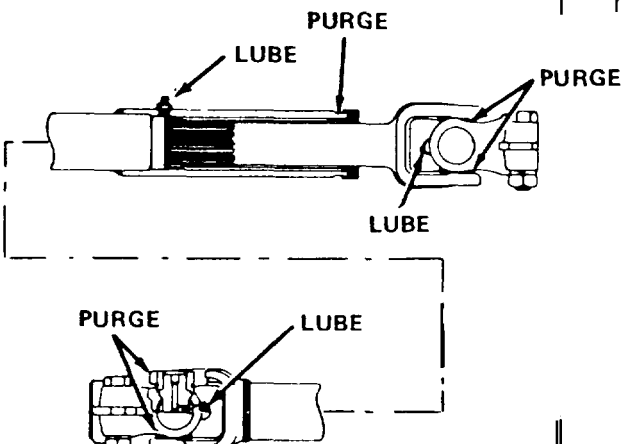
Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
31	Semi-Annual	Propeller Shafts and Universal Joints Continued	b. Lubricate using GAA transmission to transfer case propeller shaft and universal joints.  c. Inspect all propeller shafts for bends and cracks. d. Inspect U-joints for wear, play, broken or missing lubrication fittings and secure. There should be no free play at U-joint.	a. Damage is evident. b. Cracks, breaks, or loose mounting hardware. c. Bends or cracks evident. d. Lubrication fittings or screws are broken or missing. Wear and play evident.
32	Semi-Annual	M916/M920 Tie Rod	NOTE Pressure gun should be held on fittings until new grease appears. This will assure that all the old contaminated grease has been forced out. Take weight off suspension walking beam during lubrication to ensure uniform application of grease into the trunnion bushing. a. Lubricate tie rod ends with GAA. b. Check tie rod drag links for proper torque. Tighten nuts-to 120 lb-ft (163 N.m).	a. Fitting will not purge old lubricant out of component, loose or side play. b. Improper torque value.

Table 3-1. Unit Level Preventive Maintenance Checks And Services M915-M920

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
33	Semi-Annual	Winch (M916 and M920 only)	a. Check for damage and proper operation of winch assembly. b. Check and fill gearbox with OE/HDO to proper level. c. Check for proper braking. d. Inspect winch cables for damage, kinks, frayed strands, and excessive wear.	a. Improper control response. b. Class III leak evident.
34	Semi-Annual	Winch Control Panel	a. Check control panel cylinders and hoses for hydraulic leaks. b. Check and fill hydraulic fluid reservoir with OE/HDO to proper level.	
35	Semi-Annual	5th Wheel Assemblies	Inspect and test the operation of the locking mechanism. Adjust as necessary (paragraph 11-13).	
36	Semi-Annual	Winterization Kit	NOTE Never operate a heater without fluid in the oil pan, transmission, or engine cooling system. a. Plug in 110 VAC power cord to power source and to receptacle on vehicle circuit breaker box with vehicle exposed to +35° F (+1.6° C) or lower. b. Turn on all four circuit breakers to the "ON" position. NOTE Allow at least 15 minutes, then check for appropriate heating level. c. Engine coolant +190° F. d. Engine oil to +170° F. e. Transmission oil to +55° F. f. Battery Box to +55° F.	

Table 3-1. Unit Level Preventive Maintenance Checks and Services M915-M920

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
			FINAL ROAD TEST After all services and inspections have been completed, take vehicle on a short road test to make sure all corrections have been accomplished. Correct any defects or malfunctions that occur during this test. During road test: 1. Listen for any noises. 2. Check steering operation. 3. Check operation of brakes. 4. Check transmission operation; all ranges. 5. Check engine retarder (JACOBS ENGINE BRAKE) operation (TM 9-2320-273-10). 6. Note any loss of power or rough running engine. 7. Check driveline lockup system operation (TM 9-2320-273-10).	

Table 1-1. Unit Level Preventive Maintenance Checks And Service M915-M920

Item No.	Interval	Item To B Inspected	Procedure	Not Mission Capable If:
37	Annual	Engine Throttle Lever	Lubricate with GAA the engine throttle lever pivot.	Fitting will not purge old lubricant out of component.
38	Annual	Head-lights	Check headlight adjustment. Adjust head-lights (paragraph 5-25.1).	
39	Annual or On Condition	Hydraulic System (M916 and M920)	NOTE If AOAP laboratory is not available, drain and refill hydraulic reservoir every 6,000 miles (9,654 km) or annually, whichever comes first. a. Replace hydraulic fluid filters (all models paragraph 12-9). NOTE To drain hydraulic reservoir, remove bottom drain plug. b. Drain reservoir using drain plug. c. Refill hydraulic reservoir using OE/HDO. d. Inspect PTO Hydraulic pump for leaks or obvious damage.	"Do not operate" received from AOAP laboratory. b. AOAP indicates changes required.

Table 3-1. Unit Level Preventive Maintenance Checks and Services M915-M920

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
40	Annual	Tires	NOTE Rotate tires (refer to TM 9-2610-200-14, paragraph 2-9). <u>WARNING</u> Changing tire pressure or wheel alignment, out of the recommended specifications, may adversely affect the vehicle's handling characteristics. Loss of vehicle control may result in serious injury or death and damage to equipment. Never mix radial tires and bias ply tires on the same axle. If radial tires are used in combination with bias ply tires on a vehicle, the radial tires must be placed on the rear axle only. Failure to do this may cause damage to equipment or injury to personnel. NOTE Vehicle must be up on jack stands for the following checks. a. Inspect tires for uneven wear and balance. NOTE If vehicle is new, and has been driven less than 3,000 miles (4,800 km), it is not necessary to align wheels unless abnormal handling is reported. b. Check alignment of front and rear wheels (see TM 9-2320-280-20-1, paragraph(s) 8-7 and 8-8).	a. Tires exhibit excessive or uneven wear or balance. b. Front or rear wheel are out of alignment.

Table 3-1. Unit Level Preventive Maintenance Checks And Services M915-M920

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
41	Annual	Front Wheel Bearings	NOTE Do not remove wheels from hubs. Use truck wheel lift to remove wheels and hub as an assembly. NOTE See paragraph 10-13 for bearing removal and installation. NOTE See paragraph 10-14 for bearing removal and installation. a. Remove, clean and re-pack with GAA front wheel bearings. b. Check wheel bearings for looseness, damage or wear (paragraph 10-13 b). c. Clean hub and brake shoe assemblies with brake cleaning solvent. NOTE If hub has one gouge or grooves, turn hub into Direct Support for resurfacing. d. Check brake drums for obvious grooves and uneven wear. e. Check that brake shoe linings are not worn less than 1/4 inch.	b. Loose, damaged or worn is evident. d. Deep grooves or uneven wear is evident. e. Brake shoe linings worn less than 1/4 inch.
		M915 Only		
		M916/M920		
42	Annual	Axle Brake Cam-Shaft and Slack Adjuster	NOTE When using a grease gun, apply lubricant to the fitting until clean lubricant squeezes out of the part being lubricated. Lubricate GAA No.1 -4 axle brake camshafts and slack adjusters.	Fitting will not purge old lubricant out of component.

Table 3-1. Unit Level Preventive Maintenance Checks and Services M915-M920

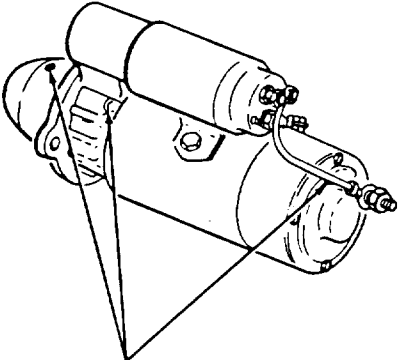
Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
43	Annual	Rear Axles	a. Inspect each input and output shaft seal for damage and leaks. NOTE Do not remove wheels from hubs. Use truck wheel lift to remove wheels and hub as an assembly. b. Remove, clean, and check wheel bearings for damage or wear (paragraph 10-15). c. Clean hub and brake shoe assemblies with brake cleaning solvent. NOTE If hub has one gouge or groove, turn hub into Direct Support for resurfacing. d. Check brake drums for obvious grooves and uneven wear.	b. Wheel bearings loose, damaged, or worn. d. Deep grooves or uneven wear is evident.
44	Annual	Forward Rear Axle Oil Filter	Change forward rear axle oil filter (paragraph 8-13).	
45	Annual	Starter	a. Remove starter (paragraph 5-32). b. Remove three socket head screws and add three to five drops of OE/HDO to each reservoir.  SOCKET HEAD SCREWS	

Table 3-1. Unit Level Preventive Maintenance Checks And Services M915-M920

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
45	Annual	Starter Continued	<u>WARNING</u> 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 fire and use in well-ventilated area. If adhesive, solvents, or sealing compound get on skin or clothing, wash immediately with soap and water. c. Clean drive and drive spline and apply a thin coat of grease (GAA).	
46	Annual	Speedometer	Lubricate speedometer with GAA.	
47	Annual	Pusher Axle Wheel Bearing (M920)	NOTE Do not remove wheels from hubs. Use truck wheel lift to remove wheels and hub as an assembly. NOTE See paragraph 10-16 for bearing removal and installation. a. Remove, clean, and repack with GAA the pusher axle wheel bearing.	

Table 3-1. Unit Level Preventive Maintenance Checks and Sewices M915-M920

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
47	Annual	Pusher Axle Wheel Bearing (M920) Continued	b. Check wheel bearings for looseness, damage, or wear (paragraph 10-16b). c. Clean hub and brake shoe assemblies with brake cleaning solvent. NOTE If hub has one gouge or groove, turn hub into Direct Support for resurfacing. d. Check brake drums for obvious grooves and uneven wear. e. Check that brake shoe linings are not worn less than 1/4 inch.	
48	Annual	Front Stop-master Wedge Brakes and Cham-bers M916/ M920	NOTE Off-Highway (M916/M920 as applicable). Change grease whenever seals are replaced or when brakes are relined. Lubricate stopmaster wedge brake chambers annually or whenever seals are replaced or brakes are relined with GAA.	

Table 3-1 Unit Level Preventive Maintenance Checks And Services M915-M920

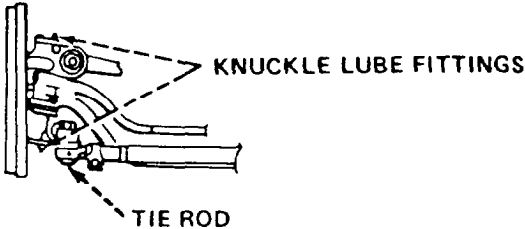
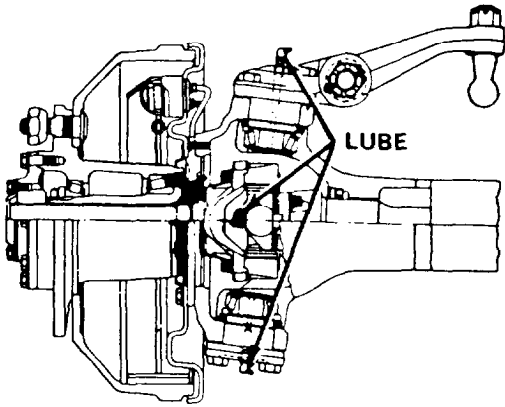
Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
49	Annual	Front Wheel Knuckle	NOTE Pressure gun should be held on fittings until new grease appears. This will assure that all the old contaminated grease has been forced out. Lubricate wheel knuckle with GAA. 	Fittings will not purge old lubricant out of component.
50	Annual	Cardan Universal Joint M916/ M920	Lubricate cardan universal joint with GAA. 	Fittings will not purge old lubricant out of component.

Table 3-1. Unit Level Preventive Maintenance Checks and Services M915-M920

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
			FINAL ROAD TEST After all services and inspections have been completed, take vehicle on a short road test to make sure all corrections have been accomplished. Correct any defects or malfunctions that occur during this test. During road test: 1. Listen for any noises. 2. Check steering operation. 3. Check brake operation. 4. Check transmission operation; all ranges. 5. Check engine retarder (JACOBS ENGINE BRAKE) operation (TM 9-2320-273-10). 6. Note any loss of power or rough running engine. 7. Check driveline lockup system operation (TM 9-2320-273-10).	

Table 3-1. Unit Level Preventive Maintenance Checks And Service M915-M920

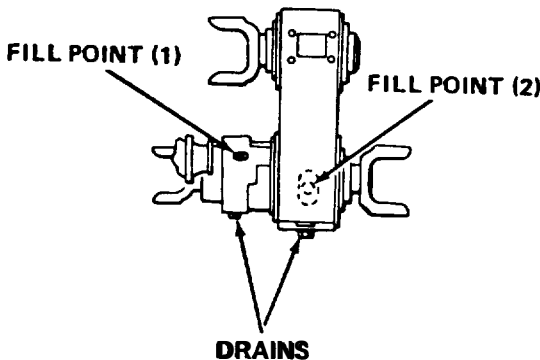
Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
51	Biennially	Transfer Case (M916 and M920 Only)	Drain oil from transfer case at drain plug. Refill with OE/HDO at fill plug. 	
52	Biennially	Tie Rod Ends (M915 Only)	Inspect tie rod for looseness.	Any looseness is evident.
53	Biennially	Front Stop-master Wedge Brakes and Chambers M916/M920	NOTE On-Highway (M916/M920 as applicable). Change grease whenever seals are replaced, or when brakes are relined. Lubricate stopmaster wedge brake chambers annually or whenever seals are replaced or brakes are relined with GAA.	

Table 3-1. Unit Level Preventive Maintenance Checks and Services M915-M920

Item No.	Interval	Item To Be Inspected	Procedure	Not Mission Capable If:
54	Biennially	Rear Axles	NOTE Change lubricant in new or rebuilt axles within 1000 miles (1600 km) but no sooner than 500 miles (800 km). Following initial drain, change lubricant every 12,000 miles (19,300 km) or 2 years of service, whichever comes first. During all lubricant changes, remove metal particles from magnetic drain and filler plugs. Drain and refill all axle differentials with GO.	Differentials have not been drained within specified interval.
55	Biennially	Front Axles M916/ M920	NOTE Change lubricant in new or rebuilt axles within 1000 miles (1600 km) but no sooner than 500 miles (800 km). Following initial drain, change lubricant every 12,000 miles (19,300 km) or 2 years of service, whichever comes first. During all lubricant changes, remove metal particles from magnetic drain and filler plugs. Drain and refill front axle differential with GO.	Differentials have not been drained within specified interval.

M915 THROUGH M920 SERIES TRUCK (CHASSIS)
PMCS PARTS LIST

ITEM NO	PART NUMBER	STOCK NUMBER	NOMENCLATURE	QTY	REMARKS
Semi-Annual (6,000 Miles)					
1	286718	2940-01-081-1391	DESSICANT PACK	1	
2	LF6070	2940-01-019-4513	ENG-FF-OIL-FTR	1	
3	C175AP	2940-00-316-1413	ENG-BP-OIL-FTR	1	
Annual (12,000 Miles)					
1	286718	2940-01-081-1391	DESSICANT PACK	1	
2	LF6070	2940-01-019-4513	ENG-FF-OIL-FTR	1	
3	C175AP	2940-00-316-1413	ENG-BP-OIL-FTR	1	
4	FS1212	2910-01-146-1099	FUEL FILTER	1	
5	250C127S	2940-01-065-8396	INT-AIR-FILTER	1	DON'T REUSE
6	250C128S	2940-01-066-1327	EXT-AIR-FILTER	1	CLEAN 5X ONLY
7	3280-V-5040	2940-00-221-3470	F-RR-AXLE FTR	1	M915 ONLY
8	WF2071	4330-00-274-4712	ENG-WTR-FILTER	1	KIT OPTION
Biennial (24,000 Miles)					
1	286718	2940-01-081-1391	DESSICANT PACK	1	
2	LF6070	2940-01-019-4513	ENG-FF-OIL-FTR	1	
3	C175AP	2940-00-316-1413	ENG-BP-OIL-FTR	1	
4	FS1212	2910-01-146-1099	FUEL FILTER	1	
5	250C127S	2940-01-065-8396	INT-AIR-FILTER	1	DON'T REUSE
6	250C128S	2940-01-066-1327	EXT-AIR-FILTER	1	CLEAN 5X ONLY
7	3280-V-5040	2940-00-221-3470	F-RR AXLE FTR	1	M915ONLY
8	WF2071	4330-00-274-4712	ENG-WTR-FILTER	1	KIT OPTION
9	ERS27549	2530-00-445-4420	P/S PUMP FTR	1	AS REQUIRED
10	S58	2910-00-545-1350	WINCH-HYD-FTR	1	M916/M9200ONLY
11	A-1205-L-1338	5330-01-082-7965	SEAL, WHL BRNG	2	M915FRONT AXLE
12	2208-M-819	5330-01-082-8595	HUB GASKET	2	M915FRONT AXLE
13	839495	5330-00-409-5771	SEAL, IN BRNG	4	915 TANDEM AXLE

Biennial (24,000 Miles) - Continued

ITEM NO	PART NUMBER	STOCK NUMBER	NOMENCLATURE	QTY	REMARKS

14	A-1205-N-612	5330-00-807-8123	SEAL, OUT BRNG	4	915 TANDEM AXLE
15	1229-X-518	5310-00-800-0695	STAR WASHERS	16	915 TANDEM AXLE
16	2208-X-440	5330-00-580-6567	GASKET, HUB	4	915 TANDEM AXLE
17	**2499 (78500)	5330-01-330-5412	SEALS, WH BRNG	4	915 TANDEM AXLE
	*A-1205-Y-1533	5330-01-088-9142	SEAL, WHL BRNG	2	M916-M920 F. AX
	*1199-T-3166	5330-01-090-2106	SEAL, WHL BRNG	2	M916-M920 F. AX
	*A-1205-T-774	2540-00-938-8160	SEAL, IN BRNG	4	M916-M920 T. AX
	'A-1205-U-619	5330-01-076-2886	SEAL, OUT BRNG	4	M916-M920 T. AX
	*1244U879	5330-01-075-0790	SEAL, WHL BRNG	4	M916-M920 T. AX
	*2208-W-413	5330-00-255-0310	HUB GASKET	2	M916-M920 T. AX
(*Part of kit identified above with **)					
18	1205-P-1212	5330-01-090-2107	SEAL, IN BRNG	2	PUSHER AXLE
19	2208-P-796	5330-01-273-9944	HUB GASKET	2	PUSHER AXLE

LUBRICATION TABLE

LUBRICANTS (SEE NOTE 20)	REFILL CAPACITY (APPR.)	EXPECTED TEMPERATURES					
		Above +32°F	+40°F to -15°F (See Note 19)	0°F to-65°F			
OE/HDO, AND OEA (ARC- TIC GRADE)-OIL ENGINE	11 GAL WITH BOTH FILTERS	OE/HDO 30	OE/HDO 10	OEA			
OE/HDO-10, AND OEA ARCTIC GRADE)-OIL DEXRON* ATF PREFERRED) (SEE NOTE 11 E) TRANSMISSION	32 QUARTS WITH EXTERNAL	OE/HDO 10	OE/HDO 10	OEA			
GO LUBRICANT, MULTIPURPOSE (EP 75W-90,SHC 75W-90, OR P.A.O. 75W 140 PER MIL-L-2105C) DIFFERENTIALS	SEE NOTE 7C	GO 85/140	GO 80/90	GO 75 (-40°F LIMIT) (-40°F to-65°F)			
OE/HDO-10, AND OEA (ARTIC GRADE)-OIL (DEXRON* ATF PREFERRED) (SEE NOTE 4B) POWER STEERING	2 QUARTS	ALL TEMPERATURES D - Daily W - Weekly, as required depend- ing upon use 1-1,000 Miles or 1 month, whichever occurs first 3-3,000 Miles or 3 months, whichever occurs first 12-12,000 Miles or 12 months, whichever occurs first 24-24,000 Miles or 24 months, whichever occurs first FOR ARTIC OPERATION REFER TO FM 9-207					
GAA-GREASE AUTOMOTIVE & ARTILLERY	AS REQUIRED						
CWII-LUBR, CHAIN EX- POSED GEAR AND WIRE ROPE	AS REQUIRED						
TOTAL MAN-HOURS							
INTERVAL	D	W	1	3	6	12	24
MAN-HOURS	.3	.1	.7	.4	.6	.4	3.2
NOTE: The man-hours shown above have been established on an individual vehicle basis and hence are not applicable at maintenance facilities where production line methods are employed.							

Section IV TROUBLESHOOTING SYMPTOM INDEX

3-8. INTRODUCTION.

Detailed troubleshooting procedures are provided in chapters 4 thru 12 of this manual. The procedures are arranged by subsystem categories under Malfunction Symptoms. The following composite Malfunction Symptom Index provides a cross reference to the troubleshooting procedures contained in the other chapters.

Table 3-2. Composite Troubleshooting Symptom Index

	Troubleshooting Procedures	
	Table	Malfunction Number
BACKUP LAMPS.		
Backup lamp(s) inoperative.	5-12	1
BATTERY SYSTEM.		
All electrical systems are weak.	5-1	1
Engine fails to crank or cranks slowly.	5-1	2
Batteries do not hold a charge.	5-1	3
BLACKOUT LIGHTING SYSTEM.		
All blackout lamps inoperative.	5-13	1
One blackout marker, headlamp, tail lamp, or stop lamp inoperative.	5-13	2
Trailer blackout lamps inoperative.	5-13	3
CHARGING CIRCUIT.		
Batteries are being undercharged or overcharged.	5-5	1
COMPRESSED AIR AND BRAKE SYSTEMS.		
Insufficient air pressure.	9-1	1
Excessive system pressure indicated.	9-1	2
Park brakes will not release.	9-1	3
Trailer brakes will not release.	9-1	4
Service brakes will not release (one wheel only).	9-1	5
Service brakes will not apply.	9-1	6

Table 3-2. Composite Troubleshooting Symptom Index (Continued).

	Troubleshooting Procedures	
	Table	Malfunction Number
<u>COMPRESSED AIR AND BRAKE SYSTEMS (Continued).</u>		
No service brakes on trailer only.	9-1	7
Trailer hand control unit will not apply trailer service brakes.	9-1	8
Park brakes will not apply.	9-1	9
Service brakes are weak or slow responding (all wheels).	9-1	10
Front service brakes are weak or slow responding.	9-1	11
Rear service brakes are uneven or erratic.	9-1	12
Service brakes are uneven or erratic on one or more wheels.	9-1	13
Brakes overheat.	9-1	14
Stop lamps do not operate, brakes function normally.	9-1	15
Pressure gage(s) not indicating or not accurate, brakes normal.	9-1	16
Air horn does not operate.	9-1	17
Windshield wipers are inoperative.	9-1	18
Interaxle differential lockup inoperative.	9-1	19
<u>ENGINE.</u>		
Engine will not crank.	4-1	1
Engine will crank but not start.	4-1	2
Engine stops, not seized.	4-1	3
Engine stops, seized.	4-1	4
High oil consumption.	4-1	5
Intermittent loss of power.	4-1	6
Sudden loss of power.	4-1	7
Gradual loss of power, no smoke.	4-1	8
Slow deceleration, engine "floats".	4-1	9

Table 3-2. Composite Troubleshooting Symptom Index (Continued).

	Troubleshooting Procedures	
	Table	Malfunction Number
<u>ENGINE (Continued).</u>		
Erratic idle speed.	4-1	10
Excessive exhaust smoke during acceleration.	4-1	11
Excessive exhaust smoke throughout speed range.	4-1	12
High fuel consumption.	4-1	13
Low oil pressure.	4-1	14
No cab heat.	4-1	15
Excessive exhaust noise.	4-1	16
Exhaust fumes in cab.	4-1	17
Engine overheats	4-1	18
<u>ENGINE RETARDER CONTROLS.</u>		
No retarding action.	5-4	1
Retard inoperative in one or two selector position.	5-4	2
<u>ETHER QUICK-START CONTROLS.</u>		
Solenoid cannot be heard to click when ether button is pushed.	5-3	1
<u>FRAME.</u>		
Towing pintle does not pivot or latch, or jaw is stuck.	11-1	1
Excessive jerking of towed trailer.	11-1	2
Excessive noise or popping sounds from fifth wheel when turning.	11-1	3
<u>HEADLAMPS.</u>		
Both headlamps blink on and off.	5-8	1
One headlamp inoperative.	5-8	2
Both headlamps inoperative.	5-8	3
High beam indicator inoperative.	5-8	4

Table 3-2. Composite Troubleshooting Symptom Index (Continued).

	Troubleshooting Procedures	
	Table	Malfunction Number
<u>INSTRUMENTS AND INDICATORS.</u>		
Differential lockup lamp inoperative.	5-7	1
Park brake lamp inoperative.	5-7	2
Instrument panel gages inoperative.	5-7	3
Tachograph clock is inoperative.	5-7	4
Indicator/illumination lamp out.	5-7	5
<u>MARKER LAMPS.</u>		
Front marker lamps inoperative.	5-9	1
Intermediate marker lamps inoperative.	5-9	2
Rear marker lamps inoperative.	5-9	3
All marker lamps inoperative.	5-9	4
<u>MISCELLANEOUS ELECTRICAL.</u>		
Electric horn inoperative.	5-14	1
Personnel heater fan inoperative.	5-14	2
Dome lamp inoperative.	5-14	3
Work lamps inoperative.	5-14	4 & 5
Cigar lighter inoperative.	5-14	6
Winterization kit malfunctioning.	5-14	7
<u>PARKING AND TAIL LAMPS.</u>		
Single lamp inoperative.	5-10	1
Front lamps inoperative.	5-10	2
Rear lamps inoperative.	5-10	3
<u>POWER TAKEOFF.</u>		
PTO will not engage.	12-2	1
PTO is excessively noisy.	12-2	2
<u>POWER TRANSFER CASE..</u>		
Power transfer case does not turn front axle propeller shaft.	7-1	1
Excessive heat buildup.	7-1	2

Table 3-2. Composite Troubleshooting Symptom Index (Continued).

	Troubleshooting Procedures	
	Table	Malfunction Number
<u>POWER TRANSFER CASE (Continued).</u>		
Lubricant leaking.	7-1	3
Transfer case noisy (oil level okay).	7-1	4
<u>PROPELLER SHAFTS AND AXLES.</u>		
Excessive shaft noise or vibration.	8-1	1
Excessive backlash.	8-2	1
Continuous axle or wheel noise.	8-2	2
Lubricant leaking.	8-2	3
Excessive or uneven tire wear.	8-2	4
<u>STARTER SYSTEM.</u>		
Starter fails to crank or cranks too slowly.	5-2	1
Starting motor is noisy and engagement is erratic	5-2	2
<u>STEERING.</u>		
Front tires wearing unevenly.	10-2	1
Hard steering.	10-2	2
Vehicle wanders or pulls to one side.	10-2	3
Lost motion or excessive play in steering wheel.	10-2	4
Temporary increase in effort when turning steering wheel.	10-2	5
Vehicle does not fully steer from stop to stop.	10-2	6
<u>STOP AND TURN SIGNAL LAMPS.</u>		
Turn signals inoperative.	5-11	1
Stop lamps inoperative.	5-11	2
<u>SUSPENSION.</u>		
Vehicle wanders or shimmies.	10-3	1
Pusher axle will not raise or lower.	10-3	2
Rear axle assembly not tracking properly.	10-3	3

Table 3-2. Composite Troubleshooting Symptom Index (Continued).

	Troubleshooting Procedures	
	Table	Malfunction Number
<u>TRANSMISSION.</u>		
Selector lever cannot be moved from NEUTRAL position.	6-1	1
Engine does not turn driveshaft in any speed, forward or reverse.	6-1	2
Engine turns driveshaft in some gears, but not others.	6-1	3
Engine does not turn power takeoff in NEUTRAL.	6-1	4
Truck moves when engine is at low idle and transmission in gear.	6-1	5
Transmission housing breather shows an air leak after the shift is complete.	6-1	6
Transmission feels like it is engaged, then not engaged, then engaged again – Transmission is also noisy.	6-1	7
Transmission has a decrease in oil level with an increase in oil in the engine.	6-1	8
Transmission gears make noise during a shift,	6-1	9
<u>WARNING LAMPS AND ALARMS.</u>		
Engine temperature warning lamp inoperative.	5-6	1
Engine oil pressure low warning lamp inoperative.	5-6	2
Low air pressure warning lamp and/or buzzer inoperative.	5-6	3
Backup alarm is inoperative.	5-6	4
<u>WHEELS AND TIRES.</u>		
Tires wearing unevenly.	10-1	1
Noisy or bumping sound while traveling on the road.	10-1	2
<u>WINCH.</u>		
Winch operates in one direction only.	12-1	1
Winch does not operate in either direction.	12-1	2
Winch operates at one speed only.	12-1	3
Winch will not hold suspended load.	12-1	4

Section V TORQUE INSTRUCTIONS

3-9. Use these guidelines when tightening bolts and capscrews:

- a. If the text gives a specific torque value, use it.
- b. Never torque engine capscrew beyond the values given for grade 5 in table 3-3.
- c. If no torque is specified, refer to table 3-3 for torque value.

A rectangular box with a decorative, wavy border. Inside the box, the word "CAUTION" is written in a bold, sans-serif font.

CAUTION

Never torque an engine capscrew beyond the value given for grade 5, even if it is marked as grade 6, 7 or 8.

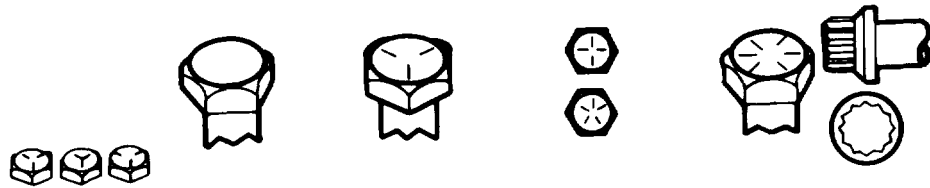
Table 3-3. Standard Capscrew Markings and Torque.

Current Usage	Much Used	Much Used	Used at Times	Used at Times
Minimum Tensile Strength PSI MPa	To 1/2-69,000 (476) To 3/4-64,000 (421) To 1-55,000 (379)	To 3/4-120,000 (827) To 1-115,000 (793)	To 5/8-140,000 (965) To 3/4-133,000 (917)	150,000 (1034)
Quality of Material	Indeterminate	Minimum Commercial	Medium Commercial	Best Commercial
SAE Grade Number	1 or 2	5	6 or 7	8

Capscrew Head Markings

Manufacturer's marks
may vary

These are all SAE
Grade 5 (3 line)



Capscrew Body Size Torque (Inches) - (Thread) Lb-Ft (N•m)	Torque Lb-Ft (N•m)	Torque Lb-Ft (N•m)	Torque Lb-Ft (N•m)
1/4 – 20	5(7)	8(11)	10(14)
-28	6(8)	10(14)	12(16)
5/16-18	11(15)	17(23)	19(26)
-24	13(18)	19(26)	24(33)
3/8 – 16	18(24)	31(42)	27(37)
-24	20(27)	35(47)	44(60)
7/16 – 14	28(38)	49(66)	49(66)
- 20	30(41)	55(75)	70(95)
1/2 – 13	39(53)	75(102)	78(106)
- 20	41(56)	85(115)	105(142)
9/16 – 12	51(69)	110(149)	120(163)
- 18	55(75)	120(163)	155(210)
5/8 – 11	83(113)	150(203)	170(231)
- 18	95(129)	170(231)	210(285)
3/4 – 10	105(142)	270(366)	240(325)
- 16	115(156)	295(400)	375(508)
7/8 – 9	160(217)	395(536)	420(569)
- 14	175(237)	435(590)	605(820)
1 – 8	235(319)	590(800)	675(915)
- 14	250(339)	660(895)	910(1234)
			990(1342)

1. Always use the torque values listed above when definite specifications are not available.

Note: Do not use standard values in place of those specified in other sections of this manual; special attention should be observed when using SAE Grade 6, 7 and 8 capscrews.

2. The above is based on use of clean and dry threads.

3. Reduce torque by 10% when engine oil is used as a lubricant.

4. Reduce torque by 20% if new plated capscrews are used.

Caution: Capscrews threaded into aluminum may require reductions in torque of 30% or more, unless inserts are used.

TA 074608

CHAPTER 4

ENGINE AND ENGINE SYSTEMS MAINTENANCE

4-1. OVERVIEW.

This chapter provides you with the following information related to engine maintenance:

- a. All required special tools and equipment
- b. Other technical manuals
- c. Troubleshooting procedures
- d. Maintenance procedures

Section I REPAIR PARTS, SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT

4-2. COMMON TOOLS AND EQUIPMENT.

For authorized common tools and equipment, refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

4-3. SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT.

The special tools, TM DE, and support equipment required for the engine maintenance procedures described in this chapter are limited to the oil filter strap wrench. (Refer to Organizational Maintenance RPSTL, TM 9-2320-273-20P for tool description and illustration.)

4-4. SPARES AND REPAIR PARTS.

Spares and repair parts are listed and illustrated in the Repair Parts and Special Tools List covering Organizational Maintenance for this equipment (TM 9-2320-273-20P).

Section II TROUBLESHOOTING

4-5. INTRODUCTION.

Procedures for troubleshooting the engine and engine systems are given in table 4-1. These procedures are limited to isolation of faulty components that can be repaired or replaced at the Organizational Maintenance level. (For repair and replacement, see section III in this chapter.) A complaint by the operator may have a variety of causes, singly or in combination. For example, in cases where internal engine parts have failed, the true cause can usually be found in one or more of the fluid systems and less frequently in the internal parts themselves. Therefore, a thorough repair would include the investigation and discovery of the faulty system.

Table 4-1. Engine and Engine Systems Troubleshooting.

MALFUNCTION.	TEST OR INSPECTION.	CORRECTIVE ACTION.
1. ENGINE WILL NOT CRANK:	Step 1. Check battery condition.	Test, charge, or replace as indicated by hydrometer (para 5-7).
	Step 2. Check battery cables and terminals for loose or dirty connections.	Clean and tighten connections.
	Step 3. Check electrical starting system.	a. Troubleshoot starting system (para 5-8). b. Notify Direct Support Maintenance.
2. ENGINE WILL CRANK BUT NOT START:	Step 1. Check fuel level in tank.	Add fuel, if required.
	Step 2. Check fuel solenoid shutoff valve.	Repair, if required (para 4-16).
	Step 3. Check for leaking fuel lines.	Tighten connections or replace fuel lines as required (para 4-20).
	Step 4. Check for air cleaner element restriction.	Service air cleaner element (para 4-24).
	Step 5. Check for white exhaust smoke.	Use cold weather starting aid (Refer to TM 9-2320-273-10).
	Step 6. Check for dirty fuel filter.	Service fuel filter (para 4-18).
	Step 7. Check for congealed fuel (cold weather).	Check fuel specifications (Refer to TM 9-2320-273-10).
3. ENGINE STOPS, NOT SEIZED:	Step 1. Refer to steps 1 thru 7 of Malfunction 2 above.	
	Step 2. Check for obstructed air vent in fuel tank.	Remove air vent (para 4-23), then clean.
4. ENGINE STOPS, SEIZED:	Refer problem to Direct Support Maintenance.	

Table 4-1. Engine and Engine Systems Troubleshooting (Continued).

MALFUNCTION.	
TEST OR INSPECTION.	
CORRECTIVE ACTION.	
5. HIGH OIL CONSUMPTION:	
Step 1.	Check for overfilling.
	a. Check oil level.
	b. Determine that you have proper dipstick by matching against known proper configuration.
Step 2.	Check service records to determine that proper viscosity of oil is in use. (Refer to LO 9-2320-273-12.)
Step 3.	Check engine for external oil leaks with engine running.
	Refer to Direct Support Maintenance for repair of oil leaks.
6. INTERMITTENT LOSS OF POWER:	
Step 1.	Refer to steps 1, 3 and 4 of Malfunction 2.
Step 2.	Check fuel tank air vent.
	Remove air vent (refer to para 4-23); then clean.
Step 3.	Refer to step 6 of Malfunction 2.
	Refer to Direct Support Maintenance.
7. SUDDEN LOSS OF POWER:	
Step 1.	Check fuel level in tank.
Step 2.	Check for exhaust restriction.
	a. Check for loose baffles. Replace muffler if damaged (para 4-37).
	b. Check for damaged exhaust stack. Replace.
Step 3.	Check for dirty fuel filter.
	Service fuel filter (para 4-18).
Step 4.	Check for leaking fuel lines.
	Tighten connections or replace fuel lines as required (para 4-20).
Step 5.	Check for air cleaner element restriction.
	Service air cleaner element as necessary (para 4-24).
Step 6.	Check for congealed fuel (cold weather).
	Check fuel specification (refer to TM 9-2320-273-10).

Table 4-1. Engine and Engine Systems Troubleshooting (Continued).

MALFUNCTION.	TEST OR INSPECTION.	CORRECTIVE ACTION.
8. GRADUAL LOSS OF POWER, NO SMOKE:		
	Step 1. Check for leaking fuel lines.	Tighten connections or replace fuel lines as required (para 4-20).
	Step 2. Check for air intake restriction.	Service air intake as necessary (para 4-25).
	Step 3. Check for worn accelerator rod linkage.	Adjust and replace worn parts (para 4-21).
	Step 4. Check for congealed fuel (cold weather).	Check fuel specification (refer to TM 9-2320-273-10).
9. SLOW DECELERATION, ENGINE "FLOATS":		
	Check for air leaks in fuel pump supply lines.	Service supply lines as necessary (para 4-20).
10. ERRATIC IDLE SPEED:		
	Check for air leaks in fuel pump supply lines.	Service supply lines as necessary (para 4-20).
11. EXCESSIVE EXHAUST SMOKE DURING ACCELERATION:		
	Step 1. Check for dirty fuel filter.	Service fuel filter (para 4-18).
	Step 2. Check for air crossover tube leaks (para 4-28).	a. Repair air crossover tube leaks (para 4-28). b. Refer to Direct Support Maintenance.
12. EXCESSIVE EXHAUST SMOKE THROUGHOUT SPEED RANGE:		
	Step 1. Check for dirty air cleaner element.	Clean or replace element (para 4-24).
	Step 2. Check for poor quality fuel.	a. Check fuel specification. (Refer to TM 9-2320-273-10). b. Refer to Direct Support Maintenance.
13. HIGH FUEL CONSUMPTION:		
	Step 1. Check for poor quality fuel.	a. Check fuel specification refer to TM 9-2320-273-10). b. Notify Direct Support Maintenance.

Table 4-1. Engine and Engine Systems Troubleshooting (Continued).

MALFUNCTION.	
TEST OR INSPECTION.	
CORRECTIVE ACTION.	
14. LOW OIL PRESSURE:	
Step 1.	Check oil level. Fill to proper level (Refer to Lubrication Order LO 9-2320-273-12).
Step 2.	Check filter. Replace filter (para 4-14).
Step 3.	Check for defective oil pressure gage. Test pressure with a gage that is known to be good (para 5-59). If test gage indicates correct pressure, replace gage. If low or no pressure is indicated, notify Direct Support Maintenance.
15. NO CAB HEAT:	
Step 1.	Check for closed heater water control valve. Open valve (para 4-50).
Step 2.	Check for air in heater. Bleed air from heater (para 4-50).
Step 3.	Check for low coolant level. Fill to proper level and check for leaks (para 4-42).
Step 4.	Check thermostat and thermal control (engine running cold). Replace thermostat (para 4-43).
16. EXCESSIVE EXHAUST NOISE:	
Step 1.	Check for defective exhaust pipe or gasket(s). Replace defective item (para 4-34 thru 4-38, as applicable).
Step 2.	Check for defective muffler. Replace muffler (para 4-37).
17. EXHAUST FUMES IN CAB:	
	Check for loose or defective manifold or leaks in pipes. Replace pipe (para 4-34 thru 4-38, as applicable) or refer to Direct Support Maintenance if manifold is defective.
18. ENGINE OVERHEATS:	
Step 1.	Check coolant level. Add coolant until sight glass is full.

Table 4-1. Engine and Engine Systems Troubleshooting (Continued).

MALFUNCTION.	
TEST OR INSPECTION.	
CORRECTIVE ACTION.	
18. ENGINE OVERHEATS (Continued):	
Step 2.	Check for loose or broken fan belts. Tighten or replace belts (para 4-45).
Step 3.	Check thermostat. Replace thermostat (para 4-43).
Step 4.	With engine running and radiator cap removed, check for proper coolant flow. a. Check for clogged radiator hose. Clean or replace hoses (para 4-39). b. Replace water pump (para 4-53).
Step 5.	Check fan clutch actuator. a. Check actuator tubes. Replace if necessary (para 4-48 or 4-49). b. Replace actuator (para 4-46 or 4-47). c. Replace fan clutch (para 4-45). d. Refer problem to Direct Support Maintenance.

Section III MAINTENANCE PROCEDURES

4-6. INTRODUCTION

This section provides Organizational Level maintenance procedures for the engine and engine systems. To find a specific maintenance procedure, see one of the following lists of task summaries:

- a.* Engine Oil System Maintenance (para 4-7).
- b.* Fuel and Air Intake System Maintenance (para 4-8).
- c.* Engine Retarder Brake Maintenance (para 4-9).
- d.* Ether Quick-Start System Maintenance (para 4-10).
- e.* Exhaust System Maintenance (para 4-11).
- f.* Cooling System Maintenance (para 4-12).
- g.* Alternator Drive System Maintenance (para 4-13).

4-7. ENGINE OIL SYSTEM MAINTENANCE TASK SUMMARY.			
<u>INITIAL SETUP</u> <u>APPLICABLE CONFIGURATIONS</u>		<u>EQUIPMENT</u> <u>CONDITION PARA.</u>	<u>CONDITION DESCRIPTION</u>
All.		11-14A or C.	Left Front Fender Removed.
<u>TEST EQUIPMENT</u>			
None.			
<u>SPECIAL TOOLS</u>			
None.			
<u>MATERIALS/PARTS (P/N)</u>			
Oil, 40 qts (Refer to Appendix C).			
Containers, Five Gallon (3).			
Rags.			
Bypass Filter Element, 2122 (37099).			
Cover Gasket, 4311 (37099).			
Primary Filter Element, 299670 (15434).			
Tape, Antiseizing Item 14, Appendix C.			
<u>PERSONNEL REWIRED</u>			
One (MOS-63B20).			
<u>REFERENCES (TM)</u>			
M9-2320-273-20P.			
TM9-2320-273-10.			
LO 9-2320-273-12			
<u>REFERENCES (TROUBLESHOOTING)</u>			
Table 4-1.			
		<u>SPECIAL ENVIRONMENTAL CONDITIONS</u>	
		Vehicle parked on level ground.	
		<u>GENERAL SAFETY INSTRUCTIONS</u>	
		Engine OFF.	
		Transmission in Neutral.	
		Park Brake Set.	
LIST OF TASKS			
TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
1.	Engine Oil Service:	4-14	4-1
	A. Draining oil.	4-14A	
	B. Removal of primary filter.	4-14B	
	C. Inspection of filter adapter.	4-14C	
	D. Installation of primary filter.	4-14D	
	E. Removal of bypass filter.	4-14E	
	F. Bypass filter inspection.	4-14F	
	G. Inspection/replacement of oil lines	4-14G	

4-7. ENGINE OIL SYSTEM MAINTENANCE TASK SUMMARY (Continued).			
LIST OF TASKS			
TASK NO.	TASK	TAS K REF	TROUBLESHOOTING REF (TABLE)
1.	Engine Oil Service (Continued):		
	H. Installation of bypass filter element.	4-14H	
	I. Replenishing oil.	4-14I	
	J. Checking for leaks.	4- 14J	
2.	Breather Tube Maintenance:	4-15	
	A. Removal.	4-15A	
	B. Cleaning.	4-15B	
	C. Inspection.	4-15C	
	D. Installation.	4-15D	

4-8. FUEL AND AIR INTAKE SYSTEM MAINTENANCE TASK SUMMARY.

INITIAL SETUP		EQUIPMENT	
APPLICABLE CONFIGURATIONS		CONDITION PARA	CONDITION DESCRIPTION
All.		5-37A.	Batteries Disconnected.
		11-14 A or C.	Left Front Fender Removed.
TEST EQUIPMENT		4-22A.	Hand Throttle Cable Disconnected
None.		12-12A.	at Throttle Mounting Bracket.
			Winch Throttle Cable Disconnected
			at Throttle Mounting Bracket
			(M916 and M920).
SPECIAL TOOLS			
None.			
MATERIALS/PARTS (P/N)			
Shield (2910-00-064-7787).	Outer Filter Element V250C128,		
O-Ring (5330-00-081-9299).	Inner Filter Element V250C127.		
Masking Tape.	Container(s) (AR for fuel).		
Marking Pencil.	Liquid Teflon (Appendix C).		
Fuel Filter (2910-00-174-5822).	Soap Solution.		
O-Ring, 213079 (15434).	Dry Cleaning Solvent SD-2 (Appendix C).		
Container (1 qt.	Gasket (5330-00-951-3538).		
Tachometer RPM Drive Cable	Cap Seal Ring (5330-00-961-9470).		
MA280J20000 (34623).	Cotter Pin (3), 103362 (24617).		
PERSONNEL REQUIRED		SPECIAL ENVIRONMENTAL CONDITIONS	
One, two or three (MOS-63B20).		Vehicle parked on level ground.	
		Work in well ventilated area.	
REFERENCES (TM)		Darkened area for filter check.	
TM 9-2320-273-20P.		Work area must be clean as dirt in the air	
TM 9-2320-273-10.		passages can damage the turbocharger and	
		engine.	
REFERENCES (TROUBLESHOOTING)		GENERAL SAFETY INSTRUCTIONS	
Table 4-1.		Engine off.	
		Transmission in Neutral.	
		Park brake set.	
LIST OF TASKS			
TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
1.	Fuel Solenoid Shutoff Valve Maintenance:	4-16	4-1
	A. Removal.	4-16A	
	B. Installation.	4-16B	
	C. Operational Check.	4-16C	
2.	Fuel Pump Screen Maintenance:	4-17	
	A. Removal.	4-17A	
	B. Cleaning.	4-17B	

4-8. FUEL AND AIR INTAKE SYSTEM MAINTENANCE TASK SUMMARY (Continued).

LIST OF TASKS			
TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
2.	Fuel Pump Screen Maintenance (Continued): C. Installation. D. Checking for leaks.	4-17C 4-17D	4-1
3.	Fuel Filter Maintenance: A. Removal. B. Installation. C. Checking for leaks.	4-18 4-18A 4-18B 4-18C	
4.	Tachograph RPM Cable Maintenance: A. Removal. B. Installation. C. Operational check.	4-19 4-19A 4-19B 4-19C	
5.	Lines, Hoses, and Fittings Maintenance	4-20	4-1
6.	Accelerator Pedal and Rod Maintenance: A. Removal. B. Installation. C. Checking idle speed.	4-21 4-21A 4-21B 4-21C	4-1
7.	Hand Throttle Linkage Maintenance: A. Removal. B. Cleaning and inspection. C. Installation. D. Checking idle speed.	4-22 4-22A 4-22B 4-22C 4-22D	4-1
8.	Fuel Tank Maintenance: A. Removal. B. Installation. C. Checking for leaks.	4-23 4-23A 4-23B 4-23C	

4-8. FUEL AND AIR INTAKE SYSTEM MAINTENANCE TASK SUMMARY (Continued)			
LIST OF TASKS			
TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
9.	Air Cleaner Element Maintenance:	4-24	4-1
	A. Removal.	4-24A	
	B. Cleaning.	4-24B	
	C. Installation	4-24C	
10.	Air Cleaner Assembly Maintenance:	4-25	4-1
	A. Removal of filter assembly.	4-25A	
	B. Removal of brackets & fittings.	4-25B	
	C. installation of brackets & fittings.	4-25C	
	D. Installation of filter assembly.	4-25D	
11.	Air Cleaner Restriction Indicator Maintenance:	4-26	
	A. Removal of indicator.	4-26A	
	B. Installation of indicator.	4-26B	
	C. Removal of tube and filter.	4-26C	
	D. Installation of tube and filter.	4-26D	
12.	Turbo Air Inlet Maintenance:	4-27	
	A. Removal.	4-27A	
	B. Inspection.	4-27B	
	C. Installation.	4-27C	
	D. Checking for leaks.	4-27D	

4-9. ENGINE RETARDER BRAKE MAINTENANCE TASK SUMMARY.**INITIAL SETUP****APPLICABLE CONFIGURATIONS**

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Dry cleaning solvent (Refer to Appendix C).
 Crossover tube gasket (center cover only) (216487).
 Gasket, rocker arm housing (3009999).

EQUIPMENT**CONDITION PARA**

4-15A.
 4-27A.
 4-28A&B.

CONDITION DESCRIPTION

Breather tube removed.
 Turbo air inlet removed.
 Rocker arm housing covers removed.

PERSONNEL REQUIRED

One, or two (MOS-63B20).

REFERENCES (TM)

TM9-2320-273-10.
 TM9-2320-273-20P.

REFERENCES (TROUBLESHOOTING)

Table 5-4.

SPECIAL ENVIRONMENTAL CONDITIONS

Work area must be clean, as dirt in the turbocharger and engine can cause damage.
 Vehicle parked on level ground.

GENERAL SAFETY INSTRUCTIONS

Engine off; transmission in neutral.
 Park brake set.

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
1.	Rocker Arm Housing Covers Maintenance:	4-28	5-4
	A. Removal of crossover tube.	4-28A	
	B. Removal of cover.	4-28B	
	C. Cleaning.	4-28C	
	D. Installation of cover.	4-28D	
	E. Installation of crossover tube.	4-28E	
2.	Engine Retarder Brake Maintenance:	4-29	5-4
	Inspection.	4-29	

4-10. ETHER QUICK-START SYSTEM MAINTENANCE TASK SUMMARY.

<u>INITIAL SETUP</u> <u>APPLICABLE CONFIGURATIONS</u> All. <u>TEST EQUIPMENT</u> None. <u>SPECIAL TOOLS</u> None. <u>MATERIALS/PARTS (P/N)</u> Ether cylinder (2910-01-072-1783). Solenoid valve, 913032-04 (06991). Atomizer, 91302406 (06991). <u>PERSONNEL REQUIRED</u> Two (MOS-63B20) <u>REFERENCES (TM)</u> TM9-2320-273-10. TM9-2320-273-20P. <u>REFERENCES (TROUBLESHOOTING)</u> Table 5-3.		<u>EQUIPMENT</u> <u>CONDITION PARA</u> 4-30A. 911A.	<u>CONDITION DESCRIPTION</u> Ether Cylinder Removed. Alcohol Evaporator Removed.
		<u>SPECIAL ENVIRONMENTAL CONDITIONS</u> Work in well ventilated area. Vehicle parked on level ground. Coolant temperature must be below 50°F or ether button will not function.	
		<u>GENERAL SAFETY INSTRUCTIONS</u> Ether is highly explosive, dispose of cylinder properly. Be alert for the strong odor of spilled ether. Guard against flame or sparks in work area. Engine off; transmission in neutral. Park brake set.	
LIST OF TASKS			
TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
1.	Ether Cylinder Maintenance: A. Removal. B. Installation. C. Operational check.	4-30 4-30A 4-30B 4-30C	5-3
2.	Solenoid Valve Maintenance: A. Removal. B. Installation.	4-31 4-31 A 4-31 B	5-3

4-10. ETHER QUICK-START SYSTEM MAINTENANCE TASK SUMMARY (Continued).**LIST OF TASKS**

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
3.	Atomizer Maintenance:	4-32	5-3
	A. Removal.	4-32A	
	B. Installation and operational check.	4-32B	
4.	Ether Tube Maintenance:	4-33	5-3
	A. Removal.	4-33A	
	B. Inspection.	4-33B	
	C. Installation,	4-33C	
	D. Operational check.	4-33D	

4-11. EXHAUST SYSTEM MAINTENANCE TASK SUMMARY.**INITIAL SETUP****APPLICABLE CONFIGURATIONS**

All.

EQUIPMENT**CONDITION PARA**

None.

CONDITION DESCRIPTION

None.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Locknut (M916/M920) M 1219B-20002 (34623).
 Couplings (5) 5.0-1236 BJ (76700).
 (3) 5.0-1256 LJ (76700).
 5.0-1259 LJ (76700).

PERSONNEL REQUIRED

One or two (MOS-63B20).

REFERENCES (TM)

TM9-2320-273-10.
 TM9-2320-273-20P.

REFERENCES (TROUBLESHOOTING)

Table 4-1.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle parked on level ground.

GENERAL SAFETY INSTRUCTIONS

Wait until exhaust components are cool.
 Engine off; transmission in neutral.
 Park brake set.

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
1.	Turbo Outlet Pipe Maintenance:	4-34	4-1
	A. Removal.	4-34A	
	B. Inspection of mating flanges.	4-34B	
	C. Installation.	4-34C	
	D. Checking for leaks.	4-34D	
2.	Flex Pipes Maintenance:	4-35	4-1
	A. Removal.	4-35A	
	B. Inspection of mating flanges.	4-35B	

4-11. EXHAUST SYSTEM MAINTENANCE TASK SUMMARY (Continued).**LIST OF TASKS**

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
2.	Flex Tubes Maintenance (Continued): C. Installation. D. Checking for leaks.	4-35C 4-35D	4-1
3.	Muffler Inlet Pipe Maintenance: A. Removal. B. Inspection of mating flanges. C. Installation. D. Checking for leaks.	4-36 4-36A 4-36B 4-36C 4-36D	
4.	Muffler Maintenance: A. Removal. B. Inspection of mating flanges. C. Installation. D. Checking for leaks.	4-37 4-37A 4-37B 4-37C 4-37D	
5.	Exhaust Stack Maintenance: A. Removal. B. Inspection of mating flanges and rain cap. C. Installation. D. Checking for leaks.	4-38 4-38 4-38B 4-38C 4-38D	

4-12. COOLING SYSTEM MAINTENANCE TASK SUMMARY.**INITIAL SETUP****APPLICABLE CONFIGURATIONS**

All.

TEST EQUIPMENT

Belt tension gage.

SPECIAL TOOLS

Thermostat mandrel No. 139.

MATERIALS/PARTS (P/N)

Insulators (2) CBA24-500 (76005)
 Liquid teflon (refer to appendix C).
 Container (60 qt min).
 Gasket (6620-00-047-281 1).
 Rubber seal (5330-00-864-5422).
 O-Rings (4) (5330-00-506-4874).
 Sealing rings (6) (5330-00-143-8369).
 Gasket, 210859 (15434).
 Soap solution.
 Gasket, 3011931 (15434).
 Gasket, 208132 (15434).
 Gasket, water pump to engine block
 (5330-01 -066-5350) .
 Gasket, water pump to heater manifold
 208132 (15434).

PERSONNEL REQUIRED

One or two (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
 TM 9-2320-273-20P.

REFERENCES (TROUBLESHOOTING)

Table 4-1.

EQUIPMENT**CONDITION PARA**

4-41A.
 4-42A.
 4-49A, 4-51A. 4-47A.
 4-46A.
 4-25A.
 4-41A.
 4-44A.
 4-45A.
 6-10A.
 5-73A.
 4-27A.
 11-29A, 11-32A.
 11-16E.
 11-16A.
 10-22A.

CONDITION DESCRIPTION

Upper fan shroud removed.
 Coolant drained.
 Water pump belt removed.
 Fan clutch "actuator removed.
 Air cleaner removed.
 Upper shroud & fan removed.
 Fan removed.
 Fan belts removed.
 Transmission oil cooler hoses removed.
 Water temperature switch wire removed.
 Turbo air inlet removed
 Hood removed
 Brush guard removed (M916/M920).
 Grille removed.
 Steering pump cooler hoses removed.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle parked on level ground.

GENERAL SAFETY INSTRUCTIONS

Engine off; transmission in neutral.
 Park brake set.

4-12. COOLING SYSTEM MAINTENANCE TASK SUMMARY (Continued).			
LIST OF TASKS			
TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
1.	Radiator Hoses Maintenance:	4-39	4-1
	A. Inspection.	4-39A	
	B. Removal.	4-39B	
	C. Installation.	4-39C	
2.	Radiator Maintenance:	4-40	4-1
	A. Removal.	4-40A	
	B. Installation.	4-40B	
3.	Fan Shrouds Maintenance:	4-41	
	A. Removal.	4-41A	
	B. Installation.	4-41B	
4.	Coolant System Maintenance:	4-42	4-1
	A. Drain.	4-42A	
	B. Inspection/installation of draincocks	4-42B	
	C. Replenishing coolant,	4-42C	
	D. Checking for leaks.	4-42D	
5.	Thermostat and Housing Maintenance:	4-43	4-1
	A. Removal.	4-43A	
	B. Testing.	4-43B	
	C. Installation.	4-43C	
	D. Operational check.	4-43D	
6.	Fan Maintenance:	4-44	4-1
	A. Removal.	4-44A	
	B. Installation.	4-44B	
	C. Operational check.	4-44C	

4-12. COOLING SYSTEM MAINTENANCE TASK SUMMARY (Continued).			
LIST OF TASKS			
TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
7.	Fan Clutch and Belts Maintenance:	4-45	4-1
	A. Removal.	4-45A	
	B. Inspection.	4-45B	
	C. Installation.	4-45C	
	D. Adjustment.	4-45D	
8.	Fan Clutch Actuator Maintenance (M915, M916, M917, M918, and M920):	4-46	4-1
	A. Removal.	4-46A	
	B. Inspection of air tubes.	4-46B	
	C. Installation.	4-46C	
	D. Operational check.	4-46 D	
9.	Fan Clutch Actuator and Valve Maintenance (M919):	4-47	4-1
	A. Removal.	4-47A	
	B. Inspection of air tubes.	4-47B	
	C. Installation.	4-47C	
	D. Operational check.	4-47 D	
10.	Fan Clutch Actuator Tubes Maintenance (M915, M916, M917, M918, and M920):	4-48	4-1
	A. Removal.	4-48A	
	B. Installation.	4-48B	
	C. Checking for leaks.	4-48C	
11.	Fan Clutch Actuator Tubes Maintenance (M919):	4-49	4-1
	A. Removal.	4-49A	
	B. Inspection.	4-49B	
	C. Installation.	4-49C	
	D. Checking for leaks.	4-49D	

4-12. COOLING SYSTEM MAINTENANCE TASK SUMMARY (Continued).**LIST OF TASKS**

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)	
12.	Heater Shutoff Valve Maintenance: A. Removal. B. Installation. C. Bleeding heater.	4-50 4-50A 4-50B 4-50C	4-1	
13.	Water Pump Belt Maintenance: A. Removal. B. Installation. C. Adjustment.	4-51 4-51 A 4-51 B 4-51C		
14.	Water Manifold Maintenance: A. Removal. B. Inspection. C. Installation.	4-52 4-52A 4-52B 4-52C		
15.	Water Pump Maintenance: A. Removal. B. Installation.	4-53 4-53A 4-53B		4-1
16.	Water Pump Idler Pulley Maintenance: A. Removal. B. Installation. C. Operational check.	4-54 4-54A 4-54B 4-54C		
NOTE Maintenance procedures for the water temperature switch and transmitter are given in Chapter 5, section III.				

4-13. ALTERNATOR DRIVE SYSTEM MAINTENANCE TASK SUMMARY.**INITIAL SETUP****APPLICABLE CONFIGURATIONS**

All.

EQUIPMENT**CONDITION PARA**

None.

CONDITION DESCRIPTION

None.

TEST EQUIPMENT

Belt tension gage.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

PERSONNEL REQUIRED

One (MOS-63B20)

REFERENCES (TM)

TM9-2320-273-10

REFERENCES (TROUBLESHOOTING)

Table 4-1.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle parked on level ground.

GENERAL SAFETY INSTRUCTIONSEngine off; transmission in neutral.
Park brake set.**LIST OF TASKS**

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
1	Alternator Belts Maintenance:	4-55	
	A. Removal.	4-55A	
	B. Installation.	4-55B	
	C. Adjustment	4-55C	

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OIL SYSTEM**4-14. ENGINE OIL SERVICE.****MIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

a. Draining Oil.	(15)	g. Inspection/Replacement of Oil Lines.	(10)
b. Removal of Primary Filter.	(10)	h. Installation of Bypass Filter.	(15)
c. Inspection of Filter Adapter.	(5)	i. Replenishing Oil.	(15)
d. Installation of Primary Filter,	(10)	j. Checking for Leaks.	(10)
Removal of Bypass Filter.	(10)		
Bypass Filter Inspection.	(5)		
105 Minutes Total.			

INITIAL SETUP**EQUIPMENT CONDITION****APPLICABLE CONFIGURATIONS****PARAGRAPH****CONDITION DESCRIPTION**

All,

11-14 A or C.

Left Fender Removed.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Oil, 40 Qts (Refer to Appendix C).
 Containers (Three 5-gal buckets).
 Rag, Wiping.
 Bypass Filter Element, 2122 (37099).
 Cover Gasket, 4311 (37099).
 Primary Oil Filter, 299670 (15434).
 Liquid Teflon (Refer to Appendix C).

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-20P.
 LO 9-2320-273-12.
 TM 9-2320-273-10.

GENERAL SAFETY INSTRUCTIONS

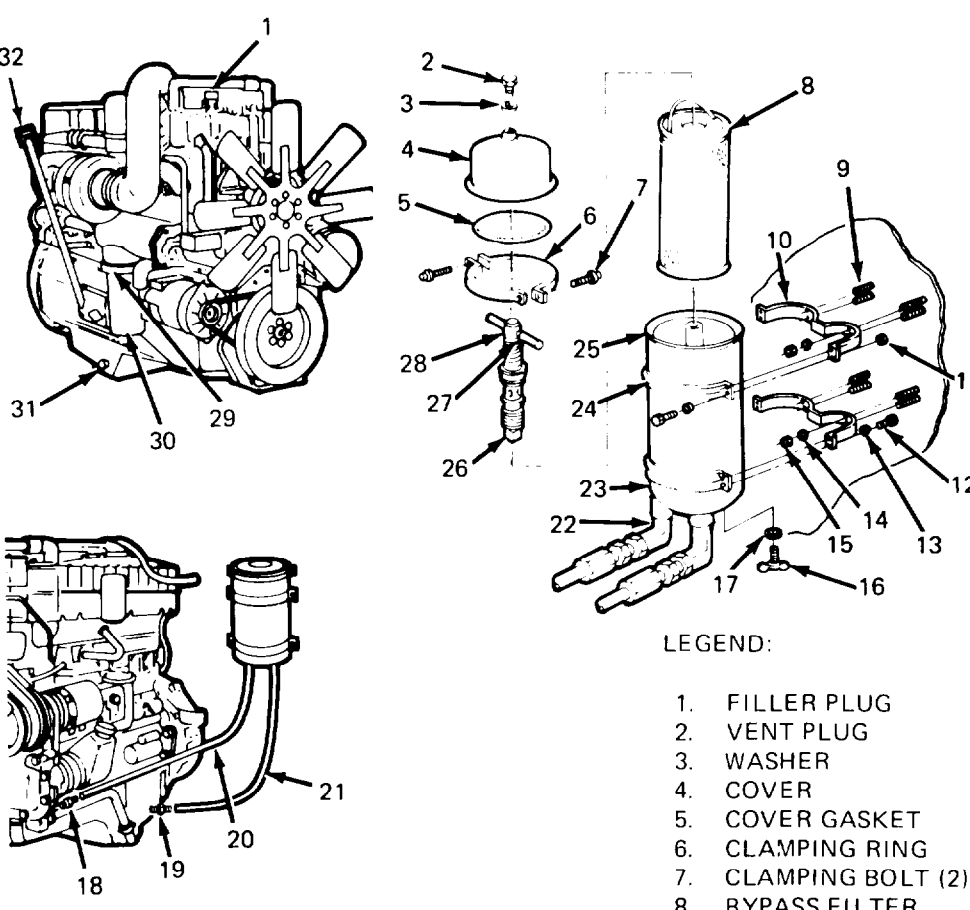
Engine OFF.
 Transmission in Neutral.
 Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 4.1.

OIL SYSTEM

4-14. ENGINE OIL SERVICE (Continued).

LOCATION/ITEM	ACTION	REMARKS																																																
A. DRAINING OIL.																																																		
NOTE																																																		
Place container under crankcase drain plug (31) to catch oil.																																																		
1. Vent plug 2) and washer (3).	Unscrew and remove.	Allow sufficient time for oil to drain from bypass filter to crankcase.																																																
2. Drain plug (31).	a. Unscrew and remove. b. Allow all oil to drain out. c. Inspect magnet for foreign particles and wipe clean. d. Screw in and tighten	Oil should be drained from a warm engine. Stop flow by reinserting plug to change containers.																																																
 LEGEND: <table><tr><td>1. FILLER PLUG</td><td>25. FLANGE</td></tr><tr><td>2. VENT PLUG</td><td>26. ORIFICE</td></tr><tr><td>3. WASHER</td><td>27. BLEEDER HOLE</td></tr><tr><td>4. COVER</td><td>28. PACK HOLD DOWN ASSEMBLY</td></tr><tr><td>5. COVER GASKET</td><td>29. FILTER ADAPTER</td></tr><tr><td>6. CLAMPING RING</td><td>30. PRIMARY FILTER</td></tr><tr><td>7. CLAMPING BOLT (2)</td><td>31. DRAIN PLUG</td></tr><tr><td>8. BYPASS FILTER ELEMENT</td><td>32. DIPSTICK</td></tr><tr><td>9. MOUNTING STUD (8)</td><td></td></tr><tr><td>10. MOUNTING BRACKET (2)</td><td></td></tr><tr><td>11. NUT (8)</td><td></td></tr><tr><td>12. BOLT (8)</td><td></td></tr><tr><td>13. LOCKWASHER (8)</td><td></td></tr><tr><td>14. LOCKWASHER (8)</td><td></td></tr><tr><td>15. NUT (8)</td><td></td></tr><tr><td>16. DRAINCOCK</td><td></td></tr><tr><td>17. WASHER</td><td></td></tr><tr><td>18. CONNECTOR</td><td></td></tr><tr><td>19. CONNECTOR</td><td></td></tr><tr><td>20. FILTER TO PUMP LINE</td><td></td></tr><tr><td>21. FILTER TO SUMP LINE</td><td></td></tr><tr><td>22. ELBOW (2)</td><td></td></tr><tr><td>23. CANNISTER</td><td></td></tr><tr><td>24. MOUNTING BRACKET CLAMP</td><td></td></tr></table>			1. FILLER PLUG	25. FLANGE	2. VENT PLUG	26. ORIFICE	3. WASHER	27. BLEEDER HOLE	4. COVER	28. PACK HOLD DOWN ASSEMBLY	5. COVER GASKET	29. FILTER ADAPTER	6. CLAMPING RING	30. PRIMARY FILTER	7. CLAMPING BOLT (2)	31. DRAIN PLUG	8. BYPASS FILTER ELEMENT	32. DIPSTICK	9. MOUNTING STUD (8)		10. MOUNTING BRACKET (2)		11. NUT (8)		12. BOLT (8)		13. LOCKWASHER (8)		14. LOCKWASHER (8)		15. NUT (8)		16. DRAINCOCK		17. WASHER		18. CONNECTOR		19. CONNECTOR		20. FILTER TO PUMP LINE		21. FILTER TO SUMP LINE		22. ELBOW (2)		23. CANNISTER		24. MOUNTING BRACKET CLAMP	
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OIL SYSTEM

4-14. ENGINE OIL SERVICE (Continued).

LOCATION/ITEM	ACTION	REMARKS
LEGEND:		
1. FILLER PLUG	12. BOLT (8)	23. CANISTER
2. VENT PLUG	13. LOCKWASHER (8)	24. MOUNTING
3. WASHER	14. LOCKWASHER (8)	BRACKET CLAMP
4. COVER	15. NUT (8)	25. FLANGE
5. COVER GASKET	16. DRAIN COCK	26. ORIFICE
6. CLAMPING RING	17. WASHER	27. BLEEDER HOLE
7. CLAMPING BOLT (2)	18. CONNECTOR	28. PACK HOLD DOWN
8. BYPASS FILTER	19. CONNECTOR	ASSEMBLY
ELEMENT	20. FILTER TO	29. FILTER ADAPTER
9. MOUNTING STUD (8)	PUMP LINE	30. PRIMARY FILTER
10. MOUNTING	21. FILTER TO	31. DRAIN PLUG
BRACKET (2)	SUMP LINE	32. DIPSTICK
11. NUT (8)	22. ELBOW (2)	

NOTE: OIL
SAMPLE TAKEN
AT THIS POINT

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OIL SYSTEM

4-14. ENGINE OIL SERVICE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A.1. OIL SAMPLE FOR ANALYSIS.		
NOTE Before beginning this task check engine oil level according to Operator's manual (TM 9-2320-273-10). Start engine (see TM 9-2320-273-10), warm vehicle to normal operating range and stop engine.		
1. Draincock (16).	a. Unscrew and loosen. b. When completed with task 1., use the proper bottle and take oil sample from the oil bypass filter drain valve as shown in illustration on page 4-26, item 16. c. Check oil level to insure proper level after sampling.	When taking a sample, first use a container to drain a small amount of oil to clean the valve assembly.
B. REMOVAL OF PRIMARY FILTER.		
NOTE Place container under primary filter (30) to catch oil.		
3. Primary filter (30).	Unscrew using filter wrench. Throw filter away.	
C. INSPECTION OF FILTER ADAPTER.		
4. Filter adapter (29).	Inspect for: a. Cracks. b. Nicks. c. Damaged threads.	If adapter is defective, notify Direct Support.

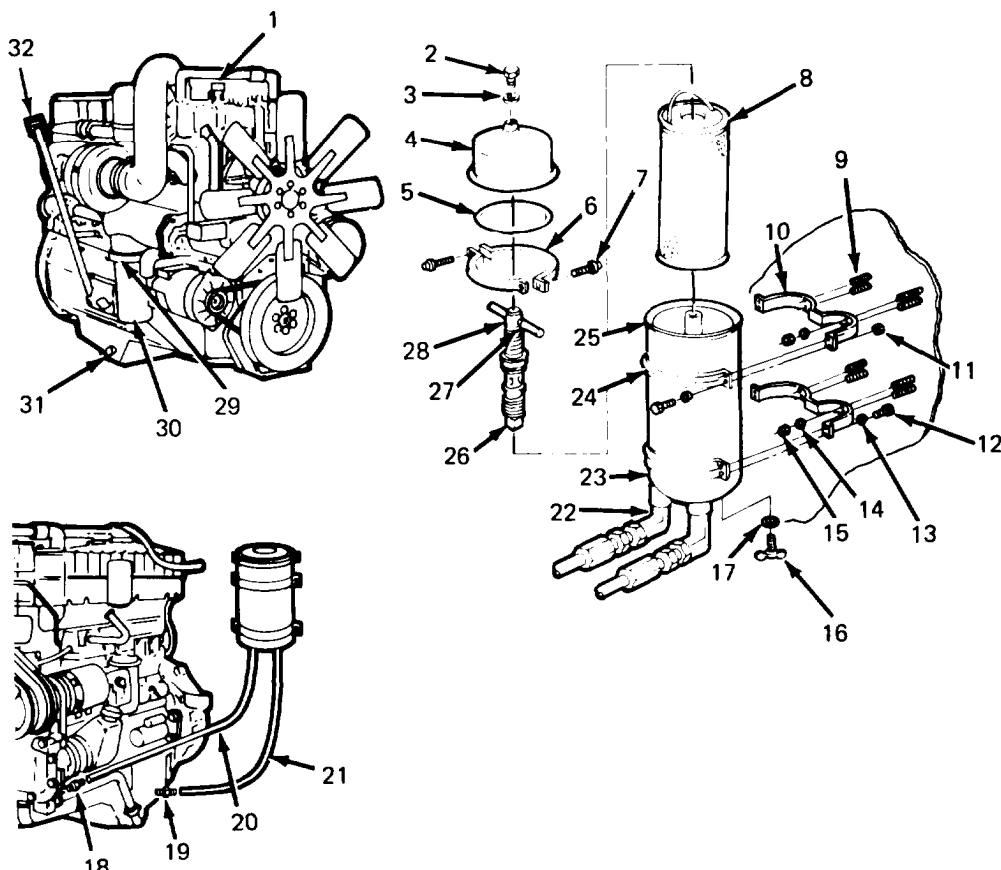
OIL SYSTEM

4-14. ENGINE OIL SERVICE (Continued).

LOCATION/ITEM	ACTION	REMARKS
<u>D. INSTALLATION OF PRIMARY FILTER.</u>		
5. New primary filter (30).	a. Apply lube to seal. b. Screw into filter adapter (29) and tighten by hand,	Do not use filter wrench,
<u>E. REMOVAL OF BYPASS FILTER.</u>		
NOTE		
Place container under bypass filter draincock (16) to catch oil,		
6. Bypass filter draincock (16) and washer (17).	a. Remove and allow oil to drain out. b. Screw in and tighten.	
7. Two clamping bolts (7).	Unscrew and remove.	
8. Clamping ring (6).	Remove.	
9. Cover (4) and cover gasket (5).	Remove.	Discard cover gasket (5).
10. Pack hold down assembly (28).	Unscrew and remove.	
11. Bypass filter element (8).	Remove and discard.	
12. Filter to pump line (20) and filter to sump line (21).	Unscrew and remove from two elbows (22).	
13. Eight bolts (12), lockwashers (13) and nuts (11).	Unscrew and remove.	

OIL SYSTEM

4-14. ENGINE OIL SERVICE (Continued).

LOCATION/ITEM	ACTION	REMARKS																																	
																																			
LEGEND: <table> <tbody> <tr> <td>1. FILLER PLUG</td><td>12. BOLT (8)</td><td>23. CANISTER</td></tr> <tr> <td>2. VENT PLUG</td><td>13. LOCKWASHER (8)</td><td>24. MOUNTING BRACKET CLAMP</td></tr> <tr> <td>3. WASHER</td><td>14. LOCKWASHER (8)</td><td>25. FLANGE</td></tr> <tr> <td>4. COVER</td><td>15. NUT (8)</td><td>26. ORIFICE</td></tr> <tr> <td>5. COVER GASKET</td><td>16. DRAINCOCK</td><td>27. BLEEDER HOLE</td></tr> <tr> <td>6. CLAMPING RING</td><td>17. WASHER</td><td>28. PACK HOLD DOWN ASSEMBLY</td></tr> <tr> <td>7. CLAMPING BOLT (2)</td><td>18. CONNECTOR</td><td>29. FILTER ADAPTER</td></tr> <tr> <td>8. BYPASS FILTER ELEMENT</td><td>19. CONNECTOR</td><td>30. PRIMARY FILTER</td></tr> <tr> <td>9. MOUNTING STUD (8)</td><td>20. FILTER TO PUMP LINE</td><td>31. DRAIN PLUG</td></tr> <tr> <td>10. MOUNTING BRACKET (2)</td><td>21. FILTER TO SUMP LINE</td><td>32. DIPSTICK</td></tr> <tr> <td>11. NUT (8)</td><td>22. ELBOW (2)</td><td></td></tr> </tbody> </table>			1. FILLER PLUG	12. BOLT (8)	23. CANISTER	2. VENT PLUG	13. LOCKWASHER (8)	24. MOUNTING BRACKET CLAMP	3. WASHER	14. LOCKWASHER (8)	25. FLANGE	4. COVER	15. NUT (8)	26. ORIFICE	5. COVER GASKET	16. DRAINCOCK	27. BLEEDER HOLE	6. CLAMPING RING	17. WASHER	28. PACK HOLD DOWN ASSEMBLY	7. CLAMPING BOLT (2)	18. CONNECTOR	29. FILTER ADAPTER	8. BYPASS FILTER ELEMENT	19. CONNECTOR	30. PRIMARY FILTER	9. MOUNTING STUD (8)	20. FILTER TO PUMP LINE	31. DRAIN PLUG	10. MOUNTING BRACKET (2)	21. FILTER TO SUMP LINE	32. DIPSTICK	11. NUT (8)	22. ELBOW (2)	
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11. NUT (8)	22. ELBOW (2)																																		
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OIL SYSTEM

4-14. ENGINE OIL SERVICE (Continued).

LOCATION/ITEM	ACTION	REMARKS
E. REMOVAL OF BYPASS FILTER {Continued}.		
14. Two mounting bracket clamps (24).	Lift off and remove canister (23).	
15. Two elbows (22).	Unscrew from canister (23).	
16. Eight nuts (15) and lock-washers (14).	Unscrew and remove two mounting brackets (10) from eight mounting studs (9) at firewall.	
F. BYPASS FILTER INSPECTION.		
17. Orifice (26) and bleeder hole (27).	Holes should not be blocked. Clean out with a piece of wire if necessary.	
18. Mounting brackets (10), clamps (24), canister (23) and elbows (22).	Inspect for: a. Damage, b. Looseness, c. Stains from leaks. d. Crossed threads.	Replace any damaged components if necessary.
G. INSPECTION/REPLACEMENT OF OIL LINES.		
19. Filter to pump line (20) and filter to sump line (24).	a. Unscrew from two connectors (18). b. Inspect for: 1. Cracks. 2. Stains from leaks. 3. Kinks. 4. End fitting damage.	
20. Two connectors (18) and 19).	a. Unscrew from oil pump and oil sump. b. Coat threads with liquid teflon. c. Screw into oil pump and oil sump.	Replace if threads are damaged.
21. Filter to pump line (20) and filter to sump line (21).	Screw onto connectors (18) and (19).	

OIL SYSTEM

4-14. ENGINE OIL SERVICE (Continued).

LOCATION/ITEM	ACTION	REMARKS

LEGEND:

1. FILLER PLUG	12. BOLT (8)	23. CANISTER
2. VENT PLUG	13. LOCKWASHER (8)	24. MOUNTING
3. WASHER	14. LOCKWASHER (8)	BRACKET CLAMP
4. COVER	15. NUT (8)	25. FLANGE
5. COVER GASKET	16. DRAINCOCK	26. ORIFICE
6. CLAMPING RING	17. WASHER	27. BLEEDER HOLE
7. CLAMPING BOLT (2)	18. CONNECTOR	28. PACK HOLD DOWN
8. BYPASS FILTER	19. CONNECTOR	ASSEMBLY
ELEMENT	20. FILTER TO	29. FILTER ADAPTER
9. MOUNTING STUD (8)	PUMP LINE	30. PRIMARY FILTER
10. MOUNTING	21. FILTER TO	31. DRAIN PLUG
BRACKET (2)	SUMP LINE	32. DIPSTICK
11. NUT (8)	22. ELBOW (2)	

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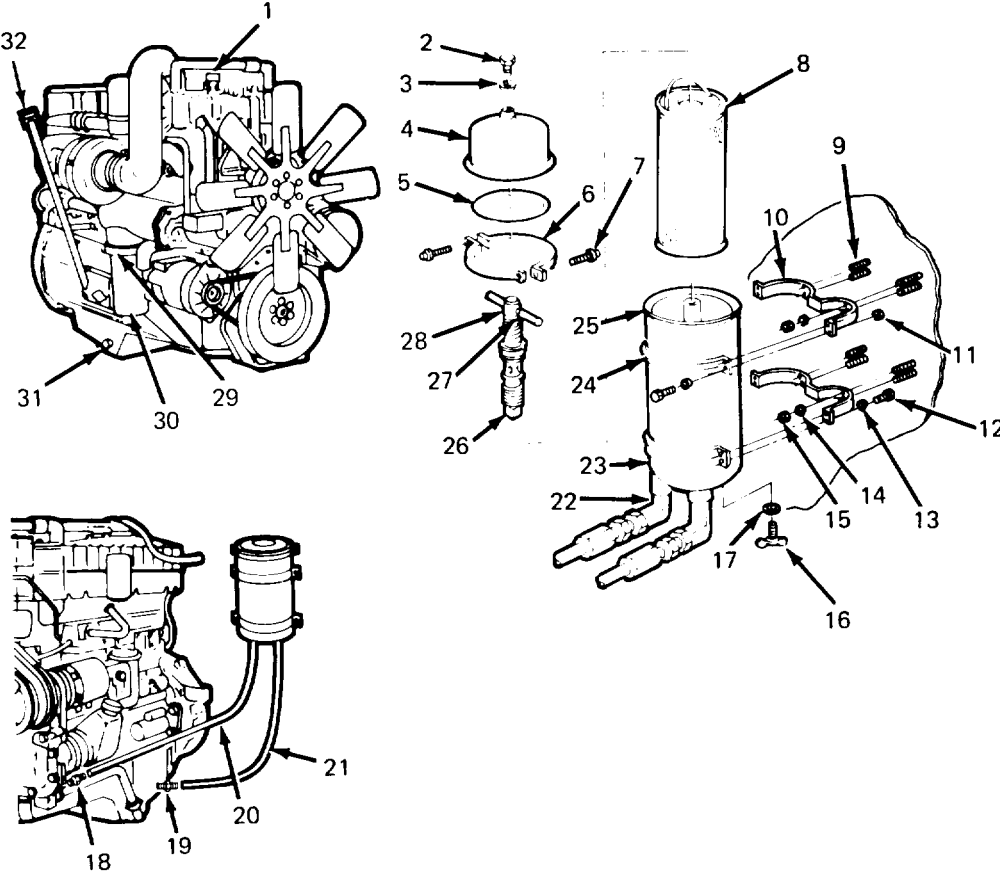
OIL SYSTEM

4-14. ENGINE OIL SERVICE (Continued).

LOCATION/ITEM	ACTION	REMARKS
H. INSTALLATION OF BYPASS FILTER.		
22. Two mounting brackets (10).	a. Position over eight mounting studs (9). b. Secure with eight lockwashers (14) and nuts (15).	
23. Two elbows (22).	a. Coat threads with liquid teflon. b. Screw into canister (23).	
24. Canister (23).	Secure to two mounting brackets (10) with two clamps (24), eight bolts (12), lockwashers (13), and nuts (11).	
25. Filter to pump line (20) and filter to sump line (21).	Screw onto two elbows (22).	
26. Bypass filter element (8).	Place into canister (23).	
27. Pack hold down assembly (28).	a. Place thru center of bypass filter element (8) in canister (23). b. Screw all the way down to the stop.	
28. Cover (4) and new cover gasket (5).	Set in place on canister flange (25).	
29. Clamping ring (6).	a. Position over cover (4) and canister flange (25). b. Secure with two clamping bolts (7); draw up bolts until they stop against shoulder.	
30. Vent plug (2) and washer (3).	Install at cover (4) and tighten.	
I. REPLENISHING OIL.		
31. Filler cap (1).	a. Remove. b. Pour oil thru filler cap opening. c. Tighten filler cap.	See LO 9-2320-273-12. OEA IF SUB-ZERO.
J. CHECKING FOR LEAKS.		
32. Engine.	a. Start up. b. Run 3-5 minutes, shut off and let set 8-10 minutes.	See TM 9-2320-273-10.

OIL SYSTEM

4-14. ENGINE OIL SERVICE (Continued).

LOCATION/ITEM	ACTION	REMARKS																																							
																																									
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TA 075364																																									

OIL SYSTEM

4-14. ENGINE OIL SERVICE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
J. CHECKING FOR LEAKS (Continued).		
33. Dipstick (32).	Pull out and check oil level. Should be near "H" mark.	If oil level is far above or below mark, check to be sure you have the correct dipstick for the NTC 400 engine.
34. Primary filter (30), drain plug (31), connectors (18) and (19), two elbows (22), drain cock (16), cover (4), filter to pump line (20) and filter to sump line (21).	Check for leaks.	Tighten as necessary.

OIL SYSTEM

4-14. ENGINE OIL SERVICE (Continued).

LOCATION/ITEM	ACTION	REMARKS																																							
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TA 075635																																									

OIL SYSTEM**4-15. BREATHER TUBE MAINTENANCE.****HIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

a. Removal.	(5)
b. Cleaning.	(15)
c. Inspection.	(5)
d. Installation.	(5)
	30 Minutes Total.

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

**EQUIPMENT CONDITION
PARAGRAPH**

None.

CONDITION DESCRIPTION

None.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

None.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

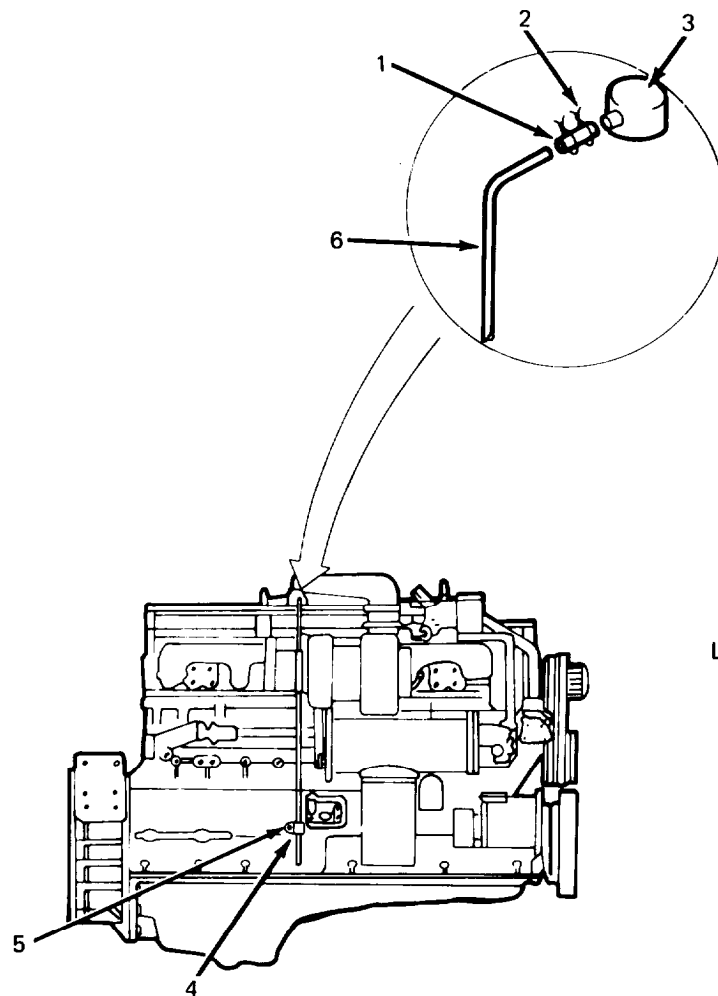
TROUBLESHOOTING REFERENCES

None.

OIL SYSTEM

4-15. BREATHER TUBE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Two clamps (2), and line (1).	Remove from breather cup (3).	
2. Tube (6).	Remove by loosening capscrews (5) and pulling tube (6) out of loop clamp (4).	



LEGEND:

- 1. LINE
- 2. CLAMP (2)
- 3. BREATHER CAP
- 4. LOOP CLAMP
- 5. CAPSCREW
- 6. TUBE

TA 074612

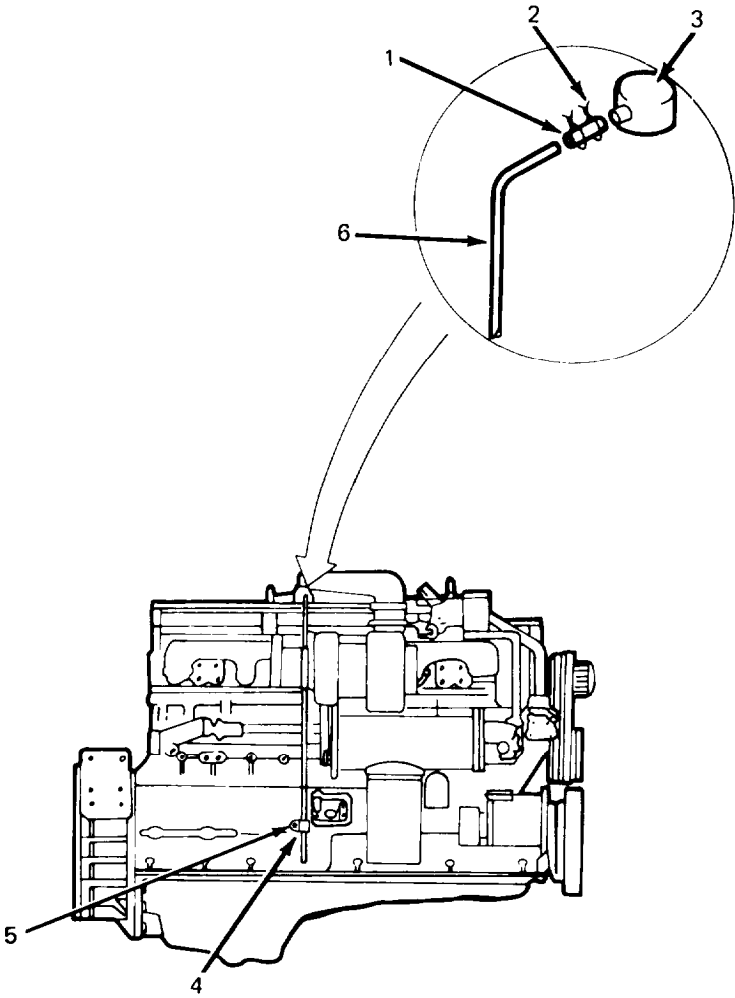
OIL SYSTEM

4-15. BREATHER TUBE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
<u>B. CLEANING</u>		
3. Tube (6).	immerse and flush in solvent.	
<u>C. INSPECTION.</u>		
4. Tube (6).	Check for: a. Cracks. b. Nicks. c. Dents.	If tube (6) is defective, replace.
5. Line (1).	Check for cracks.	If line (1) is defective, replace.
<u>D. INSTALLATION.</u>		
6. Line (1).	Attach to breather tube cap (3).	
7. Clamps (2).	Put on line (1).	
8. Tube (6).	Push into line (1) and loop clamp (4).	
9. Clamps (2).	Tighten capscrew (5). Put into place.	

OIL SYSTEM

4-15. BREATHER TUBE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
 LEGEND: 1. LINE 2. CLAMP (2) 3. BREATHER CAP 4. LOOP CLAMP 5. CAPSCREW 6. TUBE		

TA 074613

FUEL AND AIR INTAKE

4-16. FUEL SOLENOID SHUTOFF VALVE MAINTENANCE.		
THIS TASK COVERS: (Approximate TIME REQUIRED FOLLOWS TASK Description.)		
a. Removal. (10) b. Installation. (10) c. Operational Check. (5) 25 Minutes Total.		
INITIAL SETUP	EQUIPMENT CONDITION	
<u>APPLICABLE CONFIGURATIONS</u>	<u>PARAGRAPH</u>	<u>CONDITION DESCRIPTION</u>
All.	11-14 A or C.	Left Fender Removed.
<u>TEST EQUIPMENT</u>		
None.		
<u>SPECIAL TOOLS</u>		
None.		
<u>MATERIALS/PARTS (P/N)</u>		
Shield (2910-00-084-7787). O-Ring (5330-00-081-9299). Gasket (5330-00-951-3538). Masking Tape. Marking Pencil.		
<u>PERSONNEL REQUIRED</u>	<u>SPECIAL ENVIRONMENTAL CONDITIONS</u>	
Two (MOS-63B20). (2nd mechanic turns engine run switch in part C.).	Work in Well Ventilated Area. Vehicle Parked on Level Ground.	
<u>REFERENCES (TM)</u>	<u>GENERAL SAFETY INSTRUCTIONS</u>	
TM 9-2320-273-10. TM 9-2320-273-20P.	Engine OFF. Transmission in Neutral. Park Brake Set.	
<u>TROUBLESHOOTING REFERENCES</u>		
Table 4-1.		

FUEL AND AIR INTAKE SYSTEM

4-16. FUEL SOLENOID SHUTOFF VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Two nuts (11) and washers (10).	Unscrew and remove.	Hold rear nut with wrench as front nut is being loosened.
2. Two wires (9).	Remove from terminals (14).	Mark wires for installation reference, using masking tape and marking pencil.
3. Four screws (12) and washers (13).	Unscrew and remove.	

LEGEND:

1. SCREW (2)
2. WASHER (2)
3. WASHER (2)
4. VALVE
5. SPRING WASHER
6. O-RING
7. SHIELD
8. COIL ASSEMBLY
9. WIRE (2)
10. WASHER (2)
11. NUT (2)
12. SCREW (4)
13. WASHER (4)
14. TERMINAL (2)
15. GASKET
16. VALVE

TA 074614

FUEL AND AIR INTAKE SYSTEM

4-16. FUEL SOLENOID SHUTOFF VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
4. Coil assembly (8), shield (7), O-ring (6), spring washer (5), and valve (4).	a. Remove. b. Throw away shield (7), and O-ring (6).	
5. Two screws (1), and two washers (2 and 3).	Unscrew and remove.	
6. Valve (16), and gasket (15).	a. Remove valve. b. Throw away gasket.	
B. INSTALLATION.		
7. Gasket (15), valve (16), two washers (2 and 3), and two screws (1).	a. Hold gasket (15) and valve (16), in place and insert two screws (1) and washers (2 and 3). b. Tighten screws (1).	
8. Coil assembly (8), shield (7), O-ring (6), spring washer (5), and valve (4).	Hold in place. Insert four screws (12), and washers (13).	
9. Four mounting screws (12), and washers (13).	Tighten.	
10. Two wires (9).	Attach to terminals (14).	
11. Nuts (11), and washers (10).	Install on terminals and tighten.	
C. OPERATIONAL CHECK.		
12. INSTRUMENT PANEL/ engine run switch.	Turn ON, and OFF again.	2nd mechanic.
13. Coil assembly (8).	Listen for "click" when run switch is turned ON or OFF.	1st mechanic.
14. Engine.	Start up (see TM 9-2320-273-10).	Engine will not start unless solenoid is working.
15. Coil assembly (8).	Check valve for leaks.	

FUEL AND AIR INTAKE SYSTEM

4-16. FUEL SOLENOID SHUTOFF VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
LEGEND: 1. SCREW (2) 2. WASHER (2) 3. WASHER (2) 4. VALVE 5. SPRING WASHER 6. O-RING 7. SHIELD 8. COIL ASSEMBLY 9. WIRE (2) 10. WASHER (2) 11. NUT (2) 12. SCREW (4) 13. WASHER (4) 14. TERMINAL (2) 15. GASKET 16. VALVE		

TA 074615

FUEL AND AIR INTAKE SYSTEM**1-17. FUEL PUMP SCREEN MAINTENANCE.****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

a. Removal.	(10)
b. Cleaning.	(10)
c. Installation.	(10)
d. Checking for Leaks.	(5)
35 Minutes Total,	

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Cap Seal Ring (5330-00-961-9470).

**EQUIPMENT CONDITION
PARAGRAPH**

11-14 A or C.

CONDITION DESCRIPTION

Left Fender Removed.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

None.

SPECIAL ENVIRONMENTAL CONDITIONS

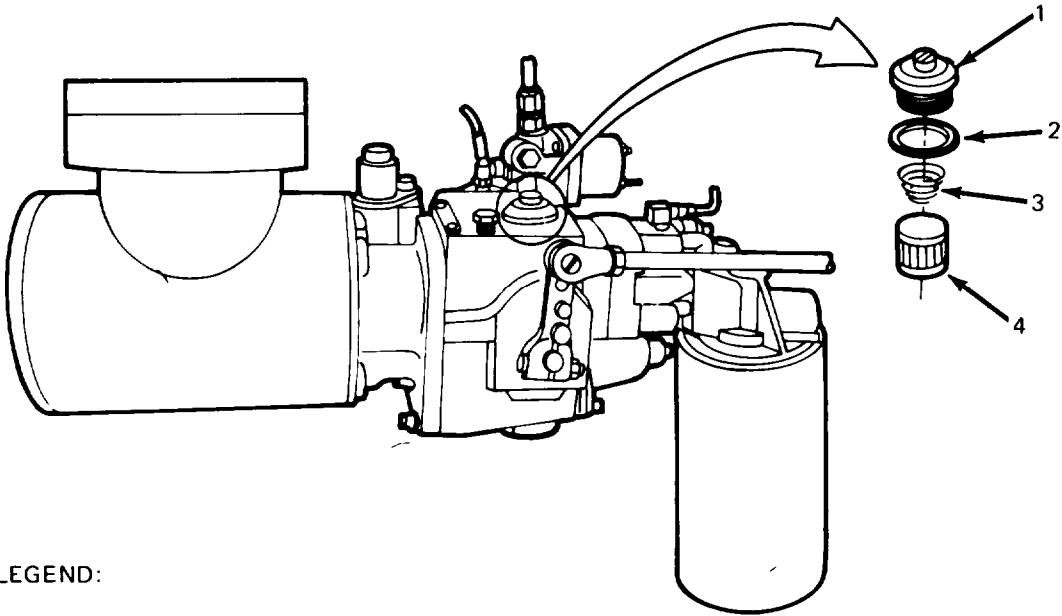
Work in Well Ventilated Area.
Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

FUEL AND AIR INTAKE SYSTEM.

1-17. FUEL PUMP SCREEN MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Filter screen cap (1).	Unscrew and remove.	
2. Cap seal ring (2), filter spring (3), and fuel filter screen assembly (4).	a. Take out. b. Throw away cap seal ring (2).	
B. CLEANING.		
3. Fuel filter screen assembly (4).	Clean.	
		
LEGEND:		
1.	FILTER SCREEN	
2.	CAP SEAL RING	
3.	FILTER SPRING	
4.	FUEL FILTER SCREEN ASSEMBLY	

TA 074616

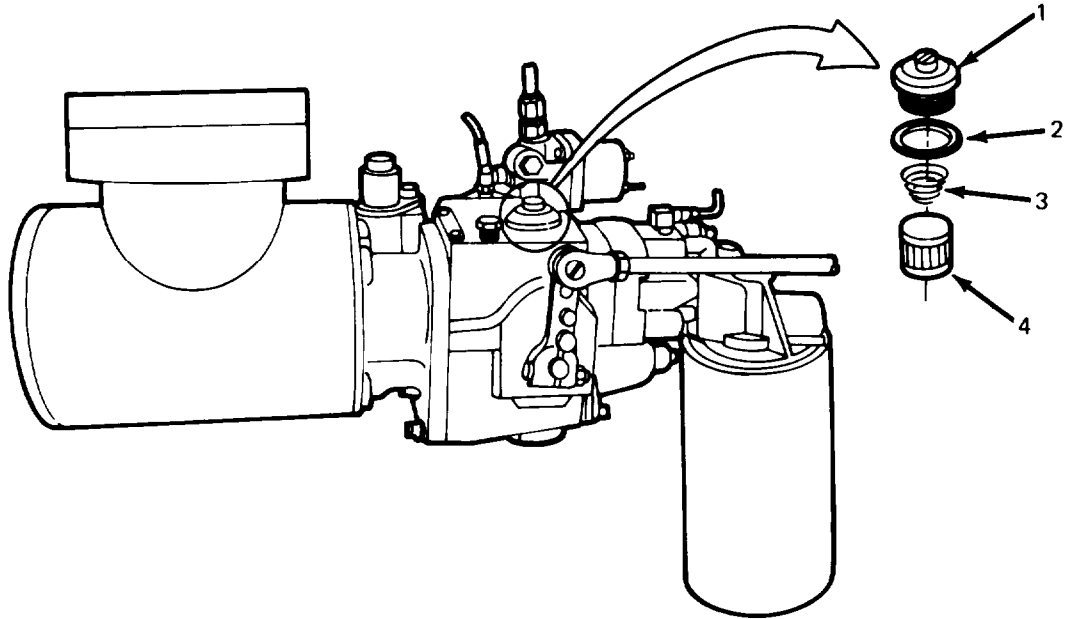
FUEL AND AIR INTAKE SYSTEM.

4-17. FUEL PUMP SCREEN MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
<u>C. INSTALLATION.</u>		
4. Fuel filter screen assembly (4).	Drop into place.	Opening must be down.
5. Filter spring (3) and new cap seal ring (2).	Set into place.	
6. Filter screen cap (1).	Screw in.	
<u>D. CHECKING FOR LEAKS.</u>		
7. Engine.	Start up (see TM 9-2320-273-10).	
8. Filter screen cap (1).	Look for leaking around edges.	
NOTE Follow-on maintenance required. Install left fender; refer to para 11-14.		

FUEL AND AIR INTAKE SYSTEM.

4-17. FUEL PUMP SCREEN MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
 The diagram illustrates the assembly of a fuel filter screen. On the left, a fuel pump is shown with a curved arrow pointing to the filter assembly. The assembly consists of four numbered components: 1. Filter Screen, 2. Cap Seal Ring, 3. Filter Spring, and 4. Fuel Filter Screen Assembly. The components are shown in a disassembled state, with the filter screen (1) being inserted into the cap seal ring (2), which is then secured by the filter spring (3) and the fuel filter screen assembly (4).		
LEGEND: 1. FILTER SCREEN 2. CAP SEAL RING 3. FILTER SPRING 4. FUEL FILTER SCREEN ASSEMBLY		
TA 074617		

FUEL AND AIR INTAKE SYSTEM.**4-18. FUEL FILTER MAINTENANCE.****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

- a. Removal. (5)
 b. Installation. (10)
 c. Checking for leaks. (5)
20 Minutes Total.

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

EQUIPMENT CONDITION**PARAGRAPH**

11-14 A or C.

CONDITION DESCRIPTION

Left Fender Removal.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIAL/PARTS (P/N)

Fuel Filter (2910-00-174-5822).
 O-Ring, 213079 (15434).
 Container (1qt).

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.
 Work in Well Ventilated Area.

REFERENCES (TM)

TM9-2320-273-20P.
 TM9-2320-273-10.

GENERAL SAFETY INSTRUCTIONS

Engine Off; Transmission in Neutral.
 Park Brake Set.

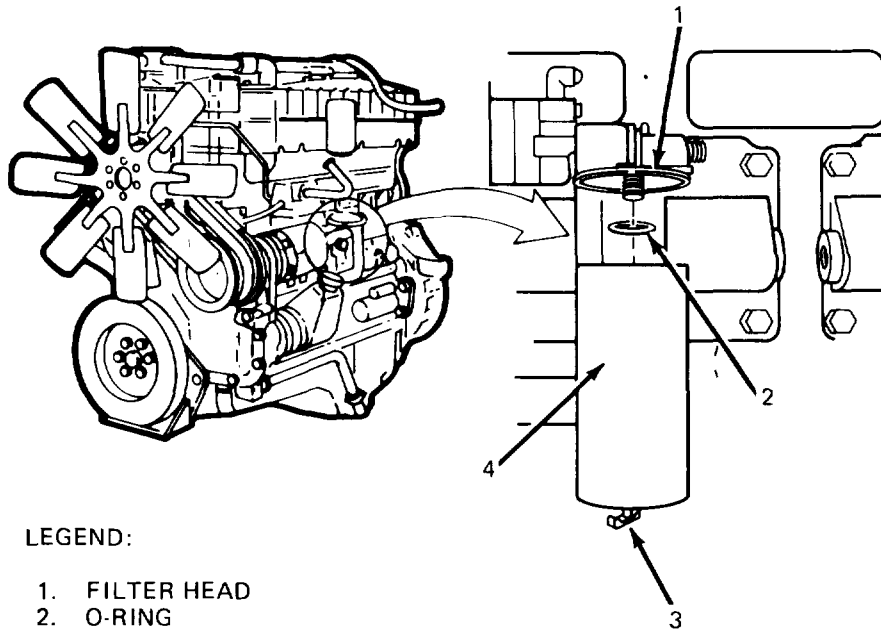
TROUBLESHOOTING REFERENCES

Table 4-1.

FUEL AND AIR INTAKE SYSTEM.

4-18. FUEL FILTER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
<u>A. REMOVAL .</u>		
1. Fuel filter (4).	a. Open draincock (3) and drain fuel into suitable container. b. Unscrew and remove.	Unscrew draincock for use in new replacement filter.
2. O-ring (2).	Remove and throw away.	
<u>B. INSTALLATION.</u>		
3. New fuel filter (4).	a. Install draincock (3). b. Fill with clean fuel. c. Install new O-ring (2). d. Screw in until seal just touches filter head (1). e. Screw in one-half turn to three-fourths turn more.	Do not tighten with wrench.



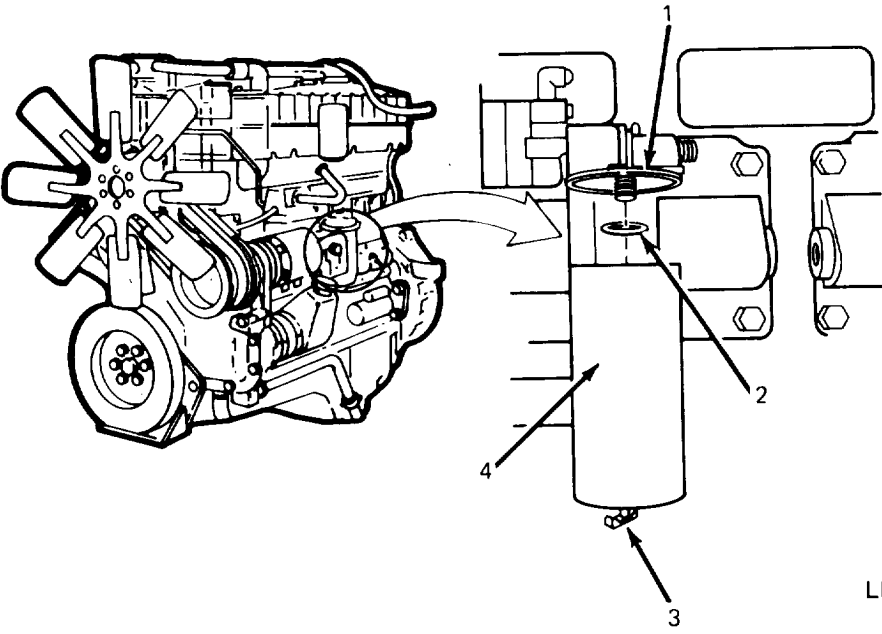
LEGEND:

1. FILTER HEAD
2. O-RING
3. DRAIN COCK
4. FUEL FILTER

TA 074618

FUEL AND AIR INTAKE SYSTEM.

4-18. FUEL FILTER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
<u>C. CHECKING FOR LEAKS.</u>		
4. Engine.	Start up (see TM 9-2320-273-10).	
5. Fuel filter (4).	Check for leaks.	
NOTE Follow-on maintenance action required: Install left fender; refer to para 11-14.		
 LEGEND: 1. FILTER HEAD 2. O-RING 3. DRAIN COCK 4. FUEL FILTER		

TA 074619

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FUEL AND AIR INTAKE SYSTEM.

4-19. TACHOGRAPH RPM CABLE MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

- a. Removal. (4)
 - b. Installation. (6)
 - c. Operational Check. (2)
- 12 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Tachometer RPM Cable, MA280J20000 (34623).

EQUIPMENT CONDITION

PARAGRAPH

5-37A.

11-14 A or C.

CONDITION DESCRIPTION

Disconnect Batteries.

Left Fender Removed.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM9-2320-273-10.

TM9-2320-273-20P.

GENERAL SAFETY INSTRUCTIONS

Engine Off; Transmission in Neutral.

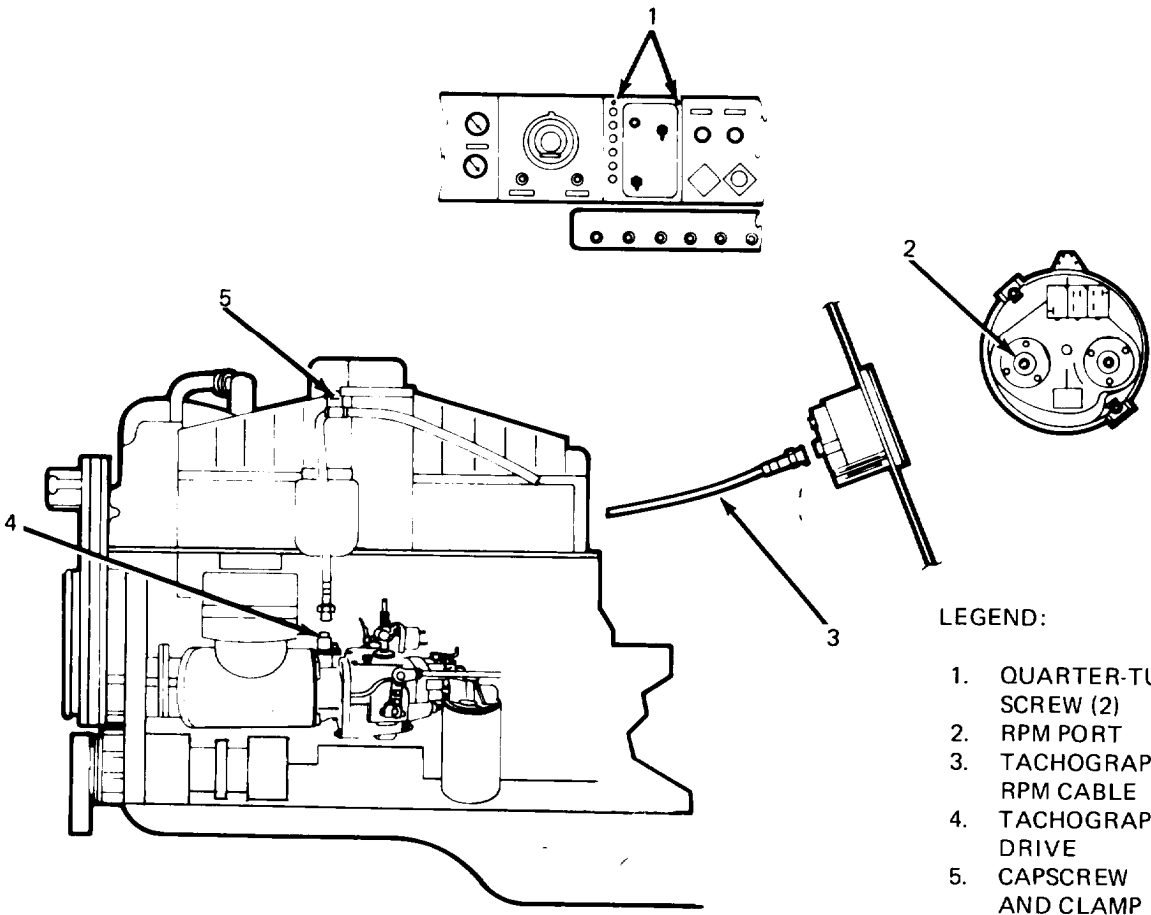
Park Brake Set.

TROUBLESHOOTING REFERENCES

None.

FUEL AND AIR INTAKE SYSTEM.

4-19. TACHOGRAPH RPM CABLE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
WARNING Do not work behind dash panel until batteries are disconnected.		
A. REMOVAL. 1. Two quarter-turn screws (1). 2. Tachograph RPM cable (3). Loosen. Lower panel. a. Disconnect from RPM port (2) of tachograph. b. Remove capscrew and clamp (5). Closest cable to the lowered panel. Tachograph RPM cable may be tied to the heater water control valve cable; if so remove tie.		
 LEGEND: 1. QUARTER-TURN SCREW (2) 2. RPM PORT 3. TACHOGRAPH RPM CABLE 4. TACHOGRAPH DRIVE 5. CAPSCREW AND CLAMP		
TA 074620		

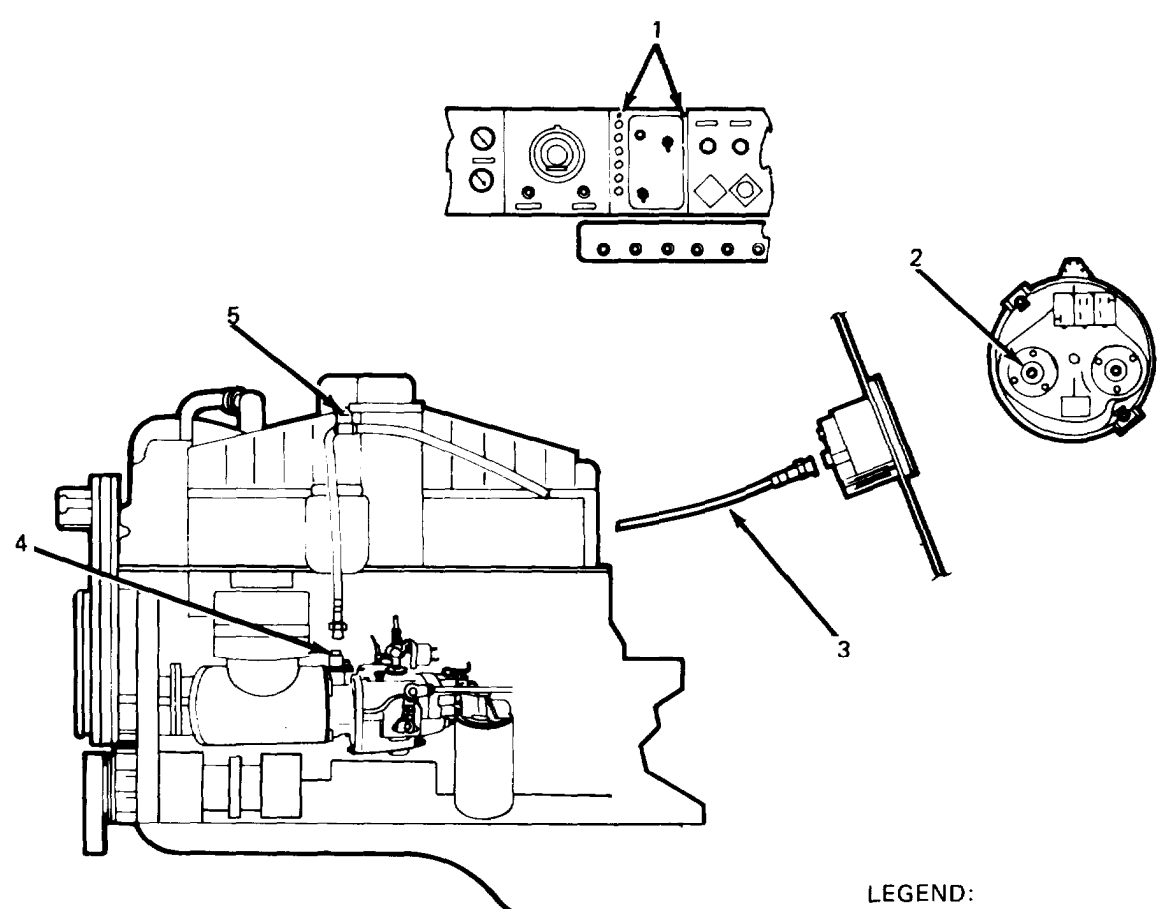
FUEL AND AIR INTAKE SYSTEM.

4-19. TACHOGRAPH RPM CABLE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
	c. Unscrew from tachograph drive (4) on fuel pump. d. Pull through firewall and remove.	
B. INSTALLATION.		
3. Tachograph RPM cable (3).	a. Screw into tachograph drive (4) on fuel pump. b. Thread free end through firewall. c. Install capscrew and clamp (5). d. Connect to "RPM" port (2) of tachograph. e. Replace cable tie.	Avoid bending the cable sharply. For proper operation, cable should be as straight as possible.
4. Two quarter-turn screws (1).	Close panel; tighten screws.	
C. OPERATIONAL CHECK.		
5. Engine.	Start up (see TM9-2320-273-10).	
6. Tachometer.	Check for appropriate reading (580-620 rpm if engine is idling normally) and responsiveness to changes in engine speed.	
7. Engine.	Shut down (see TM 9-2320-273-10).	
NOTE		
Follow-on maintenance action required:		
a. Connect batteries; refer to para 5-37B.		
b. Install left fender; refer to para 11-14.		

FUEL AND AIR INTAKE SYSTEM.

4-19. TACHOGRAPH RPM CABLE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
 LEGEND: 1. QUARTER-TURN SCREW (2) 2. RPM PORT 3. TACHOGRAPH RPM CABLE 4. TACHOGRAPH DRIVE 5. CAPSCREW AND CLAMP		

TA 074621

FUEL AND AIR INTAKE SYSTEM.

4-20. LINES, HOSES AND FITTINGS MAINTENANCE.		
THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)		
INITIAL SETUP	EQUIPMENT CONDITION	
APPLICABLE CONFIGURATIONS	PARAGRAPH	CONDITION DESCRIPTION
All.	None.	None.
TEST EQUIPMENT		
None.		
SPECIAL TOOLS		
None.		
MATERIALS/PARTS (P/N)		
Liquid Teflon (see Appendix C).		
Soap Solution.		
PERSONNEL REQUIRED	SPECIAL ENVIRONMENTAL CONDITIONS	
One (MOS-63B20).	Work in Well Ventilated Area.	
	Vehicle Parked on Level Ground.	
REFERENCES (TM)	GENERAL SAFETY INSTRUCTIONS	
TM9-2320-273-10.	Engine Off; Transmission in Neutral.	
TM9-2320-273-20P.	Park Brake Set.	
TROUBLESHOOTING REFERENCES		
Table 4-1.		

FUEL AND AIR INTAKE SYSTEM.

4-20. LINES, HOSES, AND FITTINGS MAINTENANCE (Continued).

LOCATION/ITEM

ACTION

REMARKS

NOTE

The illustration below identifies all exterior lines and hoses of the fuel system. No special instructions or tools are needed if you follow standard shop practice techniques. During installation, observe the following:

1. Line-to-block fittings.

Coat pipes with liquid teflon before insertion.

2. Line-to-line fittings.

Screw together.

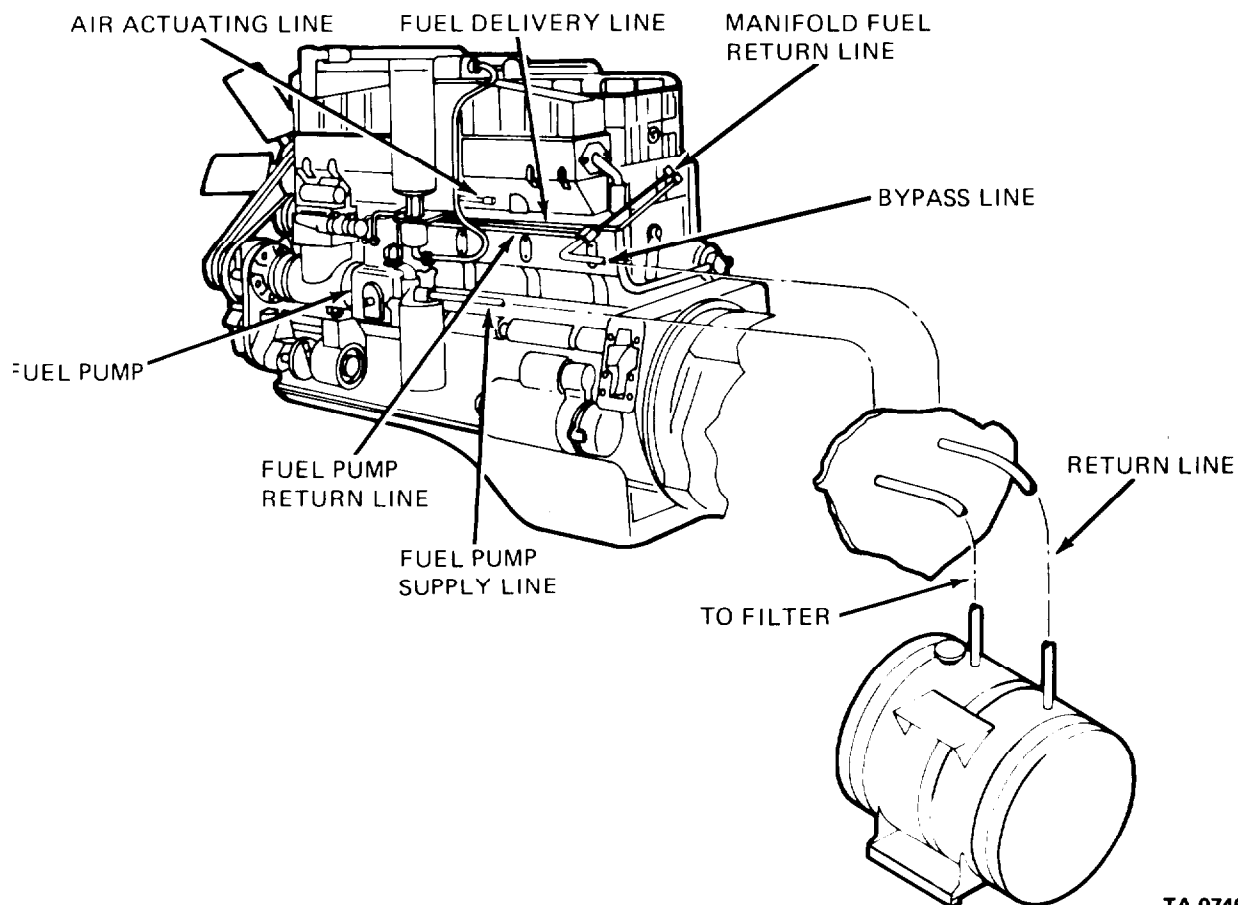
3. Air line.

Check for leakage with soap solution.

4. Hose-to-line fittings.

Clamp securely.

After installation, start up engine (see TM9-2320-273-10) and check for leaks.



TA 074622

FUEL AND AIR INTAKE SYSTEM.

4-21. ACCELERATOR PEDAL AND ROD MAINTENANCE.		
THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)		
a. Removal. (15) b. Installation. (15) c. Checking Idle Speed. (3) 33 Minutes Total.		
INITIAL SETUP	EQUIPMENT CONDITION	
<u>APPLICABLE CONFIGURATIONS</u>	<u>PARAGRAPH</u>	<u>CONDITION DESCRIPTION</u>
All.	4-22A.	Hand Throttle Cable Disconnected at Throttle Mounting Bracket. Winch Throttle Cable Disconnected at Throttle Mounting Bracket (M916 and M920)_.
<u>TEST EQUIPMENT</u>	12-12A,	
None.		
<u>SPECIAL TOOLS</u>		
None.		
<u>MATERIALS/PARTS (P/N)</u>		
Cotter pin (3), 103362 (24617).		
<u>PERSONNEL REQUIRED</u>	<u>SPECIAL ENVIRONMENTAL CONDITIONS</u>	
One (MOS-63B20).	Vehicle-Parked on Level Ground.	
<u>REFERENCES (TM)</u>	<u>GENERAL SAFETY INSTRUCTIONS</u>	
TM9-2320-273-10.	Engine Off. Transmission in Neutral. Park Brake Set.	
<u>TROUBLESHOOTING REFERENCES</u>		
Table 4-1.		

FUEL AND AIR INTAKE SYSTEM.

4-21. ACCELERATOR PEDAL AND ROD MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
NOTE		
Any time you repair or replace a part in this system, check that idle speed is correct (part C).		
A. REMOVAL.		
1. Cotter pins (1) and (4).	Remove and pull out clevis pin (3) and straight pin (7); lift out pedal (2).	Discard cotter pins (1) and (4).
LEGEND:		
1. COTTER PIN	34. THROTTLE MOUNTING BRACKET	
2. PEDAL	35. LOCKWASHER (2)	
3. CLEVIS PIN	36. BOLT (2)	
4. COTTER PIN	37. FORK	
5. BOLT (2)	38. CLEVIS PIN	
6. BRACKET	39. COTTER PIN	
7. STRAIGHT PIN	40. PIVOT LEVER	
8. BOLT (2)	41. FLANGED BEARING	
9. BOLT	42. BELLCRANK BRACKET	
10. NUT (2)	43. FLANGED BEARING	
11. PEDAL STOP BRACKET	44. BOLT (4)	
12. LOCKWASHER (2)	45. FLAT WASHER (4)	
13. NUT (2)	46. NUT (4)	
14. FLAT WASHER	47. ACCELERATOR SEAL	
15. LOCKNUT	48. SEAL RETAINER	
16. LOCKNUT	49. ROD	
17. FLAT WASHER	50. SCREW (3)	
18. LOCKWASHER AND NUT (2)		
19. SPRING		
20. LEVER		
21. NUT		
22. WASHER		
23. BALL STUD		
24. NUT		
25. BELLCRANK ROD		
26. NUT		
27. BALL STUD		
28. SPRING		
29. NUT		
30. WASHER		
31. BRACKET		
32. FUEL PUMP LEVER		
33. NYLON FLANGED BUSHING		

TA 074623

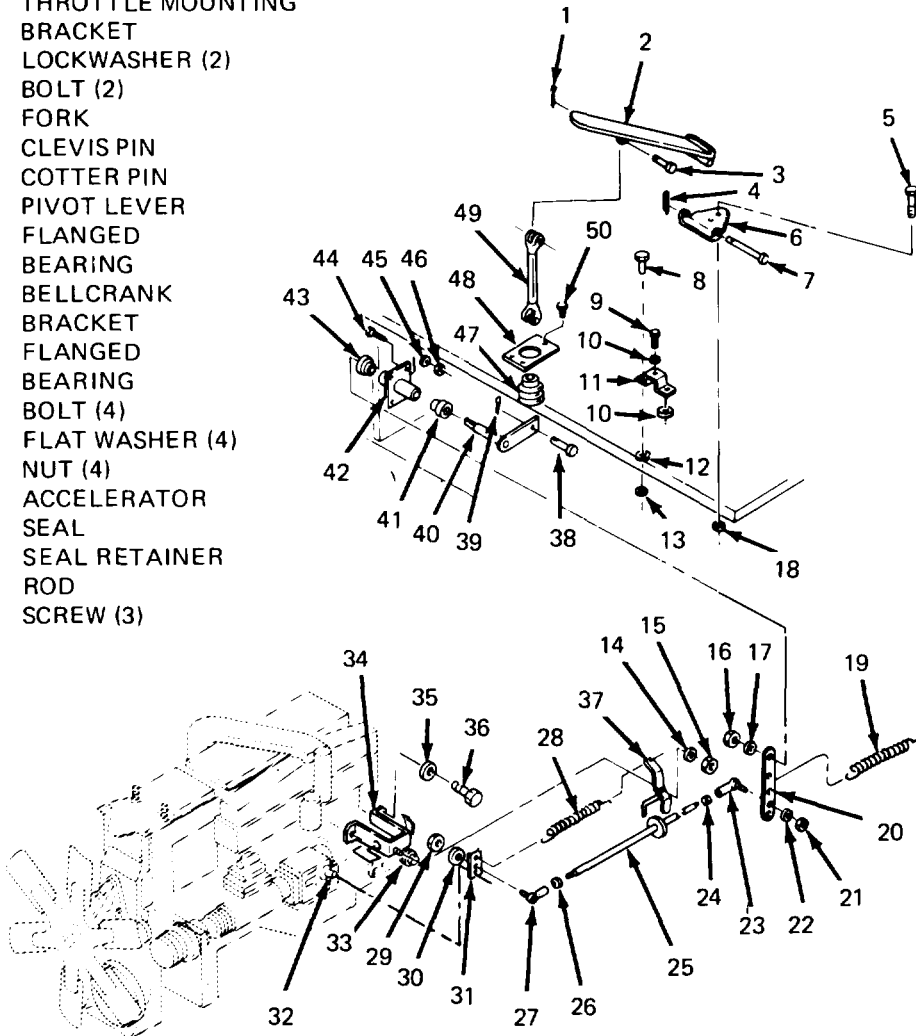
FUEL AND AIR INTAKE SYSTEM.

4-21. ACCELERATOR PEDAL AND ROD MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
<u>A. REMOVAL (Continued).</u>		
2. Two bolts (5), lockwashers and nuts (18).	Unscrew and remove bracket (6).	
3. Two bolts (8), lockwashers (12), and nuts (13).	Unscrew and remove pedal stop bracket (11),	
4. Bolt (9) and two nuts (10).	Unscrew and remove from pedal stop bracket (11).	Count number of threads before disassembly.
5. Three screws (50).	Unscrew and remove seal retainer (48) and accelerator seal (47).	
6. Cotter pin (39).	Remove and pull out clevis pin (38); lift out rod (49).	Discard cotter pin (39).
7. Locknut (16) and flat washer (17).	Unscrew and remove pivot lever (40), flanged bearing (41), and flanged bearing (43).	
8. Four bolts (44), flat washers (45) and nuts (46).	Unscrew and remove bellcrank bracket (42).	
9. Spring (19).	Unhook from lever (20) and attachment point to cab at other end of spring,	
10. Nut (21) and washer (22).	Unscrew and remove lever (20).	
11. Nut (29) and washer (30).	Unscrew from ball stud (27).	Remove items (23 thru (27) as an assembly. Count number of threads before disassembly to maintain idle speed setting.
12. Ball stud (23) and (27) along with nuts (24) and (26).	Unscrew from bellcrank rod (25).	
13. Spring (28).	Unhook from bracket (3) located at fuel pump lever (32), and from throttle mounting bracket (34).	

FUEL AND AIR INTAKE SYSTEM.

4-21. ACCELERATOR PEDAL AND ROD MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
LEGEND: 1. COTTER PIN 2. PEDAL 3. CLEVIS PIN 4. COTTER PIN 5. BOLT (2) 6. BRACKET 7. STRAIGHT PIN 8. BOLT (2) 9. BOLT 10. NUT (2) 11. PEDAL STOP BRACKET 12. LOCKWASHER (2) 13. NUT (2) 14. FLAT WASHER 15. LOCKNUT 16. LOCKNUT 17. FLAT WASHER 18. LOCKWASHER AND NUT (2) 19. SPRING 20. LEVER 21. NUT 22. WASHER 23. BALL STUD 24. NUT 25. BELLCRANK ROD 26. NUT 27. BALL STUD 28. SPRING 29. NUT 30. WASHER 31. BRACKET 32. FUEL PUMP LEVER 33. NYLON FLANGED BUSHING 34. THROTTLE MOUNTING BRACKET 35. LOCKWASHER (2) 36. BOLT (2) 37. FORK 38. CLEVIS PIN 39. COTTER PIN 40. PIVOT LEVER 41. FLANGED BEARING 42. BELLCRANK BRACKET 43. FLANGED BEARING 44. BOLT (4) 45. FLAT WASHER (4) 46. NUT (4) 47. ACCELERATOR SEAL 48. SEAL RETAINER 49. ROD 50. SCREW (3) 		

TA 075636

FUEL AND AIR INTAKE SYSTEM

4-21. ACCELERATOR PEDAL AND ROD MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
14. Locknut (15) and flatwasher (14).	Unscrew and remove fork (37) and nylon flanged bushing (33).	
15. Two bolts (36) and lockwashers (35).	Unscrew and remove throttle mounting bracket (34).	
B. INSTALLATION.		
16. Throttle mounting bracket (34).	Position against side of engine and install with two bolts (36) and lockwashers (35).	
17. Nylon flanged bushing (33) and fork (37).	Attach to throttle mounting bracket (34) with flat washer (14) and locknut (15).	
18. Spring (28).	Hook to bracket (31), located at fuel pump lever (32), and to throttle mounting bracket (34).	
19. Nuts (24) and (26) along with ball stud (23) and (27),	Screw onto bellcrank rod (25).	Screw on the same number of threads you counted in step A 11.
20. Ball stud (27).	a. Insert threaded end thru bracket (31). b. Attach with washer (30) and nut (29).	
21. Ball stud (23).	a. Insert threaded end thru lever (20). b. Attach with washer (22) and nut (21).	
22. Bellcrank bracket (42).	Attach to cab with four bolts (44), flat washers (45) and nuts (46).	
23. Flanged bearing (41) and (43).	Position in either end of guide tube in bellcrank bracket (42).	
24. Pivot lever (40).	a. Insert threaded end thru flanged bearing (41), bellcrank bracket (42), flanged bearing (43) and lever (20). b. Secure with flat washer (17) and locknut (16).	

FUEL AND AIR INTAKE SYSTEM.

4-21. ACCELERATOR PEDAL AND ROD MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION (Continued).		
25. Spring (19).	Hook to lever (20) and cab attachment point.	
26. Rod (49).	a. Insert up thru cab floor opening until mounting hole aligns with that in pivot lever (40). b. Insert clevis pin (38). c. Secure with new cotter pin (39).	From underneath cab floor.
LEGEND:		
1. COTTER PIN	34. THROTTLE MOUNTING BRACKET	
2. PEDAL	35. LOCKWASHER (2)	
3. CLEVIS PIN	36. BOLT (2)	
4. COTTER PIN	37. FORK	
5. BOLT (2)	38. CLEVIS PIN	
6. BRACKET	39. COTTER PIN	
7. STRAIGHT PIN	40. PIVOT LEVER	
8. BOLT (2)	41. FLANGED BEARING	
9. BOLT	42. BELLCRANK BRACKET	
10. NUT (2)	43. FLANGED BEARING	
11. PEDAL STOP BRACKET	44. BOLT (4)	
12. LOCKWASHER (2)	45. FLAT WASHER (4)	
13. NUT (2)	46. NUT (4)	
14. FLAT WASHER	47. ACCELERATOR SEAL	
15. LOCKNUT	48. SEAL RETAINER	
16. LOCKNUT	49. ROD	
17. FLAT WASHER	50. SCREW (3)	
18. LOCKWASHER AND NUT (2)		
19. SPRING		
20. LEVER		
21. NUT		
22. WASHER		
23. BALL STUD		
24. NUT		
25. BELLCRANK ROD		
26. NUT		
27. BALL STUD		
28. SPRING		
29. NUT		
30. WASHER		
31. BRACKET		
32. FUEL PUMP LEVER		
33. NYLON FLANGED BUSHING		

TA 075637

FUEL AND AIR INTAKE SYSTEM.**4-21. ACCELERATOR PEDAL AND ROD MAINTENANCE (Continued).**

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION (Continued).		
27. Accelerator seal (47) and seal retainer (48).	Slide over rod (49) and secure to cab floor with three screws (50).	From inside cab.
28. Bolt (9) and two nuts (10).	Install thru pedal stop bracket (11).	Screw nuts (10) onto bolt (9) the same number of threads you counted in step A. 4.
29. Pedal stop bracket (11).	Attach to cab floor with two bolts (8), lockwashers (12) and nuts (13).	
30. Bracket (6).	Install to cab floor with two bolts (5), lockwashers and nuts (18).	
31. Pedal (2).	a. Install to bracket (6) with straight pin (7) and new cotter pin (4). b. Install to rod (49) with clevis pin (3) and new cotter pin (1).	
C. CHECKING IDLE SPEED.		
32. Engine.	a. Start up (see TM 9-2320-273-20). b. With engine warmed to normal operating temperature, check to see that tachometer reads 580-620 rpm with your foot off the accelerator pedal. c. Shut down.	If idle speed was below 580 rpm or above 620 rpm proceed to step 33.
33. Nut (29), washer (30) and bracket (31).	Unscrew from ball stud (27).	
34. Ball stud (27).	a. Loosen nut (26). b. Turn counterclockwise to increase idle speed or clockwise to decrease idle speed. c. Lock in position with nut (26). d. Reconnect to bracket (31) with washer (30) and nut (29).	

FUEL AND AIR INTAKE SYSTEM.

4-21. ACCELERATOR PEDAL AND ROD MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
C. CHECKING IDLE SPEED (Continued).		
35. Engine.	a. Start up (see TM 9-2320-273-10). b. Verify that idle speed is within the correct rpm range. Follow on maintenance required: a. Reconnect hand throttle cable at throttle mounting bracket; refer to para 4-22C. b. Reconnect winch throttle cable at throttle mounting bracket; refer to para 12-12C. (M916 and M920 only).	Readjust as necessary.
LEGEND:		
1. COTTER PIN	33. NYLON FLANGED BUSHING	
2. PEDAL	34. THROTTLE MOUNTING BRACKET	
3. CLEVIS PIN	35. LOCKWASHER (2)	
4. COTTER PIN	36. BOLT (2)	
5. BOLT (2)	37. FORK	
6. BRACKET	38. CLEVIS PIN	
7. STRAIGHT PIN	39. COTTER PIN	
8. BOLT (2)	40. PIVOT LEVER	
9. BOLT	41. FLANGED BEARING	
10. NUT (2)	42. BELLCRANK BRACKET	
11. PEDAL STOP BRACKET	43. FLANGED BEARING	
12. LOCKWASHER (2)	44. BOLT (4)	
13. NUT (2)	45. FLAT WASHER (4)	
14. FLAT WASHER	46. NUT (4)	
15. LOCKNUT	47. ACCELERATOR SEAL	
16. LOCKNUT	48. SEAL RETAINER	
17. FLAT WASHER	49. ROD	
18. LOCKWASHER AND NUT (2)	50. SCREW (3)	
19. SPRING		
20. LEVER		
21. NUT		
22. WASHER		
23. BALL STUD		
24. NUT		
25. BELLCRANK ROD		
26. NUT		
27. BALL STUD		
28. SPRING		
29. NUT		
30. WASHER		
31. BRACKET		
32. FUEL PUMP LEVER		

TA 075638

FUEL AND AIR INTAKE SYSTEM.

4-22. HAND THROTTLE LINKAGE MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

- a.. Removal. (20)
- b. Cleaning and Inspection. (5)
- c. Installation. (30)
- d. Checking Idle Speed. (2)

57 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

EQUIPMENT CONDITION

PARAGRAPH

None.

CONDITION DESCRIPTION

None.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.

GENERAL SAFETY INSTRUCTIONS

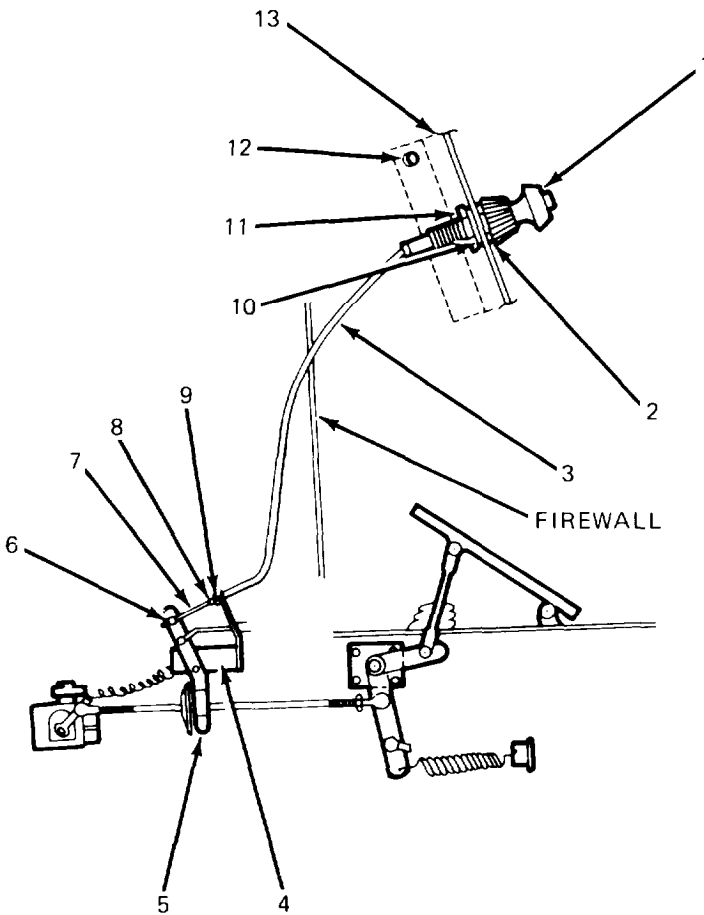
Engine Off; Transmission in Neutral.
Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 4-1.

FUEL AND AIR INTAKE SYSTEM.

4-22. HAND THROTTLE LINKAGE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Setscrew (6).	Unscrew and remove from pivot lever (5).	Screws are located on each end.
2. Two locknuts (8) and washers (9).	Unscrew and remove.	
3. Hand throttle cable (3).	Pull through bracket (4).	
4. Two screws (12).	a. Remove from heater control panel (13). b. Remove back of heater control panel (13).	
		
LEGEND:		
1. THROTTLE KNOB		
2. LOCKNUT		
3. HAND THROTTLE CABLE		
4. BRACKET		
5. PIVOT LEVER		
6. SET SCREW		
7. CABLE WIRE		
8. LOCKNUT (2)		
9. WASHER (2)		
10. STAR WASHER		
11. LOCKNUT		
12. SCREW (2)		
13. HEATER CONTROL PANEL		

TA 074625

TA 074625

FUEL AND AIR INTAKE SYSTEM.

4-22. HAND THROTTLE LINKAGE MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
5. Locknut (11) and starwasher (10).	Unscrew and remove from hand throttle cable (3).	
6. Hand throttle cable (3).	Pull from firewall and heater control panel (13).	
7. Locknut (2).	Unscrew and remove from hand throttle cable (3).	
B. CLEANING AND INSPECTION.		
8. Hand throttle cable (3).	Wipe clean and inspect for: a. Kinked cable. b. Cable end crossed or burred threads.	Replace as necessary.
C. INSTALLATION.		
9. Locknut (2).	Screw onto hand throttle cable (3).	
10. Hand throttle cable (3).	Install thru front of heater control panel (13).	
11. Locknut (11) and starwasher (10)	Screw onto hand throttle cable (3).	
12. Hand throttle cable (3).	Insert end thru firewall and bracket.	
13. Heater control panel (13).	a. Install back of panel. b. Install two screws (12) and tighten.	
14. Two locknuts (8) and washers (9).	a. Install and tighten. b. It may be necessary to either loosen or tighten the locknut (8) on the outer bracket face.	
15. Setscrew (6).	Install and tighten to lock cable wire (7).	
16. Throttle knob (1).	Remove and lubricate hand throttle cable (3) per LO 9-2320-273-12.	

FUEL AND AIR INTAKE SYSTEM.

4-22. HAND THROTTLE LINKAGE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
D. CHECKING IDLE SPEED.		
17. Engine.	a. Start up (see TM 9-2320-273-10). b. With engine warmed up check that: (1) Engine idles at 580. 620 rpm when throttle knob (1) is pushed completely in. (2) Idle speed increases as soon as you begin to pull out on throttle knob (1). (Turning knob counterclockwise will also increase rpm.)	
LEGEND: 1. THROTTLE KNOB 2. LOCKNUT 3. HAND THROTTLE CABLE 4. BRACKET 5. PIVOT LEVER 6. SET SCREW 7. CABLE WIRE 8. LOCKNUT (2) 9. WASHER (2) 10. STAR WASHER 11. LOCKNUT 12. SCREW (2) 13. HEATER CONTROL PANEL		

TA 074626

FUEL AND AIR INTAKE SYSTEM.**4-23. FUEL TANK MAINTENANCE.****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

a. Removal.	(35)
b. Installation.	(40)
c. Checking for Leaks.	<u>(5)</u>
80 Minutes Total.	

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

EQUIPMENT CONDITION**PARAGRAPH**

None.

CONDITION DESCRIPTION

None.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

SD-2 Dry Cleaning Solvent (Refer to Appendix C).
 Containers for Fuel (AR).
 Masking Tape.
 Marking Pencil.

PERSONNEL REQUIRED

Three (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Work in Well Ventilated Area.
 Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.
 TM 9-2320-273-20P.

GENERAL SAFETY INSTRUCTIONS

Engine Off; Transmission in Neutral.
 Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 4-1.

FUEL AND AIR INTAKE SYSTEM.

4-23. FUEL TANK MAINTENANCE (Continued).

LOCATION/ITEM

ACTION

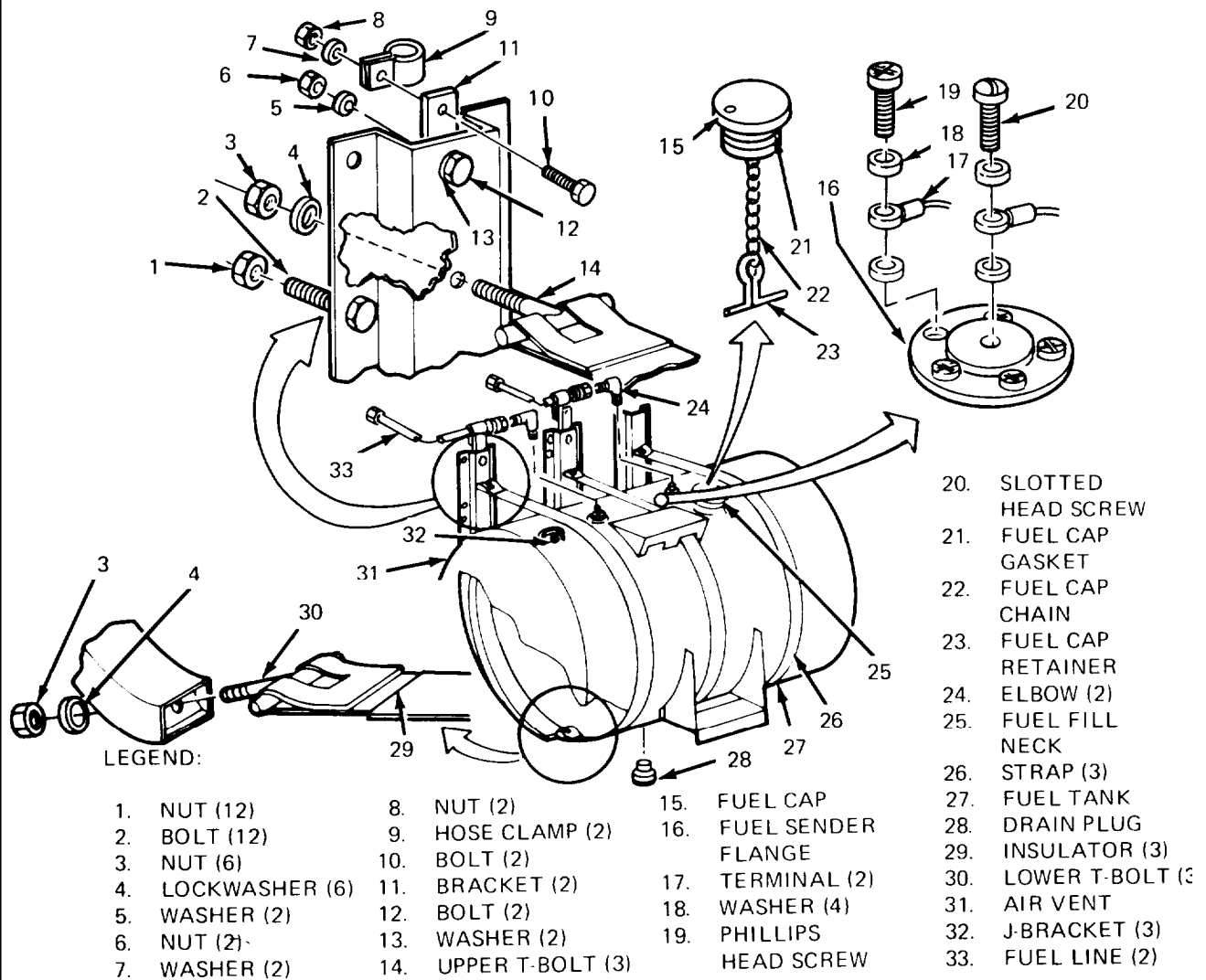
REMARKS

CAUTION

Be sure that tank is supported so that it will not fall when straps (26) are removed.

A. REMOVAL.**NOTE**

Place container under drain plug (28) to catch fuel.



TA 074627

FUEL AND AIR INTAKE SYSTEM.**4-23. FUEL TANK MAINTENANCE (Continued).**

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
1. Drain Plug (28).	a. Remove and allow fuel to drain into container. b. Screw back into tank.	
2. Two fuel lines (33).	Unscrew from two elbows (24).	Mark locations for reassembly.
3. Two elbows (24).	Unscrew and remove from fuel tank (27).	
4. Phillips head screw (19), slot- ted head screw (20) and four washers (18).	Unscrew and remove two ter- minals (17).	Mark wire locations for reassembly.
5. Six nuts (3) and lockwashers (4).	Unscrew and remove three straps (26).	
6. Fuel tank (27).	Lower from vehicle to ground.	
7. Two bolts (10), washers (7), and nuts (8).	Unscrew and remove two hose clamps (9) from two brackets (11).	Slide hose clamps (9) off two fuel lines (33).
8. Two bolts (12), washers (13), washers (5), and nuts (6).	Unscrew and remove two brackets (11).	
9. Twelve bolts (2) and nuts (1).	Unscrew and remove three J-brackets (32).	
10. Air vent (31).	Unscrew from fuel tank (27).	Run wire thru vent hole to ensure free air flow.
11. Three insulators (29).	Remove from three straps (26).	Replace if rubber is crack- ed or deteriorated.
12. Fuel cap (15).	Unscrew and pull out to point where fuel cap retainer (23) catches on fuel filter screen inside tank.	
13. Fuel cap gasket (21) and fuel cap chain (22).	Inspect for damage.	Replace as necessary by unhooking chain from in- side of fuel cap (15) and replacing, use needle nose pliers to open chain link.
14. Fuel sender flange (16) with fuel sender attached.	Remove; refer to para 5-79A.	

FUEL AND AIR INTAKE SYSTEM.

4-23. FUEL TANK MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
LEGEND:		
1. NUT (12) 2. BOLT (12) 3. NUT (6) 4. LOCKWASHER (6) 5. WASHER (2) 6. NUT (2) 7. WASHER (2)	8. NUT (2) 9. HOSE CLAMP (2) 10. BOLT (2) 11. BRACKET (2) 12. BOLT (2) 13. WASHER (2) 14. UPPER T-BOLT (3)	15. FUEL CAP 16. FUEL SENDER FLANGE 17. TERMINAL (2) 18. WASHER (4) 19. PHILLIPS HEAD SCREW 20. SLOTTED HEAD SCREW 21. FUEL CAP GASKET 22. FUEL CAP CHAIN 23. FUEL CAP RETAINER 24. ELBOW (2) 25. FUEL FILL NECK 26. STRAP (3) 27. FUEL TANK 28. DRAIN PLUG 29. INSULATOR (3) 30. LOWER T-BOLT (3) 31. AIR VENT 32. J-BRACKET (3) 33. FUEL LINE (2)

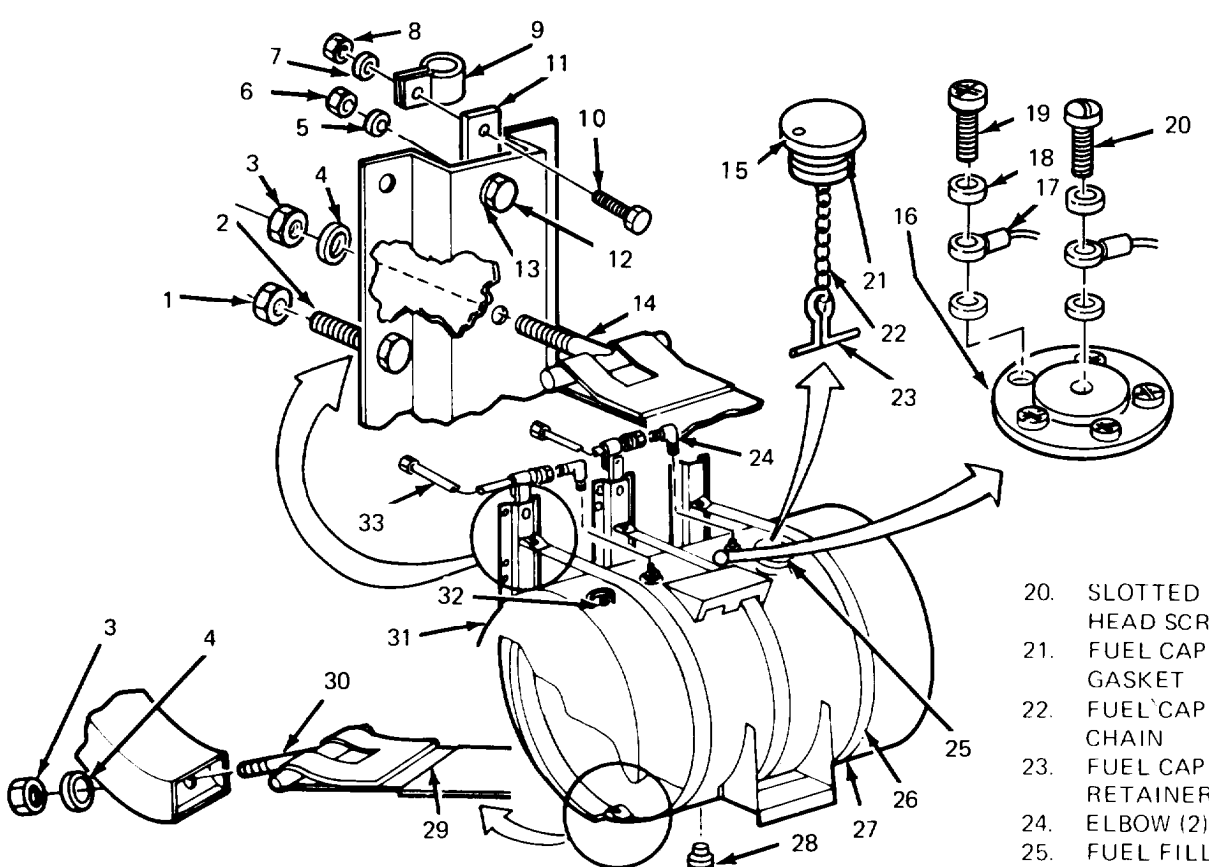
TA 074628

FUEL AND AIR INTAKE SYSTEM.

4-23. FUEL TANK MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
<u>B. INSTALLATION.</u>		
15. Fuel sender flange (16) with fuel sender attached.	Install; refer to para 5-79B.	
16. Fuel cap (15) with fuel cap gasket (21), fuel cap chain (22), and fuel cap retainer (23).	Position on fuel fill neck (25) and screw fuel cap (15) on.	
17. Three insulators (29).	Install on three straps (26).	
18. Air vent (31).	Screw into fuel tank (27).	
19. Three J-brackets (32).	Aline mounting holes to frame and install with twelve bolts (2) and nuts (1).	
20. Two brackets (11).	Install to two J-brackets (32) with two bolts (12), washers (13), washers (5), and nuts (6).	Install to the two forward most J-brackets.
21. Two hose clamps (9).	a. Slide over two fuel lines (33). b. Secure to two brackets (11) with two bolts (10), washers (7) and nuts (8).	
22. Fuel tank (27).	Raise into position against three J-brackets (26).	
23. Three strap (26) with three insulators (29).	a. Insert three lower T-bolts (30) thru bottom of three J-brackets (32) and secure with three lockwashers (4) and nuts (3). b. Insert three upper T-bolts (14) thru top center hole of three J-brackets (32) and secure with three lockwashers (4) and nuts (3).	
24. Two terminals (17).	Position on fuel sender flange (16) and install with phillips head screw (19), slotted head screw (20) and four washers (18).	Install as you marked at disassembly.
25. Two elbows (24).	a. Apply liquid teflon to threads. b. Screw into fuel tank (27).	

FUEL AND AIR INTAKE SYSTEM.

4-23. FUEL TANK MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS																																																																														
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TA 075639

FUEL AND AIR INTAKE SYSTEM.**4-23. FUEL TANK MAINTENANCE (Continued).**

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION (Continued).		
26. Two fuel lines (33).	Screw onto two elbows (24).	Install as you marked at disassembly.
C. CHECKING FOR LEAKS.		
27. Fuel fill neck (25).	Remove fuel cap (15) from fuel fill neck (25). Fill tank with fuel (see TM 9-2320-273-10).	Be sure drain plug (28) is tightened.
28. Fuel cap (15).	Put on and tighten to fuel fill neck (25).	
29. Engine.	Start up (see TM 9-2320-273-10).	
30. Fuel tank (27), two fuel lines (33), and two elbows (24).	Check for leaks.	Retighten as necessary.
31. Engine.	Shut down (see TM 9-2320-273-10).	
NOTE For other fuel line locations refer to para 4-20.		

FUEL AND AIR INTAKE SYSTEM.

4-23. FUEL TANK MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS																																																									
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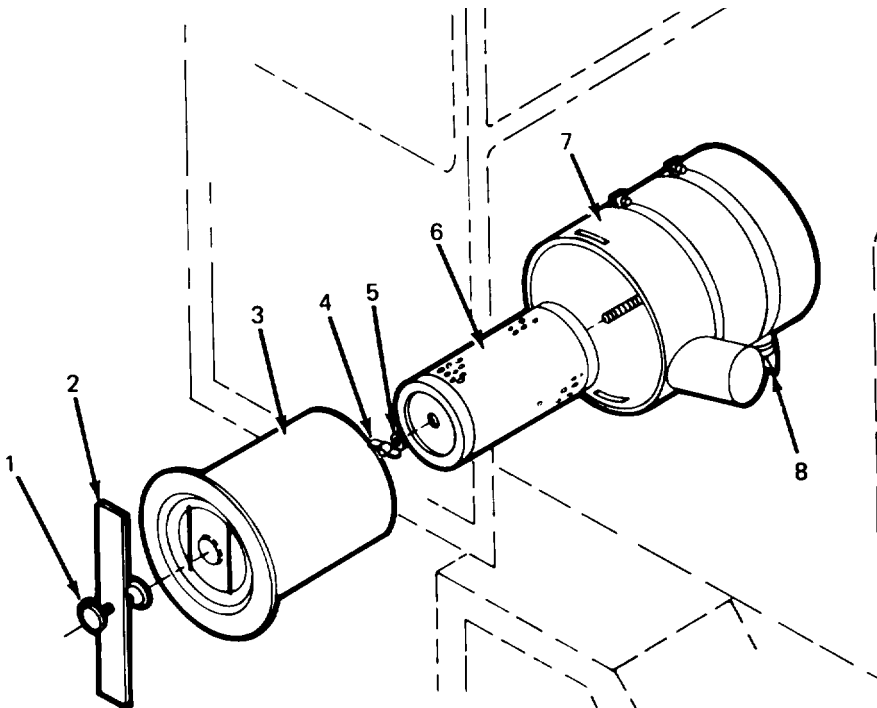
TA 075640

FUEL AND AIR INTAKE SYSTEM.

4-24. AIR CLEANER ELEMENT MAINTENANCE.		
THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.		
a. Removal. (10) b. Cleaning. (15) c. Installation. (15) 40 Minutes Total.		
INITIAL SETUP	EQUIPMENT CONDITION	
<u>APPLICABLE CONFIGURATIONS</u>	<u>PARAGRAPH</u>	<u>CONDITION DESCRIPTION</u>
All.	None.	None.
<u>TEST EQUIPMENT</u>		
None.		
<u>SPECIAL TOOLS</u>		
None.		
<u>MATERIALS/PARTS (P/N)</u>		
Inner Filter Element (If Outside Filter Has Been Cleaned Five Times.) (250C127). Outer Filter Element (250C128).		
<u>PERSONNEL REQUIRED</u>	<u>SPECIAL ENVIRONMENTAL CONDITIONS</u>	
One (MOS-63B20).	Darkened Area for Element Check. Vehicle Parked on Level Ground.	
<u>REFERENCES (TM)</u>	<u>GENERAL SAFETY INSTRUCTIONS</u>	
TM 9-2320-273-20P.	Engine Off; Transmission in Neutral. Park Brake Set.	
<u>TROUBLESHOOTING REFERENCES</u>		
Table 4-1.		

FUEL AND AIR INTAKE SYSTEM.

4-24. AIR CLEANER ELEMENT MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Handle (1) and retainer bar (2).	Unscrew handle, slide bar out of slots and remove.	
2. Outer filter element (3).	Grasp bands on face and pull out of canister (7).	
CAUTION Do not clean inner element. Do not remove unless to replace with a new element. This should be done after the outside filter has been cleaned five times.		
3. Inner filter element (6).	Remove if necessary, by unscrewing wing nut (4) and removing rubber backed washer (5).	Rubber seal at opposite end may stick making removal difficult. Grasp end and work back and forth to free.
 LEGEND: 1. HANDLE 2. RETAINER BAR 3. OUTER FILTER ELEMENT 4. WING NUT 5. RUBBER BACKED WASHER 6. INNER FILTER ELEMENT 7. CANISTER 8. BOOT		

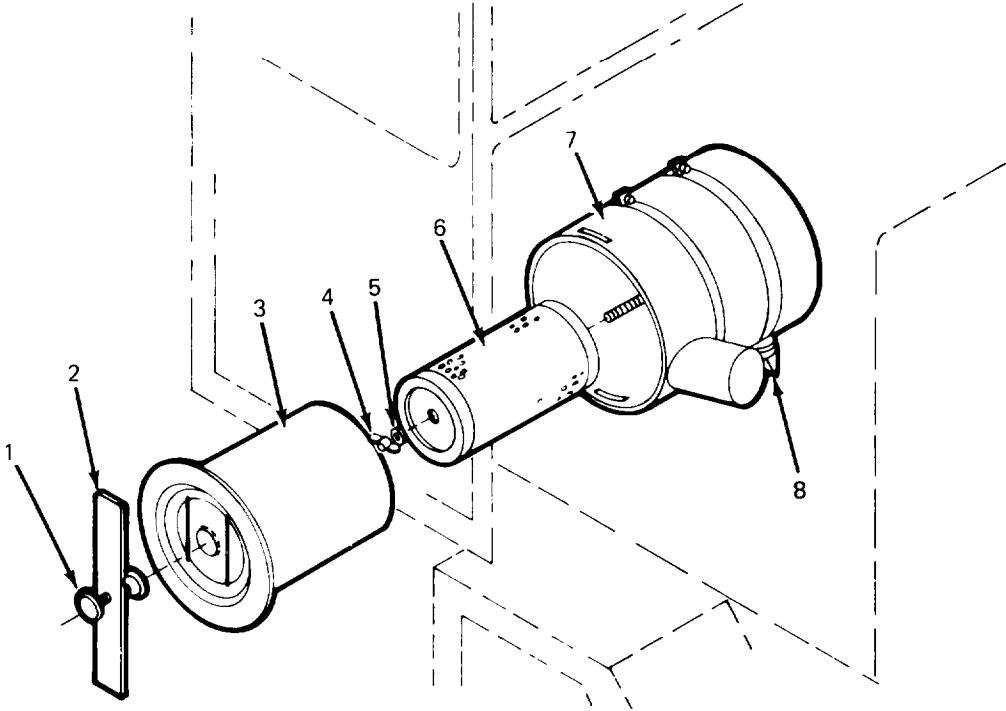
TA 074629

FUEL AND AIR INTAKE SYSTEM.

4-24. AIR CLEANER ELEMENT MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
WARNING Compressed air used for cleaning purposes will not exceed 30 psi. Use only with effective chip guarding and personal protective equipment (goggles/shield, gloves, etc.).		
B. CLEANING.		
4. Outer filter element (3).	a. Tap element to shake dust loose. b. Insert compressor air nozzle into element to blow out dust. c. Wash in water with mild non-sudsing detergent. Rinse gently with clean water and allow to air dry. (Replace after five washings.) d. Shine light inside element. Watch outside for light shining through leaks.	Pressure should not exceed 30 psi. Skip this step if filter seems clean and after steps a and b. If element is damaged, replace.
5. Canister (7).	a. Squeeze boot (8) together to release trapped dust. b. Wipe inside of canister (7) clean.	
C. INSTALLATION.		
6. Inner filter element (6).	If removed, install new element by positioning rubber backed washer (5) over stud and screw on wing nut (4).	
7. Outer filter element (3).	Place in canister (7).	
8. Retainer bar (2), and handle (1).	Slide through slots and tighten.	

FUEL AND AIR INTAKE SYSTEM.

4-24. AIR CLEANER ELEMENT MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
 Diagram illustrating the components of the air cleaner assembly: 1. HANDLE 2. RETAINER BAR 3. OUTER FILTER ELEMENT 4. WING NUT 5. RUBBER BACKED WASHER 6. INNER FILTER ELEMENT 7. CANISTER 8. BOOT		
LEGEND: 1. HANDLE 2. RETAINER BAR 3. OUTER FILTER ELEMENT 4. WING NUT 5. RUBBER BACKED WASHER 6. INNER FILTER ELEMENT 7. CANISTER 8. BOOT		
TA 074630		

FUEL AND AIR INTAKE SYSTEM

4-25. AIR CLEANER ASSEMBLY MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

- a. Removal of Filter Assembly. (5)
- b. Removal of Brackets and Fittings. (5)
- c. Installation of Brackets and Fittings. (5)
- d. Installation of Filter Assembly. (5)

20 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None

MATERIALS/PARTS (P/N)

None.

EQUIPMENT CONDITION

PARAGRAPH

None.

CONDITION DESCRIPTION

None.

PERSONNEL REQUIRED

TWO (MOS-63820).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

None.

GENERAL SAFETY INSTRUCTIONS

Engine Off; Transmission in Neutral.
Park Brake Set.

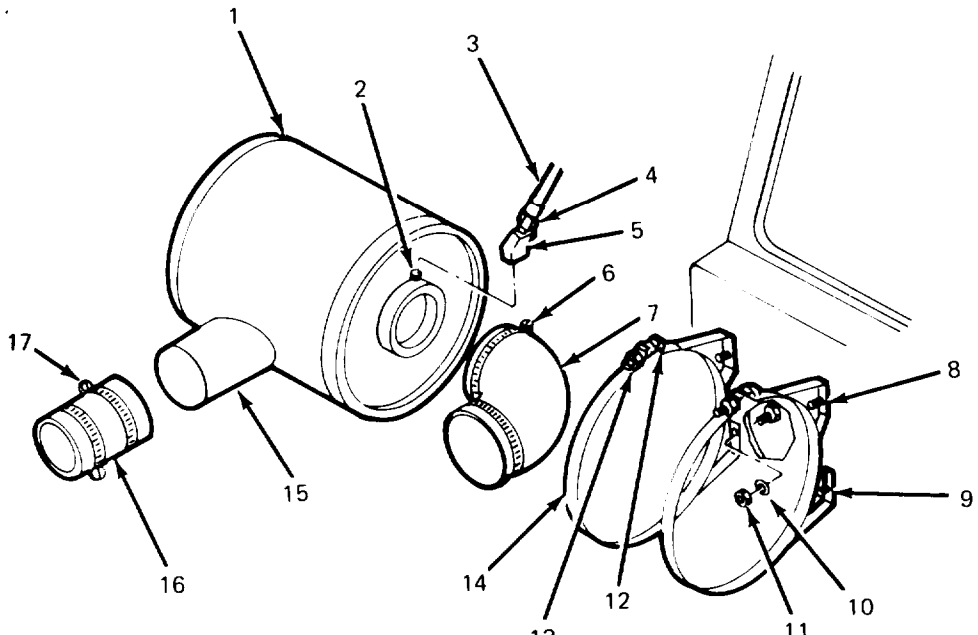
TROUBLESHOOTING REFERENCES

Table 4-1.

FUEL AND AIR INTAKE SYSTEM.

4-25. AIR CLEANER ASSEMBLY MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL OF FILTER ASSEMBLY.		
1. Turbo air inlet pipe (7).	Loosen clamp (6). at filter discharge and remove inlet pipe.	
2. Restriction indicator tube (3).	Disconnect flare nut (4) from elbow (5).	
3. Air intake pipe (15).	Loosen clamps (17) and slide boot (16) off air intake pipe (15).	
4. Four nuts (11) and four lockwashers (10).	Remove from three studs (8) and bolt (9).	
5. Filter assembly (1).	Remove.	
B. REMOVAL OF BRACKETS AND FITTINGS (REPLACEMENT OF UNIT ONLY).		
6. Two capscrews (12) and two nuts and lockwashers (13).	Remove.	
7. Two brackets (14).	Spread and remove.	
8. Nipple filter (2).	Remove with elbow (5) attached.	



LEGEND:

- 1. FILTER ASSEMBLY
- 2. NIPPLE FILTER
- 3. RESTRICTION INDICATOR TUBE
- 4. FLARE NUT
- 5. ELBOW
- 6. CLAMP (2)
- 7. TURBO AIR INLET PIPE
- 8. STUD (3)
- 9. BOLT
- 10. LOCKWASHER (4)
- 11. NUT (4)
- 12. CAPSCREW (2)
- 13. NUT AND LOCKWASHER (2)
- 14. BRACKET (2)
- 15. AIR INTAKE PIPE
- 16. BOOT
- 17. CLAMP (2)

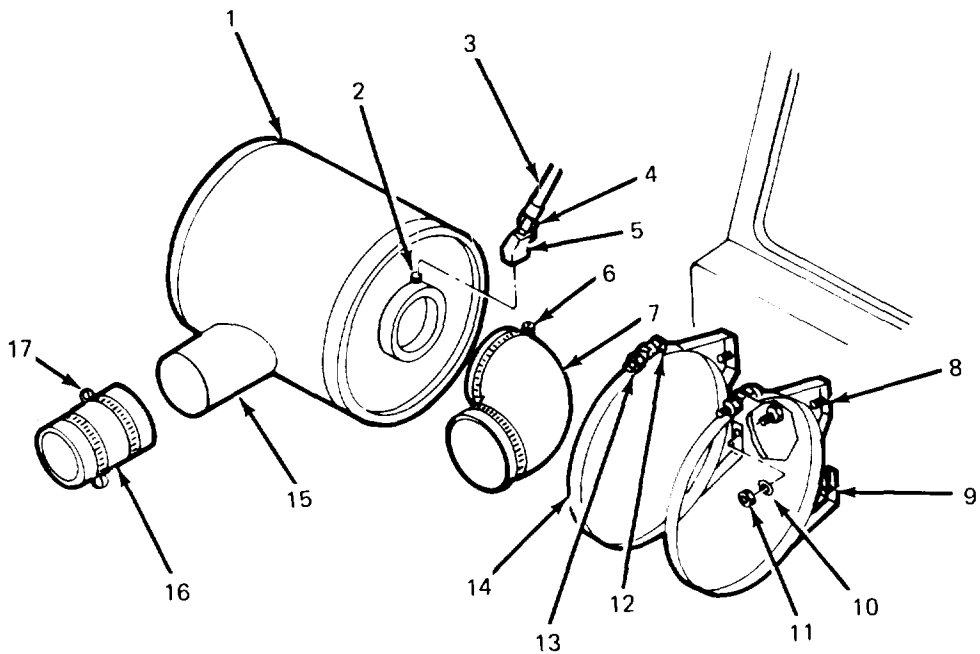
TA 074631

FUEL AND AIR INTAKE SYSTEM.

4-25. AIR CLEANER ASSEMBLY MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
C. INSTALLATION OF BRACKETS AND FITTINGS (IF REMOVED).		
9. Nipple filter (2).	Install with elbow (5) attached.	
10. Two brackets (14).	Spread and position on air filter assembly (1).	
11. Two capscrews (12) and two nuts and lockwashers (13).	Install finger tight.	
D. INSTALLATION OF FILTER ASSEMBLY.		
12. Filter assembly (1).	Place on three studs (8), and bolt (9), install four lockwashers (10) and nuts (11).	If brackets are removed it may be necessary to reposition them to fit over studs. Tighten nuts at this time.
13. Air intake pipe (15).	Slide boot (16) over air intake pipe (15) position and tighten two clamps (17).	
14. Restriction indicator tube (3).	Connect flare nut (4) to elbow (5) and tighten.	
15. Turbo air inlet pipe (7).	Install over filter discharge. Position and tighten clamps (6).	

FUEL AND AIR INTAKE SYSTEM.

4-25. AIR CLEANER ASSEMBLY MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
		
LEGEND:		
1. FILTER ASSEMBLY	9. BOLT	
2. NIPPLE FILTER	10. LOCKWASHER (4)	
3. RESTRICTION INDICATOR TUBE	11. NUT (4)	
4. FLARE NUT	12. CAPSCREW (2)	
5. ELBOW	13. NUT AND LOCKWASHER (2)	
6. CLAMP (2)	14. BRACKET (2)	
7. TURBO AIR INLET PIPE	15. AIR INTAKE PIPE	
8. STUD (3)	16. BOOT	
	17. CLAMP (2)	

TA 074632

FUEL AND AIR INTAKE SYSTEM.**4-26. AIR CLEANER RESTRICTION INDICATOR MAINTENANCE.****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

a. Removal of Indicator.	(2)
b. Installation of Indicator.	(2)
c. Removal of Tube and Filter.	(5)
d. Installation of Tube and Filter.	(6)
15 Minutes Total.	

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

EQUIPMENT CONDITION**PARAGRAPH**

None.

CONDITION DESCRIPTION

None.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

None.

GENERAL SAFETY INSTRUCTIONS

Engine Off; Transmission in Neutral
Park Brake Set.

TROUBLESHOOTING REFERENCES

None.

FUEL AND AIR INTAKE SYSTEM

4-26. AIR CLEANER RESTRICTION INDICATOR MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. INDICATOR REMOVAL.		
1. Flare nut (4).	Reach behind bracket and unscrew nut from compression adapter (3). Disconnect tube (5).	
2. Two screws (1) and starwashers (11).	Unscrew and remove.	
3. Restriction indicator (2).	Remove.	If replacing indicator remove compression adapter (3).

BRACKET MOUNTED TO INSTRUMENT PANEL

FIREWALL

AIR CLEANER

AIR INLET PIPE

LEGEND:

1. SCREW (2)
2. RESTRICTION INDICATOR
3. COMPRESSION ADAPTER
4. FLARE NUT
5. TUBE
6. GROMMET
7. FLARE NUT
8. FITTING
9. ELBOW
10. NIPPLE FILTER
11. STAR WASHER (2)

TA 074633

FUEL AND AIR INTAKE SYSTEM.

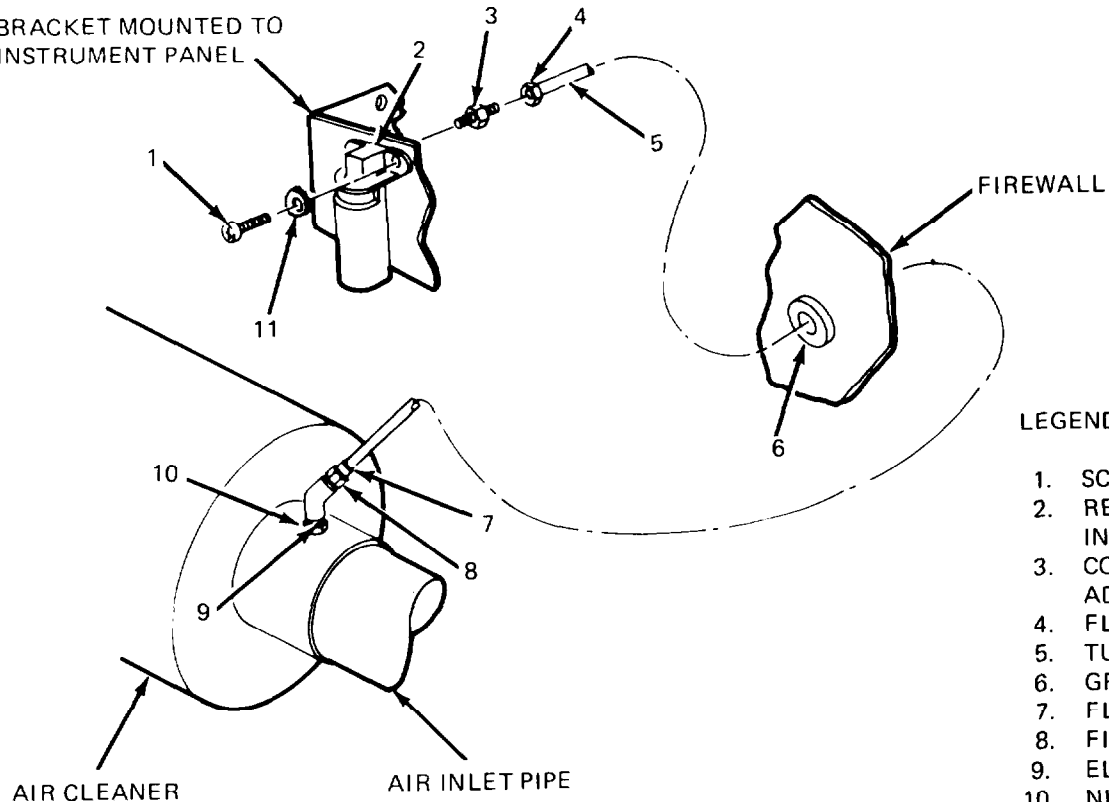
4-26. AIR CLEANER RESTRICTION INDICATOR MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
B. INDICATOR INSTALLATION.		
4. Restriction indicator (2).	Position on bracket.	
5. Two screws (1) and starwashers (11).	Screw in and tighten.	If new indicator is being installed screw in and tighten compression adapter (3), into restriction indicator (2).
NOTE If you plan to remove tube (5) and nipple filter (10), go directly to step 7, if not do step 6.		
6. Flare nut (4).	Screw onto compression adapter (3) and tighten.	
C. TUBE AND FILTER REMOVAL.		
7. Flare nut (7).	Unscrew. Disconnect tube (5).	
8. Nipple filter (10).	Unscrew and remove from air cleaner with elbow (9) and fitting (8).	
9. Tube (5) and grommet (6).	Remove from firewall.	

FUEL AND AIR INTAKE SYSTEM.

4-26. AIR CLEANER RESTRICTION INDICATOR MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
D. TUBE AND FILTER INSTALLATION.		
10. Nipple filter (10), elbow (9) and fitting (8).	Screw onto air cleaner.	
11. Flare nut (7).	Screw onto connector (8).	
12. Tube (5) and grommet (6).	Install grommet. Insert tube through firewall.	
13. Flare nut (4).	Screw onto adapter (3).	Reach behind bracket.

BRACKET MOUNTED TO INSTRUMENT PANEL



LEGEND:

1. SCREW (2)
2. RESTRICTION INDICATOR
3. COMPRESSION ADAPTER
4. FLARE NUT
5. TUBE
6. GROMMET
7. FLARE NUT
8. FITTING
9. ELBOW
10. NIPPLE FILTER
11. STAR WASHER (2)

TA 074634

FUEL AND AIR INTAKE SYSTEM**4-27. TURBO AIR INLET MAINTENANCE.****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

a. Removal.	(4)
b. Inspection.	(5)
c. Installation.	(6)
d. Checking for Leaks.	(2)
17 Minutes Total.	

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

**EQUIPMENT CONDITION
PARAGRAPH**

None.

CONDITION DESCRIPTION

None.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

None.

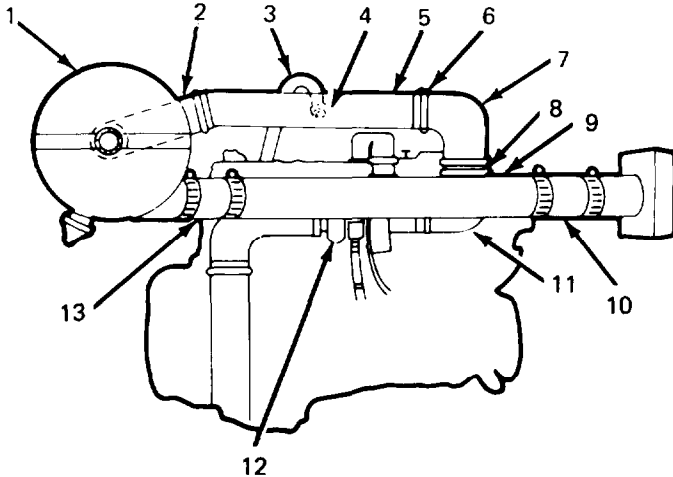
SPECIAL ENVIRONMENTAL CONDITIONS

Work Area Must be Clean as Dirt in the Air Passages
Can Damage the Turbocharger and Engine.
Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

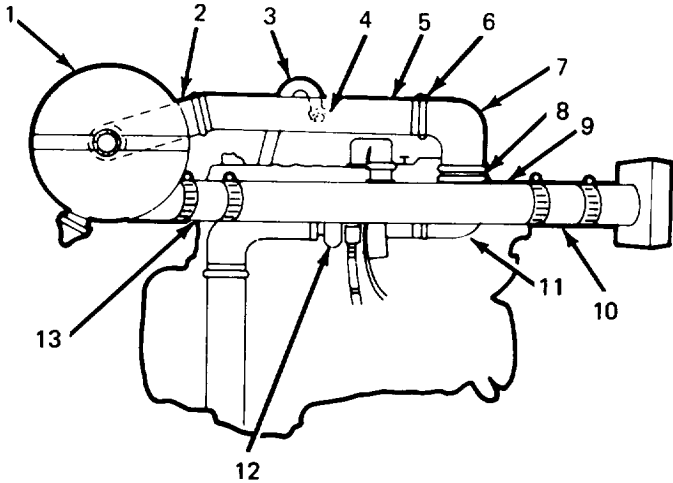
Engine OFF.
Transmission in Neutral.
Park Brake Set.

FUEL AND AIR INTAKE SYSTEM.**4-27 TURBO AIR INLET MAINTENANCE (Continued).**

LOCATION/ITEM	ACTION	REMARKS
CAUTION Dirt in the air passages can severely damage the turbocharger and engine. Be sure your work area is clean. Clean parts before installation. Cover openings to keep out dust while you are working.		
A. REMOVAL.		
1. Six clamps (6).	Loosen.	
2. Clamp (4), hose (3).	Loosen and remove.	
3. Three elbow pipes (2), (7), and (9); three straight pipes (5), (8) and (9), and two boots (10) and (13).	Remove.	
B. INSPECTION.		
4. Three elbow pipes (2), (7), and (9); three straight pipes (5), (8) and (9), and two boots (10) and (13).	Inspect for a. cracks b. leaks c. blockage	Replace, if necessary.
 LEGEND: 1. AIR CLEANER 2. ELBOW PIPE 3. HOSE 4. CLAMP 5. STRAIGHT PIPE 6. CLAMP (6) 7. ELBOW PIPE 8. STRAIGHT PIPE 9. STRAIGHT PIPE 10. BOOT 11. ELBOW PIPE 12. TURBOCHARGER 13. BOOT		

TA 074635

FUEL AND AIR INTAKE SYSTEM.

4-27. TURBO AIR INLET MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
C. INSTALLATION.		
5. Two straight pipes (5) and (8).	Insert into elbow pipes (2), (7) and (11).	
6. Straight pipe (9).	Insert into two boots (10) and (13).	
7. Two elbow pipes (2) and (11).	Attach to turbocharger (12) and air cleaner (1).	
8. Six clamps (6).	Tighten to 32-36 lb-in (3.6-4.1 N•m).	
D. CHECKING FOR LEAKS.		
9. Engine.	Start up (see TM 9-2320-273-10).	
WARNING During normal operation, the turbocharger and outlet pipe can become very hot. Be careful not to touch these components with your bare hands. These components may be hot enough to cause severe burns.		
		LEGEND: 1. AIR CLEANER 2. ELBOW PIPE 3. HOSE 4. CLAMP 5. STRAIGHT PIPE 6. CLAMP (6) 7. ELBOW PIPE 8. STRAIGHT PIPE 9. STRAIGHT PIPE 10. BOOT 11. ELBOW PIPE 12. TURBOCHARGER 13. BOOT
		TA 074636

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ENGINE RETARDER BRAKE**4-28. ROCKER ARM HOUSING COVERS MAINTENANCE.****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

Removal of Crossover Tube. (5)
 Removal of Cover. (5)
 Cleaning. (20)
 Installation of Cover. (5)
 Installation of Crossover Tube (5)
40 Minutes Total.

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Dry Cleaning Solvent (Refer to Appendix C).
 Gasket for Crossover Tube
 (Center Cover Only.) (216487).
 Gasket for Rocker Arm Housing
 (3009999).

**EQUIPMENT CONDITION
PARAGRAPH**

4-15A.
 4-27A.

CONDITION DESCRIPTION

Breather Tube Removed
 (For Center Cover Only).
 Turbo Air Inlet Removed.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-20P.

SPECIAL ENVIRONMENTAL CONDITIONS

Work Area Must be Clean as Dirt in the Turbocharger
 and Engine Can Cause Damage.
 Vehicle Parked on Level Ground.

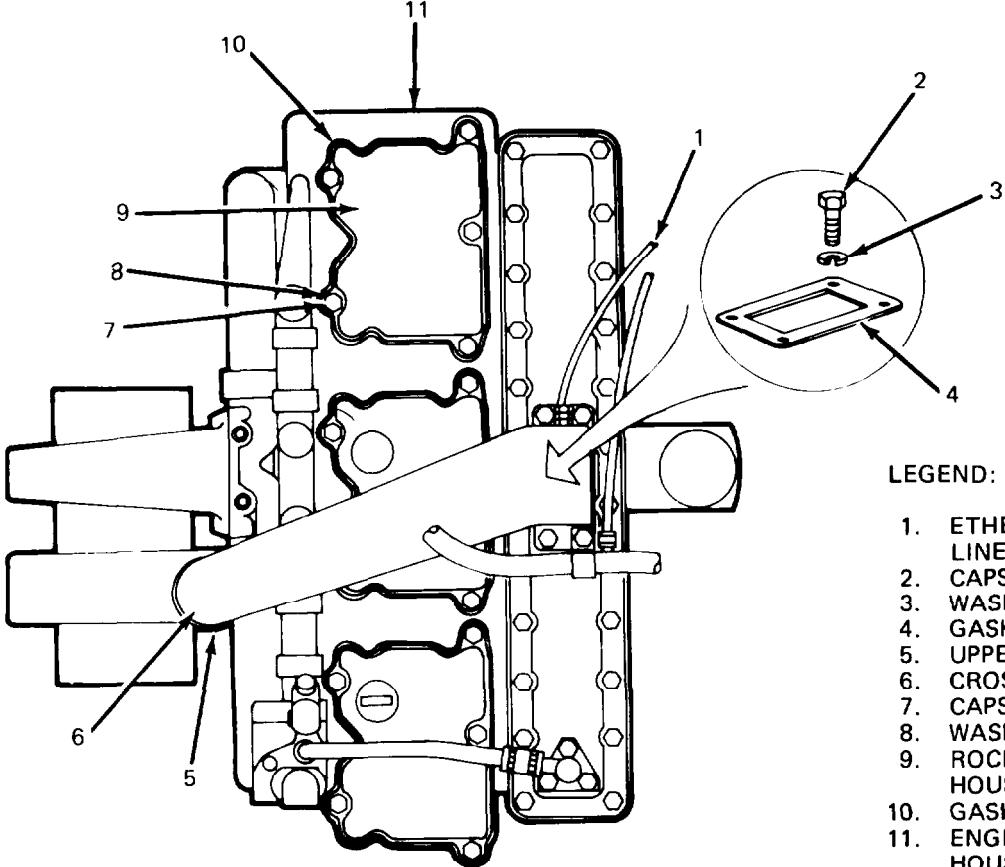
GENERAL SAFETY INSTRUCTIONS

Engine OFF.
 Transmission in Neutral.
 Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 5-4.

ENGINE RETARDER BRAKE.

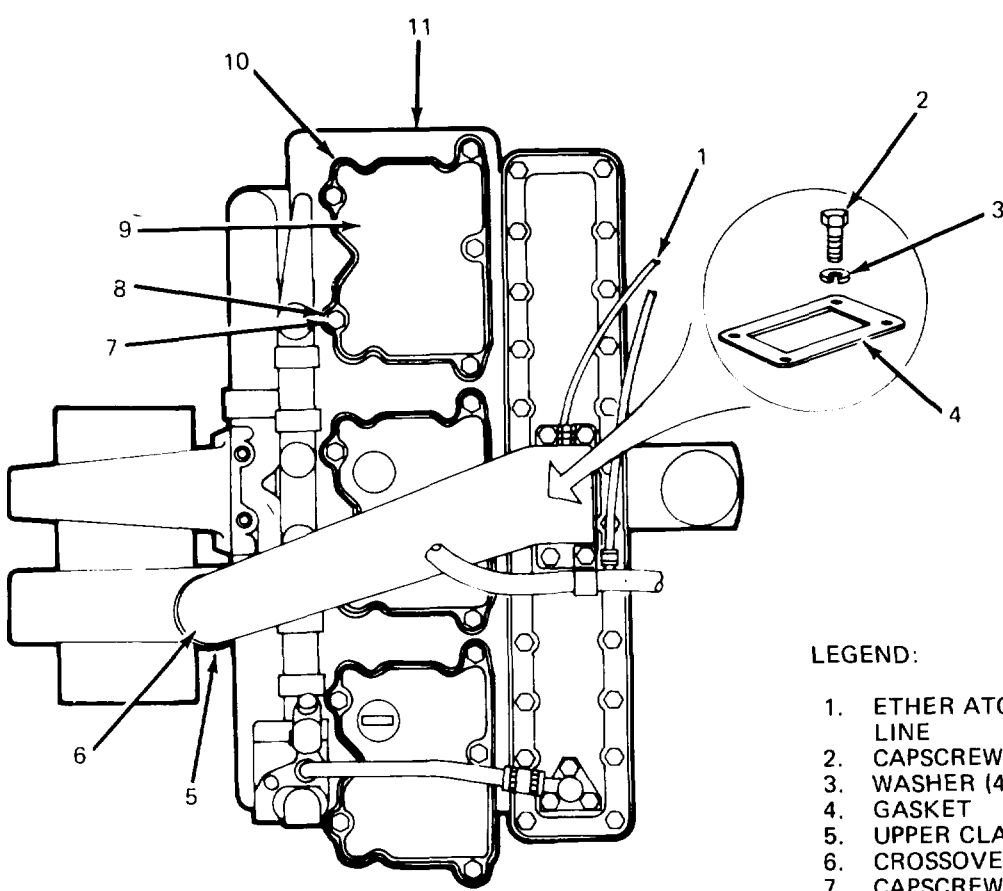
4-28. ROCKER ARM HOUSING COVERS MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
CAUTION Do not allow SD-2 dry cleaning solvents to come in contact with seals on flexible hoses. These cleaners may damage leather, rubber, and synthetic materials.		
A. REMOVAL OF CROSSOVER TUBE (FOR CENTER COVER, ONLY).		
1. Ether atomizer line (1).	Unscrew and remove.	
2. Four capscrews (2), washers (3), and gasket (4).	Unscrew and remove. Throw away gasket (4).	At this time tachograph cable and hose are free enough to move out of way.
		
LEGEND: 1. ETHER ATOMIZER LINE 2. CAPSCREW (4) 3. WASHER (4) 4. GASKET 5. UPPER CLAMP 6. CROSSOVER TUBE 7. CAPSCREW (5) 8. WASHER (5) 9. ROCKER ARM HOUSING COVER 10. GASKET 11. ENGINE RETARDER HOUSING		
TA 074637		

ENGINE RETARDER BRAKE.**4-28. ROCKER ARM HOUSING COVERS MAINTENANCE (Continued).**

4-28. ROCKER ARM HOUSING COVERS MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL OF CROSSOVER TUBE (Continued).		
3. Upper clamp (5).	Loosen.	If rubber connector is damaged, replace.
4. Crossover tube (6).	Remove.	
B. REMOVAL OF COVER.		
5. Five capscrews (7), and washers (8).	Unscrew and remove.	
6. Rocker arm housing cover (9).	Lift off.	
7. Gasket (10).	Take off and throw away.	
C. CLEANING.		
8. Rocker arm housing cover (9).	Clean with dry cleaning solvent.	
9. Engine retarder housing (11).	Wipe grease from rim where gasket (10) rests.	
D. INSTALLATION OF COVER.		
10. New gasket (10).	Set in place on engine retarder housing (11).	
11. Rocker arm housing cover (9).	Set onto gasket (10).	
12. Capscrews (7) and washers (8).	Tighten to 15 lb-ft (20 N•m) with torque wrench.	
E. INSTALLATION OF CROSSOVER TUBE (CENTER COVER ONLY).		
13. Crossover tube (6) and new crossover tube gasket (4).	Hold in place and attach with capscrews (2) and washers (3).	Clamp down tachograph cable and hose at this time.
14. Upper clamp (5).	Tighten.	
15. Crossover tube capscrews (2).	Tighten.	
16. Ether atomizer line (1).	Connect and tighten.	

ENGINE RETARDER BRAKE.

4-28. ROCKER ARM HOUSING COVERS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
NOTE Follow-on maintenance action required if center cover was removed: a. Install breather tube; refer to para 4-15D. b. Install turbo air inlet; refer to para 4-27C.		
 LEGEND: 1. ETHER ATOMIZER LINE 2. CAPSCREW (4) 3. WASHER (4) 4. GASKET 5. UPPER CLAMP 6. CROSSOVER TUBE 7. CAPSCREW (5) 8. WASHER (5) 9. ROCKER ARM HOUSING COVER 10. GASKET 11. ENGINE RETARDER HOUSING		
TA 074638		

ENGINE RETARDER BRAKE

4-29. ENGINE RETARDER BRAKE MAINTENANCE.

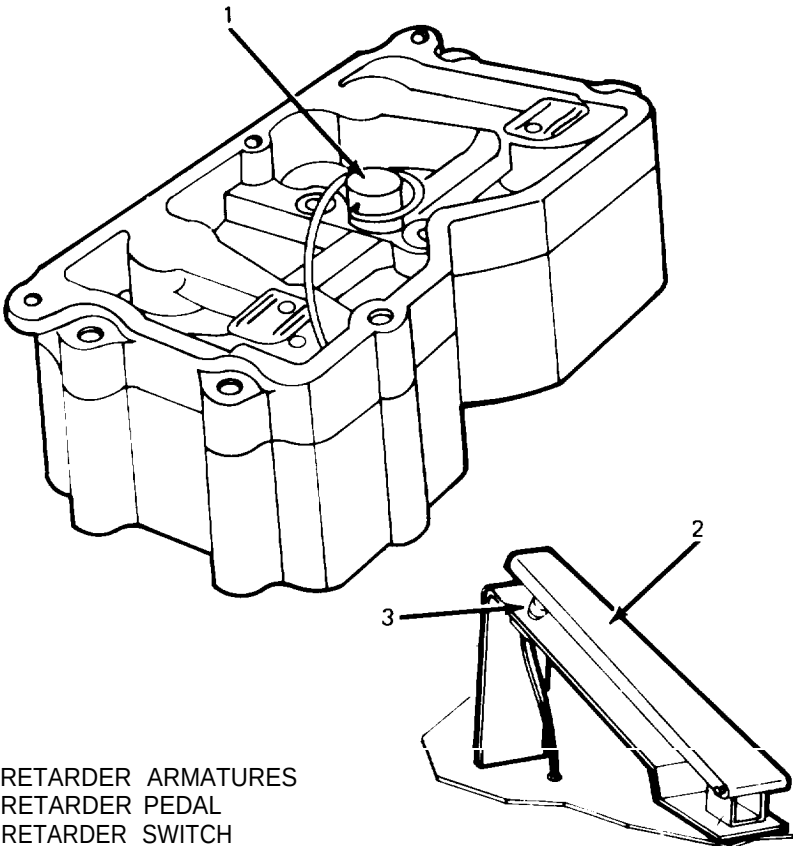
THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

Inspection, (20)
20 Minutes Total.

INITIAL SETUP	EQUIPMENT CONDITION	CONDITION DESCRIPTION
<u>APPLICABLE CONFIGURATIONS</u>	<u>PARAGRAPH</u>	
All.	4-28A.	Remove Crossover Tube.
<u>TEST EQUIPMENT</u>	4-28B.	Rocker Arm Housing
None.		Covers.
<u>SPECIAL TOOLS</u>		
None.		
<u>MATERIALS/PARTS (P/N)</u>		
None.		
<u>PERSONNEL REQUIRED</u>	<u>SPECIAL ENVIRONMENTAL CONDITIONS</u>	
Two (MOS-63B20).	Work Area Must be Clean as Dirt in the Turbocharger and Engine can Cause Damage.	
<u>REFERENCES (TM)</u>	Vehicle Parked on Level Ground.	
TM 9-2320-273-10.	<u>GENERAL SAFETY INSTRUCTIONS</u>	
<u>TROUBLESHOOTING REFERENCES</u>	Engine OFF.	
Table 5-4.	Transmission in Neutral.	
	Park Brake Set.	

ENGINE RETARDER BRAKE

4-29. ENGINE RETARDER BRAKE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
WARNING During normal operation the turbocharger and outlet pipe can become very hot. Be careful not to touch these components with your bare hands. These components may be hot enough to cause serious burns. CAUTION You will be operating the engine with cover removed. Be absolutely certain that work area is clean and dust-free. Do not allow dirt, tools, or engine parts to fall into engine.		
 LEGEND: 1. ENGINE RETARDER ARMATURES 2. ENGINE RETARDER PEDAL 3. ENGINE RETARDER SWITCH		

TA 074639

ENGINE RETARDER BRAKE.

4-29. ENGINE RETARDER BRAKE MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
INSPECTION.		
1. Engine.	Start up (see TM 9-2320-273-10) (1st mechanic).	
2. Six engine retarder armatures (1).	Bleed brakes by pressing each engine retarder armature five or six times in a row. (2nd mechanic).	
3. Cab/Engine Retarder Switch (3).	a. Keep engine retarder pedal (2) pressed down to actuate engine retarder switch (3). b. Start with dash selector switch at LOW. c. Move to MED. d. Move to HIGH. (1st mechanic).	Refer to TM 9-2320-273-10.
4. Engine retarder armatures (1).	Observe that: a. When dash selector switch is at LOW center armature remains down. b. When dash selector switch is moved to MED, center armature comes up, armature on ends go down. c. When dash selector switch is on HIGH, all armatures go down.	If brake does not work properly, refer problem to Direct Support Maintenance.
NOTE Follow-on maintenance action required: a. Install rocker arm housing covers, and crossover tube, para 4-28D and E.		

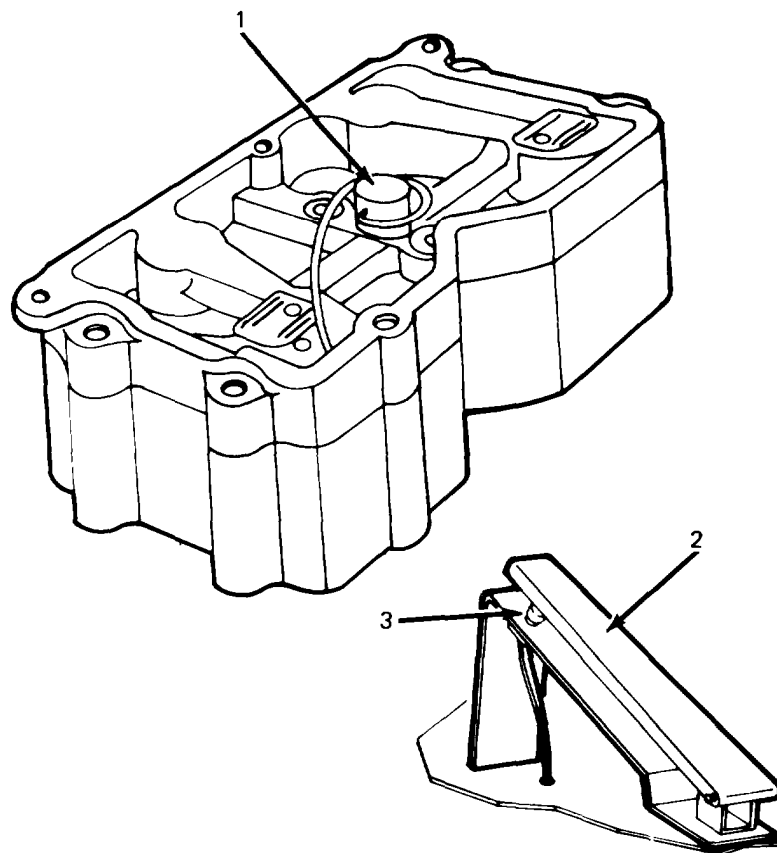
ENGINE RETARDER BRAKE.

4-29. ENGINE RETARDER BRAKE MAINTENANCE (Continued).

LOCATION/ITEM

ACTION

REMARKS



LEGEND:

1. ENGINE RETARDER ARMATURES
2. ENGINE RETARDER PEDAL
3. ENGINE RETARDER SWITCH

TA 074640

ETHER QUICK-START SYSTEM

4-30. ETHER CYLINDER MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

- a. Removal. (5)
- b. Installation. (10)
- c. Check Operation. (5)

20 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Ether Cylinder (2910-01-072-1783).

EQUIPMENT CONDITION
PARAGRAPH

None.

CONDITION DESCRIPTION

None.

PERSONNEL REQUIRED

Two (MOS-63B20).
(2nd Mechanic Operates
Cab Control in Part C).
REFERENCES (TM)
TM 9-2320-273-20P.

SPECIAL ENVIRONMENTAL CONDITIONS

1. Coolant Temperature Must be Below 50°F or Either Solenoid Valve Will Not Function.
2. Work in a Well Ventilated Area Away From Sparks or Flame.
3. Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Ether is Highly Explosive.
Be Alert for the Strong Odor of Spilled Ether.
Guard Against Flame or Sparks in Work Area.
Engine OFF.
Transmission in Neutral.
Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 5-3.

ETHER QUICK-START SYSTEM.**4-30. ETHER CYLINDER MAINTENANCE (Continued).****LOCATION/ITEM****ACTION****REMARKS****WARNING**

Ether is highly explosive. Dispose of cylinder properly. Be alert for the strong odor of spilled ether. Guard against flame or sparks in work area.

A. REMOVAL.

1. Clamp (4).

Loosen.

2. Ether cylinder (1).

Unscrew from fitting (5) and lift out.

It may be necessary to hold fitting (5) with open-end wrench.

NOTE

Check neck of cylinder for dirt or lint prior to installation.

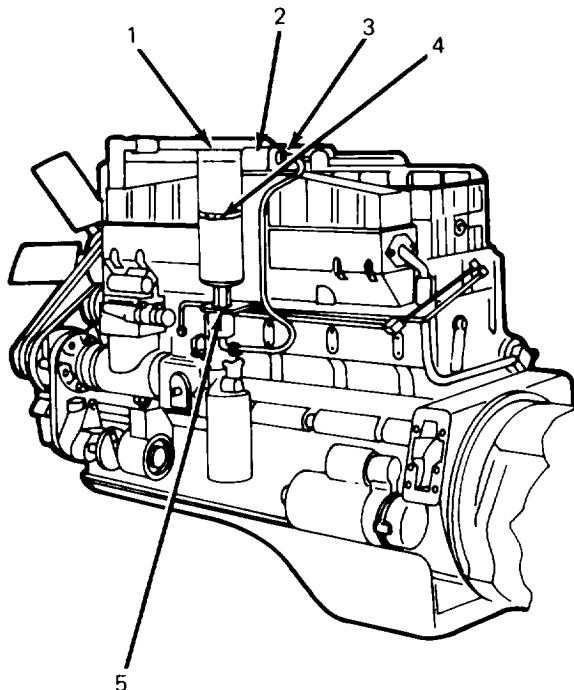
B. INSTALLATION.

3. Ether cylinder (1).

Screw into fitting (5).

4. Clamp (4).

Tighten.

**LEGEND:**

- 1. ETHER CYLINDER
- 2. CROSSOVER TUBE
- 3. ATOMIZER LINE
- 4. CLAMP
- 5. FITTING

TA 074641

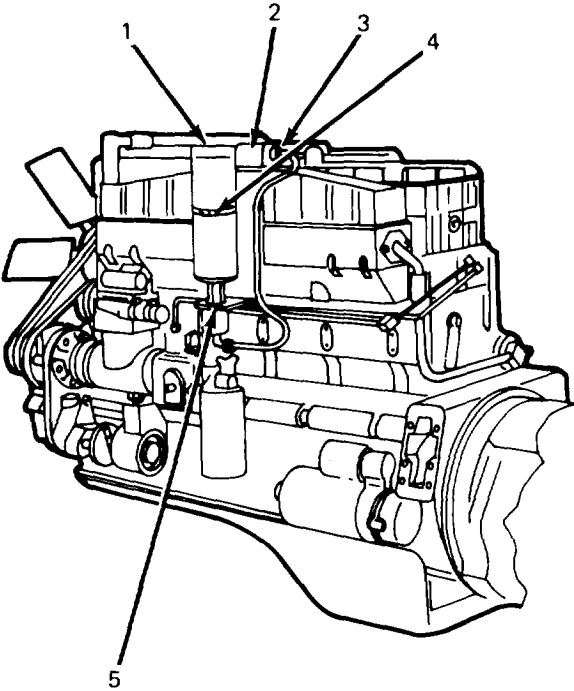
ETHER QUICK-START SYSTEM.

4-30. ETHER CYLINDER MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
NOTE Coolant temperature must be below 50°F or solenoid valve will not function.		
C. OPERATIONAL CHECK.		
5. Atomizer Line (3).	Unscrew from crossover tube (2).	
6. INSTRUMENT PANEL/ Engine run switch.	Turn On.	Refer TM 9-2320-273-10 2nd Mechanic.
7. INSTRUMENT PANEL/ Ether button	Push and release.	
8. Atomizer Line (3)	Observe ether mist.	If mist is not observed, check ether temperature switch (para 5-74), solenoid valve (para 4-31), ether tube (para 4-33), and atomizer (para 4-32).
9. INSTRUMENT PANEL/ Engine run switch.	After check, turn OFF.	2nd Mechanic.
10. Atomizer Line (3).	Screw into crossover tube (2).	

ETHER QUICK-START SYSTEM.

4-30. ETHER CYLINDER MAINTENANCE (Continued)

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

- 1. ETHER CYLINDER
- 2. CROSSOVER TUBE
- 3. ATOMIZER LINE
- 4. CLAMP
- 5. FITTING

ETHER QUICK START SYSTEM

4-31. SOLENOID VALVE MAINTENANCE.**THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

a. Removal.	(20)
b. Installation.	(25)
45 Minutes Total.	

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS {P/N}

Solenoid Valve, 913032-04 (06991).

EQUIPMENT CONDITION**PARAGRAPH**

4-30A.

9-11A.

CONDITION DESCRIPTION

Ether Cylinder Removed.

Remove Alcohol Evaporator.

PERSONNEL REQUIRED

Two (MOS-63B20).
 (2nd Mechanic Operates
 Cab Control in Part C of Para 4-30.)

REFERENCES (TM)

TM 9-2320-273-20P

TROUBLESHOOTING REFERENCES

Table 5-3.

SPECIAL ENVIRONMENTAL CONDITIONS

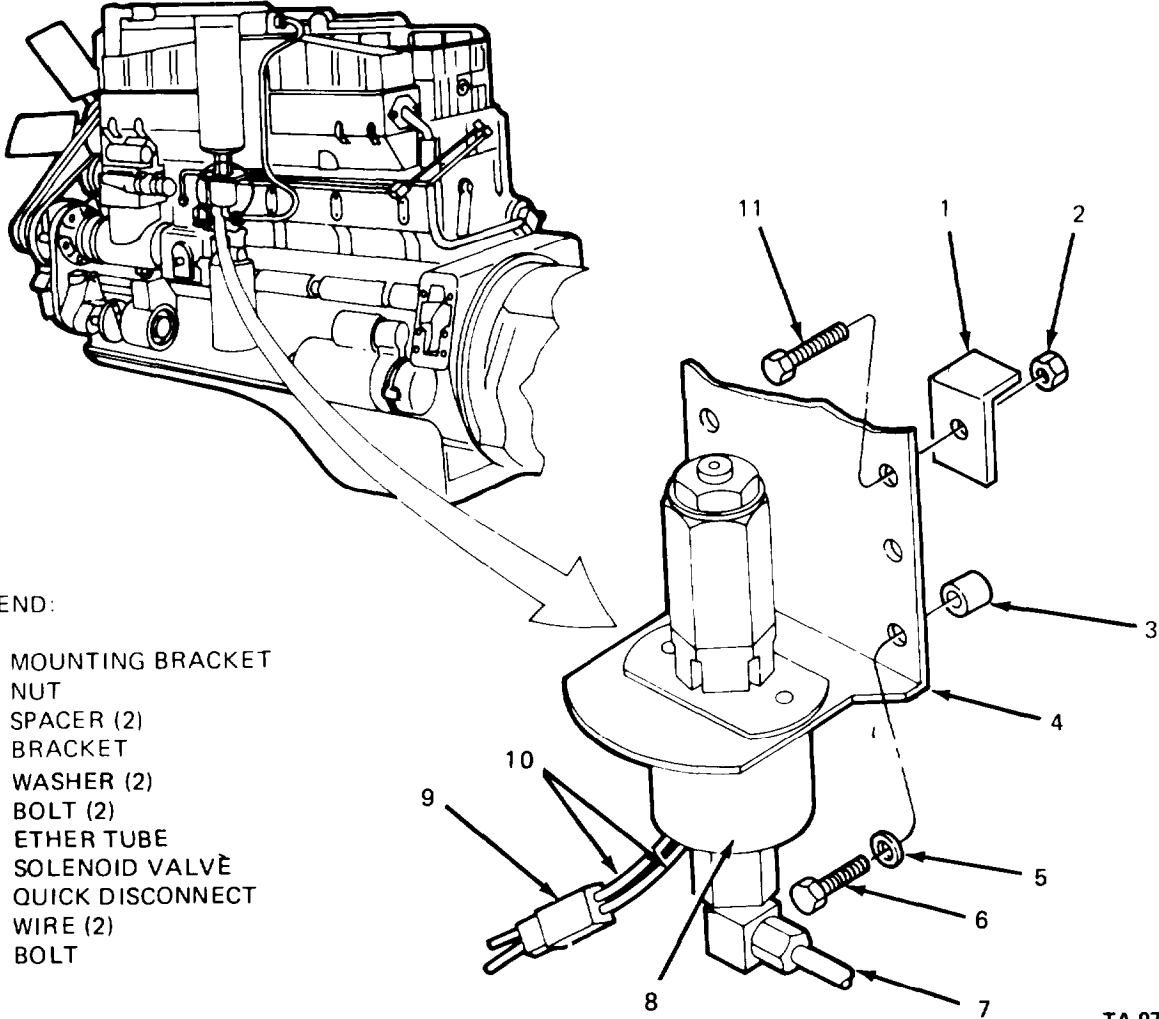
Coolant Temperature Must be Below 50°F or Ether
 Solenoid Valve Will Not Function.
 Work in a Well Ventilated Area Away From Sparks or Flame.
 Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Ether is Highly Explosive.
 Be Alert for the Strong Odor of Spilled Ether.
 Guard Against Flame or Sparks in Work Area.
 Engine OFF; Transmission in Neutral.
 Park Brake Set.

ETHER QUICK-START SYSTEM

4-31. SOLENOID VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
WARNING Ether is highly explosive. Be alert for the strong odor of spilled ether. Guard against flames or sparks in work area.		
A. REMOVAL.		
1. Two wires (10).	Unplug from quick-disconnect (9).	
2. Ether tube (7).	Unscrew from solenoid valve (8).	
 LEGEND: 1. MOUNTING BRACKET 2. NUT 3. SPACER (2) 4. BRACKET 5. WASHER (2) 6. BOLT (2) 7. ETHER TUBE 8. SOLENOID VALVE 9. QUICK DISCONNECT 10. WIRE (2) 11. BOLT		

TA 074643

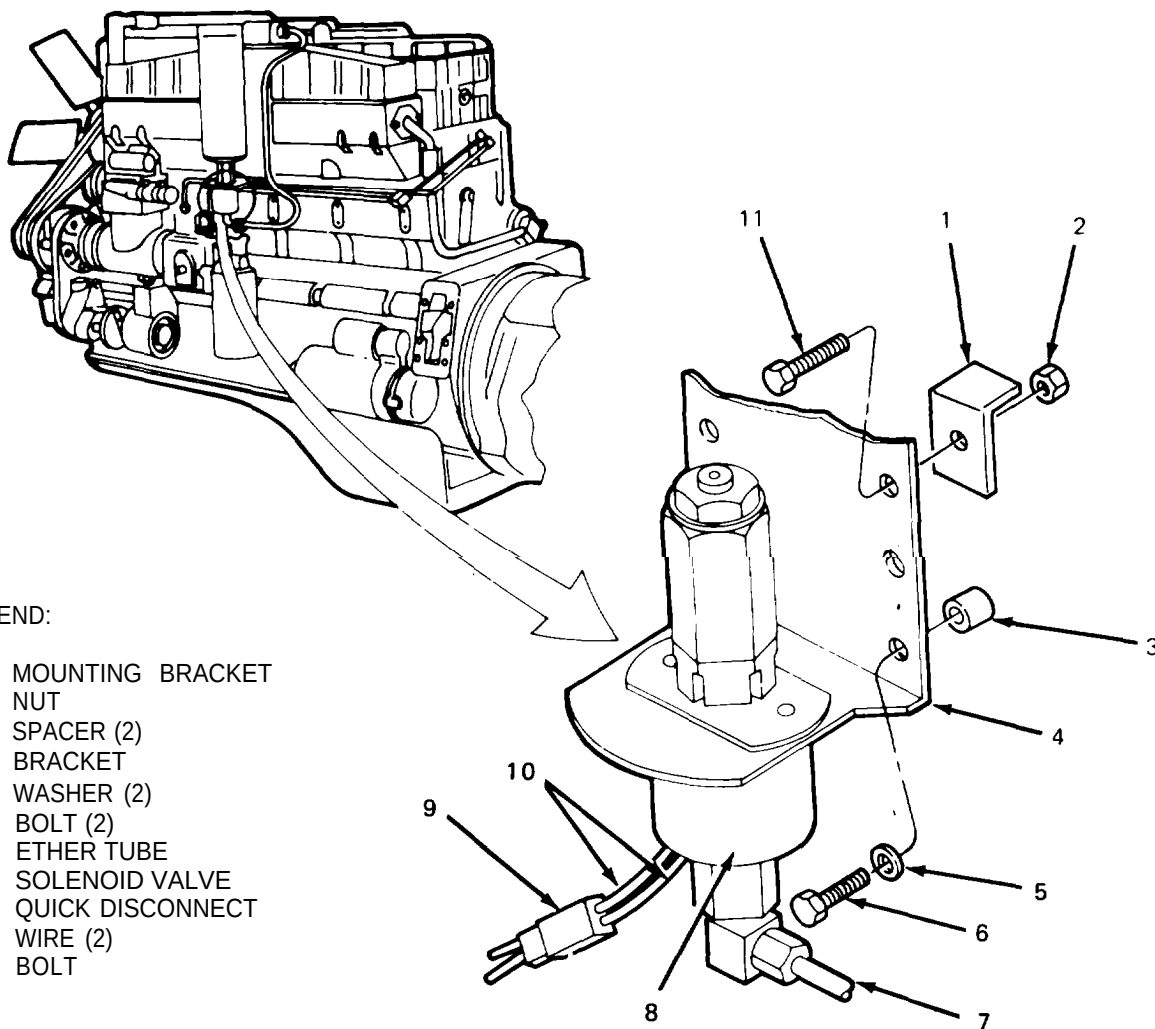
ETHER QUICK-START SYSTEM.

4-31. SOLENOID VALVE MAINTENANCE {Continued}.		
LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
3. Two bolts (6), washers (5), and spacers (3).	Unscrew and remove.	
4. Bolt (11) and nut (2).	Unscrew and remove bracket (4) with solenoid valve (8) attached from mounting bracket (1).	
B. INSTALLATION.		
5. Bracket (4) with solenoid valve (8) attached.	Mount to engine with two bolts (6), washers (5), and spacers (3).	
6. Bolt (11) and nut (2).	Mount thru bracket (4) and mounting bracket (1) and tighten.	
7. Ether tube (7).	Screw onto solenoid valve (8).	
8. Quick disconnect (9).	Plug in two wires (10).	
NOTE Follow-on maintenance required: Install ether cylinder and check operation; see para 4-30 B and C.		

ETHER QUICK-START SYSTEM.

4-31. SOLENOID VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
LEGEND:		
1. MOUNTING BRACKET		
2. NUT		
3. SPACER (2)		
4. BRACKET		
5. WASHER (2)		
6. BOLT (2)		
7. ETHER TUBE		
8. SOLENOID VALVE		
9. QUICK DISCONNECT		
10. WIRE (2)		
11. BOLT		



TA 074644

ETHER QUICK-START SYSTEM

4-32. ATOMIZER MAINTENANCE.**THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

a. Removal.	(2)
b. Installation and Operational Check.	(3)
5 Minutes Total.	

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

EQUIPMENT CONDITION**PARAGRAPH**

None.

CONDITION DESCRIPTION

None.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Atomizer, 91302406 (06991)

PERSONNEL REQUIRED

Two (MOS-63B20).
 (2nd Mechanic Operates Cab
 Controls in Part B.)

REFERENCES (TM)

None.

SPECIAL ENVIRONMENTAL CONDITIONS

Coolant Temperature Must Be Below 50°F or Ether
 Solenoid Valve Will Not Function.
 Work in a Well Ventilated Area Away from Sparks or Flame.

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

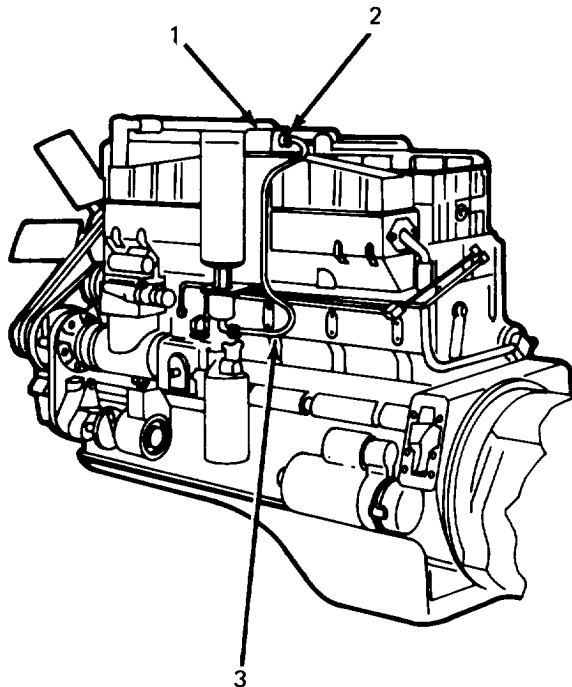
Ether is Highly Explosive.
 Be Alert for the Strong Odor of Spilled Ether.
 Guard Against Flame or Sparks in Work Area.
 Engine OFF: Transmission in Neutral.
 Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 5-3.

ETHER QUICK-START SYSTEM.

4-32. ATOMIZER MAINTENANCE (Continued).

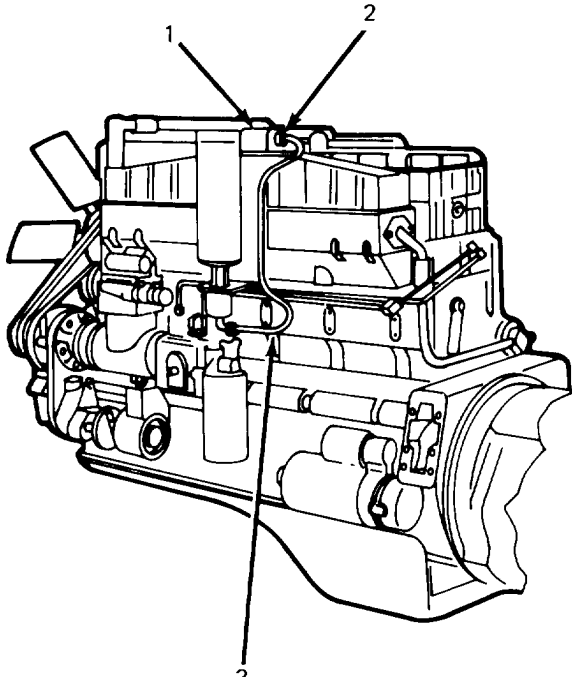
LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Atomizer (2).	- Unscrew ether tube (3) and remove. - Unscrew from crossover tube (1).	
		
LEGEND: - CROSSOVER TUBE - ATOMIZER - ETHER TUBE		
TA 074645		

ETHER QUICK-START SYSTEM.

4-32. ATOMIZER MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
NOTE Coolant temperature must be below 50°F or solenoid valve will not function.		
B. INSTALLATION AND OPERATIONAL CHECK.		
2. Ether tube (3).	Screw on atomizer (2).	
INSTRUMENT PANEL/		
3. Ether button.	Push (2nd mechanic).	Engine run switch must be ON
4. Atomizer (2).	Observe ether mist from atomizer (2) (2nd mechanic).	If mist is not observed, check ether temperature switch (para 5-74), ether cylinder (para 4-30), solenoid valve (para 4-31), and ether tube (para 4-33).
INSTRUMENT PANEL/		
5. Engine run switch.	Engine run switch OFF (2nd mechanic).	
6. Atomizer (2).	a. Remove from ether tube (3). b. Screw into crossover tube (1).	
7. Ether tube (3).	Screw into atomizer (2).	

ETHER QUICK-START SYSTEM.

4-32. ATOMIZER MAINTENANCE (Continued).

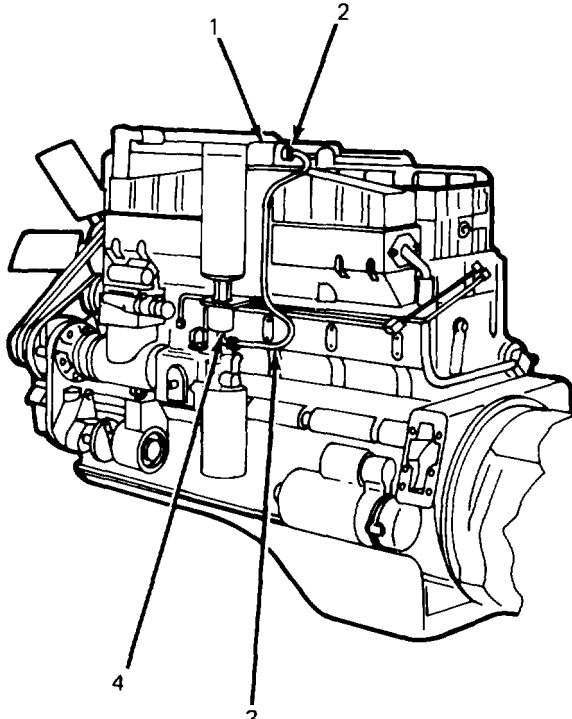
LOCATION/ITEM	ACTION	REMARKS
 1. CROSSOVER TUBE 2. ATOMIZER 3. ETHER TUBE		
LEGEND:		
1. CROSSOVER TUBE		
2. ATOMIZER		
3. ETHER TUBE		
TA 074646		

ETHER QUICK-START MAINTENANCE.

4-33. ETHER TUBE MAINTENANCE.		
THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)		
a. Removal. (10) b. Inspection. (5) c. Installation. (10) d. Operational Check. (5) 30 Minutes Total.		
INITIAL SETUP	EQUIPMENT CONDITION	
<u>APPLICABLE CONFIGURATIONS</u>	<u>PARAGRAPH</u>	<u>CONDITION DESCRIPTION</u>
All.	None.	None.
<u>TEST EQUIPMENT</u>		
None.		
<u>SPECIAL TOOLS</u>		
None.		
<u>MATERIALS/PARTS (P/N)</u>		
Liquid Teflon (Refer to Appendix C).		
<u>PERSONNEL REQUIRED</u>	<u>SPECIAL ENVIRONMENTAL CONDITIONS</u>	
Two (MOS-63B20). (2nd Mechanic Operates Cab Controls in Part D.)	Coolant Temperature Must be Below 50°F or Ether Solenoid Valve Will Not Function. Work in a Well Ventilated Area Away From Sparks or Flame. Vehicle Parked on Level Ground.	
<u>REFERENCES (TM)</u>	<u>GENERAL SAFETY INSTRUCTIONS</u>	
None.	Ether is Highly Explosive. Be Alert for the Strong Odor of Spilled Ether. Guard Against Flame or Sparks in Work Area. Engine OFF. Transmission in Neutral. Park Brake Set.	
<u>TROUBLESHOOTING REFERENCES</u>		
Table 5-3.		

ETHER QUICK-START SYSTEM.

4-33. ETHER TUBE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Ether tube (3).	a. Unscrew from atomizer (2). b. Unscrew from solenoid valve (4).	
2. Atomizer (2).	Unscrew from crossover tube (1).	
		
LEGEND: 1. CROSSOVER TUBE 2. ATOMIZER 3. ETHER TUBE 4. SOLENOID VALVE		
TA 074647		

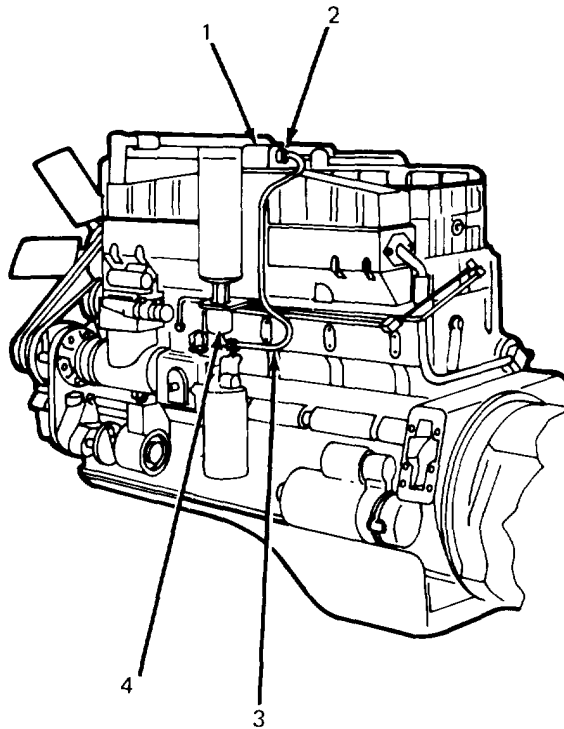
ETHER QUICK-START SYSTEM.

4-33. ETHER TUBE MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
B. INSPECTION.		
3. Ether tube (3), solenoid valve (4), atomizer (2).	Look for: a. Cracks. b. Leaks. c. Kinks. d. Damaged fittings.	Replace, if necessary.
C. INSTALLATION.		
4. Ether tube (3).	a. Screw onto solenoid valve (4). b. Screw onto atomizer (2).	
NOTE Coolant temperature must be below 50°F or solenoid valve will not function.		
D. OPERATIONAL CHECK.		
5. INSTRUMENT PANEL/ Ether button.	Push (2nd mechanic).	Engine run switch must be ON.
6. Atomizer (2).	Observe ether mist (1st mechanic).	If mist is not observed, check ether temperature switch (para 5-74) ether cylinder (para 4-30), solenoid valve (para 4-31), and atomizer (para 4-32).
7. INSTRUMENT/PANEL. Engine run switch.	Turn OFF (2nd mechanic).	
8. Atomizer (2).	a. Unscrew from ether tube (3). b. Screw into crossover tube (1).	
9. Ether tube (3).	Screw onto atomizer (2).	

ETHER QUICK-START SYSTEM.

4-33. ETHER TUBE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. CROSSOVER TUBE
2. ATOMIZER
3. ETHER TUBE
4. SOLENOID VALVE

TA 074648

EXHAUST SYSTEM.**4-34. TURBO OUTLET PIPE MAINTENANCE.****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

- a Removal. (5)
- b. Inspection of Mating Flanges. (5)
- c. Installation. (10)
- d. Checking for Leaks. (5)

25 Minutes Total.

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

**EQUIPMENT CONDITION
PARAGRAPH**

None.

CONDITION DESCRIPTION

None.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Coupling, 5-0-1259LJ(76700).

Coupling (3), 5-0-1236BJ (76700).

Locknut (M916/M920) M/219 B-20002 (34623).

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 92320-273-10.

TM 9-2320-273-20P.

GENERAL SAFETY INSTRUCTIONS

Wait Until Exhaust Components are Cool.

Engine OFF.

Transmission in Neutral.

Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 4-1.

EXHAUST SYSTEM.

4-34. TURBO OUTLET PIPE MAINTENANCE (Continued).

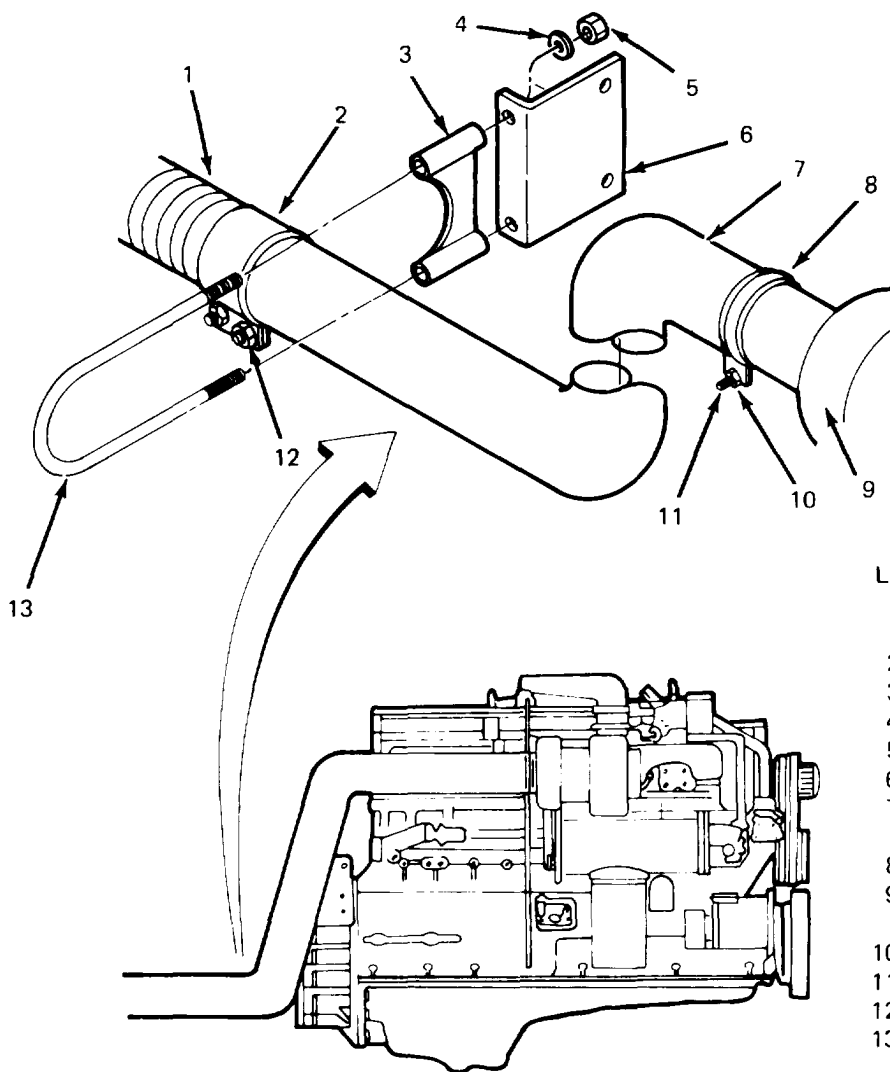
LOCATION/ITEM

ACTION

REMARKS

WARNING

During normal operation, the exhaust pipes and muffler can become very hot. Be careful not to touch these components with your bare hands. Do not allow your body to come in contact with the hot pipes or muffler. Exhaust system components may be hot enough to cause serious burns.



LEGEND:

1. FLEX PIPE
2. COUPLING
3. SPACER
4. WASHER (2)
5. CLAMP NUT (2)
6. BRACKET
7. TURBOCHARGER
OUTLET PIPE
8. CLAMP
9. TURBOCHARGER
OUTLET
10. LOCKNUT
11. BOLT
12. COUPLING NUT (2)
13. U-CLAMP

TA 074649

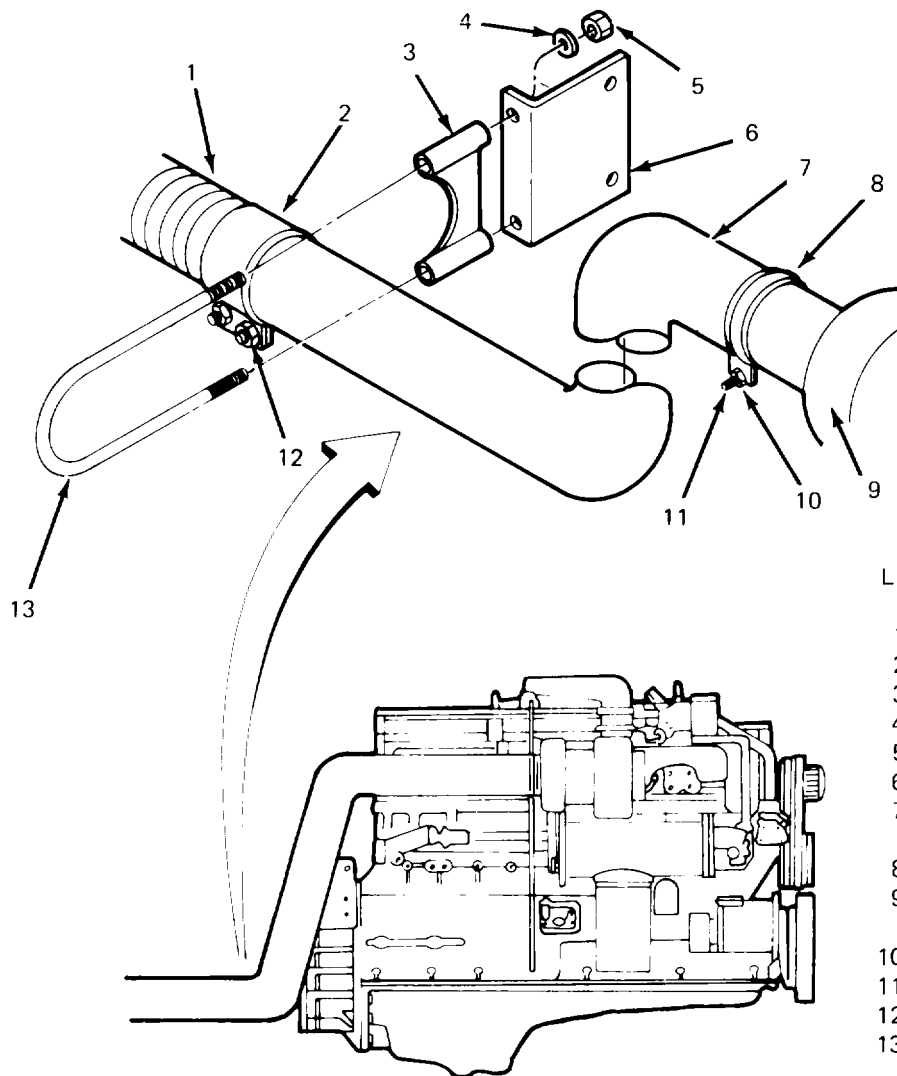
EXHAUST SYSTEM.**4-34. TURBO OUTLET PIPE MAINTENANCE (Continued).**

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL		
1. Locknut (10) and bolt (11).	Unscrew and remove clamp (8).	Replace locknut (10).
2. Two coupling nuts (12).	Loosen.	
3. Two clamp nuts (5) and washers (4).	Unscrew and remove U-clamp (13) and spacer (3) from bracket (6).	
4. Turbocharger outlet pipe (7).	Remove.	
5. Coupling (2).	Remove and discard.	
B. INSPECTION OF MATING FLANGES.		
6. End of turbocharger outlet (9), turbocharger outlet pipe (7), and flex pipe (1).	Check for: a. Burrs. b. Cracks. c. Distortion.	Replace (1) and (7) if necessary, or refer to Direct Support for (9).
C. INSTALLATION.		
7. Turbocharger outlet pipe (7), U-clamp (13), spacer (3).	Position at bracket (6) and install with two washers (4) and clamp nuts (5).	Do not tighten clamp nuts (5) yet.
8. Turbocharger outlet (9).	a. Aline with turbocharger outlet pipe (7). b. Secure with clamp (8), bolt (11), and locknut (10).	
9. New coupling (2).	a. Position at connection of flex pipe (1) and turbocharger outlet pipe (7). b. Secure with two new coupling nuts (12).	Use torque wrench and tighten to 45 lb-ft (61 N·m).
10. Two clamp nuts (5).	Tighten.	
D. CHECKING FOR LEAKS		
11. Engine.	Start up (see TM 9-2320-273-10).	

EXHAUST SYSTEM.

4-34. TURBO OUTLET PIPE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
D. CHECKING FOR LEAKS (Continued).		
12. Coupling (2) and clamp (8).	Listen for leaks.	Tighten two coupling nuts (12) or locknut (10) as necessary.
13. Engine.	Shut down (see TM 9-2320-273-10).	



LEGEND:

1. FLEX PIPE
2. COUPLING
3. SPACER
4. WASHER (2)
5. CLAMP NUT (2)
6. BRACKET
7. TURBOCHARGER
OUTLET PIPE
8. CLAMP
9. TURBOCHARGER
OUTLET
10. LOCKNUT
11. BOLT
12. COUPLING NUT (2)
13. U-CLAMP

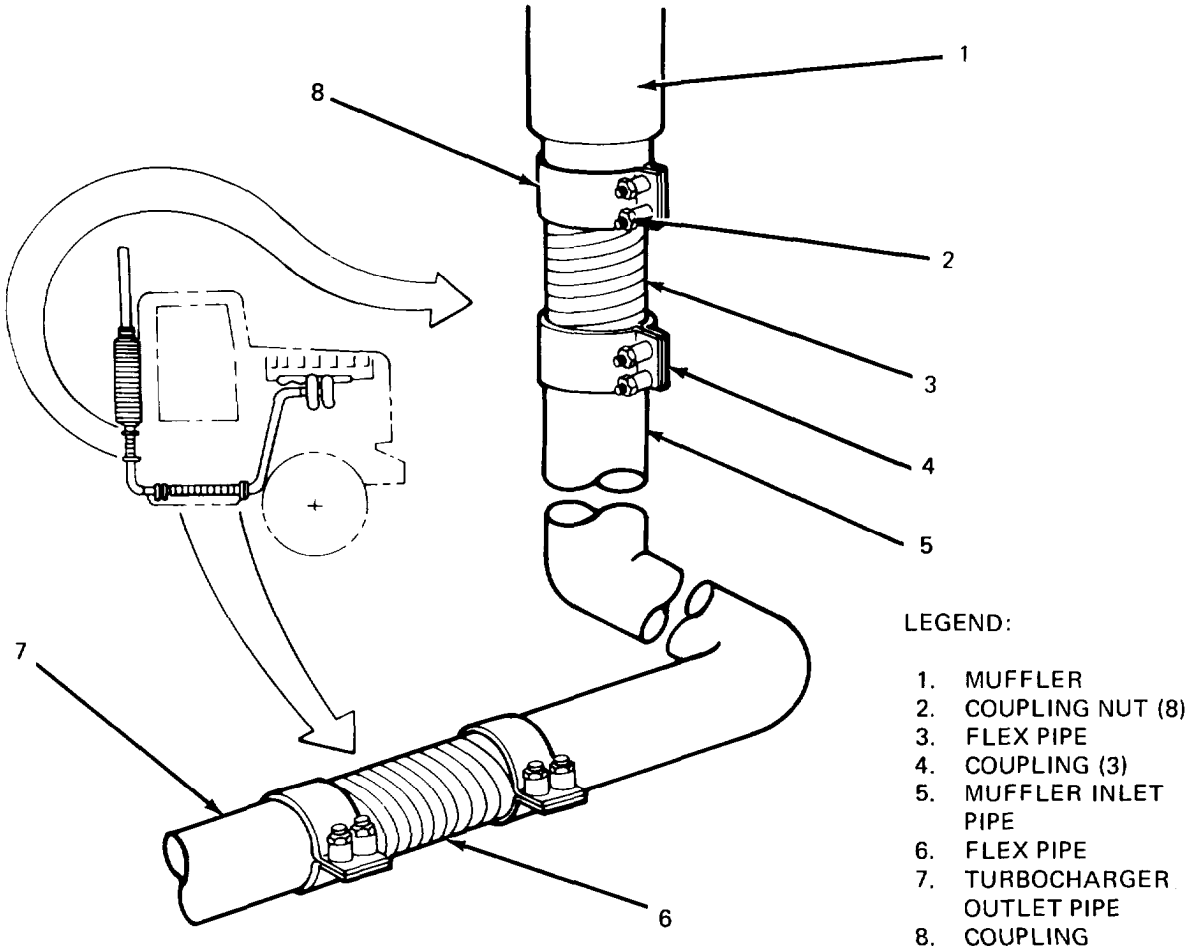
TA 074650

EXHAUST SYSTEM.

4-35. FLEX PIPES MAINTENANCE.		
THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)		
a. Removal. (5)		
b. Inspection of Mating Flanges. (5)		
c.Installation. (10)		
d.Checking for Leaks. (5)		
25 Minutes Total.		
INITIAL SETUP	EQUIPMENT CONDITION	
<u>APPLICABLE CONFIGURATIONS</u>	<u>PARAGRAPH</u>	<u>CONDITION DESCRIPTION</u>
All.	None.	None.
<u>TEST EQUIPMENT</u>		
None.		
<u>SPECIAL TOOLS</u>		
None.		
<u>MATERIALS/PARTS (P/N)</u>		
Couplings (3), 5.0-1236BJ (76700).		
Coupling, 5.0-1259LJ (76700).		
<u>PERSONNEL REQUIRED</u>	<u>SPECIAL ENVIRONMENTAL CONDITIONS</u>	
One (MOS-63B20).	Vehicle Parked on Level Ground.	
<u>REFERENCES (TM)</u>	<u>GENERAL SAFETY INSTRUCTIONS</u>	
TM 9-2320273-10.	Wait Until Exhaust Components are Cool.	
	Engine OFF.	
	Transmission in Neutral.	
	Park Brake Set.	
<u>TROUBLESHOOTING REFERENCES</u>		
Table 4-1.		

EXHAUST SYSTEM.

4-35. FLEX PIPES MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
WARNING During normal operation, the exhaust pipes and muffler can become very hot. Be careful not to touch these components with your bare hands. Do not allow your body to come in contact with the hot pipes or muffler. Exhaust system components may be hot enough to cause serious burns.		
 The diagram illustrates the assembly of an exhaust system flex pipe. It shows a vertical section with a muffler (1) at the top, followed by a coupling nut (2) and a flex pipe (3). Below the flex pipe is another coupling nut (4) and a muffler inlet pipe (5). A separate view shows a turbocharger outlet pipe (7) connected to a flex pipe (6) using a coupling (8). The legend identifies the components: 1. MUFFLER, 2. COUPLING NUT (8), 3. FLEX PIPE, 4. COUPLING (3), 5. MUFFLER INLET PIPE, 6. FLEX PIPE, 7. TURBOCHARGER OUTLET PIPE, 8. COUPLING.		
TA 074651		

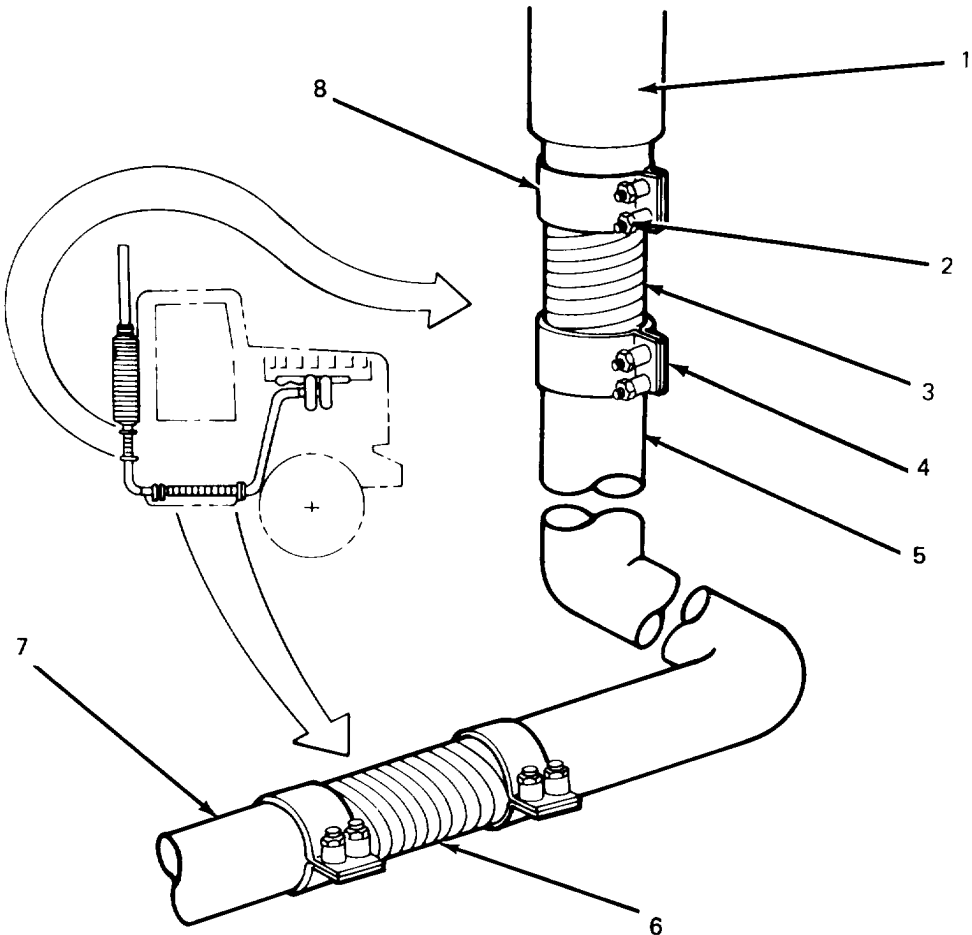
EXHAUST SYSTEM.

4-35. FLEX PIPES MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Eight coupling nuts (2).	Loosen and slide three couplings (4) and coupling (8) onto flex pipes (3) and (6).	
2. Flex pipes (3) and (6).	Remove.	
3. Three couplings (4) and coupling (8).	Remove and discard.	
B. INSPECTION OF MATING FLANGES.		
4. Turbocharger outlet pipe (7), muffler inlet pipe (5), muffler (1), and flex pipes (3) and (6).	Inspect pipes and pipe ends for: a. Cracks. b. Distortion. c. Burring.	Replace if necessary.
C. INSTALLATION.		
5. Three new couplings (4) and coupling (8).	Slide onto flex pipes (3) and (6).	
6. Flex pipes (3) and (6).	Put in place.	
7. Three new couplings (4) and coupling (8).	Slide into position over connections.	
8. Eight coupling nuts (2).	Tighten to 45 lb-ft (61 N·m) with torque wrench.	
D. CHECKING FOR LEAKS.		
9. Engine.	Start up (see TM 9-2320-273-10).	
10. Flex pipes (3) and (6); three couplings (4) and coupling (8).	Listen for leaks	Retighten coupling nuts (2) as necessary.
11. Engine.	Shut down (see TM 9-2320-273-10).	

EXHAUST SYSTEM,

4-35. FLEX TUBES MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
 The diagram illustrates the assembly and maintenance of an exhaust system. It shows a vertical section where a muffler (1) is connected to a flex pipe (3) via a coupling nut (2) and a coupling (3). The muffler inlet pipe (5) is also shown. A horizontal section shows a turbocharger (7) connected to a flex pipe (6). A coupling (8) is used to connect the two sections. Arrows indicate the flow of exhaust from the turbocharger through the flex pipes and couplings.		
LEGEND: 1. MUFFLER 2. COUPLING NUT (8) 3. FLEX PIPE 4. COUPLING (3) 5. MUFFLER INLET PIPE 6. FLEX PIPE 7. TURBOCHARGER 8. COUPLING TA 074652		

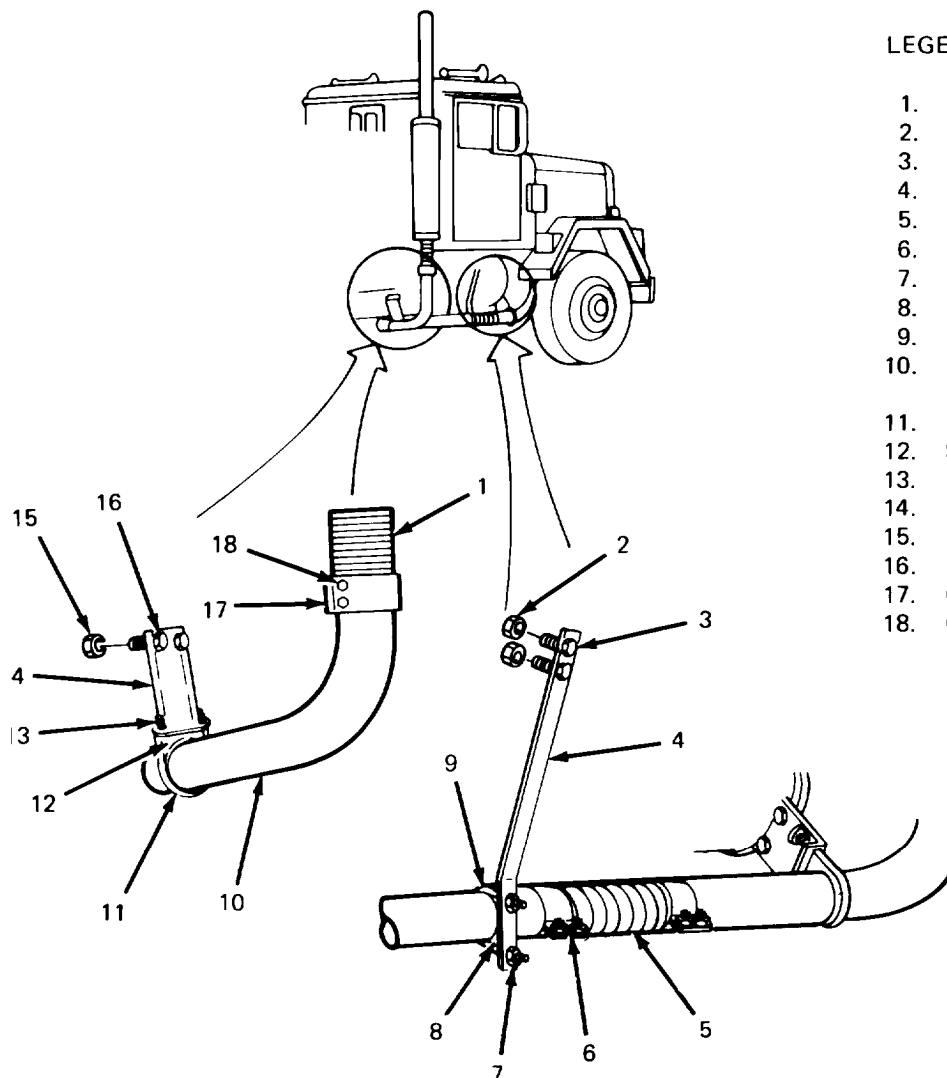
EXHAUST SYSTEM.

4-36. MUFFLER INLET PIPE MAINTENANCE.		
THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)		
a. Removal. (6)		
b. Inspection of Mating Flanges. (5)		
c. Installation. (10)		
d. Checking for Leaks. (5)		
26 Minutes Total.		
INITIAL SETUP	EQUIPMENT CONDITION	
<u>APPLICABLE CONFIGURATIONS</u>	<u>PARAGRAPH</u>	<u>CONDITION DESCRIPTION</u>
All.	None.	None.
<u>TEST EQUIPMENT</u>		
None.		
<u>SPECIAL TOOLS</u>		
None.		
<u>MATERIALS/PARTS (P/N)</u>		
Coupling (2), 5.0-1236BJ (76700).		
<u>PERSONNEL REQUIRED</u>	<u>SPECIAL ENVIRONMENTAL CONDITIONS</u>	
One (MOS-63B20).	Vehicle Parked on Level Ground.	
<u>REFERENCES (TM)</u>	<u>GENERAL SAFETY INSTRUCTIONS</u>	
TM 9-2320-273-10.	Wait Until Exhaust Components are Cool.	
TM 9-2320-273-20P.	Engine OFF.	
	Transmission in Neutral.	
	Park Brake Set.	
<u>TROUBLESHOOTING REFERENCES</u>		
Table 4-1.		

EXHAUST SYSTEM.

4-36. MUFFLER INLET PIPE MAINTENANCE (Continued).**LOCATION/ITEM****ACTION****REMARKS****W A R N I N G**

During normal operation, the exhaust pipes and muffler can become very hot. Be careful not to touch these components with your bare hands. Do not allow your body to come in contact with the hot pipes or muffler. Exhaust system components may be hot enough to cause serious burns.

**LEGEND:**

1. FLEX PIPE
2. BRACKET NUT (2)
3. BRACKET BOLT (2)
4. BRACKET
5. FLEX PIPE
6. COUPLING
7. U-CLAMP NUT (2)
8. SPACER
9. U-CLAMP
10. MUFFLER INLET PIPE
11. U-CLAMP
12. SPACER
13. U-CLAMP NUT (2)
14. BRACKET
15. BRACKET NUT (2)
16. BRACKET BOLT (2)
17. COUPLING
18. COUPLING NUT (4)

TA 074653

EXHAUST SYSTEM.

4-36. MUFFLER INLET PIPE MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Two U-clamp nuts (7).	Unscrew and remove spacer (8) and U-clamp (9).	
2. Two bracket bolts (3) and two bracket nuts (2).	Unscrew and remove bracket (4).	
3. Two U-clamp nuts (13).	Unscrew and remove spacer (12) and U-clamp (11).	
4. Two bracket bolts (16) and two bracket nuts (15).	Unscrew and remove bracket (14).	
5. Four coupling nuts (18).	Loosen and slide couplings (6) and (17) onto muffler inlet pipe (10).	
6. Muffler inlet pipe (10).	Remove.	
7. Couplings (6) and (17).	Slide from muffler inlet pipe (10).	Discard couplings.
B. INSPECTION OF MATING FLANGES.		
8. Flex pipes (1) and (5) and muffler inlet pipe (10).	Inspect pipes for: a. Burrs, b. Cracks. c. Distortion.	Replace as necessary,
C. INSTALLATION.		
9. Two new couplings (6) and (17).	Slide onto muffler inlet pipe (10).	
10. Muffler inlet pipe (10).	Set in position and slide couplings (6) and (17) over ends of flex pipes (1) and (5).	
11. Bracket (14).	Install to vehicle with two bracket bolts (16) and bracket nuts (15).	
12. U-clamp (11) and spacer (12).	Position around muffler inlet pipe (10) and secure to bracket (14) with two U-clamp nuts (13).	

EXHAUST SYSTEM.

4-36. MUFFLER INLET PIPE MAINTENANCE (Continued).

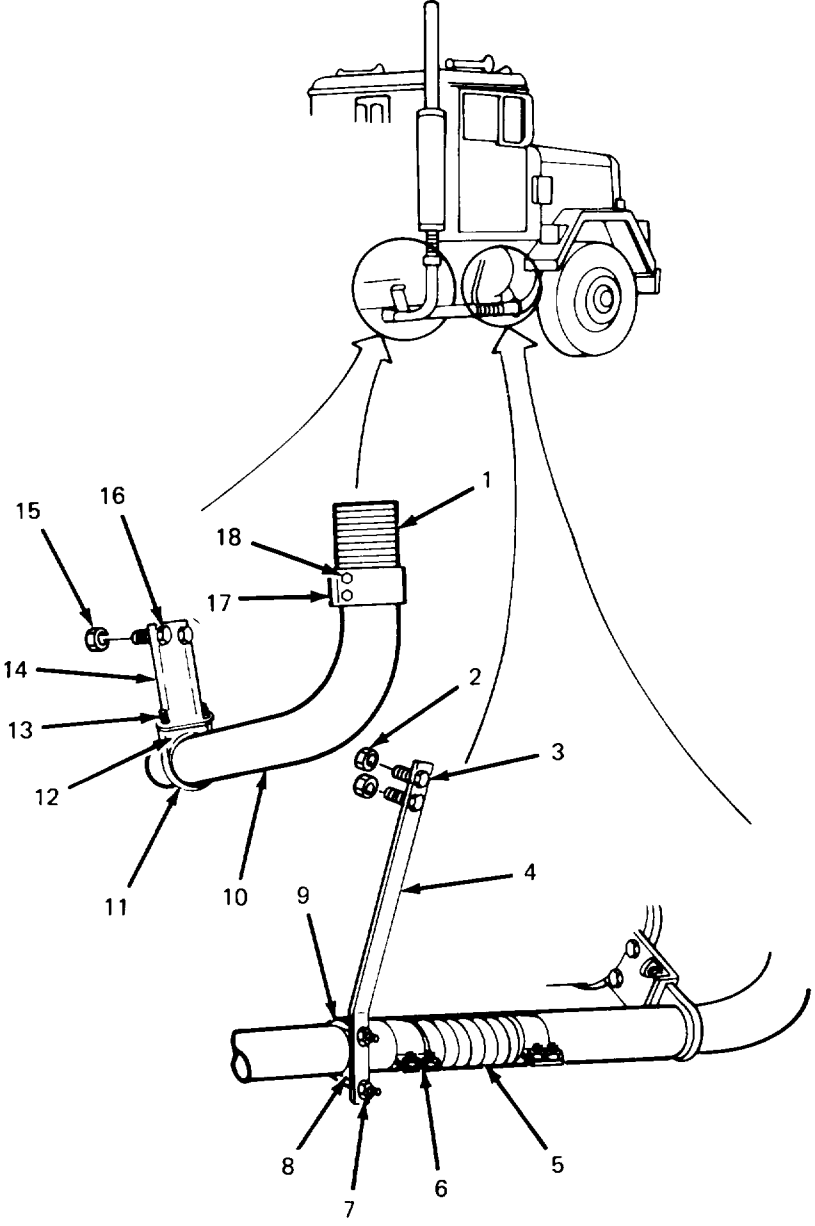
LOCATION/ITEM	ACTION	REMARKS
The diagram illustrates the installation of a muffler system on a truck chassis. It includes a side view of the truck and a detailed view of the muffler assembly. The muffler assembly consists of a horizontal muffler pipe with a bracket and U-clamp at the front, and a vertical muffler inlet pipe with a bracket and U-clamp at the rear. Various components are numbered 1 through 18.		
LEGEND: 1. FLEX PIPE 2. BRACKET NUT (2) 3. BRACKET BOLT (2) 4. BRACKET 5. FLEX PIPE 6. COUPLING 7. U-CLAMP NUT (2) 8. SPACER 9. U-CLAMP 10. MUFFLER INLET PIPE 11. U-CLAMP 12. SPACER 13. U-CLAMP NUT (2) 14. BRACKET 15. BRACKET NUT (2) 16. BRACKET BOLT (2) 17. COUPLING 18. COUPLING NUT (4)		

EXHAUST SYSTEM.

4-36. MUFFLER INLET PIPE MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
C. INSTALLATION (Continued).		
13. Bracket (4).	Install to vehicle with two bracket bolts (3) and bracket nuts (2).	
14. U-clamp (9) and spacer (8).	Position around muffler inlet pipe (10) and secure to bracket (4) with two U-clamp nuts (7).	
15. Four coupling nuts (18).	Tighten to 45 lb-ft (61 N·m) with torque wrench.	
D. CHECKING FOR LEAKS.		
16. Engine.	Start up (see TM 9-2320-273-10).	
17. Muffler inlet pipe (10).	Listen for leaks.	
18. Engine.	Shut down (see TM 9-2320-273-10).	

EXHAUST SYSTEM.

4-36. MUFFLER INLET PIPE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
 LEGEND: 1. FLEX PIPE 2. BRACKET NUT (2) 3. BRACKET BOLT (2) 4. BRACKET 5. FLEX PIPE 6. COUPLING 7. U-CLAMP NUT (2) 8. SPACER 9. U-CLAMP 10. MUFFLER INLET PIPE 11. U-CLAMP 12. SPACER 13. U-CLAMP NUT (2) 14. BRACKET 15. BRACKET NUT (2) 16. BRACKET BOLT (2) 17. COUPLING 18. COUPLING NUT (4)		

TA 075641

EXHAUST SYSTEM

4-37. MUFFLER MAINTENANCE.**THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

a. Removal.	(10)
b. Inspection of Mating Flanges.	(5)
c. Installation.	(10)
d. Checking for Leaks.	<u>(5)</u>

30 Minutes Total.

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

EQUIPMENT CONDITION**PARAGRAPH**

None.

CONDITION DESCRIPTION

None.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Coupling, 5.0-1259LJ (76700).

PERSONNEL REQUIRED

Two (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.
 TM 9-2320-273-20P.

GENERAL SAFETY INSTRUCTIONS

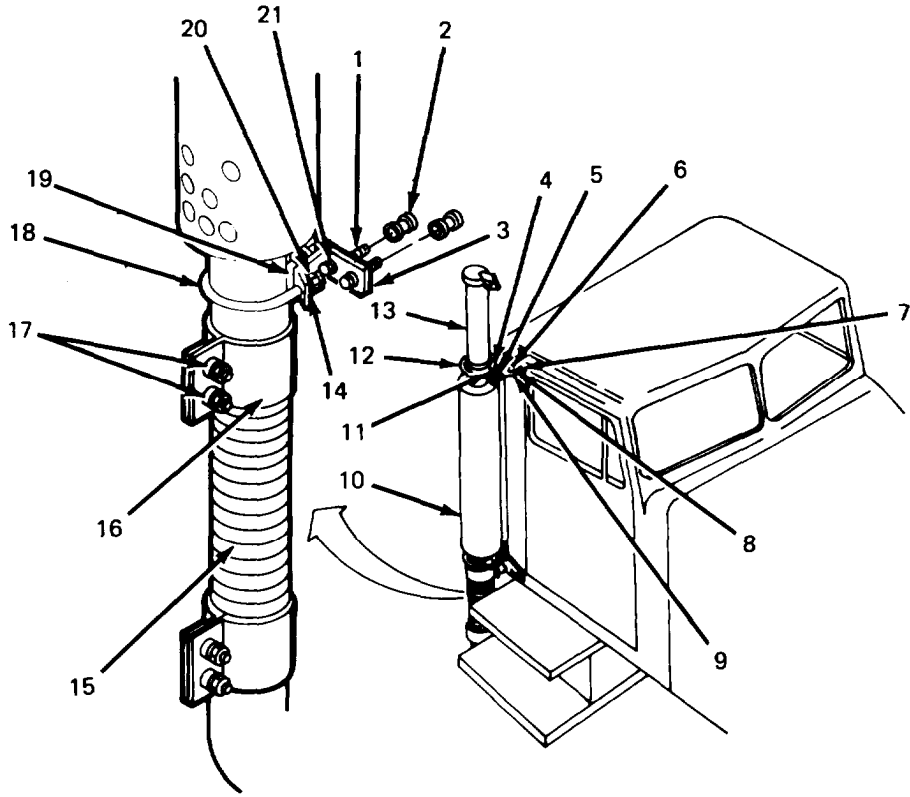
Wait Until Exhaust Components Are Cool.
 Engine OFF.
 Transmission in Neutral.
 Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 4-1.

EXHAUST SYSTEM.

4-37. MUFFLER MAINTENANCE (Continued).

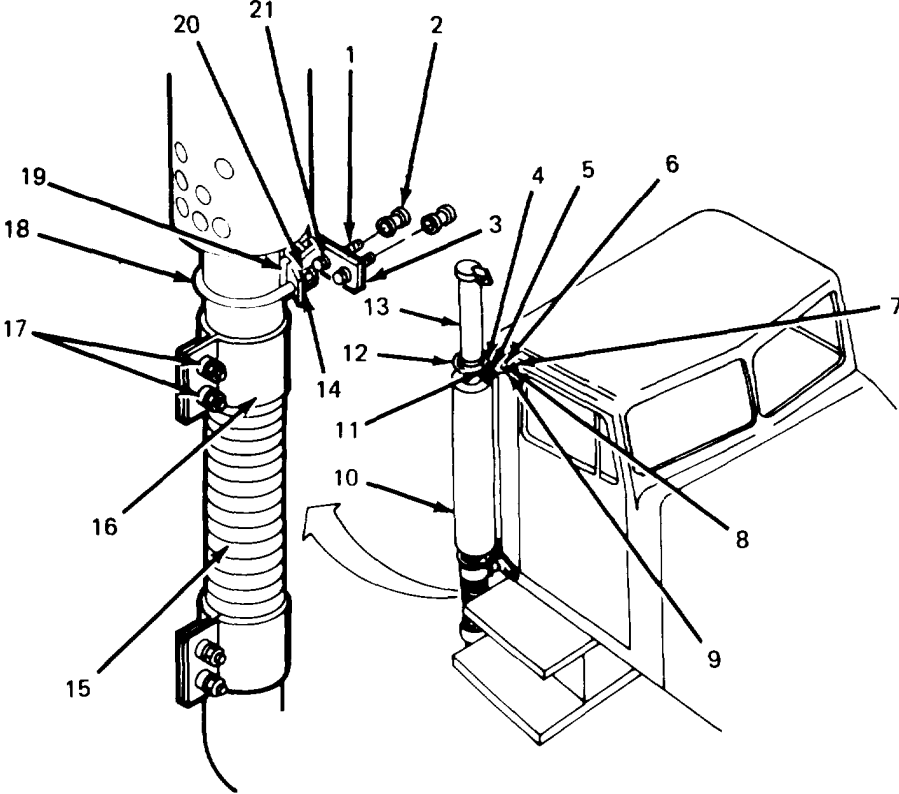
LOCATION/ITEM	ACTION	REMARKS
W A R N I N G During normal operation the exhaust pipes and muffler can become very hot. Be careful not to touch these components with your bare hands. Do not allow your body to come in contact with the hot pipes or muffler. Exhaust system components may be hot enough to cause serious burns.		
A. REMOVAL.		
1. Two coupling nuts (17).	Loosen and slide coupling (16) down over flex pipe (15).	
2. Two U-clamp nuts (5) and U-clamp washers (4).	Unscrew and remove U-clamp (2) and spacer (11).	
LEGEND: 1. BRACKET BOLT (4) 2. INSULATOR (4) 3. U-CLAMP BRACKET 4. U-CLAMP WASHER (2) 5. U-CLAMP NUT (2) 6. U-CLAMP BRACKET 7. BRACKET BOLT (4) 8. BRACKET WASHER (4) 9. INSULATOR (4) 10. MUFFLER 11. SPACER 12. U-CLAMP 13. EXHAUST STACK 14. U-CLAMP WASHER (2) 15. FLEX PIPE 16. COUPLING 17. COUPLING NUT (2) 18. U-CLAMP 19. SPACER 20. U-CLAMP NUT (2) 21. BRACKET WASHER (4)		
		
TA 07465E		

EXHAUST SYSTEM.

4-37. MUFFLER MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
3. Four bracket bolts (7), bracket washers (8) and insulators (9).	Unscrew and remove U-clamp bracket (6).	
4. Two U-clamp nuts (20) and U-clamp washers (14).	Unscrew and remove U-clamp (18) and spacer (19).	
5. Muffler (10) and exhaust stack (13).	Remove from flex pipe (15).	If muffler (10) is to be replaced, pull exhaust stack (13) from muffler.
6. Four bracket bolts (1), bracket washers (21), and insulators (2).	Unscrew and remove U-clamp bracket (3).	
7. Coupling (16).	Slide off of flex tube (15).	Discard coupling (16).
B. INSPECTION OF MATING FLANGES.		
8. Flex pipe (15), muffler (10), and exhaust stack (13).	Inspect pipe ends for: a. Burrs. b. Cracks. c. Distortion.	Replace as necessary.
C. INSTALLATION.		
9. Four insulators (2) and U-clamp bracket (3).	a. Position to cab. b. Install with four bracket bolts (1) and bracket washers (21).	
10. Four insulators (9) and U-clamp bracket (6).	a. Position to cab. b. Install with four bracket bolts (7) and bracket washers (8),	
11. New coupling (16).	Slide over flex pipe (15).	
12. Exhaust stack (13).	Slide into top of muffler (10).	If removed.
13. Muffler (10) and exhaust stack (13).	Slide into flex pipe (15).	
14. Coupling (16).	Slide up over connection of muffler (10) and flex pipe (15).	
15. Two coupling nuts (17).	Tighten to 45 lb-ft (61 N·m) with torque wrench.	
16. U-clamp (18) and spacer (19).	Position around muffler (10) at U-clamp bracket (3).	

EXHAUST SYSTEM.

4-37. MUFFLER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
		
LEGEND:		
1. BRACKET BOLT (4)	12. U-CLAMP	
2. INSULATOR (4)	13. EXHAUST STACK	
3. U-CLAMP BRACKET	14. U-CLAMP WASHER (2)	
4. U-CLAMP WASHER (2)	15. FLEX PIPE	
5. U-CLAMP NUT (2)	16. COUPLING	
6. U-CLAMP BRACKET	17. COUPLING NUT (2)	
7. BRACKET BOLT (4)	18. U-CLAMP	
8. BRACKET WASHER (4)	19. SPACER	
9. INSULATOR (4)	20. U-CLAMP NUT (2)	
10. MUFFLER	21. BRACKET WASHER (4)	
11. SPACER		

TA 074656

TA 074656

EXHAUST SYSTEM.

4-37. MUFFLER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
C. INSTALLATION (Continued).		
17. Two-U-clamp washers (14) and U-clamp nuts (20).	Screw onto U-clamp (18) and tighten.	
18. U-clamp (12) and spacer (11).	Position around muffler (10) and exhaust stack (13) at U-clamp bracket (6).	
19. Two U-clamp washers (4) and U-clamp nuts (5).	Screw onto U-clamp (12) and tighten.	
D. CHECKING FOR LEAKS.		
20. Engine.	Start up (see TM 9-2320-273-10).	
21. Muffler (10).	If muffler is leaking, you will hear a hissing sound.	Tighten connections as necessary.
22. Engine.	Shut down (see TM 9-2320-273-10).	

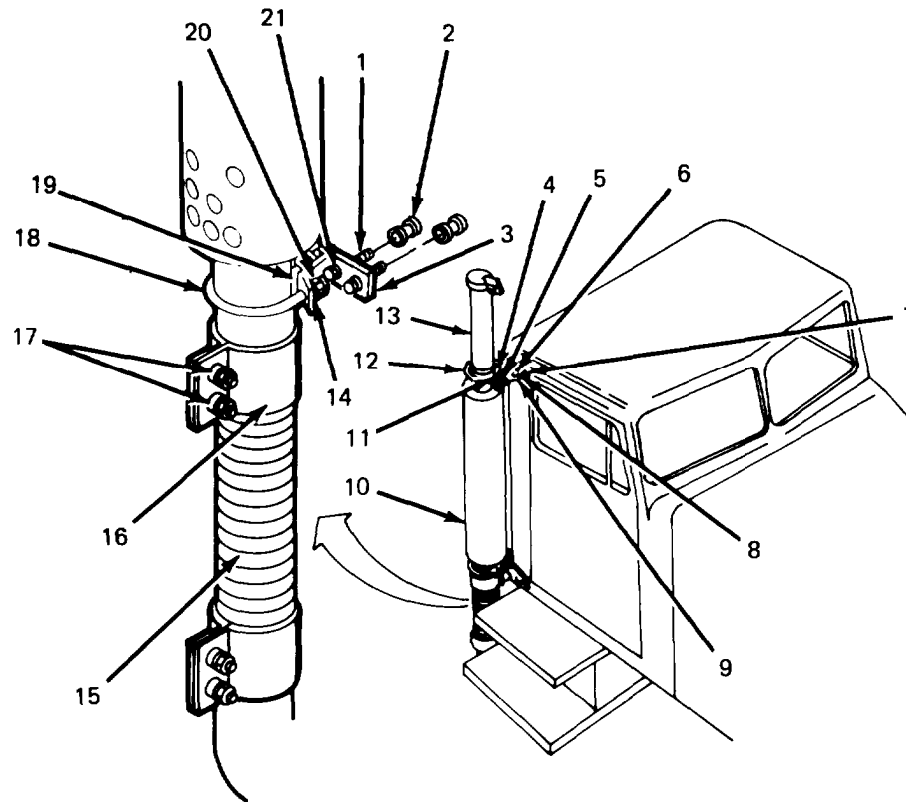
EXHAUST SYSTEM

4-37. MUFFLER MAINTENANCE (Continued).

LOCATION/ITEM

ACTION

REMARKS



LEGEND:

1. BRACKET BOLT (4)	12. U-CLAMP
2. INSULATOR (4)	13. EXHAUST STACK
3. U-CLAMP BRACKET	14. U-CLAMP WASHER (2)
4. U-CLAMP WASHER (2)	15. FLEX PIPE
5. U-CLAMP NUT (2)	16. COUPLING
6. U-CLAMP BRACKET	17. COUPLING NUT (2)
7. BRACKET BOLT (4)	18. U-CLAMP
8. BRACKET WASHER (4)	19. SPACER
9. INSULATOR (4)	20. U-CLAMP NUT (2)
10. MUFFLER	21. BRACKET WASHER (4)
11. SPACER	

TA 074656

EXHAUST SYSTEM.

4-38. EXHAUST STACK MAINTENANCE.**THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

a. Removal.	(5)
b. Inspection of Mating Flanges and Rain Cap.	(5)
c. Installation.	(5)
d. Checking for Leaks.	<u>(5)</u>
20 Minutes Total.	

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIAL/PARTS (P/N)

None.

EQUIPMENT CONDITION**PARAGRAPH**

None.

CONDITION DESCRIPTION

None.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.

GENERAL SAFETY INSTRUCTIONS

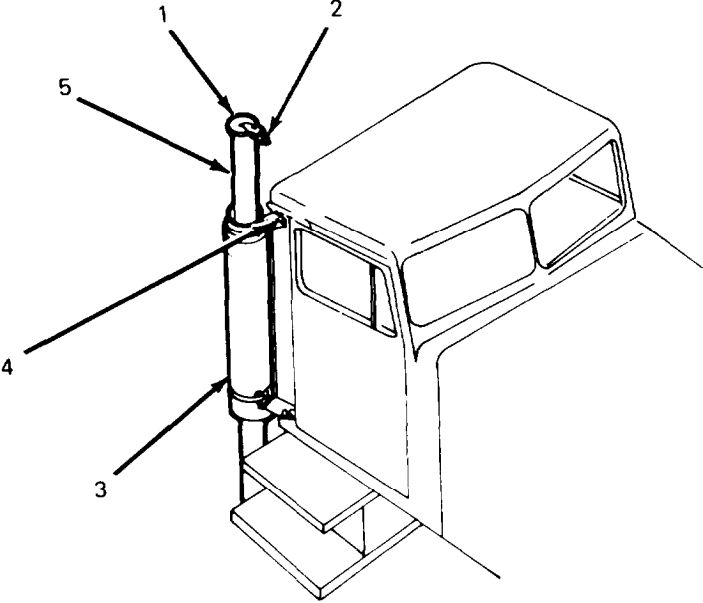
Wait Until Exhaust Components are Cool.
 Engine OFF.
 Transmission in Neutral.
 Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 4-1.

EXHAUST SYSTEM.

4-38. EXHAUST STACK MAINTENANCE (Continued).

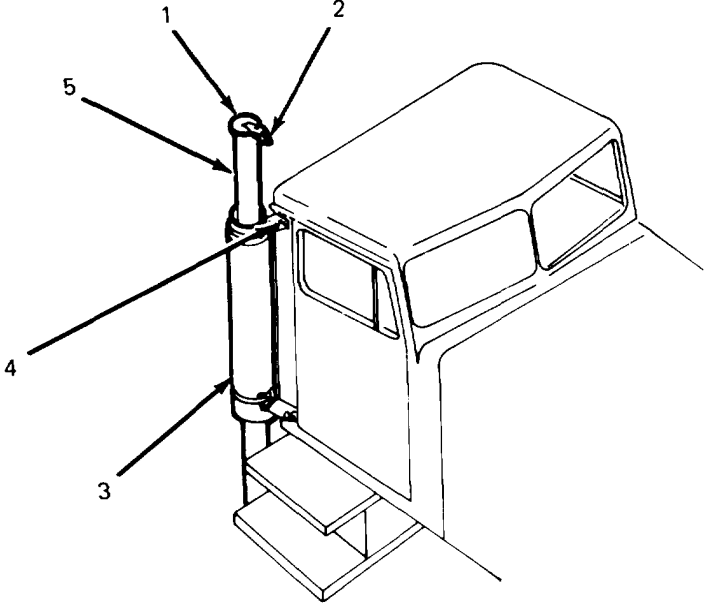
LOCATION/ITEM	ACTION	REMARKS
W A R N I N G During normal operation, the exhaust pipes and muffler can become very hot. Be careful not to touch these components with your bare hands. Do not allow your body to come in contact with the hot pipes or muffler. Exhaust system components may be hot enough to cause serious burns.		
A. REMOVAL. 1. Two U-clamp nuts (4). Loosen. 2. Exhaust stack (5). Lift up out of U-clamp and muffler (3).		
 LEGEND: 1. RAIN CAP 2. NUT 3. MUFFLER 4. U-CLAMP NUT (2) 5. EXHAUST STACK		
TA 074657		

EXHAUST SYSTEM.

4-38. EXHAUST STACK MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
3. Nut (2).	Unscrew and remove rain cap (1).	
B. INSPECTION OF MATING FLANGES AND RAIN CAP.		
4. Exhaust stack (5) and muffler (3).	Inspect ends for: a. Burrs. b. Cracks. c. Distortions.	Replace if necessary.
5. Rain cap (1).	Check for free movement and a good seal to top of exhaust stack (5).	Replace if necessary.
C. INSTALLATION.		
6. Rain cap (1).	Position on exhaust stack (5) and tighten nut (2).	
7. Exhaust stack (5).	Slide into muffler (3).	
8. Two U-clamp nuts (4).	Tighten.	
D. CHECKING FOR LEAKS.		
9. Engine.	Start up (see TM 9-2320-273-10).	
10. Exhaust stack (5).	Listen for leaks, and tighten U-clamp nuts (4) as necessary.	
11. Engine.	Shut down (see TM 9-2320-273-10).	

EXHAUST SYSTEM.

4-38. EXHAUST STACK MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
 1. RAIN CAP 2. NUT 3. MUFFLER 4. U-CLAMP NUT (2) 5. EXHAUST STACK		
LEGEND:		
1. RAIN CAP		
2. NUT		
3. MUFFLER		
4. U-CLAMP NUT (2)		
5. EXHAUST STACK		

TA 074658

COOLING SYSTEM.

4-39. RADIATOR HOSES MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

- a. Inspection. (10)
 - b. Removal. (15)
 - c. Installation. (20)
- 45 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

EQUIPMENT CONDITION

PARAGRAPH

4-42A.

CONDITION DESCRIPTION

Coolant Drained.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (Refer to Appendix C).

PERSONNEL REQUIRED

One (MOS-63B20),

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

None.

GENERAL SAFETY INSTRUCTIONS

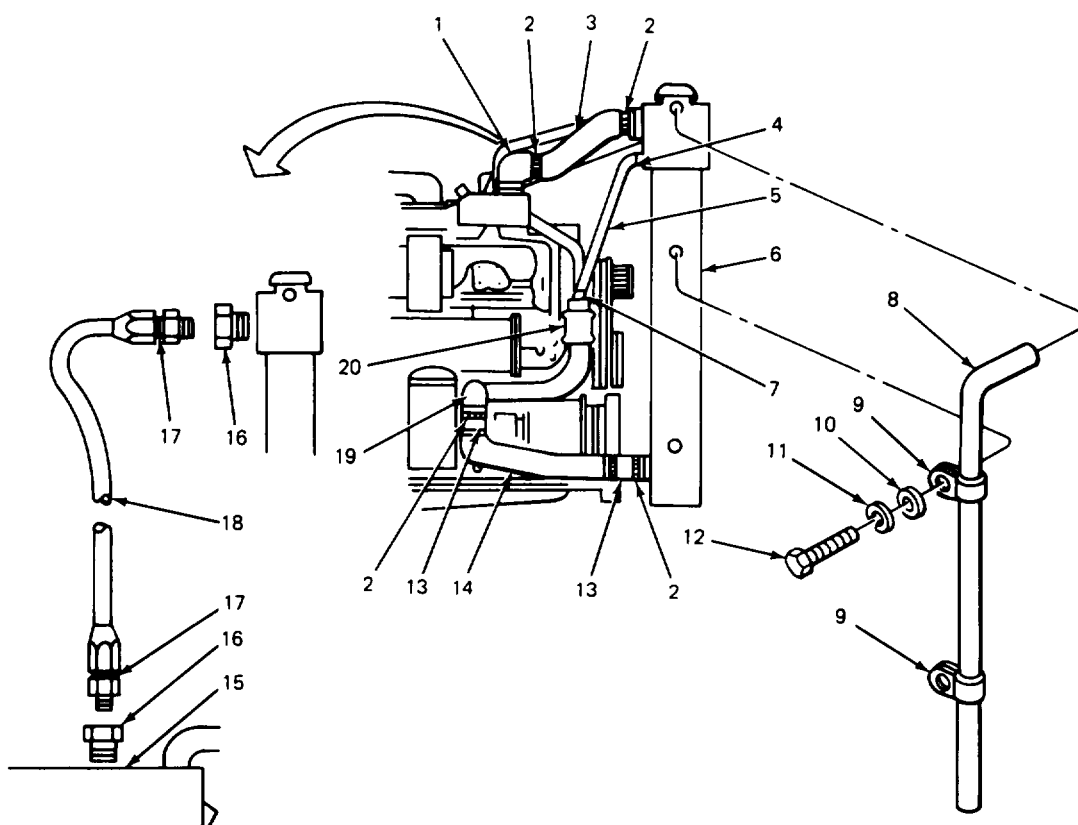
Engine OFF.
Transmission in Neutral.
Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 4-1.

COOLING SYSTEM.

4-39. RADIATOR HOSES MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. Inspection.		
1. Radiator inlet hose (3), water pump aeration hose (5), overflow hose (8), two radiator outlet hoses (13), radiator outlet tube (14) and radiator aeration hose (18).	Check for: a. Cracks. b. Kinks. c. Stains (may indicate leaks).	If hoses or tube are leaking or damaged, replace.
		
LEGEND:		
1. INLET ELBOW	11. LOCKWASHER (2)	
2. HOSE CLAMP (6)	12. CAPSCREW (2)	
3. RADIATOR INLET HOSE	13. RADIATOR OUTLET HOSE (2)	
4. HOSE CLAMP	14. RADIATOR OUTLET TUBE	
5. WATER PUMP AERATION HOSE	15. FRONT WATER MANIFOLD	
6. RADIATOR	16. REDUCER (2)	
7. HOSE CLAMP	17. CONNECTOR (2)	
8. OVERFLOW HOSE	18. RADIATOR AERATION HOSE	
9. HOSE RETAINER (2)	19. OUTLET FITTING	
10. FLAT WASHER (2)	20. OUTLET HOUSING	

TA211959

TA211959

COOLING SYSTEM.**4-39. RADIATOR HOSES MAINTENANCE (Continued).**

LOCATION/ITEM	ACTION	REMARKS
B. REMOVAL.		
2. Two hose clamps (2).	Unscrew and remove radiator inlet hose (3).	
3. Hose clamp (4) and hose clamp (7).	Unscrew and remove water pump aeration hose (5).	
4. Two connectors (17).	Unscrew and remove radiator aeration hose (18).	
5. Two reducers (16).	Unscrew from radiator (6) and front water manifold (15).	
6. Four hose clamps (2).	Unscrew and remove two radiator outlet hoses (13) and radiator outlet tube (14).	
7. Two capscrews (12), lockwashers (11), and flat washers (10).	Unscrew and remove two hose retainers (9).	
8. Overflow hose (8).	Remove by twisting and pulling from barb fitting.	
C. INSTALLATION.		
9. Overflow hose (8).	Turn and push onto barb fitting on side of radiator fill neck.	
10. Two hose retainers (9).	Position around overflow hose (8) and secure to side of radiator (6) with two capscrews (12), lockwashers (11), and flat washers (10).	

COOLING SYSTEM.

4-39. RADIATOR HOSES MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS																				
LEGEND: <table> <tr> <td>1. INLET ELBOW</td> <td>11. LOCKWASHER (2)</td> </tr> <tr> <td>2. HOSE CLAMP (6)</td> <td>12. CAPSCREW (2)</td> </tr> <tr> <td>3. RADIATOR INLET HOSE</td> <td>13. RADIATOR OUTLET HOSE (2)</td> </tr> <tr> <td>4. HOSE CLAMP</td> <td>14. RADIATOR OUTLET TUBE</td> </tr> <tr> <td>5. WATER PUMP AERATION HOSE</td> <td>15. FRONT WATER MANIFOLD</td> </tr> <tr> <td>6. RADIATOR</td> <td>16. REDUCER (2)</td> </tr> <tr> <td>7. HOSE CLAMP</td> <td>17. CONNECTOR (2)</td> </tr> <tr> <td>8. OVERFLOW HOSE</td> <td>18. RADIATOR AERATION HOSE</td> </tr> <tr> <td>9. HOSE RETAINER (2)</td> <td>19. OUTLET FITTING</td> </tr> <tr> <td>10. FLAT WASHER (2)</td> <td>20. OUTLET HOUSING</td> </tr> </table>			1. INLET ELBOW	11. LOCKWASHER (2)	2. HOSE CLAMP (6)	12. CAPSCREW (2)	3. RADIATOR INLET HOSE	13. RADIATOR OUTLET HOSE (2)	4. HOSE CLAMP	14. RADIATOR OUTLET TUBE	5. WATER PUMP AERATION HOSE	15. FRONT WATER MANIFOLD	6. RADIATOR	16. REDUCER (2)	7. HOSE CLAMP	17. CONNECTOR (2)	8. OVERFLOW HOSE	18. RADIATOR AERATION HOSE	9. HOSE RETAINER (2)	19. OUTLET FITTING	10. FLAT WASHER (2)	20. OUTLET HOUSING
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3. RADIATOR INLET HOSE	13. RADIATOR OUTLET HOSE (2)																					
4. HOSE CLAMP	14. RADIATOR OUTLET TUBE																					
5. WATER PUMP AERATION HOSE	15. FRONT WATER MANIFOLD																					
6. RADIATOR	16. REDUCER (2)																					
7. HOSE CLAMP	17. CONNECTOR (2)																					
8. OVERFLOW HOSE	18. RADIATOR AERATION HOSE																					
9. HOSE RETAINER (2)	19. OUTLET FITTING																					
10. FLAT WASHER (2)	20. OUTLET HOUSING																					

TA211960

TA211960

COOLING SYSTEM.

4-39. RADIATOR HOSES MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
C. INSTALLATION (Continued).		
11. Two radiator outlet hoses (13), radiator outlet tube (14), and four hose clamps (2).	a. Slide radiator outlet hose (13) over ends of radiator outlet tube (14). b. Slide four hose clamps (2) over radiator outlet hoses (13). c. Slide one radiator outlet hose (13) over outlet fitting (19) and secure with two hose clamps (2). d. Slide other radiator outlet hose (13) over outlet of radiator (6) and secure with two hose clamps (2).	
12. Two reducers (16).	a. Apply liquid teflon to threads. b. Screw into top of radiator (6) and front water manifold (15).	
13. Radiator aeration hose (18) with two connectors (17).	Screw connectors (17) into two reducers (16).	
14. Water pump aeration hose (5), hose clamp (4), and hose clamp (7).	a. Slide hose clamps (4) and (7) over water pump aeration hose (5). b. Secure water pump aeration hose (5) to top of radiator (6) and top of outlet housing (20) with hose clamps (4) and (7).	
15. Radiator inlet hose (3) and two hose clamps (2).	a. Slide hose clamps (2) over radiator inlet hose (3). b. Secure radiator inlet hose (3) to top of radiator (6) and inlet elbow (1) with two hose clamps (2).	
NOTE Follow-on maintenance required: Install draincock, fill with coolant, and check for leaks; refer to para 4-429, C, and D. Fill with Arctic Anti-Freeze if sub-zero conditions are anticipated.		

COOLING SYSTEM.

4-39. RADIATOR HOSES MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS																				
LEGEND: <table border="0"> <tr> <td>1. INLET ELBOW</td> <td>11. LOCKWASHER (2)</td> </tr> <tr> <td>2. HOSE CLAMP (6)</td> <td>12. CAPSCREW (2)</td> </tr> <tr> <td>3. RADIATOR INLET HOSE</td> <td>13. RADIATOR OUTLET HOSE (2)</td> </tr> <tr> <td>4. HOSE CLAMP</td> <td>14. RADIATOR OUTLET TUBE</td> </tr> <tr> <td>5. WATER PUMP AERATION HOSE</td> <td>15. FRONT WATER MANIFOLD</td> </tr> <tr> <td>6. RADIATOR</td> <td>16. REDUCER (2)</td> </tr> <tr> <td>7. HOSE CLAMP</td> <td>17. CONNECTOR (2)</td> </tr> <tr> <td>8. OVERFLOW HOSE</td> <td>18. RADIATOR AERATION HOSE</td> </tr> <tr> <td>9. HOSE RETAINER (2)</td> <td>19. OUTLET FITTING</td> </tr> <tr> <td>10. FLAT WASHER (2)</td> <td>20. OUTLET HOUSING</td> </tr> </table>			1. INLET ELBOW	11. LOCKWASHER (2)	2. HOSE CLAMP (6)	12. CAPSCREW (2)	3. RADIATOR INLET HOSE	13. RADIATOR OUTLET HOSE (2)	4. HOSE CLAMP	14. RADIATOR OUTLET TUBE	5. WATER PUMP AERATION HOSE	15. FRONT WATER MANIFOLD	6. RADIATOR	16. REDUCER (2)	7. HOSE CLAMP	17. CONNECTOR (2)	8. OVERFLOW HOSE	18. RADIATOR AERATION HOSE	9. HOSE RETAINER (2)	19. OUTLET FITTING	10. FLAT WASHER (2)	20. OUTLET HOUSING
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7. HOSE CLAMP	17. CONNECTOR (2)																					
8. OVERFLOW HOSE	18. RADIATOR AERATION HOSE																					
9. HOSE RETAINER (2)	19. OUTLET FITTING																					
10. FLAT WASHER (2)	20. OUTLET HOUSING																					

TA211961

TA211961

COOLING SYSTEM.**4-40. RADIATOR MAINTENANCE.****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

- a. Removal. (25)
 b. Installation. (30)
 55 Minutes Total.

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All,

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Insulators (2) CBA 24-500 (76005).
 Liquid Teflon (refer to appendix C).

EQUIPMENT CONDITION**PARAGRAPH**

4-42A.

11-32A.

11-16E.

11-16A.

10-22A.

6-10A.

CONDITION DESCRIPTION

Drain Coolant.
 Hood Removed,
 Brush Guard Removed
 (M916 thru M920).
 Grille Removed.
 Steering Pump Cooler Hoses
 Removed.
 Transmission Oil Cooler
 Hoses Removed.

PERSONNEL REQUIRED

Two (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-20P.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
 Transmission in Neutral.
 Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 4-1.

COOLING SYSTEM.**4-40. RADIATOR MAINTENANCE (Continued).**

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Radiator aeration hose (9).	Unscrew fitting from connector in radiator top tank.	
2. Three hose clamps (1), (2), and (16).	Loosen and remove inlet hose (3), pump aeration hose (18) and outlet hose (17) from radiator (15).	
3. Two clamps (19).	Loosen. Slide boot (20) onto air filter inlet tube (21).	If desired, loosen forward clamp at opposite end of tube and remove tube.
4. Two nuts (8) and washers (7).	Loosen and remove.	
5. Two nuts (10) and washers (11).	Loosen and remove.	
LEGEND: 1. HOSE CLAMP 2. HOSE CLAMP 3. INLET HOSE 4. ROD ARM (2) 5. FAN 6. CAPSCREW (6) 7. WASHER (2) 8. NUT (2) 9. RADIATOR AERATION HOSE 10. NUT 1,2) 11. WASHER (2) 12. SUPPORT 13. INSULATOR (2) 14. MOUNTING STUD (2) 15. RADIATOR 16. HOSE CLAMP 17. OUTLET HOSE 18. PUMP AERATION HOSE 19. CLAMP (2) 20. BOOT 21. AIR FILTER INLET TUBE 22. CLAMP (2) 23. CLAMP BOLT (2) 24. NUT (2)		

TA 074661

COOLING SYSTEM.**4-40. RADIATOR MAINTENANCE (Continued).**

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
6. Two rod arms (4).	a. Remove two nuts (8) and washers (7). b. Remove two rod arms and attached ball studs from radiator. c. If required, separate rods by removing two nuts (24), clamp bolts (23) and clamps (22) from center of rod arms (4).	
7. Radiator (15).	a. Tilt forward and support. b. Remove six capscrews (6) from fan (5) and remove fan. c. Lift radiator (15) enough to clear insulators (13) and remove.	If lifting device is available, install lifting eyes in rod arm holes.
8. Two insulators (13).	a. Remove. b. Throw away.	
NOTE To remove shrouds from radiator assembly refer to paragraph 4-41. Fan Shrouds Maintenance.		
B. INSTALLATION.		
9. Two new insulators (13).	Position on mounting studs (14).	You may use tape to hold the insulators in place.
10. Radiator (15).	a. Aline mounting studs (14) with support (12). Set in place. b. Tilt forward and support. Install six capscrews (6) into fan (5). Torque to 25-32 lb-ft (33.9 to 43.4 N•m).	
11. Two rod arms (4).	a. If separated, install two nuts (24), clamp bolts (23), and clamps (22) thru center of rod arms (4) and tighten. b. Insert in top support bracket. c. Install two washers (7) and nuts (8). Tighten.	

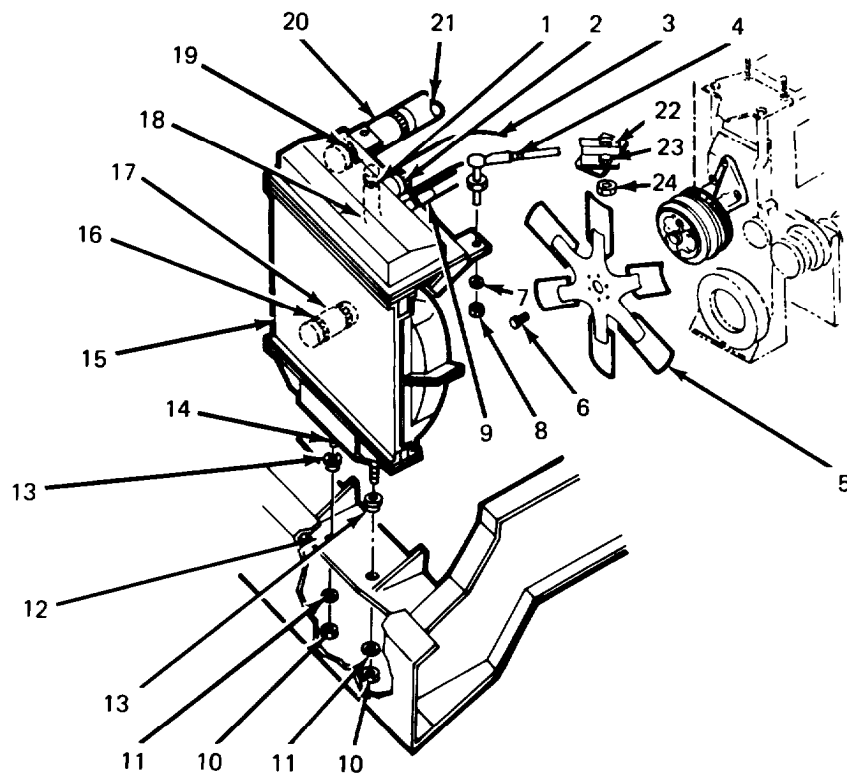
COOLING SYSTEM.

4-40. RADIATOR MAINTENANCE (Continued).

LOCATION/ITEM

ACTION

REMARKS



LEGEND:

1. HOSE CLAMP	13. INSULATOR (2)
2. HOSE CLAMP	14. MOUNTING STUD (2)
3. INLET HOSE	15. RADIATOR
4. ROD ARM (2)	16. HOSE CLAMP
5. FAN	17. OUTLET HOSE
6. CAPSCREW (6)	18. PUMP AERATION HOSE
7. WASHER (2)	19. CLAMP (2)
8. NUT (2)	20. BOOT
9. RADIATOR AERATION HOSE	21. AIR FILTER INLET TUBE
10. NUT (2)	22. CLAMP (2)
11. WASHER (2)	23. CLAMP BOLT (2)
12. SUPPORT	24. NUT (2)

TA 074662

COOLING SYSTEM.**4-40. RADIATOR MAINTENANCE (Continued).**

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION (Continued).		
12. Two washers (11) and nuts (10).	Install and tighten.	
13. Air filter inlet tube (21).	a. If removed, reinsert at filter end and tighten forward clamp, b. Slide boot (20) onto air inlet and tighten two clamps (19).	
14. Three hose clamps (1), (2) and (16).	Reinstall inlet hose (3) pump aeration hose (18) and outlet hose (17) to radiator. Position clamps and tighten.	
15. Radiator aeration hose (9).	Apply liquid teflon to fitting and screw into connector.	
NOTE		
Follow-on maintenance actions required:		
a. Install steering pump cooler hoses, para 10-22.		
b. Install transmission cooler hoses, para 6-10C.		
c. Install grille, para 11-16.		
d. Install brush guard (M916/M920), para 11-16.		
e. Fill cooling system, para 4-42C; use Artic Anti Freeze if sub zero.		
f. Install hood, para 11-32C.		

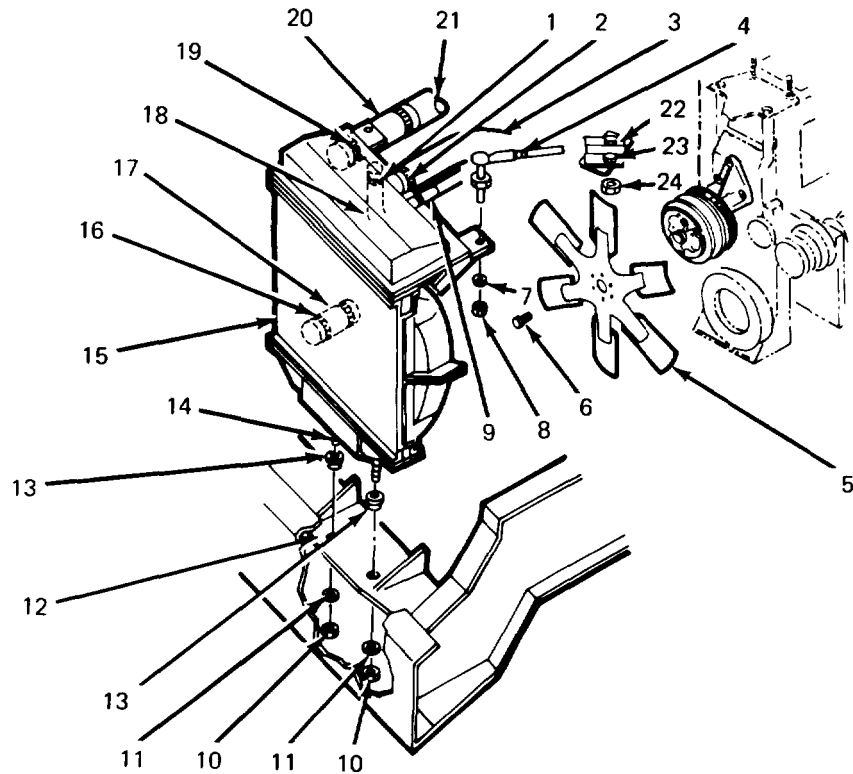
COOLING SYSTEM.

4-40. RADIATOR MAINTENANCE (Continued).

LOCATION/ITEM

ACTION

REMARKS



LEGEND:

1. HOSE CLAMP	13. INSULATOR (2)
2. HOSE CLAMP	14. MOUNTING STUD (2)
3. INLET HOSE	15. RADIATOR
4. ROD ARM (2)	16. HOSE CLAMP
5. FAN	17. OUTLET HOSE
6. CAPSCREW (6)	18. PUMP AERATION HOSE
7. WASHER (2)	19. CLAMP (2)
8. NUT (2)	20. BOOT
9. RADIATOR AERATION HOSE	21. AIR FILTER INLET TUBE
10. NUT (2)	22. CLAMP (2)
11. WASHER (2)	23. CLAMP BOLT (2)
12. SUPPORT	24. NUT (2)

TA 075643

COOLING SYSTEM.**4-41. FAN SHROUDS MAINTENANCE.****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

a. Removal.	(20)
b. Installation.	(30)
50 Minutes Total.	

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

**EQUIPMENT CONDITION
PARAGRAPH**

None.

CONDITION DESCRIPTION

None.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCE (TM)

None.

GENERAL SAFETY INSTRUCTIONS

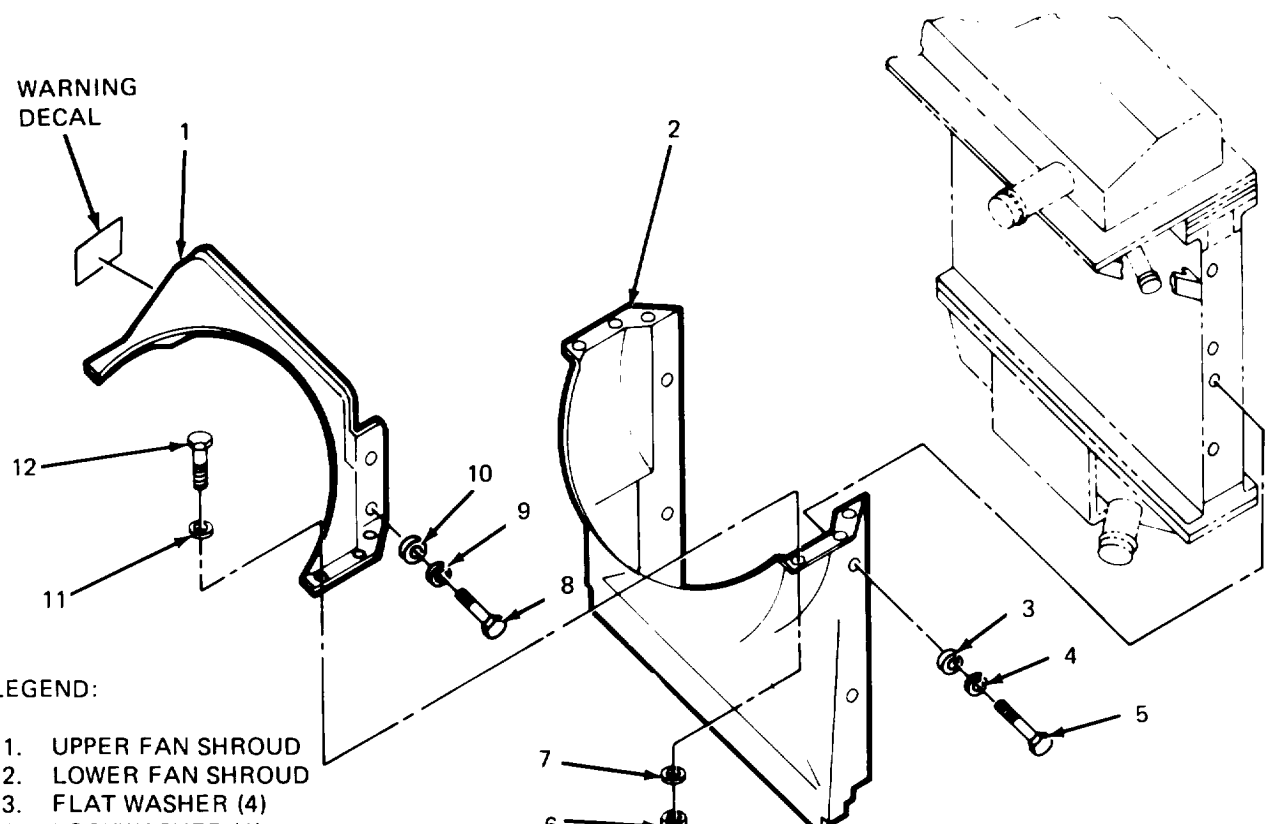
Engine OFF.
Transmission in Neutral.
Park Brake Set.

TROUBLESHOOTING REFERENCES

None.

COOLING SYSTEM.

4-41. FAN SHROUDS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL. 1. Six capscrews (12), nuts (6), and twelve washers (7) and (11). 2. Four capscrews (8), flat washers (10), and lock washers (9).	Unscrew and remove. Unscrew and remove.	
 Diagram illustrating the removal of fan shrouds. The diagram shows the upper fan shroud (1) and lower fan shroud (2) being detached from the engine compartment. A warning decal is shown on the upper shroud. Various fasteners are labeled: 12 (capscrew), 6 (nut), 7 (flat washer), 11 (flat washer), 10 (flat washer), 9 (lockwasher), 8 (capscrew), 3 (flat washer), 4 (lockwasher), 5 (capscrew), and 6 (nut). LEGEND: 1. UPPER FAN SHROUD 2. LOWER FAN SHROUD 3. FLAT WASHER (4) 4. LOCKWASHER (4) 5. CAPSCREW (4) 6. NUT (6) 7. FLAT WASHER (6) 8. CAPSCREW (4) 9. LOCKWASHER (4) 10. FLAT WASHER (4) 11. FLAT WASHER (6) 12. CAPSCREW (6)		

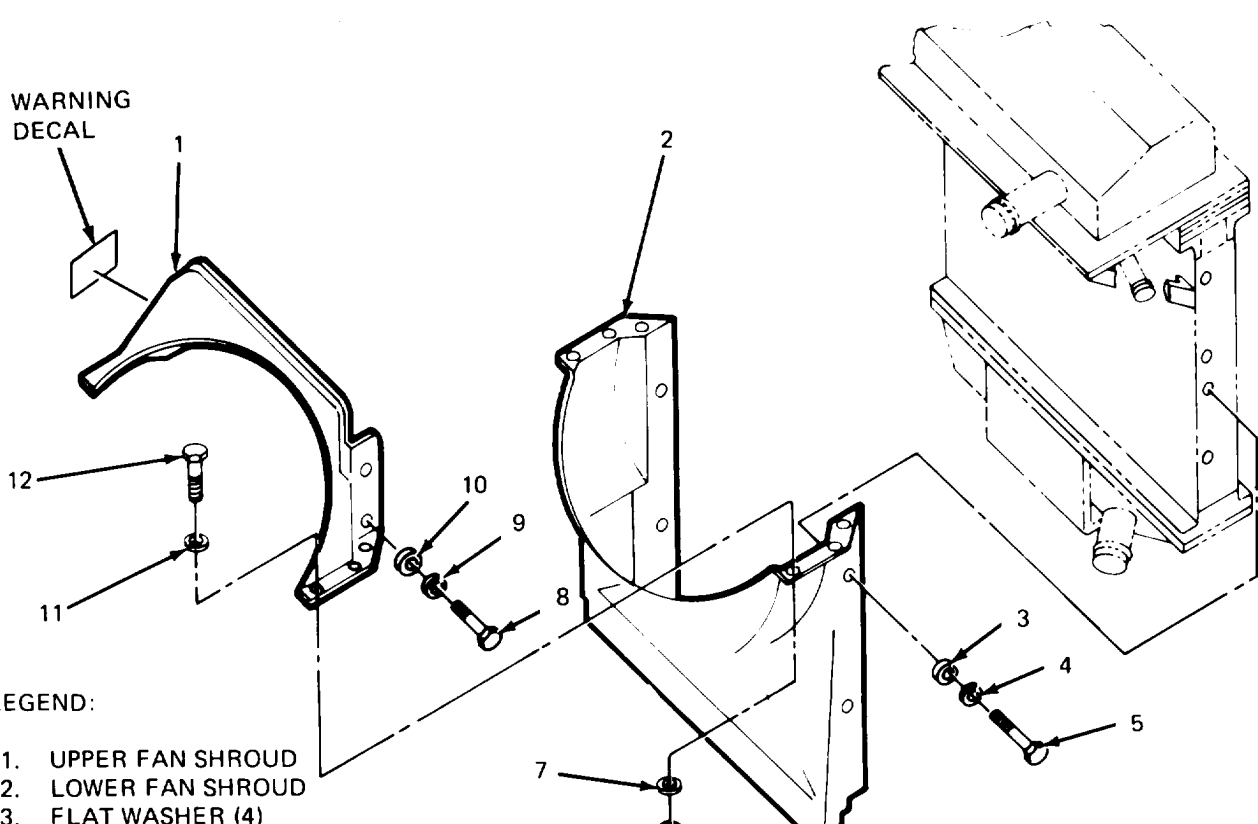
TA 074663

COOLING SYSTEM.**4-41. FAN SHROUDS MAINTENANCE (Continued).**

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
3. Upper fan shroud (1).	a. Remove. b. Remove fan (refer to para 4-4A).	
4. Four capscrews (5), lock-washers (4) and fiat washers (3).	Unscrew and remove.	
5. Lower fan shroud (2).	Remove.	
B. INSTALLATION.		
6. Lower fan shroud (2).	a. Set in place and attach with four capscrews (5), lockwashers (4), and flat washers (3). b. Install fan (refer to para 4-4B).	
7. Upper fan shroud (1).	Set in place and attach with four capscrews (8), flat washers (10), and lock-washers (9).	
8. Six capscrews (12), nuts (6), and twelve washers (7) and (11).	Screw on and tighten.	
9. Eight capscrews (5) and (8), lockwashers (4) and (9), and flat washers (3) and (10).	Tighten.	

COOLING SYSTEM

4-41. FAN SHROUDS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
 WARNING DECAL 1. UPPER FAN SHROUD 2. LOWER FAN SHROUD 3. FLAT WASHER (4) 4. LOCKWASHER (4) 5. CAPSCREW (4) 6. NUT (6) 7. FLAT WASHER (6) 8. CAPSCREW (4) 9. LOCKWASHER (4) 10. FLAT WASHER (4) 11. FLAT WASHER (6) 12. CAPSCREW (6) LEGEND:		

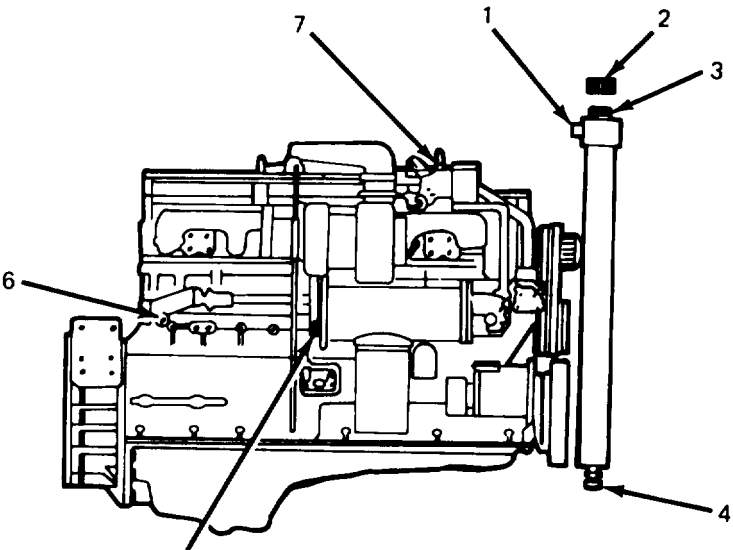
TA 074664

COOLING SYSTEM.

4-42. COOLANT SYSTEM MAINTENANCE.		
THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)		
a. Drain. (21)		
b. Inspection/Installation of Draincocks. (1)		
c. Replenishing Coolant. (10)		
d. Checking for Leaks. (5)		
37 Minutes Total.		
INITIAL SETUP		
EQUIPMENT CONDITION		
<u>APPLICABLE CONFIGURATIONS</u>	<u>PARAGRAPH</u>	<u>CONDITION DESCRIPTION</u>
All.	None.	None.
<u>TEST EQUIPMENT</u>		
None.		
<u>SPECIAL TOOLS</u>		
None.		
<u>MATERIALS/PARTS (P/N)</u>		
Container(s) (60 qt min).		
Liquid Teflon (refer to appendix C).		
PERSONNEL REQUIRED		
One (MOS-63B20).		
SPECIAL ENVIRONMENTAL CONDITIONS		
Vehicle Parked on Level Ground.		
REFERENCE (TM)		
TM 9-2320-273-10.		
TM 9-2320-273-20P.		
GENERAL SAFETY INSTRUCTIONS		
Engine OFF.		
Transmission in Neutral.		
Park Brake Set.		
<u>TROUBLESHOOTING REFERENCES</u>		
Table 4-1.		

COOLING SYSTEM

4-42. COOLANT SYSTEM MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
NOTE Before opening each drain cock, place container underneath to catch coolant.		
A. DRAIN.		
1. Radiator cap (2).	Remove.	
2. Radiator draincock (4).	Open and let coolant drain out.	
3. Thermostat petcock (7).	Open.	
4. Oil cooler draincock (5).	a. Open. b. Let coolant drain out. c. Close.	
5. Ether quick-start sending unit (6).	a. Disconnect wire. b. Remove ether quick-start sending unit and clean threads. c. Allow coolant to drain out. d. Apply liquid teflon to threads and install ether quick-start sending unit.	
LEGEND: 1. SIGHT GLASS 2. RADIATOR CAP 3. RADIATOR FILL NECK 4. RADIATOR DRAINCOCK 5. OIL COOLER DRAINCOCK 6. ETHER QUICK-START SENDING UNIT 7. THERMOSTAT PETCOCK		
		

TA 074665

COOLING SYSTEM**4-42. COOLANT SYSTEM MAINTENANCE (Continued).**

LOCATION/ITEM	ACTION	REMARKS
B. INSPECTION/INSTALLATION OF DRAINCOCKS.		
6. Radiator draincock (4), oil cooler draincock (5) and thermostat petcock (7).	a. Remove as required. b. Inspect for damage. c. Coat threads with liquid teflon. d. Screw into place and close.	
C. REPLENISHING COOLANT.		
NOTE Fill with Artic Anti Freeze if sub-zero		
7. Radiator fill neck (3).	Add coolant until thermostat petcock (7) overflows.	
8. Thermostat petcock (7).	Close.	
9. Radiator fill neck (3).	Continue adding coolant until sight glass (1) is filled.	
D. CHECKING FOR LEAKS.		
10. Engine.	Start up (see TM 9-2320-273-10).	
11. Coolant system.	a. Check for leaks. b. Make sure coolant level is to the top of sight glass (1).	Add more if needed.
12. Radiator cap, (2).	Install.	

COOLING SYSTEM

4-42. COOLANT SYSTEM MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
LEGEND: 1. SIGHT GLASS 2. RADIATOR CAP 3. RADIATOR FILL NECK 4. RADIATOR DRAINCOCK 5. OIL COOLER DRAINCOCK 6. ETHER QUICK-START SENDING UNIT 7. THERMOSTAT PETCOCK		

TA 074666

COOLING SYSTEM.**4-43. THERMOSTAT AND HOUSING MAINTENANCE.****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

a. Removal.	(20)
b. Testing.	(10)
c. Installation.	(30)
d. Operational Check.	<u>(15)</u>
75 Minutes Total.	

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

TEST EQUIPMENT

None,

SPECIAL TOOLS

Thermostat Seal Mandrel, ST-1225 (15434).

MATERIALS/PARTS (P/N)

Gasket (6620-00-047-2811).
 Rubber Seal (5330-00-864-5422).
 Gasket, 210859 (15434).
 Container(s) for Coolant.

EQUIPMENT CONDITION**PARAGRAPH**

4-42A.

CONDITION DESCRIPTION

Cooling System
 Drained Below
 Thermostat Housing.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCE (TM)

TM 9-2320-273-10.
 TM 9-2320-273-20P.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
 Transmission in Neutral.
 Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 4-1.

COOLING SYSTEM

4-43. THERMOSTAT AND HOUSING MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Bypass hose clamp (4), radiator inlet hose clamp (10), and hose (9).	Loosen and remove hoses.	
2. Compressor coolant line (15).	Unscrew from fitting (8).	
LEGEND: 1. WASHER 2. CAPSCREW 3. ELBOW 4. BYPASS HOSE CLAMP 5. GASKET 6. WASHER (4) 7. CAPSCREW (4) 8. FITTING 9. HOSE 10. RADIATOR INLET HOSE CLAMP 11. THERMOSTAT HOUSING 12. RUBBER SEAL 13. THERMOSTAT 14. GASKET 15. COMPRESSOR COOLANT LINE		

TA 074667

COOLING SYSTEM.

4-43. THERMOSTAT AND HOUSING MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
3. Two capscrews (2), and washers (1).	Unscrew and remove.	
4. Elbow (3) and gasket (5).	a. Remove. b. Check elbow for cracks.	
5. Four capscrews (7) and washers (6).	Unscrew and remove.	
6. Thermostat housing (11).	a. Tap with soft head hammer and remove. b. Check housing for: 1. Cracks. 2. Damaged fittings. 3. Stains from leaks.	Replace if necessary.
7. Gasket (14), thermostat (13), and rubber seal (12).	Remove.	
B. TESTING.		
8. Thermostat (13).	a. Check that at room temperature thermostat is closed. b. Put thermostat in hot water. When temperature reaches 185°F (85°C) thermostat should open.	If thermostat does not work, replace it.
C. INSTALLATION.		
9. Thermostat (13), gasket (14), and rubber seal (12).	Install rubber seal (12) in thermostat housing (11) using thermostat seal mandrel. Install thermostat (13), new gasket (14), and secure with four capscrews (7), and washers (6).	Seal must be installed with part number or metal flange of seal toward mandrel to ensure proper sealing.
10. Gasket (5), elbow (3), washer (1), and capscrew (2).	Secure new gasket (5), and elbow (3), with two capscrews (2), and washers (1).	
11. Compressor coolant line (15).	Screw to fitting (8).	

COOLING SYSTEM

4-43. THERMOSTAT AND HOUSING MAINTENANCE (Continued).

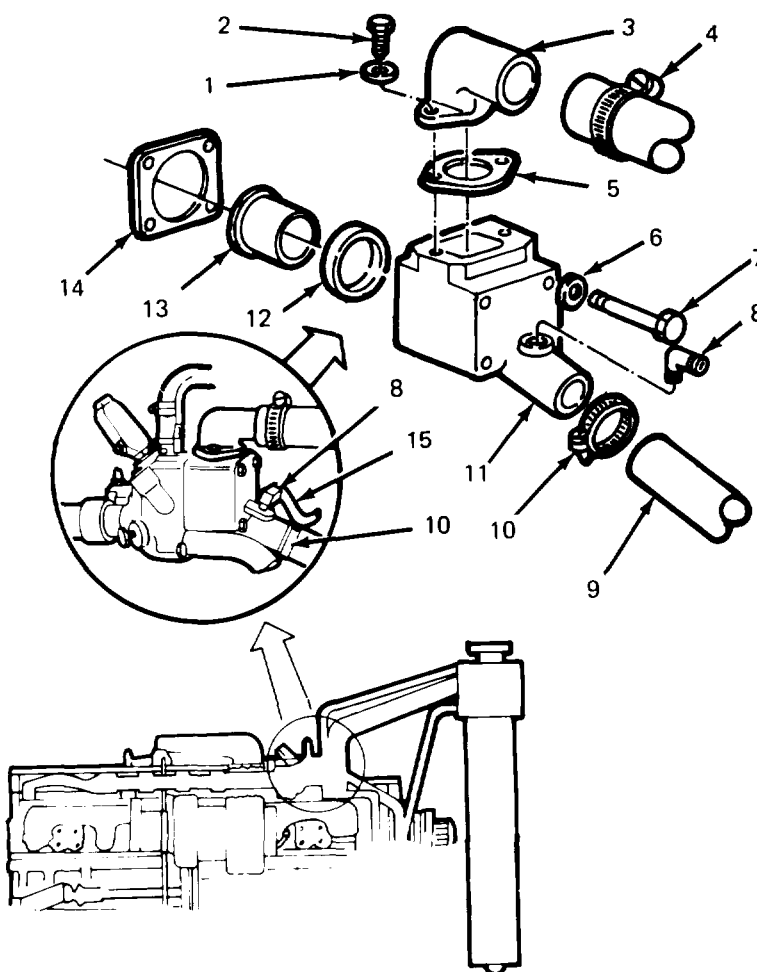
LOCATION/ITEM

ACTION

REMARKS

LEGEND:

1. WASHER
2. CAPSCREW
3. ELBOW
4. BYPASS HOSE CLAMP
5. GASKET
6. WASHER (4)
7. CAPSCREW (4)
8. FITTING
9. HOSE
10. RADIATOR INLET HOSE CLAMP
11. THERMOSTAT HOUSING
12. RUBBER SEAL
13. THERMOSTAT
14. GASKET
15. COMPRESSOR COOLANT LINE



TA 074668

COOLING SYSTEM.**4-43. THERMOSTAT AND HOUSING MAINTENANCE (Continued).**

LOCATION ITEM	ACTION	REMARKS
C. INSTALLATION (Continued).		
12. Bypass hose clamp (4), radiator inlet hose clamp (10) and hose (9).	Install hoses to thermostat housing (11).	
13. Fill cooling system.	Refer to para 4-42C.	
D. OPERATIONAL CHECK.		
14. Engine.	Start up (see TM 9-2320-273-10).	
15. Cooling system.	a. Check for leaks at thermostat housing. b. Make sure coolant is to the top of the radiator sight glass.	

COOLING SYSTEM.

4-43. THERMOSTAT AND HOUSING MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
LEGEND: 1. WASHER 2. CAPSCREW 3. ELBOW 4. BYPASS HOSE CLAMP 5. GASKET 6. WASHER (4) 7. CAPSCREW (4) 8. FITTING 9. HOSE 10. RADIATOR INLET HOSE CLAMP 11. THERMOSTAT HOUSING 12. RUBBER SEAL 13. THERMOSTAT 14. GASKET 15. COMPRESSOR COOLANT LINE		

TA 075644

COOLING SYSTEM.**4-44. FAN MAINTENANCE.****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

a. Removal.	(15)
b. Installation.	(15)
c. Operational Check.	(2)
32 Minutes Total.	

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

EQUIPMENT CONDITION**PARAGRAPH**

4-41A.

CONDITION DESCRIPTION

Upper Fan Shroud Removed.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCE (TM)

TM 9-2320-273-10.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
 Transmission in Neutral.
 Park Brake Set.
 Fan Clutch May Engage at any
 Time When Engine is Running.

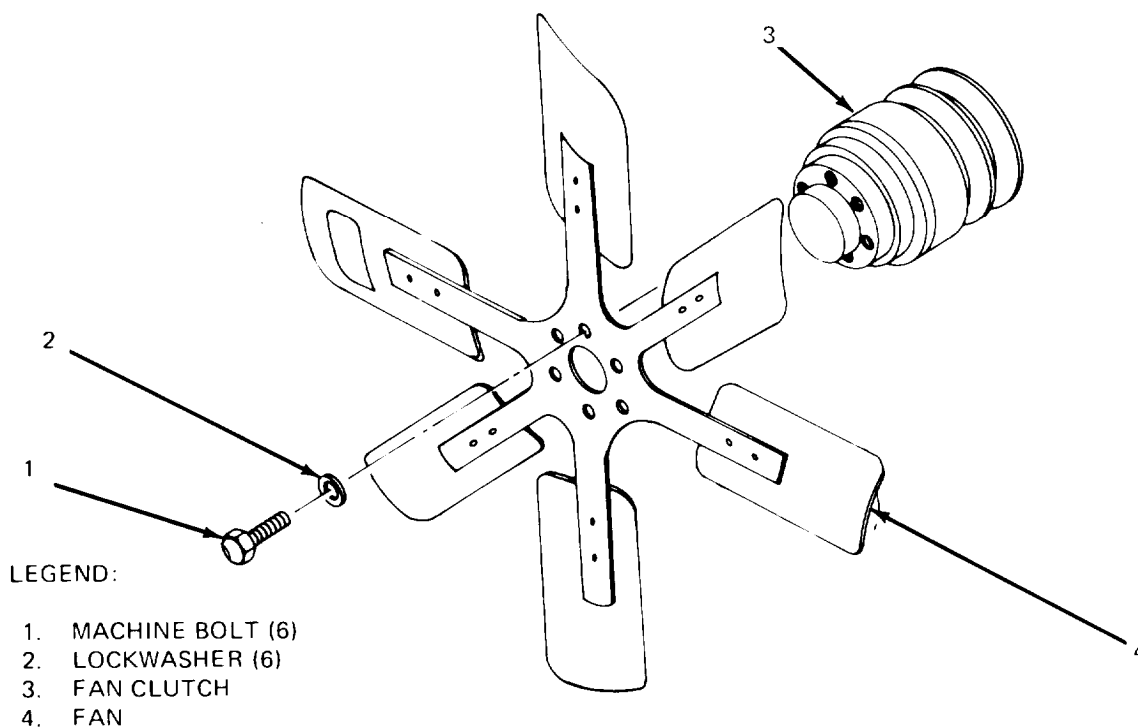
TROUBLESHOOTING REFERENCES

Table 4-1.

COOLING SYSTEM

4-44. FAN MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL		
1. Six machine bolts (1) and lockwashers (2).	Unscrew and remove.	
2. Fan (4).	Remove from fan clutch (3) and lay in lower fan shroud.	
3. Fan clutch (3).	Remove	Refer to para 4-45A.
4. Fan (4).	Remove from lower fan shroud.	



TA 074669

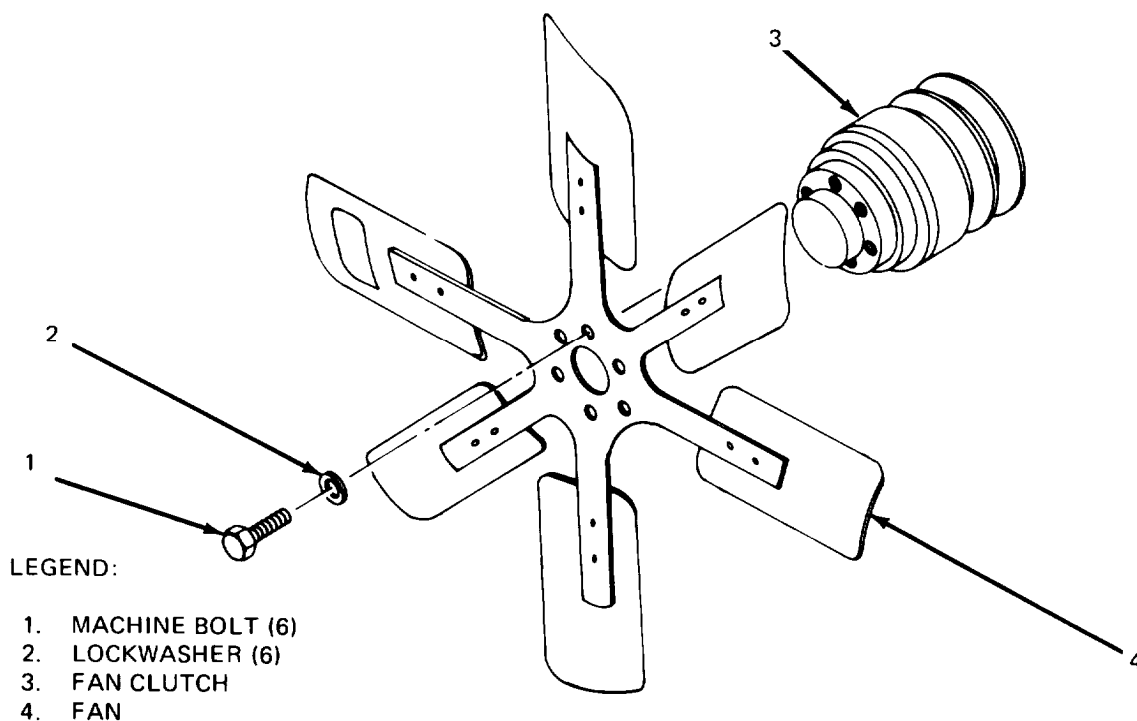
COOLING SYSTEM.

4-44. FAN MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION.		
5. Fan (4).	Set in lower fan shroud.	
6. Fan clutch (3).	Install.	Refer to para 4-45 C & D.
7 Fan (4), six machine bolts (1), and lockwashers (2).	a. Mount on fan clutch (3). b. Tighten machine bolts to 25-31 lb-ft (34-42 N•m).	Numbers on fan blade must face radiator.
8. Upper fan shroud.	Reinstall.	Refer to para 4-41 B.

C. OPERATIONAL CHECK.

9. Engine.	Start up (see TM 9-2320-273-10).
10. Fan (4).	With engine running, make sure that fan draws air from radiator.
11. Engine.	Shut down (see TM 9-2320-273-10).



TA 074670

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COOLING SYSTEM.

4-45. FAN CLUTCH AND BELTS MAINTENANCE.**HIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

- a. Removal. (10)
- b. Inspection. (5)
- c. Installation. (5)
- d. Adjustment. (15)

35 Minutes Total.

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

EQUIPMENT CONDITION**PARAGRAPH**

4-41A.

CONDITION DESCRIPTIONUpper Fan Shroud
Removed.**TEST EQUIPMENT**

Belt Tension Gage.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

PERSONNEL REQUIRED

Two (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCE (TM)

None.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
 Transmission in Neutral.
 Park Brake Set.
 Fan Clutch May engage at any
 Time Engine is Running.

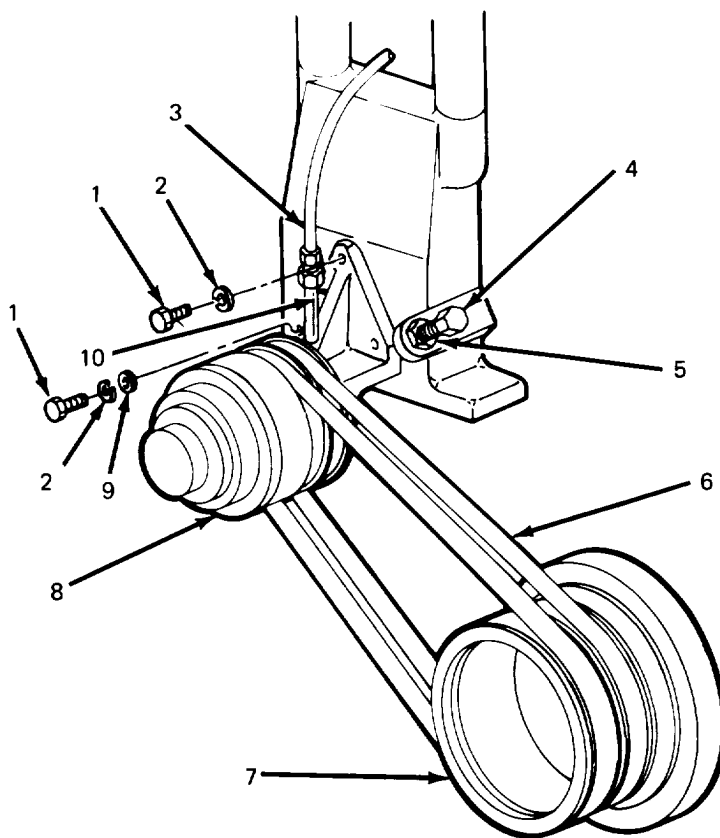
TROUBLESHOOTING REFERENCES

None.

COOLING SYSTEM.

4-45. FAN CLUTCH AND BELTS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Fan.	Remove from fan clutch (8) and set in lower fan shroud.	Refer to para 4-44 A.
2. Three machine bolts (1).	Loosen.	
3. Two fan belts (6).	Remove by loosening locknut (5) and adjusting screw (4).	
4. Actuator outlet line (3).	Loosen and remove from fan clutch (8).	
5. Three machine bolts (1), three lockwashers (2), two flat washers (9), and fan clutch (8).	Remove.	Flat washers (9) are used with the two lower machine bolts (1).



LEGEND:

- 1. MACHINE BOLT (3)
- 2. LOCKWASHER (3)
- 3. ACTUATOR OUTLET LINE
- 4. ADJUSTING SCREW
- 5. LOCKNUT
- 6. FAN BELTS (2)
- 7. ACCESSORY DRIVE PULLEY
- 8. FAN CLUTCH
- 9. FLAT WASHER (2)
- 10. FAN LOCKUP SCREW

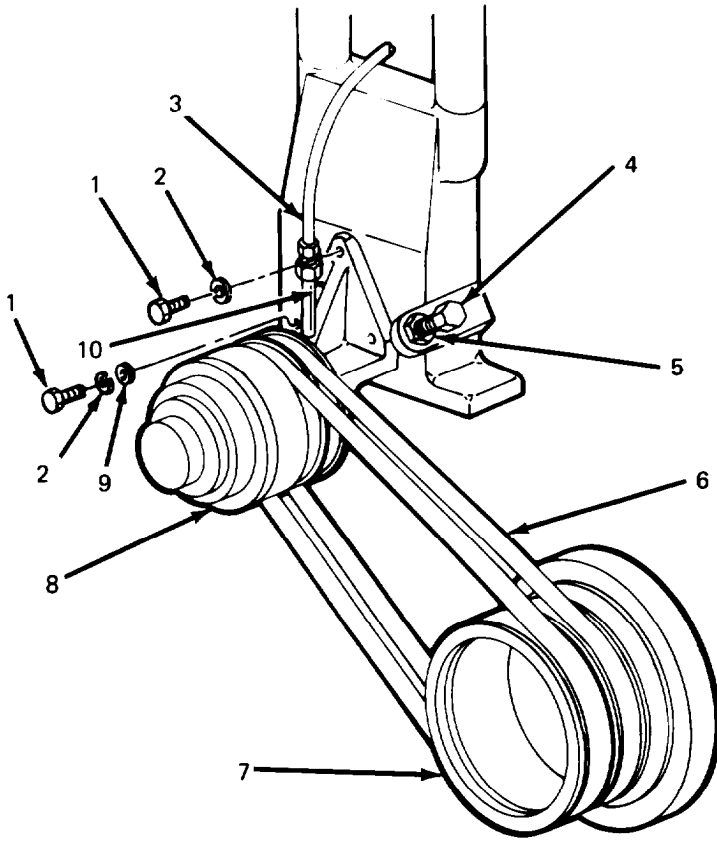
TA 074671

COOLING SYSTEM.**4-45. FAN CLUTCH AND BELTS MAINTENANCE (Continued).**

LOCATION/ITEM	ACTION	REMARKS
B. INSPECTION.		
6. Actuator outlet line (3).	Check for: a. Leaks. b. Kinks. c. Cracks. d. Damaged threads.	Replace if necessary.
7. Two fan belts (6).	Check for: a. Cuts. b. Wear.	Replace if necessary. Belts must be replaced as a matched set.
C. INSTALLATION.		
8. Fan clutch (8), three machine bolts (1), three lockwashers (2), and two flat washers (9).	Install; hand tighten machine bolts (1).	Be sure fan lockup screw (10) is backed out. Flat washers (9) are used with the two lower machine bolts (1).
9. Two fan belts (6).	Install over fan clutch (8) and accessory drive pulley (7).	Rotate fan clutch (8) toward accessory drive pulley (7) for ease of installation.
CAUTION Fan lockup screw (10) should not be used unless clutch stops functioning and engine begins to overheat.		

COOLING SYSTEM

4-45. FAN CLUTCH AND BELTS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
 LEGEND: 1. MACHINE BOLT (3) 2. LOCKWASHER (3) 3. ACTUATOR OUTLET LINE 4. ADJUSTING SCREW 5. LOCKNUT 6. FAN BELTS (2) 7. ACCESSORY DRIVE PULLEY 8. FAN CLUTCH 9. FLAT WASHER (2) 10. FAN LOCKUP SCREW		

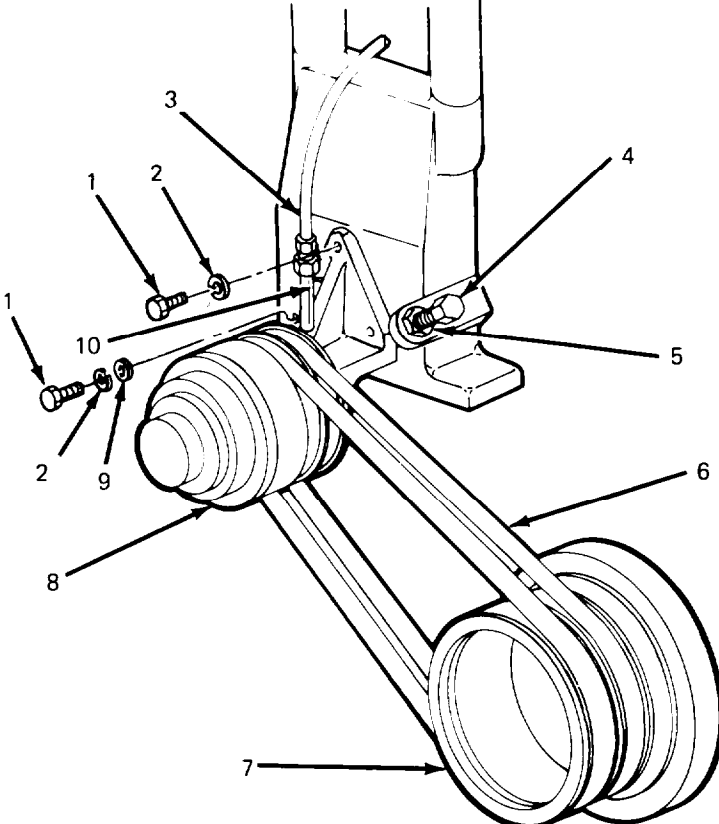
TA 074672

COOLING SYSTEM.

4-45. FAN CLUTCH AND BELTS MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
D. ADJUSTMENT.		
NOTE Use belt tension gage to check tension. It should be 120 lb-ft (162 N•m) for new belts or 100 lb-ft (136 N•m) for used belts. Used belts have more than one thousand miles of use.		
10. Adjusting screw (4), locknut (5) and fan belts (6).	Loosen locknut (5) and adjust tension as necessary with adjusting screw (4).	
11. Three machine bolts (1).	Tighten to 70-85 lb-ft (95-115 N•m).	
12. Two fan belts (6).	Check that tension is the same as described in step 9.	
13. Locknut (5).	Tighten securely.	
14. Actuator outlet line (3).	Install on fan clutch (8).	
15. Fan.	Lift from lower fan shroud and install to fan clutch (8).	Refer to para 4-44 B.
NOTE Follow-on maintenance action required: Install upper fan shroud; refer to para 4-41 B.		

COOLING SYSTEM.

4-45. FAN CLUTCH AND BELTS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
 The diagram illustrates the fan clutch and belt assembly. It shows a fan clutch (8) mounted on a shaft, with two fan belts (6) driving it. An accessory drive pulley (7) is also shown. The assembly is secured with machine bolts (1), lockwashers (2), and locknuts (5). An actuator outlet line (3) is connected to the assembly. Adjusting screws (4) and fan lockup screws (10) are also indicated. Flat washers (9) are used for additional support. LEGEND: 1. MACHINE BOLT (3) 2. LOCKWASHER (3) 3. ACTUATOR OUTLET LINE 4. ADJUSTING SCREW 5. LOCKNUT 6. FAN BELTS (2) 7. ACCESSORY DRIVE PULLEY 8. FAN CLUTCH 9. FLAT WASHER (2) 10. FAN LOCKUP SCREW		

TA 075645

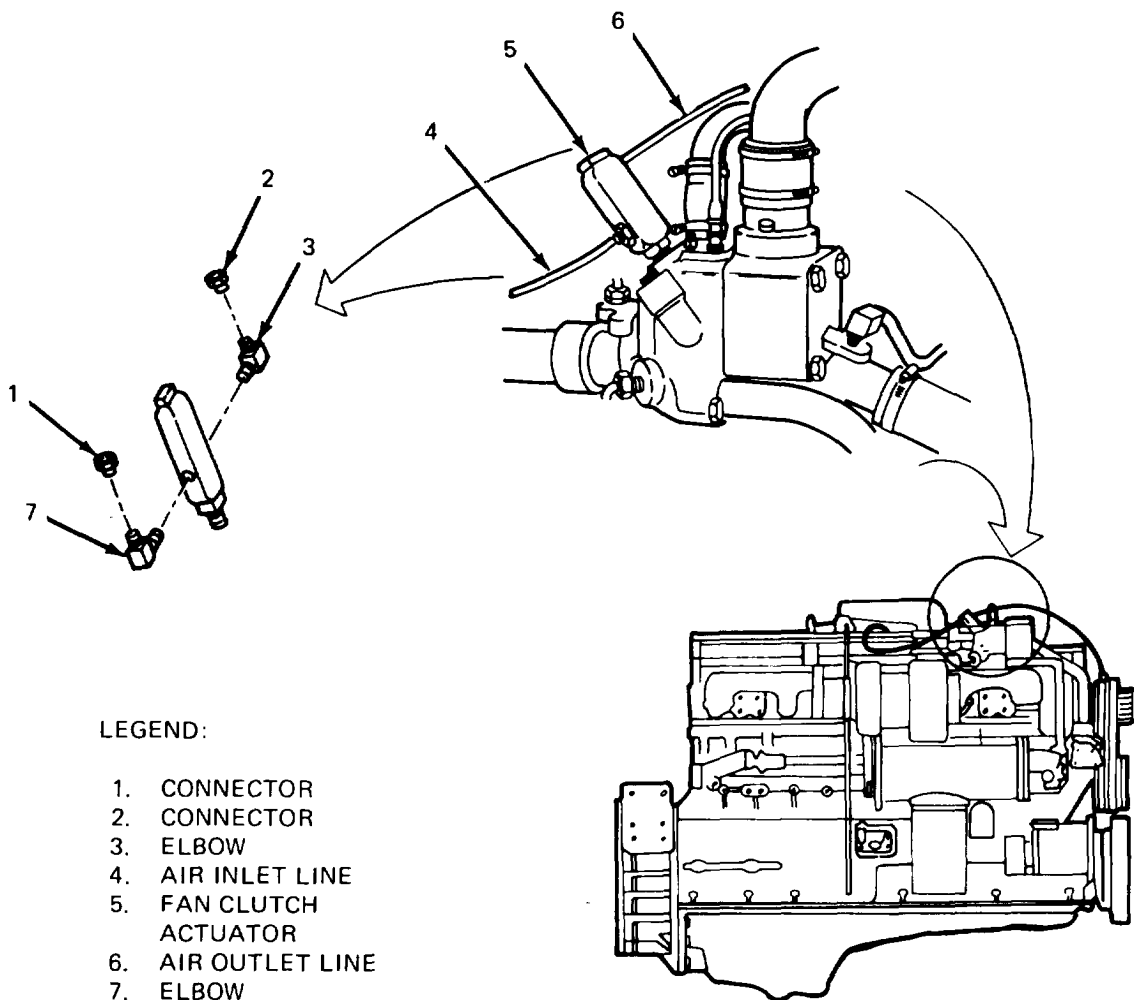
COOLING SYSTEM.

1-46. FAN CLUTCH ACTUATOR MAINTENANCE (M915, M916, M917 AND M920).		
THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)		
a. Removal. (10)		
b. Inspect Air Lines. (5)		
c. Installation. (15)		
d. Operational Check. (10)		
40 Minutes Total.		
INITIAL SETUP	EQUIPMENT CONDITION	
APPLICABLE CONFIGURATIONS	PARAGRAPH	CONDITION DESCRIPTION
M915,M916, M917, M918, M920.	4-42A.	Coolant Drained Below Fan Clutch Actuator.
TEST EQUIPMENT		
None.		
SPECIAL TOOLS		
None.		
MATERIALS/PARTS (P/N)		
Liquid Teflon (refer to appendix C).		
PERSONNEL REQUIRED	SPECIAL ENVIRONMENTAL CONDITIONS	
One (MOS-63B20).	Vehicle Parked on Level Ground.	
REFERENCE (TM)	GENERAL SAFETY INSTRUCTIONS	
TM 9-2320-273-10.	Engine OFF.	
TM 9-2320-273-20P.	Transmission in Neutral.	
	Park Brake Set.	
	Fan Clutch May Engage at Any	
	Time Engine is Running.	
TROUBLESHOOTING REFERENCES		
Table 4-1.		

COOLING SYSTEM.

4-46. FAN CLUTCH ACTUATOR MAINTENANCE (M915, M916, M917, M918 AND M920)
(Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL		
1. Air inlet line (4).	Disconnect connector (1) and remove air inlet line (4) from fan clutch actuator (5).	
2. Air outlet line (6).	Disconnect connector (2) and remove air outlet line (6) from fan clutch actuator (5).	
3. Fan clutch actuator (5).	Unscrew and remove.	Use crows foot wrench, if necessary.
4. Elbows (3) and (7).	Unscrew and remove.	



TA 074673

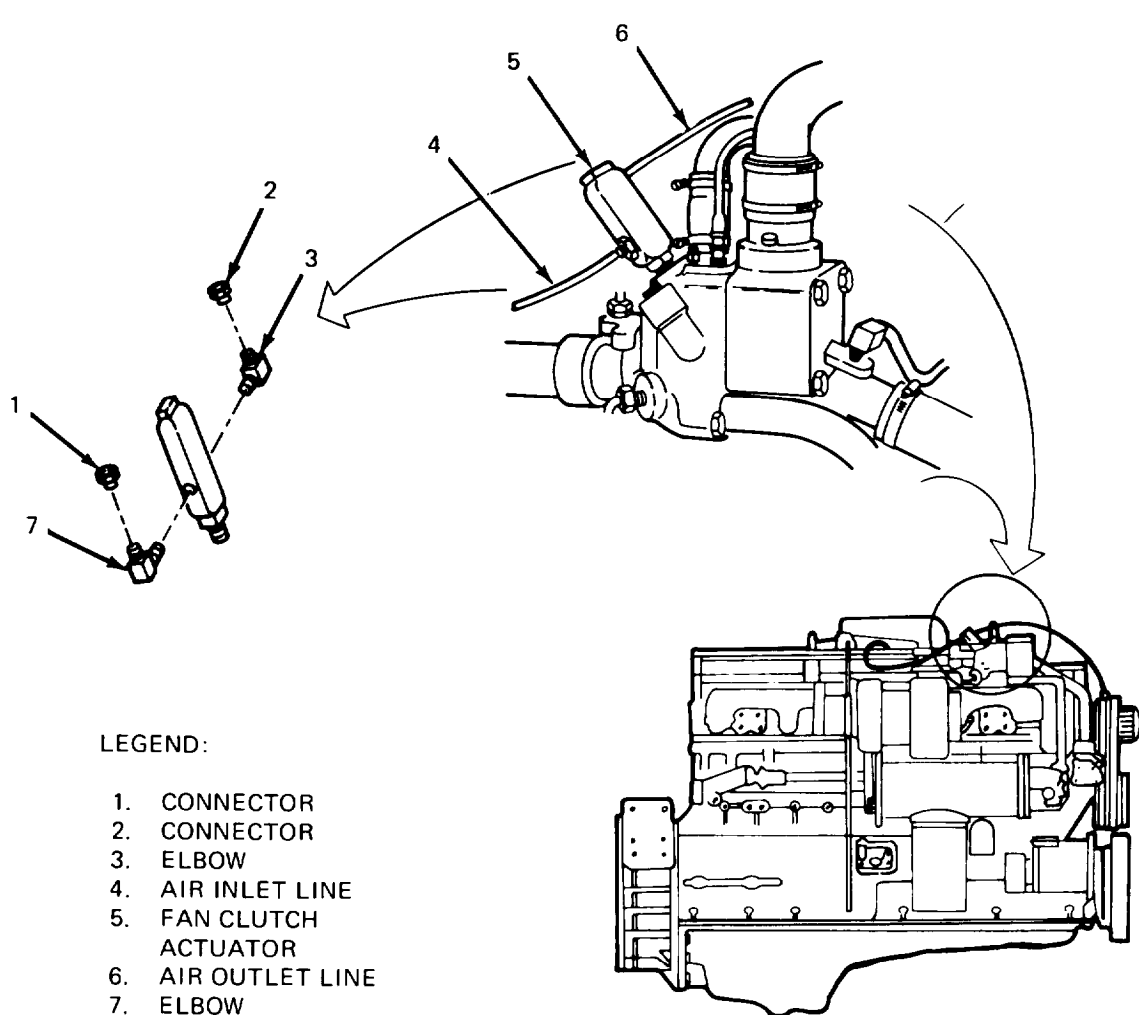
COOLING SYSTEM.

4-46. FAN CLUTCH ACTUATOR MAINTENANCE (M915, M916, M917, M918 & M920) (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSPECT AIR LINES.		
5. Air inlet (4) and outlet (6) lines.	a. Inspect lines for: 1. Cracks. 2. Kinks.	Replace, if necessary.
	b. Inspect elbows and connectors for: 1. Cracks. 2. Bends.	Replace, if necessary.
C. INSTALLATION.		
6. Fan clutch actuator (5).	Coat threads with liquid teflon, screw in.	
7. Elbows (3) and (7).	Coat threads with liquid teflon, screw in.	
8. Air outlet line (6).	Screw connector (2) into side marked OUTLET.	
9. Air inlet line (4).	Screw connector (1) into side marked INLET.	
NOTE Follow-on maintenance required before operational check: Refill radiator; refer to para 4-42C.		
D. OPERATIONAL CHECK.		
10. Engine.	Start up (see TM 9-2320-273-10).	
11. Fan.	Observe that fan begins to operate when engine water temperature (gage on instrument panel in cab) rises above 190°F, (88°C).	
12. Engine.	Shut down (see TM 9-2320-273-10).	

COOLING SYSTEM

4-46. FAN CLUTCH ACTUATOR MAINTENANCE (M915, M916, M917, M918 & M920) (Continued)

LOCATION/ITEM	ACTION	REMARKS
 LEGEND: 1. CONNECTOR 2. CONNECTOR 3. ELBOW 4. AIR INLET LINE 5. FAN CLUTCH ACTUATOR 6. AIR OUTLET LINE 7. ELBOW		

TA 074674

COOLING SYSTEM.

4-47. FAN CLUTCH ACTUATOR AND VALVE MAINTENANCE (M919).

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

- a. Removal. (15)
- b. Insection of Air Tubes. (5)
- c. Installation. (15)
- d. Operational Check. (10)

40 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

M919.

**EQUIPMENT CONDITION
PARAGRAPH**

4-42A.

CONDITION DESCRIPTION

Coolant Drained Below Fan
Clutch Actuator Level.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (refer to appendix C).

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCE (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

GENERAL SAFETY INSTRUCTIONS

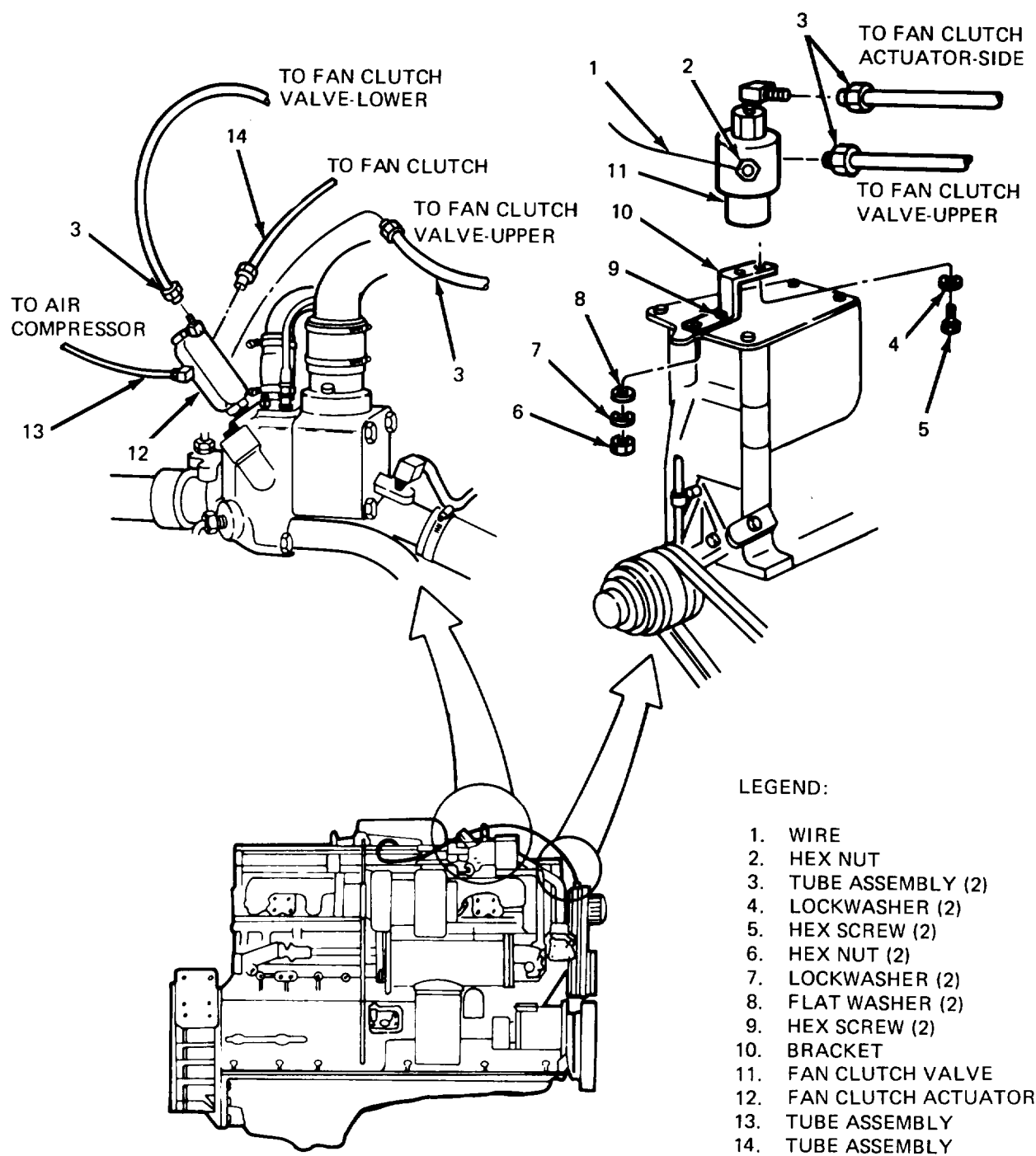
Engine Off.
Transmission in Neutral.
Park Brake Set.
Fan Clutch May Engage at Any Time Engine
is Running.

TROUBLESHOOTING REFERENCES

Table 4-1.

COOLING SYSTEM.

4-47. FAN CLUTCH ACTUATOR AND VALVE MAINTENANCE (M919) (Continued).



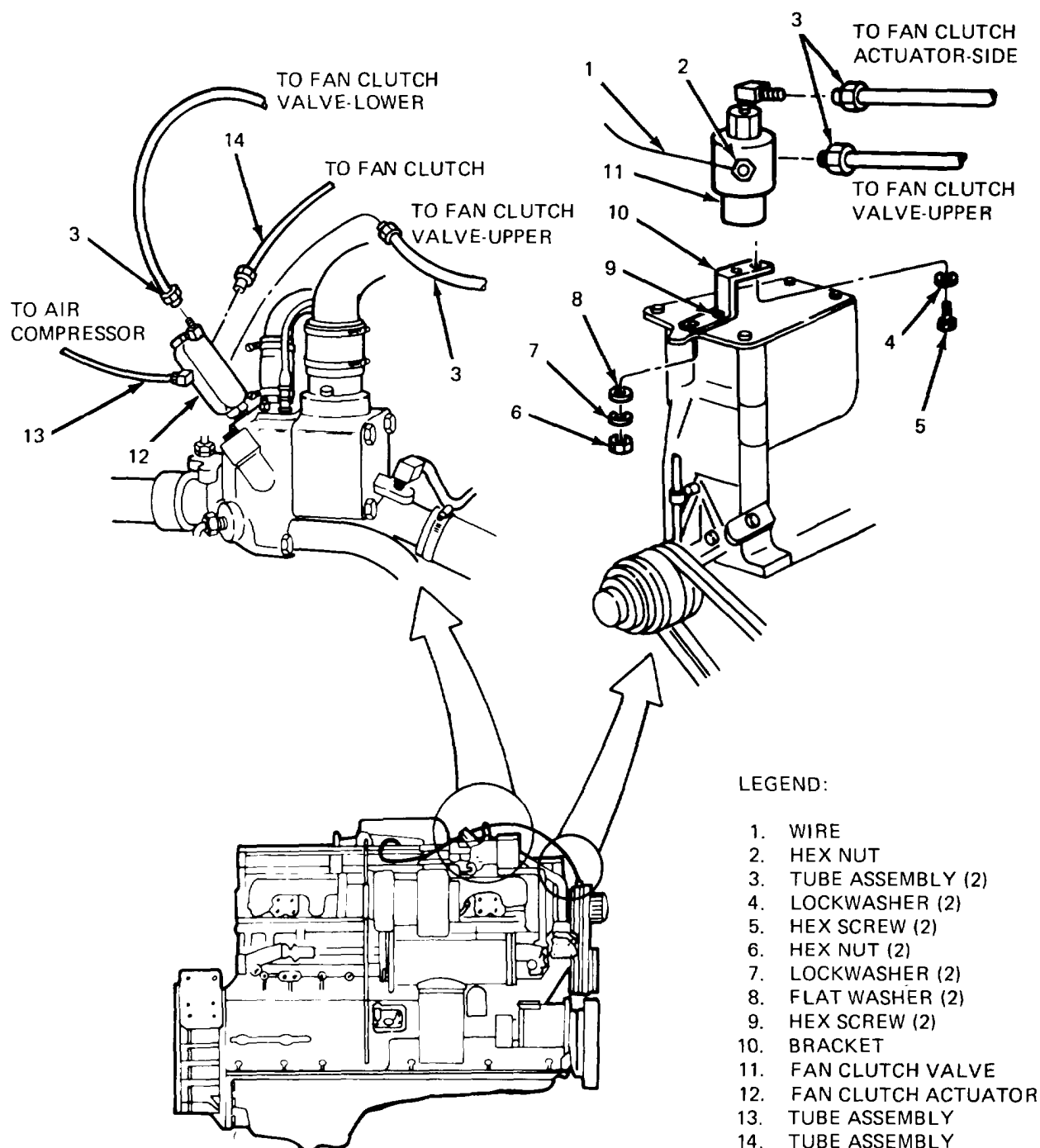
TA 075646

COOLING SYSTEM.

4-47. FAN CLUTCH ACTUATOR AND VALVE MAINTENANCE (M919) (Continued).		
LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Two tube assemblies (3).	Disconnect at fan clutch actuator (12) and fan clutch valve (11).	Tag for location.
2. Two tube assemblies (13) and (14).	Disconnect at fan clutch actuator (12).	Tag for location.
3. Fan clutch actuator (12).	Unscrew and remove.	Use crows foot wrench if necessary.
4. Hex nut (2).	Remove.	
5. Wire (1)	Remove.	
6. Two hex screws (5) and lockwashers (4).	Remove.	
7. Fan clutch valve (11).	Remove.	
8. Two hex screws (9), hex nuts (6), lockwashers (7), and flat washers (8).	Remove.	
9. Bracket (10).	Remove.	
B. INSPECTION OF AIR TUBES. !		
10. Four tube assemblies (3), (13), and (14).	a. Inspect tubes for: 1. Cracks. 2. Kinks. b. Inspect fittings for: 1. Cracks. 2. Bends.	Replace if necessary. Replace if necessary.
NOTE If a new fan clutch actuator or fan clutch valve is being installed, transfer fittings from defective valve or actuator to the new one. Use liquid teflon on threaded connections.		
11. Bracket (10).	Set in place and secure with two hex screws (9) hex nuts (6), lockwashers (7), and flat washers (8). Tighten securely.	

COOLING SYSTEM.

4-47. FAN CLUTCH ACTUATOR AND VALVE MAINTENANCE (M919) (Continued).



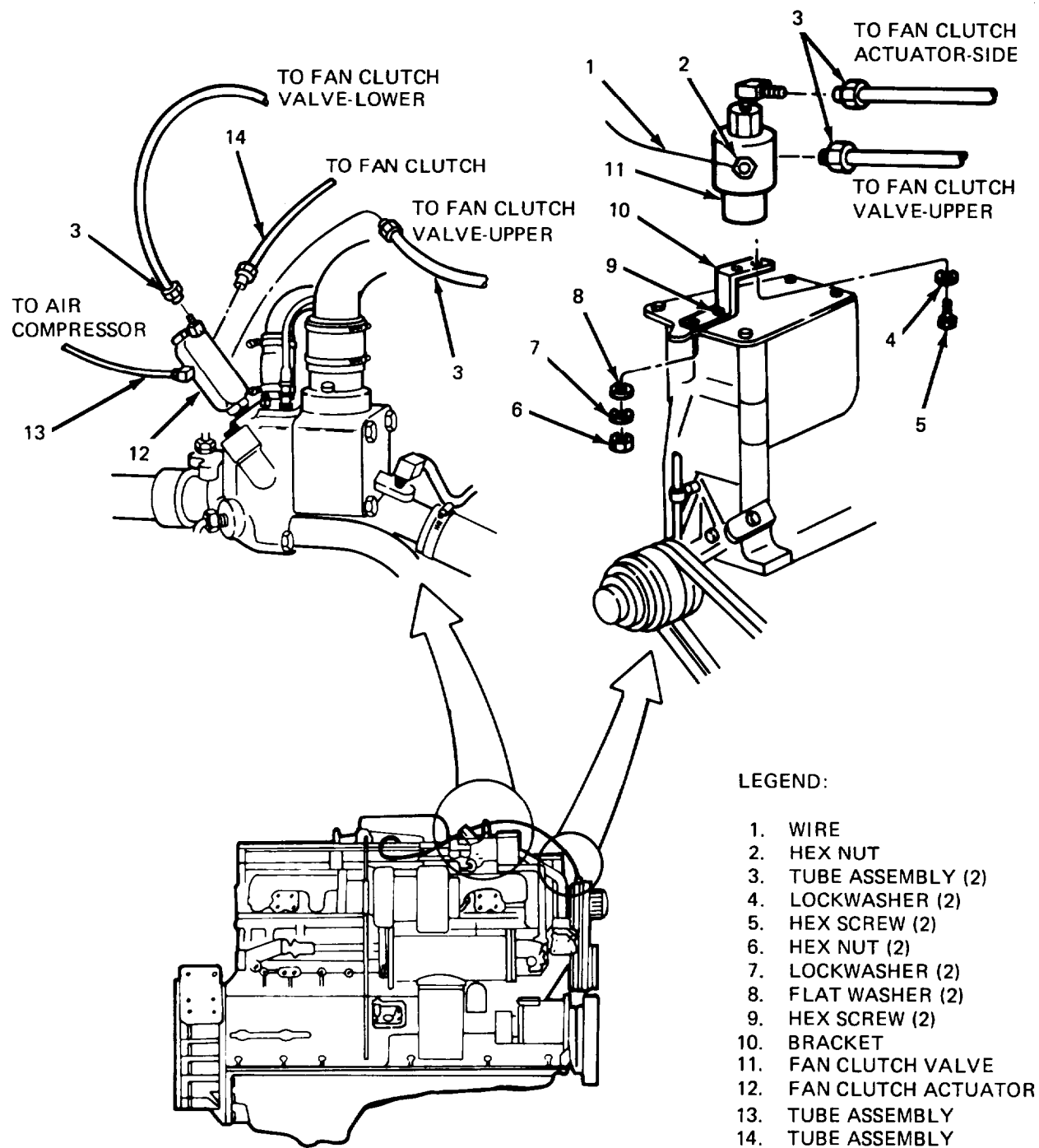
TA 075647

COOLING SYSTEM.**4-47. FAN CLUTCH ACTUATOR AND VALVE MAINTENANCE (M919) (Continued).**

LOCATION/ITEM	ACTION	REMARKS
C. INSTALLATION (Continued).		
12. Fan clutch valve (11).	Set in place and secure with two hex screws (5) and lockwashers (4).	
13. Wire (1).	Install over terminal and secure with hex nuts (2).	
14. Fan clutch actuator (12).	Coat threads with liquid teflon and screw in.	Tighten securely with crows foot wrench.
15. Two tube assemblies (13) and (14).	Connect at fan clutch actuator (12).	Note identification tagged for ease of installation.
16. Two tube assemblies (3).	Connect at fan clutch actuator (12) and fan clutch valve (11).	Note identification tagged for ease of installation.
D. OPERATIONAL CHECK.		
17. Engine.	Start up (see TM 9-2320-273-10).	
18. Fan.	Observe that fan begins to operate when engine water temperature (gage on instrument panel in cab) rises above 190°F (88°C) and/or when fan clutch valve switch is manually operated (see TM 9-2320-273-10).	
19. Engine.	Shut down (see TM 9-2320-273-10).	

COOLING SYSTEM.

4-47. FAN CLUTCH ACTUATOR AND VALVE MAINTENANCE (M919) (Continued).



TA 075648

COOLING SYSTEM.**4-48 FAN CLUTCH ACTUATOR TUBES MAINTENANCE (M915, M916, M917, M918 & M920).****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

a. Removal.	(5)
b. Installation.	(5)
c. Checking for Leaks.	(2)
12 Minutes Total.	

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

M915, M916, M917, M918, M920.

EQUIPMENT CONDITION**PARAGRAPH**

None.

CONDITION DESCRIPTION

None.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Soap Solution.

Liquid Teflon (refer to appendix C).

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCE (TM)

TM 9-2320-273-10.

TM 9-2320-273-20P.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.

Transmission in Neutral.

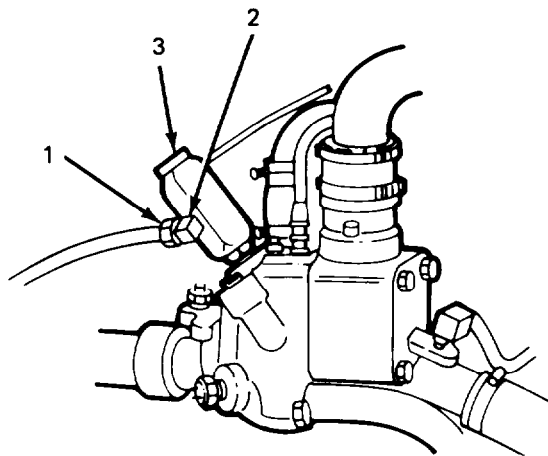
Park Brake Set.

TROUBLESHOOTING REFERENCES

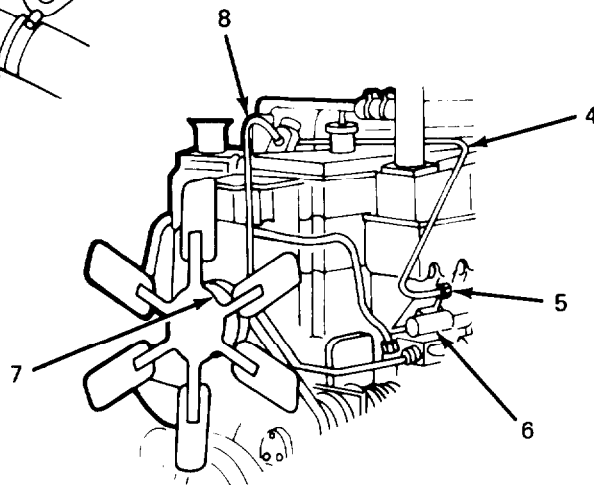
Table 4-1.

COOLING SYSTEM.**4-48. FAN CLUTCH ACTUATOR TUBES MAINTENANCE (M915, M916, M917, M918 AND M920) (Continued).**

LOCATION/ITEM	ACTION	REMARKS
<u>A. REMOVAL.</u>		
1. Four fittings (1).	Unscrew from fan clutch (7), actuator (3) and tee (5) located on compressor governor (6).	Replace if necessary.
2. Two elbows (2).	Unscrew from fan clutch actuator (3).	Replace if necessary.
3. Inlet tube (4) and outlet tube (8).	a. Remove. b. Inspect for: 1. Cracks. 2. Leaks. 3. Damaged fittings. c. Blow gently through tubes to see that air flow is not blocked.	

**LEGEND:**

1. FITTING (4)
2. ELBOW (2)
3. ACTUATOR
4. INLET TUBE
5. TEE
6. COMPRESSOR GOVERNOR
7. FAN CLUTCH
8. OUTLET TUBE



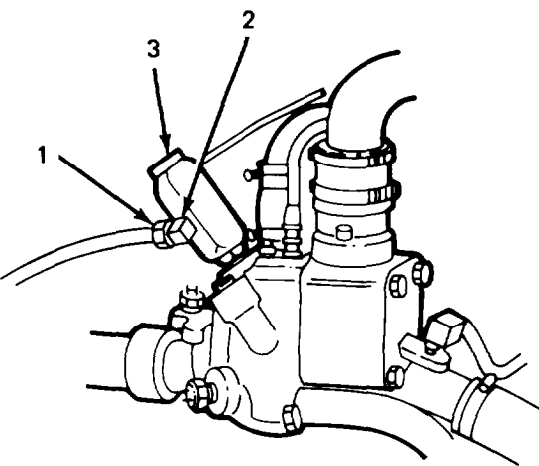
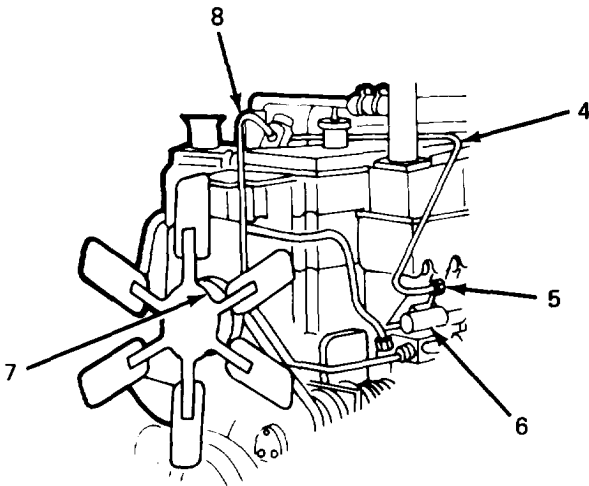
TA 07467E

COOLING SYSTEM.**4-48. FAN CLUTCH ACTUATOR TUBES MAINTENANCE (M915, M916, M917, M918 AND M920) (Continued).**

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION.		
4. Two elbows (2).	Coat threads with liquid teflon. Screw into fan clutch actuator.	
5. Two tubes (4) and (8).	a. Coat threads with liquid teflon. b. Screw four fittings (1) on fan clutch (7), actuator (3), and tee fitting (5) located on compressor governor (6). c. Tighten.	
C. CHECKING FOR LEAKS.		
6. Engine.	Start up (see TM 9-2320-273-10).	
WARNING Be sure to stay completely clear of fan blades. Do not reach into fan clutch area while engine is operating.		
7. Tubes (4) and (8).	Use soap solution to check for leaks.	
8. Engine.	Shut down (see TM 9-2320-273-10).	

COOLING SYSTEM

4-48. FAN CLUTCH ACTUATOR TUBES MAINTENANCE (M915, M916, M917, M918 & M920}
(Continued).

LOCATION/ITEM	ACTION	REMARKS
  LEGEND: 1. FITTING (4) 2. ELBOW (2) 3. ACTUATOR 4. INLET TUBE 5. TEE 6. COMPRESSOR GOVERNOR 7. FAN CLUTCH 8. OUTLET TUBE		
TA 074676		

COOLING SYSTEM.**4-49. FAN CLUTCH ACTUATOR TUBES MAINTENANCE (M919).****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

a. Removal.	(10)
b. Inspection.	(5)
c. Installation.	(10)
d. Checking for Leaks.	(5)

30 Minutes Total.

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

M919.

**EQUIPMENT CONDITION
PARAGRAPH**

None.

CONDITION DESCRIPTION

None.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Soap Solution.
Liquid Teflon (refer to appendix C).

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

GENERAL SAFETY INSTRUCTIONS

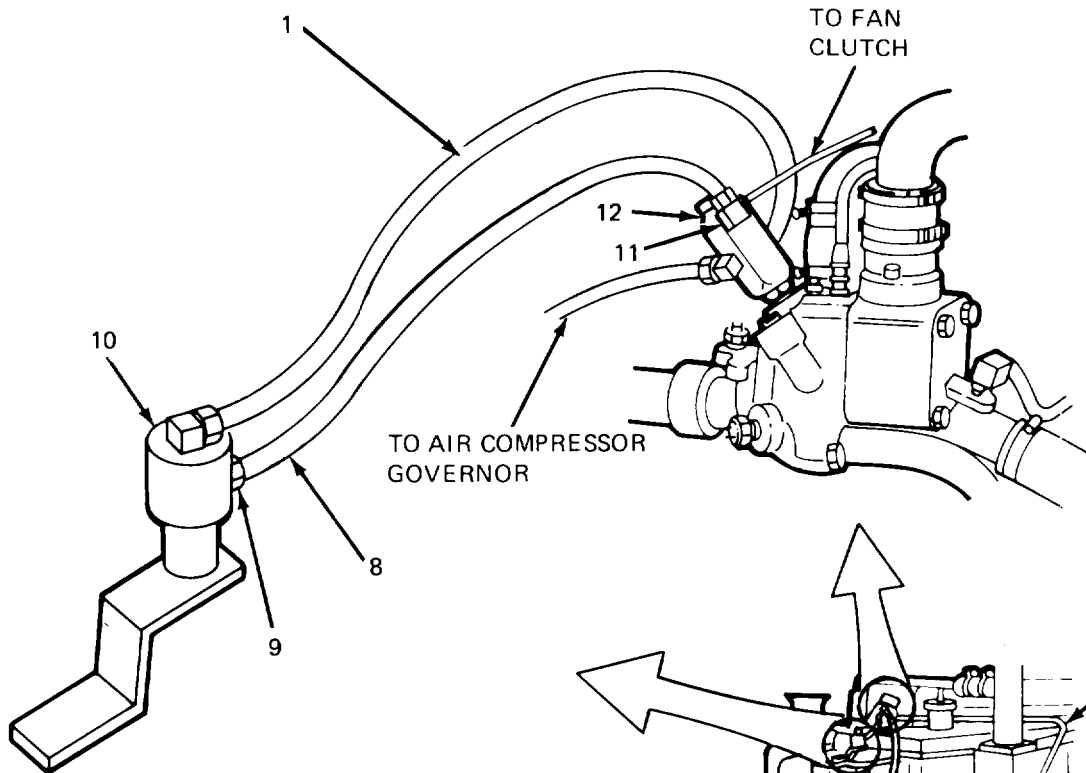
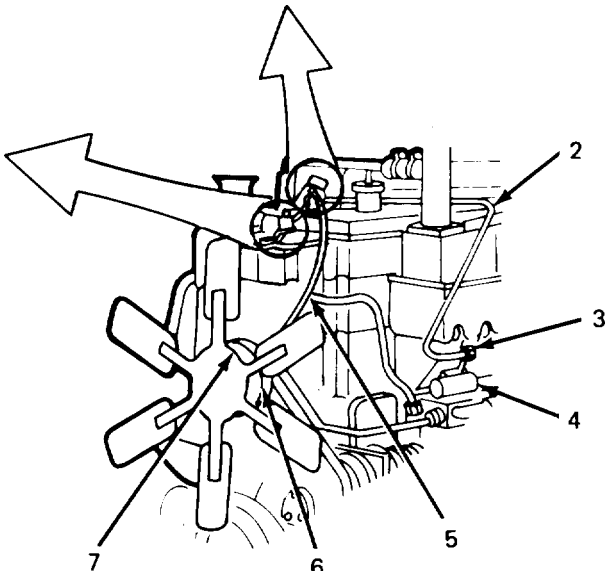
Engine Off.
Transmission in Neutral.
Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 4-1

COOLING SYSTEM.

4-49. FAN CLUTCH ACTUATOR TUBES MAINTENANCE (M919) (Continued).

LOCATION/ITEM	ACTION	REMARKS																		
																				
TO FAN CLUTCH TO AIR COMPRESSOR GOVERNOR																				
LEGEND: <table><tr><td>1. TUBE</td><td>10. FAN CLUTCH VALVE</td></tr><tr><td>2. TUBE</td><td>11. ELBOW (4)</td></tr><tr><td>3. TEE</td><td>12. FAN CLUTCH ACTUATOR</td></tr><tr><td>4. GOVERNOR</td><td></td></tr><tr><td>5. TUBE</td><td></td></tr><tr><td>6. FAN CLUTCH</td><td></td></tr><tr><td>7. CONNECTOR</td><td></td></tr><tr><td>8. TUBE</td><td></td></tr><tr><td>9. CONNECTOR</td><td></td></tr></table>			1. TUBE	10. FAN CLUTCH VALVE	2. TUBE	11. ELBOW (4)	3. TEE	12. FAN CLUTCH ACTUATOR	4. GOVERNOR		5. TUBE		6. FAN CLUTCH		7. CONNECTOR		8. TUBE		9. CONNECTOR	
1. TUBE	10. FAN CLUTCH VALVE																			
2. TUBE	11. ELBOW (4)																			
3. TEE	12. FAN CLUTCH ACTUATOR																			
4. GOVERNOR																				
5. TUBE																				
6. FAN CLUTCH																				
7. CONNECTOR																				
8. TUBE																				
9. CONNECTOR																				
																				

TA 075649

TA 075649

COOLING SYSTEM.

4-49. FAN CLUTCH ACTUATOR TUBES MAINTENANCE (M919).		
LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Tube (1).	Disconnect at fan clutch valve (10) and fan clutch actuator (12).	Tag for location.
2. Tube (2).	Disconnect at fan clutch actuator (12) and at governor (4).	Tag for location.
3. Tee (3).	Remove at governor (4).	
4. Tube (5).	Disconnect from connector (7) located on fan clutch and at fan clutch actuator (12).	Tag for location.
5. Tube (8).	Disconnect at fan clutch valve (10) and at fan clutch actuator (12).	Tag for location.
6. Connector (9).	Remove.	
7. Four elbows (11).	Remove one elbow (11) at fan clutch valve (10) and three elbows (11) at the fan clutch actuator (12).	

COOLING SYSTEM.

4-49. FAN CLUTCH ACTUATOR TUBES MAINTENANCE (M919) (Continued).

4-49. FAN CLUTCH ACTUATOR TUBES MAINTENANCE (M919) (Continued).																				
LOCATION/ITEM	ACTION	REMARKS																		
LEGEND: <table> <tr> <td>1. TUBE</td> <td>10. FAN CLUTCH VALVE</td> </tr> <tr> <td>2. TUBE</td> <td>11. ELBOW (4)</td> </tr> <tr> <td>3. TEE</td> <td>12. FAN CLUTCH ACTUATOR</td> </tr> <tr> <td>4. GOVERNOR</td> <td></td> </tr> <tr> <td>5. TUBE</td> <td></td> </tr> <tr> <td>6. FAN CLUTCH</td> <td></td> </tr> <tr> <td>7. CONNECTOR</td> <td></td> </tr> <tr> <td>8. TUBE</td> <td></td> </tr> <tr> <td>9. CONNECTOR</td> <td></td> </tr> </table>			1. TUBE	10. FAN CLUTCH VALVE	2. TUBE	11. ELBOW (4)	3. TEE	12. FAN CLUTCH ACTUATOR	4. GOVERNOR		5. TUBE		6. FAN CLUTCH		7. CONNECTOR		8. TUBE		9. CONNECTOR	
1. TUBE	10. FAN CLUTCH VALVE																			
2. TUBE	11. ELBOW (4)																			
3. TEE	12. FAN CLUTCH ACTUATOR																			
4. GOVERNOR																				
5. TUBE																				
6. FAN CLUTCH																				
7. CONNECTOR																				
8. TUBE																				
9. CONNECTOR																				

TA 075650

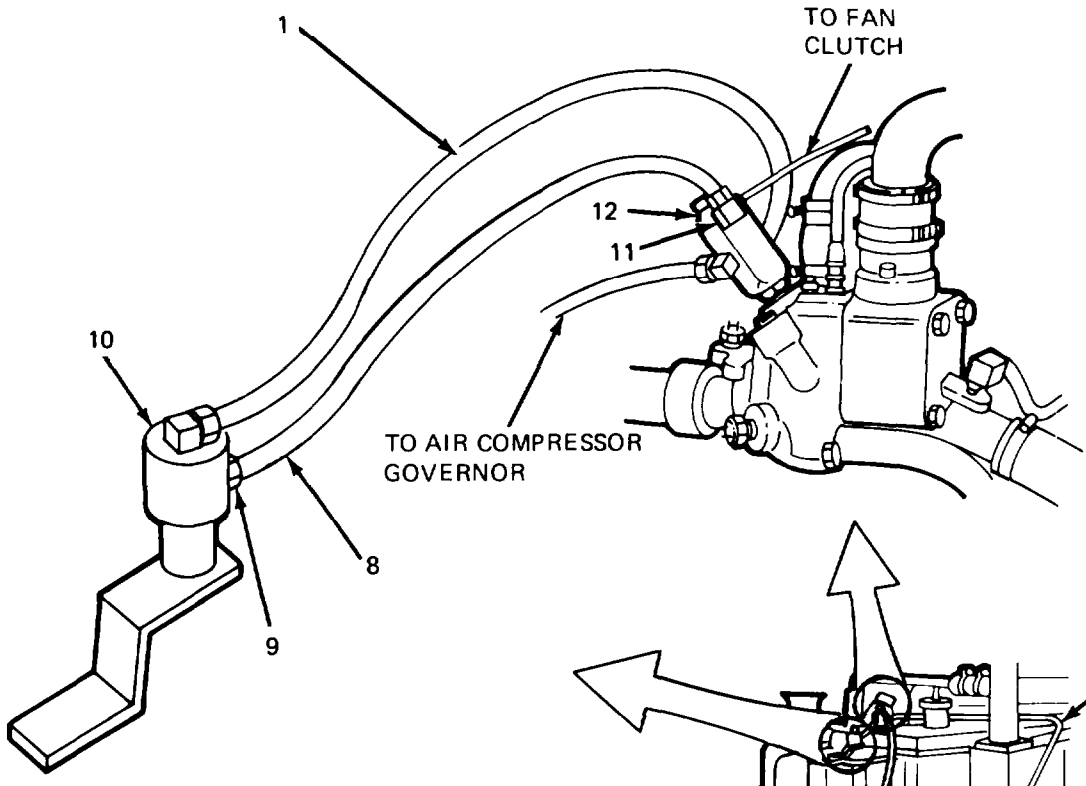
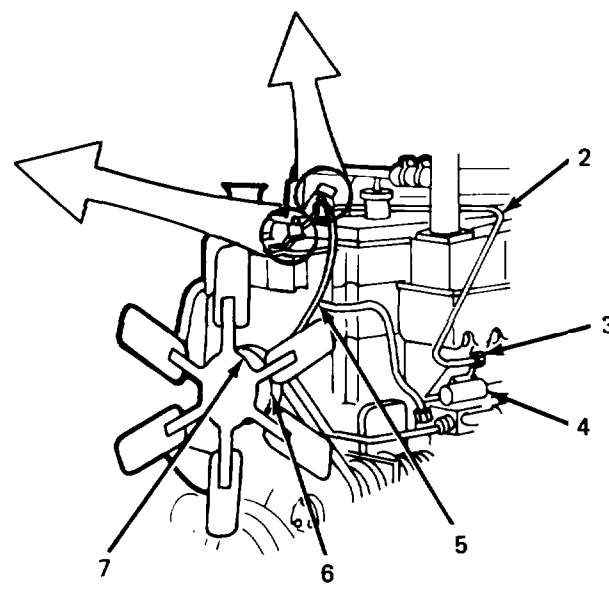
TA 075650

COOLING SYSTEM.

4-49. FAN CLUTCH ACTUATOR TUBES MAINTENANCE (M919) (Continued).		
LOCATION/ITEM	ACTION	REMARKS
<u>B. INSPECTION.</u>		
8. Tubes and fittings.	Inspect all components for cracks and defects.	Replace if necessary.
<u>C. INSTALLATION.</u>		
9. Four elbows (11).	Install one elbow (11) at fan clutch valve (10) and three elbows (11) at the fan clutch actuator (12).	Coat threads with liquid teflon.
10. Connector (9).	Install in fan clutch valve (10).	Coat threads with liquid teflon.
11. Tube (8).	Connect at fan clutch valve (10) and at fan clutch actuator (12).	Coat threads with liquid teflon.
12. Tube (5).	Connect tube (5) to connector (7) located on fan clutch (6) and at fan clutch actuator (12).	Coat threads with liquid teflon.
13. Tee (3).	Install tee into governor (4).	Coat threads with liquid teflon.

COOLING SYSTEM.

4-49. FAN CLUTCH ACTUATOR TUBES MAINTENANCE (M919) (Continued).

LOCATION/ITEM	ACTION	REMARKS
 LEGEND: 1. TUBE 2. TUBE 3. TEE 4. GOVERNOR 5. TUBE 6. FAN CLUTCH 7. CONNECTOR 8. TUBE 9. CONNECTOR 10. FAN CLUTCH VALVE 11. ELBOW (4) 12. FAN CLUTCH ACTUATOR		

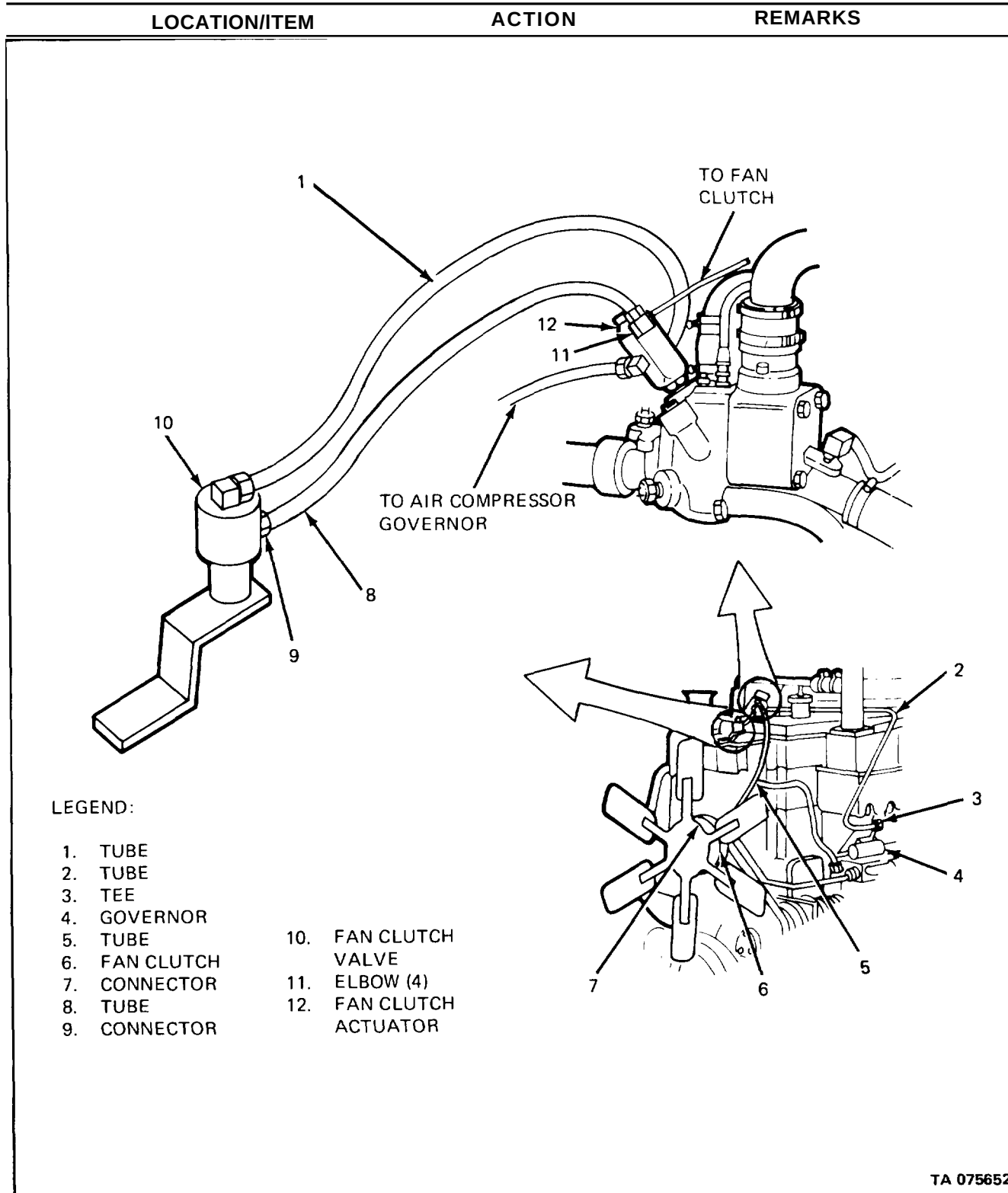
TA 075651

COOLING SYSTEM.**4-49. FAN CLUTCH ACTUATOR TUBES MAINTENANCE (M919) (Continued).**

LOCATION/ITEM	ACTION	REMARKS
C. INSTALLATION (Continued).		
14. Tube (2).	Connect at fan clutch actuator (12) and at tee (3).	Coat threads with liquid teflon.
15. Tube.	Connect at fan clutch actuator (12) and at fan clutch valve (10).	Coat threads with liquid teflon.
D. CHECKING FOR LEAKS.		
16. Engine.	Start up (see TM 9-2320-273-10).	
W A R N I N G Be sure to stay completely clear of fan blades. Do not reach into fan clutch area while engine is operating.		
17. Tubes, fittings, and connections.	Use soap solution to check for leaks.	
18. Engine.	Shut down (see TM 9-2320-273-10).	

COOLING SYSTEM

4-49. FAN CLUTCH ACTUATOR TUBES MAINTENANCE (M919) (Continued).



COOLING SYSTEM.**4-50. HEATER SHUTOFF VALVE MAINTENANCE.****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

- a. Removal. (10)
 - b. Installation. (15)
 - c. Bleeding Heater. (5)
- 30 Minutes Total.

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

EQUIPMENT CONDITION**PARAGRAPH**

4-42A.

CONDITION DESCRIPTIONCoolant Drained below
Level of Valve.**TEST EQUIPMENT**

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)Container(s).
Liquid Teflon (refer to appendix C).**PERSONNEL REQUIRED**

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

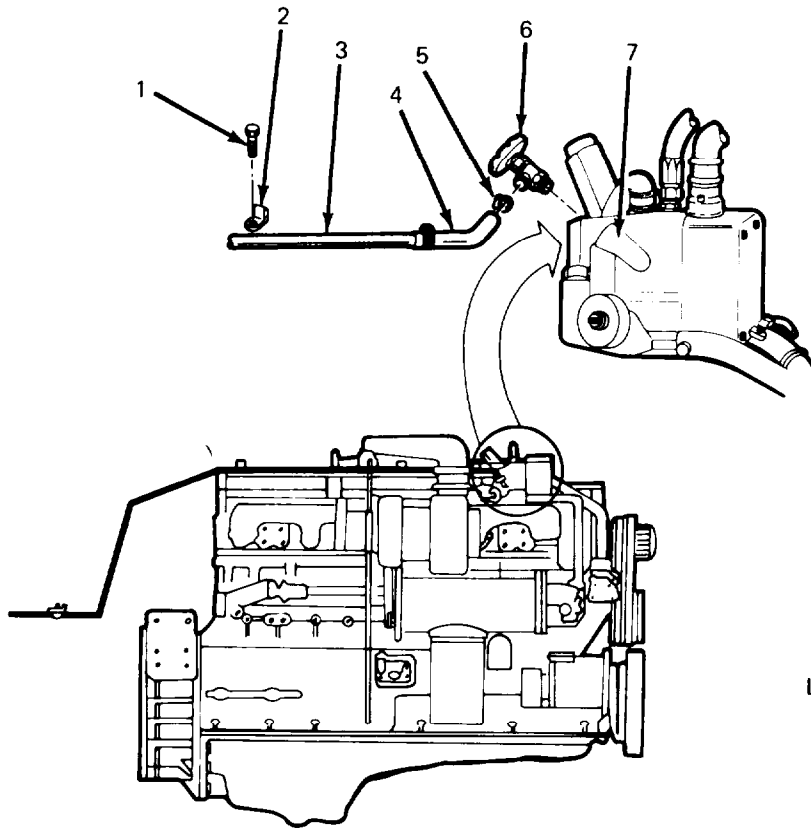
REFERENCE (TM)TM 9-2320-273-10.
TM 9-2320-273-20P.**GENERAL SAFETY INSTRUCTIONS**Engine OFF.
Transmission in Neutral.
Park Brake Set.**TROUBLESHOOTING REFERENCES**

Table 4-1.

COOLING SYSTEM.

4-50. HEATER CONTROL VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Two clamps (5).	Loosen.	
2. Heater tube (3) and rubber hose (4).	Remove from valve (6).	If necessary you may remove clamp (2) by unscrewing capscrew (1).
3. Valve (6).	Unscrew and remove from manifold (7).	



LEGEND:

- 1. CAPSCREW
- 2. CLAMP
- 3. HEATER TUBE
- 4. RUBBER HOSE
- 5. CLAMP (2)
- 6. VALVE
- 7. MANIFOLD

TA 074677

COOLING SYSTEM.**4-50. HEATER CONTROL VALVE MAINTENANCE (Continued).**

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION.		
4. Valve (6).	a. Coat threads with liquid teflon. b. Screw into adapter manifold (7).	
5. Heater tube (3) and rubber hose (4).	a. Connect to valve (6). b. Tighten clamps (5),	If you removed clamp (1), put it back on and tighten capscrew (2).
C. BLEEDING HEATER.		
NOTE Before removing outlet hose, place clean container under heater openings to catch coolant.		
6. Cab/heater outlet hose.	Loosen clamp and disconnect hose (para 11-27).	
7. Engine.	Start up (see TM 9-2320-273-10).	
8. Cab/heater knob, heater outlet hose.	a. Pull knob (see TM 9-2320-273-10). b. When coolant flows from heater, push knob back in. c. Immediately connect hose to heater. Tighten clamp. d. Pull knob out again.	
9. Valve (6).	a. With engine running, check for leaks.	

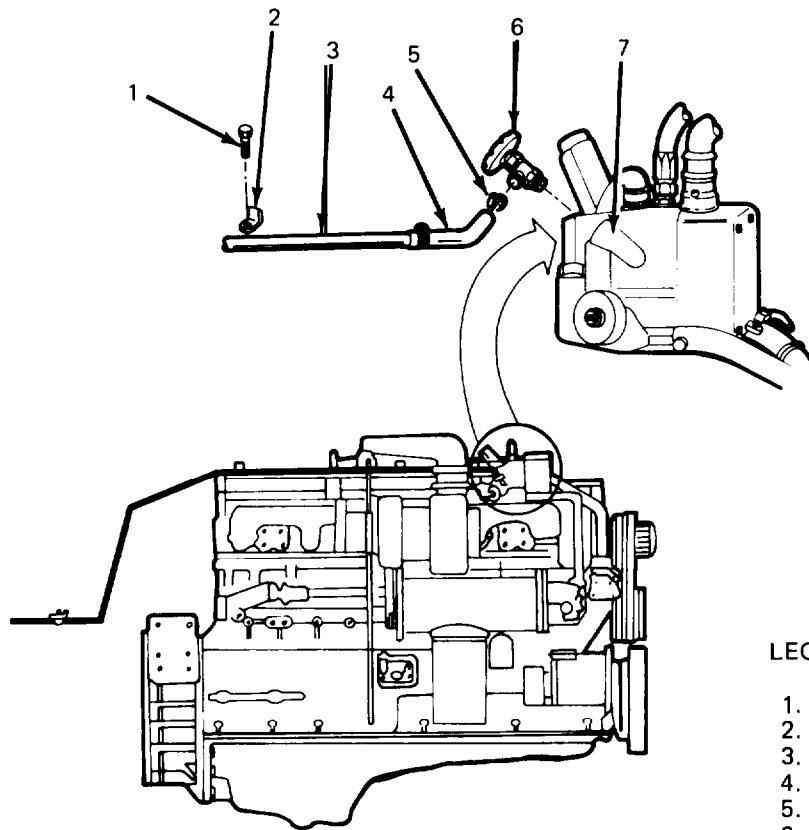
COOLING SYSTEM.

4-50. HEATER CONTROL VALVE MAINTENANCE (Continued).

LOCATION/ITEM

ACTION

REMARKS



LEGEND:

1. CAPSCREW
2. CLAMP
3. HEATER TUBE
4. RUBBER HOSE
5. CLAMP (2)
6. VALVE
7. MANIFOLD

TA 074678

COOLING SYSTEM.

4-51. WATER PUMP BELT MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(5)
b. Installation.	(5)
c. Adjustment.	(1)
11 Minutes Total.	

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

Belt Tension Gage.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

EQUIPMENT CONDITION

PARAGRAPH

4-44A.

4-45A.

CONDITION DESCRIPTION

Fan Removed.

Fan Belts Removed.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCE (TM)

None.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.

Transmission in Neutral.

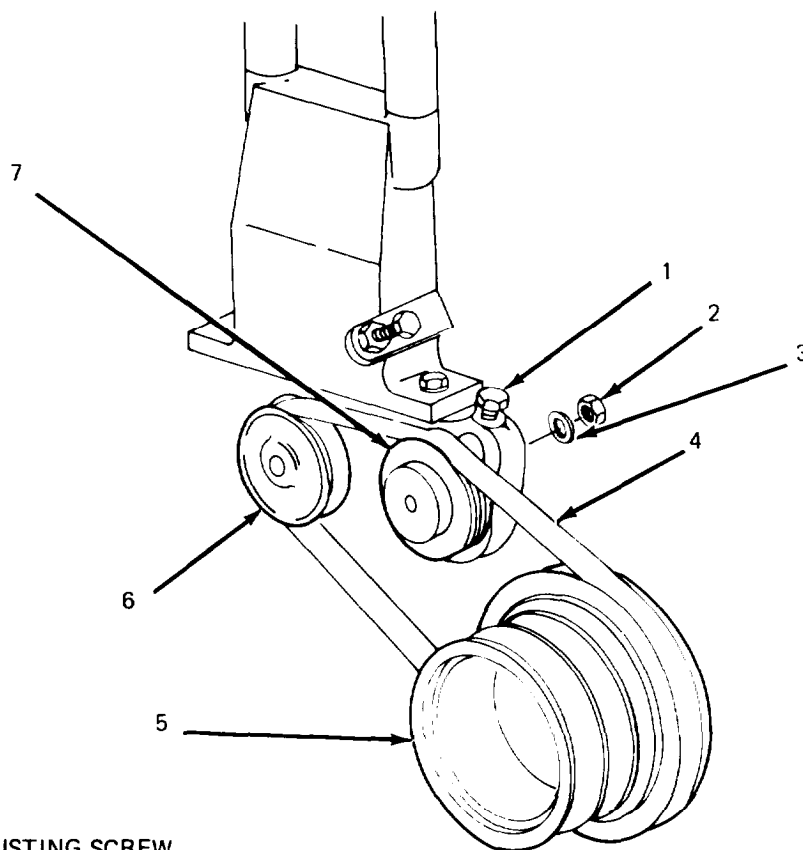
Park Brake Set.

TROUBLESHOOTING REFERENCES

None.

COOLING SYSTEM.**4-51. WATER PUMP BELT MAINTENANCE (Continued).**

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Idler pulley locknut (2) and washer (3).	Loosen.	
2. Idler belt adjusting screw (1).	Loosen.	
3. Idler belt (4).	Take off.	Fan belts and fan must be removed first.

**LEGEND:**

- 1. ADJUSTING SCREW
- 2. LOCKNUT
- 3. WASHER
- 4. IDLER BELT
- 5. ACCESSORY DRIVE
- 6. WATER PUMP RELAY
- 7. IDLER PULLEY

TA 074679

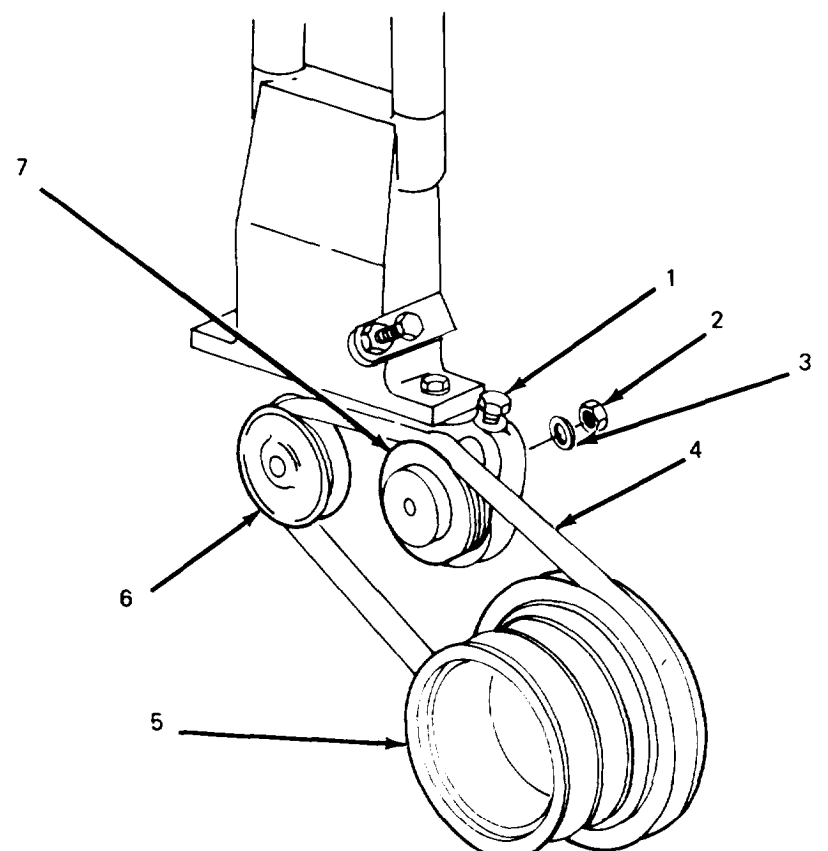
COOLING SYSTEM.

4-51. WATER PUMP BELT MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION.		
4. Idler belt (4).	Put on over idler pulley (7), water pump pulley (6), and accessory drive (5).	Do not force belt on with screwdriver.
C. ADJUSTMENT.		
5. Idler belt adjusting screw (1).	Adjust until belt tension is 90/100 on belt tension gage.	
6. Idler pulley locknut (2).	Tighten 50 lb-ft (68 N-m) with torque wrench.	
NOTE		
Follow-on maintenance action required:		
Install and adjust fan belts; refer to 4-45B and C.		
Install fan; refer to para 4-44B and C.		

COOLING SYSTEM

4-51. WATER PUMP BELT MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
 The diagram illustrates the components of a water pump belt system. It shows an idler pulley (7) at the top, which guides an idler belt (4). The belt (4) is connected to an accessory drive (5) and a water pump relay (6). An adjusting screw (1) and locknut (2) are used to adjust the tension of the belt. A washer (3) is also shown as part of the adjustment mechanism.		
LEGEND: 1. ADJUSTING SCREW 2. LOCKNUT 3. WASHER 4. IDLER BELT 5. ACCESSORY DRIVE 6. WATER PUMP RELAY 7. IDLER PULLEY		
TA 074880		

COOLING SYSTEM.**4-52. WATER MANIFOLD MAINTENANCE.****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

- a. Removal. (25)
 b. Inspection. (5)
 c. Installaticm. (30)
 60 Minutes Total.

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

TEST EQUIPMENT**SPECIAL TOOLS**

None.

MATERIALS/PARTS (P/N)

O-Rings (4) (5330-00-506-4874).
 Sealing Rings (6) (5330-00-143-8369).
 Gasket (3011931) (15434).
 Gasket (208132) (15434).

EQUIPMENT CONDITION**PARAGRAPH**

4-42A.

4-46A.

5-73A.

4-25A.

4-27A.

CONDITION DESCRIPTIONCoolant Drained below
Manifold Level.Fan Clutch Actuator
Removed.Water Temperature Switch
Wire Removed.Air Cleaner Assembly
Removed.

Turbo Air Inlet Removed.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCE (TM)

TM9-2320-273-20P.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
 Transmission in Neutral.
 Park Brake Set.

TROUBLESHOOTING REFERENCES

None.

COOLING SYSTEM.

4-52. WATER MANIFOLD MAINTENANCE (Continued).

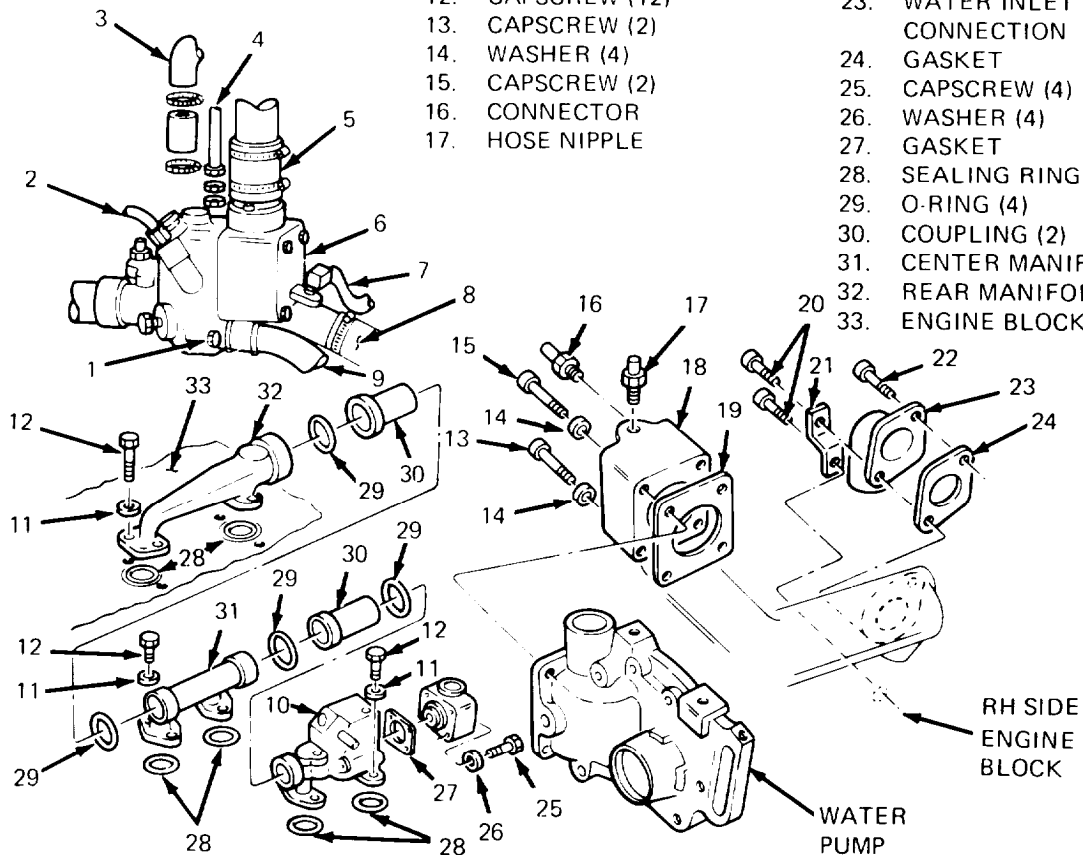
LOCATION/ITEM	ACTION	REMARKS

A. REMOVAL.

1. Return hose (3) and radiator hose (5).	a. Loosen clamp.
	b. Disconnect hose.

LEGEND:

1. CAPSCREW	7. AIR COMPRESSOR LINE	18. WATER TRANSFER CONNECTION
2. HEATER HOSE	8. HOSE	19. GASKET
3. RETURN HOSE	9. TRANSFER TUBE	20. CAPSCREW (2)
4. DEAERATION LINE	10. FRONT MANIFOLD	21. BRACKET
5. RADIATOR HOSE	11. WASHER (12)	22. CAPSCREW
6. THERMOSTAT HOUSING	12. CAPSCREW (12)	23. WATER INLET CONNECTION
	13. CAPSCREW (2)	24. GASKET
	14. WASHER (4)	25. CAPSCREW (4)
	15. CAPSCREW (2)	26. WASHER (4)
	16. CONNECTOR	27. GASKET
	17. HOSE NIPPLE	28. SEALING RING (6)
		29. O-RING (4)
		30. COUPLING (2)
		31. CENTER MANIFOLD
		32. REAR MANIFOLD
		33. ENGINE BLOCK



TA 074681

COOLING SYSTEM.

4-52. WATER MANIFOLD MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
2. Transfer tube (9).	a. Remove capscrew (1). b. Remove tube (9).	
3. Deaeration line (4) heater hose (2), air compressor line (7), and hose (8).	Remove from front manifold (10).	
4. Four capscrews (25) and washers (26).	Unscrew and remove thermostat housing (6).	
5. Rear manifold (32), two O-rings (29), coupling (30), two sealing rings (28), four capscrews (12), and washers (11).	a. Unscrew and remove capscrews and washers. b. Remove rear manifold and coupling. c. Throw away sealing rings and O-rings.	Examine O-rings and sealing rings as you remove them. Leaks may sometimes be repaired by replacing broken or damaged rings.
6. Center manifold (31), coupling (30), two O-rings (29), sealing rings (28), four capscrews (12), and washers (11).	a. Unscrew and remove capscrews and washers. b. Remove center manifold and coupling. c. Throw away O-rings and sealing rings.	Examine O-rings and sealing rings as you remove them. Leaks may sometimes be repaired by replacing broken or damaged rings.
7. Front manifold (10), gasket (27), two sealing rings (18), four capscrews (12), and washers (11).	a. Unscrew and remove capscrews and washers. b. Remove front manifold. c. Throw away gasket and sealing rings.	Examine sealing rings as you remove them. Leaks may sometimes be repaired by replacing broken or damaged rings.
8. Hose nipple (17) and connector (16).	Unscrew and remove.	
9. Two capscrews (13), two capscrews (15), and four washers (14).	Unscrew and remove.	
10. Two capscrews (20) and capscrews (22).	Unscrew and remove water transfer connection (18), gasket (19), bracket (21), water inlet connection (23), and gasket (24).	Discard gasket (19) and (24).

COOLING SYSTEM.

4-52. WATER MANIFOLD MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS

LEGEND:

1. CAPSCREW
2. HEATER HOSE
3. RETURN HOSE
4. DEAERATION LINE
5. RADIATOR HOSE
6. THERMOSTAT HOUSING

7. AIR COMPRESSOR LINE
8. HOSE
9. TRANSFER TUBE
10. FRONT MANIFOLD
11. WASHER (12)
12. CAPSCREW (12)
13. CAPSCREW (2)
14. WASHER (4)
15. CAPSCREW (2)
16. CONNECTOR
17. HOSE NIPPLE

18. WATER TRANSFER CONNECTION
19. GASKET
20. CAPSCREW (2)
21. BRACKET
22. CAPSCREW
23. WATER INLET CONNECTION
24. GASKET
25. CAPSCREW (4)
26. WASHER (4)
27. GASKET
28. SEALING RING (6)
29. O-RING (4)
30. COUPLING (2)
31. CENTER MANIFOLD
32. REAR MANIFOLD
33. ENGINE BLOCK

TA 074682

COOLING SYSTEM.**4-52. WATER MANIFOLD MAINTENANCE (Continued).**

LOCATION/ITEM	ACTION	REMARKS
B. INSPECTION.		
11. Front manifold (10), center manifold (31), rear manifold (32), two couplings (30), thermostat housing (6), engine block (33), water transfer connection (18), and water inlet connection (23).	a. Inspect mating surfaces for: 1. Burrs. 2. Cracks. 3. Distortion. b. Inspect manifolds and couplings for: 1. Cracks. 2. Leaks. 3. Discoloration.	Replace as necessary.
C. INSTALLATION.		
12. Hose nipple (17) and connector (16).	Screw into water transfer connection (18).	
13. New gasket (19) and water transfer connection (18).	Install to water pump with two capscrews (13), two capscrews (15), and four washers (14).	
14. New gasket (24), water inlet connection (23), and bracket (21).	Mount to water transfer connection (18) as shown and to side of engine with two capscrews (20) and one capscrew (22).	

COOLING SYSTEM.

4-52. WATER MAN I FOLD MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS

LEGEND:

1. CAPSCREW	7. AIR COMPRESSOR LINE	18. WATER TRANSFER CONNECTION
2. HEATER HOSE	8. HOSE	19. GASKET
3. RETURN HOSE	9. TRANSFER TUBE	20. CAPSCREW (2)
4. DEAERATION LINE	10. FRONT MANIFOLD	21. BRACKET
5. RADIATOR HOSE	11. WASHER (12)	22. CAPSCREW
6. THERMOSTAT HOUSING	12. CAPSCREW (12)	23. WATER INLET CONNECTION
	13. CAPSCREW (2)	24. GASKET
	14. WASHER (4)	25. CAPSCREW (4)
	15. CAPSCREW (2)	26. WASHER (4)
	16. CONNECTOR	27. GASKET
	17. HOSE NIPPLE	28. SEALING RING (6)
		29. O-RING (4)
		30. COUPLING (2)
		31. CENTER MANIFOLD
		32. REAR MANIFOLD
		33. ENGINE BLOCK

Diagram illustrating the Water Man I Fold Maintenance assembly, showing components and their assembly locations. Key components labeled include:

- 1. CAPSCREW
- 2. HEATER HOSE
- 3. RETURN HOSE
- 4. DEAERATION LINE
- 5. RADIATOR HOSE
- 6. THERMOSTAT HOUSING
- 7. AIR COMPRESSOR LINE
- 8. HOSE
- 9. TRANSFER TUBE
- 10. FRONT MANIFOLD
- 11. WASHER (12)
- 12. CAPSCREW (12)
- 13. CAPSCREW (2)
- 14. WASHER (4)
- 15. CAPSCREW (2)
- 16. CONNECTOR
- 17. HOSE NIPPLE
- 18. WATER TRANSFER CONNECTION
- 19. GASKET
- 20. CAPSCREW (2)
- 21. BRACKET
- 22. CAPSCREW
- 23. WATER INLET CONNECTION
- 24. GASKET
- 25. CAPSCREW (4)
- 26. WASHER (4)
- 27. GASKET
- 28. SEALING RING (6)
- 29. O-RING (4)
- 30. COUPLING (2)
- 31. CENTER MANIFOLD
- 32. REAR MANIFOLD
- 33. ENGINE BLOCK

Additional labels in the diagram include: RH SIDE ENGINE BLOCK, WATER PUMP.

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COOLING SYSTEM.

4-52. WATER MANIFOLD MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
C. INSTALLATION (Continued).		
15. Front manifold (10), and two new sealing rings (28).	Place in position on engine block (33).	
16. Four capscrews (12) and washers (11).	Screw on finger tight.	
17. Coupling (30), two new O-rings (29), center manifold (31) and two new sealing rings (28).	Place in position against front manifold (10) and engine block (33).	
18. Four capscrews (12) and washers (11).	Screw on finger tight.	
19. Rear manifold (32), two new O-rings (29), coupling (30), and two new sealing rings (28)	Place in position on engine block (33) against center manifold (31).	
20. Four capscrews (12) and washers (11).	Screw on finger tight.	
21. Twelve capscrews (12).	Tighten to 35 lb-ft (47 N-m) with torque wrench.	Alternate to tighten down evenly.
22. New gasket (27) and thermostat housing (6).	Set in place.	
23. Four capscrews (25) and washers (26).	Install and tighten.	
24. Deaeration line (4) and heater hose (2).	Screw into front manifold (10).	
25. Air compressor line (7).	Install and tighten.	
26. Return hose (3), radiator hose (5) and hose (8).	Attach to front manifold (10) and tighten clamps.	
27. Transfer tube (9).	Install to front manifold (10) with capscrew (1).	

COOLING SYSTEM.

4-52. WATER MANIFOLD MAINTENANCE (Continued).

LOCATION/ITEM

ACTION

REMARKS

NOTE

Follow on maintenance required:

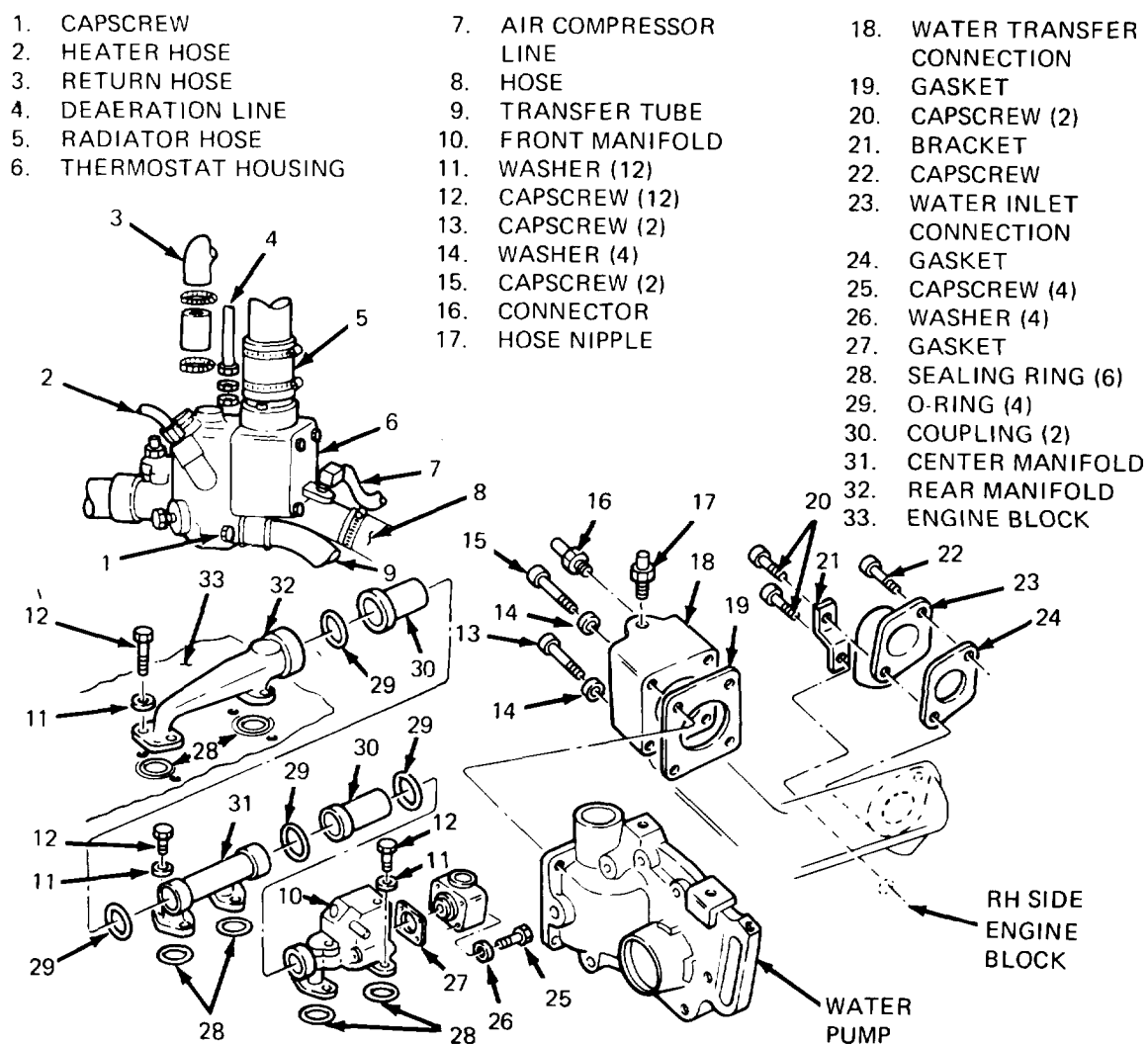
Install water temperature switch wire; refer to paragraph 5-73B.

Install fan clutch actuator; refer to paragraph 4-46C.

Install air cleaner and turbocharger air intake; refer to paragraph 4-25D & 4-27C.

Refill cooling system and check for leaks; refer to paragraph 4-42C & D.

LEGEND:



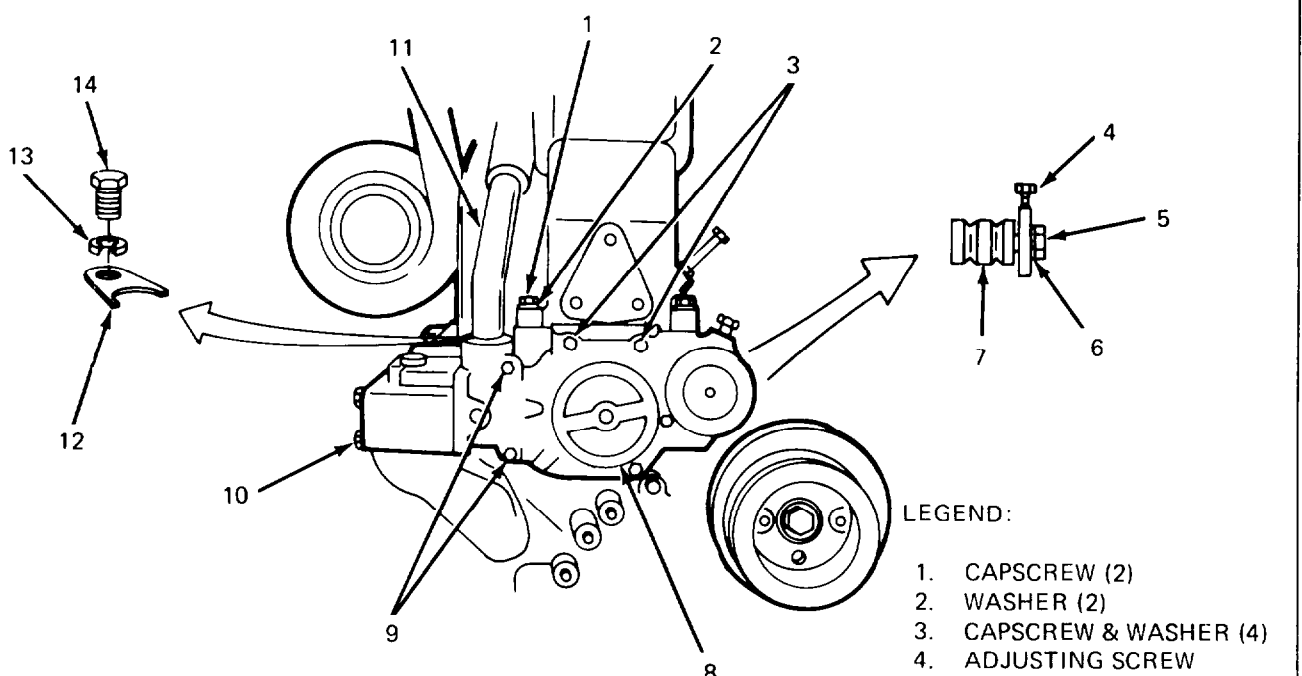
TA 075653

COOLING SYSTEM.

4-53. WATER PUMP MAINTENANCE.		
THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)		
a. Removal. (15)		
b. Installation. (15)		
30 Minutes Total.		
INITIAL SETUP		
APPLICABLE CONFIGURATIONS	EQUIPMENT CONDITION	CONDITION DESCRIPTION
All.	4-44A.	Fan Removed.
TEST EQUIPMENT	4-45A.	Fan Clutch and Belts Removed.
None.	4-51A.	Water Pump Belts Removed.
SPECIAL TOOLS	4-42A.	Coolant Drained.
None.		
MATERIALS/PARTS (P/N)		
Gasket, Water Pump to Engine Block (5330-01-066-5350).		
Gasket, Water Pump to Heater Manifold, 208132 (15434).		
PERSONNEL REQUIRED		
One (MOS-63B20).		
SPECIAL ENVIRONMENTAL CONDITIONS		
Vehicle Parked on Level Ground.		
REFERENCES (TM)		
None.		
GENERAL SAFETY INSTRUCTIONS		
Engine OFF.		
Transmission in Neutral.		
Park Brake Set.		
TROUBLESHOOTING REFERENCES		
Table 4-1.		

COOLING SYSTEM.

4-53. WATER PUMP MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
 LEGEND: 1. CAPSCREW (2) 2. WASHER (2) 3. CAPSCREW & WASHER (4) 4. ADJUSTING SCREW 5. HEX NUT 6. LOCKWASHER 7. IDLER PULLEY 8. WATER PUMP 9. CAPSCREW & WASHER (2) 10. CAPSCREW & WASHER (4) 11. BYPASS TUBE 12. CLAMP 13. LOCKWASHER 14. CAPSCREW		

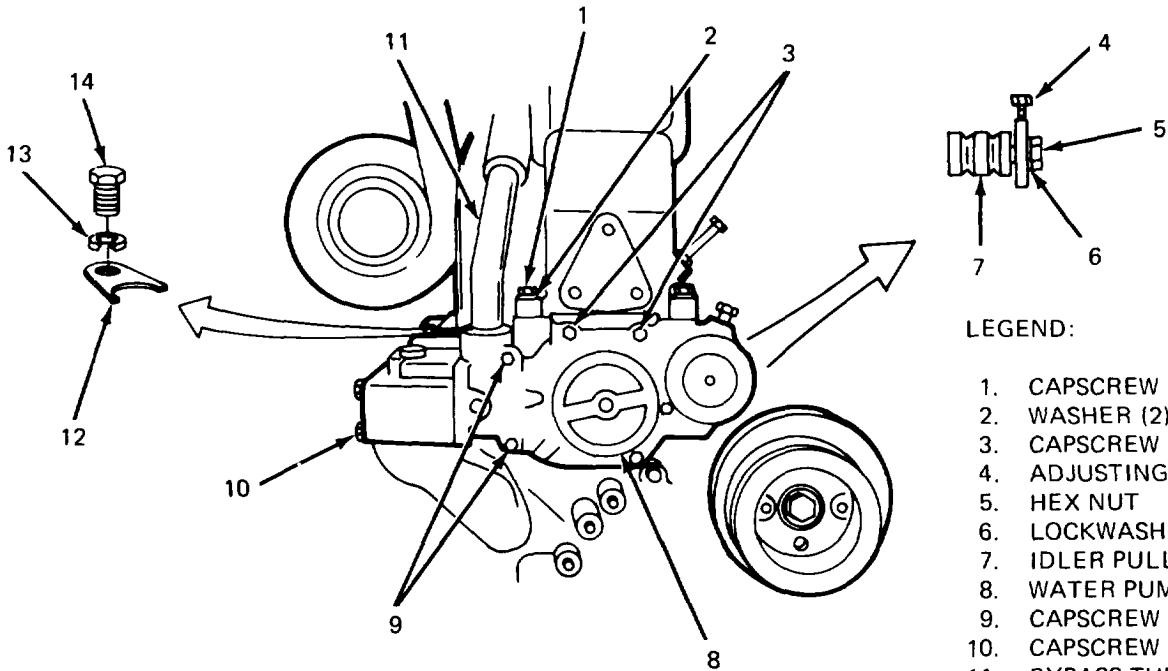
TA 074684

COOLING SYSTEM.

4-53. WATER PUMP MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Adjusting screw (4).	Remove.	
2. Idler pulley (7).	Remove hex nut (5) and lock-washer (6) and remove idler pulley from water pump (8).	
3. Two capscrews (1) and washers (2).	Loosen and remove.	
4. Four capscrews and washers (3).	Loosen and remove.	
5. Two capscrews and washers (9).	Loosen and remove.	
6. Capscrew (14), lockwasher (13), and clamp (12).	Unscrew and remove.	
7. Four capscrews and washers (10).	Unscrew and remove.	
8. Water pump (8) and gaskets.	a. Remove from engine and bypass tube (11). b. Throw away gaskets.	
B. INSTALLATION.		
9. Water pump (8) and new gaskets.	Put in position on bypass tube (11) and engine.	
10. Four capscrews and washers, (10).	Install and tighten to 35 lb-ft (47 N-m).	
11. Capscrew (14), lockwasher (13), and clamp (12).	Install and tighten securely,	
12. Two capscrews and washer, four capscrews and washers (3).	Install and tighten to 35 lb-ft (47 N-m).	
13. Two capscrews (1) and washers (2).	Install and tighten securely.	
14. Idler pulley (7).	Install in water pump (8) and secure with hex nut (5) and lockwasher (6).	Do not tighten.

COOLING SYSTEM.

4-53. WATER PUMP MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION (Continued).		
15. Adjusting screw (4).	Install.	No specific adjustment needed at this time.
NOTE Follow-on maintenance action required: install water pump belt; refer to para 4-51 B and C. Adjust water pump belt; refer to para 4-51C. Install fan clutch; refer to para 4-45C. Install fan belt; refer to para 4-45C. Install fan; refer to para 4-44B. Replenish coolant and check for leaks, refer to para 4-42C and D. Fill with arctic anti freeze if sub zero.		
 LEGEND: 1. CAPSCREW (2) 2. WASHER (2) 3. CAPSCREW (4) 4. ADJUSTING SCREW 5. HEX NUT 6. LOCKWASHER 7. IDLER PULLEY 8. WATER PUMP 9. CAPSCREW (2) 10. CAPSCREW (4) 11. BYPASS TUBE 12. CLAMP 13. LOCKWASHER 14. CAPSCREW		

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COOLING SYSTEM.**-54. WATER PUMP IDLER PULLEY MAINTENANCE.****HIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

Removal. (10)
 Installation. (10)
 Operational Check. (5)
 25 Minutes Total.

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

EQUIPMENT CONDITION**PARAGRAPH**

None.

CONDITION DESCRIPTION

None.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

None.

REFERENCES (TM)

TM 9-2320-273-10.

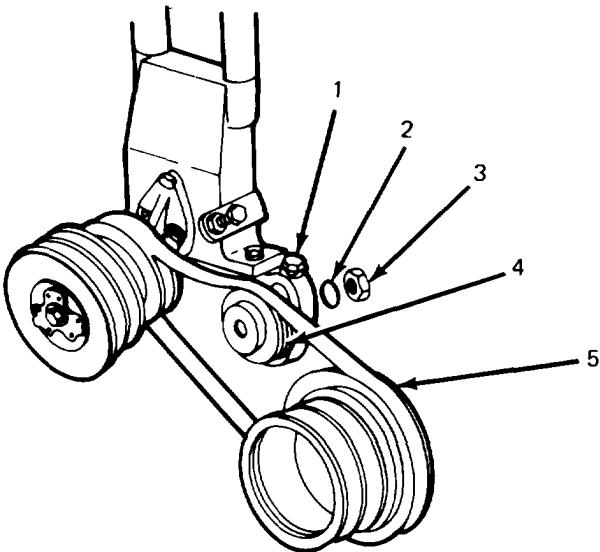
GENERAL SAFETY INSTRUCTIONS

None.

TROUBLESHOOTING REFERENCES

None.

COOLING SYSTEM.**4-54. WATER PUMP IDLER PULLEY MAINTENANCE (Continued).**

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Nut (3) and washer (2).	Loosen and remove.	
2. Idler belt adjusting screw (1).	Remove.	
3. Idler pulley (4).	Remove.	
		
LEGEND: 1. ADJUSTING SCREW 2. WASHER 3. NUT 4. IDLER PULLEY 5. BELT		

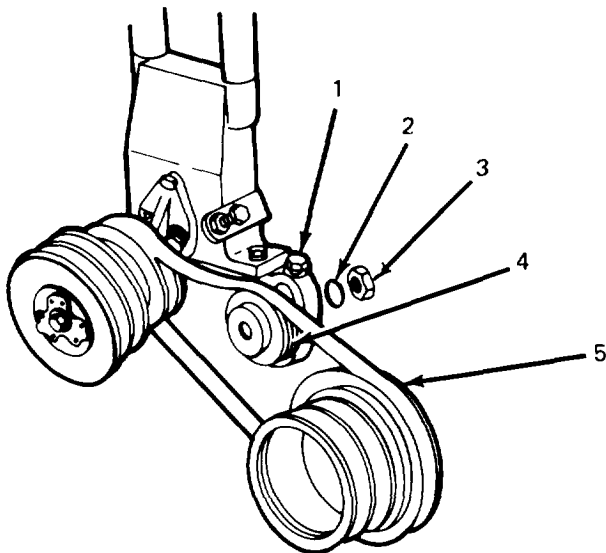
TA 074686

COOLING SYSTEM.**4-54. WATER PUMP IDLER PULLEY MAINTENANCE (Continued).**

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION.		
4. Idler pulley (4).	Set into place.	
5. Idler belt adjusting screw (1).	Install.	
6. Washer (2) and nut (3).	Screw on finger tight.	
7. Belt (5).	a. Adjust belt tension with adjusting screw (1) until belt tension gage reads 90/100. b. Tighten locknut (3) to 50 lb-ft (68 N-m) with a torque wrench.	
C. OPERATIONAL CHECK.		
8. Engine.	Start up (see TM 9-2320-273-10).	
WARNING Be sure to stay completely clear of fan blades. Do not reach into fan area while engine is operating.		
9. Idler pulley (4).	Check that belt rides smoothly on pulley and that pulley is not slipping.	
10. Engine.	Shut down (see TM 9-2320-273-10).	

COOLING SYSTEM.

4-54. WATER PUMP IDLER PULLEY MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
 The diagram illustrates the assembly of the water pump idler pulley. It shows a belt being guided over a pulley system. Numbered callouts identify the following components: 1. Adjusting screw, 2. Washer, 3. Nut, 4. Idler pulley, and 5. Belt. The belt is shown looping around a large pulley and then under the idler pulley. The idler pulley is mounted on a bracket that is being adjusted using the screw, washer, and nut assembly.		
LEGEND: 1. ADJUSTING SCREW 2. WASHER 3. NUT 4. IDLER PULLEY 5. BELT		
TA 074687		

ALTERNATOR DRIVE SYSTEM.**4-55. ALTERNATOR BELTS MAINTENANCE.****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

- a. Removal. (5)
 - b. Installation. (5)
 - c. Adjustment. (1)
- 11 Minutes Total.

INITIAL SETUPAPPLICABLE CONFIGURATIONS

All.

EQUIPMENT CONDITIONPARAGRAPH

None.

CONDITION DESCRIPTION

None.

TEST EQUIPMENT

Belt Tension Gage.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

None.

GENERAL SAFETY INSTRUCTIONS

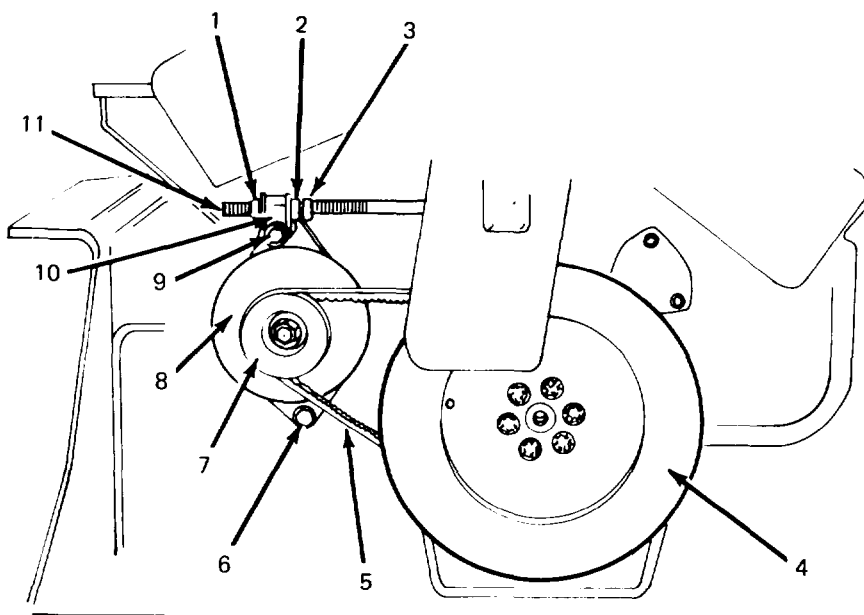
Engine OFF.
Transmission in Neutral.
Park Brake Set.

TROUBLESHOOTING REFERENCES

None.

ALTERNATOR DRIVE SYSTEM.**4-55. ALTERNATOR BELTS MAINTENANCE (Continued).**

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Alternator capscrews (6) and (9).	Loosen.	
2. Adjusting nut (3).	Loosen.	
3. Adjusting nut (2).	Loosen to allow alternator (8) to slide towards engine along adjusting rod (11), enough to remove alternator belts (5).	
4. Two alternator belts (5).	Take off.	The belts are a matched set.

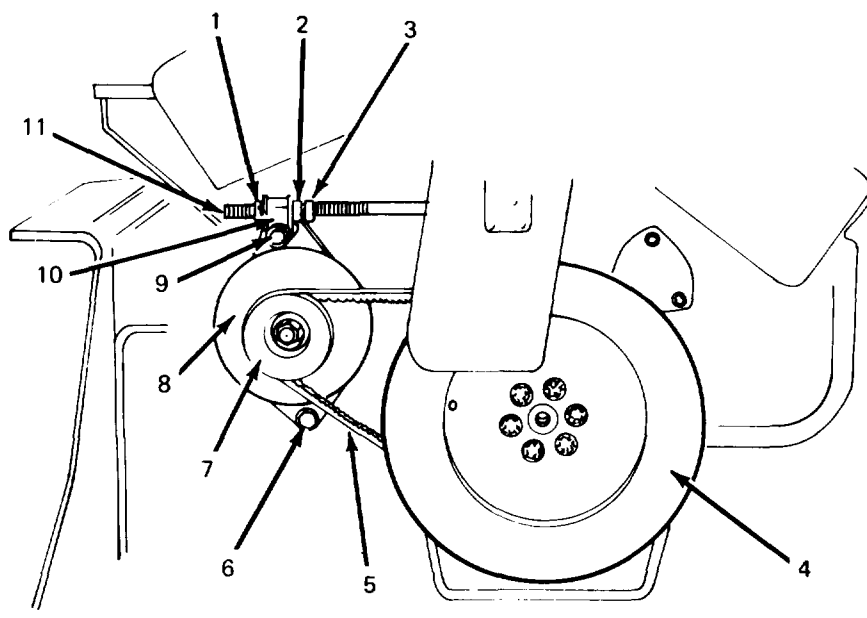
**LEGEND:**

1. JAM NUT	7. ALTERNATOR PULLEY
2. ADJUSTING NUT	8. ALTERNATOR
3. ADJUSTING NUT	9. CAPSCREW
4. VIBRATION DAMPER	10. ADJUSTING ROD COLLAR
5. ALTERNATOR BELT (2)	11. ADJUSTING ROD
6. CAPSCREW	

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ALTERNATOR DRIVE SYSTEM.**4-55. ALTERNATOR BELTS MAINTENANCE (Continued),**

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION.		
5. Alternator belts (5).	a. Put onto alternator pulley (7) and vibration damper (4), b. Push alternator away from engine until belts stop the travel of alternator.	Do not pry on with screwdriver. Always replace belts as a set. Never put on just one new belt.
C. ADJUSTMENT.		
6. Adjusting nut (2).	Tighten against adjusting rod collar (10) until belt tension is 110 lbs for new belts, or 80 lbs for used belts.	A used belt is one that has been on the truck more than a thousand miles.
7. Jam nut (1)	Tighten against collar (10).	
8. Adjusting nut (3).	Tighten against adjusting nut (2).	
9. Alternator capscrews (6) and (9).	Torque to 30 lb-ft (41 N-m).	

**LEGEND:**

1. JAM NUT
2. ADJUSTING NUT
3. ADJUSTING NUT
4. VIBRATION DAMPER
5. ALTERNATOR BELT (2)
6. CAPSCREW
7. ALTERNATOR PULLEY
8. ALTERNATOR
9. CAPSCREW
10. ADJUSTING ROD COLLAR
11. ADJUSTING ROD

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CHAPTER 5

ELECTRICAL AND INSTRUMENTATION SYSTEMS MAINTENANCE

5-1. OVERVIEW.

This chapter provides you with the following information related to electrical and instrumentation systems maintenance:

- a. All required special tools and equipment,
- b. Other technical manuals.
- c. Troubleshooting procedures.
- d. Maintenance procedures.

Section I REPAIR PARTS, SPECIAL TOOLS, TMDE AND SUPPORT EQUIPMENT

5-2. COMMON TOOLS AND EQUIPMENT .

For authorized common tools and equipment, refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

5-3. SPECIAL TOOLS, TMDE, SUPPORT EQUIPMENT.

The special tools, TMDE and support equipment required for the electrical and instrumentation maintenance procedures described in this chapter are limited to the test meters shown in para 5-6.

5-4. SPARES AND REPAIR PARTS.

Spares and repair parts are listed and illustrated in the Repair Parts and Special Tools List covering Organizational Maintenance for this equipment (TM 9-2320-273-20P).

Section II TROUBLESHOOTING

5-5. INTRODUCTION.

a. *Scope.* This section contains detailed troubleshooting information for locating and correcting malfunctions in the electrical system. Each of the functional subsystems is treated separately by means of:

- (1) A physical and functional description.
- (2) A circuit schematic.
- (3) A brief overall subsystem check.
- (4) Step-by-step test to diagnose problems using authorized test equipment,

b. *Subsystem Circuits.* The functional subsystem circuits covered in this section are presented in the following sequence:

- (1) Battery (table 5-1).
- (2) Starting (table 5-2).
- (3) Ether Quick-Start Control (table 5-3).
- (4) Engine Retarder Control (table 5-4).
- (5) Battery Charging (table 5-5).
- (6) Warning Lamps and Alarms (table 5-6).
- (7) Instruments and Indicators (table 5-7).
- (8) Headlamps (table 5-8).
- (9) Marker Lamps (table 5-9).
- (10) Parking and Tail Lamps (table 5-10).
- (11) Stop and Turn Signal Lamps (table 5-11).
- (12) Backup Lamps (table 5-12).
- (13) Blackout Lighting System (table 5-13).
- (14) Miscellaneous Electrical (table 5-14).

c. *General Troubleshooting Procedures.* The following procedures are general "in nature and should be applied as appropriate during any electrical troubleshooting.

(1) *Research the problem.* Before you start detail troubleshooting procedures, review the wiring diagram and schematic (Appendix D) to thoroughly familiarize yourself with the circuit(s) involved. Analyze the symptoms and conditions and use common sense and logic to determine the most likely cause for the problem, then troubleshoot that circuit first. The more information you have concerning the problem, the easier it will be to troubleshoot.

5-5. INTRODUCTION (Continued).

(2) *General Approach.* First, isolate to the subsystem level (in cases where more than one subsystem is involved); next, isolate the problem to a single circuit within the subsystem; then isolate the problem to the faulty component. An example of an exception to this rule would be in cases where a lamp is out; the first step would be to check the bulb.

(3) *Wiring.* Frayed, broken, loose, or corroded wiring is a common source of problems in any electrical circuit. Always make a visual inspection before starting detail troubleshooting. Observe in particular, contacts to ground. Components with case grounds are especially troublesome.

(4) *Circuit Breakers.*

CAUTION

Never jumper a cycling circuit breaker unless specifically instructed to do so in the troubleshooting procedure. The overload could cause serious damage to equipment and result in a fire.

The circuit breakers in these circuits are the automatic recycling type. If an overload exists, the circuit breaker will open and shut off all circuits being fed by that particular circuit breaker. After cooling, the circuit breaker will close. If the problem still exists the circuit breaker will again open. This cycle will continue until the problem is corrected. When a circuit breaker is cycling, it will feel warm to the touch and you can hear a clicking sound.

(5) *Relays.* A relay is basically a two-element device – a coil and a set of contacts in a common housing. When voltage is applied to the coil, the contacts close (normally open relay) or open (normally closed relay). The relay provides a path of supply voltage to a circuit or component which draws a heavy current load. In troubleshooting, first be sure the coil is functioning. Connect a multi meter between frame ground and the hot side of the coil and check for 12 volts dc nominal. If voltage is present, disconnect the multi meter and measure voltage across any set of contacts with the coil voltage present. The meter should indicate either 12 or 24 volts dc nominal depending on the circuit involved. Sometimes it is advantageous to simply jumper across the relay contacts and if the inoperative circuit being checked works, a bad relay or voltage supply wiring is indicated.

5-6, TEST EQUIPMENT.

a. *Introduction.* In automotive troubleshooting, the Simpson 160, the TS-352B/U, and the AN/URM-105 will do the same job. Therefore, your automotive shop sets may contain any one of these multi meters (fig. 5-1). Any of these three multi meters can be used to troubleshoot the electrical system.

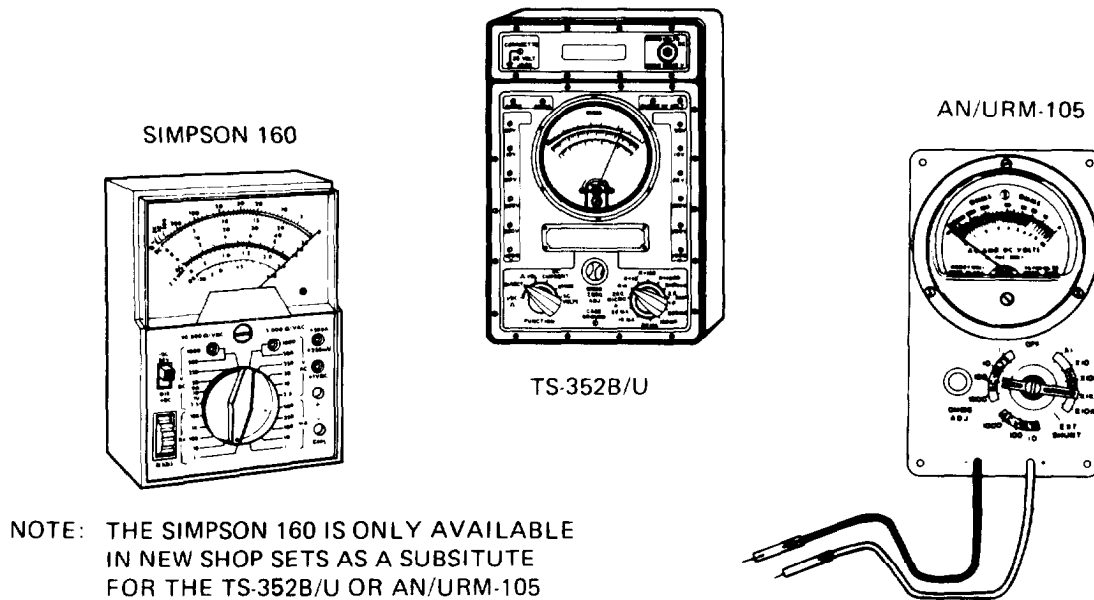


Figure 5-1. Multimeters

5-6. TEST EQUIPMENT (Continued).

b. Using the Ohms Scale. The Ohms Scale (fig. 5-2 thru fig. 5-4) is used to make tests for continuity, shorts, and resistance. The multi meter must be set up and "zeroed" before making these tests. Do the following steps that match the multi meter you have:

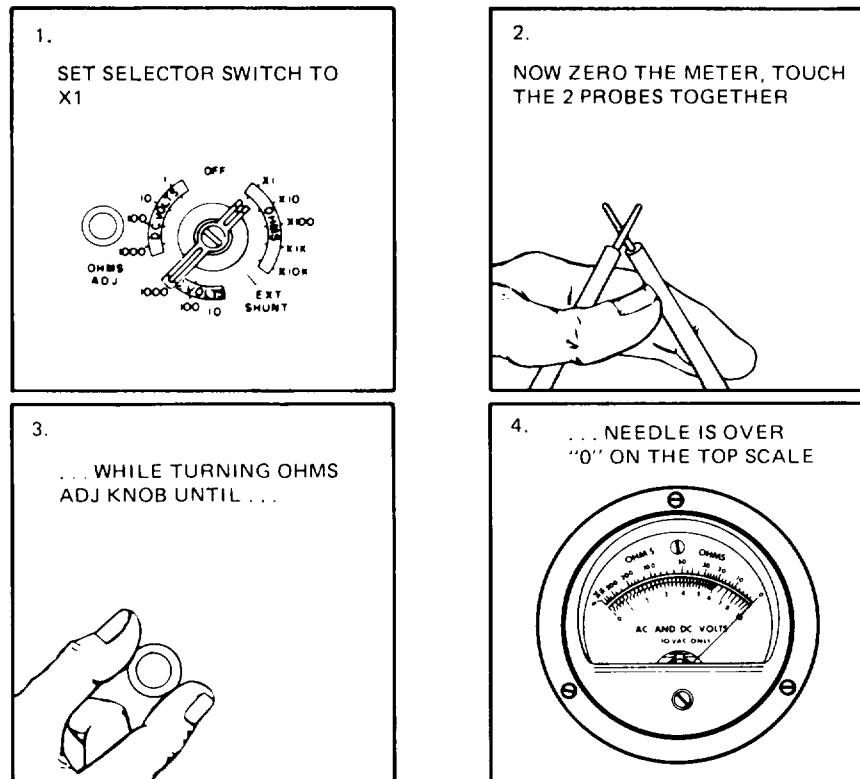


Figure 5-2. Using the Ohms Scale and "Zeroing" Multimeter AN/URM-105

NOTE

If needle will not "zero," replace the batteries.
If the needle still will not "zero" after replacing the batteries, turn the meter in for repair.

5-6. TEST EQUIPMENT (Continued).

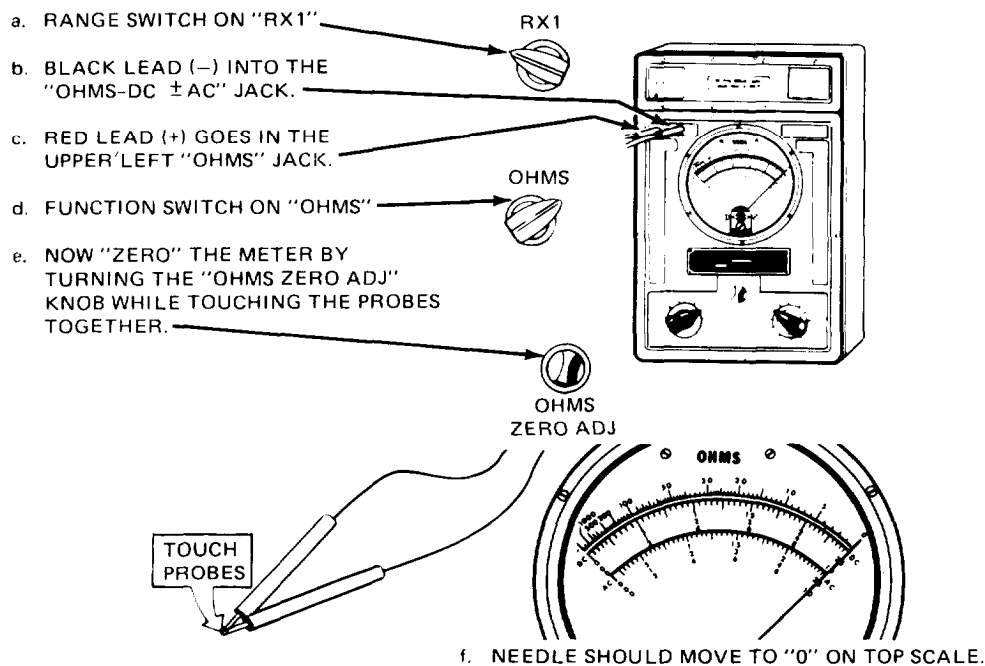


Figure 5-3. Using Ohms Scale and "Zeroing" Multimeter TS-352 B/U

NOTE

If needle will not "zero", replace the batteries. If the needle will not "zero" after replacing the batteries, turn the meter in for repair.

5-6. TEST EQUIPMENT (Continued).

SIMPSON 160

- (1) Set selector switch on "RX1".
- (2) Put black probe in "COM-" jack.
- (3) Put red probe in "+" jack.
- (4) Now "zero" the meter. While touching the probes together, turn "ADJ" knob until needle is over the "0" on the top scale.

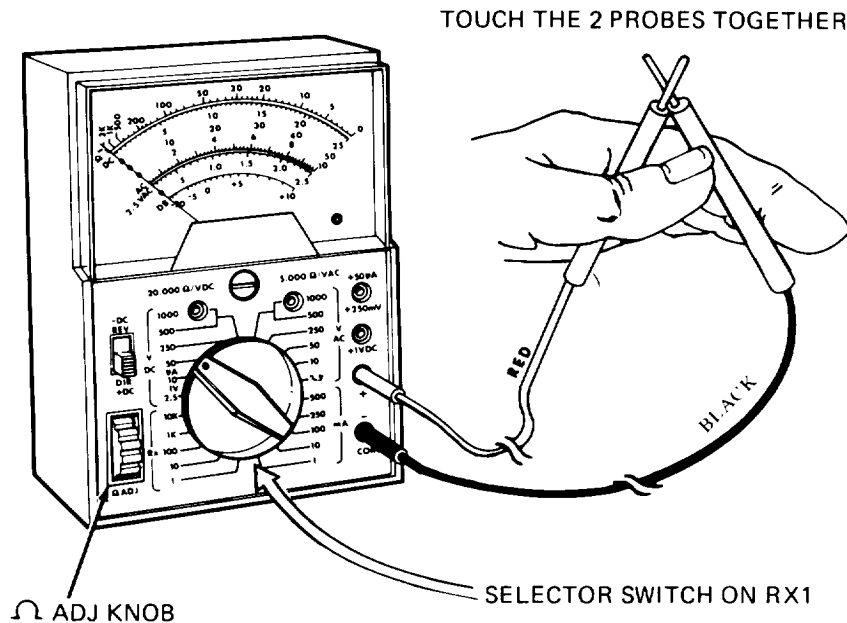


Figure 5-4. Using Ohms Scale and "Zeroing" Multimeter Simpson 160

NOTE

If the needle will not "zero", replace the batteries. If the needle still will not "zero" after replacing the batteries, turn the meter in for repair.

5-6. TEST EQUIPMENT (Continued).

c. *Continuity Tests.* Continuity tests are made to check for breaks in a circuit (such as the switch, light bulb, or electrical cable illustrated). To make a continuity check (Fig. 5-5), do the following steps:

CAUTION

Failure to perform the following step can damage the multimeter.

- (1) Disconnect the circuit being tested. To be safe, disconnect the battery ground strap.
- (2) Set up and "zero" the multimeter.
- (3) Connect the meter probes to both terminals of the circuit being tested. (The TS-352B/U is illustrated below, but the probes are connected to the circuit the same way with each of the three multi meters.)

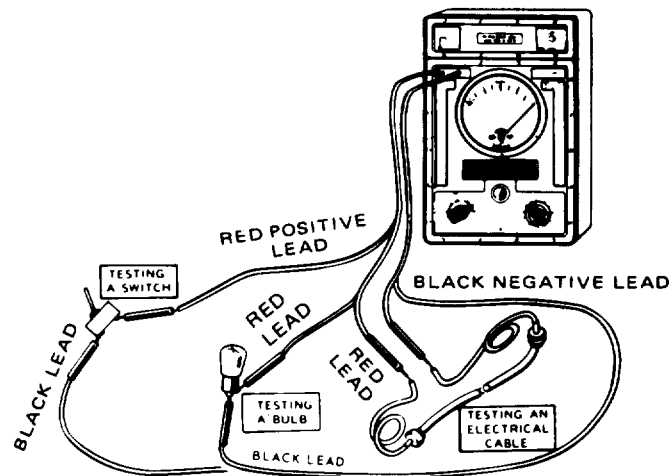


Figure 5-5. Making a Continuity Check

- (4) Look at the meter needle.
 - (a) If the needle swings to the far right over the "O" on the top scale (on all three multimeters), the circuit has continuity.
 - (b) If the needle doesn't move, the circuit is open (broken).
 - (c) If the needle jumps or flickers, there is a loose connection in the circuit being tested,

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5-6. TEST EQUIPMENT (Continued).

d. *Testing for Shorts.* A short (or short circuit) occurs when two circuits that should not be connected have metal-to-metal contact with each other. A short also occurs when a circuit that should not touch ground has metal-to-metal contact with ground. To check for shorts, do the following steps:

CAUTION

Failure to do the following step can damage the multimeter.

- (1) Disconnect the circuit being tested. To be safe, disconnect the battery ground cable.
- (2) Set UP and "zero" the multimeter (para b.).
- (3) With any of the three multimeters, connect one probe to one circuit and the other probe to the other circuit or ground (if checking for a short to ground). Figure 5-6 shows a check to see if wire "A" is shorted to wire "B" in the wiring harness.

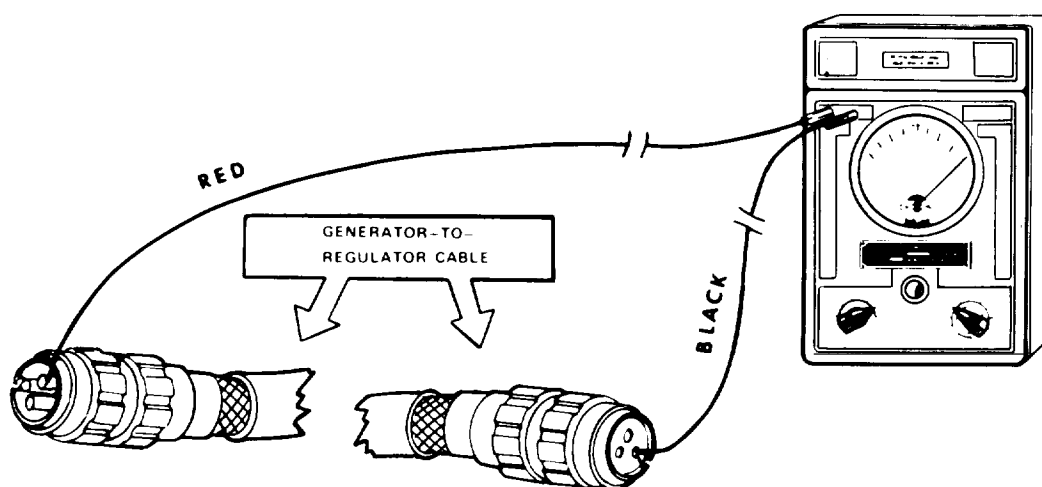


Figure 5-6. Testing for Shorts

- (4) Look at the needle.
 - (a) If the needle swings to the far right over the "O" on the top scale (on all three multi meters), the circuits are shorted.
 - (b) If the needle doesn't move, the circuits are not shorted.
 - (c) If needle jumps or flickers, the circuits are occasionally shorted.
- e. *Testing Resistance.* To measure resistance in a circuit do the following steps.

CAUTION

Failure to do the following step can damage the multimeter.

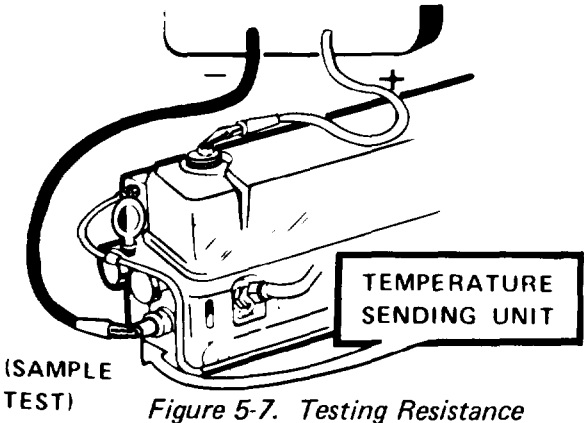
5-6. TEST EQUIPMENT (continued).

- (1) Disconnect the circuit being tested. To be safe, disconnect the battery ground cable.
- (2) Set up and “zero” the multimeter (para b).
- (3) If the test in this manual calls for an “Ohms Range” different than “RX” or “X1,” set the selector switch to that range (like “RX10” or “X10”).

NOTE

“ZERO” the meter whenever you change ranges.

- (4) With any of the three multimeters, connect the probes across the circuit or item to be measured. Figure 5-7 below shows measuring the resistance of a temperature sending unit:



- (5) Read the meter. If the meter switch is on the “RX1” or “X1” range, the reading is taken directly from the top scale. If the meter switch is on a different range, (fig. 5-8), multiply the reading on the scale according to the table below.

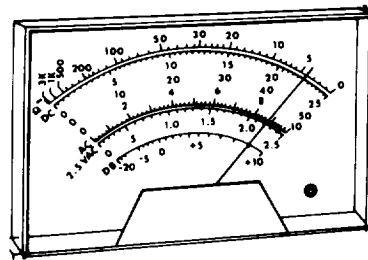
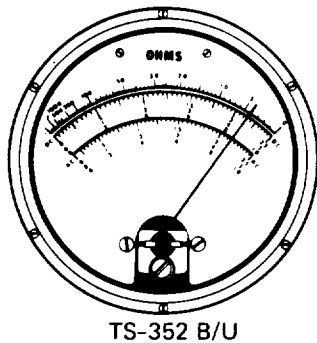
OHMS SWITCH SETTING.	YOU DO!
X1 or RX1.	READ NUMBER ON SCALE.
X10 OR RX10	MULTIPLY READING BY 10.
X100 OR RX 100.	MULTIPLY READING BY 100.
X1K OR RX1K.	MULTIPLY READING BY 1000.
X10K OR RX10K.	MULTIPLY READING BY 10,000.
(REMEMBER: K = 1000)	

Figure 5-8. Ohms Switch Settings

5-6. TEST EQUIPMENT (Continued).

For example, the meters in fig, 5-9 below show the following readings:

OHMS SWITCH SETTING.	READING.
X1 OR RX1.	4 OHMS.
X10 OR RX10.	40 OHMS.
X100 OR RX100.	400 OHMS.



SIMPSON 160

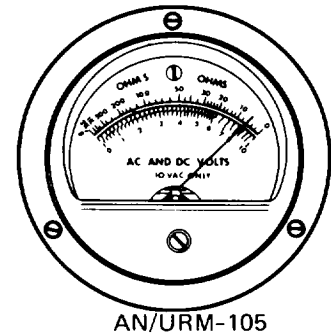


Figure 5-9. OHMS Switch Settings

f. Using the DC Volts Scale. The dc volts scale is used to measure all voltages in the electrical system.

Before using the multi meter to measure dc voltage, do the following steps that match the multi-meter you have (fig. 5-10 thru fig. 5-12).

(7) AN/URM-105

Set meter switch to dc volts range given in TM.. (To measure 24 volts dc, set switch on "100 DC VOLTS" range.)

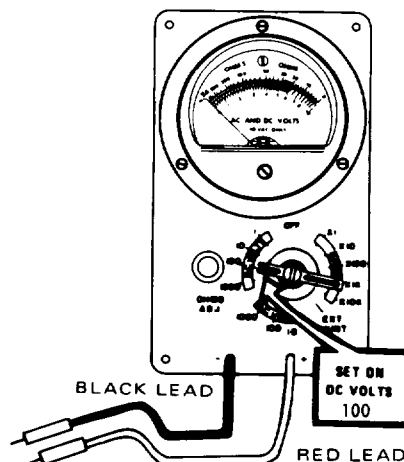


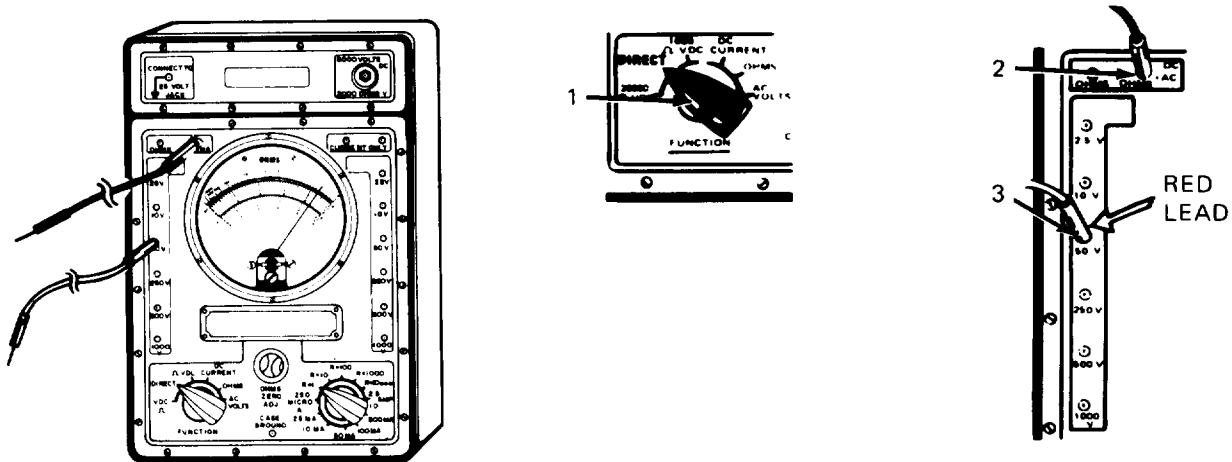
Figure 5-10. Using the DC Volts Scale AN/URM-105

TA 074697

5-6. TEST EQUIPMENT (Continued).

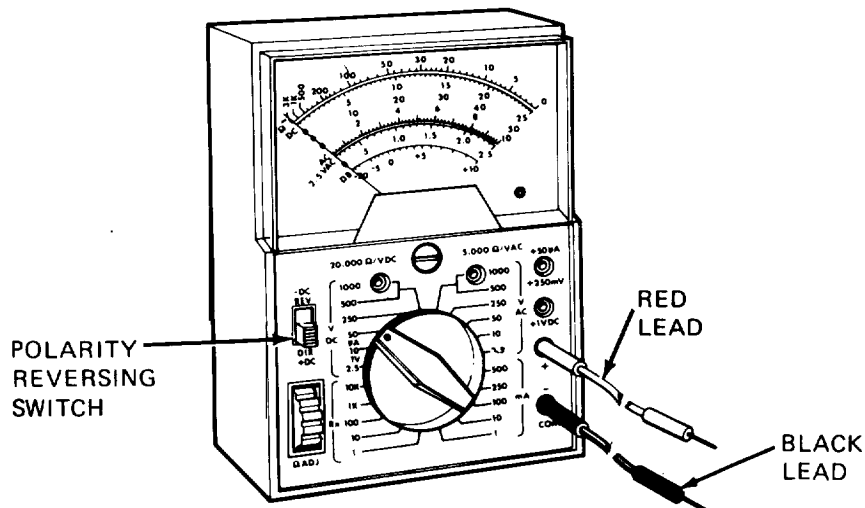
(2) TS-352 B/U

- (a) Set FUNCTION switch (1) to DIRECT (range switch can be at any position).
- (b) Put black lead in "DC/* AC/OHMS" jack (2).
- (c) To measure 24 volts dc, plug red lead into "50V" jack on left side of meter (3).
(If measuring less than 10 volts dc, use "10V" jack, If measuring less than 2.5 volts dc, use "2.5V" jack.)

**Figure 5-11. Setting the Function Switch TS-352 B/U**

(3) SIMPSON 160

- (a) Connect black lead to COM- jack.
- (b) Connect red lead to+ jack.
- (c) To measure 24 volts dc, set selector switch to V/DC 50 position. (If measuring less than 10 volts dc, set selector switch to V/DC 10 position. If measuring less than 2.5 volts dc, set selector switch to V/DC 2.5 position.)

**Figure 5-12. Setting the Function Switch Simpson 160**

TA 074698

5-6. TEST EQUIPMENT (Continued).

will protect the meter.

g. Measuring DC Voltage. To measure dc volts (fig. 5-13), do the following steps:

- (1) Set up multimeter (see para f).

NOTE

If you are not sure of the voltage to be measured on the vehicle, always start on the highest range shown in para f. This will protect the meter,

- (2) With any of the three multimeters, connect the red probe to the positive (+) side of the circuit and the black probe to the negative (-) side. The example below shows 24 volts dc being measured across the batteries.

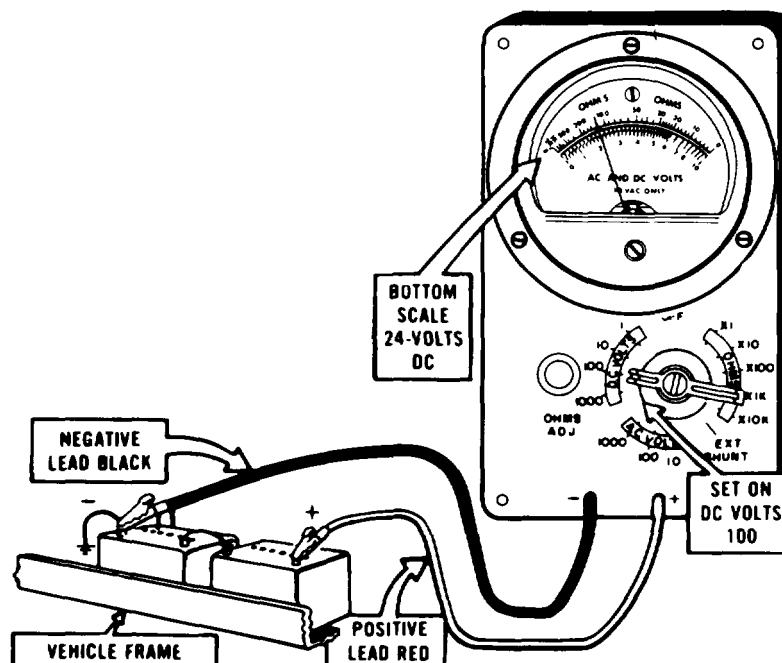


Figure 5-13. Measuring DC Voltage

- (3) Read the meter. (Figures 5-14 thru 5-16 show how to read all three multi meters.) If the needle tries to move off scale to the left, reverse the probes on the circuit.

5-6. TEST EQUIPMENT (Continued).

(a) AN/URM-105

Read the upper, black, straight-lined portion of the AC and DC VOLTS scale for the range the selector switch is set at:

SWITCH SETTING.	SCALE.
1000 DC VOLTS.	0.10 (AND MULTIPLY BY 100).
100 DC VOLTS.	0.10 (AND MULTIPLY BY 10).
10 DC VOLTS.	0.10.
1 DC VOLT.	0.10 (AND MULTIPLY BY 10).

Thus the meter illustrated is showing the following readings:

SWITCH SETTING.	READING.
100 DC VOLTS.	20 VOLTS DC.
10 DC VOLTS.	2 VOLTS DC.
1 DC VOLT.	.2 VOLTS DC.

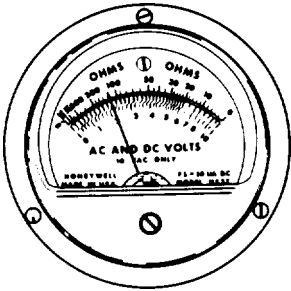


Figure 5-14. Reading DC Volts Scale AN/URM-105

5-6. TEST EQUIPMENT (Continued).

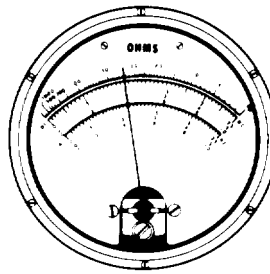
(b) TS-352 B/U.

Read the DC volts scale for the range the red lead is plugged in at:

RANGE.	SCALE.
50V.	0.5 (AND MULTIPLY BY 10).
10V.	0.10.
2.5V.	0.25.

Thus the meter illustrated is showing the following readings:

RANGE.	READING.
50V.	20 VOLTS DC.
10V.	4 VOLTS DC.
2.5V.	1 VOLT DC.

**Figure 5-15. Reading DC Volts Scale- TS-352 B/U**

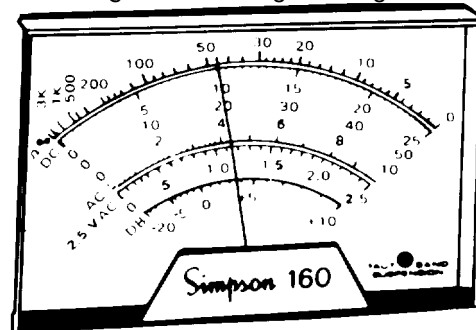
(c) SIMPSON 160

Read the "DC VOLTS" scale for the range the selector switch is set at:

SWITCH SETTING.	SCALE.
V/DC 50.	0.50.
V/DC 10.	0.10.
V/DC 2.5.	0.25 (AND DIVIDE BY 10).

Thus the meter illustrated is showing the following readings:

SWITCH SETTING.	READING.
V/DC 50.	20 VOLTS DC.
V/DC 10.	4 VOLTS DC.
V/DC 2.5.	1 VOLT DC.

**Figure 5-16. Reading DC Volts Scale - Simpson 160**

TA 074701

5-7. BATTERY SYSTEM.

a Description. Four 12-volt, heavy-duty, maintenance-free batteries, (fig. 5-1 7) are located in an enclosure in the right-hand frame rail under the cab. The batteries are connected in a series-parallel combination to provide 24 volts for engine starting plus trailer lighting, and 12 volts for operation of all of the electrical equipment on the vehicle. Water never needs to be added to the maintenance-free batteries. There are no vent plugs in the cover. The batteries are completely sealed except for a small vent hole in the side. The test indicator in the cover can be used to determine if the battery is charged to the proper level for testing.

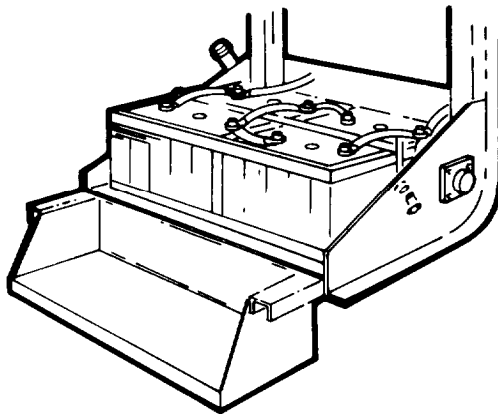


Figure 5-17. Battery System

5-7. BATTERY SYSTEM (Continued).

b. Test Indicator. The test indicator is a built-in hydrometer in one cell which provides visual information for battery testing only. The test indicator will give correct indications only when the battery is relatively level and the top is clean. Under normal conditions, the indicator displays either green or dark to indicate readiness of battery for testing.

(1) *Green dot visible.* Any green appearance is interpreted as a green dot, which means the battery is ready for testing. On rare occasions following prolonged cranking, the green dot may still be visible. If this should occur, the battery needs charging.

(2) *Dark green (dot not visible).* The battery needs to be charged prior to testing. On rare occasions the test indicator may turn light yellow. In this case, the battery must be replaced and the vehicle charging system should be checked out.

WARNING

Do not charge, test, or jump start a battery when a light yellow color appears in the test indicator as the battery may explode, squirt electrolyte from the vent hole, and/or damage the charging system of this vehicle.

c. The negative terminals of the battery combination (fig. 5-18) are connected to the ground connector of the starting motor and from there to the engine, tractor frame, and cab (ground). The 24-volt cable of the battery combination is connected to the starting solenoid relay. When the relay contacts are closed, 24-volt power is routed to the starter motor. The 12-volt cable is connected to the alternator and to two circuit breakers for 12-volt distribution.

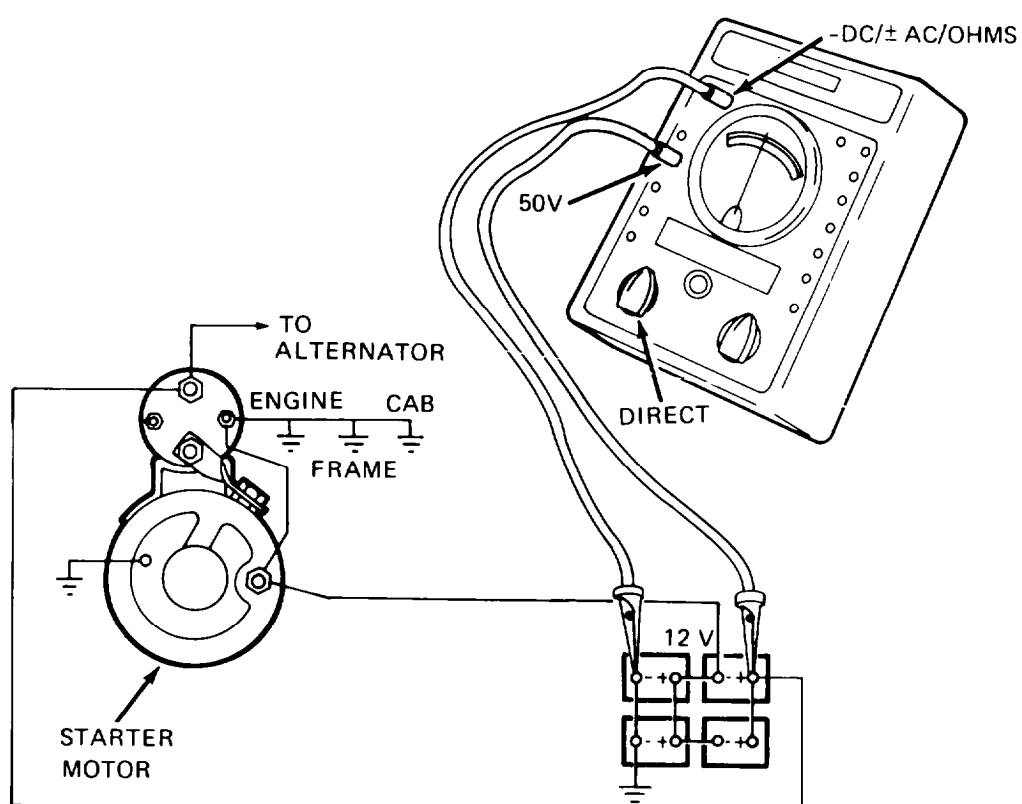
Table 5-1 Battery System Troubleshooting.

FLAM	PETS	INSTRUCTION	INDICATION	YES	NO	REMARKS
1		ALL ELECTRICAL SYSTEMS ARE WEAK.				
	1	Inspect battery terminals.	a. Loose.	Tighten.		
			b. Corroded or dirty.	Clean.	Go to Step 2.	
	2	Inspect battery cases.	a. Cracked or broken.	Replace (para 5-38).	Go to Step 3.	
	3	Inspect cables.	a. Frayed or broken.	Replace (para 5-39).		
			b. Corroded.	Clean	Go to Step 4.	
	4	Check battery test indicators.	a. Green.	Test (Malf 2, Step 2).		
			b. Dark.	Charge (para 5-38).		
			c. Yellow	Replace (para 5-38).		Troubleshoot charging system (table 5-5).
			NOTE A defective battery in the series parallel configuration will adversely affect the charge of the other batteries.			
2		ENGINE FAILS TO CRANK OR CRANKS SLOWLY.				
	1	Check battery test indicators.	a. Green.	Test (para 5-38).		
			b. Dark.	Charge (para 5-38).		
			c. Yellow.	Replace (para 5-38).		Troubleshoot charging system (table 5-5).
	2	Test batteries under load.				
		a. Disconnect connector on fuel shutoff valve.				

Table 5-1. Battery System Troubleshooting (Continued).

MALF	S-INT	INSTRUCTION	INDICATION	YES	NO	REMARKS
2	2	ENGINE FAILS TO CRANK OR CRANKS SLOWLY (Continued).				
	2	Test batteries under load (Continued). b. Crank engine for approximately 15 seconds to remove battery surface charge. c. Connect a multi-meter as shown in Figure 5-18. d. Have an assistant crank the engine for 15 seconds. e. Observe voltmeter.	24 volts DC nominal.	Trouble-shoot starting circuit table 5-2).	Remove and test each battery (para 5-38).	
		NOTE f the engine will not crank, perform the following steps,				
		f. Disconnect the battery cables and jumper to a known good source, such as another vehicle. g. Connect the multi-meter as before, except on the jumper batteries. h. Have an assistant crank the engine for 15 seconds. i. Observe voltmeter.	24 volts DC nominal.	Trouble-shoot starting circuit (table 5-2).	Remove and test each battery (para 5-38).	
3		BATTERIES DO NOT HOLD A CHARGE.				
	1	Check vehicle lights.	On.	Turn Off.	Go to step	

Table 5-1. Battery System Troubleshooting (Continued).



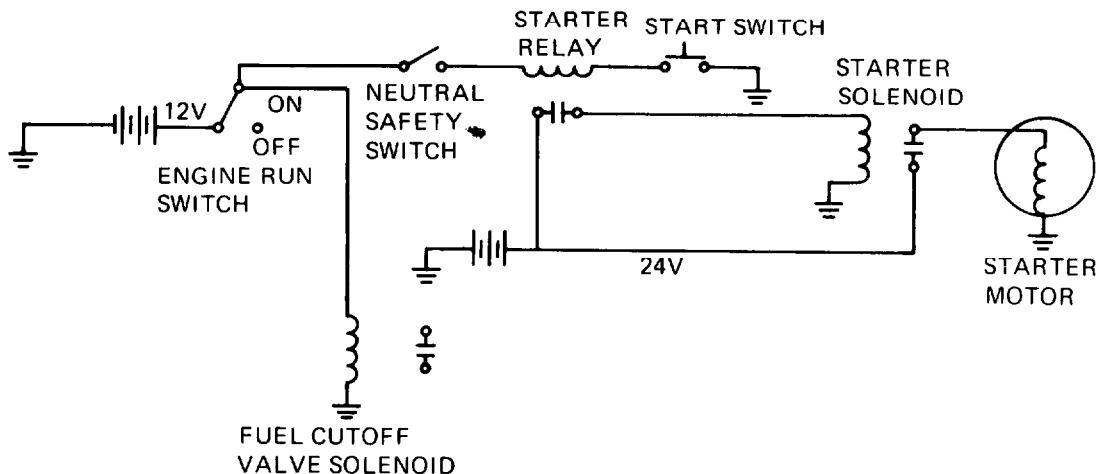
TA 074703

Figure 5-18. DC Voltage Tests

5-8. STARTING SYSTEM CIRCUIT.

a. *Description (fig. 5- 79).* The starting system consists of two sets of 12-volt batteries (connected in series/parallel to provide 24 volts for starting), a starter motor and solenoid, a starter relay, a neutral safety switch, a key switch (ENGINE RUN), and a start button. When the ENGINE RUN switch is turned ON, the fuel solenoid valve is opened and power is applied to one side of the ENGINE START switch. When the transmission ratio selector is in neutral (N) (closing the neutral safety switch), the starter relay is energized and 24 volts dc is applied to the starter solenoid coil. Starter solenoid contacts then close and apply 24 volts to the starter motor. When the engine starts, an overrunning clutch in the starter motor allows the motor to run free until the ENGINE RUN switch is released, thus removing 24-volt power from the starter motor.

b. *Troubleshooting the Starting System Circuits.* When you suspect a starting system circuit problem, perform the steps in table 5-2.



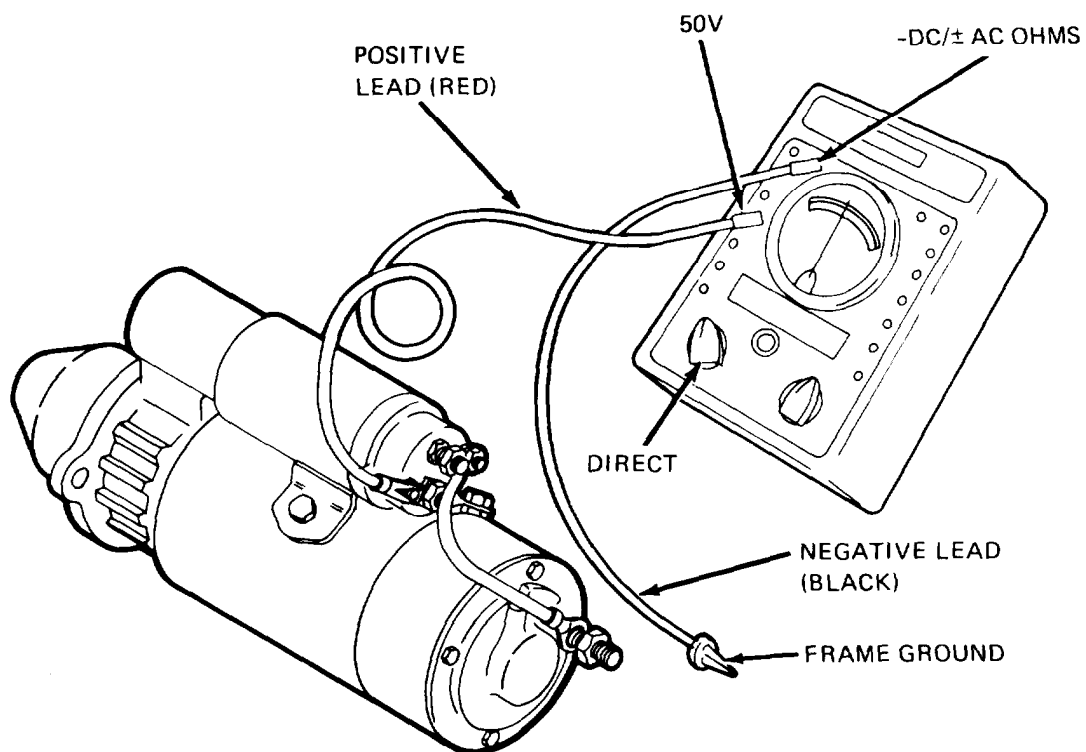
TA 074734

Figure 5-19. Starting System Circuit (Simplified Schematic)

Table 5-2. Starter System Circuit Troubleshooting.

MALF	STEP	INSTRUCTION	INDICATION		YES	NO	REMARKS
1		STARTER FAILS TO CRANK OR CRANKS TOO SLOWLY.					
	1	Turn on ignition key switch and check voltmeter (TM 9-2320-273-1 O).	Normal reading.		Go to Step 2.	Trouble-shoot battery charging circuit (para 5-11).	
	2	Push engine run button and have an assistant listen for heavy thump of the solenoid switch on the starting motor.	Thump.		Go to Step 4.	Check wiring to starter relay. Go to Step 3.	
	3	Push engine run button and have an assistant listen for a click of the starter relay located behind the center of the instrument panel.	Click.		Go to Step 4.	Check wiring to START switch. Go to Step 4.	
	4	Feel all battery, starter, and starter relay terminals.	Excessive heat.		Repair or replace cables or connectors.	Go to Step 5.	
	5	Check starting solenoid switch with multi meter as shown (figure 5-20), while cranking engine.	24 volts (nominal).		Replace motor and/or solenoid switch (para 5-32).	Go to Step 6.	

Table 5-2. Starter System Circuit Troubleshooting (Continued).



TA 074705

Figure 5-20. Starting Solenoid Switch Checks

Table 5-2. Starter System Circuit Troubleshooting (Continued).

MALF	STEP	INSTRUCTION	INDICATION	YES	NO	REMARKS
1	6	STARTER FAILS TO CRANK OR CRANKS TOO SLOWLY (Continued). Check starter relay with multimeter as shown (figure 5-21), while cranking engine. a. Terminal C.	12 Volts (nominal).	Go to (b).	Check wiring to neutral safety switch. Go to Step 7.	
		b. Terminals A and B.	24 Volts (nominal).	Repair wiring to starting motor.	Replace relay (para 5-33).	

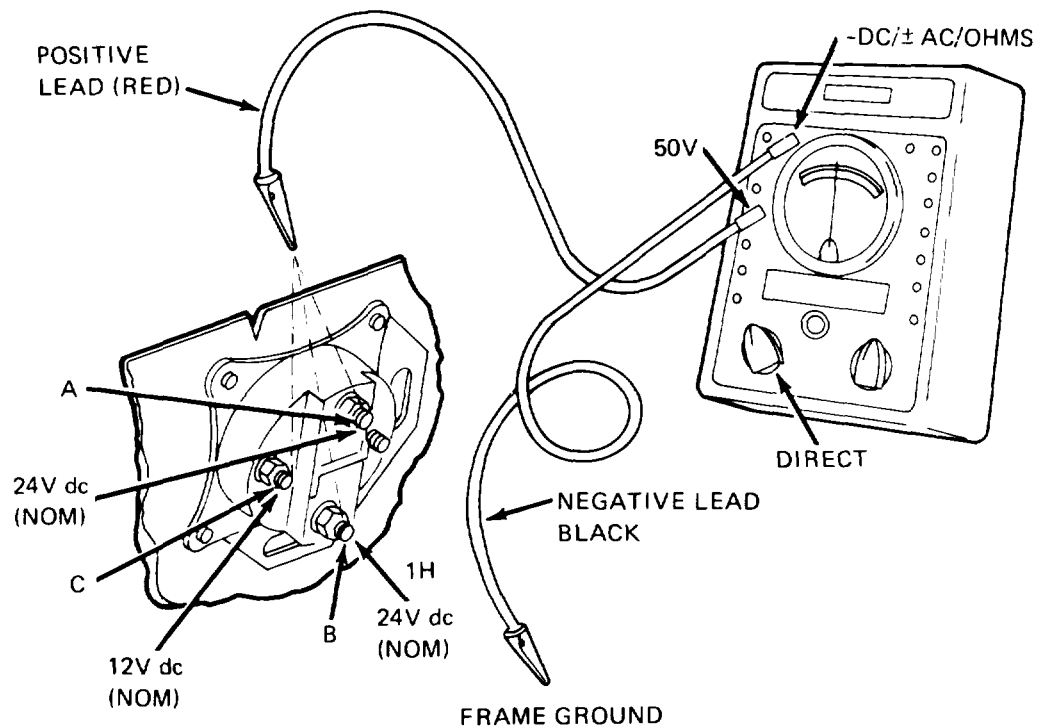


Figure 5-21. Starter Relay Checks

TA 074706

Table 5-2. Starter System Circuit Troubleshooting (Continued).

MAINT	STEP	INSTRUCTION	INDICATION	YES	NO	REMARKS
1	7	STARTER FAILS TO CRANK OR CRANKS TOO SLOWLY (Continued). Check operation of the transmission ratio selector neutral safety switch with multimeter as shown (figure 5-22). Check while attempting to crank the engine and the selector in neutral (N). Terminal No. 4. Terminal No. 3.	12 volts (nominal). 12 volts (nominal).	To Step 8.	Check wiring to engine run switch. Replace neutral safety switch (para 5-75).	

Figure 5-22. Neutral Safety Switch Checks

TA 074707

Table 5-2. Starter System Circuit Troubleshooting (Continued).

MALF	STEP	INSTRUCTION	INDICATION	YES	NO	REMARKS
1	8	STARTER FAILS TO CRANK OR CRANKS TOO SLOWLY (Continued). a. Check operation of the ENGINE RUN switch with multi-meter as shown in (figure 5-23). Check for 12 volts nominal on the side of the switch that is wired to the starter relay while pushing the button. b. Check wiring. Refer to wiring diagram and schematic in Appendix D.	12 volts nominal.	Go to Step 9.	Check wiring starter relay. Go to Step 9. Replace ENGINE RUN switch (para 5-35).	

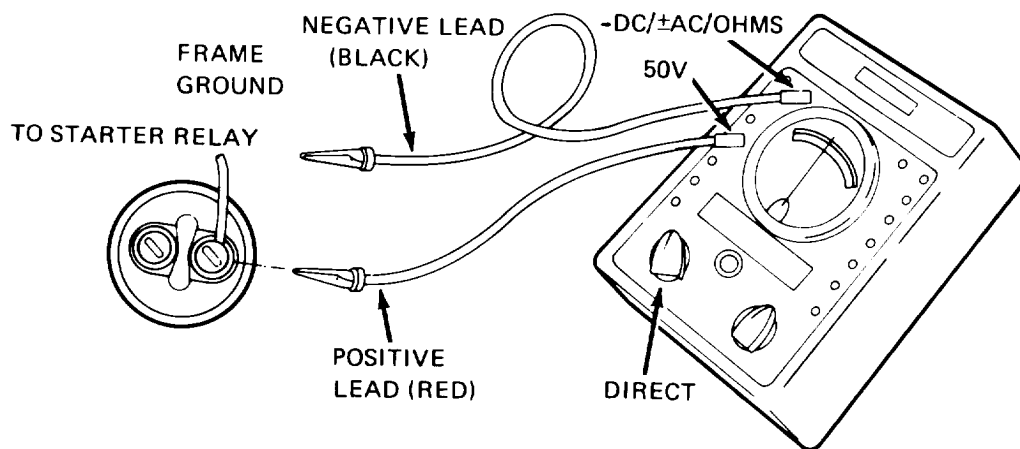


Figure 5-23. ENGINE START Switch Checks

TA 074708

Table 5-2. Starter System Circuit Troubleshooting (Continued).

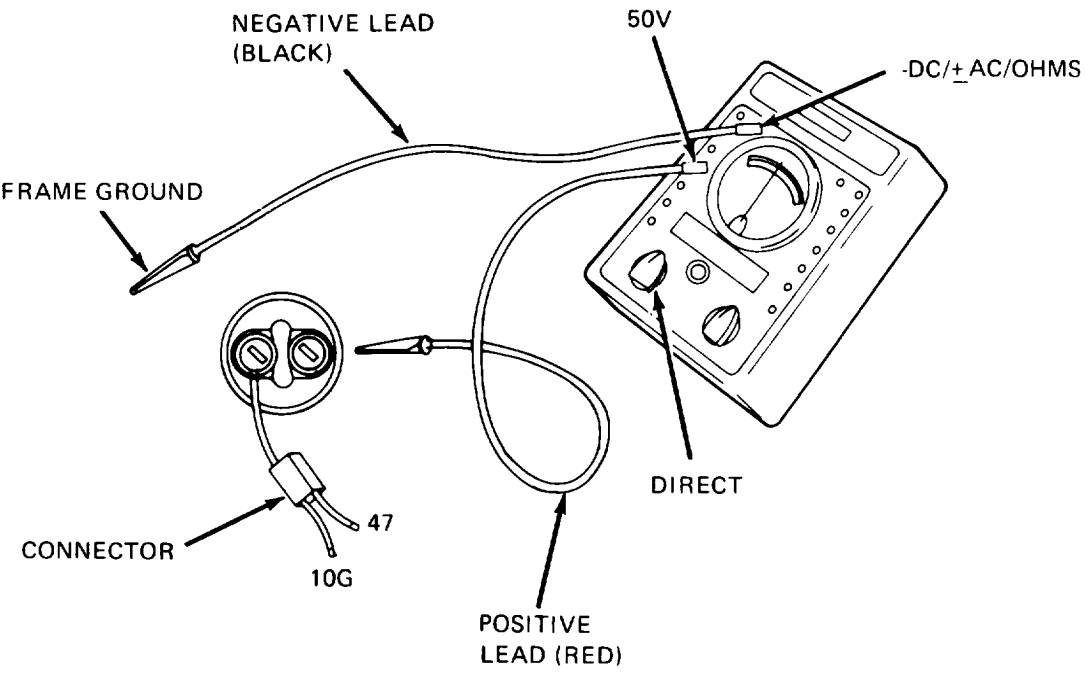
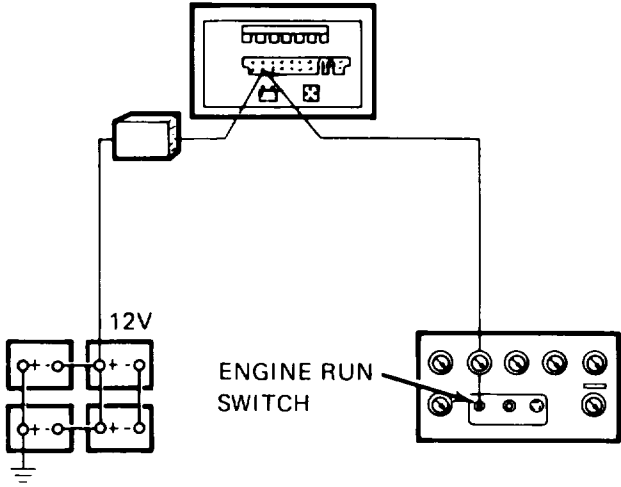
MALF	STEP	INSTRUCTION	INDICATION	YES	NO	REMARKS
1	9	STARTER FAILS TO CRANK OR CRANKS TOO SLOWLY (Continued). Check ENGINE RUN as follows: a. Remove connector from back of ENGINE RUN switch. b. Install jumper wire as shown in figure 5-24.	Starter motor cranks.	Replace ENGINE RUN switch (para 5-35).	Go to Step 10.	
 Figure 5-24. ENGINE RUN Switch Checks.						
						TA 074709

Table 5-2. Starter System Circuit Troubleshooting (Continued).

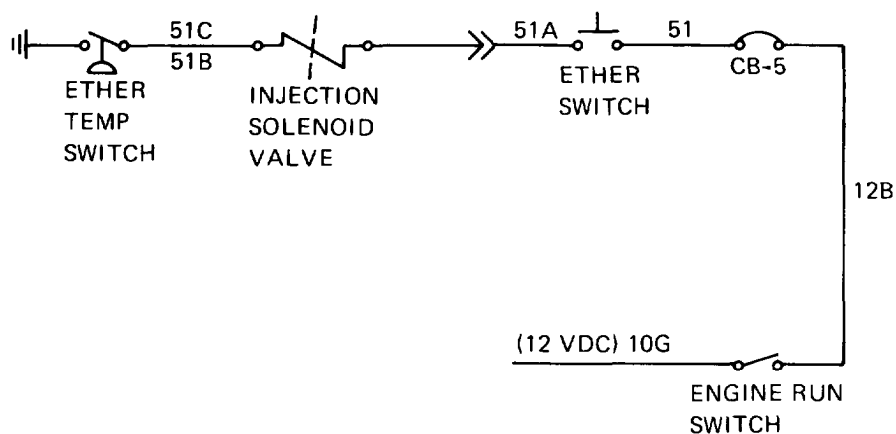
MALF	STEP	INSTRUCTION	INDICATION	YES	NO	REMARKS
1	10	STARTER FAILS TO CRANK OR CRANKS TOO SLOWLY (Continued). Check for loose connections between batteries and the ENGINE RUN switch (circuits shown in figure 5-25).	Loose. Defective.	Tighten. Repair or replace.		
 Figure 5-25. Starting Circuit to ENGINE RUN switch.						
2	1	STARTING MOTOR IS NOISY AND ENGAGEMENT IS ERRATIC. Replace motor and solenoid switch assembly (para 5-32).				

TA 074710

5-9. ETHER QUICK-START CONTROLS.

a. *Description (fig. 5-26).* The ether injection solenoid valve is opened to allow ether to flow from the storage canister into the intake manifold when the ETHER button is pushed and released and the ether temperature switch is closed (engine coolant temperature is less than 50°F (10°C).

b. *Troubleshooting* Perform the steps in table 5-3 to isolate faulty components of the ether quick-start controls.



TA 074711

Figure 5-26. Ether Quick-Start Electrical Circuit

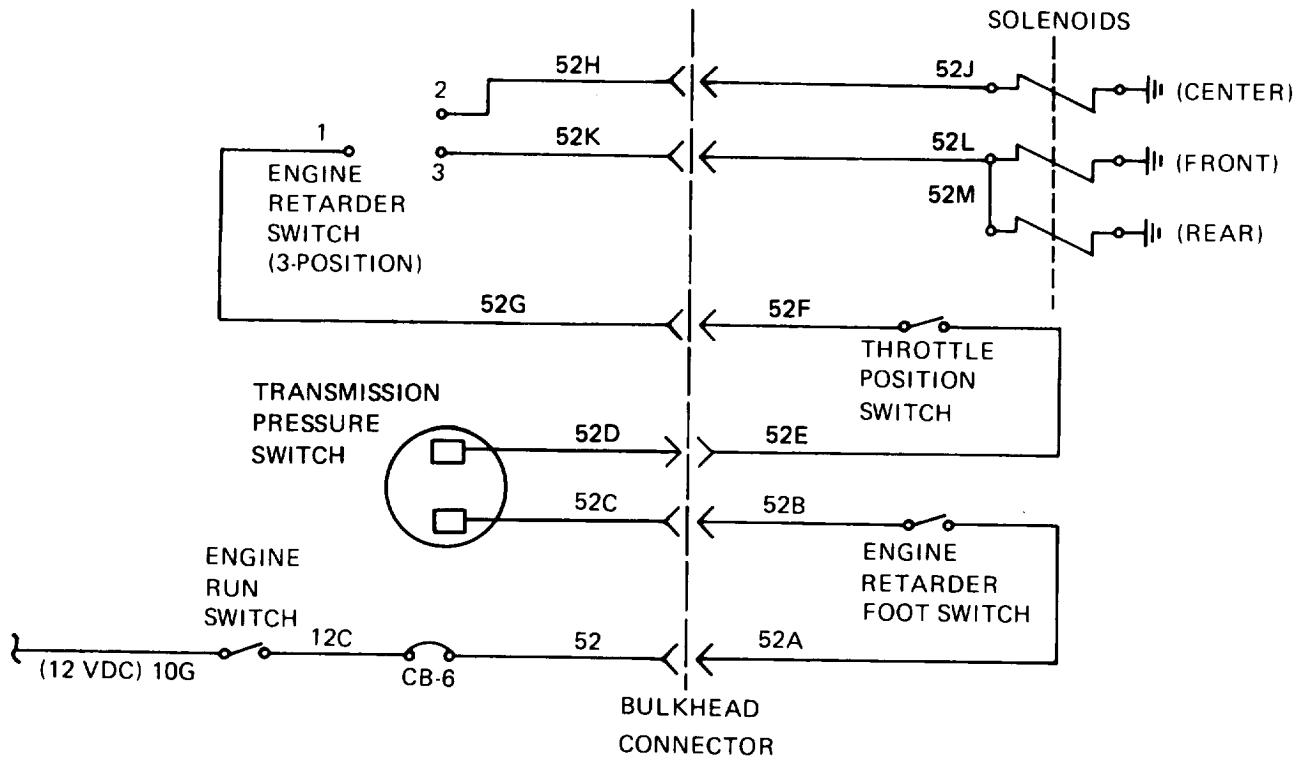
Table 5-3. Ether Quick Start Control Circuit Troubleshooting.

MALF	STEP	INSTRUCTION	INDICATION	YES	NO	REMARKS
		SOLENOID CANNOT BE HEARD TO CLICK WHEN ETHER BUTTON IS PUSHED.				
	1	Check engine coolant temperature gage.	Below 50°F (10°C).	Go to Step 2.		Solenoid is not supposed to work when coolant is above 50°F
	NOTE The ETHER button must be pushed and released when performing the following checks.					
	2	Check for voltage at circuit 51 terminal of ETHER switch.	12 voltage nominal.	Go to Step 3.	Check circuit breaker (para 5-5) and wiring.	
	3	Check for voltage at circuit 51A terminal of ETHER switch.	12 volts dc nominal.	Go to Step 4.	Replace witch (para 5-74).	
	4	Check for voltage at circuit 51B terminal of solenoid.	12 volts dc nominal.	Go to Step 5.	Repair wiring or connections	
	5	Check for voltage at circuit 51C terminal of solenoid.	12 volts dc nominal.	Go to Step 6.	Replace solenoid.	
	6	Check for voltage at terminal of ETHER temperature switch.	12 volts dc nominal.	Replace witch (para 5-74).	Repair wiring or connections	

5-10. ENGINE RETARDER CONTROLS.

a. *Description.* The engine retarder solenoid valves are applied by the foot switch as selected by the three-position ENGINE RETARDER switch (fig. 5-27). The operator must let up on the foot throttle to close the throttle position sensing switch.

b. *Troubleshooting the Engine Retarder Control.* Perform the steps in table 5-4 to isolate faulty components of the engine retarder circuit.



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Figure 5-27. Engine Retarder Control Circuit

Table 5-4. Engine Retarder Control Circuit Troubleshooting.

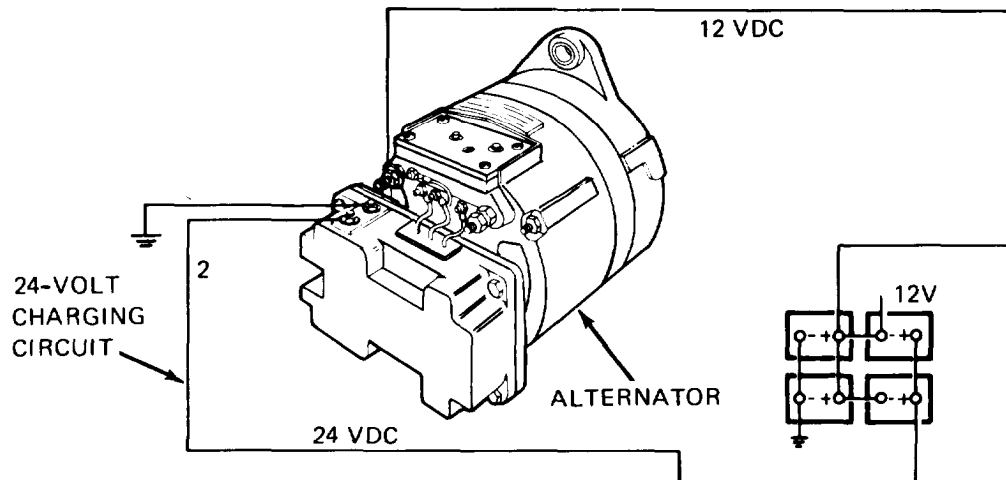
MALF	STEP	INSTRUCTION	INDICATION	YES	NO	REMARKS
1		NO RETARDING ACTION.				
	1	With ENGINE RUN switch on, check for voltage to retarder foot switch (circuit 52A).	12 volts dc nominal.	Go to Step 2.	Check for faulty circuit breaker (para 5-5 C),	
	NOTE Before making the voltage checks described in steps 2 through 8, do the following: Apply parking brake. Check system air pressure. Activate transmission control group. Put transmission in gear. Press and hold engine retarder foot pedal during voltage checks.					
	2	Check for voltage at circuit 52B terminal of foot retarder switch.	12 volts dc nominal.	Go to Step 3	Replace switch.	
	3	Check for voltage at circuit 52C terminal of transmission pressure switch.	12 volts dc nominal.	Go to Step 4	Repair wiring between 52B and 52C.	
	4	Check for voltage at circuit 52D terminal of transmission pressure switch.	12 volts dc nominal.	Go to Step 5	Drain system air pressure and replace switch.	
	5	Check for voltage at circuit 52E terminal of throttle position sensing switch.	12 volts dc nominal.	Go to Step 6	Repair wiring (52D, 52E) or connection!	
	6	Check for voltage at circuit 52F terminal of throttle position sensing switch.	12 volts dc nominal.	Go to Step 7	Replace switch.	
	7	Check for voltage at circuit 52G terminal of panel ENGINE RETARDER switch.	12 volts dc nominal.	Go to Step 8	Repair wiring (52F, 52G) or connection:	

Table 5-4. Engine Retarder Control Circuit Troubleshooting (Continued).

MALF	STEP	INSTRUCTION	INDICATION	YES	NO	REMARKS
	1	NO RETARDING ACTION (Continued).				
	8	Check for voltage at circuit 52H and 52K terminals of panel ENGINE RETARDER switch with switch in HIGH position,	12 volts dc nominal.	Go to Step 9.	Replace switch.	
	9	Check for voltage at each solenoid valve, circuits 52J, 52L and 52M.	12 volts dc nominal.	Refer to Direct Support Maintenance,	Repair wiring (52J, 52L, 52M) or connections.	

5-11. BATTERY CHARGING CIRCUIT.

a. *Description.* Charging of the batteries is accomplished by a 14-volt, 85-ampere, self-load limiting alternator with an integral transformer rectifier providing 24 volts for the cranking batteries and 12 volts for other vehicle electrical loads. This system uses two sets of 12-volt batteries in series to provide 24 volts for cranking. The cranking batteries are charged by the transformer rectifier unit, and as the load demand on these batteries is cranking only, the 15 amperes available from the transformer rectifier is more than sufficient for this application. As the cranking batteries become charged, the output current gradually drops to approximately one ampere when the terminal voltage of the battery reaches 13.8 volts (adjustable). The charging circuit is shown in figure 5-28.



TA 074713

Figure 5-28. Battery Charging Circuit

Table 5-5. Battery Charging Circuit Troubleshooting.

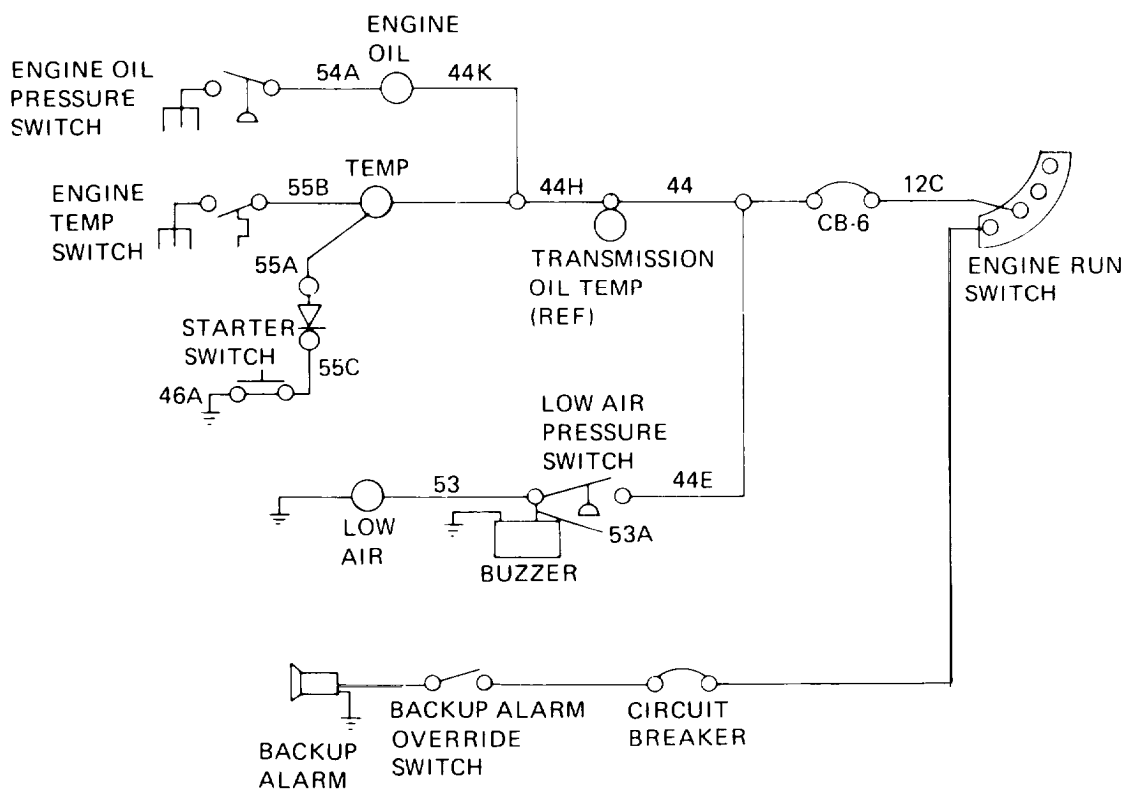
MALF	STEP	INSTRUCTION	INDICATION	YES	NO	REMARKS
		BATTERIES ARE BEING UNDERCHARGED OR OVERCHARGED.				
	1	Check batteries (table 5-1, malfunction 2, step 2).				
	2	Check the alternator drive belts for proper tension (para 4-55).	a. Loose. b. Damaged.	Tighten (para 5-43). Replace (para 5-43).	Go to Step 3. Go to Step 3.	
	3	Check all charging circuit wiring and connections.	a. Loose. b. Defective	Tighten. Repair or replace.		
	4	Refer to Direct Support Maintenance.				

5-12. WARNING LAMPS AND ALARMS .

a. *Description.* The following warning lamps and alarms are employed in this vehicle series:

- (1) ENGINE TEMPERATURE warning lamp.
- (2) ENGINE OIL LOW warning lamp.
- (3) LOW AIR PRESSURE warning lamp.
- (4) BACKUP ALARM (M916 THRU M920).

The ENGINE TEMPERATURE warning lamp is actuated when the water temperature sensing switch closes (at 225° F, 95°C) if the ignition switch is ON. The ENGINE OIL LOW warning lamp is actuated when the engine oil pressure sensing switch closes (at 5 psi, 100 kPa) if the ignition switch is ON. The LOW AIR PRESSURE warning lamp and buzzer are actuated when the low air switch closes (between 64 and 76 psi) if the ignition switch is ON. The backup alarm goes off when the backup switch is closed and the ignition switch is ON unless the manual backup alarm override switch is open. The circuits for these devices are shown in figure 5-29. Wire connection points and wire identification numbers are indicated.



TA 074714

Figure 5-29. Warning Lamp and Alarm Circuits

Table 5-6. Warning Lamps and Alarms Circuit Troubleshooting.

MALF	STEP	INSTRUCTION	INDICATION	YES	NO	REMARKS
1		ENGINE TEMPERATURE WARNING LAMP INOPERATIVE.				
	1	Press START switch.	Lamp lights.	Replace water temperature switch (para 5-73).	Replace the bulb.	
	2	Attach test lead between the ground side of the bulb (circuit 6A) and ground and turn on the ENGINE RUN switch.	Lamp lights.	Replace water temperature switch (para 5-73).	Go to Step 3.	
	3	Check the ENGINE lamp when the ENGINE RUN switch is ON.	Lamp lights.	Double check the temperature switch.	Check wiring to circuit breaker.	
	4	Check for faulty circuit breaker No. 6 with multi meter.	12 volts dc nominal.	Repair wiring (circuits 44, 44H, 44J).	Replace circuit breaker.	
2		ENGINE OIL PRESSURE LOW WARNING LAMP INOPERATIVE.				
	1	Attach test lead between the ground side of the bulb (circuit 54A) and ground and turn on the ENGINE RUN switch.	Lamp lights.	Replace the switch (para 5-71).	Replace the bulb.	
	2	Troubleshoot wiring.				
3		LOW AIR PRESSURE' WARNING LAMP AND/OR BUZZER INOPERATIVE.				
		NOTE The air pressure must be below 60 psi to perform the following check.				
		Attach a test lead across both terminals on the LOW AIR PRESSURE switch (located on the fire-wall inside cab at center).	a. Lamp and buzzer operate.	Replace the pressure switch (para 5-81).		
			b. Lamp only works.	Replace the buzzer (para 5-80).		

Table 5-6. Warning Lamps and Alarms Circuit Troubleshooting (Continued).

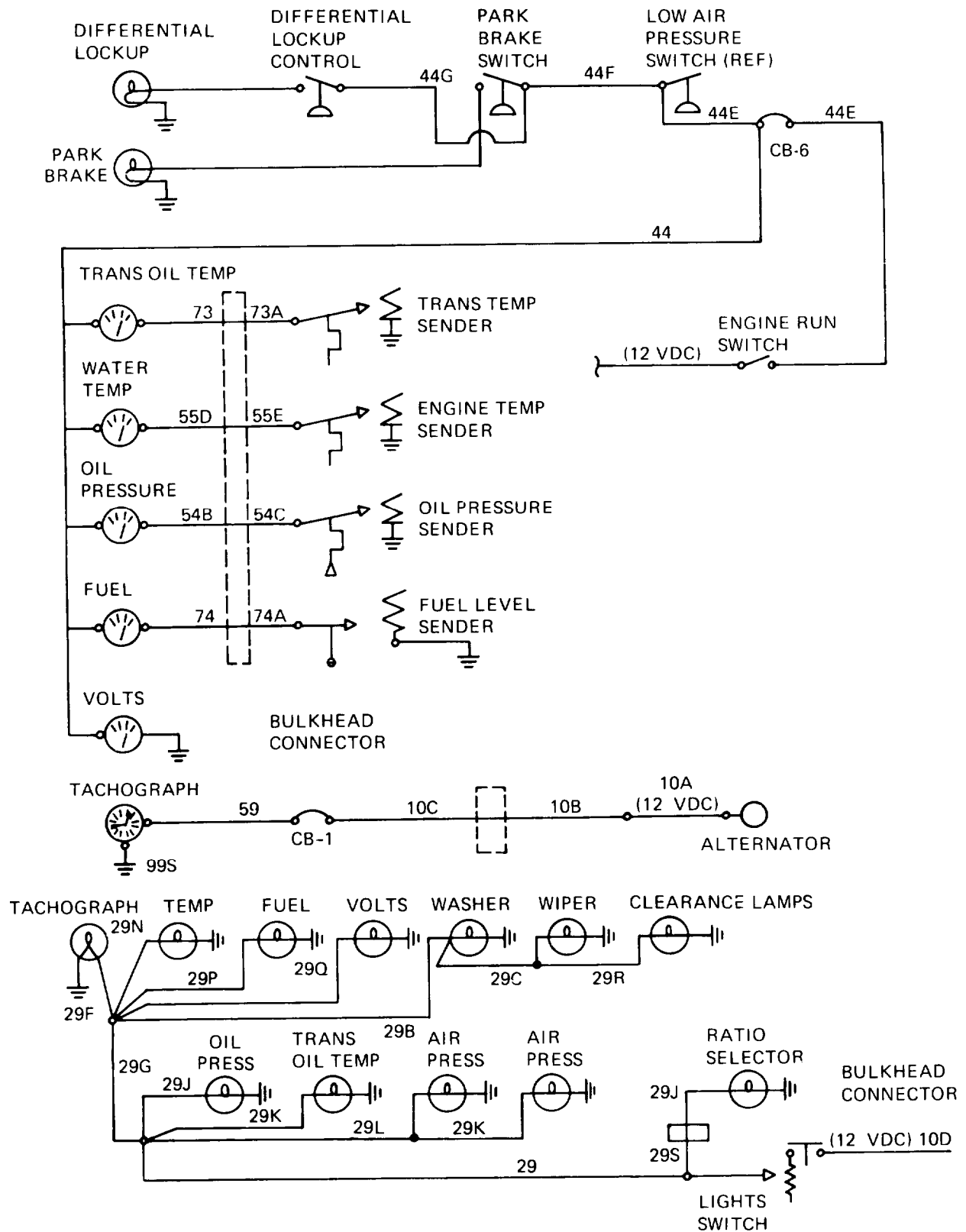
MALF	STEP	INSTRUCTION	INDICATION	YES	NO	REMARKS
3		LOW AIR PRESSURE	WARNING LAMP AND/OR BUZZER INOPERATIVE (Continued).			
			c. Buzzer only works.	Replace the bulb (para 5-61).		
4		BACKUP ALARM IS INOPERATIVE.	d. Neither lamp nor buzzer operates.	Troubleshoot wiring (refer to schematic in Appendix D).		
			NOTE			
			The compressed air system must be within normal operating pressures to actuate the backup switch.			
	1		Verify the backup alarm override switch is OFF, and the ENGINE RUN switch is ON. Place the ratio selector in one of the reverse gears.			
	2		Check for voltage at the alarm with a multi meter.	12 dc volts nominal.	Go to Step 3.	Go to Step 4.
	3		Check ground at alarm for loose or dirty ground.	Bad ground.	Repair ground.	Replace the alarm (para 5-78).
	4		Attach a test lead across the terminals on the backup switch.	Alarm operates.	Replace backup switch (para 5-77).	Go to Step 5.
	5		Attach a test lead across the terminals on the override switch,	Alarm operates.	Replace switch.	Go to Step 6.
	6		Troubleshoot wiring through circuit breaker. Refer to schematic in Appendix D.			

5-13. INSTRUMENTS AND INDICATORS.]

a. Description. Electrically operated gages and indicators in the cab provide information for operation as follows:

- (1) PARK BRAKE lamp.
- (2) DIFFERENTIAL LOCKUP lamp.
- (3) FUEL LEVEL gage.
- (4) POWER TAKEOFF lamp.
- (5) WATER TEMP gage.
- (6) TRANS OIL TEMP gage.
- (7) OIL PRESSURE gage.
- (8) VOLTS meter.
- (9) TACHOGRAPH (clock).
- (10) LAMPS.

The circuits for these items are shown in figure 5-30. Wire connection points and wire identification numbers are indicated.



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Figure 5-30. Instrument and Indicator Circuits

Table 5-7. Instruments and Indicators Circuit Troubleshooting.

MALF	STEP	INSTRUCTION	INDICATION	YES	NO	REMARKS	
1		DIFFERENTIAL LOCKUP LAMP INOPERATIVE.					
	1	With differential lock-up control set to LOCK, and ENGINE RUN switch ON check for voltage to the lamp using a multi meter.	12 volts dc nominal.	Check for good ground at bulb. (Replace bulb) (para 5-63).	Go to Step 2.		
	2	Attach test lead across the differential lockup control terminals.	Lamp lights.	Replace differential lockup control (para 5-83).	Go to Step 3.		
	3	Troubleshoot wiring. Refer to wire diagram and schematic in Appendix D.					
	2	PARK BRAKE LAMP INOPERATIVE.					
		1	With park brake applied and ENGINE RUN switch set to ON, use a multimeter to check voltage to the lamp.	12 volts dc nominal.	Check for a good ground at the bulb. (Replace the bulb) (para 5-63).	Go to Step 2.	
		2	Attach test lead across park brake switch terminals (located in instrument panel near circuit breaker).	Lamp lights.	Replace park brake switch (para 5-82).	Go to Step 3.	
	3	Troubleshoot wiring. Refer to wiring diagram and schematic in Appendix D.					

Table 5-7. Instruments and Indicators Circuit Troubleshooting (Continued).

MALF	STEP	INSTRUCTION	INDICATION	YES	NO	REMARKS
3	1	INSTRUMENT PANEL GAGES INOPERATIVE.				
		Check the following gages: Trans oil temp, water temp, oil press, fuel.				
		a. Using a multi meter check for voltage at the gage terminals.	12 volts dc nominal.	Replace gage.	Go to Step b.	
	2	b. Attach jumper across terminals of sending unit.	Gage operates.	Replace sending unit	Go to Step c.	
		c. Troubleshoot wiring. Refer to wire diagram and schematic in Appendix D.				
	2	Check volts gage:				
		a. Using a multi meter check voltage at gage terminals.	12 volts dc nominal.	Replace gage.	Go to Step b.	
		b. Troubleshoot wiring. Refer to wire diagram and schematic in Appendix D.				

Table 5-7. Instruments and Indicators Circuit Troubleshooting (Continued).

MALF	STEP	INSTRUCTION	INDICATION	YES	NO	REMARKS
4		TACHOGRAPH CLOCK IS INOPERATIVE.				
	1	Check circuit 59 using 12 volts dc nominal. a multi meter.		Replace tachograph para 5-66)	Go to Step 2.	
	2	Check wiring. Refer to diagram and schematic in Appendix D.				
5		INDICATOR/ILLUMINATION LAMP OUT.				
	1	Pull headlamp switch out.	All lamps come on with headlamp switch at full out or half way position.	Go to Step 4	Go to Step 2.	
	2	Check for voltage at the headlamp switch using a multimeter.	12 volts dc nominal.	Replace headlamp switch para 5-62).	Go to Step 3.	
	3	Check wiring to headlamp switch. Refer to wire diagram and schematic in Appendix D.				
	4	For individual lamps that are out, replace bulb. Turn on headlamp switch.	Lamp comes on.			
	5	Check wiring. Refer to wire diagram and schematic in Appendix D.				

5-14. HEADLAMPS.

a. *Description (fig. 5-31).* The headlamp system uses two sealed-beam lamps which provide separate and distinct high and low beams. A foot-operated dimmer switch controls the use of the high or low beam. The headlamp switch on the instrument panel turns the headlamps ON and OFF. A recycling type circuit breaker in the headlamp switch protects the circuit without a total loss of the headlamps in case of a short.

b. *Troubleshooting the Headlamp Circuit.* Perform the steps in table 5-8 to isolate faulty components of the headlamp circuit.

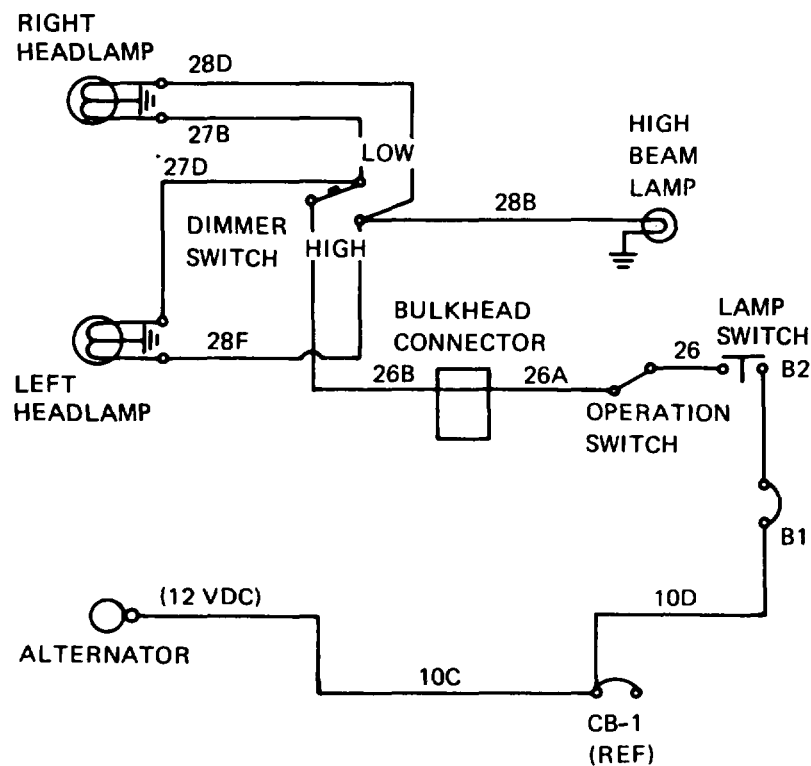
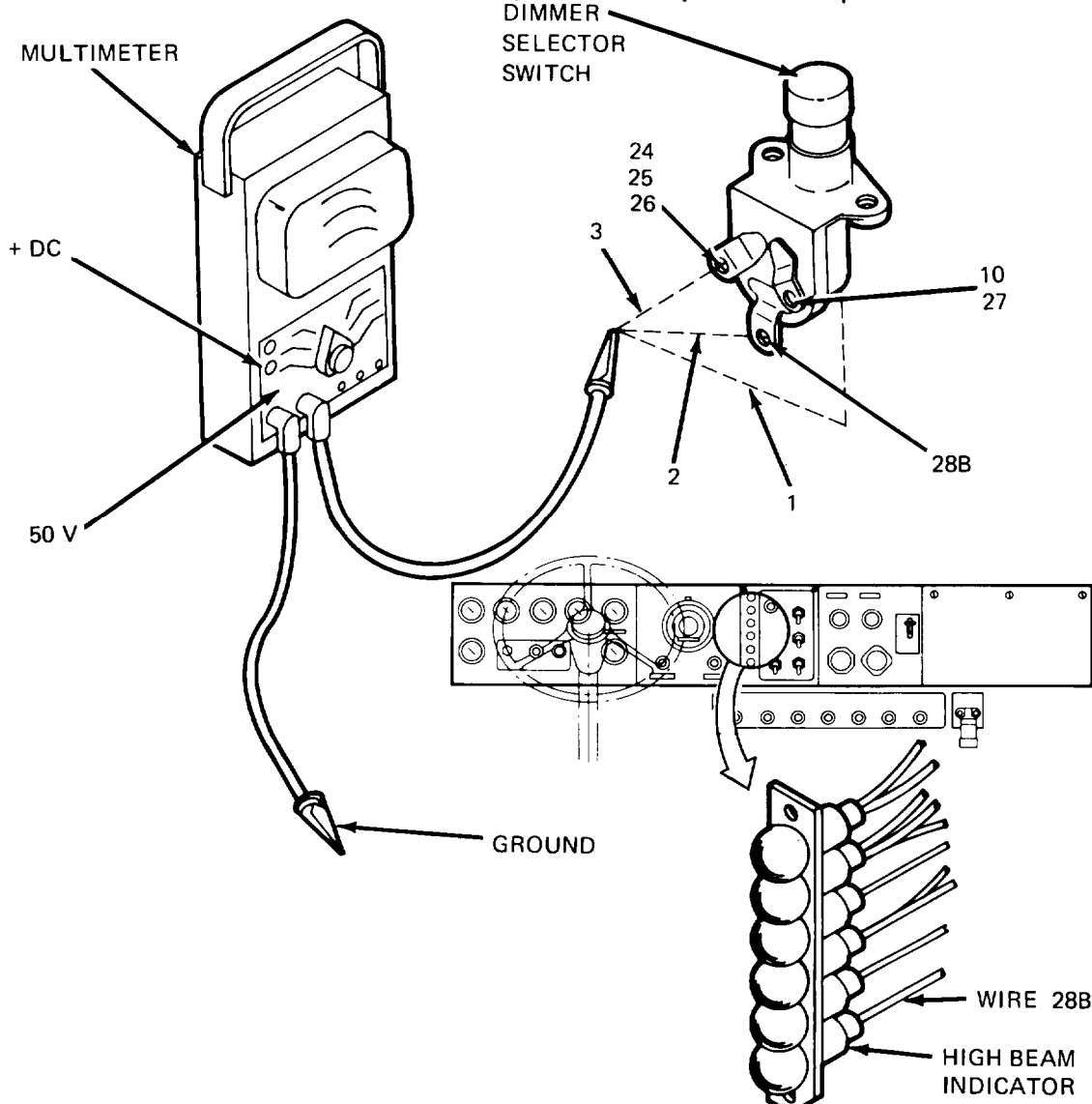


Figure 5-31. Headlamp Circuit

Table 5-8. Headlamp Circuit Troubleshooting

MALF	STEP	INSTRUCTION	INDICATION	YES	NO	REMARKS
1		BOTH HEADLAMPS BLINK ON AND OFF				
			NOTE A short in the headlamp circuit is causing the circuit breaker to cycle.			
2		ONE HEADLAMP IS INOPERATIVE. Remove the lamp and check for voltage at the lamp socket with multimeter.	12 volts dc nominal.	Replace lamp (para 5-44).	Repair ground connection at lamp.	
3		BOTH HEADLAMPS ARE INOPERATIVE.				
	1	Check blackout lamp switch position.				
	2	Check for voltage at dimmer switch terminal (circuit 26B) using multimeter.	12 volts dc nominal. Fig. 5-32.	Replace (para 5-57).	Go to Step 3.	
	3	Check for voltage at lamp switch (circuit 26) terminal.	12 volts dc nominal.	Check circuit 26 wiring.	Go to Step 4.	
	4	Check for voltage at lamp switch (circuit 10D) terminal.	12 volts dc nominal.	Replace switch (para 5-62).	Go to Step 5.	
	5	Troubleshoot wiring.				
	6	Check circuit breaker in headlamp switch.	Continuity.	Troubleshoot wiring	Replace headlamp switch.	

Table 5-8. Headlamp Circuit Troubleshooting (Continued).

MALF	STEP	INSTRUCTION	INDICATION	YES	NO	REMARKS
		 The diagram illustrates the electrical connections for testing a dimmer switch. A multimeter is connected to the dimmer switch terminals. The multimeter's positive lead is connected to terminal 24, and its negative lead is connected to ground. The dimmer switch has terminals 24, 25, 26, 10, 27, and 28B. Wires 2, 1, and 3 are also shown. A high beam indicator is connected to wire 28B. The diagram is labeled 'Figure 5-32. Dimmer Switch Checks'.				
4		HIGH BEAM INDICATOR IS INOPERATIVE. Check for voltage at lamp and terminal 2 with multi meter.	12 volts dc nominal.	Replace bulb (para 5-63), or switch (para 5-57).	Check wire numbers 24, 25, 26, 10, 27 and 28B from dimmer selector switch at terminals 1, 2, and 3.	

5-15. MARKER LAMPS.

a. *Description.* All vehicles in the series have five front marker lamps. The concrete mixer also has two intermediate side marker lamps. The dump, bituminous distributor, and the concrete mixer also have five rear marker lamps. Wiring to 24 V dc and 12 V dc trailer connectors is also provided. The lamps are turned on by the headlamp switch when the blackout switch is in the normal position. A momentary contact CLEARANCE LAMP switch allows the driver to flash the lamps.

b. Troubleshooting. The marker lamps circuit is straightforward and troubleshooting can, for the most part, be based on observation of the lamp(s) not working and reference to the circuit schematic, figure 5-33. The checks in table 5-9 can be used to isolate a problem.

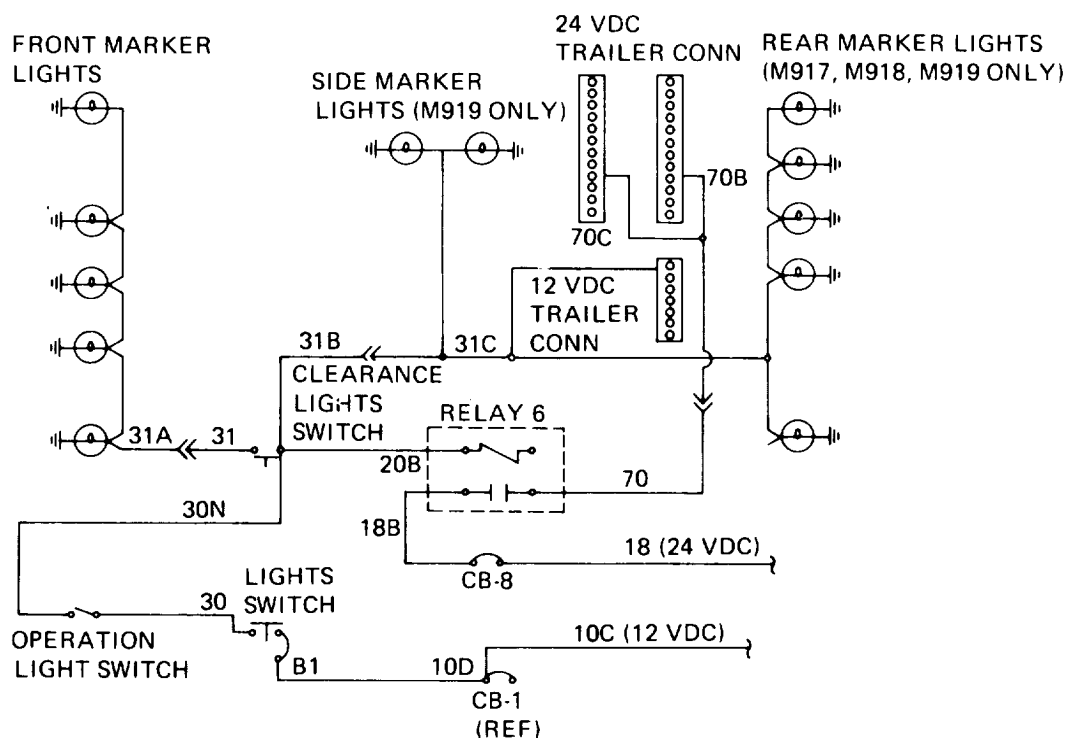


Figure 5-33. Marker Lamps Circuit

Table 5-9. Marker Lamps Circuit Troubleshooting.

MALF	STEP	INSTRUCTION	INDICATION	YES NO REMARKS		
				YES	NO	REMARKS
1		FRONT MARKER LAMPS INOPERATIVE.				
		If none of the front marker lamps operates check wiring from the switch.	Loose connection. Broken wire.	Tighten. Repair.	Replace any single lamp that is inoperative.	
2		INTERMEDIATE MARKER LAMPS INOPERATIVE.				
		If neither of the side marker lamps operate, check wiring from the switch.	Loose connection. Broken wire.	Tighten. Repair.	Replace bulb.	
3		REAR MARKER LAMPS INOPERATIVE.				
		If none of the rear marker lamps operates, check wiring from the switch.	Loose Connection. Broken wire.	Tighten. Repair.	Replace bulb.	
4		ALL MARKER LAMPS INOPERATIVE.				
		Check for voltage at both switch terminals using multi meter.	12 volts dc nominal.	Trouble-shoot wiring.	Replace switch.	

5-16. PARKING AND TAIL LAMPS.

a. *Description.* The (front) parking and (rear) tail lamps are combination lamps which also provide stop and turn functions. The parking and tail lamp functions are actuated by the headlamp switch when it is pulled either halfway or all the way out (fig. 5-34).

b. *Troubleshooting.* Troubleshooting is indicated directly as the result of the observed malfunction as described in table 5-10.

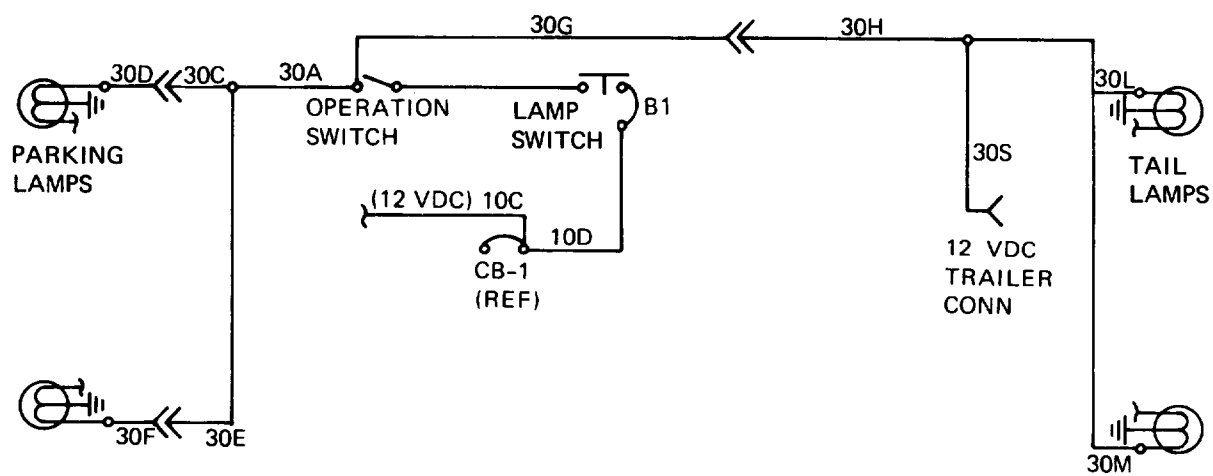


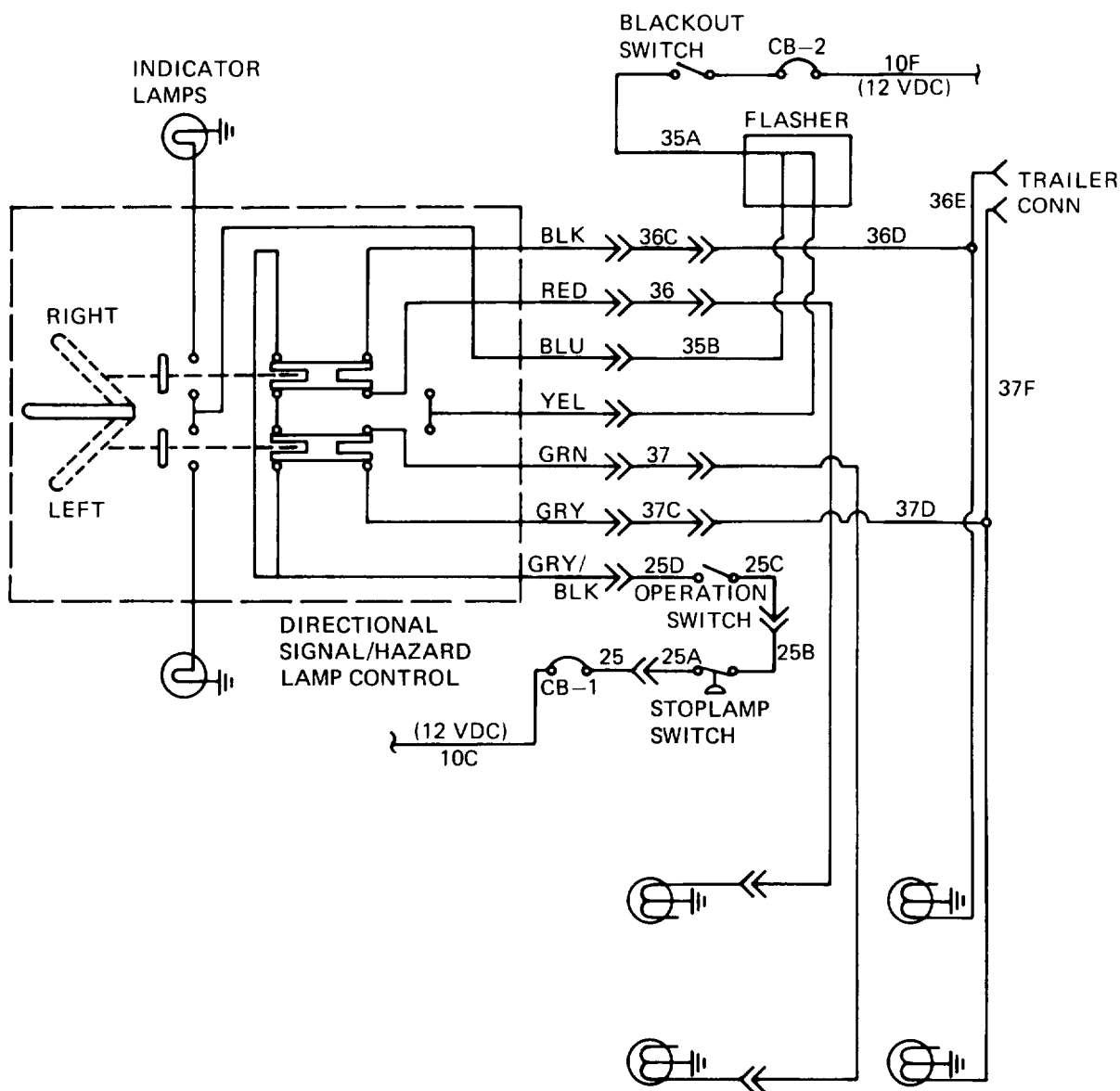
Figure 5-34. Parking and Tail Lamp Circuit

Table 5-10. Parking and Tail Lamps Circuit Troubleshooting.

MALF	STEP	INSTRUCTION	INDICATION	YES	NO	REMARKS
1		SINGLE LAMP INOPERATIVE. Replace bulb.	Lamp lights.		Check wiring.	
2		FRONT LAMPS ARE INOPERATIVE. Check circuits 30C, 30D, 30E, and 30F wiring and connection points, using a multi-meter.				
3		REAR LAMPS ARE INOPERATIVE. Check circuits 30L, and 30M wiring and connection points, using a multimeter.				

5-17. STOP AND TURN SIGNAL LAMPS.

a. Description. The turn signal and stop lamps (fig. 5-35) are combination lamps which also provide the parking and tail lamp functions. Referring to figure 5-35, you will see that circuits 35B and 36C provide the right turn directional flashing when the control handle is raised. Circuits 37 and 37F provide the left turn directional flashing when the control lever is lowered. The hazard lamps use those same circuits simultaneously to provide flashing of all four lamps. The stop lamp switch completes circuit 25 to actuate circuits 36C and 37F which provide the stop lamp function. The flashing functions override the stop and park functions. The flashing lamps on the control operate in conjunction with the flashing circuits (refer to table 5-11).



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Figure 5-35. Stop and Turn Signal Lamp Circuit.

Table 5-11. Stop and Turn Signal Lamps Circuit Troubleshooting.

MALF	STEP	INSTRUCTION	INDICATION	YES	NO	REMARKS
				</		

5-18. BACKUP LAMPS.

a. *Description (fig. 5-36).* When the ratio selector is placed in either reverse speed, the air-actuated backup switch (located on the transmission) will close and light up the backup lamps if the ENGINE RUN switch is turned on and the blackout switch is in the normal position. (Reference Table 5-12.)

NOTE

The compressed air system must be charged within the normal operating range in order to shift the transmission and actuate the backup switch.

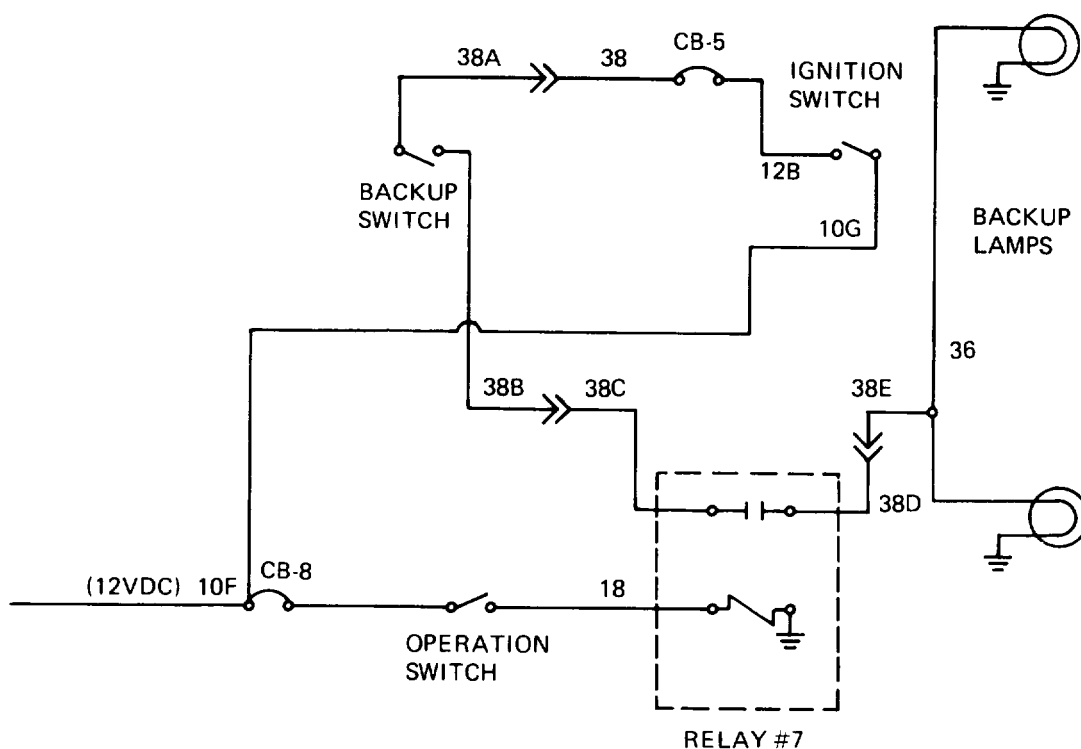


Figure 5-36. Backup Lamp Circuit.

Table 5-12. Backup Lamps Circuit Troubleshooting.

MALF	STEP	INSTRUCTION	INDICATION	YES	NO	REMARKS
1		BACKUP LAMP(S) INOPERATIVE.				
	1	Check for voltage at inoperative lamp using multimeter.	12 volts dc nominal.	Check ground, replace bulb (para 5-46).	Go to Step 2.	
	2	Check for voltage at circuit 38B terminal of backup switch.	12 volts dc nominal.	Go to Step 3.	Check circuit 38B wiring.	
	3	Check for voltage at circuit 38A terminal of backup switch.	12 volts dc nominal.	Replace switch (para 5-77).	Check circuit 38A wiring and circuit breaker.	

5-19. BLACKOUT LIGHTING SYSTEM.

a. The blackout lighting system is shown and pictorially described in paragraphs 2-50 and 2-51. See illustration in paragraph 2-51 for location of the major components in this system.

b. To aid in troubleshooting, a schematic diagram (fig. 5-37) is provided below that isolates the blackout lighting system from the complete vehicle electrical system. You will find the vehicle electrical schematic diagram in Appendix D, along with the vehicle wiring harness drawings.

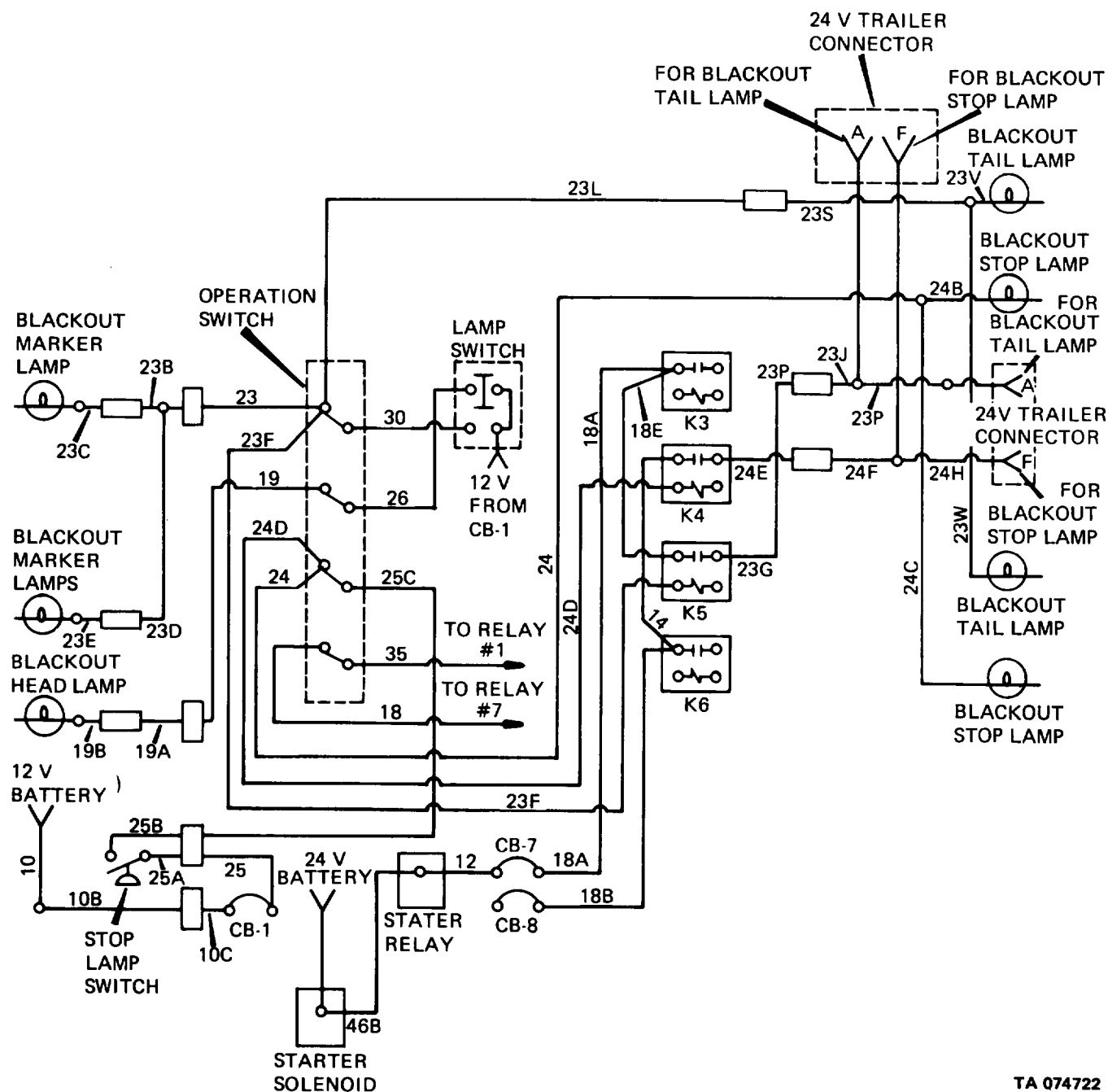


Figure 5-37. Blackout Lighting System Circuit

Table 5-13. Blackout Lighting System Circuit Troubleshooting.

MALF	STEP	INSTRUCTION	INDICATION	YES	NO	REMARKS
		NOTE The following procedures assume that: a. Normal service lighting system functions properly (if not; refer to para 5-14). b. OPERATION switch is in BLACKOUT position.				
1		ALL BLACKOUT LAMPS INOPERATIVE. Replace OPERATION switch.				
2		ONE BLACKOUT MARKER, HEADLAMP, TAIL LAMP OR STOP LAMP INOPERATIVE.				
	1	Replace bulb.	Lamp goes on,	Go to Step 2.		
	2	Check for voltage at lamp connector; then work back to OPERATION switch checking for voltage at each wire connector.	12V nominal available at one test point; not available at preceding test point.	Inspect wiring between points checked; then replace defective wire(s).		
3		TRAILER BLACKOUT LAMPS INOPERATIVE.				
	1	Check for voltage at trailer applicable connector pin (A or F); then work back to output of relay (K4 or K5) checking for voltage at each wire connection.	24V nominal available at one test point; not available at preceding test point.	Inspect wiring between points checked; then replace defective wire(s).	Go to Step 2.	
	2	Check for voltage at input of relay coil (K4 or K5).	12V nominal.	Go to Step 3.	Go to Step 4.	If power is available, problem is in relay or 24V circuit from starter solenoid. If power is not available, problem is in relay or 12V circuit from OPERATIONS switch. Check relay as described in para. 5-5C.

Table 5-13. Blackout Lighting System Circuit Troubleshooting (Continued).

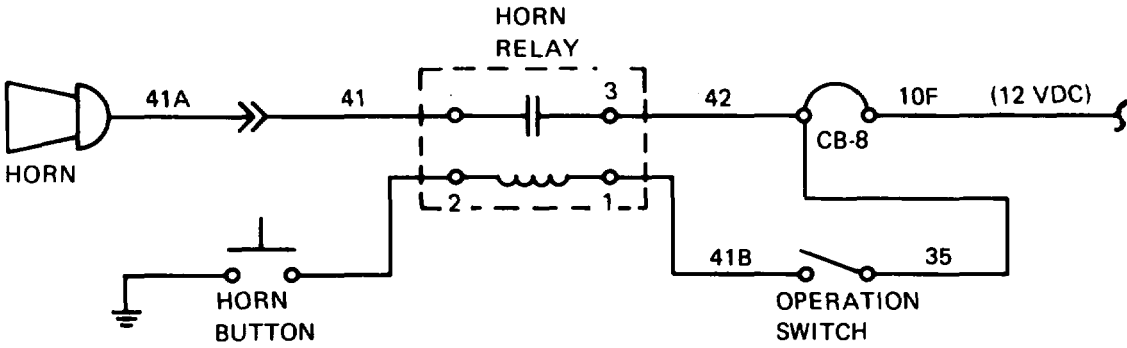
MALF	STEP	INSTRUCTION	INDICATION	YES	NO	REMARKS
3		TRAILER BLACKOUT	LAMPS INOPERATIVE	(Continued)		
	3	Check for voltage at relay contact terminal then work back to starter solenoid.	24V nominal available at one test point; not available at preceding test point.	Inspect wiring between points checked; then replace defective wire(s).		
	4	Check for voltage at each wire contact from relay to OPERATION switch.	12V nominal available at one test point; not available at preceding test point.	Inspect wiring between point checked; then replace defective wire(s).		

5-20. MISCELLANEOUS ELECTRICAL.

The items covered in this paragraph are:

- a.* Electric horn.
- b.* Heater fan.
- c.* Dome lamp in the cab.
- d.* Fixed work lamps (M916 and M920 only).
- e.* Portable work lamp receptacles.
- f.* Cigar lighter.
- g.* Winterization kit.

Table 5-14. Miscellaneous Electrical Circuit Troubleshooting.

MALF	STEP	INSTRUCTION	INDICATION	YES	NO	REMARKS
	1	ELECTRICAL HORN IS INOPERATIVE				
	1	Check horn for a good ground.	Clean and tighten.	Go to Step 2.	Repair.	
	2	Check for voltage at horn using multimeter while pressing horn button.	12 volts dc nominal.	Replace horn (para 5-68).	Go to Step 3.	
	3	Check for voltage at terminal 3 (fig. 5-38) on horn relay while pressing horn button.	12 volts dc nominal.	Check circuit 41 wiring.	Go to Step 4.	
	4	Check for voltage at terminal 1 on horn relay while pressing horn button.	12 volts dc nominal.	Go to Step 5.		
	5	Jumper terminal 2 on horn relay to ground.	Horn operates.	Go to Step 6.	Replace horn relay (para 5-67).	
	6	Check horn button switch ground and wiring to horn relay.	Wiring and ground okay.	Replace button switch (para 5-67).	Repair.	
						
Figure 5-38. Electric Horn Circuit 1 1 1 1						

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Table 5-14. Miscellaneous Electrical Circuit Troubleshooting (Continued).

MALF	STEP	INSTRUCTION	INDICATION	YES	NO	REMARKS
2		PERSONNEL HEATER FAN INOPERATIVE.				
	1	Turn Engine Run switch ON and check for voltage at terminal B on heater switch, fig. 5-39 using a multi meter.	12 volts dc nominal.	Replace switch (para 5-69).	Go to Step 3.	
	2	If any speed is working check wiring between switch and fan motor.	Detective switch.	Repair.	Replace switch (para 5-69).	
	3	Troubleshoot wiring (circuits 33 and 34).				
Figure 5-39. Heater Fan Circuit						
3		DOMELAMP INOPERATIVE.				
	1	Replace the bulb.	Lamp lights.		Go to Step 2.	
	2	Using a multimeter check for voltage at dome lamp switch terminals (fig. 5-40).	12 volts dc nominal.	Replace switch (para 5-56).	Go to Step 3.	
	3	Troubleshoot wiring.				

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Table 5-14. Miscellaneous Electrical Circuit Troubleshooting (Continued).

MALF	STEP	INSTRUCTION	INDICATION	YES	NO	REMARKS
		Figure 5-40. Dome Lamp, Work Lamps, and Cigar Lighter Circuits.				
4		WORK LAMPS INOPERATIVE (FIXED, M916 AND M920 ONLY).				
	1	Replace bulb.	Lamp lights.		Go to Step 2.	
	2	Check wiring between lamps and switch. Check for voltage at terminal on switch.	12 volts dc nominal.	Replace switch (para 5-62A).	Go to Step 3.	
	3	Troubleshoot wiring.				
5		WORK LAMPS INOPERATIVE (PORTABLE RECEPTACLES).				
	1	Replace bulb.	Lamp lights.		Go to Step 2.	
	2	Check wiring between lamps and switch. Check for voltage at terminal on switch.	12 volts dc nominal.	Replace switch (para 5-62A).	Go to Step 3.	
	3	Troubleshoot wiring.				
6		CIGAR LIGHTER INOPERATIVE.				
	1	Replace the lighter element.	Lighter works.		Go to Step 2.	
	2	Check for voltage at lighter receptacle, using a multimeter.	12 volts dc nominal.	Replace receptacle (para 5-60A).	Go to Step 3.	
	3	Troubleshoot wiring.				

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Table 5-14. Miscellaneous Electrical Circuit Troubleshooting (Continued).

MALF	STEP	INSTRUCTION	INDICATION	YES	NO	REMARKS
		Figure 5-41. Winterization Kit				
	7	WINTERIZATION KIT MALFUNCTIONING.				
	1	Check 110 VAC power source.	Heaters functions.		Go to Step 2.	
	2	Check power cord, receptacle, and all wiring for breaks.	Heaters functions.		Go to Step 3.	
	3	Replace circuit breaker.	Heater functions.		Go to step 4, 5, 6, or 7.	
	4	Replace engine oil heater thermostat.	Heater functions.		Refer to DS/GS for heater replacement.	

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Table 5-14. Miscellaneous Electrical Circuit Troubleshooting (Continued).

MALF	STEP	INSTRUCTION	INDICATION	YES	NO	REMARKS
		Figure 5-41. Winterization Kit				
	7	WINTERIZATION KIT MALFUNCTIONING (Continued).				
	5	Replace engine coolant heater & thermostat.	Heater functions.			
	6	Replace transmission oil heater.	Heater functions.			
	7	Replace battery box heater and thermostat.	Heater functions.			

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Section III MAINTENANCE PROCEDURES

5-21. INTRODUCTION.

This section provides you with Organizational Level maintenance procedures for the electrical and instrumentation systems. To find a specific maintenance procedure, see one of the following task summaries.

- a.* Circuit Breakers and Wiring (para 5-22).
- b.* Starting and Starting Control (para 5-23).
- c.* Batteries and Alternator (para 5-24).
- d.* Exterior Lighting (para 5-25).
- e.* Cab Interior Lighting and Switches (para 5-26).
- f.* Panel-Mounted Instruments (para 5-27).
- g.* Electric Horn and Cab Heater Control (para 5-28).
- h.* Sending Units, Switching Devices and Winterization Kit (para 5-29).

5-22. CIRCUIT BREAKERS AND WIRING MAINTENANCE TASK SUMMARY.**INITIAL SETUP****APPLICABLE CONFIGURATIONS**

All-Circuit Breakers.

**EQUIPMENT CONDITION
PARAGRAPH**

5-37A.

CONDITION DESCRIPTION

Batteries Disconnected.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

REFERENCES (TROUBLESHOOTING)

None.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
1	Circuit Breaker Maintenance: (M915, M916 and M920): A. Removal. B. Installation. C. Operational Check	5-30 5-30A 5-30B 5-30C	None
2	Circuit Breaker Maintenance (M917, M918 and M919): A. Removal. B. Installation. C. Operational Check.	5-30.1 5-30.1 A 5-30.1 B 5-30.1 C	None
3	Wiring Harness Maintenance:	5-31	None

5-23. STARTING AND STARTING CONTROL MAINTENANCE TASK SUMMARY.**INITIAL SETUP****APPLICABLE CONFIGURATIONS**

All.

EQUIPMENT CONDITION**PARAGRAPH**5-37A.
11-14A or C.**CONDITION DESCRIPTION**Battery Disconnected.
Left Fender Removed.**TEST EQUIPMENT**

None.

SPECIAL TOOLS

Small Flat Tip Punch.

MATERIALS/PARTS (P/N)Gasket (5330-00-143-7737).
Nylon Rope (10 feet).
Gasket (5330-00-252-3274).**PERSONNEL REQUIRED**

Two (MOS-63B20).

REFERENCES (TM)TM 9-2320-273-10.
TM 9-2320-273-20 P.**REFERENCES (TROUBLESHOOTING)**

Table 5-2,4-1, 5-3.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle on Level Ground.

GENERAL SAFETY INSTRUCTIONSEngine Off.
Transmission in Neutral.
Park Brake Set.**LIST OF TASKS**

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
1	Starter Motor Maintenance:	5-32	4-1
	A. Removal.	5-32A	5-2
	B. Installation.	5-32B	
	C. Operational Check.	5-32C	
2	Starter Relay Maintenance:	5-33	5-2
	A. Removal.	5-33A	
	B. Installation.	5-33B	
	C. Operational Check.	5-33C	

5-23. STARTING AND STARTING CONTROL MAINTENANCE TASK SUMMARY (Continued).**LIST OF TASKS**

TASK NO.	TASK	TIM K REF	TROUBLESHOOTING REF (TABLE)
3	Starter Button Maintenance:	5-34	5-2
	A. Removal.	5-34A	
	B. Installation.	5-34B	
	C. Operational Check.	5-34C	
4	Engine Run Switch Maintenance:	5-35	4-1
	A. Removal.	5-35A	
	B. Installation.	5-35B	
	C. Operational Check.	5-35C	
5	Ether Button Maintenance:	5-36	5-3
	A. Removal.	5-36A	
	B. Installation.	5-36B	
	C. Operational Check.	5-36C	

5-24. BATTERIES AND ALTERNATOR MAINTENANCE TASK SUMMARY.**INITIAL SETUP****APPLICABLE CONFIGURATIONS**

All.

**EQUIPMENT CONDITION
PARAGRAPH**

11-14 A&C.

CONDITION DESCRIPTION

Right Front Fender Removed.

TEST EQUIPMENT

Battery Charger.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

PERSONNEL REWIRED

Two (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

REFERENCES (TROUBLESHOOTING)

Table 5-1, 5-5.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine Off.

Park Brake Set.

Transmission in Neutral.

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
1	Disconnect Batteries:	5-37	5-1
	A. Removal.	5-37A	
	B. Installation.	5-37B	
	C. Operational Check.	5-37C	

5-24. BATTERIES AND ALTERNATOR MAINTENANCE TASK SUMMARY (Continued).			
LIST OF TASKS			
TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
2	Battery Maintenance:	5-38	5-1
	A. Removal.	5-38A	
	B. Cleaning.	5-38B	
	C. Inspection.	5-38C	
	D. Charging.	5-38D	
	E. Installation.	5-38E	
3	Battery Cables Maintenance:	5-39	5-1
	A. Removal.	5-39A	
	B. Installation.	5-39B	
	C. Operational Check.	5-39C	
4	Battery Box Latch Maintenance:	5-40	
	A. Removal.	5-40A	
	B. Installation.	5-40B	
	C. Operational Check.	5-40C	
5	Battery Box Cover Maintenance:	5-41	
	A. Removal.	5-41A	
	B. Installation.	5-41B	
	C. Checking Fit.	5-41C	
6	Battery Box Maintenance:	5-42	
	A. Removal.	5-42A	
	B. Installation.	5-42B	
7	Alternator Maintenance:	5-43	5-5
	A. Removal.	5-43A	
	B. Installation.	5-43B	
	C. Operational Check.	5-43C	

5-25. EXTERIOR LIGHTING MAINTENANCE TASK SUMMARY.**INITIAL SETUP****APPLICABLE CONFIGURATIONS**

All.

**EQUIPMENT CONDITION
PARAGRAPH**

5-37A.

5-44A.

CONDITION DESCRIPTION

Battery Disconnected.
Headlamp Removed if Wire (3)
is to be Removed.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

1. 35 W-12V Bulb GE 4419 (or equal).
2. Non Flammable Cleaning Solvent,
(Refer to Appendix C).
3. Bearing Grease (Refer to Appendix C).
4. Tape.
5. Marking Pen.

PERSONNEL REQUIRED

Two (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-20P. LO 9-2320-273-12.

TM 9-2320-273-10.

REFERENCES (TROUBLESHOOTING)

Table 5-8, 5-9, 5-10, 5-11, 5-13, 5-14.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Park Brake Set.
Engine Off.
Transmisison in Neutral.

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
1	Headlamps Maintenance:	5-44	5-8
	A. Removal.	5-44A	
	B. Installation.	5-44B	
	C. Operational Check.	5-44C	
2	Front Turn and Marker Lamps Maintenance:	5-45	5-9 5-11
	A. Removal.	5-45A	
	B. Installation.	5-45B	
	C. Operational Check.	5-45C	

5-25. EXTERIOR LIGHTING MAINTENANCE TASK SUMMARY (Continued).			
LIST OF TASKS			
TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
3	Rear Lamp Assembly Maintenance:	5-46	5-10
	A. Removal.	5-46A	
	B. Installation.	5-46B	
	C. Operational Check.	5-46C	
4	Clearance Lamps Maintenance:	5-47	5-9
	A. Removal.	5-47A	
	B. Installation.	5-47B	
	C. Operational Check.	5-47C	
5	Blackout Headlamp Maintenance:	5-48	5-13
	A. Removal.	5-48A	
	B. Installation.	5-48B	
	C. Operational Check.	5-48C	
6	Blackout Marker Lamps Maintenance:	5-49	5-13
	A. Removal.	5-49A	
	B. Installation.	5-49B	
	C. Operational Check.	5-49C	
7	Blackout Tail and Stop Lamps Maintenance:	5-50	5-13
	A. Removal.	5-50A	
	B. Installation.	5-50B	
	C. Operational Check.	5-50C	
8	Stationary Work lamp Bulb Replacement:	5-51	5-14
	A. Removal.	5-51A	
	B. Installation.	5-51 B	
	C. Operational Check.	5-51C	
9	Stationary Worklamp Replacement:	5-52	5-14
	A. Removal.	5-52A	
	B. Installation.	5-52B	
	C. Operational Check.	5-52C	

5-25. EXTERIOR LIGHTING MAINTENANCE TASK SUMMARY (Continued).

LIST OF TASKS			
TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
10	Portable Work Lamp Bulb Replacement: A. Removal. B. Installation. C. Operational Check.	5-53 5-53A 5-53B 5-53C	5-14
11	Portable Work Lamp Maintenance: A. Disassembly. B. Assembly. C. Operational Check.	5-54 5-54A 5-54B 5-54C	5-14
12	Trailer Lamp Connector Maintenance (12 and 24 Volt): A. Removal (24 Volt Connector). B. Removal (12 Volt Connector). C. Inspection (24 Volt and 12 Volt). D. Installation (24 Volt Connector). E. Installation (12 Volt Connector). F. Test 24 Volt and 12 Volt).	5-55 5-55A 5-55B 5-55C 5-55D 5-55E 5-55F	5-10

5-26. CAB INTERIOR LIGHTING AND SWITCH MAINTENANCE TASK SUMMARY.**INITIAL SETUP****APPLICABLE CONFIGURATIONS**

All.

**EQUIPMENT CONDITION
PARAGRAPH**

None.

CONDITION DESCRIPTION

None.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TROUBLESHOOTING)

Table 5-8, 5-11, 5-14.

GENERAL SAFETY INSTRUCTIONS

Engine Off.

Transmission in Neutral.

Park Brake Set.

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
1	Dome Lamp Maintenance: A. Removal. B. Installation. C. Operational Check.	5-56 5-56A 5-56B 5-56C	5-14
2	Headlamp Dimmer Switch Maintenance: A. Removal. B. Installation. C. Operational Check.	5-57 5-57A 5-57B 5-57C	5-8

5-26. CAB INTERIOR LIGHTING AND SWITCH MAINTENANCE TASK SUMMARY (Continued).**LIST OF TASKS**

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
3	Turn Signal Control Maintenance:	5-58	5-11
	A. Removal.	5-58A	
	B. Installation.	5-58B	
	C. Operational Check.	5-58C	

5-27. PANEL-MOUNTED INSTRUMENTS MAINTENANCE TASK SUMMARY.**INITIAL SETUP****APPLICABLE CONFIGURATIONS**

All.

**EQUIPMENT CONDITION
PARAGRAPH**

5-37A.

CONDITION DESCRIPTION

Battery Disconnected.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Seven Day Disk Pack (7530-01-060-1628).

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10

REFERENCES (TROUBLESHOOTING)

Table 5-6, 5-7, 5-9, 5-14.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine Off.

Transmission in Neutral.

Park Brake Set.

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
1	Electrical Instruments Maintenance (LH Cluster):	5-59	5-7
	A. Removal.	5-59A	
	B. Installation.	5-59B	
	C. Operational Check.	5-59C	
2	Cigar Lighter Maintenance:	5-60	5-14
	A. Removal.	5-60A	
	B. Installation.	5-60B	
	C. Operational Check.	5-60C	

5-27. PANEL-MOUNTED INSTRUMENTS MAINTENANCE TASK SUMMARY (Continued).

LIST OF TASKS			
TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
3.	Low Air Pressure Indicator Lamp Maintenance:	5-61	5-6
	A. Removal.	5-61A	
	B. Installation.	5-61B	
	C. Operational Check.	5-61C	
4.	Electrical Switches Maintenance (R H Cluster):	5-62	5-6
	A. Removal.	5-62A	
	B. Installation.	5-62B	
	C. Operational check.	5-62C	
5.	Indicator Lamps Maintenance (R H Cluster):	5-63	5-7
	A. Removal.	5-63A	
	B. Installation.	5-63B	
	C. Operational Check.	5-63C	
6.	Clearance Lamps Switch Maintenance	5-64	5-9
	A. Removal.	5-64A	
	B. Installation.	5-64B	
	C. Operational Check.	5-64C	
7.	Clearance Indicator Lamp Maintenance:	5-65	5-9
	A. Removal.	5-65A	
	B. Installation.	5-65B	
	C. Operational Check.	5-65C	
8.	Tachograph Maintenance:	5-66	5-7
	A. Reading Tachograph Disk.	5-66A	
	B. Disk Pack Removal.	5-66B	
	C. Disk Pack Installation.	5-66C	
	D. Tachograph Removal.	5-66D	
	E. Tachograph Installation.	5-66E	
	F. Operational Check.	5-66F	

5-28. ELECTRIC HORN AND CAB HEATER CONTROL MAINTENANCE TASK SUMMARY.**INITIAL SETUP****APPLICABLE CONFIGURATIONS**

All.

**EQUIPMENT CONDITION
PARAGRAPH**

5-37A.

CONDITION DESCRIPTION

Batteries Disconnected.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

REFERENCES (TROUBLESHOOTING)

Table 5-14.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine Off.
Transmission in Neutral.
Park Brake Set.

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
1	Horn Button Maintenance:	5-67	5-14
	A. Removal.	5-67A	
	B. Installation.	5-67B	
	C. Operational Check.	5-67C	
2	Horn Maintenance:	5-68	5-14
	A. Removal.	5-68A	
	B. Installation.	5-68B	
	C. Operational Check.	5-68C	

5-28. ELECTRIC HORN AND CAB HEATER CONTROL MAINTENANCE TASK SUMMARY (Continued).			
LIST OF TASKS			
TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
3	Heater Fan Switch Maintenance:	5-69	5-14
	A. Removal.	5-69A	
	B. Installation.	5-69B	
	C. Operational Check.	5-69C	

**5-29. SENDING UNITS, SWITCHING DEVICES AND WINTERIZATION KIT
MAINTENANCE TASK SUMMARY.**
INITIAL SETUP
APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (Refer to Appendix C).
Gasket, Fuel Level Sending Unit (2013).
Container (Approx. 2 gal).
30 Amp Circuit Breaker.
15 Amp Circuit Breaker (3).
Gasket (1020803).

PERSONNEL REQUIRED

Two (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TM 9-2320-273-20P.

REFERENCES (TROUBLESHOOTING)

Table 6-1, 5-6, 5-12, 5-7, 12-2, 5-3, 5-11, 5-14.

**EQUIPMENT CONDITION
PARAGRAPH**

4-42A.

5-37A.

6-9A.

6-9C.

9-13A.

CONDITION DESCRIPTION

Radiator Drained Below Actuator
Level.
Batteries Disconnected.
Transmission Oil Drained.
Cab Floor Inspection Plate Removed.
Air Reservoir Drained.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine Off.
Transmission in Neutral.
Park Brake Set.

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
1	Oil Pressure Sending Unit Maintenance: A. Removal. B. Installation. C. Operational Check.	5-70 5-70A 5-70B 5-70C	5-7
2	Oil Pressure Switch Maintenance: A. Removal. B. Installation C. Operational Check.	5-71 5-71A 5-71B 5-71C	5-6

**5-29. SENDING UNITS, SWITCHING DEVICES AND WINTERIZATION KIT MAINTENANCE
TASK SUMMARY (Continued).**
LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
3.	Water Temperature Sending Unit Maintenance:	5-72	5-7
	A. Removal.	5-72A	
	B. Installation.	5-72B	
	C. Operational Check.	5-72C	
4.	Water Temperature Switch Maintenance:	5-73	5-7
	A. Removal.	5-73A	
	B. Installation.	5-73B	
	C. Operational Check.	5-73C	
5.	Ether Temperature Switch Maintenance:	5-74	5-3
	A. Removal.	5-74A	
	B. Installation.	5-74B	
	C. Operational Check.	5-74C	
6.	Neutral Safety Switch Maintenance:	5-75	6-1
	A. Removal.	5-75A	
	B. Installation.	5-75B	
	C. Operational Check.	5-75C	
7.	Transmission Oil Temperature Sending Unit Maintenance:	5-76	5-7
	A. Removal.	5-76A	
	B. Installation.	5-76B	
	C. Operational Check.	5-76C	
8.	Backup Switch and Clutch Disengagement Sensor Maintenance:	5-77	5-12
	A. Removal.	5-77A	
	B. Installation.	5-77B	
	C. Operational Check.	5-77C	
9.	Backup Alarm Maintenance:	5-78	5-6
	A. Removal.	5-78A	
	B. Installation.	5-78B	
	C. Operational Check.	5-78C	

5-29. SENDING UNITS, SWITCHING DEVICES AND WINTERIZATION KIT MAINTENANCE TASK SUMMARY (Continued).			
LIST OF TASKS			
TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
10	Fuel Level Sending Unit Maintenance:	5-79	5-7
	A. Removal.	5-79A	
	B. Installation.	5-79B	
	C. Operational Check.	5-79C	
11	Low Air Pressure Buzzer Maintenance:	5-80	5-6
	A. Removal.	5-80A	
	B. Installation.	5-80B	
	C. Operational Check.	5-80C	
12	Low Air Pressure Switch Maintenance:	5-81	5-6
	A. Removal.	5-81A	
	B. Installation.	5-81B	
	C. Operational Check.	5-81C	
13	Park Brake Switch Maintenance:	5-82	5-7
	A. Removal.	5-82A	
	B. Installation.	5-82B	
	C. Operational Check.	5-82C	
14	Differential Lock-Up Switch Maintenance:	5-83	5-7
	A. Removal.	5-83A	
	B. Installation.	5-83B	
	C. Operational Check.	5-83C	
15	Power Takeoff (PTO) Switch Maintenance:	5-84	12-2
	A. Removal.	5-84A	
	B. Installation.	5-84B	
	C. Operational Check.	5-84C	
16	Stop Lamp Switch Maintenance:	5-85	5-11
	A. Removal.	5-85A	
	B. Installation.	5-85B	
	C. Operational Check.	5-85C	

**5-29. SENDING UNITS, SWITCHING DEVICES AND WINTERIZATION KIT
MAINTENANCE TASK SUMMARY (Continued).**
LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
17	Instrument Relay Maintenance:	5-86	None
	A. Removal.	5-86A	
	B. Installation.	5-86B	
	C. Operational Check.	5-86C	
18	Winterization Kit Circuit Breakers, Box, and Receptacle Maintenance:	5-87	5-14
	A. Removal of Circuit Breakers.	5-87A	
	B. Installation of Circuit Breakers.	5-87B	
	C. Operational Check.	5-87C	
	D. Removal of Circuit Breaker Box and Receptacle.	5-87D	
	E. Installation of Circuit Breaker Box and Receptacle.	5-87E	
	F. Operational Check.	5-87F	
19	Winterization Kit Transmission Oil Heater Maintenance:	5-88	5-14
	A. Removal of Heater.	5-88A	
	B. Installation of Heater.	5-88B	
	C. Operational Check.	5-88C	
20	Winterization Kit Engine Oil Heater Thermostat Maintenance:	5-89	5-14
	A. Removal of Thermostat.	5-89A	
	B. Installation of Thermostat.	5-89B	
	C. Operational Check.	5-89C	
21	Winterization Kit Engine Coolant Heater Maintenance:	5-90	5-14
	A. Removal of Heater.	5-90A	
	B. Installation of Heater.	5-90B	
	C. Operational Check.	5-90C	
22	Winterization Kit Battery Box Heater Maintenance:	5-91	5-14
	A. Removal of Heater.	5-91A	
	B. Installation of Heater.	5-91B	
	C. Operational Check.	5-91C	

5-29. SENDING UNITS, SWITCHING DEVICES AND WINTERIZATION KIT MAINTENANCE TASK SUMMARY (Continued).			
LIST OF TASKS			
TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
23	Winterization Kit Battery Box Thermostat and Terminal Strip Maintenance:	5-92	5-14
	A. Removal.	5-92A	
	B. Installation.	5-92B	
	C. Operational Check.	5-92C	
24	Winterization Kit Battery Box Insulation Maintenance:	5-93	None
	A. Removal.	5-93A	
	B. Cleaning.	5-93B	
	C. Installation.	5-93C	

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CIRCUIT BREAKERS AND WIRING.**5-30. CIRCUIT BREAKER MAINTENANCE. (M915, M916, and M920)****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

- a. Removal. (4)
 - b. Installation. (4)
 - c. Operational Check. (2)
- 10 Minutes Total.

INITIALSETUP**APPLICABLE CONFIGURATIONS**

M915, M916, and M920 – (9) Circuit Breakers

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

**EQUIPMENT CONDITION
PARAGRAPH**

5-37A.

CONDITION DESCRIPTION

Batteries Disconnected.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.

Transmission on Neutral.

Park Brake Set.

Always disconnect batteries to prevent electrical shorts when working in the circuit breaker area. An electrical short or arc can cause damage to wiring and other electrical components.

TROUBLESHOOTING REFERENCES

None.

CIRCUIT BREAKERS AND WIRING.

5-30. CIRCUIT BREAKER MAINTENANCE (M915, M916, and M920) (Continued).

LOCATION/ITEM	ACTION	REMARKS

A. REMOVAL.

CAUTION

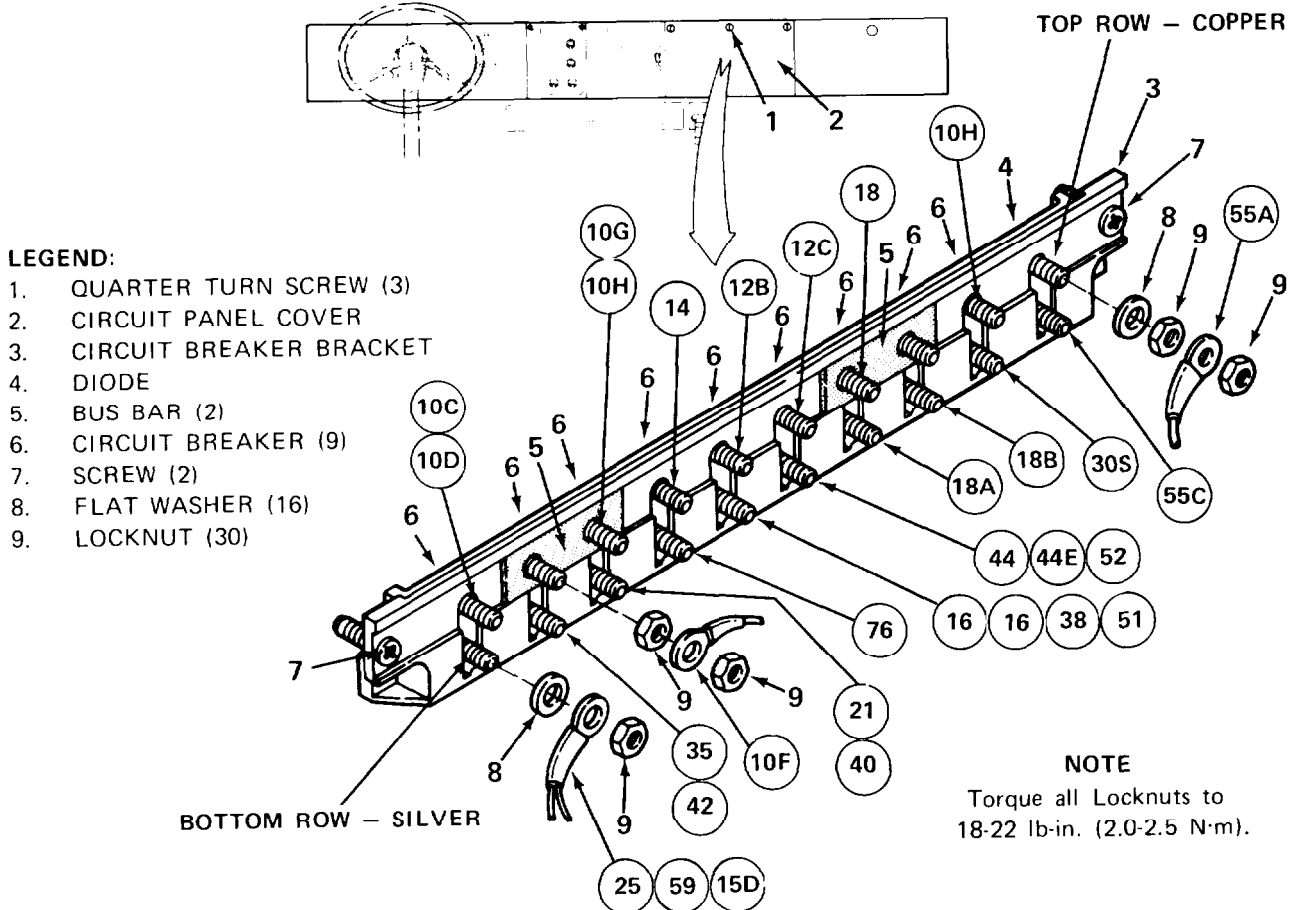
To prevent electrical shorts and damage to wiring or other components, always: use one flat washer and two locknuts on the top row of terminal studs (copper), except no flat washer is used where a bus bar is present. Use one flat washer and one locknut on the bottom row of terminal studs (silver).

Connect wire terminals to the correct circuit breaker or diode and to the correct color terminal stud as illustrated.

NOTE

Circled numbers in the illustration are wire numbers, while uncircled numbers are legend items.

Wire number 15D used on M916 and M920 only.



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CIRCUIT BREAKERS AND WIRING.

5-30. CIRCUIT BREAKER MAINTENANCE (M915, M916, AND M920) (CONTINUED).		
LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
1. Three quarter turn screws (1).	Loosen.	
2. Circuit Panel cover (2).	Lower.	
3. Two screws (7).	Remove from circuit breaker bracket (3).	
4. Three locknuts (9) and two flat washers (8).	a. Unscrew from diode (4) or circuit breaker (6). b. Remove wire terminals. c. Remove diode (4) or circuit breaker (6).	Only one flat washer (8) is used when a bus bar (5) is present. Also remove bus bar (5) if used.
B. INSTALLATION.		
5. Diode (4) or circuit breaker (6).	a. Install in circuit breaker bracket (3). b. Position bus bar (5) if used. c. Install wire terminals. d. Secure with two flat washers (8) and three locknuts (9); torque each locknut to 18-22 lb-in. (2.0-2.5 N•m).	Install per illustration, assuring the copper terminal stud is on top and the silver is on the bottom. Ensure wire terminals are connected to the correct circuit breaker or diode and to the correct color terminal stud. Only one flat washer (8) used when a bus bar (5) is present.
6. Circuit breaker bracket (3).	a. Aline mounting holes. b. Secure with two screws (7).	
7. Circuit panel cover (2).	Raise into position.	
8. Three quarter turn screws (1).	Tighten.	
9. Batteries.	Connect per paragraph 5-37B.	
C. OPERATIONAL CHECK.		
10. Circuit breaker (6) or diode (4).	Refer to paragraph 2-34 and 2-35; check the operation of the circuit breaker or diode replaced.	

CIRCUIT BREAKERS AND WIRING.

5-30. CIRCUIT BREAKER MAINTENANCE (M915, M916, and M920) (Continued).

LOCATION/ITEM	ACTION	REMARKS
TOP ROW - COPPER BOTTOM ROW - SILVER NOTE Torque all Locknuts to 18-22 lb-in. (2.0-2.5 N·m). LEGEND: 1. QUARTER TURN SCREW (3) 2. CIRCUIT PANEL COVER 3. CIRCUIT BREAKER BRACKET 4. DIODE 5. BUS BAR (2) 6. CIRCUIT BREAKER (9) 7. SCREW (2) 8. FLAT WASHER (16) 9. LOCKNUT (30)		

TA 074729

CIRCUIT BREAKERS AND WIRING.**5-30.1 CIRCUIT BREAKER MAINTENANCE. (M917, M918, AND M919)****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

- a. Removal. (4)
 b. Installation. (4)
 c. Operational Check. (2)
-
- 10 Minutes Total.

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

M917, M918, M919 – (7) Circuit Breakers.

EQUIPMENT CONDITION**PARAGRAPH**

5-37A .

CONDITION DESCRIPTION

Batteries Disconnected.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.

Transmission on Neutral.

Park Brake Set.

Always disconnect batteries to prevent electrical shorts when working in the circuit breaker area. An electrical short or arc can cause damage to wiring and other electrical components.

TROUBLESHOOTING REFERENCES

None.

CIRCUIT BREAKERS AND WIRING.

5-30.1 CIRCUIT BREAKER MAINTENANCE (M917, M918, AND M919) (Continued).

LOCATION/ITEM

ACTION

REMARKS

A. REMOVAL.**CAUTION**

To prevent electrical shorts and damage to wiring or other components, always: use one flat washer and two locknuts on the top row of terminal studs (copper), except no flat washer is used where a bus bar is present. Use one flat washer and one locknut on the bottom row of terminal studs (silver).

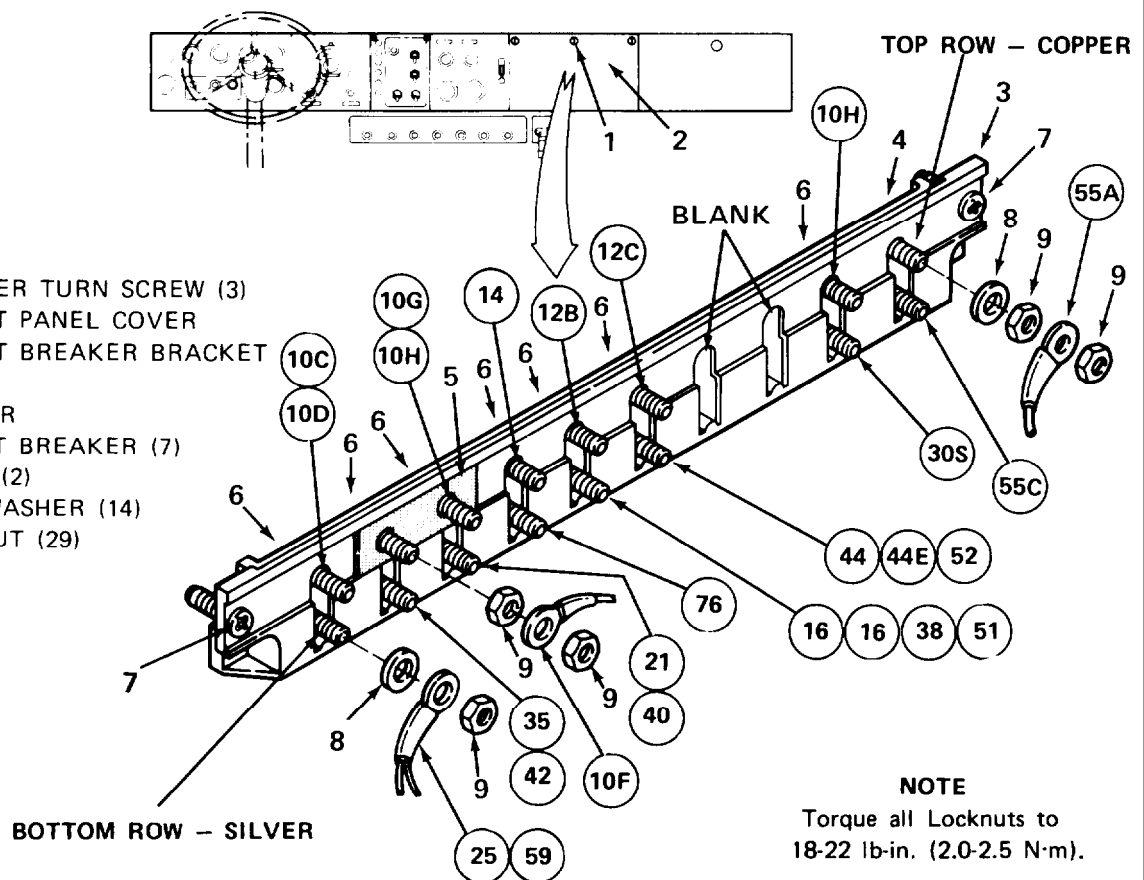
Connect wire terminals to the correct circuit breaker or diode and to the correct color terminal stud as illustrated.

NOTE

Circled numbers in the illustration are wire numbers, while uncircled numbers are legend items.

LEGEND:

1. QUARTER TURN SCREW (3)
2. CIRCUIT PANEL COVER
3. CIRCUIT BREAKER BRACKET
4. DIODE
5. BUS BAR
6. CIRCUIT BREAKER (7)
7. SCREW (2)
8. FLAT WASHER (14)
9. LOCKNUT (29)



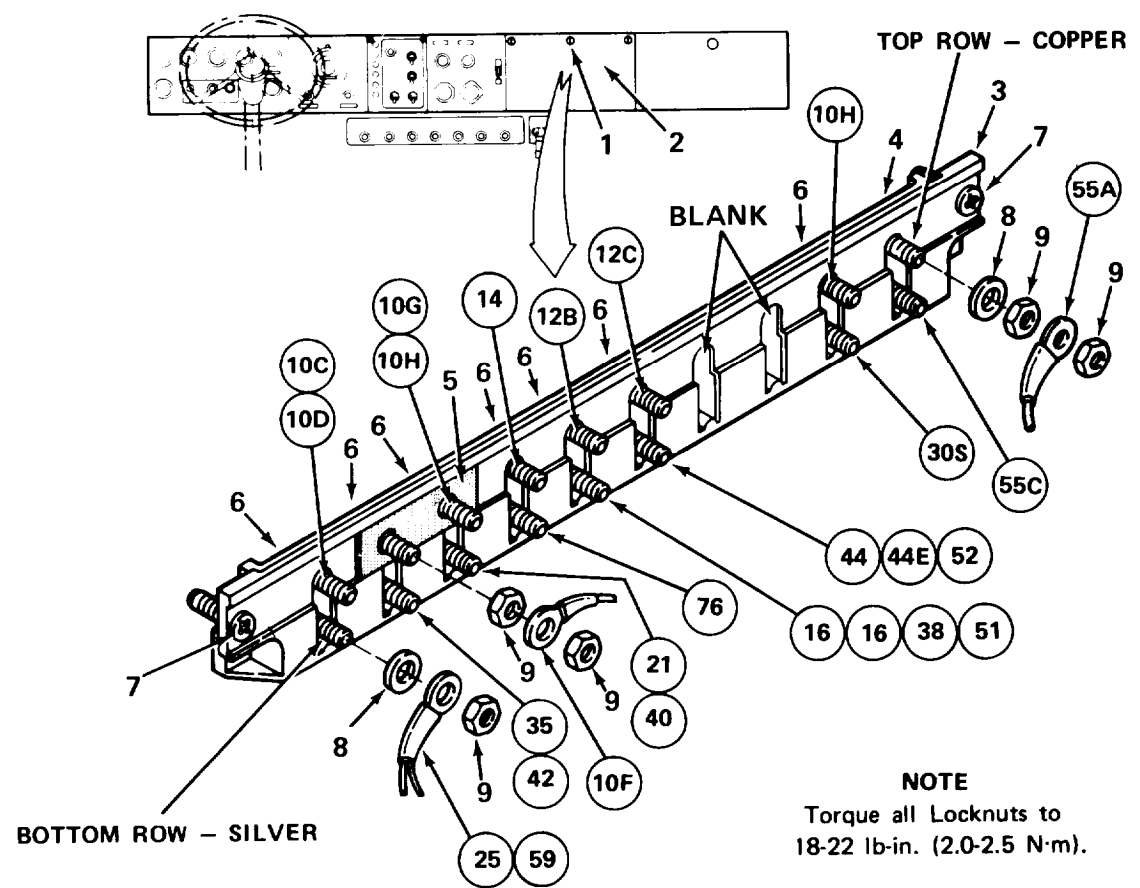
TA 076536

CIRCUIT BREAKERS AND WIRING.

5-30.1 CIRCUIT BREAKER MAINTENANCE (M917, M918, AND M919) (CONTINUED).		
LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
1. Three quarter turn screws (1).	Loosen.	
2. Circuit Panel cover (2).	Lower.	
3. Two screws (7).	Remove from circuit breaker bracket (3).	
4. Three locknuts (9) and two flat washers (8).	a. Unscrew from diode (4) or circuit breaker (6). b. Remove wire terminals. c. Remove diode (4) or circuit breaker (6).	Only one flat washer (8) is used when a bus bar (5) is present. Also remove bus bar (5) if used.
B. INSTALLATION.		
5. Diode (4) or circuit breaker (6).	a. Install in circuit breaker bracket (3). b. Position bus bar (5) if used. c. Install wire terminals. d. Secure with two flat washers (8) and three locknuts (9); torque each locknut to 18-22 lb-in. (2.0-2.5 N•m).	Install per illustration, assuring the copper terminal stud is on top and the silver is on the bottom. Ensure wire terminals are connected to the correct circuit breaker or diode and to the correct color terminal stud. Only one flat washer (8) used when a bus bar (5) is present.
6. Circuit breaker bracket (3).	a. Aline mounting holes. b. Secure with two screws (7).	
7. Circuit panel cover (2).	Raise into position.	
8. Three quarter turn screws (1).	Tighten.	
9. Batteries.	Connect per paragraph 5-37 B.	
C. OPERATIONAL CHECK.		
10. Circuit breaker (6) or diode (4).	Refer to paragraph 2-34 and 2-35; check the operation of the circuit breaker or diode replaced.	

CIRCUIT BREAKERS AND WIRING.

5-30.1 CIRCUIT BREAKER MAINTENANCE (M917, M918, AND M919) (Continued).

LOCATION/ITEM	ACTION	REMARKS
 TOP ROW – COPPER BLANK BOTTOM ROW – SILVER NOTE Torque all Locknuts to 18-22 lb-in. (2.0-2.5 N·m). LEGEND: 1. QUARTER TURN SCREW (3) 2. CIRCUIT PANEL COVER 3. CIRCUIT BREAKER BRACKET 4. DIODE 5. BUS BAR 6. CIRCUIT BREAKER (7) 7. SCREW (2) 8. FLAT WASHER (14) 9. LOCKNUT (29)		

TA 076535

CIRCUIT BREAKERS AND WIRING.**5-31. WIRING HARNESS MAINTENANCE.****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

See Appendix D for Harness Routing and Location.

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

**EQUIPMENT CONDITION
PARAGRAPH**

5-37A.

CONDITION DESCRIPTION

Batteries Disconnected.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.

GENERAL SAFETY INSTRUCTIONS

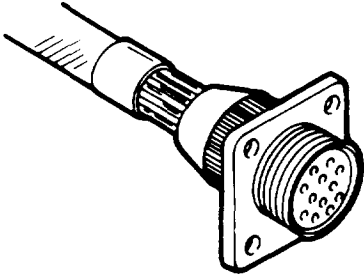
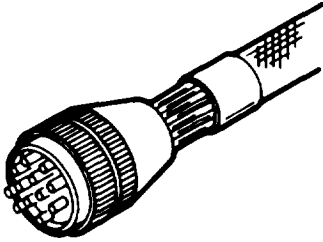
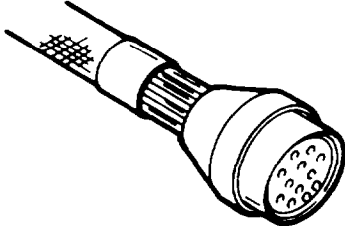
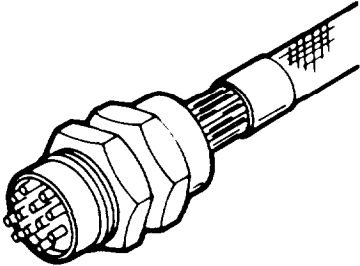
Engine OFF.
Transmission In Neutral.
Park Brake Set.

TROUBLESHOOTING REFERENCES

None.

CIRCUIT BREAKERS AND WIRING.

5-31. WIRING HARNESS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
NOTE For removal and installation of vehicle wiring harness, refer to Appendix D for harness routing and location. Illustrated below are typical connectors and terminals used on the vehicle wiring harness. Use standard shop maintenance procedures in removing all harness clamps and cable ties.  FEMALE TYPE RECEPTACLE BAYONET COUPLING  MALE TYPE CONNECTOR PLUG BAYONET COUPLING  FEMALE TYPE RECEPTACLE BAYONET COUPLING  MALE TYPE CONNECTOR PLUG BAYONET COUPLING  TERMINAL TYPE CONNECTOR  FEMALE CABLE CONNECTOR  MALE CABLE CONNECTOR		

TA 074730

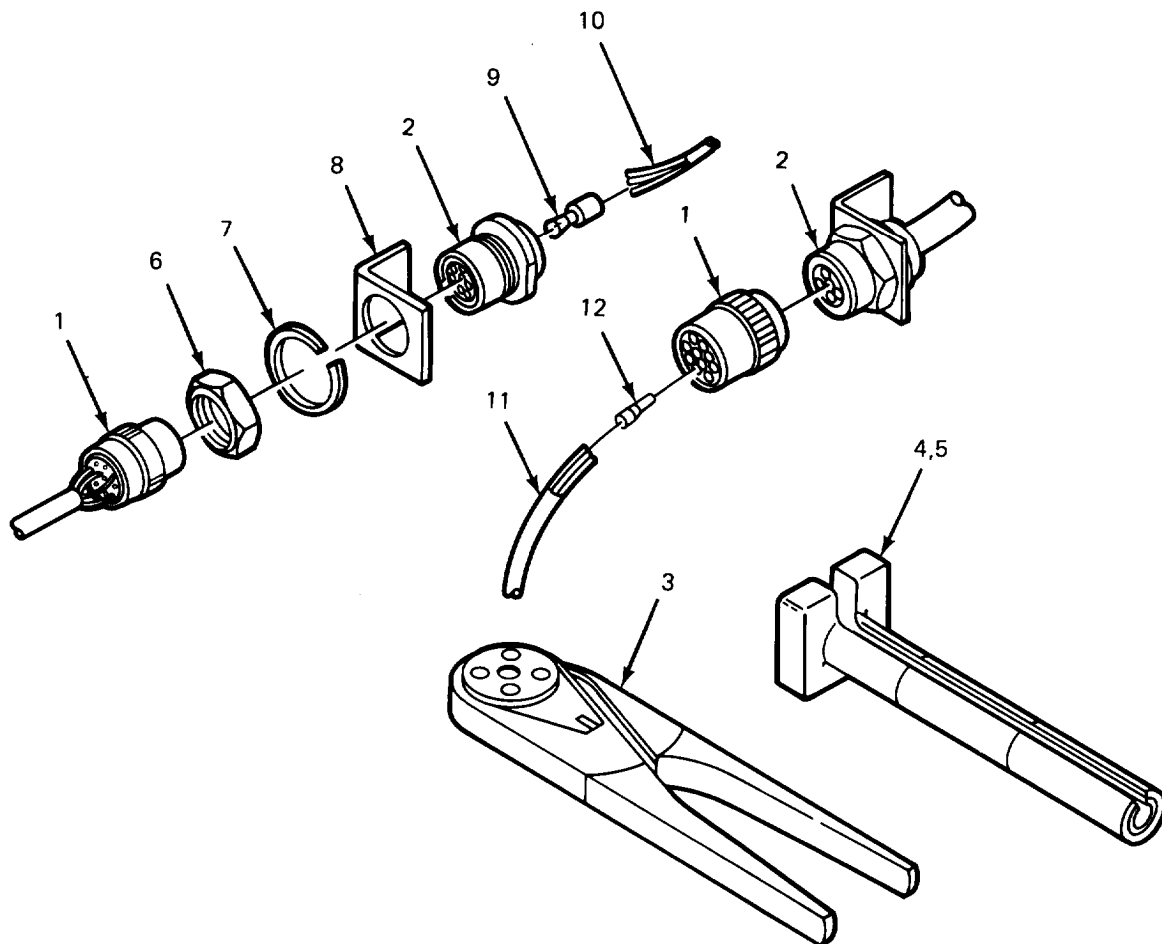
ELECTRICAL SYSTEM.

5-31.1. WIRING HARNESS REPAIR.

LOCATION/ITEM

ACTION

REMARKS



LEGEND:

1. CONNECTOR PLUG	7. LOCKWASHER
2. CONNECTOR RECEPTACLE	8. BRACKET
3. CRIMPING TOOL	9. TERMINAL (AS REQUIRED)
4. CONTACT REMOVAL TOOL (SIZE #12)	10. WIRE (AS REQUIRED)
5. CONTACT REMOVAL TOOL (SIZE #16)	11. WIRE (AS REQUIRED)
6. HEXAGON NUT	12. TERMINAL PIN (AS REQUIRED)

TA 237221

ELECTRICAL SYSTEM.**5-31.1. WIRING HARNESS REPAIR (Continued).**

LOCATION/ITEM	ACTION	REMARKS
A. CIRCULAR CONNECTOR PLUG REPAIR.		
NOTE Use this procedure to repair any one of the connector plugs.		
1. Connector plug (1).	Unscrew and remove from connector receptacle (2).	
2. Terminal pin (12).	Using contact removal tool (4) or (5), pull out from rear side of connector plug (1).	If connector plug (1) is being replaced, repeat this step until all terminal pins (12) have been removed. Be sure to tag wires (11).
3. All parts.	Clean and inspect.	If any terminal pins (12) are damaged, perform steps (4) and (5).
4. Terminal pin (12).	Remove from wire (11) and discard.	
5. New terminal pin (12).	Using crimping tool (3), install onto wire (11).	Be careful not to damage terminal pin (12) during this step.
6. Terminal pin (12).	Push into rear end of connector plug (1) until it snaps into place.	If connector plug (1) is new, repeat this step until all terminal pins (12) have been installed. Check the mating side of connector plug (1) to make sure all connector receptacles (2) are on the same level.
7. Connector plug (1).	Line up slots with pins on connector receptacle (2) and screw in until it clicks into place.	

ELECTRICAL SYSTEM.**5-31.1. WIRING HARNESS REPAIR (Continued).**

LOCATION/ITEM	ACTION	REMARKS
B. CIRCULAR CONNECTOR RECEPTACLE REPAIR.		
NOTE Use this procedure to repair any one of the connector receptacles.		
1. Connector plug (1).	Unscrew and remove from connector receptacle (2).	
2. Hexagon nut (6) and lockwasher (7).	Unscrew and remove from connector receptacle (2).	
3. Connector receptacle (2).	Remove from bracket (8).	
4. Terminal (9).	Using contact removal tool (4) or (5), pull out from rear side of connector receptacle (2).	If connector receptacle (2) is being replaced, repeat this step until all terminals (9) have been removed. Be sure to tag wires (10).
5. All parts.	Clean and inspect.	If any terminals (9) are damaged, do steps 6 and 7.
6. Terminal (9).	Remove from wire (10) and discard.	
7. New terminal (9).	Using crimping tool (3), install onto wire (10).	Be careful not to damage terminal (9) during this step.
8. Terminal (9).	Push into rear end of connector receptacle (2) until it snaps into place.	If connector receptacle (2) is new, repeat this step until all terminals (9) have been installed. Check the mating side of connector receptacle (2) to make sure all terminals (9) are on the same level.
9. Connector receptacle (2).	a. Position on bracket (8). b. Secure with hexagon nut (6) and lockwasher (7).	
10. Connector plug (1).	Line up slots with pins on connector receptacle (2) and screw on until it clicks into place.	

STARTING AND STARTING CONTROL.

5-32. STARTER MOTOR MAINTENANCE.		
THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)		
a. Removal. (30) b. Installation. (30) c. Operational Check. <u>(2)</u> 62 Minutes Total.		
<u>INITIAL SETUP</u> <u>APPLICABLE CONFIGURATIONS</u> All. <u>TEST EQUIPMENT</u> None. <u>SPECIAL TOOLS</u> None. <u>MATERIALS/PARTS (P/N)</u> 1. Gasket (5330-00-143-7737). 2. Nylon Rope (10 Feet). 3. Gasket (5330-00-252-3274).	<u>EQUIPMENT CONDITION</u> <u>PARAGRAPH</u> 5-37A. 11-14A&C.	<u>CONDITION DESCRIPTION</u> Batteries Disconnected. Left Fender Removed.
<u>PERSONNEL REQUIRED</u> Two (MOS-63B20).	<u>SPECIAL ENVIRONMENTAL CONDITIONS</u> Vehicle Parked on Level Ground.	
<u>REFERENCES (TM)</u> TM 9-2320-273-10, TM 9-2320-273-20P.	<u>GENERAL SAFETY INSTRUCTIONS</u> Engine OFF. Park Brake Set. Transmission In Neutral.	
<u>TROUBLESHOOTING REFERENCES</u> Table 4-1, 5-2.		

STARTING AND STARTING CONTROL.

5-32. STARTER MOTOR MAINTENANCE (Continued).

LOCATION/ITEM

ACTION

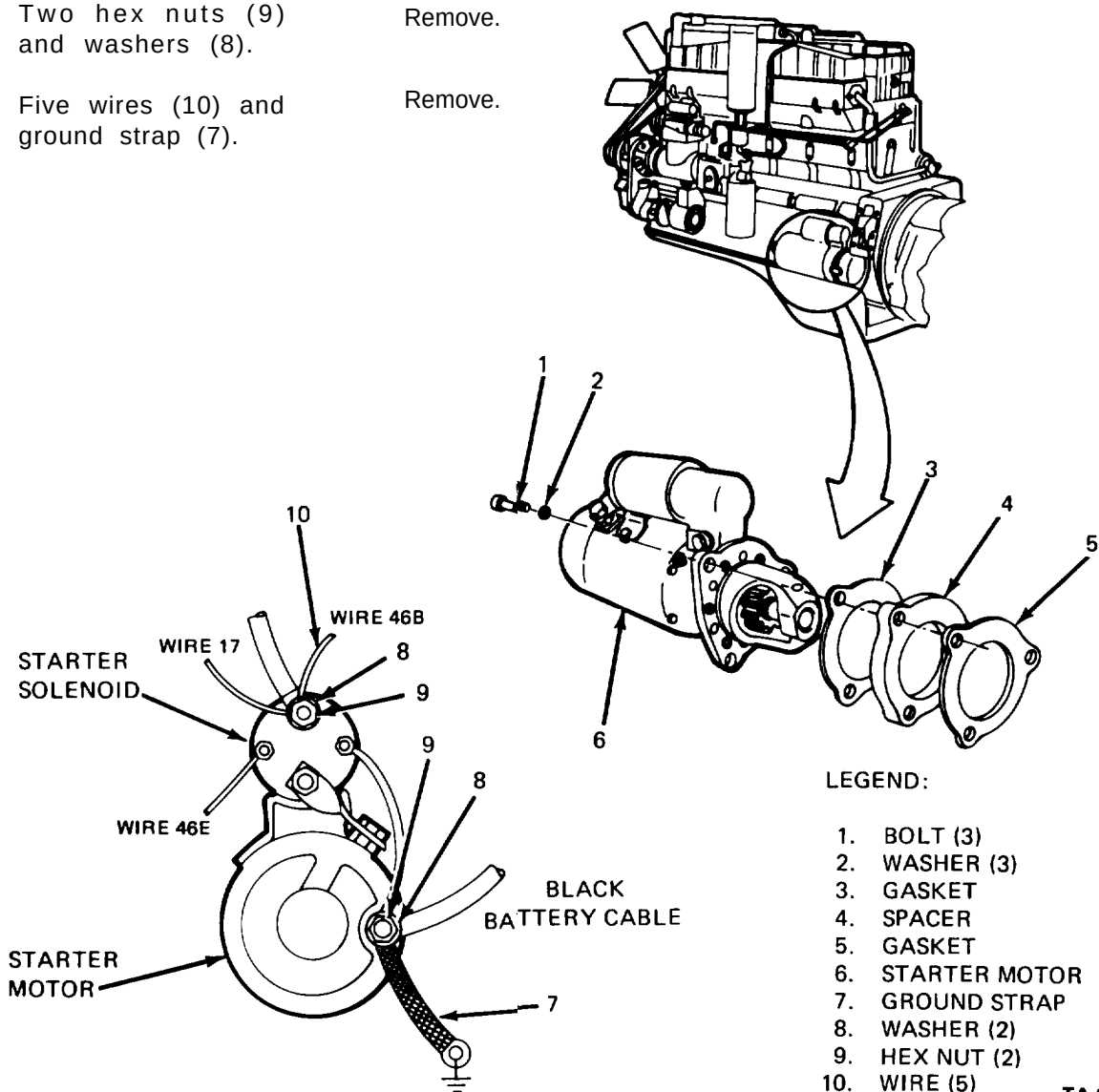
REMARKS

WARNING

Disconnect battery cables before removing starter.

A. REMOVAL.

1. Two hex nuts (9) and washers (8). Remove.
2. Five wires (10) and ground strap (7). Remove.



TA 074731

STARTING AND STARTING CONTROL.

5-32. STARTER MOTOR MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
	NOTE	
	Wrap rope around starter motor and first mechanic holds rope while second mechanic performs steps 3, 4, 7, and 8.	
3. Three bolts (1) and washers (2).	Remove.	
4. Starter motor (6).	Remove.	
5. Gasket (3), spacer (4), and gasket (5).	Remove.	Discard gaskets (3) and (5).
B. INSTALLATION.		
6. New gasket (3), spacer (4), and new gasket (5).	Aline and install on starter motor (6).	
7. Starter motor (6).	Aline and install.	
8. Three washers (2) and bolts (1) .	Install and tighten.	
9. Five wires (10) and ground strap (7).	Install on starter motor (6) according to figure.	
10. Two washers (8) and hex nuts (9).	Install and tighten.	
11. Batteries.	Connect per paragraph 5-37B.	
C. OPERATIONAL CHECK.		
12. Engine.	Start up (see TM 9-2320-273-10). Verify that starter motor (6) engages.	
	NOTE	
	Follow-on maintenance action required: Install left fender, para 11-14B or D.	

STARTING AND STARTING CONTROL.

5-32. STARTER MOTOR MAINTENANCE (Continued).

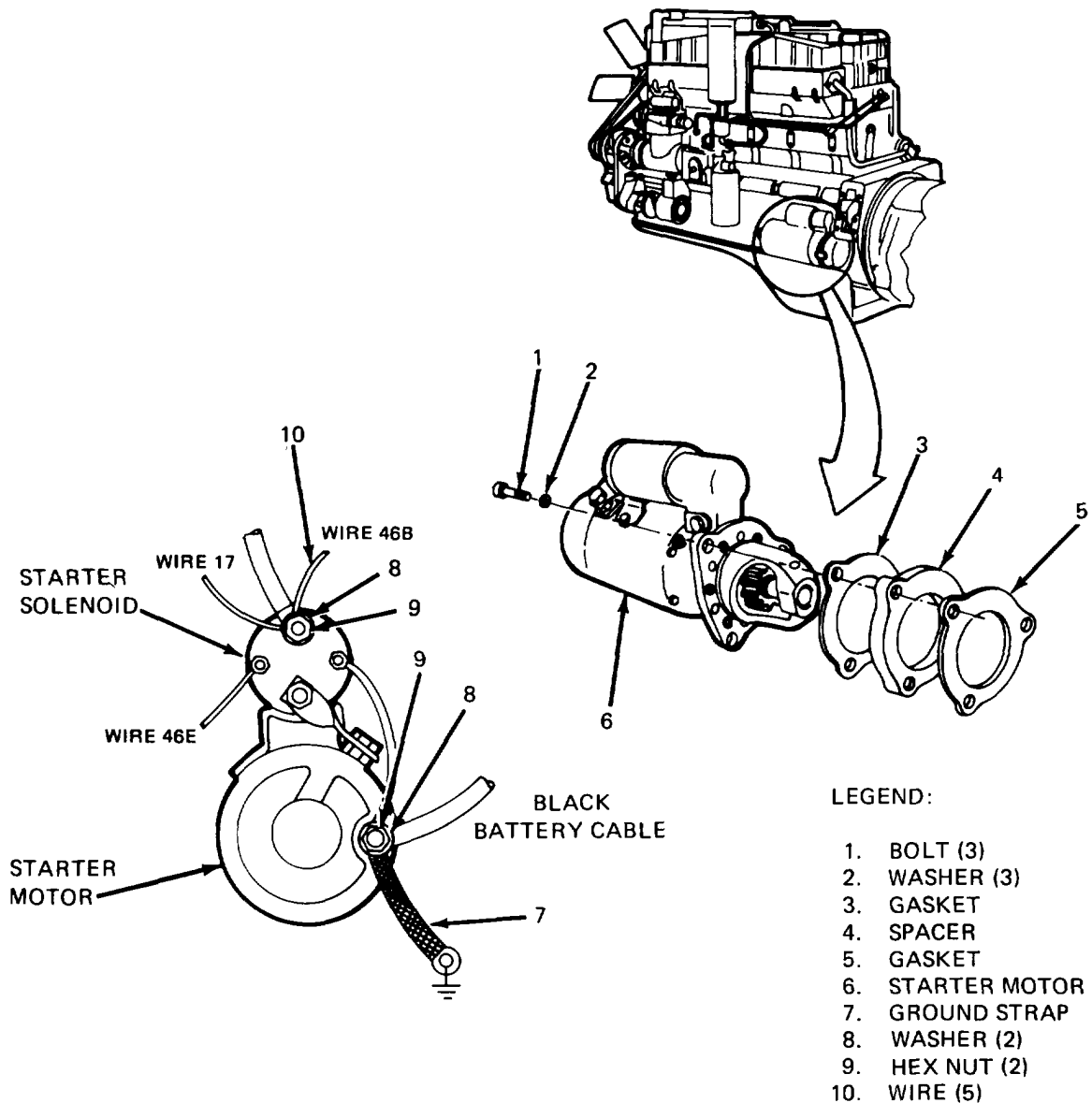
LOCATION/ITEM

ACTION

REMARKS

NOTE

Follow-on maintenance action required:
Replace fender, para 11-14.



TA 074732

STARTING AND STARTING CONTROL.

5-33. STARTER RELAY MAINTENANCE.**THIS TASK COVERS: (APPROXIMATE TIME REWIRED FOLLOWS TASK DESCRIPTION.)**

- a. Removal. (5)
 - b. Installation. (5)
 - c. Operational Check. (2)
- 12 Minutes Total.

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

EQUIPMENT CONDITION**PARAGRAPH**

5-37A.

CONDITION DESCRIPTION

Batteries Disconnected.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

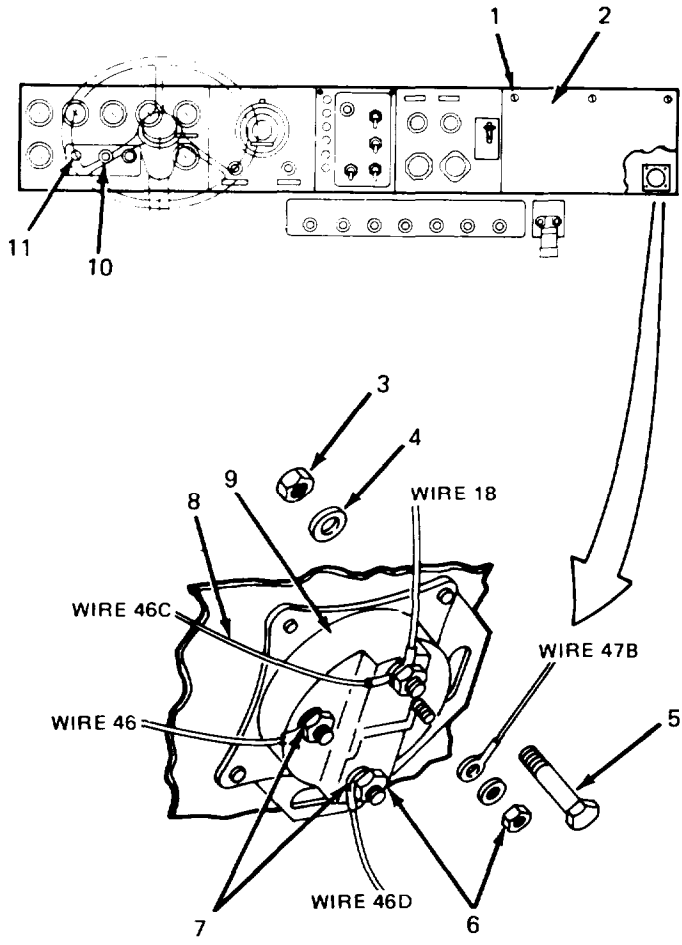
TROUBLESHOOTING REFERENCES

Table 5-2.

STARTING AND STARTING CONTROL.

5-33. STARTER RELAY MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Three quarter-turn screws (1).	Loosen.	
2. Circuit panel cover (2).	Lower hinged panel.	
3. Four hex nuts (6) and washers (7).	Remove.	



LEGEND:

- 1. QUARTER TURN SCREW (3)
- 2. CIRCUIT PANEL COVER
- 3. HEX NUT (2)
- 4. WASHER (2)
- 5. BOLT (2)
- 6. HEX NUT (4)
- 7. WASHER (4)
- 8. WIRE (5)
- 9. STARTER RELAY
- 10. ENGINE START BUTTON
- 11. ENGINE RUN SWITCH

TA 074733

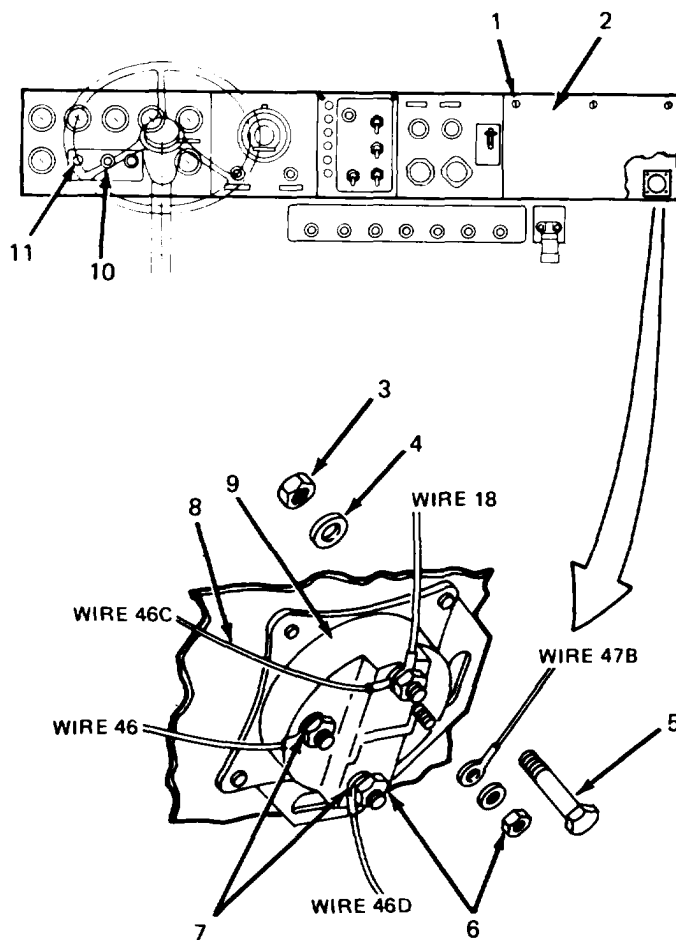
STARTING AND STARTING CONTROL.**5-33. STARTER RELAY MAINTENANCE (Continued).**

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
4. Five wires (8).	Remove.	
5. Two bolts (5), washers (4), and hex nuts (3).	Remove.	
6. Starter relay (9).	Remove.	
B. INSTALLATION.		
7. Starter relay (9).	Set relay in place and align mounting holes.	
8. Two bolts (5), washers (4), and hex nuts (3).	Install and tighten.	
9. Five wires (8).	Connect wires according to figure.	
10. Four washers (7) and hex nuts (6).	Replace and tighten.	
11. Circuit panel cover (2).	Raise into place.	
12. Three quarter-turn screws (1).	Tighten.	
13. Batteries.	Connect per paragraph 5-37B.	

STARTING AND STARTING CONTROL.

5-33. STARTER RELAY MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
C. OPERATIONAL CHECK.		
14. ENGINE RUN switch (11).	Turn ON.	
15. ENGINE START button (10).	Depress momentarily and observe that the starter motor engages.	



LEGEND:

1. QUARTER TURN SCREW (3)
2. CIRCUIT PANEL COVER
3. HEX NUT (2)
4. WASHER (2)
5. BOLT (2)
6. HEX NUT (4)
7. WASHER (4)
8. WIRE (5)
9. STARTER RELAY
10. ENGINE START BUTTON
11. ENGINE RUN SWITCH

TA 074734

STARTING AND STARTING CONTROL.

5-34. ENGINE START BUTTON MAINTENANCE.**THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

a. Removal.	(5)
b. Installation.	(5)
c. Operational Check.	(2)
12 Minutes Total.	

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

EQUIPMENT CONDITION**PARAGRAPH**

5-37A.

CONDITION DESCRIPTION

Batteries Disconnected.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.

GENERAL SAFETY INSTRUCTIONS

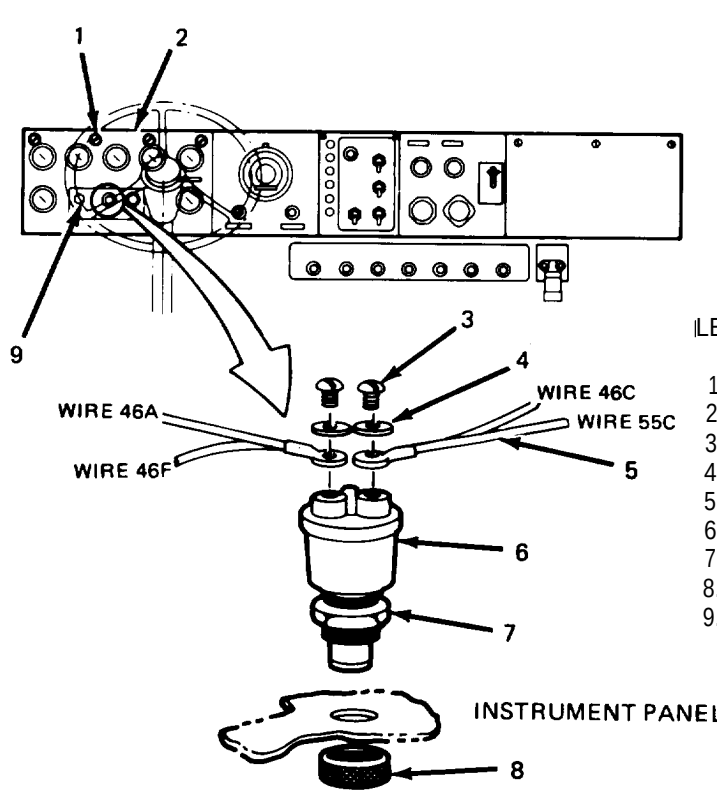
Engine OFF.
Transmission in Neutral.
Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 5-2.

STARTING AND STARTING CONTROL.

5-34. ENGINE START BUTTON MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Four quarter-turn screws (1).	Loosen.	
2. Hinged instrument panel (2).	Lower.	
 LEGEND: 1. QUARTER TURN SCREW (4) 2. HINGED INSTRUMENT PANEL 3. SCREW (2) 4. WASHER (2) 5. WIRE (4) 6. STARTER BUTTON 7. ADJUSTING HEX NUT 8. KNURLED NUT 9. ENGINE RUN SWITCH WIRE 46A WIRE 46F WIRE 46C WIRE 55C INSTRUMENT PANEL		

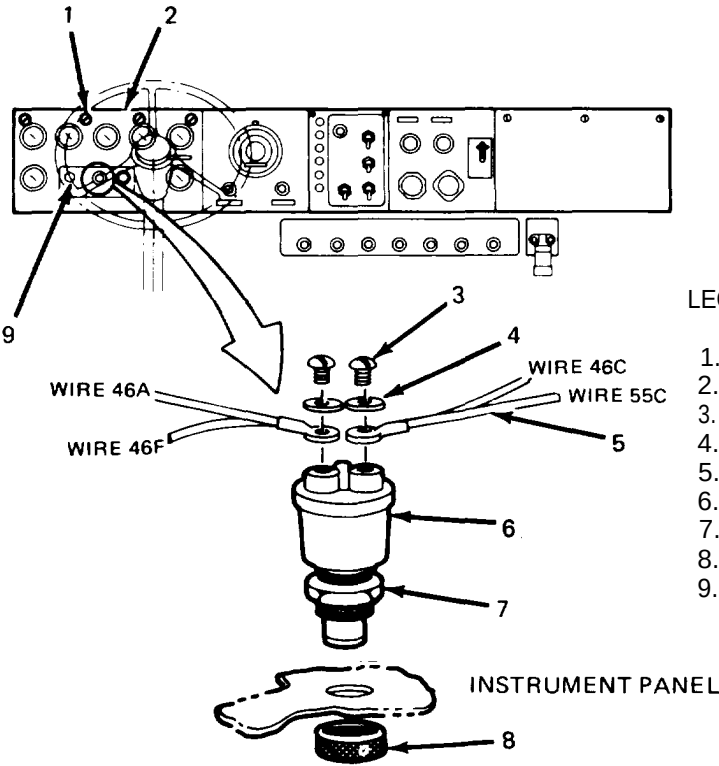
TA 074735

STARTING AND STARTING CONTROL.**5-34. ENGINE START BUTTON MAINTENANCE (Continued).**

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
3. Two screws (3) and washers (4).	Remove.	
4. Four wires (5).	Remove.	
5. Knurled nut (8).	Remove,	
6. Starter button (6).	Remove.	
7. Adjusting hex nut (7).	Remove.	
B. INSTALLATION.		
8. Adjusting hex nut (7).	Adjust to proper depth on starter switch to allow installation of knurled nut (8).	
9. Starter button (6).	Replace in panel.	
10. Knurled nut (8).	Install and tighten.	
11. Four wires (5), two washers (4) and screws (3).	Install according to figure and tighten.	
12. Hinged instrument panel (2).	Raise into place.	
13. Four quarter-turn screws (1).	Tighten.	

STARTING AND STARTING CONTROL.

5-34. ENGINE START BUTTON MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
NOTE Follow-on maintenance: a. Hook up batteries; refer to para. 5-37B.		
C. OPERATIONAL CHECK.		
14. ENGINE RUN switch (9).	Turn ON.	
15. ENGINE START button (6).	Depress momentarily and observe that the starter motor engages.	
 LEGEND: 1. QUARTER TURN SCREW (4) 2. HINGED INSTRUMENT PANEL 3. SCREW (2) 4. WASHER (2) 5. WIRE (4) 6. STARTER BUTTON 7. ADJUSTING HEX NUT 8. KNURLED NUT 9. ENGINE RUN SWITCH		
TA 074736		

STARTING AND STARTING CONTROL.

5-35. ENGINE RUN SWITCH MAINTENANCE.**THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

- a. Removal. (5)
 - b. Installation. (5)
 - c. Operational Check. (2)
- 12 Minutes Total.

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

EQUIPMENT CONDITION**PARAGRAPH**

5-37A .

CONDITION DESCRIPTION

Batteries Disconnected.

TEST EQUIPMENT

None.

SPECIAL TOOLS

Small Flat Tip Punch.

MATERIALS/PARTS (P/N)

None.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
 Transmission in Neutral.
 Park Brake Set.

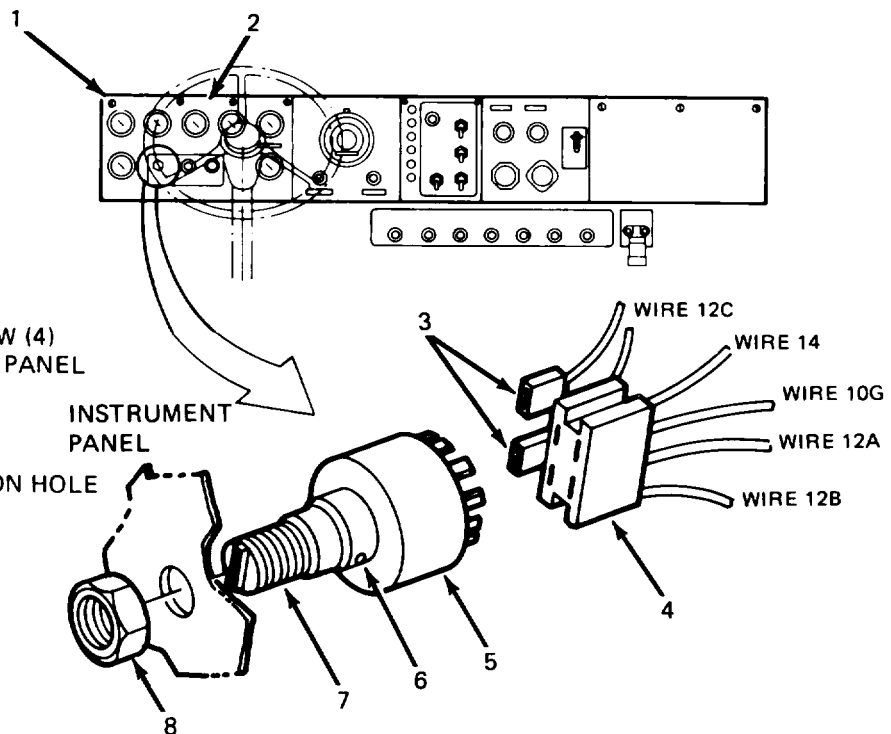
TROUBLESHOOTING REFERENCES

Table 4-1.

STARTING AND STARTING CONTROL.

5-35. ENGINE RUN SWITCH MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Four quarter-turn screws (1).	Loosen.	
2. Hinged instrument panel (2).	Lower.	
3. Wire connector (4) and two wires (3).	Remove.	
4. Hex nut (8).	Remove.	
5. ENGINE RUN switch (5).	Remove from instrument panel.	
6. Lock cylinder (7).	Place switch in ON position. Insert flat tip punch in cylinder extraction hole (6) and remove lock cylinder (7).	



LEGEND:

1. QUARTER TURN SCREW (4)
2. HINGED INSTRUMENT PANEL
3. WIRE (2)
4. WIRE CONNECTOR
5. ENGINE RUN SWITCH
6. CYLINDER EXTRACTION HOLE
7. LOCK CYLINDER
8. HEX NUT

TA 074737

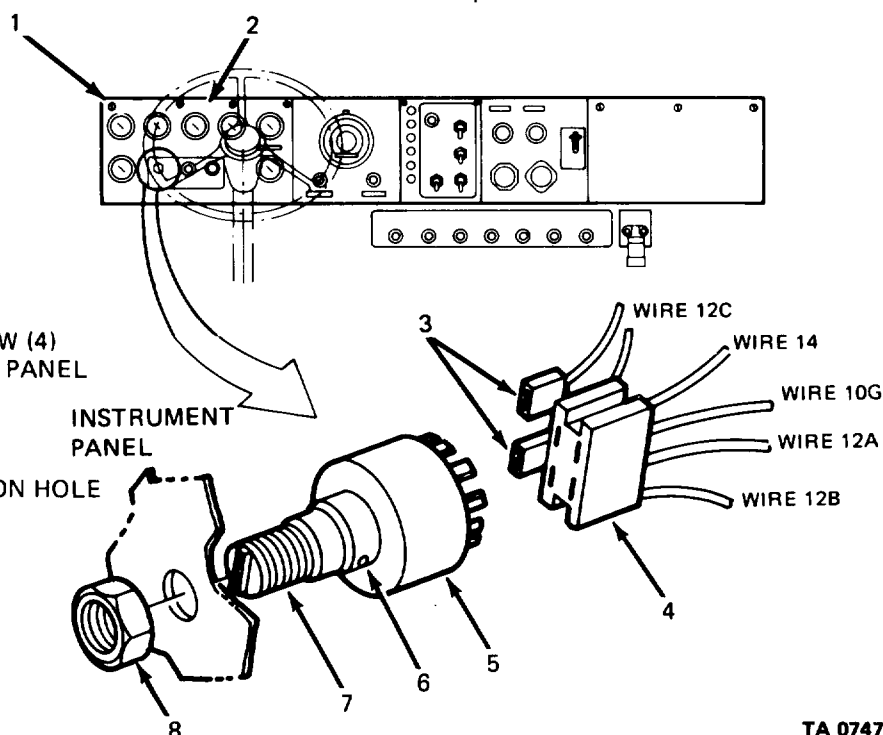
STARTING AND STARTING CONTROL.

5-35. ENGINE RUN SWITCH MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION.		
7. ENGINE RUN switch (5).	Aline lock cylinder (7) and press into switch.	
8. ENGINE RUN switch (5).	Aline and insert in instrument panel.	
9. Hex nut (8).	Install and tighten.	
10. Wire connector (4) and wires (3).	Install on switch.	
11. Hinged instrument panel (2).	Raise into place.	
12. Four quarter-turn screws (1).	Tighten.	
13. Batteries.	Connect per paragraph 37B.	
C. OPERATIONAL CHECK.		
14. Engine	Start up (see TM 9-2320-273-10). Verify that all circuits are operational.	

LEGEND:

1. QUARTER TURN SCREW (4)
2. HINGED INSTRUMENT PANEL
3. WIRE (2)
4. WIRE CONNECTOR
5. ENGINE RUN SWITCH
6. CYLINDER EXTRACTION HOLE
7. LOCK CYLINDER
8. HEX NUT



TA 074738

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STARTING AND STARTING CONTROL .

5-36. ETHER BUTTON MAINTENANCE.**THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

- a. Removal. (5)
 - b. Installation. (5)
 - c. Operational Check. (5)
- 15 Minutes Total.

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

EQUIPMENT CONDITION**PARAGRAPH**

5-37A .

CONDITION DESCRIPTION

Batteries Disconnected.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

PERSONNEL REQUIRED

One (M OS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Sat.

TROUBLESHOOTING REFERENCES

Table 5-3.

STARTING AND STARTING CONTROL .

5-36. ETHER BUTTON MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Four quarter turn screws (1).	Loosen.	
2. Hinged instrument panel (2).	Lower hinged panel.	
3. Knurled nut (8).	Remove.	
4. ETHER button (6).	Remove.	
5. Hex nut (7).	Remove.	
6. Two screws (3) and washers (4).	Remove.	
7. Two wires (5).	Remove.	

WIRE 51

WIRE 51A

LEGEND:

1. QUARTER TURN SCREW (4)
2. HINGED INSTRUMENT PANEL
3. SCREW (2)
4. WASHER (2)
5. WIRE (2)
6. ETHER BUTTON
7. HEX NUT
8. KNURLED NUT

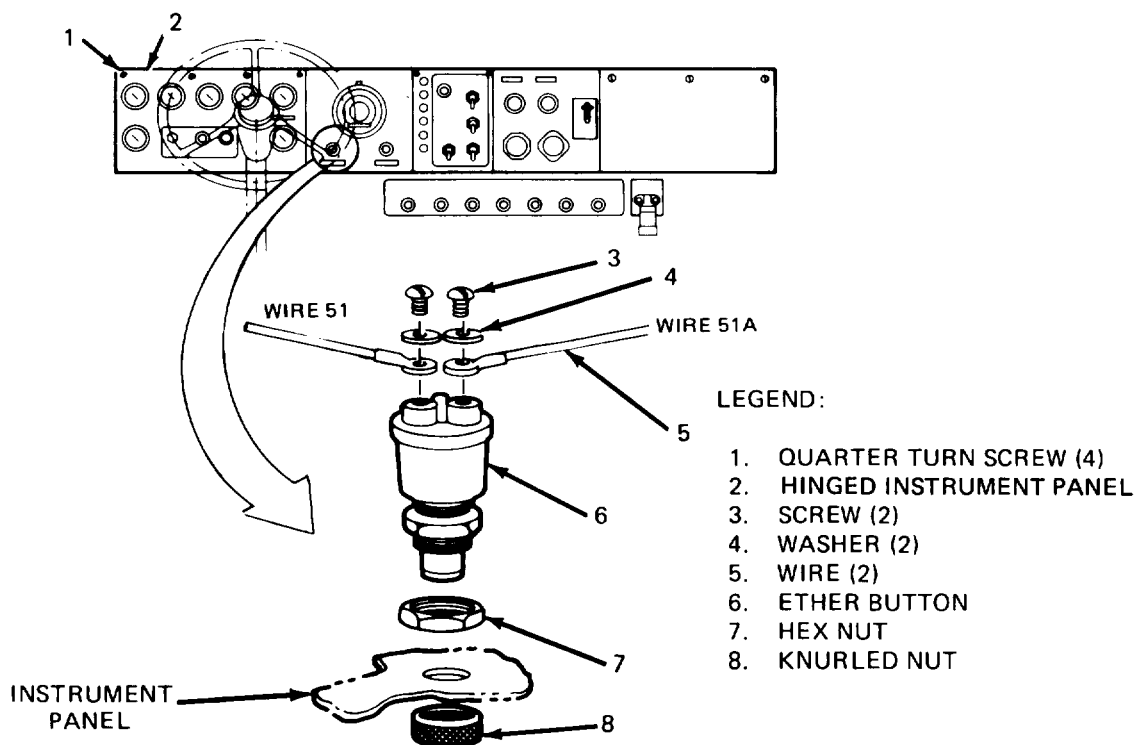
INSTRUMENT PANEL

TA 074739

STARTING AND STARTING CONTROL

5-36. ETHER BUTTON MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION.		
8. Two wires (5).	Place on ETHER button (6).	
9. Two washers (4) and screws (3).	Install and tighten.	
10. Hex nut (7).	Install and adjust to proper depth on ETHER button (6) to allow installation of knurled nut (8).	
11. ETHER button (6).	Install in instrument panel.	
12. Knurled nut (8).	Install and tighten.	
13. Hinged instrument panel(2).	Raise into place.	
14. Four quarter turn screws (1).	Tighten.	
15. Batteries.	Connect per paragraph 5-37B.	
C. OPERATIONAL CHECK.		
16. Engine.	Start up using cold start procedure (see TM 9-2320-273-10).	



TA 074740

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BATTERIES AND ALTERNATOR MAINTENANCE.

5-37. DISCONNECT BATTERIES.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

- a. Removal. (5)
- b. Installation. (5)
- c. Operational Check. (2)

12 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

EQUIPMENT CONDITION

PARAGRAPH

None.

CONDITION DESCRIPTION

None.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 5-1.

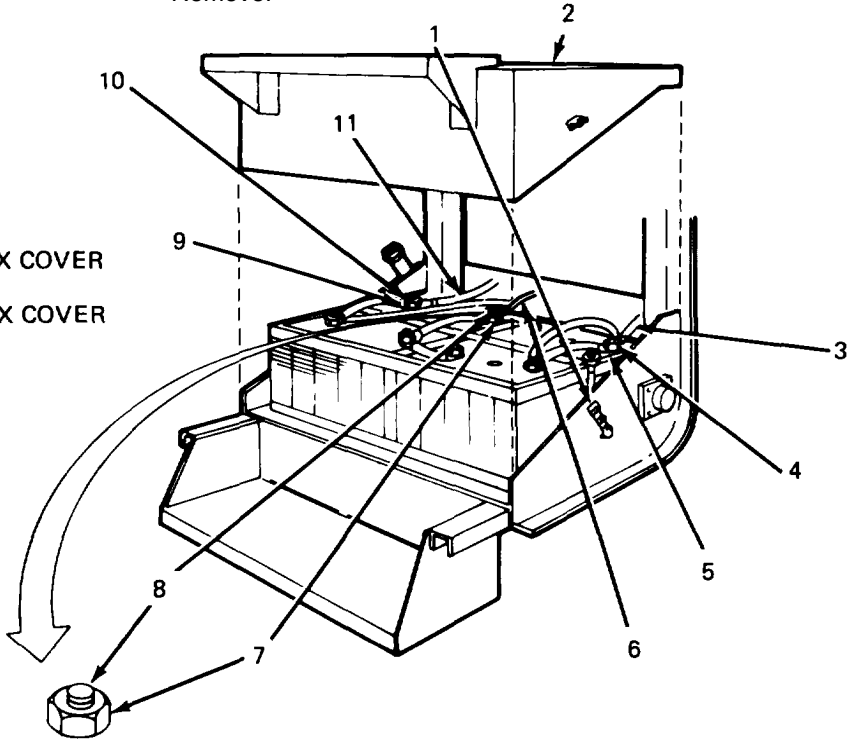
BATTERIES AND ALTERNATOR.

5-37. DISCONNECT BATTERIES (Continued).

LOCATION/ITEM	ACTION	REMARKS
CAUTION Do not place edge of cover on cables.		
A. REMOVAL,		
1. Two battery box cover latches (1).	Unfasten to slide off battery box cover (2).	
2. Hex nut (4).	Remove.	
3. Cable (3).	Remove from terminals (5). Replace hex nut (4) on terminal (5).	
4. Hex nut (7).	Remove.	
5. Cable (6).	Remove from terminal (8). Replace hex nut (7) on terminal (8).	
6. Hex nut (10).	Remove.	

LEGEND:

- 1. BATTERY BOX COVER LATCH (2)
- 2. BATTERY BOX COVER
- 3. CABLE
- 4. HEX NUT
- 5. TERMINAL
- 6. CABLE
- 7. HEX NUT
- 8. TERMINAL
- 9. TERMINAL
- 10. HEX NUT
- 11. CABLE



The diagram illustrates the removal of the battery box cover. It shows a perspective view of the battery box with its cover being lifted away. Numbered callouts identify various components: 1 points to a latch on the cover; 2 points to the cover itself; 3 points to a cable; 4 points to a hex nut on a terminal; 5 points to a terminal; 6 points to a cable; 7 points to a hex nut on a terminal; 8 points to a terminal; 9 points to another terminal; 10 points to a hex nut; and 11 points to a cable. A curved arrow indicates the direction of removal for the cover.

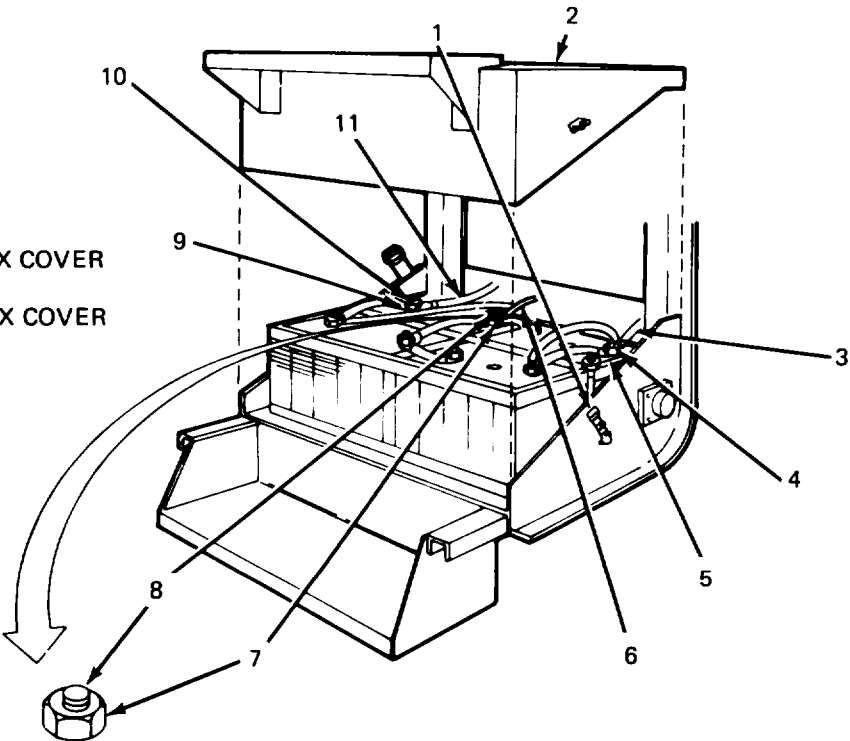
TA 074741

BATTERIES AND ALTERNATOR.

5-37. DISCONNECT BATTERIES (Continued).		
LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
7. Cable(11).	Remove from terminal (9). Replace hex nut (10) on terminal (9).	
B. INSTALLATION.		
8. Hex nut (10).	Remove from terminal (9).	
9. Cable(11).	Connect to terminal (9).	
10. Hex nut (10).	Install and tighten.	
11. Hex nut (7).	Remove from terminal (8).	
12. Cable (6).	Connect to terminal (8).	
13. Hex nut (7).	Install and tighten.	
14. Hex nut (4).	Remove from terminal (5).	
15. Cable (3).	Connect to terminal (5).	
16. Hex nut (4).	Install and tighten.	
NOTE		
Check cables at terminal connections for tightness; then, cover terminals with light coat of lubricant.		
17. Battery box cover (2).	Install.	
18. Two battery box cover latches (1).	Fasten to battery box cover (2).	
C. OPERATIONAL CHECK.		
19. Engine.	Start up (see TM 9-2320-273-10). If system fails to operate, check connections for proper location and tighteners.	
20. Engine.	Shut down (see TM 9-2320-273-10).	

BATTERIES AND ALTERNATOR.

5-37. DISCONNECT BATTERIES (Continued).

LOCATION/ITEM	ACTION	REMARKS
LEGEND: 1. BATTERY BOX COVER 2. BATTERY BOX COVER LATCH (2) 3. CABLE 4. HEX NUT 5. TERMINAL 6. CABLE 7. HEX NUT 8. TERMINAL 9. TERMINAL 10. HEX NUT 11. CABLE 		

TA 074742

BATTERIES AND ALTERNATOR.**5-38. BATTERY MAINTENANCE.****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

a. Removal.	(20)
b. Cleaning.	(10)
c. Inspection.	(5)
d. Charging.	(120)
e. Installation.	(20)
<u>175 Minutes Total.</u>	

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All

EQUIPMENT CONDITION**PARAGRAPH**

None.

CONDITION DESCRIPTION

None.

TEST EQUIPMENT

Battery Charger.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

TROUBLESHOOTING REFERENCES

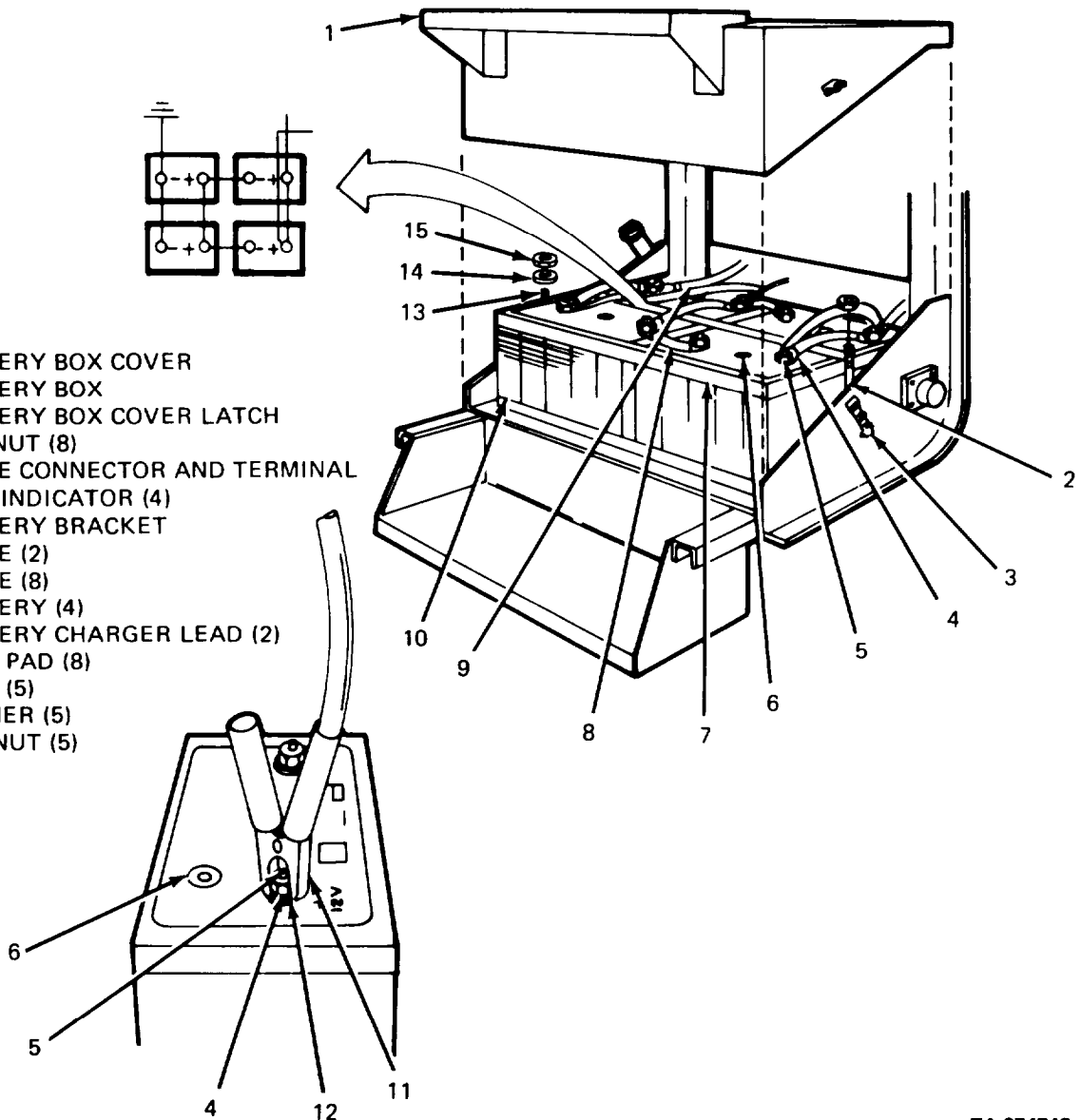
Table 5-1.

BATTERIES AND ALTERNATOR.**5-38. BATTERY MAINTENANCE (Continued).**

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Two battery box cover latches (3).	Unfasten to remove battery box cover (1).	Pull up and out to remove.
2. Eight hex nuts (4).	Remove.	
3. Ten cables (8) and (9).	Remove.	

LEGEND:

1. BATTERY BOX COVER
2. BATTERY BOX
3. BATTERY BOX COVER LATCH
4. HEX NUT (8)
5. CABLE CONNECTOR AND TERMINAL
6. TEST INDICATOR (4)
7. BATTERY BRACKET
8. CABLE (2)
9. CABLE (8)
10. BATTERY (4)
11. BATTERY CHARGER LEAD (2)
12. LEAD PAD (8)
13. BOLT (5)
14. WASHER (5)
15. HEX NUT (5)



TA 074743

BATTERIES AND ALTERNATOR.

6-38. BATTERY MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
4. Five bolts (13), washers (14), and hex nuts (15).	Remove.	
5. Battery bracket (7).	Remove.	
6. Four batteries (10).	Remove from battery box (2).	
B. CLEANING.		
7. Cable connectors and terminals (5), and battery top.	Use baking soda, water, and a wire brush to clean the parts. Cover connections with grease after installation.	
C. INSPECTION.		
8. Battery cases.	Make sure that none is leaking or cracked.	
9. Four test indicators (6).	Make sure that a GREEN DOT appears in the indicator window.	If indicator is completely dark the battery needs to be charged. If indicator shows yellow, the battery needs to be replaced.
D. CHARGING.		
WARNING Always turn off charger before connecting or disconnecting to a battery to prevent sparks or arcing which might cause explosion or ignition. WARNING Do Not Charge a Battery if the Green Dot is Visible. Do Not Charge a Battery if the Test Indicator is Light Yellow.		

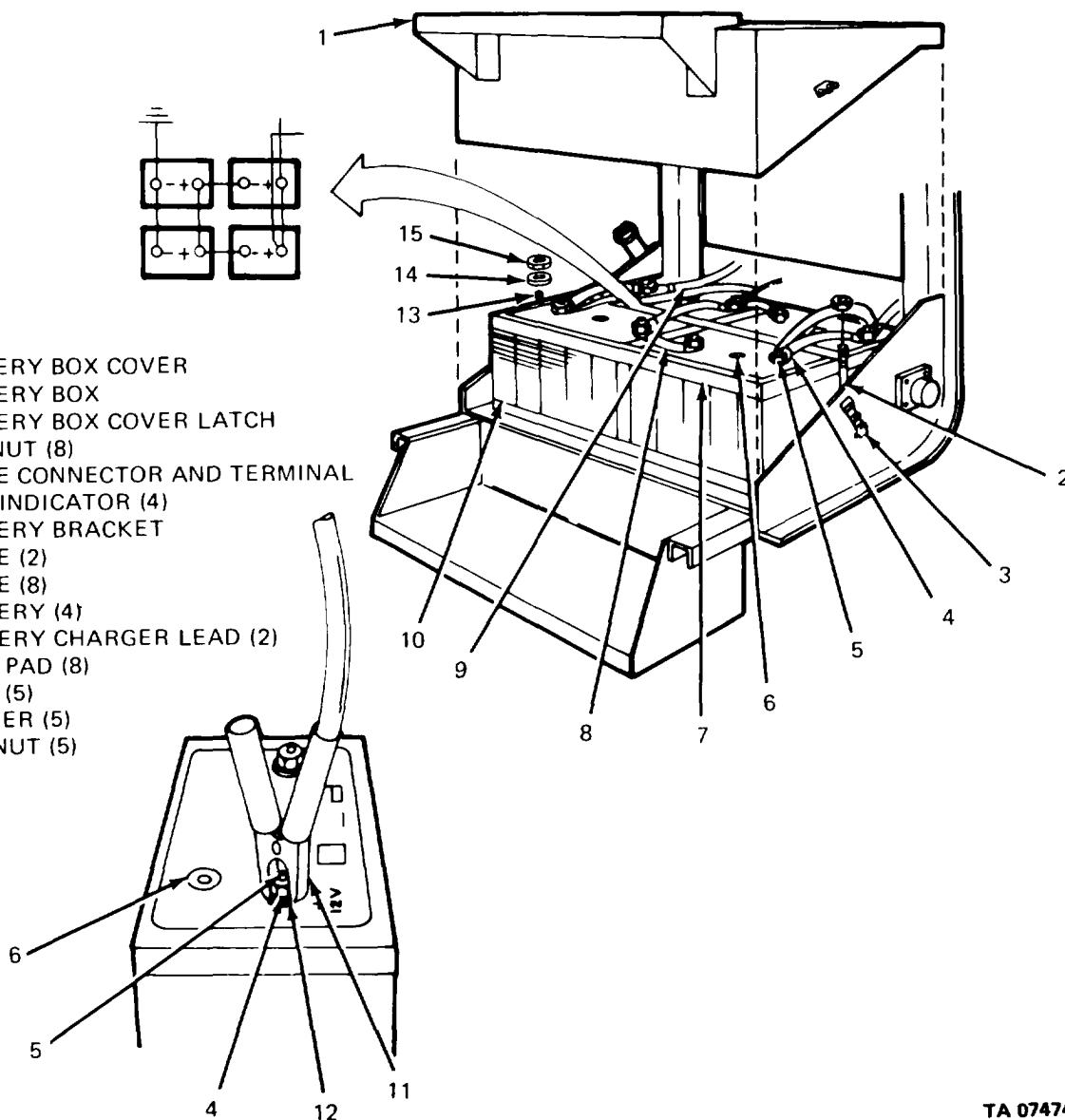
BATTERIES AND ALTERNATOR.

5-38. BATTERY MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
D. CHARGING (Continued).		
10. Eight hex nuts (4).	Install and tighten to positive and negative terminals.	
11. Two battery charger leads (11).	Connect to hex nuts (4) and lead pad (12) on positive and negative terminals. Charge battery according to table 5-15.	

LEGEND:

1. BATTERY BOX COVER
2. BATTERY BOX
3. BATTERY BOX COVER LATCH
4. HEX NUT (8)
5. CABLE CONNECTOR AND TERMINAL
6. TEST INDICATOR (4)
7. BATTERY BRACKET
8. CABLE (2)
9. CABLE (8)
10. BATTERY (4)
11. BATTERY CHARGER LEAD (2)
12. LEAD PAD (8)
13. BOLT (5)
14. WASHER (5)
15. HEX NUT (5)



TA 074744

Table 5-15. Battery Charging Rates.

BATTERY MODEL	SLOW CHARGING RATE	FAST CHARGING RATE
1200	5A at 15 hours 10A at 7-1/2 hours	20A at 3-3/4 hours 30A at 2-1/2 hours 40A at 2 hours 50A at 1-1/2 hours

BATTERIES AND ALTERNATOR.

5-38. BATTERY MAINTENANCE (Continued).

LOCATION/ITEM

ACTION

REMARKS

D. CHARGING (Continued).

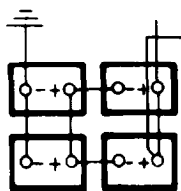
WARNING

TO AVOID DAMAGE turn off charger
and remove leads if:

- a. Battery case feels hot (125°F) (51.7°C).
- b. Violent gassing or spewing of electrolyte occurs.

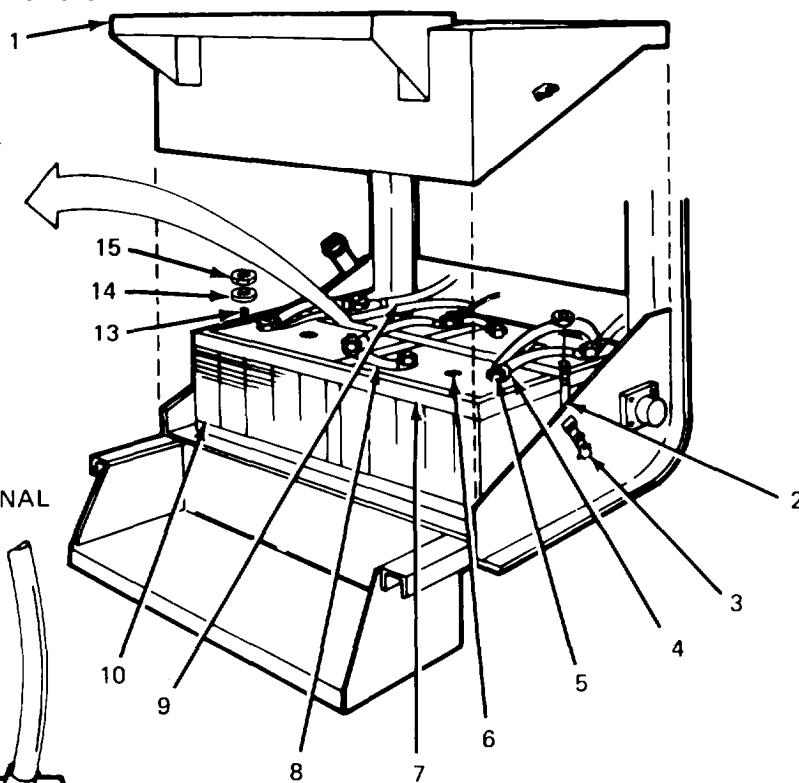
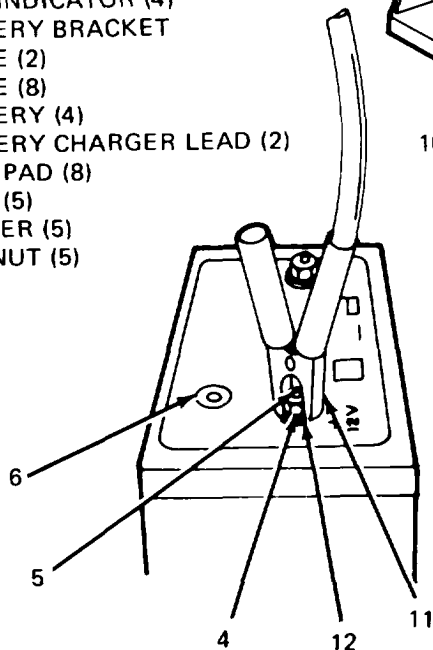
12. Eight hex nuts (4).

Remove.



LEGEND:

1. BATTERY BOX COVER
2. BATTERY BOX
3. BATTERY BOX COVER LATCH
4. HEX NUT (8)
5. CABLE CONNECTOR AND TERMINAL
6. TEST INDICATOR (4)
7. BATTERY BRACKET
8. CABLE (2)
9. CABLE (8)
10. BATTERY (4)
11. BATTERY CHARGER LEAD (2)
12. LEAD PAD (8)
13. BOLT (5)
14. WASHER (5)
15. HEX NUT (5)



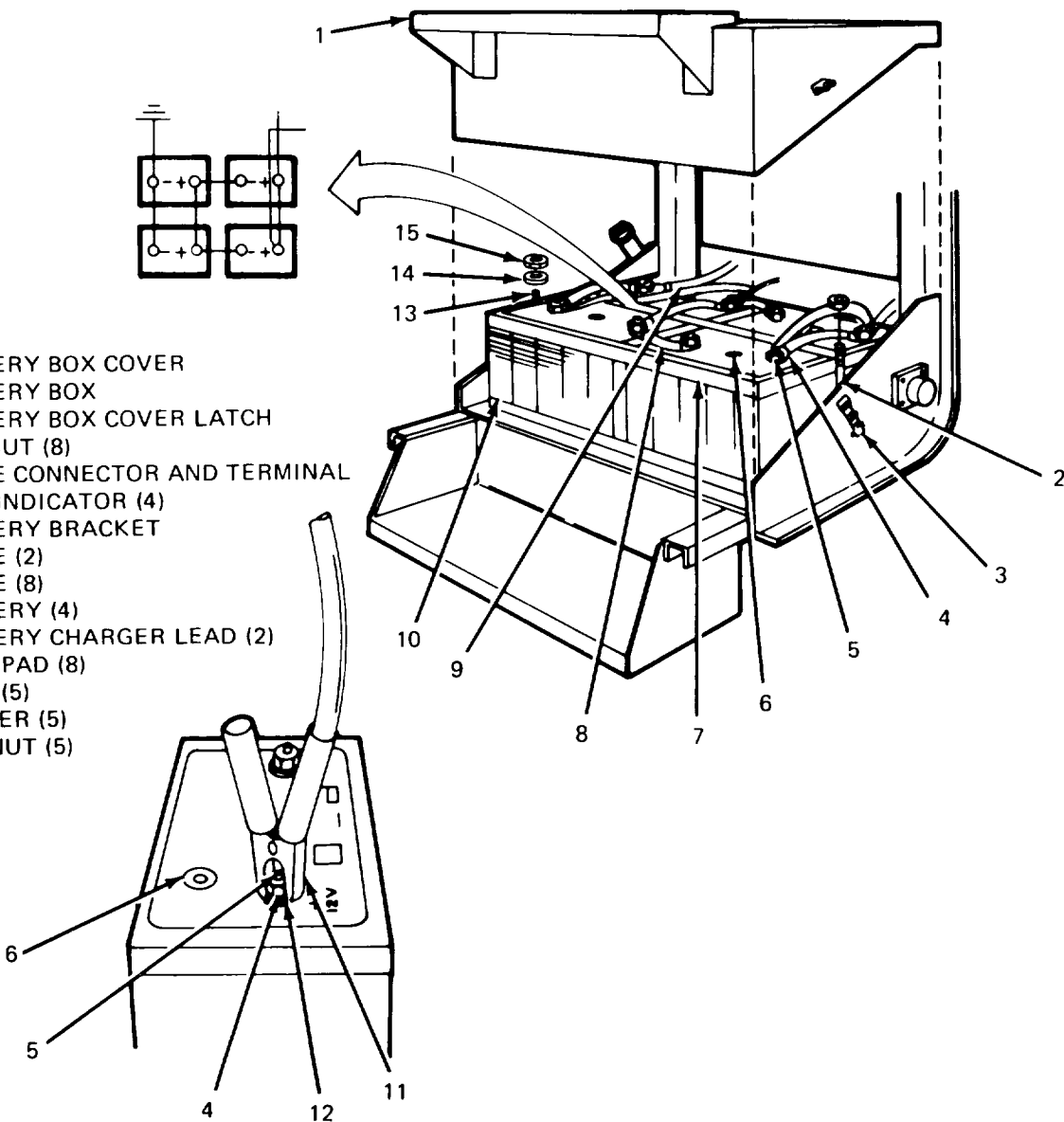
TA 074745

BATTERIES AND ALTERNATOR**5-38. BATTERY MAINTENANCE (Continued).**

LOCATION/ITEM	ACTION	REMARKS
E. INSTALLATION.		
13. Four batteries (10).	Set batteries in box as shown.	
14. Battery bracket (7).	Set in place.	
15. Five bolts (13), washers (14), and hex nuts (15).	Install and tighten.	
CAUTION Always check to make sure that the batteries are connected as shown in the illustration (series-parallel). Failure to connect batteries correctly can result in severe damage to the truck's electrical system.		
16. Ten cables (8) and (9).	Connect to batteries as shown.	
17. Eight hex nuts (4).	Replace and tighten.	
18. Battery box cover latches (3).	Install cover (1) and fasten latches.	
NOTE Follow-on maintenance action required: a. Check operation; refer to TM 9-2320-273-10.		

BATTERIES AND ALTERNATOR.

5-38. BATTERY MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
LEGEND: 1. BATTERY BOX COVER 2. BATTERY BOX 3. BATTERY BOX COVER LATCH 4. HEX NUT (8) 5. CABLE CONNECTOR AND TERMINAL 6. TEST INDICATOR (4) 7. BATTERY BRACKET 8. CABLE (2) 9. CABLE (8) 10. BATTERY (4) 11. BATTERY CHARGER LEAD (2) 12. LEAD PAD (8) 13. BOLT (5) 14. WASHER (5) 15. HEX NUT (5) 		

TA 074746

BATTERIES AND ALTERNATOR.**5-39. BATTERY CABLES MAINTENANCE.****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

- a. Removal. (6)
- b. Installation. (6)
- c. Operational Check. (2)

14 Minutes Total.

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

EQUIPMENT CONDITION**PARAGRAPH**

5-37A.

CONDITION DESCRIPTION

Batteries disconnected.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Sat.

TROUBLESHOOTING REFERENCES

Table 5-1.

BATTERIES AND ALTERNATOR.

5-39. BATTERY CABLES MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS

A. REMOVAL.

1. Two battery box cover latches (23).
2. Two bolts (2), washers (12), and nuts (13).
3. Two cable clamps (3).
4. Hex nut (22).

Unfasten to slide and remove battery box cover (1).

Remove.

Remove,

Remove from terminal (21).

LEGEND:

1. COVER
2. BOLT (2)
3. CLAMP (2)
4. CABLE
5. TERMINAL
6. WASHER
7. NUT
8. TERMINAL
9. WASHER
10. NUT
11. CABLE
12. WASHER (2)
13. NUT (2)
14. NUT (4)
15. RUBBER GASKET
16. SCREW (2)
17. WASHER (2)
18. SLAVE RECEPTACLE
19. WASHER (8)
20. SCREW (4)
21. TERMINAL
22. HEX NUT
23. COVER LATCH (2)
24. CABLE
25. TERMINAL
26. CABLE
27. NUT

The diagram illustrates the removal of battery cables. It shows a battery box with its cover (1) being lifted. Two bolts (2) with washers (12) and nuts (13) are shown being removed from the cover. Two cable clamps (3) are shown being removed from the cables. A hex nut (22) is shown being removed from a terminal (21). The starter motor and solenoid switch are also shown with numbered callouts for their components.

TA 074747

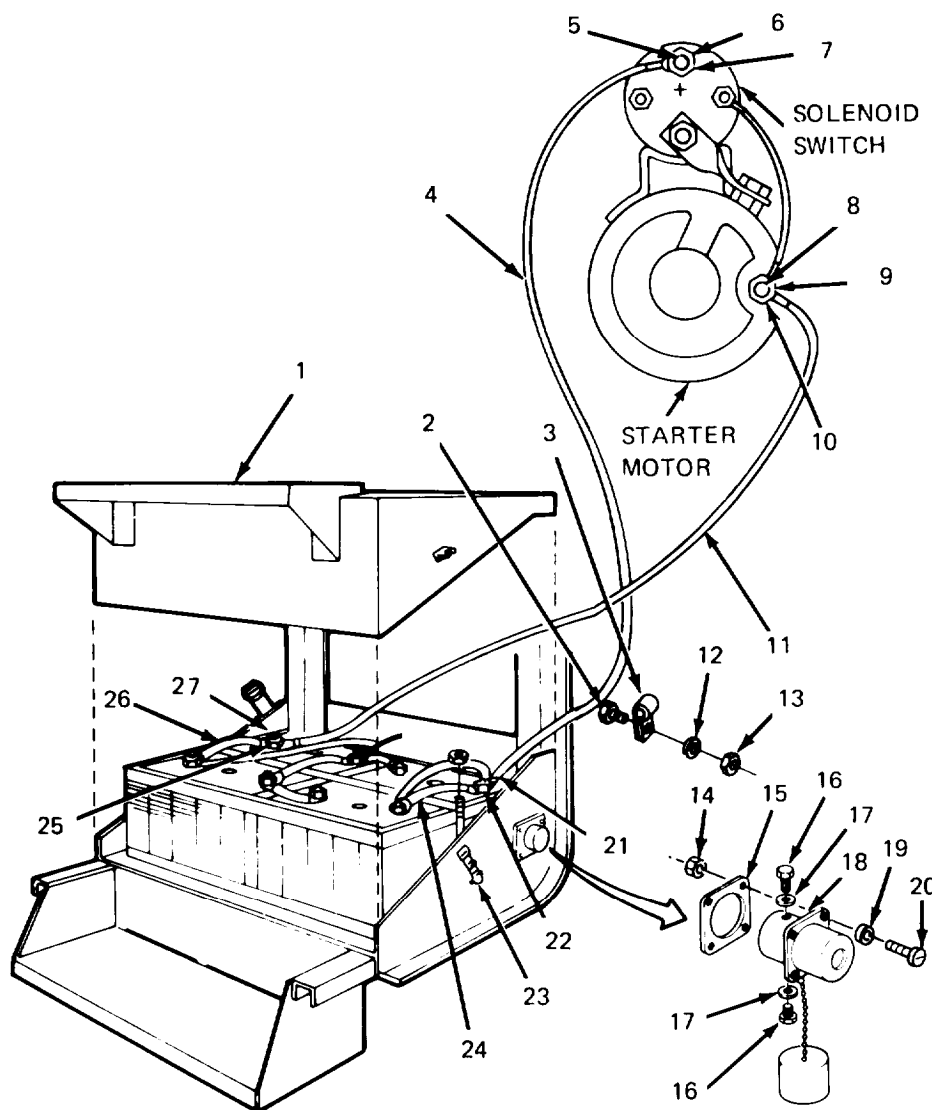
BATTERIES AND ALTERNATOR.

5-39. BATTERY CABLES MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
5. Cable (4).	Remove from terminal (21).	
6. Nut (7) and washer (6).	Remove from terminal (5).	
7. Cable (4).	Lift from terminal (5) and remove.	
8. Nut (10) and washer (9).	Remove from terminal (8).	
9. Cable (11).	Remove from terminal (8).	
10. Nut (27).	Remove from terminal (25).	
11. Cable(11).	Lift from terminal (25) and remove.	
12. Cables (24) and (26).	Remove two screws (16) and washers (17); lift cables from slave receptacle (18).	Remove from battery terminals as shown, if required.
13. Slave receptacle (18).	a. Remove four screws (20), eight washers (19) and four nuts (14). b. Remove slave receptacle (18) with rubber gasket (15).	Replace if damaged.
B. INSTALLATION.		
14. Slave receptacle (18), and gasket (15).	Install to battery box with four screws (20), eight washers (19) and four nuts (14).	
15. Cables (24) and (26).	Install to slave receptacle (18) with two screws (16) and washers (17).	Reconnect to battery terminals as shown.
NOTE After installation of cables, cover terminals and nuts with light coat of lubrication.		
16. Cable (11).	Connect to terminal (25).	
17. Nut (27).	Install on terminal (25) and tighten.	

BATTERIES AND ALTERNATOR.

5-39. BATTERY CABLES MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
LEGEND:		
1. COVER		
2. BOLT (2)		
3. CLAMP (2)		
4. CABLE		
5. TERMINAL		
6. WASHER		
7. NUT		
8. TERMINAL		
9. WASHER		
10. NUT		
11. CABLE		
12. WASHER (2)		
13. NUT (2)		
14. NUT (4)		
15. RUBBER GASKET		
16. SCREW (2)		
17. WASHER (2)		
18. SLAVE RECEPTACLE		
19. WASHER (8)		
20. SCREW (4)		
21. TERMINAL		
22. HEX NUT		
23. COVER LATCH (2)		
24. CABLE		
25. TERMINAL		
26. CABLE		
27. NUT		



TA 074748

BATTERIES AND ALTERNATOR.

5-39. BATTERY CABLES MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION (Continued).		
18. Cable (11).	Connect to terminal (8).	
19. Nut (10) and washer (9).	Install on terminal (8) and tighten.	
20. Cable (4).	Connect to terminal (5).	
21. Nut (7) and washer (6).	Install on terminal (5) and tighten.	
22. Cable (4).	Connect to terminal (21).	
23. Nut (22).	Install on terminal (21) and tighten.	
24. Two cable clamps (3).	Install on cables (4) and (11).	
25. Bolts (2), washers (12), and nuts (13).	Install and tighten.	
C. OPERATIONAL CHECK.		
26. Cables (11) and (4).	Check connections at batteries, solenoid switch, and starter motor to verify tightness.	
27. Engine.	Start up (see TM 9-2320-273-10).	
28. Engine.	Shut down (see TM 9-2320-273-10).	

BATTERIES AND ALTERNATOR.

5-39. BATTERY CABLES MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
LEGEND: 1. COVER 2. BOLT (2) 3. CLAMP (2) 4. CABLE 5. TERMINAL 6. WASHER 7. NUT 8. TERMINAL 9. WASHER 10. NUT 11. CABLE 12. WASHER (2) 13. NUT (2) 14. NUT (4) 15. RUBBER GASKET 16. SCREW (2) 17. WASHER (2) 18. SLAVE RECEPTACLE 19. WASHER (8) 20. SCREW (4) 21. TERMINAL 22. HEX NUT 23. COVER LATCH (2) 24. CABLE 25. TERMINAL 26. CABLE 27. NUT		

TA 075701

BATTERIES AND ALTERNATOR.**5-40. BATTERY BOX LATCH MAINTENANCE.****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

- a. Removal. (6)
- b. installation. (6)
- c. Operational Check. (1)

13 Minutes Total.

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

EQUIPMENT CONDITION**PARAGRAPH**

5-41A.

CONDITION DESCRIPTION

Battery Box Cover Removed.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.

Transmission in Neutral.

Park Brake Set.

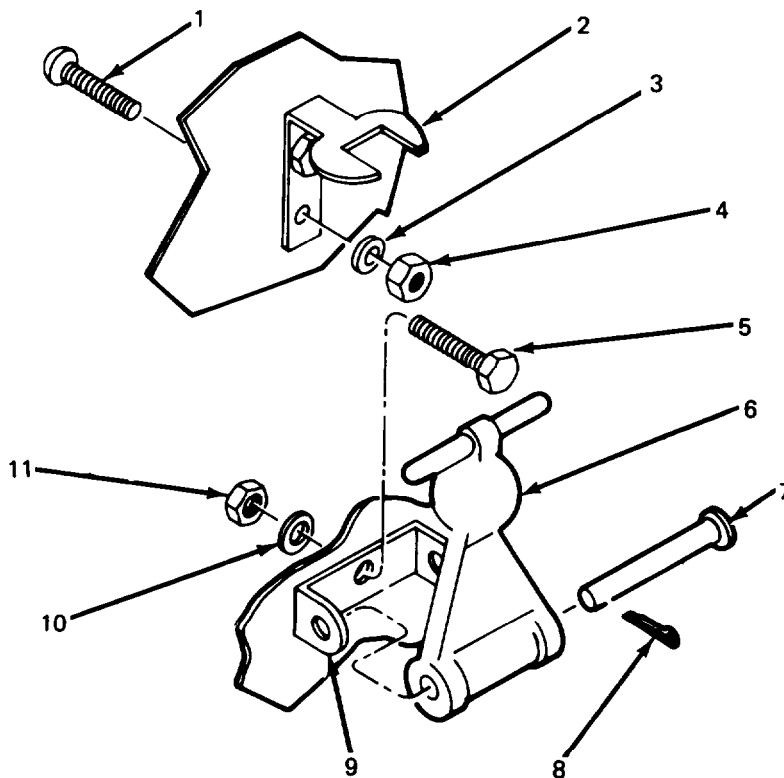
TROUBLESHOOTING REFERENCES

None.

BATTERIES AND ALTERNATOR.

5-40. BATTERY BOX LATCH MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Two nuts (4), washers (3) and screws (1).	Remove.	
2. Bracket (2).	Remove.	
3. Cotter pin (8) and pin (7).	Remove.	
4. Battery box cover hook (6).	Remove.	
5. Hex nut (11), washer (10) and bolt (5).	Remove.	
6. Anchor bracket (9).	Remove.	



LEGEND:

- 1. SCREW (2)
- 2. BRACKET
- 3. WASHER (2)
- 4. NUT (2)
- 5. BOLT
- 6. HOOK
- 7. PIN
- 8. COTTER PIN
- 9. ANCHOR BRACKET
- 10. WASHER
- 11. HEX NUT

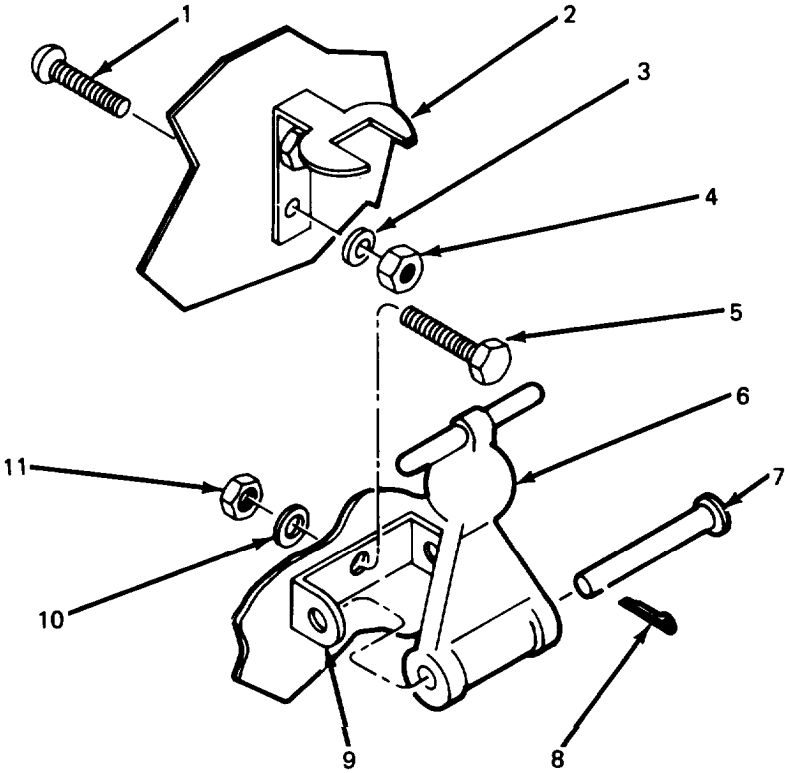
TA 074749

BATTERIES AND ALTERNATOR.

5-40. BATTERY BOX LATCH MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION.		
7. Bracket (2), two screws (1), washers (3) and nuts (4).	Install and tighten.	
8. Anchor bracket (9), bolt (5), washer (10), and nut (11)	Install and tighten.	
9. Battery box cover hook (6), pin (7) and cotter pin (8).	Install	
C. OPERATIONAL CHECK.		
10. Battery box cover.	Install per paragraph 5-91 B.	
11. Battery box hook .	Check that battery box cover hook (6) engages bracket (2) and is under tension when released.	

BATTERIES AND ALTERNATOR.

5-40. BATTERY BOX LATCH MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
 LEGEND: 1. SCREW (2) 2. BRACKET 3. WASHER (2) 4. NUT (2) 5. BOLT 6. HOOK 7. PIN 8. COTTER PIN 9. ANCHOR BRACKET 10. WASHER 11. HEX NUT		

BATTERIES AND ALTERNATOR.**5-41. BATTERY BOX COVER MAINTENANCE.****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

a. Removal.	(2.0)
b. Installation.	(2.0)
c. Checking Fit.	(0.5)
4.5 Minutes Total.	

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

EQUIPMENT CONDITION**PARAGRAPH**

None.

CONDITION DESCRIPTION

None.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.

GENERAL SAFETY INSTRUCTIONS

Engine Off.
Transmission in Neutral
Park Brake Set.

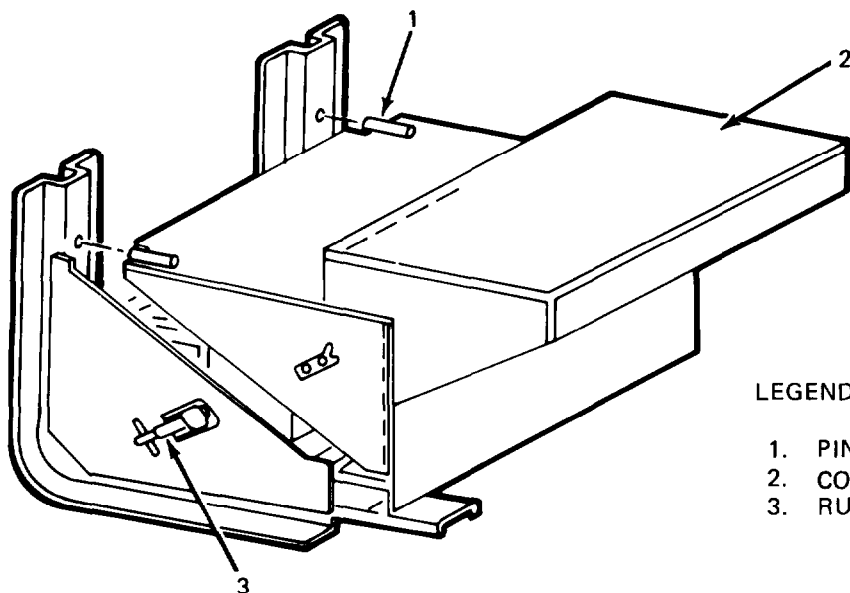
TROUBLESHOOTING REFERENCES

None.

BATTERIES AND ALTERNATOR.

5-41. BATTERY BOX COVER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Two rubber hooks (3).	Unlatch.	
2. Battery box cover (2).	Remove.	
	a. Pull forward.	
	b. Lift up.	
B. INSTALLATION.		
3. Battery box cover (2).	Install.	
	a. Position to align pins (1) with mounting holes.	
	b. Slide back, then lower.	
4. Two rubber hooks (3).	Fasten to battery box cover.	
C. CHECKING FIT.		
5. Battery box.	Check fit of cover (1) over battery box; make sure hooks (3) latch tight on the bracket.	



LEGEND:

- 1. PIN (2)
- 2. COVER
- 3. RUBBER HOOK (2)

TA 074751

BATTERIES AND ALTERNATOR.**5-42. BATTERY BOX MAINTENANCE.****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

- a. Removal. (10)
- b. Installation. (10)

20 Minutes Total.

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (PIN)

None.

EQUIPMENT CONDITION**PARAGRAPH****CONDITION DESCRIPTION**

5-38A.

Batteries Removed.

9-16A.

Air Reservoir Above
Battery Box Removed.**PERSONNEL REQUIRED**

Two (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

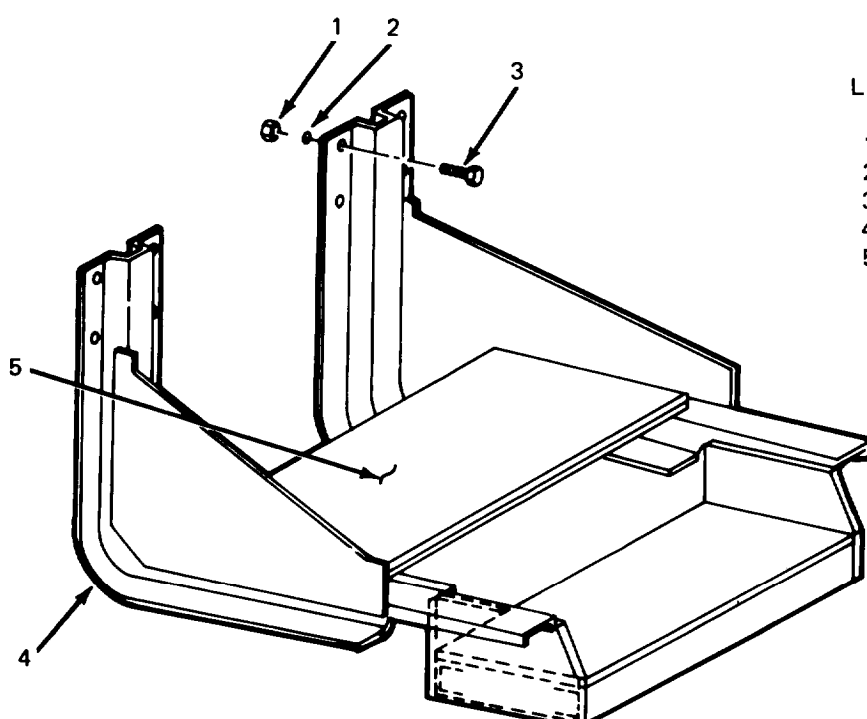
TM 9-2320-273-10.

GENERAL SAFETY INSTRUCTIONSEngine OFF.
Transmission in Neutral.
Park Brake Set.**TROUBLESHOOTING REFERENCES**

None.

BATTERIES AND ALTERNATOR.

5-42. BATTERY BOX MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Spacer (5).	Remove.	
2. Eight nuts (1), washers (2) and bolts (3).	Remove.	
3. Battery box (4).	Remove.	
B. INSTALLATION.		
4. Battery box (4).	Position and hold.	
5. Eight bolts (3), washers (2) and nuts (1).	Install and tighten.	
6. Spacer (5).	Set in place.	
NOTE Follow-on maintenance action required: a. Install batteries, refer to para 5-38E. b. Install air reservoir; refer to para 9-16B.		
 LEGEND: 1. NUT (8) 2. WASHER (8) 3. BOLT (8) 4. BOX 5. SPACER		

TA 074752

BATTERIES AND ALTERNATOR.

5-43. ALTERNATOR MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED RED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(15)
b. Installation.	(20)
c. Operational Check.	(<u>5</u>)

40 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All .

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

EQUIPMENT CONDITION

PARAGRAPH

5-37A.

11-14A&C.

CONDITION DESCRIPTION

Batteries Disconnected.

Right Front Fender
Removed.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.

Transmission in Neutral.

Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 5-5.

BATTERIES AND ALTERNATOR.

5-43. ALTERNATOR MAINTENANCE (Continued).

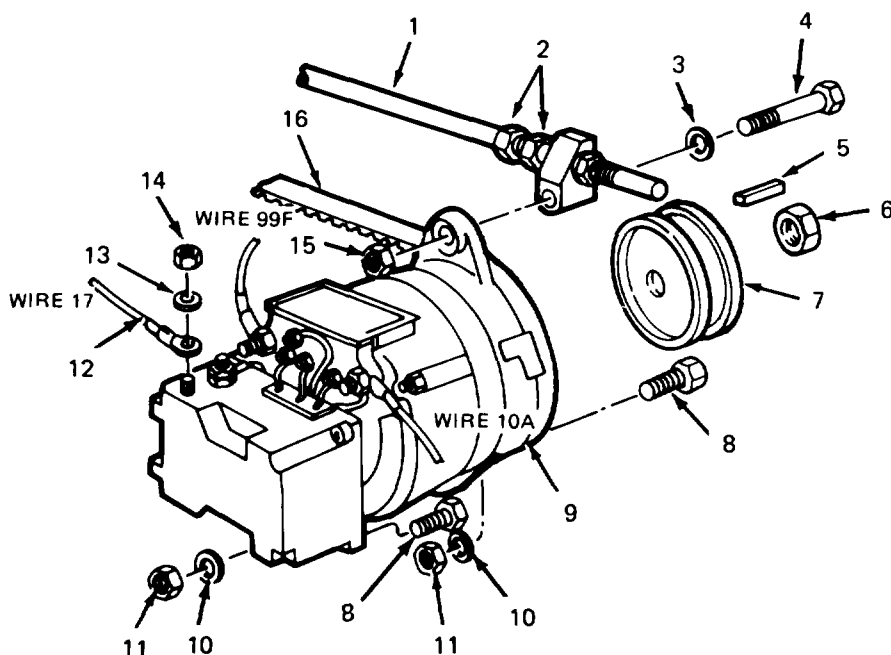
LOCATION/ITEM	ACTION	REMARKS

A. REMOVAL.

1. Three nuts (14) and washers (13).	Remove.
2. Three wires (12).	Remove.
3. Adjusting nuts (2).	Unscrew to release tension on alternator (9).
4. Bolt (4), washer (3) and nut (15).	Remove.
5. Adjustment rod (1).	Raise out of way.
6. Two nuts(11).	Loosen, but do not remove.
7. Alternator (9).	Move towards engine and remove two belts (16).
8. Two nuts (11), washers (10) and bolts (8).	Remove slowly while holding alternator (9) in place.
9. Alternator (9).	Remove.

LEGEND:

1. ROD
2. NUT (2)
3. WASHER
4. BOLT
5. KEY
6. NUT
7. PULLEY
8. BOLT (2)
9. ALTERNATOR
10. WASHER (2)
11. NUT (2)
12. WIRE (3)
13. WASHER (3)
14. NUT (3)
15. NUT
16. BELT (2)



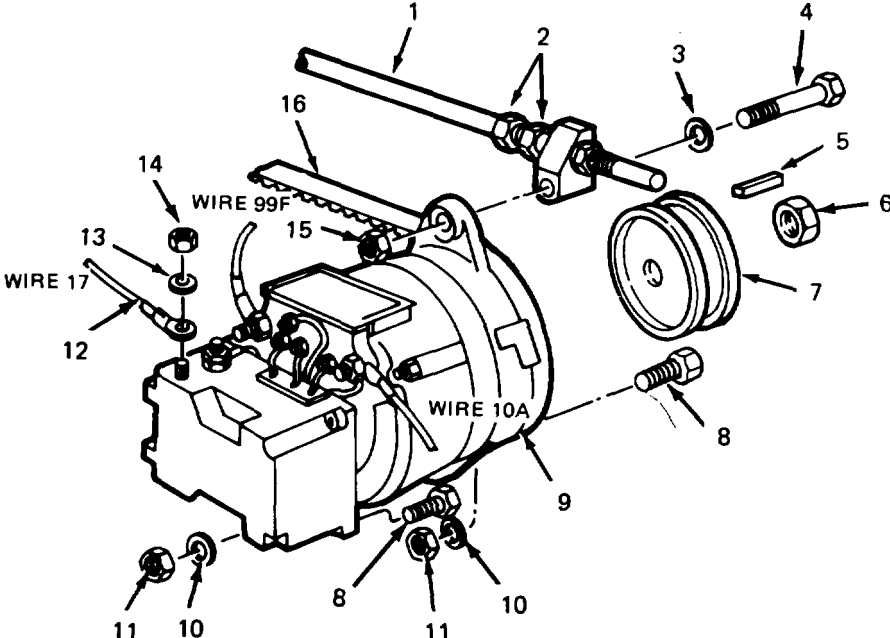
TA 074753

BATTERIES AND ALTERNATOR.

5-43. ALTERNATOR MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
10. Nut (6), key (5), and pulley (7).	Remove from alternator shaft.	
B. INSTALLATION.		
11. Pulley (7), key (5), and nut (6).	Install on alternator shaft.	Transfer parts if not damaged.
12. Alternator (9).	Aline and hold in place.	
13. Two bolts (8), washers (10) and nuts (11).	Install, but do not tighten.	
14. Adjustment rod (1).	Lower and aline with mounting hole on alternator (9).	
15. Bolt (4), washer (3) and nut (15).	Install but do not tighten.	
16. Alternator (9).	Push towards engine and replace two belts (16).	
17. Adjusting nuts (2).	Tighten until proper tension is applied to belts (16) (Refer to para 4-55).	
18. Bolt (4) and nut (15).	Tighten.	
19. Two nuts (11) and bolts (8).	Tighten.	
20. Three wires (12).	Install according to figure.	
21. Three washers (13) and nuts (14).	Install and tighten.	
22. Batteries.	Connect per paragraph 5-37B.	
C. OPERATIONAL CHECK.		
23. Engine	Start up (see TM 9-2320-273-10). Verify voltmeter indicates normal.	
NOTE		
Follow-on maintenance action required:		
Replace fender paragraph 11-14B or D.		

BATTERIES AND ALTERNATOR.

5-43. ALTERNATOR MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
LEGEND: 1. ROD 2. NUT (2) 3. WASHER 4. BOLT 5. KEY 6. NUT 7. PULLEY 8. BOLT (2) 9. ALTERNATOR 10. WASHER (2) 11. NUT (2) 12. WIRE (3) 13. WASHER (3) 14. NUT (3) 15. NUT 16. BELT (2) 		

TA 074754

EXTERIOR LIGHTING MAINTENANCE.**5-44. HEADLAMPS MAINTENANCE.****THIS TASK COVERS: APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

- a. Removal. (10)
 - b. Installation. (10)
 - c. Operational Check. (2)
- 22 Minutes Total

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

EQUIPMENT CONDITION**PARAGRAPH**

None.

CONDITION DESCRIPTION

None.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.

GENERAL SAFETY INSTRUCTIONS

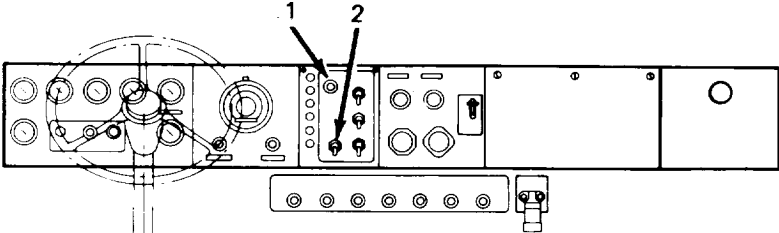
Engine OFF.
Transmission in Neutral.
Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 5-8.

EXTERIOR LIGHTING.

5-44. HEADLAMPS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
1. Screw (15).	Remove.	
2. Rim cover (14).	Remove by pushing up and pulling outward to release spring clip.	
NOTE Do not remove spring and two screws which hold inner and outer bases together as headlight re-alignment will be necessary.		
 CAB FLOOR BOARD		
LEGEND: 1. LAMP SWITCH 2. OPERATION SWITCH 3. TERMINAL BOARD 4. WASHER (3) 5. NUT (2) 6. BOLT 7. WIRE (3) 8. HEADLAMP BASE 9. SCREW (6) 10. WIRE CONNECTOR 11. HEADLAMP 12. HEADLAMP RETAINER 13. SHORT SCREW (3) 14. RIM COVER 15. SCREW 16. DIMMER SWITCH		

TA 074755

EXTERIOR LIGHTING

5-44. HEADLAMPS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
3. Three short screws (13).	a. Remove b. Remove headlamp retainer (12).	
4. Headlamp (11).	Disconnect wire connector (10) and remove.	
5. Six screws (9).	Remove	
6. Headlamp base (8).	Remove.	
7. Two nuts (5), one bolt (6) and three washers (4).	Remove three headlamp wires (7) from terminal board (3).	
B. INSTALLATION.		
8. Three wires (7).	Install on terminal board (3).	
9. Three washers (4) and two nuts (5), and one bolt (6).	Install and tighten on terminal board (3).	
10. Headlamp base (8).	Install with six screws (9) and align.	
11. Wire connector (10).	Connect to headlamp (11) and insert headlamp into base (8).	
12. Headlamp retainer (12).	Install with three short screws (13).	
13. Rim cover (14).	Install with screw (15).	
C. OPERATIONAL CHECK.		
14. OPERATION switch (2).	Set to NORMAL.	
15. LAMP switch (1).	Pull ON to second position.	
16. HEADLAMP (11).	Observe that headlamp comes ON.	
17. DIMMER switch (16).	Press and verify that HIGH beam comes ON. Press again and verify that LOW beam comes ON.	

EXTERIOR LIGHTING.

5-44. HEADLAMPS MAINTENANCE (Continued).

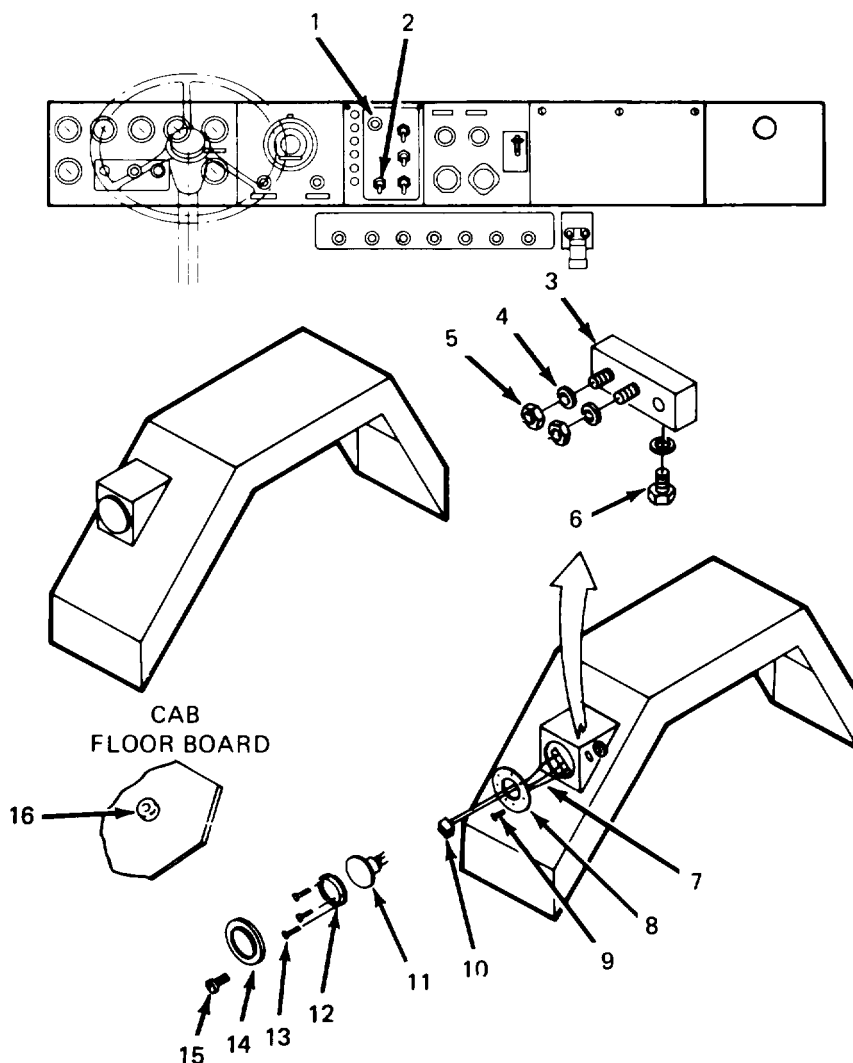
LOCATION/ITEM

ACTION

REMARKS

LEGEND:

1. LAMP SWITCH
2. OPERATION SWITCH
3. TERMINAL BOARD
4. WASHER (3)
5. NUT (2)
6. BOLT
7. WIRE (3)
8. HEADLAMP BASE
9. SCREW (6)
10. WIRE CONNECTOR
11. HEADLAMP
12. HEADLAMP RETAINER
13. SHORT SCREW (3)
14. RIM COVER
15. SCREW
16. DIMMER SWITCH



TA 074756

EXTERIOR LIGHTING.

5-45. FRONT TURN AND MARKER LAMPS MAINTENANCE.		
THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)		
a. Removal. (6) b. Installation. (6) c. Operational Check, (1) 13 Minutes Total.		
INITIAL SETUP APPLICABLE CONFIGURATIONS All. TEST EQUIPMENT None. SPECIAL TOOLS None. MATERIALS/PARTS (P/N) None. EQUIPMENT CONDITION PARAGRAPH None. CONDITION DESCRIPTION None. PERSONNEL REQUIRED One (MOS-63B20). SPECIAL ENVIRONMENTAL CONDITIONS Vehicle Parked on Level Ground. REFERENCES (TM) TM 9-2320-273-10. GENERAL SAFETY INSTRUCTIONS Engine OFF. Transmission in Neutral. Park Brake Set. TROUBLESHOOTING REFERENCES Table 5-9, 5-11.		

EXTERIOR LIGHTING.

5-45. FRONT TURN AND MARKER LAMPS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Four screws (12).	Remove.	
2. Lens (11).	Remove.	
3. Gasket (10).	Remove.	
4. Bulb (14).	Remove.	

LEGEND:

- 1. LAMP SWITCH
- 2. OPERATION SWITCH
- 3. LENS
- 4. SCREW (2)
- 5. BULB
- 6. WASHER (2)
- 7. NUT (2)
- 8. WIRE CONNECTOR
- 9. FRONT TURN AND MARKER LAMP
- 10. GASKET
- 11. LENS
- 12. SCREW (4)
- 13. WIRE CLAMP
- 14. BULB
- 15. TURN SIGNAL CONTROL

TA 074757

EXTERIOR LIGHTING.**5-45. FRONT TURN AND MARKER LAMPS MAINTENANCE (Continued).**

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
5. Two screws (4).	Remove.	
6. Lens (3).	Remove.	
7. Bulb (5).	Remove.	
8. Two nuts (7), washers (6) and wire clamp (13).	Remove.	
9. Wire connector (8).	Remove from front turn and marker lamp (9).	
10. Front turn and marker lamp (9).	Remove.	
B. INSTALLATION.		
11. Front turn and marker lamp (9).	Aline in mounting holes.	
12. Two washers (6), nuts (7) and wire clamp (13).	Install and tighten.	
13. Wire connector (8).	Connect to front turn and marker lamp (9).	
14. Bulb (5).	Insert and turn to tighten.	
15. Lens (3).	Replace and aline.	
16. Two screws (4).	Install and tighten.	
17. Bulb (14).	Insert and turn to tighten.	
18. Gasket (10).	Replace and aline.	
19. Lens(11).	Replace and aline.	
20. Four screws (12).	Install and tighten.	
C. C. OPERATIONAL CHECK.		
21. OPERATION switch (2).	Set to NORMAL.	
22. LAMP switch (1).	Pull out to first notch and verify that marker lamps (9) come ON.	

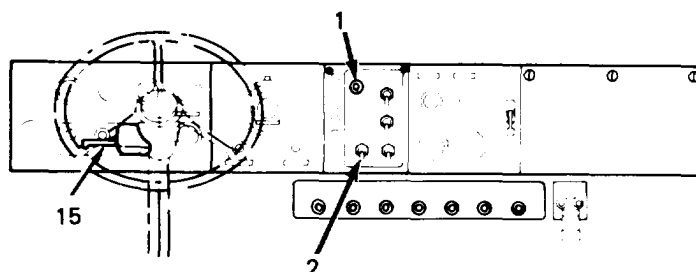
EXTERIOR LIGHTING.

5-45. FRONT TURN AND MARKER LAMPS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS

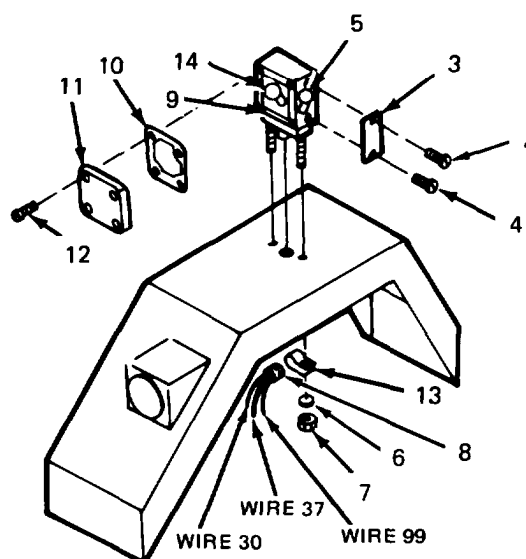
C. OPERATIONAL CHECK (Continued).

23. Turn signal control (15).	Push lever down. Verify that left turn lamp flashes.
24. Turn signal control (15).	Push lever up. Verify that right turn lamp flashes.



LEGEND:

1. LAMP SWITCH
2. OPERATION SWITCH
3. LENS
4. SCREW (2)
5. BULB
6. WASHER (2)
7. NUT (2)
8. WIRE CONNECTOR
9. FRONT TURN AND MARKER LAMP
10. GASKET
11. LENS
12. SCREW (4)
13. WIRE CLAMP
14. BULB
15. TURN SIGNAL CONTROL



TA 074758

EXTERIOR LIGHTING.**5-46. REAR LAMP ASSEMBLY MAINTENANCE.****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

- a. Removal. (5)
 - b. Installation. (5)
 - c. Operational Check. (2)
- 12 Minutes Total.

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

EQUIPMENT CONDITION**PARAGRAPH**

None.

CONDITION DESCRIPTION

None.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

1. Non-Flammable Cleaning Solvent (Refer to Appendix C)
2. Bearing Grease; GAA (Refer to Appendix C).

PERSONNEL REQUIRED

Two (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.
LO 9-2320-273-12.

GENERAL SAFETY INSTRUCTIONS

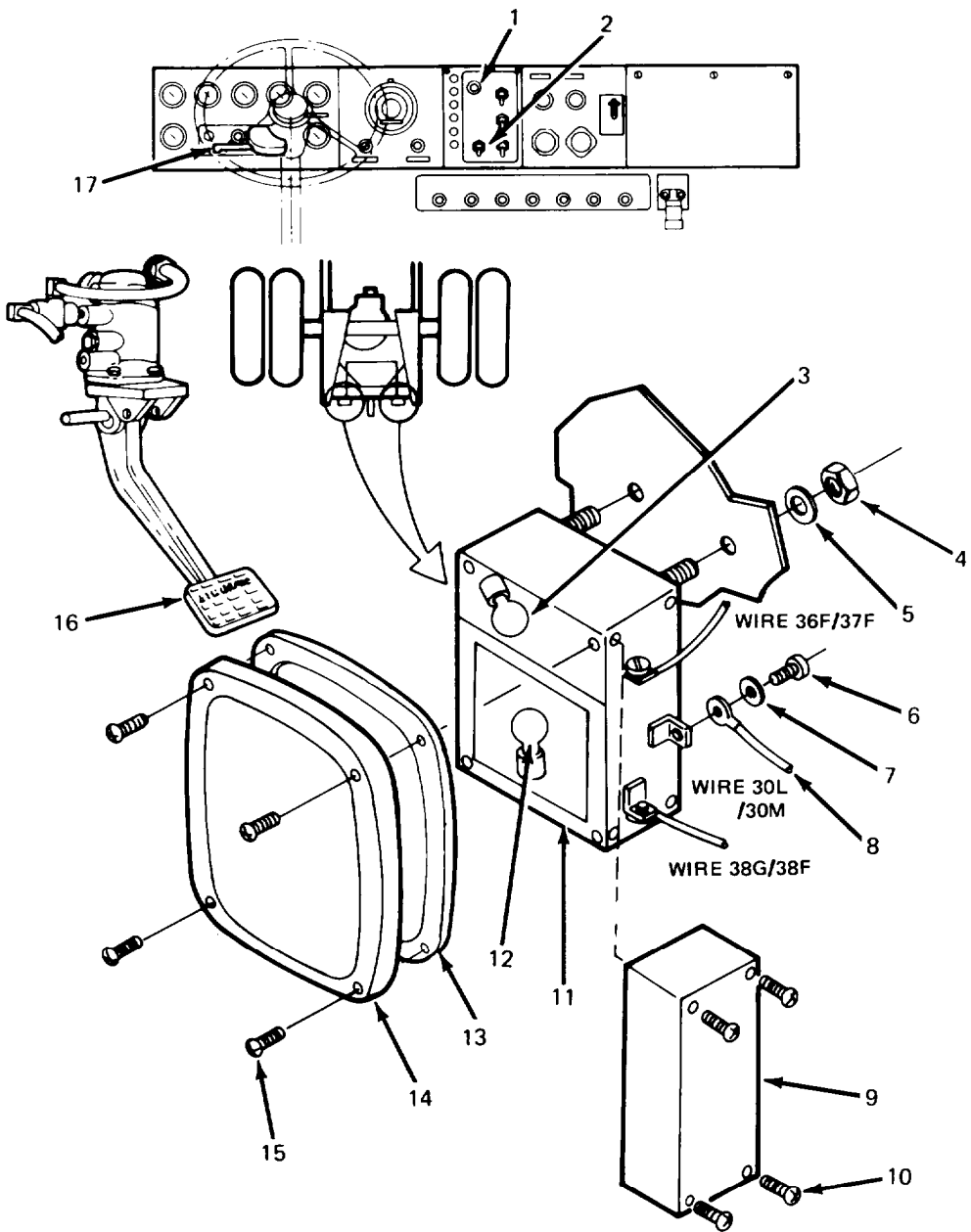
Engine OFF.
Transmission in Neutral.
Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 5-10.

EXTERIOR LIGHTING.

5-46. REAR LAMP ASSEMBLY MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
 LEGEND: - LAMP SWITCH - OPERATION SWITCH - BULB - NUT (2) - WASHER (2) - SCREW (3) - WASHER (3) - WIRE (3) - TERMINAL COVER - SCREW (4) - REAR LAMP ASSEMBLY - BULB - GASKET - LENS - SCREW (4) - BRAKE PEDAL - TURN SIGNAL CONTROL WIRE 36F/37F WIRE 30L/30M WIRE 38G/38F		

TA 074759

EXTERIOR LIGHTING.**5-46. REAR LAMP ASSEMBLY MAINTENANCE (Continued).**

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Four screws (15).	Remove	
2. Lens (14).	Remove.	
3. Gasket (13}.	Remove.	Discard if cracking or tears are evident.
4. Bulb (12).	Remove.	
5. Bulb (3).	Remove.	
6. Four screws (10).	Remove.	
7. Terminal cover (9).	Remove.	
NOTE		
Remove grease from wire connections with cleaning solvent before proceeding to next step.		
8. Three screws (6) and washers (7).	Remove.	
9. Three wires (8).	Remove.	
10. Two nuts (4) and washers (5).	Remove.	
11. Rear lamp assembly (11).	Remove.	
B. INSTALLATION.		
12. Rear lamp assembly (11).	Aline mounting studs and install.	
13. Two washers (5) and nuts (4).	Install and tighten.	
14. Three wires (8).	Replace on rear lamp assembly according to figure.	
15. Three washers (7) and screws (6).	Install and tighten.	
16. Terminal cover (9).	Fill with bearing grease; then, aline and install.	

EXTERIOR LIGHTING.

5-46. REAR LAMP ASSEMBLY MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
LEGEND:		
1. LAMP SWITCH		
2. OPERATION SWITCH		
3. BULB		
4. NUT (2)		
5. WASHER (2)		
6. SCREW (3)		
7. WASHER (3)		
8. WIRE (3)		
9. TERMINAL COVER		
10. SCREW (4)		
11. REAR LAMP ASSEMBLY		
12. BULB		
13. GASKET		
14. LENS		
15. SCREW (4)		
16. BRAKE PEDAL		
17. TURN SIGNAL CONTROL		

TA 074760

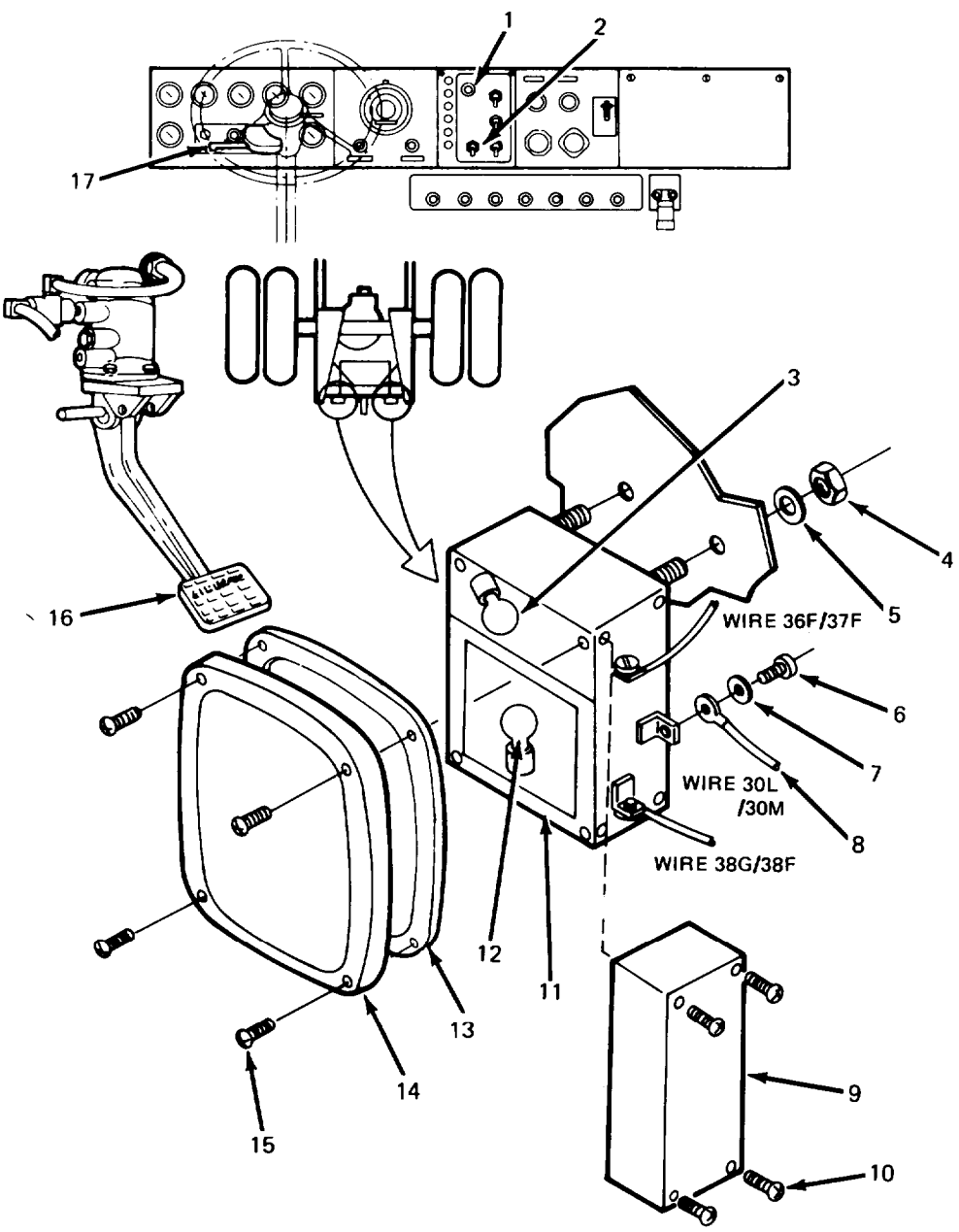
EXTERIOR LIGHTING.

5-46. REAR LAMP ASSEMBLY MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION (Continued).		
17. Four screws (10).	Install and tighten.	
18. Bulb (3).	Insert and twist to tighten.	
19. Bulb (12).	Insert and twist to tighten.	
20. Gasket (13).	Install if it was removed.	
21. Lens (14).	Align and install.	
22. Four screws (15).	Install and tighten.	
23. OPERATION switch (2).	Set to NORMAL.	First mechanic.
24. LAMP switch (1).	Pull ON.	First mechanic.
25. Rear lamp assembly (11).	Verify that lights go ON.	Second mechanic.
26. Brake pedal (16).	Press down.	First mechanic.
27. Rear lamp assembly (11).	Verify that brake lights go ON.	Second mechanic.
28. Turn signal control (17).	Press lever down.	First mechanic.
29. Left rear lamp assembly (11).	Verify that left turn signal lamp flashes.	Second mechanic.
30. Turn signal control (17).	Push lever up.	First mechanic.
31. Right rear lamp assembly (11).	Verify that right turn signal lamp flashes.	Second mechanic.

EXTERIOR LIGHTING.

5-46. REAR LAMP ASSEMBLY MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
LEGEND: 1. LAMP SWITCH 2. OPERATION SWITCH 3. BULB 4. NUT (2) 5. WASHER (2) 6. SCREW (3) 7. WASHER (3) 8. WIRE (3) 9. TERMINAL COVER 10. SCREW (4) 11. REAR LAMP ASSEMBLY 12. BULB 13. GASKET 14. LENS 15. SCREW (4) 16. BRAKE PEDAL 17. TURN SIGNAL CONTROL		

TA 074761

EXTERIOR LIGHTING.

5-47. CLEARANCE LAMPS MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

- a. Removal. (2)
b. Installation. (2)
c. Operational Check. (1)
5 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

EQUIPMENT CONDITION

PARAGRAPH

None.

CONDITION DESCRIPTION

None.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 5-9.

EXTERIOR LIGHTING.

5-47. CLEARANCE LAMPS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
1. Screw (3) and seal (4).	Remove.	
2. Lens (5) and gasket (6).	Remove.	
3. Bulb (7).	Remove.	
4. Two screws (8) and ground washers (9).	Remove.	

LEGEND:

- 1. LAMP SWITCH
- 2. OPERATION SWITCH
- 3. SCREW
- 4. SEAL
- 5. LENS
- 6. GASKET
- 7. BULB
- 8. SCREW (2)
- 9. GROUND WASHER (2)
- 10. LAMP BASE
- 11. GASKET
- 12. WIRE CONNECTOR
- 13. CLEARANCE BUTTON

TA211962

EXTERIOR LIGHTING.**5-47. CLEARANCE LAMPS MAINTENANCE (Continued).**

LOCATION/ITEM	ACTION	REMARKS
5. Lamp base (10).	Remove.	
6. Gasket (11).	Remove.	Discard if cracking or tears are evident
7. Wire connector (12).	Disconnect.	

B. INSTALLATION.

8. Wire connector (12).	Connect.	
9. Gasket (11).	Install.	
10. Lamp base (10).	Aline mounting holes.	
11. Two screws (8) and ground washers (9).	Install and tighten.	
12. Bulb (7).	Install.	
13. Gasket (6) and lens (5).	Replace.	
14. Screw (3) and seal (4).	Install and tighten.	

C. OPERATIONAL CHECK.

15. OPERATION switch (2).	Set to NORMAL.	
16. LAMP switch (1).	Pull ON; verify that clearance lamps come on.	
17. CLEARANCE button (13).	Press and verify that clearance lamps go OFF.	

NOTE

Upon completion of this task, apply a suitable windshield sealant over screws (8) to prevent water entry.

EXTERIOR LIGHTING.

5-47. CLEARANCE LAMPS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
LEGEND: 1. LAMP SWITCH 2. OPERATION SWITCH 3. SCREW 4. SEAL 5. LENS 6. GASKET 7. BULB 8. SCREW (2) 9. GROUND WASHER (2) 10. LAMP BASE 11. GASKET 12. WIRE CONNECTOR 13. CLEARANCE BUTTON		

TA211963

EXTERIOR LIGHTING.

5-48. BLACKOUT HEADLAMP MAINTENANCE.

THIS TASK COVERS (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(5)
b. Installation.	(5)
c. Operational Check.	(2)

12 Minutas Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

EQUIPMENT CONDITION

PARAGRAPH

5-44A.

CONDITION DESCRIPTION

Headlamp Removed if Wire
(3) is To Be Removed.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320.273-10.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 5-13.

EXTERIOR LIGHTING.

5-48. BLACKOUT HEADLAMP MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
1. Three retaining screws (10).	Remove.	
2. Lens cover (11).	Remove.	

1. LAMP SWITCH
2. OPERATION SWITCH
3. WIRE
4. TERMINAL
5. WASHER
6. NUT
7. NUT
8. WASHER
9. GASKET
10. RETAINING SCREW (3)
11. LENS COVER
12. BLACKOUT HEADLAMP ASSEMBLY
13. BULB

TA 074764

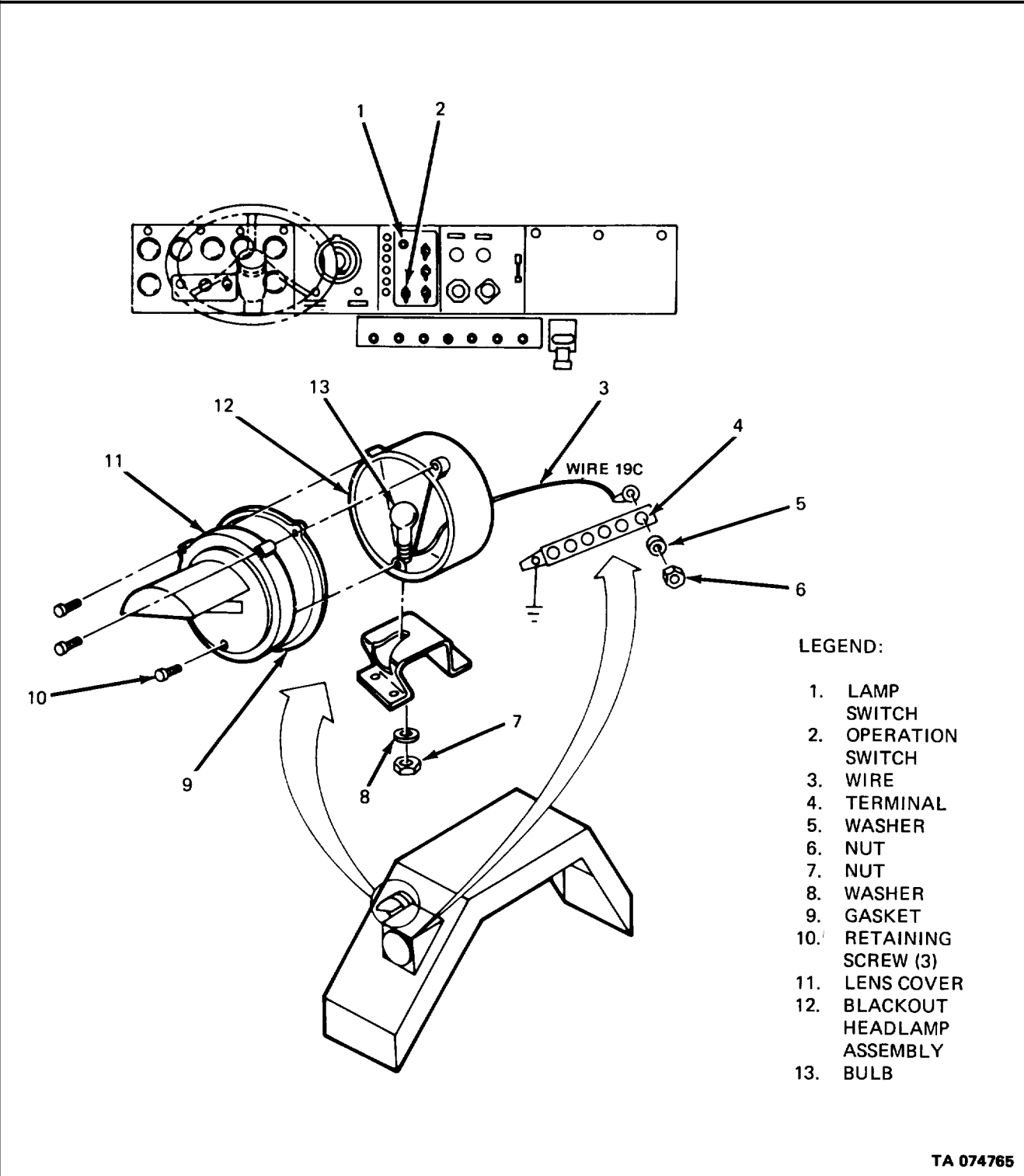
EXTERIOR LIGHTING.

5-48. BLACKOUT HEADLAMP MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
3. Gasket (9).	Remove.	Discard if cracking or tears are evident.
4. Bulb (13).	Remove.	
5. Nut (6) and washer (5).	Remove from terminal (4).	
6. Wire (3).	Remove from terminal (4).	
7. Nut (7) and washer (8).	Remove.	
8. Blackout headlamp assembly (12).	Remove.	
NOTE		
To gain access to terminal block (4) refer to para. 5-44.		
B. INSTALLATION.		
9. Blackout headlamp assembly (12).	Aline mounting stud and install.	
10. Washer (8) and nut (7).	Install and tighten.	
11. Wire (3).	Connect to terminal (4).	
12. Washer (5) and nut (6).	Install and tighten.	
13. Bulb (13).	Install and twist to tighten.	
14. Gasket (9).	Install.	
15. Lens cover (11).	Aline and install.	
16. Three retaining screws (10).	Tighten.	
17. Headlamp.	Install per paragraph 5-45.	
C. OPERATIONAL CHECK.		
18. OPERATION switch (2).	Set to BLACKOUT.	
19. LAMPswitch (1).	Pull ON. Verify that black-out headlamp comes ON.	

EXTERIOR LIGHTING.

5-48. BLACKOUT HEADLAMP MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
 LEGEND: 1. LAMP SWITCH 2. OPERATION SWITCH 3. WIRE 4. TERMINAL 5. WASHER 6. NUT 7. NUT 8. WASHER 9. GASKET 10. RETAINING SCREW (3) 11. LENS COVER 12. BLACKOUT HEADLAMP ASSEMBLY 13. BULB		

TA 074765

EXTERIOR LIGHTING.

5-49. BLACKOUT MARKER LAMPS MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

- a. Removal. (5)
b. Installation. (5)
c. Operational Check. (2)
12 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

EQUIPMENT CONDITION
PARAGRAPH

5-44A.

CONDITION DESCRIPTION

Headlamp Removed.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.

GENERAL SAFETY INSTRUCTIONS

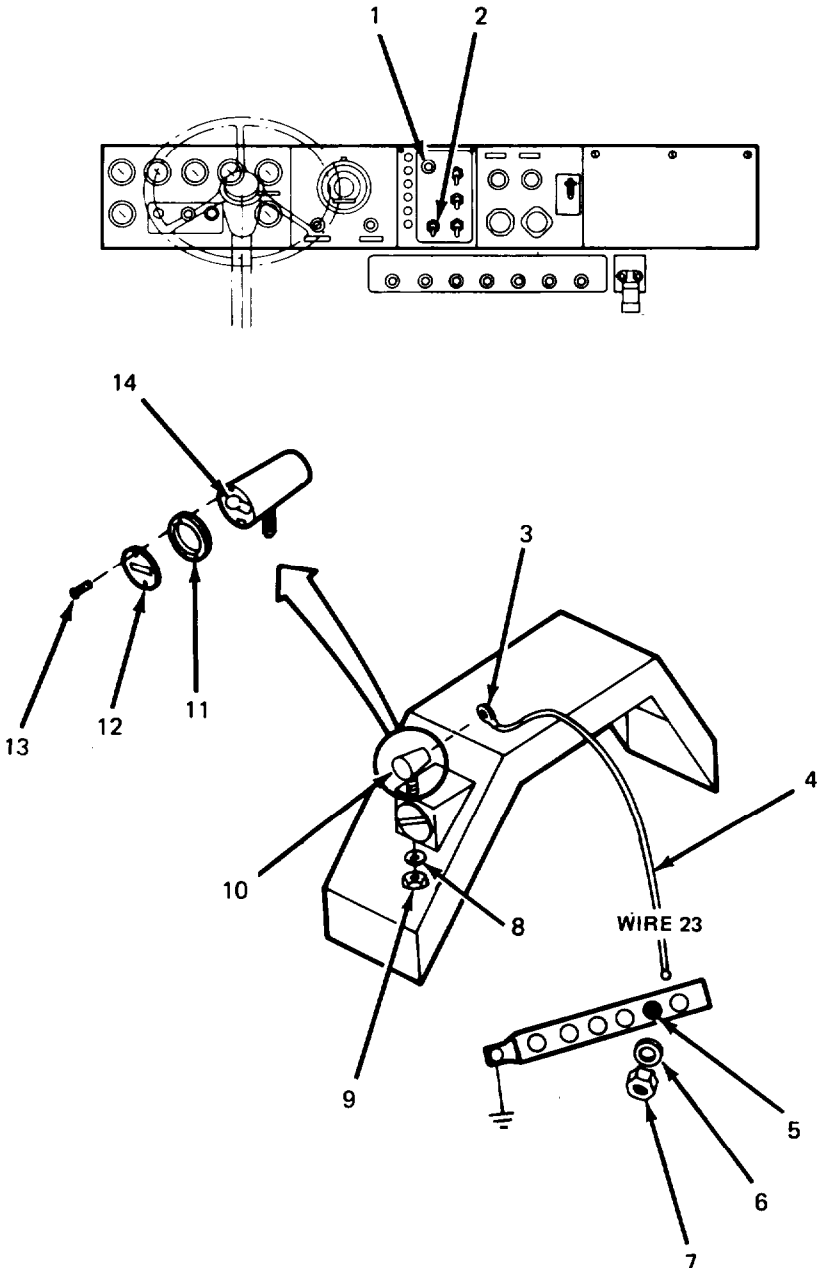
Engine OFF.
Transmission in Neutral.
Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 5-13.

EXTERIOR LIGHTING.

5-49. BLACKOUT MARKER LAMPS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
 The diagram illustrates the maintenance of blackout marker lamps. The top portion shows a control panel with two switches, labeled 1 and 2. The bottom portion provides a detailed view of the lamp assembly, including the bulb (14), gasket (11), lens cover (12), and various mounting hardware (13, 14). A wire labeled 'WIRE 23' is connected to a terminal block, which is grounded. The legend identifies the components and their functions. LEGEND: 1. LAMP SWITCH 2. OPERATION SWITCH 3. WIRE CONNECTOR 4. WIRE 5. TERMINAL 6. WASHER 7. NUT 8. WASHER 9. NUT 10. BLACKOUT MARKER LAMP 11. GASKET 12. LENS COVER 13. SCREW (2) 14. BULB		

TA 074766

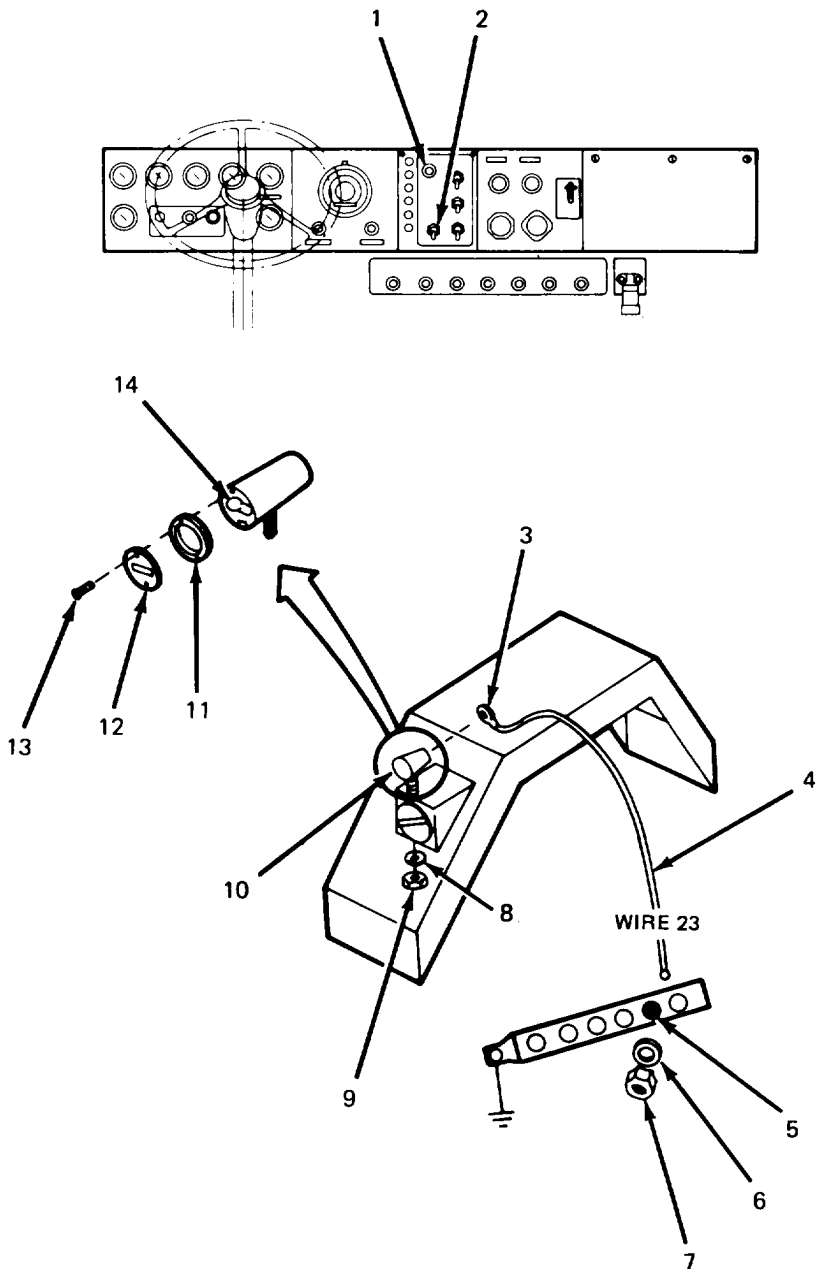
EXTERIOR LIGHTING.

5-49. BLACKOUT MARKER LAMPS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Two screws (13).	Remove.	
2. Lens cover (12).	Remove.	
3. Gasket (11).	Remove.	Discard if cracking or tears are evident.
4. Bulb (14).	Remove.	
5. Wire connector (3).	Remove.	
6. Nut (9) and washer (8).	Remove.	
7. Blackout marker lamp (10).	Remove.	
8. Nut (7) and washer (6).	Remove from terminal (5).	
9. Wire (4).	Remove from terminal (5).	
B. INSTALLATION.		
10. Wire (4).	Install on terminal (5).	
11. Washer (6) and nut (7).	Install and tighten.	
12. Blackout marker lamp (10).	Aline mounting stud and install.	
13. Washer (8) and nut (9).	Install and tighten.	
14. Wire connector (3).	Install in blackout marker (10).	
15. Bulb (14).	Install and twist to tighten.	
16. Gasket (11).	Install.	
17. Lens cover (12).	Aline and install.	
18. Two screws (13).	Install and tighten.	
19. Headlamp.	Install per paragraph 5-44.	
C. OPERATIONAL CHECK.		
20. OPERATION switch (2).	Set to BLACKOUT.	

EXTERIOR LIGHTING.

5-49. BLACKOUT MARKER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
C. OPERATIONAL CHECK (Continued).		
21. LAMP switch (1).	Pull On to first position and verify that blackout marker lamp comes ON.	
		
LEGEND: 1. LAMP SWITCH 2. OPERATION SWITCH 3. WIRE CONNECTOR 4. WIRE 5. TERMINAL 6. WASHER 7. NUT 8. WASHER 9. NUT 10. BLACKOUT MARKER LAMP 11. GASKET 12. LENS COVER 13. SCREW (2) 14. BULB		

TA 074767

EXTERIOR LIGHTING.

5-50. BLACKOUT TAIL AND STOPLAMPS MAINTENANCE.**THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

- a. Removal. (5)
 - b. Installation (5)
 - c. Operational Check. (2)
- 12 Minutes Total.

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

EQUIPMENT CONDITION**PARAGRAPH**

None.

CONDITION DESCRIPTION

None.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

PERSONNEL REQUIRED

Two (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 92320273-10.

GENERAL SAFETY INSTRUCTIONS

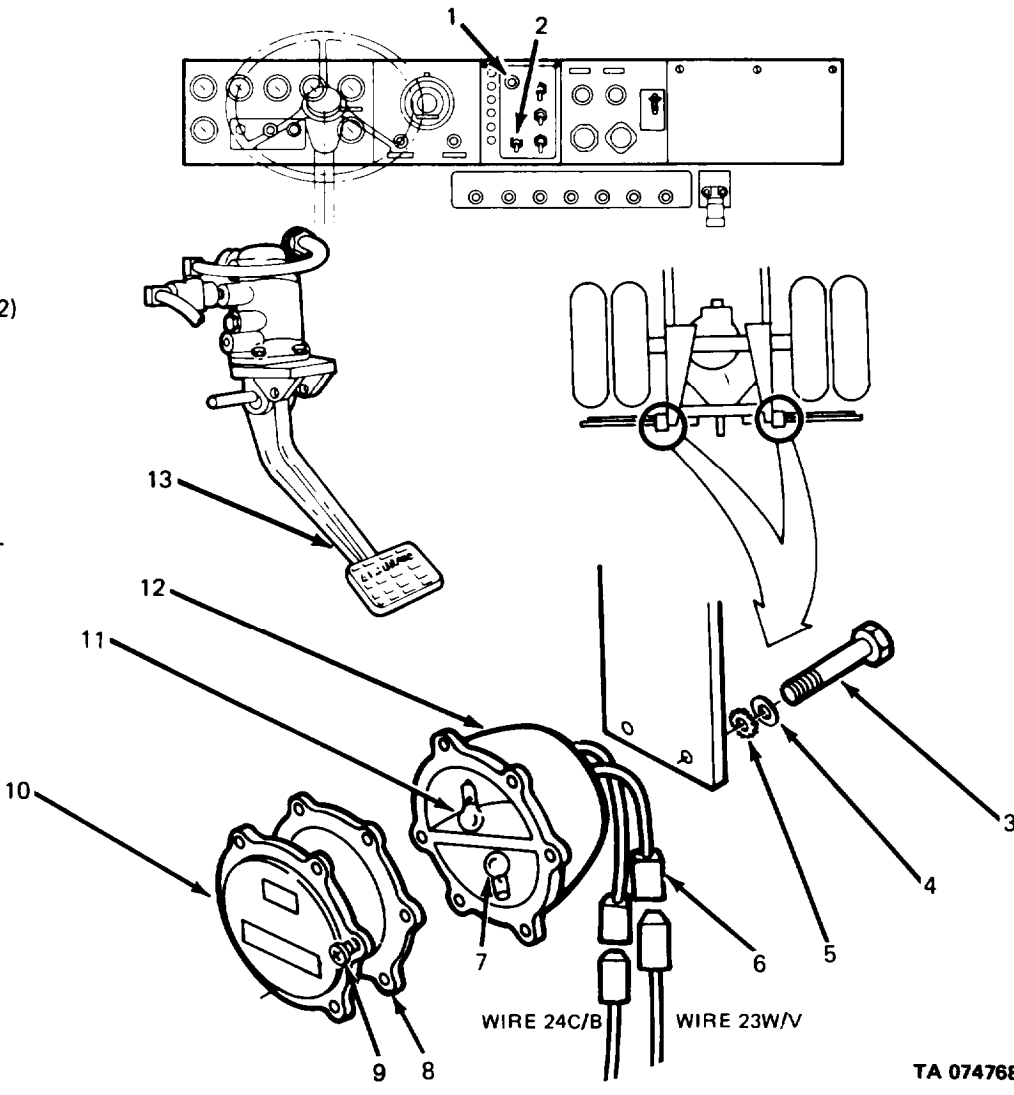
Engine OFF.
Transmission In Neutral.
Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 5-13.

EXTERIOR LIGHTING.

5-50. BLACKOUT TAIL AND STOPLAMPS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Six screws (9).	Loosen from blackout tail and stop lamp assembly (12).	Screws (9) cannot be removed from lens cover (10).
2. Lens cover (10).	Remove.	
3. Gasket (8).	Remove.	Discard if cracking or tears are evident.
4. Bulbs (7) and (11).	Remove.	
LEGEND:		
1. LAMP SWITCH		
2. OPERATION SWITCH		
3. BOLT (2)		
4. WASHER (2)		
5. STAR WASHER (2)		
6. WIRE CONNECTOR (2)		
7. BULB		
8. GASKET		
9. SCREW (6)		
10. LENS COVER		
11. BULB		
12. BLACKOUT TAIL AND STOPLAMP ASSEMBLY (2)		
13. BRAKE PEDAL		

TA 074768

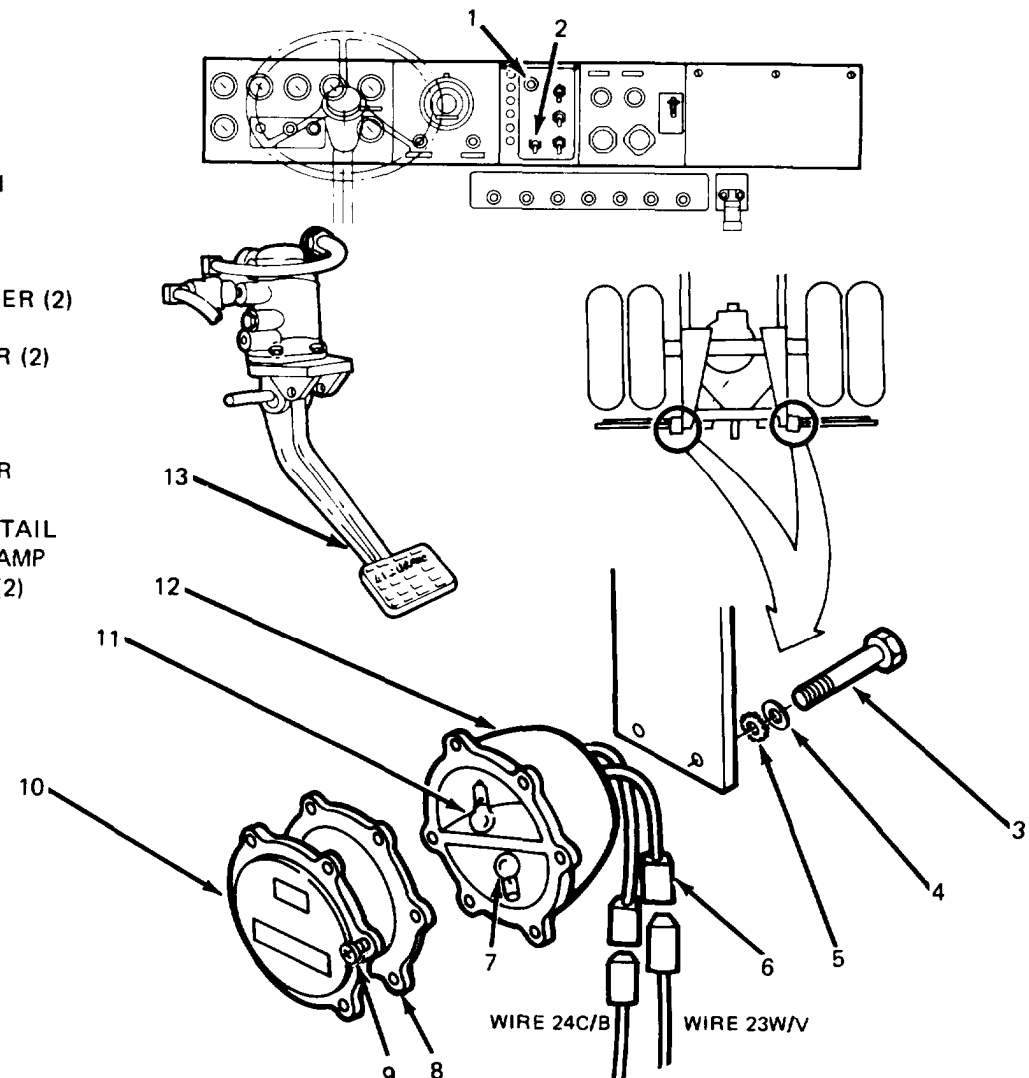
EXTERIOR LIGHTING.

5-50. BLACKOUT TAIL AND STOPLAMPS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
5. Two wire connectors (6).	Disconnect.	
6. Two bolts (3), washers (4), and star washers (5).	Remove.	
7. Blackout tail and stoplamp assembly (12).	Remove.	
B. INSTALLATION.		
8. Blackout tail and stoplamp assembly (12).	Aline with mounting holes.	
9. Two star washers (5), washers (4) and bolts (3).	Install and tighten.	
10. Two wire connectors (6).	Reconnect.	
11. Bulbs (7) and (11).	Install and twist to tighten.	
12. Gasket (8).	Install.	
13. Lens cover (10).	Aline and install.	
14. Six screws (9).	Install and tighten.	
C. OPERATIONAL CHECK.		
15. OPERATION switch (2).	Set to BLACKOUT.	First mechanic.
16. LAMP switch (1).	Pull ON.	First mechanic.
17. Blackout tail and stoplamp assembly (12).	Verify that both tail lights (7) come ON.	Second mechanic.
18. Brake pedal (13).	Press down.	First mechanic.
19. Blackout tail and stoplamp assembly (12).	Verify that both brake lamps (11) come ON.	Second mechanic.

EXTERIOR LIGHTING.

5-50. BLACKOUT TAIL AND STOPLAMPS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
LEGEND: 1. LAMP SWITCH 2. OPERATION SWITCH 3. BOLT (2) 4. WASHER (2) 5. STAR WASHER (2) 6. WIRE CONNECTOR (2) 7. BULB 8. GASKET 9. SCREW (6) 10. LENS COVER 11. BULB 12. BLACKOUT TAIL AND STOPLAMP ASSEMBLY (2) 13. BRAKE PEDAL 		

TA 074769

EXTERIOR LIGHTING.**5-51. STATIONARY WORK LAMP BULB REPLACEMENT.****THIS TASK COVERS:** (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION)

- a. Removal. (5)
- b. Installation. (5)
- c. Operational (2)

12 Minutes Total.

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

M916 and M920.

EQUIPMENT CONDITION**PARAGRAPH**

None.

CONDITION DESCRIPTION

None.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

35W 12V GE4419
(or equal) Bulb.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-201P

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 5-14,

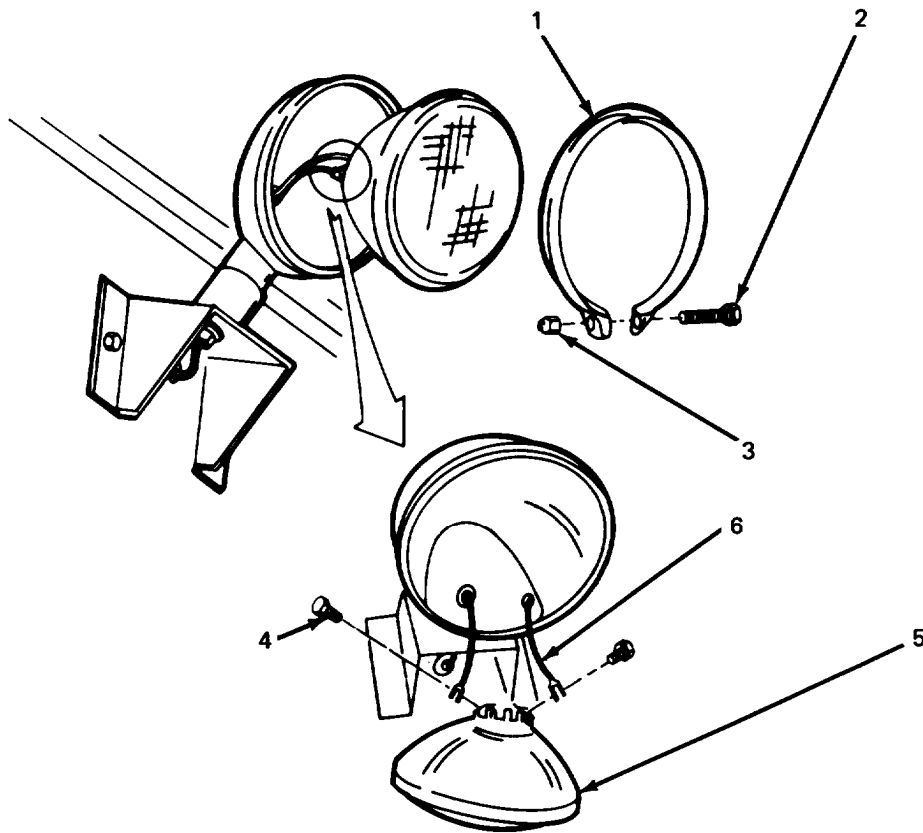
EXTERIOR LIGHTING.

5-51. STATIONARY WORK LAMP BULB REPLACEMENT (Continued).

LOCATION/ITEM

ACTION

REMARKS



LEGEND:

1. RETAINER RING
2. MACHINE SCREW
3. HEX NUT
4. SCREW (2)
5. BULB
6. WIRE (2)

EXTERIOR LIGHTING.

5-51. STATIONARY WORK LAMP BULB REPLACEMENT (Continued).

LOCATION/ITEM	ACTION	REMARKS
NOTE Prior to the removal of the bulb make certain that the work lamp switch is in the OFF position.		
A. REMOVAL.		
1. Machine screw (2) and hex nut (3).	Remove.	
2. Retainer ring (1).	Remove.	
3. Two screws (4).	Loosen and remove wires (6).	
4. Bulb (5).	Remove.	
B. INSTALLATION.		
5. Bulb (5).	Hold in position and install wires (6).	
6. Two screws (4).	Tighten.	
7. Retainer ring (1).	Install.	
8. Machine screw (2) and hex nut.(3).	Install and tighten.	
C. OPERATIONAL CHECK.		
9. Work lamp switch.	Place switch in ON position.	Check to see that lamp is lit.

EXTERIOR LIGHTING

5-51. STATIONARY WORK LAMP BULB REPLACEMENT (Continued).

LOCATION/ITEM	ACTION	REMARKS
The diagram illustrates the assembly of a stationary work lamp. It shows a lamp housing with a lens, a bulb, and various mounting hardware. Numbered callouts point to specific parts: 1. Retainer ring, 2. Machine screw, 3. Hex nut, 4. Screw (2), 5. Bulb, and 6. Wire (2). LEGEND: 1. RETAINER RING 2. MACHINE SCREW 3. HEX NUT 4. SCREW (2) 5. BULB 6. WIRE (2)		

TA 074771

EXTERIOR LIGHTING.**5-52. STATIONARY WORK LAMP REPLACEMENT.****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

- a. Removal. (10)
 b. Installation. (15)
 c. Operational Check. (2)
 27 Minutes Total.

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

M916, and M920.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

EQUIPMENT CONDITION**PARAGRAPH**

None.

CONDITION DESCRIPTION

None.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.

GENERAL SAFETY INSTRUCTIONS

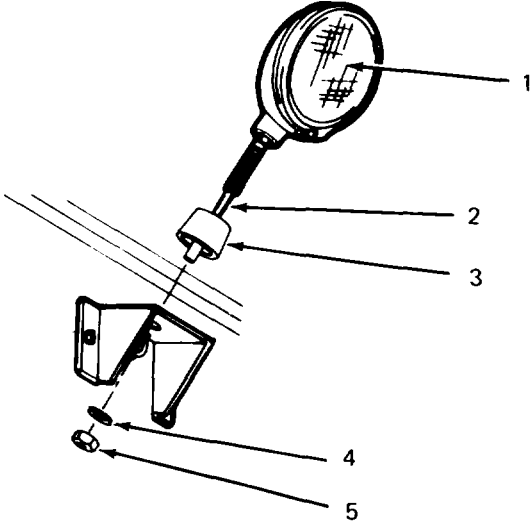
Engine OFF.
 Transmission in Neutral.
 Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 5-14.

EXTERIOR LIGHTING.

5-52. STATIONARY WORK LAMP REPLACEMENT (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Wire (2).	Cut and remove connectors.	
2. Hex nut (5) and lockwasher (4).	Remove.	
3. Cone spacer (3).	Remove.	
4. Lamp assembly (1).	Remove.	
B. INSTALLATION.		
5. Lamp assembly (1).	Install.	
6. Cone spacer (3), hex nut (5) and lockwasher (4).	Install. Tighten nut.	
7. Wire (2).	Reconnect, using suitable electrical connectors.	
C. OPERATIONAL CHECK.		
8. WORK LAMP switch.	Place switch in ON position.	Check to see that lamp is lit.
LEGEND: 1. LAMP ASSEMBLY 2. WIRE 3. CONE SPACER 4. LOCKWASHER 5. HEX NUT 		
TA 074772		

EXTERIOR LIGHTING.**5-53. PORTABLE WORK LAMP BULB REPLACEMENT.****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

- a. Removal. (5)
 - b. Installation. (5)
 - c. Operational Check. (2)
- 12 Minutes Total.

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

35W12VGE4419
(or equal) Bulb.

EQUIPMENT CONDITION**PARAGRAPH**

None.

CONDITION DESCRIPTION

None.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

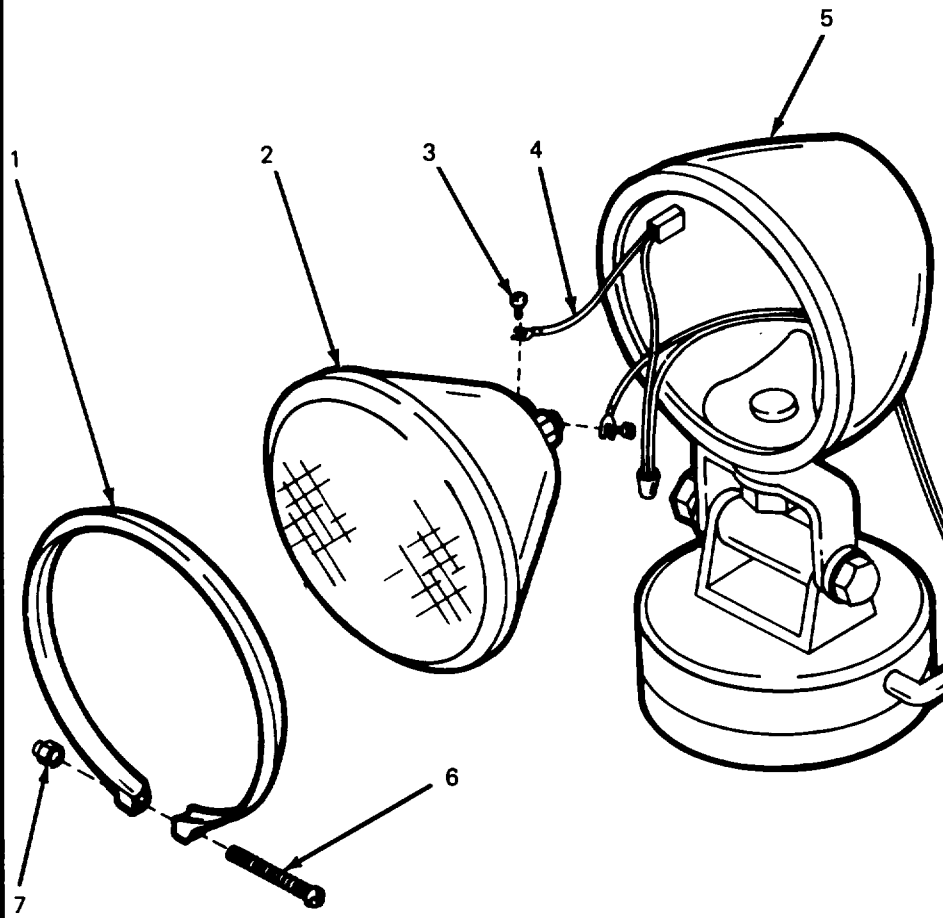
TROUBLESHOOTING REFERENCES

Table 5-14.

EXTERIOR LIGHTING.

5-53. PORTABLE WORK LAMP BULB REPLACEMENT (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Machine screw (6) and hex nut (7).	Remove.	
2. Retainer (1).	Remove from housing (5),	
3. Two screws (3).	Loosen and remove two wires (4).	
4. Bulb (2).	Remove.	

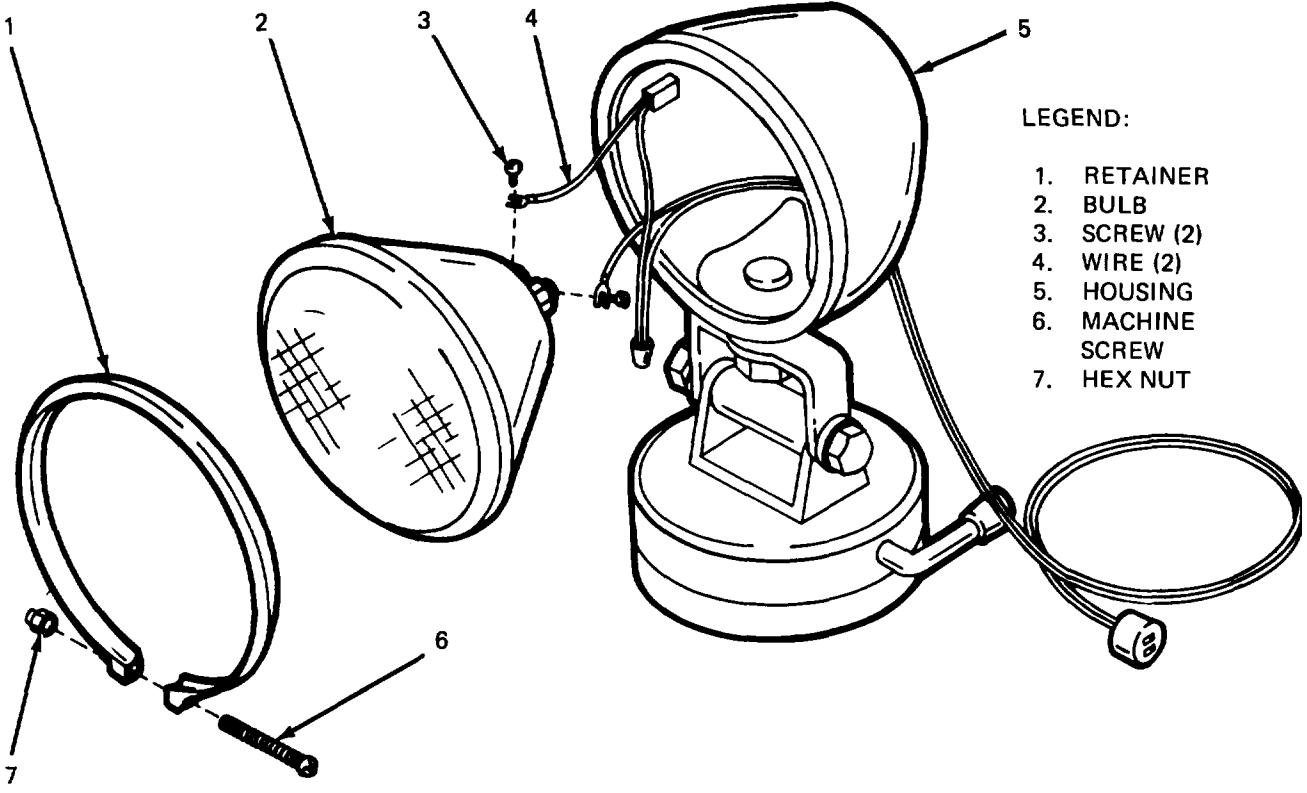


LEGEND:

- 1. RETAINER
- 2. BULB
- 3. SCREW (2)
- 4. WIRE (2)
- 5. HOUSING
- 6. MACHINE SCREW
- 7. HEX NUT

TA 074773

EXTERIOR LIGHTING

5-53. PORTABLE WORK LAMP BULB REPLACEMENT (Continued).		
LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION. 5. Bulb (2). 6. Two screws (3). 7. Bulb (2). 8. Retainer ring (1). 9. Machine screw (6) and hex nut (7).		
	Hold in place and install wires (4).	
	Tighten.	
	Install in housing (5).	
	Install on housing (5).	
	Install and tighten.	
C. OPERATIONAL CHECK. 10. Lamp. Plug into outside cab receptacle and flip switch to ON position. Lamp should now be lit.		
 LEGEND: 1. RETAINER 2. BULB 3. SCREW (2) 4. WIRE (2) 5. HOUSING 6. MACHINE SCREW 7. HEX NUT		

TA 074774

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THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

- ## INITIAL SETUP

All.

None.

None.

None.

553A.

Bulb Removed.

One (MOS63B20).

Vehicle Parked on Level Ground.

TM 9-2320-273-10.

Engine OFF.
Transmission in Neutral.
Park Brake Set.

Table 5-14.

EXTERIOR LIGHTING.

5-54. PORTABLE WORK LAMP MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. DISASSEMBLY.		
1. Wire nut (17).	Remove.	
2. Lock nut (1)	Remove.	
3. Switch (2).	Remove.	
4. Hex nut (16) and lockwasher (15).	Remove.	

LEGEND:

1. LOCK NUT
2. SWITCH
3. FLATWASHER
4. PLASTIC WASHER
5. BRACKET
6. PLASTIC WASHER
7. HEX BOLT
8. LOCKWASHER
9. HEX NUT
10. LEVER
11. RUBBER SUCTION CUP
12. HOUSING
13. SCREW
14. SPACER
15. LOCKWASHER
16. HEX NUT
17. WIRE NUT
18. BULB

TA 074775

EXTERIOR LIGHTING.

5-54 PORTABLE WORK LAMP MAINTENANCE (Continued).

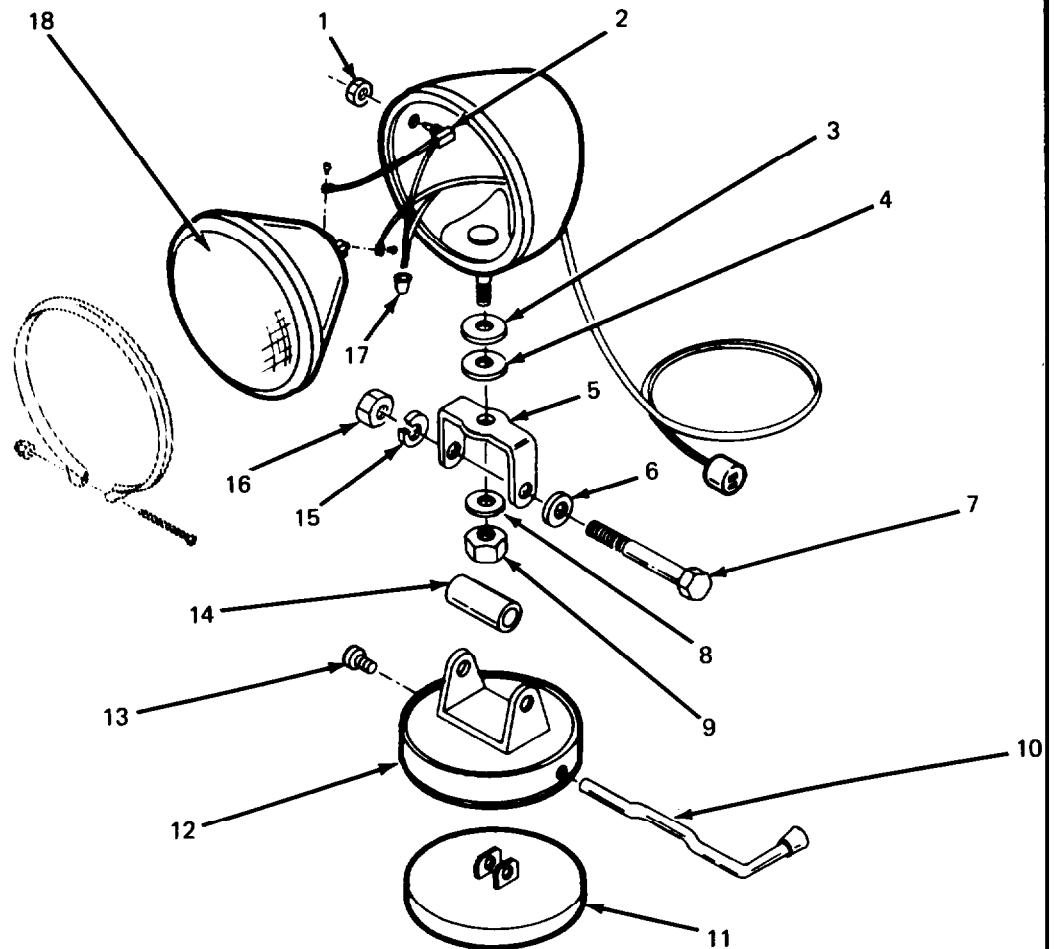
LOCATION/ITEM	ACTION	REMARKS
A. DISASSEMBLY (Continued).		
5. Hex bolt (7), plastic washer (6) and spacer (14).	Remove.	
6. Hex nut (9) and lockwasher (8).	Remove.	
7. Bracket (5), plastic washer (4) and flat washer (3).	Remove,	
8. Screw (13).	Remove.	
9. Lever (10).	Remove.	
10. Rubber suction cup (11).	Remove from housing (12).	
B. ASSEMBLY.		
11. Rubber suction cup (11).	Install in housing (12).	
12. Lever (10).	Insert through housing (12) and suction cup (11).	
13. Screw (13).	Install and tighten.	
14. Plastic washer (4) and flat washer (3).	Install.	
15. Bracket (5).	Install.	
16. Lockwasher (8) and hex nut (9).	Install and tighten.	
17. Hex bolt (7), spacer (14) and plastic washer (6).	Install.	
18. Hex nut (16) and lockwasher (15).	Install and tighten.	
19. Switch (2).	Install.	
20. Locknut (1).	Install and tighten.	

EXTERIOR LIGHTING.

5-54. PORTABLE WORK LAMP MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
B. ASSEMBLY (Continued).		
21. Wire nut (17).	Twist one wire from switch and one wire from supply used together and install.	
22. Bulb (18).	Install	Refer to para 5-53.
C. OPERATIONAL CHECK.		
23. Lamp Assembly	Plug into outside cab receptacle and flip switch to ON position.	Lamp should now be lit.

LEGEND:

1. LOCK NUT
2. SWITCH
3. FLATWASHER
4. PLASTIC WASHER
5. BRACKET
6. PLASTIC WASHER
7. HEX BOLT
8. LOCKWASHER
9. HEX NUT
10. LEVER
11. RUBBER SUCTION CUP
12. HOUSING
13. SCREW
14. SPACER
15. LOCKWASHER
16. HEX NUT
17. WIRE NUT
18. BULB



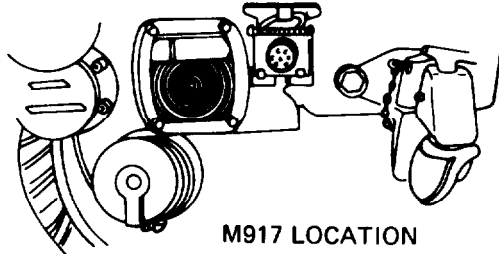
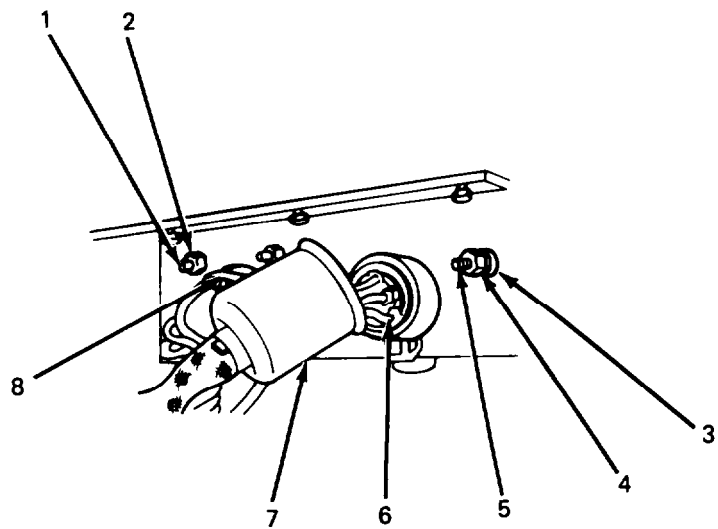
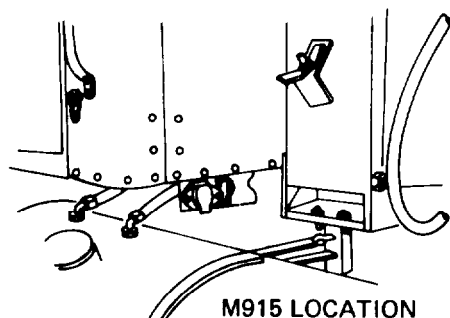
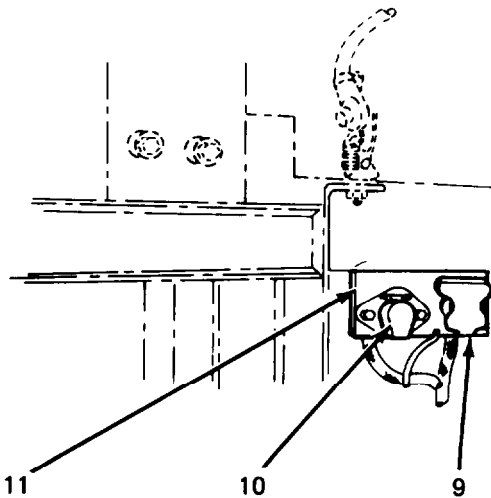
TA 074776

EXTERIOR LIGHTING.

5-55. TRAILER LAMP CONNECTOR MAINTENANCE (12 AND 24 VOLT).		
THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)		
a. Removal (24 Volt Connector). (10)	f. Test (24 Volt and 12 Volt). (5)	55 Minutes Total.
b. Removal (12 Volt Connector). (10)		
c. Inspection (12 Volt and 24 Volt Connector). (10)		
d. Installation (24 Volt Connector). (10)		
e. Installation (12 Volt Connector). (10)		
INITIAL SETUP	EQUIPMENT CONDITION	
<u>APPLICABLE CONFIGURATIONS</u>	<u>PARAGRAPH</u>	<u>CONDITION DESCRIPTION</u>
M915, M916, M917, and M920.	5-37A.	Batteries Disconnected.
<u>TEST EQUIPMENT</u>		
None.		
<u>SPECIAL TOOLS</u>		
None.		
<u>MATERIALS/PARTS (P/N)</u>		
Tape.		
Marking Pen.		
<u>PERSONNEL REQUIRED</u>	<u>SPECIAL ENVIRONMENTAL CONDITIONS</u>	
Two (MOS-63B20).	Vehicle Parked on Level Ground.	
<u>REFERENCES (TM)</u>	<u>GENERAL SAFETY INSTRUCTIONS</u>	
TM 9-2320-273-10.	Engine OFF.	
TM 9-2320-273-20P.	Transmission in Neutral.	
	Park Brake Set.	
<u>TROUBLESHOOTING REFERENCES</u>		
Table 5-10.		

EXTERIOR LIGHTING.

5-55. TRAILER LAMP CONNECTOR MAINTENANCE (12 VOLT AND 24 VOLT) (Continued).

LOCATION/ITEM	ACTION	REMARKS
NOTE If wires are to be cut, mark each with tape and pen.		
A. REMOVAL (24 VOLT CONNECTOR).		
1. Connector assembly (8).	Unscrew from back of connector assembly (8) and pull free.	
2. Four bolts (1) and nuts (2).	Remove.	
 M917 LOCATION  M915, M916, M920 MOUNTING  M915 LOCATION  M916/M920 LOCATION LEGEND: 1. BOLT (4) 2. NUT (4) 3. WASHER (2) 4. NUT (2) 5. BOLT (2) 6. TERMINAL SCREW (7) 7. RUBBER BOOT 8. CONNECTOR ASSEMBLY 9. CONNECTOR ASSEMBLY 10. CONNECTOR ASSEMBLY 11. MOUNTING PLATE		
TA 074777		

TA 074777

CAB INTERIOR LIGHTING AND SWITCHES.

5-56. DOME LAMP MAINTENANCE.		
<u>THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)</u>		
a. Removal. (5) b. Installation. (5) c. Operational Check. (1) 11 Minutes Total.		
<u>INITIAL SETUP</u>	<u>EQUIPMENT CONDITION</u>	<u>CONDITION DESCRIPTION</u>
<u>APPLICABLE CONFIGURATIONS</u>	<u>PARAGRAPH</u>	
All.	None.	None.
<u>TEST EQUIPMENT</u>		
None.		
<u>SPECIAL TOOLS</u>		
None.		
<u>MATERIALS/PARTS (P/N)</u>		
None.		
<u>PERSONNEL REQUIRED</u>	<u>SPECIAL ENVIRONMENTAL CONDITIONS</u>	
One (MOS-63B20).	Vehicle Parked on Level Ground.	
<u>REFERENCES (TM)</u>	<u>GENERAL SAFETY INSTRUCTIONS</u>	
TM 9-2320-273-10.	Engine OFF. Transmission in Neutral. Park Brake Set.	
<u>TROUBLESHOOTING REFERENCES</u>		
Table 5-14.		

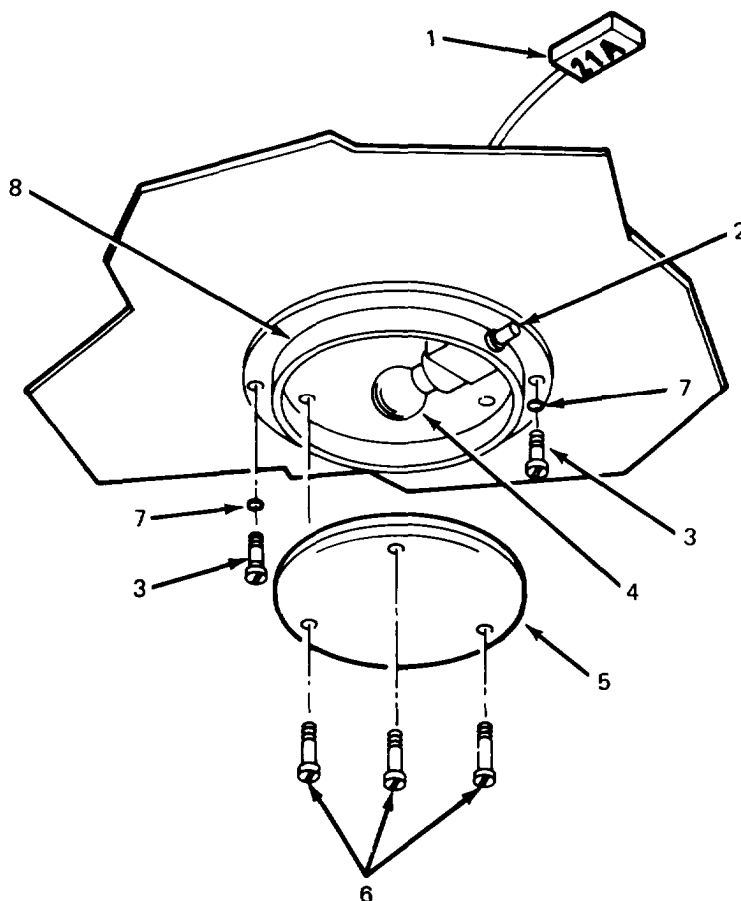
CAB INTERIOR LIGHTING AND SWITCHES.

5-56. DOME LAMP MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Three screws (6).	Remove.	
2. Lens (5).	Remove.	
3. Bulb (4).	Remove.	
4. Two screws (3) and trim washers (7).	Remove.	
5. Dome lamp assembly (8).	Remove.	
6. Wire connector (1).	Disconnect.	

LEGEND:

- 1. WIRE CONNECTOR
- 2. DOME LAMP SWITCH
- 3. SCREW (2)
- 4. BULB
- 5. LENS
- 6. SCREW (3)
- 7. TRIM WASHER (2)
- 8. DOME LAMP ASSEMBLY



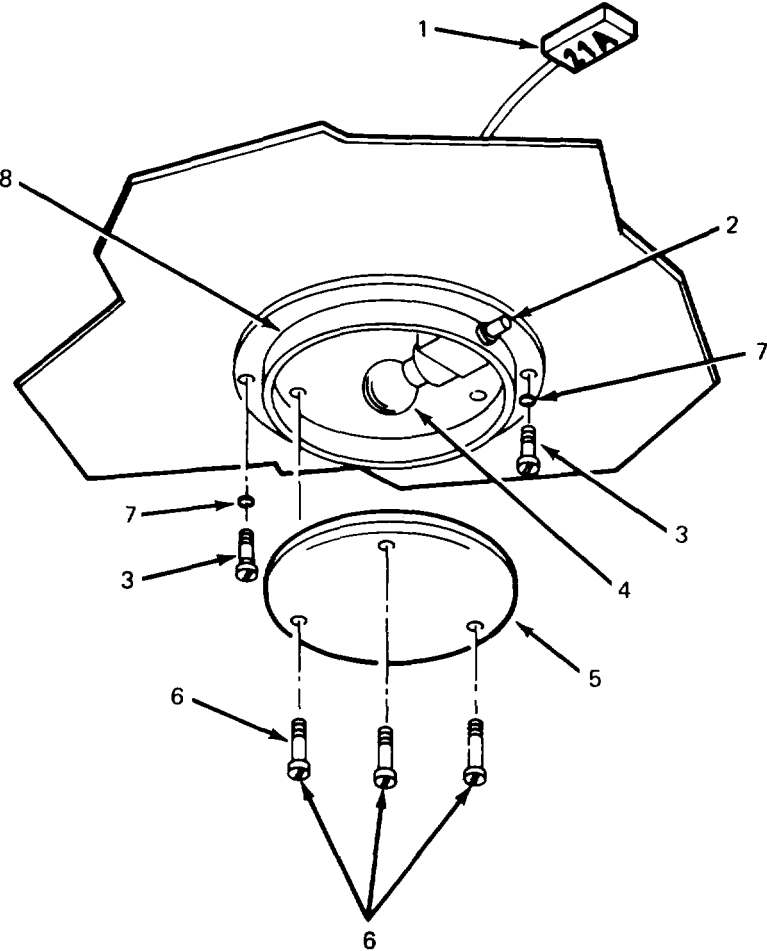
TA 074779

CAB INTERIOR LIGHTING AND SWITCHES.

5-56. DOME LAMP MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION. 7. Wire connector (1) Reconnect. 8. Dome lamp assembly (8). Aline and install. 9. Two trim washers (7) and screws (3). Install and tighten. 10. Bulb (4). Install and twist to tighten. 11. Lens (5) Aline and install. 12. Three screws (6). Install and tighten. C. OPERATIONAL CHECK. 13. DOME LAMP switch (2). Press ON and OFF. Verify that lamp comes ON and goes OFF.		

CAB INTERIOR LIGHTING AND SWITCHES.

5-56. DOME LAMP MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
LEGEND: 1. WIRE CONNECTOR 2. DOME LAMP SWITCH 3. SCREW (2) 4. BULB 5. LENS 6. SCREW (3) 7. TRIM WASHER (2) 8. DOME LAMP ASSEMBLY 		

TA 074780

CAB INTERIOR LIGHTING AND SWITCHES

5-57. HEADLAMP DIMMER SWITCH MAINTENANCE.**THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

- a. Removal. (10)
 - b. Installation. (10)
 - c. Operational Check. (2)
- 22 Minutes Total.

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

EQUIPMENT CONDITION**PARAGRAPH**

None.

CONDITION DESCRIPTION

None.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (PIN)

None.

PERSONNEL REQUIRED

One MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

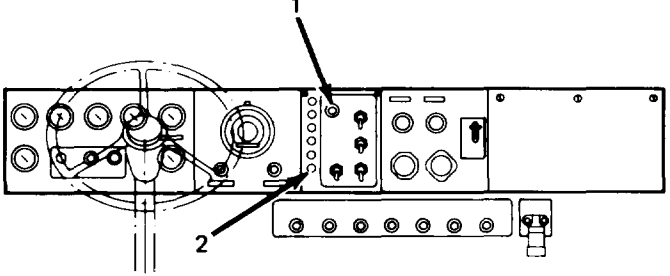
TROUBLESHOOTING REFERENCES

Table 5-8.

CAB INTERIOR LIGHTING AND SWITCHES.

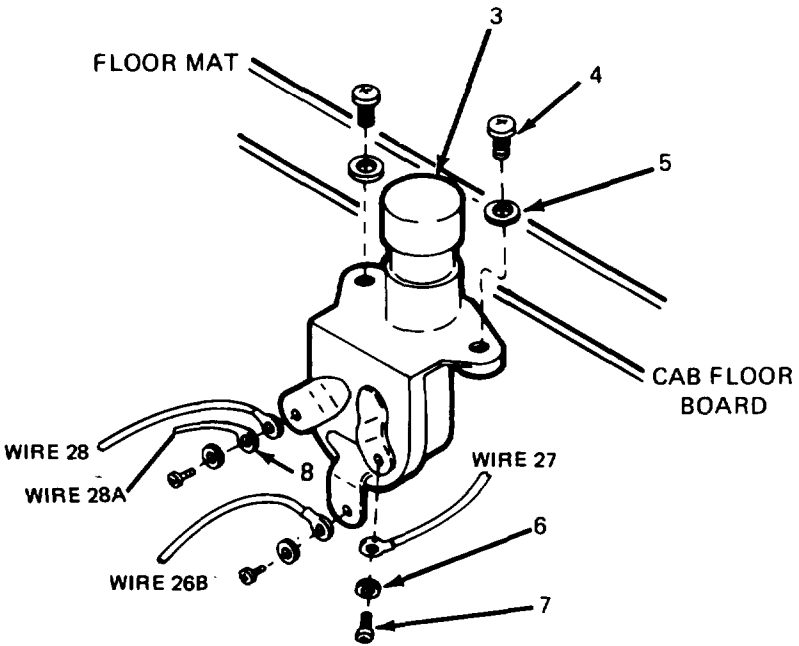
5-57. HEADLAMP DIMMER SWITCH MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Floor mat.	Lift from dimmer switch (3).	
2. Two screws (4) and washers (5).	Remove.	
3. Headlamp dimmer switch (3).	Remove from under cab floor board.	
4. Three screws (7) and washers (6).	Remove.	
5. Four wires (8).	Remove.	



LEGEND:

1. LAMP SWITCH
2. HIGH BEAM INDICATOR LAMP
3. HEADLAMP DIMMER SWITCH
4. SCREW (2)
5. WASHER (2)
6. WASHER (3)
7. SCREW (3)
8. WIRE (4)



TA 074781

CAB INTERIOR LIGHTING AND SWITCHES.**5-57. HEADLAMP DIMMER SWITCH MAINTENANCE (Continued).**

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION.		
6. Four wires (8).	Install on dimmer switch (3) according to figure.	
7. Three washers (6) and screws (7).	Install and tighten.	
8. Headlamps dimmer switch (3).	Install into cab floor board.	
9. Two washers (5) and screws (4).	Install and tighten.	
10. Floor mat.	Replace.	
C. OPERATIONAL CHECK.		
11. LAMP switch (1).	Pull ON.	
12. HEADLAMP DIMMER switch (3).	Press down. Verify that high beam indicator lamp (2) comes ON. Press down on headlamp dimmer switch (3) again and verify that high beam indicator lamp (2) goes OUT.	

CAB INTERIOR LIGHTING AND SWITCHES

5-57. HEADLAMP DIMMER SWITCH MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
LEGEND: 1. LAMP SWITCH 2. HIGH BEAM INDICATOR LAMP 3. HEADLAMP DIMMER SWITCH 4. SCREW (2) 5. WASHER (2) 6. WASHER (3) 7. SCREW (3) 8. WIRE (4)		

TA 074782

CAB INTERIOR LIGHTING AND SWITCHES.**5-58. TURN SIGNAL CONTROL MAINTENANCE.****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

- a. Removal. (7)
 b. Installation. (7)
 c. Operational Check. (1)
 15 Minutes Total.

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

EQUIPMENT CONDITION**PARAGRAPH**

None.

CONDITION DESCRIPTION

None.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

Table 5-11.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
 Transmission in Neutral.
 Park Brake Set.

CAB INTERIOR LIGHTING AND SWITCHES.

5-58. TURN SIGNAL CONTROL MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Two screws (11) and strap (6).	Remove.	
2. Two screws (2).	Remove.	
3. Cover (3).	Remove.	
4. Handle (13) with bulb (4).	Remove.	
5. Flare tab (12).	Remove.	
6. Connector (10).	Disconnect.	

The diagram is an exploded view of the turn signal control assembly. At the top, a control panel (1) is shown with two screws (2) and two screws (11). Below it, a directional signal handle (13) is shown attached to a steering column (14). The handle has a bulb (4) and a flare tab (12). A strap (6) is connected to the handle via a cable clamp (7), washer (8), and bolt (9). A connector (10) is shown at the bottom.

LEGEND:

1. OPERATION SWITCH
2. SCREW (2)
3. COVER
4. BULB
5. TURN SIGNAL CONTROL
6. STRAP
7. CABLE CLAMP
8. WASHER
9. BOLT
10. CONNECTOR
11. SCREW (2)
12. FLARE TAB
13. DIRECTIONAL SIGNAL HANDLE
14. STEERING COLUMN

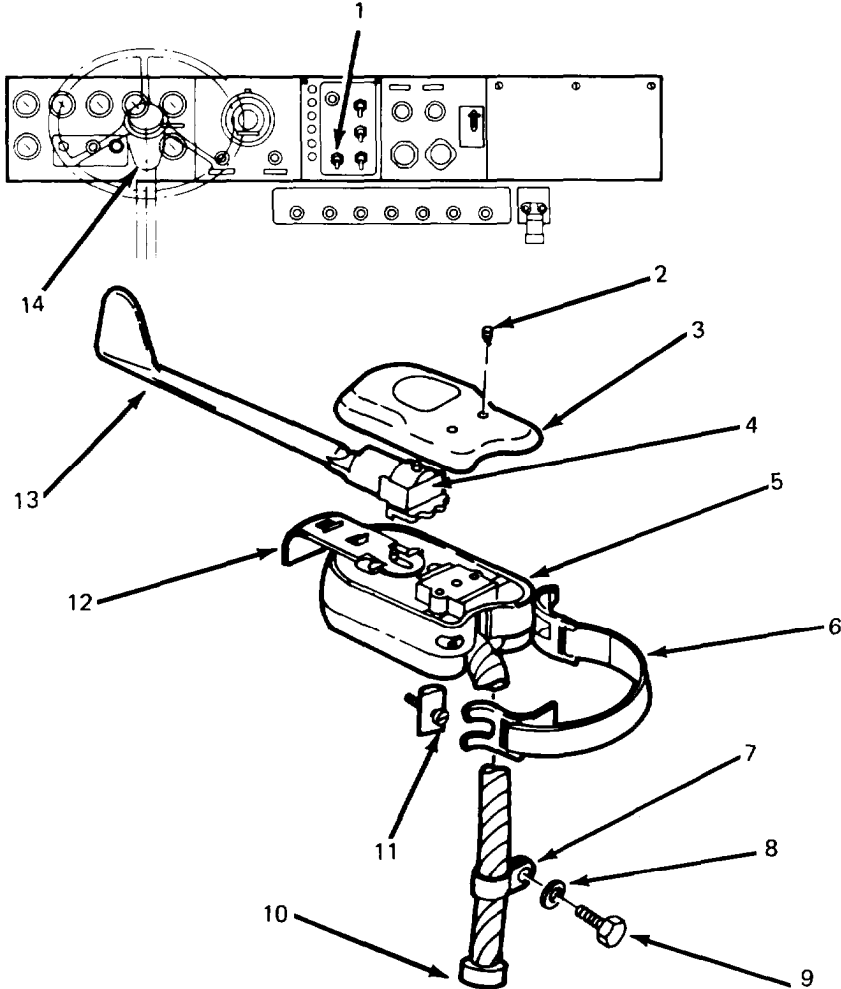
TA 074783

CAB INTERIOR LIGHTING AND SWITCHES.**5-58. TURN SIGNAL CONTROL MAINTENANCE (Continued).**

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
7. Bolt (9) and washer (8).	Remove from cable clamp (7).	
8. Turn signal control (5).	Remove from steering column (14).	
B. INSTALLATION.		
9. Flare tab (12).	Place over pin and press down.	
10. Handle (13) with bulb (4).	Install and twist to tighten.	
11. Cover (3).	Install.	
12. Two screws (2).	Install and tighten.	
13. Turn signal control (5).	Aline and install on steering column (14).	
14. Strap (6) and two screws (11).	Replace and tighten.	
15. Connector (10).	Reconnect.	
16. Cable clamp (7).	Aline.	
17. Washer (8) and bolt (9).	Install and tighten.	
C. OPERATIONAL CHECK.		
18. OPERATION switch (1).	Set to Normal.	
19. Directional signal handle (13).	Place in down position and observe that left green lamp flashes. Place handle in up position and observe that right green lamp flashes.	
20. Flare tab (12).	Pull tab and observe that red lamp flashes.	

CAB INTERIOR LIGHTING AND SWITCHES.

5-58. TURN SIGNAL CONTROL MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
 The diagram illustrates the assembly and maintenance of a turn signal control. At the top, a rectangular control panel is shown with various knobs and switches. A callout '1' points to a specific switch on the panel. Below the panel, a detailed exploded view of the mechanical components is shown. Callout '14' points to the steering column. Callout '13' points to the directional signal handle. Callout '12' points to a flare tab. Callout '11' points to a screw. Callout '10' points to a connector. Callout '9' points to a bolt. Callout '8' points to a washer. Callout '7' points to a cable clamp. Callout '6' points to a strap. Callout '5' points to the turn signal control unit. Callout '4' points to a bulb. Callout '3' points to a cover. Callout '2' points to a screw. The legend on the right lists these items with their corresponding numbers.		
LEGEND: 1. OPERATION SWITCH 2. SCREW (2) 3. COVER 4. BULB 5. TURN SIGNAL CONTROL 6. STRAP 7. CABLE CLAMP 8. WASHER 9. BOLT 10. CONNECTOR 11. SCREW (2) 12. FLARE TAB 13. DIRECTIONAL SIGNAL HANDLE 14. STEERING COLUMN		
TA 074784		

PANEL MOUNTED INSTRUMENTS

5-59. ELECTRICAL INSTRUMENTS MAINTENANCE (LH CLUSTER).**THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

- a. Removal. (5)
 - b. Installation. (5)
 - c. Operational Check. (5)
- 15 Minutes Total.

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

**EQUIPMENT CONDITION
PARAGRAPH**

5-37A.

CONDITION DESCRIPTION

Batteries Disconnected.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

Table 5-7.

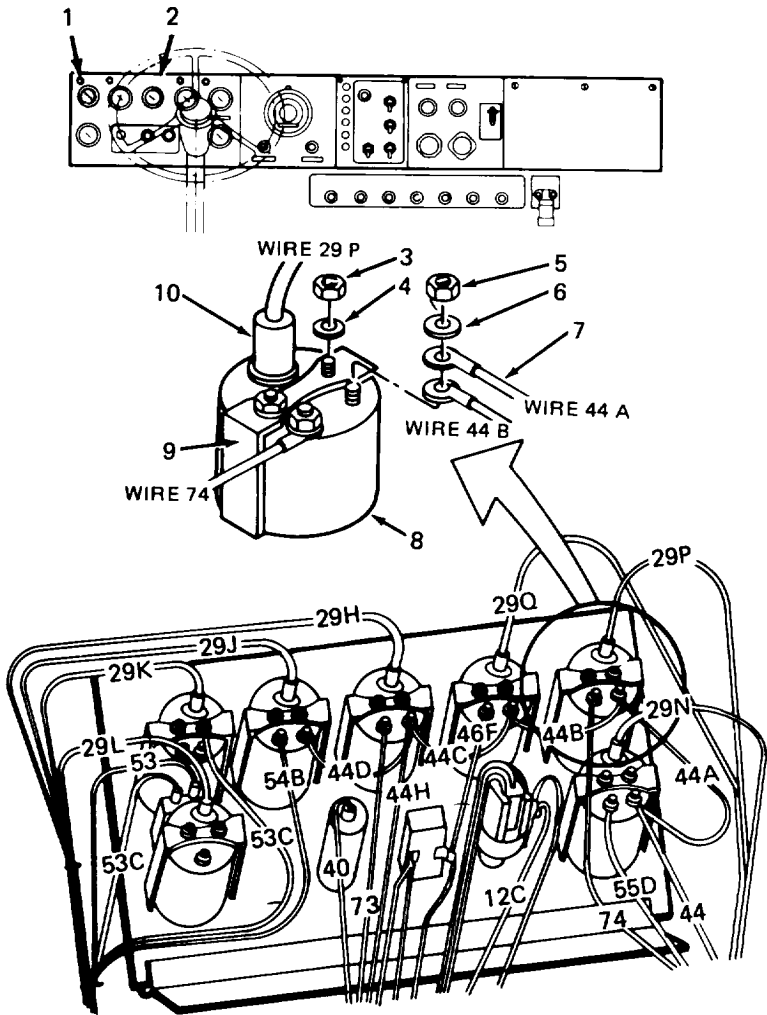
SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Park Brake Set.
Transmission In Neutral.

PANEL MOUNTED INSTRUMENTS.

5-59. ELECTRICAL INSTRUMENTS MAINTENANCE (LH CLUSTER) (Continued).		
LOCATION/ITEM	ACTION	REMARKS
NOTE The gages covered in the following procedures are identical as far as removal and installation; therefore, only one is covered the FUEL gage.		
A. REMOVAL 1. Four quarter-turn screws (1). Loosen. 2. Hinged instrument panel (2). Lower.		
LEGEND: 1. QUARTER-TURN SCREW (4) 2. HINGED INSTRUMENT PANEL 3. NUT (2) 4. WASHER (2) 5. NUT (2) 6. WASHER (2) 7. WIRE (3) 8. FUEL GAGE 9. BRACKET 10. ILLUMINATING BULB		
		

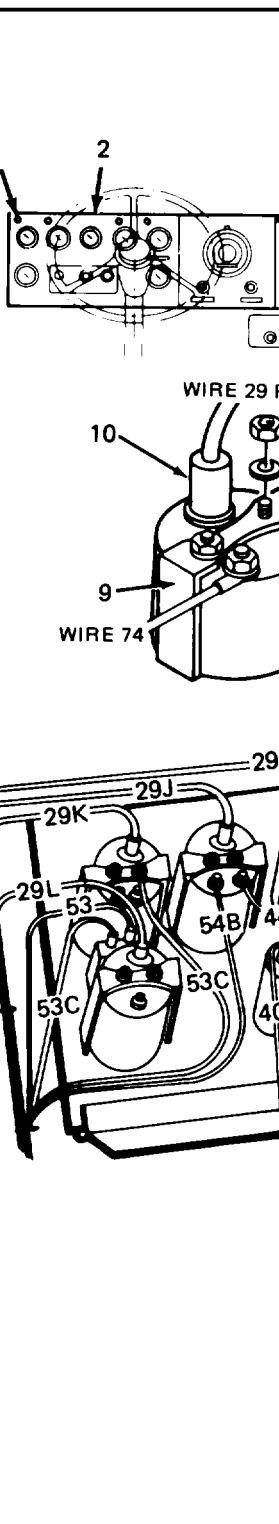
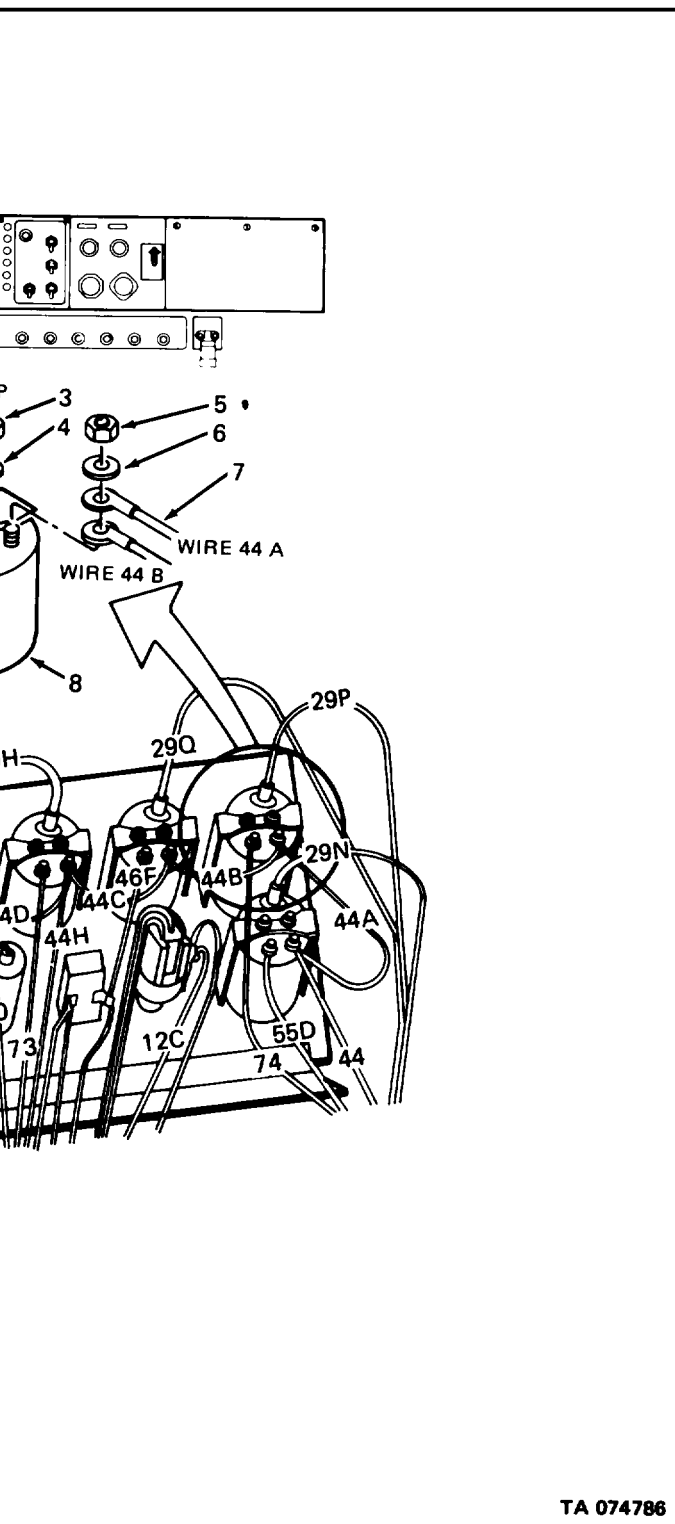
TA 074785

PANEL MOUNTED INSTRUMENTS.

5-59. ELECTRICAL INSTRUMENTS MAINTENANCE (LH CLUSTER) (Continued).		
LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
3. Illuminating bulb (10).	Remove.	
4. Two nuts (5) and washers (6).	Remove.	
5. Three wires (7).	Remove.	
6. Two nuts (3) and washers (4).	Remove.	
7. Bracket (9).	Remove.	
8. FUEL gage (8).	Remove from instrument panel.	
B. INSTALLATION.		
9. FUEL gage (8).	Aline and insert in panel.	
10. Bracket (9).	Install on back of FUEL gage (8).	
11. Two washers (4) and nuts (3).	Install and tighten.	
12. Three wires (7).	Install according to figure.	
13. Two washers (6) and nuts (5).	Install and tighten.	
14. Illuminating bulb (10).	Install.	
15. Hinged instrument panel (2).	Raise into place.	
16. Four quarter-turn screws (1).	Tighten.	
17. Batteries.	Connect per paragraph 5-37B.	
C. OPERATIONAL CHECK.		
18. Engine.	Start up (see TM 9-2320-273-10).	
19. Gages.	Observe gage replaced and verify operation.	

PANEL MOUNTED INSTRUMENTS.

5-59. ELECTRICAL INSTRUMENTS MAINTENANCE (LH CLUSTER) (Continued).

LOCATION/ITEM	ACTION	REMARKS
LEGEND: 1. QUARTER-TURN SCREW (4) 2. HINGED INSTRUMENT PANEL 3. NUT (2) 4. WASHER (2) 5. NUT (2) 6. WASHER (2) 7. WIRE (3) 8. FUEL GAGE 9. BRACKET 10. ILLUMINATING BULB		

TA 074786

PANEL MOUNTED INSTRUMENTS.**5-60. CIGAR LIGHTER MAINTENANCE.****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

- a. Removal. (5)
 - b. Installation, (5)
 - c. Operational Check. (1)
- 11 Minutes Total.

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS {P/N}

None.

**EQUIPMENT CONDITION
PARAGRAPH**

5-37A.

CONDITION DESCRIPTION

Batteries Disconnected.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

Table 5-14.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

PANEL MOUNTED INSTRUMENTS.

5-60. CIGAR LIGHTER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Four quarter-turn screws (1).	Loosen.	
2. Hinged instrument panel (2).	Lower.	
3. Wire cap connector (6).	Remove.	

INSTRUMENT PANEL

LEGEND:

1. QUARTER-TURN SCREW (4)
2. HINGED INSTRUMENT PANEL
3. CIGAR LIGHTER UNIT
4. HEATING UNIT AND BUTTON ASSEMBLY
5. CIGAR LIGHTER CASING
6. WIRE CAP CONNECTOR

TA 074787

PANEL MOUNTED INSTRUMENTS.

5-60. CIGAR LIGHTER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
4. Heating unit and button assembly (4).	Remove.	
5. Cigar lighter casing (5).	Unscrew from cigar lighter unit (3).	
6. Cigar lighter unit (3).	Remove from instrument panel.	
B. INSTALLATION.		
7. Cigar lighter unit (3).	Install in instrument panel.	
8. Cigar lighter casing (5).	Install on cigar lighter unit (3) and tighten.	
9. Wire cap connector (6).	Install on cigar lighter unit (3).	
10. Hinged instrument panel (2).	Raise into place.	
11. Four quarter-turn screws (1).	Tighten.	
12. Batteries.	Connect per paragraph 5-37B.	
C. OPERATIONAL CHECK		
13. Heating unit and button assembly (4).	Insert and press. Verify that element gets hot.	

PANEL MOUNTED INSTRUMENTS.

5-60. CIGAR LIGHTER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
INSTRUMENT PANEL LEGEND: 1. QUARTER-TURN SCREW (4) 2. HINGED INSTRUMENT PANEL 3. CIGAR LIGHTER UNIT 4. HEATING UNIT AND BUTTON ASSEMBLY 5. CIGAR LIGHTER CASING 6. WIRE CAP CONNECTOR		

TA 074788

PANEL MOUNTED INSTRUMENTS.

5-61. LOW AIR PRESSURE INDICATOR LAMP MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOW TASK DESCRIPTION.)

- a. Removal. (1)
 - b. Installation (1)
 - c. Operational Check. (1)
- 3 Minutes Total.

INITIAL SETUP	EQUIPMENT CONDITION	CONDITION DESCRIPTION
<u>APPLICABLE CONFIGURATIONS</u>	<u>PARAGRAPH</u>	
All.	5-37A.	Batteries Disconnected.
<u>TEST EQUIPMENT</u>		
None.		
<u>SPECIAL TOOLS</u>		
None.		
<u>MATERIALS/PARTS (P/N)</u>		
None.		
 <u>PERSONNEL REQUIRED</u>	 <u>SPECIAL ENVIRONMENTAL CONDITIONS</u>	
One (MOS-63B20).	Vehicle Parked on Level Ground.	
 <u>REFERENCES (TM)</u>	 <u>GENERAL SAFETY INSTRUCTIONS</u>	
TM 9-2320-273-10.	Engine OFF. Transmission in NEUTRAL. Park Brake Set.	
 <u>TROUBLESHOOTING REFERENCES</u>		
Table 5-6.		

PANEL MOUNTED INSTRUMENTS.

5-61. LOW AIR PRESSURE INDICATOR LAMP MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Four quarter-turn screws (1).	Loosen.	
2. Hinged instrument panel (2).	Lower.	
3. Two wires (3)	Remove.	
4. LOW AIR PRESSURE indicator lamp unit (4).	Remove from instrument panel.	

The diagram illustrates the removal process. The top view shows the instrument panel with four quarter-turn screws (1) being loosened. The hinged instrument panel (2) is then lowered. Two wires (3), labeled WIRE 53 and WIRE 53C, are shown being removed from the lamp unit (4). The lamp unit (4) is then removed from the instrument panel. The engine run switch (5) is also shown.

LEGEND:

1. QUARTER-TURN SCREW (4)
2. HINGED INSTRUMENT PANEL
3. WIRE (2)
4. LOW AIR PRESSURE INDICATOR LAMP UNIT
5. ENGINE RUN SWITCH

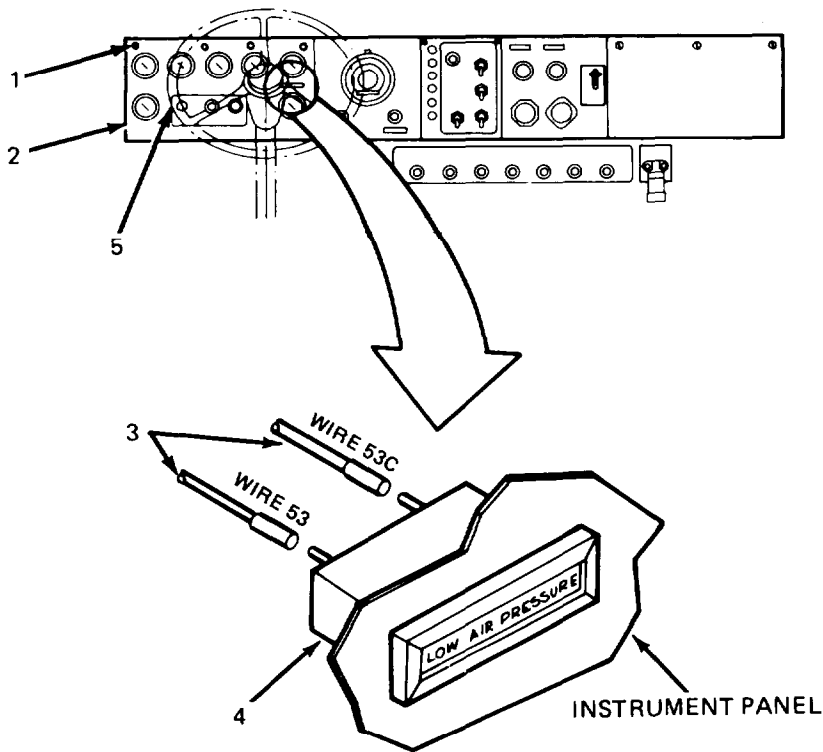
TA 074789

PANEL MOUNTED INSTRUMENTS.

5-61. LOW AIR PRESSURE INDICATOR LAMP MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION.		
5. LOW AIR PRESSURE indicator lamp unit (4).	Aline and press into instrument panel.	
6. Two wires (3).	Connect to LOW AIR PRESSURE indicator lamp unit (4).	
7. Hinged instrument panel (2).	Raise into place.	
8. Four quarter-turn screws (1).	Tighten.	
9. Batteries.	Connect per paragraph 5-37B.	
C. OPERATIONAL CHECK.		
10. Air pressure supply reservoir.	Bleed off air pressure (see TM 9-2320-273-10).	
11. ENGINE RUN switch (5).	Turn on. Verify that LOW AIR PRESSURE lamp comes ON.	

PANEL MOUNTED INSTRUMENTS.

5-61. LOW AIR PRESSURE INDICATOR LAMP MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
 LEGEND: 1. QUARTER-TURN SCREW (4) 2. HINGED INSTRUMENT PANEL 3. WIRE (2) 4. LOW AIR PRESSURE INDICATOR LAMP UNIT 5. ENGINE RUN SWITCH		

TA 074790

PANEL MOUNTED INSTRUMENTS.

5-62. ELECTRICAL SWITCHES MAINTENANCE (RH CLUSTER).

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(30)
b. Installation.	(30)
c. Operational Check.	(5)
	<u>65 Minutes Total.</u>

INITIAL SETUP

APPLICABLE CONFIGURATIONS

1. OPERATION Switch-All.
2. ENGINE RETARDER Switch-All.
3. LAMP Switch-All.
4. BACKUP ALARM Switch -
M916 Thru M920.
5. WORK LAMPS Switch -
M916 and M920.

**EQUIPMENT CONDITION
PARAGRAPH**

5-37A.

CONDITION DESCRIPTION

Batteries Disconnected.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Masking tape.
Marking pen.
Tie Wrap, MS-3367-2-0 (96906).

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

Table 5-4, 5-6, 5-14.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

PANEL MOUNTED INSTRUMENTS.

5-62. ELECTRICAL SWITCHES MAINTENANCE (RH CLUSTER) (Continued).

LOCATION/ITEM	ACTION	REMARKS																								
LEGEND: <table> <tbody> <tr> <td>1. KNOB AND SHAFT ASSEMBLY</td><td>9. WIRE (3)</td><td>17. WIRE (12)</td></tr> <tr> <td>2. LAMP SWITCH</td><td>10. SCREW (2)</td><td>18. HEX NUT</td></tr> <tr> <td>3. RELEASE BUTTON</td><td>11. WIRE (2)</td><td>19. HEX NUT</td></tr> <tr> <td>4. TIE WRAP</td><td>12. WORK LAMPS SWITCH</td><td>20. HEX NUT</td></tr> <tr> <td>5. LAMP SWITCH CONNECTOR</td><td>13. SCREW (2)</td><td>21. QUARTER-TURN SCREW (2)</td></tr> <tr> <td>6. HINGED INSTRUMENT PANEL</td><td>14. BACKUP ALARM SWITCH</td><td>22. KNURLED NUT</td></tr> <tr> <td>7. HEX NUT</td><td>15. WIRE (2)</td><td>23. MOLDED CLIP (2)</td></tr> <tr> <td>8. ENGINE RETARDER SWITCH</td><td>16. OPERATION SWITCH</td><td>24. TAB (2)</td></tr> </tbody> </table>			1. KNOB AND SHAFT ASSEMBLY	9. WIRE (3)	17. WIRE (12)	2. LAMP SWITCH	10. SCREW (2)	18. HEX NUT	3. RELEASE BUTTON	11. WIRE (2)	19. HEX NUT	4. TIE WRAP	12. WORK LAMPS SWITCH	20. HEX NUT	5. LAMP SWITCH CONNECTOR	13. SCREW (2)	21. QUARTER-TURN SCREW (2)	6. HINGED INSTRUMENT PANEL	14. BACKUP ALARM SWITCH	22. KNURLED NUT	7. HEX NUT	15. WIRE (2)	23. MOLDED CLIP (2)	8. ENGINE RETARDER SWITCH	16. OPERATION SWITCH	24. TAB (2)
1. KNOB AND SHAFT ASSEMBLY	9. WIRE (3)	17. WIRE (12)																								
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3. RELEASE BUTTON	11. WIRE (2)	19. HEX NUT																								
4. TIE WRAP	12. WORK LAMPS SWITCH	20. HEX NUT																								
5. LAMP SWITCH CONNECTOR	13. SCREW (2)	21. QUARTER-TURN SCREW (2)																								
6. HINGED INSTRUMENT PANEL	14. BACKUP ALARM SWITCH	22. KNURLED NUT																								
7. HEX NUT	15. WIRE (2)	23. MOLDED CLIP (2)																								
8. ENGINE RETARDER SWITCH	16. OPERATION SWITCH	24. TAB (2)																								

TA076517

PANEL MOUNTED INSTRUMENTS.

5-62. ELECTRICAL SWITCHES MAINTENANCE (RH CLUSTER) (Continued).

LOCATION/ITEM	ACTION	REMARKS
NOTE Tag all wires prior to disconnecting for ease of correct installation.		
A. REMOVAL		
1. Two quarter-turn screws (21).	Loosen.	
2. Hinged instrument panel (6).	Lower.	
3. Hex Nut (7).	Remove from ENGINE RETARDER switch (8).	
4. Three wires (9).	Disconnect and remove ENGINE RETARDER Switch (8).	
5. Hex nut (20).	Remove from WORK LAMPS switch (12).	M916 and M920 only.
6. Two screws (10) and wires (11).	Unscrew and remove WORK LAMPS switch (12).	M916 and M920 only.
7. Hex Nut (19).	Remove from BACKUP ALARM switch (14).	M916 thru M920.
8. Two screws (13) and wires (15).	Unscrew and remove BACKUP ALARM switch (14).	M916 thru M920.
9. Hex Nut (18).	Remove from OPERATION switch (16).	
10. Twelve wires (17).	Disconnect and remove OPERATION switch (16).	
11. Knob and shaft assembly (1).	Remove by pressing release button (3) on top of LAMP switch (2).	
12. Knurled nut (22).	Remove from LAMP switch (2).	
13. Tie wrap (4).	Cut and remove from around LAMP switch (2) and LAMP switch connector (5).	If used.
14. Lamp switch connector (5).	a. Disconnect by pulling outward slightly on two molded clips (23). b. Remove LAMP switch (2).	

PANEL MOUNTED INSTRUMENTS.

5-62. ELECTRICAL SWITCHES MAINTENANCE (RH CLUSTER) (Continued).

LOCATION/ITEM	ACTION	REMARKS

LEGEND:

1. KNOB AND SHAFT ASSEMBLY	9. WIRE (3)	17. WIRE (12)
2. LAMP SWITCH	10. SCREW (2)	18. HEX NUT
3. RELEASE BUTTON	11. WIRE (2)	19. HEX NUT
4. TIE WRAP	12. WORK LAMPS SWITCH	20. HEX NUT
5. LAMP SWITCH CONNECTOR	13. SCREW (2)	21. QUARTER-TURN SCREW (2)
6. HINGED INSTRUMENT PANEL	14. BACKUP ALARM SWITCH	22. KNURLED NUT
7. HEX NUT	15. WIRE (2)	23. MOLDED CLIP (2)
8. ENGINE RETARDER SWITCH	16. OPERATION SWITCH	24. TAB (2)

TA076518

PANEL MOUNTED INSTRUMENTS.

5-62. ELECTRICAL SWITCHES MAINTENANCE (RH CLUSTER) (Continued).		
LOCATION/ITEM	ACTION	REMARKS
NOTE Install all wires as you marked at removal.		
B. INSTALLATION.		
15. LAMP switch connector (5).	Push on to LAMP switch (2).	Ensure two molded clips (23) are snapped over two tabs (24).
16. New tie wrap (4).	Install around LAMP switch (2) and LAMP switch connector (5).	If one was present at removal.
17. LAMP switch (2).	a. Position in hinged instrument panel (6). b. Secure with knurled nut (22).	
18. Knob and shaft assembly (1).	Insert shaft into LAMP switch (2).	Push in firmly until locked in position.
19. Twelve wires (17).	Connect to OPERATION switch (16).	
20. OPERATION switch (16).	a. Position in hinged instrument panel (6). b. Secure with hex nut (18).	
21. Two wires (15).	Secure to BACKUP ALARM switch (14) with two screws (13).	M916 thru M920.
22. BACKUP ALARM switch (14).	a. Position in hinged instrument panel (6). b. Secure with hex nut (19).	M916 thru M920.
23. Two wires (11).	Connect to WORK LAMPS switch (12) with two screws (10).	M916 and M920 only.
24. WORK LAMPS switch (12).	a. Position in hinged instrument panel (6). b. Secure with hex nut (20).	M916 and M920 only.
25. Three wires (9).	Connect to ENGINE RETARDER switch (8).	
26. ENGINE RETARDER switch (8).	a. Position in hinged instrument panel (6). b. Secure with hex nut (7).	
27. Hinged instrument panel (6).	Raise into position and secure with two quarter-turn screws (21).	
28. Batteries.	Connect (refer to para. 5-37B).	
C. OPERATIONAL CHECK.		
29. Switch (as required).	Check operation.	

PANEL MOUNTED INSTRUMENTS.

5-62. ELECTRICAL SWITCHES MAINTENANCE (RH CLUSTER) (Continued).

LOCATION/ITEM	ACTION	REMARKS

LEGEND:

1. KNOB AND SHAFT ASSEMBLY	9. WIRE (3)	17. WIRE (12)
2. LAMP SWITCH	10. SCREW (2)	18. HEX NUT
3. RELEASE BUTTON	11. WIRE (2)	19. HEX NUT
4. TIE WRAP	12. WORK LAMPS SWITCH	20. HEX NUT
5. LAMP SWITCH CONNECTOR	13. SCREW (2)	21. QUARTER-TURN SCREW (2)
6. HINGED INSTRUMENT PANEL	14. BACKUP ALARM SWITCH	22. KNURLED NUT
7. HEX NUT	15. WIRE (2)	23. MOLDED CLIP (2)
8. ENGINE RETARDER SWITCH	16. OPERATION SWITCH	24. TAB (2)

TA076519

PANEL MOUNTED INSTRUMENTS.

5-63. INDICATOR LAMPS MAINTENANCE (RH CLUSTER).**THIS TASK COVERS: (APPROXIMATE: TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

- a. Removal. (3)
 b. Installation. (3)
 c. Operational Check. (3)
9 Minutes Total.

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

1. M916 Thru M920-ALL.
2. M915 ALL(Except PTO).

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

**EQUIPMENT CONDITION
PARAGRAPH**

None.

CONDITION DESCRIPTION

None.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
 Transmission in Neutral.
 Park Brake Set.

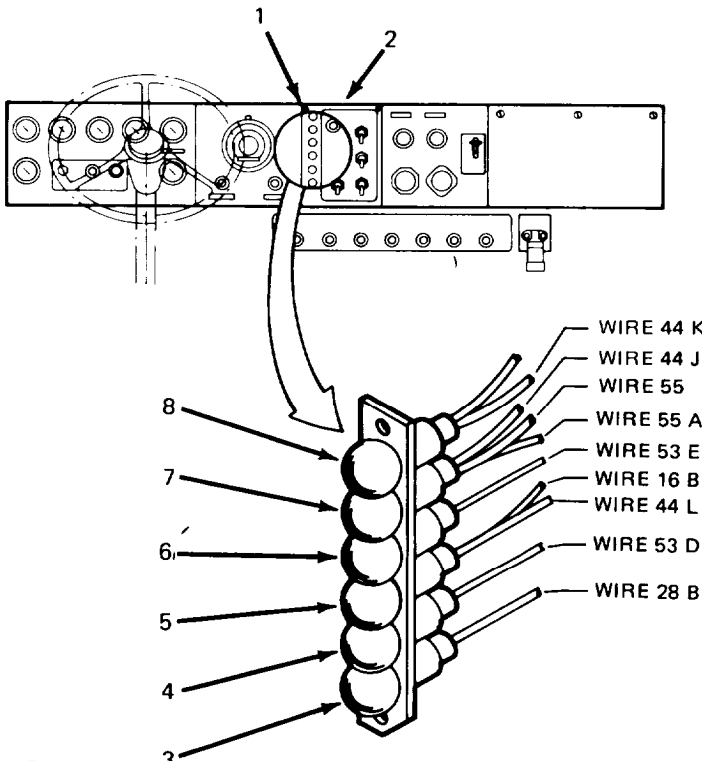
TROUBLESHOOTING REFERENCES

Table 5-7.

PANEL MOUNTED INSTRUMENTS.

5-63. INDICATOR LAMPS MAINTENANCE (RH CLUSTER) (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Two quarter-turn screws (1).	Loosen.	
2. Hinged instrument panel (2).	Lower hinged panel.	
3. HIGH BEAM bulb (3).	Remove.	



WIRE 44 K

WIRE 44 J

WIRE 55

WIRE 55 A

WIRE 53 E

WIRE 16 B

WIRE 44 L

WIRE 53 D

WIRE 28 B

LEGEND:

1. QUARTER-TURN SCREW (2)
2. HINGED INSTRUMENT PANEL
3. HIGH BEAM BULB
4. PARK BRAKE BULB
5. PTO BULB
6. DIFF LOCK BULB
7. ENG TEMP BULB
8. ENG OIL BULB

TA 074794

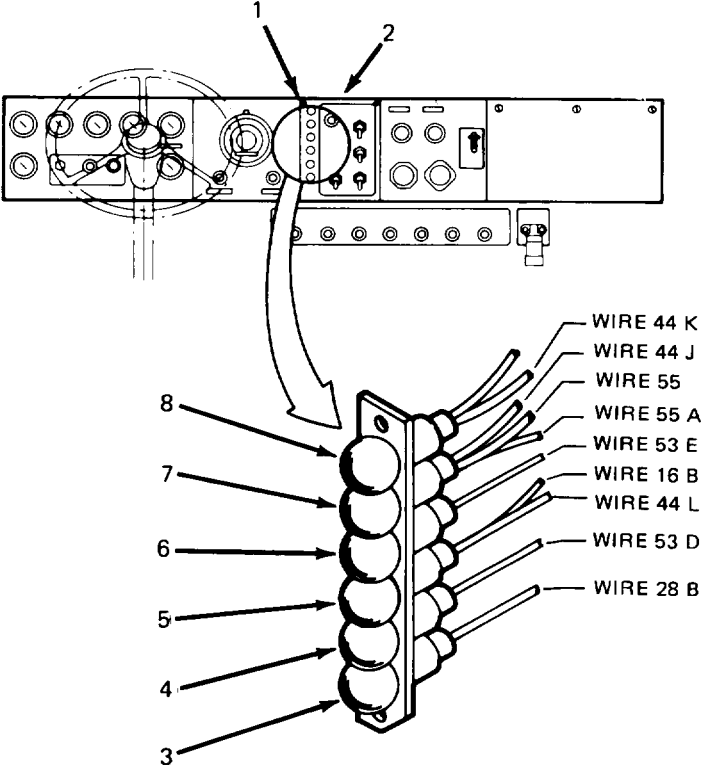
PANEL MOUNTED INSTRUMENTS

5-63. INDICATOR LAMPS MAINTENANCE (RH CLUSTER) (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
4. PARK BRAKE bulb (4).	Remove.	
5. PTO bulb (5).	Remove.	
6. DIFF LOCK bulb (6).	Remove.	
7. ENG TEMP bulb (7).	Remove.	
8. ENG OIL bulb (8).	Remove.	
B. INSTALLATION.		
9. ENG OIL bulb (8).	Insert in holder.	
10. ENG TEMP bulb (7).	Insert in holder.	
11. DIFF LOCK bulb (6).	Insert in holder.	
12. PTO bulb (5).	Insert in holder.	
13. PARK BRAKE bulb (4).	Insert in holder.	
14. HIGH BEAM bulb (3).	Insert in holder.	
15. Hinged instrument panel (2).	Raise into place.	
16. Two quarter-turn Screws (1).	Tighten.	
C. OPERATIONAL CHECK.		
17. Switch (as required).	Turn on and verify operation of new bulb.	

PANEL MOUNTED INSTRUMENTS.

5-63. INDICATOR LAMPS MAINTENANCE (RH CLUSTER) (Continued).

LOCATION/ITEM	ACTION	REMARKS
		
LEGEND: 1. QUARTER-TURN SCREW (2) 2. HINGED INSTRUMENT PANEL 3. HIGH BEAM BULB 4. PARK BRAKE BULB 5. PTO BULB 6. DIFF LOCK BULB 7. ENG TEMP BULB 8. ENG OIL BULB		

TA 074795

PANEL MOUNTED INSTRUMENTS.

5-64. CLEARANCE LAMPS SWITCH MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

- a. Removal. (5)
- b. Installation (5)
- c. Operational Check. (1)

11 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

ALL.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

EQUIPMENT CONDITION

PARAGRAPH

5-37A.

CONDITION DESCRIPTION

Batteries Disconnected.

PERSONNEL REQUIRED

TWO (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.

GENERAL SAFETY INSTRUCTIONS

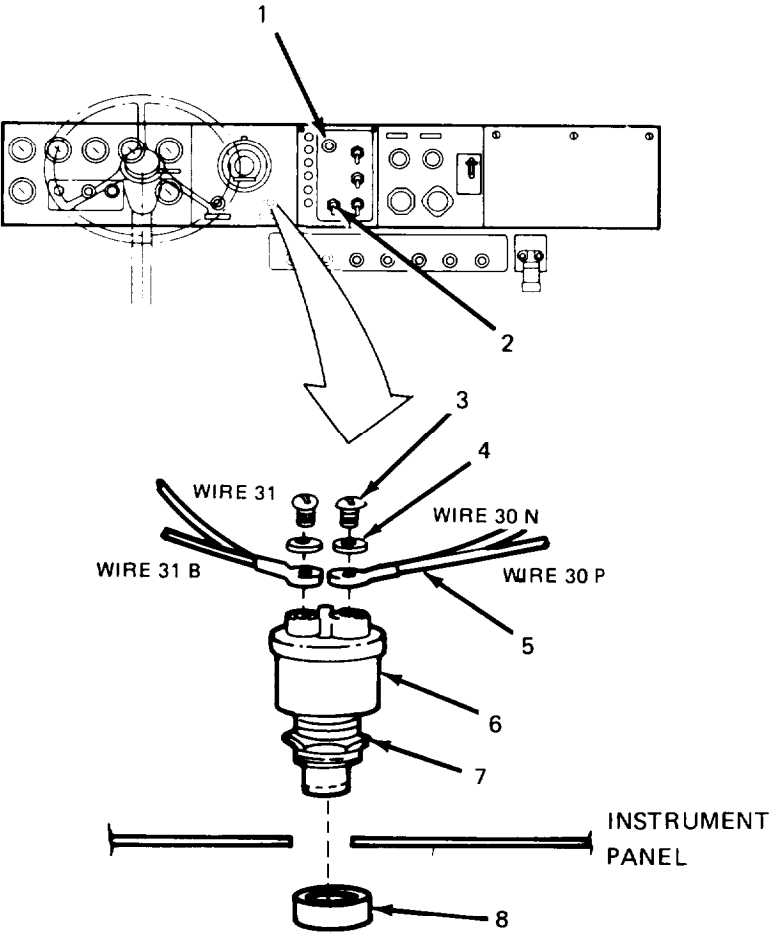
Engine OFF.
Transmission in Neutral.
Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 5-9.

PANEL MOUNTED INSTRUMENTS.

5-64. CLEARANCE LAMPS SWITCH MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
 1. LAMP SWITCH 2. OPERATION SWITCH 3. SCREW (2) 4. WASHER (2) 5. WIRE (4) 6. CLEARANCE LAMPS SWITCH 7. HEX NUT 8. KNURLED NUT WIRE 31 WIRE 30 N WIRE 30 P WIRE 31 B INSTRUMENT PANEL LEGEND: 1. LAMP SWITCH 2. OPERATION SWITCH 3. SCREW (2) 4. WASHER (2) 5. WIRE (4) 6. CLEARANCE LAMPS SWITCH 7. HEX NUT 8. KNURLED NUT		

TA 074796

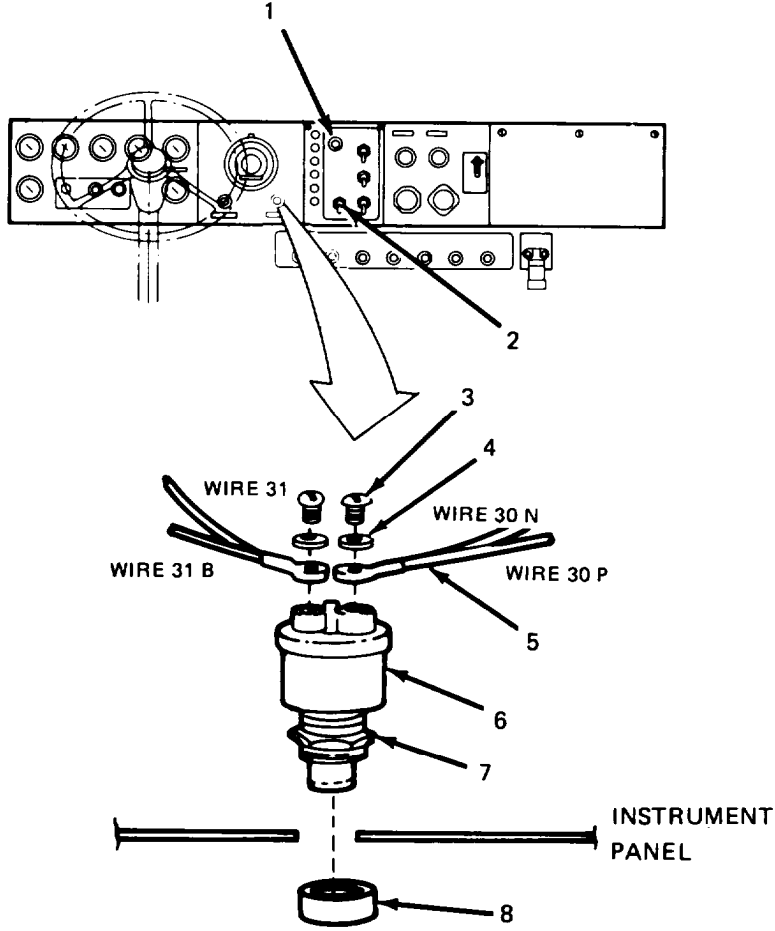
PANEL MOUNTED INSTRUMENTS.

5-64. CLEARANCE LAMPS SWITCH MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Knurled nut (8).	Remove.	
2. Clearance lamps switch (6).	Remove from instrument panel.	
3. Hex nut (7).	Remove.	
4. Two screws (3) and washers (4).	Remove.	
5. Four wires (5).	Remove	
B. INSTALLATION.		
6. Four wires (5), two washers (4), and screws (3).	Install and tighten on clearance lamps switch (6).	
7. Hex nut (7).	Install and adjust to proper depth on switch (6) to al low installation of knurled nut (8).	
8. Clearance lamps switch (6).	Install in instrument panel.	
9. Knurled nut (8).	Install and tighten.	
10. Batteries.	Connect per paragraph 5-37B.	
C. OPERATIONAL CHECK.		
11. LAMP switch (1).	Pull ON.	
12. OPERATION switch (2).	Set to Normal.	
13. CLEARANCE LAMPS switch (6).	Press and release.	First mechanic.
14. Clearance lamps.	Verify that lamps go OFF and ON.	Second mechanic.

PANEL MOUNTED INSTRUMENTS.

5-64. CLEARANCE LAMPS SWITCH MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
 1. LAMP SWITCH 2. OPERATION SWITCH 3. SCREW (2) 4. WASHER (2) 5. WIRE (4) 6. CLEARANCE LAMPS SWITCH 7. HEX NUT 8. KNURLED NUT WIRE 31 WIRE 30 N WIRE 31 B WIRE 30 P INSTRUMENT PANEL LEGEND: 1. LAMP SWITCH 2. OPERATION SWITCH 3. SCREW (2) 4. WASHER (2) 5. WIRE (4) 6. CLEARANCE LAMPS SWITCH 7. HEX NUT 8. KNURLED NUT		

TA 074798

PANEL MOUNTED INSTRUMENTS.

5-65. CLEARANCE INDICATOR LAMP MAINTENANCE.

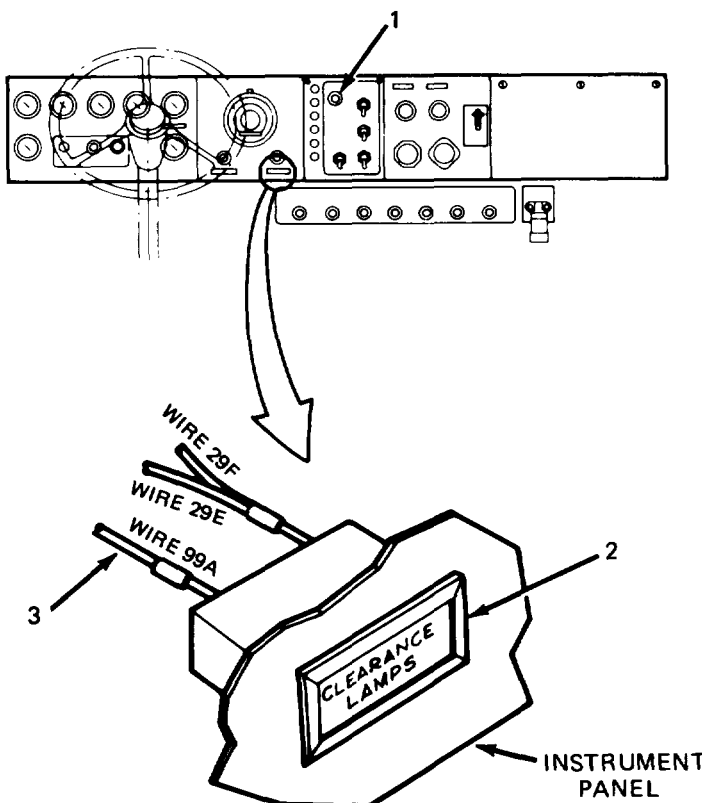
THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

- a. Removal. (1)
 - b. Installation. (1)
 - c. Operational Check. (1)
- 3 Minutes Total.

INITIAL SETUP		EQUIPMENT CONDITION	
APPLICABLE CONFIGURATIONS		PARAGRAPH	CONDITION DESCRIPTION
All.		5-37A.	Batteries Disconnected.
TEST EQUIPMENT			
None.			
SPECIAL TOOLS			
None.			
MATERIALS/PARTS (PIN)			
None.			
PERSONNEL REQUIRED		SPECIAL ENVIRONMENTAL CONDITIONS	
One (MOS-63B20).		Vehicle Parked on Level Ground.	
REFERENCES (TM)		GENERAL SAFETY INSTRUCTIONS	
TM 9-2320-273-10.		Engine OFF. Transmission in Neutral. Park Brake Set.	
TROUBLESHOOTING REFERENCES			
None.			

PANEL MOUNTED INSTRUMENTS .

5-65. CLEARANCE INDICATOR LAMP MAINTENANCE (Continued).

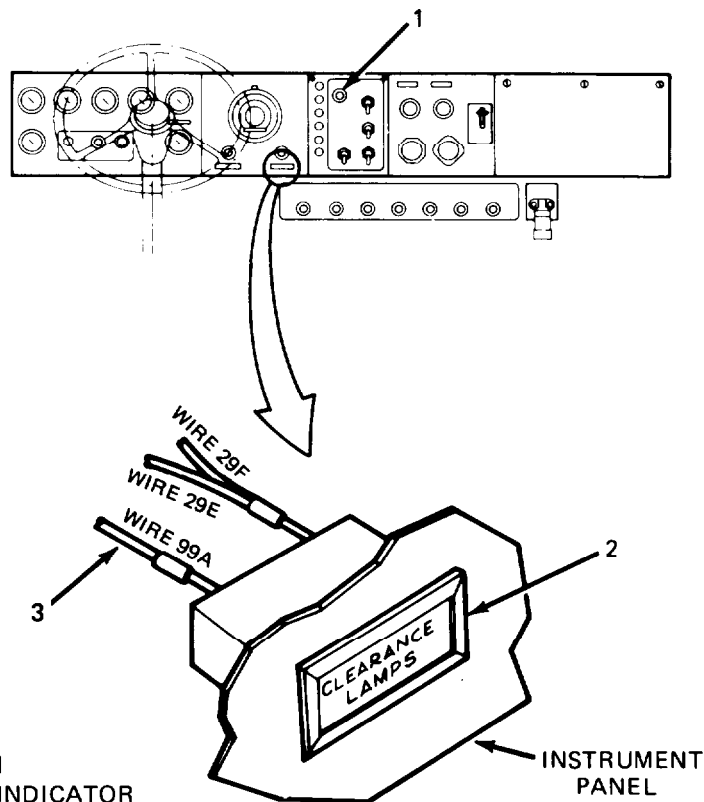
LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL. 1. Three wires (3). Remove from underneath panel. 2. Clearance indicator lamp unit (2). Remove from instrument panel by pushing outward from behind panel.		
 LEGEND: 1. LAMP SWITCH 2. CLEARANCE INDICATOR LAMP UNIT 3. WIRE (3)		

TA 074799

PANEL MOUNTED INSTRUMENTS.

5-65. CLEARANCE INDICATOR LAMP MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION.		
3. Clearance indicator lamp unit (2).	Aline and press into instrument panel.	
4. Three wires (3).	Connect to clearance indicator lamp unit (2).	
5. Batteries.	Connect per paragraph 5-38.	
C. OPERATIONAL CHECK.		
6. LAMP switch (1).	Pull ON. Verify that CLEARANCE LAMPS indicator (2) comes ON.	



LEGEND:

- 1. LAMP SWITCH
- 2. CLEARANCE INDICATOR LAMP UNIT
- 3. WIRE (3)

TA 074800

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PANEL MOUNTED INSTRUMENTS.**5-66. TACHOGRAPH MAINTENANCE.****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

a. Reading Tachograph Disk.	(AR)
b. Disk Pack Removal.	(2)
c. Disk Pack Installation.	(2)
d. Tachograph Removal.	(7)
e. Tachograph Installation.	(7)
f. Operational Check.	(5)
23 Minutes Total.	

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Seven Day Disk Pack (7530-01-060-1628).

**EQUIPMENT CONDITION
PARAGRAPH**

5-37A.

CONDITION DESCRIPTION

Batteries Disconnected.

PERSONNEL REQUIRED

One MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

Table 5-7.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

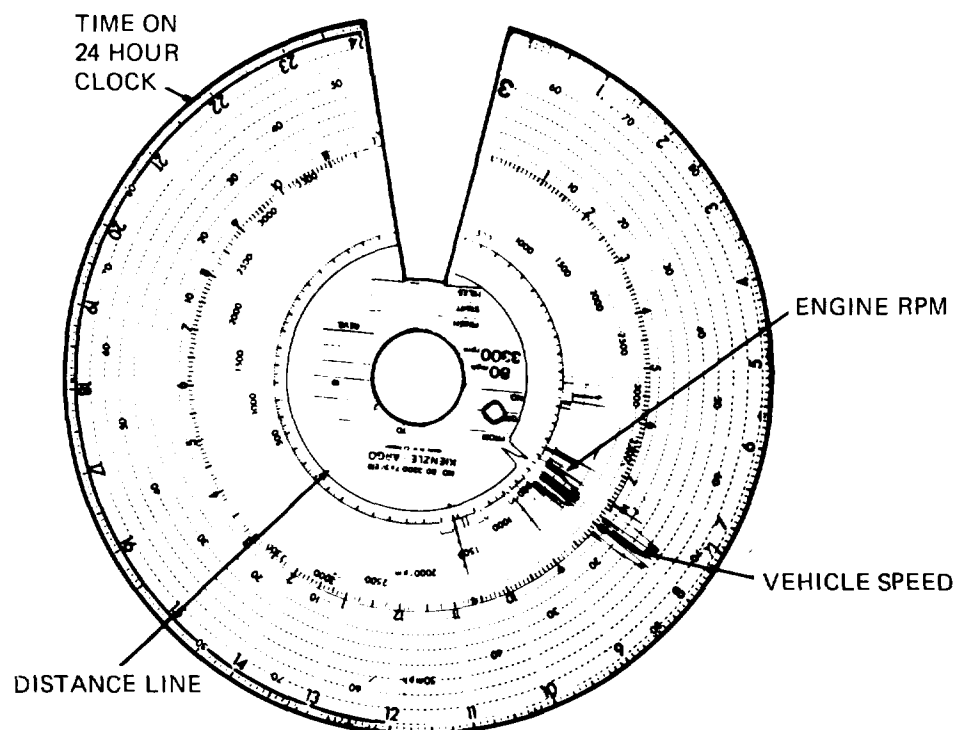
PANEL MOUNTED INSTRUMENTS.

5-66. TACHOGRAPH MAINTENANCE (Continued).

A. READING TACHOGRAPH DISK.

TIME	The outer ring of the disk has markings for 24 hours. Any events shown on the disk by markings happened at the time shown on the outer ring of the disk. Also, each time the tachograph is opened, a small tic mark is put onto the disk by each stylus. (There is a stylus for vehicle speed, engine speed, and distance).
SPEED	Next to the outer marks for time there is a band about 3/4" wide. The stylus moving in this area records vehicle speed at any moment. You can see at a glance if an operator has been speeding.
RPM	After the speed band, there is a narrower band (about 1/2"). Another stylus moves in this area recording engine RPM. You can see if the engine has been overrevved. You can also determine whether the driver warmed up the engine before moving out. To see this, compare RPM reading with vehicle speed. The disk should record the RPM for the proper number of minutes before vehicle speed is recorded.
DISTANCE	A third stylus moves in the narrowest band, closest to the disk's center. This stylus moves away from the center for 5 miles and then toward the center for 5 miles.

In the disk shown, the vehicle did not move from midnight to about 5:37 AM. Then the engine was started, rewed momentarily to about 1800 RPM, then idled at 600 RPM for six or seven minutes, rewed to 2100 RPM momentarily, then shut down at about 5:46. At 7:10 AM the engine was started again, idled for 22 minutes. At 7:32 it moved out, attaining a speed of about 28 mph, then stopped and idled for eight minutes. Then it moved out, accelerated to about 45 mph and did stop-and-go driving for about 32 minutes, accelerating from 0 to about 45 mph three times and traveling about 15 miles. At 8:11 it stopped, having traveled about 15 miles, it idled for about 48 minutes and then was shut down at about 9 AM.



TA 075702

PANEL MOUNTED INSTRUMENTS.

5-66. TACHOGRAPH MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. DISK PACK REMOVAL.		
CAUTION The disk pack must be changed before the end of the seventh day to prevent stylus damage.		
1. Key (6).	Unlock tachograph (3) with key (6) and swing open.	
2. Retainer (1).	a. Turn to the left and remove. b. Lift out used disk pack (2).	
NOTE If pack is not properly installed, instruments and dials may not function.		
C. DISK PACK INSTALLATION.]		
3. New disk pack (2).	a. Enter date, driver's name, vehicle number and mileage. b. Ensure pack is under separating knife (7) and under tachometer lever (4). c. Aline time at installation with red dot (5) on disk. d. With disk pack in position on center hub, place retainer (1) in place and turn to the right.	Enter in center field on disk number one.
4. Tachograph (3).	Swing up into closed position and lock with key (6).	

PANEL MOUNTED INSTRUMENTS.

5-66. TACHOGRAPH MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
LEGEND: 1. RETAINER 2. DISK PACK 3. TACHOGRAPH 4. TACHOMETER LEVER 5. RED DOT 6. KEY 7. SEPARATING KNIFE		

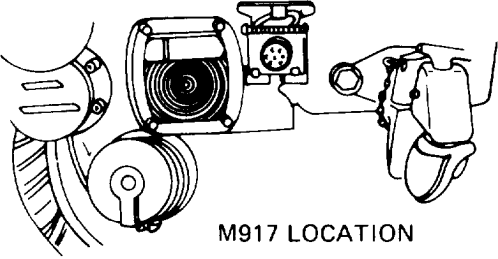
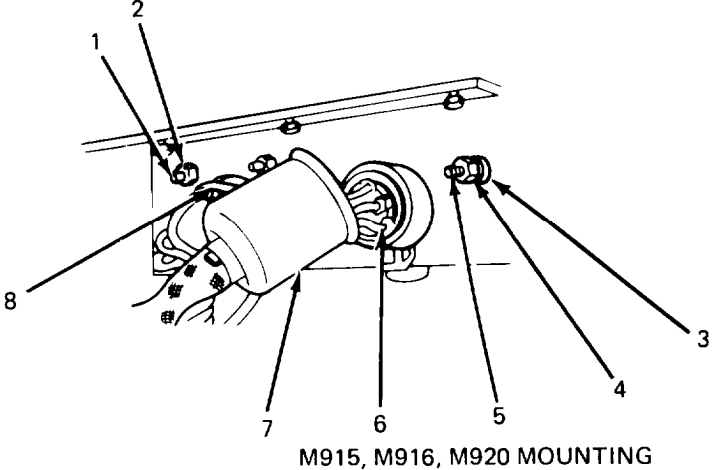
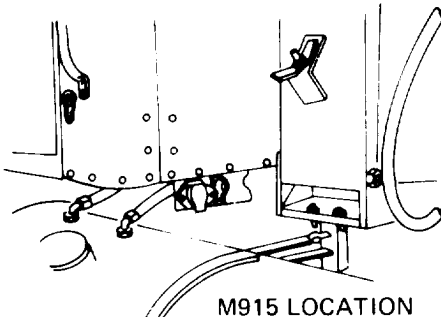
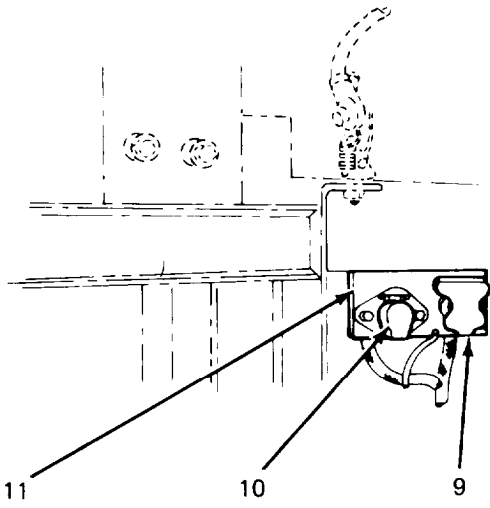
TA 075703

PANEL MOUNTED INSTRUMENTS.

5-66. TACHOGRAPH MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
<u>D. TACHOGRAPH REMOVAL.</u>		
5. Two quarter turn screws (1).	Remove.	
6. Hinged instrument panel (2).	Lower hinged panel.	
7. RPM cable (7).	Disconnect.	
8. MPH cable (9).	Disconnect.	
9. Wire connector (6).	Disconnect.	
10. Two knurled nuts (3) and washers (4).	Remove.	
11. Two brackets (5).	Remove.	
12. Tachograph (8).	Remove.	
<u>E. TACHOGRAPH INSTALLATION.</u>		
13. Tachograph (8).	Insert into panel.	
14. Two brackets (5).	Install on tachograph (8).	
15. Two washers (4) and knurled nuts (3).	Install and tighten.	
16. Wire connector (6).	Reconnect.	
17. MPH cable (9).	Reconnect.	
18. RPM cable (7).	Reconnect.	
19. Hinged instrument panel (2).	Raise into place.	
20. Two quarter-turn screws (1).	Tighten.	
21. Batteries.	Connect per paragraph 5-37B.	
<u>F. OPERATIONAL CHECK.</u>		
22. Engine.	Start (Refer to TM 9-2320-273-10).	
23. Tachograph (8).	Check operation.	
24. Engine.	Shut down (Refer to TM 9-2320-273-10).	

EXTERIOR LIGHTING.

5-55. TRAILER LIGHTS CONNECTOR MAINTENANCE (12 AND 24 VOLT) (Continued).

LOCATION/ITEM	ACTION	REMARKS
E. INSTALLATION (12 VOLT CONNECTOR) (Continued).		
13. Rubber boot (7).	Slide into position over terminal connections.	
F. TEST (24 VOLT AND 12 VOLT).		
14. Connector assemblies (9) and (10).	a. Hook up suitable trailer.	
	b. Activate cab controls.	1st mechanic.
	c. Check for proper functioning of all trailer lights.	2nd mechanic.
 M917 LOCATION  M915, M916, M920 MOUNTING  M915 LOCATION  M916/M920 LOCATION		
LEGEND:		
1. BOLT (4)	8. CONNECTOR ASSEMBLY	
2. NUT (4)	9. CONNECTOR ASSEMBLY	
3. WASHER (2)	10. CONNECTOR ASSEMBLY	
4. NUT (2)	11. MOUNTING PLATE	
5. BOLT (2)		
6. TERMINAL SCREW (7)		
7. RUBBER BOOT		

TA 074778

EXTERIOR LIGHTING.

5-55. TRAILER LIGHTS CONNECTOR MAINTENANCE (12 AND 24 VOLT) (Continued).		
LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (24 VOLT CONNECTOR) (Continued).		
3. Connector assembly (9).	Remove from mounting plate (11).	
B. REMOVAL (12 VOLT CONNECTOR).		
4. Rubber boot (7).	Twist and pull from back of connector assembly (8).	Replace if cracked.
5. Seven terminal screws (6).	Unscrew and remove wires.	Mark wires to facilitate installation.
6. Two bolts (5), washers (3), and nuts (4).	Remove.	
7. Connector assembly (10).	Remove from mounting plate (11).	
C. INSPECTION (24 VOLT AND 12 VOLT).		
8. Connectors assemblies (9) and (10).	Inspect pin receptacles (24V) and pins (12V) for corrosion.	Replace as necessary.
D. INSTALLATION (24 VOLT CONNECTOR).		
9. Connector assembly (9).	Mount into plate (11) with four bolts (1) and nuts (2). Tighten.	
10. Connector assembly (8).	Push into back of connector assembly (9) and screw on ring.	
E. INSTALLATION (12 VOLT CONNECTOR).		
11. Connector assembly (10).	Mount into mounting plate (11) with two bolts (5), washers (3), and nuts (4). Tighten.	
12. Seven terminal screws (6).	Insert seven wires as marked at removal and fasten with screws (6). Tighten.	

PANEL MOUNTED INSTRUMENTS.

5-66. TACHOGRAPH MAINTENANCE, {Continued}.

LOCATION/ITEM	ACTION	REMARKS
WIRE 29F WIRE 29G WIRE 59 WIRE 99 LEGEND: 1. QUARTER-TURN SCREW (2) 2. HINGED INSTRUMENT PANEL 3. KNURLED NUT (2) 4. WASHER (2) 5. BRACKET (2) 6. WIRE CONNECTOR 7. RPM CABLE 8. TACHOGRAPH 9. MPH CABLE		

TA 074802

ELECTRICAL HORN AND CAB HEATER CONTROL.**5-67. HORN BUTTON MAINTENANCE.****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

a. Removal.	(2.0)
b. Installation.	(2.0)
c. Operational Check.	<u>(0.5)</u>
4.5 Minutes Total.	

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

ALL.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

EQUIPMENT CONDITION**PARAGRAPH**

5-37A.

CONDITION DESCRIPTION

Batteries Disconnected.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked On Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission In Neutral.
Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 5-14.

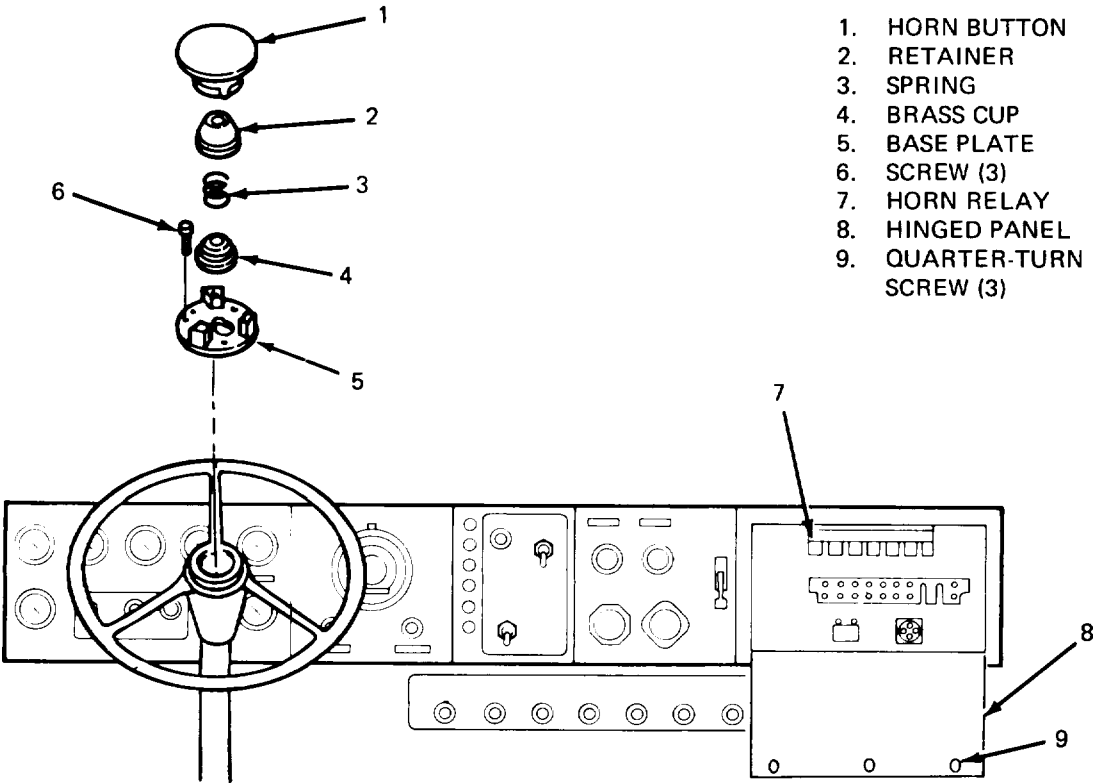
ELECTRIC HORN AND CAB HEATER CONTROL.

5-67. HORN BUTTON MAINTENANCE (Continued),

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Three quarter turn screws (9).	Loosen.	
2. Hinged panel (8).	Lower.	
3. Horn relay (7).	Remove.	
4. Horn button (1).	Push down and twist counter-clockwise, and remove.	
5. Retainer (2), and spring (3).	Remove.	
6. Brass cup (4).	Remove.	

LEGEND:

- 1. HORN BUTTON
- 2. RETAINER
- 3. SPRING
- 4. BRASS CUP
- 5. BASE PLATE
- 6. SCREW (3)
- 7. HORN RELAY
- 8. HINGED PANEL
- 9. QUARTER-TURN SCREW (3)

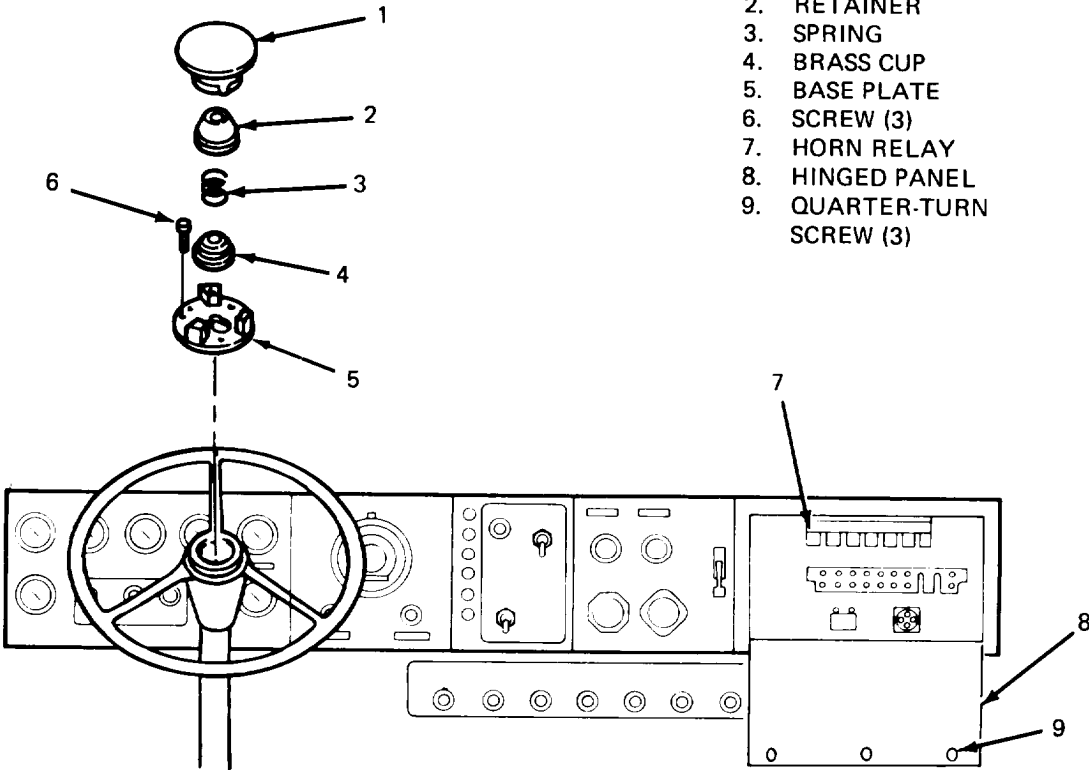


TA 074803

ELECTRIC HORN AND CAB HEATER CONTROL.**5-67. HORN BUTTON MAINTENANCE (Continued).**

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
7. Three screws (6).	Loosen and remove.	
8. Base plate (5).	Remove.	
B. INSTALLATION.		
9. Base plate (5).	Place in steering wheel.	
10. Three screws (6).	Screw in and tighten.	
11. Brass cup (4).	Install.	
12. Spring (3) and retainer (2).	Install over brass cup.	
13. Horn button (1).	Install.	Push down and turn clockwise.
14. Horn relay (7).	Install.	
15. Hinged panel (8).	Raise into position.	
16. Three quarter turn screws (9).	Tighten.	
17. Batteries.	Connect (refer to para 5-37 B).	
C. OPERATIONAL CHECK.		
18. Horn button (1).	Press. Verify that horn operates.	

ELECTRIC HORN AND CAB HEATER CONTROL.

5-67. HORN BUTTON MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
 LEGEND: 1. HORN BUTTON 2. RETAINER 3. SPRING 4. BRASS CUP 5. BASE PLATE 6. SCREW (3) 7. HORN RELAY 8. HINGED PANEL 9. QUARTER-TURN SCREW (3)		
TA 074804		

ELECTRIC HORN AND CAB HEATER CONTROL.

5-68. HORN MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

- a. Removal. (5)
b. Installation. (5)
c. Operational Check. (1)
11 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

EQUIPMENT CONDITION

PARAGRAPH

5-37A.

CONDITION DESCRIPTION

Batteries Disconnected.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

PERSONNEL REQUIRED

T_{WO} (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked On Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.

GENERAL SAFETY INSTRUCTIONS

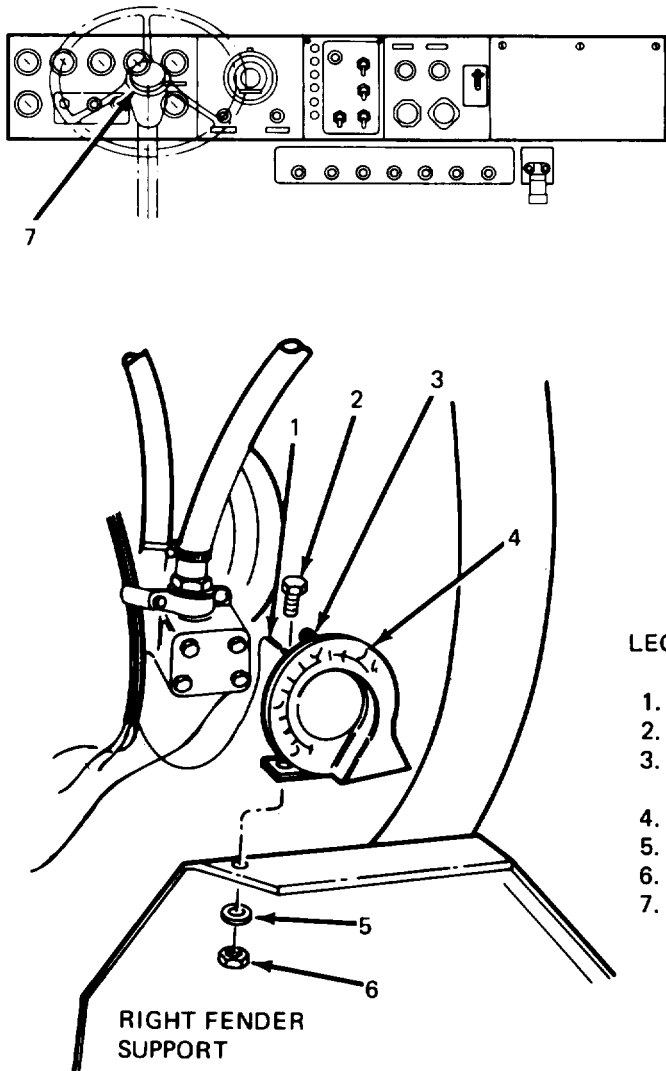
Engine OFF.
Transmission In Neutral.
Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 5-14.

ELECTRIC HORN AND CAB HEATER CONTROL.

5-68. HORN MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL. 1. Wire connector (1). Disconnect. 2. Bolt (2), washer (5) and nut (6). Remove. 3. Horn assembly (4). Remove.		
 RIGHT FENDER SUPPORT LEGEND: 1. WIRE CONNECTOR 2. BOLT 3. HORN ADJUSTING SCREW 4. HORN ASSEMBLY 5. WASHER 6. NUT 7. HORN BUTTON		

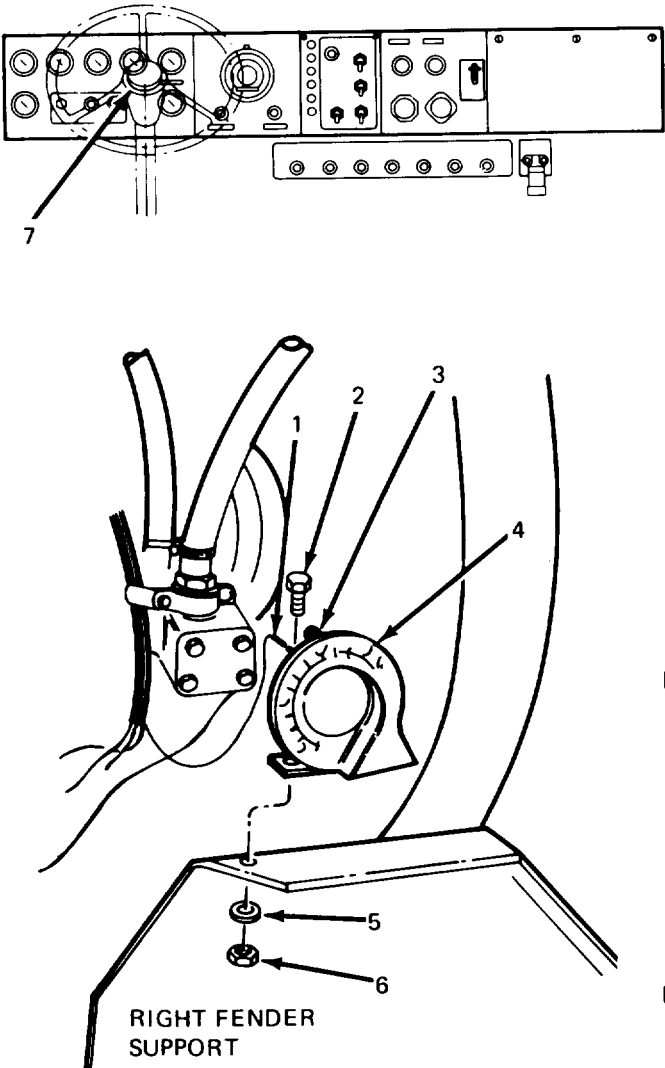
TA 074805

ELECTRIC HORN AND CAB HEATER CONTROL.**5-68. HORN MAINTENANCE (Continued).**

LOCATION/ITEM	ACTION	REMARKS
<u>B. INSTALLATION.</u>		
4. Horn assembly (4).	Replace and aline mounting hole.	
5. Bolt (2), washer (5) and nut (6).	Replace and tighten.	
6. Wire connector (1).	Reconnect.	
7. Batteries	Connect (refer to para 5-37 B).	
<u>C. OPERATIONAL CHECK.</u>		
8. Horn button (7).	Press and verify the horn works.	
9. Horn adjusting screw (3).	Adjust for maximum loudness.	

ELECTRIC HORN AND CAB HEATER CONTROL.

5-68. HORN MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
 RIGHT FENDER SUPPORT		LEGEND: 1. WIRE CONNECTOR 2. BOLT 3. HORN ADJUSTING SCREW 4. HORN ASSEMBLY 5. WASHER 6. NUT 7. HORN BUTTON LEGEND:

TA 074806

ELECTRIC HORN AND CAB HEATER CONTROL.**5-69. HEATER FAN SWITCH MAINTENANCE.****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

- a. Removal. (5)
 b. Installation. (5)
 c. Operational Check. (1)
 11 Minutes Total.

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

**EQUIPMENT CONDITION
PARAGRAPH**

537A.

CONDITION DESCRIPTION

Batteries Disconnected.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked On Level Ground.

REFERENCES (TM)

TM 92320273-10.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
 Transmission In Neutral.
 Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 5-14.

ELECTRIC HORN AND CAB HEATER CONTROL.

5-69. HEATER FAN SWITCH MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Two screws (2).	Remove.	
2. Back panel cover (7).	Slide back over cables.	
3. Heater knob (6).	Pull off.	
4. Hex nut (5).	Remove.	
5. Heater fan switch (4).	Remove from lower control panel.	
6. Four wires (3).	Remove.	Tag for proper location.

Diagram illustrating the removal of the lower control panel. The panel is shown with various components labeled 1 through 7. A large arrow points down from the panel to a detailed view of its components.

LEGEND:

- 1. ENGINE RUN SWITCH
- 2. SCREW (2)
- 3. WIRE (4)
- 4. HEATER FAN SWITCH
- 5. HEX NUTS
- 6. HEATER
- 7. BACK PANEL COVER

TA 074807

ELECTRIC HORN AND CAB HEATER CONTROL.**5-69. HEATER FAN SWITCH MAINTENANCE (Continued).**

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION.		
7. Four wires (3).	Install on heater fan switch (4).	
8. Heater fan switch (4).	Aline and install in lower control panel.	
9. Hex nut (5).	Install and tighten.	
10. Heater knob (6).	Install.	
11. Back panel cover (7).	Slide over cables and press on back of lower control panel.	
12. Two screws (2).	Install and tighten.	
13. Batteries.	Connect per paragraph 5-37B.	
C. OPERATIONAL CHECK.		
14. ENGINE RUN switch (1).	Turn left to accessory.	
15. HEATER FAN switch (4).	Rotate heater knob (6) through all positions (Lo, Medium, Hi) and verify the heater fan increases and decreases accordingly. Verify that fan motor shuts off with heater knob (6) set to OFF.	

ELECTRIC HORN AND CAB HEATER CONTROL.

5-69. HEATER FAN SWITCH MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
LEGEND: 1. ENGINE RUN SWITCH 2. SCREW (2) 3. WIRE (4) 4. HEATER FAN SWITCH 5. HEX NUTS 6. HEATER 7. BACK PANEL COVER		

TA 074808

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-70. OIL PRESSURE SENDING UNIT MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REWIRED FOLLOWS TASK DESCRIPTION.)

- a. Removal. (5)
 - b. Installation. (5)
 - c. Operational Check (2)
- 12 Minutes Total.

<u>INITIAL SETUP</u>	<u>EQUIPMENT CONDITION</u>	<u>CONDITION DESCRIPTION</u>
<u>APPLICABLE CONFIGURATIONS</u>	<u>PARAGRAPH</u>	
All.	None.	None.
<u>TEST EQUIPMENT</u>		
None.		
<u>SPECIAL TOOLS</u>		
None.		
<u>MATERIALS/PARTS (P/N)</u>		
Liquid Teflon (Refer to Appendix C).		
<u>PERSONNEL REQUIRED</u>	<u>SPECIAL ENVIRONMENTAL CONDITIONS</u>	
One (MOS-63B20).	Vehicle Parked On Level Ground.	
<u>REFERENCES (TM)</u>	<u>GENERAL SAFETY INSTRUCTIONS</u>	
TM 92320273-10. TM 9-2320-273-20F?	Engine OFF. Transmission In Neutral. Park Brake Set.	
<u>TROUBLESHOOTING REFERENCES</u>		
Table 5-7.		

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-70. OIL PRESSURE SENDING UNIT MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Nut (5) and washer (4).	Remove.	
2. Wire (3).	Remove.	
3. Oil pressure sending unit (2).	Remove.	

A line drawing of an instrument panel with various gauges and switches. A callout line labeled '1' points to a gauge on the left. Another callout line labeled '2' points to a component on the right side of the panel.

LEGEND:

- 1. OIL PRESSURE GAGE
- 2. OIL PRESSURE SENDING UNIT
- 3. WIRE
- 4. WASHER
- 5. NUT

A detailed diagram showing the removal of the oil pressure sending unit. The sending unit (2) is shown being unscrewed from the engine block. A wire (3) is shown connected to the sending unit. A washer (4) and nut (5) are shown being removed from the wire. The diagram also shows the fuel filter and the left side of the engine.

TA 074809

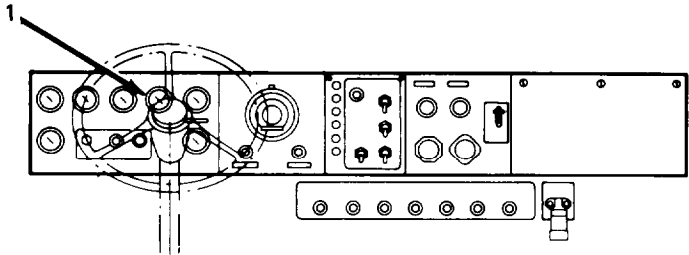
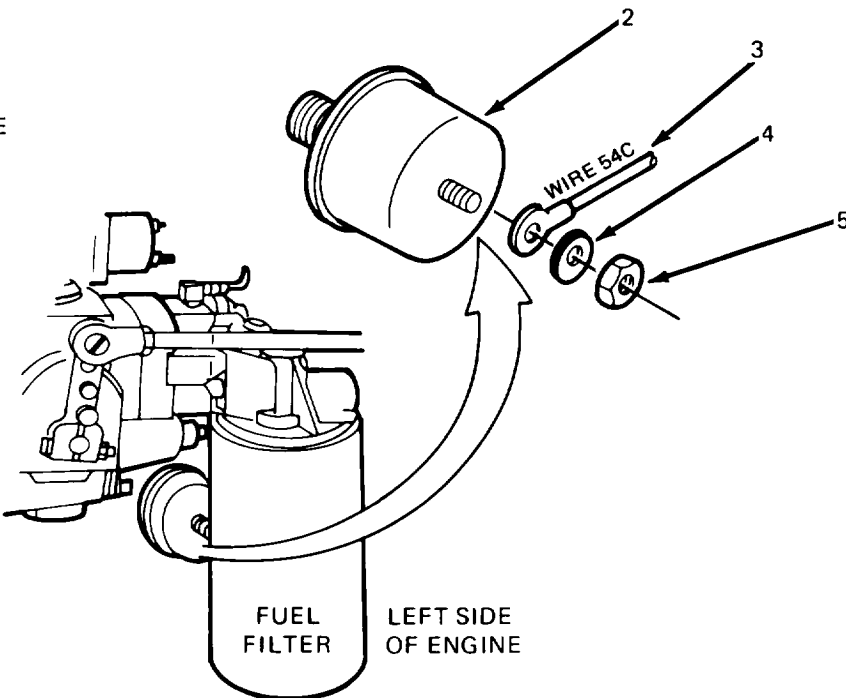
SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-70. OIL PRESSURE SENDING UNIT MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION.		
4. Oil pressure sending unit (2).	Coat threads with liquid teflon. Install and tighten.	
5. Wire (3).	Place on oil pressure sending unit (2).	
6. Washer (4) and nut (5).	Install and tighten.	
C. OPERATIONAL CHECK.		
7. Engine.	Start up (see TM 9-2320-273-10).	
8. Oil pressure gage (1).	Observe that gage indicates a pressure reading.	

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-70. OIL PRESSURE SENDING UNIT MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
 LEGEND: 1. OIL PRESSURE GAGE 2. OIL PRESSURE SENDING UNIT 3. WIRE 4. WASHER 5. NUT  FUEL FILTER LEFT SIDE OF ENGINE		

TA 074810

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-71. OIL PRESSURE SWITCH MAINTENANCE.**THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

- a. Removal. (5)
 - b. Installation. (5)
 - c. Operational Check. (1)
- 11 Minutes Total.

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

EQUIPMENT CONDITION**PARAGRAPH**

None.

CONDITION DESCRIPTION

None.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (Refer to Appendix C).

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 92320273-10.
TM 92320273-20P.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission In Neutral.
Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 5-6.

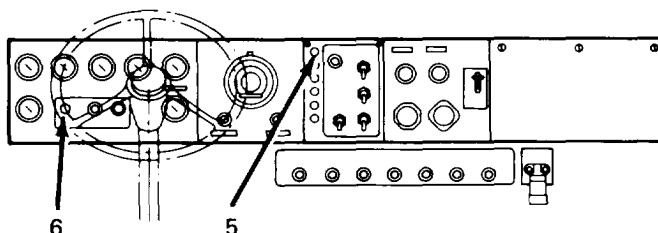
SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-71. OIL PRESSURE SWITCH MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS

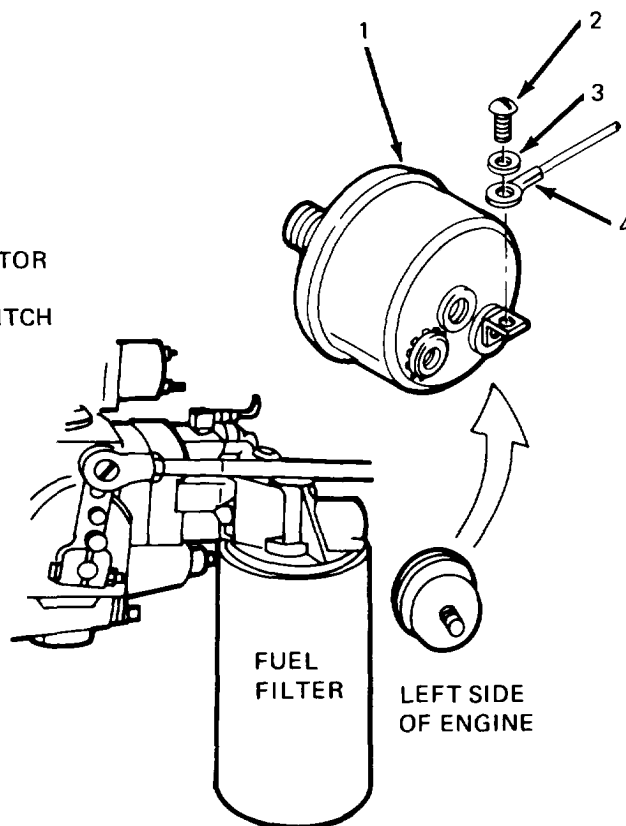
A. REMOVAL.

1. Screw (2) and washer (3).	Remove.
2. Wire (4).	Remove.
3. Oil pressure switch (1).	Remove.



LEGEND:

1. OIL PRESSURE SWITCH
2. SCREW
3. WASHER
4. WIRE
5. LOW OIL INDICATOR LAMP
6. ENGINE RUN SWITCH



TA 074811

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-71. OIL PRESSURE SWITCH MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION.		
4. Oil pressure switch (1).	Coat threads with liquid teflon. Install and tighten.	
5. Wire (4).	Place on oil pressure switch (1).	
6. Washer (3) and screw (2).	Install and tighten.	
C. OPERATIONAL CHECK.		
7. Engine Run switch (6).	Turn ON. Verify that Low Oil indicator (5) lamp goes ON.	

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-71. OIL PRESSURE SWITCH MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
LEGEND: 1. OIL PRESSURE SWITCH 2. SCREW 3. WASHER 4. WIRE 5. LOW OIL INDICATOR LAMP 6. ENGINE RUN SWITCH		

TA 074812

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-72. WATER TEMPERATURE SENDING UNIT MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

- a. Removal. (5)
 - b. Installation. (5)
 - c. Operational Check. (10)
- 20 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (Refer to Appendix C).

EQUIPMENT CONDITION

PARAGRAPH

4-42A.

CONDITION DESCRIPTION

Radiator Drained Below
Sending Unit Level.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission In Neutral.
Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 5-7.

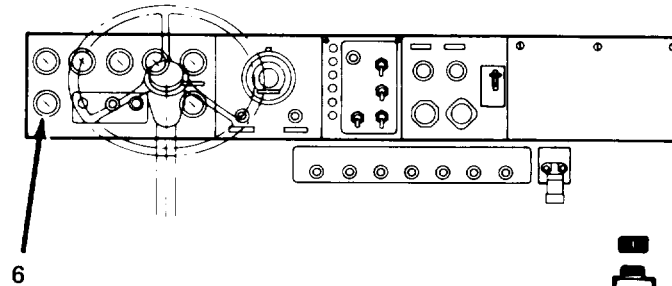
SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-72. WATER TEMPERATURE SENDING UNIT MAINTENANCE (Continued).

LOCATION/ITEM

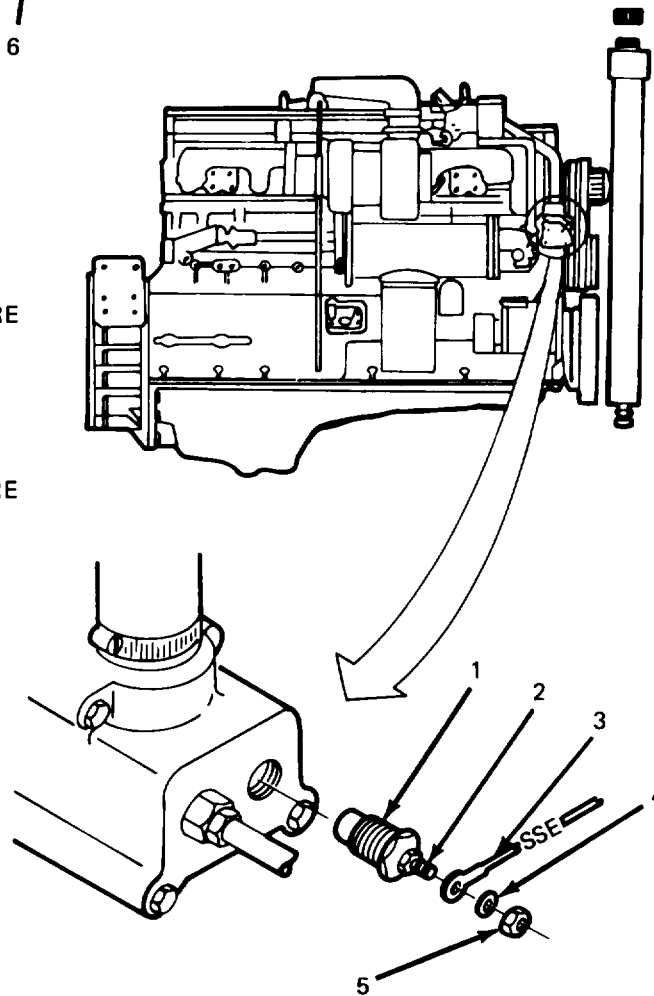
ACTION

REMARKS



LEGEND:

1. WATER TEMPERATURE SENDING UNIT
2. TERMINAL
3. WIRE
4. WASHER
5. NUT
6. WATER TEMPERATURE GAGE



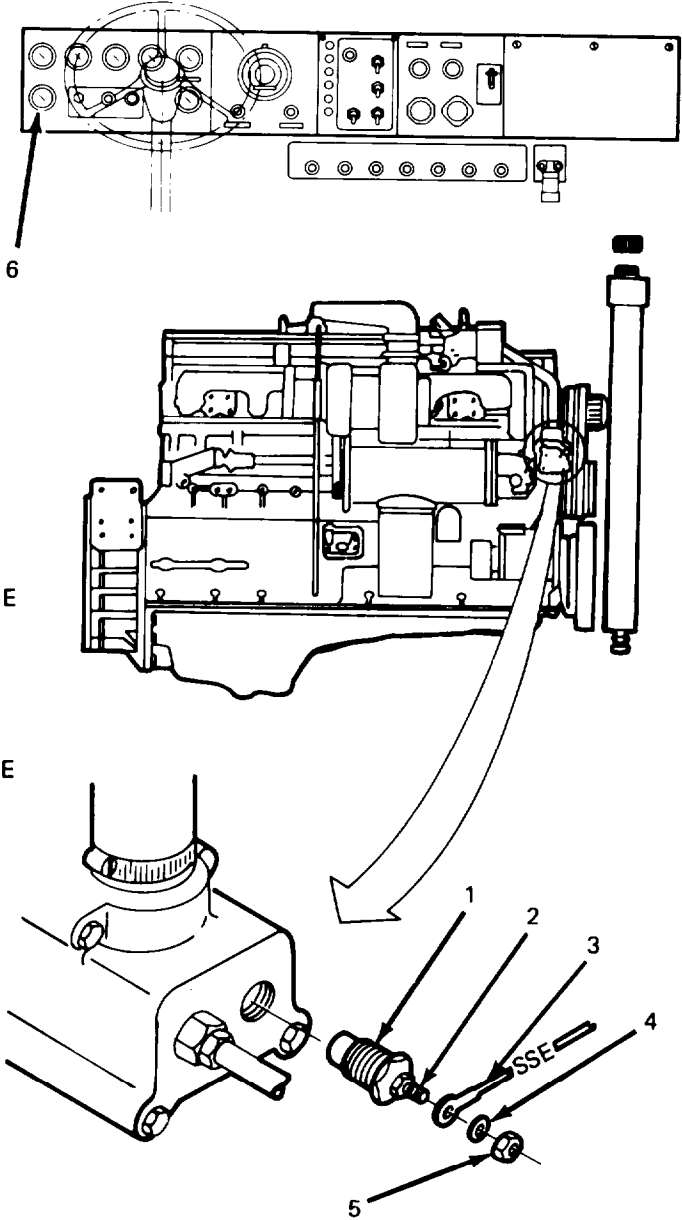
TA 074813

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-72. WATER TEMPERATURE SENDING UNIT MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Nut (5) and washer (4).	Remove.	
2. Wire (3).	Remove from terminal (2).	
3. Water temperature sending unit (1).	Remove.	
B. INSTALLATION.		
4. Water temperature sending unit (1).	Coat threads with liquid teflon. Install and tighten.	
5. Wire (3).	Place on terminal (2).	
6. Washer (4) and nut (5).	Install and tighten.	
C. OPERATIONAL CHECK.		
7. Engine	Start up (see TM 9-2320-273-10).	
8. Water temperature gage (6).	Observe that temperature increases as truck engine warms up.	
NOTE Follow on maintenance required: Fill radiator per paragraph 4-42.		

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-72. WATER TEMPERATURE SENDING UNIT MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
LEGEND: 1. WATER TEMPERATURE SENDING UNIT 2. TERMINAL 3. WIRE 4. WASHER 5. NUT 6. WATER TEMPERATURE GAGE 		

TA 074814

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-73. WATER TEMPERATURE SWITCH MAINTENANCE.**THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

- a. Removal. (5)
 b. Installation. (5)
 c. Operational Check. (20)
30 Minutes Total .

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (Refer to Appendix C).

EQUIPMENT CONDITION**PARAGRAPH**

4-42A.

CONDITION DESCRIPTIONRadiator Drained Below
Switch Level.**PERSONNEL REQUIRED**

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

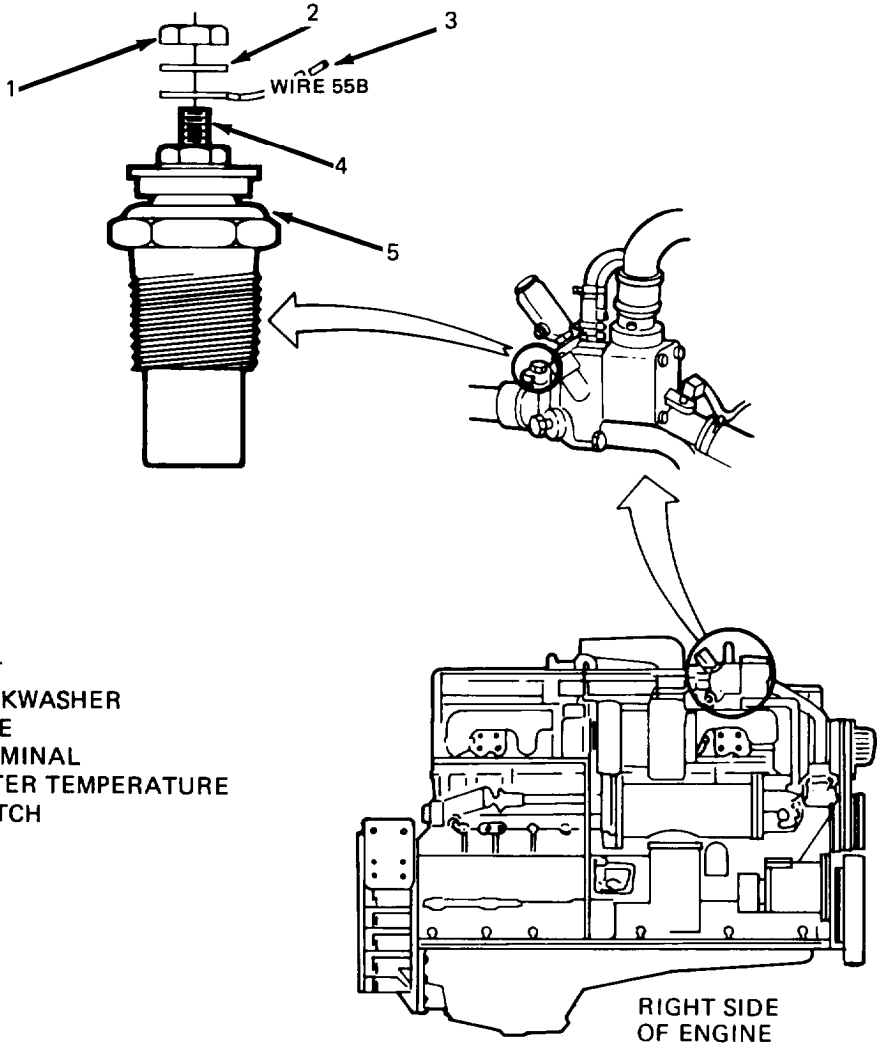
Vehicle Parked on Level Ground.

REFERENCES (TM)TM 9-2320-273-10.
TM 9-2320- 273-20P.**GENERAL SAFETY INSTRUCTIONS**Engine OFF.
Transmission In Neutral.
Park Brake Set.**TROUBLESHOOTING REFERENCES**

Table 5-7.

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-73. WATER TEMPERATURE SWITCH MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Nut (1) and lockwasher (2).	Remove.	
2. Wire (3).	Remove from terminal (4).	
 LEGEND: 1. NUT 2. LOCKWASHER 3. WIRE 4. TERMINAL 5. WATER TEMPERATURE SWITCH RIGHT SIDE OF ENGINE		
TA 074815		

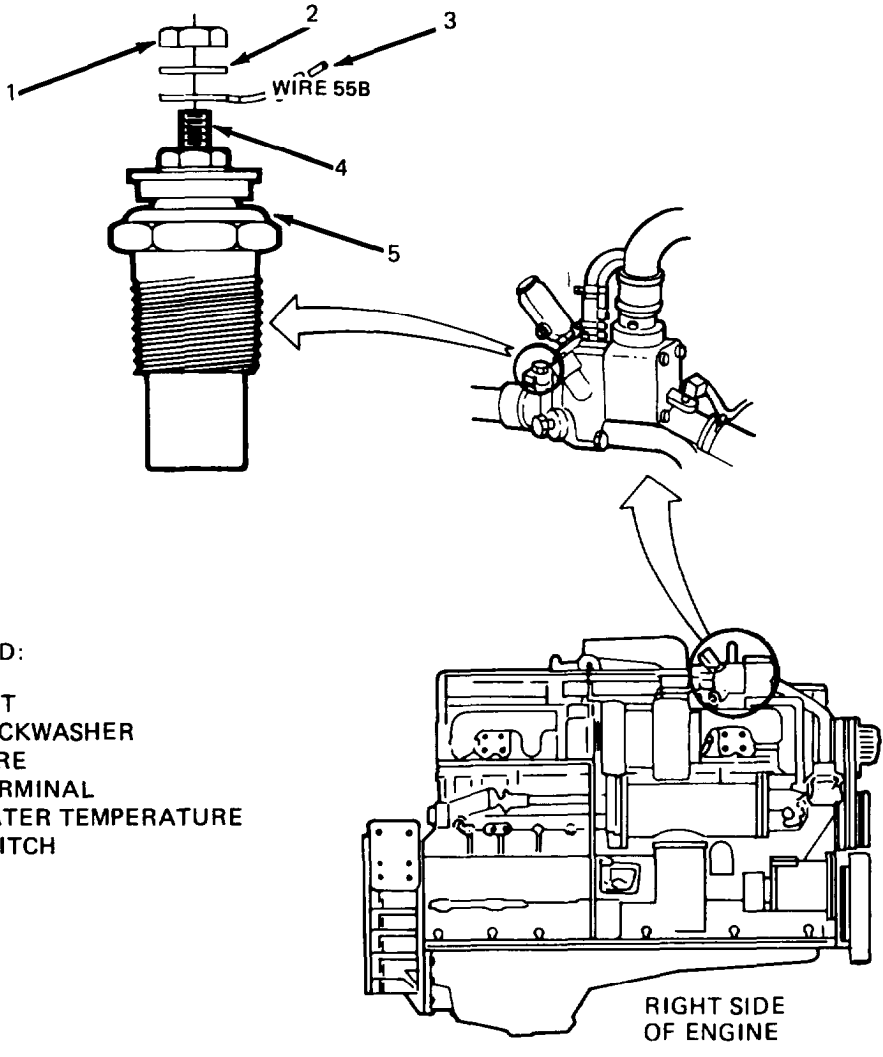
SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-73. WATER TEMPERATURE SWITCH MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
3. Water temperature switch (5).	Remove.	
B. INSTALLATION.		
4. Water temperature switch (5).	Coat threads with liquid teflon. Install and tighten.	
5. Wire (3).	Place on terminal (4).	
6. Lockwasher (2) and nut (1).	Install on terminal (4) and tighten.	
C. OPERATIONAL CHECK.		
7. Engine.	Start (refer to TM 9-2320-273-10). Monitor WATER TEMP gage, switch should close and activate indicator lamp when coolant reaches 225°F (107°C) .	
WARNING Let radiator cool before removing cap. Remove radiator cap in two steps. First, place a thick cloth over the cap and slowly rotate cap left to its first stop; pause, and let pressure escape from the cooling system. Then rotate cap farther left until you can remove it. Failure to follow this procedure can result in serious burns.		
NOTE Follow-on maintenance required: Fill radiator per paragraph 4-42.		

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-73. WATER TEMPERATURE SWITCH MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
 LEGEND: 1. NUT 2. LOCKWASHER 3. WIRE 4. TERMINAL 5. WATER TEMPERATURE SWITCH RIGHT SIDE OF ENGINE		

TA 074816

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-74. ETHER TEMPERATURE SWITCH MAINTENANCE.

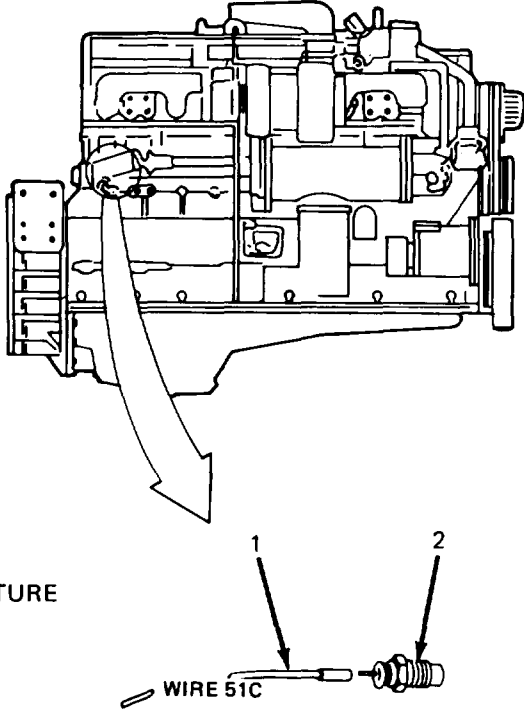
THIS TASK COVERS: (APPROXIMATE TIME REWIRED FOLLOWS TASK DESCRIPTION.)

- a. Removal. (2)
 - b. Installation. (2)
 - c. Operational Check. (2)
- 6 Minutes Total.

INITIAL SETUP	EQUIPMENT CONDITION	CONDITION DESCRIPTION
<u>APPLICABLE CONFIGURATIONS</u>	<u>PARAGRAPH</u>	
All.	4-42A.	Radiator Drained.
<u>TEST EQUIPMENT</u>		
None.		
<u>SPECIAL TOOLS</u>		
None.		
<u>MATERIALS/PARTS (P/N)</u>		
Liquid Teflon (Refer to Appendix C).		
Container (Approx 2 gal).		
<u>PERSONNEL REQUIRED</u>	<u>SPECIAL ENVIRONMENTAL CONDITIONS</u>	
One (MOS-63B20).	Vehicle Parked on Level Ground.	
	Coolant Temperature Below 50°F.	
<u>REFERENCES (TM)</u>	<u>GENERAL SAFETY INSTRUCTIONS</u>	
TM 9-2320-273-10.	Engine OFF.	
	Transmission In Neutral.	
	Park Brake Set.	
<u>TROUBLESHOOTING REFERENCES</u>		
Table 5-3.		

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

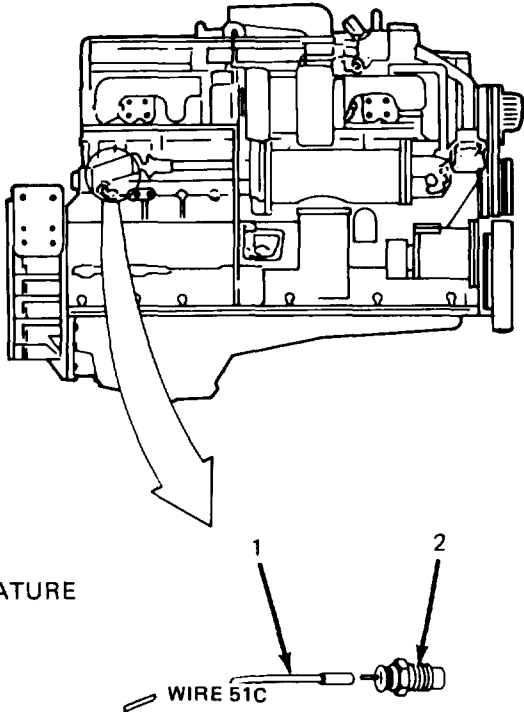
5-74. ETHER TEMPERATURE SWITCH MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Wire connector (1).	Remove.	
2. Ether temperature switch (2).	Remove.	Place container to catch coolant draining from block.
LEGEND:		
1. WIRE CONNECTOR 2. ETHER TEMPERATURE SWITCH		
		

TA 074817

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-74. ETHER TEMPERATURE SWITCH MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION. 3. Ether temperature switch (2). Coat threads with liquid teflon. Install and tighten. 4. Wire connector (1). Reconnect.		
C. OPERATIONAL CHECK. NOTE Follow-on maintenance required: Fill radiator per paragraph 4-42. 5. Engine. Start using cold start procedure (refer to TM 9-2320-273-10).  The diagram shows a side view of an engine. A curved arrow points from a location on the engine to a detailed inset. The inset shows a wire connector (labeled 1) and an ether temperature switch (labeled 2) connected by a wire labeled WIRE 51C. LEGEND: 1. WIRE CONNECTOR 2. ETHER TEMPERATURE SWITCH		

TA 074818

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SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-75. NEUTRAL SAFETY SWITCH MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

- a.. Removal. (5)
b. Installation (5)
c. Operational Check. (2)
12 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

None.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

EQUIPMENT CONDITION

PARAGRAPH

None.

CONDITION DESCRIPTION

None.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked On Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission In Neutral.
Park Brake Set.

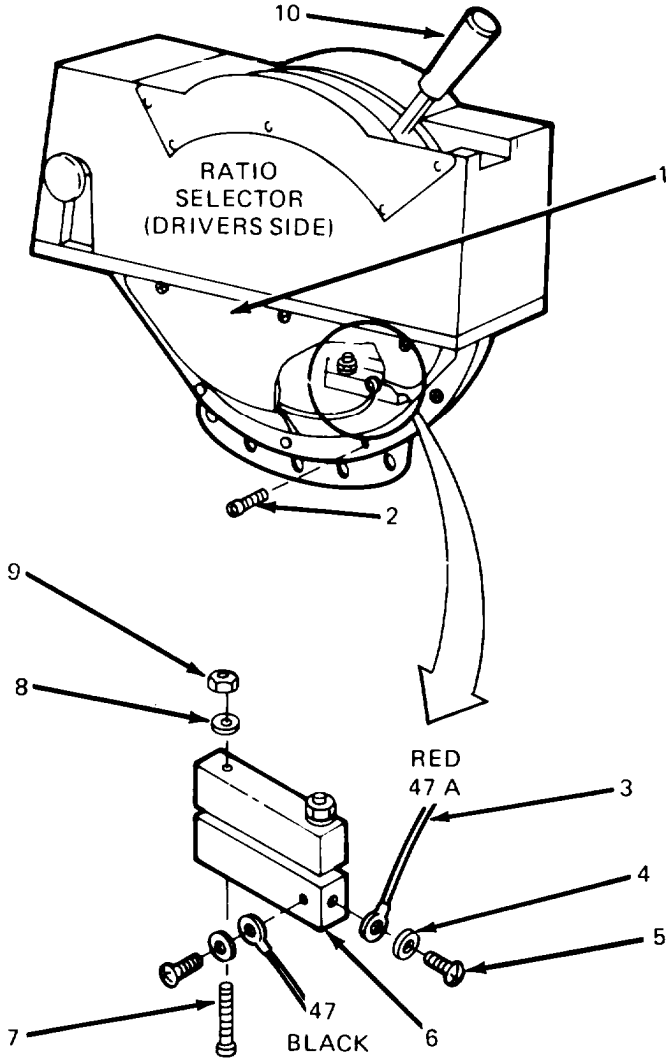
TROUBLESHOOTING REFERENCES

Table 6-1.

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-75. NEUTRAL SAFETY SWITCH MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Nine screws (2).	Remove.	
2. Ratio selector side cover (1).	Remove.	
3. Two screws (5) and washers (4).	Remove.	



LEGEND:

1. RATIO SELECTOR SIDE COVER
2. SCREW (9)
3. WIRE (2)
4. WASHER (2)
5. SCREW (2)
6. NEUTRAL SAFETY SWITCH
7. SCREW (2)
8. WASHER (2)
9. NUT (2)
10. RATIO SELECTOR LEVER

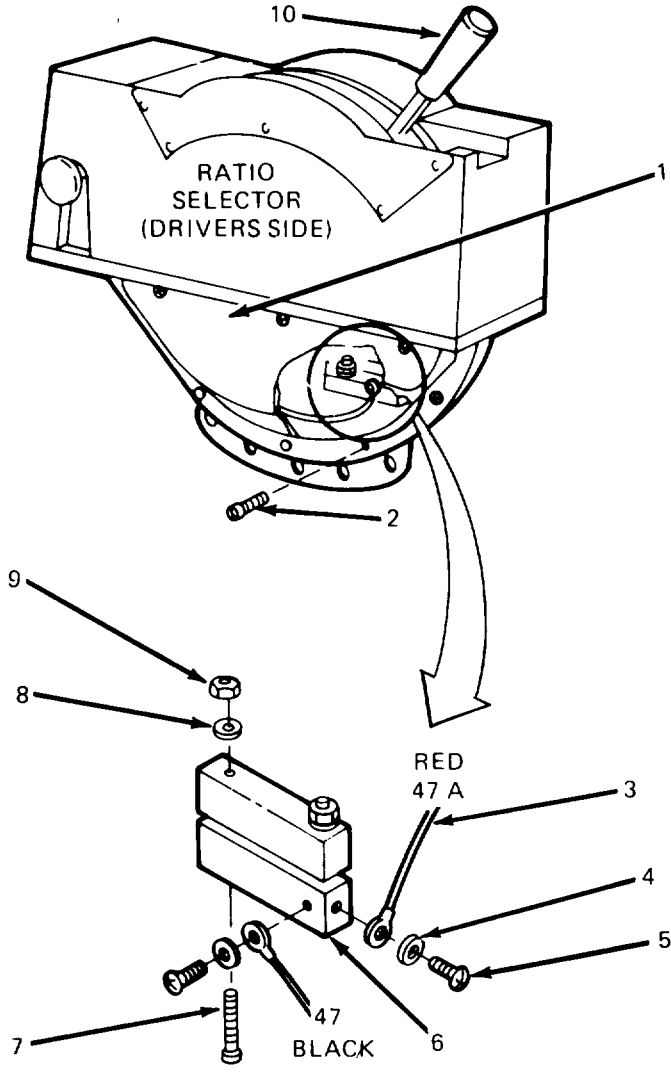
TA 074819

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-75. NEUTRAL SAFETY SWITCH MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
4. Two wires (3).	Remove.	
5. Two screws (7), washers (8) and nuts (9).	Remove.	
6. Neutral safety switch (6).	Remove.	
B. INSTALLATION.		
7. Neutral safety switch (6).	Aline and install.	
8. Two screws (7), washers (8) and nuts (9).	Install and tighten.	
9. Two wires (3), washers (4) and screws (5).	Install and tighten on neutral safety switch (6).	Install per illustration.
10. Ratio selector side cover (1).	Aline and install.	
11. Nine screws (2).	Install and tighten.	
c. OPERATIONAL CHECK.		
12. Ratio selector lever (10).	Set to N.	
13. Engine.	Start up (see TM 9-2320-273-10).	

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-75. NEUTRAL SAFETY SWITCH MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
 RATIO SELECTOR (DRIVERS SIDE) RED 47 A BLACK 47 LEGEND: 1. RATIO SELECTOR SIDE COVER 2. SCREW (9) 3. WIRE (2) 4. WASHER (2) 5. SCREW (2) 6. NEUTRAL SAFETY SWITCH 7. SCREW (2) 8. WASHER (2) 9. NUT (2) 10. RATIO SELECTOR LEVER		

TA 074820

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-76. TRANSMISSION OIL TEMPERATURE SENDING UNIT MAINTENANCE.		
THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)		
a. Removal. (2) b. Installation. (2) c. Operational Check. (20) 24 Minutes Total.		
<u>INITIAL SETUP</u> <u>APPLICABLE CONFIGURATIONS</u> All.	<u>EQUIPMENT CONDITION</u> <u>PARAGRAPH</u> 6-9A.	<u>CONDITION DESCRIPTION</u> Transmission Drained.
<u>TEST EQUIPMENT</u> None.		
<u>SPECIAL TOOLS</u> None.		
<u>MATERIAL/PARTS (P/N)</u> Liquid Teflon (Refer to Appendix C).		
<u>PERSONNEL REQUIRED</u> One (MOS-63B20).	<u>SPECIAL ENVIRONMENTAL CONDITIONS</u> Vehicle Parked on Level Ground.	
<u>REFERENCES (TM)</u> TM 9-2320-273-10. LO 9-2320-273-12. TM 9-2320-273-20P.	<u>GENERAL SAFETY INSTRUCTIONS</u> Engine Off. Transmission in Neutral. Park Brake Set.	
<u>TROUBLESHOOTING REFERENCES</u> Table 5-7.		

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-76. TRANSMISSION OIL TEMPERATURE SENDING UNIT MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Hex nut (5) and washer (4).	Remove.	
2. Wire (3).	Remove from terminal (2).	
3. Transmission oil temperature sending unit (1).	Remove.	

WIRE 73A

1. TRANSMISSION OIL TEMPERATURE SENDING UNIT

2. TERMINAL

3. WIRE

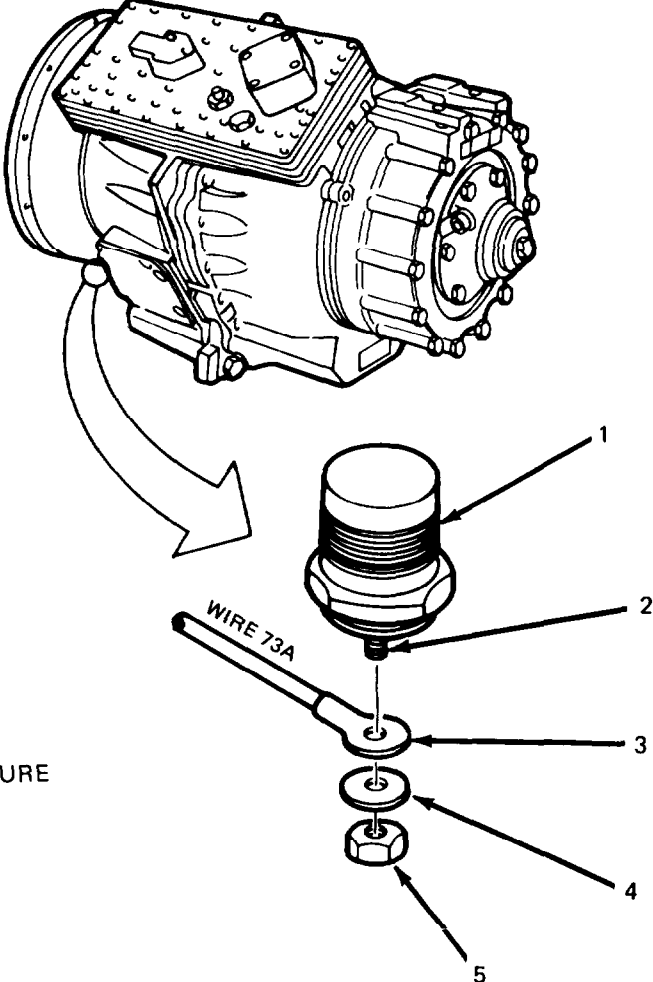
4. WASHER

5. HEX NUT

TA 074821

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-76. TRANSMISSION-OIL TEMPERATURE SENDING UNIT MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION.		
4. Transmisison oil tempera- ture sending unit (1).	Coat threads with liquid teflon. Install and tighten.	
5. Wire (3).	Replace on terminal (2).	
6. Washer (4) and hex nut (5).	Replace on terminal (2), and tighten.	
NOTE Follow on maintenance required: Fill transmission per paragraph 6-9.  LEGEND: 1. TRANSMISSION OIL TEMPERATURE SENDING UNIT 2. TERMINAL 3. WIRE 4. WASHER 5. HEX NUT		

TA 074822

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

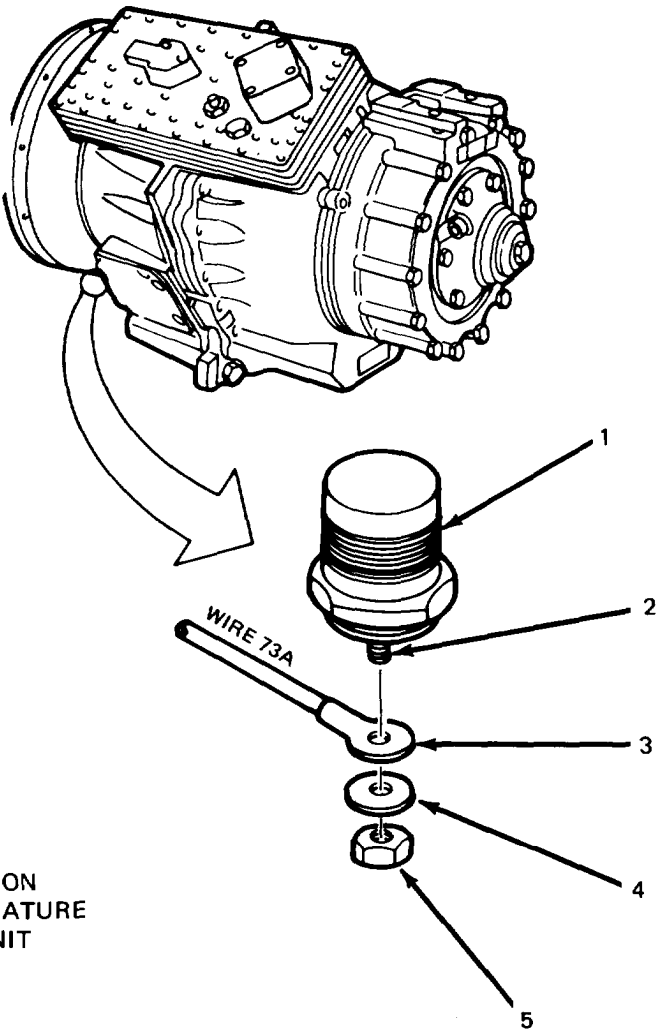
5-76. TRANSMISSION OIL TEMPERATURE SENDING UNIT MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS

C. OPERATIONAL CHECK.

7. Engine.

Start-up (refer to TM 9-2320-273-10).
Check TRANS OIL TEMP gage to be
certain temperature readings go up as
the oil warms.



LEGEND:

- 1. TRANSMISSION OIL TEMPERATURE SENDING UNIT
- 2. TERMINAL
- 3. WIRE
- 4. WASHER
- 5. HEX NUT

TA 074823

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-77. BACKUP SWITCH AND CLUTCH DISENGAGEMENT SENSOR MAINTENANCE.**THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

- a. Removal. (5)
 - b. Installation. (5)
 - c. Operational Check. (2)
- 12 Minutes Total.

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS**MATERIALS/PARTS (P/N)**

Liquid Teflon (Refer to Appendix C).

**EQUIPMENT CONDITION
PARAGRAPH**

6-9C.

9-13A.

CONDITION DESCRIPTIONCab Floor Inspection
Plate Removed.

Air Reservoirs Drained.

PERSONNEL REQUIRED

Two (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)TM 9-2320-273-10.
TM 9-2320-273-20P.**GENERAL SAFETY INSTRUCTIONS**Engine Off.
Transmission in Neutral.
Park Brake Set.**TROUBLESHOOTING REFERENCES**

Table 5-12.

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-77. BACKUP SWITCH AND CLUTCH DISENGAGEMENT SENSOR MAINTENANCE (Continued).

LOCATION/ITEM

ACTION

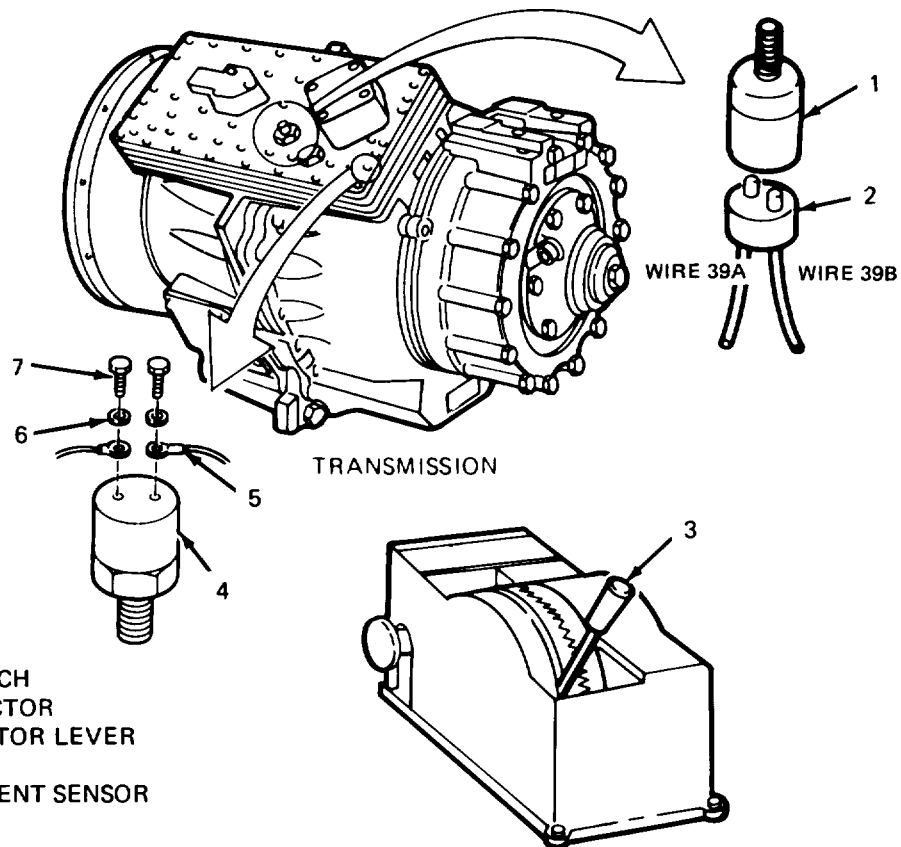
REMARKS

NOTE

On M915 model only, access can be gained outside truck by reaching through under cab floor.

A. REMOVAL.

1. Wire Connector (2).	Disconnect.	
2. Backup switch (1).	Remove.	
3. Two screws (7) and washers (6).	Unscrew and remove two wires (5).	Mark for identification.
4. Clutch disengagement sensor (4).	Unscrew and remove.	



LEGEND:

1. BACKUP SWITCH
2. WIRE CONNECTOR
3. RATIO SELECTOR LEVER
4. CLUTCH
DISENGAGEMENT SENSOR
5. WIRE (2)
6. WASHER (2)
7. SCREW (2)

TA 074824

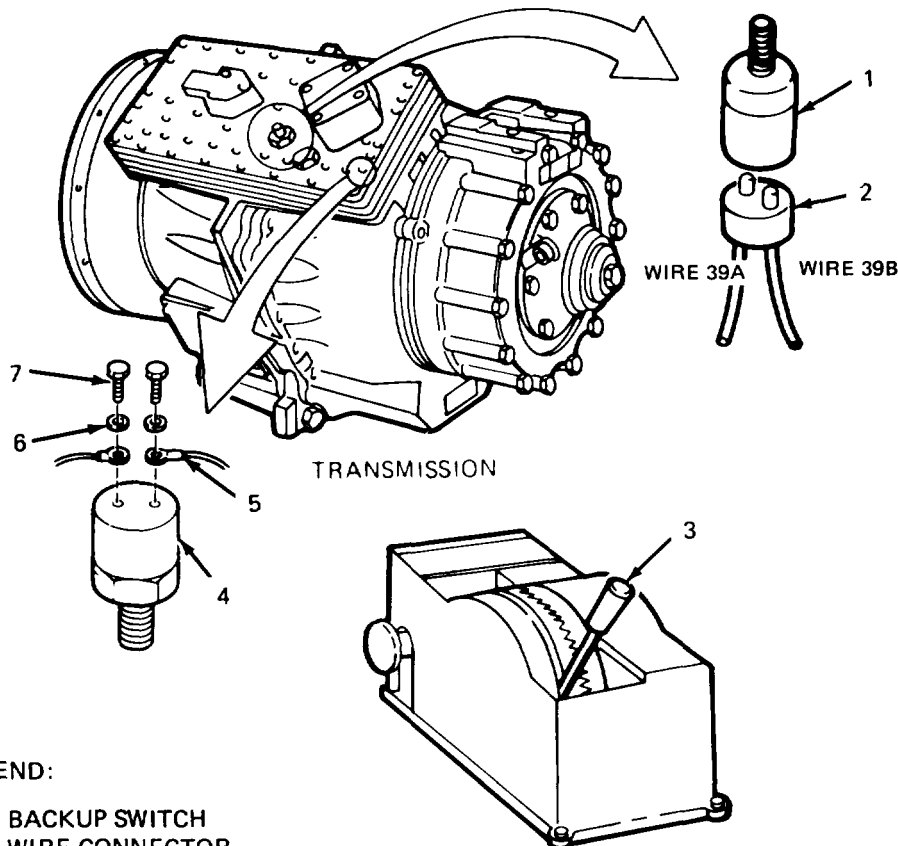
SENDING UNITS, SWITCHING DEVICES. AND WINTERIZATION KIT.

5-77. BACKUP SWITCH AND CLUTCH DISENGAGEMENT SENSOR MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION.		
5. Backup switch (1).	Coat threads with liquid Teflon. Install and tighten.	
6. Wire connector (2).	Connect to backup switch (1).	
7. Clutch disengagement sensor (4).	Apply liquid Teflon to threads and screw into valve body.	
8. Two wires (5).	Fasten to terminals with two washers (6) and screws (7).	
9. Cab floor inspection plate.	Replace per paragraph 6-9. (M916 thru M920 only).	
C. OPERATIONAL CHECK.		
10. Engine.	Start up (see TM 9-2320-273-10).	
11. Ratio selector lever (3).	Set to R1 or R2	First mechanic.
	Verify that backup lamps come ON.	Second mechanic.
12. Vehicle.	Test drive. Check operation of engine retarder (see TM 9-2320-273-10).	Disengagement sensor should override engine retarder when rpm drops below 700.

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-77. BACKUP SWITCH AND CLUTCH DISENGAGEMENT SENSOR MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
 TRANSMISSION WIRE 39A WIRE 39B LEGEND: 1. BACKUP SWITCH 2. WIRE CONNECTOR 3. RATIO SELECTOR LEVER 4. CLUTCH DISENGAGEMENT SENSOR 5. WIRE (2) 6. WASHER (2) 7. SCREW (2)		

TA 074825

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-78. BACKUP ALARM MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

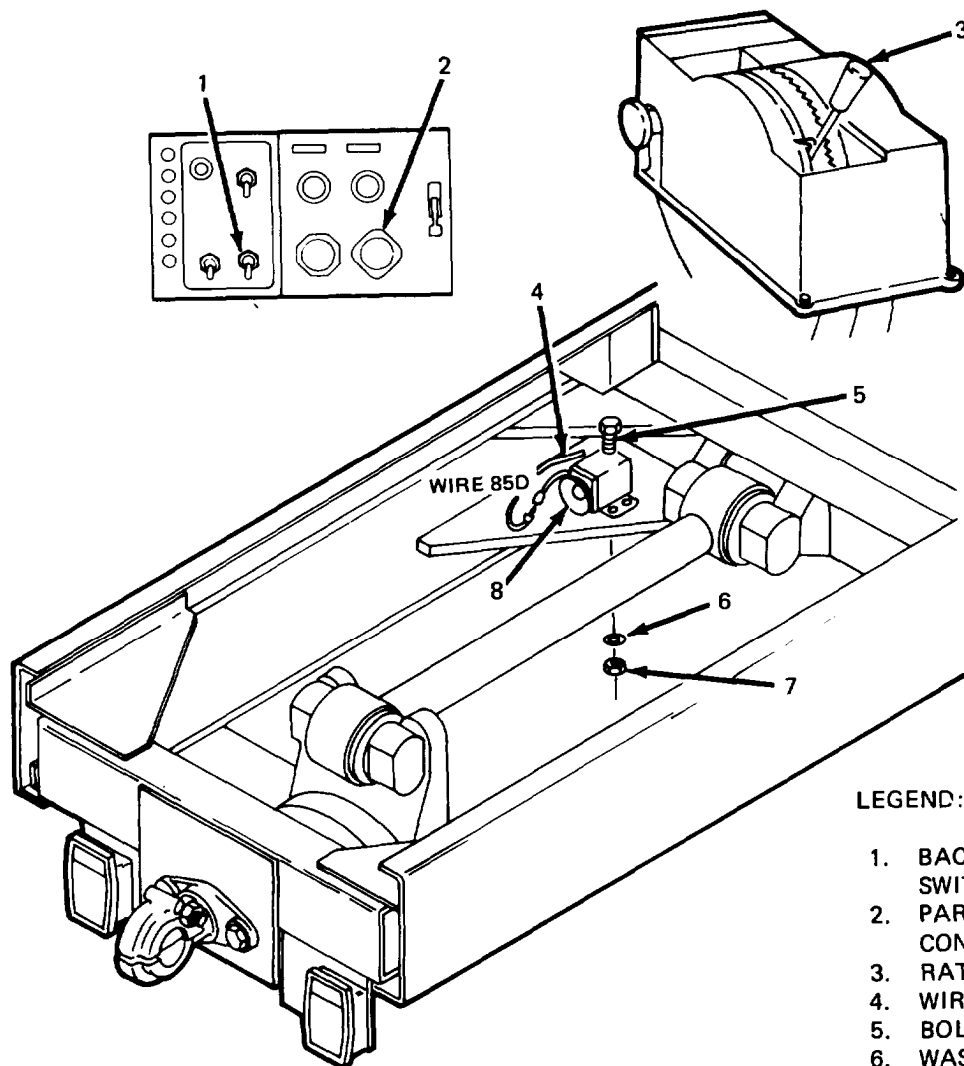
- a. Removal. (5)
b. Installation. (5)
c. Operational Check. (2)
12 Minutes Total.

<u>INITIAL SETUP</u>	<u>EQUIPMENT CONDITION</u>	<u>CONDITION DESCRIPTION</u>
<u>APPLICABLE CONFIGURATIONS</u>		
M916 thru M920.	None.	None.
<u>TEST EQUIPMENT</u>		
None.		
<u>SPECIAL TOOLS</u>		
None.		
<u>MATERIALS/PARTS (P/N)</u>		
None.		
<u>PERSONNEL REQUIRED</u>	<u>SPECIAL ENVIRONMENTAL CONDITIONS</u>	
One (MOS-63B20).	Vehicle Parked on Level Ground.	
<u>REFERENCES (TM)</u>	<u>GENERAL SAFETY INSTRUCTIONS</u>	
TM 9-2320-273-10.	Engine Off. Transmission in Neutral. Park Brake Set.	
<u>TROUBLESHOOTING REFERENCES</u>		
Table 5-6.		

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-78. BACKUP ALARM MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Wire (4).	Disconnect.	
2. Four bolts (5), washers (6), and nuts (7).	Remove.	
3. Backup alarm (8).	Remove.	



LEGEND:

1. BACKUP ALARM SWITCH
2. PARKING BRAKE CONTROL
3. RATIO SELECTOR
4. WIRE
5. BOLT (4)
6. WASHER (4)
7. NUT (4)
8. BACKUP ALARM

TA 074826

SENDING UNITS. SWITCHING DEVICES. AND WINTERIZATION KIT.

5-78. BACKUP ALARM MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION.		
4. Backup alarm (8).	Aline mounting holes.	
5. Four bolts (5), washers (6), and nuts (7).	Install and tighten.	
6. Wire (4).	Reconnect.	
C. OPERATIONAL CHECK.		
7. Engine.	Start up (see TM 9-2320-273-10).	
8. BACKUP ALARM switch (1).	Set to NORMAL.	
9. PARKING BRAKE control (2).	Pull ON.	
10. Ratio selector (3).	Set to R1 or R2.	
11. Backup alarm (8).	Verify that alarm operates.	

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-78. BACKUP ALARM MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
The diagram illustrates the components and assembly of a backup alarm system. At the top left, a control panel features two switches labeled 1 and 2. To the right, a ratio selector is labeled 3. The main assembly, shown in a perspective view, includes a wire (4) connected to a bolt (5). A label 'WIRE 85D' points to a specific wire. Washers (6) and nuts (7) are used to secure the assembly. A backup alarm (8) is also shown. A legend on the right lists the items: 1. BACKUP ALARM SWITCH, 2. PARKING BRAKE CONTROL, 3. RATIO SELECTOR, 4. WIRE, 5. BOLT (4), 6. WASHER (4), 7. NUT (4), 8. BACKUP ALARM. LEGEND: 1. BACKUP ALARM SWITCH 2. PARKING BRAKE CONTROL 3. RATIO SELECTOR 4. WIRE 5. BOLT (4) 6. WASHER (4) 7. NUT (4) 8. BACKUP ALARM		

TA 074827

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-79. FUEL LEVEL SENDING UNIT MAINTENANCE.**THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

a. Removal.	(5)
b. Installation.	(5)
c. Operational Check.	<u>(1)</u>
11 Minutes Total.	

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Sending Unit Gasket (2013).

EQUIPMENT CONDITION**PARAGRAPH**

None.

CONDITION DESCRIPTION

None.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.
 TM 9-2320-273-20P.

GENERAL SAFETY INSTRUCTIONS

Engine Off.
 Transmission in Neutral.
 Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 5-7.

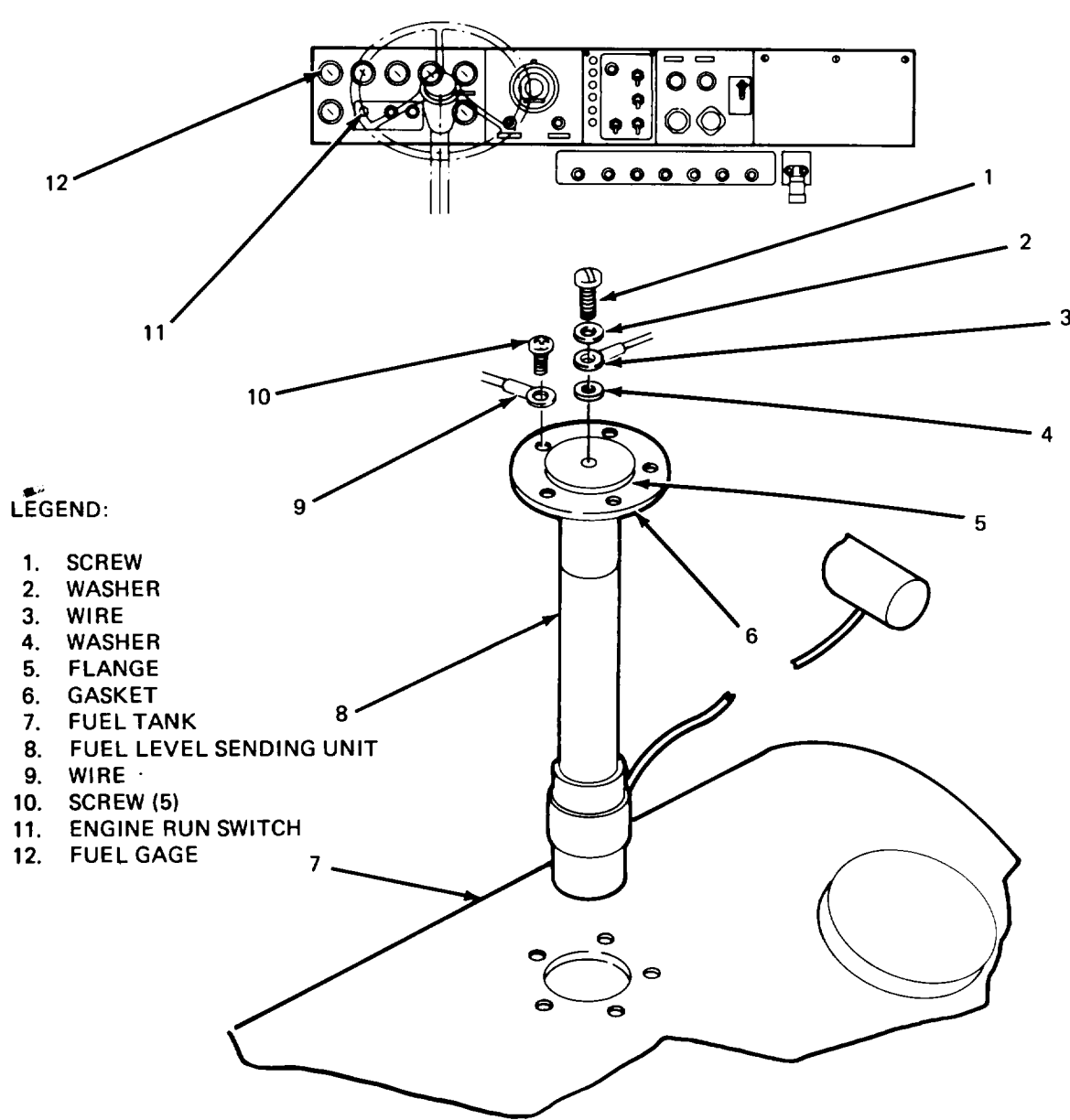
SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-79. FUEL LEVEL SENDING UNIT MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS

WARNING

Do not smoke or handle flammable materials while performing this task. Flame or explosion will cause physical injury.



TA 074828

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-79. FUEL LEVEL SENDING UNIT MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Screw (1) and washers (2) and (4).	Remove.	
2. Wire (3).	Remove.	
3. Five screws (10).	Remove.	
4. Wire (9).	Remove	
5. Flange (5). gasket (6). and fuel level sending unit (8).	Remove from tank {7}.	Discard gasket (6).
B. INSTALLATION.		
6. Fuel level sending unit (8), gasket (6), and flange (5).	Aline and insert into tank (7).	
7. Wire (9) and five screws (10).	Install and tighten.	
8. Wire (3), washers (2) and (4), and screw (1).	Install and tighten.	
C. OPERATIONAL CHECK.		
9. ENGINE RUN switch (11).	Turn ON. Verify that FUEL gage (12) indicates fuel level.	

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-80. LOW AIR PRESSURE BUZZER MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REWIRED FOLLOWS TASK DESCRIPTION.)

- a. Removal. (8)
- b. Installation. (5)
- c. Operational Check. (3)

16 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIAL/PARTS (P/N)

None.

EQUIPMENT CONDITION

PARAGRAPH

5-37A.

9-13A.

CONDITION DESCRIPTION

Batteries Disconnected.

Air Reservoirs Drained.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.

GENERAL SAFETY INSTRUCTIONS

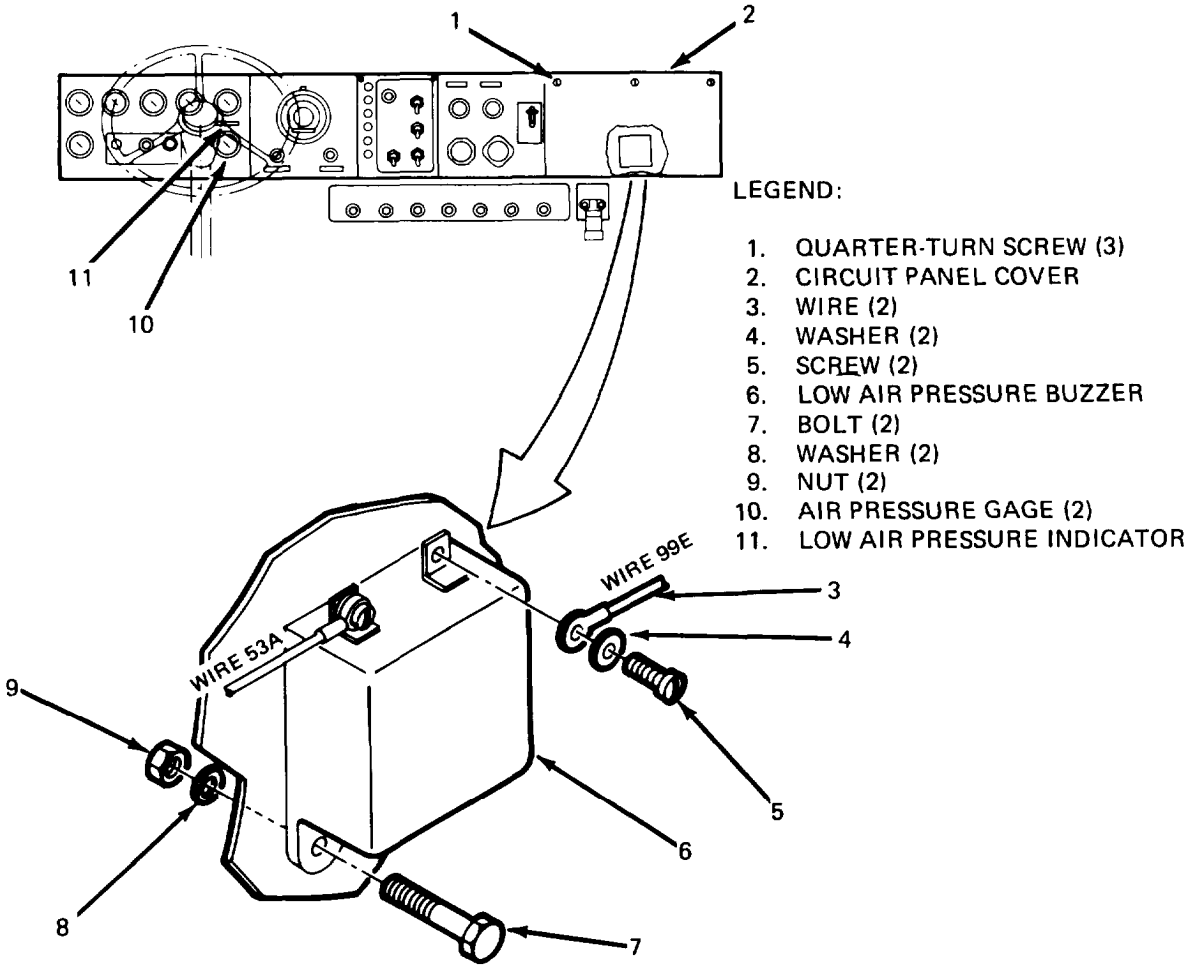
Engine Off.
Transmission in Neutral.
Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 5-6.

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-80. LOW AIR PRESSURE BUZZER MAINTENANCE. (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Three quarter-turn screws (1).	Loosen.	
2. Circuit panel cover (2).	Lower.	
		
LEGEND:		
1.	QUARTER-TURN SCREW (3)	
2.	CIRCUIT PANEL COVER	
3.	WIRE (2)	
4.	WASHER (2)	
5.	SCREW (2)	
6.	LOW AIR PRESSURE BUZZER	
7.	BOLT (2)	
8.	WASHER (2)	
9.	NUT (2)	
10.	AIR PRESSURE GAGE (2)	
11.	LOW AIR PRESSURE INDICATOR	

TA 074830

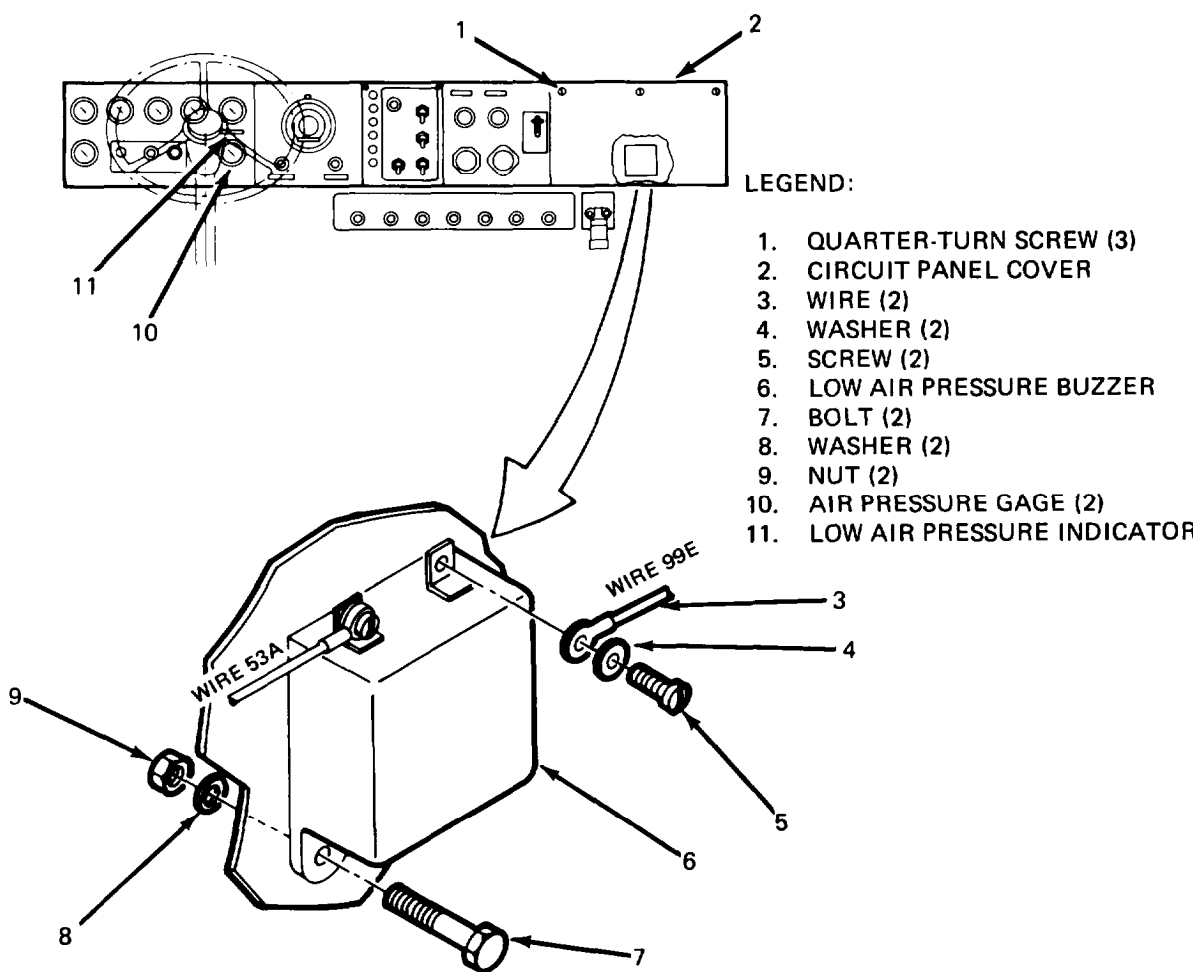
SENDING UNITS. SWITCHING DEVICES, AND WINTERIZATION KIT.

5-80. LOW AIR PRESSURE BUZZER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
3. Two screws (5) washers (4).	Remove.	
4. Two wires (3).	Remove.	
5. Two bolts (7) washers (8) and nuts (9).	Remove.	
6. Low air pressure buzzer (6).	Remove.	
B. INSTALLATION.		
7. Low air pressure buzzer (6).	Aline mounting holes.	
8. Two bolts (7), washers (8), and nuts (9).	Install and tighten.	
9. Two wires (3).	Place on low air pressure buzzer (6) according to figure.	
10. Two washers (4) and screws (5).	Install and tighten.	
11. Circuit panel cover (2).	Raise into place.	
12. Three quarter-turn screws (1).	Tighten.	
13. Batteries.	Connect per paragraph 5-37B.	
C. OPERATIONAL CHECK		
14. Engine.	Start up (see TM 9-2320-273-10).	
15. Two AIR PRESSURE GAGES (10), LOW AIR PRESSURE INDICATOR (11), LOW AIR PRESSURE BUZZER (6).	Verify that gages indicate LOW PRESSURE. indicator lamp comes ON, and buzzer is ACTIVATED.	

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-80. LOW AIR PRESSURE BUZZER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
 LEGEND: 1. QUARTER-TURN SCREW (3) 2. CIRCUIT PANEL COVER 3. WIRE (2) 4. WASHER (2) 5. SCREW (2) 6. LOW AIR PRESSURE BUZZER 7. BOLT (2) 8. WASHER (2) 9. NUT (2) 10. AIR PRESSURE GAGE (2) 11. LOW AIR PRESSURE INDICATOR		

TA 074831

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-81. LOW AIR PRESSURE SWITCH MAINTENANCE.**THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

- a. Removal. (9)
 b. Installation, (10)
 c. Operational Check, (6)
 25 Minutes Total.

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (Refer to Appendix C).

EQUIPMENT CONDITION**PARAGRAPH**

5-37A.

9-13A.

CONDITION DESCRIPTION

Batteries Disconnected.

Air Reservoirs Drained.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.

TM 9-2320-273-20P.

GENERAL SAFETY INSTRUCTIONS

Engine Off.

Transmission in Neutral.

Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 5-6.

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-81. LOW AIR PRESSURE SWITCH MAINTENANCE (Continued).

LOCATION/ITEM

ACTION

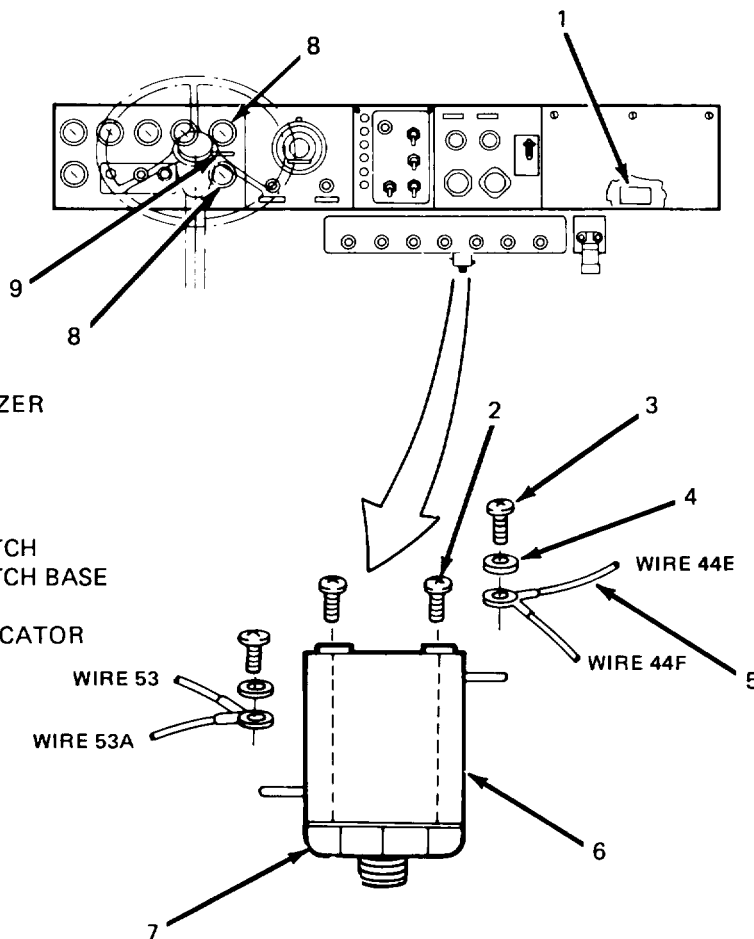
REMARKS

NOTE

Switch is located on firewall.

A. REMOVAL.

1. Two screws (3), washers (4) and four wires (5). Remove.
2. Two screws (2). Remove.
3. Low air pressure switch (6). Remove.
4. Low air pressure switch base (7). Remove.



LEGEND:

1. LOW AIR PRESSURE BUZZER
2. SCREW (2)
3. SCREW (2)
4. WASHER (2)
5. WIRE (4)
6. LOW AIR PRESSURE SWITCH
7. LOW AIR PRESSURE SWITCH BASE
8. AIR PRESSURE GAGE (2)
9. LOW AIR PRESSURE INDICATOR

TA 074832

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-81. LOW AIR PRESSURE SWITCH MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION.		
5. Low air pressure switch base (7).	Coat threads with liquid teflon. Install and tighten.	
6. Low air pressure switch (6).	Align and install on base (7).	
7. Two screws (2).	Install and tighten.	
8. Four wires (5), two washers (4) and screws (3).	Install and tighten.	
9. Batteries.	Connect per paragraph 5-37B.	
C. OPERATIONAL CHECK,		
10. Engine.	Start up (see TM 9-2320-273-10).	
11. LOW AIR PRESSURE gages (8), LOW AIR PRESSURE indicator (9) and low air pressure buzzer (1).	Verify that gages indicate low pressure, indicator lamp comes ON, and buzzer is activated.	

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-81. LOW AIR PRESSURE SWITCH MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
LEGEND: 1. LOW AIR PRESSURE BUZZER 2. SCREW (2) 3. SCREW (2) 4. WASHER (2) 5. WIRE (4) 6. LOW AIR PRESSURE SWITCH 7. LOW AIR PRESSURE SWITCH BASE 8. AIR PRESSURE GAGE (2) 9. LOW AIR PRESSURE INDICATOR WIRE 53 WIRE 53A WIRE 44E WIRE 44F		

TA 074833

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-82. PARK BRAKE SWITCH MAINTENANCE.		
THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)		
a. Removal. (3) b. Installation. (3) c. Operational Check. (5) 11 Minutes Total.		
INITIAL SETUP <u>APPLICABLE CONFIGURATIONS</u> All. <u>TEST EQUIPMENT</u> None. <u>SPECIAL TOOLS</u> None. <u>MATERIALS/PARTS (P/N)</u> Liquid Teflon (Refer to Appendix C).	EQUIPMENT CONDITION <u>PARAGRAPH</u> 5-37A. 9-13A.	CONDITION DESCRIPTION Batteries Disconnected. Air Reservoirs Drained.
<u>PERSONNEL REQUIRED</u> One (MOS-63B20). <u>REFERENCES (TM)</u> TM 9-2320-273-10. TM 9-2320-273-20P. <u>TROUBLESHOOTING REFERENCES</u> Table 5-7.	<u>SPECIAL ENVIRONMENTAL CONDITIONS</u> Vehicle Parked on Level Ground. <u>GENERAL SAFETY INSTRUCTIONS</u> Engine Off. Transmission in Neutral. Park Brake Set.	

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-82. PARK BRAKE SWITCH MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS

A. REMOVAL.

1. Three quarter-turn screws (1). Loosen.
2. Circuit panel cover (2). Lower.

The diagram illustrates the removal of the park brake switch. The top portion shows a circuit panel with a cover (2) being lowered. A screw (1) is being loosened. The bottom portion shows the park brake switch (4) being removed from the panel. Wires 44F, 44G, and 53D are shown connected to the switch. An adapter (5) and washer (6) are also shown.

LEGEND:

1. QUARTER-TURN SCREW (3)
2. CIRCUIT PANEL COVER
3. WIRE (3)
4. PARK BRAKE SWITCH
5. ADAPTER
6. WASHER (2)
7. SCREW (2)
8. PARKING BRAKE CONTROL
9. PARK BRAKE INDICATOR

TA 074834

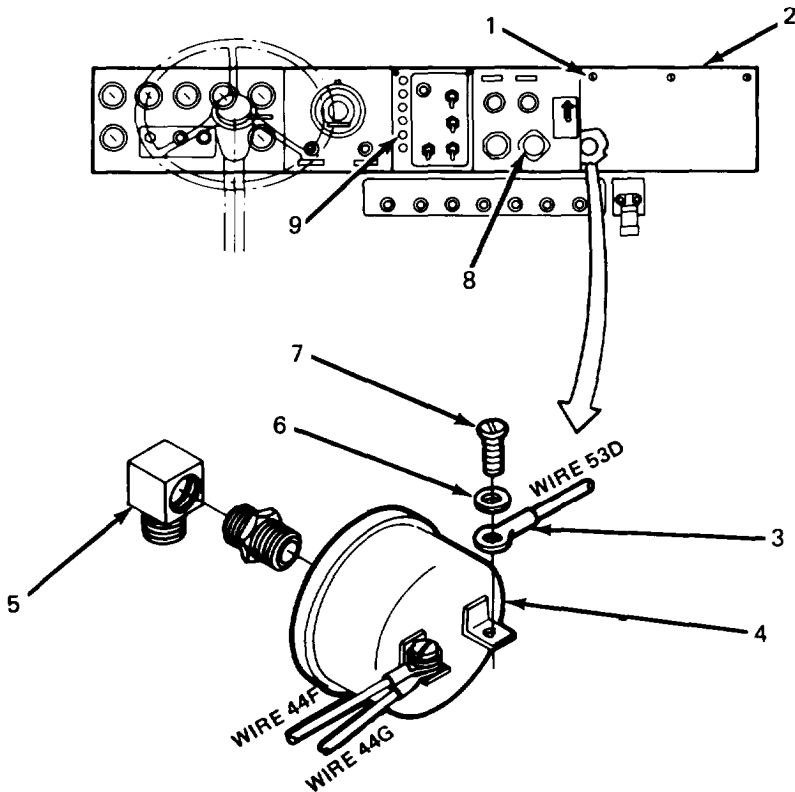
SENDING UNITS, SWITCHING DEVICES AND WINTERIZATION KIT.

5-82. PARK BRAKE SWITCH MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
3. Two screws (7) and washers (6).	Remove.	
4. Three wires (3).	Remove.	
5. Park brake switch (4).	Remove from adapter (5).	
B. INSTALLATION.		
6. Park brake switch (4).	Coat threads with liquid teflon. Install and tighten into adapter (5).	
7. Three wires (3), two washers (6) and screws (7).	Install and tighten,	
8. Circuit panel cover (2).	Raise into place.	
9. Three quarter-turn screws (1).	Tighten.	
10. Batteries.	Connect per paragraph 5-37B.	
C. OPERATIONAL CHECK		
11. Engine.	Start up (see TM 9-2320-273-10).	
12. PARKING BRAKE control (8).	Pull ON.	
13. PARK BRAKE indicator (9).	Observe that indicator lamp comes ON.	

SENDING UNITS. SWITCHING DEVICES, AND WINTERIZATION KIT.

582. PARK BRAKE SWITCH MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
 LEGEND: 1. QUARTER-TURN SCREW (3) 2. CIRCUIT PANEL COVER 3. WIRE (3) 4. PARK BRAKE SWITCH 5. ADAPTER 6. WASHER (2) 7. SCREW (2) 8. PARKING BRAKE CONTROL 9. PARK BRAKE INDICATOR		

TA 074835

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-83. DIFFERENTIAL LOCK-UP SWITCH MAINTENANCE.**THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

Removal.	(3)
Installation.	(3)
Operational Check.	(2)
8 Minutes Total.	

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (Refer to Appendix C).

**EQUIPMENT CONDITION
PARAGRAPH**

5-37A.

9-13A.

CONDITION DESCRIPTION

Batteries Disconnected.

Air Reservoirs Drained.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground,

REFERENCES (TM)

TM 9-23202-273-10.

TM 9-2320-273-20P.

GENERAL SAFETY INSTRUCTIONS

Engine OFF

Transmission in Neutral

Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 5-7.

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-83. DIFFERENTIAL LOCK-UP SWITCH MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Three quarter-turn screws (1).	Loosen.	
2. Circuit panel cover (2).	Lower .	
3. Two screws (7) and washers (6).	Remove.	
4. Two wires (3).	Remove.	
5. Differential lock-up switch (4).	Remove.	
6. Hex nut (5).	Remove.	

LEGEND:

1. QUARTER-TURN SCREW (3)
2. CIRCUIT PANEL COVER
3. WIRE (2)
4. DIFFERENTIAL LOCK-UP SWITCH
5. HEX NUT
6. WASHER (2)
7. SCREW (2)
8. DIFFERENTIAL LOCK-UP CONTROL
9. DIFFERENTIAL LOCK-UP INDICATOR

TA 074836

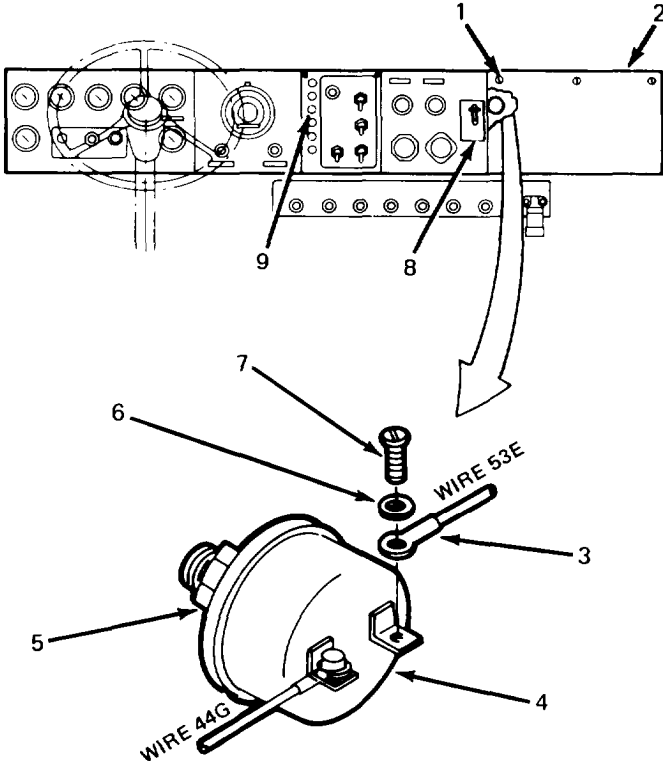
SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-83. DIFFERENTIAL L LOCK-UP SWITCH MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION.		
7. Hex nut (5).	Install on differential lock-up switch (4).	
8. Differential lock-up switch (4).	Coat threads with liquid teflon. Install and tighten.	
9. Hex nut (5).	Tighten.	
10. Two wires (3), washers (6) screws (7).	Install and tighten.	
11. Circuit panel cover (2).	Raise into place.	
12. Three quarter-turn screws (1).	Tighten.	
13. Batteries.	Connect per paragraph 5-37B.	
C. OPERATIONAL CHECK.		
14. Engine.	Start up (see TM 9-2320-273-10).	
15. DIFFERENTIAL LOCK-UP control (8).	Set to LOCK.	
16. DIFFERENTIAL LOCK-UP indicator (9).	Observe that indicator lamp comes on.	

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-83. DIFFERENTIAL LOCK-UP SWITCH MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
LEGEND: 1. QUARTER-TURN SCREW (3) 2. CIRCUIT PANEL COVER 3. WIRE (2) 4. DIFFERENTIAL LOCK-UP SWITCH 5. HEX NUT 6. WASHER (2) 7. SCREW (2) 8. DIFFERENTIAL LOCK-UP CONTROL 9. DIFFERENTIAL LOCK-UP INDICATOR		

TA 074837

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-84. POWER TAKEOFF(PTO) SWITCH MAINTENANCE.**THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

- a. Removal. (5)
- b. Installation. (5)
- c. Operational Check. (2)

12 Minutes Total.

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

M916 Thru M920.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

EQUIPMENT CONDITION**PARAGRAPH**

None.

CONDITION DESCRIPTION

None

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.

GENERAL SAFETY INSTRUCTIONS

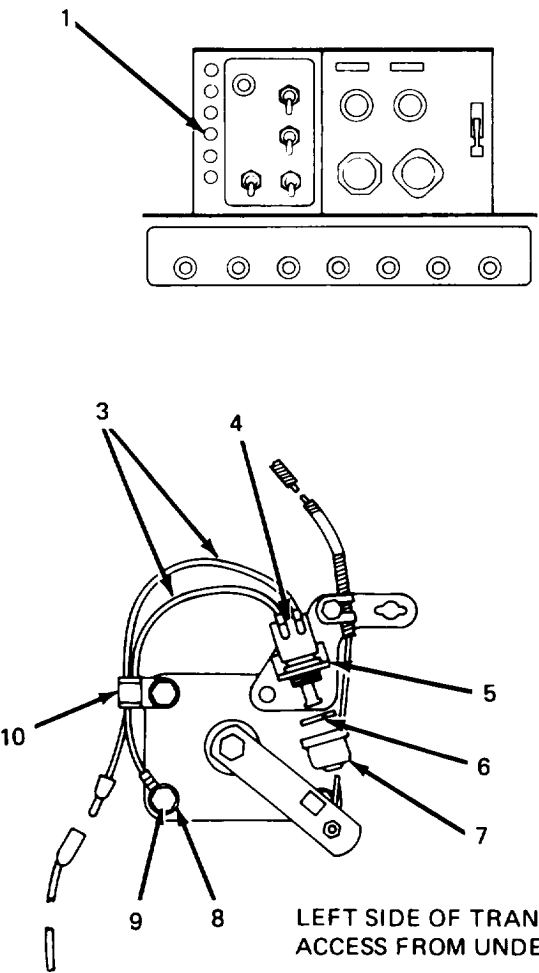
Engine OFF.
Transmission in Neutral.
Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 12-2.

SENDING UNITS. SWITCHING DEVICES AND WINTERIZATION KIT.

5-84. POWER TAKEOFF (PTO) SWITCH MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Nutcap (7) and lockwasher (6).	Remove.	
2. Two screws (9), grounding washer (8) and wire clamp (10).	Remove with two wires (3).	
 LEFT SIDE OF TRANSMISSION ACCESS FROM UNDER VEHICLE		
LEGEND: 1. PTO INDICATOR 2. PTO CONTROL KNOB 3. WIRE (2) 4. PTO SWITCH 5. BRACKET 6. LOCKWASHER 7. NUTCAP 8. GROUNDING WASHER 9. SCREW (2) 10. WIRE CLAMP		

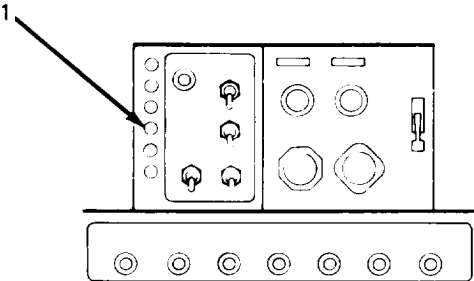
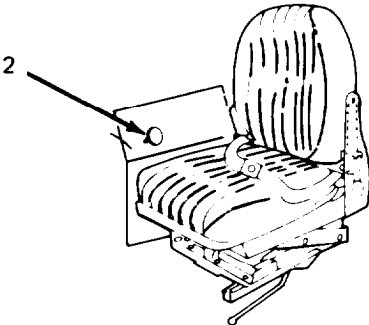
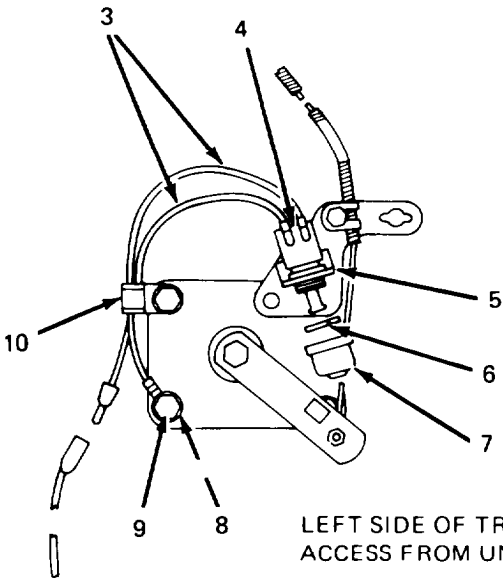
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SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-84. POWER TAKEOFF (PTO) SWITCH MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
3. PTO switch (4).	Remove from bracket (5).	
B. INSTALLATION.		
4. PTO switch (4).	Install on bracket (5).	
5. Lockwasher (6) and nutcap (7).	Install and tighten.	
6. Two wires (3).	Install on PTO switch (4).	
7. Two screws (9), grounding washer (8) and wire clamp (10).	Install to PTO.	
C. OPERATIONAL CHECK.		
8. Engine.	Start up (see TM 9-2320-273-10).	
9. PTO control knob (2).	Pull to engage.	
10. PTO indicator (1).	Observe that indicator lamp comes ON.	

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-84. POWER TAKEOFF (PTO) SWITCH MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
   LEFT SIDE OF TRANSMISSION ACCESS FROM UNDER VEHICLE LEGEND: 1. PTO INDICATOR 2. PTO CONTROL KNOB 3. WIRE (2) 4. PTO SWITCH 5. BRACKET 6. LOCKWASHER 7. NUTCAP 8. GROUNDING WASHER 9. SCREW (2) 10. WIRE CLAMP		

TA 074839

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-85. STOPLAMP SWITCH MAINTENANCE.**THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

- a. Removal. (2)
 b. Installation (2)
 c. Operational Check. (1)
5 Minutes Total.

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

**EQUIPMENT CONDITION
PARAGRAPH**

None.

CONDITION DESCRIPTION

None.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

PERSONNEL REQUIRED

Two (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

References (TM)

TM 9-2320-273-10.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
 Transmission in Neutral.
 Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 5-11.

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-85. STOPLAMP SWITCH MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL. 1. Two nuts (2) and washers (3). Remove. 2. Two wires (4). Remove. 3. Two screws (5). Remove. 4. Stoplamp switch (6). Remove. LEGEND: 1. OPERATION SWITCH 2. NUT (2) 3. WASHER (2) 4. WIRE (2) 5. SCREW (2) 6. STOPLAMP SWITCH 7. BRAKE PEDAL LEFT SIDE ENGINE COMPARTMENT FIRE WALL TA 074840		

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-85. STOPLAMP SWITCH MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION.		
5. Stoplamp switch (6).	Aline and install.	
6. Two screws (5).	Install and tighten.	
7. Two wires (4), washers (3) and nuts (2).	Install and tighten.	
C. OPERATIONAL CHECK.		
8. Engine.	Start up (see TM 9-2320-273-10).	
9. OPERATION switch (1).	Set to NORMAL.	
10. BRAKE pedal (7).	Press DOWN.	First mechanic.
11. BRAKE lamps.	Verify that brake lamps come ON.	Second mechanic.

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-85. STOPLAMP SWITCH MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
LEGEND: 1. OPERATION SWITCH 2. NUT (2) 3. WASHER (2) 4. WIRE (2) 5. SCREW (2) 6. STOPLAMP SWITCH 7. BRAKE PEDAL LEFT SIDE ENGINE COMPARTMENT FIRE WALL		

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SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-86. INSTRUMENT RELAY MAINTENANCE.**THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

- a. Removal. (2)
 b. Installation, (2)
 c. Operational Check. (1)
 5 Minutes Total.

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

1. M917, M918, M919 – Two Relays.
2. M915 – Seven Relays.
3. M916 and M920 – Eight Relays.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

**EQUIPMENT CONDITION
PARAGRAPH**

None.

CONDITION DESCRIPTION

None.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
 Transmission in Neutral.
 Park Brake Set.

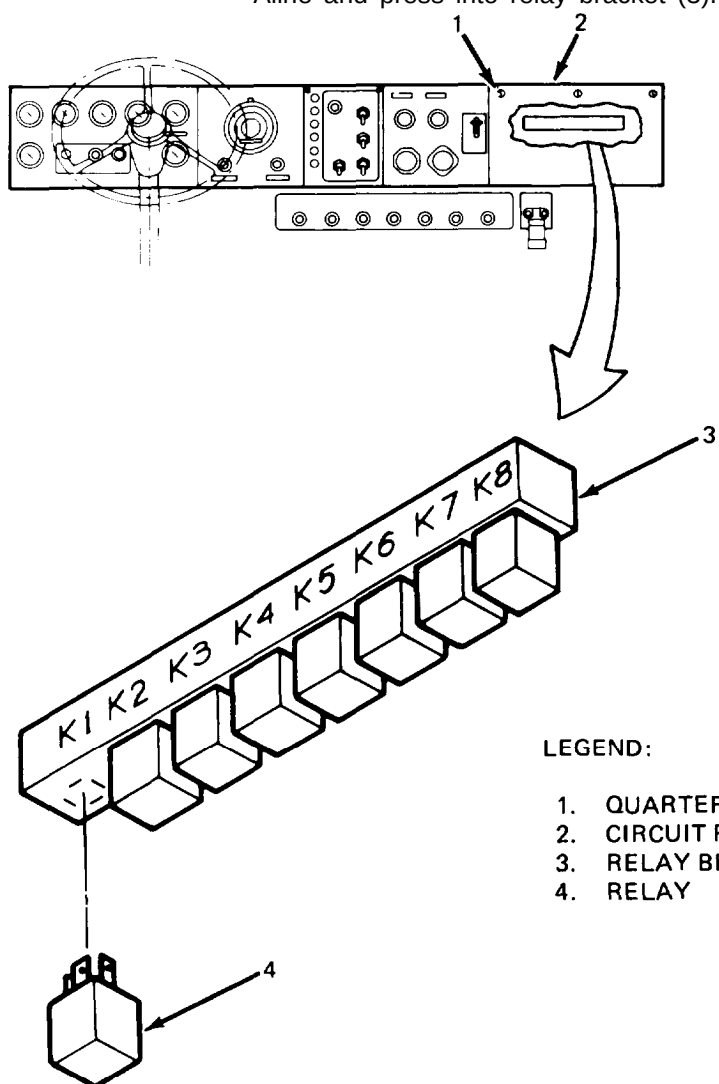
TROUBLESHOOTING REFERENCES

None.

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

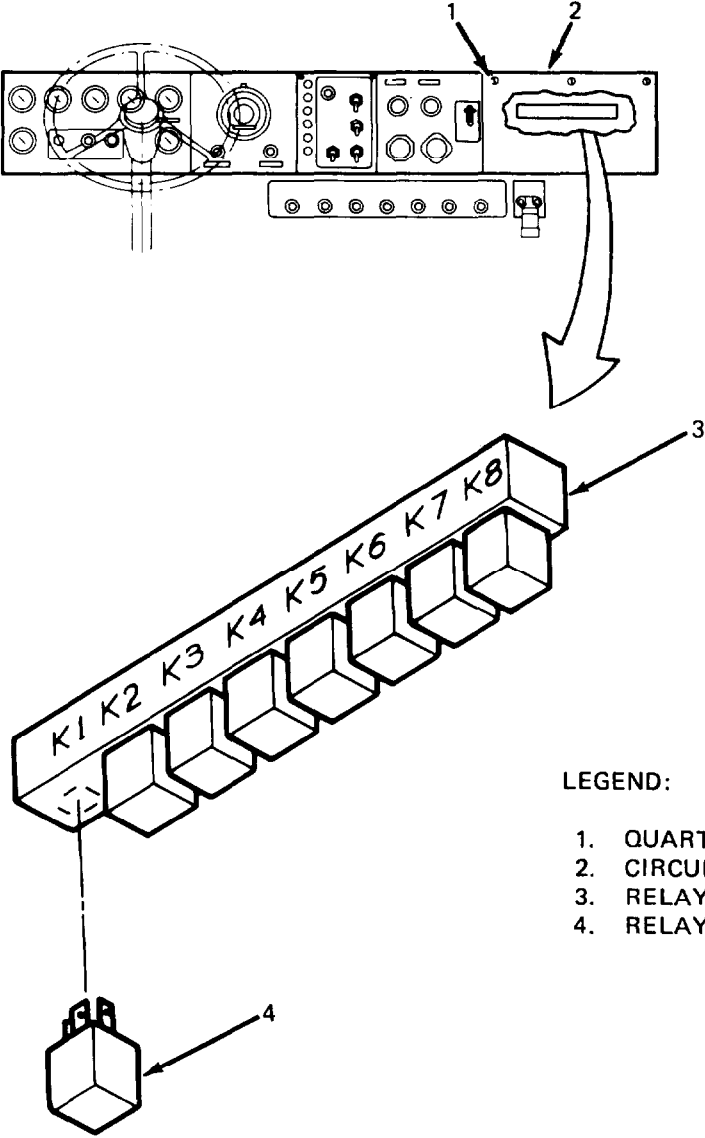
5-86. INSTRUMENT RELAY MAINTENANCE

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Three quarter-turn screws (1).	Loosen.	
2. Circuit panel cover (2).	Lower.	
3. Relay (4).	Remove from relay bracket (3).	
4. Relay (4).	Align and press into relay bracket (3).	



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SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-86. INSTRUMENT RELAY MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION (Continued).		
5. Circuit panel cover (2).	Raise into place.	
6. Three quarter-turn screws (1).	Tighten.	
C. OPERATIONAL CHECK.		
7. Relay.	Refer to paragraph 2-34 and check the operation of the relay replaced.	
		
LEGEND: 1. QUARTER-TURN SCREW (3) 2. CIRCUIT PANEL COVER 3. RELAY BRACKET 4. RELAY		
TA 074843		

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SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-87. WINTERIZATION KIT CIRCUIT BREAKERS, BOX, AND RECEPTACLE MAINTENANCE.**THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

a. Removal of Circuit Breaker (es).	(15)	d. Removal of Circuit Breaker Box and Receptacle,	(60)
b. Installation of Circuit Breaker (es).	(15)	e. Installation of Circuit Breaker Box and Receptacle.	(60)
c. Operational Check.	(15)	f. Operational Check	(30)
			<u>195</u> Minutes
			Total.

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

EQUIPMENT CONDITION**PARAGRAPH**

5-37A.

CONDITION DESCRIPTION

Batteries Disconnected.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

30 Amp Circuit Breaker (1).

15 Amp Circuit Breaker (3).

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.

TM 9-2320-273-20P.

GENERAL SAFETY INSTRUCTIONS

Engine Off.

Transmission in Neutral.

Park Brake Set.

110 VAC Cable Disconnected From

Power Source and Receptacle.

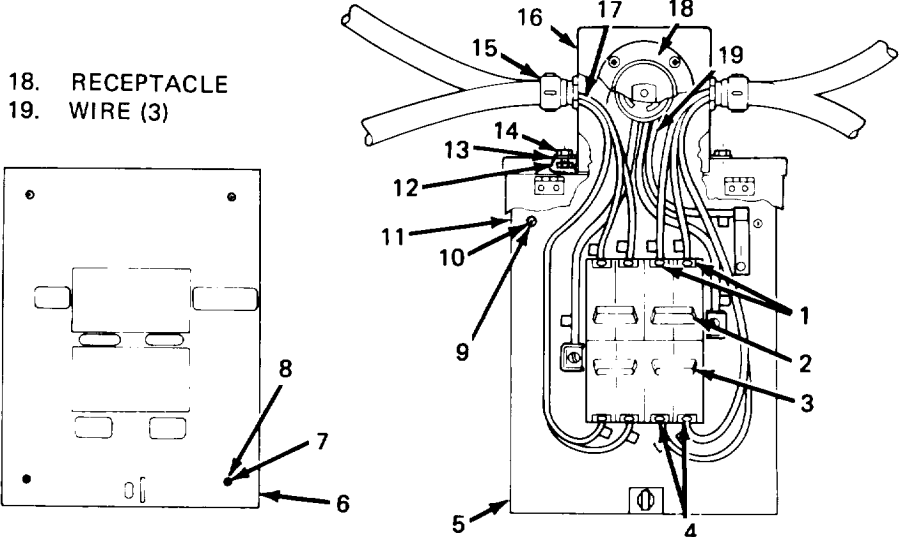
All Breakers Set to OFF.

TROUBLESHOOTING REFERENCES

Table 5-14.

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-87. WINTERIZATION KIT CIRCUIT BREAKERS, BOX, AND RECEPTACLE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL OF CIRCUIT BREAKER.		
1. Four screws (7) and washers (8).	Remove and lift out inner panel (6).	Open outer cover to gain access to (6), (7), and (8).
2. Two screws (1) or (4).	Remove and lift off wires.	Screws (1) if 15 amp breaker; screws (4) if 30 amp breaker. Mark wires for location.
3. Circuit breaker (2) or (3).	Remove by pulling out.	Circuit breakers are the plug in type. Item (2) 15 amp; Item (3) 30 amp.
B. INSTALLATION OF CIRCUIT BREAKER.		
4. Circuit breaker (2) or (3).	Install by pushing into position.	Be sure breaker is securely snapped in.
5. Two screws (1) or (4).	Place wires into position on circuit breaker and secure with screws.	Be sure to reattach wires as marked in step 2.
6. Inner panel (6).	Set into position in box (5) and attach with four screws (7) and washers (8).	
LEGEND: 1. SCREW (2) 2. CIRCUIT BREAKER (3) 3. CIRCUIT BREAKER 4. SCREW (2) 5. BOX 6. INNER PANEL 7. SCREW (4) 8. WASHER (4) 9. BOLT (3) 10. WASHER (3) 11. NUT (3) 12. NUT (4) 13. WASHER (4) 14. BOLT (4) 15. CONNECTOR (4) 16. RECEPTACLE BOX 17. WIRE (8) 18. RECEPTACLE 19. WIRE (3) 		
		TA 074844

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-87. WINTERIZATION KIT CIRCUIT BREAKERS, BOX, AND RECEPTACLE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
C. OPERATIONAL CHECK.		
7. Receptacle (18).	Plug in 110 VAC power cord,	
8. Circuit breaker (2) or (3).	Flip replaced breaker to ON and verify that appropriate heater is functional.	After verifying proper heater functions, flip all breakers to OFF and disconnect power cord.
D. REMOVAL OF CIRCUIT BREAKER BOX AND RECEPTACLE.		
9. Breaker box (5).	Open outer cover, remove four washers (8) and screws (7) and inner panel (6) to gain access to box attaching hardware.	
10. Four cable to receptacle box connectors (15).	Unscrew.	
11. Six screws (1) and two screws (4).	Unscrew and remove eight wires (17).	Mark each wire and pull wire out of receptacle box.
12. Three bolts (9) with washers (10) and nuts (11).	Unscrew and remove circuit breaker box (5) with receptacle box (16) attached.	
13. Receptacle (18).	Remove retaining screws.	
14. Three wires (19).	Disconnect from receptacle (18) and remove receptacle.	Mark position before disconnecting.
15. Four bolts (14), washers (13) and nuts (12).	Unscrew and remove receptacle box (16) from circuit breaker box (5).	
E. INSTALLATION OF CIRCUIT BREAKER BOX AND RECEPTACLE.		
16. Receptacle box (16).	Attach to circuit box (5) with four bolts (14), washers (13) and nuts (12).	
17. Three wires..	Connect to receptacle (18) and install receptacle to box (16).	
18. Circuit breaker box (5).	Mount to vehicle with three bolts (9), washers (10) and nuts (11).	
19. Eight wires (17).	Push thru either side of receptacle box and fasten to circuit breakers as marked, with six screws (1) and two screws (4).	

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-87. WINTERIZATION KIT CIRCUIT BREAKERS. BOX, AND RECEPTACLE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
E. INSTALLATION OF CIRCUIT BREAKER BOX AND RECEPTACLE (Continued).		
20. Four cable connectors (15),	Screw onto receptacle box (16).	
21. Inner panel (6).	Fasten to box (5) with four screws (7) and washers (8).	Insure all breakers are OFF.
F. OPERATIONAL CHECK.		
22. Receptacle (18).	Plug in 110 VAC power cord.	
23. Four circuit breakers (2) and (3).	Flip to ON and verify that all four heaters are functioning.	
24. Four circuit breakers (2) and (3).	Flip to OFF, disconnect power cord and close outer cover on circuit breaker box (5).	
NOTE Follow-on maintenance action required: Connect 12 VDC vehicle batteries per para 5-37B.		
LEGEND: 1. SCREW (2) 2. CIRCUIT BREAKER (3) 3. CIRCUIT BREAKER 4. SCREW (2) 5. BOX 6. INNER PANEL 7. SCREW (4) 8. WASHER (4) 9. BOLT (3) 10. WASHER (3) 11. NUT (3) 12. NUT (4) 13. WASHER (4) 14. BOLT (4) 15. CONNECTOR (4) 16. RECEPTACLE BOX 17. WIRE (8) 18. RECEPTACLE 19. WIRE (3)		

TA 074845

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-88. WINTERIZATION KIT TRANSMISSION OIL HEATER MAINTENANCE.**THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

- a. Removal of Transmission Oil Heater, (30)
 - b. Installation of Transmission Oil Heater. (30)
 - c. Operational Check. (15)
- 75 Minutes Total.

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

EQUIPMENT CONDITION**PARAGRAPH**

6-9A.

5-37A.

CONDITION DESCRIPTION

Transmission Oil Drained.

Batteries Disconnected.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.

TM 9-2320-273-20P.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.

Transmission in Neutral.

Park Brake Set.

110 VAC Cable Disconnected From Power Source
and Receptacle.

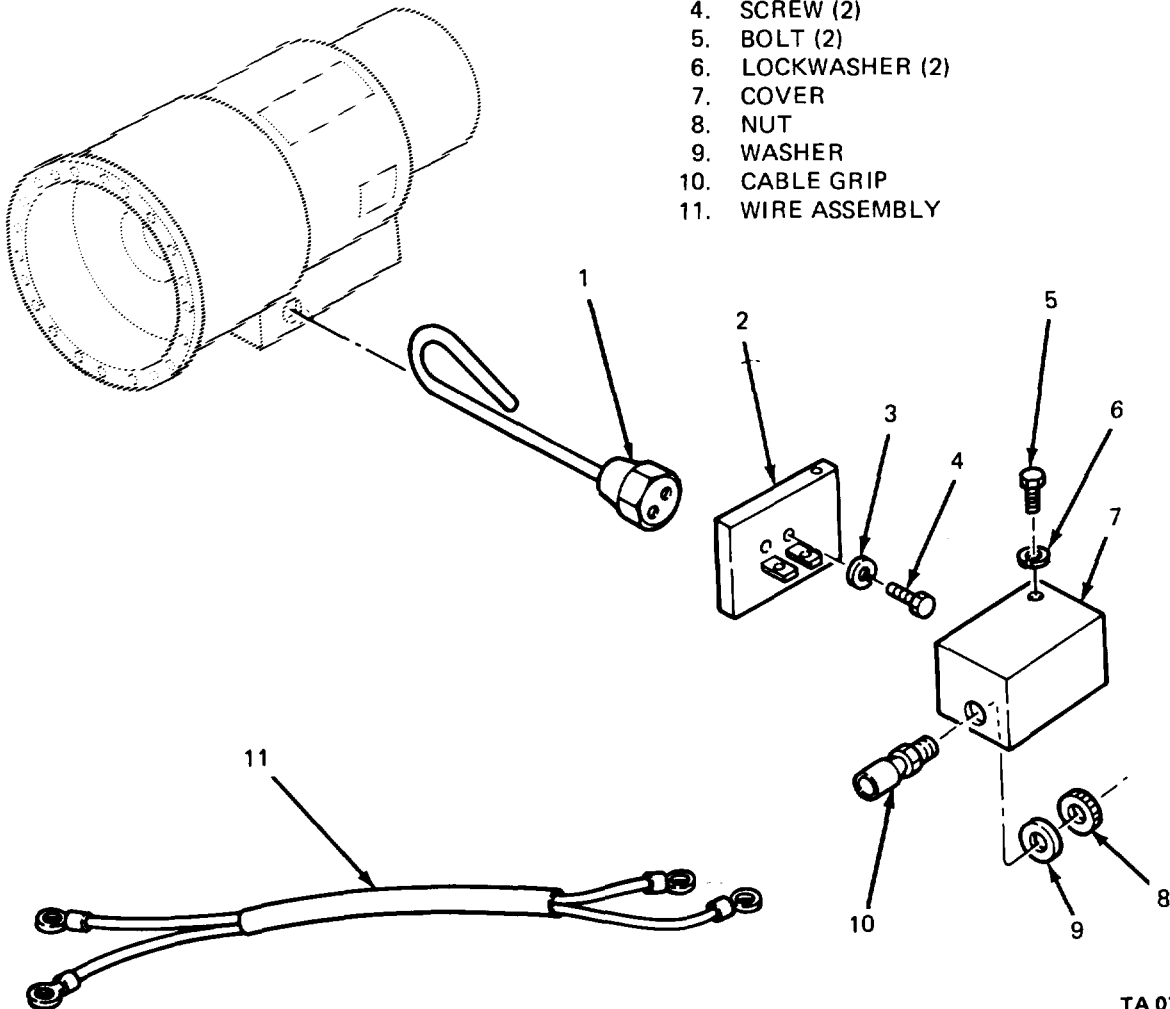
All Breakers Set to OFF.

TROUBLESHOOTING REFERENCES

Table 5-14.

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-88. WINTERIZATION KIT TRANSMISSION OIL HEATER MAINTENANCE (Continued).

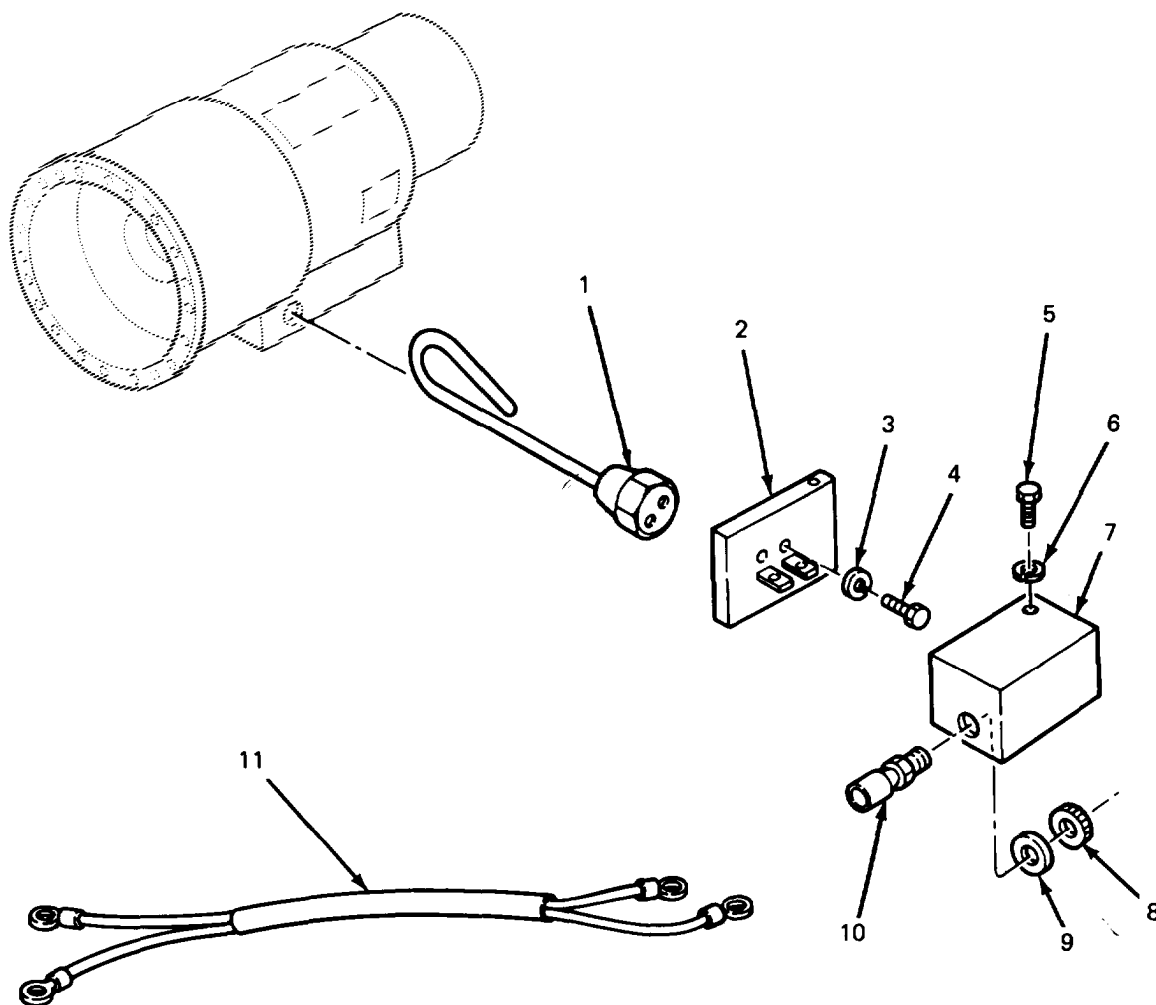
LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL OF HEATER.		
1. Heater cover (7).	a, Remove two bolts (5) and lockwashers (6). b. Remove heater cover (7) from heater mounting plate (2).	
2. Wire assembly (11).	Remove from heater mounting plate (2).	
LEGEND: 1. HEATER 2. HEATER MOUNTING PLATE 3. LOCKWASHER (2) 4. SCREW (2) 5. BOLT (2) 6. LOCKWASHER (2) 7. COVER 8. NUT 9. WASHER 10. CABLE GRIP 11. WIRE ASSEMBLY 		
TA 074846		

SENDING UNITS. SWITCHING DEVICES, AND WINTERIZATION KIT.

5-88. WINTERIZATION KIT TRANSMISSION OIL HEATER MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL OF HEATER (Continued).		
3. Cable grip (10).	a. Remove nut (8) and washer (9). b. Remove cable grip (10) from heater cover (7).	
4. Heater mounting plate (2) and heater (1).	a. Remove two screws (4) and lockwashers (3). b. Remove heater mounting plate (2) and heater (1) from transmission.	
B. INSTALLATION OF HEATER.		
5. Heater (1) and heater mounting plate (2).	a. Install in transmission. b. Secure with two screws (4) and lockwashers (3).	
6. Cable grip (10).	a. Install in heater cover (7). b. Secure with nut (8) and washer (9).	
7. Wire assembly (11).	Connect to heater mounting plate (2).	
8. Heater cover (7).	a. Install on heater mounting plate (2). b. Secure with two bolts (5) and lockwashers (6).	
C. OPERATIONAL CHECK.		
9. Refill transmission.	Refer to para 6-9E.	
10. 110 VAC power cord.	Plug into source and vehicle receptacle, flip transmission heater circuit breaker to ON.	
11. Heater (1).	Verify that heater is functioning,	Flip circuit breaker OFF and disconnect power cord after check.
12. Vehicle batteries.	Reconnect per para 5-37B.	

SENDING UNITS, SWITCHING DEVICES. AND WINTERIZATION KIT.

5-88. WINTERIZATION KIT TRANSMISSION OIL HEATER MAINTENANCE (Continued).



LEGEND:

- 1. HEATER
- 2. HEATER MOUNTING PLATE
- 3. LOCKWASHER (2)
- 4. SCREW (2)
- 5. BOLT (2)
- 6. LOCKWASHER (2)
- 7. COVER
- 8. NUT
- 9. WASHER
- 10. CABLE GRIP
- 11. WIRE ASSEMBLY

TA 074847

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-89. WINTERIZATION KIT ENGINE OIL HEATER THERMOSTAT MAINTENANCE.**THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

a. Removal of Thermostat.	(30)
b. Installation of Thermostat.	(30)
c. Operational Check.	(15)
75 Minutes Total.	

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

TEST EQUIPMENT

None,

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Gasket (1020803).

EQUIPMENT CONDITION**PARAGRAPH**

4-14A.

5-37A.

CONDITION DESCRIPTION

Engine Oil Drained.

Batteries Disconnected.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.

TM 9-2320-273-20P.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.

Transmission in Neutral.

Park Brake Set.

110 VAC Cable Disconnected From Power

Source and Receptacle.

All Breakers Set to Off.

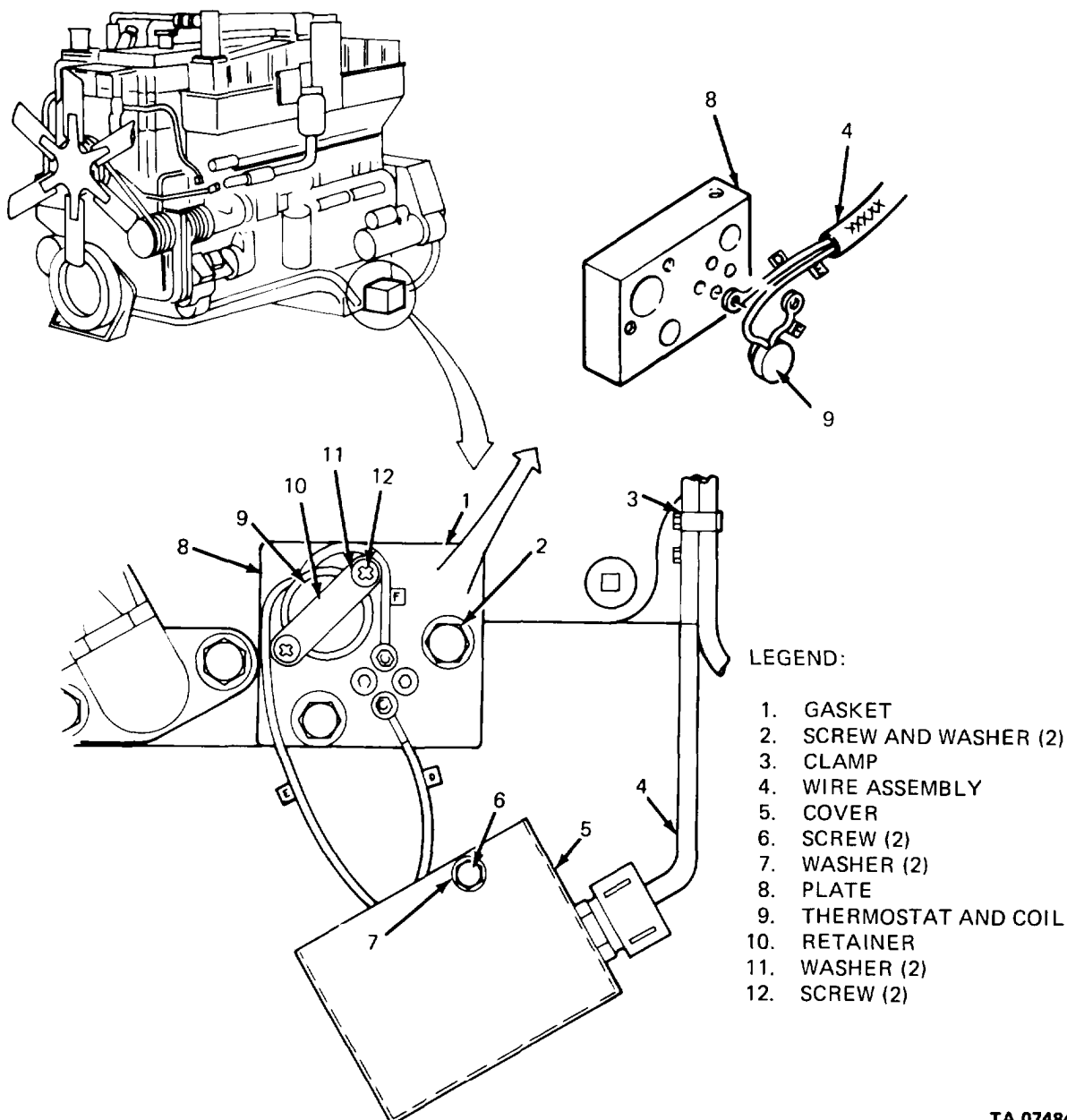
TROUBLESHOOTING REFERENCES

Table 5-14.

SENDING UNITS. SWITCHING DEVICES, AND WINTERIZATION KIT.

5-89. WINTERIZATION KIT ENGINE OIL HEATER THERMOSTAT MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL OF THERMOSTAT.		
1. Two screws (6) and washers (7).	Unscrew and remove cover (5).	
2. Wire assembly (4).	Disconnect from terminals on plate (8).	Mark locations.



TA 074848

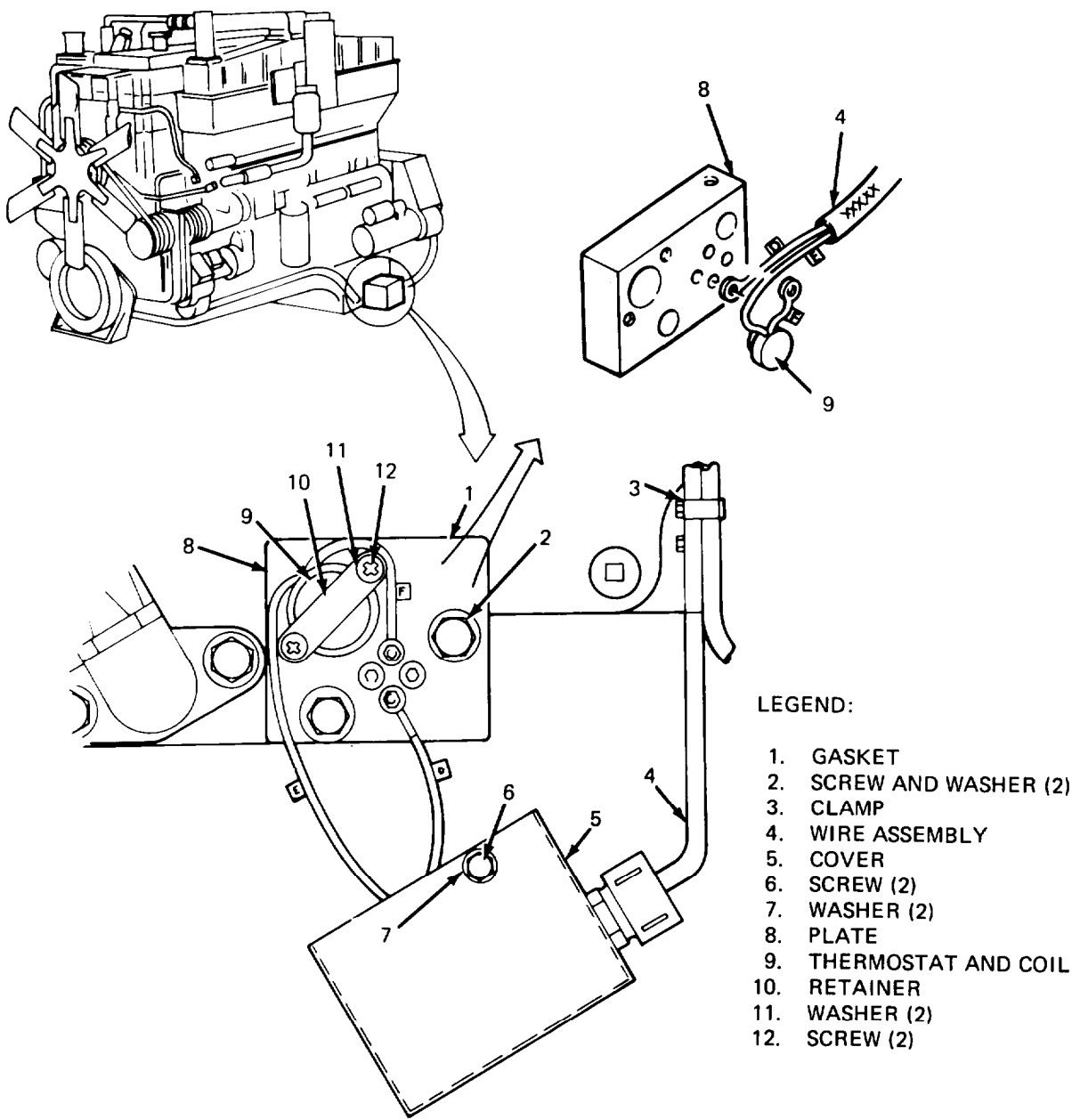
SENDING UNITS. SWITCHING DEVICES, AND WINTERIZATION KIT.

5-89. WINTERIZATION KIT ENGINE OIL HEATER THERMOSTAT MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL OF THERMOSTAT (Continued).		
3. Clamp (3)	Remove from transmission front by taking out one screw.	Remove if wire assembly is to be disconnected at circuit breaker box.
4. Two screws (2) with washers.	Remove and lift off plate (8) with thermostat and coil (9) attached.	
5. Two screws (12) and washers (11).	Unscrew to remove retainer (10).	Lift out thermostat and coil (9). Replace as necessary.
6. Gasket (1).	Remove.	Discard.
B. INSTALLATION OF THERMOSTAT.		
7. New gasket (1).	Install to side of oil pan.	
8. Thermostat and coil (9).	Install to plate (8) with retainer (10), two washers (11) and two screws (12).	
9. Plate (8) with coil and thermostat (9) attached.	Mount over gasket with two screws (2) and washers.	
10. Clamp (3).	Install over wire assembly (4) at transmission front.	If removed.
11. Wire assembly (4).	Connect to heater terminals on plate (8).	Install as marked.
12. Cover (5).	Install on plate (8) with two screws (2) and washers.	
C. OPERATIONAL CHECK.		
13. Refill engine oil pan.	Refer to para 4-14.	
14. 110 VAC power cord.	Plug into source and vehicle receptacle, flip engine oil circuit breaker ON and verify that heater is functioning properly.	Flip breaker to OFF and remove power cord after check.

SENDING UNITS, SWITCHING DEVICES. AND WINTERIZATION KIT.

5-89. WINTERIZATION KIT ENGINE OIL HEATER THERMOSTAT MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
 The diagram illustrates the maintenance of the engine oil heater thermostat. It includes a perspective view of the engine, a detailed view of the thermostat assembly (8, 4, 9), and a detailed view of the heater unit (1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12) with a legend. LEGEND: 1. GASKET 2. SCREW AND WASHER (2) 3. CLAMP 4. WIRE ASSEMBLY 5. COVER 6. SCREW (2) 7. WASHER (2) 8. PLATE 9. THERMOSTAT AND COIL 10. RETAINER 11. WASHER (2) 12. SCREW (2)		

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SENDING UNITS, SWITCHING DEVICES AND WINTERIZATION KIT.

5-89. WINTERIZATION KIT ENGINE OIL HEATER THERMOSTAT MAINTENANCE (Continued)

LOCATION/ITEM

ACTION

REMARKS

C. OPERATIONAL CHECK (continued).**NOTE**

If after thermostat maintenance the heater does not function properly, refer to DS/GS as the oil pan will have to be removed for service of the heater,

Follow-on maintenance required:

Reconnect vehicle batteries per para 5-37B.

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-89. WINTERIZATION KIT ENGINE OIL HEATER THERMOSTAT MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
LEGEND: 1. GASKET 2. SCREW AND WASHER (2) 3. CLAMP 4. WIRE ASSEMBLY 5. COVER 6. SCREW (2) 7. WASHER (2) 8. PLATE 9. THERMOSTAT AND COIL 10. RETAINER 11. WASHER (2) 12. SCREW (2)		

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SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-90. WINTERIZATION KIT ENGINE COOLANT HEATER MAINTENANCE.**THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

a. Removal of Heater	(60)
b. Installation of Heater.	(60)
c. Operational Check .	<u>(15)</u>
135 Minutes Total	

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (See App C) .

EQUIPMENT CONDITION**PARAGRAPH**

4-42A.

4-25A/4-27A.

4-37A.

CONDITION DESCRIPTION

Engine Cooling System Drained.

Engine Air Filter and
Ducts Removed.

Batteries Disconnected.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.

TM 9-2320-273-20P.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.

Transmission in Neutral.

Park Brake Set.

110 VAC Cable Disconnected

From Power Source and Receptacle.

All Breakers Set to OFF.

TROUBLESHOOTING REFERENCES

Table 5-14.

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION-KIT.

5-90. WINTERIZATION KIT ENGINE COOLANT HEATER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
LEGEND:		
1. NIPPLE		
2. TEE		
3. DRAIN COCK		
4. ADAPTER		
5. HOSE CLAMP (6)		
6. HOSE (3)		
7. PIPE		
8. NUT		
9. LOCKWASHER		
10. BRACKET		
11. LOCKWASHER		
12. NUT (2)		
13. HARNESS CLAMP		
14. HARNESS CLAMP		
15. CABLE GRIP		
16. WASHER		
17. LOCKNUT		
18. THERMOSTAT		
19. BUSHING		
20. TERMINAL		
21. SPLICE CONNECTOR		
22. WIRE ASSEMBLY		
23. HEATER		
24. NIPPLE		
25. DRAINCOCK		
26. TEE		
27. NIPPLE		
28. ELBOW		
29. SCREW (2)		
30. ADAPTER		
31. SUPPORT		
32. BOLT (2)		
33. LOCKWASHER (2)		
34. NUT (2)		
35. ADAPTER		
36. VALVE		
37. NUT		
38. LOCKWASHER		
39. CLAMP		
40. SCREW		
41. NIPPLE (2)		
42. ELBOW		

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-90. WINTERIZATION KIT ENGINE COOLANT HEATER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Two hose clamps (5).	Loosen and remove hose (6).	
2. Tee (2) and nipple (1).	Unscrew and remove from water manifold. Remove draincock (3) and adapter (4).	
3. Two hose clamps (5).	Loosen and remove hose (6) from pipe (7), adapter (4), and clamp (14).	
4. Bushing (19).	Unscrew and remove from rear port of heater (23).	
5. Two hose clamps (5).	Loosen and remove hose (6) from two adapters (30) and (35).	
6. Two nipples (41) and valve (36).	Unscrew and remove from engine block with elbow (42) and adapter (35).	
7. Elbow (28), two nipples (24) and (27), tee (26), and draincock (25).	Unscrew and remove from forward port on bottom of heater (23).	
8. Wire assembly (22), cable grip (15), washer (16) and locknut (17).	Remove from thermostat (18).	
9. Three harness clamps (13), (14), and (39).	a. Remove two nuts (12), bolts (32) and lockwashers (11) and remove harness clamps (13) and (14). b. Remove nut (37), bolt (40) and lockwasher (38) and remove harness clamp (39).	
10. Wire assembly (22).	a. Pull thru to circuit breaker if service is required. b. Replace terminals (20) or splice connectors (21) as required.	
11. Two screws (29), nuts (34) and lockwashers (33).	Unscrew and remove heater (23) and thermostat (18).	
12. Bracket (10).	Separate from support (31) by removing bolt (32), lockwasher (9), and nut (8).	

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-90. WINTERIZATION KIT ENGINE COOLANT HEATER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
LEGEND: 1. NIPPLE 2. TEE 3. DRAIN COCK 4. ADAPTER 5. HOSE CLAMP (6) 6. HOSE (3) 7. PIPE 8. NUT 9. LOCKWASHER 10. BRACKET 11. LOCKWASHER 12. NUT (2) 13. HARNESS CLAMP 14. HARNESS CLAMP 15. CABLE GRIP 16. WASHER 17. LOCKNUT 18. THERMOSTAT 19. BUSHING 20. TERMINAL 21. SPLICE CONNECTOR 22. WIRE ASSEMBLY 23. HEATER 24. NIPPLE 25. DRAINCOCK 26. TEE 27. NIPPLE 28. ELBOW 29. SCREW (2) 30. ADAPTER 31. SUPPORT 32. BOLT (2) 33. LOCKWASHER (2) 34. NUT (2) 35. ADAPTER 36. VALVE 37. NUT 38. LOCKWASHER 39. CLAMP 40. SCREW 41. NIPPLE (2) 42. ELBOW		

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SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-90. WINTERIZATION KIT ENGINE COOLANT HEATER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION.		
NOTE		
The thermostat (18) cannot be replaced separate of the heater.		
13. Bracket (10).	Assemble to support (31) and secure with bolt (32), lock-washer (9) and nut (8).	
14. Heater (23) and thermostat (12).	Mount to support (31) with two screws (29), nuts (34) and lockwashers (33).	
15. Wire assembly (22).	Reroute, if removed.	
16. Three harness clamps (13), (14), and (39).	a. Install harness clamps (13) and (14) and secure with two nuts (12), bolts (32) and lockwashers (11). b. Install harness clamp (39) and secure with nut (37), bolt (40) and lockwasher (38).	
17. Wire assembly (22), cable grip (15), washer (16) and locknut (17).	Install on thermostat (18).	
18. Elbow (28), two nipples (24) and (27), tee (26), and draincock (25).	a. Coat threads with liquid teflon. b. Install on forward port on bottom of heater (23).	
19. Two nipples (41), valve (36), elbow (42), and adapter (35).	a. Coat threads with liquid teflon. b. Install on engine block.	
29. Hose (6).	a. Install two hose clamps (5). b. Fit ends on adapters (30) and (35). c. Tighten hose clamps (5).	
21. Bushing (19).	a. Coat threads with liquid teflon. b. Install in rear port of heater (23).	

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT

5-90. WINTERIZATION KIT ENGINE COOLANT HEATER MAINTENANCE (Continued).

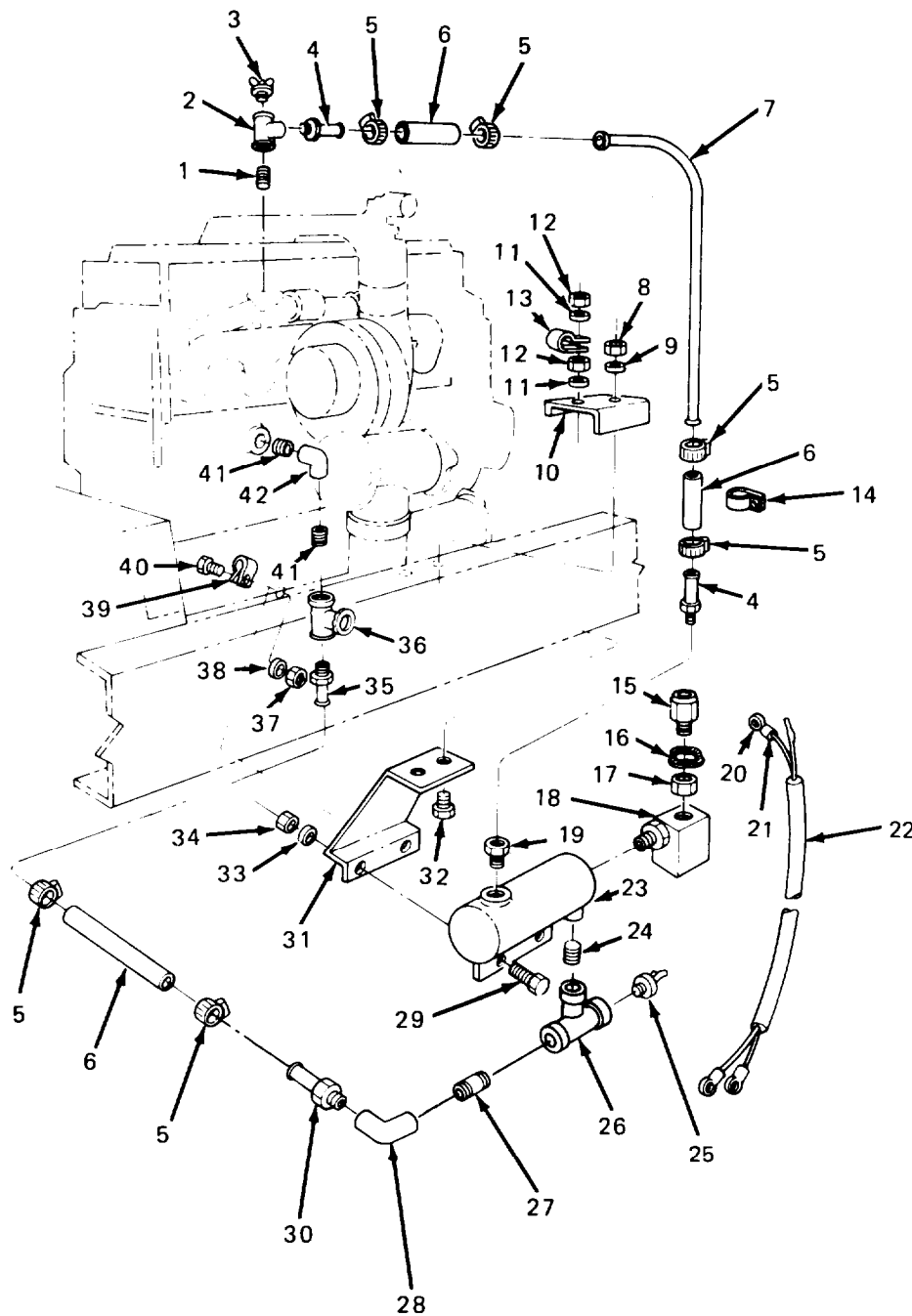
LOCATION/ITEM

ACTION

REMARKS

LEGEND:

1. NIPPLE
2. TEE
3. DRAIN COCK
4. ADAPTER
5. HOSE CLAMP (6)
6. HOSE (3)
7. PIPE
8. NUT
9. LOCKWASHER
10. BRACKET
11. LOCKWASHER
12. NUT (2)
13. HARNESS CLAMP
14. HARNESS CLAMP
15. CABLE GRIP
16. WASHER
17. LOCKNUT
18. THERMOSTAT
19. BUSHING
20. TERMINAL
21. SPLICE CONNECTOR
22. WIRE ASSEMBLY
23. HEATER
24. NIPPLE
25. DRAINCOCK
26. TEE
27. NIPPLE
28. ELBOW
29. SCREW (2)
30. ADAPTER
31. SUPPORT
32. BOLT (2)
33. LOCKWASHER (2)
34. NUT (2)
35. ADAPTER
36. VALVE
37. NUT
38. LOCKWASHER
39. CLAMP
40. SCREW
41. NIPPLE (2)
42. ELBOW



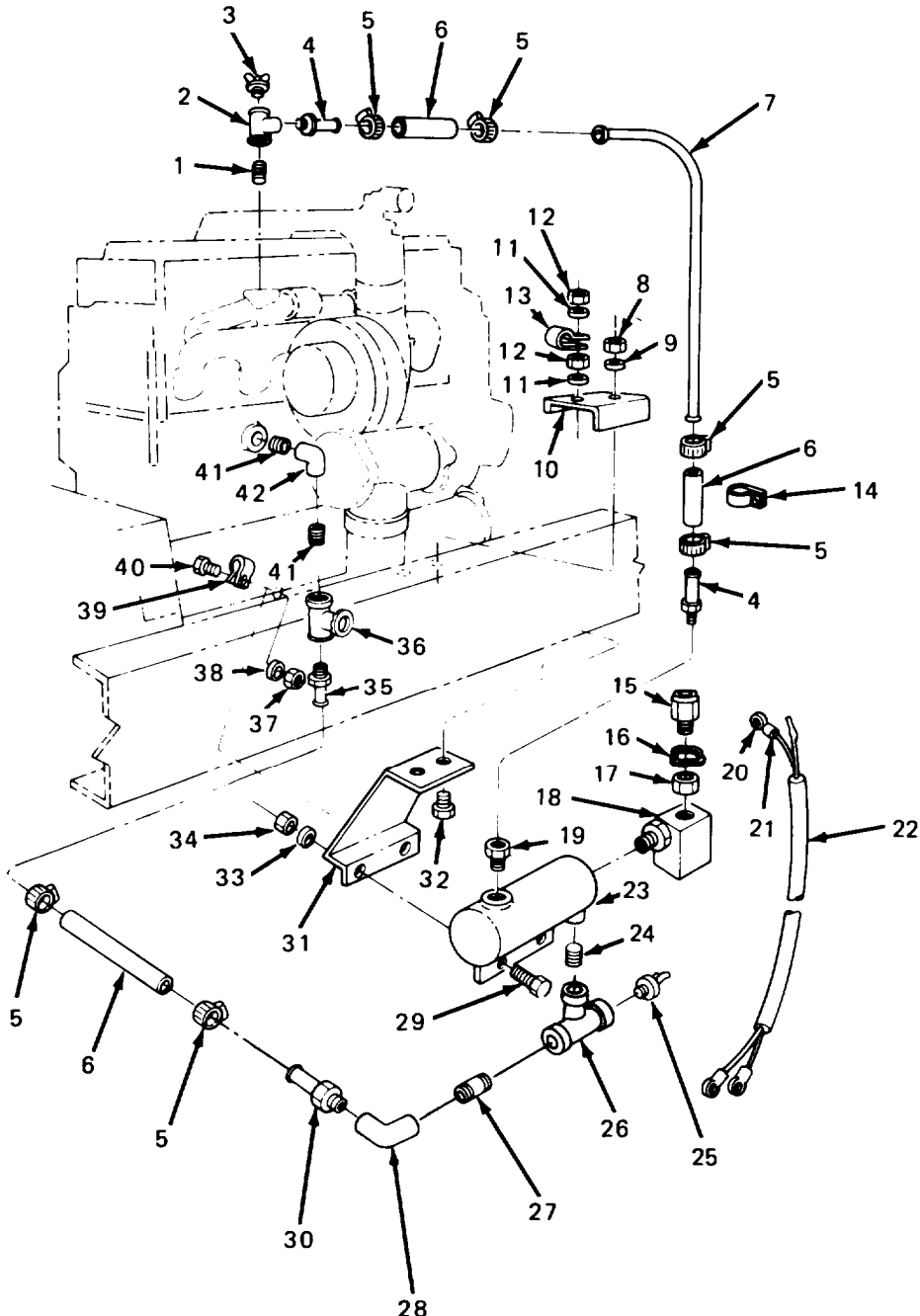
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SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-90. WINTERIZATION KIT ENGINE COOLANT HEATER MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION (Continued).		
22. Hose (6).	a. Insert thru harness clamp (14). b. Install two hose clamps (5). c. Fit ends on adapter (4) and pipe (7). d. Tighten hose clamps (5).	
23. Nipple (1) and tee (2).	a. Coat threads with liquid teflon. b. Install nipple (1) into water manifold, c. Install draincock (3) and adapter (4).	
24. Hose (6).	a. Install two hose clamps (5). b. Fit ends on adapter (4) and pipe (7). c. Tighten hose clamps (5).	
C. OPERATIONAL CHECK.		
25. Engine coolant system.	Refill, refer to para 4-42C.	
26. Engine air cleaner.	Install, refer to para 4-25D.	
27. Engine turbo air inlet.	Install, refer to para 4-27C.	
28. 110 VAC power cord.	Plug into curcuit breaker box receptacle and power source.	
29. Engine coolant heater circuit breaker.	Flip to ON and verify that heater (23) functions properly.	After check, flip circuit breaker to OFF and disconnect power cord.
30. Vehicle batteries.	Reconnect, per para 5-37B.	
31. Engine.	Start up (refer to TM 9-2320-273-10) and check for leaks.	
32. Engine.	Shut down, refer to TM 9-2320-273-10.	

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-90. WINTERIZATION KIT ENGINE COOLANT HEATER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
LEGEND: 1. NIPPLE 2. TEE 3. DRAIN COCK 4. ADAPTER 5. HOSE CLAMP (6) 6. HOSE (3) 7. PIPE 8. NUT 9. LOCKWASHER 10. BRACKET 11. LOCKWASHER 12. NUT (2) 13. HARNESS CLAMP 14. HARNESS CLAMP 15. CABLE GRIP 16. WASHER 17. LOCKNUT 18. THERMOSTAT 19. BUSHING 20. TERMINAL 21. SPLICE CONNECTOR 22. WIRE ASSEMBLY 23. HEATER 24. NIPPLE 25. DRAINCOCK 26. TEE 27. NIPPLE 28. ELBOW 29. SCREW (2) 30. ADAPTER 31. SUPPORT 32. BOLT (2) 33. LOCKWASHER (2) 34. NUT (2) 35. ADAPTER 36. VALVE 37. NUT 38. LOCKWASHER 39. CLAMP 40. SCREW 41. NIPPLE (2) 42. ELBOW 		

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SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-91. WINTERIZATION KIT BATTERY BOX HEATER MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

- a. Removal. (60)
 - b.Installation. (60)
 - c. Operational Check. (15)
- 135 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

EQUIPMENT CONDITION

PARAGRAPH

5-38A.

CONDITION DESCRIPTION

Batteries Removed.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level ground.
Battery Thermostat Must be Below 35°F
for Actuation of Heater.

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.
110 VAC Cable Disconnected From
Power Source and Receptacle.
All Breakers Set to OFF.

TROUBLESHOOTING REFERENCES

Table 5-14.

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-91. WINTERIZATION KIT BATTERY BOX HEATER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL		
1. Cover assembly (1).	a. Mark and disconnect terminals (2) from terminal strip, b. Remove six screws (15) and lockwashers (16). c. Remove cover assembly from bottom of battery box.	Refer to para 5-92.
2. Heater (3) and loom (6).	a. Remove four capscrews (14), washers (8), and nuts (7). b. Remove heater (3) and loom (6) from bottom cover (13).	
3. Four brackets (9) and tube clips (4).	a. Remove four screws (5), lockwashers (10) and nuts (11). b. Remove four brackets (9) and tube clips (4).	
4. Cover (17), insulation (19), and seals (20) and (21).	a. Remove. b. Clean surface with Milsolv (18).	Milsolv (18) supplied with kit.
LEGEND:		
1. COVER ASSEMBLY	15. SCREW (6)	
2. TERMINAL	16. LOCKWASHER (6)	
3. HEATER	17. COVER	
4. TUBE CLIP (4)	18. MILSOLV	
5. SCREW (4)	19. INSULATION	
6. LOOM	20. SEAL (2)	
7. NUT (4)	21. SEAL (2)	
8. WASHER (4)	22. ADHESIVE	
9. BRACKET (4)		
10. LOCKWASHER (4)		
11. NUT (4)		
12. INSULATION		
13. COVER, BOTTOM		
14. CAPSCREW (4)		

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SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-91. WINTERIZATION KIT BATTERY BOX HEATER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
5. Insulation (12) and bottom cover (13).	a. Remove. b. Clean surface with Milsolv (18).	
B. INSTALLATION		
6. Insulation (12) and bottom cover (13).	a. Apply adhesive (22) to bottom cover (13).	Adhesive (22) supplied with kit.
7. Insulation (19) and cover (17).	a. Install insulation (19) in place. b. Install cover (17).	
8. Four seals (20) and (21).	a. Apply adhesive (22) to seals. b. Stick in place.	
9. Heater (3) and loom (6).	a. Install four brackets (9) and tube clips (4). b. Secure with four screws (5), lockwashers (10), and nuts (11). c. Position heater (3) and loom (6) on bottom cover (13) and align four mounting holes. d. Install four capscrews (14), washers (8) and nuts (7) and tighten. e. Tighten four nuts (11), lockwashers (10) and screws (5).	Do not tighten nuts (11) at this time.
10. Cover assembly (1).	Install to bottom of battery box.	Position loom (6) so it is accessible after installation of cover assembly (1).
11. Two terminals (2).	Connect to terminal strip.	Refer to para 5-92.

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-91. WINTERIZATION KIT BATTERY BOX HEATER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
C. OPERATIONAL CHECK.		
2. 110 VAC power cord.	Plug into power source and vehicle receptacle. Flip battery heater circuit ON.	
13. Heater (3).	Verify that heater (3) functions properly.	Thermostat closes at 350F (1.7°C) and opens at 55°F (12.8°C).
NOTE Follow-on maintenance action required: Install and connect batteries per para 5-38E.		
LEGEND: 1. COVER ASSEMBLY 2. TERMINAL 3. HEATER 4. TUBE CLIP (4) 5. SCREW (4) 6. LOOM 7. NUT (4) 8. WASHER (4) 9. BRACKET (4) 10. LOCKWASHER (4) 11. NUT (4) 12. INSULATION 13. COVER, BOTTOM 14. CAPSCREW (4) 15. SCREW (6) 16. LOCKWASHER (6) 17. COVER 18. MILSOLV 19. INSULATION 20. SEAL (2) 21. SEAL (2) 22. ADHESIVE		

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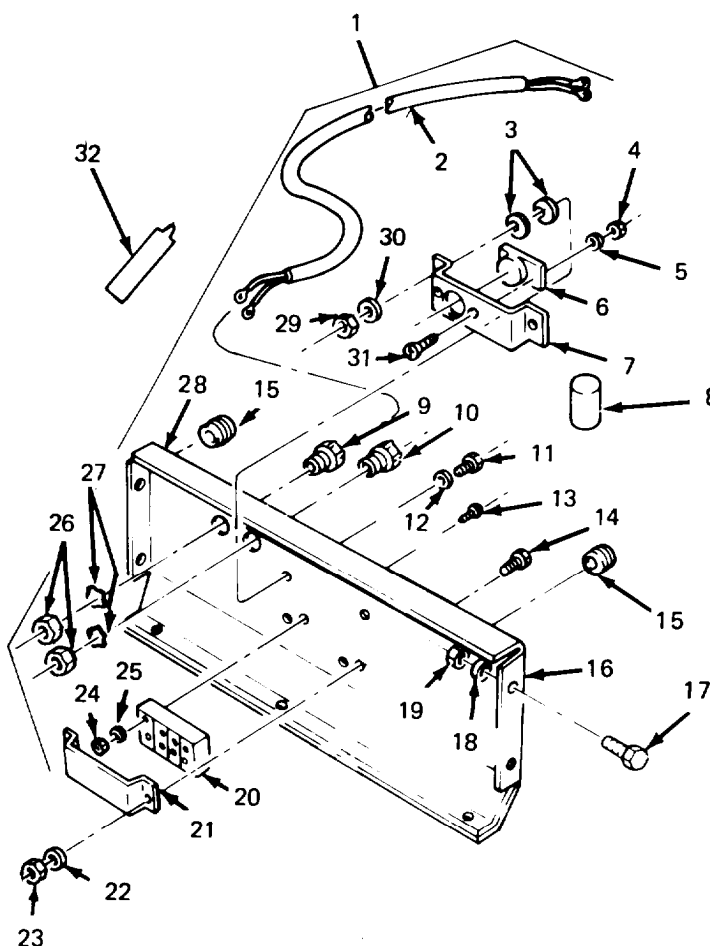
SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-92. WINTERIZATION KIT BATTERY BOX THERMOSTAT AND TERMINAL STRIP MAINTENANCE.		
<u>THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)</u>		
a. Removal. (45) b. Installation. (45) c. Operational Check. (15)		
105 Minutes Total.		
<u>INITIAL SETUP</u>	<u>EQUIPMENT CONDITION</u>	
<u>APPLICABLE CONFIGURATIONS</u>	<u>PARAGRAPH</u>	<u>CONDITION DESCRIPTION</u>
All.	5-38A.	Batteries Removal.
<u>TEST EQUIPMENT</u>		
None.		
<u>SPECIAL TOOLS</u>		
None.		
<u>MATERIALS/PARTS (P/N)</u>		
None.		
<u>PERSONNEL REQUIRED</u>	<u>SPECIAL ENVIRONMENTAL CONDITIONS</u>	
One (MOS-63B20).	Vehicle Parked on Level Ground. Battery Thermostat Must be Below 35°F for Actuation of Heater.	
<u>REFERENCES (TM)</u>	<u>GENERAL SAFETY INSTRUCTIONS</u>	
TM 9-2320-273-10. TM 9-2320-273-20P.	Engine OFF. Transmission in Neutral. Park Brake Set. 110 VAC Cable Disconnected From Power Source and Receptacle. All Breakers Set to OFF.	
<u>TROUBLESHOOTING REFERENCES</u>		
Table 5-14.		

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-92. WINTERIZATION KIT BATTERY BOX THERMOSTAT AND TERMINAL STRIP MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL		
1. Rear cover assembly (1).	a. Remove seven capscrews (17), seven lockwashers (18) and four hex nuts (19). b. Remove rear cover (16).	Hex nuts (19) are only used on sides of rear cover (16).
2. Cover (7).	Remove two screws (11), four teflon washers (3), two bushings (30) and hex nuts (29).	
3. Thermostat assembly (6).	a. Remove two screws (31), lockwashers (5), and hex nuts (4). b. Remove thermostat assembly (6) from cover (7).	
LEGEND:		
1. REAR COVER ASSEMBLY		
2. WIRE ASSEMBLY		
3. TEFLON WASHER (4)		
4. HEX NUT (2)		
5. LOCKWASHER (2)		
6. THERMOSTAT ASSEMBLY		
7. COVER		
8. MILSOLV		
9. CABLE GRIP		
10. CABLE GRIP		
11. SCREW (2)		
12. LOCKWASHER (2)		
13. SCREW (2)		
14. SCREW (2)		
15. GROMMET (2)		
16. REAR COVER		
17. CAPSCREW (7)		
18. LOCKWASHER (7)		
19. HEX NUT (4)		
20. TERMINAL STRIP		
21. COVER		
22. LOCKWASHER		
23. HEX NUT (2)		
24. HEX NUT (2)		
25. LOCKWASHER (2)		
26. CONDUIT NUT (2)		
27. REDUCING WASHER (2)		
28. INSULATION		
29. HEX NUT (2)		
30. BUSHING (2)		
31. SCREW (2)		
32. ADHESIVE		



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SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-92. WINTERIZATION KIT BATTERY BOX THERMOSTAT AND TERMINAL STRIP MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
4. Cover (21).	Remove two hex nuts (23), lockwashers (22), and screws (14).	
5. Terminal strip (20).	a. Remove wire assembly (2). b. Remove two hex nuts (24), lockwashers (25) and screws (13).	Tag terminals to aid in reassembly.
6. Two cable grips (9) and (10).	Remove two conduit nuts (26) and reducing washers (27).	
7. Two grommets (15).	Remove.	
8. Insulation (28).	Remove with sharp tool or putty knife and clean off adhesive with Milsolv (8).	Milsolv (8) supplied with kit.
B. INSTALLATION		
9. Insulation (28).	a. Install adhesive (32) to rear cover (16). b. Put insulation (28) in place.	Adhesive (32) supplied with kit.
10. Two grommets (15).	Install.	
11. Two cable grips (9) and (10).	Install into rear cover and secure with two reducing washers (27) and conduit nuts (26).	
12. Terminal strip (20).	a. Install and secure with two screws (13), lockwashers (25) and screws (13). b. Install wire assembly (2).	
13. Cover (21).	Install and secure with two hex nuts (23), lockwashers (22), and screws (14).	

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-92. WINTERIZATION KIT BATTERY BOX THERMOSTAT AND TERMINAL STRIP MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
LEGEND:		
1. REAR COVER ASSEMBLY		
2. WIRE ASSEMBLY		
3. TEFLON WASHER (4)		
4. HEX NUT (2)		
5. LOCKWASHER (2)		
6. THERMOSTAT ASSEMBLY		
7. COVER		
8. MILSOLV		
9. CABLE GRIP		
10. CABLE GRIP		
11. SCREW (2)		
12. LOCKWASHER (2)		
13. SCREW (2)		
14. SCREW (2)		
15. GROMMET (2)		
16. REAR COVER		
17. CAPSCREW (7)		
18. LOCKWASHER (7)		
19. HEX NUT (4)		
20. TERMINAL STRIP		
21. COVER		
22. LOCKWASHER		
23. HEX NUT (2)		
24. HEX NUT (2)		
25. LOCKWASHER (2)		
26. CONDUIT NUT (2)		
27. REDUCING WASHER (2)		
28. INSULATION		
29. HEX NUT (2)		
30. BUSHING (2)		
31. SCREW (2)		
32. ADHESIVE		

An exploded view diagram of a rear cover assembly. The diagram shows the rear cover (16) with various components being installed. Callouts 1 through 32 identify specific parts and their assembly locations. Key components include the rear cover assembly (1), wire assembly (2), thermostat assembly (6), terminal strip (20), and various fasteners like screws (11, 13, 14, 17, 31), nuts (4, 5, 19, 23, 24), washers (3, 12, 18, 22, 25), and grommets (15). The diagram also shows the installation of a cable grip (9, 10) and a terminal strip (20) with a cover (21). An adhesive (32) is shown being applied to the rear cover. The diagram is a technical drawing with dashed lines indicating the assembly path and alignment of the parts.

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SENDING UNITS, SWITCHING DEVICES. AND WINTERIZATION KIT.

**5-92. WINTERIZATION KIT BATTERY BOX THERMOSTAT AND TERMINAL STRIP
MAINTENANCE (Continued).**

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION (Continued).		
14. Thermostat assembly (6).	Install in cover (7) and secure with two screws (31), lock-washers (5), and hex nuts (4).	
15. Cover (7).	Install and secure with two screws (11), four teflon washers (3), two bushings (30), and hex nuts (29).	
16. Rear cover assembly (1).	Install and secure with seven capscrews, seven lockwashers (18), and four hex nuts (19).	Hex nuts (19) are only used on sides of rear cover (16).
C. OPERATIONAL CHECK.		
17. 110 VAC power cord.	Plug into power source and vehicle receptacle. Flip battery heater circuit ON.	
18. Thermostat assembly (6).	Verify operation.	Thermostat closes at 35°F (1.7°C) and opens at 55°F (12.8°C).
NOTE		
Follow-on maintenance action required:		
Install and connect batteries per para 5-38E.		

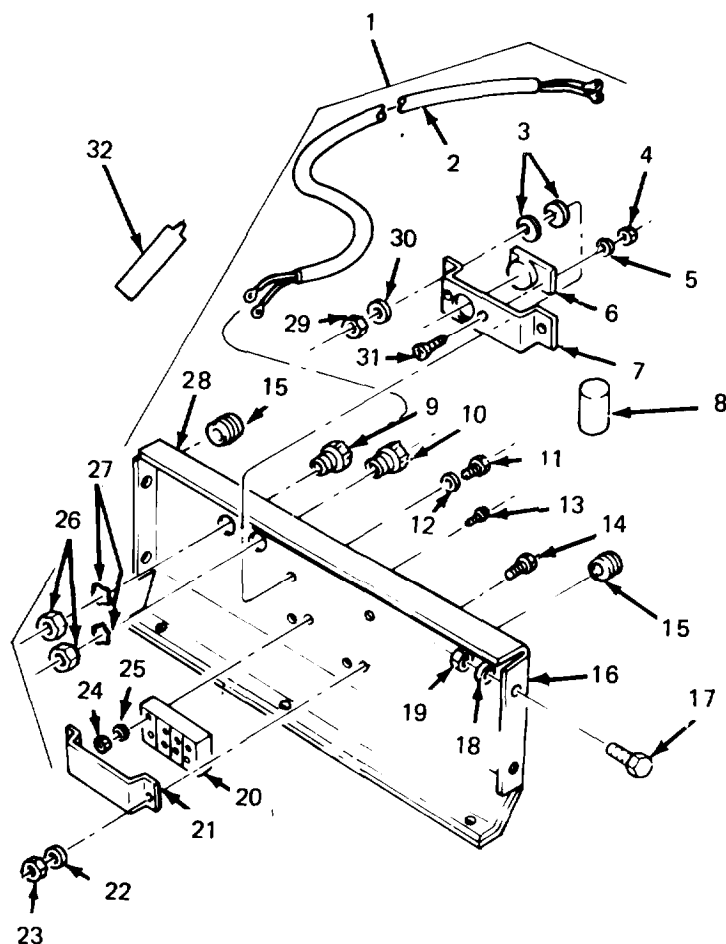
SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-93. WINTERIZATION KIT BATTERY BOX THERMOSTAT AND TERMINAL STRIP MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS

LEGEND:

1. REAR COVER ASSEMBLY
2. WIRE ASSEMBLY
3. TEFLON WASHER (4)
4. HEX NUT (2)
5. LOCKWASHER (2)
6. THERMOSTAT ASSEMBLY
7. COVER
8. MILSOLV
9. CABLE GRIP
10. CABLE GRIP
11. SCREW (2)
12. LOCKWASHER (2)
13. SCREW (2)
14. SCREW (2)
15. GROMMET (2)
16. REAR COVER
17. CAPSCREW (7)
18. LOCKWASHER (7)
19. HEX NUT (4)
20. TERMINAL STRIP
21. COVER
22. LOCKWASHER
23. HEX NUT (2)
24. HEX NUT (2)
25. LOCKWASHER (2)
26. CONDUIT NUT (2)
27. REDUCING WASHER (2)
28. INSULATION
29. HEX NUT (2)
30. BUSHING (2)
31. SCREW (2)
32. ADHESIVE



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SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-93. WINTERIZATION KIT BATTERY BOX INSULATION MAINTENANCE.**THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

a. Removal. (30)

b. Cleaning. (45)

c. Installation. (15)

90 Minutes Total.

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

**EQUIPMENT CONDITION
PARAGRAPH**

5-38A.

CONDITION DESCRIPTION

Batteries Removed.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (PIN)

None.

PERSONNEL REQUIRED

One (MOS-63B20).

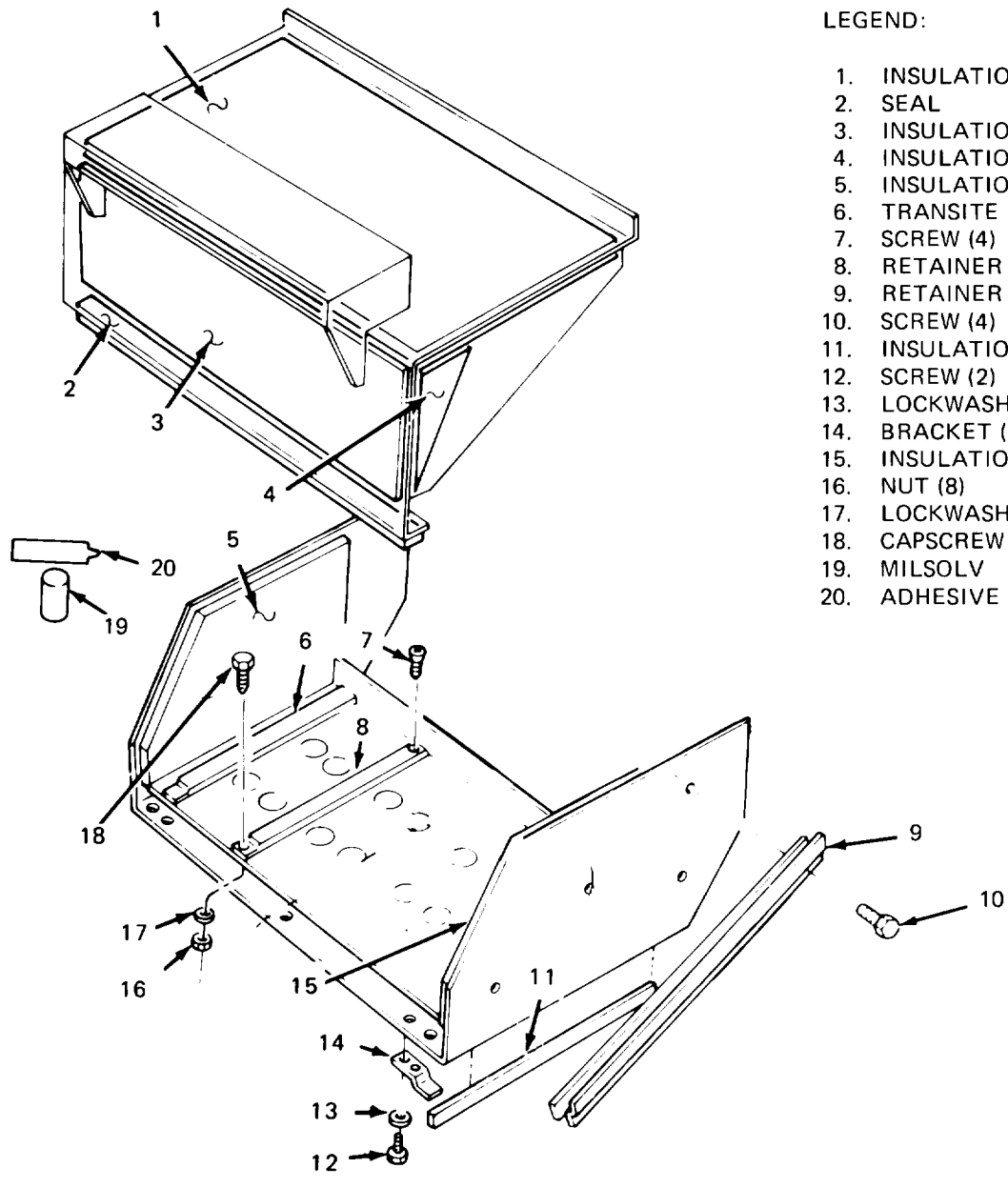
REFERENCES (TM)TM 9-2320-273-10.
TM 9-2320-273-20P.**TROUBLESHOOTING REFERENCES**

None.

SPECIAL ENVIRONMENTAL CONDITIONSVehicle Parked on Level Ground.
Battery Thermostat Must be Below 35°F
for Actuation of Heater.**GENERAL SAFETY INSTRUCTIONS**Engine OFF.
Transmission in Neutral.
Park Brake Set.
110 VAC Cable Disconnected From
Power Source and Receptacle.
All Breakers Set to OFF.

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-93. WINTERIZATION KIT BATTERY BOX INSULATION MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL		
1. Insulation (1), (3), (4), (5), and (15), and seal (2).	If insulation is damaged or needs replacement scrape off with sharp tool or putty knife and clean off adhesive with Milsolv (19).	Milsolv (19) supplied with kit.
		
LEGEND: 1. INSULATION 2. SEAL 3. INSULATION 4. INSULATION (2) 5. INSULATION 6. TRANSITE (4) 7. SCREW (4) 8. RETAINER (4) 9. RETAINER (2) 10. SCREW (4) 11. INSULATION (2) 12. SCREW (2) 13. LOCKWASHER (2) 14. BRACKET (2) 15. INSULATION 16. NUT (8) 17. LOCKWASHER (8) 18. CAPSCREW (4) 19. MILSOLV 20. ADHESIVE		

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SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-93. WINTERIZATION KIT BATTERY BOX INSULATION MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
2. Four capscrews (18), lock-washers (17), nuts (16), and screws (7).	Remove and lift out four retainers (8), and transite (6).	
3. Four screws (10), and two retainers (9),	Remove.	
4. Two screws (12), lock-washers (13), and brackets (14).	Remove and scrape off insulation (11) with sharp tool or putty knife.	
B. CLEANING		
5. Battery compartment.	Wash out with high pressure water or steam and clean off adhesive with Milsolv (19).	
C. INSTALLATION		
6. Adhesive (20), insulation (1), (3), (4), (5), (11), and (15), and seal (2).	Apply adhesive (20) to all insulation panels and apply to their respective places.	Adhesive (20) supplied with kit.
7. Two brackets (14), lock-washers (13), and screws (1 2).	Install.	
8. Four screws (10), and two retainers (9).	Install.	
9. Four capscrews (18), eight lockwashers (1 7), and nuts (16), four retainers (8), four transites (6), and screws (7).	Install four retainers (8) and transite (6) and secure with four capscrews (8) and screws (7).	

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-93. WINTERIZATION KIT BATTERY BOX INSULATION MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS

LEGEND:

1. INSULATION
2. SEAL
3. INSULATION
4. INSULATION (2)
5. INSULATION
6. TRANSITE (4)
7. SCREW (4)
8. RETAINER (4)
9. RETAINER (2)
10. SCREW (4)
11. INSULATION (2)
12. SCREW (2)
13. LOCKWASHER (2)
14. BRACKET (2)
15. INSULATION
16. NUT (8)
17. LOCKWASHER (8)
18. CAPSCREW (4)
19. MILSOLV
20. ADHESIVE

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CHAPTER 6

TRANSMISSION MAINTENANCE

6-1. OVERVIEW.

This chapter provides you with the following information related to transmission maintenance:

- a. All required special tools and equipment.
- b. Other technical manuals.
- c. Troubleshooting procedures.
- d. Maintenance procedures.

Section I REPAIR PARTS, SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT

6-2. COMMON TOOLS AND EQUIPMENT.

For authorized common tools and equipment, refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

6-3. SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT.

The special tools, TMDE and support equipment required for the transmission maintenance procedures described in this chapter are as follows: 0-150 psi (0-1-34 kPa) air pressure gage (refer to Organizational Maintenance RPSTL, TM 9-2320-273-20P for tool description and illustration).

6-4. SPARES AND REPAIR PARTS.

Spares and repair parts are listed and illustrated in the repair parts and special tools list covering Organizational Maintenance for this equipment (TM 9-2320-273-20P).

Section II TROUBLESHOOTING

6-5. INTRODUCTION.

Troubleshooting procedures (table 6-1) are limited to those on-vehicle checks for which corrective actions are within the scope of Organizational Maintenance. Prior to starting any troubleshooting, the malfunction should be verified after the transmission has been warmed up to over 100° F (37.8°C) since a cold transmission can give faulty indications. To warm the transmission, run the engine for approximately 10 minutes with the transmission in NEUTRAL. The transmission will feel warm to the touch.

6-6. TEST EQUIPMENT.

An air pressure gage with a range of 0-150 psi (0-1034 kPa) is required to check for proper air pressure.

Table 6-1. Transmission Troubleshooting Procedures.

MALFUNCTION.	
TEST OR INSPECTION.	
CORRECTIVE ACTION.	
1. SELECTOR LEVER CANNOT BE MOVED:	
Step 1. Inhibitor plate jammed with dirt.	Remove cover, clean, and lubricate (Seg LO 9-2320-273-12).
Step 2. Inhibitor centering piston assembly out of alignment or damaged.	Replace (Refer to Direct Support).
Step 3. Bolts holding air control line to ratio selector too long or incorrectly torqued.	Tighten to 9 lb-ft (12 N•m), replace damaged components, or use shorter bolts.
Step 4. Bolts incorrectly installed when ratio selector assembled.	Check to see that bolts are not run in at an angle.
2. ENGINE DOES NOT TURN DRIVESHAFT IN ANY SPEED FORWARD OR REVERSE:	
Step 1. Check oil level in transmission.	Add oil to correct level (see LO 9-2320-273-12).
Step 2. Check to see that air hand control valve on ratio selector is pushed in.	Push in hand valve.
Step 3. Check to see that air pressure supply is available and adequate to transmission; 60-120 psi (414-827 kPa).	Troubleshoot compressed air system (para 9-5).
Step 4. Inspect air control line and connectors between ratio selector and transmission.	Tighten to 18 lb-ft (24 N•m) or replace damaged components.

Table 6-1. Transmission Troubleshooting Procedures (Continued).

MALFUNCTION.	TEST OR INSPECTION.	CORRECTIVE ACTION.
2. ENGINE DOES NOT TURN DRIVESHAFT IN ANY SPEED FORWARD OR REVERSE (Continued):	Step 5. Check to see that air pressure is available at ratio selector from truck compressed air system.	a. Troubleshoot compressed air system (para 9-5). b. Refer to Direct Support Maintenance for troubleshooting.
3. ENGINE TURNS DRIVE SHAFT IN SOME GEARS BUT NOT OTHERS:	Step 1. Check to see that adequate compressed air is available from truck.	Troubleshoot compressed air system (para 9-5).
	Step 2. Check air control line and connections between ratio selector and transmission for tight connections, damage and leaks.	a. Tighten to 18 lb-ft (24 N•m) or replace damaged components. b. Refer to Direct Support Maintenance for troubleshooting.
4. ENGINE DOES NOT TURN POWER TAKEOFF IN NEUTRAL :		Perform same steps as in Malfunction 2.
5. TRUCK MOVES WHEN ENGINE IS AT LOW IDLE AND TRANSMISSION IN GEAR :	Step 1. Check engine low idle rpm (should be 580-620 rpm).	Refer to Direct Support Maintenance for adjustment.
	Step 2. Check transmission operating temperature.	Allow transmission temperature to reach 100°F (37.8°C) before putting truck in gear.
	Step 3. Put selector lever in NEUTRAL and check engine rpm at low idle. Put selector lever in 4th gear and check engine rpm.	a. If engine rpm does not change, the problem is corrected. b. If engine rpm decreases, the input clutch may be warped. Refer to Direct Support Maintenance for repairs.

Table 6-1. Transmission Troubleshooting Procedures (Continued).

MALFUNCTION.

TEST OR INSPECTION.

CORRECTIVE ACTION.

6. TRANSMISSION HOUSING BREATHERS SHOW AN AIR LEAK AFTER THE SHIFT IS COMPLETE :

Refer to Direct Support Maintenance for troubleshooting.

7. TRANSMISSION FEELS LIKE IT IS ENGAGED, THEN NOT ENGAGED, THEN ENGAGED AGAIN – TRANSMISSION IS ALSO NOISY:

Refer to Direct Support Maintenance for troubleshooting.

8. TRANSMISSION HAS A DECREASE IN OIL LEVEL WITH AN INCREASE IN OIL IN THE ENGINE :

Step 1. Check for inoperative breathers.

Replace the breathers (para 6-9C and 6-9 D).

Step 2. Check engine crankshaft seal.

Refer to Direct Support Maintenance.

9. TRANSMISSION GEARS MAKE NOISE DURING A SHIFT:

Step 1. Check for correct oil level.

Add oil to correct level (refer to LO 9-2320-273-12).

Step 2. Check for oil leaks.

Refer problem to Direct Support Maintenance.

Step 3. Check for clogged oil pump suction screen.

Clean screen (para 6-9B).

Table 6-1. Transmission Troubleshooting Procedures (Continued).

MALFUNCTION.	TEST OR INSPECTION.	CORRECTIVE ACTION.
10. TRANSMISSION TEMPERATURE GAGE READINGS ABNORMALLY HIGH :		
	Step 1. Check for correct oil level.	Add or remove oil to correct level (refer to LO 9-2320-273-12).
	Step 2. Check for oil leaks.	Refer problem to Direct Support Maintenance.
	Step 3. Check for clogged oil pump suction screen.	Clean screen (para 6-9 B).
	Step 4. Check oil cooler fins for obstructions.	Clean cooling fins.

Section III MAINTENANCE PROCEDURES

6-7. INTRODUCTION.

This section provides you with Organizational Level maintenance procedures for the transmission. The scope of maintenance is limited to the work listed in the following summary of task procedures.

6-8. TRANSMISSION MAINTENANCE TASK SUMMARY.**INITIAL SETUP****APPLICABLE CONFIGURATIONS**

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

**EQUIPMENT CONDITION
PARAGRAPH**

9-13A.

11-16A.

11-16E.

4-23A.

4-30A.

5-37A.

6-11A.

9-16A.

CONDITION DESCRIPTIONAir Reservoirs Drained.
Front Radiator Shell and
Screen Removed.Brush Guard Removed
(916 thru 920).

Fuel Tank Removed.

Ether Cylinder Removed.

Batteries Disconnected.

Floor Access Plate Removed.

Supply Air Reservoir Re-
moval (M916 thru M920
Only).**MATERIALS/PARTS (P/N)**

Dry Cleaning Solvent SD-2 (Refer to Appendix C).

Oil – 5.5 Gallons (Refer to Appendix C).

Case Breathers (12), (2520-01-077-2803).

Oil Funnel.

Container, 6 Gal Min.

Gaskets (2), 9N4010 (11083).

O-Ring, 3D2824 (11083).

Soap Solution.

Gaskets (2), 9N1507 (11083).

Loctite (242).

Masking Tape.

Marking Pen.

Cable Ties (8) SST4S (06383).

Liquid Teflon (Refer to Appendix C).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine Off.

Park Brake Set.

Transmission in Neutral.

PERSONNEL REQUIRED

One (MOS (63B20).

References (TM)

TM 9-2320-273-10.

TM 9-2320-273-20P.

LO 9-2320-273-12.

REFERENCES (TROUBLESHOOTING)

Table 6-1, 5-7, 9-1.

6-8. TRANSMISSION MAINTENANCE TASK SUMMARY (Continued).			
LIST OF TASKS			
TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
1.	Oil Service :	6-9	6-1
	A. Draining Oil.	6-9A	
	B. Cleaning or Replacement of Pump Screen.	6-9B	
	C. Removal of Case Breather.	6-9C	
	D. Installation of New Case Breather.	6-9D	
	E. Replenishing Oil Supply.	6-9E	
	F. Checking for Leaks.	6-9F	
2.	Oil Cooler Maintenance:	6-10	6-1
	A. Removal.	6- 10A	
	B. Cleaning and Inspection.	6-10B	
	c. Installation.	6- 10C	
3.	Pneumatic Control Line Maintenance:	6-11	9-1
	A. Removal.	6-11A	
	B. Inspection.	6-11B	
	c. Installation.	6-11C	
	b. Checking for Leaks.	6-11D	
4.	Ratio Selector and Air Charging Valve Maintenance:	6-12	9-1
	A. Removal.	6-12A	
	B. Inspection of Lines and Fittings.	6-12B	
	C. Lubrication of Ratio Selector.	6-1 2C	
	D. Installation.	6-12D	
	E. Operational Check.	6-12E	
5.	Speedometer Cable Maintenance:	6-13	5-7
	A. Removal.	6-13A	
	B. installation.	6-13B	
	C. Operational Check.	6-13C	
6.	Transmission Control Heater Maintenance:	6-14	
	A. Removal.	6- 14A	
	B. Installation.	6-14B	
	c. Operational Check.	6-14C	

TRANSMISSION.**6-9. OIL SERVICE.****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

- a. Draining Oil. (10)
- b. Cleaning or Replacement of Pump Screen. (15)
- c. Removal of Case Breather. (5)
- d. Installation of New Case Breather. (5)
- e. Replenishing Oil Supply. (10)
- f. Checking for Leaks. (10)

55 Minutes Total.

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

EQUIPMENT CONDITION**PARAGRAPH**

None.

CONDITION DESCRIPTION

None.

TEST EQUIPMENT

None

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Nonflammable Cleaning Solvent SD-2 (Refer to Appendix C).

Oil, 5.5 gallons (21 Liters) (Refer to Appendix C);

OEA if Sub-Zero Use.

Case Breathers (12) (2520-01-077-2803).

Oil Funnel.

Container, 6 gal min.

Loctite (242).

Gaskets (2), 9N1507 (11083).

O-Ring, 3D2824 (11083).

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.

LO 9-2320-273-12.

TM 9-2320-273-20P.

GENERAL SAFETY INSTRUCTIONS

Engine Off.

Transmission in Neutral.

Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 6-1.

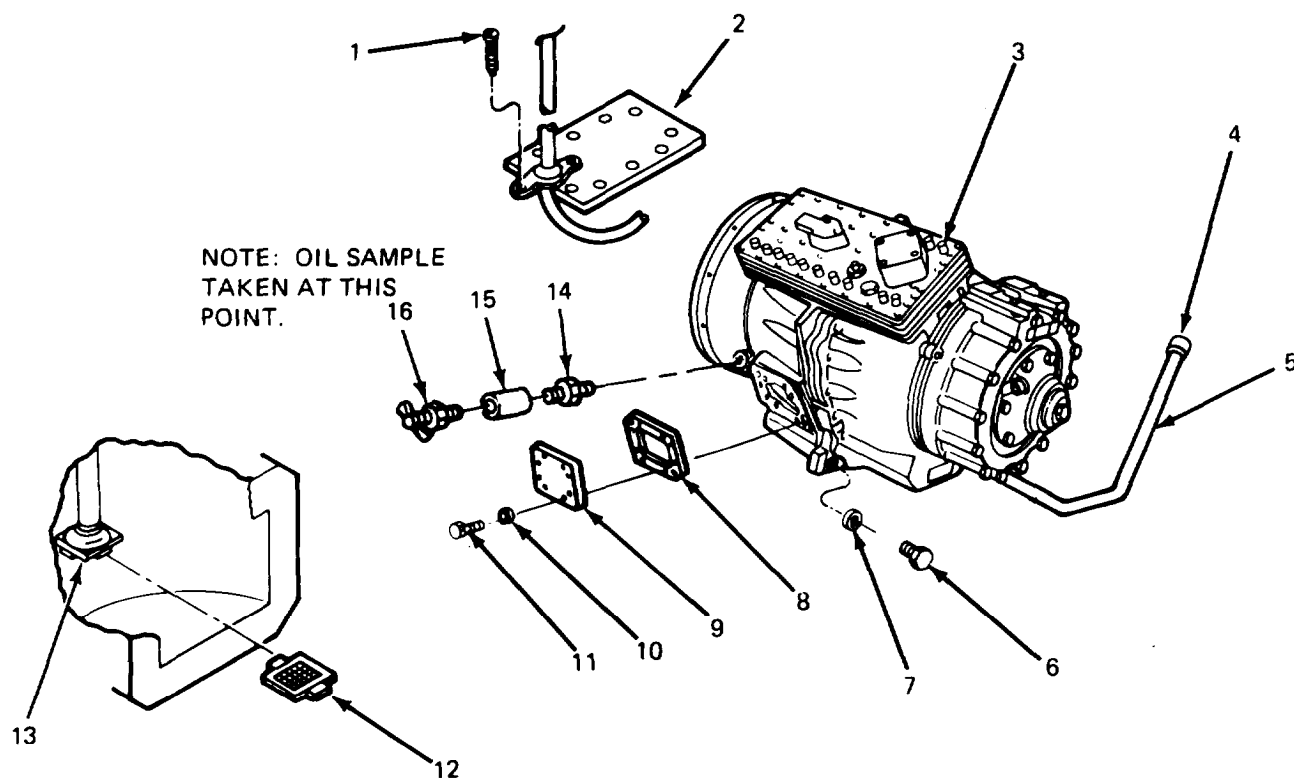
TRANSMISSION .

6-9. OIL SERVICE (Continued).**LOCATION/ITEM****ACTION****REMARKS****NOTE**

Transmission should be warm for this task.
Park the truck on level ground.

A. DRAINING OIL.**NOTE**

Place container under drain plug to catch oil.

**LEGEND:**

1. SCREW (11)	5. DIPSTICK TUBE	9. ACCESS COVER	13. SUCTION TUBE
2. ACCESS PLATE	6. DRAIN PLUG	10. WASHER (8)	14. REDUCER PIPE
3. CASE BREATHER (12)	7. O-RING	11. CAPSCREW (8)	15. COUPLING PIPE
4. DIPSTICK	8. GASKET	12. PUMP SCREEN	16. DRAIN COCK

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TRANSMISSION.

6-9. OIL SERVICE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. DRAINING OIL (Continued).		
1. Dipstick (4).	Remove.	
2. Drain plug (6) and O-ring (7).	a. Unscrew and remove. b. Throw away O-ring. c. Allow oil to drain out. d. Inspect magnetic base of plug. e. Install new O-ring (7) on drain plug (6). f. Screw in plug and tighten,	If there are large metal particles notify Direct Support Maintenance.
A-1. TAKING OIL SAMPLE FOR ANALYSIS		
NOTE Before beginning this task check transmission oil level according to operator's manual (TM 9-2320-273-10). Start engine (see TM 9-2320-273-10), warm vehicle to normal operating range and stop engine.		
1. Draincock (16)	a. Unscrew and loosen. b. When completed with task 1., use the proper bottle and take oil sample from the transmission drain valve (see TB 43-0210). c. Check oil level to insure proper level after sampling.	When taking a sample, first use a container to drain a small amount of oil to clean the valve assembly.

TRANSMISSION.

6-9. OIL SERVICE (Continued).**LOCATION/ITEM****ACTION****REMARKS****B. CLEANING OR REPLACEMENT OF PUMP SCREEN.**

3. Eight capscrews (11) and washers (10). Unscrew and remove.

4. Access cover (9) and gasket (8). a. Remove.
b. Discard gasket (8).

On the M916 thru M920 the left side access cover is blocked by the PTO, so you will have to use the right side cover.

CAUTION

Exercise care that when the pump screen is replaced, that it is properly latched. If not the screen will fall into the housing and may damage internal transmission parts.

5. Pump screen (12). a. Slide off of suction tube (13) by grasping metal spring tab and pushing down slightly while pulling out.

b. Inspect magnets.

If there are large metal particles, notify Direct Support Maintenance.

c. Clean with dry cleaning solvent.

d. Dry with compressed air.

TRANSMISSION.

6-9. OIL SERVICE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. CLEANING OR REPLACEMENT OF PUMP SCREEN (Continued).		
	e. Inspect.	If screen or magnets are damaged, replace assembly.
	f. Slide onto suction tube base, pushing down slightly on clip while sliding in.	Be sure spring clip latches screen in place. A distinct click will be heard. Check for proper engagement by pulling out with slight pressure and not pushing down on clip.
6. New gasket (8), access cover (9), eight capscrews (11), and washers (10).	a. Put in place.	
	b. Tighten capscrews (11) to 31 lb-ft (42 N•m) with torque wrench.	
LEGEND: 1. SCREW (11) 2. ACCESS PLATE 3. CASE BREATHER (12) 4. DIPSTICK 5. DIPSTICK TUBE 6. DRAIN PLUG 7. O-RING 8. GASKET 9. ACCESS COVER 10. WASHER (8) 11. CAPSCREW (8) 12. PUMP SCREEN 13. SUCTION TUBE		

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TRANSMISSION.

6-9. OIL SERVICE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
C. REMOVAL OF CASE BREATHER.		
7. Floor mat.	Pull back at seam to expose access plate (2).	
8. Eleven screw (1).	Remove.	
9. Access plate (2).	Remove from cab floor.	
10. One case breather (3).	Unscrew, remove and throw away.	
10.1.If required, change vents (14).	Unscrew, remove and throw away.	
D. INSTALLATION OF NEW CASE BREATHER.		
11. One new case breather (3).	Apply loctite on threads, screw in and tighten carefully with pliers. Do not clamp too tightly, otherwise the plastic cap may crack.	
11.1. Eleven new breather vents (14).	Apply loctite on threads, screw in and tighten carefully with pliers. Do not clamp too tightly, otherwise the plastic cap may crack.	
12. Access plate (2) and control cable grommet and plate.	Position and secure with twelve screws (1).	
13. Floor mat.	Reinstall over cover plate.	
E. REPLENISHING OIL SUPPLY.		
14. Dipstick tube (5).	a. Insert tip of funnel. b. Pour in 5.5 gal (20.8 liters) transmission oil. c. Put dipstick (4) in place.	

TRANSMISSION .

6-9. OIL SERVICE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
F. CHECKING FOR LEAKS.		
15. Engine.	Start up (see TM 9-2320-273-10).	
16. Transmission.	Check for fluid and air leaks while engine is at low idle.	
17. Dipstick (4).	Check oil level. Add more if needed.	
18. Engine.	Shut down (see TM 9-2320-273-10).	

TRANSMISSION.

6-9. OIL SERVICE (Continued).

LOCATION/ITEM

ACTION

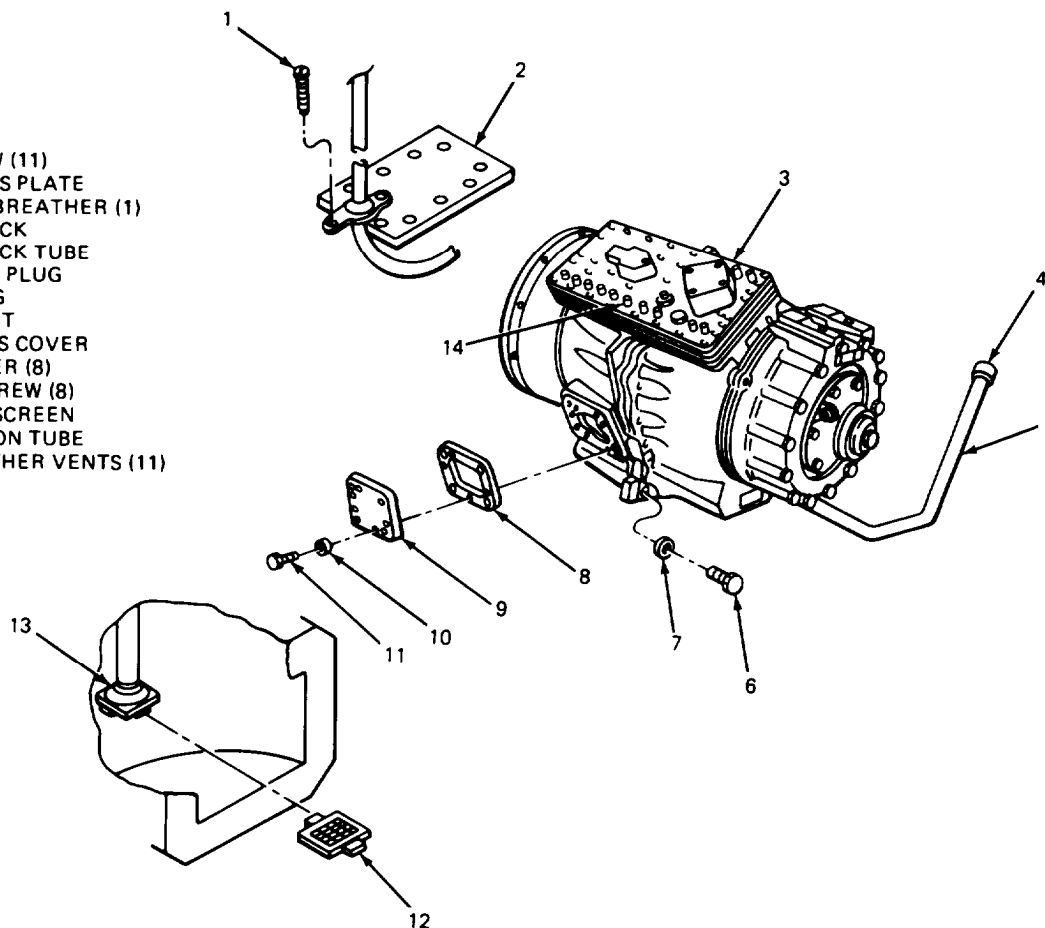
REMARKS

CAUTION

Do not allow SD-2 dry cleaning solvents to come in contact with seals or flexible hoses. These cleaners may damage leather, rubber, and synthetic materials.

LEGEND:

1. SCREW (11)
2. ACCESS PLATE
3. CASE BREATHER (1)
4. DIPSTICK
5. DIPSTICK TUBE
6. DRAIN PLUG
7. O-RING
8. GASKET
9. ACCESS COVER
10. WASHER (8)
11. CAPSCREW (8)
12. PUMP SCREEN
13. SUCTION TUBE
14. BREATHER VENTS (11)



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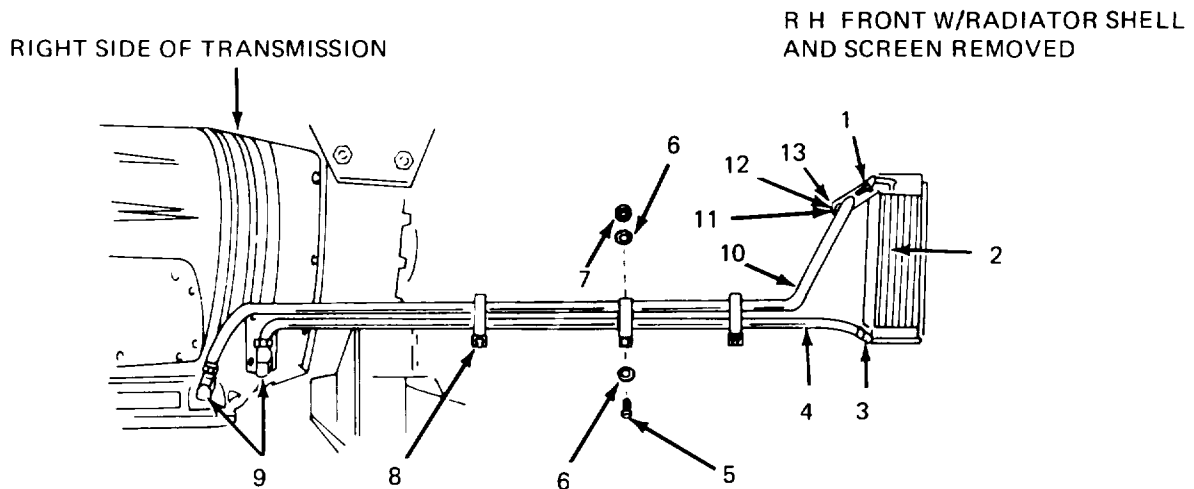
TRANSMISSION.

6-10. OIL COOLER MAINTENANCE.		
THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)		
a. Removal. (15)		
b. Cleaning and Inspection. (15)		
c. Installation. (15)		
45 Minutes Total		
INITIAL SETUP	EQUIPMENT CONDITION	
<u>APPLICABLE CONFIGURATIONS</u>	<u>PARAGRAPH</u>	<u>CONDITION DESCRIPTION</u>
All.	11-16A.	Front Radiator Shell and Screen Removed.
<u>TEST EQUIPMENT</u>		
None.	11-16E.	Brush Guard Removed (M916 thru M920)
<u>SPECIAL TOOLS</u>		
None.		
<u>MATERIALS/PARTS (P/N)</u>		
None.		
 <u>PERSONNEL REQUIRED</u>	<u>SPECIAL ENVIRONMENTAL CONDITIONS</u>	
One (MOS-63B20).	Vehicle Parked on Level Ground.	
 <u>REFERENCES (TM)</u>	<u>GENERAL SAFETY INSTRUCTIONS</u>	
TM 9-2320-273-10.	Engine Off.	
	Transmission in Neutral.	
	Park Brake Set.	
 <u>TROUBLESHOOTING REFERENCES</u>		
Table 6-1.		

TRANSMISSION.

6-10. OIL COOLER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Hydraulic hoses (4) and (10).	Remove from two transmission mounted elbows (9).	Remove by unscrewing barb fitting from elbow.
2. Three bolts (5), starwashers (6), and nuts (7).	Unscrew and remove three rubber coated hose retainers (8).	Retainers are located along top of frame rail.
3. Hydraulic hoses (4) and (10).	a. Remove from two oil cooler mounted elbows (1) and (3). b. Pull hydraulic hoses (4) and (10) out of vehicle.	Remove by unscrewing barb fitting from elbow.
4. Four bolts (11), lockwashers (12), and washers (13).	Unscrew and remove oil cooler (2).	



LEGEND:

1. ELBOW	7. NUT (3)
2. OIL COOLER	8. HOSE RETAINER (3)
3. ELBOW	9. ELBOW (2)
4. HYDRAULIC HOSE	10. HYDRAULIC HOSE
5. BOLT (3)	11. BOLT (4)
6. STARWASHER (3)	12. LOCKWASHER (4)
	13. WASHER (4)

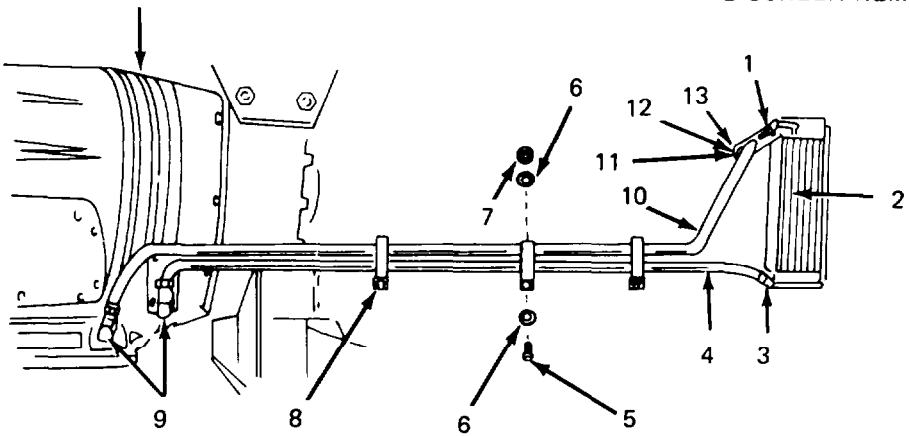
TA 074858

TRANSMISSION.**6-10. OIL COOLER MAINTENANCE (Continued).**

LOCATION/ITEM		ACTION	REMARKS
B. CLEANING AND INSPECTION.			
5.	Hydraulic hoses (4) and (10).	Inspect for cracking and leaks.	Replace as necessary.
6.	Oil cooler (2).	Clean cooling fins, inspect for bent fins and leaks.	Replace as necessary.
C. INSTALLATION.			
7.	Oil cooler (2).	Install with four bolts (11), lockwashers (12), and washers (13).	
8.	Hydraulic hose (4) and (10).	a. Install to oil cooler mounted elbows (1) and (3). b. Install to transmission mounted elbows (9).	
9.	Three hose retainers (8).	Install with three bolts (5), star washers (6), and nuts (7) and tighten.	Install hoses per illustration.

TRANSMISSION.

6-10. OIL COOLER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
NOTE Follow-on maintenance required: - Install front radiator shell and screen; refer to paragraph 11-16D. - Install Brush Guard; refer to paragraph 11-16F (M916 thru M920).		
RIGHT SIDE OF TRANSMISSION  R H FRONT W/RADIATOR SHELL AND SCREEN REMOVED LEGEND: 1. ELBOW 2. OIL COOLER 3. ELBOW 4. HYDRAULIC HOSE 5. BOLT (3) 6. STARWASHER (3) 7. NUT (3) 8. HOSE RETAINER (3) 9. ELBOW (2) 10. HYDRAULIC HOSE 11. BOLT (4) 12. LOCKWASHER (4) 13. WASHER (4)		
TA 074859		

TRANSMISSION.

6-11. PNEUMATIC CONTROL LINE MAINTENANCE.		
THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)		
a. Removal. (15)		
b. Inspection. (5)		
c. Installation. (15)		
d. Checking for Leaks. (25)		
60 Minutes Total.		
INITIAL SETUP	EQUIPMENT CONDITION	
APPLICABLE CONFIGURATIONS	PARAGRAPH	CONDITION DESCRIPTION
All.	9-13A.	Air Reservoirs Drained.
TEST EQUIPMENT		
None.		
SPECIAL TOOLS		
None.		
MATERIALS/PARTS (P/N)		
Soap Solution.		
Gaskets (Two), 9N4010 (11083).		
PERSONNEL REQUIRED	SPECIAL ENVIRONMENTAL CONDITIONS	
One (MOS-63B20)	Vehicle Parked on Level Ground.	
REFERENCES (TM)	GENERAL SAFETY INSTRUCTIONS	
TM 9-2320-273-10.	Engine Off.	
TM 9-2320-273-20P.	Transmission in Neutral.	
	Park Brake Set.	
TROUBLESHOOTING REFERENCES		
Table 9-1.		

TRANSMISSION .

6-11. PNEUMATIC CONTROL LINE MAINTENANCE (Continued).

LOCATION/ITEM

ACTION

REMARKS

WARNING

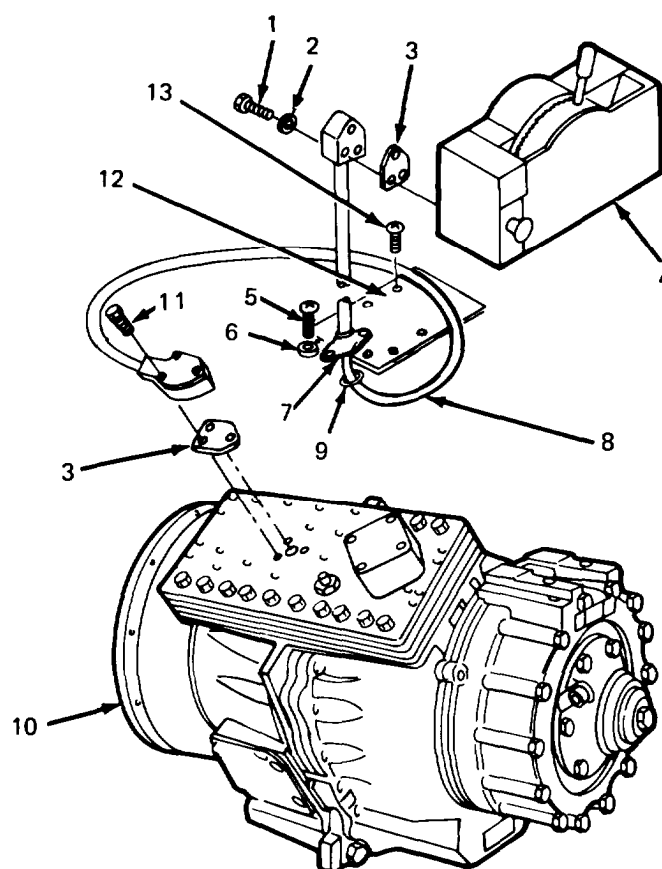
Do not begin work on air lines until pressure in air system has dropped completely.

NOTE

Pull back floor mat to expose access plate.

LEGEND:

1. BOLT (3)
2. WASHER (3)
3. GASKET (2)
4. RATIO SELECTOR
5. SCREW (2)
6. WASHER (2)
7. RETAINER
8. CONTROL LINE
9. GROMMET
10. TRANSMISSION
11. BOLT (3)
12. ACCESS PLATE
13. SCREW (10)



TA 074860

TRANSMISSION.

6-11. PNEUMATIC CONTROL LINE MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Two screws (5) and washers (6).	Loosen and remove.	
2. Retainer (7).	Remove.	
3. Ten screws (13).	Loosen and remove.	
4. Access plate (12).	Remove.	
5. Grommet (9).	Remove,	
6. Three bolts (11).	Loosen and remove.	
7. Three bolts (1) and washers (2).	Loosen and remove.	
8. Control line (8) and two gaskets (3).	Remove	Discard two gaskets (3).
B. INSPECTION.		
9. Control line (8).	a. Inspect for: 1. Cracks. 2. Leaks. 3. Kinks. b. Blow air through to see that line is not clogged.	Replace if necessary.
C. INSTALLATION.		
10. Control line (8) and two new gaskets (3).	a. Attach to ratio selector (4) using three bolts (1) and washers (2). b. Attach to transmission (10) using three bolts (11).	
11. Six bolts (1) and (11).	Tighten to 18 lb-ft (24 N•m) using torque wrench.	
12. Grommet (9).	Install.	
13. Access plate (12).	Install.	
14. Ten screws (13).	Install and tighten.	
15. Retainer (7).	Install.	
16. Two screws (5) and washers (6).	Install and tighten.	

TRANSMISSION.

6-11. PNEUMATIC CONTROL LINE MAINTENANCE (Continued).

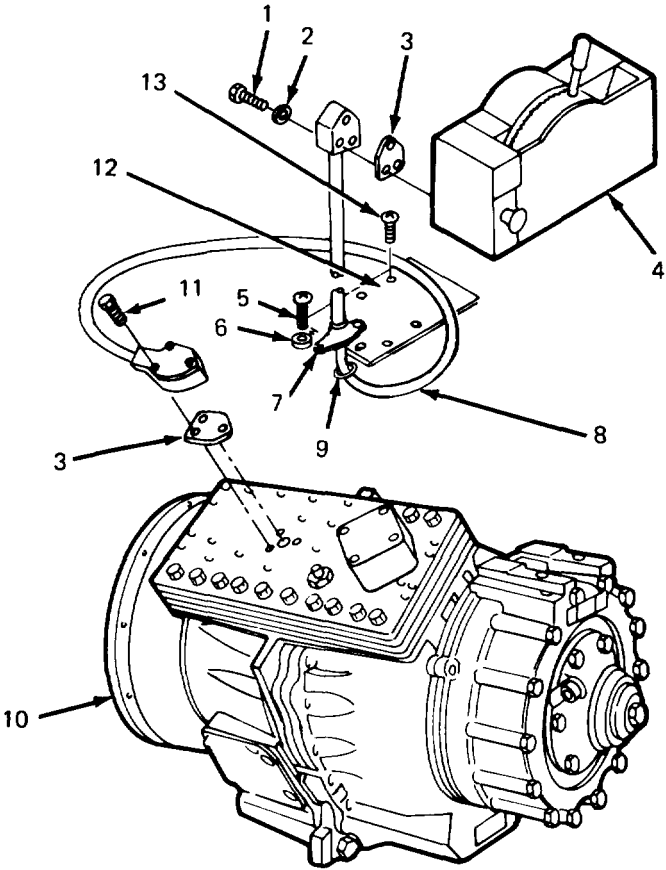
LOCATION/ITEM	ACTION	REMARKS
NOTE Follow on maintenance action required: Close drain valve on air reservoir; (refer to para 9-13 D).		
D. CHECKING FOR LEAKS.		
17. Engine.	Start up (See TM9-2320-273-10).	
18. CAB/Air charging valve.	Push in and charge until system reaches 65 psi (448 kPa).	When system reaches 65 psi, valve will stay in without being held.
LEGEND: 1. BOLT (3) 2. WASHER (3) 3. GASKET (2) 4. RATIO SELECTOR 5. SCREW (2) 6. WASHER (2) 7. RETAINER 8. CONTROL LINE 9. GROMMET 10. TRANSMISSION 11. BOLT (3) 12. ACCESS PLATE 13. SCREW (10)		
TA 074861		

TRANSMISSION.

6-11. PNEUMATIC CONTROL LINE MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
D. CHECKING FOR LEAKS (Continued).		
19. Control line (8).	Check for leaks, using soap solution.	

LEGEND:

- 1. BOLT (3)
- 2. WASHER (3)
- 3. GASKET (2)
- 4. RATIO SELECTOR
- 5. SCREW (2)
- 6. WASHER (2)
- 7. RETAINER
- 8. CONTROL LINE
- 9. GROMMET
- 10. TRANSMISSION
- 11. BOLT (3)
- 12. ACCESS PLATE
- 13. SCREW (10)



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TRANSMISSION.

6-12. RATIO SELECTOR AND AIR CHARGING VALVE MAINTENANCE.

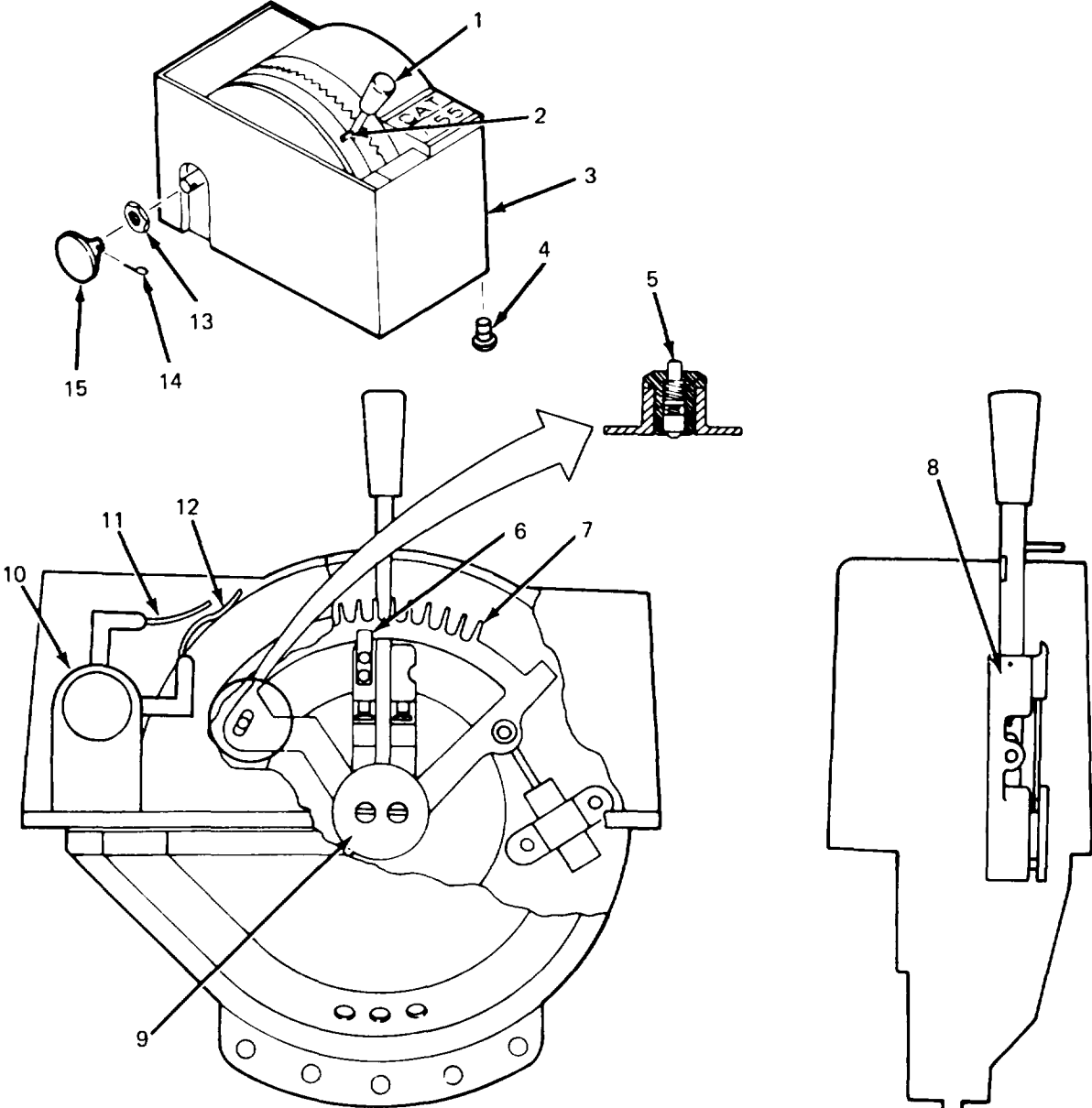
THIS TASK COVERS: (APPROXIMATE TIME REQUIRED RED FOLLOWS TASK DESCRIPTION.)

- a. Removal. (8)
 - b. Inspection of Lines and Fittings. (2)
 - c. Lubrication of, Ratio Selecton. (5)
 - d. Installation. (8)
 - e. Operational Check. (5)
- 28 Minutes Total.

INITIAL SETUP		EQUIPMENT CONDITION
<u>APPLICABLE CONFIGURATIONS</u>	<u>PARAGRAPH</u>	<u>CONDITION DESCRIPTION</u>
All.	9 - 13 A .	Air Reservoirs Drained.
<u>TEST EQUIPMENT</u>		
None.		
<u>SPECIAL TOOLS</u>		
None.		
<u>MATERIALS/PARTS (P/N)</u>		
None.		
<u>PERSONNEL REQUIRED</u>		<u>SPECIAL ENVIRONMENTAL CONDITIONS</u>
One (MOS-63B20).		Vehicle Parked on Level Ground.
<u>REFERENCES (TM)</u>		<u>GENERAL SAFETY INSTRUCTIONS</u>
TM 9-2320-273-10.		Engine Off.
		Transmission in Neutral.
		Park Brake Set.
<u>TROUBLESHOOTING REFERENCES</u>		
Table 9-1.		

TRANSMISSION.

6-12. RATIO SELECTOR AND AIR CHARGING VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
		
LEGEND: 1. KNOB 2. INDICATOR 3. HOUSING 4. SCREW (4) 5. PLUNGER 6. GUIDE 7. INHIBITOR PLATE 8. BASE 9. RETAINER 10. VALVE 11. AIR LINE 12. AIR LINE 13. NUT 14. PIN 15. KNOB		TA 074863

TRANSMISSION.

6-12. RATIO SELECTOR AND AIR CHARGING VALVE MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Knob (1) and indicator (2).	Unscrew and remove.	
2. Four screws (4).	Unscrew and remove.	
3. Housing (3).	Remove and lay on side.	
4. Pin (14).	Remove with hammer and punch.	
5. Knob (15).	Remove.	
6. Airlines(n) and (12).	Unscrew from valve (10), tag and remove.	
7. Nut (13).	Loosen and remove.	
8. Valve (10).	Remove.	
B. INSPECTION OF LINES AND FITTINGS.		
9. Air lines (11) and (12).	Inspect for: a. Cracks. b. Leaks. c. Damaged threads.	Also check threads on valve (10) for damage. Replace as necessary.
C. LUBRICATION OF RATIO SELECTOR.		
10. Inhibitor plate (7), retainer (9), base (8), guide (6) and plunger (5).	Spray surfaces between these items any time sticking becomes evident.	See LO 9-2320-273-12.

TRANSMISSION.

6-12. RATIO SELECTOR AND AIR CHARGING VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS																
LEGEND: <table> <tr> <td>1. KNOB</td><td>9. RETAINER</td></tr> <tr> <td>2. INDICATOR</td><td>10. VALVE</td></tr> <tr> <td>3. HOUSING</td><td>11. AIR LINE</td></tr> <tr> <td>4. SCREW (4)</td><td>12. AIR LINE</td></tr> <tr> <td>5. PLUNGER</td><td>13. NUT</td></tr> <tr> <td>6. GUIDE</td><td>14. PIN</td></tr> <tr> <td>7. INHIBITOR PLATE</td><td>15. KNOB</td></tr> <tr> <td>8. BASE</td><td></td></tr> </table>			1. KNOB	9. RETAINER	2. INDICATOR	10. VALVE	3. HOUSING	11. AIR LINE	4. SCREW (4)	12. AIR LINE	5. PLUNGER	13. NUT	6. GUIDE	14. PIN	7. INHIBITOR PLATE	15. KNOB	8. BASE	
1. KNOB	9. RETAINER																	
2. INDICATOR	10. VALVE																	
3. HOUSING	11. AIR LINE																	
4. SCREW (4)	12. AIR LINE																	
5. PLUNGER	13. NUT																	
6. GUIDE	14. PIN																	
7. INHIBITOR PLATE	15. KNOB																	
8. BASE																		

TA 074864

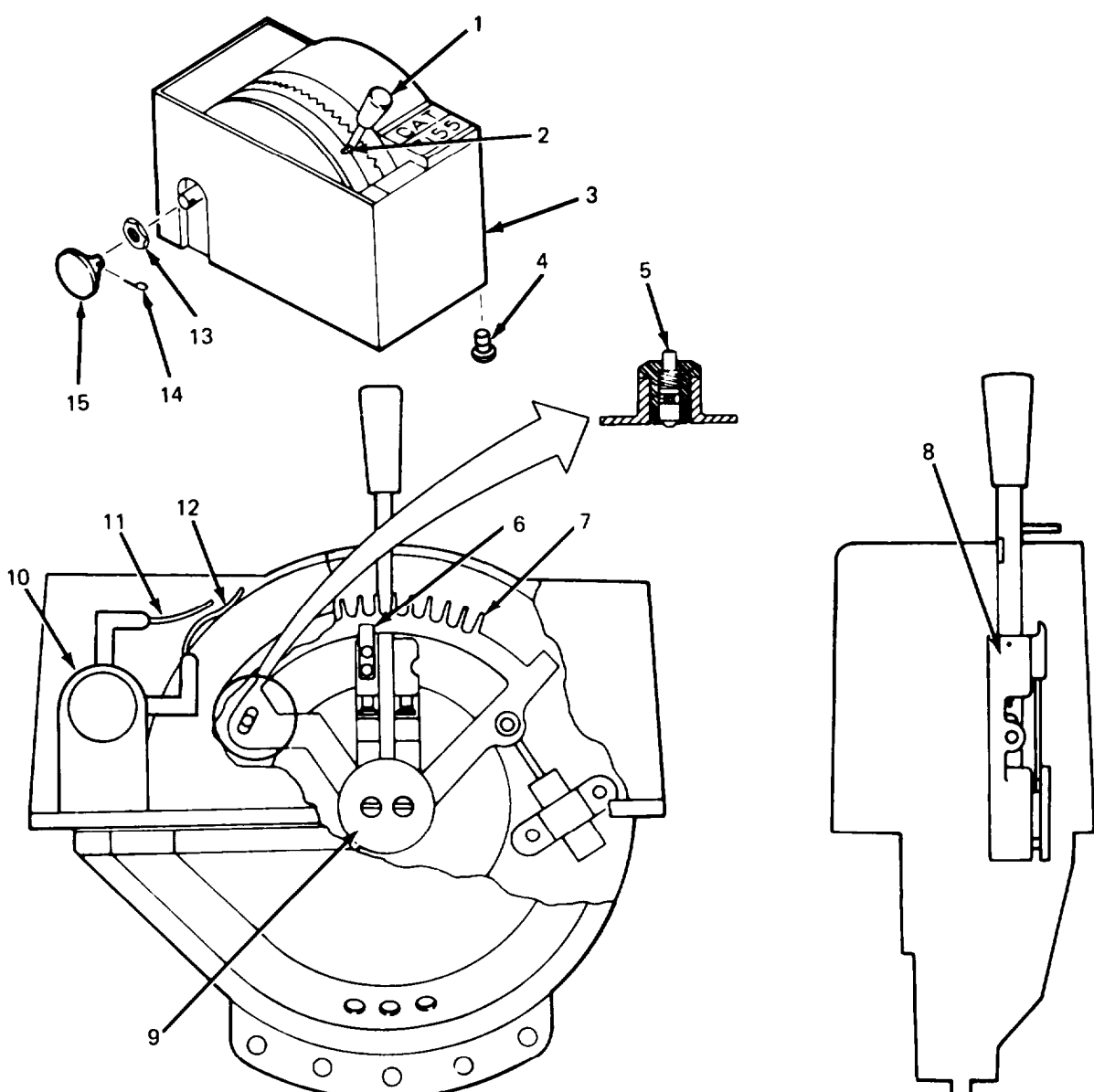
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TRANSMISSION.**6-12. RATIO SELECTOR AND AIR CHARGING VALVE MAINTENANCE (Continued).**

LOCATION/ITEM	ACTION	REMARKS
D. INSTALLATION.		
11. Valve (10).	Put in place.	
12. Nut (13).	Screw on and tighten.	
13. Knob (15).	a. Place on valve (10). b. Attach with pin (14).	
14. Air lines (11) and (12).	Screw onto fittings.	
15. Housing (3).	a. Attach with four screws (4). b. Tighten screws (4).	
16. Knob (1) and indicator (2).	Screw in and tighten.	
E. OPERATIONAL CHECK.		
17. Engine.	Start up (see TM 9-2320-273-10).	
18. Air charging valve knob (15).	a. Push knob in with air pressure below 65 psi (448 kPa). It should pop out when released. b. Push knob in with air pressure above 65 psi (448 kPa). It should stay in and the sound of the transmission engaging should be evident. c. Test drive vehicle. Shifts should be smooth with no evidence of sticking.	

TRANSMISSION.

6-12. AIR CHARGING - VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
		
LEGEND: 1. KNOB 2. INDICATOR 3. HOUSING 4. SCREW (4) 5. PLUNGER 6. GUIDE 7. INHIBITOR PLATE 8. BASE	9. RETAINER 10. VALVE 11. AIR LINE 12. AIR LINE 13. NUT 14. PIN 15. KNOB	

TA 074865

TRANSMISSION.**6-13. SPEEDOMETER CABLE MAINTENANCE.****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

a. Removal.	(5)	
b. Installation.	(10)	
c. Operational check.	(5)	
	Minutes	Total.

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

EQUIPMENT CONDITION**PARAGRAPH**

None.

CONDITION DESCRIPTION

None.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.

GENERAL SAFETY INSTRUCTIONS

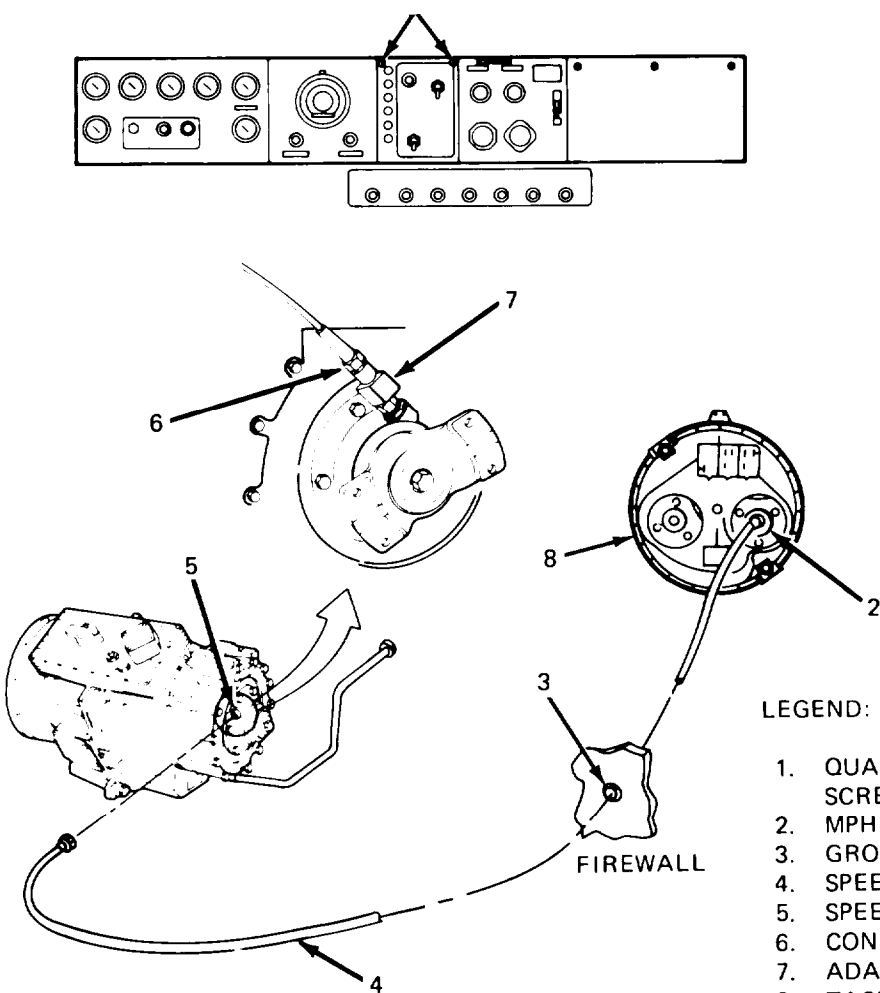
Engine Off.
 Transmission in Neutral.
 Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 5-7.

TRANSMISSION.

6-13. SPEEDOMETER CABLE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Two quarter-turn screws (1).	Loosen and lower panel.	
2. Speedometer cable (4).	a. Disconnect from km/h MPH connection (2) on back of tachograph (8). b. Unscrew connector (6) from speedometer drive (5) at transmission. c. Pull thru grommet (3) on firewall.	M916/M920 – Unscrew from adapter (7) at speedometer drive (5).
 LEGEND: 1. QUARTER-TURN SCREW (2) 2. MPH PORT 3. GROMMET 4. SPEEDOMETER CABLE 5. SPEEDOMETER DRIVE 6. CONNECTOR 7. ADAPTER 8. TACHOGRAPH		

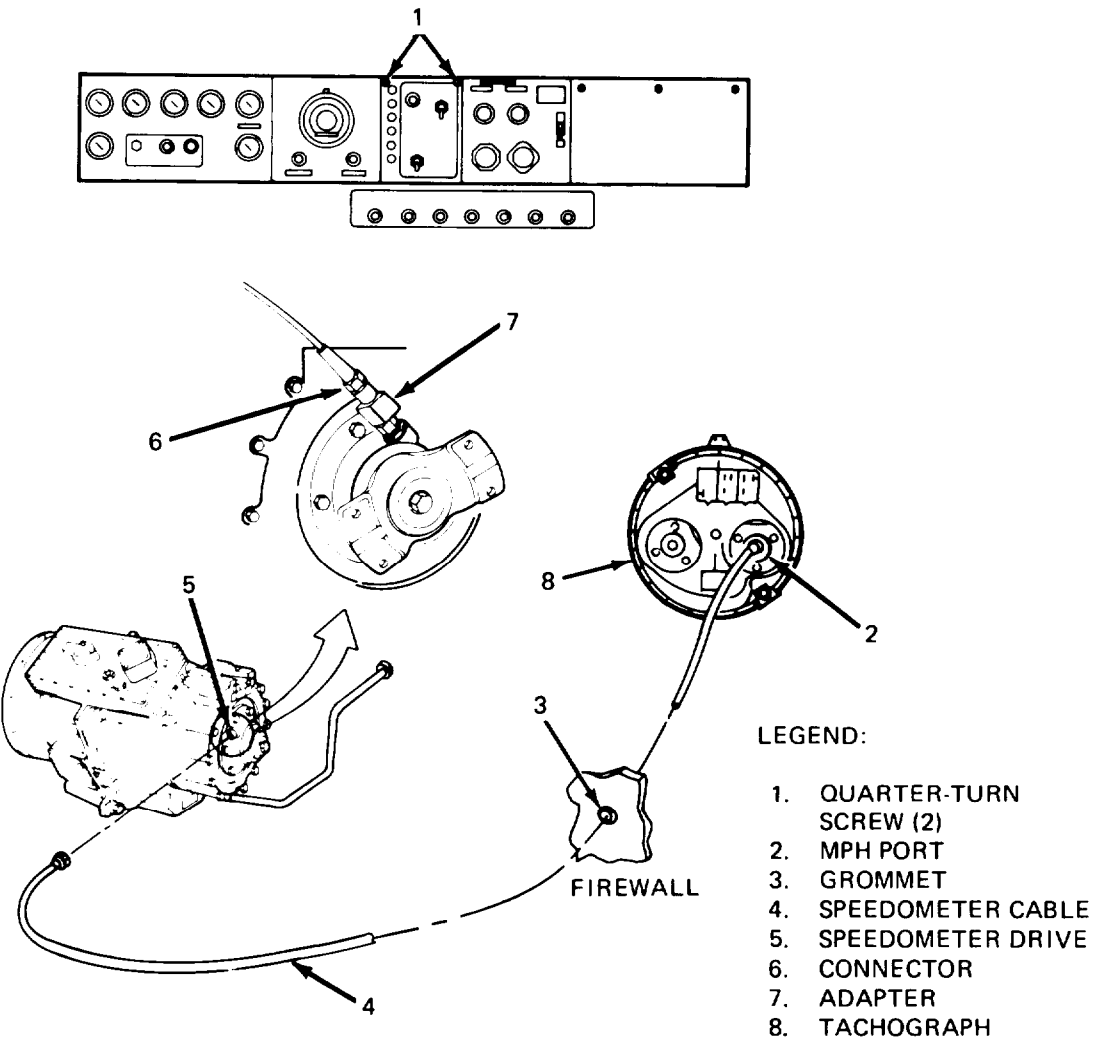
TA 074866

TRANSMSSION.

6-13. SPEEDOMETER CABLE MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
3. Adapter (7).	Unscrew and remove from speedometer drive (5).	(M916/M920 only).
B. INSTALLATION.		
4. Adapter (7).	Install on speedometer drive (5).	(M916/M920 only).
5. Speedometer cable (4).	a. Plug into speedometer drive (5) or adapter (7). Tighten connector (6). b. Thread free end through grommet (3) on firewall. c. Connect to MPH port (2) on back of tachograph (8).	
6. Two quarter-turn screws (1).	Close panel and tighten screws.	
C. OPERATIONAL CHECK.		
7. Vehicle.	Road test. Check tachograph (8) for appropriate road speed indication and responsiveness to changes in speed.	

TRANSMISSION.

6-13. SPEEDMETER CABLE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
 LEGEND: 1. QUARTER-TURN SCREW (2) 2. MPH PORT 3. GROMMET 4. SPEEDOMETER CABLE 5. SPEEDOMETER DRIVE 6. CONNECTOR 7. ADAPTER 8. TACHOGRAPH		

TA 074867

TRANSMISSION.

6-14. TRANSMISSION CONTROL HEATER MAINTENANCE.**THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

a. Removal.	(60)
b. Installation.	(60)
c. Operational Check.	(30)
	<u>150 Minutes Total.</u>

INITIAL SETUP**APPLICABLE CONFIGURATION**

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

Non.

MATERIALS/PARTS (P/N)

Masking Tape.
 Marking Pen.
 Cable Ties (8), SST4S (06383).
 Liquid Teflon (Refer to Appendix C).

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES

TM 9-2320-273-10.
 TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

None

EQUIPMENT CONDITION**PARAGRAPH**

4-23A.

4-30A.

5-37A.

6-11A.

9-16A.

CONDITION DESCRIPTION

Fuel Tank Removed.
 Ether Cylinder Removed.
 Batteries Disconnected.
 Floor Access Plate Removed.
 Supply Air Reservoir Removed
 (M916 thru M920 Only).

SPECIAL ENVIRONMENTAL CONDITIONS

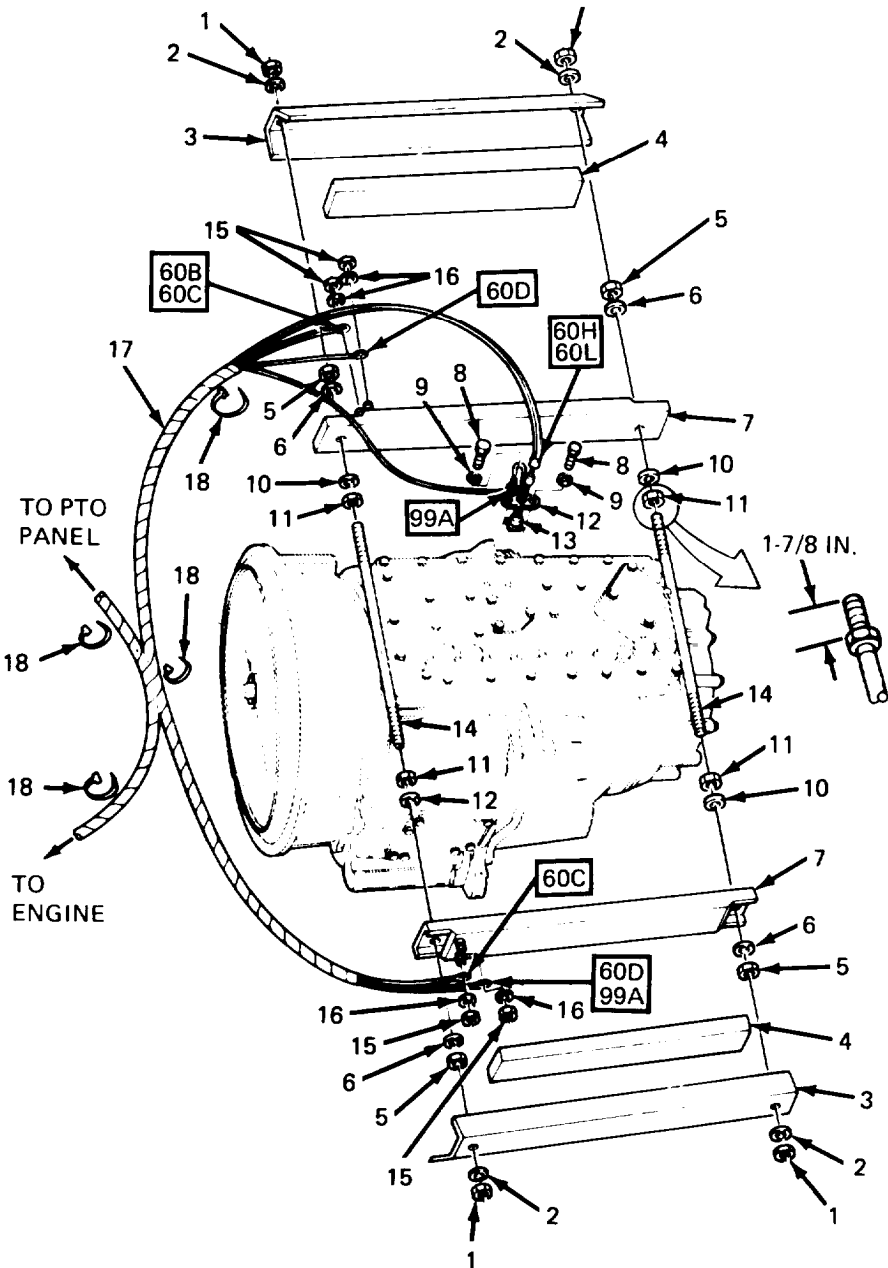
Vehicle Parked on Level Ground.
 Temperature of Transmission
 Control 0°F (-17.8°C) or Less for Testing.

GENERAL SAFETY INSTRUCTIONS

Engine Off.
 Transmission in Neutral.
 Park Brake Set.

TRANSMISSION.

6-14. TRANSMISSION CONTROL HEATER MAINTENANCE (Continued),

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Four nuts (1) and washers (2). Unscrew and remove two heater covers (3) and insulation strips (4).		
		
LEGEND: 1. NUT (4) 2. WASHER (4) 3. HEATER COVER (2) 4. INSULATION STRIP (2) 5. NUT (4) 6. WASHER (4) 7. HEATER (2) 8. BOLT (2) 9. WASHER (2) 10. WASHER (4) 11. NUT (4) 12. PLATE 13. SWITCH 14. ROD (2) 15. NUT (4) 16. WASHER (4) 17. HARNESS 18. CABLE TIE (4)		

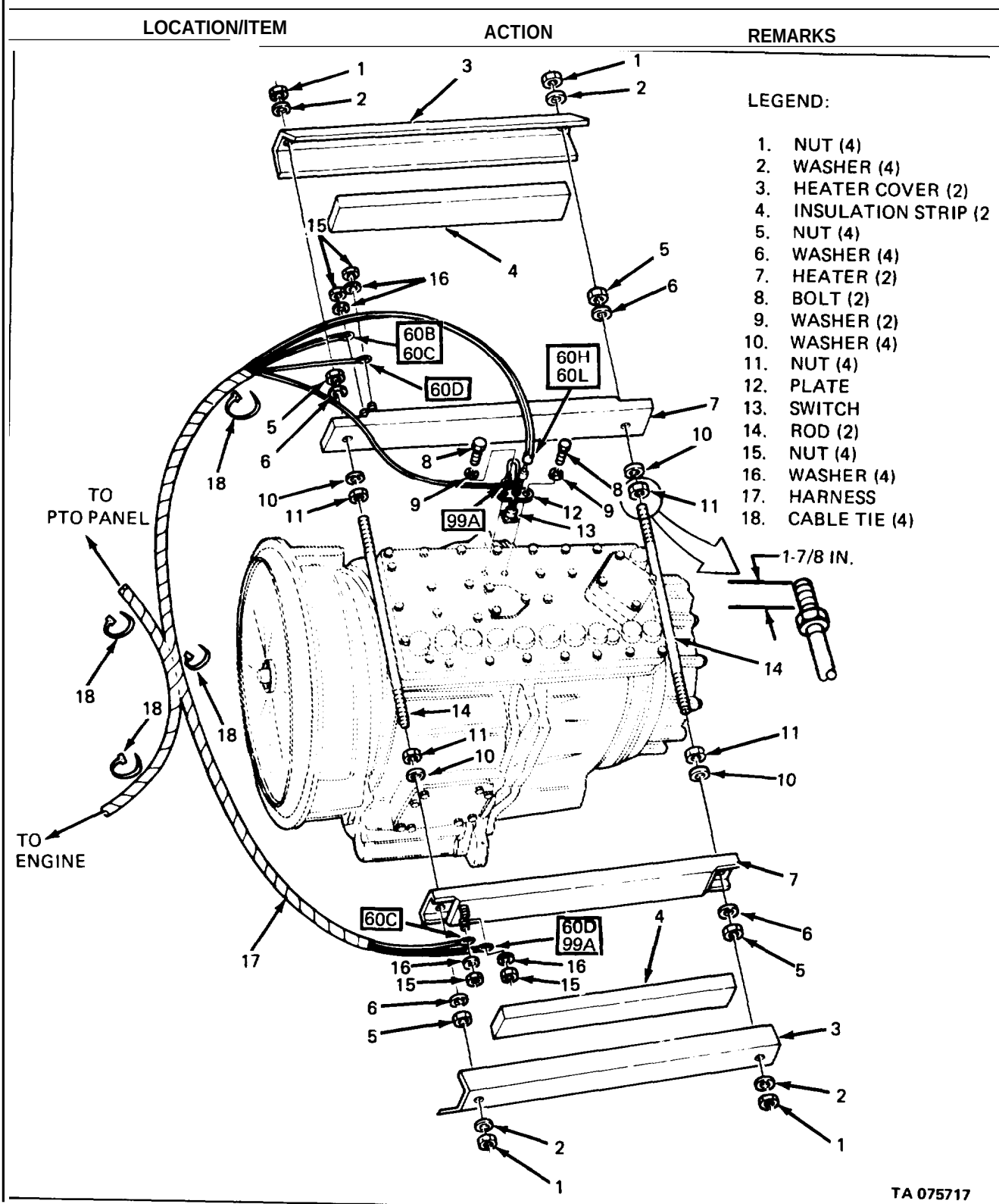
TA 075716

TRANSMISSION.

6-14. TRANSMISSION CONTROL HEATER MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
2. Four nuts (15) and washers (16).	Unscrew and remove four wires from two heaters (7).	Wires are contained in harness (17). Tag for reassembly.
3. Two nuts (5) and washers (6).	Unscrew and remove bottom heater (7) and two washers (10) from two rods (14).	Remove only the bottom heater at this time.
4. Top heater (7), two nuts (5), washers (6), rods (14), washers (10), and four nuts (11).	Remove as an assembly from transmission.	After assembly has been removed, disassemble nuts, washers, and heater from rods.
5. Harness (17).	Unplug from switch (13).	Tag for reassembly. One terminal from harness (17) will still be connected to switch (13).
6. Two bolts (8) and washers (9).	Unscrew and remove harness (17), plate (12), and switch (13) from transmission.	Tag one terminal from harness (17) for reassembly.
7. Four cable ties (18).	Cut and remove from harness (17).	Discard.

TRANSMISSION

6-14. TRANSMISSION CONTROL HEATER MAINTENANCE (Continued).



TRANSMISSION.

6-14. TRANSMISSION CONTROL HEATER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
8. Harness (17).	Unplug from harness (21).	Inside cab by driver's seat at ratio selector support (M915), or at PTO console (M916 thru M920). Tag for assembly.
9. Harness (21).	Pull down to remove from bracket (23).	This step required to replace lamp.
10. Lens (19).	Push up from bottom to remove from bracket (23).	
11. Two bolts (25), washers (24), and nuts (26).	Unscrew and remove bracket (23) with decal (22) attached.	

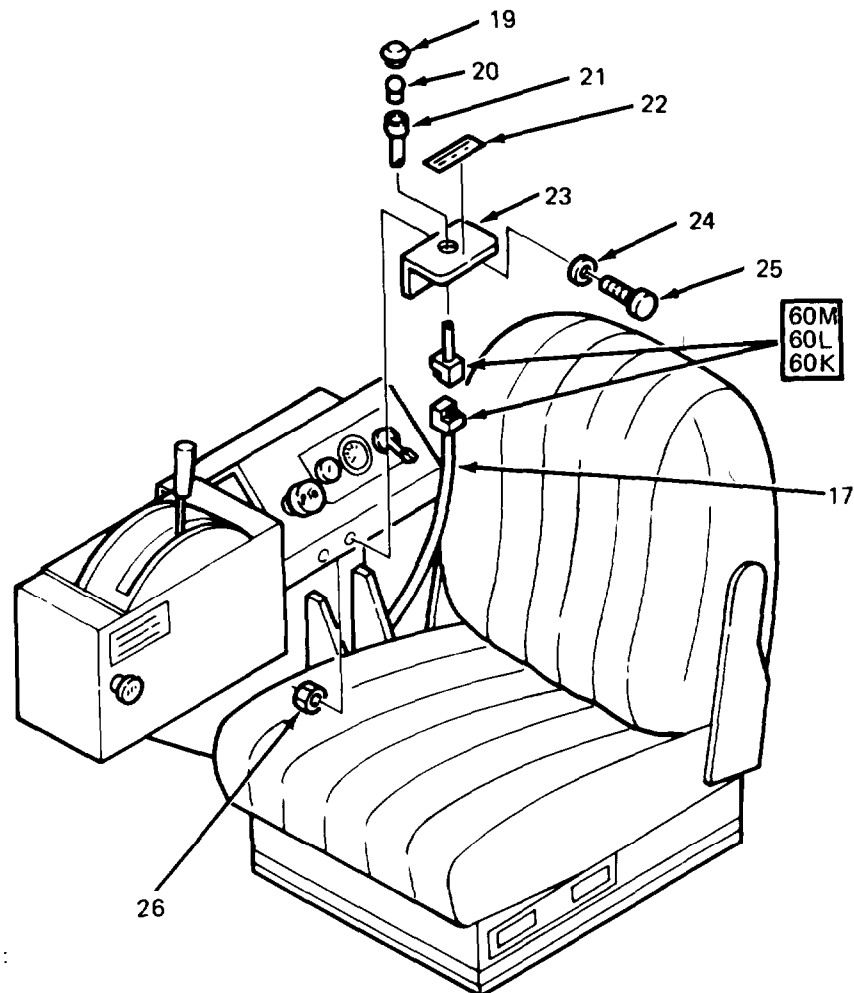
TRANSMISSION.

6-14. TRANSMISSION CONTROL HEATER MAINTENANCE (Continued).

LOCATION/ITEM

ACTION

REMARKS



LEGEND:

- 17. HARNESS
- 19. LENS
- 20. LAMP
- 21. HARNESS
- 22. DECAL
- 23. BRACKET
- 24. WASHER (2)
- 25. BOLT (2)
- 26. NUT (2)

TA 075718

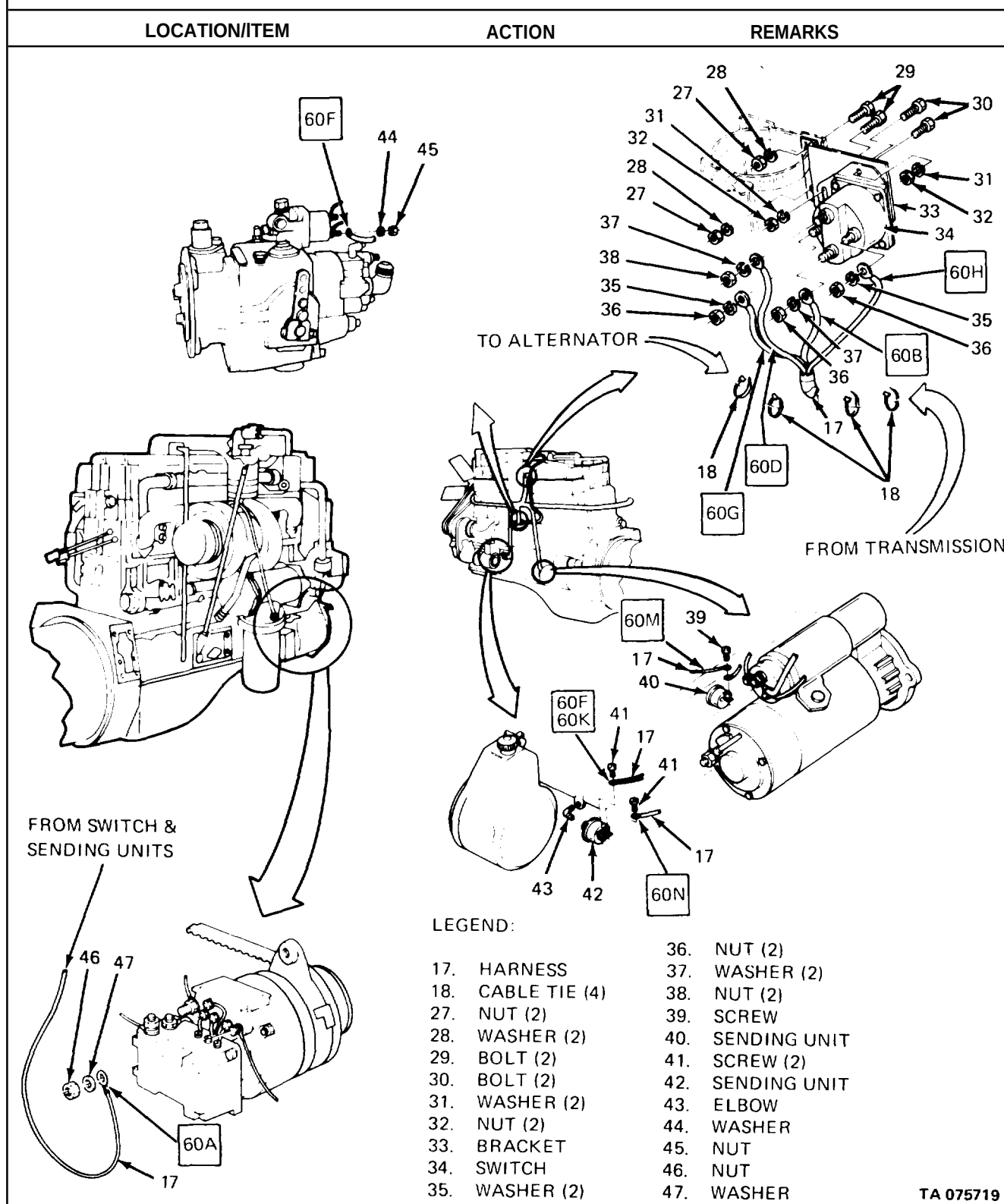
TRANSMISSION.

6-14. TRANSMISSION CONTROL HEATER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
12. Four cable ties (18).	Cut and remove.	Discard.
13. Screw (39).	Unscrew from sending unit (40) and remove one wire.	Near starter. Wire is contained in harness (17). Tag for assembly.
14. Two nuts (38), washers (37), nuts (37), and washers (35).	Unscrew and remove four wires from switch (34).	At ether quick-start bracket. Four wires are contained in harness (17). Tag for assembly.
15. Two bolts (30), washers (31) and nuts (32).	Unscrew and remove switch (34) from bracket (33).	
16. Two bolts (29), washers (28), and nuts (27).	Unscrew and remove bracket (33).	
17. Nut (45) and washer (44).	Unscrew and remove one wire.	At fuel pump. Wire is contained in harness (17). Tag for assembly.
18. Two screws (41).	Unscrew and remove two wires from sending unit (42).	Near power steering pump. Wires are contained in harness (17). Tag for assembly.
19. Sending unit (42).	Unscrew from elbow (43).	
20. Elbow (43).	Unscrew from engine block.	
21. Nut (46), and washer (47).	Unscrew and remove one wire.	On positive post of alternator. Wire is contained in harness (17) which is now completely removed from vehicle. Tag for assembly.

TRANSMISSION.

6-14. TRANSMISSION CONTROL HEATER MAINTENANCE (Continued).



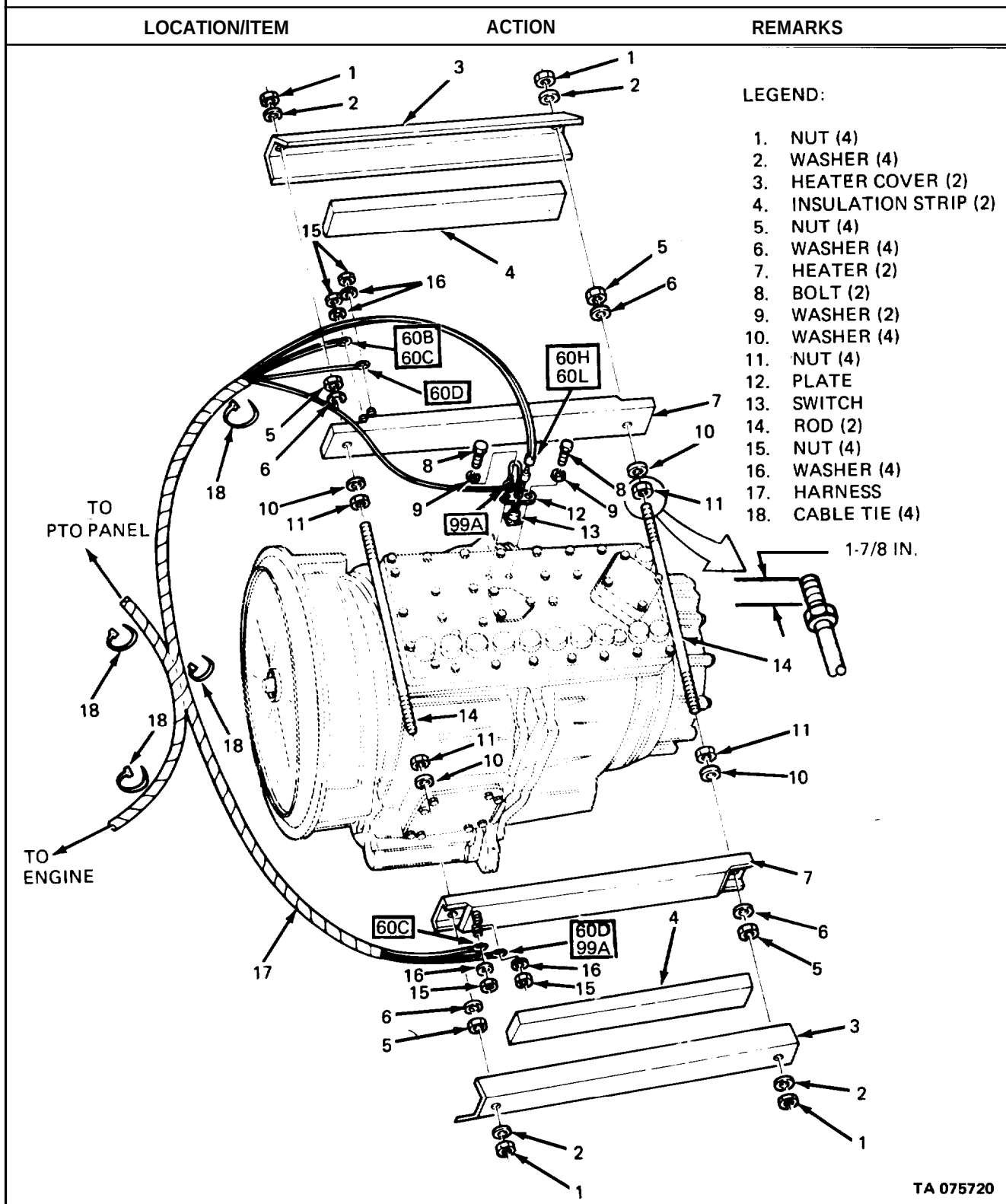
TRANSMISSION

6-14. TRANSMISSION CONTROL HEATER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION.		
22. Two nuts (11).	Screw one nut (11) onto each of two rods (14).	Nut must be exactly 1 7/8 inches from end of rod for proper installation clearance (see exploded view).
23. Two washers (10) and one heater (7).	Slide onto two rods (14).	At same end of rods you installed nuts (11) on in step (22).
24. Two nuts (5) and washers (6).	Install on two rods (14) and adjust down to contact heater (7).	Check for 1 7/8 inch measurement again from nuts (11) to end of rods (14). Adjust if necessary.
25. Assembled heater (7), two nuts (11), nuts (5), washers (6), washers (10), and rods (14).	Position on top edge of transmission.	
 CAUTION Do not over tighten nuts (5) or (11). Adjust to retain heaters (7) snugly against transmission control. Over tightening will cause heaters to distort and pull away from control block on transmission.		
26. Second-heater (7), two nuts (11), washers (10), washers (6), and nuts (5).	a, Install at bottom of two rods (14). b. Tighten two bottom nuts (11) and two bottom nuts (5) to snug two heaters to transmission.	If heater(s) start to bow, loosen nuts (11) until heater(s) are straight, then lock in place with nuts(11).

TRANSMISSION.

6-14. TRANSMISSION CONTROL HEATER MAINTENANCE (Continued).



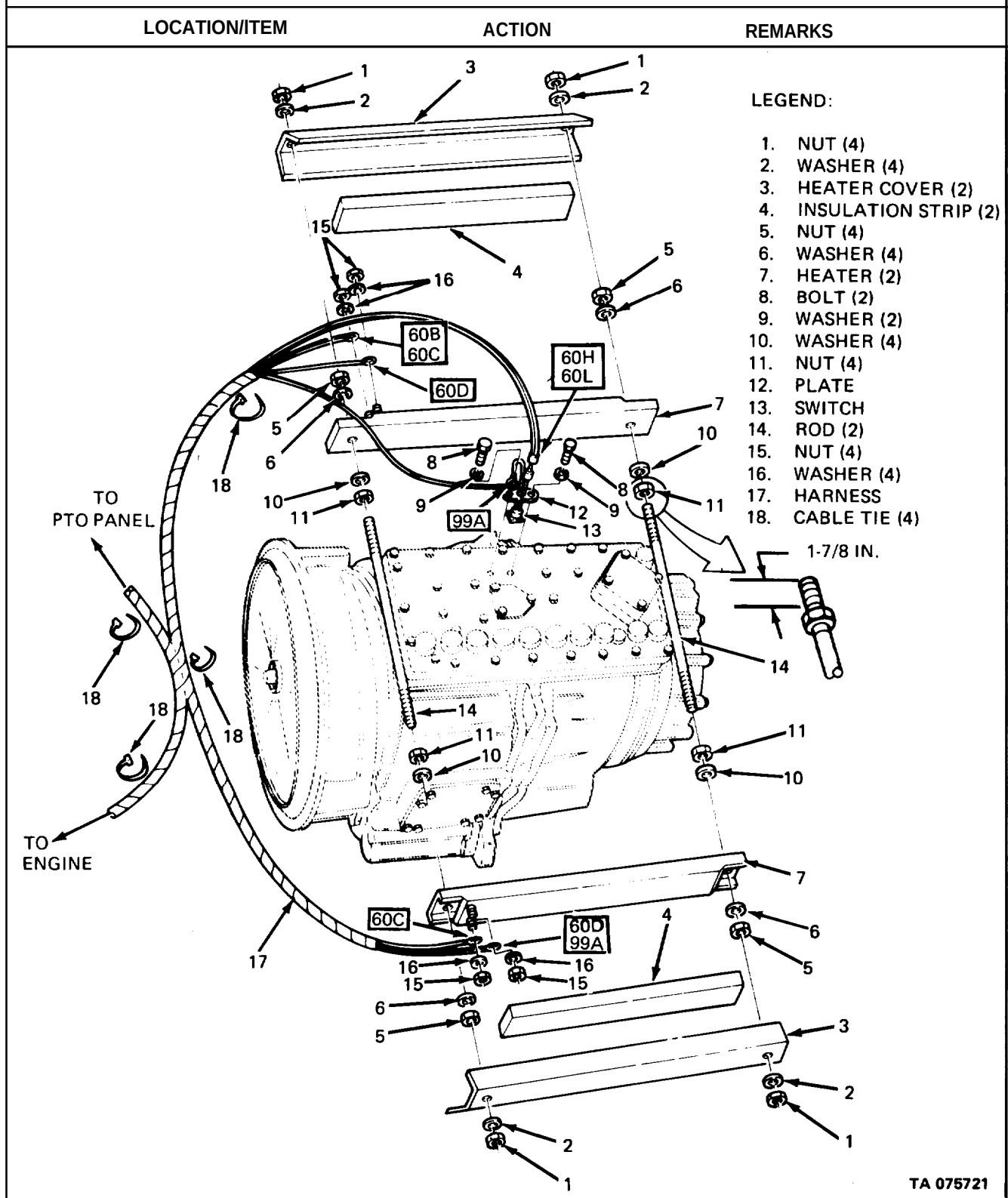
TRANSMISSION.

6-14. TRANSMISSION CONTROL HEATER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION (Continued).		
27. Switch (13) and plate (12).	a. Put switch (13) thru center of plate (12). b. Position plate (12) on transmission as shown. c. Install one bolt (8) and washer (9), but do not tighten.	
28. Harness (17).	a. Position one wire from harness and one wire from switch (13). b. Install second bolt (8) and washer (9). c. Tighten two bolts (8) to 32 lb-ft (43 N-m). d. Plug harness (17) into switch (13). e. Install four harness wires, two to each heater (7) and secure with four washers (16) and nuts (15).	Install as tagged during disassembly. Install as tagged during disassembly.
 CAUTION Do not over tighten nuts (1) as this will cause bowing of heaters (7) and heater covers (3).		
29. Two insulation strips (4) and heater covers (3).	Position as shown and secure with washers (2) and nuts (1).	Set insulation strips inside heater covers. Slide heater covers onto two rods (14).
30. Four new cable ties (18).	Install around harness (17) to prevent slack.	At transmission air line and at engine or chassis harness.

TRANSMISSION.

6-14. TRANSMISSION CONTROL HEATER MAINTENANCE (Continued).



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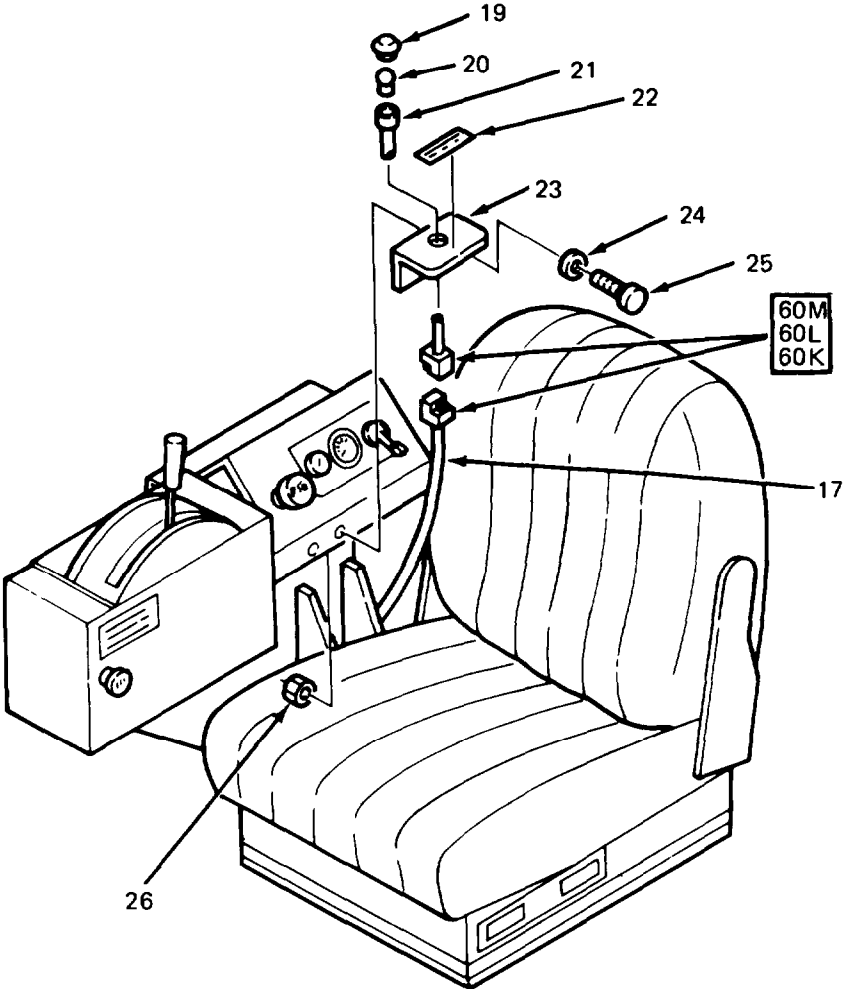
TRANSMISSION.

6-14. TRANSMISSION CONTROL HEATER MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION (Continued).		
31. Bracket (23).	Install to PTO console (M916 thru M920) or to ratio selector support (M915) with two bolts (25), washers (24), and nuts (26).	
32. Lens (19).	Press down into bracket (23).	
33. Lamp (20).	a. Plug into harness (21). b. Press into lens (19).	
34. Harness (21).	Plug into harness (17).	Install as tagged at disassembly.

TRANSMISSION,

1-14. TRANSMISSION CONTROL HEATER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

- 17. HARNESS
- 19. LENS
- 20. LAMP
- 21. HARNESS
- 22. DECAL
- 23. BRACKET
- 24. WASHER (2)
- 25. BOLT (2)
- 26. NUT (2)

TRANSMISSION.

6-14. TRANSMISSION CONTROL HEATER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION (Continued).		
35. Harness (17).	a. Route along engine and secure with four new cable ties (18). b. Install one wire to sending unit (40) with screws (39) .	Left side. Install as needed to prevent slack. Near starter. Install as tagged at disassembly.
36. Bracket (33).	Position at ether quick-start bracket and install with two bolts (29), washers (28) and nuts (27).	
37. Switch (34).	Install to bracket (33) with two bolts (30), washers (31), and nuts (32).	
38. Harness (17).	a. Install four wires to four terminals on switch (34) with two nuts (38), washers (37), nuts (36), and washers (35). b. Install one wire to fuel pump and secure with nut (45) and washer (44).	Install as tagged at disassembly. Install as tagged at disassembly.

TRANSMISSION

6-14. TRANSMISSION CONTROL HEATER MAINTENANCE (Continued).

LOCATION/ITEM

ACTION

REMARKS

Diagram showing a component with callouts 60F, 44, and 45.

Diagram showing an engine with a large arrow pointing to the right.

FROM SWITCH & SENDING UNITS

Diagram showing a component with callouts 46, 47, and 60A.

Diagram showing a component with callouts 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 60B, 60C, 60D, 60E, 60F, 60G, 60H, 60I, 60J, 60K, 60L, 60M, 60N, 60O, 60P, 60Q, 60R, 60S, 60T, 60U, 60V, 60W, 60X, 60Y, 60Z.

TO ALTERNATOR

FROM TRANSMISSION

LEGEND:

- 17. HARNESS
- 18. CABLE TIE (4)
- 27. NUT (2)
- 28. WASHER (2)
- 29. BOLT (2)
- 30. BOLT (2)
- 31. WASHER (2)
- 32. NUT (2)
- 33. BRACKET
- 34. SWITCH
- 35. WASHER (2)

- 36. NUT (2)
- 37. WASHER (2)
- 38. NUT (2)
- 39. SCREW
- 40. SENDING UNIT
- 41. SCREW (2)
- 42. SENDING UNIT
- 43. ELBOW
- 44. WASHER
- 45. NUT
- 46. NUT
- 47. WASHER

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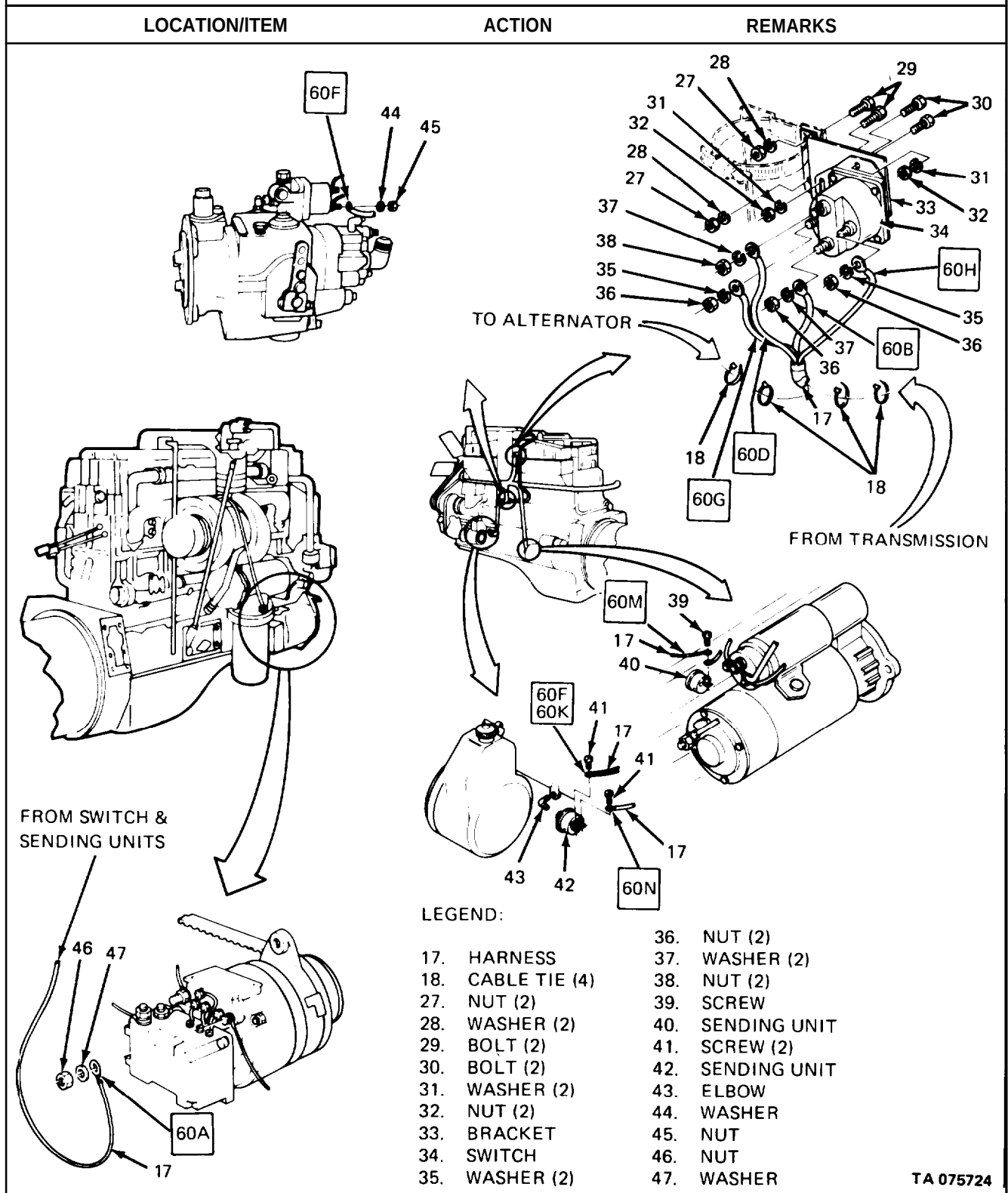
TRANSMISSION.

6-14. TRANSMISSION CONTROL HEATER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION (Continued).		
39. Elbow (43).	a. Coat threads with liquid teflon. b. Screw into engine block.	Near power steering pump.
40. Sending unit (42).	Screw onto elbow (43).	
41. Harness (17).	a. Install two wires to sending unit (42) with two screws (41). b. Install one wire to alternator positive post with washer (47) and nut (46).	Install as tagged at disassembly.
NOTE Follow-on maintenance action required: a. Install fuel tank; refer to para 4-23B and C. b. Install supply air reservoir (M916 thru M920 only); refer to para 9-166 and C. c. Connect batteries; refer to para 5-37B. d. Install floor access plate; refer to para 6-11C. e. Install ether cylinder; refer to para 4-30B and C.		
C. OPERATIONAL CHECK.		
42. Engine.	Start up (see TM 9-2320-273-10).	
43. Lamp (20).	Should light and remain on until control temperature is in excess of 0°F (-17.8°C).	See decal (22) for further instructions.
44. Engine.	Shut down (see TM 9-2320-273-10).	

TRANSMISSION.

6-14. TRANSMISSION CONTROL HEATER MAINTENANCE (Continued).



CHAPTER 7

POWER TRANSFER CASE MAINTENANCE

7-1. OVERVIEW.

This chapter provides you with the following information related to power transfer case maintenance:

- a. All required special tools and equipment.
- b. Other technical manuals.
- c. Troubleshooting procedures.
- d. Maintenance procedures.

Section I REPAIR PARTS, SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT

7-2. COMMON TOOLS AND EQUIPMENT.

For authorized common tools and equipment, refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

7-3. SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT.

No special tools, TMDE and support equipment are required for the power transfer case maintenance procedures described in this chapter.

7-4. SPARES AND REPAIR PARTS.

Spares and repair parts are listed and illustrated in the Repair Parts and Special Tools List covering Organizational Maintenance for this equipment (TM 9-2320-273-20P).

Section II TROUBLESHOOTING

7-5. INTRODUCTION.

Troubleshooting procedures (table 7-1) are limited to those on-vehicle checks for which corrective actions are within the scope of Organizational Maintenance.

Table 7-1. Power Transfer Case Troubleshooting Procedures.

MALFUNCTION. TEST OR INSPECTION. CORRECTIVE ACTION.
1. POWER TRANSFER CASE DOES NOT TURN FRONT AXLE PROPELLER SHAFT: Disconnect control air supply line at power transfer case air chamber and check for air supply with differential lockup control valve switch in LOCK position. - Replace defective control valve (para 9-44). - Troubleshoot truck compressed air system (para 9-5). - If air control system is good, refer problem to Direct Support Maintenance. 2. EXCESSIVE HEAT BUILDUP: Step 1. Check oil level in both the main case and the clutch housing for proper level. Fill to proper level (para 7-8). Step 2. Check oil cooler system for proper functioning. Tighten fittings, clean cooling fins, replace pump (para 7-9). 3. LUBRICANT LEAKING: Step 1. Check drain plugs for tightness. Tighten drain plugs. Step 2. Check for clogged or damaged breathers on clutch housing. Replace breathers. Step 3. Check for damaged gaskets or seals. Refer problem to Direct Support Maintenance. 4. TRANSFER CASE NOISY (OIL LEVEL OKAY): Refer problem to Direct Support Maintenance.

7-6. POWER TRANSFER CASE MAINTENANCE TASK SUMMARY.**INITIAL SETUP****APPLICABLE CONFIGURATIONS**

M916 thru M920.

**EQUIPMENT CONDITION
PARAGRAPH**

7-8A.

CONDITION DESCRIPTIONPower Transfer Case Oil
Drained.**TEST EQUIPMENT**

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)Oil, 5 Qts (4.7 Liters) (Refer to Appendix C);
OEA if Sub-zero Use.

Oil Funnel.

Container, 1.5 Gal (5.68 Liters).

Gaskets -2 18108F (34632).

Plugs.

Liquid Teflon (Refer to Appendix C).

Cable Ties -2 5963577-A (06383).

Masking Tape.

Marking Pen.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TM 9-2320-273-20P.

LO 9-2320-273-12.

REFERENCES (TROUBLESHOOTING)

Table 7-1.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine Off.

Transmission in Neutral

Park Brake Set.

7-6. POWER TRANSFER CASE MAINTENANCE TASK SUMMARY (Continued),			
LIST OF TASKS			
TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
1.	Oil Service:	7-8	7-1
	A. Draining Oil.	7-8A	
	B. Replenishing Oil Supply.	7-8B	
	C. Checking for Leaks.	7-8C	
2.	Cooler System Maintenance:	7-9	7-1
	A. Removal.	7-9A	
	B. Cleaning and Inspection.	7-9B	
	c. Installation.	7-9C	
	D. Operational Check.	7-9D	

Section III MAINTENANCE PROCEDURES

7-7. INTRODUCTION.

This section provides you with Organizational Level maintenance procedures for the power transfer case. The scope of work is limited to oil service and cooler system maintenance.

NOTE

Maintenance procedures for the differential lockup control valve are given in Chapter 9, Section III, paragraph 9-44.

POWER TRANSFER CASE.

7-8. OIL SERVICE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

- a. Draining Oil. (15)
 - b. Replenishing Oil Supply. (15)
 - c. Checking for Leaks. (15)
- 45 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

M916 thru M920.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Oil Funnel.
Oil, 5 Qts (4.7 Liters) (Refer to Appendix C);
OEA if Sub-zero Use.
Container, 1.5 Gal (5.68 Liters).

EQUIPMENT CONDITION

PARAGRAPH

None.

CONDITION DESCRIPTION

None.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES

TM 9-2320-273-10.
TM 9-2320-273-20P.
LO 9-2320-273-12.

GENERAL SAFETY INSTRUCTIONS

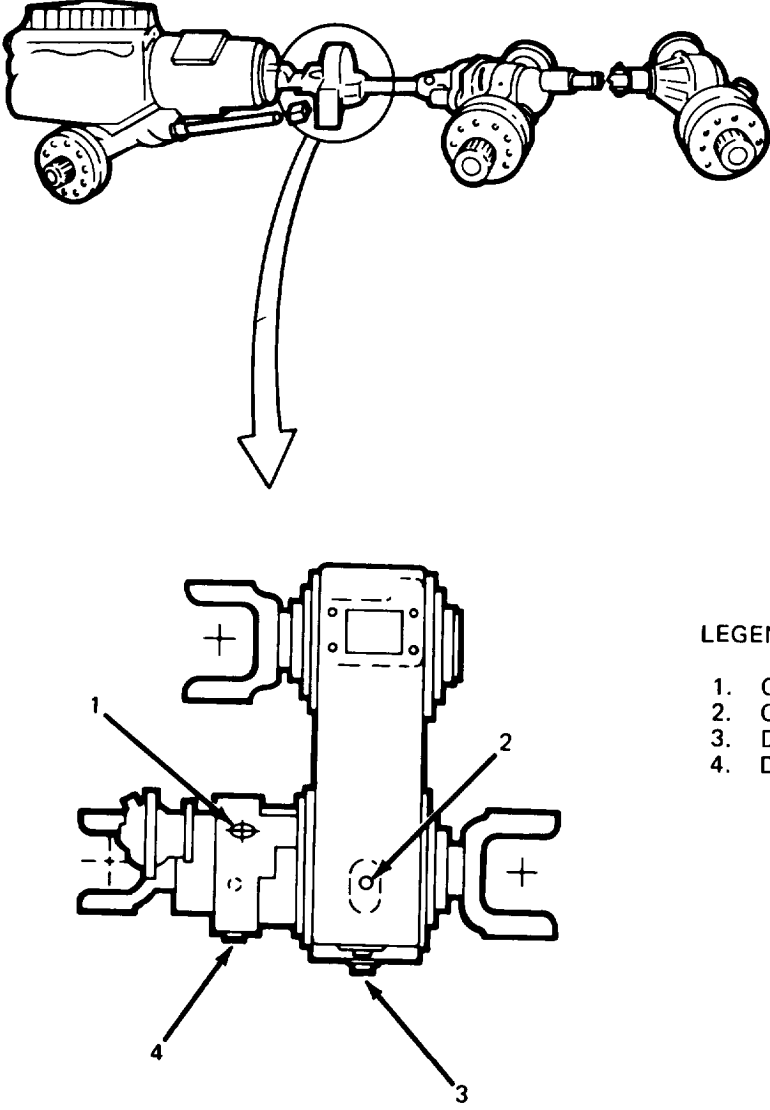
Engine Off.
Transmission in Neutral.
Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 7-1.

POWER TRANSFER CASE.

7-8. OIL SERVICE (Continued).

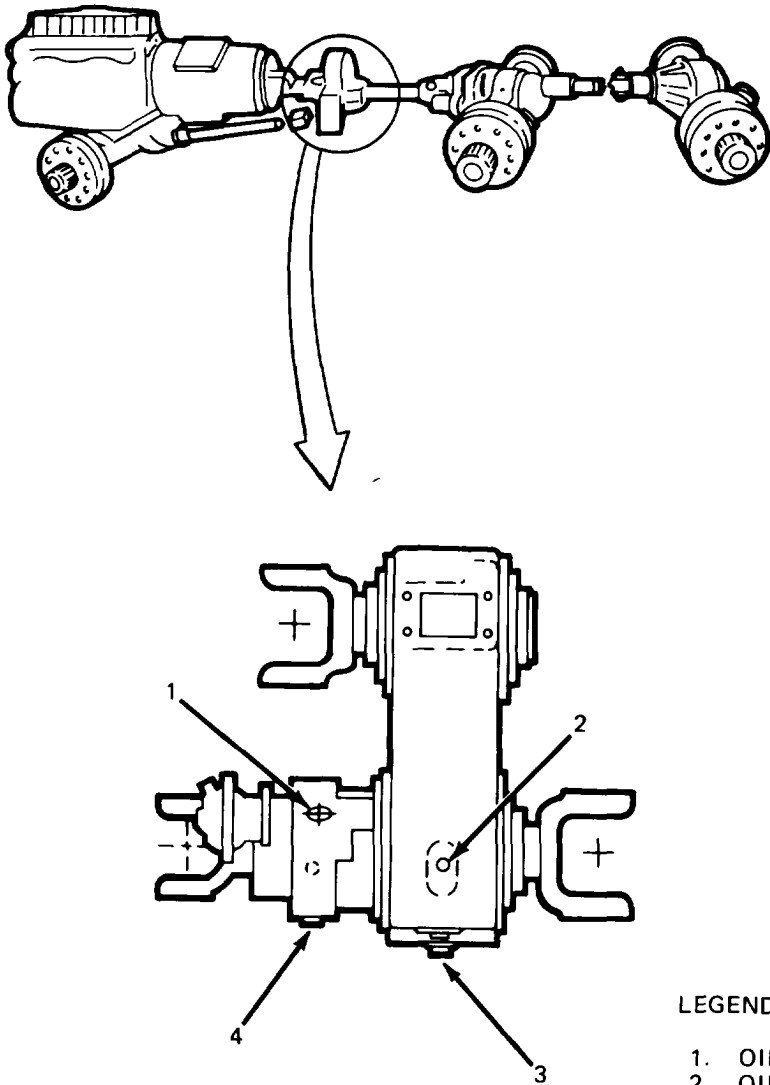
LOCATION/ITEM	ACTION	REMARKS
A. DRAINING OIL..		
1. Oil level plugs (1) and (2).	Unscrew and remove.	
NOTE Before unscrewing drain plugs, place container underneath to catch oil.  LEGEND: 1. OIL LEVEL PLUG 2. OIL LEVEL PLUG 3. DRAIN PLUG 4. DRAIN PLUG		

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POWER TRANSFER CASE.

7-8. OIL SERVICE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
A. DRAINING OIL (Continued).		
2. Drain plugs (3) and (4).	a. Unscrew and remove. b. Allow oil to drain out. c. Wipe plugs and openings with clean, dry rag. d. Screw in drain plugs (3) and (4) tightly.	
B. REPLENISHING OIL SUPPLY.		
3. Oil level plug (1).	a. Pour in two quarts of oil. b. Screw in oil level plug (1) tightly.	Use funnel.
4. Oil level plug (2).	a. Add oil until visible in fill hole of transfer case. b. Screw in oil level plug (2) tightly. c. Clean off spilled oil.	Use funnel
C. CHECKING FOR LEAKS.		
5. Two oil level plugs (1) and (2), and two drain plugs (3) and (4).	Road test vehicle, then check for leaks.	Retighten plugs as necessary.

POWER TRANSFER CASE.

7-8. OIL SERVICE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
 LEGEND: 1. OIL LEVEL PLUG 2. OIL LEVEL PLUG 3. DRAIN PLUG 4. DRAIN PLUG		

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POWER TRANSFER CASE.

7-9. COOLER SYSTEM MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

- a. Removal. (20)
- b. Cleaning and Inspection. (15)
- c. Installation. (20)
- d. Operational Check. (10)

65 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

M916 and M920.

EQUIPMENT CONDITION PARAGRAPH

7-8A.

CONDITION DESCRIPTION

Powver Transfer Case Oil
Drained.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Gaskets 2, MA128-20004 (34623).
Plugs.
Liquid Teflon (Refer to Appendix C)
Masking Tape.
Marking Pen.
Cable Ties 2, SST4S (06383).

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground,

REFERENCES

TM 9-2320-273-10.
TM 9-2320-273-20P.
LO 9-2320-273-12.

GENERAL SAFETY INSTRUCTIONS

Engine Off.
Transmission in Neutral.
Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 7-1.

POWER TRANSFER CASE.

7-9. COOLER SYSTEM MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Two bolts (32), six washers (20), and two nuts (21).	Unscrew and remove grille (31).	
2. Lines (1) and (16).	Remove from three adapters (28).	Plug openings; mark location for reassembly.

LEGEND:

1. LINE
2. ELBOW
3. TRANSFER CASE
4. SHAFT
5. BOLT (4)
6. RETAINER (2)
7. MOUNTING PLUG (4)
8. SUPPORT ANGLE (2)
9. WINCH PLATFORM BRACE
10. CABLE TIE (2)
11. NUT
12. WASHER
13. CLAMP (3)
14. NUT (4)
15. BOLT
16. LINE
17. ELBOW (2)
18. WASHER (8)
19. NUT (4)
20. WASHER (6)
21. NUT (2)
22. PUMP
23. GASKET (2)
24. SPACER
25. BOLT (4)
26. LINE
27. ELBOW (2)
28. ADAPTER (6)
29. TEE
30. PLUG
31. GRILLE
32. BOLT (2)
33. COOLER
34. BOLT (4)

WARM WEATHER OPERATION CONFIGURATION

COLD WEATHER OPERATION CONFIGURATION

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POWER TRANSFER CASE.

7-9. COOLER SYSTEM MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
3. Two elbows (17) and one elbow (2).	Unscrew from cooler (33) and transfer case (3).	Remove adapters (28) from elbows (17) and (2) if necessary.
4. Four bolts (5), washers (18), and nuts (19).	a. Unscrew and remove two retainers (6), and four mounting plugs (7). b. Lower cooler (33) from two support angles (8).	If support angles (8) are to be removed from winch platform brace (9), remove four bolts (34), washers (18), and nuts (14).
5. Two cable ties (10).	Remove.	Discard.
6. Bolt (15), washer (12), and nut (11).	Unscrew and remove two adapters (28).	
7. Lines (16) and (26).	Disconnect from two adapters (28).	Plug openings; mark location for reassembly.
8. Two elbows (27).	Unscrew and remove from pump (22).	Remove adapters (28) from elbows (27) if necessary.
9. Four bolts (25).	Unscrew and remove pump (22), spacer (24), and two gaskets (23).	Discard gaskets (23).
10. Line (26).	Disconnect from adapter (28).	Plug opening, mark location for reassembly.
11. Clamp (13).	Unscrew existing nuts and remove.	
12. Adapter (28).	Unscrew from tee (29).	
13. Tee (29).	Unscrew from bottom of transfer case (3).	
14. Plug (30).	Unscrew from tee (29).	
B. CLEANING AND INSPECTION.		
15. Cooler (33).	a. Spray with water to clean off debris. b. Check fins and tubes for damage.	Replace as necessary.

POWER TRANSFER CASE.

7-9. COOLER SYSTEM MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
WARM WEATHER OPERATION CONFIGURATION COLD WEATHER OPERATION CONFIGURATION		
LEGEND: 1. LINE 2. ELBOW 3. TRANSFER CASE 4. SHAFT 5. BOLT (4) 6. RETAINER (2) 7. MOUNTING PLUG (4) 8. SUPPORT ANGLE (2) 9. WINCH PLATFORM BRACE 10. CABLE TIE (2) 11. NUT 12. WASHER 13. CLAMP (3) 14. NUT (4) 15. BOLT 16. LINE 17. ELBOW (2) 18. WASHER (8) 19. NUT (4) 20. WASHER (6) 21. NUT (2) 22. PUMP 23. GASKET (2) 24. SPACER 25. BOLT (4) 26. LINE 27. ELBOW (2) 28. ADAPTER (6) 29. TEE 30. PLUG 31. GRILLE 32. BOLT (2) 33. COOLER 34. BOLT (4)		

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POWER TRANSFER CASE.

7-9. COOLER SYSTEM MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
B. CLEANING AND INSPECTION (Continued).		
16. Lines (1), (16), and (26).	a. Wipe clean. b. Inspect for cracks.	Replace as necessary.
17. Fasteners and fittings; all.	Inspect for damaged threads.	Replace as necessary.
C. INSTALLATION.		
NOTE Remove plugs and apply liquid teflon to all oil carrying connection threads as re-assembled.		
18. Plug (30).	Screw into tee (29).	
19. Adapter (28).	Screw into tee (29).	
20. Tee (29).	Screw into bottom of transfer case (3).	
21. Line (26).	Screw onto adapter (28).	Install as marked.
22. Clamp (13).	Install around line (26) and fasten to transfer case with existing nut.	
23. Two new gaskets (23), spacer (24) and pump" (22).	a. Align with shaft (4) and four mounting holes. b. Install with four bolts (25); torque to 14 lb-ft (19 N•m).	Assemble per illustration for either warm or cold weather operation.
24. Two elbows (27)	Screw into pump (22).	Install adapters (28) to elbows if removed.
25. Lines (16) and (26).	Screw onto two adapters (28).	Install as marked.
26. Elbow (2).	Screw into top of transfer case (3).	Install adapter (28) to elbow, if removed.
27. Line (1).	Screw onto adapter (28).	
28. Two support angles (8).	If removed, fasten to winch platform brace (9) with four bolts (34), washers (18), and nuts (14).	Torque to 14 lb-ft (19 N.m).

POWER TRANSFER CASE.

7-9. COOLER SYSTEM MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS

WARM WEATHER
OPERATION
CONFIGURATION

COLD WEATHER OPERATION
CONFIGURATION

LEGEND:

1. LINE
2. ELBOW
3. TRANSFER CASE
4. SHAFT
5. BOLT (4)
6. RETAINER (2)
7. MOUNTING PLUG (4)
8. SUPPORT ANGLE (2)
9. WINCH PLATFORM BRACE
10. CABLE TIE (2)
11. NUT
12. WASHER
13. CLAMP (3)
14. NUT (4)
15. BOLT
16. LINE
17. ELBOW (2)
18. WASHER (8)
19. NUT (4)
20. WASHER (6)
21. NUT (2)
22. PUMP
23. GASKET (2)
24. SPACER
25. BOLT (4)
26. LINE
27. ELBOW (2)
28. ADAPTER (6)
29. TEE
30. PLUG
31. GRILLE
32. BOLT (2)
33. COOLER
34. BOLT (4)

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POWER TRANSFER CASE.

7-9. COOLER SYSTEM MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
C. INSTALLATION (Continued).		
29. Cooler (33).	Aline with mounting holes on two support angles (8) and secure with four bolts (5), two retainers (6), four mounting plugs (7), four washers (18), and four nuts (19).	Torque to 14 lb-ft (19 N•m).
30. Two elbows (17).	Screw into cooler (33).	Install adapters (28) to elbows if removed.
31. Lines (1) and (16).	a. Screw onto adapters (28). b. Fasten together with two new cable ties (10). c. Fasten to winch platform with two clamps (13), one bolt (13), one bolt (15), washer (12), and nut (11).	Route along LH frame rail. Torque to 9 lb-ft (12 N•m).
32. Grille (31).	Fasten to cooler (33) with two bolts (32), six washers (20) and two nuts (21).	Torque to 14 lb-ft (19 N•m).
D. OPERATIONAL CHECK.		
33. Transfer case (3).	Refill with oil; para 7-8B.	
34. Engine.	Start up (refer to TM 9-2320-273-10).	
35. Cooler system.	Check for leakage at all connection points to transfer case (3) and cooler (33).	Tighten as necessary.
36. Engine.	Shut down (refer to TM 9-2320-273-10).	

POWER TRANSFER CASE.

7-9. COOLER SYSTEM MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS

LEGEND:

1. LINE
2. ELBOW
3. TRANSFER CASE
4. SHAFT
5. BOLT (4)
6. RETAINER (2)
7. MOUNTING PLUG (4)
8. SUPPORT ANGLE (2)
9. WINCH PLATFORM BRACE
10. CABLE TIE (2)
11. NUT
12. WASHER
13. CLAMP (3)
14. NUT (4)
15. BOLT
16. LINE
17. ELBOW (2)
18. WASHER (8)
19. NUT (4)
20. WASHER (6)
21. NUT (2)
22. PUMP
23. GASKET (2)
24. SPACER
25. BOLT (4)
26. LINE
27. ELBOW (2)
28. ADAPTER (6)
29. TEE
30. PLUG
31. GRILLE
32. BOLT (2)
33. COOLER
34. BOLT (4)

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CHAPTER 8

PROPELLER SHAFTS AND AXLE MAINTENANCE

8-1. OVERVIEW.

This chapter provides you with the following information related to propeller shaft and axle maintenance:

- a. All required special tools and equipment.
 - b. Other technical manuals.
 - c. Troubleshooting procedures,
 - d. Maintenance procedures.
-

Section I REPAIR PARTS, SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT

8-2. COMMON TOOLS AND EQUIPMENT.

For authorized common tools and equipment, refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

8-3. SPECIAL TOOLS, TMDE AND SUPPORT EQUIPMENT.

The special tools, TMDE and support equipment required for the propeller shaft and axle procedures described in this chapter are as follows. (Refer to Organizational Maintenance RPSTL, TM 9-2320-273-20P for tool description and illustration.)

Oil filter strap wrench.

8-4. SPARES AND REPAIR PARTS.

Spares and repair parts are listed and illustrated in the Repair Parts and Special Tools List covering Organizational Maintenance for this equipment (TM 9-2320-273-20P).

Section II TROUBLESHOOTING

8-5. INTRODUCTION.

Tables 8-1 and 8-2 contain instructions for troubleshooting the propeller shafts and axles. The corrective actions describe how to fix the problem or refer to a procedure for fixing the problem. The tables are arranged by malfunctions in the following order:

PROPELLER SHAFTS (table 8-1). Excessive shaft noise or vibration.

AXLES (table 8-2).

- a.* Excessive backlash.
- b.* Continuous axle or wheel noise.
- c.* Lubricant leaking,
- d.* Excessive or uneven tire wear.

If you cannot locate a problem using these procedures, refer to the troubleshooting procedures for wheels, steering, and suspension (para 10-5).

Table 8-1. Propeller Shafts Troubleshooting Procedures.

MALFUNCTION.	
TEST OR INSPECTION.	
CORRECTIVE ACTION.	
1. EXCESSIVE SHAFT NOISE OR VIBRATION: Step 1. Check torque of yoke bolts at universal joints. Torque bolts to 300 lb-ft (407 N•m). Step 2. Check torque of capscrews. Torque capscrews to 100 lb-ft (136 N•m). Step 3. Inspect propeller shafts and universal joints for evidence of damage or excessive wear. Replace worn or damaged components (para 8-11). Step 4. Check universal joints for adequate lubrication. Lubricate (para 8-11). Step 5. Check for proper shaft alinement, propeller shafts are properly phased when the cross and bearing in the yokes at each end of shaft are in the same place. Disassemble and aline as necessary (para 8-11). NOTE Look for arrow marks on the propeller shaft and slip yoke. The arrows will point toward each other. If marks are not discernible, punch mark each member insuring reassembly in the same relative position. Step 6. Remove propeller shaft from vehicle. Check freedom of motion of splines by moving shaft from fully retracted to fully extended. If excessive force is required to retract or extend shaft, or it does not reach full travel, separate shaft halves and inspect splines for wear, damage, and lubrication. Replace shaft assembly if required (para 8-11).	

Table 8-2. Axles Troubleshooting Procedures.

MALFUNCTION.	
TEST OR INSPECTION.	
CORRECTIVE ACTION.	
1. EXCESSIVE BACKLASH:	
Step 1. Check all universal joints.	Lubricate and replace as necessary (para 8-11).
Step 2. Check drive axle capscrews on universal joints for tightness.	Torque to 100-110 lb-ft (136-149 N•m) (para 8-11D). If the problem persists, notify Direct Maintenance Personnel.
2. CONTINUOUS AXLE OR WHEEL NOISE:	
Step 1. Check lube level in axle housing.	Fill axle housing to proper level (para 8-12 for front axle or 8-13 for rear axle).
Step 2. Check lube pump cover (forward rear axle) for visible damage. Remove and check for clogged filter (M915 only).	a. Replace filter as required (para 8-13). b. Refer problem to Direct Support Maintenance if internal pump damage is evident.
Step 3. Check that brake shoes are not dragging. Check for overheating of brake drum. Jack wheel clear of ground. Use tanker bar to pry up under wheel to check for loose bearings. Any movement of wheels indicates loose bearings. With brakes released spin wheels to check for overly tight bearings. Wheel should spin freely and smoothly. Remove hub and drum to check condition of bearings.	Adjust dragging brakes and clean, repack, or replace bearings as necessary (para 10-13 or 10-14, for front wheels, para 10-15 for rear wheels).
Step 4. Visually inspect tires.	Inflate tires to proper pressure or replace if necessary (refer to TM 9-2320-273-10).
Step 5. Check wheel balance.	Balance wheels, if necessary.
3. LUBRICANT LEAKING:	
Step 1. Check all cover plate bolts for tightness.	

Table 8-2. Axles Troubleshooting Procedures (Continued).

MALFUNCTION.	
TEST OR INSPECTION.	
CORRECTIVE ACTION.	
LUBRICANT LEAKING (Continued):	
	Tighten bolts or notify direct support personnel to reseal.
Step 2.	Check breathers (driving axles) for obstruction or damage.
	Clean or replace as necessary.
4. EXCESSIVE OR UNEVEN TIRE WEAR:	
Step 1.	Check wheel alinement (para 10-10 for front wheels).
	Adjust alinement.
Step 2.	Check brake adjustment.
	Adjust brake if required (para 9-31 (M915), 9-32 (M916-M920) for front wheels or 9-33 (M915), 9-34 (M916-M920) for rear wheels).
Step 3.	Check cold tire pressure.
	Inflate to proper pressure (Refer to TM 9-2320-273-10).

Section III MAINTENANCE PROCEDURES

8-6. INTRODUCTION.

This section provides you with Organizational Level maintenance procedures for the propeller shafts and axles. To find a specific maintenance procedure, see one of the following task summaries.

- a. Propeller Shafts (para 8-7).
- b. Front Axle (para 8-8).
- c. Rear Axle (para 8-9).
- d. Pusher Axle (para 8-10).

8-7. PROPELLER SHAFTS MAINTENANCE TASK SUMMARY.**INITIAL SETUP****APPLICABLE CONFIGURATIONS**

All.

**EQUIPMENT CONDITION
PARAGRAPH**

None.

CONDITION DESCRIPTION

None.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

GAA (Refer to Appendix C).

Blocks.

Nonflammable Dry Cleaning Solvent SD-2 (Refer to Appendix C).

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TM 9-2320-273-20P.

LO 9-2320-273-12.

REFERENCES (TROUBLESHOOTING)

Table 8-1, 8-2.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.

Transmission in Neutral.

Park Brake Set.

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
	Propeller Shafts:	8-11	8-1, 8-2
	A. Removal.	8-11A	
	B. Cleaning and Lubrication.	8-11 B	
	C. Inspection of Universals.	8-11C	
	D. Installation.	8-11D	
	E. Checking for Vibration.	8-11E	

8-8. FRONT AXLE MAINTENANCE TASK SUMMARY.**INITIAL SETUP****APPLICABLE CONFIGURATIONS**

M916 thru M920.

**EQUIPMENT CONDITION
PARAGRAPH**

None.

CONDITION DESCRIPTION

Axle Oil Warm (Perform Oil Service immediately after truck has been driven).

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

GO (27 Pints, 12.7 Liters) (Refer to Appendix C).
 GOS Gear Oil if Sub-Zero Use (Refer to Appendix C).
 Chassis Grease (Refer to Appendix C).
 Liquid Teflon (Refer to Appendix C).
 Container (3 Gallon).
 Nonflammable Cleaning Solvent SD-2 (Refer to Appendix C).
 Grease Gun.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
 TM 9-2320-273-20P.
 LO 9-2320-273-12.

REFERENCES (TROUBLESHOOTING)

None.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
 Transmission in Neutral.
 Park Brake Set.

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
	Oil Service (M916 thru M920) :	8-12	None
	A. Draining Oil.	8-12A	
	B. Replenishing Oil Supply.	8-12B	
	C. Operational Check.	8-12C	

8-9. REAR AXLE MAINTENANCE TASK SUMMARY.**INITIAL SETUP****APPLICABLE CONFIGURATIONS**

All.

**EQUIPMENT CONDITION
PARAGRAPH**

None.

CONDITION DESCRIPTIONAxle Oil Warm. (Perform
Oil Service Immediately
After Truck Has Been
Driven.)**TEST EQUIPMENT**

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Container, 10 Gals (38 Liters).

Gear Oil, GOS if Sub-Zero Use (Refer to Appendix C).

M915

M916 Thru M920.

76 Pints (36 Liters).

62 Pints (29 Liters).

Oil Filter Element (M915), 3280-V-5040 (78500).

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TM 9-2320-273-20P.

LO 9-2320-273-12.

REFERENCES (TROUBLESHOOTING)

Table 8-2.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONSEngine OFF.
Park Brake Set.
Transmission in Neutral.**LIST OF TASKS**

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
	Oil Service:	8-13	8-2
	A. Draining Oil.	8-13A	
	B. Replacing Oil Filter (M915 Only).	8-13B	
	C. Replenishing Oil.	8-13C	
	D. Checking for Leaks.	8-13D	

8-10. PUSHER AXLE MAINTENANCE TASK SUMMARY.**INITIAL SETUP****APPLICABLE CONFIGURATIONS**

M917, M919, and M920.

**EQUIPMENT CONDITION
PARAGRAPH**TM 9-2320-273-10.
9-13A.**CONDITION DESCRIPTION**Pusher Axle Down.
Air Reservoirs Bled.**TEST EQUIPMENT**

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (Refer to Appendix C).

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)TM 9-2320-273-10.
TM 9-2320-273-20P.**REFERENCES (TROUBLESHOOTING)**

Table 9-1,

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONSEngine OFF.
Transmission in Neutral.
Park Brake Set.**LIST OF TASKS**

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
1.	Pusher Axle Air Bags (M917, M919, and M920):	8-14	9-1
	A. Removal.	8-14A	
	B. Installation.	8-14B	
	C. Operational Check.	8-14C	
2.	Pusher Axle Lift Cylinders:	8-15	9-1
	A. Removal.	8-15A	
	B. Installation.	8-15B	
	C. Operational Check.	8-15C	

8-10. PUSHER AXLE MAINTENANCE TASK SUMMARY (Continued).			
LIST OF TASKS			
TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
3.	Pusher Axle Pressure Gage :	8-16	9-1
	A. Removal.	8-16A	
	B. Installation.	8-16B	
	C. Operational Check.	8-16C	
4.	Pusher Axle Pressure Regulator Valve :	8-17	9-1
	A. Removal.	8-17A	
	B. Installation.	8-17B	
	C. Operational Check.	8-17C	
5.	Pusher Axle Up-Down Selector Valve :	8-18	9-1
	A. Removal.	8-18A	
	B. Installation.	8-18B	
	C. Operational Check.	8-18C	

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PROPELLER SHAFTS AND UNIVERSAL JOINTS.

8-11. PROPELLER SHAFTS AND UNIVERSAL JOINTS MAINTENANCE.**THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

a. Removal.	(25)
b. Cleaning and Lubrication.	(10)
c. Inspection of Universals.	(10)
d. Installation.	(25)
e. Checking for Vibration.	(15)
85 Minutes Total .	

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

EQUIPMENT CONDITION**PARAGRAPH**

None.

CONDITION DESCRIPTION

None.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

GAA (Refer to Appendix C).

Blocks.

Nonflammable Cleaning Solvent SD-2 (Refer to Appendix C).

PERSONNEL REQUIRED

One (MOS63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.

LO 9-2320-273-12.

TM 9-2320-273-20P.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.

Transmission in Neutral.

Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 8-1, 8-2.

PROPELLER SHAFTS AND UNIVERSAL JOINTS.

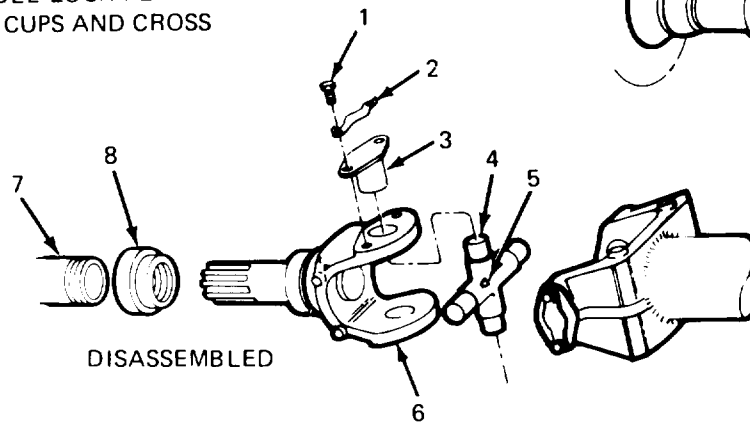
8-11. PROPELLER SHAFTS AND UNIVERSAL JOINTS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS

NOTE

The M915 has two propeller shafts while the M916 thru M920 have four. Two styles of yokes and two universal joints are used throughout the model series as illustrated below.

STYLE A
CLOSED YOKE END
REMOVABLE LOCK PLATES
BEARING CUPS AND CROSS

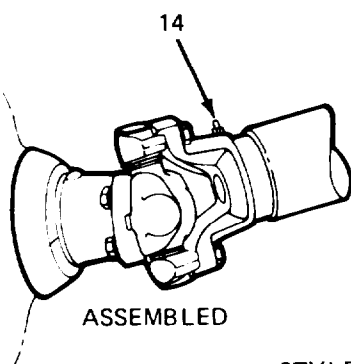


ASSEMBLED

DISASSEMBLED

LEGEND:

1. CAPSCREW (8)
2. LOCKPLATE (4)
3. BEARING CUP (4)
4. CROSS
5. GREASE FITTING
6. YOKE
7. PROPELLER SHAFT
8. DUST SEAL
9. UNIVERSAL JOINT
10. GREASE FITTING
11. BOLT (8)
12. LOCKWASHER (8)
13. LOCKNUT (8)
14. GREASE FITTING
15. YOKE



ASSEMBLED

DISASSEMBLED

STYLE B
OPEN YOKE END
ONE PIECE U-JOINT

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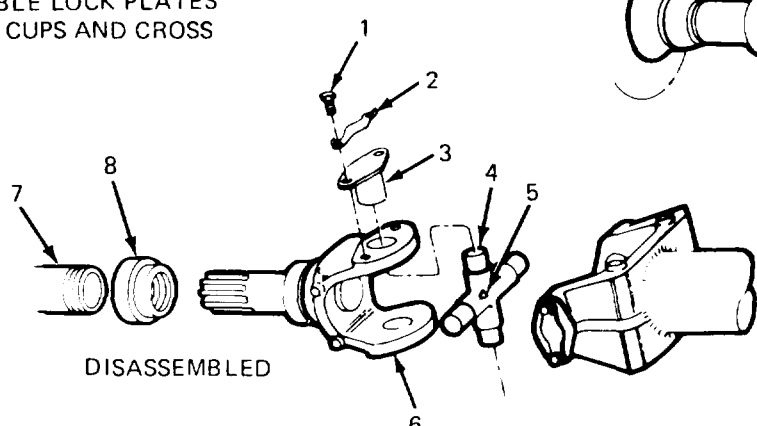
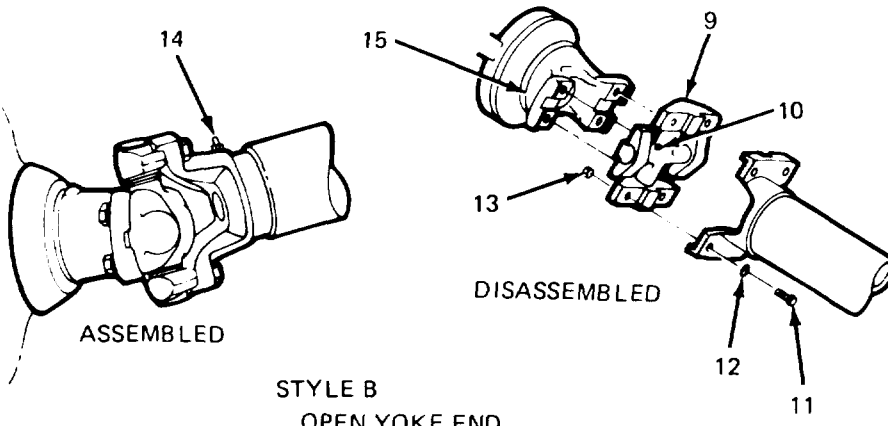
PROPELLER SHAFTS AND UNIVERSAL JOINTS.

8-11. PROPELLER SHAFTS AND UNIVERSAL JOINTS MAINTENANCE (Continued).

LOCATION/ITEM			ACTION	REMARKS
APPLICATION				
Model	Quantity	Style	Location	
M915	1	A	Prop shaft from transmission to forward rear axle.	
	1	B	Prop shaft from forward rear axle to rear rear axle.	
M916, M917	1	B	Prop shaft from transmission to top of transfer case.	
M918, M919	1	B	Prop shaft from bottom of transfer case to front axle.	
M920	1	B	Prop shaft from bottom rear of transfer case to forward rear axle.	
	1	A	Prop shaft from forward rear axle to rear rear axle.	
NOTE				
Before disassembly of any prop shafts and U-joints, punch mark each shaft and joint to insure proper assembly alinement. If already punch marked, do not make new marks, but use existing ones.				
NOTE				
Before disassembly, use a suitable jack or sling to support shaft. It may be necessary to jack up rear differential with Park Brake OFF to release torque pressure on prop shaft/joint connections.				
A. REMOVAL.				
STYLE A				
1. Four lockplates (2).		Bend down tabs as needed.		
2. Eight capscrews (1).		Unscrew and remove.		
3. Four lockplates (2).		Remove from bearing cups (3).		
4. Bearing cups (3).		Remove.		
5. Yokes (6) and cross (4).		a. Disengage cross from yokes.		
		b. Remove cross (4).		
		c. Swing shaft yoke free of axle or transmission.		
		d. Unscrew grease fitting (5).		

PROPELLER SHAFTS AND UNIVERSAL JOINTS.

8-11. PROPELLER SHAFTS AND UNIVERSAL JOINTS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
STYLE B		
6. Eight hexhead bolts (11), lockwashers (12), and locknuts (13), if so equipped.	Unscrew and remove.	
7. Universal joint (9).	a. Remove from shaft flange and yoke by inserting suitable tool into slots. Remove support and swing shaft yoke free of axle or transfer case. b. Unscrew grease fitting (10).	
STYLE A CLOSED YOKE END REMOVABLE LOCK PLATES BEARING CUPS AND CROSS  ASSEMBLED DISASSEMBLED		
STYLE B OPEN YOKE END ONE PIECE U-JOINT  ASSEMBLED DISASSEMBLED		
LEGEND: 1. CAPSCREW (8) 2. LOCKPLATE (4) 3. BEARING CUP (4) 4. CROSS 5. GREASE FITTING 6. YOKE 7. PROPELLER SHAFT 8. DUST SEAL 9. UNIVERSAL JOINT 10. GREASE FITTING 11. BOLT (8) 12. LOCKWASHER (8) 13. LOCKNUT (8) 14. GREASE FITTING 15. YOKE		

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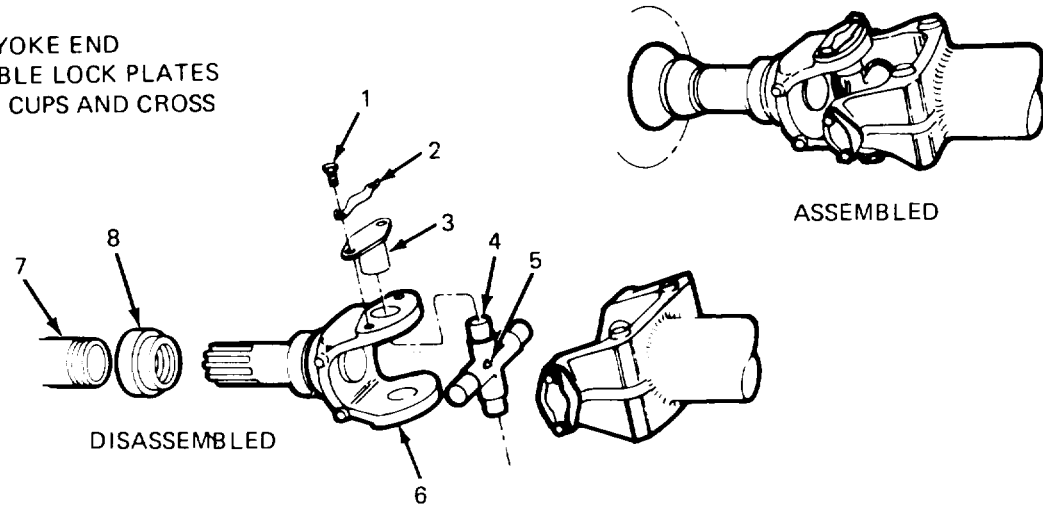
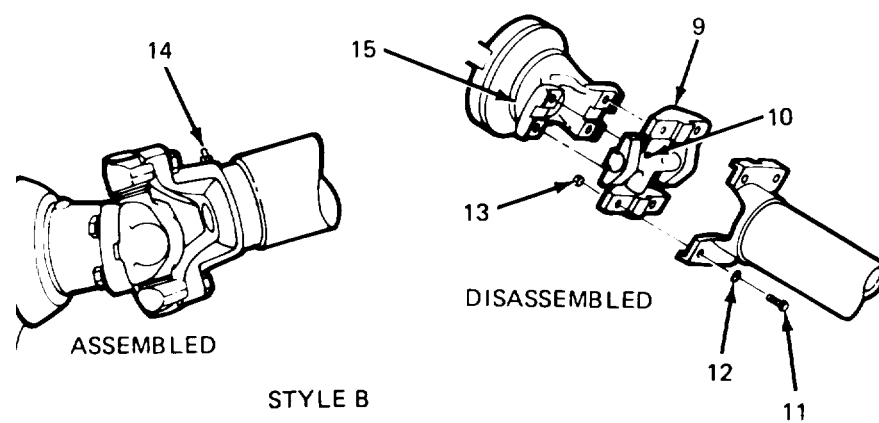
PROPELLER SHAFTS AND (UNIVERSAL JOINTS

8-II. PROPELLER SHAFTS AND UNIVERSAL JOINTS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
STYLES A AND B		
8. Yoke (6) and propeller shaft (7).	a. Pull yoke (6) out of propeller shaft (7). b. Screw on dust seal (8) and slide yoke (6) and propeller shaft (7) back together.	Inspect dust seal (8) and replace as necessary.
B. CLEANING AND LUBRICATION.		
CAUTION Do not allow SD-2 dry cleaning solvent to come in contact with seals or flexible hoses. These cleaners may damage leather, rubber, and synthetic materials.		
STYLE A		
9. Yoke (6), cross (4), four lockplates (2), eight capscrews (1), and grease fitting (5).	a. Soak in dry cleaning solvent to loosen grease and foreign matter. b. Clean thoroughly and refer to 8-11C for inspection prior to lubrication.	
NOTE Do not disassemble bearing assembly inside bearing cups.		
10. Four bearing cups (3).	a. Clean with a short stiff brush being careful not to dislodge needle bearings. b. Coat lightly with GAA.	
11. Grease fitting (5).	Screw into cross (4) and apply grease liberally thru grease fitting (refer to LO 9-2320-273-12) and on all mating surfaces.	

PROPELLER SHAFTS AND UNIVERSAL JOINTS.

8-11. PROPELLER SHAFTS AND UNIVERSAL JOINTS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
STYLE A CLOSED YOKE END REMOVABLE LOCK PLATES BEARING CUPS AND CROSS  ASSEMBLED DISASSEMBLED		
STYLE B OPEN YOKE END ONE PIECE U-JOINT  ASSEMBLED DISASSEMBLED		
LEGEND: 1. CAPSCREW (8) 2. LOCKPLATE (4) 3. BEARING CUP (4) 4. CROSS 5. GREASE FITTING 6. YOKE 7. PROPELLER SHAFT 8. DUST SEAL 9. UNIVERSAL JOINT 10. GREASE FITTING 11. BOLT (8) 12. LOCKWASHER (8) 13. LOCKNUT (8) 14. GREASE FITTING 15. YOKE		

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PROPELLER SHAFTS AND UNIVERSAL JOINTS.

8-11. PROPELLER SHAFTS AND UNIVERSAL JOINTS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. CLEANING AND LUBRICATION (Continued).		
STYLE B		
12. Universal joint (9), yoke (15), grease fittings (5), (10), and (14).	a. Clean with dry cleaning solvent being careful not to contact seals. Refer to 8-11C for inspection prior to lubrication. b. Screw grease fittings into yokes and joints and apply grease liberally through all grease fittings (5), (10), and (14) (refer LO 9-2320-273-12) and on all mating surfaces.	
C. INSPECTION OF UNIVERSALS.		
STYLE A		
13. Universal joint yokes (6), crosses (4) and bearing cups (3).	Inspect for: a. Excess wear. b. Damaged grease seals.	Replace as necessary.
14. Propeller shaft (7).	Slide shaft sections and inspect for excess spline wear and binding.	Replace as necessary.
15. Grease fitting (5).	Inspect for: a. Damaged threads. b. Damaged tip.	Replace as necessary.
STYLE B		
16. Universal joint (9).	Inspect for damaged grease seals.	Replace as necessary.
17. Grease fittings (10) and (14).	Inspect for damaged threads or tip.	Replace as necessary.
CAUTION Style A bearing cups (3) and cross (4) should be replaced as a set. Do not use an old cross with new cups or old cups with a new cross. Style B universal joints must be replaced as an assembly if excessive wear or grease leakage is evident. Repair parts are available only in kits.		

PROPELLER SHAFTS AND UNIVERSAL JOINTS .

8-11. PROPELLER SHAFTS AND UNIVERSAL JOINTS MAINTENANCE (Continued).

LOCATION/ITEM

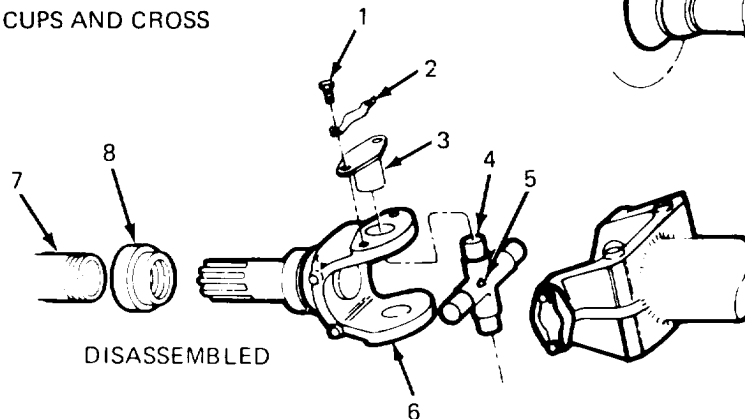
ACTION

REMARKS

NOTE

For proper alinement of propeller shafts, use the punch marks you made before removal, or the marks that were there from a previous removal.

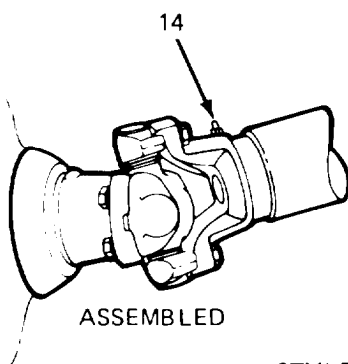
STYLE A
CLOSED YOKE END
REMOVABLE LOCK PLATES
BEARING CUPS AND CROSS



ASSEMBLED

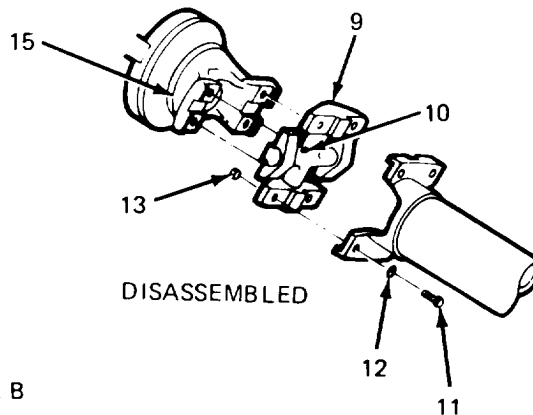
LEGEND:

1. CAPSCREW (8)
2. LOCKPLATE (4)
3. BEARING CUP (4)
4. CROSS
5. GREASE FITTING
6. YOKE
7. PROPELLER SHAFT
8. DUST SEAL
9. UNIVERSAL JOINT
10. GREASE FITTING
11. BOLT (8)
12. LOCKWASHER (8)
13. LOCKNUT (8)
14. GREASE FITTING
15. YOKE



ASSEMBLED

STYLE B
OPEN YOKE END
ONE PIECE U-JOINT



DISASSEMBLED

TA 074873

PROPELLER SHAFTS AND UNIVERSAL JOINTS.

8-11. PROPELLER SHAFTS AND UNIVERSAL JOINTS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
D. INSTALLATION.		
STYLE A		
18. Yoke (6) and cross (5).	Install cross in one yoke.	
19. Two bearing cups (3).	Press into yoke to secure cross.	
20. Two lockplates (2).	a. Install one on each bearing cup. b. Attach with capscrews (1).	
21. Yoke (6) and cross (4).	Install other yoke.	
22. Two bearing cups (3).	Press into yoke to secure cross.	
23. Two lockplates (2).	a. Install one on each bearing cup. b. Attach with capscrews (1). c. Bend up tabs on lockplates (2).	
STYLE B		
24. Universal joint (9).	Aline mounting holes to propeller shaft flange, install hexhead bolts (11) and lockwashers (12). Tighten to 100-110 lb-ft (136-149 N•m).	
25. Universal joint (9) attached to shaft flange.	Raise into alinement with yoke mounting holes, install hexhead bolts (11) and lockwashers (12). Tighten to 100-110 lb-ft (136-149 N•m). Install locknuts (13), if so equipped.	
NOTE		
Follow-on maintenance required: Lubricate all grease fittings (5), (10), and (14) (see LO 9-2320-273-12).		

PROPELLER SHAFTS AND UNIVERSAL JOINTS.

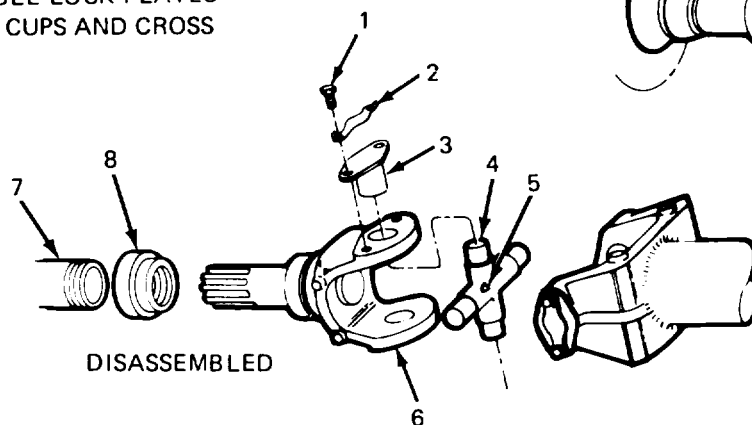
8-11. PROPELLER SHAFTS AND UNIVERSAL JOINTS MAINTENANCE (Continued).**LOCATION/ITEM****ACTION****REMARKS****E. CHECKING FOR VIBRATION.****STYLE A AND B**

26. Vehicle.

Road test. Check for unusual noise or vibration.

If vibration is present, recheck alignment and bolt tightness. If this doesn't cure, refer to DS/GS maintenance.

STYLE A
CLOSED YOKE END
REMOVABLE LOCK PLATES
BEARING CUPS AND CROSS

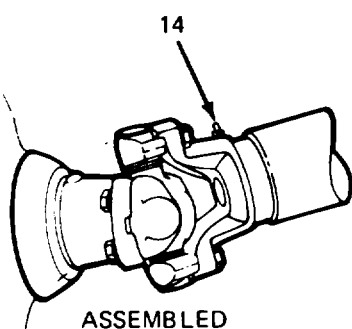


ASSEMBLED

DISASSEMBLED

LEGEND:

1. CAPSCREW (8)
2. LOCKPLATE (4)
3. BEARING CUP (4)
4. CROSS
5. GREASE FITTING
6. YOKE
7. PROPELLER SHAFT
8. DUST SEAL
9. UNIVERSAL JOINT
10. GREASE FITTING
11. BOLT (8)
12. LOCKWASHER (8)
13. LOCKNUT (8)
14. GREASE FITTING
15. YOKE



ASSEMBLED

DISASSEMBLED

STYLE B
OPEN YOKE END
ONE PIECE U-JOINT

TA 074874

FRONT AXLE.

8-12. OIL SERVICE (M916 Thru M920).**THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

- a. Draining Oil. (15)
 - b. Replenishing Oil Supply. (20)
 - c. Operational Check. (30)
- 65 Minutes Total.

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

M916 thru M920.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

CW, 27 Pt (12.7 Liters) (Refer to Appendix C).
 GOS Gear Oil if Sub-Zero Use (Refer to Appendix C).
 Chassis Grease, GAA (Refer to Appendix C).
 Liquid Teflon (Refer to Appendix C).
 Container (3 Gal).
 Non-Flammable Cleaning Solvent SD-2 (Refer to Appendix C).
 Grease Gun.

PERSONNEL REQUIRED

One, (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
 TM 9-2320-273-20P.
 LO 9-2320-273-12.

TROUBLESHOOTING REFERENCES

None.

EQUIPMENT CONDITION**PARAGRAPH**

None.

CONDITION DESCRIPTION

Axle Oil Warm (Perform
 Oil Service Immediately
 After Truck Has Been
 Driven.)

SPECIAL ENVIRONMENTAL CONDITIONS

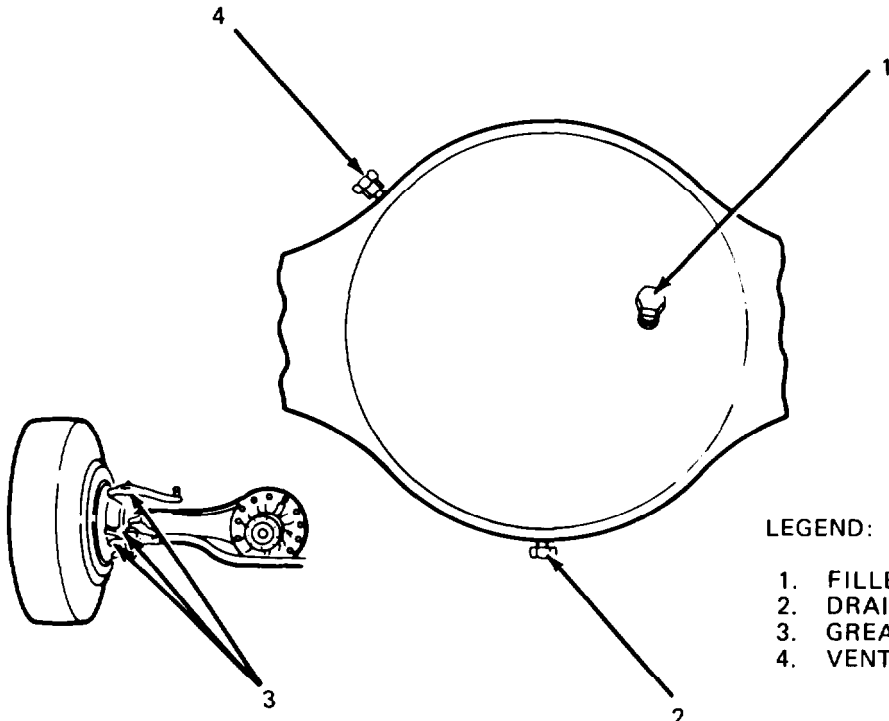
Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
 Transmission in Neutral.
 Park Brake Set.

FRONT AXLE

8-12. OIL SERVICE (M916 Thru M920).

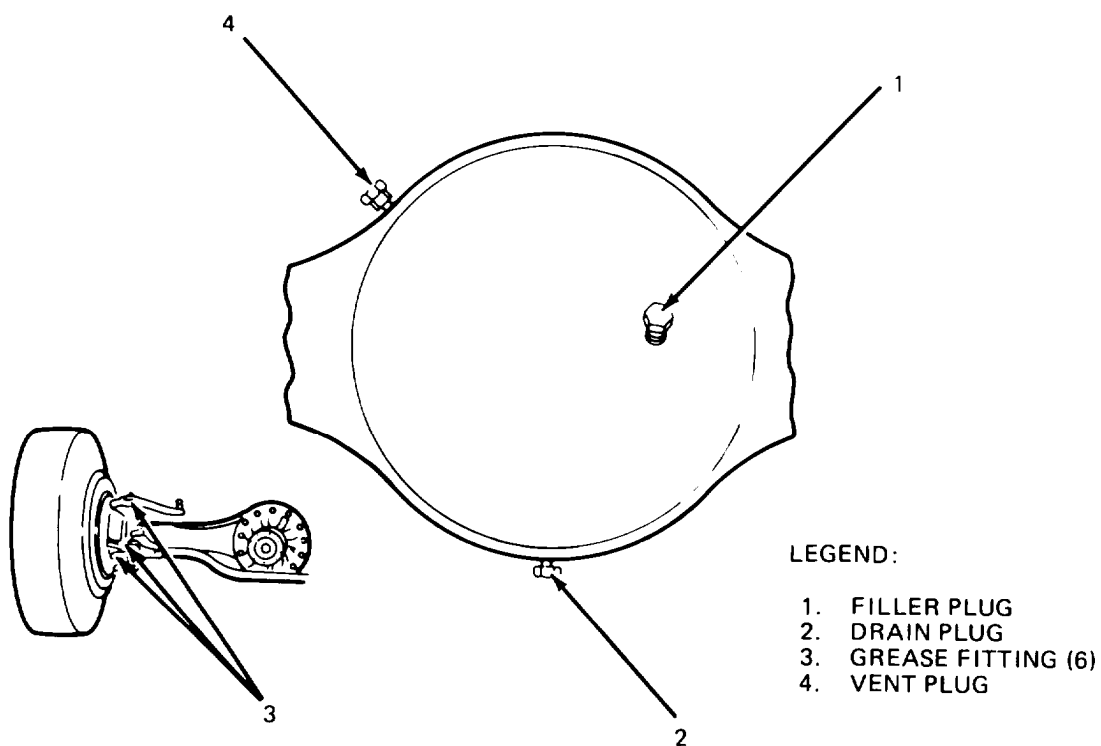
LOCATION/ITEM	ACTION	REMARKS
A. DRAINING OIL.		
NOTE Before removing drain plug (2), place container underneath to catch oil.		
1. Filler plug (1) and drain plug (2).	Remove and allow oil to drain out.	
2. Vent plug (4).	a. Remove, inspect, and clean with solvent. b. Install; threads coated with Teflon.	
3. Drain plug (2).	a. Wipe plug and openings clean. b. Screw in and tighten.	
 LEGEND: 1. FILLER PLUG 2. DRAIN PLUG 3. GREASE FITTING (6) 4. VENT PLUG		
TA 074875		

FRONT AXLE.

8-12. OIL SERVICE (M916 Thru M920) (Continued).		
LOCATION/ITEM	ACTION	REMARKS
B. REPLENISHING OIL SUPPLY.		
4. Opening at filler plug (1).	a. Add 27 pts (12.7 liters) of GO. b. Wipe filler plug (1) and opening clean. c. Screw in filler plug (1) and tighten.	If sub-zero useage add GOS gear oil.
5. Six grease fittings (3).	Lubricate with chassis grease, using grease gun.	
C. OPERATIONAL CHECK.		
6. Vehicle.	Road test. Check for unusual noise.	If excessively noisy, refer problem to Direct Support Maintenance.
7. Front driving axle.	After road test, check for leaks.	Retighten plugs as necessary.

FRONT AXLE.

8-12. OIL SERVICE (M916 THRU M920) (Continued).



TA 074876

REAR AXLE.

8-13. OIL SERVICE.**THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

a. Draining Oil.	(15)
b. Replacing Oil Filter (M915).	(5)
c. Replenishing Oil.	(10)
d. Checking for Leaks.	(20)
	50 Minutes Total.

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Container. 10 Gals (38 Liters).
 Gear Oil , GOS if Sub-Zero Use (Refer to Appendix C).
 M915 M916 Thru M920.
 76 Pints (36 Liters). 62 Pints (29 Liters).
 Oil Filter Element (M915), 3280-V-5040 (78500).

EQUIPMENT CONDITION**PARAGRAPH**

None.

CONDITION DESCRIPTION

Axle Oil Warm. (Perform
 Oil Service Immediately
 After Truck Has Been
 Driven.)

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.
 TM 9-2320-273-20P.
 LO 9-2320-273-12.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
 Transmission in Neutral.
 Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 8-2.

REAR AXLE.

8-13. OIL SERVICE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. DRAINING OIL.		
1. Filler plugs (1) and (10) or (7) and (12).	Unscrew and remove.	
NOTE		
Before removing a drain plug, place container underneath to catch oil. Drain plugs are magnetic and any metal particles should be completely removed. If excessive, refer to Direct Support.		
M915		
M916 THRU M920		
LEGEND:		
1. FILLER PLUG 2. FILTER 3. FILTER COVER 4. STUD (2) 5. LOCKNUT (2) 6. DRAIN PLUG 7. FILLER PLUG 8. DRAIN PLUG 9. DRAIN PLUG 10. FILLER PLUG 11. DRAIN PLUG 12. FILLER PLUG (2)		

TA 074877

TA 074877

REAR AXLE.

8-13. OIL SERVICE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
A. DRAINING OIL (Continued).		
2. Magnetic drain plugs (9) and (11) or (6) and (8).	a. Remove. b. Allow oil to drain. c. Wipe magnetic plugs and axle housing. d. Screw in plugs.	
B. REPLACING OIL FILTER (M915 ONLY).		
3. Two filter cover locknuts (5).	Remove.	Replace studs (4) if damaged.
4. Filter cover (3).	Slide off filter.	
5. Filter (2).	Unscrew and throw away.	You will need to use a strap wrench.
6. New filter (2).	a. Moisten gasket with oil. b. Screw on until gasket contacts adapter. c. Tighten one more full turn.	
7. Filter cover (3).	a. Slide over new filter (2) and studs (4). b. Secure with two locknuts (5).	
C. REPLENISHING OIL.		
8. Front filler plug (10)	a. Pour in GO. (1) M95 -40 Pts (19 (2) M916 thru M920 - 34 pts (16 liters). b. Screw in filler plug.	Fill with GOS if sub-zero useage.
9. Rear filler plug(s) (1) or (12).	a. Pour in GO. (1) M915 -36pts(17 (2) M916 thru M920- 28 pts (13 liters). b. Screw in filler plug(s).	One plug. Two plugs.

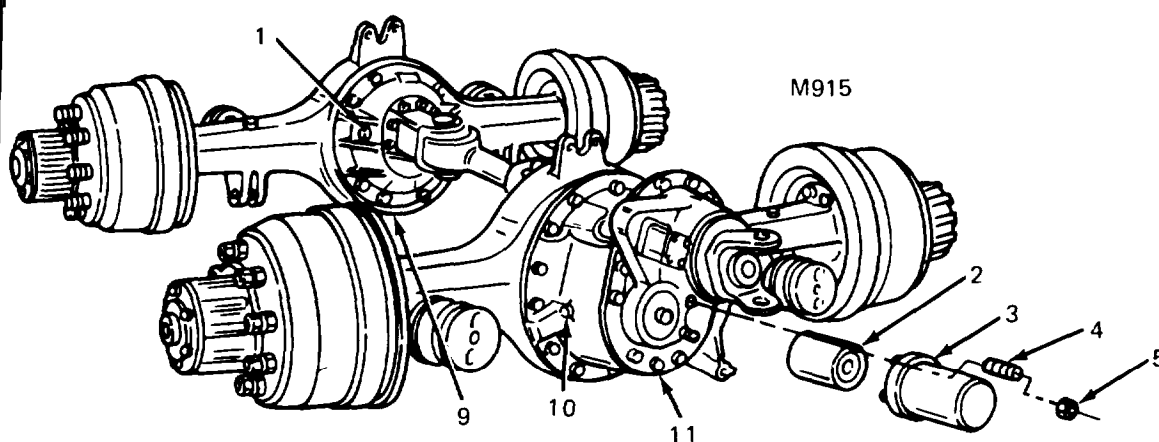
REAR AXLE.

8-13. OIL SERVICE (Continued).

LOCATION/ITEM	ACTION	REMARKS

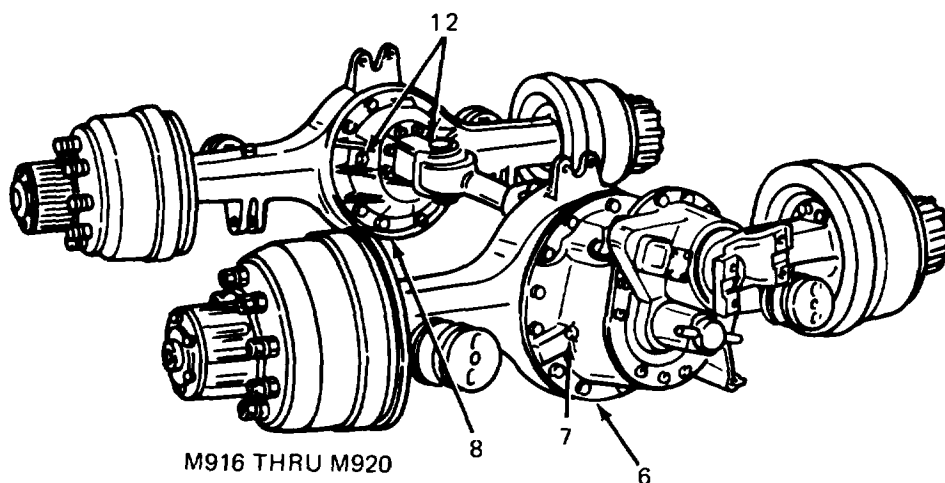
D. CHECKING FOR LEAKS.

10. Vehicle.	Road test.	
11. Filler plugs(1) and (10) or (7) and (12); drain plugs (9) and (11) or (6) and (8), filter (2) (M915 only).	a. Check for leaks. b. Check oil level.	Add more oil if necessary.



LEGEND:

1. FILLER PLUG
2. FILTER
3. FILTER COVER
4. STUD (2)
5. LOCKNUT (2)
6. DRAIN PLUG
7. FILLER PLUG
8. DRAIN PLUG
9. DRAIN PLUG
10. FILLER PLUG
11. DRAIN PLUG
12. FILLER PLUG (2)



TA 074878

PUSHER AXLE.

8-14. PUSHER AXLE AIR BAGS MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(20)
b. Installation.	(20)
c. Operational Check.	(10)
	50 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

M917, M919, M920.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (Refer to Appendix C).

EQUIPMENT CONDITION

PARAGRAPH

TM 9-2320-273-10.
9-13A.

CONDITION DESCRIPTION

Pusher Axle Down.
Air Reservoirs Drained.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P,

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 9-1.

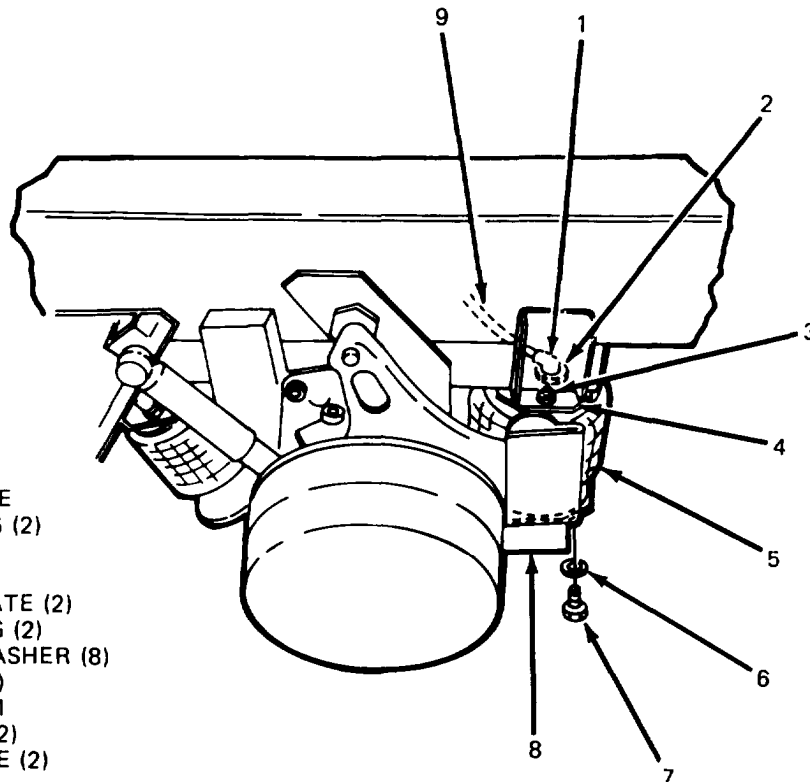
PUSHER AXLE.

8-14. PUSHER AXLE AIR BAGS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
NOTE Air bags should be replaced as a pair.		
A. REMOVAL.		
1. Two air lines (9).	a. Unscrew and remove. b. Inspect for: (1) Leaks. (2) Cracks. (3) Damaged fittings.	Replace if necessary. Located on top plate (4) toward inside of chassis rails.
2. Two air line fittings (1).	Unscrew from studs (inner).	Located on top plates (4).
3. Two nuts (2).	Unscrew from studs (inner).	Located on top plates (4).
4. Two nuts (3).	Unscrew from studs (outer).	Located on top plates (4).

LEGEND:

1. AIR LINE FITTING (2)
2. NUT (2)
3. NUT (2)
4. TOP PLATE (2)
5. AIR BAG (2)
6. LOCKWASHER (8)
7. BOLT (8)
8. BOTTOM PLATE (2)
9. AIR LINE (2)



TA 074879

PUSHER AXLE.**8-14. PUSHER AXLE AIR BAGS MAINTENANCE (Continued).**

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
5. Eight bolts (7) and lockwashers (6).	Remove from bottom plates (8).	
6. Two air bags (5).	a. Slide out. b. Inspect for: (1) Deterioration. (2) Cracks.	Replace if cracked or leaking. Replace as a set of two air bags.
B. INSTALLATION.		
7. Two air bags (5).	Slide into position between top plates (4) and bottom plates (8); aline holes.	
8. Eight bolts (7) and lockwashers (6).	Install through bottom plates (8) and tighten.	
9. Two nuts (3).	Install and tighten on outer top plate stud.	
10. Two nuts (2).	Install and tighten on upper inner air line studs.	
11. Two air line fittings (1).	Apply liquid teflon to threads and screw onto upper inner air stud above nuts (2).	
12. Two air lines (9).	Apply liquid teflon and install on air line fittings (1).	
C. OPERATIONAL CHECK.		
13. Engine.	Start up (see TM 9-2320-273-10).	
14. Pusher axle.	Raise and lower (see TM 9-2320-273-10). Check for proper inflation and deflation of both air bags.	
15. Engine.	Shut down (see TM 9-2320-273-10).	

PUSHER AXLE.

8-14. PUSHER AXLE AIR BAGS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
LEGEND: 1. AIR LINE FITTING (2) 2. NUT (2) 3. NUT (2) 4. TOP PLATE (2) 5. AIR BAG (2) 6. LOCKWASHER (8) 7. BOLT (8) 8. BOTTOM PLATE (2) 9. AIR LINE (2)		

TA 074880

PUSHER AXLE.**8-15. PUSHER AXLE LIFT CYLINDERS MAINTENANCE.****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

a. Removal.	(20)
b. Installation.	(20)
Operational Check.	(10)
50 Minutes Total.	

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

M917, M919, M920.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (Refer to Appendix C).

EQUIPMENT CONDITION**PARAGRAPH**TM 9-2320-273-10.
9-13A.**CONDITION DESCRIPTION**Pusher Axle Down.
Air Reservoirs Drained.**PERSONNEL REQUIRED**

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

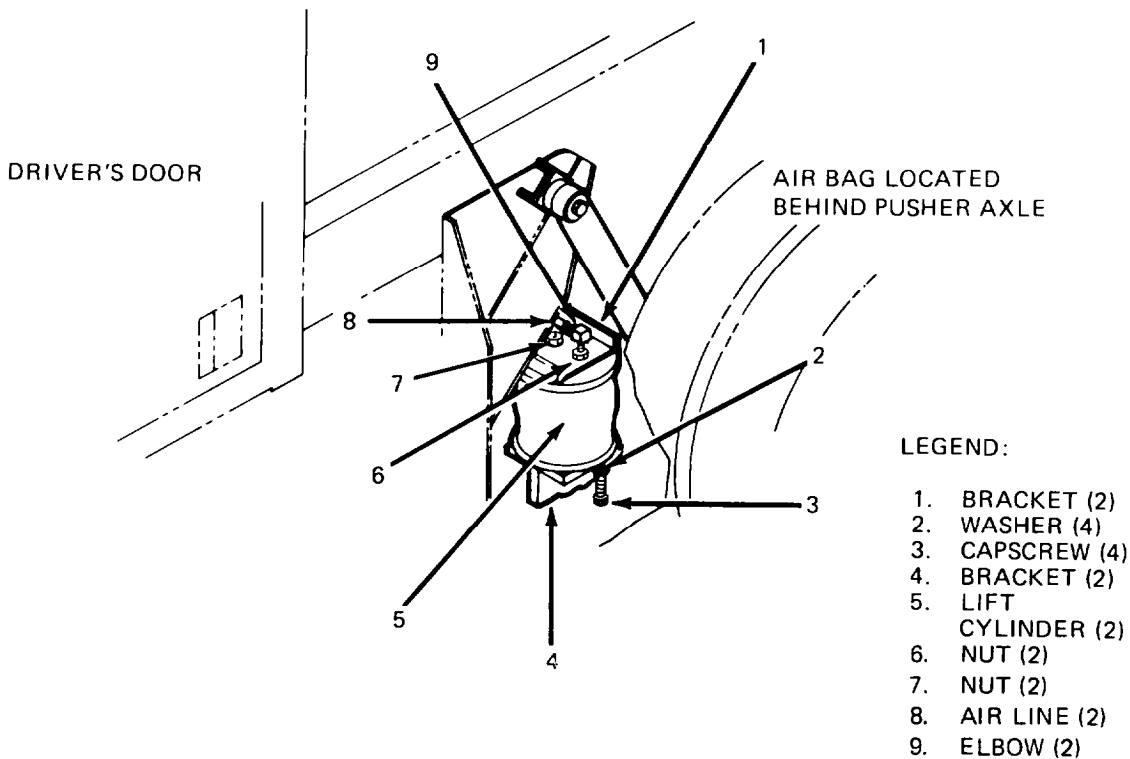
REFERENCES (TM)TM 9-2320-273-10.
TM 9-2320-273-20P.**GENERAL SAFETY INSTRUCTIONS**Engine OFF.
Transmission in Neutral.
Park Brake Set.**TROUBLESHOOTING REFERENCES**

Table 9-1.

PUSHER AXLE.

8-15. PUSHER AXLE LIFT CYLINDERS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
NOTE Lift cylinders should be replaced as a pair.		
A. REMOVAL.		
1. Two air lines (8) and elbows (9).	a. Unscrew and remove. b. Inspect for: (1) Cracks. (2) Leaks. (3) Damaged fittings.	One on each side of truck. Replace if necessary.
2. Four capscrews (3), and washers (2).	Unscrew and remove.	
3. Two nuts (7).	Unscrew and remove.	
4. Two nuts (6).	Unscrew and remove. Remove two lift cylinders (5).	



TA 074881

PUSHER AXLE.

8-15. PUSHER AXLE LIFT CYLINDERS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION.		
5. Two lift cylinders (5).	Place in position, Aline bolt holes. Push studs through brackets (1).	
6. Four capscrews (3) with washers (2).	Screw in and tighten.	
7. Two nuts (7).	Screw on and tighten.	
8. Two nuts (6).	Screw on and tighten.	
9. Two elbows (9) and air lines (8).	a. Put liquid teflon on threads of elbows (9). b. Screw on air lines (8) and tighten.	
C. OPERATIONAL CHECK.		
10. Engine.	Start up (see TM 9-2320-273-10).	
11. Pusher axle.	Raise and lower (see TM 9-2320-273-10). Check for proper inflation and deflation of both lift cylinders.	
12. Engine.	Shut down (see TM 9-2320-273-10).	

PUSHER AXLE.

8-15. PUSHER AXLE LIFT CYLINDERS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
DRIVER'S DOOR AIR BAG LOCATED BEHIND PUSHER AXLE LEGEND: 1. BRACKET (2) 2. WASHER (4) 3. CAPSCREW (4) 4. BRACKET (2) 5. LIFT CYLINDER (2) 6. NUT (2) 7. NUT (2) 8. AIR LINE (2) 9. ELBOW (2)		

TA 074882

PUSHER AXLE.**8-16. PUSHER AXLE PRESSURE GAGE MAINTENANCE.****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

- a. Removal. (10)
 - b. Installation. (10)
 - c. Operational Check. (10)
- 30 Minutes Total .

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

M917, M919, M920.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (Refer to Appendix C).

**EQUIPMENT CONDITION
PARAGRAPH**TM9-2320-273-10.
9-13A .**CONDITION DESCRIPTION**Pusher Axle Down.
Air Reservoirs Bled**PERSONNEL REQUIRED**

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

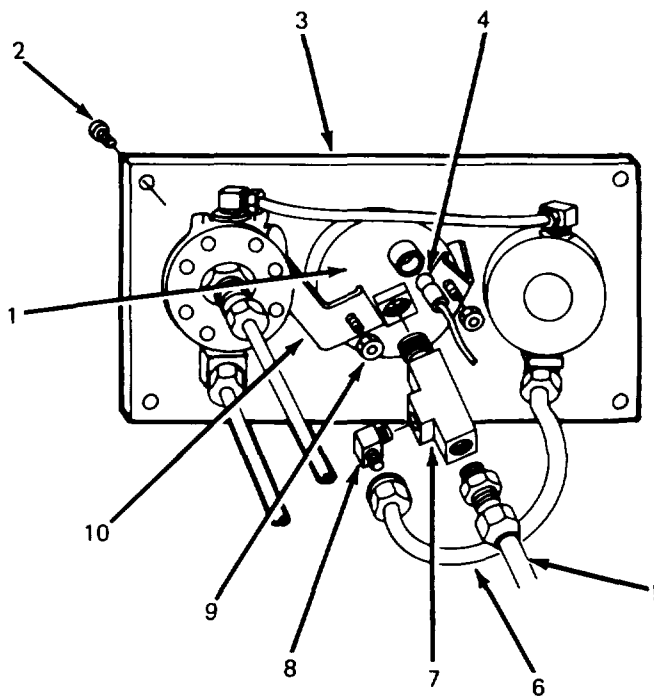
Vehicle Parked on Level Ground.

REFERENCES (TM)TM 9-2320-273-10.
TM 9-2320-273-20P.**GENERAL SAFETY INSTRUCTIONS**Engine OFF.
Transmission in Neutral.
Park Brake Set.**TROUBLESHOOTING REFERENCES**

Table 9-1.

PUSHER AXLE.

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Four screws (2).	Loosen and remove. Remove panel (3).	
2. Bulb/lamp assembly (4).	Disconnect.	
3. Air lines (5) and (6).	a. Unscrew and remove from fitting block (7) and elbow (8). b. Inspect for: (1) Cracks. (2) Leaks. (3) Damaged fittings.	Replace if necessary.
4. Air line fitting block (7).	a. Unscrew from back of gage (1). b. Inspect for damaged threads.	Replace if necessary.



LEGEND:

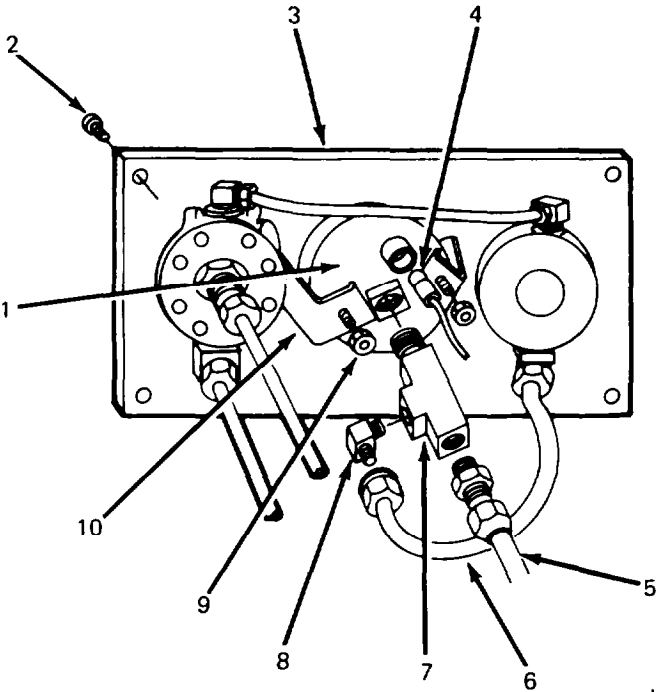
- 1. GAGE
- 2. SCREW (4)
- 3. PANEL
- 4. BULB/LAMP ASSEMBLY
- 5. AIR LINE
- 6. AIR LINE
- 7. FITTING BLOCK
- 8. ELBOW
- 9. NUT (2)
- 10. BRACKET (2)

TA 074883

PUSHER AXLE.**8-16. PUSHER AXLE PRESSURE GAGE MAINTENANCE (Continued).**

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
5. Two nuts (9).	Unscrew and remove.	
6. Two brackets (10).	Remove.	
7. Gage (1).	Remove.	
B. INSTALLATION.		
8. Gage (1).	Place in panel (3).	
9. Two brackets (10).	Place in position over gage studs.	
10. Two nuts (9).	Screw on and tighten.	
11. Fitting block (7).	Apply liquid teflon to threads and screw into the rear of gage (1).	
12. Air lines (5) and (6).	Screw on and tighten.	
13. Bulb/lamp assembly (4).	Connect.	
14. Panel (3).	Put in place. Screw in and tighten four screws (2).	
C. OPERATIONAL CHECK.		
15. Engine.	Start up (see TM 9-2320-273-10).	
16. Pressure gage.	Check readings as regulator valve is actuated (see TM 9-2320-273-10).	
17. Engine.	Shut down (see TM 9-2320-273-10).	

PUSHER AXLE

8-16. PUSHER AXLE PRESSURE GAGE MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
 The diagram shows a rectangular panel (3) with a pressure gage (1) mounted on the left. A bulb/lamp assembly (4) is on the right. Two air lines (5 and 6) enter from the bottom right, passing through fittings (7) and elbow blocks (8). Nuts (9) are used to secure the elbow blocks. Brackets (10) are used to support the gage and the air line assembly. A screw (2) is shown at the top left corner of the panel. LEGEND: 1. GAGE 2. SCREW (4) 3. PANEL 4. BULB/LAMP ASSEMBLY 5. AIR LINE 6. AIR LINE 7. FITTING 8. ELBOW BLOCK 9. NUT (2) 10. BRACKET (2)		

TA 074884

PUSHER AXLE.**8-17. PUSHER AXLE REGULATOR VALVE MAINTENANCE.****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

- a. Removal. (3.5)
 - b. Installation. (3.5)
 - c. Operational Check. (2.0)
- 9.0 Minutes Total.

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

M917, M919, M920.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (Refer to Appendix C).

**EQUIPMENT CONDITION
PARAGRAPH**TM9-2320-273-10 .
9-13A.**CONDITION DESCRIPTION**Pusher Axle Down.
Air Reservoirs Drained.**PERSONNEL REQUIRED**

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked On Level Ground.

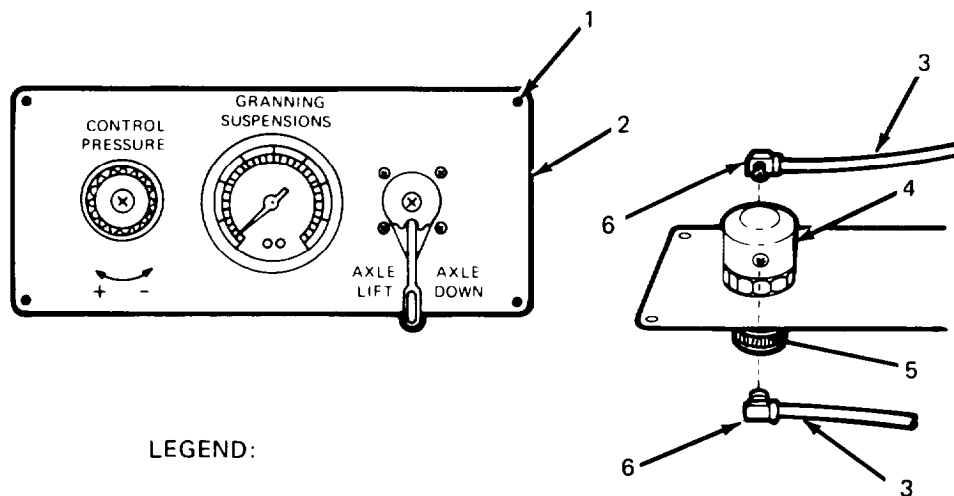
REFERENCES (TM)TM 9-2320-273-10.
TM 9-2320-273-20P.**GENERAL SAFETY INSTRUCTIONS**Engine OFF.
Transmission in Neutral.
Park Brake Set.**TROUBLESHOOTING REFERENCES**

Table 9-1.

PUSHER AXLE.

8-17. PUSHER AXLE REGULATOR VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Four screws (1).	Unscrew and remove. panel (2).	
2. Two air lines (3).	a. Unscrew and remove from elbows (6). b. Inspect for: (1) Cracks. (2) Leaks. (3) Damaged fittings.	Replace if necessary.
3. Elbows (6).	Unscrew from valve (4).	
4. Lockring (5).	Unscrew and remove from panel front. Remove valve (4).	



LEGEND:

1. SCREW (4)
2. PANEL
3. AIR LINE (2)
4. VALVE
5. LOCKRING
6. ELBOW (2)

TA 074885

PUSHER AXLE.

8-17. PUSHER AXLE REGULATOR VALVE MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
<u>B. INSTALLATION.</u>		
5. Elbows (6).	Apply liquid teflon to threads and screw into valve (4).	
6. Valve (4).	a. Insert in panel (2). b. Screw on and tighten lock-ring (5).	
7. Two air lines (3).	Screw onto fittings (6) and tighten.	
8. Panel (2).	Set in place. Screw in and tighten four screws (1).	
<u>C. OPERATIONAL CHECK.</u>		
9. Engine.	Start up (see TM 9-2320-273-10).	
10. Pressure regulator valve.	Check for increases and decreases in pressure readings on gage when valve is operated (see TM 9-2320-273-10).	
11. Engine.	Shut down (see TM 9-2320-273-10).	

PUSHER AXLE.

8-17. PUSHER AXLE REGULATOR VALVE MAINTENANCE (Continued.

LOCATION/ITEM	ACTION	REMARKS
LEGEND: 1. SCREW (4) 2. PANEL 3. AIR LINE (2) 4. VALVE 5. LOCKRING 6. ELBOW (2)		

TA 074886

PUSHER AXLE.**8-18. PUSHER AXLE UP-DOWN SELECTOR VALVE MAINTENANCE.****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

a. Removal.	(10)
b. Installation.	(15)
c. Operational Check.	(10)
35 Minutes Total.	

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

M917, M919, M920.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS [P/N]

Liquid Teflon (Refer to Appendix C).

**EQUIPMENT CONDITION
PARAGRAPH**TM 9-2320-273-10.
9-13A.**CONDITION DESCRIPTION**Pusher Axle Down.
Air Reservoirs Drained.**PERSONNEL REQUIRED**

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

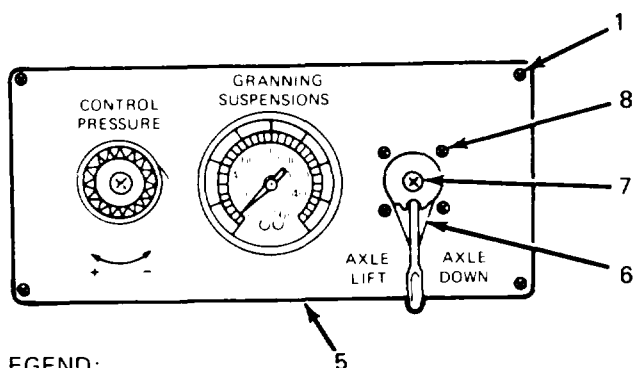
REFERENCES (TM)TM 9-2320-273-10.
TM 9-2320-273-20P.**GENERAL SAFETY INSTRUCTIONS**Engine OFF.
Transmission in Neutral.
Park Brake Set.**TROUBLESHOOTING REFERENCES**

Table 9-1.

PUSHER AXLE.

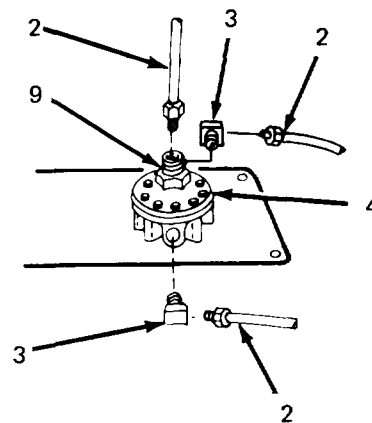
8-18. PUSHER AXLE UP-DOWN SELECTOR VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Screw (7) and lever (6).	Unscrew and remove.	
2. Four screws (1).	Unscrew and remove panel (5).	
3. Three air lines (2).	a. Unscrew and remove from two elbows (3) and straight fitting (9). b. Inspect for: (1) Cracks. (2) Leaks. (3) Damaged fittings.	Replace if necessary.
4. Two elbows (3) and straight fitting (9).	Unscrew from valve (4).	
5. Four screws (8).	Unscrew and remove valve (4).	



LEGEND:

- 1. SCREW (4)
- 2. AIR LINE (3)
- 3. ELBOW (2)
- 4. VALVE
- 5. PANEL
- 6. LEVER
- 7. SCREW
- 8. SCREW (4)
- 9. STRAIGHT FITTING



TA 074887

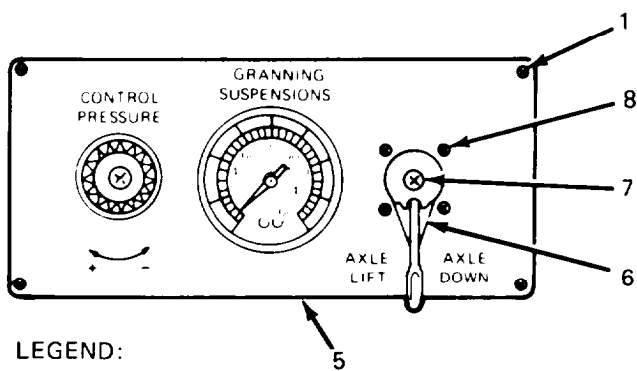
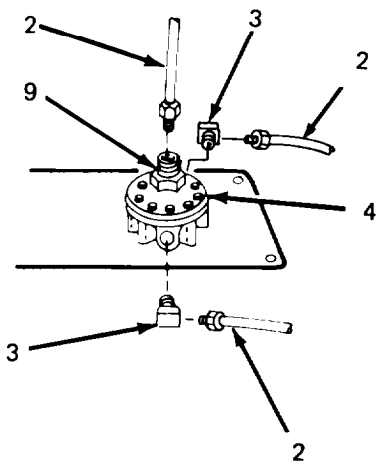
PUSHER AXLE.

8-18. PUSHER AXLE UP-DOWN SELECTOR VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION.		
6. Two elbows (3) and straight fitting (9).	Coat threads with liquid teflon and screw into valve (4).	
7. Valve (4).	Attach to panel (5) with four screws (8). Tighten screws.	
8. Three air lines (2).	Screw into two elbows (3) and straight fitting (9).	Supply line goes to center of valve, air bag line goes to top of valve, and lift cylinder line goes to bottom of valve.
9. Panel (5).	Set in place. Screw in and tighten four screws (1).	
10. Lever (6).	Attach to valve (4) and tighten screw (7).	
C. OPERATIONAL CHECK.		
11. Engine.	Start up (see TM 9-2320-273-10).	
12. Pusher axle.	Check for proper raising and lowering (see TM 9-2320-273-10).	
13. Engine.	Shut down (see TM 9-2320-273-10).	

PUSHER AXLE.

8-18. PUSHER AXLE UP-DOWN SELECTOR VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
 LEGEND: 1. SCREW (4) 2. AIR LINE (3) 3. ELBOW (2) 4. VALVE 5. PANEL 6. LEVER 7. SCREW 8. SCREW (4) 9. STRAIGHT FITTING		

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CHAPTER 9

COMPRESSED AIR AND BRAKE SYSTEMS

9-1. OVERVIEW.

This chapter provides you with the following information related to compressed air and brake maintenance:

- a. All required special tools and equipment.
 - b. Other technical manuals.
 - c. Troubleshooting procedures.
 - d. Maintenance procedures.
-

Section I REPAIR PARTS, SPECIAL TOOLS, TMDE AND SUPPORT EQUIPMENT

9-2. COMMON TOOLS AND EQUIPMENT.

For authorized common tools and equipment, refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

9-3. SPECIAL TOOLS, TMDE, SUPPORT EQUIPMENT.

The special tools, TMDE and support equipment required for the compressed air and brake maintenance procedures described in this chapter are limited to the following items. (Refer to Organizational Maintenance RPSTL, TM 9-2320-273-20P for tool description and illustration.)

- a. Air Pressure Gage (0-200 psi min).
- b. Brake spring pliers.
- c. Wheel dolly jacks, and blocks.
- d. Oil filter strap wrench.

9-4. SPARES AND REPAIR PARTS.

Spares and repair parts are listed and illustrated in the Repair Parts and Special Tools list covering Organizational Maintenance for this equipment (TM 9-2320-273-20P).

Section II TROUBLESHOOTING

9-5. INTRODUCTION.

a. General. The primary use of the compressed air system is to operate the service and park/emergency vehicle brakes. Other uses of compressed air are for transmission shifting control, air horn operation, windshield wiper and washer operation, the differential lockout, and on some vehicles, pusher axle controls, and front wheel drive. Air system component location illustrations for each truck model are contained in paragraphs 9-5e thru 9-5j. These same illustrations are contained in paragraphs 2-65 thru 2-70 and the components are further described in paragraph 2-64.

b. Scope. This section contains troubleshooting instructions based on observed malfunctions starting with generalized pressure problems and continuing to more specific malfunctions of components and compressed air functions.

c. Test Equipment: Air pressure gage (0-200 psi min).

d. Troubleshooting. Troubleshooting procedures are given in table 9-1. The procedures are grouped under the malfunctions listed below. Perform only those steps in a procedure required to remedy the malfunction.

1. Insufficient air pressure (Malfunction No. 1).
2. Excessive system pressure indicated (Malfunction No. 2).
3. Park brakes will not release (Malfunction No. 3).
4. Trailer or towed vehicle brakes will not release (Malfunction No. 4).
5. Service brake will not release (one wheel only) (Malfunction No. 5).
6. Service brakes will not apply (Malfunction No. 6).
7. No service brakes on trailer or towed vehicle only (Malfunction No. 7).
8. Trailer hand control will not apply trailer service brakes (Malfunction No. 8).
9. Park brakes will not apply (Malfunction No. 9).
10. Service brakes are weak or slow responding (all wheels) (Malfunction No. 10).
11. Front service brakes are weak or slow responding (Malfunction No. 11).
12. Rear service brakes are uneven or erratic (Malfunction No. 12).
13. Service brakes are uneven or erratic on one or more wheels (Malfunction No. 13).
14. Brakes overheat (Malfunction No. 14).
15. Stop lamps do not operate, brakes function normally (Malfunction No. 15).
16. Pressure gage(s) not indicating or is not accurate, brakes normal (Malfunction No. 16).
17. Air horn does not operate (Malfunction No. 17).
18. Windshield wipers or washers are inoperative (Malfunction No. 18).
19. Interaxle differential lockup inoperative (Malfunction No. 19).

Table 9-1. Compressed Air and Brake System Troubleshooting Procedures.

MALFUNCTION.	
TEST OR INSPECTION.	
CORRECTIVE ACTION.	
1. INSUFFICIENT AIR PRESSURE: Step 1. Check for air exhausting through open or damaged air reservoir drain valves. a. Close or replace manual drain valve (para 9-13). b. Replace automatic drain valve on supply reservoir (para 9-12). Step 2. Check for loose air connections between the compressor, governor, and air reservoirs. Tighten any loose air connections and replace damaged components. Step 3. Check governor for proper operation and adjustment. Should be set to control pressure in supply reservoir at 105-125 psi (724-862 kPa). Refer problem to Direct Support Maintenance. Step 4. With the engine not running, loosen the compressor output line at the compressor and listen for escaping air. a. If air escapes continuously, replace the check valve in that line at the supply reservoir (para 9-15). b. If the check valve is okay, refer problem to Direct Support Maintenance. Step 5. Check air line connections for tightness and air lines for cracks or breaks. Tighten or replace connections and lines as necessary.	
2. EXCESSIVE SYSTEM PRESSURE INDICATED: Step 1. Check for inoperative pressure safety relief valve on the supply reservoir. Replace the safety release valve (para 9-14) only if reservoir exceeds 150 psi. Step 2. Check governor for proper operation. Refer problem to Direct Support Maintenance.	
3. PARK BRAKES WILL NOT RELEASE: Step 1. Check reservoir pressure gage and verify LOW PRESSURE warning lamp is out. See Malfunction 1. Step 2. Verify PARK BRAKE manual valve is closed. Close valve; if valve will not close, refer to para 9-19. Step 3. Check air lines for leakage or damage. Use a soap solution to check for leakage at connections and watch for bubbles. Replace damaged lines and tighten loose connections (para 9-36).	

Table 9-1. Compressed Air and Brake System Troubleshooting Procedures (Continued).

MALFUNCTION.	TEST OR INSPECTION.	CORRECTIVE ACTION.
3. PARK BRAKES WILL NOT RELEASE (Continued):	Step 4. (M915, M916 and M920 only). Inspect intervehicle air hoses for proper connections. Connect hoses properly. Step 5. Check the air line between the two rear quick-release valves for damage or leaks using a soap solution. a. Replace the line if damaged and tighten connections. b. Replace the park brake quick-release valve (para 9-22).	
4. TRAILER OR TOWED VEHICLE BRAKES WILL NOT RELEASE:	Step 1. Check intervehicle air hoses for proper connections. Close the trailer supply valve and disconnect the hoses. Reconnect the hoses and open the supply valve. Step 2. Check for trailer air leaks or defective brakes. Troubleshoot trailer.	
5. SERVICE BRAKES WILL NOT RELEASE (ONE WHEEL ONLY) :	Troubleshoot brake. Refer to brake malfunctions 3 and 4, above.	
6. SERVICE BRAKES WILL NOT APPLY:	Step 1. Check the pressure gages in the cab. Operate the engine to build up proper pressure. Step 2. Check position of park brake and trailer supply valves. Position correctly. Step 3. (M915, M916 and M920 only). Check intervehicle connections. Connect air hoses correctly and open trailer supply valve.	

Table 9-1. Compressed Air and Brake System Troubleshooting Procedures (Continued).

MALFUNCTION.	
	TEST OR INSPECTION.
	CORRECTIVE ACTION.
6. SERVICE BRAKES WILL NOT APPLY (Continued): Step 4. Check for leakage at the brake pedal valve using a soap solution. Tighten connections or replace defective brake pedal valve (para 9-21). Step 5. Check brakes for proper adjustment and worn linings. Adjust brakes (para 9-31, 9-32, 9-33, 9-34). 7. NO SERVICE BRAKES ON TRAILER OR TOWED VEHICLE ONLY: Step 1. Check service air hose connection and position of trailer supply valve. Reconnect hose properly and open trailer supply valve. Step 2. Check trailer supply valve for damage or leakage using a soap solution. Replace defective valve (para 9-17). Step 3. Check the double-check valve(s) for damage or leakage using a soap solution. Replace defective valve (para 9-27). Step 4. Check tractor protection valve for damage or corrosion. If valve is defective, replace defective valve. 8. TRAILER HAND CONTROL WILL NOT APPLY TRAILER SERVICE BRAKES: Step 1. Check air lines between trailer hand control and double check valve for leakage using a soap solution. Repair leaks. Step 2. Check tractor protection valve for damage or leaks using a soap solution. Tighten connections or replace valve (para 9-26). Step 3. Check the double-check valve for damage or leaks using a soap solution. Tighten connections or replace valve (para 9-27). 9. PARK BRAKES WILL NOT APPLY: Step 1. Inspect vent on the park brake valve for damage or clogging. Clean vent or replace valve (para 9-19).	

Table 9-1. Compressed Air and Brake System Troubleshooting Procedures (Continued).

MALFUNCTION.	TEST OR INSPECTION.	CORRECTIVE ACTION.
9. PARK BRAKES WILL NOT APPLY (Continued):		
	Step 2. Check air chambers for proper position of caging bolt.	Adjust caging bolt (Para 9-37).
10. SERVICE BRAKES ARE WEAK OR SLOW RESPONDING (ALL WHEELS):		
	Step 1. Check for low reservoir pressure. Pressure should not be below 80 lbs. (Buzzer sounds at 80 lbs).	See Malfunction 1.
	Step 2. Check service air lines for damage and leakage using a soap solution.	Tighten loose connections and replace damaged lines.
	Step 3. Check brake linings and adjustment (para 9-31, 9-32, 9-33, 9-34, 9-35).	Replace brake linings and/or adjust as necessary.
11. FRONT SERVICE BRAKES ARE WEAK OR SLOW RESPONDING:		
	Step 1. Check air lines between brake pedal valve and front brake chambers for damage and leakage using a soap solution.	Tighten loose connections and replace damaged lines.
	Step 2. Check the limiting valve for damage and leakage using a soap solution.	Replace defective limiting valve (para 9-25).
	Step 3. Check the brake pedal valve for damage and leakage using a soap solution.	Replace defective valve (para 9-21).
	Step 4. Check front brakes for worn linings (shoes) and proper adjustment.	Adjust brakes and replace linings if necessary (para 9-31, 9-32).
12. REAR SERVICE BRAKES ARE UNEVEN OR ERRATIC:		
	Step 1. Check for leakage in air lines between service brake relay valve and wheel air chambers using a soap solution.	Tighten loose connections or replace defective components.

Table 9-1. Compressed Air and Brake System Troubleshooting Procedures (Continued).

MALFUNCTION.	
TEST OR INSPECTION.	
CORRECTIVE ACTION.	
12. REAR SERVICE BRAKES ARE UNEVEN OR ERRATIC (Continued):	
Step 2.	Check for air leakage between the air reservoir and the rear service brake relay valve. Tighten loose connections or replace damaged line.
Step 3.	Leak test rear brake part of the brake pedal valve. Tighten loose connections or replace pedal valve (para 9-21).
Step 4.	Check brake shoes for proper adjustment. Adjust brake shoes (para 9-39).
13. SERVICE BRAKES ARE UNEVEN OR ERRATIC ON ONE OR MORE WHEELS:	
Step 1.	Have an assistant press and hold the brake pedal valve down and perform leakage test on air lines at affected wheels using a soap solution. Tighten loose connections, repair or replace damaged air lines or hoses.
Step 2.	Loosen line fitting at affected wheel air chamber and have an assistant lightly depress the treadle valve, Listen for air exhausting from line. No air indicates a clogged line. Replace damaged or clogged line.
Step 3.	Check brake adjustment (para 9-31,9-32, 9-39): a. Adjust brake and schedule for maintenance as soon as possible. b. If manual adjustment does not correct the problem, refer problem to Direct Support Maintenance.
Step 4.	Press brake pedal down and listen for air leakage around wheel air chamber clamp. Tighten clamp or replace ruptured chamber diaphragm (para 9-36 for front brakes, para 9-37 for rear brakes).
Step 5.	Remove hub and drum assembly to inspect plunger and adjuster mechanism and brake return springs (para 9-31 and 9-32 for front brakes, para 9-33 and 9-34 for rear brakes). Clean, repair or replace defective components.
Step 6.	Check the brake linings for grease, glazing and proper installation (para 9-31 and 9-32 for front brakes, para 9-33 and 9-34 for rear brakes). Clean, replace, or reinstall as required.

Table 9-1. Compressed Air and Brake System Troubleshooting Procedures (Continued).

MALFUNCTION.	
TEST OR INSPECTION.	
CORRECTIVE ACTION.	
14. BRAKES OVERHEAT: Step 1. Check for low reservoir pressure. If below 80 psi, see Malfunction 1. Step 2. Check for damaged or leaking front limiting valve or rear relay valves. Tighten loose connections or replace defective valve (para 9-24 or 9-25, as applicable). Step 3. Pull hub and drum assembly (para 10-13 through 10-15 as applicable) and inspect brake assembly. Apply brakes lightly and observe shoe movement for smooth operation. - Replace weak or broken return springs (para 9-31 and 9-32 for front brakes, 9-33 and 9-34 for rear brakes). - Clean, service, and assemble brake mechanism. Step 4. Check for insufficient lining to drum clearance (para 9-31 and 9-32 for front brakes, para 9-33 and 9-34 for rear brakes). - Adjust. - If adjusting fails, refer problem to Direct Support Maintenance. Step 5. Inspect wheel bearings for damage and proper lubrication. Adjust, lube, or replace bearings (para 10-13 through para 10-15 as applicable).	
15. STOP LAMPS DO NOT OPERATE, BRAKES FUNCTION NORMALLY: Step 1. Have an assistant step on the brake pedal (with ignition key switch on) and check for approximately 12 volts dc at both electrical connections on the stoplamp switch. If voltage is not present on both terminals, replace the double-check valve/stop lamp switch (para 9-28 or 9-29), Step 2. Check for defective wiring or electrical connectors. Troubleshoot the electrical system (para 5-17).	

Table 9-1. Compressed Air and Brake System Troubleshooting Procedures (Continued).

MALFUNCTION .	TEST OR INSPECTION .	CORRECTIVE ACTION .
16. PRESSURE GAGE(S) NOT INDICATING OR IS NOT ACCURATE, BRAKES NORMAL:		
Step 1. Disconnect affected air line(s) at gage(s) and press the brake pedal. If no air exhausts, the line is clogged or broken.		
Replace defective line or gage (para 9-20).		
17. AIR HORN DOES NOT OPERATE:		
Step 1. Check for air LOW PRESSURE.		
If air pressure is below 20 lbs , operate engine until air pressure is back to 120 lbs. See Malfunction 1.		
Step 2. Inspect air lines for damage or clogging.		
a. Replace damaged or clogged lines.		
b. Replace defective manually-operated horn valve (para 9-45).		
18. WINDSHIELD WIPERS OR WASHERS ARE INOPERATIVE:		
Step 1. Check for air leakage in lines to the wiper or washer control valve using a soap solution.		
Tighten loose connections and replace damaged lines.		
Step 2. Check to see if the wiper mechanical linkage is binding or broken.		
Replace defective linkage (para 9-42).		
Step 3. Loosen air line at the wiper motor and turn control to the run position. Air should exhaust from the line.		
a. If no air exhausts, replace the control valve (para 9-43).		
b. If air exhausts, replace the motor (para 9-42).		

Table 9-1. Compressed Air and Brake System Troubleshooting Procedures (Continued).

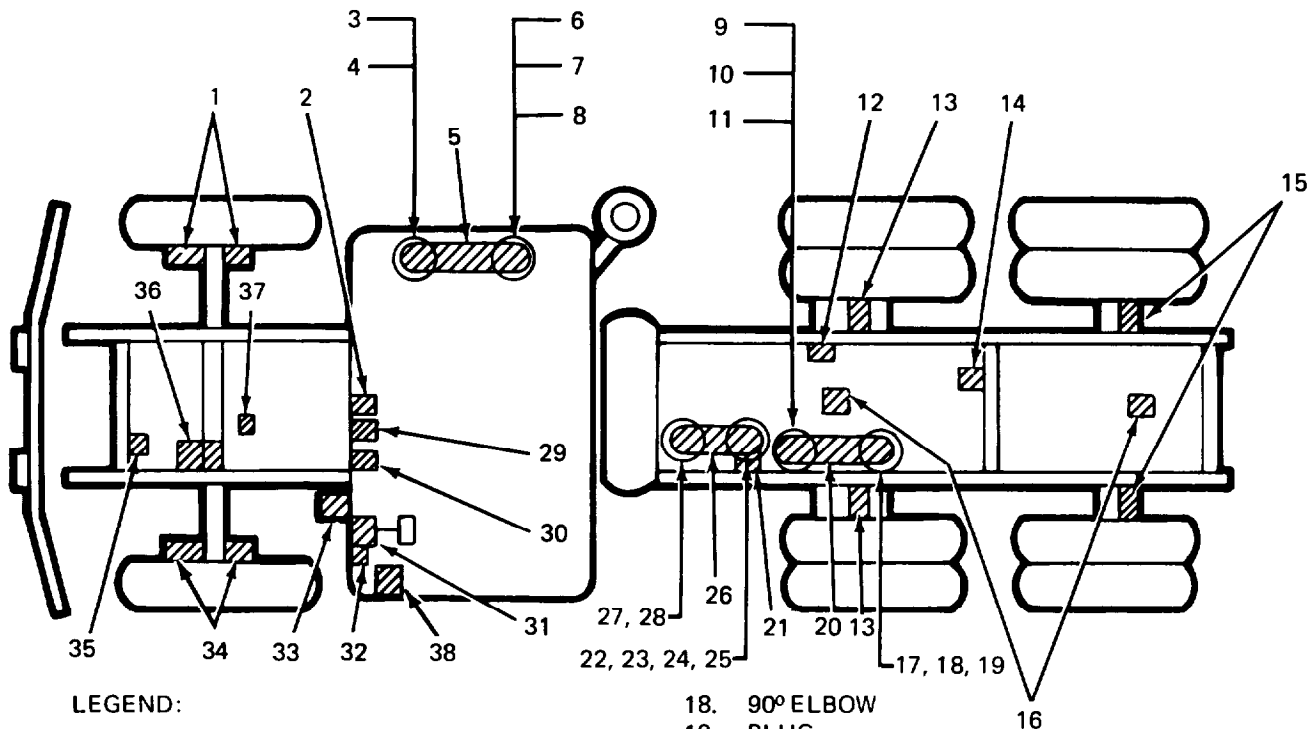
MALFUNCTION. TEST OR INSPECTION. CORRECTIVE ACTION.
19. INTERAXLE DIFFERENTIAL LOCKUP INOPERATIVE: Disconnect air lines at rear axle; then engage lockup control valve on instrument panel. Check for air pressure at rear axle. No air indicates clogged lines or defective control valve. - Replace clogged lines. - Replace defective control valve (para 9-44). - If air controls are working normally, refer problem to Direct Support Maintenance.

BRAKE SYSTEM

9-5e. AIR SYSTEM ARRANGEMENT (M915).

NOTE

The components shown below are described in paragraph 2-64.



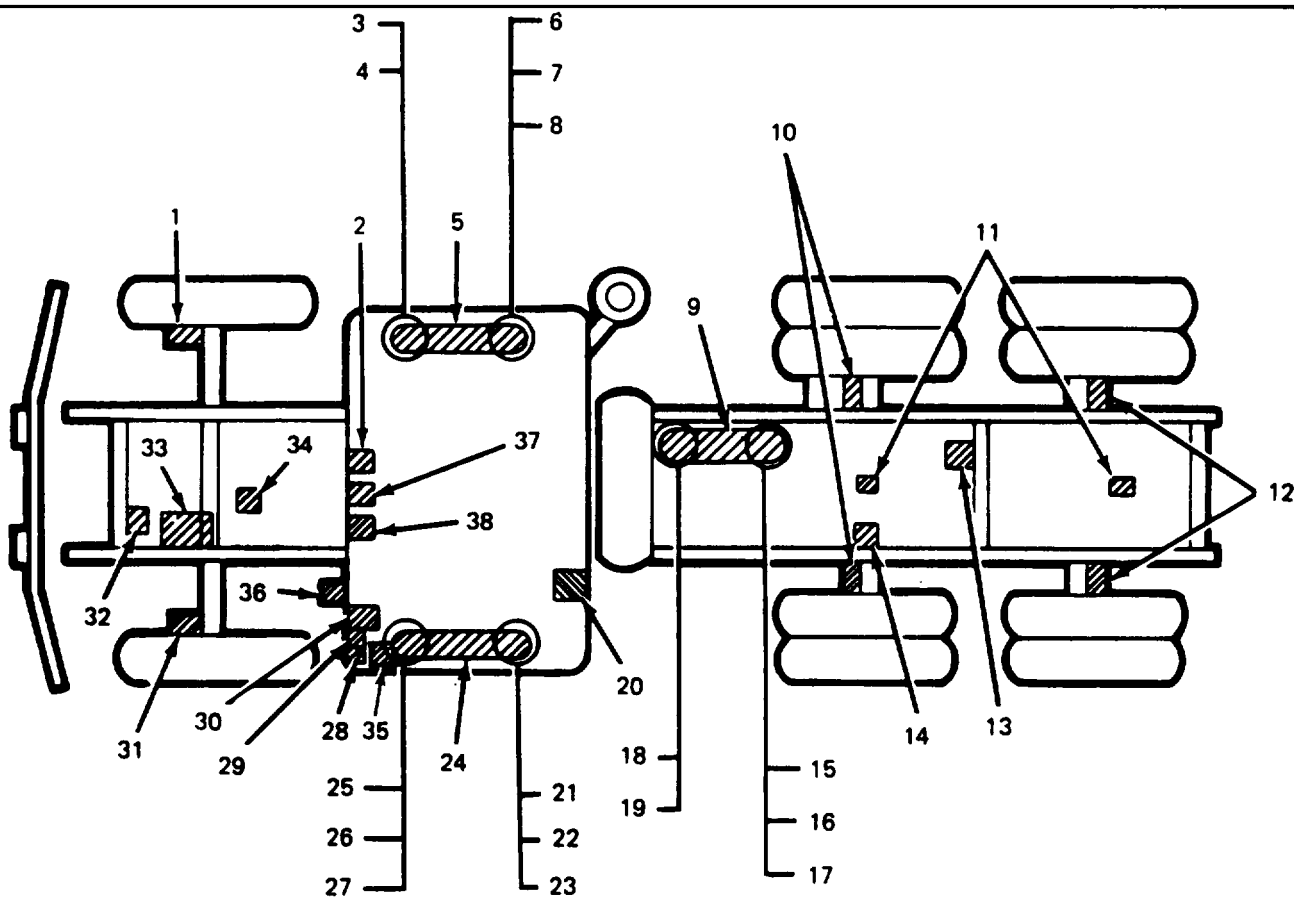
LEGEND:

1. WEDGE BRAKE AIR CHAMBER (2)	18. 90° ELBOW
2. PARKING BRAKE VALVE	19. PLUG
3. DRAIN COCK	20. PRIMARY RESERVOIR
4. PLUG (2)	21. TRACTOR PROTECTION VALVE
5. SECONDARY RESERVOIR	22. DRAIN COCK
6. DOUBLE CHECK VALVE	23. 90° ELBOW
7. 90° CHECK VALVE	24. AIR HOSE COUPLING
8. 90° ELBOW	25. SAFETY VALVE
9. DRAIN COCK	26. SUPPLY RESERVOIR
10. 45° ELBOW	27. 90° ELBOW (2)
11. 45° CHECK VALVE	28. CHECK VALVE
12. QUICK RELEASE/DOUBLE CHECK VALVE	29. TRAILER SUPPLY VALVE
13. SPRING AND SERVICE BRAKE CHAMBER (FORWARD-REAR) (2)	30. TRAILER HAND CONTROL BRAKE VALVE
14. RELAY VALVE	31. DUAL BRAKE VALVE
15. SPRING AND SERVICE BRAKE CHAMBER (REAR-REAR) (2)	32. DOUBLE CHECK VALVE
16. QUICK RELEASE VALVE	33. DOUBLE CHECK AND STOPLAMP VALVE
17. ADAPTER	34. WEDGE BRAKE AIR CHAMBER (2)
	35. LIMITING VALVE
	36. AIR COMPRESSOR/GOVERNOR
	37. CHECK VALVE
	38. AIR DRYER

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BRAKE SYSTEM

9-5f. AIR SYSTEM ARRANGEMENT (M916).



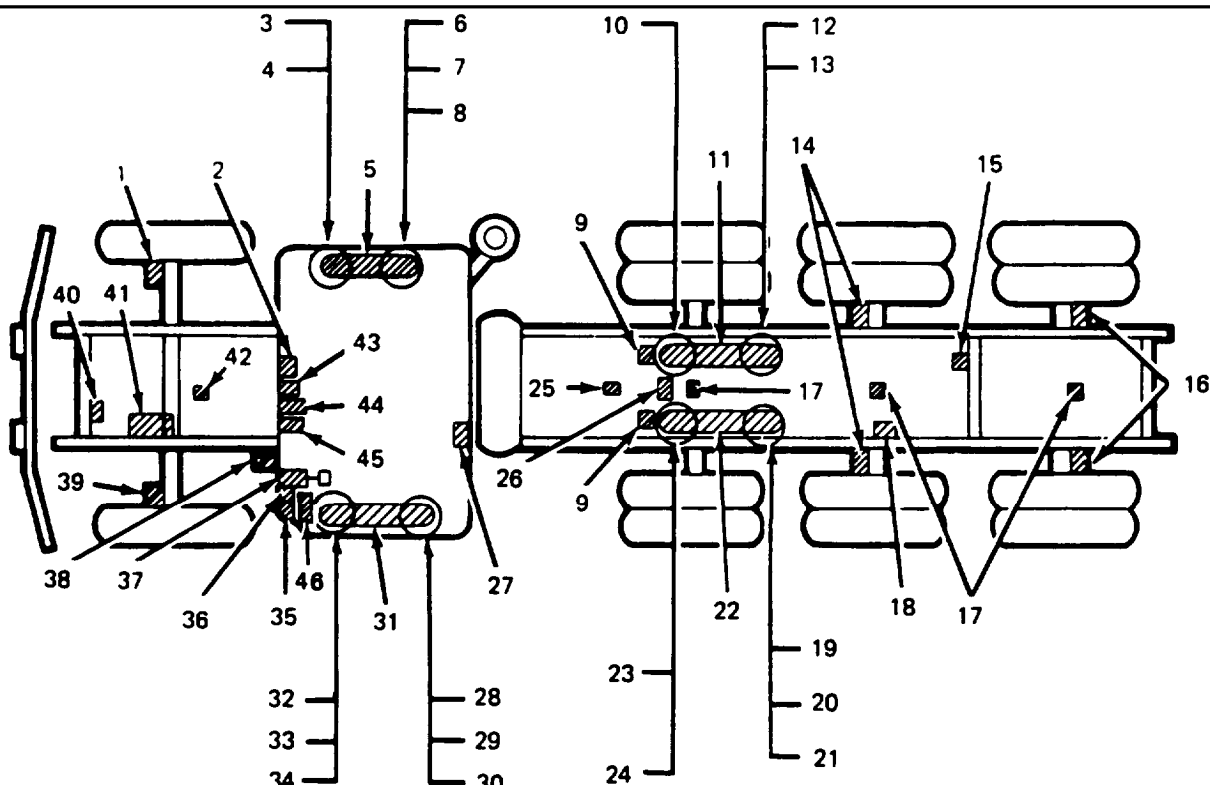
LEGEND:

1. WEDGE BRAKE AIR CHAMBER	19. CHECK VALVE
2. PARKING BRAKE VALVE	20. TRACTOR PROTECTION VALVE
3. PLUG	21. AIR HOSE COUPLING
4. DRAIN COCK	22. 90° ELBOW
5. SECONDARY RESERVOIR	23. DRAIN COCK
6. DOUBLE CHECK VALVE	24. SUPPLY RESERVOIR
7. 90° CHECK VALVE	25. SAFETY VALVE
8. 90° ELBOW	26. ADAPTER
9. PRIMARY RESERVOIR	27. CHECK VALVE
10. SPRING AND SERVICE BRAKE CHAMBER/SLACK ADJUSTER (2)	28. SPRING BRAKE CONTROL VALVE
11. QUICK RELEASE VALVE (2)	29. DOUBLE CHECK VALVE
12. SPRING AND SERVICE BRAKE CHAMBER/SLACK ADJUSTER (2)	30. DUAL BRAKE VALVE
13. RELAY VALVE	31. WEDGE BRAKE AIR CHAMBER
14. QUICK RELEASE AND DOUBLE CHECK VALVE	32. LIMITING VALVE
15. DRAIN COCK	33. AIR COMPRESSOR/GOVERNOR
16. 90° ELBOW	34. CHECK VALVE
17. PLUG	35. AIR DRYER
18. ADAPTER (2)	36. DOUBLE CHECK AND STOPLAMP VALVE
	37. TRAILER SUPPLY VALVE
	38. TRAILER HAND CONTROL BRAKE VALVE

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BRAKE SYSTEM

9-5g. AIR SYSTEM ARRANGEMENT (M917).



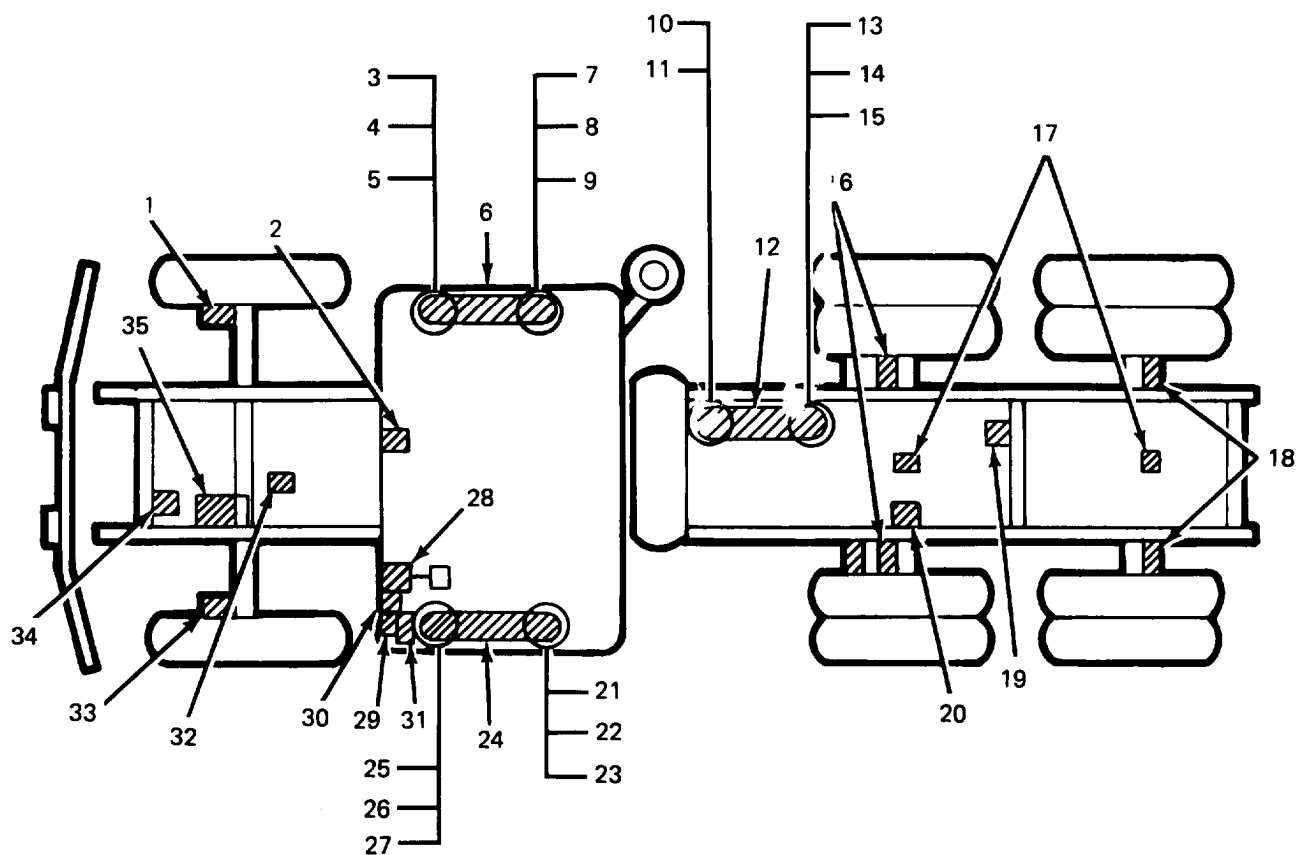
LEGEND:

1. WEDGE BRAKE AIR CHAMBER	22. PRIMARY RESERVOIR
2. PARKING BRAKE VALVE	23. CHECK VALVE
3. PLUG (2)	24. 90° ELBOW (2)
4. DRAIN COCK	25. EXHAUST VALVE
5. SECONDARY RESERVOIR	26. QUICK RELEASE VALVE
6. DOUBLE CHECK VALVE	27. TRACTOR PROTECTION VALVE
7. 90° CHECK VALVE	28. DRAIN COCK
8. 90° ELBOW	29. 90° ELBOW
9. AIR BRAKE CHAMBER/SLACK ADJUSTER (2)	30. AIR HOSE COUPLING
10. PLUG (3)	31. SUPPLY RESERVOIR
11. PRIMARY RESERVOIR	32. CHECK VALVE
12. 45° ELBOW (2)	33. ADAPTER
13. DRAIN COCK	34. SAFETY VALVE
14. SPRING AND SERVICE BRAKE CHAMBER/SLACK ADJUSTER (2)	35. SPRING BRAKE CONTROL VALVE
15. RELAY VALVE	36. DOUBLE CHECK VALVE
16. SPRING AND SERVICE BRAKE CHAMBER/SLACK ADJUSTER (2)	37. DUAL BRAKE VALVE
17. QUICK RELEASE VALVE (3)	38. DOUBLE CHECK AND STOPLAMP VALVE
18. QUICK RELEASE AND DOUBLE CHECK VALVE	39. WEDGE BRAKE AIR CHAMBER
19. DRAIN COCK	40. LIMITING VALVE
20. PLUG	41. AIR COMPRESSOR/GOVERNOR
21. 45° ELBOW	42. CHECK VALVE
	43. TRAILER SUPPLY VALVE
	44. TRAILER HAND CONTROL BRAKE VALVE
	45. PRESSURE PROTECTION VALVE
	46. AIR DRYER

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BRAKE SYSTEM

9-5h. AIR SYSTEM ARRANGEMENT (M918).



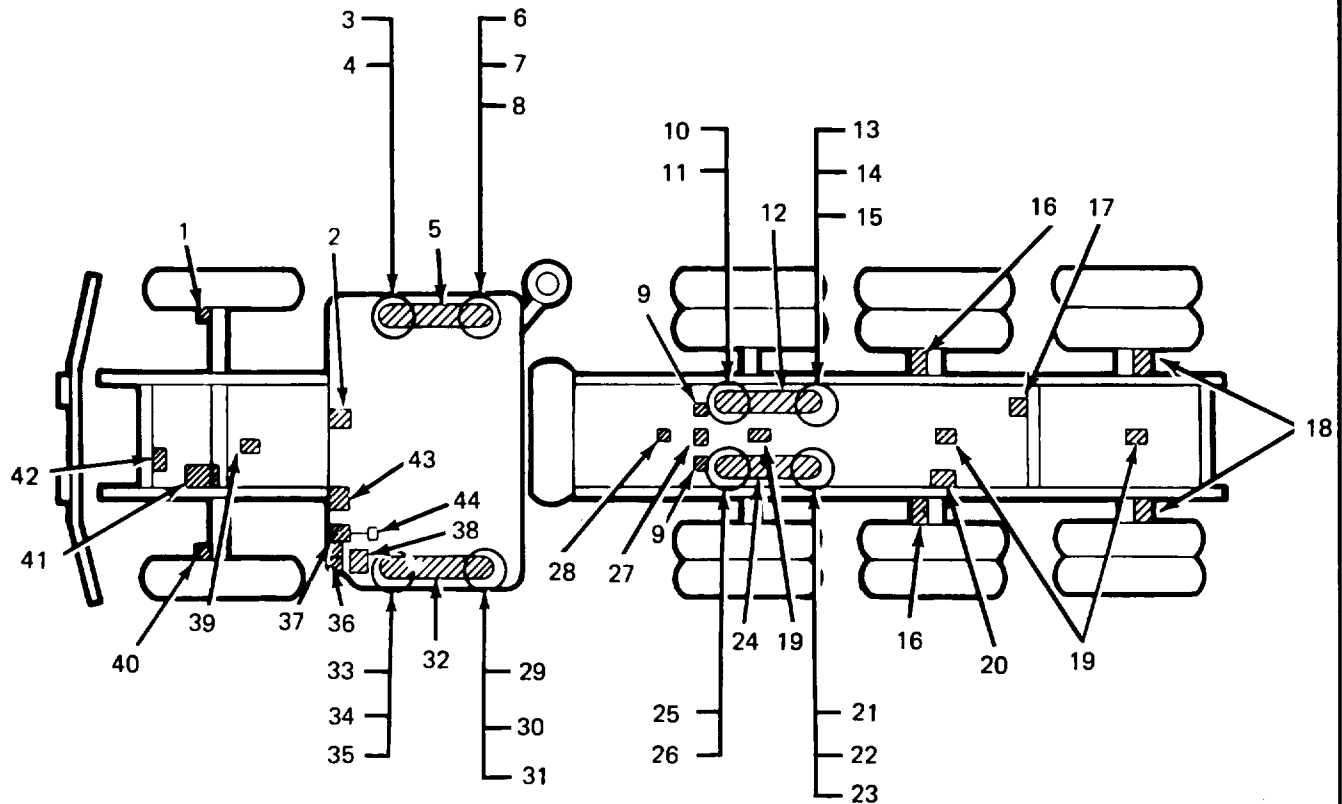
LEGEND:

1. WEDGE BRAKE AIR CHAMBER	19. RELAY VALVE
2. PARKING BRAKE VALVE	20. QUICK RELEASE AND DOUBLE CHECK VALVE
3. VALVE	21. AIR HOSE COUPLING
4. PLUG	22. 90° ELBOW
5. DRAIN COCK	23. DRAIN COCK
6. SECONDARY RESERVOIR	24. SUPPLY RESERVOIR
7. DOUBLE CHECK VALVE	25. CHECK VALVE
8. 90° CHECK VALVE	26. SAFETY VALVE
9. 90° ELBOW	27. ADAPTER
10. CHECK VALVE	28. DUAL BRAKE VALVE
11. ADAPTER (2)	29. SPRING BRAKE CONTROL VALVE
12. PRIMARY RESERVOIR	30. DOUBLE CHECK AND STOPLAMP VALVE
13. PLUG	31. AIR DRYER
14. 90° ELBOW	32. CHECK VALVE
15. DRAIN COCK	33. WEDGE BRAKE AIR CHAMBER
16. SPRING AND SERVICE BRAKE CHAMBER/SLACK ADJUSTER (2)	34. LIMITING VALVE
17. QUICK RELEASE VALVE	35. AIR COMPRESSOR/GOVERNOR
18. SPRING AND SERVICE BRAKE CHAMBER/SLACK ADJUSTER (2)	

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BRAKE SYSTEM

9-5i. AIR SYSTEM ARRANGEMENT (M919).



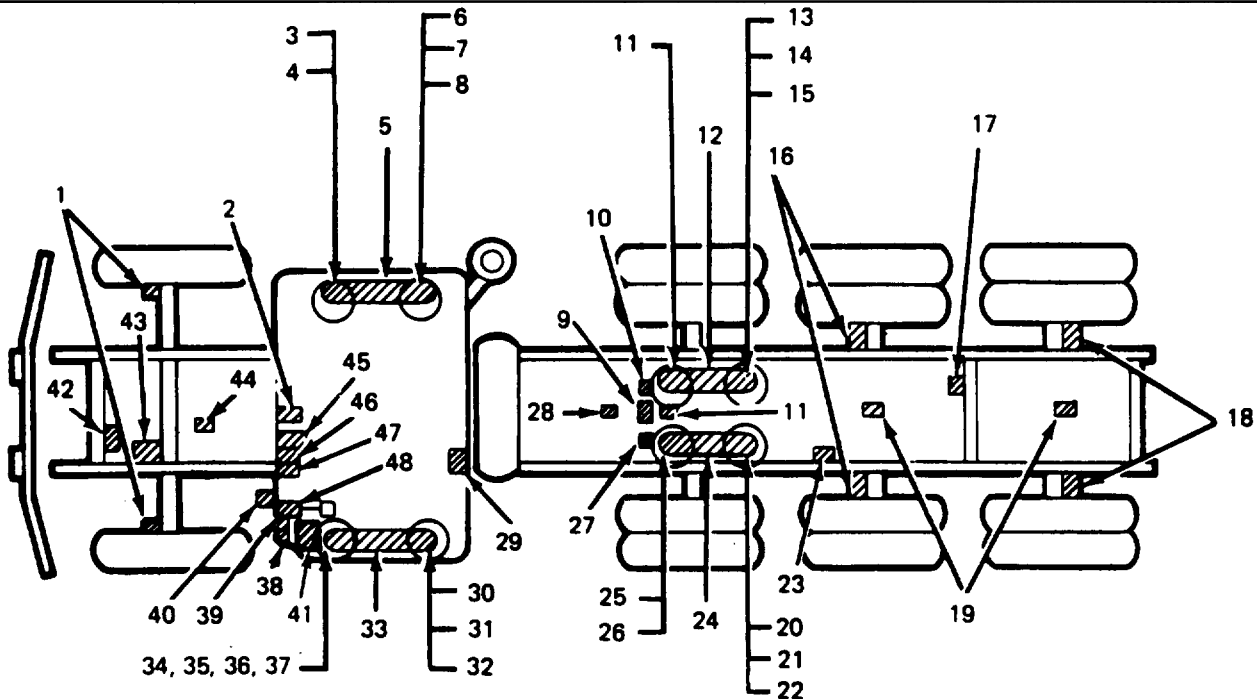
LEGEND:

1. WEDGE BRAKE AIR CHAMBER	21. DRAIN COCK
2. PARKING BRAKE VALVE	22. 90° ELBOW
3. PLUG (2)	23. PLUG
4. DRAIN COCK	24. PRIMARY RESERVOIR
5. SECONDARY RESERVOIR	25. 90° ELBOW (2)
6. 90° ELBOW	26. CHECK VALVE
7. 90° CHECK VALVE	27. QUICK RELEASE VALVE
8. DOUBLE CHECK VALVE	28. EXHAUST VALVE
9. AIR BRAKE CHAMBER/SLACK ADJUSTER (2)	29. 90° ELBOW
10. PLUG (2)	30. AIR HOSE COUPLING
11. VALVE	31. DRAIN COCK
12. PRIMARY RESERVOIR	32. SUPPLY RESERVOIR
13. DRAIN COCK	33. ADAPTER
14. 90° ELBOW	34. SAFETY VALVE
15. 45° ELBOW	35. CHECK VALVE
16. SPRING AND SERVICE BRAKE AIR CHAMBER/SLACK ADJUSTER (2)	36. SPRING BRAKE CONTROL VALVE
17. RELAY VALVE	37. DOUBLE CHECK AND STOPLAMP VALVE
18. SPRING AND SERVICE BRAKE AIR CHAMBER/SLACK ADJUSTER (2)	38. AIR DRYER
19. QUICK RELEASE VALVE (3)	39. CHECK VALVE
20. QUICK RELEASE AND DOUBLE CHECK VALVE	40. WEDGE BRAKE AIR CHAMBER
	41. AIR COMPRESSOR/GOVERNOR
	42. LIMITING VALVE
	43. PRESSURE PROTECTION VALVE
	44. DUAL BRAKE VALVE

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BRAKE SYSTEM

9-5j. AIR SYSTEM ARRANGEMENT (M920).



LEGEND:

1. WEDGE BRAKE AIR CHAMBER (2)	25. 90° ELBOW {2}
2. PARKING BRAKE VALVE	26. CHECK VALVE
3. PLUG (2)	27. AIR BRAKE CHAMBER/SLACK ADJUSTER
4. DRAIN COCK	28. EXHAUST VALVE
5. SECONDARY RESERVOIR	29. TRACTOR PROTECTION VALVE
6. 90° CHECK VALVE	30. DRAIN COCK
7. DOUBLE CHECK VALVE	31. 90° ELBOW
8. 90° ELBOW	32. AIR HOSE COUPLING
9. QUICK RELEASE VALVE	33. SUPPLY RESERVOIR
10. AIR BRAKE CHAMBER/SLACK ADJUSTER	34. DOUBLE CHECK VALVE
11. PLUG (3)	35. PLUG
12. PRIMARY RESERVOIR	36. SAFETY VALVE
13. 45° ELBOW	37. CHECK VALVE
14. 90° ELBOW	38. SPRING BRAKE CONTROL VALVE
15. DRAIN COCK	39. DOUBLE CHECK VALVE
16. SPRING AND SERVICE BRAKE CHAMBER/SLACK ADJUSTER (2)	40. DOUBLE CHECK AND STOPLAMP VALVE
17. RELAY VALVE	41. AIR DRYER
18. SPRING AND SERVICE BRAKE CHAMBER/SLACK ADJUSTER (2)	42. LIMITING VALVE
19. QUICK RELEASE VALVE (3)	43. AIR COMPRESSOR/GOVERNOR
20. 90° ELBOW	44. CHECK VALVE
21. PLUG	45. TRAILER SUPPLY VALVE
22. DRAIN COCK	46. PRESSURE PROTECTION VALVE
23. QUICK RELEASE AND DOUBLE CHECK VALVE	47. HAND CONTROL TRAILER BRAKE VALVE
24. PRIMARY RESERVOIR	48. DUAL BRAKE VALVE

Section III MAINTENANCE PROCEDURES

9-8. INTRODUCTION.

This section provides you with Organizational Level maintenance procedures for the compressed air and brake systems. To find a specific maintenance procedure, see one of the following task summaries.

- a. Compressed Air System (para 9-7).
- b. Brake System (para 9-8).
- c. Auxiliary Air-Powered Component Systems (para 9-9).

9-7. COMPRESSED AIR SYSTEM MAINTENANCE TASK SUMMARY.**INITIAL SETUP****EQUIPMENT CONDITION****APPLICABLE CONFIGURATIONS PARAGRAPH**

All.

9-13A.

CONDITION DESCRIPTION

Air Reservoirs Drained.

MATERIALS/PARTS (P/N)

Gasket (5330-00-755-71 91).
 Soap Solution.
 Silicone Sealant (Refer to Appendix C).
 Controllable Shop Air Supply.
 Non Flammable Cleaning Solvent SD-2 (Refer to Appendix C).
 Tape, Antiseizing Item 14, Appendix C.
 Check Valve, 275756 (06853).
 Air Pressure Gage.
 Marking Pen.
 Masking Tape.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.
 Work in Well Ventilated Area Away From
 Sparks and Flames.

GENERAL SAFETY INSTRUCTIONS

Engine Off.
 Transmission in Neutral.
 Park Brake Set.

REFERENCES (TM)

TM 9-2320-273-10.
 TM 9-2320-273-20P.
 LO 9-2320-273-12.

REFERENCES (TROUBLESHOOTING)

Table 9-1.

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
1.	Air Dryer Dehydrate Cartridge Replacement:	9-10 9- 10A	
2.	Air Dryer Replacement:	9-11	
	a. Removal.	9-11A	
	b. Installation.	9-11B	
	c. Checking for Leaks.	9-11C	
2.1	Air Dryer Repair.	9- 11.1	

9-7. COMPRESSED AIR SYSTEM MAINTENANCE TASK SUMMARY (Continued).			
LIST OF TASKS			
TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
3.	Supply Reservoir Automatic Drain Valve and Air Hose Coupling:	9-12	9-1
	a. Removal.	9-12A	
	b. Installation.	9-12B	
	c. Checking for Leaks.	9-12C	
4.	Secondary Reservoir Manual Drain Valve Maintenance:	9-13	9-1
	a. Bleeding Reservoirs.	9-13A	
	b. Removal.	9-13B	
	c. Installation.	9-13C	
	d. Checking for Leaks.	9-13D	
5.	Safety Release Valve Maintenance:	9-14	9-1
	a. Removal.	9- 14A	
	b. Testing.	9-14B	
	c. Installation.	9-14C	
	d. Operational Check.	9-14D	
6.	Supply Reservoir Check Valve Maintenance:	9-15	9-1
	a. Removal.	9-15A	
	b. Testing.	9-15B	
	c. Installation.	9-15C	
	d. Operational Check.	9-15D	
7.	Reservoirs and Air Lines Maintenance:	9-16	9-1
	a. Removal.	9-16A	
	b. Installation.	9-16B	
	c. Checking for Leaks.	9-16C	

9-8. BRAKE SYSTEM MAINTENANCE TASK SUMMARY.			
INITIAL SETUP		EQUIPMENT CONDITION	CONDITION DESCRIPTION
APPLICABLE CONFIGURATIONS		PARAGRAPH	
All.		9-13A.	Air Reservoirs Drained.
		5-37A.	Batteries Disconnected.
<u>TEST EQUIPMENT</u>		9-27A and 9-28A.	Double Check Valve Removed.
None,		10-13A.	Hub and Drum Assembly Removed (M915).
<u>SPECIAL TOOLS</u>		10-14A.	Hub and Drum Assembly Removed (M916 Thru M920).
Snap Ring Pliers.		(See TM 9-2320-273-10).	Wheel Raised OFF Ground;
Brake Spring Pliers.			Park Brake Should Be Released and Wheels Blocked.
<u>MATERIALS/PARTS (P/N)</u>			
Liquid Teflon (Refer to Appendix C).			
Masking Tape.			
Marking Pen.			
Soap and Water Solution.			
Seal, 1205-E-1409 (78500).			
GAA (Refer to Appendix C).			
Cotter Pin, K-227 (78500).			
Cotter Pin, 210490 (06853).			
Cotter Pin, 210492 (06853).			
<u>PERSONNEL REQUIRED</u>		<u>SPECIAL ENVIRONMENTAL CONDITIONS</u>	
Two (MOS-63B20).		Vehicle Parked on Level Ground.	
<u>REFERENCES (TM)</u>		<u>GENERAL SAFETY INSTRUCTIONS</u>	
TM 9-2320-273-10.		Engine Off.	
LO 9-2320-273-12.		Transmission in Neutral.	
TM 9-2320-273-20P.		Park Brake Set.	
		Wheels Blocked.	
<u>REFERENCES (TROUBLESHOOTING)</u>			
Table 9-1.			
LIST OF TASKS			
TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
1.	Trailer Supply Brake Valve:	9-17	9-1
	a. Removal.	9-17A	
	b. Inspection of Lines and Fittings.	9-17B	
	c. Installation.	9-17C	
	d. Operational Check.	9-17D	
2.	Trailer Hand Brake Valve:	9-18	9-1
	a. Removal.	9-18A	

9-8. BRAKE SYSTEM MAINTENANCE TASK SUMMARY (Continued).			
LIST OF TASKS			
TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
2.	Trailer Hand Brake Valve (Continued):		
	b. Inspection of Air Lines and Fittings.	9-18B	
	c. Installation.	9-18C	
	d. Operational Check.	9-18D	
3.	Parking Brake Valve:	9-19	9-1
	a. Removal.	9-19A	
	b. Inspection of Lines and Fittings.	9-19B	
	c. Installation.	9-19C	
	d. Operational Check.	9-19D	
4.	Air Pressure Gages Maintenance:	9-20	9-1
	a. Removal.	9-20A	
	b. Installation.	9-20B	
	c. Operational Check.	9-20C	
5.	Brake Pedal and Valve Maintenance:	9-21	9-1
	a. Pedal Removal.	9-21A	
	b. Valve Removal.	9-21B	
	c. Valve Installation,	9-21C	
	d. Pedal Installation.	9-21D	
	e. Operational Check.	9-21E	
6.	Service Brakes Quick Release Valve:	9-22	9-1
	a. Removal.	9-22A	
	b. Installation	9-22B	
	c. Operational Check.	9-22C	
7.	Quick-Release/Double-Check Valve Maintenance:	9-23	9-1
	a. Removal.	9-23A	
	b. Installation.	9-23B	
	c. Operational Check.	9-23C	

9-8. BRAKE SYSTEM MAINTENANCE TASK SUMMARY (Continued).			
LIST OF TASKS			
TASK No.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE
8.	Relay Valve Maintenance :	9-24	9-1
	a. Removal.	9-24A	
	b. Installation.	9-24B	
	c. Checking for Leaks.	9-24C	
9.	Limiting Valve Maintenance :	9-25	9-1
	a. Removal,	9-25A	
	b. Installation.	9-25B	
	c. Operational Check.	9-25C	
10.	Tractor Protection Valve Maintenance:	9-26	9-1
	a. Removal.	9-26A	
	b. Installation.	9-26B	
	c. Operational Check.	9-26C	
11.	Double Check Valve Maintenance :	9-27	9-1
	a. Removal.	9-27A	
	b. Installation,	9-27B	
	c. Checking for Leaks.	9-27C	
12.	Double Check and Stoplamp Valve Maintenance (M918 and M919):	9-28	9-1
	a. Removal.	9-28A	
	b. Installation.	9-28B	
	c. Operational Check.	9-28C	
13.	Double Check and Stoplamp Valve Maintenance (M915, M916, M917, M920) :	9-29	9-1
	a. Removal.	9-29A	
	b. Installation.	9-29B	
	c. Operational Check.	9-29C	

9-8. BRAKE SYSTEM MAINTENANCE TASK SUMMARY (Continued).			
LIST OF TASKS			
TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
14.	External Air Couplings Maintenance:	9-30	9-1
	a. Removal.	9-30A	
	b. Installation.	9-30B	
15.	Front Brake Shoes Maintenance (M915):	9-31	9-1
	a. Removal.	9-31A	
	b. Inspection.	9-31 B	
	c. Installation.	9-31 c	
	d. Adjustment.	9-31 D	
16.	Front Brake Shoes Maintenance (M916 Thru M920):	9-32	9-1
	a. Removal.	9-32A	
	b. Inspection.	9-32B	
	c. Installation.	9-32C	
	d. Adjustment.	9-32D	
17.	Rear Brake Shoes Maintenance (M915):	9-33	9-1
	a. Removal.	9-33A	
	b. Inspection.	9-33B	
	c. Installation.	9-33C	
18.	Rear Brake Shoes Maintenance (M916 thru M920).	9-34	9-1
	a. Removal.	9-34A	
	b. Inspection.	9-34B	
	c. Installation.	9-34C	

9-8. BRAKE SYSTEM MAINTENANCE TASK SUMMARY (Continued).			
LIST OF TASKS			
TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
19.	Pusher Axle Brake Shoes Maintenance:	9-35	9-1
	a. Removal.	9-35A	
	b. Inspection.	9-35B	
	c. Installation.	9-35C	
	d. Adjustment.	9-35D	
20.	Front Brake Air Chamber Maintenance:	9-36	9-1
	a. Removal.	9-36A	
	b. Disassembly.	9-36B	
	c. Reassembly.	9-36C	
	d. Installation.	9-36D	
	e. Operational Check.	9-36E	
21.	Rear Brake Air Chamber Maintenance:	9-37	9-1
	a. Caging Power Spring.	9-37A	
	b. Removal.	9-37B	
	c. Installation.	9-37C	
	d. Uncaging Power Spring.	9-37D	
	e. Operational Check.	9-37E	
22.	Pusher Axle Brake Air Chamber Maintenance:	9-38	9-1
	a. Removal.	9-38A	
	b. Disassembly.	9-38B	
	c. Assembly.	9-38C	
	d. Installation.	9-38D	
23.	Slack Adjusters Maintenance:	9-39	9-1
	a. Adjustment – Slack Adjuster (Forward Rear Tandem).	9-39A	
	b. Adjustment – Push Rod (Rear Rear Tandem).	9-39B	

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9-9. AUXILIARY AIR-POWERED COMPONENT SYSTEMS MAINTENANCE TASK SUMMARY.**INITIAL SETUP****APPLICABLE CONFIGURATIONS**

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (Refer to Appendix C).
 Masking Tape.
 Marking Pen
 Soap and Water Solution.
 Gasket (4730-01-055-4013).

PERSONNEL REQUIRED

One or Two (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
 TM 9-2320-273-20P.

REFERENCES (TROUBLESHOOTING)

Table 9-1.

**EQUIPMENT CONDITION
PARAGRAPH**

5-37A.
 9-13A.
 5-83A.

CONDITION DESCRIPTION

Batteries Disconnected.
 Air Reservoirs Drained.
 Differential Lock-up Switch
 Removed.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine Off.
 Transmission in Neutral.
 Park Brake Set.

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
1.	Windshield Washers Maintenance :	9-40	9-1
	a. Removal.	9-40A	
	b. Installation.	9-40B	
	c. Operational Check.	9-40C	
2.	Windshield Washer Control Maintenance:	9-41	9-1
	a. Removal.	9-41 A	
	b. Inspection of Air Lines	9-41 B	

**9-9. AUXILIARY AIR-POWERED COMPONENT SYSTEMS MAINTENANCE TASK SUMMARY
(Continued).**
LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
2.	Windshield Washer Control Maintenance (Continued):		
	c. Installation.	9-41 C	
	d. Operational Check.	9-41 D	
3.	Windshield Wiper Motor Maintenance:	9-42	9-1
	a. Removal.	9-42A	
	b. Installation.	9-42B	
	c. Operational Check.	9-42C	
4.	Windshield Wiper Control Maintenance:	9-43	9-1
	a. Removal.	9-43A	
	b. Inspection of Air Lines.	9-43B	
	c. Installation.	9-43C	
	d. Operational Check.	9-43D	
5.	Differential Lockup Control Valve Maintenance:	9-44	9-1
	a. Removal.	9-44A	
	b. Installation.	9-44B	
	c. Checking for Leaks.	9-44C	
6.	Air Horn and Control Valve Maintenance:	9-45	9-1
	a. Removal.	9-45A	
	b. Installation.	9-45B	
	c. Operational Check.	9-45C	

BRAKE SYSTEM.

9-10. AIR DRYER DEHYDRATE CARTRIDGE REPLACEMENT.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

- a. Removal. (0.4)
 - b. Cleaning and Inspection. (0.3)
 - c. Installation. (0.6)
- 1.3 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Grease, Silicone, Lubrication Item, Appendix B.
Dehydrate Cartridge Assembly (06853) 286968.
Tape, Antiseizing Item 14, Appendix C.

**EQUIPMENT CONDITION
PARAGRAPH**

TM 9-2320-273-10.

CONDITION DESCRIPTION

Air System Draincocks
Opened.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Work Area Clean and Away from Blowing Dirt and Dust.

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Vehicle on Level Ground.
Wheels Blocked.

TROUBLESHOOTING REFERENCES

None.

BRAKE SYSTEM.**9-10. AIR DRYER DEHYDRATE CARTRIDGE REPLACEMENT (Continued).**

LOCATION/ITEM	ACTION	REMARKS
NOTE Air dryer does not have to be removed from vehicle for this operation.		
A. REMOVAL.		
1. Electrical terminal (14).	a. Remove insulating boot (8), nut (13) and electrical wire (7). b. Disconnect hose assembly (6) from connector (12).	
2. End cover assembly (5).	Loosen three screws (10) and turn three retaining clips (11) inward so they do not touch air dryer housing (1).	
NOTE Make alinement marks on the end cover assembly and air dryer housing. This will help you aline them during reassembly.		
3. End cover assembly (5).	While pressing up on end cover assembly (5) pry out retaining ring (9) using flat tip screwdriver.	
4. Air dryer housing (1).	Remove end cover assembly (5). Discard O-ring (4).	
5.	Using 3/4 inch socket wrench unscrew and remove dehydrate cartridge (3).	Discard cartridge.
B. CLEANING AND INSPECTION.		
CAUTION Do not put end cover assembly into cleaning solvent. This could damage the heating element or thermostat.		
NOTE Make sure all cleaning solvent residue has been removed before reassembly.		

BRAKE SYSTEM.

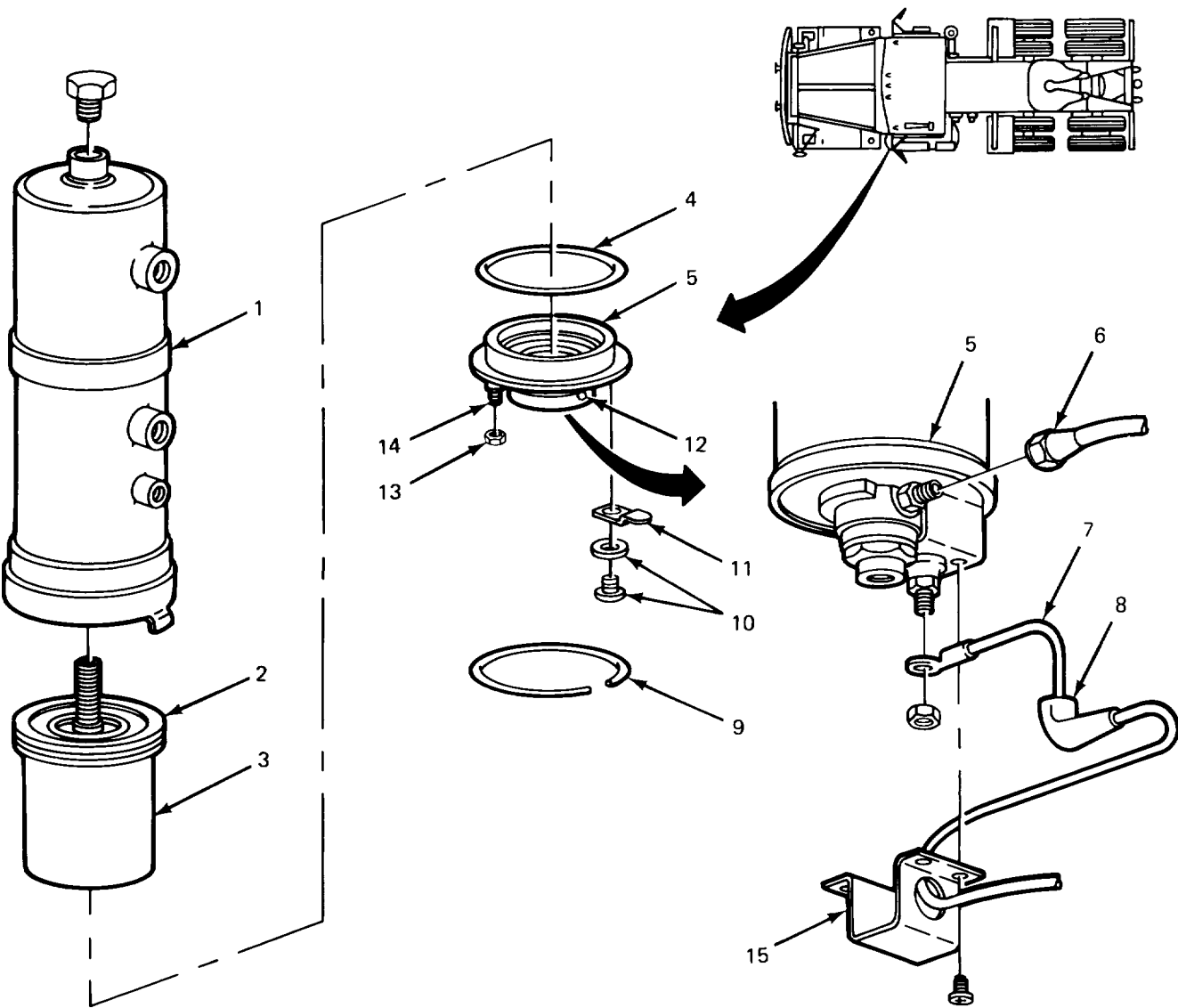
9-10. AIR DRYER DEHYDRATE CARTRIDGE REPLACEMENT (Continued).

LOCATION/ITEM	ACTION	REMARKS
C. INSTALLATION.		
6. Air dryer housing (1).	a. Lubricate O-ring (2) with silicone grease. b. Using 3/4 inch socket wrench screw in and tighten new dehydrate cartridge (3).	Torque to 32 lb-ft.
7.	Lubricate O-ring (4) with silicone grease and install in groove.	
NOTE Assistant may be required for this step.		
8.	a. Join alinement marks and press end cover assembly (5) up as far as it will go. b. Secure with retaining ring (9).	
9. Three retaining clips (11).	Turn outward and over the edge of air dryer housing (1) and tighten three screws (10).	
10. Electrical terminal (14).	Install electrical wire (7), nut (13) and insulating boot (8).	
11. End cover assembly (5).	Apply antiseizing tape and connect hose assembly (6) to connector (12).	
NOTE Follow-on maintenance action required: Pressurize air system and check for leaks and proper operation.		

BRAKE SYSTEM,

9-10. AIR DRYER DEHYDRATE CARTRIDGE REPLACEMENT (Continued).

LOCATION/ITEM	ACTION	REMARKS



VIEW LOOKING UP

LEGEND:

1. AIR DRYER HOUSING	9. RETAINING RING
2. O-RING (PART OF DEHYDRATE CARTRIDGE)	10. SCREW AND WASHER (3)
3. DEHYDRATE CARTRIDGE	11. RETAINING CLIP (3)
4. O-RING	12. CONNECTOR
5. END COVER ASSEMBLY	13. NUT
6. HOSE ASSEMBLY	14. ELECTRICAL TERMINAL
7. ELECTRICAL WIRE (AIR DRYER HEATER)	15. TERMINAL PROTECTOR
8. INSULATING BOOT	

TA 237229

BRAKE SYSTEM.**9-11. AIR DRYER REPLACEMENT.****THIS TASK COVERS {APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.}**

- a. Removal. (1.0)
 - b. Cleaning and Inspection. (0.2)
 - c. Installation. (1.0)
 - d. Operational Check. (0.3)
- 2.5 Minutes Total.

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

**EQUIPMENT CONDITION
PARAGRAPH**

TM 9-2320.273-10.

CONDITION DESCRIPTION

Air System Draincocks Opened.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Tape, Antiseizing Item 14, Appendix C.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Work Area Clean and Away from Blowing Dirt and Dust.

REFERENCES (TM)

TM 9-2320-273-10.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Vehicle on Level Ground.
Wheels Blocked.

TROUBLESHOOTING REFERENCES

None.

BRAKE SYSTEM.**9-11. AIR DRYER REPLACEMENT (Continued).**

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Air dryer assembly (1).	Unscrew and remove hoses (3) and (11) and tubing (2).	
2. Electrical terminal (17).	Remove terminal protector (14), boot (13), nut (15) and wire (12).	
NOTE For the M916 thru M920 only, disconnect tube (23) from top of air dryer assembly (1).		
3. Mounting brackets (21).	Remove four hexagon nuts (8), four lock washers (9), four flat washers (10) and (19), four capscrews (20) and dryer assembly (1).	
4. Frame bracket (7).	Remove four screws (6), four nuts (4), four washers (5) and two air dryer mounting brackets (21).	
5. Purge tank reservoir (25).	Unscrew and remove tubing (23).	
6. Four nuts (26) and four lock washers (27).	Unscrew and remove U-bolts (24) and purge tank reservoir (25).	
B. CLEANING AND INSPECTION.		
7.	Clean and inspect all parts.	
C. INSTALLATION.		
8. Air dryer brackets (21), frame bracket (7).	Secure with four screws (6), four washers (5) and four nuts (4).	
NOTE There should be 1/2 inch minimum clearance between fuel tank and mounting brackets (21), This may require moving the fuel tank rearward.		

BRAKE SYSTEM.**9-11. AIR DRYER REPLACEMENT (Continued).**

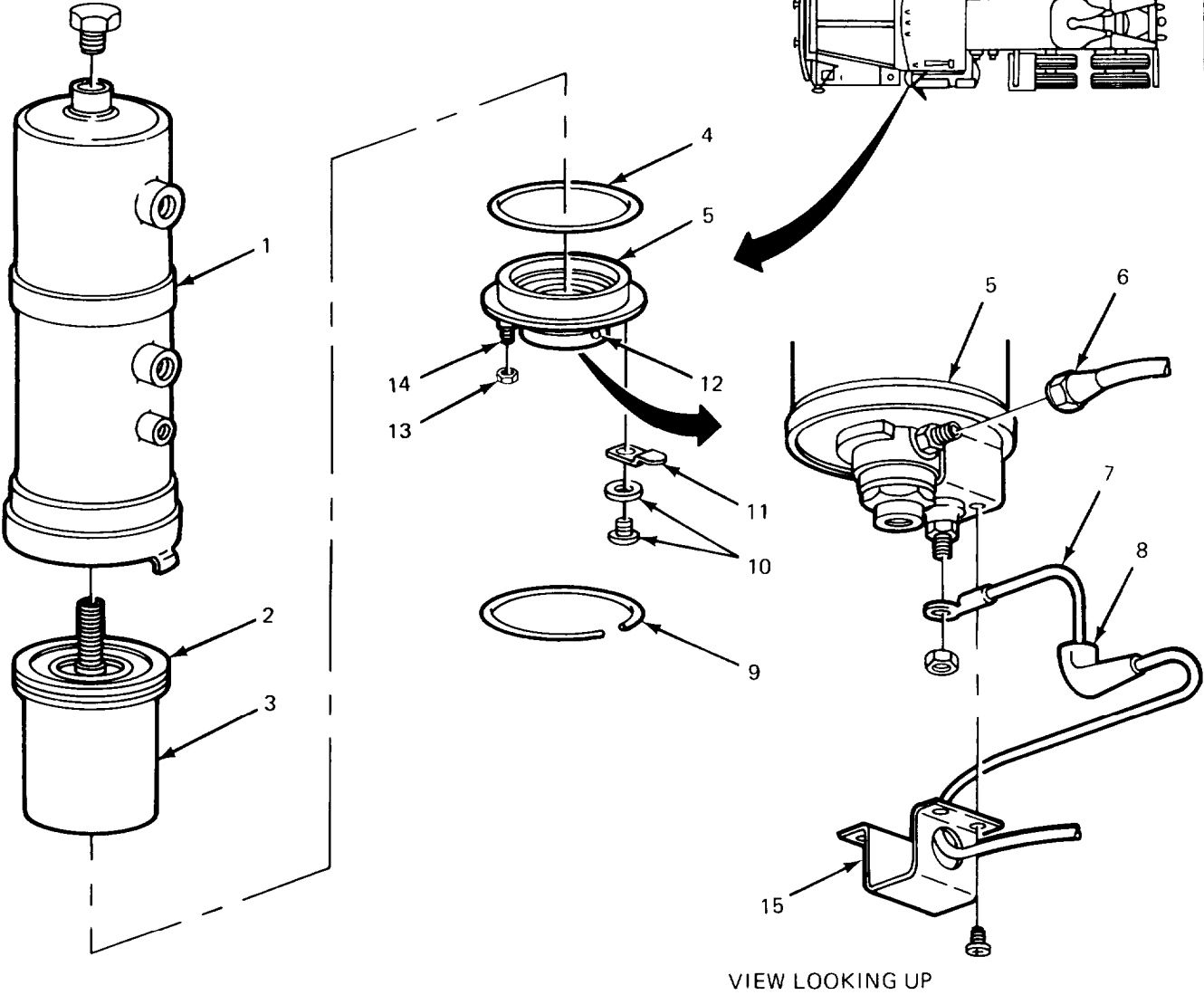
LOCATION/ITEM	ACTION	REMARKS
C. INSTALLATION (Continued).		
9. Air dryer assembly (1).	Secure to mounting brackets (21) with four capscrews (20), four flat washers (19) and (10), four lock washers (9) and four hexagon nuts (8).	
10. Air dryer head assembly (22), electrical terminal (17).	Install wire (12), secure with nut (15). Install boot (13) and terminal protector (14).	
11. Air dryer assembly (1).	Apply antiseizing tape, install tubing (2), hoses (3) and (11).	
NOTE For the M916 thru M920 only, apply anti-seizing tape and install tube (23) on air dryer assembly (1).		
12. Cab mounting bracket (28), purge tank reservoir (25).	Secure with U-bolts (24), four lock washers (27), and four nuts (26).	
13. Tubing (23).	Apply antiseizing tape and connect to purge tank reservoir (25).	
D. OPERATIONAL CHECK.		
WARNING Make sure wheels are blocked and transmission is in neutral. Failure to do this could cause injury or death to persons working in and around vehicle.		
14. Air system.	Close draincocks.	
15. Engine.	a. Start up (see TM 9-2320-273-10). b. Charge air system to 100 psi.	
16. Air dryer assembly (1).	Check for air leakage at exhaust cover (18), or any air line connections.	

BRAKE SYSTEM.**1-11. AIR DRYER REPLACEMENT (Continued).**

LOCATION/ITEM	ACTION	REMARKS
D. OPERATIONAL CHECK (Continued).		
17.	Allow system to reach operating pressure, a sharp burst of air should escape from exhaust cover (18).	
NOTE Step number 18 must be done in temperatures below 50° F (9.9°C).		
18. Air dryer assembly (1).	Run engine for a minimum of five minutes, end cover (22) should be warm if not replace the heating element.	
NOTE No follow-on maintenance is required.		

BRAKE SYSTEM.

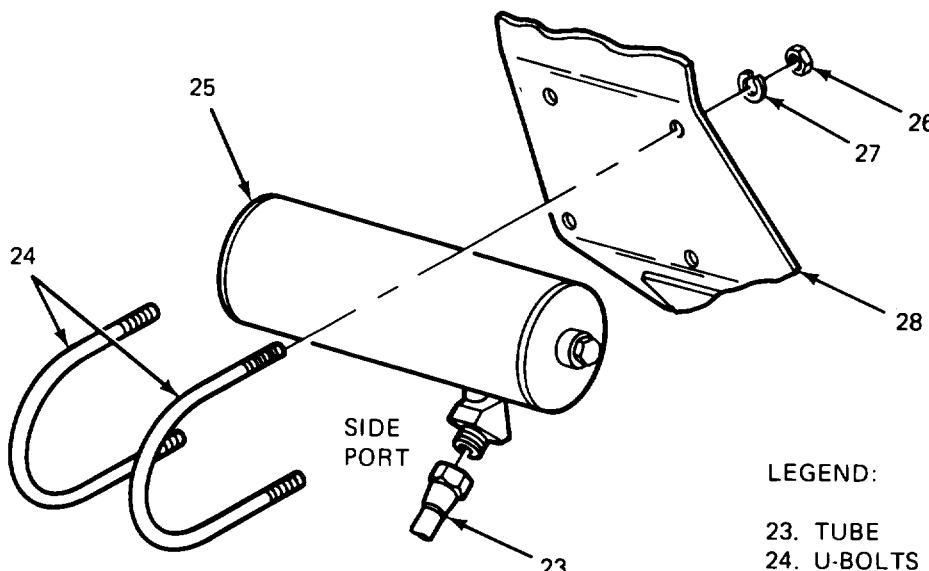
9-11. AIR DRYER REPLACEMENT (Continued).

LOCATION/ITEM	ACTION	REMARKS
		
LEGEND:		
1. AIR DRYER HOUSING		9. RETAINING RING
2. O-RING (PART OF DEHYDRATE CARTRIDGE)		10. SCREW AND WASHER (3)
3. DEHYDRATE CARTRIDGE		11. RETAINING CLIP (3)
4. O-RING		12. CONNECTOR
5. END COVER ASSEMBLY		13. NUT
6. HOSE ASSEMBLY		14. ELECTRICAL TERMINAL
7. ELECTRICAL WIRE (AIR DRYER HEATER)		15. TERMINAL PROTECTOR
8. INSULATING BOOT		

TA 237230

BRAKE SYSTEM.

9-11. AIR DRYER REPLACEMENT (Continued).

LOCATION/ITEM	ACTION	REMARKS
 The diagram illustrates the components for air dryer replacement. It includes a cylindrical purge tank reservoir (25) with a side port (23) at the bottom. Two U-bolts (24) are shown attached to the side of the reservoir. A cab mounting bracket (28) is shown with four mounting holes, two of which are secured with lock washers (27) and nuts (26). A legend box is located to the right of the diagram. LEGEND: 23. TUBE 24. U-BOLTS 25. PURGE TANK RESERVOIR 26. NUTS 27. LOCK WASHERS 28. CAB MOUNTING BRACKET		
TA 237231		

BRAKE SYSTEM.**9-11.1. AIR DRYER REPAIR.****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

- a. Disassembly. (1.0)
 - b. Cleaning, (0.3)
 - c. Inspection and Repair. (0.4)
 - d. Assembly. (1.0)
- 2.7 Minutes Total.

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

EQUIPMENT CONDITION**PARAGRAPH**

9-11.

CONDITION DESCRIPTION

Air Dryer Removed.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Grease, Silicone, Lubrication Item, Appendix C.
 Tape, Antiseizing Item 14, Appendix C.
 Kit, Check Valve Repair (06853) 287298.
 Kit, Seal (06853) 287053.
 Dehydrate Cartridge Assembly (06853) 286968.

PERSONNEL REQUIRED

One (MOS-63820).

SPECIAL ENVIRONMENTAL CONDITIONS

Work Area Clean and Away from Blowing Dirt
 and Dust.

REFERENCES (TM)

TM 9-2320-273-20P.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
 Transmission in Neutral.
 Vehicle on Level Ground.
 Wheels Blocked.

TROUBLESHOOTING REFERENCES

None.

BRAKE SYSTEM.**9-11.1. AIR DRYER REPAIR (Continued).**

LOCATION/ITEM	ACTION	REMARKS
A. DISASSEMBLY.		
NOTE Add location marks between end cover housing (35) and air dryer housing (2) prior to disassembly. This will help you align them correctly during reassembly.		
1. End cover housing (35).	Remove three screws (38) and three retaining clips (37).	
2. End cover assembly (17).	While pressing inward remove retaining ring (39) with a flat tip screwdriver.	
3. End cover housing (35), O-ring (16).	Unscrew and remove, discard O-ring.	
4. End cover housing (35), connector (36).	Unscrew and remove.	
5. Exhaust cover (28).	Remove screw (30), recessed washer (31) and exhaust diaphragm (32).	
6. Purge valve assembly (18).	Remove 3 screws (29) and exhaust cover (28).	
7. Air dryer end cover housing (35).	Remove purge valve assembly (18), by unscrewing purge valve housing (24).	Discard O-rings (22 and (23).
8. Purge valve housing (24).	Remove screw (27), purge valve piston (20), spring (21), purge valve (25), lock washer (26) and O-ring (19). Discard O-ring, spring and purge valve.	
9. Dehydrate cartridge (15).	Unscrew and remove from air dryer housing (2) using a 3/4-inch socket wrench.	Discard dehydrate cartridge.
10. Safety valve (13), and connector (11).	Unscrew and remove from air dryer housing (2).	
11. Air dryer housing (2).	Unscrew and remove check valve (3). Remove O-ring (9).	Discard O-ring (9).

BRAKE SYSTEM.**9-11.1. AIR DRYER REPAIR (Continued).**

LOCATION/ITEM	ACTION	REMARKS
A. DISASSEMBLY (Continued).		
12.	Unscrew and remove valve body (10) {rem end cap (4). Remove ball, (5), spring (6), spring guide (7) and sealing washer (8).	Discard ball, spring and sealing washer.
13.	Remove two pipe plugs (1) and nipple (12).	
NOTE		
Mark the positions of the air dryer assembly mounting brackets (40) on the air dryer housing (2). The position of these mounting brackets is important when installing the air dryer to the vehicle.		
14. Two nuts (41).	Loosen and remove.	
15. Two lock washers (42).	Remove.	
16. Two screws (43).	Remove.	
17. Two mounting brackets (40).	Remove from air dryer housing (2).	
NOTE		
For M916 thru M920 only, remove elbow (45) and reducer (46) from air dryer housing (2).		
B. CLEANING.		
CAUTION		
Do not immerse (soak) end cover housing in cleaning solution. The end cover housing contains a thermostat and heating element which could be damaged.		
18.	Clean all parts.	

BRAKE SYSTEM.**9-11.1. AIR DRYER REPAIR (Continued).**

LOCATION/ITEM	ACTION	REMARKS
C. INSPECTION AND REPAIR.		
NOTE All repair consists of replacing defective parts discovered during inspection and replacing discarded parts with new items provided.		
19.	Inspect all parts for damage and serviceability.	
20. End cover assembly (17).	a. Connect a 12VDC source to end cover housing (35). Connect a positive lead to electrical terminal (34), and a negative lead to the outer shell of the head assembly. b. Expose end cover housing (35) to temperatures below 50°F (9.9° C). If the heating element is working properly the outer shell should become warmer within a few minutes. If the outer shell does not become warmer, the end cover housing must be replaced.	
D. ASSEMBLY.		
NOTE When installing two mounting brackets (40), align them with the marks on the air dryer housing (2).		
21. Air dryer housing (2), two mounting brackets (40).	a. Install two screws (43). b. Install and tighten two lockwashers (42) and two nuts (41).	
22. Air dryer housing (2).	Apply antiseizing tape and install nipple (12) and two pipe plugs (1).	

BRAKE SYSTEM.**9-11.1. AIR DRYER REPAIR (Continued).**

LOCATION/ITEM	ACTION	REMARKS
D. ASSEMBLY (Continued).		
NOTE For the M916 thru M920 only, apply anti-seizing tape and install reducer (46) and elbow (45) in air dryer housing (2).		
23. Valve body (10).	Install new sealing washer (8), spring guide (7) with rounded bottom first in valve body. Install new spring (6) in groove of spring guide (7) and place new ball (5) on spring.	
24.	a. Lubricate end cap (4) with silicone grease. Screw in and torque to 200 - 225 lb-in (280 - 315 N•m). b. Lubricate new O-ring (9) with silicone grease, and install.	
25. Air dryer housing (2).	Screw in and tighten check valve (3).	
26. Valve body (10).	Apply antiseizing tape. Screw in and tighten connector (11).	
CAUTION Make sure exhaust hole in safety valve points downward when in place.		
27. Air dryer housing (2).	a. Apply antiseizing tape to safety valve (13). b. Screw in and tighten.	
28.	a. Lubricate O-ring (14) on dehydrate cartridge (15) with silicone grease. b. Screw in dehydrate cartridge (15), tighten using a 3/4-in. socket wrench. Torque to 32 lb-ft (43.3 N•m).	

BRAKE SYSTEM.**9-11.1. AIR DRYER REPAIR (Continued).**

LOCATION/ITEM	ACTION	REMARKS
D. ASSEMBLY (Continued).		
29. End cover housing (35), connector (36).	Apply antiseizing tape, screw in and tighten.	
30. New O-ring (19).	Lubricate with silicone grease and install on purge valve piston (20).	
31. Purge valve housing (24).	a. Lubricate purge valve piston (20) with silicone grease. b. Install purge valve piston (20), new spring (21), new purge valve (25) (rubber end goes in first), new lock-washer (26) and screw (27). Torque screw to 50 lb-in (67,8 N•m).	
32. New O-rings (22) and (23).	Lubricate with silicone grease and install on purge valve housing (24).	
33. Purge valve assembly (18).	Lubricate with silicone grease, screw into end cover housing (35).	
34. Exhaust diaphragm (32), diaphragm washer (31) and screw (30).	Install into new exhaust cover (28).	The rounded end of diaphragm washer should be facing the exhaust diaphragm.
35. Exhaust cover (28).	Install on purge valve assembly (18) using three screws (29).	
36. New O-ring (16).	Lubricate with silicone grease and install into groove on air dryer housing (2).	
NOTE		
Assistant may be required for this step.		
37. End cover assembly (17).	Lubricate with silicone grease, press into air dryer housing (2) as far as it will go. Install retaining ring (39) and secure with three retaining clips (37) and three screws (38).	

BRAKE SYSTEM.**9-11.1. AIR DRYER REPAIR (Continued).****LOCATION/ITEM****ACTION****REMARKS****D. ASSEMBLY (Continued).**

38. Boot (33).

Place in plastic bag and tape
to air dryer assembly for use
during installation.

NOTE

Follow-on maintenance action required:
Install air dryer (para 9-11c).

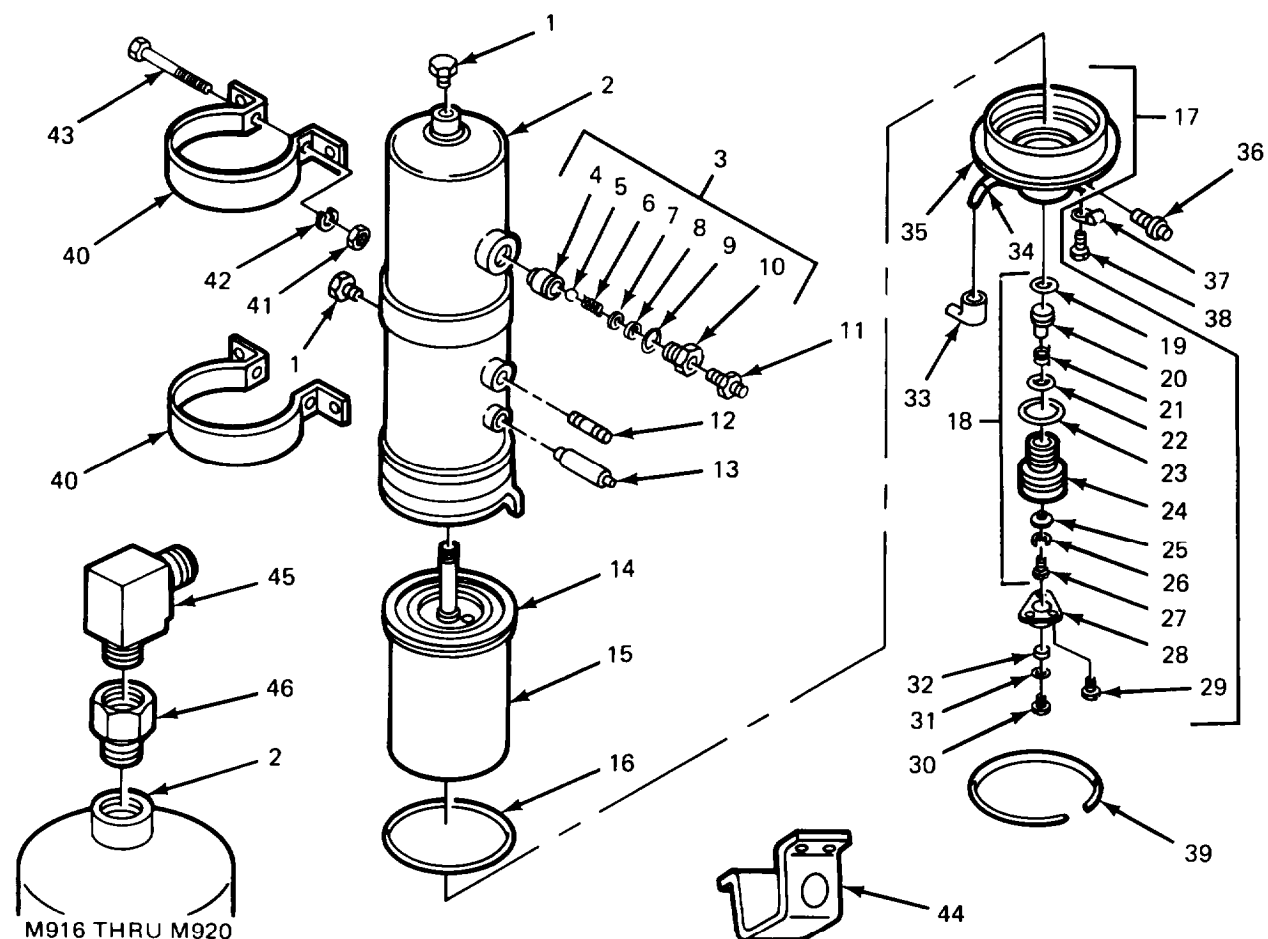
BRAKE SYSTEM.

9-11.1. AIR DRYER REPAIR (Continued).

LOCATION/ITEM

ACTION

REMARKS



LEGEND:

1. PIPE PLUG (2)
2. AIR DRYER HOUSING
3. CHECK VALVE
4. END CAP
5. BALL
6. SPRING
7. SPRING GUIDE
8. SEALING WASHER
9. O-RING
10. VALVE BODY
11. CONNECTOR
12. NIPPLE
13. SAFETY VALVE
14. O-RING (PART OF DEHYDRATE CARTRIDGE)
15. DEHYDRATE CARTRIDGE

16. O-RING
17. END COVER ASSEMBLY
18. PURGE VALVE ASSEMBLY
19. O-RING
20. PURGE VALVE PISTON
21. SPRING
22. O-RING
23. O-RING
24. PURGE VALVE HOUSING
25. PURGE VALVE
26. LOCKWASHER
27. SCREW
28. EXHAUST COVER
29. SCREW (3)
30. SCREW
31. DIAPHRAGM WASHER

32. EXHAUST DIAPHRAGM
33. BOOT
34. ELECTRICAL TERMINAL
35. END COVER HOUSING
36. CONNECTOR
37. RETAINING CLIP (3)
38. SCREW (3)
39. RETAINING RING
40. MOUNTING BRACKET (2)
41. NUT (2)
42. LOCKWASHER (2)
43. SCREW (2)
44. TERMINAL PROTECTOR
45. ELBOW
46. REDUCER

TA 237232

COMPRESSED AIR SYSTEM.**9-12. SUPPLY RESERVOIR AUTOMATIC DRAIN VALVE AND AIR HOSE COUPLING.****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

a. Removal.	(5)
b. Installation.	(5)
c. Checking for Leaks.	(5)

15 Minutes Total .

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (Refer to Appendix C).
 Soap Solution.

**EQUIPMENT CONDITION
PARAGRAPH**

9-13A.

CONDITION DESCRIPTION

Primary Air Reservoirs
 Drained.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.
 TM 9-2320-273-20P.
 LO 9-2320-273-12.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
 Transmission in Neutral.
 Park Brake Set.

TROUBLESHOOTING REFERENCES

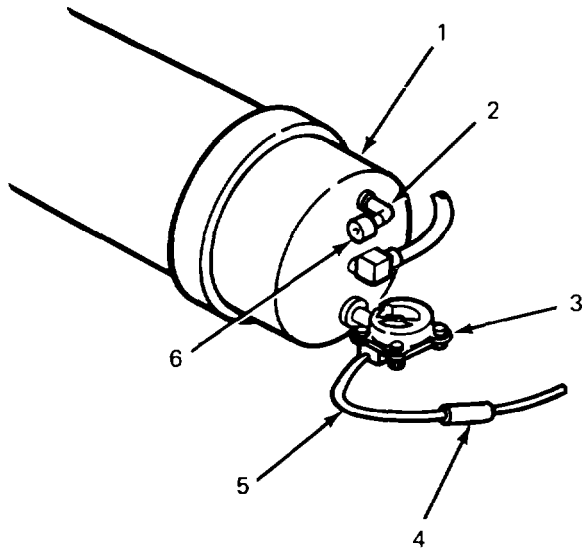
Table 9-1.

COMPRESSED AIR SYSTEM.

9-12. SUPPLY RESERVOIR AUTOMATIC DRAIN VALVE AND AIR HOSE COUPLING (Continued).		
LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION.		
4. Drain valve (3).	a. Coat threads with liquid teflon. b. Screw into supply reservoir (1) and tighten.	
5. Elbow (2) and air hose coupling (6).	a. Coat threads with liquid teflon. b. Screw elbow (2) into supply reservoir (1). c. Screw air hose coupling (6) into elbow (2).	
C. CHECKING FOR LEAKS.		
6. Engine.	Start up (see TM 9-2320-273-10). Allow system to reach operating pressure of 90-120 psi (621-827 kPa).	
7. Drain valve (3), supply reservoir (1), elbow (2), and air hose coupling (6).	Use soap solution to check for leaks.	
8. Engine.	Shut down (see TM 9-2320-273-10).	

COMPRESSED AIR SYSTEM.

9-12. SUPPLY RESERVOIR AUTOMATIC DRAIN VALVE AND AIR HOSE COUPLING (Continued).

LOCATION/ITEM	ACTION	REMARKS
 LEGEND: 1. SUPPLY RESERVOIR 2. ELBOW 3. DRAIN VALVE 4. CONNECTOR 5. WIRE 6. AIR HOSE COUPLING		

COMPRESSED AIR SYSTEM.**9-13. SECONDARY RESERVOIR MANUAL DRAIN VALVE MAINTENANCE.****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

- a. Bleeding Reservoirs. (2)
- b. Removal. (1)
- c. Installation. (2)
- d. Checking for Leaks. (5)

 10 Minutes Total.
INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

**EQUIPMENT CONDITION
PARAGRAPH**

None.

CONDITION DESCRIPTION

None.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (Refer to Appendix C).
Soap Solution.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

GENERAL SAFETY INSTRUCTIONS

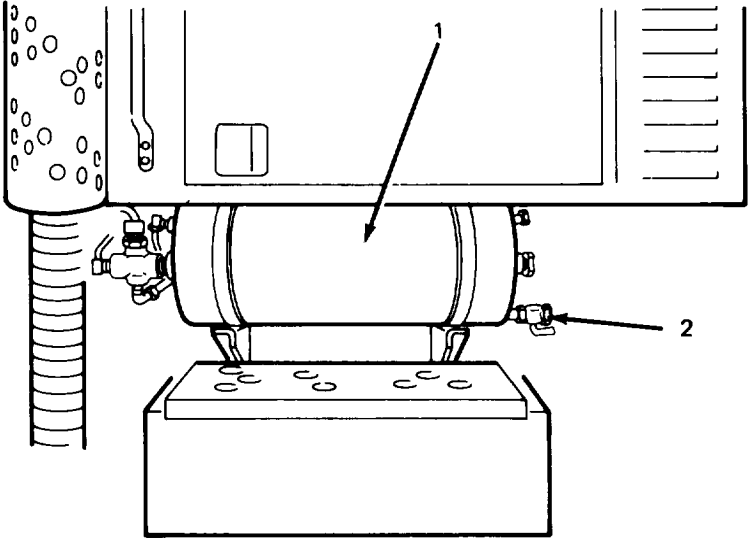
Engine OFF.
Transmission in Neutral.
Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 9-1.

COMPRESSED AIR SYSTEM.

9-13. SECONDARY RESERVOIR MANUAL DRAIN VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
NOTE For location, refer to locator illustration (para 9-5 e. thru 9-5 j.).		
A. BLEEDING RESERVOIRS. WARNING Before removing drain valve, bleed the secondary reservoir. There is one on all models located under passenger door. 1. Drain valve (2). Turn handle and allow air to exhaust. B. REMOVAL. 2. Drain valve (2). Unscrew and remove from reservoir (1). LEGEND: 1. RESERVOIR 2. DRAIN VALVE 		

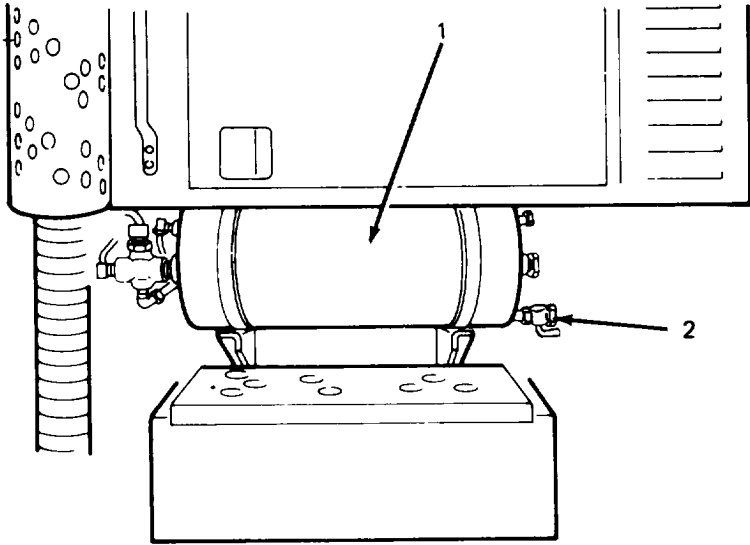
TA 074900

COMPRESSED AIR SYSTEM.

9-13. SECONDARY RESERVOIR MANUAL DRAIN VALVE MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
C. INSTALLATION.		
3. Drain valve (2).	a. Coat threads with liquid teflon. b. Screw into reservoir (1) and tighten.	
D. CHECKING FOR LEAKS.		
4. Drain valve (2).	Turn handle to close valve,	Be sure valves are closed on all service reservoirs.
5. Engine.	Start up (see TM 9-2320-273-10). Allow system to reach operating pressure of 90-120 psi (621-827 kPa).	
6. Drain valve (2).	Use soap solution to check for leaks.	Tighten as necessary.
7. Engine.	Shut down (see TM 9-2320-273-10).	

COMPRESSED AIR SYSTEM.

9-13. SECONDARY RESERVOIR MANUAL DRAIN VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
 LEGEND: 1. RESERVOIR 2. DRAIN VALVE		
TA 074901		

COMPRESSED AIR SYSTEM.**9-14. SAFETY RELEASE VALVE MAINTENANCE.****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

a. Removal.	(2)
b. Testing.	(10)
c. Installation.	(3)
d. Operational Check	(5)
20 Minutes Total.	

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (Refer to Appendix C).
 Soap Solution.
 Controllable Shop Air Supply.
 Air Pressure Gage.

**EQUIPMENT CONDITION
PARAGRAPH**

9-13A.

CONDITION DESCRIPTION

Air Reservoirs Drained.
 (M915 Primary
 M916 Thru M920-
 Secondary).

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.
 TM 9-2320-273-20P.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
 Transmission in Neutral.
 Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 9-1.

COMPRESSED AIR SYSTEM.

9-14. SAFETY RELEASE VALVE MAINTENANCE (Continued).

LOCATION/ITEM

ACTION

REMARKS

NOTE

For location refer to locator illustration
(para 9-5 e. thru 9-5 j.).

A. REMOVAL.

WARNING

Do not remove safety release valve until
reservoir pressure is fully exhausted.

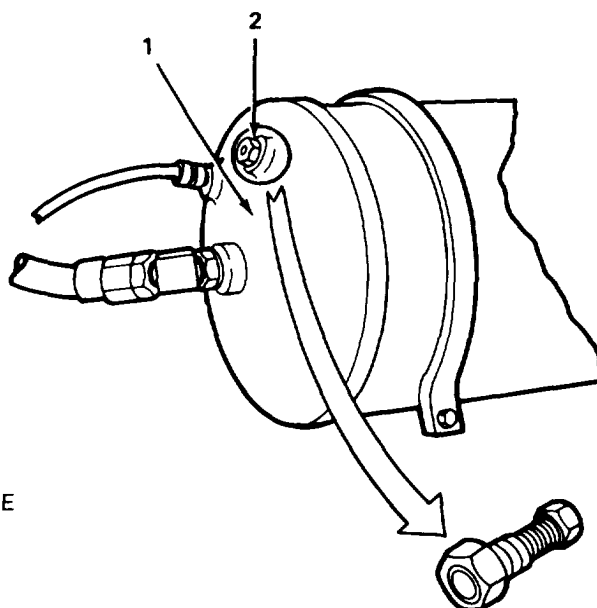
1. Safety release valve (2).

Unscrew and remove from reservoir (1).

B. TESTING.

2. Check safety release valve (2),

a. Connect to adjustable
pressure supply with
pressure gage between
valve and supply.



LEGEND:

- 1. RESERVOIR
- 2. SAFETY RELEASE VALVE

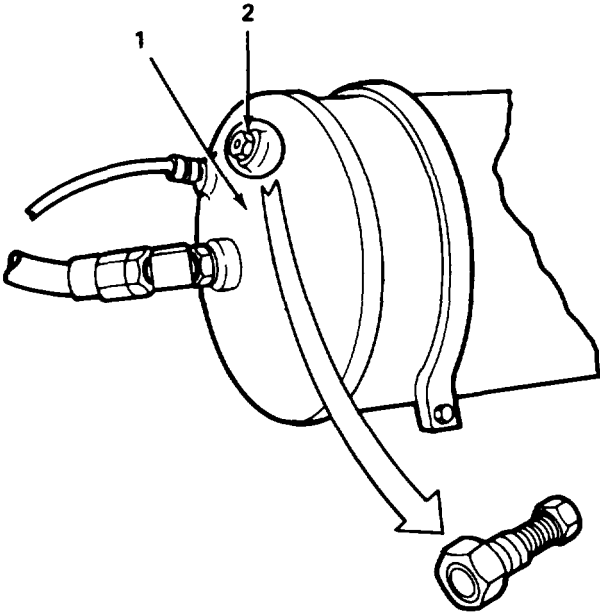
TA 074902

COMPRESSED AIR SYSTEM.

9-14. SAFETY RELEASE VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
<u>B. TESTING (Continued).</u>		
	b. Gradually increase pressure, Valve should exhaust air when pressure reaches 145-155 psi (1000-1069 kPa).	If valve does not work properly, replace it.
<u>C. INSTALLATION.</u>		
3. Safety release valve (2).	a. Coat threads with liquid teflon. b. Screw into reservoir (1) and tighten.	
<u>D. OPERATIONAL CHECK.</u>		
4. Engine.	a. Start up (see TM 9-2320-273-10). b. Allow system to reach operating pressure of 105-120 psi (724-827 kPa).	
5. Safety release valve (2).	Use soap solution to check for leaks.	Tighten as necessary.
6. Engine.	Shut down (see TM 9-2320-273-10).	

COMPRESSED AIR SYSTEM.

9-14. SAFETY RELEASE VALVE MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
 LEGEND: 1. RESERVOIR 2. SAFETY RELEASE VALVE		
TA 074903		

COMPRESSED AIR SYSTEM.

9-15. SUPPLY RESERVOIR CHECK VALVE MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

- a. Removal. (4)
 - b. Testing. (2)
 - c. Installation. (4)
 - d. Operational Check. (4)
- 14 Minutes Total.

INITIAL SETUP	EQUIPMENT CONDITION	CONDITION DESCRIPTION
<u>APPLICABLE CONFIGURATIONS</u> All.	<u>PARAGRAPH</u> 9-13A.	Primary Air Reservoirs Drained.
<u>TEST EQUIPMENT</u> None.		
<u>SPECIAL TOOLS</u>		
<u>MATERIALS/PARTS (P/N)</u> Liquid Teflon (Refer to Appendix C). Controllable Shop Air Supply. Air Pressure Gage.		
<u>PERSONNEL REQUIRED</u> One (MOS-63B20).	<u>SPECIAL ENVIRONMENTAL CONDITIONS</u> Vehicle Parked on Level Ground.	
<u>REFERENCES (TM)</u> TM 9-2320-273-10. TM 9-2320-273-20P.	<u>GENERAL SAFETY INSTRUCTIONS</u> Engine Off. Transmission in Neutral. Park Brake Set.	
<u>TROUBLESHOOTING REFERENCES</u> Table 9-1.		

COMPRESSED AIR SYSTEM.

9-15. SUPPLY RESERVOIR CHECK VALVE MAINTENANCE (Continued).

LOCATION/ITEM

ACTION

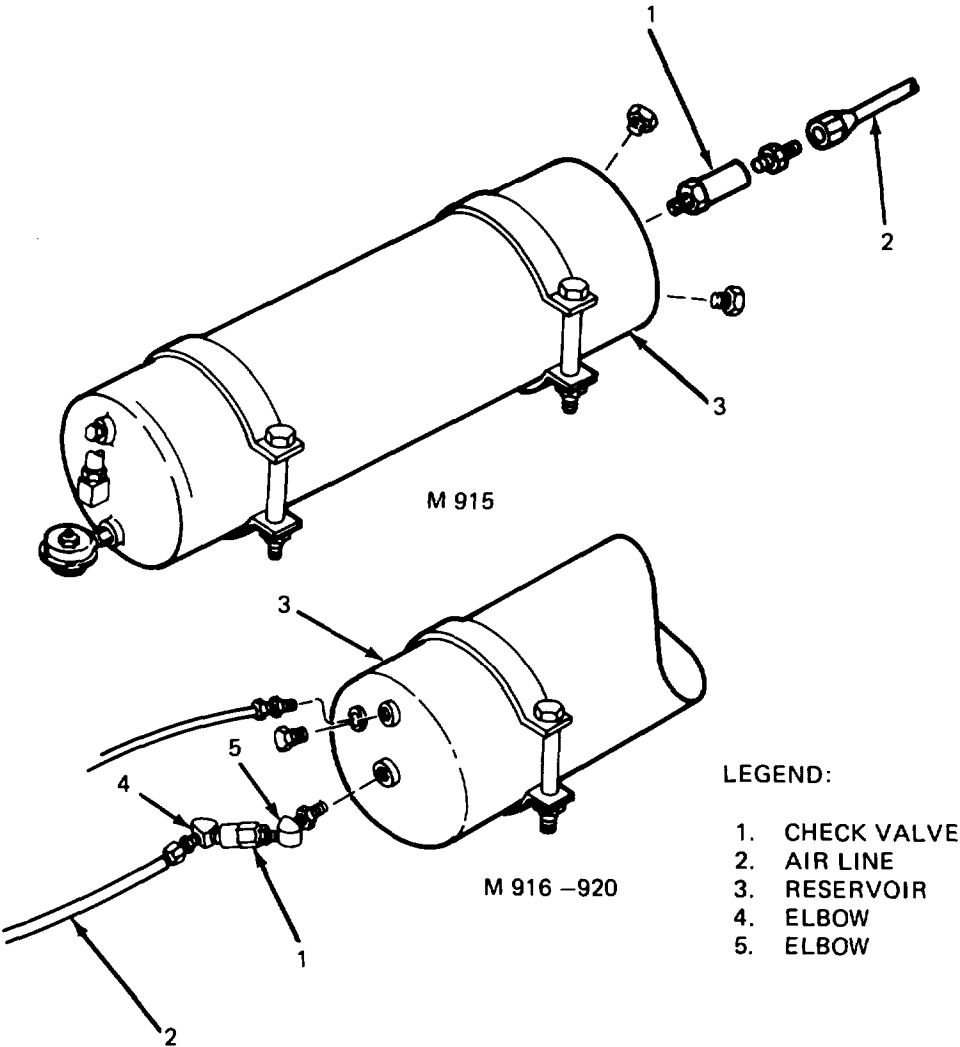
REMARKS

A. REMOVAL.

WARNING

Do not remove check valve until reservoir pressure is fully exhausted.

1. Air line (2).	Unscrew and remove.	
2. Elbow (4).	Unscrew and remove.	M916 thru M920
3. Check valve (1).	Unscrew and remove from reservoir (3) (M915) or from elbow (5) (M916 thru M920).	



TA 074904

COMPRESSED AIR SYSTEM.**9-15. SUPPLY RESERVOIR CHECK VALVE MAINTENANCE (Continued).**

LOCATION/ITEM	ACTION	REMARKS
B. TESTING.		
4. Check valve (1).	a. Connect to adjustable pressure supply with pressure gage between valve and supply. b. Gradually increase pressure. If valve does not work properly, Valve should begin exhaust- replace it. ing air when pressure reaches 145-155 psi (1000-1069 kPa).	
C. INSTALLATION.		
5. Check valve (1).	a. Coat threads with liquid teflon. b. Screw into reservoir (3) and tighten. c. Screw into elbow (5).	M915. M916 thru M920.
6. Elbow (4).	Screw into check valve (1).	M916 thru M920.
7. Air line (2).	Install and tighten.	
D. OPERATIONAL CHECK.		
8. Engine.	a. Start up (see TM 9-2320-273-10). b. Allow system to reach operating pressure of 105-120 psi (724-827 kPa).	
9. Check valve (1).	Use soap solution to check for Tighten as necessary. leaks.	
10. Engine.	Shut down (see TM 9-2320-273-10).	

COMPRESSED AIR SYSTEM.

9-15. SUPPLY RESERVOIR CHECK VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
1 2 3 M 915 3 5 4 1 2 M 916 -920 LEGEND: 1. CHECK VALVE 2. AIR LINE 3. RESERVOIR 4. ELBOW 5. ELBOW		

TA 074905

COMPRESSED AIR SYSTEM.

9-16. RESERVOIRS AND AIR LINES MAINTENANCE.		
THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)		
a. Removal. (10) b. Installation. (10) c. Checking for Leaks. (5) 25 Minutes Total.		
INITIAL SETUP	EQUIPMENT CONDITION	
<u>APPLICABLE CONFIGURATIONS</u>	<u>PARAGRAPH</u>	<u>CONDITION DESCRIPTION</u>
All.	9-13A.	Air Reservoirs Drained.
<u>TEST EQUIPMENT</u>		
None.		
<u>SPECIAL TOOLS</u>		
None.		
<u>MATERIALS/PARTS (P/N)</u>		
Liquid Teflon (Refer to Appendix C). Soap Solution. Marking Pen. Masking Tape.		
<u>PERSONNEL REQUIRED</u>	<u>SPECIAL ENVIRONMENTAL CONDITIONS</u>	
One (MOS-63B20).	Vehicle Parked on Level Ground.	
<u>REFERENCES (TM)</u>	<u>GENERAL SAFETY INSTRUCTIONS</u>	
TM 9-2320-273-10. TM 9-2320-273-20P.	Engine OFF. Transmission in Neutral. Park Brake Set.	
<u>TROUBLESHOOTING REFERENCES</u>		
Table 9-1.		

COMPRESSED AIR SYSTEM.

9-16. RESERVOIRS AND AIR LINES MAINTENANCE (Continued).

LOCATION/ITEM

ACTION

REMARKS

NOTE

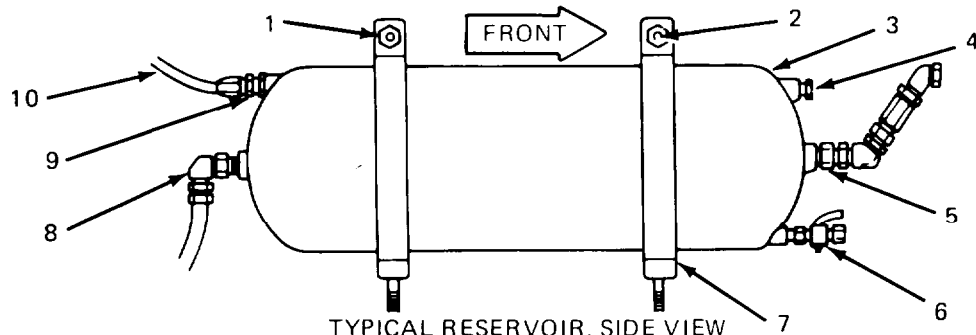
For locations of reservoirs see para 9-5 e. thru 9-5 j. of this manual.

WARNING

Do not remove any reservoir or air line until pressure is fully exhausted from all supply and service reservoirs.

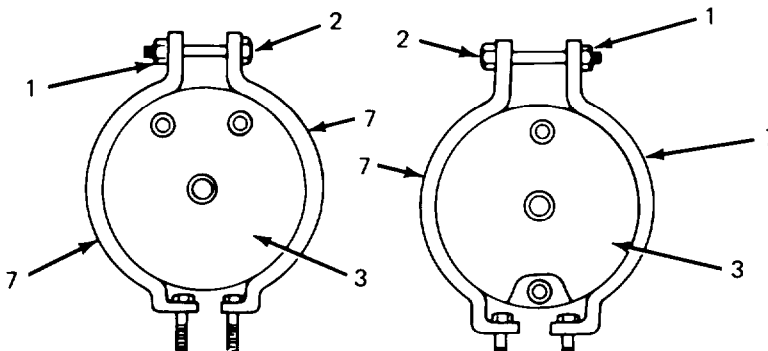
NOTE

The illustrations below show a typical air reservoir and associated air lines and fittings of the M915 thru M920 truck tractors and chassis. No special instructions or tools are needed if you follow standard shop practice techniques.



LEGEND:

1. NUT (2)
2. BOLT (2)
3. RESERVOIR
4. PLUG(S)
5. REDUCER(S)
6. VALVE(S)
7. STRAP (4)
8. ELBOW(S)
9. CONNECTOR(S)
10. AIR LINE(S)



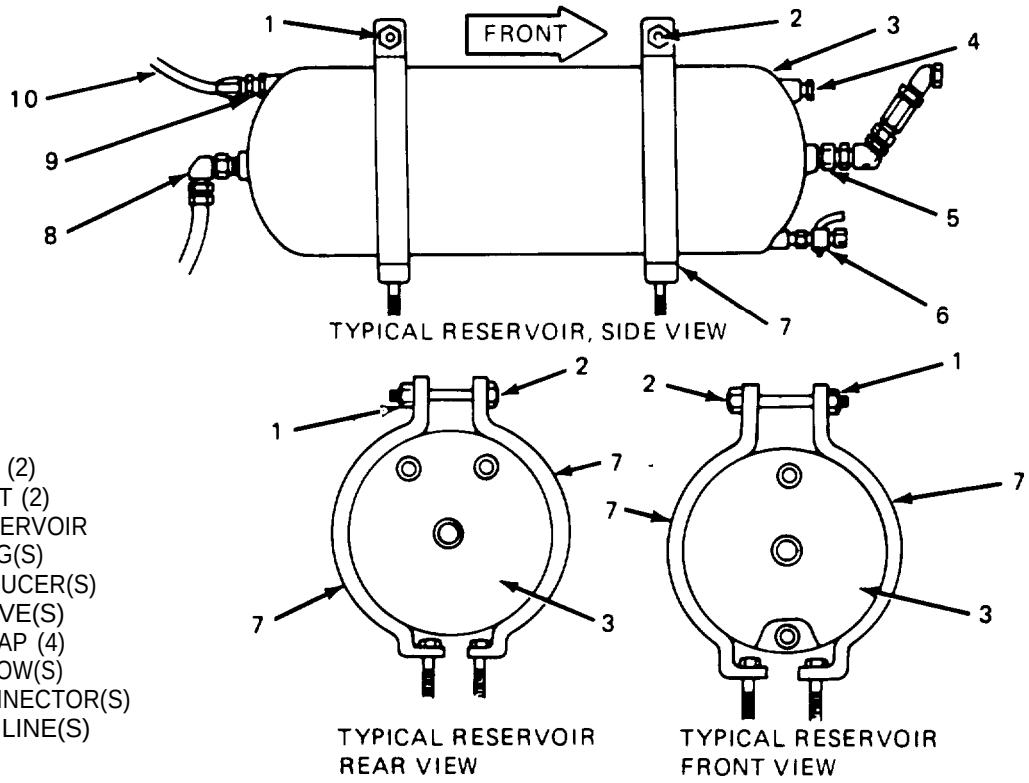
TA 074906

COMPRESSED AIR SYSTEM.**9-16. RESERVOIRS AND AIR LINES MAINTENANCE (Continued).**

LOCATION/ITEM	ACTION	REMARKS
<u>A. REMOVAL.</u>		
NOTE		
As you remove each component, tag for reassembly.		
1. Air line(s) (10).	Disconnect.	
2. Two nuts (1).	Loosen and remove.	
3. Two bolts (2).	Remove.	
4. Reservoir (3).	Slide forward or aft through two sets of straps (7) and remove.	
5. All fittings on reservoir; (plug(s) (4), reducer(s) (5), valve(s) (6), elbow(s) (8), connector(s) (9).	Unscrew and remove.	
<u>B. INSTALLATION.</u>		
NOTE		
Check all lines and fittings for leaks, cracks, and damaged threads. Replace, if necessary. Be sure hoses are connected to the proper reservoir or valve ports as you tagged at removal.		
6. Plug(s) (4), reducer(s) (5), valve(s) (6), elbow(s) (8) and connector(s) (9).	Coat threads with liquid teflon and install.	
7. Reservoir (3).	Slide back into place through two sets of straps (7).	
8. Two bolts (2).	Install one through each set of straps (7).	
9. Two nuts (1).	Install and tighten.	
10. Air line(s) (10).	Reconnect.	

COMPRESSED AIR SYSTEM.

9-16. RESERVOIRS AND AIR LINES MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
C. CHECKING FOR LEAKS.		
11. Engine.	a. Start up (see TM 9-2320-273-10). b. Allow system to reach operating pressure of 105-120 psi (724-827 kPa). c. Check for leaks using soap solution, then shut down engine.	Retighten as necessary.
 The diagrams illustrate the components of a typical reservoir. The side view shows the reservoir with two straps (7) and various fittings. The rear and front views show the circular end of the reservoir with mounting points and valves. The legend identifies the numbered items: 1. NUT (2), 2. BOLT (2), 3. RESERVOIR, 4. PLUG(S), 5. REDUCER(S), 6. VALVE(S), 7. STRAP (4), 8. ELBOW(S), 9. CONNECTOR(S), 10. AIR LINE(S). LEGEND: 1. NUT (2) 2. BOLT (2) 3. RESERVOIR 4. PLUG(S) 5. REDUCER(S) 6. VALVE(S) 7. STRAP (4) 8. ELBOW(S) 9. CONNECTOR(S) 10. AIR LINE(S) TYPICAL RESERVOIR, SIDE VIEW TYPICAL RESERVOIR REAR VIEW TYPICAL RESERVOIR FRONT VIEW		

TA 074907

COMPRESSED AIR SYSTEM**9-16.1. AIR DRYER TUBING AND HOSE REPLACEMENT.****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

- a. Removal. (1.0)
 - b. Inspection and Installation. (0.4)
 - c. Operational Check. (0.3)
- 1.7 Minutes Total.

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIAL/PARTS (P/N)

Tape, Antiseizing Item 14, Appendix C.

EQUIPMENT CONDITION**PARAGRAPH**

TM 9-2320-273-10.

CONDITION DESCRIPTION

Air System Draincocks Open.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

None.

SPECIAL ENVIRONMENTAL CONDITIONS

Work Area Clean and Away from Blowing Dirt and Dust.

GENERAL SAFETY INSTRUCTIONS

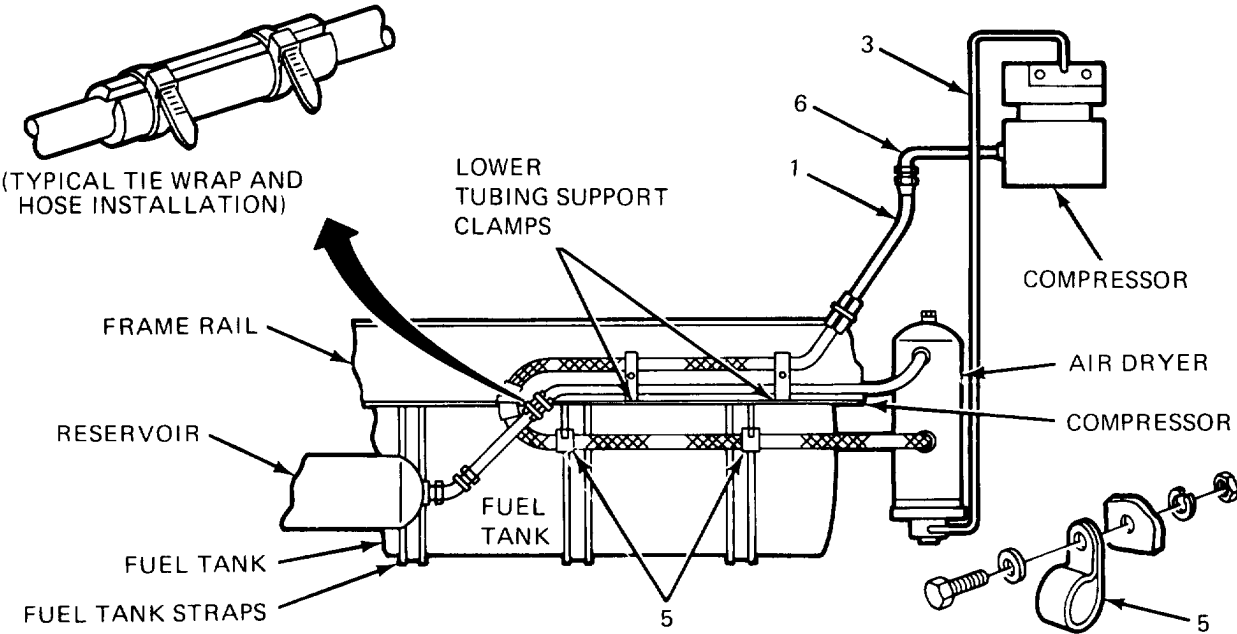
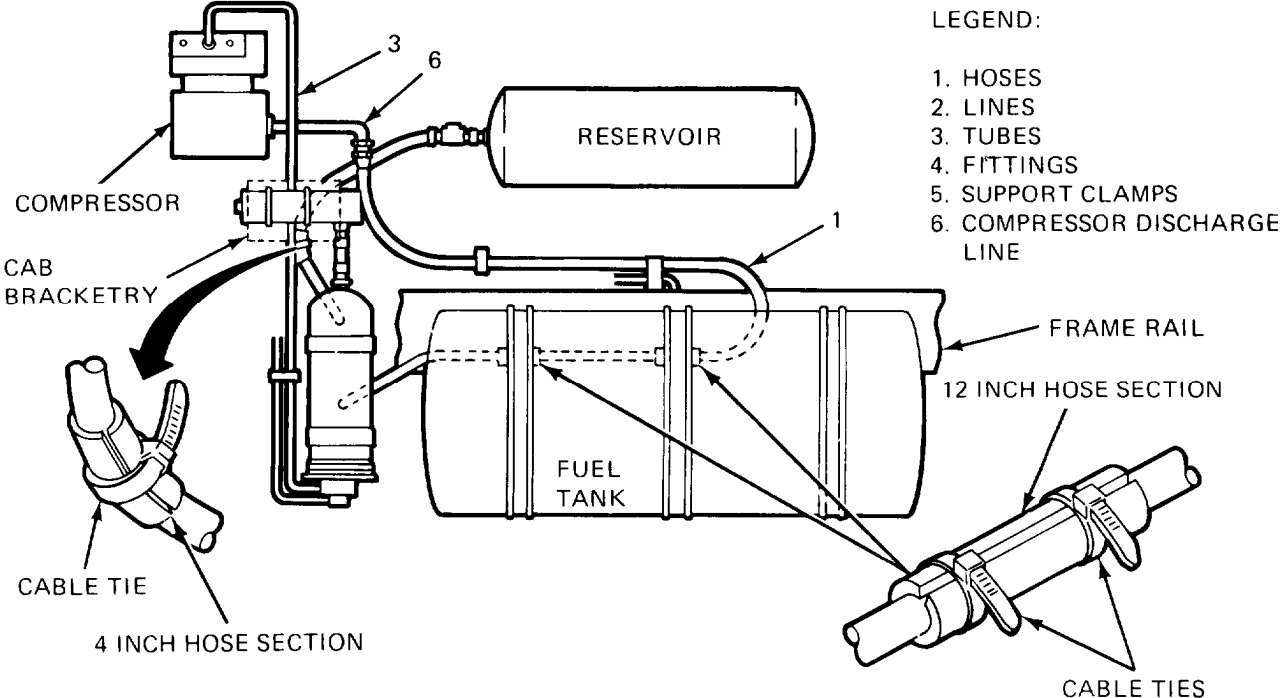
Engine OFF.
 Transmission in Neutral.
 Vehicle on Level Ground.
 Wheels Blocked.

COMPRESSED AIR SYSTEM.**9-16.1. AIR DRYER TUBING AND HOSE REPLACEMENT.**

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Air dryer.	Disconnect damaged hoses (1), lines (2), tubes (3), or fittings (4).	Tag each component for reassembly. Note the routing of the hoses, lines and tubes when removing them.
B. INSPECTION AND INSTALLATION.		
2. Air dryer.	Check all hoses (1), lines (2), tubes (3), or fittings (4) for leaks, cracks and damage.	Replace if necessary.
3.	Install new hoses (1), lines (2), tubes (3) in the same location as the old ones.	
<u>CAUTION</u> Make sure that all support clamps (5) are used when replacing lines or tubes. Do not let tubing touch any hot surface such as compressor discharge line (6), or oil lines.		
4. Hoses (1), lines (2), tubes (3) or fittings (4).	Apply antiseizing tape on all threads and reconnect as tagged during removal.	
C. OPERATIONAL CHECK.		
5. Air system.	Close draincocks and start engine to charge the air system.	Charge air system until it reaches 120 psi (827.4 kPa) and check for air leaks.
NOTE No Follow-on maintenance required,		

COMPRESSED AIR SYSTEM.

9-16.1. AIR DRYER TUBING AND HOSE REPLACEMENT.

LOCATION/ITEM	ACTION	REMARKS
 (TYPICAL TIE WRAP AND HOSE INSTALLATION) LOWER TUBING SUPPORT CLAMPS FRAME RAIL RESERVOIR FUEL TANK FUEL TANK STRAPS COMPRESSOR AIR DRYER COMPRESSOR 5 Tubing and hose installation model M915.		
 LEGEND: 1. HOSES 2. LINES 3. TUBES 4. FITTINGS 5. SUPPORT CLAMPS 6. COMPRESSOR DISCHARGE LINE COMPRESSOR CAB BRACKETRY RESERVOIR FRAME RAIL FUEL TANK 12 INCH HOSE SECTION 4 INCH HOSE SECTION CABLE TIE CABLE TIES Tubing and hose installation models M916 thru M920.		

TA 237233

BRAKE SYSTEM.

9s-17. TRAILER SUPPLY BRAKE VALVE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

- a. Removal. (10)
- b. Inspection of Lines and Fittings. (5)
- c. Installation. (15)
- d. Operational Check. (15)

45 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

M915, M916, M917, and M920.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (Refer to Appendix C).
Masking Tape.
Marking Pen.
Soap and Water Solution.

EQUIPMENT CONDITION

PARAGRAPH

9-13A.

5-37A.

CONDITION DESCRIPTION

Air Reservoirs Drained.

Batteries Disconnected.

PERSONNEL REQUIRED

Two (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.

TM 9-2320-273-20P.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.

Park Brake Set.

Transmission in Neutral.

TROUBLESHOOTING REFERENCES

Table 9-1.

BRAKE SYSTEM.**9-17. TRAILER SUPPLY BRAKE VALVE (Continued).****LOCATION/ITEM****ACTION****REMARKS****NOTE**

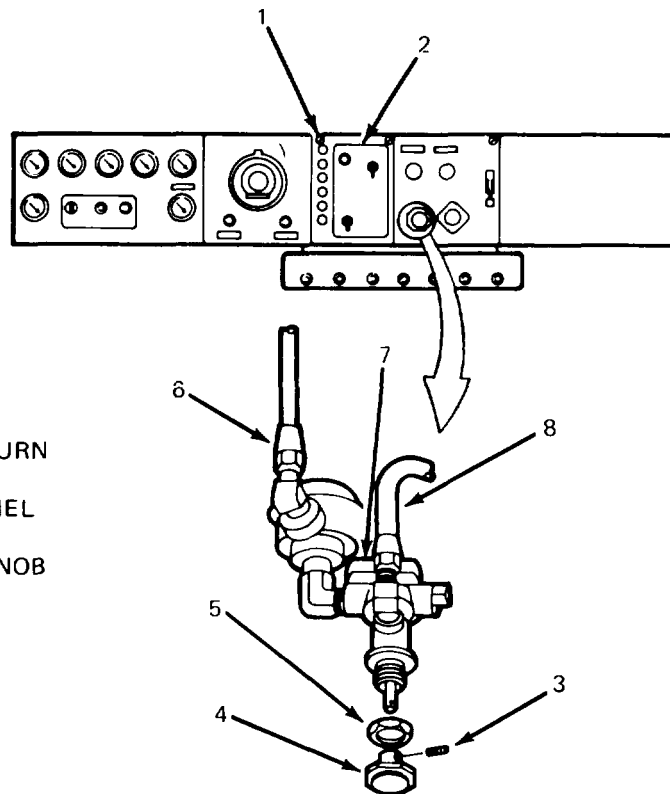
For location, refer to locator illustration para 9-5 e. thru 9-5 j.

WARNING

Disconnect battery before doing any work behind dash panel.

A. REMOVAL.

1. Two quarter-turn screws (1).	Loosen.
2. Hinged panel (2).	Lower.
3. Roll pin (3).	Push out.
4. Control Knob (4).	Remove.
5. Locknut (5).	Unscrew and remove.

**LEGEND:**

1. QUARTER-TURN SCREW (2)
2. HINGED PANEL
3. ROLL PIN
4. CONTROL KNOB
5. LOCKNUT
6. AIR LINE
7. VALVE
8. AIR LINE

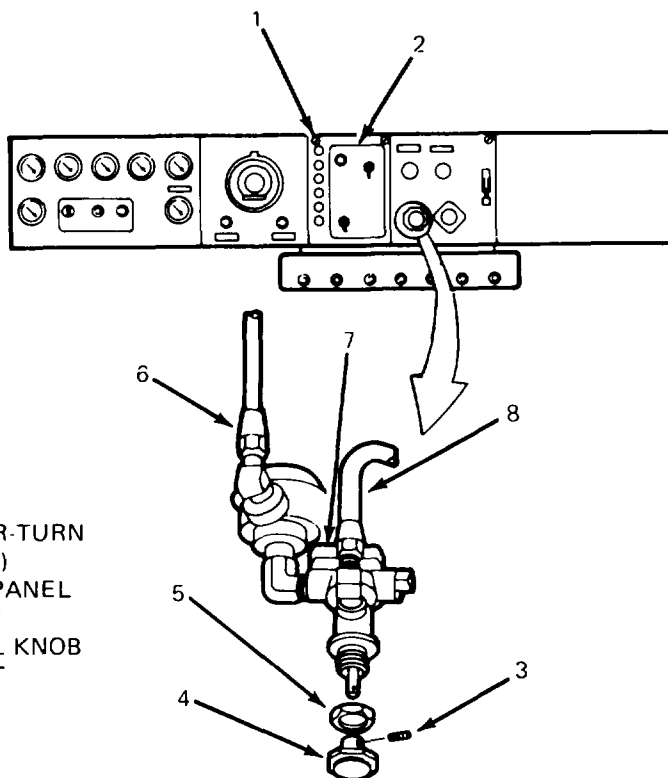
TA 074908

BRAKE SYSTEM.

9-17. TRAILER SUPPLY BRAKE VALVE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued). WARNING Do not remove any air lines until pressure is fully exhausted from all reservoirs.		
6. Air line (6).	a. Label using masking tape and marker pencil. b. Unscrew and remove from valve (7).	
7. Air line (8).	a. Label using masking tape and marker pencil. b. Unscrew and remove from valve (7).	
8. Valve (7).	Remove from dash panel.	
B. INSPECTION OF LINES AND FITTINGS.		
9. Air lines (6) and (8).	Inspect for: a. Cracks. b. Leaks. c. Kinks. d. Damaged threads.	Replace, if necessary.
C. INSTALLATION.		
10. Valve (7).	Install behind dash panel.	
11. Two air lines (6) and (8).	a. Coat threads on valve (7) with liquid teflon. b. Screw into valve (7) and tighten.	
12. Locknut (5).	Screw into valve (7) and tighten.	
13. Control knob (4).	Install by alining hole in knob with hole in valve handle.	
14. Roll pin (3).	Push in.	
15. Hinged panel (2).	Raise into position.	
16. Two quarter-turn screws (1).	Tighten.	
D. OPERATIONAL CHECK.		
17. Engine.	Start up (see TM 9-2320-273-10). Allow pressure to reach 105-120 psi (724-827 kPa).	

BRAKE SYSTEM.**9-17. TRAILER SUPPLY BRAKE VALVE (Continued).**

LOCATION/ITEM	ACTION	REMARKS
D. OPERATIONAL CHECK (Continued).		
18. Control knob (4).	Push in.	2nd mechanic.
19. CAB/Park brake control and brake pedal.	a. Apply and release parking brakes. b. Press and release brake pedal.	2nd mechanic.
20. Trailer brakes.	Check that brakes apply when: a. Park brake is applied. b. Brake pedal is pressed. c. Trailer emergency brake knob is pulled out.	1st mechanic.
21. Engine.	Shut down (see TM 9-2320-273-10).	

**LEGEND:**

1. QUARTER-TURN SCREW (2)
2. HINGED PANEL
3. ROLL PIN
4. CONTROL KNOB
5. LOCKNUT
6. AIR LINE
7. VALVE
8. AIR LINE

TA 074909

BRAKE SYSTEM.**9-18. TRAILER HAND BRAKE VALVE MAINTENANCE.****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

a. Removal.	(5)
b. Inspection of Air Lines and Fittings.	(5)
c. Installation.	(10)
d. Operational Check.	(15)
35 Minutes Total.	

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

M915, M916, M917, M920.

EQUIPMENT CONDITION**PARAGRAPH**

9-13A.

CONDITION DESCRIPTION

Air Reservoirs Drained.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Masking Tape.

Marking Pen.

PERSONNEL REQUIRED

Two (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.

TM 9-2320-273-20P.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.

Transmission in Neutral.

Park Brake Set.

TROUBLESHOOTING REFERENCES

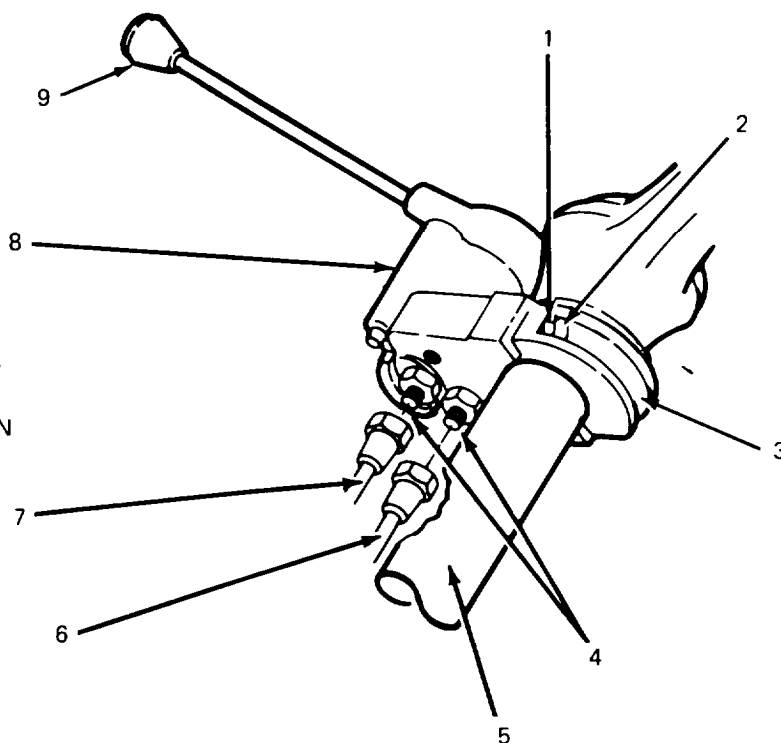
Table 9-1.

BRAKE SYSTEM.**9-18. TRAILER HAND BRAKE VALVE MAINTENANCE (Continued).**

LOCATION/ITEM	ACTION	REMARKS
NOTE For location, refer to locator illustration (para 9-5 e. thru 9-5 j.).		
A. REMOVAL.		
1. Air supply line (6) and air delivery line (7).	a. Use tape and marker pencil to label lines. b. Unscrew from adapters (4) and remove.	
2. Two capscrews (2) and lockwashers (1).	Unscrew and remove.	
3. Valve (8) and retaining strap (3).	Remove.	
4. Two adapters (4),	Unscrew and remove from valve (8).	
5. Knob (9).	Remove by twisting and pulling.	Knob is not threaded.

LEGEND:

1. LOCKWASHER (2)
2. CAPSCREW (2)
3. RETAINING STRAP
4. ADAPTER (2)
5. STEERING COLUMN
6. AIR SUPPLY LINE
7. AIR DELIVERY LINE
8. VALVE
9. KNOB



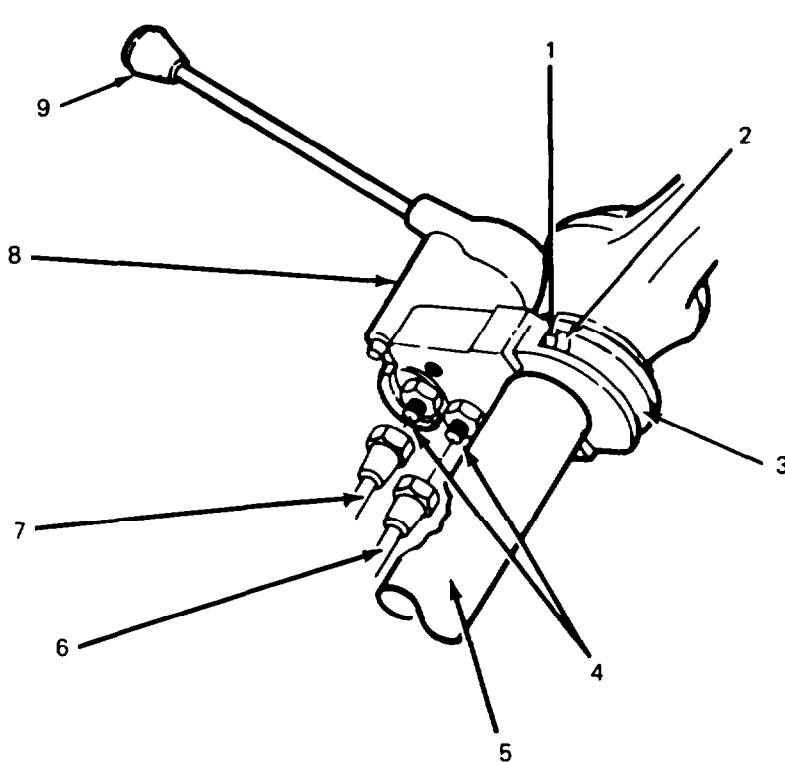
TA 074910

BRAKE SYSTEM.

9-18. TRAILER HAND BRAKE VALVE MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
B. INSPECTION OF AIR LINES AND FITTINGS.		
6. Air supply line (6), air delivery line (7), two adapters (4), and valve (8).	Inspect for: a. Cracks. b. Leaks. c. Damaged threads.	Replace as necessary.
C. INSTALLATION.		
7. Knob (9).	Push onto valve handle.	
8. Two adapters (4).	Screw into valve (8).	
9. Valve (8).	Position on steering column (5).	
10. Two capscrews (2) and lockwashers (1).	Screw in and tighten to secure retaining strap (3) to valve (8).	
11. Air supply line (6) and air delivery line (7).	Screw air lines onto adapters (4) and tighten.	Be sure to attach each line to the correct fitting as you marked.
D. OPERATIONAL CHECK.		
12. Engine.	Start up (See TM 9-2320-273-10). Allow pressure to reach 105-120 psi (724-827 kPa).	
13. Knob (9).	a. Pull down slowly.	1st mechanic.
	b. Check for leaks at air supply line (6) and air delivery line (7).	1st mechanic.
	c. Check for air pressure at gladhand connection or trailer.	2nd mechanic.
	d. Return handle to normal position.	1st mechanic.
14. Engine.	Shut down (see TM 9-2320-273-10).	

BRAKE SYSTEM.

9-18. TRAILER HAND BRAKE VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
 LEGEND: 1. LOCKWASHER (2) 2. CAPSCREW (2) 3. RETAINING STRAP 4. ADAPTER (2) 5. STEERING COLUMN 6. AIR SUPPLY LINE 7. AIR DE LIVERY LINE 8. VALVE 9. KNOB		

TA 074911

BRAKE SYSTEM.**9-19. PARKING BRAKE VALVE.****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

a. Removal.	(15)
b. Inspection of Lines and Fittings.	(5)
c. Installation.	(20)
d. Operational Check.	(15)
55 Minutes Total.	

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (refer to appendix C).
Masking Tape.
Marking Pen.
Soap and Water Solution.

EQUIPMENT CONDITION**PARAGRAPH**

9-13A.

5-37A.

CONDITION DESCRIPTION

Air Reservoirs Drained.
Batteries Disconnected.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.

TM 9-2320-273-20P.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

TROUBLESHOOTING REFERENCES

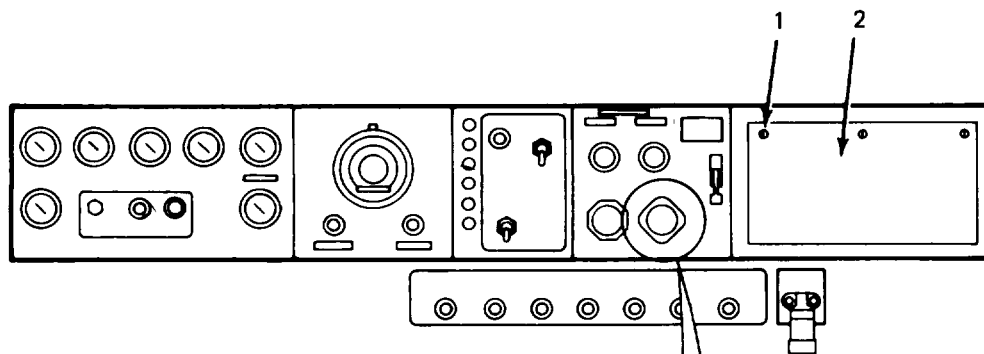
Table 9-1.

BRAKE SYSTEM.**9-19. PARKING BRAKE VALVE (Continued).****LOCATION/ITEM****ACTION****REMARKS****NOTE**

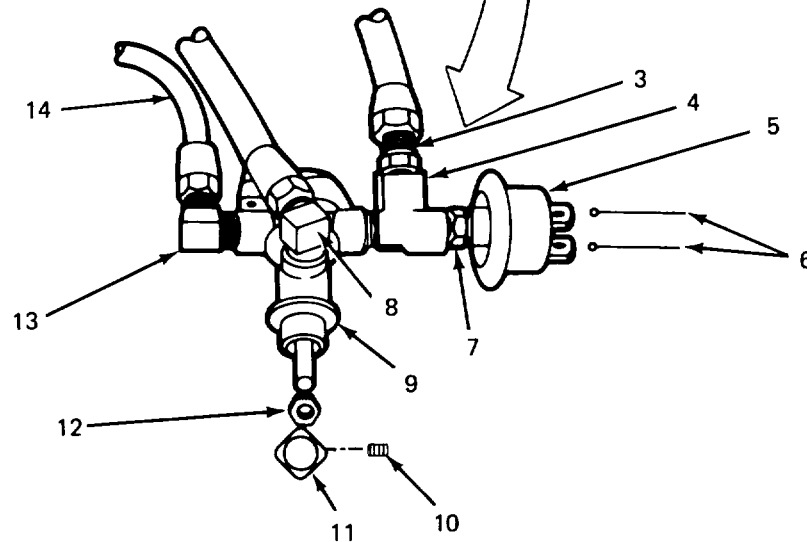
For location, refer to locator illustration
(para 9-5 e. thru 9-5 j.).

WARNING

Disconnect battery before doing any work
behind dash panel.

**LEGEND:**

1. QUARTER-TURN SCREW (3)
2. HINGED PANEL
3. FITTING
4. FITTING ASSEMBLY
5. SENDING UNIT
6. WIRE (2)
7. FITTING
8. FITTING
9. VALVE
10. ROLL PIN
11. CONTROL KNOB
12. LOCKNUT
13. FITTING
14. AIR LINE (3)

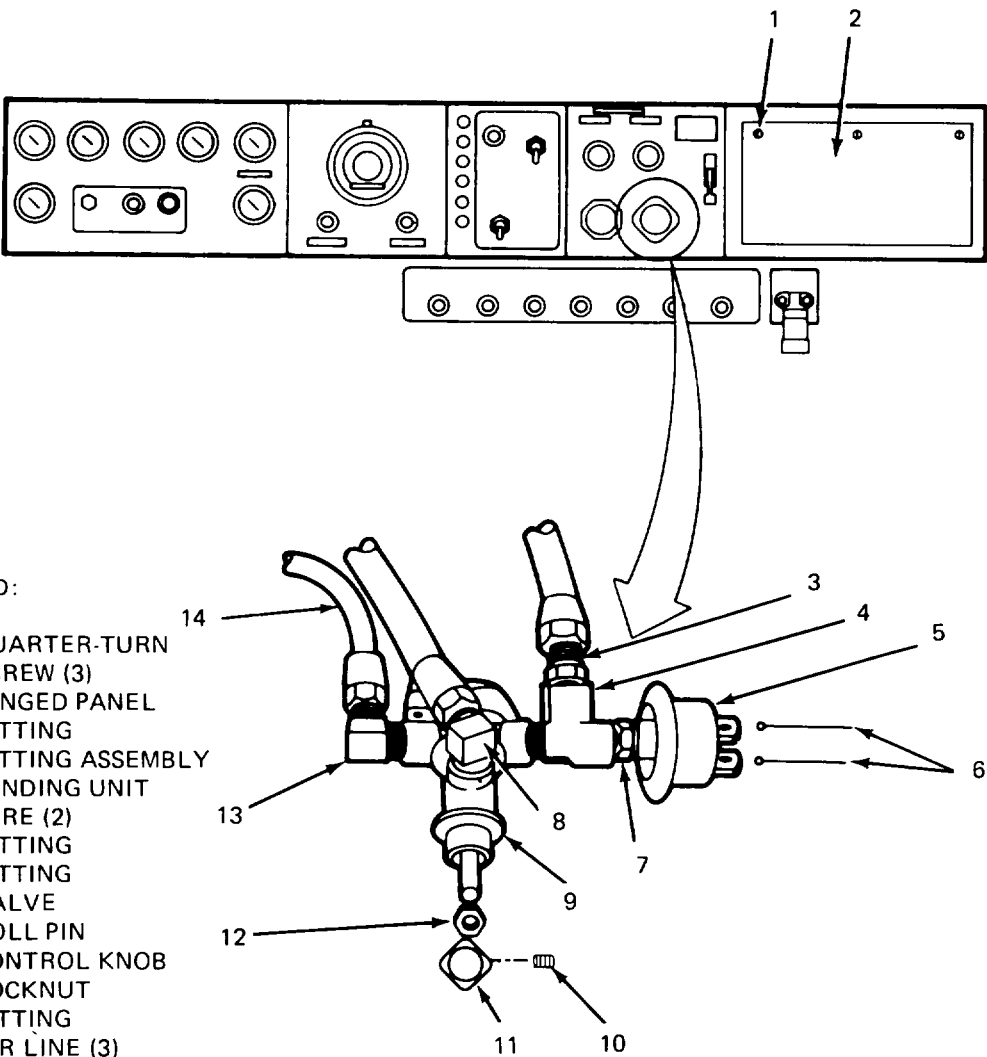


TA 074912

BRAKE SYSTEM.**9-19. PARKING BRAKE VALVE (Continued).**

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Three quarter-turn screws (1).	Loosen.	
2. Hinged panel (2).	Lower.	
3. Roll pin (10).	Push out.	
4. Control knob (11).	Remove.	
5. Locknut (12).	Unscrew and remove.	
6. Two wires (6).	Mark and disconnect from sending unit (5).	
WARNING Do not remove any air lines until pressure is fully exhausted from all reservoirs.		
7. Three air lines (14)	a. Label using masking tape and marker pencil. b. Unscrew and remove.	
8. Valve (9).	Remove from dash panel.	
B. INSPECTION OF LINES AND FITTINGS.		
9. Air lines (14).	Inspect for: a. Cracks. b. Leaks. c. Kinks. d. Damaged threads.	Replace if necessary.
C. INSTALLATION.		
10. Fittings.	Lay new valve beside old valve and remove fittings (13), (8) and assembly (4) from old valve, coat threads with liquid teflon and install in new valve.	

BRAKE SYSTEM.**9-19. PARKING BRAKE VALVE (Continued).**

LOCATION/ITEM	ACTION	REMARKS
C. INSTALLATION (Continued).		
NOTE Install fittings to same angle as removed.		
11. Valve (9).	Install behind dash panel.	
12. Three air lines (14).	Screw onto valve (9) and tighten.	
 LEGEND: 1. QUARTER-TURN SCREW (3) 2. HINGED PANEL 3. FITTING 4. FITTING ASSEMBLY 5. SENDING UNIT 6. WIRE (2) 7. FITTING 8. FITTING 9. VALVE 10. ROLL PIN 11. CONTROL KNOB 12. LOCKNUT 13. FITTING 14. AIR LINE (3)		

TA 074913

BRAKE SYSTEM.**9-19. PARKING BRAKE VALVE (Continued).**

LOCATION/ITEM	ACTION	REMARKS
C. INSTALLATION (Continued).		
13. Two wires (6).	Fasten to sending unit (5).	
14. Locknut (12).	Screw onto valve (9) and tighten.	
15. Control knob (11).	Install by alining hole in knob with hole in valve handle.	
16. Roll pin (10).	Push in.	
17. Hinged panel (2)	Raise into position.	
18. Three quarter-turn screws (1).	Tighten.	
D. OPERATIONAL CHECK.		
19. Engine	Start up (see TM 9-2320-273-10).	
20. Control knob (11).	a. When valve is pushed in, parking brakes should be released. b. When valve is pulled out, parking brakes should apply. c. Apply soapy solution to the fittings and check for bubbles. If bubbles appear, tighten fittings.	Brakes will not release until system reaches 65 psi.
21. Engine.	Shut down (see TM 9-2320-273-10).	

BRAKE SYSTEM.

9-19. PARKING BRAKE VALVE (Continued).

LOCATION/ITEM	ACTION	REMARKS
LEGEND: 1. QUARTER-TURN SCREW (3) 2. HINGED PANEL 3. FITTING 4. FITTING ASSEMBLY 5. SENDING UNIT 6. WIRE (2) 7. FITTING 8. FITTING 9. VALVE 10. ROLL PIN 11. CONTROL KNOB 12. LOCKNUT 13. FITTING 14. AIR LINE (3)		

TA 074914

BRAKE SYSTEM.**9-20. AIR PRESSURE GAGES MAINTENANCE.****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

- a. Removal. (10)
 - b. Installation. (10)
 - c. Operational Check. (10)
- 30 Minutes Total.

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

EQUIPMENT CONDITION**PARAGRAPH**

9-13A.

CONDITION DESCRIPTION

Air Reservoirs Drained.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (Refer to Appendix C).

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
 Park Brake Set.
 Transmission in Neutral.

TROUBLESHOOTING REFERENCES

Table 9-1.

BRAKE SYSTEM.**9-20. AIR PRESSURE GAGES MAINTENANCE (Continued).****LOCATION/ITEM****ACTION****REMARKS****NOTE**

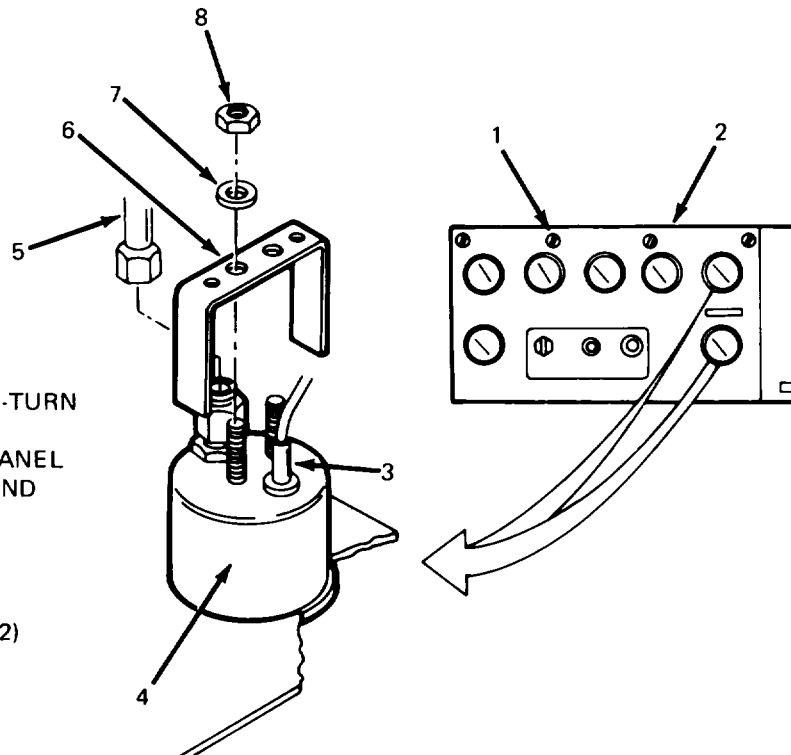
The procedure below may be used to replace either of the two air gages on the left-hand instrument panel.

A. REMOVAL.

1. Four quarter-turn screws (1).	Loosen. Lower hinged panel (2).	
2. Air line (5).	a. Unscrew and remove.	Replace, if necessary.
	b. Inspect for:	
	1. Leaks.	
	2. Cracks.	
	3. Damaged fittings.	

LEGEND:

1. QUARTER-TURN SCREW (4)
2. HINGED PANEL
3. SOCKET AND BULB
4. GAGE
5. AIR LINE
6. BRACKET
7. WASHER (2)
8. NUT (2)



TA 074915

BRAKE SYSTEM.**9-20. AIR PRESSURE GAGES MAINTENANCE (Continued).**

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
3. Socket and bulb (3).	Remove by pulling on socket.	
4. Two nuts (8) and washers (7).	Remove.	
5. Bracket (6).	Remove.	
6. Gage (4).	Remove gage.	
NOTE If you are pulling rear air gage do the same as above.		
B. INSTALLATION.		
7. Gage (4).	Place in panel (2) with studs pushed through bracket (6).	If a new gage is being installed, transfer all components and use liquid teflon on threads.
8. Two nuts (8) and washers (7).	Install and tighten.	
9. Socket and bulb (3).	Press in until socket is flush with gage (4).	
10. Air line (5).	Screw into gage (4).	
11. Hinged panel (2).	Close. Tighten four quarter-turn screws (1).	
NOTE If you removed rear air gage do the same as above.		
C. OPERATIONAL CHECK.		
12. Engine.	Start up (see TM 9-2320-273-10).	
13. Gage (4).	Observe that pressure build up is registered on gage and that both front and rear show approximately the same pressure.	
14. Engine.	Shut down (see TM 9-2320-273-10).	

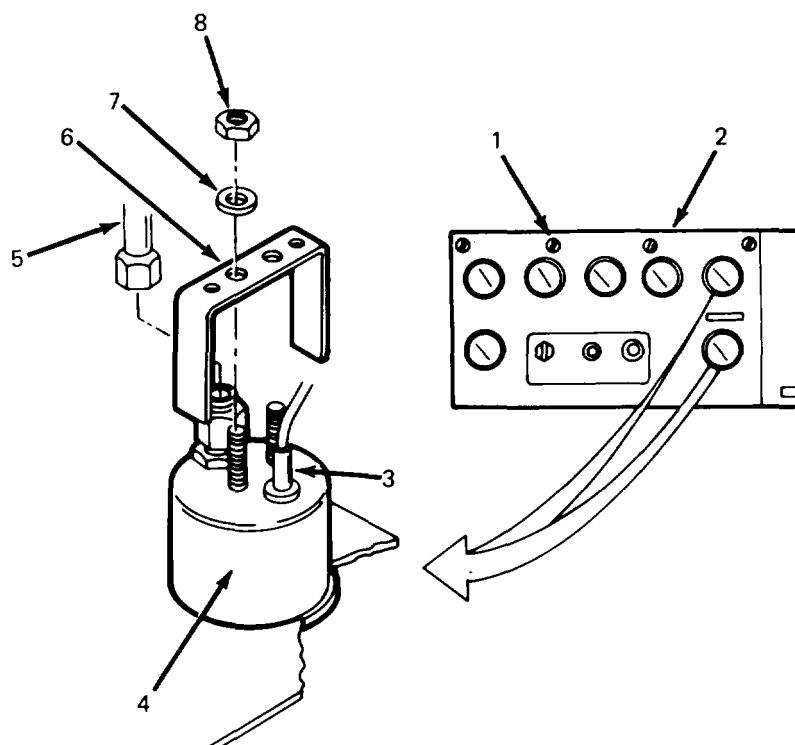
BRAKE SYSTEM.

9-20. AIR PRESSURE GAGES MAINTENANCE (Continued).

LOCATION/ITEM

ACTION

REMARKS



LEGEND:

1. QUARTER-TURN SCREW (4)
2. HINGED PANEL
3. SOCKET AND BULB
4. GAGE
5. AIR LINE
6. BRACKET
7. WASHER (2)
8. NUT (2)

TA 074916

BRAKE SYSTEM.**9-21. BRAKE PEDAL AND VALVE MAINTENANCE.****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

a. Pedal Removal.	(5)
b. Valve Removal.	(20)
c. Valve Installation.	(20)
d. Pedal Installation.	(10)
e. Operational Check.	<u>(2)</u>
57 Minutes Total.	

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (Refer to Appendix C).
 Soap and Water Solution.
 Masking Tape.
 Marking Pen,
 Cotter Pin, 210490 (06853).
 Cotter Pin, 210492 (06853).

PERSONNEL REQUIRED

Two (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
 TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

Table 9-1.

EQUIPMENT CONDITION**PARAGRAPH**

9-13A.
 9-27A and 9-28A.

CONDITION DESCRIPTION

Air Reservoirs Drained,
 Double Check Valve
 Removed.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

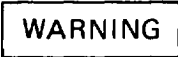
GENERAL SAFETY INSTRUCTIONS

Engine OFF.
 Park Brake Set.
 Transmission in Neutral.

BRAKE SYSTEM.**9-21. BRAKE PEDAL AND VALVE MAINTENANCE (Continued).**

LOCATION/ITEM	ACTION	REMARKS
A. PEDAL REMOVAL.		
1. Cotter pin (11).		
LEGEND: 1. AIR LINE (2) 2. TEE 3. REDUCER 4. WASHER (3) 5. LOCKWASHER (3) 6. BOLT (3) 7. ELBOW (2) 8. AIR LINE (2) 9. PLUG (2) 10. COTTER PIN 11. COTTER PIN 12. PEDAL 13. ROLLER PIN 14. FULCRUM PIN 15. VALVE 16. CONNECTOR 17. PLUG 18. PLUG (2) 19. SPACER (2) 20. ENGINE COMPARTMENT AIR LINES (5) 21. CHECK VALVE 22. ELBOW (3)		
TA 074917		

BRAKE SYSTEM.

9-21. BRAKE PEDAL AND VALVE MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
A. PEDAL REMOVAL (Continued).		
 CAUTION When brake pedal is removed, piston will drop from brake valve.		
2. Roller pin (13).	Remove.	
3. Cotter pin (10).	Remove.	
4. Fulcrum pin (14).	Push out and remove pedal (12), along with two spacers (19).	
B. VALVE REMOVAL.		
 WARNING Do not remove brake valve until pressure is fully exhausted from all reservoirs.		
5. Two air lines (8).	a. Unscrew and remove. b. Tape and mark each line as an aid when installing line. c. Inspect for: 1. Leaks. 2. Cracks. 3. Damaged fittings.	Replace if necessary.
6. Two air lines (1).	a. Unscrew and remove. b. Tape and mark each line as an aid when installing line. c. Inspect for: 1. Leaks. 2. Cracks. 3. Damaged fittings.	Replace if necessary. M918 and M919 only.
7. Five engine compartment air lines (20).	a. Unscrew and remove. b. Tape and mark each line as an aid when installing line. c. Inspect for: 1. Leaks. 2. Cracks. 3. Damaged fittings.	Replace if necessary.
8. Check valve (21).	Remove.	

BRAKE SYSTEM.

9-21. BRAKE PEDAL AND VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
LEGEND: 1. AIR LINE (2) 2. TEE 3. REDUCER 4. WASHER (3) 5. LOCKWASHER (3) 6. BOLT (3) 7. ELBOW (2) 8. AIR LINE (2) 9. PLUG (2) 10. COTTER PIN 11. COTTER PIN 12. PEDAL 13. ROLLER PIN 14. FULCRUM PIN 15. VALVE 16. CONNECTOR 17. PLUG 18. PLUG (2) 19. SPACER (2) 20. ENGINE COMPARTMENT 21. CHECK VALVE 22. ELBOW (3)		

TA 074918

BRAKE SYSTEM.

9-21. BRAKE PEDAL AND VALVE MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
B. VALVE REMOVAL (Continued).		
9. Three elbows (22).	a. Unscrew and remove. b. Tape and mark each fitting as an aid when installing.	
10. Three bolts (6), lockwashers (5) and washers (4).	a. Unscrew and remove. b. Remove valve (15).	
11. Two elbows (7).	a. Unscrew and remove. b. Tape and mark as an aid when installing.	
12. Two plugs (9).	a. Unscrew and remove. b. Tape and mark as an aid when installing.	
13. Connector (16).	a. Unscrew and remove. b. Tape and mark as an aid when installing.	M916 thru M920.
14. Plug (17).	a. Unscrew and remove. b. Tape and mark as an aid when installing.	M915 only.
15. Two plugs (18).	a. Unscrew and remove. b. Tape and mark as an aid when installing.	
16. Reducer (3).	a. Unscrew and remove with tee (2) attached. b. Tape and mark as an aid when installing.	M918 and M919 only.
C. VALVE INSTALLATION.		
17. Reducer (3) with tee (2) attached.	a. Coat threads with liquid teflon. b. Install, noting position of tee and reducer when removed.	M918 and M919 only.
18. Two plugs (18).	a. Coat threads with liquid teflon. b. Install, noting positions of plugs when removed.	

BRAKE SYSTEM.

9-21. BRAKE PEDAL AND VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
LEGEND: 1. AIR LINE (2) 2. TEE 3. REDUCER 4. WASHER (3) 5. LOCKWASHER (3) 6. BOLT (3) 7. ELBOW (2) 8. AIR LINE (2) 9. PLUG (2) 10. COTTER PIN 11. COTTER PIN 12. PEDAL 13. ROLLER PIN 14. FULCRUM PIN 15. VALVE 16. CONNECTOR 17. PLUG 18. PLUG (2) 19. SPACER (2) 20. ENGINE COMPARTMENT 21. CHECK VALVE 22. ELBOW (3)		
TA 074919		

BRAKE SYSTEM.

9-21. BRAKE PEDAL AND VALVE MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
C. VALVE INSTALLATION (Continued).		
19. Plug (17).	a. Coat threads with liquid teflon. b. Install, noting position of plug when removed.	M915 only.
20. Connector (16).	a. Coat threads with liquid teflon. b. Install, noting position of connector when removed.	M916 thru M920.
21. Two plugs (9).	a. Coat threads with liquid teflon. b. Install, noting position of plugs when removed.	
22. Two elbows (7).	a. Coat threads with liquid teflon. b. Install, noting position of elbows when removed.	
23. Valve (15).	a. Aline with mounting holes on firewall in cab. b. Install with three bolts (6), lockwashers (5), and washers (4).	
24. Three elbows (22).	a. Coat threads with liquid teflon. b. Install, noting position of elbows when removed.	
25. Check valve (21).	a. Coat threads with liquid teflon. b. Install, noting position of check valve when removed.	
26. Five engine compartment air lines (20).	Install, noting positions of air lines when removed.	
27. Two air lines (1).	Install, noting positions of air lines when removed.	M918 and M919 only.
28. Two air lines (8).	Install, noting positions of air lines when removed.	

BRAKE SYSTEM.

9-21. BRAKE PEDAL AND VALVE MAINTENANCE (Continued).

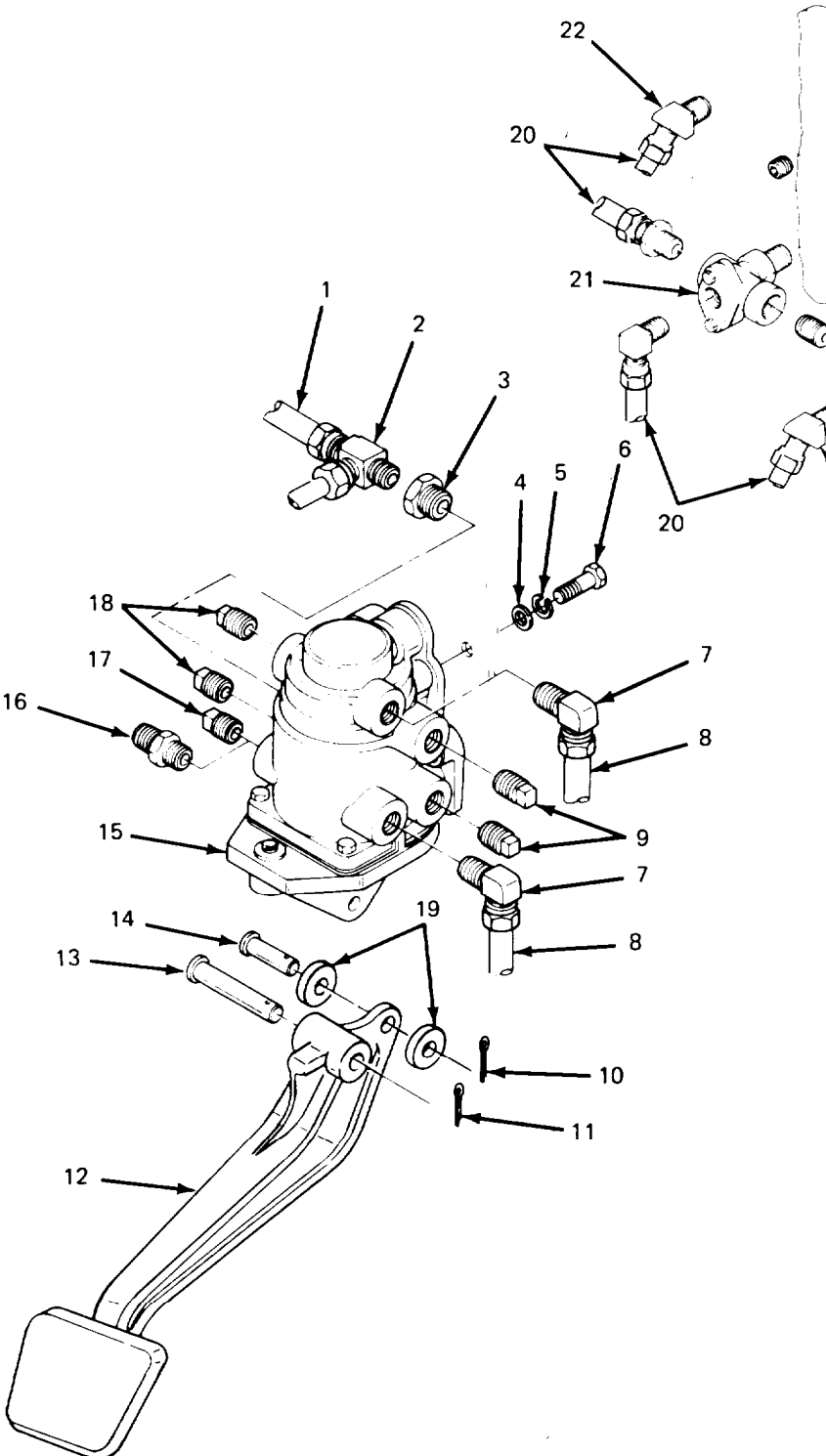
LOCATION/ITEM	ACTION	REMARKS
LEGEND: 1. AIR LINE (2) 2. TEE 3. REDUCER 4. WASHER (3) 5. LOCKWASHER (3) 6. BOLT (3) 7. ELBOW (2) 8. AIR LINE (2) 9. PLUG (2) 10. COTTER PIN 11. COTTER PIN 12. PEDAL 13. ROLLER PIN 14. FULCRUM PIN 15. VALVE 16. CONNECTOR 17. PLUG 18. PLUG (2) 19. SPACER (2) 20. ENGINE COMPARTMENT 21. AIR LINES (5) 22. CHECK VALVE 23. ELBOW (3)		
TA 075668		

BRAKE SYSTEM.

9-21. BRAKE PEDAL AND VALVE MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
D. PEDAL INSTALLATION.		
NOTE Install piston into brake valve before installing pedal.		
29. Pedal (12).	a. Aline with mounting holes on valve (15). b. Install fulcrum pin (14) and two spacers (19).	
30. Cotter pin (10).	Install thru fulcrum pin (14).	
31. Roller pin (13).	Install thru pedal (12).	
32. Cotter pin (11).	Install thru roller pin (13).	
NOTE Follow on maintenance action required: Install double check valve; refer to para 9-27B and 9-28B.		
E. OPERATIONAL CHECK.		
33. Engine.	Start up (see TM 9-2320-273-10). Allow system to reach operating pressure of 105-120 psi (724-827 kPa).	
34. Pedal (12).	Press down, then release.	Second mechanic.
35. All brakes.	Check to see that all brakes are actuated when pedal is pressed, and that they are released when pedal is released.	First mechanic.
36. Valves (15) and (21).	Use soap solution to check for leaks.	Retighten as necessary.
37. Engine.	Shut down (see TM 9-2320-273-10).	

BRAKE SYSTEM.

9-21. BRAKE PEDAL AND VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
		LEGEND: 1. AIR LINE (2) 2. TEE 3. REDUCER 4. WASHER (3) 5. LOCKWASHER (3) 6. BOLT (3) 7. ELBOW (2) 8. AIR LINE (2) 9. PLUG (2) 10. COTTER PIN 11. COTTER PIN 12. PEDAL 13. ROLLER PIN 14. FULCRUM PIN 15. VALVE 16. CONNECTOR 17. PLUG 18. PLUG (2) 19. SPACER (2) 20. ENGINE COMPARTMENT AIR LINES (5) 21. CHECK VALVE 22. ELBOW (3)

TA 075669

BRAKE SYSTEM.**9-22. SERVICE BRAKES QUICK RELEASE VALVE.****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

a. Removal.	(5)
b. Installation.	(10)
c. Operational Check.	(10)
25 Minutes Total.	

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

M915, M916, M918 – 2 Valves Total.
 M917, M919, M920 – 3 Valves Total.

1 each Axle.

EQUIPMENT CONDITION**PARAGRAPH**

9-13A.

CONDITION DESCRIPTION

Air Reservoirs Drained.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (PIN)

Liquid Teflon (Refer to Appendix C).
 Soap and Water Solution.

PERSONNEL REQUIRED

Two (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.
 TM 9-2320-273-20P.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
 Transmission in Neutral.
 Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 9-1.

BRAKE SYSTEM.

9-22. SERVICE BRAKES QUICK RELEASE VALVE (Continued).

LOCATION/ITEM

ACTION

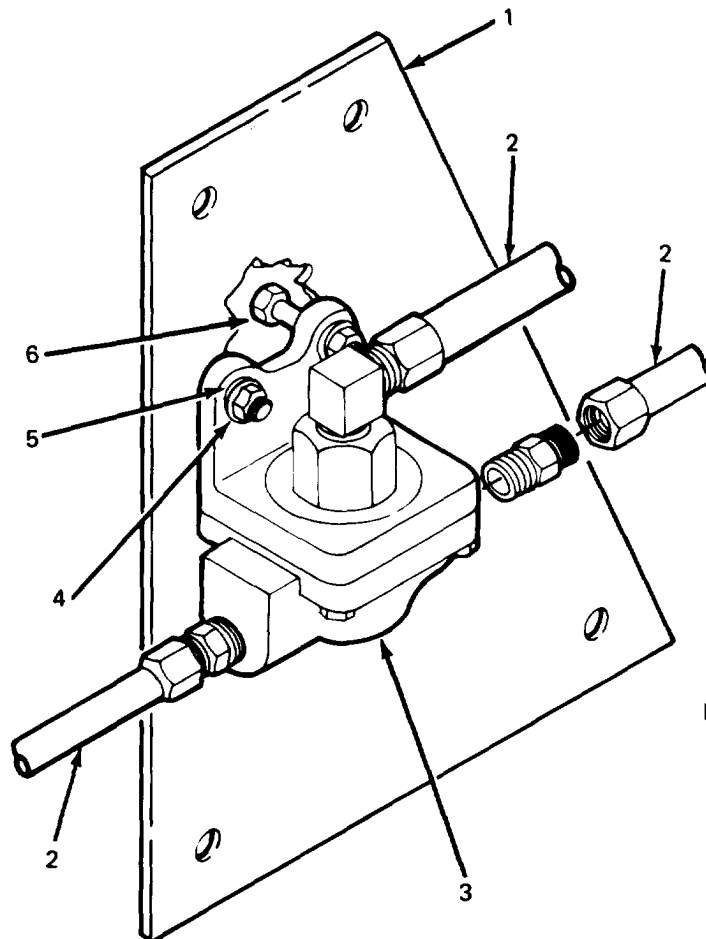
REMARKS

NOTE

For location, refer to locator illustration
(para 9-5 e thru 9-5 j).

WARNING

Do not remove quick-release valve until
pressure is fully exhausted from all
reservoirs.



LEGEND:

1. BRACKET
2. AIR LINE (3)
3. VALVE
4. NUT (2)
5. WASHER (2)
6. BOLT (2)

TA 074920

BRAKE SYSTEM.

9-22. SERVICE BRAKES QUICK RELEASE VALVE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
<u>A. REMOVAL.</u>		
1. Three air lines (2).	a. Unscrew and remove. b. Inspect for: 1. Leaks. 2. Cracks. 3. Damaged threads.	Replace if necessary.
2. Two bolts (6), washers (5), and nuts (4).	Unscrew and remove.	
3. Valve (3).	Remove from bracket (1).	
<u>B. INSTALLATION.</u>		
4. Valve (3).	Transfer all components (elbows, adapters, etc.) to new valve. Use liquid teflon on threaded joints.	
5. Valve (3).	a. Coat threads with liquid teflon. b. Set onto bracket (7) and install two bolts (6).	
6. Two washers (5) and nuts (4).	Install on bolts (6) and tighten.	
7. Three air lines (2).	Screw on and tighten.	
<u>C. OPERATIONAL CHECK.</u>		
8. Engine.	Start up (see TM 9-2320-273-10). Allow system to reach operating pressure of 105-120 psi (724-827 kPa).	
9. CAB/Brake pedal.	Press down and release.	Second mechanic.
10. Valve (3).	a. Check that air exhausts from valve when brake pedal is released. b. Use soap solution to check for leaks.	
11. Engine.	Shut down (see TM 9-2320-273-10).	

BRAKE SYSTEM.

9-22. SERVICE BRAKES QUICK RELEASE VALVE (Continued,

LOCATION/ITEM	ACTION	REMARKS
The diagram shows an exploded view of a quick release valve assembly. A central valve (3) is mounted on a bracket (1). Two air lines (2) are connected to the valve. The assembly is secured with nuts (4), washers (5), and bolts (6). LEGEND: 1. BRACKET 2. AIR LINE (3) 3. VALVE 4. NUT (2) 5. WASHER (2) 6. BOLT (2)		

TA 074921

BRAKE SYSTEM.

9-23. QUICK RELEASE/DOUBLE-CHECK VALVE MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(5)
b. Installation.	(5)
c. Operational Check.	(2)
	12 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (refer to appendix C).

EQUIPMENT CONDITION

PARAGRAPH

9-13A.

CONDITION DESCRIPTION

Drain Primary Air Reservoirs

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 9-1.

BRAKE SYSTEM.

9-23. QUICK RELEASE/DOUBLE-CHECK VALVE MAINTENANCE (Continued).

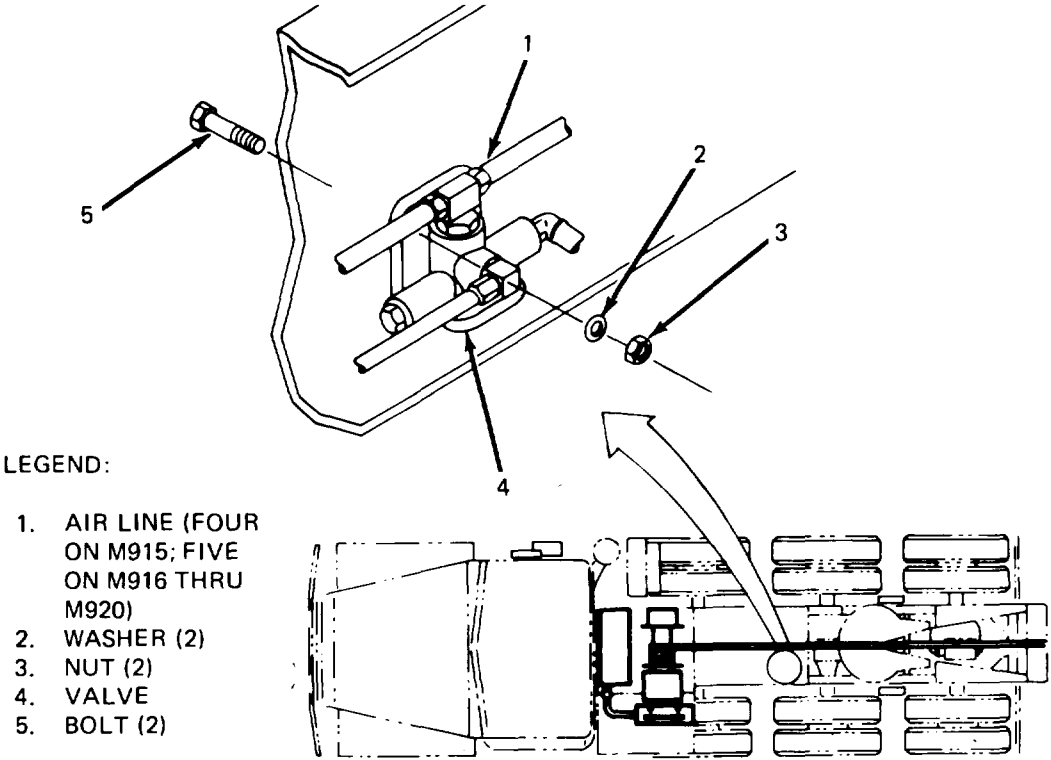
LOCATION/ITEM	ACTION	REMARKS

NOTE

For location, refer to locator illustration
(para 9-5 e. thru 9-5 j.).

WARNING

Do not remove quick-release/double-check
valve until pressure is fully exhausted from
all reservoirs.



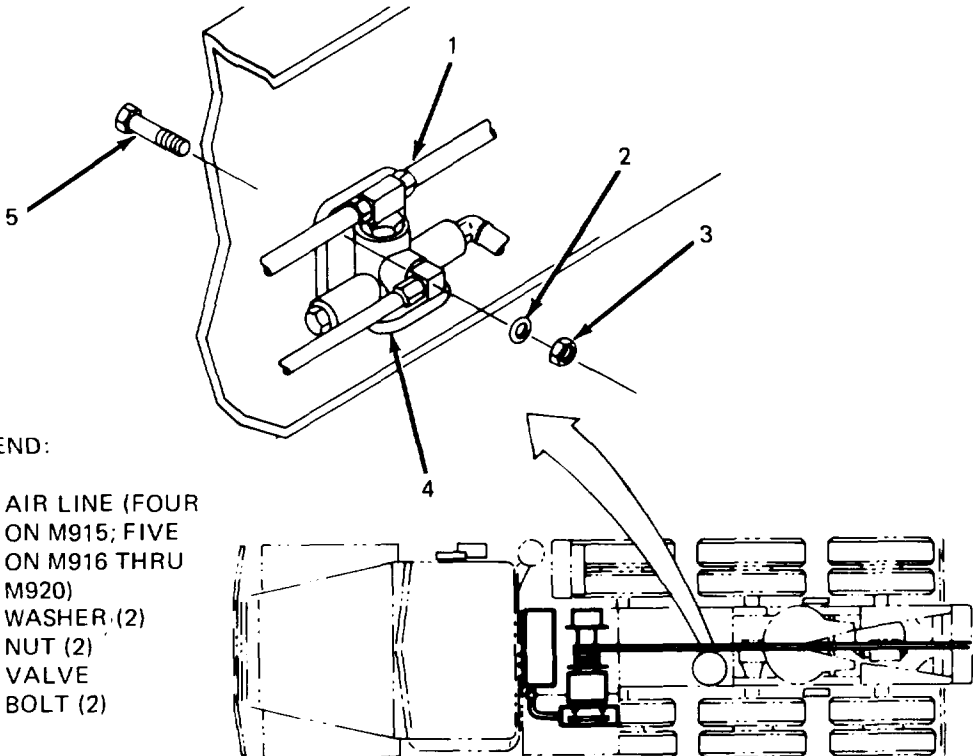
TA 074922

BRAKE SYSTEM.**9-23. QUICK RELEASE/DOUBLE-CHECK VALVE MAINTENANCE (Continued).**

LOCATION/ITEM	ACTION	REMARKS
NOTE On the M915, the valve is located forward of the fifth wheel on the right frame rail. On the M916 thru M920 it is on the left frame rail.		
A. REMOVAL.		
1. Four air lines(1). (M916 thru M920 have five air lines.)	a. Unscrew and remove.	Tag lines for ease of installation.
	b. Inspect for: 1. Cracks. 2. Damaged fittings.	Replace, if necessary.
2. Two nuts (3), washers (2), and bolts (5).	Unscrew and remove. Remove valve (4).	
B. INSTALLATION.		
3. New valve (4).	Transfer all components (elbows, adapters, etc.) to new valve. Use liquid teflon on threads.	
4. Valve (4).	Attach to frame rail with two nuts (3), washers (2), and bolts (5). Tighten nuts and bolts.	
5. Four air lines (1).	a. Coat fittings with liquid teflon. b. Screw on and tighten.	
C. OPERATIONAL CHECK.		
6. Engine.	Start up (see TM 9-2320-273-10). Allow system to reach operating pressure of 105-120 psi (724-827 kPa).	
7. CAB/Brake pedal.	Press and release.	Second mechanic.

BRAKE SYSTEM.

9-23. QUICK RELEASE/DOUBLE-CHECK VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
C. OPERATIONAL CHECK (Continued).		
8. Valve (4).	a. Check to see that air exhausts from-valve when brakes are released. b. Use soap solution to check for leaks.	First mechanic.
9. Engine.	Shut down (see TM 9-2320-273-10).	
 LEGEND: 1. AIR LINE (FOUR ON M915; FIVE ON M916 THRU M920) 2. WASHER (2) 3. NUT (2) 4. VALVE 5. BOLT (2)		

TA 074923

BRAKE SYSTEM.**1-24. RELAY VALVE MAINTENANCE.****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

a. Removal.	(15)
b. Installation.	(20)
c. Checking for Leaks.	(10)
45 Minutes Total.	

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

EQUIPMENT CONDITION**PARAGRAPH**

9-13A.

CONDITION DESCRIPTION

Air Reservoirs Drained.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (Refer to Appendix C).
 Soap and Water Solution.

PERSONNEL REQUIRED

Two (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.
 TM 9-2320-273-20P.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
 Transmission in Neutral.
 Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 9-1.

BRAKE SYSTEM.**9-24. RELAY VALVE MAINTENANCE (Continued).****LOCATION/ITEM****ACTION****REMARKS****WARNING**

Do not remove relay valve until pressure is fully exhausted from all reservoirs.

A. REMOVAL.

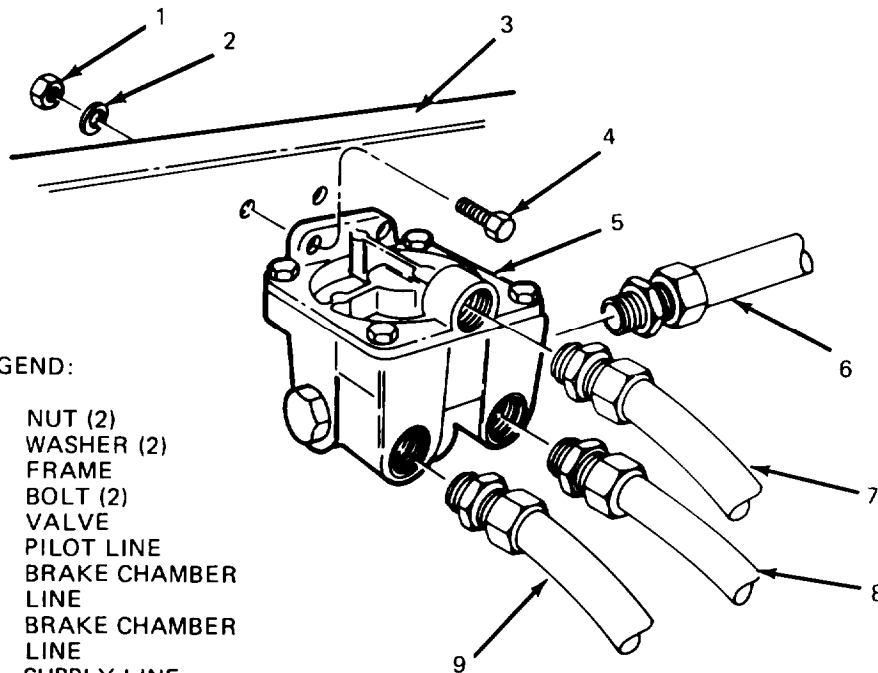
1. Pilot line (6), two brake chamber lines (7) and (8), and supply line (9).

- a. Unscrew and remove.
- b. Inspect for:
 1. Cracks.
 2. Damaged fittings.

Replace if necessary.

LEGEND:

1. NUT (2)
2. WASHER (2)
3. FRAME
4. BOLT (2)
5. VALVE
6. PILOT LINE
7. BRAKE CHAMBER LINE
8. BRAKE CHAMBER LINE
9. SUPPLY LINE



TA 074924

BRAKE SYSTEM.**9-24. RELAY VALVE MAINTENANCE (Continued).**

LOCATION/ITEM	ACTION	REMARKS
<u>A. REMOVAL (Continued).</u>		
2. Two nuts (1), washers (2), and bolts (4).	a. Unscrew and remove. b. Remove valve (5).	
<u>B. INSTALLATION.</u>		
3. Valve (5).	Transfer all components (elbows, adapters, etc.) to new valve before installation. Use liquid teflon on joints.	
4. Valve (5), two nuts (1), washers (2), and bolts (4).	a. Position against frame crossmember (3). b. Tighten nuts.	
5. Pilot line (6), two brake chamber lines (7) and (8), and supply line (9).	a. Coat threads with liquid teflon. b. Screw into valve (5) and tighten.	
<u>C. CHECKING FOR LEAKS.</u>		
6. Engine.	Start up (see TM 9-2320-273-10). Allow system to reach Operating pressure of 105-120 psi (724-827 kPa).	
7. Valve (5).	Apply service brakes and check for leaks using soap solution.	
8. Engine.	Shut down (see TM 9-2320-273-10) .	

BRAKE SYSTEM.

9-24. RELAY VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
LEGEND: 1. NUT (2) 2. WASHER (2) 3. FRAME 4. BOLT (2) 5. VALVE 6. PILOT LINE 7. BRAKE CHAMBER LINE 8. BRAKE CHAMBER LINE 9. SUPPLY LINE		

TA 074925

BRAKE SYSTEM.

3-25. LIMITING VALVE MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a.	Removal.	(5)
b.	Installation.	(10)
c.	Operational Check.	(5)
		<u>20 Minutes Total.</u>

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (refer to appendix C)
Soap and Water Solution.

EQUIPMENT CONDITION
PARAGRAPH

9-13A.

CONDITION DESCRIPTION

Air Reservoirs Drained.

PERSONNEL REQUIRED

Two (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 9-1.

BRAKE SYSTEM.

9-25. LIMITING VALVE MAINTENANCE (Continued).

LOCATION/ITEM

ACTION

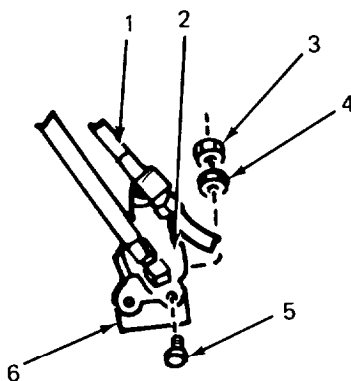
REMARKS

WARNING

Do not remove limiting valve until pressure is fully exhausted from all reservoirs.

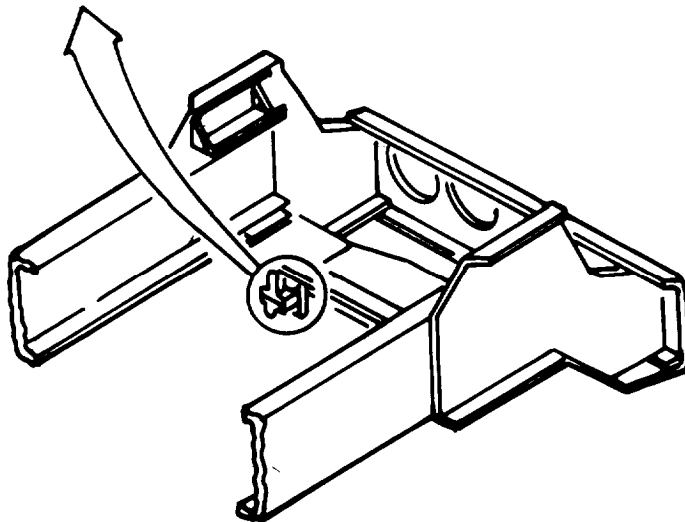
NOTE

For location, refer to locator illustration (para 9-5 e. thru 9-5 j.).



LEGEND:

1. AIR LINE (3)
2. VALVE
3. NUT (2)
4. WASHER (2)
5. CAPSCREW (2)
6. BRACKET



TA 074926

BRAKE SYSTEM.**9-25. LIMITING VALVE MAINTENANCE (Continued).**

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Three air lines (l).	a. Unscrew and remove. b. Inspect for: 1. Cracks. 2. Damaged fittings.	Replace, if necessary.
2. Two capscrews (5), two washers (4) and two nuts (3).	a. Unscrew and remove. b. Remove valve (2).	
B. INSTALLATION .		
3. Valve (2).	Attach to bracket (6) with two capscrews (5), two washers (4) and two nuts (3).	If a new valve is installed transfer all components (elbows, adapters, etc.) to new valve. Use liquid teflon on threaded joints.
4. Three air lines 1).	a. Coat threads with liquid teflon. b. Screw in and tighten.	
C. OPERATIONAL CHECK.		
5. Engine.	Start up (see TM 9-2320-273-10).	
6. CAB/Brake pedal,	Press down.	Second mechanic.
7. Valve (2).	Use soap solution to check for leaks.	First mechanic. Perform this step while brake pedal is pressed down.
8. Vehicle.	Road test. Check for even application of front brakes.	

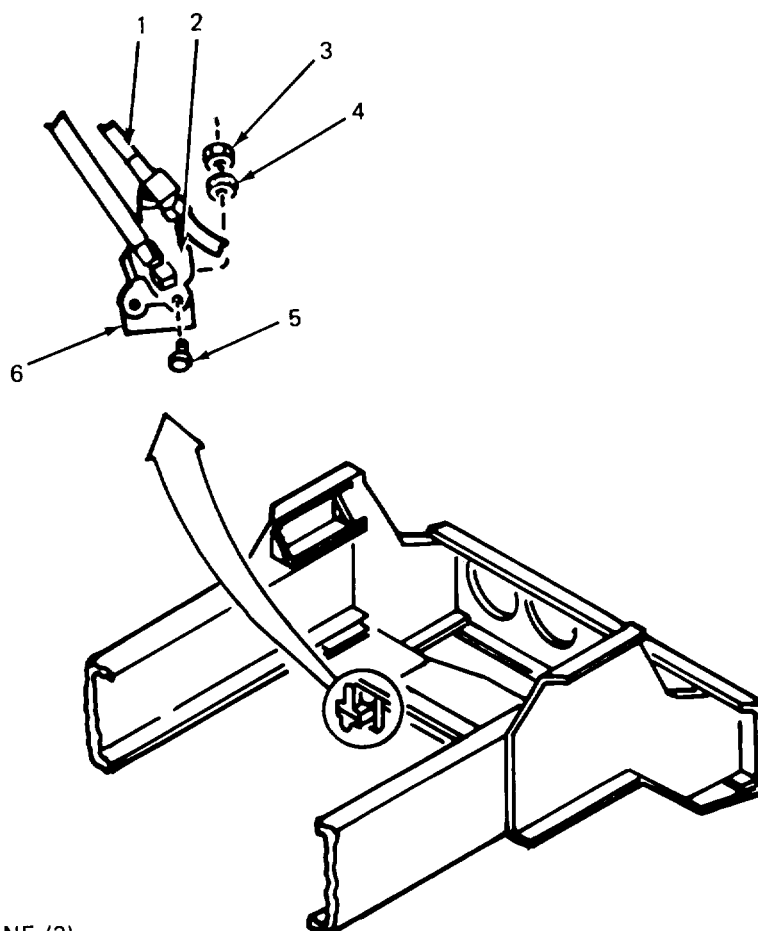
BRAKE SYSTEM.

9-25. LIMITING VALVE MAINTENANCE (Continued).

LOCATION/ITEM

ACTION

REMARKS



LEGEND:

1. AIR LINE (3)
2. VALVE
3. NUT (2)
4. WASHER (2)
5. CAPSCREW (2)
6. BRACKET

TA 074927

BRAKE SYSTEM.**3-26. TRACTOR PROTECTION VALVE MAINTENANCE.****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

- a . Removal. (15)
 - b . Installation. (10)
 - c . Operational Check. (10)
- 35 Minutes Total.

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

M915, M916, M917, M920.

EQUIPMENT CONDITION**PARAGRAPH**

9-13A.

CONDITION DESCRIPTION

Air Reservoirs Drained.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIAL/PARTS (PIN)

Liquid Teflon (Refer to Appendix C).

Marking Pen.

Masking Tape.

PERSONNEL REQUIRED

Two (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.

TM 9-2320-273-20P.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.

Transmission in Neutral.

Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 9-1.

BRAKE SYSTEM.

9-26. TRACTOR PROTECTION VALVE MAINTENANCE (Continued).

LOCATION/ITEM

ACTION

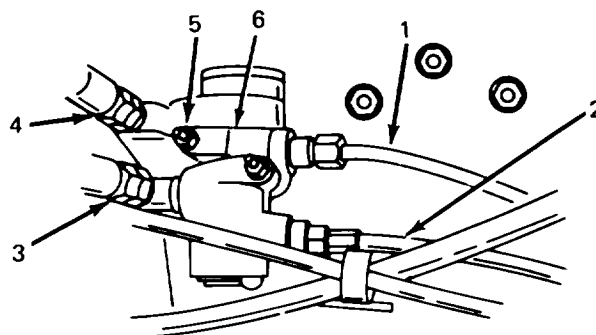
REMARKS

NOTE

For location, refer to locator illustration
(para 9-5 e. thru 9-5 j.).

WARNING

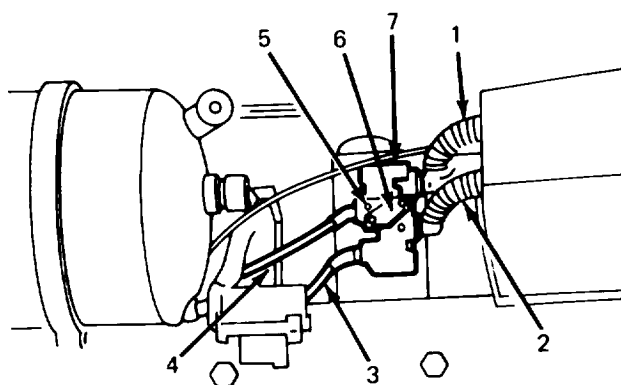
Do not remove tractor protection valve
until pressure is fully exhausted from all
reservoirs.



M915

LEGEND:

1. AIR LINE
2. AIR LINE
3. AIR LINE
4. AIR LINE
5. NUT, LOCKWASHER,
BOLT (2)
6. VALVE



M916, M917, M920

LEGEND:

1. AIR LINE
2. AIR LINE
3. AIR LINE
4. AIR LINE
5. NUT, LOCKWASHER,
BOLT (2)
6. SPACER CLIP
7. VALVE

TA 074928

BRAKE SYSTEM.

9-26. TRACTOR PROTECTION VALVE MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Airlines (1), (2), (3), and (4)	Remove.	Tag lines for ease of location at installation.
2. Two nuts, lockwashers, and bolts (5).	Remove.	
3. Spacer clip (6).	Remove.	(M916, M917, and M920 only,)
4. Valve (7), M916, M917, M920 or valve (6), M915.	Remove.	
5. Valve (7), M916, M917, M920 or valve (6), M915.	Transfer all components (el-bows, fittings, adapters, etc.) to new valve. Coat threaded joints with liquid teflon,	If installing new valve,
B. INSTALLATION.		
6. Valve (7), M916, M917, M920 or valve (6), M915.	Install in vehicle.	
7. Spacer clip (6).	Install	(M916, M917, and M920 only.)
8. Two nuts, lockwashers, and bolts (5).	Install and tighten.	
9. Air lines (1), (2), (3), and (4).	Install and tighten.	Replace any damaged lines and/or fittings.
C. OPERATIONAL CHECK.		
10. Engine.	Start up (see TM 9-2320-273-10). Allow system to reach operating pressure of 105-120 psi (724-827 kPa).	
11. Valve (7), M916, M917, M920 or valve (6), M915.	Apply trailer supply valve and brake pedal valve. Use soap solution to check for leaks.	Second mechanic

BRAKE SYSTEM.

926. TRACTOR PROTECTOR VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
C. OPERATIONAL CHECK (Continued):		
	NOTE	
	If leaks are detected, re-tighten all fittings. If leaks persist, remove hoses and fittings and examine for cracks, and damaged fittings. Replace if necessary.	
12. Engine.	Shut down (see TM 9-2320-273-10).	
	M915 LEGEND: 1. AIR LINE 2. AIR LINE 3. AIR LINE 4. AIR LINE 5. NUT, LOCKWASHER, BOLT (2) 6. VALVE	
	M916, M917, M920 LEGEND: 1. AIR LINE 2. AIR LINE 3. AIR LINE 4. AIR LINE 5. NUT, LOCKWASHER, BOLT (2) 6. SPACER CLIP 7. VALVE	

TA 074929

TA 074929

BRAKE SYSTEM.**9-27. DOUBLE-CHECK VALVE MAINTENANCE.****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

a. Removal.	(5)
b. Installation.	(10)
c. Checking for Leaks.	(10)
25 Minutes Total.	

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

EQUIPMENT CONDITION**PARAGRAPH**

9-13A.

CONDITION DESCRIPTION

Air Reservoirs Drained.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (refer to appendix C).
 Masking Tape.
 Marking Pencil.
 Soap and Water Solution.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.
 TM 9-2320-273-20P.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
 Transmission in Neutral.
 Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 9-1.

BRAKE SYSTEM.

9-27, DOUBLE-CHECK VALVE MAINTENANCE (Continued).

LOCATION/ITEM

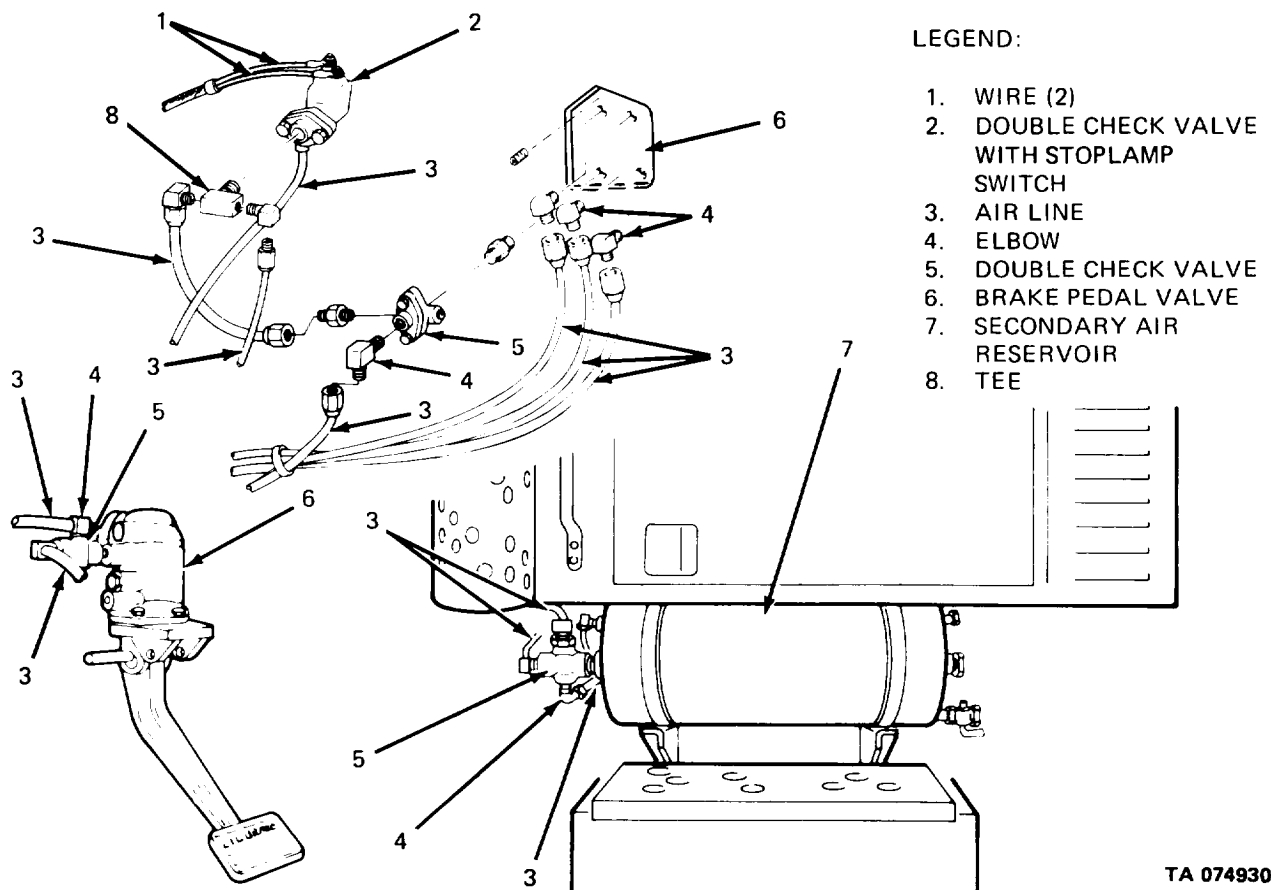
ACTION

REMARKS

Do not remove double-check valve until pressure is fully exhausted from all reservoirs.

NOTE

For location, refer to locator illustration (para 9-5 e. thru 9-5 j.). Double-check valves are attached to the rear of the secondary air reservoir and to the engine side of the brake pedal valve on all models. There is a double-check valve on the driver's side of the brake pedal valve on all models except the M918 and M919. All models use a double check valve with stoplamp switch attached to the engine side of the firewall near the brake pedal valve. The procedure below is general and may be used to service any of these double-check valves.



TA 074930

BRAKE SYSTEM.

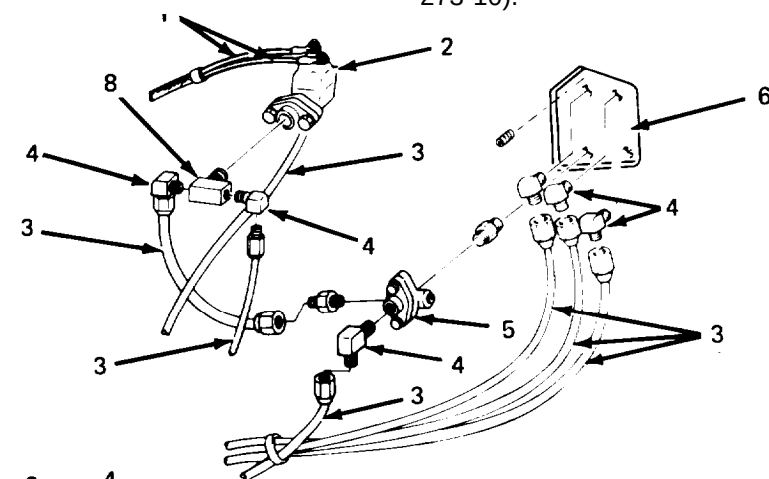
9-27. DOUBLE-CHECK VALVE MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.]		
NOTE Before removing air lines, use masking tape and marking pencil to identify air lines for installation in their proper location.		
1. Wires (1), air lines (3), and tee (8).	Remove from double-check valve with stoplamp switch (2).	Replace if damaged.
2. Double-check valve with stoplamp switch (2).	Unscrew and remove.	
3. Air lines (3) and elbows (4).	Unscrew from double-check valve (5).	Replace if damaged.
4. Double-check valve (5).	Unscrew and remove.	
B. INSTALLATION.		
NOTE Apply liquid teflon to threads of valves, elbows, and tee as you assemble per the locations you marked at disassembly.		
5. Double-check valve with stoplamp switch (2) or double-check valve (5).	Screw in and tighten to fire-wall, brake pedal valve (6), or secondary air reservoir (7).	
6. Elbows (4) and tee (8).	Screw into double-check valve with stoplamp switch (2) or double-check valve (5).	
7. Air lines (3).	Install at double-check valve with stoplamp switch (2) or double-check valve (5).	
8. Wires (1).	Connect to terminals of double-check valve with stoplamp switch (2).	

BRAKE SYSTEM.**9-27. DOUBLE-CHECK VALVE MAINTENANCE (Continued).**

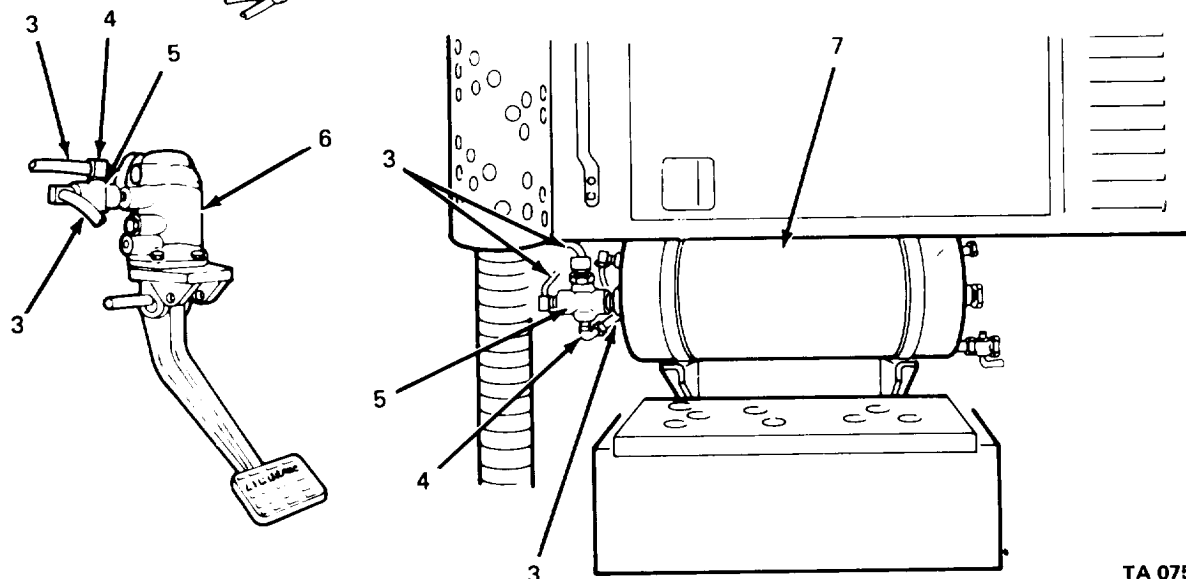
LOCATION/ITEM	ACTION	REMARKS

C. CHECKING FOR LEAKS.

9. Engine.	Start up (see TM 9-2320-273-10). Allow system to reach operating pressure of 105-120 psi (724-827 kPa).	
10. Double-check valve with stoplamp switch (2), double-check valve (5), air lines (3), elbows (4), and tee (8).	Use soap solution to check for leaks.	Tighten as necessary.
11. Engine.	Shut down (see TM 9-2320-273-10).	

**LEGEND:**

1. WIRE (2)
2. DOUBLE CHECK VALVE WITH STOPLAMP SWITCH
3. AIR LINE
4. ELBOW
5. DOUBLE CHECK VALVE
6. BRAKE PEDAL VALVE
7. SECONDARY AIR RESERVOIR
8. TEE



TA 075670

BRAKE SYSTEM.

9-28a DOUBLE-CHECK AND STOPLAMP VALVE MAINTENANCE (M918 AND M919).		
THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)		
a. Removal. (10) b. Installation. (10) c. Operational Check. (10) 30 Minutes Total.		
INITIAL SETUP	EQUIPMENT CONDITION	
<u>APPLICABLE CONFIGURATIONS</u> M918 and M919.	<u>PARAGRAPH</u> 9-13A.	<u>CONDITION DESCRIPTION</u> Air Reservoirs Drained.
<u>TEST EQUIPMENT</u> None.		
<u>SPECIAL TOOLS</u> None.		
<u>MATERIALS/PARTS (P/N)</u> Liquid Teflon (refer to appendix C).		
<u>PERSONNEL REQUIRED</u> One (MOS-63B20).	<u>SPECIAL ENVIRONMENTAL CONDITIONS</u> Vehicle Parked on Level Ground.	
<u>REFERENCES (TM)</u> TM 9-2320-273-10. TM 9-2320-273-20P.	<u>GENERAL SAFETY INSTRUCTIONS</u> Engine OFF. Transmission in Neutral. Park Brake Set.	
<u>TROUBLESHOOTING REFERENCES</u> Table 9-1.		

BRAKE SYSTEM,

9-28. DOUBLE-CHECK AND STOPLAMP VALVE MAINTENANCE (M918 AND M919) (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Fittings (1) and (8).	Unscrew and remove two air lines.	Mark location for reassembly.
2. Tee (2).	Unscrew and remove.	

FIREWALL
ENGINE COMPARTMENT SIDE

LEGEND:

1. FITTING
2. TEE
3. WIRE (2)
4. TERMINAL
5. NUT (2)
6. BULKHEAD FITTING
7. DOUBLE CHECK AND STOPLAMP VALVE
8. ELBOW
9. FITTING

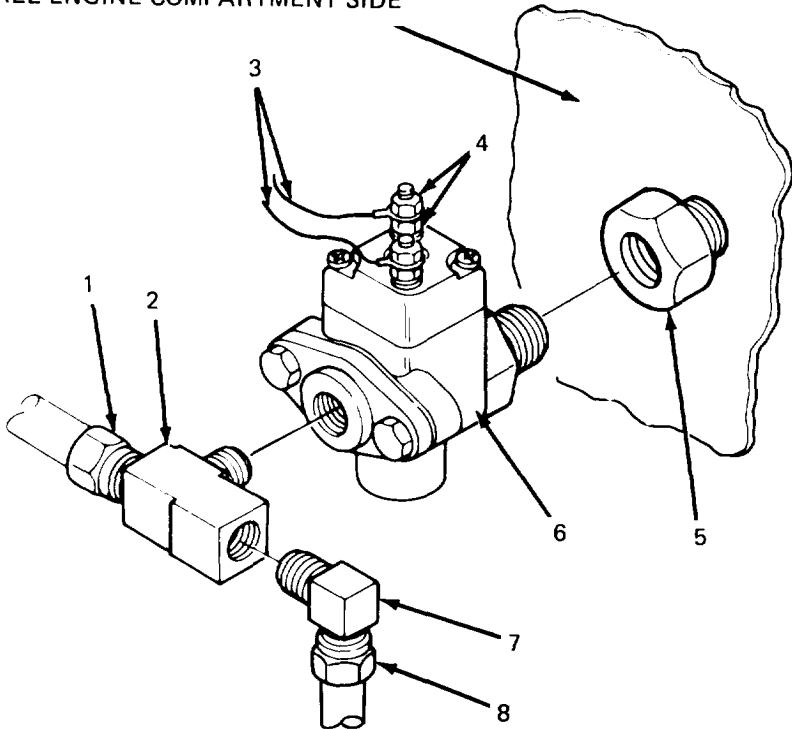
TA 074932

BRAKE SYSTEM.

9-28. DOUBLE-CHECK AND STOPLAMP VALVE-MAINTENANCE (M918 AND M919) (Continued).		
LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
3. Two terminal nuts (4).	Unscrew and remove two wires (3).	Mark location for reassembly.
4. Double-check and stop-lamp valve (6).	Unscrew from bulkhead fitting (5).	
5. Elbow (7).	Unscrew and remove from tee (2).	
B. INSTALLATION.		
6. Elbow (7).	a. Coat threads with liquid teflon. b. Screw into tee (2).	
7. Double-check and stop-lamp valve (6).	a. Coat threads with liquid teflon. b. Screw into bulkhead fitting (5).	
8. Tee (2).	a. Coat threads with liquid teflon. b. Screw into double-check and stoplamp valve (6).	
9. Fittings (1) and (8).	a. Coat threads with liquid teflon. b. Screw into tee (2) and elbow (7).	Install as previously marked.
10. Two wires (3).	Install over terminals and secure with two terminal nuts (4).	Install as previously marked.

BRAKE SYSTEM.

9-28. DOUBLE-CHECK AND STOPLIGHT VALVE MAINTENANCE (M918 AND M919) (Continued).

LOCATION/ITEM	ACTION	REMARKS
C. OPERATIONAL CHECK.		
11. Vehicle.	Road test. Check operation of: a. Service brakes. b. Park brakes. c. Trailer brakes. d. Stoplamps.	Tighten fittings as necessary to stop any detected air leaks.
FIREWALL ENGINE COMPARTMENT SIDE  LEGEND: 1. FITTING 2. TEE 3. WIRE (2) 4. TERMINAL 5. BULKHEAD FITTING 6. DOUBLE CHECK AND STOPLAMP VALVE 7. ELBOW 8. FITTING		

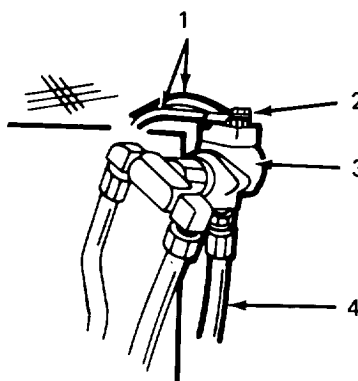
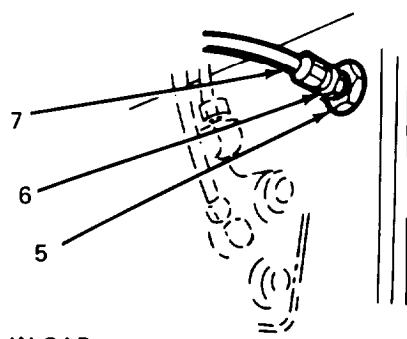
TA 074933

BRAKE SYSTEM.

1.29. DOUBLE-CHECK AND STOPLAMP VALVE MAINTENANCE (M915, M916, M917, M920)		
THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)		
Removal.	(15)	
Installation.	(15)	
Operational Check.	(10)	
40 Minutes Total.		
INITIAL SETUP	EQUIPMENT CONDITION	
APPLICABLE CONFIGURATIONS	PARAGRAPH	CONDITION DESCRIPTION
M915, M916, M917, M920.	9-13A.	Secondary Air Reservoirs Drained.
TEST EQUIPMENT		
None.		
SPECIAL TOOLS		
None.		
MATERIALS/PARTS (P/N)		
Liquid Teflon (refer to appendix C).		
PERSONNEL REQUIRED	SPECIAL ENVIRONMENTAL CONDITIONS	
Two (MOS-63B20).	Vehicle Parked on Level Ground.	
REFERENCES (TM)	GENERAL SAFETY INSTRUCTIONS	
TM 9-2320-273-10.	Engine OFF.	
TM 9-2320-273-20P.	Transmission in Neutral.	
	Park Brake Set.	
TROUBLESHOOTING REFERENCES		
Table 9-1.		

BRAKE SYSTEM.

9-29. DOUBLE-CHECK AND STOPLAMP VALVE MAINTENANCE (M915, M916, M917, M920)
(Continued).

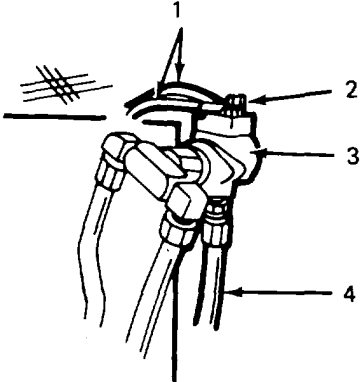
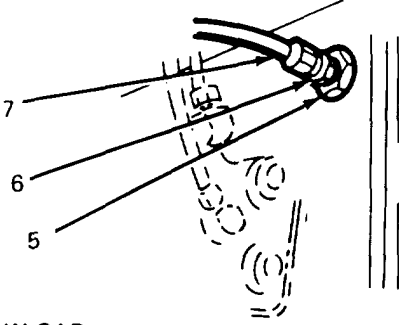
LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Two nuts and washers (2).	Remove.	
2. Two wires (1).	Remove from stoplamp switch terminals.	Tag for location.
3. Three air lines (4).	Remove.	Tag for location.
4. Air line (7).	Remove.	In cab.
 ENGINE COMPARTMENT/FIREWALL		
 IN CAB LEGEND: 1. WIRE (2) 2. NUT AND WASHER (2) 3. VALVE 4. AIR LINE (3) 5. NUT 6. ADAPTER 7. AIR LINE		

TA 074934

BRAKE SYSTEM.**9-29. DOUBLE-CHECK AND STOPLAMP VALVE MAINTENANCE (M915, M916, M917, M920)
(Continued).**

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
5. Adapter (6).	Remove.	In cab.
6. Nut (5).	Remove.	In cab, 2nd mechanic to hold valve to keep from twisting while nut removed.
7. Valve (3).	Remove from vehicle.	
8. Valve (3).	Remove elbows, adapters, tee's from valve.	
B. INSTALLATION.		
9. Valve (3).	Install elbows, tee's, adapters in valve.	Coat threads with liquid teflon.
10. Valve (3).	Install in vehicle.	
11. Nut (5).	Install on valve.	2nd mechanic to hold valve from turning during tightening.
12. Adapter (6).	Install.	Coat threads with liquid teflon.
13. Air line (7).	Install.	
14. Three air lines (4).	Install.	
15. Two wires (1).	Install on terminals.	
16. Two nuts and washers (2).	Install.	

BRAKE SYSTEM.**9-29. DOUBLE-CHECK AND STOPLAMP VALVE MAINTENANCE (M915, M916, M917, M920)
(Continued).**

LOCATION/ITEM	ACTION	REMARKS
C. OPERATIONAL CHECK.		
17. Vehicle	Road test check operation of: a. Service brakes. b. Park brakes. c. Trailer brakes. d. Stoplamps.	
	 ENGINE COMPARTMENT/FIREWALL	
	 IN CAB	LEGEND: 1. WIRE (2) 2. NUT AND WASHER (2) 3. VALVE 4. AIR LINE (3) 5. NUT 6. ADAPTER 7. AIR LINE

TA 074935

BRAKE SYSTEM.

9-30. EXTERNAL AIR COUPLINGS MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(5)
b. Installation.	(10)
	15 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

M915, M916, M920.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (refer to appendix C).

EQUIPMENT CONDITION
PARAGRAPH

9-13A.

CONDITION DESCRIPTION

Air Reservoirs Drained.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 9-1.

BRAKE SYSTEM.

9-30. EXTERNAL AIR COUPLINGS MAINTENANCE (Continued).

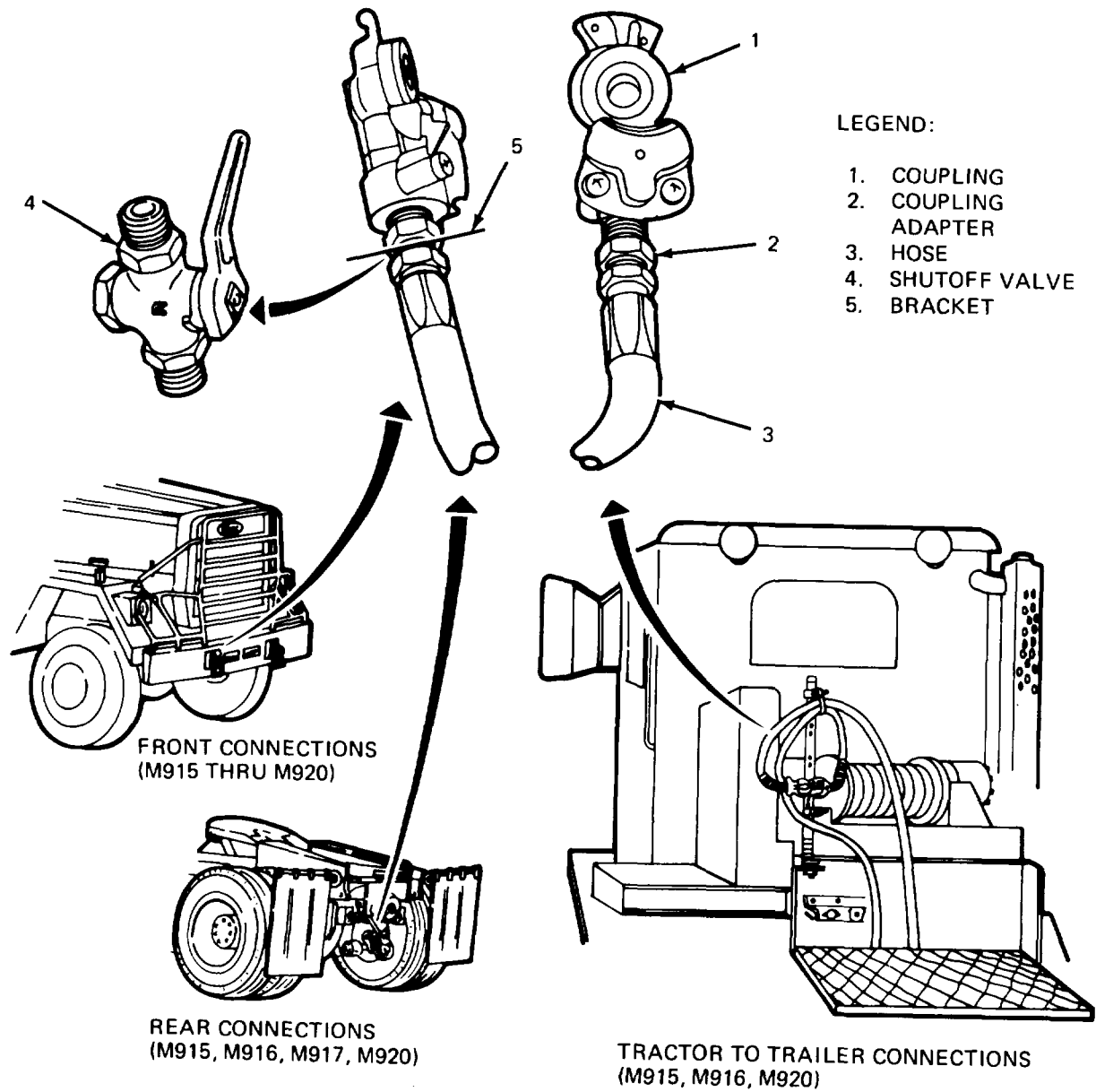
LOCATION/ITEM

ACTION

REMARKS

WARNING

Do not remove couplings until pressure is fully exhausted from all reservoirs.



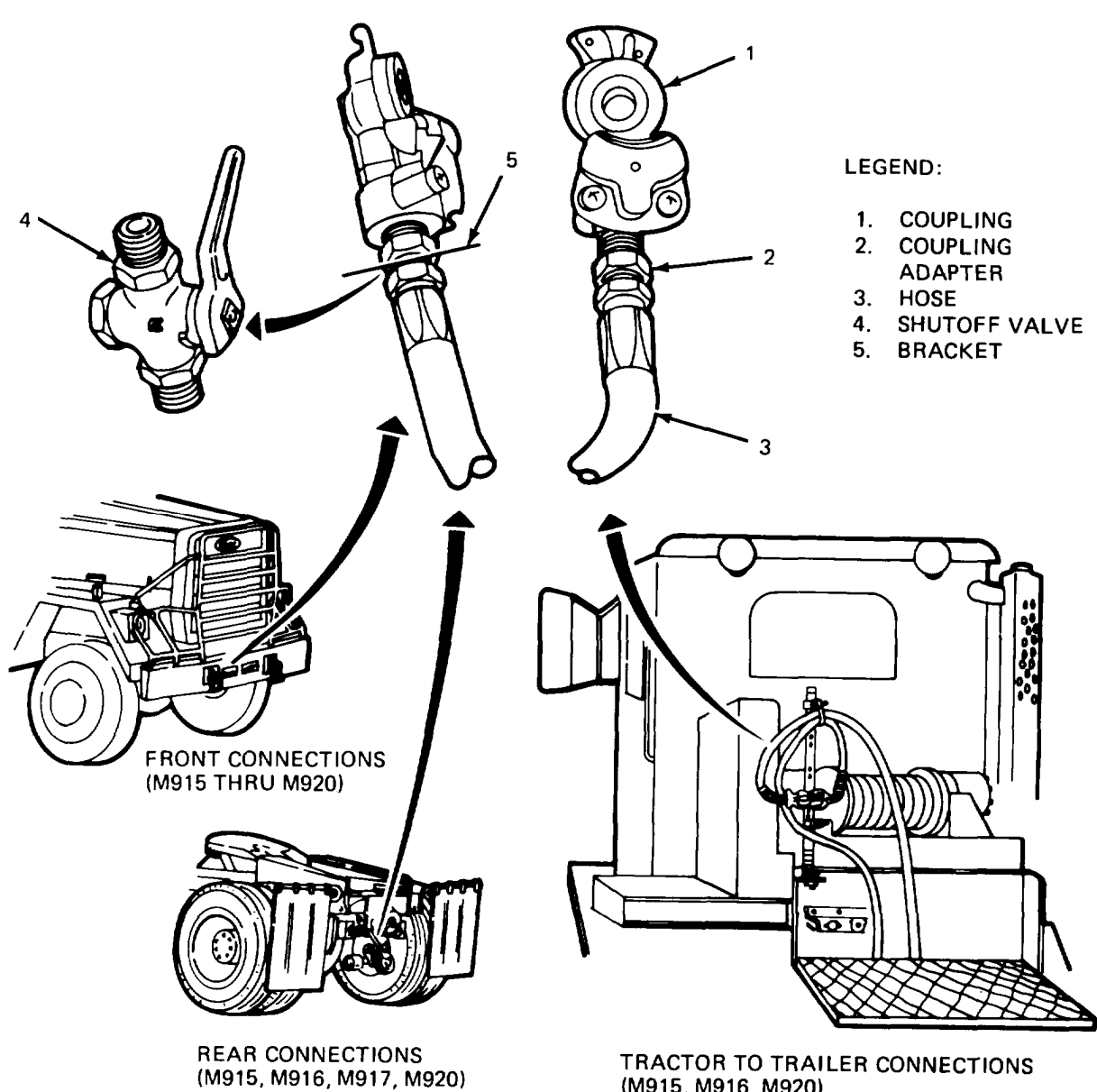
TA 074936

BRAKE SYSTEM.**9-30. EXTERNAL AIR COUPLINGS MAINTENANCE (Continued).**

LOCATION/ITEM	ACTION	REMARKS
<u>A. REMOVAL.</u>		
1. Couplings (1) and couplings adapter (2).	Unscrew and remove from hoses (3).	Tractor to trailer connections.
2. Shutoff valve (4).	Unscrew from coupling (1), coupling adapter (2), hose (3) and bracket (5).	Front and rear connections.
3. Hose (3) and shut-off valve (4).	Inspect for: a. Leaks. b. Cracks. c. Damaged fittings. d. Smooth valve handle operation.	Replace if necessary.
<u>B. INSTALLATION.</u>		
4. Couplings (1) and couplings adapter (2).	a. Apply liquid teflon to threads, b. Screw on hoses (3).	Tractor to trailer connections.
5. Shutoff valve (4).	a. Apply liquid teflon to threads. b. Install thru bracket(s) to coupling (1), coupling adapter (2), and hose (3).	Front and rear connections.

BRAKE SYSTEM.

9-30. EXTERNAL AIR COUPLINGS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
 FRONT CONNECTIONS (M915 THRU M920) REAR CONNECTIONS (M915, M916, M917, M920) TRACTOR TO TRAILER CONNECTIONS (M915, M916, M920)		LEGEND: 1. COUPLING 2. COUPLING ADAPTER 3. HOSE 4. SHUTOFF VALVE 5. BRACKET

TA 074937

BRAKE SYSTEM.

9-31. FRONT BRAKE SHOES MAINTENANCE (M915).

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(15)
b. Inspection.	(5)
c. Installation.	(15)
d. Adjustment.	(15)
	50 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

GAA (Refer to Appendix C).
Cotter Pin, K-227 (78500).

EQUIPMENT CONDITION

PARAGRAPH

10-13A.

CONDITION DESCRIPTION

Hub and Drum Removed.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.
LO 9-2320-273-12.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 9-1

BRAKE SYSTEM.

9-31. FRONT BRAKE SHOES MAINTENANCE (M915) (Continued).

LOCATION/ITEM	ACTION	REMARKS
		LEGEND: 1. BRAKE SHOE (2) 2. SPRING (2) 3. DUST PLUG (4) 4. SEAL ASSEMBLY (2) 5. PLUNGER (1) 6. ANCHOR GUIDE (2) 7. LOCKWASHER (2) 8. WEDGE (2) 9. PAWL 10. SPRING 11. LOCKWASHER 12. CAPSCREW 13. PLUNGER (2) 14. ACTUATOR (2) 15. SEAL ASSEMBLY (2) 16. ADJUSTING BOLT (2) 17. SPIDER 18. CLIP (2) 19. NUT (2) 20. LOCKWASHER (2) 21. CAPSCREW (2) 22. DUST SHIELD 23. CAPSCREW (4) 24. WASHER (4) 25. PLUG (2)

TA 074938

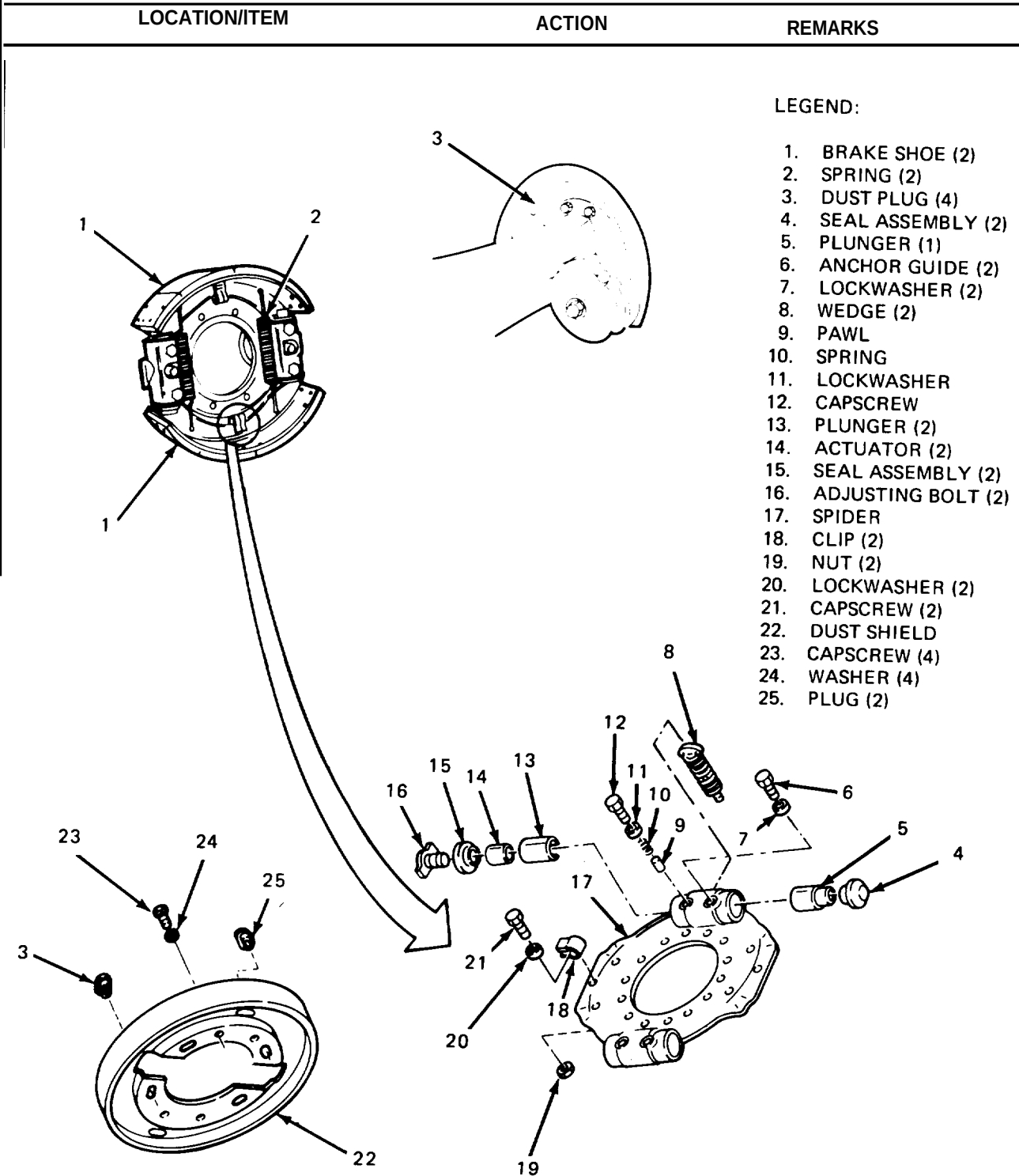
BRAKE SYSTEM.

9-31. FRONT BRAKE SHOES MAINTENANCE (M915) (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Two brake springs (2).	Remove with brake spring pliers.	Place notched tip of pliers against hood on spring, un-notched tip against inner ridge of brake shoe (1), squeezing pliers to stretch spring and remove it from the notch.
2. Two brake shoes (1).	Remove from clip (18) and lift off shoes.	
3. Two clips (18), two nuts (19), two lockwashers (20), and two capscrews (21).	Loosen nut (19) and remove capscrew (21), lockwasher (20) and clip (18).	Remove only if damaged or broken.
4. Two anchor guides (6) and two lockwashers (7).	Remove.	Remove only if service on actuator is needed.
5. Capscrew (12), lockwasher (11), spring (10), and pawl (9).	Remove.	Remove only if service on actuator is needed.
6. Two seal assemblies (4), plunger (5), two plungers (13), two actuators (14), two seal assemblies (15), and two adjusting bolts (16).	Remove.	Clean, inspect, and replace as necessary.
7. Two wedges (8).	Remove and clean.	Replace if damaged.
8. Dust shield (22), four capscrews (23), and four washers (24).	Unscrew capscrews (23).	Remove only if replacement is needed,
B. INSPECTION.		
9. Two brake springs (2), brake shoes (1), seal assemblies (4) and (15) and all hardware.	Inspect for: a. Dirt. b. Wear. c. Damage.	Clean and replace as necessary.

BRAKE SYSTEM.

9-31. FRONT BRAKE SHOES MAINTENANCE (M915) (Continued).



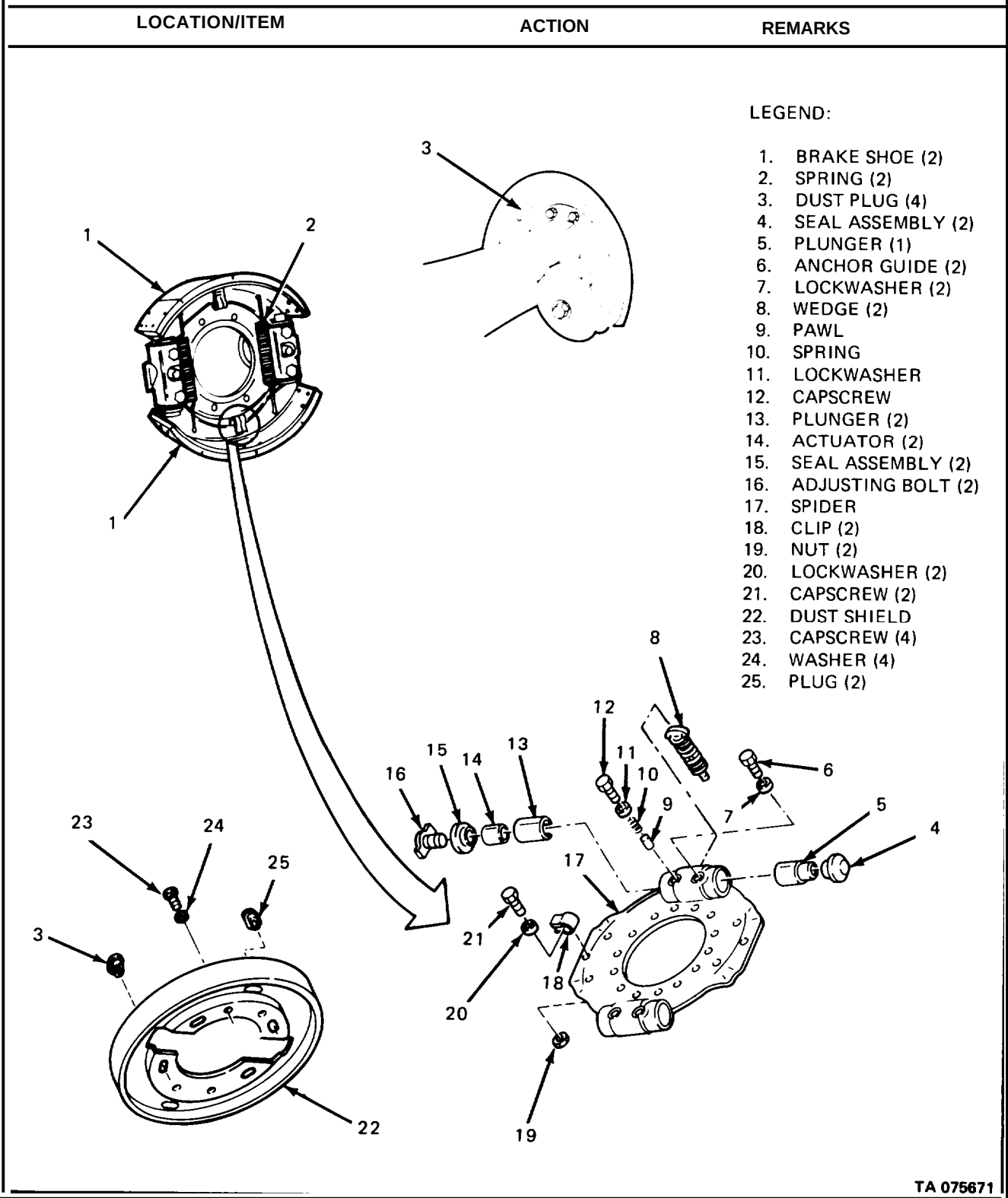
TA 074940

BRAKE SYSTEM.**9-31. FRONT BRAKE SHOES MAINTENANCE (M915) (Continued).**

LOCATION/ITEM	ACTION	REMARKS
C. INSTALLATION.		
10. Dust shield (22), four capscrews (23), and four washers (24).	Install dust shield (22) and secure with capscrews (23) and washers (24).	
11. Two wedges (8).	Install into spider (17).	
12. Plunger (5), two seal assemblies (4), two plungers (13), two actuators (14), two seal assemblies (15), two adjusting bolts (16), two anchor guides (6), and two lockwashers (7).	Install into spider (17) and secure with anchor guide (6), lockwasher (7), capscrew (12), lockwasher (11), spring (10), and pawl (9).	
13. Two clips (18), two nuts (19), two lockwashers (20), and two capscrews (21).	Install clips (18) and secure with capscrews (21), lockwashers (20), and nuts (19).	Install new if previously removed.
CAUTION If you replace any brake shoe, replace all the shoes on that axle. A combination of new and old shoes on the same axle will cause uneven braking. Make sure that the brake shoes are clean before you install them. Be careful not to get grease or oil on the linings as you assemble them.		
14. Two brake shoes (1).	a. Apply a thin film of grease to plunger (5) slots for adjusting bolt (16) and shoe rest pads. b. Position shoes on assembly with pads resting in slots for adjusting bolt (16). c. Double-check to be sure that arrows on shoes point in the direction that wheel will rotate.	Do NOT get any grease on the braking surfaces.
15. Two springs (2).	a. Turn to latch shoes in position. b. Install with brake spring pliers. Curved part of each spring must be towards adjacent brake cylinder.	

BRAKE SYSTEM,

9-31. FRONT BRAKE SHOES MAINTENANCE (M915) (Continued).



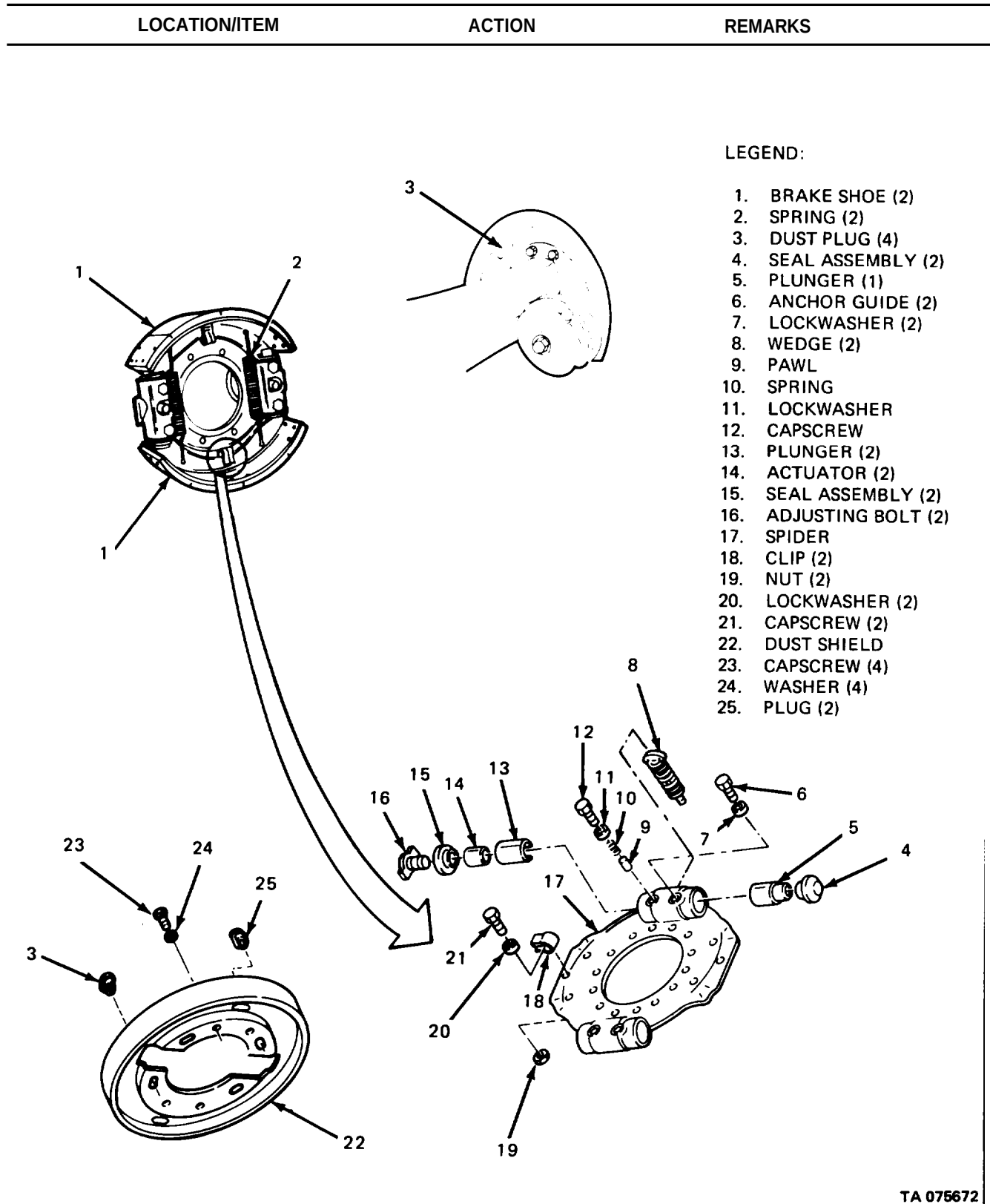
TA 075671

BRAKE SYSTEM.**9-31. FRONT BRAKE SHOES MAINTENANCE (M915) (Continued).**

LOCATION/ITEM	ACTION	REMARKS
C. INSTALLATION (Continued).		
NOTE Follow-on maintenance action required before adjustment: Para 10-12B and C.		
D. ADJUSTMENT.		
WARNING If jack is used, support truck with blocks so that it will not fall if jack slips.		
16. Wheel.	Jack or hoist free of ground.	
17. Two dust plugs (3).	a. Remove dust plugs (3). b. Insert adjusting spoon, c. Turn starwheel bolt (inside slot) until brakes drag heavily on drums. d. Back off starwheel just until wheels turn freely. e. Replace dust plugs (3).	

BRAKE SYSTEM.

9-31. FRONT BRAKE SHOES Maintenance (M915) (Continued).



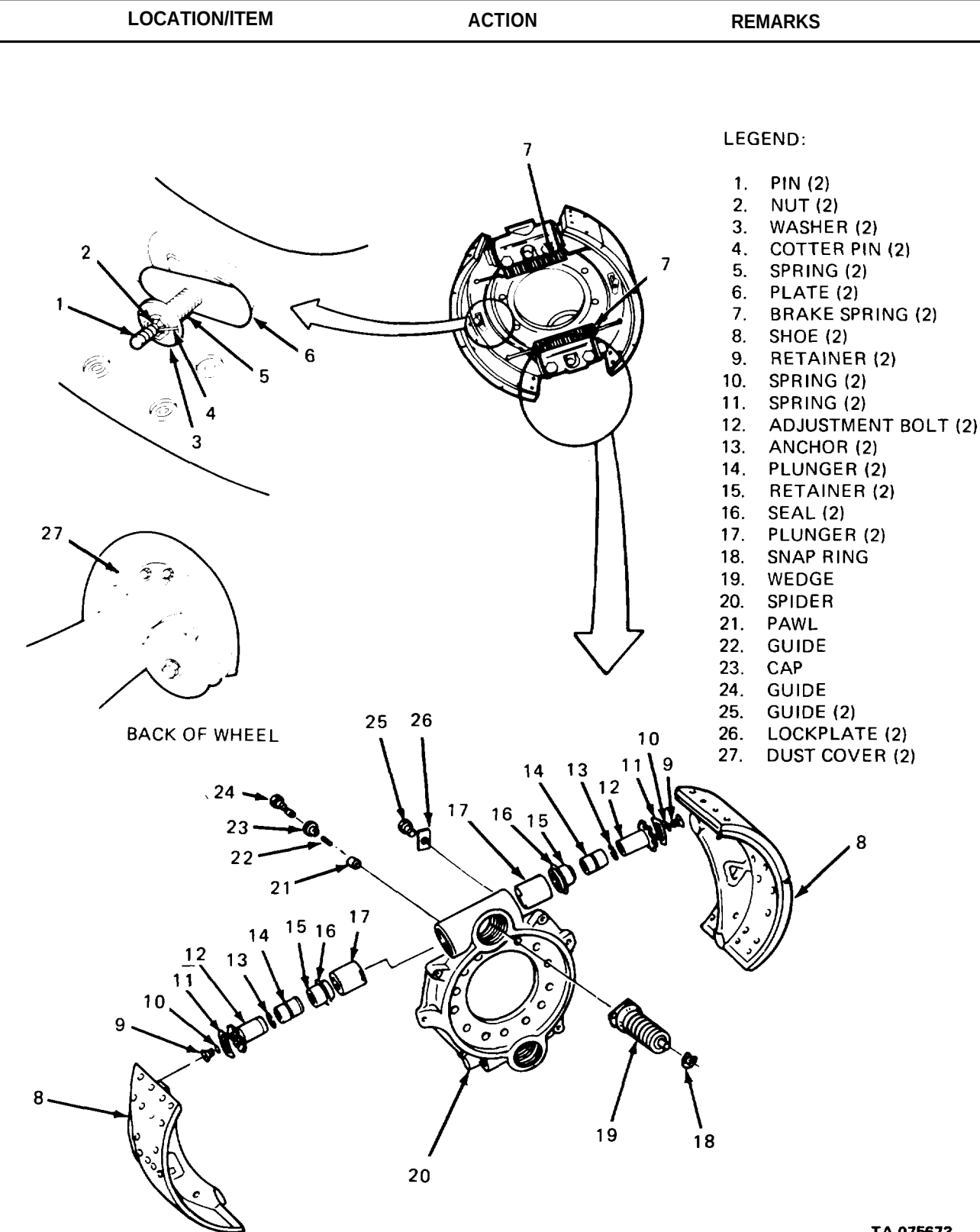
TA 075672

BRAKE SYSTEM.

9-32. FRONT BRAKE SHOES MAINTENANCE (M916 thru M920).		
THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)		
a. Removal. (15)		
b. Inspection. (5)		
c. Installation. (15)		
d. Adjustment. (15)		
50 Minutes Total,		
INITIAL SETUP	EQUIPMENT CONDITION	
<u>APPLICABLE CONFIGURATIONS</u>	<u>PARAGRAPH</u>	<u>CONDITION DESCRIPTION</u>
M916 thru M920	10-14A.	Hub and Drum Removed.
<u>TEST EQUIPMENT</u>		
None.		
<u>SPECIAL TOOLS</u>		
None.		
<u>MATERIALS/PARTS (P/N)</u>		
GAA (Refer to Appendix C).		
Cotter Pin (2), K227 (78500).		
Seal, 1205-E-1409 (78500).		
<u>PERSONNEL REQUIRED</u>	<u>SPECIAL ENVIRONMENTAL CONDITIONS</u>	
One (MOS-63B20).	Vehicle Parked on Level Ground.	
<u>REFERENCES (TM)</u>	<u>GENERAL SAFETY INSTRUCTIONS</u>	
TM 9-2320-273-10.	Engine OFF.	
TM 9-2320-273-20P.	Transmission in Neutral.	
LO 9-2320-273-12.	Park Brake Set.	
<u>TROUBLESHOOTING REFERENCES</u>		
Table 9-1.		

BRAKE SYSTEM.

9-32. FRONT BRAKE SHOES MAINTENANCE (M916 THRU M920) (Continued).



TA 075673

BRAKE SYSTEM.

9-32. FRONT BRAKE SHOES MAINTENANCE (M916 THRU M920) (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Two brake springs (7).	Remove with brake spring pliers.	Place notched tip of pliers against hood on spring, un-notched tip against inner ridge of brake shoe (8), squeezing pliers to stretch spring and remove it from the notch.
2. Two cotter pins (4).	Remove and discard.	
3. Two nuts (2) and washers (3).	Remove.	
4. Two springs (5).	Remove.	
5. Two plates (6).	Remove.	
6. Two pins (1).	Remove.	
7. Two brake shoes (8).	Remove.	
8. Guide (24), and (22), cap (23), pawl (21), two guides (25), and two lock plates (26).	Remove to provide access to wedge cylinder parts.	Remove for inspection, not normally needed unless trouble is indicated.
9. Two retainers (9), two springs (10) and (11), two adjusting bolts (12), two anchors (13), two plungers (14), two retainers (15), two seals (16), and two plungers (17).	Remove and clean; discard seals (16).	
10. Snap ring (18) and wedge (19).	Remove for inspection.	Replace if damaged.
B. INSPECTION.		
11. Brake springs (7), shoes (8), and all hardware.	Inspect for: a. Dirt. b. Wear. c. Damage.	Replace as necessary.

BRAKE SYSTEM.

9-32. FRONT BRAKE SHOES MAINTENANCE (M916 thru M920) (Continued).

LOCATION/ITEM	ACTION	REMARKS
BACK OF WHEEL		LEGEND: 1. PIN (2) 2. NUT (2) 3. WASHER (2) 4. COTTER PIN (2) 5. SPRING (2) 6. PLATE (2) 7. BRAKE SPRING (2) 8. SHOE (2) 9. RETAINER (2) 10. SPRING (2) 11. SPRING (2) 12. ADJUSTMENT BOLT (2) 13. ANCHOR (2) 14. PLUNGER (2) 15. RETAINER (2) 16. SEAL (2) 17. PLUNGER (2) 18. SNAP RING 19. WEDGE 20. SPIDER 21. PAWL 22. GUIDE 23. CAP 24. GUIDE 25. GUIDE (2) 26. LOCKPLATE (2) 27. DUST COVER (2)

TA 075674

BRAKE SYSTEM.

9-32. FRONT BRAKE SHOES MAINTENANCE (M916 THRU M920) (Continued).

LOCATION/ITEM	ACTION	REMARKS

C. INSTALLATION.**CAUTION**

If you replace any brake shoe, replace all the shoes on that axle. A combination of new and old shoes on the same axle will cause uneven braking. Make sure that the brake shoes are clean before you install them. Be careful not to get grease or oil on the linings as you assemble them.

12. Wedge (19) and snap ring (18).	Install into spider (20).	
13. Two plungers (17), two new seals (16), two retainers (15), two plungers (14), two anchors (13), two adjusting bolts (12), two springs (10) and (11) and two retainers (9).	Install as shown.	
14. Guides (24) and (22), cap (23), pawl (21), two guides (25), and two lockplates (26).	Install pawl (21) with guides (24) and (22), and cap (23).	
15. Two brake shoes (8).	Install.	
16. Two pins (1), two plates (6), two springs (5), two washers (3), two nuts (2), and two new cotter pins (4).	Install pins (1) and plates (6) with springs (5), washers (3), nuts (2), and new cotter pins (4).	
17. Two springs (7).	Install with brake spring pliers.	

NOTE

Follow-on maintenance action required before adjustment:

Install hub and drum; refer to para 10-14B and C.

BRAKE SYSTEM.

9-32. FRONT BRAKE SHOES MAINTENANCE (M916 thru M920) (Continued).

LOCATION/ITEM	ACTION	REMARKS
LEGEND: 1. PIN (2) 2. NUT (2) 3. WASHER (2) 4. COTTER PIN (2) 5. SPRING (2) 6. PLATE (2) 7. BRAKE SPRING (2) 8. SHOE (2) 9. RETAINER (2) 10. SPRING (2) 11. SPRING (2) 12. ADJUSTMENT BOLT (2) 13. ANCHOR (2) 14. PLUNGER (2) 15. RETAINER (2) 16. SEAL (2) 17. PLUNGER (2) 18. SNAP RING 19. WEDGE 20. SPIDER 21. PAWL 22. GUIDE 23. CAP 24. GUIDE 25. GUIDE (2) 26. LOCKPLATE (2) 27. DUST COVER (2)		

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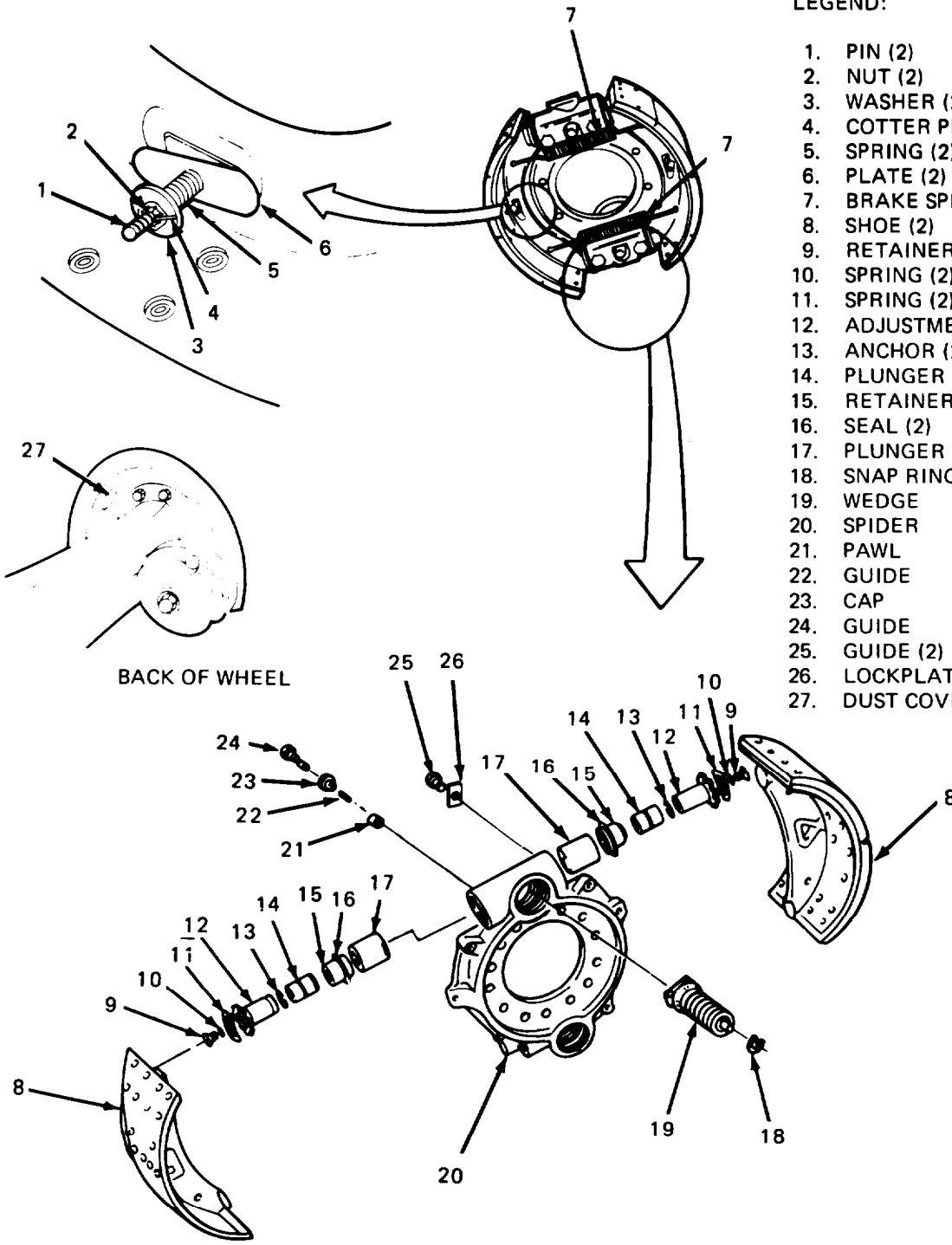
BRAKE SYSTEM.

9-32. FRONT BRAKE SHOES MAINTENANCE (M916 THRU M920) (Continued).

LOCATION/ITEM	ACTION	REMARKS
D. ADJUSTMENT.]		
WARNING If jack is used, support truck with blocks so that it will not fall if jack slips.		
18. Wheel.	Jack or hoist free of ground.	
19. Two dust covers (27)	a. Remove. b. Insert adjusting tool. c. Turn starwheel bolt (inside slot) until brakes drag heavily on drums. d. Back off starwheel just until wheels turn freely. e. Replace dust covers (27).	

BRAKE SYSTEM,

9-32. FRONT BRAKE SHOES MAINTENANCE (M916 thru M920) (Continued).

LOCATION/ITEM	ACTION	REMARKS
 BACK OF WHEEL		LEGEND: 1. PIN (2) 2. NUT (2) 3. WASHER (2) 4. COTTER PIN (2) 5. SPRING (2) 6. PLATE (2) 7. BRAKE SPRING (2) 8. SHOE (2) 9. RETAINER (2) 10. SPRING (2) 11. SPRING (2) 12. ADJUSTMENT BOLT (2) 13. ANCHOR (2) 14. PLUNGER (2) 15. RETAINER (2) 16. SEAL (2) 17. PLUNGER (2) 18. SNAP RING 19. WEDGE 20. SPIDER 21. PAWL 22. GUIDE 23. CAP 24. GUIDE 25. GUIDE (2) 26. LOCKPLATE (2) 27. DUST COVER (2)

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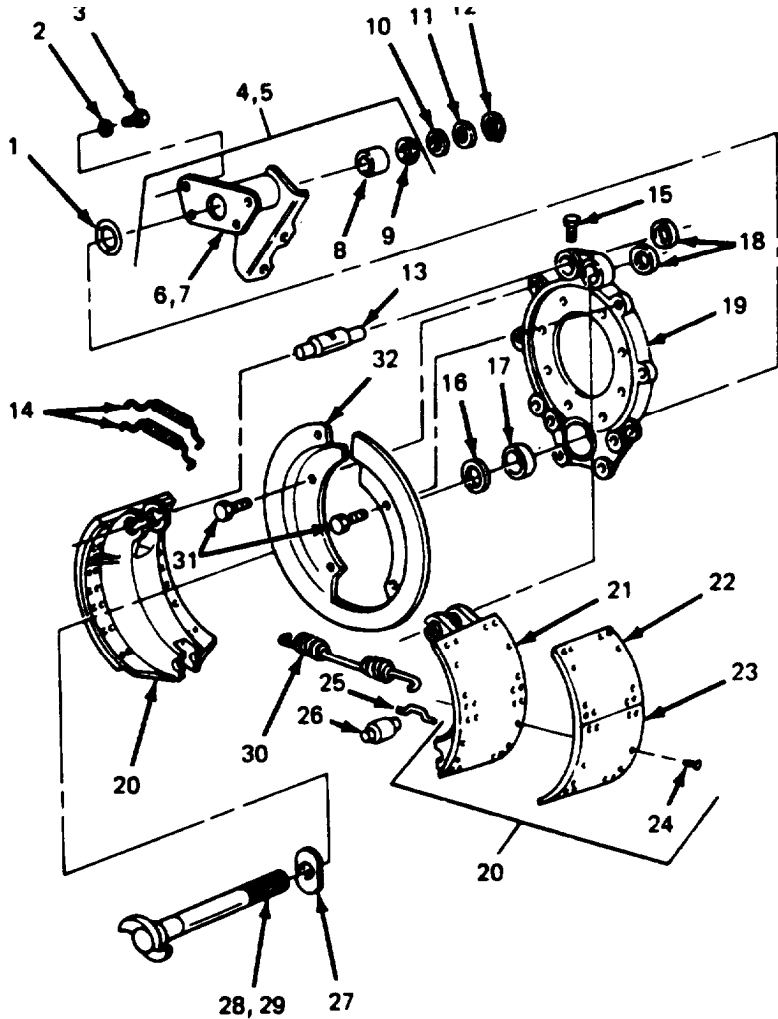
BRAKE SYSTEM.

9-33. REAR BRAKE SHOES MAINTENANCE (M915).		
THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)		
Removal. (15) Inspection. (15) Installation . (20) 50 Minutes Total.		
<u>INITIAL SETUP</u> <u>APPLICABLE CONFIGURATIONS</u> M915. <u>TEST EQUIPMENT</u> None. <u>SPECIAL TOOLS</u> None. <u>MATERIALS/PARTS (P/N)</u> None.	<u>EQUIPMENT CONDITION</u> <u>PARAGRAPH</u> 10-15A.	<u>CONDITION DESCRIPTION</u> Hub and Drum removed.
<u>PERSONNEL REQUIRED</u> One (MOS-63B20). <u>REFERENCES (TM)</u> None. <u>SPECIAL ENVIRONMENTAL CONDITIONS</u> Vehicle Parked on Level Ground.		
<u>TRROUBLESHOOTING REFERENCES</u> 9-1. <u>GENERAL SAFETY INSTRUCTIONS</u> Engine OFF. Transmission in Neutral Park Brake Set.		

BRAKE SYSTEM.

9-33. REAR BRAKE SHOES MAINTENANCE (M915) (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. GASKET	12. RETAINING RING	23. LINING
2. LOCKWASHER (4)	13. ANCHOR PIN (2)	24. RIVET
3. CAPSCREW (4)	14. SPRING (2)	25. PIN (2)
4. BRACKET ASSEMBLY	15. LOCKSCREW (2)	26. ROLLER (2)
5. BRACKET ASSEMBLY	16. SEAL	27. WASHER
6. BRACKET	17. BEARING	28. CAMSHAFT, RH
7. BRACKET	18. BUSHING (2)	29. CAMSHAFT, LH
8. BEARING	19. SPIDER	30. SPRING
9. SEAL	20. SHOE ASSEMBLY (2)	31. CAPSCREW (4)
10. WASHER (2)	21. SHOE (2)	32. DUST SHIELD
11. WASHER	22. LINING	

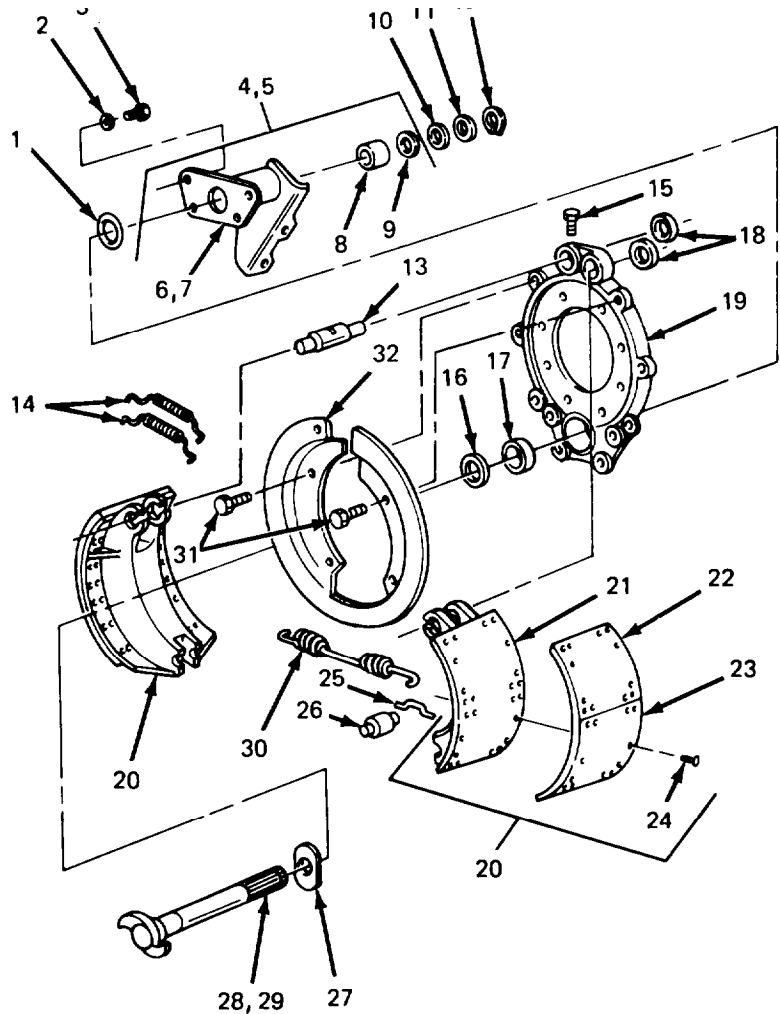
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BRAKE SYSTEM.**9-33. REAR BRAKE SHOES MAINTENANCE (M915) (Continued).**

LOCATION/ITEM	ACTION	REMARKS
1. RH and LH camshafts (28) and (29).	Back off on slack adjuster until camshafts (28) and (29) are in fully released position.	
2. Two shoe assemblies (20) and two rollers (26).	With a pry bar, pry upon shoe assemblies (20) and pull out rollers (26).	
3. Spring (30) and two pins (25).	Remove,	
4. Two springs (14).	Tilt shoe assemblies (20) out 180 degrees to release springs (14) and remove.	
5. Two lock screws (15) and two anchor pins (13).	Cut lock wire and loosen lock screw (15) to remove anchor pin (13) and shoe assemblies (20).	
B. INSPECTION.		
6. Camshafts (28) and (29), bearings (17) and (8), and two bushings (18).	Inspect for excessive wear and looseness in bearings (17), bushing (18), and bearing (8).	
7. Two shoe assemblies (20).	Inspect for wear or damage and replace as necessary.	If linings (22) and (23) are to be serviced separately, refer to Direct Support Maintenance as rivets (24) will have to be drilled out of linings and shoes (21).
NOTE Perform steps 8 thru 14 only if excessive wear has been found.		
8. Retaining ring (12) and washer (11).	Remove,	
9. Slack adjuster.	Remove (refer to para 9-39A and B).	

BRAKE SYSTEM.

9-33. REAR BRAKE SHOES MAINTENANCE (M915) (Continued).

LOCATION/ITEM	ACTION	REMARKS																																	
																																			
LEGEND: <table border="0"> <tbody> <tr> <td>1. GASKET</td><td>12. RETAINING RING</td><td>23. LINING</td></tr> <tr> <td>2. LOCKWASHER (4)</td><td>13. ANCHOR PIN (2)</td><td>24. RIVET</td></tr> <tr> <td>3. CAPSCREW (4)</td><td>14. SPRING (2)</td><td>25. PIN (2)</td></tr> <tr> <td>4. BRACKET ASSEMBLY</td><td>15. LOCKSCREW (2)</td><td>26. ROLLER (2)</td></tr> <tr> <td>5. BRACKET ASSEMBLY</td><td>16. SEAL</td><td>27. WASHER</td></tr> <tr> <td>6. BRACKET</td><td>17. BEARING</td><td>28. CAMSHAFT, RH</td></tr> <tr> <td>7. BRACKET</td><td>18. BUSHING (2)</td><td>29. CAMSHAFT, LH</td></tr> <tr> <td>8. BEARING</td><td>19. SPIDER</td><td>30. SPRING</td></tr> <tr> <td>9. SEAL</td><td>20. SHOE ASSEMBLY (2)</td><td>31. CAPSCREW (4)</td></tr> <tr> <td>10. WASHER (2)</td><td>21. SHOE (2)</td><td>32. DUST SHIELD</td></tr> <tr> <td>11. WASHER</td><td>22. LINING</td><td></td></tr> </tbody> </table>			1. GASKET	12. RETAINING RING	23. LINING	2. LOCKWASHER (4)	13. ANCHOR PIN (2)	24. RIVET	3. CAPSCREW (4)	14. SPRING (2)	25. PIN (2)	4. BRACKET ASSEMBLY	15. LOCKSCREW (2)	26. ROLLER (2)	5. BRACKET ASSEMBLY	16. SEAL	27. WASHER	6. BRACKET	17. BEARING	28. CAMSHAFT, RH	7. BRACKET	18. BUSHING (2)	29. CAMSHAFT, LH	8. BEARING	19. SPIDER	30. SPRING	9. SEAL	20. SHOE ASSEMBLY (2)	31. CAPSCREW (4)	10. WASHER (2)	21. SHOE (2)	32. DUST SHIELD	11. WASHER	22. LINING	
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BRAKE SYSTEM.**9-33. REAR BRAKE SHOES MAINTENANCE (M915) (Continued).**

LOCATION/ITEM	ACTION	REMARKS
B. INSPECTION (Continued).		
10. Camshafts (28) and (29), two washers (10), and washer (27).	Remove by tapping gently from rear.	
11. Bracket assemblies (4) and (5) and gasket (1).	Remove by unscrewing four capscrews (3) with four lockwashers (2).	
12. Bearing (8) and seal (9).	Remove from brackets (6) and (7).	
13. Two bushings (18), seal (16), and bearing (17).	Remove from spider (19).	
14. Four capscrews (31) and dust shield (32).	Remove from spider (19).	Remove only if damaged or replacing spider.
C. INSTALLATION.		
15. Two bushings (18), seal (16), and bearing (17).	Push into spider (19).	
16. Bearing (8) and seal (9).	Insert into brackets (6) and (7),	
17. Bracket assemblies (4) and (5) and gasket (1).	Install and secure with four capscrews (3) and lockwashers (2).	
18. Camshafts (28) and (29) and washer (27).	Install through bearings (17) and (8).	
19. Two shoe assemblies (20) and two anchor pins (13).	a. Install to spider (19) thru two bushings (18). b. Tighten lock screw (15) and install new lock wire.	

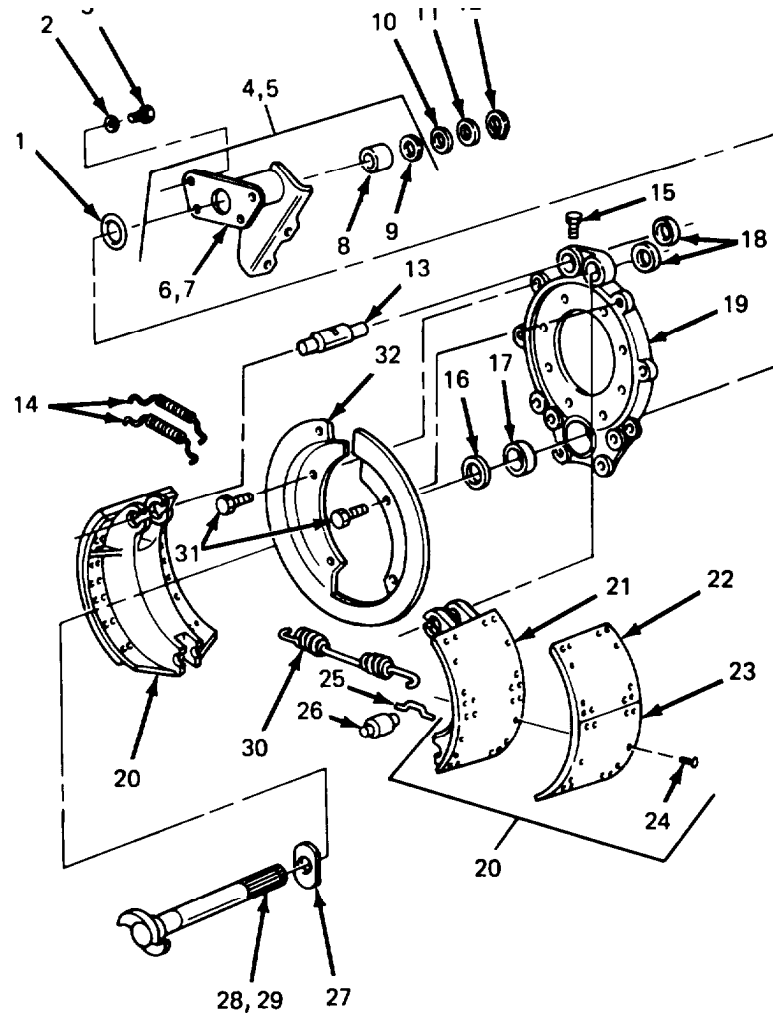
BRAKE SYSTEM.

9-33. REAR BRAKE SHOES MAINTENANCE (M915) (Continued).

LOCATION/ITEM

ACTION

REMARKS



LEGEND:

1. GASKET	12. RETAINING RING	23. LINING
2. LOCKWASHER (4)	13. ANCHOR PIN (2)	24. RIVET
3. CAPSCREW (4)	14. SPRING (2)	25. PIN (2)
4. BRACKET ASSEMBLY	15. LOCKSCREW (2)	26. ROLLER (2)
5. BRACKET ASSEMBLY	16. SEAL	27. WASHER
6. BRACKET	17. BEARING	28. CAMSHAFT, RH
7. BRACKET	18. BUSHING (2)	29. CAMSHAFT, LH
8. BEARING	19. SPIDER	30. SPRING
9. SEAL	20. SHOE ASSEMBLY (2)	31. CAPSCREW (4)
10. WASHER (2)	21. SHOE (2)	32. DUST SHIELD
11. WASHER	22. LINING	

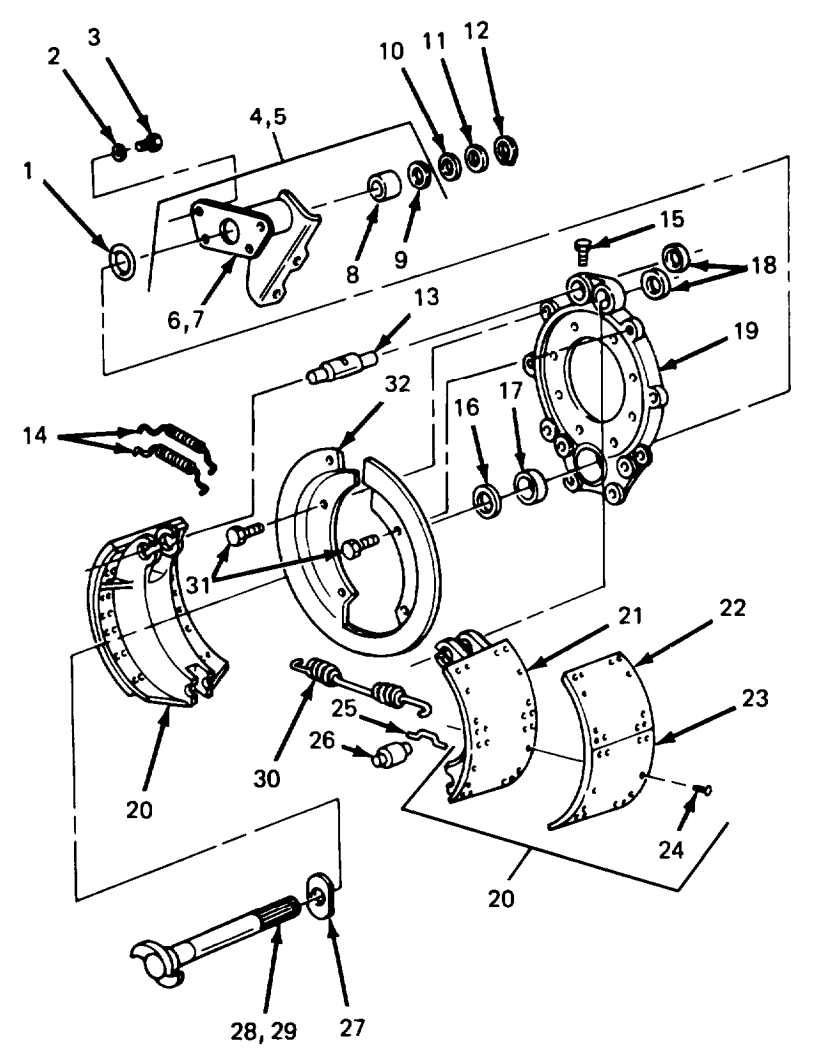
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BRAKE SYSTEM.

9-33. REAR BRAKE SHOES MAINTENANCE (M915) (Continued).		
LOCATION/ITEM	ACTION	REMARKS
C. INSTALLATION (Continued).		
20. Two springs (14).	Hook up springs (14) to shoe assemblies (20).	
21. Two pins (25) and spring (30).	Insert pins (25) into two shoe assemblies (20) and hook spring (30) in position.	
22. Two rollers (26).	With a long handled screw-driver, pry shoe assemblies (20) away from camshafts (28) and (29) and install rollers (26).	Repeat for opposite shoe to install rollers.
23. Dust shield (32) and four capscrews (31).	Install dust shield and secure with capscrews (31) to spider (19).	
24. Two washers (10) and (11), and retainer ring (12).	Install and adjust slack adjuster (refer to para 9-36A and B).	
NOTE		
Follow-on maintenance action required:		
Install hub and drum (refer to para 10-15C).		

BRAKE SYSTEM.

9-33. REAR BRAKE SHOES MAINTENANCE (M915) (Continued).

LOCATION/ITEM	ACTION	REMARKS																																	
																																			
LEGEND: <table> <tbody> <tr> <td>1. GASKET</td><td>12. RETAINING RING</td><td>23. LINING</td></tr> <tr> <td>2. LOCKWASHER (4)</td><td>13. ANCHOR PIN (2)</td><td>24. RIVET</td></tr> <tr> <td>3. CAPSCREW (4)</td><td>14. SPRING (2)</td><td>25. PIN (2)</td></tr> <tr> <td>4. BRACKET ASSEMBLY</td><td>15. LOCKSCREW (2)</td><td>26. ROLLER (2)</td></tr> <tr> <td>5. BRACKET ASSEMBLY</td><td>16. SEAL</td><td>27. WASHER</td></tr> <tr> <td>6. BRACKET</td><td>17. BEARING</td><td>28. CAMSHAFT, RH</td></tr> <tr> <td>7. BRACKET</td><td>18. BUSHING (2)</td><td>29. CAMSHAFT, LH</td></tr> <tr> <td>8. BEARING</td><td>19. SPIDER</td><td>30. SPRING</td></tr> <tr> <td>9. SEAL</td><td>20. SHOE ASSEMBLY (2)</td><td>31. CAPSCREW (4)</td></tr> <tr> <td>10. WASHER (2)</td><td>21. SHOE (2)</td><td>32. DUST SHIELD</td></tr> <tr> <td>11. WASHER</td><td>22. LINING</td><td></td></tr> </tbody> </table>			1. GASKET	12. RETAINING RING	23. LINING	2. LOCKWASHER (4)	13. ANCHOR PIN (2)	24. RIVET	3. CAPSCREW (4)	14. SPRING (2)	25. PIN (2)	4. BRACKET ASSEMBLY	15. LOCKSCREW (2)	26. ROLLER (2)	5. BRACKET ASSEMBLY	16. SEAL	27. WASHER	6. BRACKET	17. BEARING	28. CAMSHAFT, RH	7. BRACKET	18. BUSHING (2)	29. CAMSHAFT, LH	8. BEARING	19. SPIDER	30. SPRING	9. SEAL	20. SHOE ASSEMBLY (2)	31. CAPSCREW (4)	10. WASHER (2)	21. SHOE (2)	32. DUST SHIELD	11. WASHER	22. LINING	
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10. WASHER (2)	21. SHOE (2)	32. DUST SHIELD																																	
11. WASHER	22. LINING																																		
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BRAKE SYSTEM.

9-34. REAR BRAKE SHOES MAINTENANCE (M916 THRU M920).

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(15)
b. Inspection,	(15)
c. Installation.	(20)
50 Minutes Total.	

INITIAL SETUP

APPLICABLE CONFIGURATIONS

M916 Thru M920.

TEST EQUIPMENT

None.

SPECIAL TOOLS

Snap Ring Pliers.
Brake Spring Pliers.

MATERIAL/PARTS (P/N)

None.

EQUIPMENT CONDITION

PARAGRAPH

10-14A.

CONDITION DESCRIPTION

Hub and Drum Removed.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 9-1.

BRAKE SYSTEM.

9-34. REAR BRAKE SHOES MAINTENANCE (M916 THRU M920) (Continued).

LOCATION/ITEM

ACTION

REMARKS

LEGEND:

1. WASHER (4)	8. SEAL	16. SPIDER ASSEMBLY	28. ROLLER (2)
2. CAPSCREW (4)	9. WASHER	17. SPIDER	29. LINING
3. BRACKET, LH	10. WASHER (2)	18. SEAL ASSEMBLY	30. RIVET
4. BRACKET, RH	11. RETAINING RING	19. BUSHING	31. LINING
5. BRACKET, LH	12. FELT RING (4)	20. BUSHING (2)	32. SHOE
6. BRACKET, RH	13. RETAINER (4)	21. SEAL	33. BUSHING
7. BUSHING	14. RETAINER RING (4)	22. LOCK BOLT (2)	34. SPRING
	15. SPIDER ASSEMBLY	23. ANCHOR PIN (2)	35. WASHER
		24. CAPSCREW (6)	36. CAMSHAFT, RH
		25. DUST SHIELD	37. CAMSHAFT, LH
		26. SHOE ASSEMBLY (2)	38. DUST SHIELD
		27. PIN (2)	39. GASKET

TA 075681

BRAKE SYSTEM.**9-34. REAR BRAKE SHOES MAINTENANCE (M916 THRU M920) (Continued).**

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Camshafts (36) and (37).	Back off on slack adjuster until camshafts are in the released position.	See para 9-39A and B.
2. Two brake shoe assemblies (26) and two rollers (28).	With a long handle screw-driver pry brake shoe assemblies (26) away from camshafts (36) and (37), then remove rollers (28).	
3. Spring (34) and two pins (27).	Remove.	Use brake spring pliers.
4. Two retainer rings (14), two retainers (13), and two felt rings (12).	Remove from rear using snapping pliers on retainer rings (14).	
5. Two lockbolts (22), two anchor pins (23), two retainer rings (14), two retainers (13), and two felt rings (12).	a. Cut lock wire and remove. b. Loosen lock bolts (22) and pull anchor pins (23) out of retainer rings (14), retainers (13) and felt rings (12) from front.	
6. Two shoe assemblies (26) and bushings (33).	Remove.	
7. Two bushings (20).	Remove.	Inspect for wear.
8. Retaining ring (11), two washers (10), washer (9), and camshafts (36) and (37) and washer (35).	Remove.	Remove only if excessive looseness is evident.
9. Four capscrews (2), four washers (1), and brackets (3) and (4).	Remove with gasket (39).	
10. Two bushings (7) and seals (8).	Remove from brackets (5) and (6).	
11. Seal assembly (18), bushing (19), and seal (21).	Remove.	Replace only if excessive wear is evident.
12. Six capscrews (24).	Unscrew and remove dust shields (25) and (38).	
13. Spider (17).	Replace only if broken or damaged.	

BRAKE SYSTEM.

9-34. REAR BRAKE SHOES MAINTENANCE (M916 THRU M920) (Continued).

LOCATION/ITEM	ACTION	REMARKS

LEGEND:

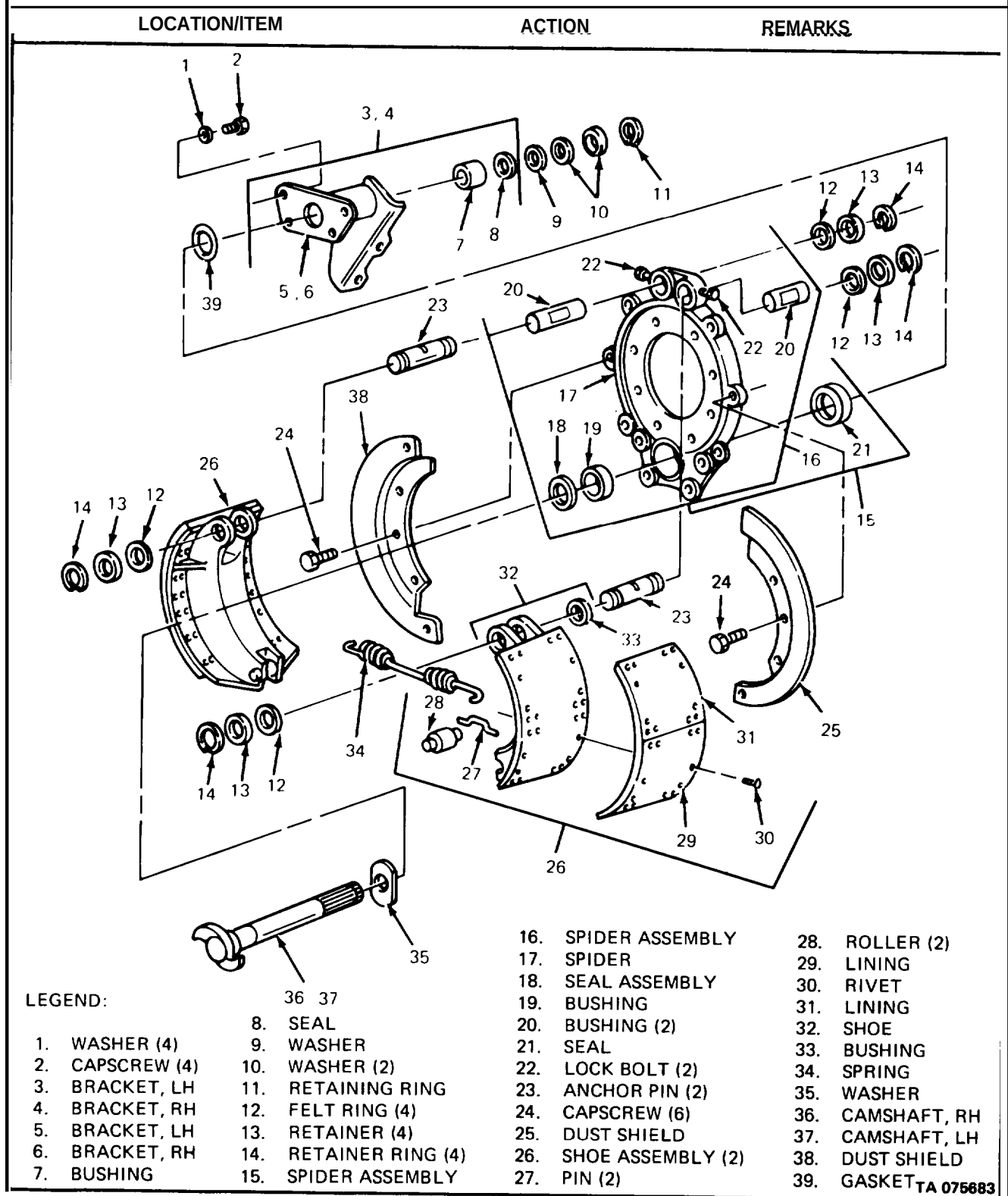
1. WASHER (4)	8. SEAL	16. SPIDER ASSEMBLY	28. ROLLER (2)
2. CAPSCREW (4)	9. WASHER	17. SPIDER	29. LINING
3. BRACKET, LH	10. WASHER (2)	18. SEAL ASSEMBLY	30. RIVET
4. BRACKET, RH	11. RETAINING RING	19. BUSHING	31. LINING
5. BRACKET, LH	12. FELT RING (4)	20. BUSHING (2)	32. SHOE
6. BRACKET, RH	13. RETAINER (4)	21. SEAL	33. BUSHING
7. BUSHING	14. RETAINER RING (4)	22. LOCK BOLT (2)	34. SPRING
	15. SPIDER ASSEMBLY	23. ANCHOR PIN (2)	35. WASHER
		24. CAPSCREW (6)	36. CAMSHAFT, RH
		25. DUST SHIELD	37. CAMSHAFT, LH
		26. SHOE ASSEMBLY (2)	38. DUST SHIELD
		27. PIN (2)	39. GASKET TA 075682

BRAKE SYSTEM.

9-34. REAR BRAKE SHOES MAINTENANCE (M916 THRU M920) (Continued).		
LOCATION/ITEM	ACTION	REMARKS
B. INSPECTION.		
14. Gasket (39), seals (8), (18), and (21), bushings (7), (19), (20) and (23), and camshafts (36) and (37), and shoe assemblies (26).	a. Inspect for wear and replace as needed. b. If linings (29) and (31) are to be serviced separately, refer to Direct Support Maintenance as rivets (30) will have to be drilled out and replaced with new.	
C. INSTALLATION.		
 CAUTION If you replace any brake shoe, replace all the shoes on that axle. A combination of new and old shoes on the same axle will cause uneven braking. Make sure that the brake shoes are clean before you install them. Be careful not to get grease or oil on the linings as you assemble them.		
15. Bushing (19), seal assembly (18), and seal (21).	Push seal (21) in place then bushing. (19), and seal assembly (18).	
16. Brackets (5) and (6), bushing (7) and seal (8).	Push bushing (7) into place then install seal (8).	
17. Brackets (3) and (4), and gasket (39).	Install one gasket (39) into brackets (3) and (4) and secure with four capscrews (2) and washers (1).	
18. Camshafts (36) and (37) and washer (36).	a. Install one washer (35) on each camshaft and install through bushings (19) and (7). b. Install washers (9) and (10) then retaining ring (11). c. Position two shoe assemblies (26).	
19. Two anchor pins (23) and two bushings (20).	a. Install anchor pins (23) through shoe assemblies (26). b. Install bushings (20) into spider (17). c. Tighten lock bolt (22) and install lockwire.	

BRAKE SYSTEM.

9-34. REAR BRAKE SHOES MAINTENANCE (M916 THRU M920) (Continued).



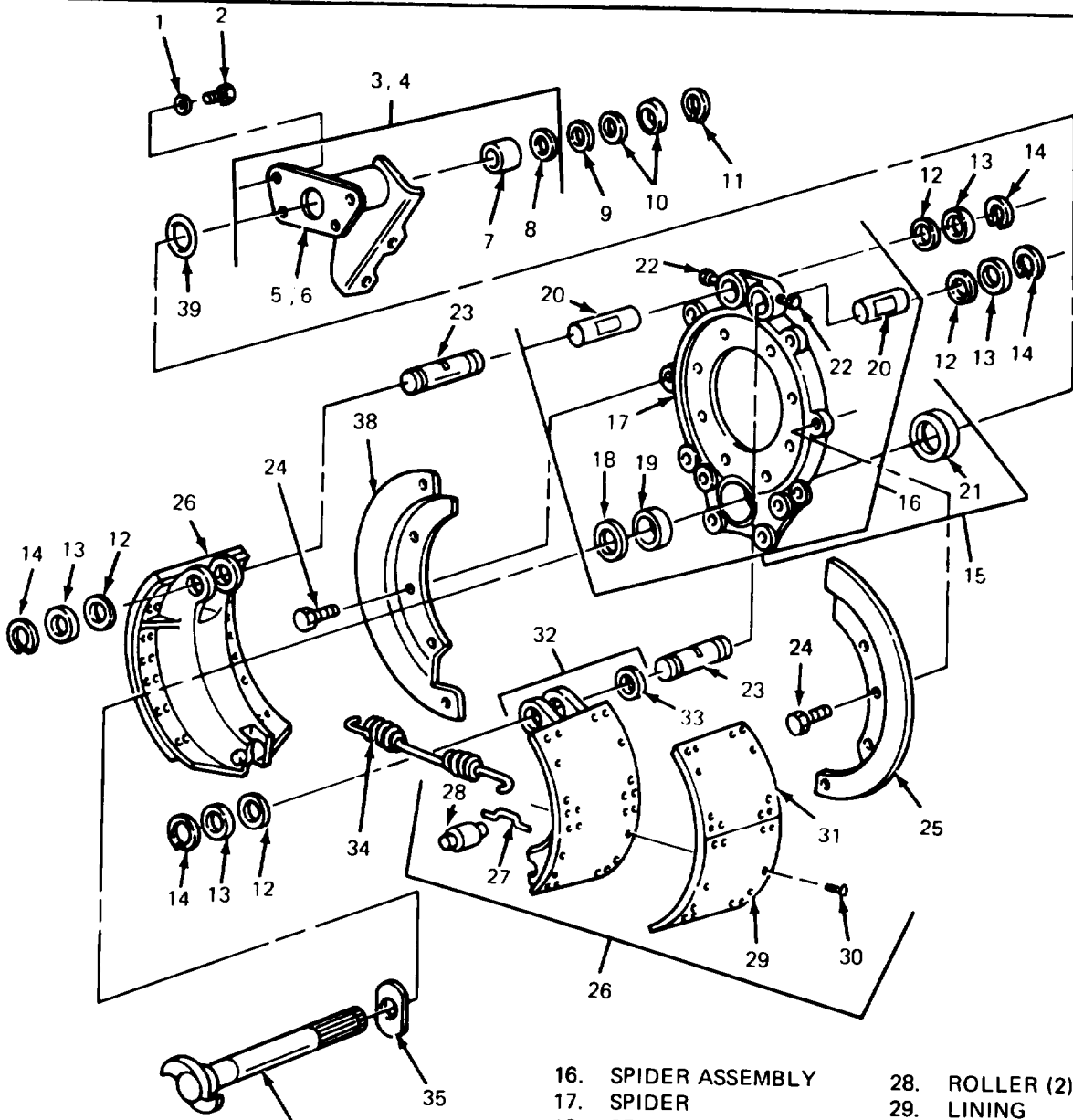
BRAKE SYSTEM.**9-34. REAR BRAKE SHOES MAINTENANCE (M916 THRU M920) (Continued).**

LOCATION/ITEM	ACTION	REMARKS
C. INSTALLATION (Continued).		
20. Two felt rings (12), two retainers (13), and two retainer rings (14).	Slide onto anchor pins (23) from rear.	
21. Two felt rings (12), two retainers (13), and two retainer rings (14).	Install on anchor pin (23) from front side and secure.	Use snap ring pliers on retainer rings (14).
22. Two pins (27), and spring (34).	Install pins (27) and hook on spring (34) with brake spring pliers.	
23. Two shoe assemblies (26) and two rollers (28).	With long screwdriver pry up on shoe assembly (26) and install roller (28).	Repeat operation for opposite shoe.
24. Dust shields (25) and (38).	Install with six capscrews (24).	
25. Slack adjusters.	Adjust (see para 9-39A and B).	
NOTE Follow-on maintenance action required: Install hub and drum; refer to para 10-14C.		

BRAKE SYSTEM.

9-34. REAR BRAKE SHOES MAINTENANCE (M916 THRU M920) (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:		
1. WASHER (4) 2. CAPSCREW (4) 3. BRACKET, LH 4. BRACKET, RH 5. BRACKET, LH 6. BRACKET, RH 7. BUSHING	8. SEAL 9. WASHER 10. WASHER (2) 11. RETAINING RING 12. FELT RING (4) 13. RETAINER (4) 14. RETAINER RING (4) 15. SPIDER ASSEMBLY	16. SPIDER ASSEMBLY 17. SPIDER 18. SEAL ASSEMBLY 19. BUSHING 20. BUSHING (2) 21. SEAL 22. LOCK BOLT (2) 23. ANCHOR PIN (2) 24. CAPSCREW (6) 25. DUST SHIELD 26. SHOE ASSEMBLY (2) 27. PIN (2)
		28. ROLLER (2) 29. LINING 30. RIVET 31. LINING 32. SHOE 33. BUSHING 34. SPRING 35. WASHER 36. CAMSHAFT, RH 37. CAMSHAFT, LH 38. DUST SHIELD 39. GASKET

TA 075684

BRAKE SYSTEM.**9-35. PUSHER AXLE BRAKE SHOES MAINTENANCE.****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

a. Removal.	(15)
b. Inspection.	(5)
c. Installation.	(15)
d. Adjustment.	(15)

50 Minutes Total.

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

M917, M919, M920.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

GAA (Refer to Appendix C).

**EQUIPMENT CONDITION
PARAGRAPH**

10-16A.

CONDITION DESCRIPTION

Hub and Drum Removed.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.
 TM 9-2320-273-20P.
 LO 9-2320-273-12.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
 Transmission in Neutral.
 Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 9-1.

BRAKE SYSTEM.

9-35. PUSHER AXLE BRAKE SHOES MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS																											
SPIDER LEGEND: <table border="0"> <tbody> <tr> <td>1. SNAP RING (4)</td><td>10. BUSHING</td><td>19. DUST SHIELD</td></tr> <tr> <td>2. WASHER (4)</td><td>11. BUSHING</td><td>20. LINING</td></tr> <tr> <td>3. BUSHING (2)</td><td>12. GREASE FITTING</td><td>21. RIVET</td></tr> <tr> <td>4. GREASE FITTING</td><td>13. O-RING</td><td>22. LINING</td></tr> <tr> <td>5. PIN (2)</td><td>14. CAMSHAFT</td><td>23. PIN (2)</td></tr> <tr> <td>6. SNAP RING</td><td>15. CAPSCREW (6)</td><td>24. RETAINER (2)</td></tr> <tr> <td>7. WASHER (2)</td><td>16. LOCKWASHER (6)</td><td>25. ROLLER (2)</td></tr> <tr> <td>8. SEAL (2)</td><td>17. WASHER (6)</td><td>26. SPRING</td></tr> <tr> <td>9. O-RING</td><td>18. DUST SHIELD</td><td>27. BRAKE SHOE ASSEMBLY (2)</td></tr> </tbody> </table>			1. SNAP RING (4)	10. BUSHING	19. DUST SHIELD	2. WASHER (4)	11. BUSHING	20. LINING	3. BUSHING (2)	12. GREASE FITTING	21. RIVET	4. GREASE FITTING	13. O-RING	22. LINING	5. PIN (2)	14. CAMSHAFT	23. PIN (2)	6. SNAP RING	15. CAPSCREW (6)	24. RETAINER (2)	7. WASHER (2)	16. LOCKWASHER (6)	25. ROLLER (2)	8. SEAL (2)	17. WASHER (6)	26. SPRING	9. O-RING	18. DUST SHIELD	27. BRAKE SHOE ASSEMBLY (2)
1. SNAP RING (4)	10. BUSHING	19. DUST SHIELD																											
2. WASHER (4)	11. BUSHING	20. LINING																											
3. BUSHING (2)	12. GREASE FITTING	21. RIVET																											
4. GREASE FITTING	13. O-RING	22. LINING																											
5. PIN (2)	14. CAMSHAFT	23. PIN (2)																											
6. SNAP RING	15. CAPSCREW (6)	24. RETAINER (2)																											
7. WASHER (2)	16. LOCKWASHER (6)	25. ROLLER (2)																											
8. SEAL (2)	17. WASHER (6)	26. SPRING																											
9. O-RING	18. DUST SHIELD	27. BRAKE SHOE ASSEMBLY (2)																											

TA 075685

BRAKE SYSTEM.

9-35. PUSHER AXLE BRAKE SHOES MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
<u>A. REMOVAL.</u>		
1. Two brake shoe assemblies (27).	With a long handle screw-driver lift brake shoe assemblies and remove two rollers (25) and retainers (24).	
2. Spring (26) and two pins (23).	Remove.	
3. Four snap rings (1), four washers (2) and two pins (5).	From rear side remove snap ring (1) and washer (2), then pull out pin (5).	
4. Two brake shoe assemblies (27).	Lift off.	
5. Two bushings (3) and grease fittings (4).	Remove.	
6. Snap ring (6), two washers (7), two seals (8), O-ring (9), and O-ring (13).	Remove and pull camshaft (14) out of spider.	
7. Bushing (10), bushing (11), and grease fitting (12).	Remove.	
8. Dust shield (18) and (19), six capscrews (15), six lockwashers (16), and six washers (17).	Remove.	Remove only if damaged and replacement is needed.
<u>B. INSPECTION.</u>		
9. Brake spring (26), shoe assemblies (27), O-ring (9), O-ring (13) and all hardware.	Inspect for: a. Dirt. b. Wear. c. Damage	Replace as necessary.
NOTE		
If lining (22) is to be replaced separately, rivets (21) will have to be drilled out and replaced with new. Refer to Direct Support Maintenance.		

BRAKE SYSTEM.

9-35. PUSHER AXLE BRAKE SHOES MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS

SPIDER

LEGEND:

1. SNAP RING (4)	10. BUSHING	19. DUST SHIELD
2. WASHER (4)	11. BUSHING	20. LINING
3. BUSHING (2)	12. GREASE FITTING	21. RIVET
4. GREASE FITTING	13. O-RING	22. LINING
5. PIN (2)	14. CAMSHAFT	23. PIN (2)
6. SNAP RING	15. CAPSCREW (6)	24. RETAINER (2)
7. WASHER (2)	16. LOCKWASHER (6)	25. ROLLER (2)
8. SEAL (2)	17. WASHER (6)	26. SPRING
9. O-RING	18. DUST SHIELD	27. BRAKE SHOE ASSEMBLY (2)

TA 075686

BRAKE SYSTEM.

9-35. PUSHER AXLE BRAKE SHOES MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
C. INSTALLATION.  CAUTION If you replace any brake shoe, replace all the shoes on that axle. A combination of new and old shoes on the same axle will cause uneven braking. Make sure that the brake shoes are clean before you install them. Be careful not to get grease or oil on the linings as you assemble them.		
10. O-ring (13), seal (8), washer (7), and camshaft (14).	Install bushings (10) and (11), O-ring (13), seal (8), washer (7), and then install camshaft (14) thru bushings (10) and (11).	
11. O-ring (9), seal (8), washer (7), snap ring (6), and grease fitting (12).	Install.	
12. Two bushings (3) and grease fitting (4).	Install into spider.	
13. Two brake shoe assemblies (27).	Place on spider.	
14. Two pins (5), two washers (2) and two snap rings (1).	Install snap ring (1) on pin (5) with washer (2) and push through brake shoe assembly (27) and bushing (3).	
15. Two washers (2) and two snap rings (1).	Install washer (2) on back side of pin (5) and install snap ring (1).	
16. Spring (26) and two pins (23).	Install pins (23) and hook up spring (26).	
17. Two rollers (25) and two retainers (24).	With long handle screwdriver raise brake shoe to allow room to install roller (25) and retainer (24).	Repeat operation for opposite shoe.

BRAKE SYSTEM.

9-35. PUSHER AXLE BRAKE SHOES MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS

SPIDER

LEGEND:

1. SNAP RING (4)	10. BUSHING	19. DUST SHIELD
2. WASHER (4)	11. BUSHING	20. LINING
3. BUSHING (2)	12. GREASE FITTING	21. RIVET
4. GREASE FITTING	13. O-RING	22. LINING
5. PIN (2)	14. CAMSHAFT	23. PIN (2)
6. SNAP RING	15. CAPSCREW (6)	24. RETAINER (2)
7. WASHER (2)	16. LOCKWASHER (6)	25. ROLLER (2)
8. SEAL (2)	17. WASHER (6)	26. SPRING
9. O-RING	18. DUST SHIELD	27. BRAKE SHOE ASSEMBLY (2)

TA 075687

BRAKE SYSTEM.**9-35. PUSHER AXLE BRAKE SHOES MAINTENANCE (Continued).**

LOCATION/ITEM	ACTION	REMARKS
C. INSTALLATION (Continued).		
18. Dust shields (18) and (19).	Install and secure with six capscrews (15), lockwashers (16), and washers (17).	If previously removed.
NOTE Follow-on maintenance action required: Install hub and drum; refer to para 10-16C.		
D. ADJUSTMENT.		
19. Adjust slack adjuster.	See para 9-39.	

BRAKE SYSTEM.

9-35. PUSHER AXLE BRAKE SHOES MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS

SPIDER

LEGEND:

1. SNAP RING (4)	10. BUSHING	19. DUST SHIELD
2. WASHER (4)	11. BUSHING	20. LINING
3. BUSHING (2)	12. GREASE FITTING	21. RIVET
4. GREASE FITTING	13. O-RING	22. LINING
5. PIN (2)	14. CAMSHAFT	23. PIN (2)
6. SNAP RING	15. CAPSCREW (6)	24. RETAINER (2)
7. WASHER (2)	16. LOCKWASHER (6)	25. ROLLER (2)
8. SEAL (2)	17. WASHER (6)	26. SPRING
9. O-RING	18. DUST SHIELD	27. BRAKE SHOE ASSEMBLY (2)

TA 075688

9-158

BRAKE SYSTEM.

9-36. FRONT BRAKE AIR CHAMBER MAINTENANCE (Continued).

LOCATION/ITEM

ACTION

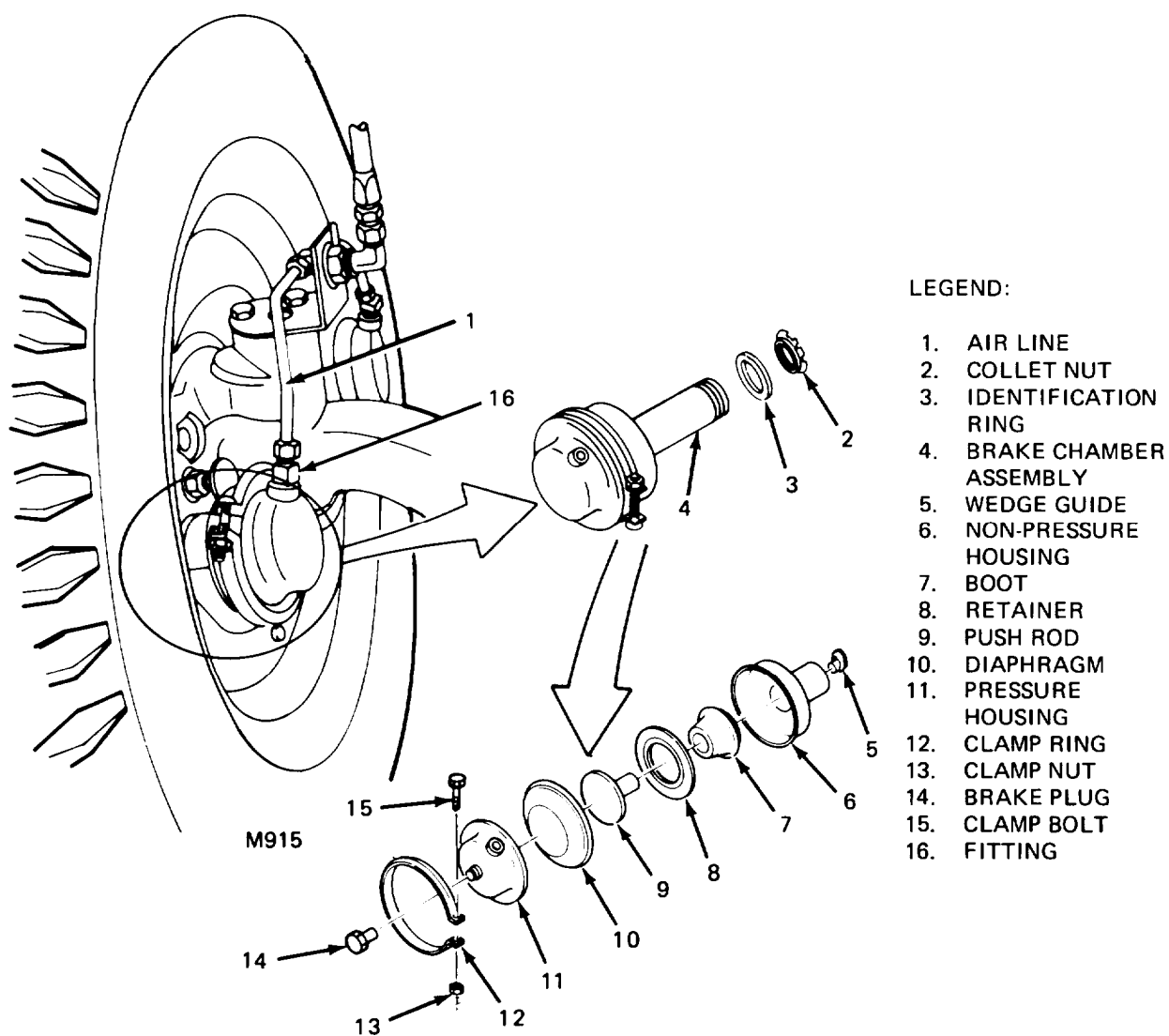
REMARKS

WARNING

Do not remove brake chamber until pressure is fully exhausted from all reservoirs.

NOTE

The M915 has two front brake air chambers per wheel, while the M916 thru M920 have one.



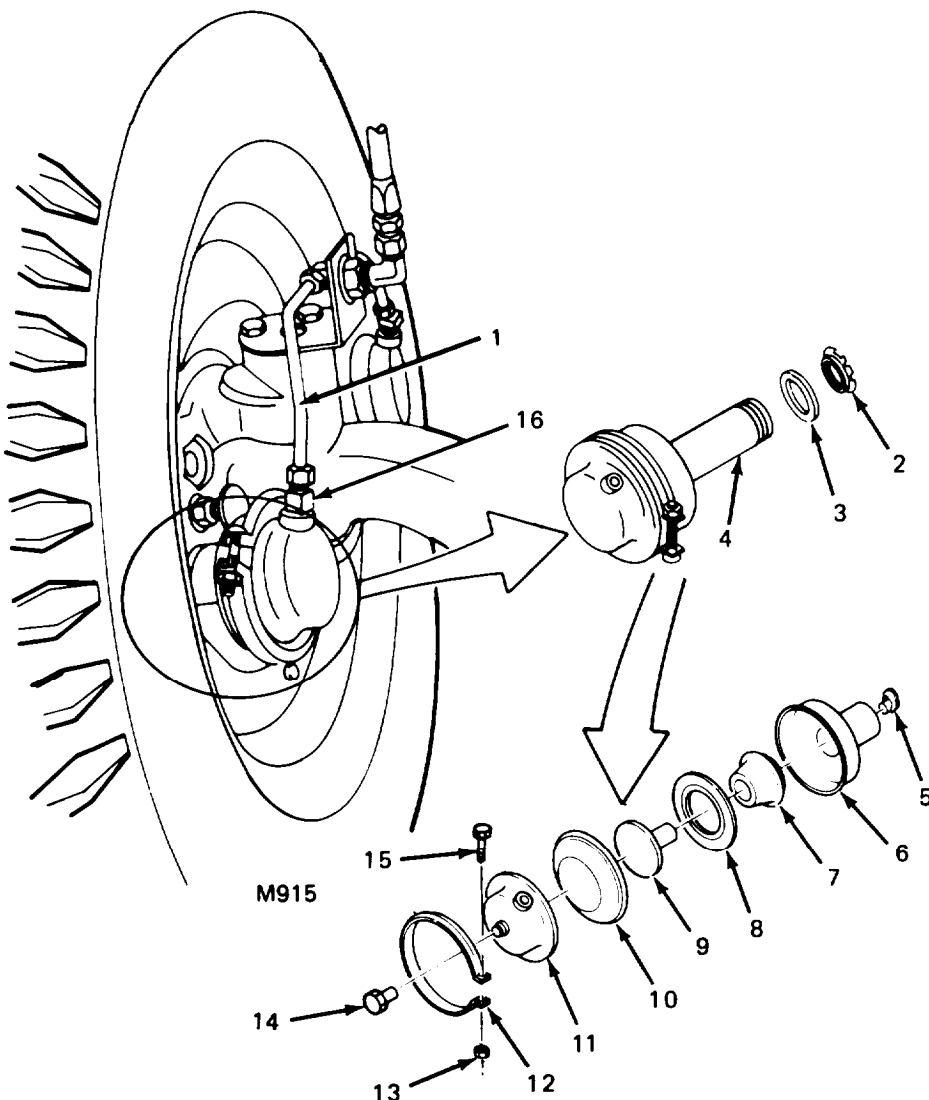
TA 074942

BRAKE SYSTEM.**9-36. FRONT BRAKE AIR CHAMBER MAINTENANCE (Continued).**

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Air line (1).	a. Unscrew and remove. b. Inspect for: 1. Cracks. 2. Leaks. 3. Damaged fittings.	Replace if necessary.
2. Collet nut (2).	Loosen.	M915 only.
3. Fitting (16).	Remove.	
4. Brake chamber assembly (4) and identification ring (3).	Unscrew and remove the brake chamber; the identification ring can also be removed now.	Be careful not to lose wedge guide (5).
B. DISASSEMBLY.		
5. Brake plug (14).	Remove.	M916 thru M920.
6. Clamp bolt (15) and clamp	Unscrew and remove clamp ring (12).	
7. Pressure housing (11) and non-pressure housing (6).	Pull apart for access to boot (7), retainer (8), push rod (9), and diaphragm (10).	
C. REASSEMBLY.		
8. Boot (7), retainer (8), push rod (9), and diaphragm (10).	Assemble within non-pressure housing (6) and pressure housing (11).	Be sure to assemble as illustrated.
9. Clamp ring (12).	Secure to housings (6) and (11) with clamp bolt (14) and clamp nut (13).	
10. Brake plug (14).	Install into pressure housing (11).	M916 thru M920.
11. Wedge guide (5).	Insert into non-pressure housing (6).	

BRAKE SYSTEM.

9-36. FRONT BRAKE AIR CHAMBER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
 M915 LEGEND: 1. AIR LINE 2. COLLET NUT 3. IDENTIFICATION RING 4. BRAKE CHAMBER ASSEMBLY 5. WEDGE GUIDE 6. NON-PRESSURE HOUSING 7. BOOT 8. RETAINER 9. PUSH ROD 10. DIAPHRAGM 11. PRESSURE HOUSING 12. CLAMP RING 13. CLAMP NUT 14. BRAKE PLUG 15. CLAMP BOLT 16. FITTING		

TA 075689

BRAKE SYSTEM.

9-36. FRONT BRAKE AIR CHAMBER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
D. INSTALLATION.		
12. Brake chamber assembly (4) and identification ring (3).	a. Slip identification ring (3) onto neck of brake chamber assembly (4). b. Screw on collet nut (2) and tighten. c. Screw brake chamber assembly (4) into wheel backing plate.	
13. Fitting (16).	a. Coat threads with liquid teflon. b. Screw into brake chamber assembly (4) and tighten.	
14. Airline (1).	a. Coat threads with liquid teflon. b. Screw into fitting (16) and tighten.	
E. OPERATIONAL CHECK.		
15. Engine.	Start up (see TM 9-2320-273-10). Allow system to reach operating pressure of 105-120 psi (725-827 kPa).	
16. Cab/brake pedal.	Press down.	2nd mechanic.
17. Front brake air chamber assembly (4).	a. Check that brakes apply when pedal is pressed. b. Use soap solution to check for leaks.	1st mechanic.
18. Vehicle.	Road test. Check for proper braking.	
19. Engine.	Shut down (see TM 9-2320-273-10).	

BRAKE SYSTEM.

9-32. FRONT BRAKE AIR CHAMBER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
M915		
LEGEND: 1. AIR LINE 2. COLLET NUT 3. IDENTIFICATION RING 4. BRAKE CHAMBER ASSEMBLY 5. WEDGE GUIDE 6. NON-PRESSURE HOUSING 7. BOOT 8. RETAINER 9. PUSH ROD 10. DIAPHRAGM 11. PRESSURE HOUSING 12. CLAMP RING 13. CLAMP NUT 14. BRAKE PLUG 15. CLAMP BOLT 16. FITTING		

TA 075690

BRAKE SYSTEM.

9-32. REAR BRAKE AIR CHAMBER MAINTENANCE.														
<u>THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)</u>														
<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 80%;">a. Caging Power Spring.</td> <td style="width: 20%; text-align: right;">(5)</td> </tr> <tr> <td>b. Removal.</td> <td style="text-align: right;">(20)</td> </tr> <tr> <td>c. Installation</td> <td style="text-align: right;">(25)</td> </tr> <tr> <td>d. Uncaging Power Spring.</td> <td style="text-align: right;">(10)</td> </tr> <tr> <td>e. Operational check.</td> <td style="text-align: right;">(2)</td> </tr> <tr> <td colspan="2" style="text-align: right; border-top: 1px solid black;">62 Minutes Total.</td> </tr> </table>			a. Caging Power Spring.	(5)	b. Removal.	(20)	c. Installation	(25)	d. Uncaging Power Spring.	(10)	e. Operational check.	(2)	62 Minutes Total.	
a. Caging Power Spring.	(5)													
b. Removal.	(20)													
c. Installation	(25)													
d. Uncaging Power Spring.	(10)													
e. Operational check.	(2)													
62 Minutes Total.														
<u>INITIAL SETUP</u> <u>APPLICABLE CONFIGURATIONS</u> All. <u>TEST EQUIPMENT</u> None. <u>SPECIAL TOOLS</u> None. <u>MATERIALS/PARTS (P/N)</u> Liquid Teflon (Refer to Appendix C). Soap and Water Solution.	<u>EQUIPMENT CONDITION</u> <u>PARAGRAPH</u> None. <u>CONDITION DESCRIPTION</u> None.													
<u>PERSONNEL REQUIRED</u> Two (MOS-63B20) .	<u>SPECIAL ENVIRONMENTAL CONDITIONS</u> Vehicle Parked on Level Ground.													
<u>REFERENCES (TM)</u> TM 9-2320-273-10. TM 9-2320-273-20P.	<u>GENERAL SAFETY INSTRUCTIONS</u> Engine OFF. Wheels Blocked. Transmission in Neutral.													
<u>TROUBLESHOOTING REFERENCES</u> Table 9-1.														

BRAKE SYSTEM.

9-37. REAR BRAKE AIR CHAMBER MAINTENANCE (Continued).

LOCATION/ITEM

ACTION

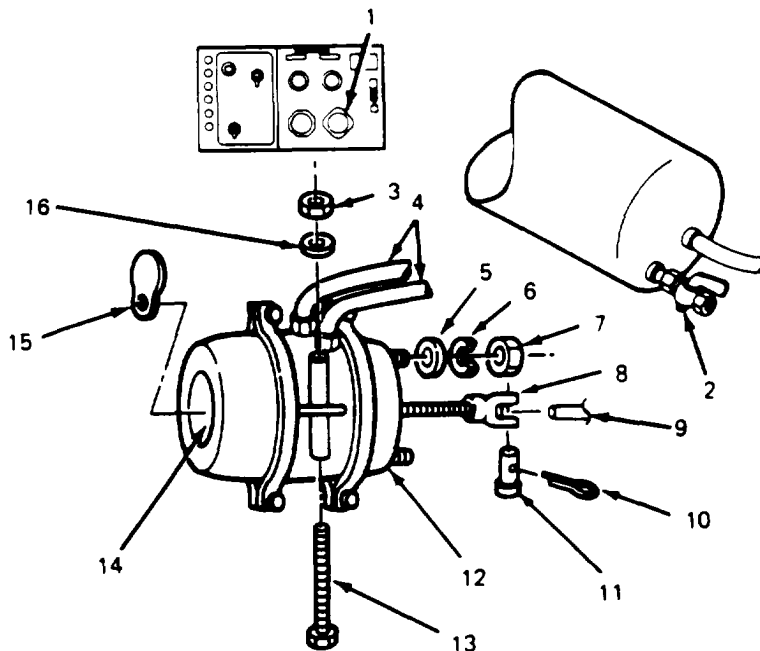
REMARKS

WARNING

Block the truck wheels before you cage the power spring, since caging the spring releases the parking brakes.

WARNING

The spring brake chamber contains a powerful spring. Do not remove the clamp rings or disassemble the chambers even with the compression spring caged. Refer to DS/GS Maintenance if internal service is required.



LEGEND:

1. PARK BRAKE CONTROL
2. MANUAL DRAIN VALVE
3. RELEASE NUT
4. AIR LINE (2)
5. FLAT WASHER (2)
6. LOCKWASHER (2)
7. NUT (2)
8. YOKE
9. SLACK ADJUSTER
10. COTTER KEY
11. PIN
12. AIR CHAMBER RELEASE STUD
13. RELEASE STUD
14. ACCESS HOLE
15. CAP
16. WASHER

TA216416

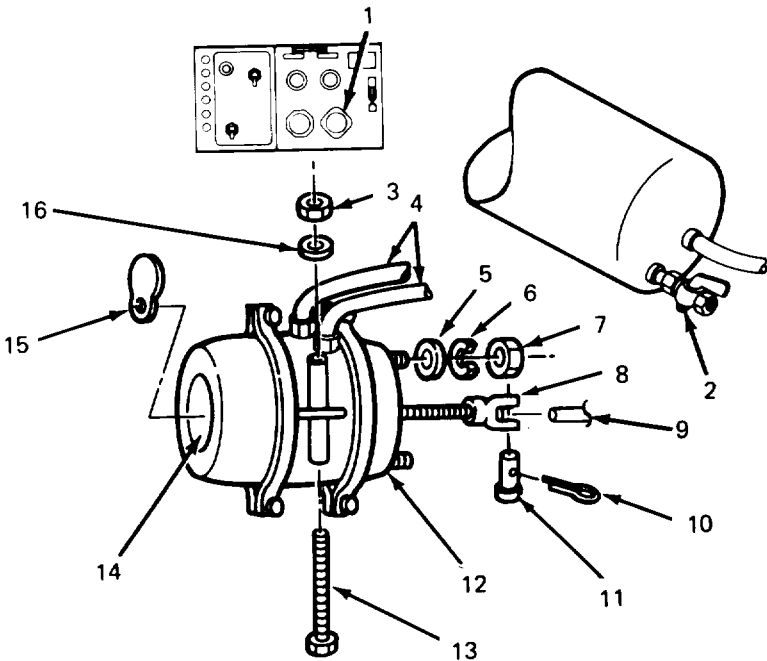
BRAKE SYSTEM.

9-37. REAR BRAKE AIR CHAMBER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. CAGING POWER SPRING.		
CAUTION Do not use an impact wrench with a torque setting higher than 30 lb-ft (41 N·m) to cage power spring.		
1. Wheels	Block.	
2. CAB/Park brake control (1).	Push to release park brakes.	
3. Cap(15).	Pull out from access hole (14).	
4. Release nut (3) and washer (16).	Unscrew from release stud (13). Remove stud from its holder.	
5. Release stud (13).	a. Insert stud through access hole (14) and turn 1/4 turn to secure cross pin into pressure plate. b. Screw on nut (3) and washer (16). c. Turn release stud assembly with wrench until compression spring is fully caged.	
B. REMOVAL.		
6. Manual drain valves (2).	a. Turn to drain air pressure. Exhaust pressure from both service reservoirs on the M915, M916, and M918 and all three service reservoirs on the M917, M919 and M920. b. Close drain valves.	
7. Two air lines (4).	a. Use tape to mark air lines. b. Unscrew and remove c. Inspect for: 1. Cracks. 2. Leaks. 3. Damaged fittings.	This will help you connect them properly during installation. Replace if necessary.
8. Cotter key (10) and pin (11).	Remove.	
9. Yoke (8).	Disconnect from slack adjuster (9).	
10. Two nuts (7), lockwashers (6), and flat washers (5).	Unscrew and remove. Remove air chamber (12).	

BRAKE SYSTEM.

9-37. REAR BRAKE AIR CHAMBER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
C. INSTALLATION.		
11. Air chamber (12).	Position on mounting bracket.	Exhaust check valve should point down.
12. Two nuts (7), lockwashers (6) and flat washers (5).	a. Screw on. b. Tighten nuts to 100 lb-ft (136 N·m) with torque wrench.	
NOTE Upper nut on both chambers cannot be torqued unless a 15/16 crowfoot is used.		
13. Yoke (8)	Attach to slack adjuster (9).	
14. Pin (11) and cotter key (10).	Install in yoke (8).	
 LEGEND: 1. PARK BRAKE CONTROL 2. MANUAL DRAIN VALVE 3. RELEASE NUT 4. AIR LINE (2) 5. FLAT WASHER (2) 6. LOCKWASHER (2) 7. NUT (2) 8. YOKE 9. SLACK ADJUSTER 10. COTTER KEY 11. PIN 12. AIR CHAMBER 13. RELEASE STUD 14. ACCESS HOLE 15. CAP 16. WASHER		
TA 074952		

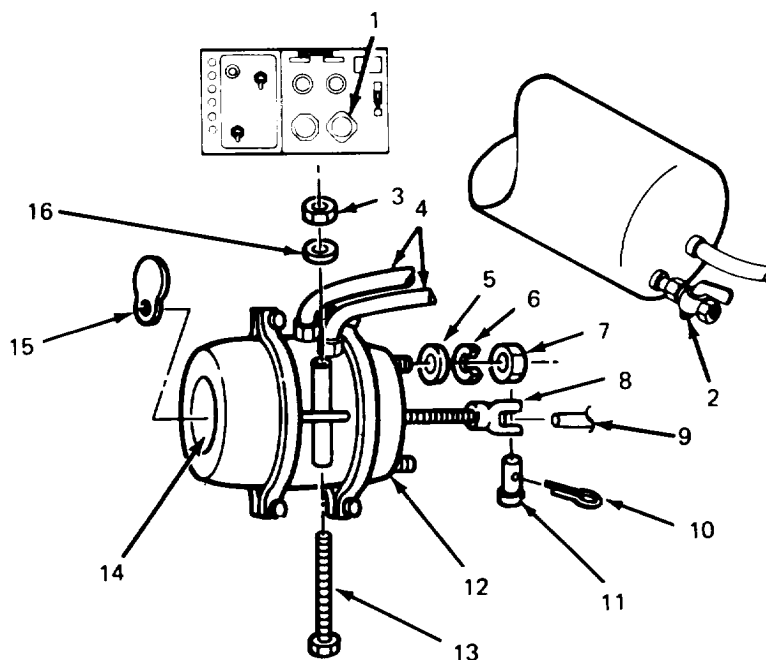
BRAKE SYSTEM.

9-37. REAR BRAKE AIR CHAMBER MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
C. INSTALLATION (Continued).		
15. Two air lines (4).	a. Coat threads with liquid teflon. b. Screw in and tighten.	Be sure to connect each line to the correct port.
16. Manual drain valves (2).	Ensure they are closed.	
D. UNCAGING POWER SPRING.		
17. Engine.	Start up (see TM 9-2320-273-10). Allow system to reach operating pressure of 105-120 psi (724-827 kPa).	
18. CAB/Park brake control (1).	Push in.	
19. Release stud (13).	a. Turn nut (3) with washer (16) to release spring. b. Remove nut (3) and washer (16) from stud (13). c. Turn stud (13) 1/4 turn counterclockwise (left) and remove from access hole (14). d. Insert stud (13) into holder and secure with washer (16) and nut (3).	
20. Cap (15).	Press into access hole (14).	
E. OPERATIONAL CHECK.		
NOTE Operational check requires system pressure of at least 100 psi (690 kPa). Run engine until this pressure is reached.		
21. Engine.	Shut down.	
22. CAB/Park brake control (1).	a. Push in. b. pull out.	Second mechanic.
23. Air chamber (12).	a. Should actuate when valve is pulled out, and release when valve is pushed in.	First mechanic.

BRAKE SYSTEM.

9-37. REAR BRAKE AIR CHAMBER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
E. OPERATIONAL CHECK (Continued).		
	b. Use soap solution to check for leaks.	
24. CAB/Brake pedal.	a. Press down. b. Release.	Second mechanic.
25. Air chamber (12).	Should apply when pedal is pressed, and release when pedal is released.	



LEGEND:

1. PARK BRAKE CONTROL
2. MANUAL DRAIN VALVE
3. RELEASE NUT
4. AIR LINE (2)
5. FLAT WASHER (2)
6. LOCKWASHER (2)
7. NUT (2)
8. YOKE
9. SLACK ADJUSTER
10. COTTER KEY
11. PIN
12. AIR CHAMBER
13. RELEASE STUD
14. ACCESS HOLE
15. CAP
16. WASHER

TA 074953

BRAKE SYSTEM.

9-38. PUSHER AXLE BRAKE AIR CHAMBER MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

- a. Removal. (10)
- b. Disassembly. (15)
- c. Assembly. (15)
- d. Installation. (10)

50 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

EQUIPMENT CONDITION
PARAGRAPH

9-13A.

CONDITION DESCRIPTION

Air Reservoirs Drained.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Tape.

Marking Pen.

Liquid Teflon (Refer to Appendix C).

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.

TM 9-2320-273-20P.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.

Transmission in Neutral.

Wheels Blocked.

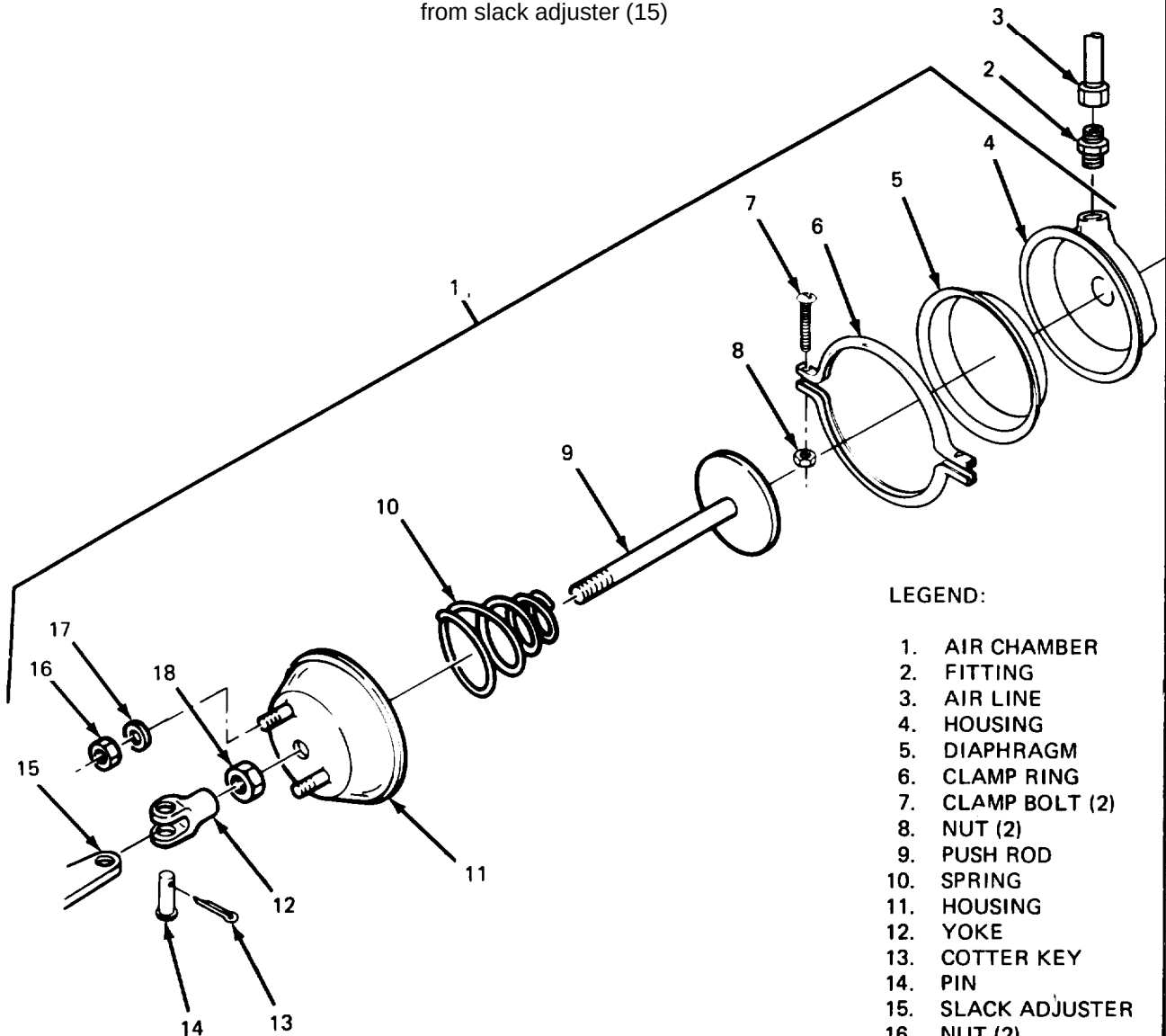
TROUBLESHOOTING REFERENCES

Table 9-1.

BRAKE SYSTEM.

9-38. PUSHER AXLE BRAKE AIR CHAMBER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Air line (3).	Unscrew and remove from fitting (2).	
2. Fitting (2).	Remove from housing (4).	
3. Cotter key (13) and pin (14).	Remove and disassemble yoke (12) on push rod (9) from slack adjuster (15)	



LEGEND:

1. AIR CHAMBER
2. FITTING
3. AIR LINE
4. HOUSING
5. DIAPHRAGM
6. CLAMP RING
7. CLAMP BOLT (2)
8. NUT (2)
9. PUSH ROD
10. SPRING
11. HOUSING
12. YOKE
13. COTTER KEY
14. PIN
15. SLACK ADJUSTER
16. NUT (2)
17. WASHER (2)
18. NUT

TA 074954

BRAKE SYSTEM.

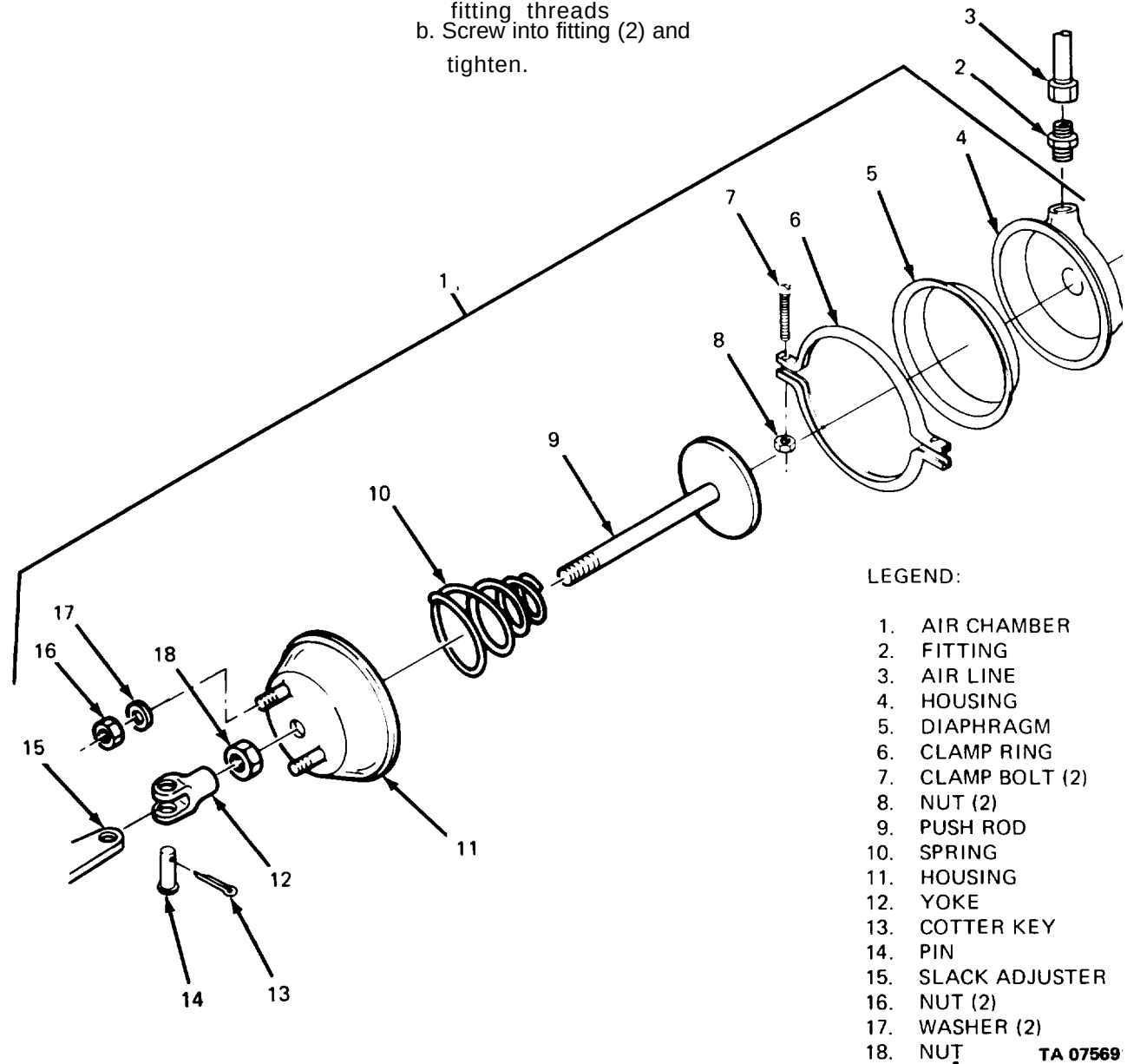
9-38. PUSHER AXLE BRAKE AIR CHAMBER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
4. Two nuts (16) and washers (17).	Unscrew and remove housing (11) with assembled air chamber (1) from mounting bracket on vehicle.	
B. DISASSEMBLY.		
5. Push rod (9).	a. Wrap with tape. b. Apply suitable pressure with vice grips to retain spring (10) in position.	Clamp vise grips onto rod close to housing (11).
6. Assembled housings (4) and (11).	Using marker pencil, draw a line from one end to the other.	You will use this line to aline parts during reassembly.
7. Two nuts (8).	Unscrew and remove clamp bolts (7).	
8. Clamp ring (6).	Pull apart and separate housings (4) and (11) for access to diaphragm (5).	Replace diaphragm if necessary.
C. ASSEMBLY.		
9. Diaphragm (5).	Position between housings (4) and (11).	Use the line you drew in step 6 to aline housings.
10. Clamp ring (6).	Position over housings joint and secure with two clamp bolts (7), and nuts (8).	
11. Push rod (9).	a. Remove vise grips. b. Remove tape.	
D. INSTALLATION.		
12. Housing (11) with assembled air chamber.	Position housing studs thru vehicle mounting bracket and secure with two washers (17) and nuts (16).	
13. Slack adjuster (15) and yoke (12) on push rod (9).	Aline holes, slide pin (14) in position and secure with new cotter key (13).	

BRAKE SYSTEM.

9-38. PUSHER AXLE BRAKE AIR CHAMBER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
D. INSTALLATION (Continued).		
14. Fitting (2).	a. Apply liquid teflon to threads. b. Screw into housing (4) and tighten.	
15. Air line (3).	a. Apply liquid teflon to hose fitting threads b. Screw into fitting (2) and tighten.	



BRAKE SYSTEM.**9-39. SLACK ADJUSTERS MAINTENANCE.****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

- a. Adjustment – Slack Adjuster (15)
(Forward Rear Tandem).
- b. Adjustment – Push Rod (30)
(Rear Rear Tandem).

45 Minutes Total.

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

**EQUIPMENT CONDITION
PARAGRAPH**

(See TM 9-2320-273-10).

CONDITION DESCRIPTIONWheel Raised OFF
Ground; Park Brake
Should Be Released And
Wheels Blocked.**PERSONNEL REQUIRED**

Two (MOS63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked On Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.

GENERAL SAFETY INSTRUCTIONSEngine OFF.
Transmission In Neutral.**TROUBLESHOOTING REFERENCES**

None.

BRAKE SYSTEM.

9-39. SLACK ADJUSTERS MAINTENANCE (Continued).

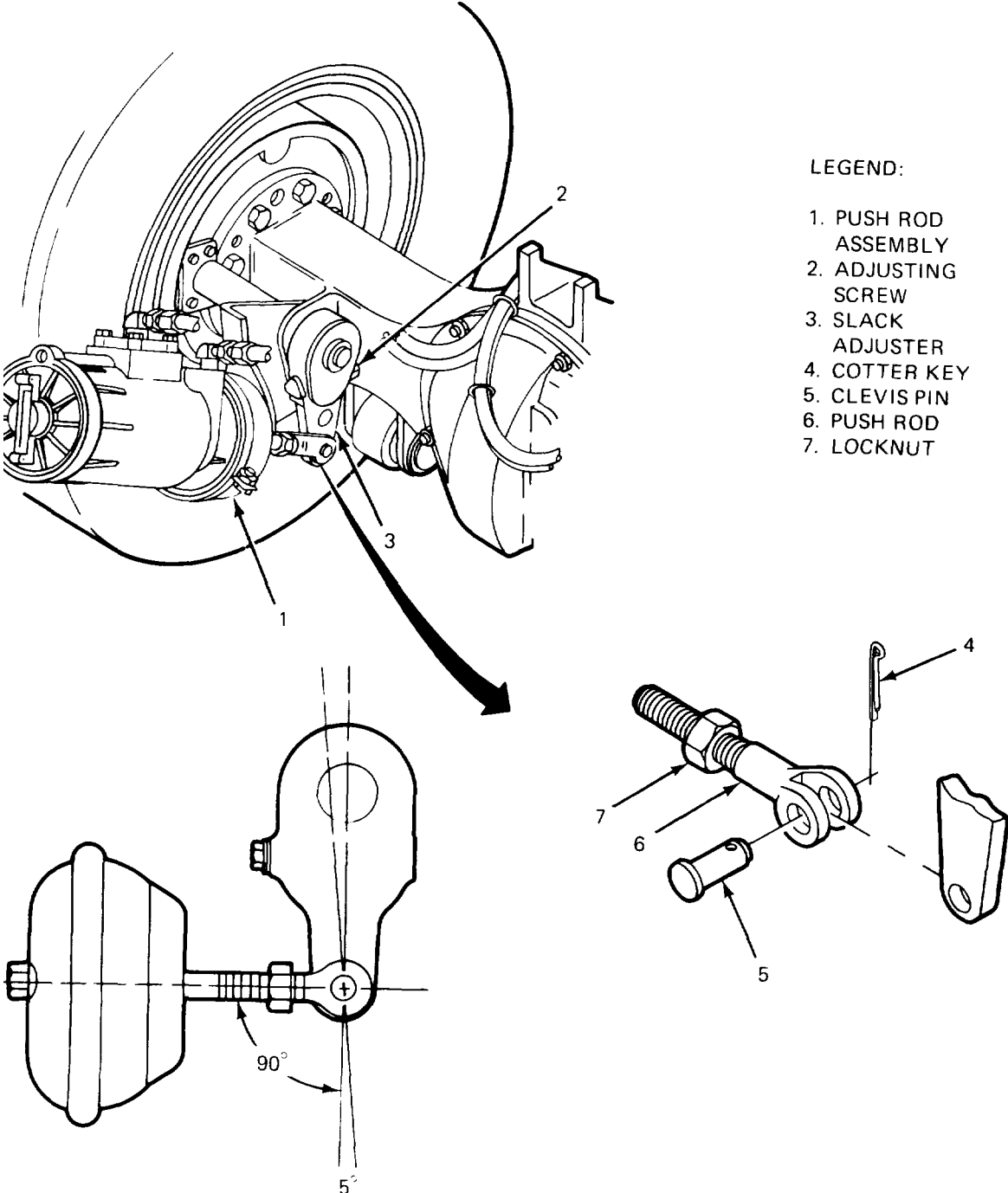
LOCATION/ITEM	ACTION	REMARKS
A. ADJUSTMENT – SLACK ADJUSTER.		
NOTE The procedure in this paragraph is limited to adjustment; it should be performed with wheel off of ground and parking brake released.		
1. Adjusting screw (2).	a. While turning wheel rotate adjusting screw (2) until brakeshoes are tight against brakedrum. b. Back off adjusting screw (2) approximately one turn or until wheel does not drag.	
2. CAB/Brake pedal.	Push completely down.	Second mechanic.
3. Slack adjuster (3) and push rod (6).	a. If brake chamber push rod (6) travel is less than 3/4 inch (1.9 cm) or more than 1 inch (2.54 cm) go to part B. b. If brake chamber push rod (6) travel is 3/4 to 1 inch (1.9 cm to 2.54 cm), adjustment is satisfactory. c. If angle between slack adjuster (3) and push rod (6) is less than 90°, go to part B. d. If angle between slack adjuster (3) and push rod (6) is more than 90°, adjustment is satisfactory.	
B. ADJUSTMENT – PUSH ROD.		
<u>WARNING</u> Do this procedure carefully. The slack adjuster may be turned toward the brake chamber and might snap back.		

BRAKE SYSTEM.**9-39. SLACK ADJUSTERS MAINTENANCE (Continued).**

LOCATION/ITEM	ACTION	REMARKS
B. ADJUSTMENT – PUSH ROD (Continued).		
4. Slack adjuster (3).	If push rod travel does not fall between 3/4 to 1 inch (1.9 cm to 2.54 cm), tighten adjusting screw to decrease travel or loosen to increase travel.	
5. Cotter key (4) and clevis pin (5).	a. Remove. b. Disconnect slack adjuster (3) from push rod (6).	
6. Push rod locknut (7).	a. Loosen. b. Turn push rod (7) to shorten.	
7. Clevis pin (5).	Insert into slack adjuster (3).	
8. CAB/Brake pedal.	Push completely down.	Second mechanic.
9. Slack adjuster (3) and push rod (6).	If angle between slack adjuster (3) and push rod (6) is at least 90°, go to step 10.	First mechanic.
10. Locknut (7).	Tighten.	
11. Cotter key (4)	Push into clevis pin (5).	
NOTE If adjustment to the push rod/slack adjuster angle is necessary, the push rod travel must be rechecked.		

BRAKE SYSTEM.

9-39. SLACK ADJUSTERS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
 LEGEND: 1. PUSH ROD ASSEMBLY 2. ADJUSTING SCREW 3. SLACK ADJUSTER 4. COTTER KEY 5. CLEVIS PIN 6. PUSH ROD 7. LOCKNUT		

TA 237234

AUXILIARY AIR-POWERED COMPONENT SYSTEMS.

9-40. WINDSHIELD WASHER MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(5)
b. Installation.	(5)
c. Operational Check.	(2)

12 Minutas Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

EQUIPMENT CONDITION

PARAGRAPH

None.

CONDITION DESCRIPTION

None.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Sat.

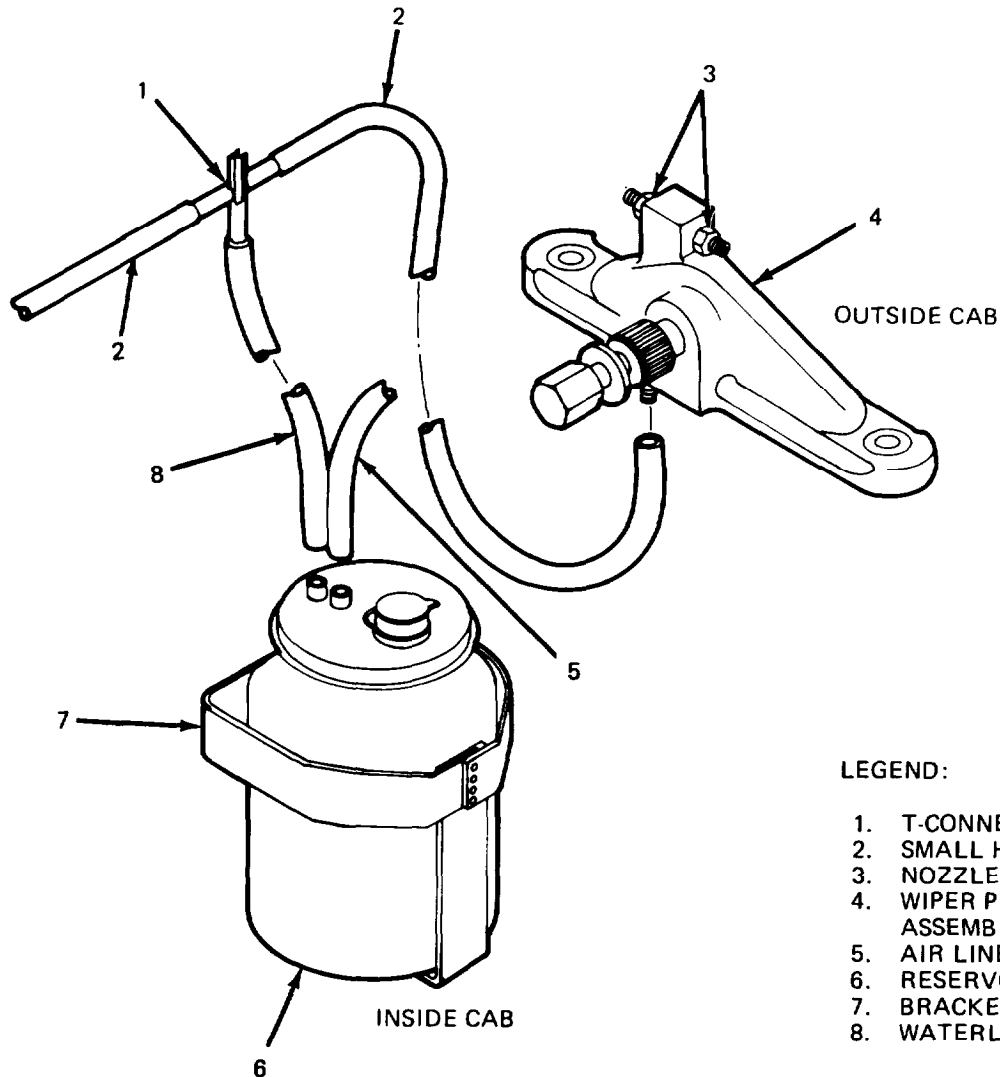
TROUBLESHOOTING REFERENCES

Table 8-1.

AUXILIARY AIR-POWERED COMPONENT SYSTEMS.

9-40. WINDSHIELD WASHER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL .		
1. Two small hoses (2).	Disconnect from wiper pivot assemblies (4).	Remove heater duct to gain access to hose (2) on right side.
2. Air line (5) and waterline (8).	Disconnect from reservoir (6).	



TA 074956

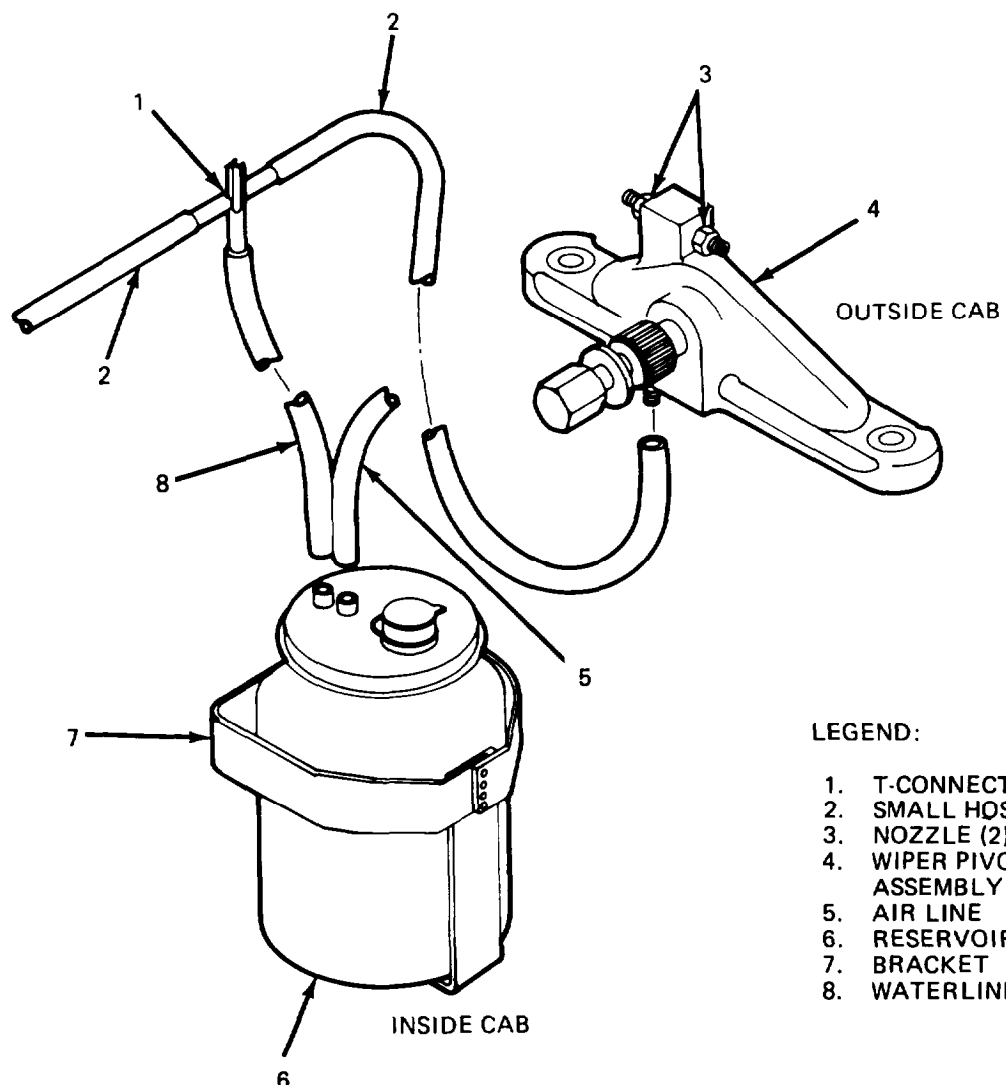
AUXILIARY AIR-POWERED COMPONENT SYSTEMS.

9-40. WINDSHIELD WASHER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
3. Reservoir (6).	Lift out of bracket (7).	
4. Two small hoses (2), T-connection (1), and water line (8).	Inspect for: a. Leaks. b. Cracks.	Replace if necessary.
B. INSTALLATION.		
5. Reservoir (6).	Set into bracket (7).	
6. Air line (5) and waterline (8).	Connect to reservoir (6).	
7. Two small hoses (2).	Connect to wiper pivot assemblies (4).	Reconnect heater duct.
C. OPERATIONAL CHECK.		
8. INSTRUMENT PANEL/ Washer button.	Push. Check that washer fluid is squirted onto wind- shield. Adjust nozzles (3) if necessary. Check for leaks.	If air pressure is low, you may need to start engine before washers will work.

AUXILIARY AIR-POWERED COMPONENT SYSTEMS.

9-40. WINDSHIELD WASHERS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
 1. T-CONNECTION 2. SMALL HOSE (2) 3. NOZZLE (2) 4. WIPER PIVOT ASSEMBLY 5. AIR LINE 6. RESERVOIR 7. BRACKET 8. WATERLINE INSIDE CAB OUTSIDE CAB		

TA 074957

AUXILIARY AIR-POWERED COMPONENT SYSTEM.

9-41. WINDSHIELD WASHER CONTROL MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

- a. Removal. (7)
- b. Inspection of Air Lines. (7)
- c. Installation. (1)
- d. Operational Check. (5)

20 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

EQUIPMENT CONDITION

PARAGRAPH

5-37A.

CONDITION DESCRIPTION

Batteries Disconnected.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (refer to appendix C).

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.

Transmission in Neutral.

Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 9-1.

AUXILIARY AIR-POWERED COMPONENT SYSTEM.

9-41. WINDSHIELD WASHER CONTROL MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Two quarter-turn screws (1).	Loosen so that instrument panel can be lowered.	
2. Supply line fitting (6).	Unscrew from valve body (7).	
3. Allen screw (2).	Remove.	
4. Control knob (3).	Remove.	
5. Nut (4).	Loosen and remove.	
6. Valve body (7).	Remove from back side of panel.	
7. Outlet hose (5).	Pull off of valve body (7).	

LEGEND:

- 1. QUARTER-TURN SCREW (2)
- 2. ALLEN SCREW
- 3. CONTROL KNOB
- 4. NUT
- 5. OUTLET HOSE
- 6. SUPPLY LINE FITTING
- 7. VALVE BODY

TA 074958

AUXILIARY AIR-POWERED COMPONENT SYSTEM.**9-41. WINDSHIELD WASHER CONTROL MAINTENANCE (Continued).**

LOCATION/ITEM	ACTION	REMARKS
B. INSPECTION OF AIR LINES AND FITTINGS.		
8. Air supply line, and fitting (6), air outlet hose (5).	Inspect for: a. Cracks. b. Leaks. c. Brittleness. d. Damaged fittings.	Replace if necessary.
C. INSTALLATION.		
9. Outlet hose (5).	Push onto arm of valve body (7).	
10. Valve body (7).	a. Put through hole in instrument panel. b. Screw on and tighten nut (4). c. Install control knob (3) and tighten Allen screw (2).	
11. Supply line fitting (6).	Screw into valve body (7).	
12. Two quarter-turn screws (1).	Tighten to fasten instrument panel in position.	
NOTE		
Follow-on maintenance required:		
Reconnect batteries per para 5-37B.		
D. OPERATIONAL CHECK.		
13. Engine RUN switch.	Turn ON (see TM 9-2320-273-10).	
14. Washer control knob (3).	Push.	If washer does not work, lower dash panel and check for leakage at air line connections. If there is no leakage, troubleshoot the rest of the washer system (para 9-5).
15. Engine RUN switch.	Turn OFF (see TM 9-2320-273-10).	

AUXILIARY AIR-POWERED COMPONENT SYSTEM.

9-41. WINDSHIELD WASHER CONTROL MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
LEGEND: 1. QUARTER-TURN SCREW (2) 2. ALLEN SCREW 3. CONTROL KNOB 4. NUT 5. OUTLET HOSE 6. SUPPLY LINE FITTING 7. VALVE BODY		

TA 074959

AUXILIARY AIR-POWERED COMPONENT SYSTEM.**9-42. WINDSHIELD WIPER MOTOR MAINTENANCE.****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

- a. Removal. (30)
 - b. Installation. (30)
 - c. Operational Check. (11)
- 71 Minutes Total.

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

EQUIPMENT CONDITION**PARAGRAPH**

None.

CONDITION DESCRIPTION

None.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (Refer to Appendix C).

Masking Tape.

Marking Pen.

Gasket (4730-01-055-4013).

PERSONNEL REQUIRED

Two (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.

TM 9-2320-273-20P.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.

Transmission in Neutral.

Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 9-1.

AUXILIARY AIR-POWERED COMPONENT SYSTEM.

9-42. WINDSHIELD WIPER MOTOR MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL. 1. Clip (3). Remove. 2. Drive lever (2). Remove from motor shaft. ENGINE COMPARTMENT LEGEND: 1. AIR LINE (2) 2. DRIVE LEVER 3. CLIP 4. NUT (4) 5. WASHER (4) 6. CAPSCREW (4) 7. MOTOR 8. GASKET		

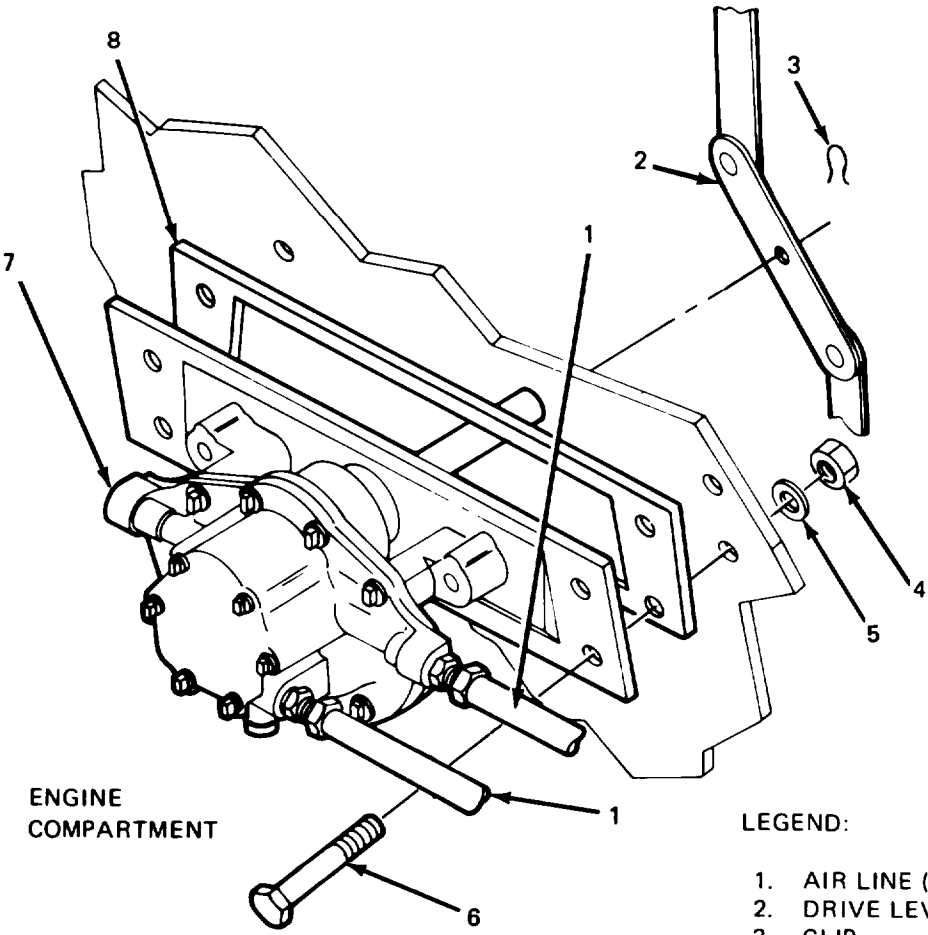
TA 074960

AUXILIARY AIR-POWERED COMPONENT SYSTEM.**9-42. WINDSHIELD WIPER MOTOR MAINTENANCE (Continued).**

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
3. Two air lines (1).	a. Use masking tape to mark PARK and RUN air lines. b. Unscrew and remove.	
4. Four capscrews (6), washers (5) and nuts (4).	Unscrew and remove motor (7) and gasket (8).	Discard gasket.
B. INSTALLATION .		
5. New gasket (8) and motor (7)	Position against firewall.	
6. Four capscrews (6), washers (5) and nuts (4).	Screw in and tighten.	
7. Two air lines (1).	Screw into ports marked PARK and RUN. Tighten.	
8. Drive lever (2).	Slide onto motor shaft.	
9. Clip (3).	Clip onto shaft.	
C. OPERATIONAL CHECK.		
10. Engine.	Start up (see TM 9-2320-273-10). Allow system to reach operating pressure of 105-120 psi (724-827 kPa).	
11. Windshield wipers.	Check operation at high and low speeds.	
12. Engine.	Shut down (see TM 9-2320-273-10)	

AUXILIARY AIR-POWERED COMPONENT SYSTEM.

9-42. WINDSHIELD WIPER MOTOR MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
 ENGINE COMPARTMENT LEGEND: 1. AIR LINE (2) 2. DRIVE LEVER 3. CLIP 4. NUT (4) 5. WASHER (4) 6. CAPSCREW (4) 7. MOTOR 8. GASKET		

TA 074961

AUXILIARY AIR-POWERED COMPONENT SYSTEMS.**9-43. WINDSHIELD WIPER CONTROL MAINTENANCE.****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

a. Removal.	(7)
b. Inspection of Air Lines	(2)
c. Installation.	(11)
d. Operational Check.	(1)
21 Minutes Total.	

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

EQUIPMENT CONDITION**PARAGRAPH**

5-37A.

CONDITION DESCRIPTION

Batteries Disconnected.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (PIN)

Masking Tape.

Marking Pen.

Liquid Teflon (refer to appendix C).

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.

TM 9-2320-273-20P.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.

Transmission in Neutral.

Park Brake Set.

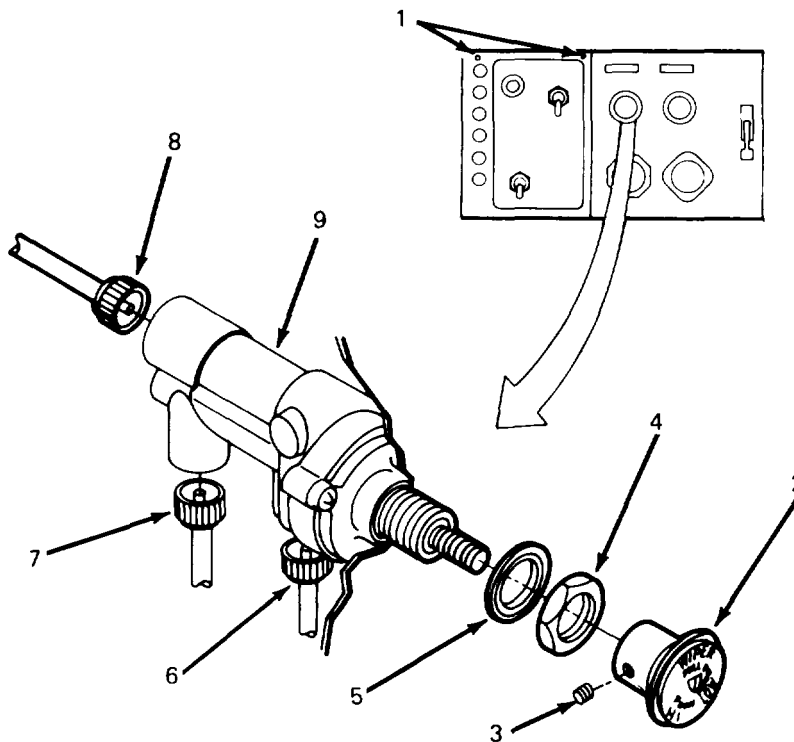
TROUBLESHOOTING REFERENCES

Table 9-1.

AUXILIARY AIR-POWERED COMPONENT SYSTEMS.

9-43. WINDSHIELD WIPER CONTROL MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Allen screw (3).	a. Loosen with Allen wrench. b. Remove knob (2).	
2. Two quarter-turn screws (1).	Loosen so that instrument panel can be lowered.	
3. Supply line (8), wiper park line (7), and wiper run line (6).	a. Use tape and marker pen to identify each line. b. Unscrew fittings from valve body (9).	
4. Nut (4) and washer (5).	a. Unscrew and remove. b. Remove valve body (9) from back side of panel.	



LEGEND:

1. QUARTER-TURN SCREW (2)
2. KNOB
3. ALLEN SCREW
4. NUT
5. WASHER
6. RUN LINE
7. PARK LINE
8. SUPPLY LINE
9. VALVE BODY

TA 074962

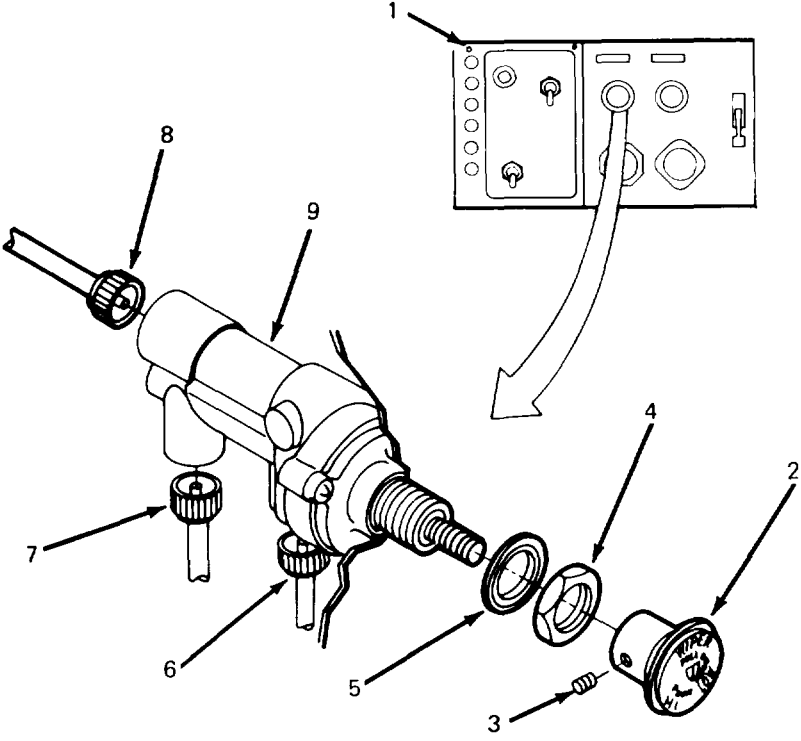
AUXILIARY AIR-POWERED COMPONENT SYSTEMS.

9-43. WINDSHIELD WIPER CONTROL MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSPECTION OF LINES AND FITTINGS.		
5. Supply line (8), wiper park line (7), and wiper run line (6).	Inspect for: a. Cracks. b. Leaks. c. Damaged fittings.	Replace if necessary.
C. INSTALLATION.		
6. Supply line (8), wiper park line (7), and wiper run line (6).	Screw into valve body (9). Be sure that each line is screwed into the proper opening.	
7. Valve body (9).	a. Push forward through hole in rear of instrument panel. b. Screw on and tighten washer (5) and nut (4).	
8. Two quarter-turn screws (1).	Tighten to fasten instrument panel cover.	
9. Knob (2).	a. Push onto valve body and twist until Allen setscrew (3) is seated properly on stem of valve body. b. Tighten with Allen wrench.	
10. Batteries.	Connect (see para 5-37 B).	
D. OPERATIONAL CHECK.		
10. Engine RUN switch.	Turn ON (see TM 9-2320-273-10).	
11. Wiper knob.	Pull out. Check to see that wipers operate properly on HI, LOW, and PARK.	If wipers do not work, open panel and check for air leaks at fittings. If no leaks are present troubleshoot the rest of the wiper system (see para 9-5).
12. Engine RUN switch.	Turn OFF (see TM 9-2320-273-10).	

AUXILIARY AIR-POWERED COMPONENT SYSTEMS.

9-43. WINDSHIELD WIPER CONTROL MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
 1. QUARTER-TURN SCREW (2) 2. KNOB 3. ALLEN SCREW 4. NUT 5. WASHER 6. RUN LINE 7. PARK LINE 8. SUPPLY LINE 9. VALVE BODY LEGEND:		

TA 074963

AUXILIARY AIR-POWERED COMPONENT SYSTEMS.

9-44. DIFFERENTIAL LOCKUP CONTROL VALVE MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

- a. Removal. (5)
- b. Installation. (6)
- c. Checking for Leaks. (2)

13 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (refer to appendix C).
Soap and Water Solution.

EQUIPMENT CONDITION

PARAGRAPH

9-13A.

5-83A.

CONDITION DESCRIPTION

Air Reservoirs Drained.

Differential Lockup

Switch Removed.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

GENERAL SAFETY INSTRUCTIONS

Differential Lockup Engaged.

Engine OFF.

Transmission in Neutral.

Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 9-1.

AUXILIARY AIR-POWERED COMPONENT SYSTEMS.

9-44. DIFFERENTIAL LOCKUP CONTROL VALVE MAINTENANCE (Continued).

LOCATION/ITEM

ACTION

REMARKS

WARNING

Do not remove differential lockup control valve until pressure is completely exhausted from all reservoirs.

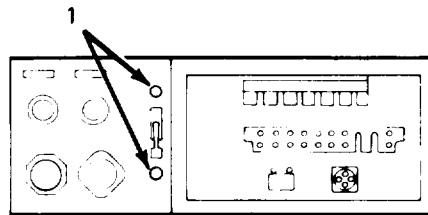
A. REMOVAL.

1. Two screws (1).

Loosen and remove valve (2).

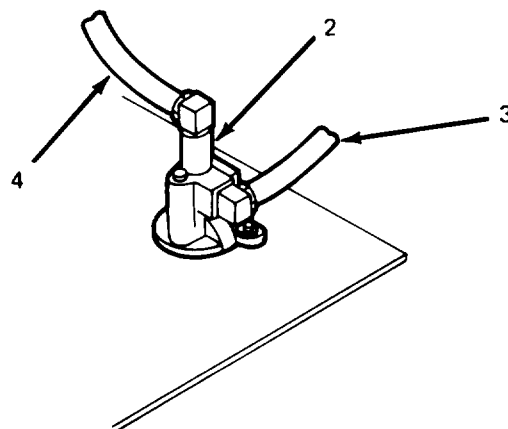
NOTE

The figure below shows M915 valve. M916 through M920 valves have three air line connections.



LEGEND:

- 1. SCREW (2)
- 2. VALVE
- 3. AIR LINE
- 4. AIR LINE



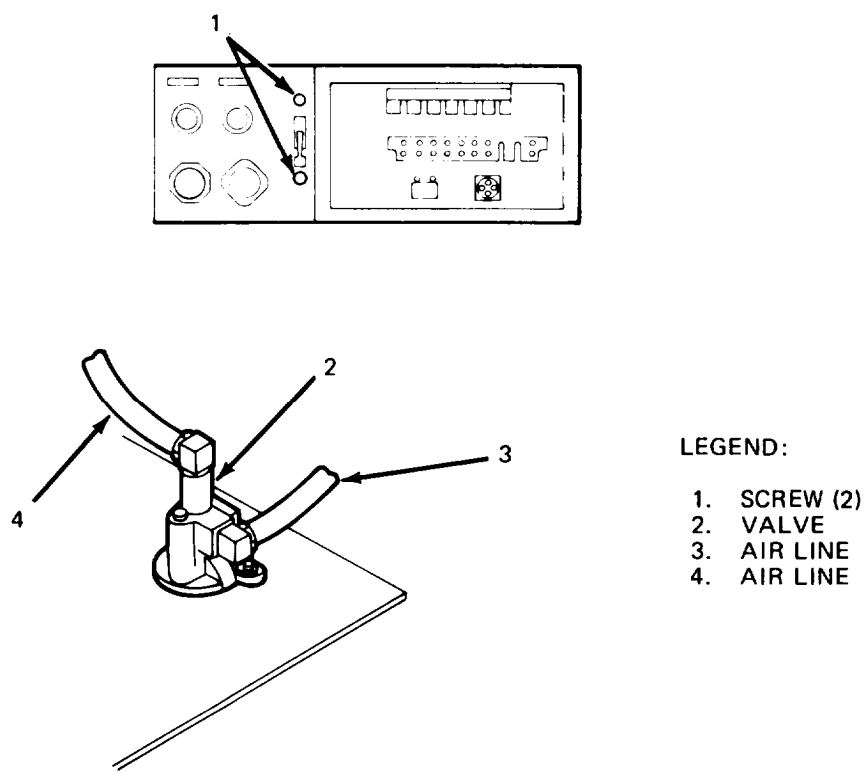
TA 074964

AUXILIARY AIR-POWERED COMPONENT SYSTEMS.**9-44. DIFFERENTIAL LOCKUP CONTROL VALVE MAINTENANCE (Continued).**

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
2. Air lines (3) and (4).	a. Unscrew and remove. b. Inspect for: 1. Cracks. 2. Leaks. 3. Damaged fittings.	Replace if necessary.
B. INSTALLATION.		
3. Air lines (3) and (4).	Screw into valve (2) and tighten.	
4. Valve (2).	Remount in instrument panel and install two screws (1).	
C. CHECKING FOR LEAKS.		
5. Engine.	Start up (see TM 9-2320-273-10). Allow system to reach operating pressure of 105-120 psi (724-827 kPa).	
6. Valve (2).	Engage, use soap solution to check for leaks.	
7. Engine.	Shut down (see TM 9-2320-273-10).	
NOTE		
Follow-on maintenance action required:		
Install differential lockup switch; refer to para 5-83B.		

AUXILIARY AIR-POWERED COMPONENT SYSTEMS.

9-44. DIFFERENTIAL LOCKUP CONTROL VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
NOTE The figure below shows M915 valve, M916 through M920 valves have three air line connections.  The diagram consists of two parts. The top part is a rectangular control panel with several circular gauges and a row of small rectangular indicators. Two arrows, labeled '1', point to screws on the right side of the panel. The bottom part is a 3D perspective view of a valve assembly. It features a central vertical valve body with two curved air lines attached. Arrows labeled '2', '3', and '4' point to the valve body, an air line, and another air line respectively. LEGEND: 1. SCREW (2) 2. VALVE 3. AIR LINE 4. AIR LINE		
TA 074965		

AUXILIARY AIR-POWERED COMPONENT SYSTEMS.**9-45. AIR HORN AND CONTROL VALVE MAINTENANCE.****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

a. Removal.	(18)
b. Installation.	(22)
c. Operational Check.	<u>(5)</u>
45 Minutes Total.	

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

**EQUIPMENT CONDITION
PARAGRAPH**

9-13A.

CONDITION DESCRIPTION

Air Reservoirs Drained.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (Refer to Appendix C).
 Soap and Water Solution.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.
 LO 9-2320-273-12.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
 Transmission in Neutral.
 Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 9-1.

AUXILIARY AIR-POWERED COMPONENT SYSTEMS.

9-45. AIR HORN AND CONTROL VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
M917 ONLY LEGEND: 1. SCREW (4) 2. COVER PLATE (2) 3. NUT (4) 4. TEE 5. CONNECTOR 6. LINE 7. ELBOW 8. HORN INLET 9. PLUG 10. SCREW 11. WASHER 12. CHAIN 13. S-HOOK 14. VALVE 15. FITTING 16. NUT (6) 17. WASHER (6) 18. SUPPLY LINE 19. GASKET (2) 20. PEDESTAL (2) 21. RUBBER LINER (2) 22. SCREW (6) 23. GASKET (2) 24. HORN (2) 25. WASHER (2) 26. WASHER		

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AUXILIARY AIR-POWERED COMPONENT SYSTEMS.

9-45. AIR HORN AND CONTROL VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
WARNING Do not remove valve (14) until pressure is fully exhausted from all reservoirs. NOTE For access to horns and valve remove headliner screws and pull down headliner as necessary.		
1. Screw (10) and washer (11).	Unscrew and remove one end of chain (12).	
2. Chain (12).	Disconnect from handle on valve (14) by slightly opening S-hook (13).	Use pliers to open S-hook.
3. Supply line (18).	Unscrew from fitting (15).	
4. Fitting (15).	Unscrew from valve (14).	
5. Valve (14).	Unscrew from horn inlet (8).	
6. Horn inlet (8).	Unscrew from tee (4).	
7. Line (6).	Unscrew from connector (5) and elbow (7).	
8. Connector (5).	Unscrew from tee (4).	
9. Plug (9).	Unscrew from tee (4).	M917 only.
10. Tee (4).	Unscrew from left hand horn (24).	
11. Elbow (7).	Unscrew from right hand horn (24).	
12. Six screws (22), washers (17), and nuts (16).	Unscrew and remove two horns (24), pedestals (20), gaskets (23), gaskets (19), and rubber liners (21).	M917 has only one horn located on left hand side.
13. Four screws (1) and nuts (3).	Unscrew and remove two plate covers (2), washers (25), and washer (26).	M917 only.

AUXILIARY AIR-POWERED COMPONENT SYSTEMS.

9-45. AIR HORN AND CONTROL VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
1. SCREW (4) 2. COVER PLATE (2) 3. NUT (4) 4. TEE 5. CONNECTOR 6. LINE 7. ELBOW 8. HORN INLET 9. PLUG 10. SCREW 11. WASHER 12. CHAIN 13. S-HOOK 14. VALVE 15. FITTING 16. NUT (6) 17. WASHER (6) 18. SUPPLY LINE 19. GASKET (2) 20. PEDESTAL (2) 21. RUBBER LINER (2) 22. SCREW (6) 23. GASKET (2) 24. HORN (2) 25. WASHER (2) 26. WASHER LEGEND: M917 ONLY.		

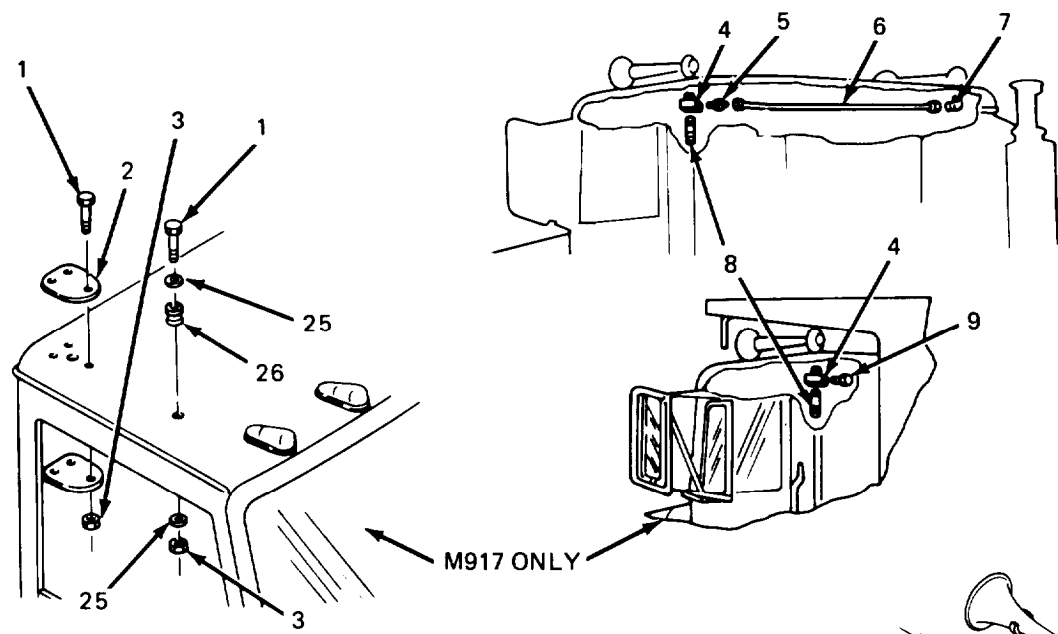
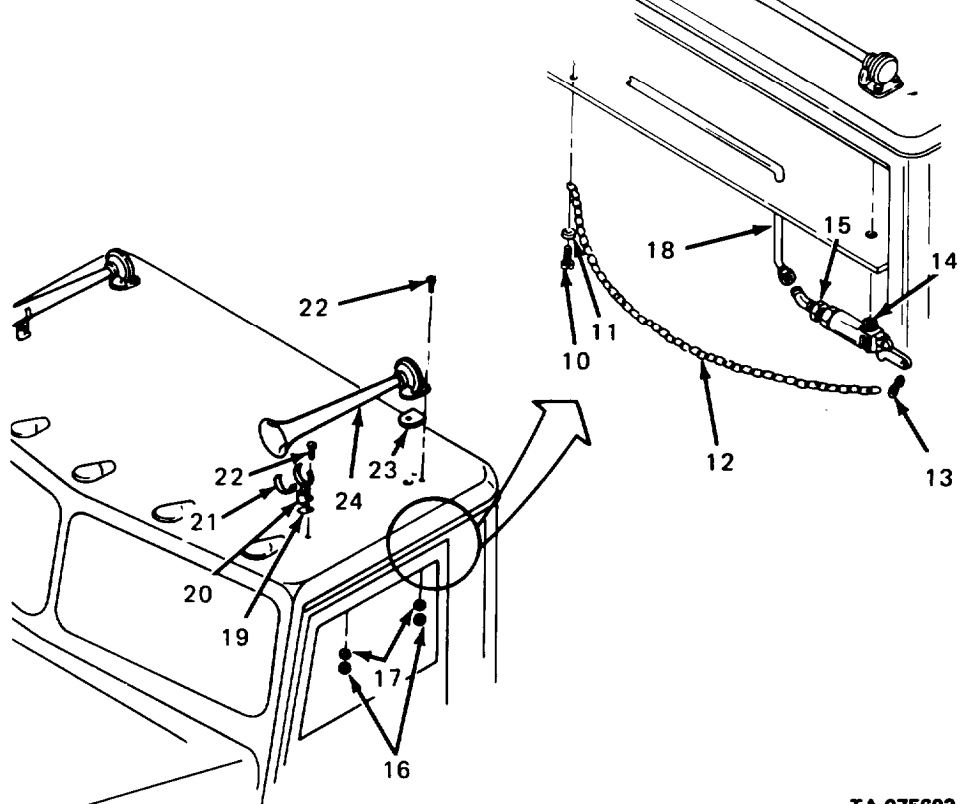
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AUXILIARY AIR-POWERED COMPONENT SYSTEMS.**9-45. AIR HORN AND CONTROL VALVE MAINTENANCE (Continued).**

LOCATION/ITEM	ACTION	REMARKS
NOTE Coat all threaded connections with liquid teflon as you assemble.		
14. Two gaskets (19), gaskets (23), pedestals (20), rubber liners (21), and horns (24).	Position on cab roof and install with six screws (22), washers (17), and and nuts (16).	M917 has only one horn.
15. Elbow (7).	Screw into horn (24) on right hand side.	
NOTE Follow step 16. For M917 only.		
16. Two cover plates (2), washers (25), and washers (26).	Position on right hand cab roof and install with four screws (1) and nuts (3).	
17. Tee (4).	Screw into horn (24) on left hand side.	
18. Connector (5).	Screw into tee (4).	
19. Plug (9).	Screw into tee (4).	M917 only.
20. Line (6).	Screw onto connector (5) and elbow (7).	
21. Horn inlet (8).	Screw into bottom of tee (4).	
22. Fitting (15).	Screw into valve (14).	
23. Valve (14).	Screw onto horn inlet (8).	
24. Supply line (18).	Screw onto fitting (15).	
25. S-hook (13).	a. Hook thru hole in handle of valve (14) and one end of chain (12). b. Clamp S-hook closed with pliers.	

AUXILIARY AIR-POWERED COMPONENT SYSTEMS.

9-45. AIR HORN AND CONTROL VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
		
LEGEND: 1. SCREW (4) 2. COVER PLATE (2) 3. NUT (4) 4. TEE 5. CONNECTOR 6. LINE 7. ELBOW 8. HORN INLET 9. PLUG 10. SCREW 11. WASHER 12. CHAIN 13. S-HOOK 14. VALVE 15. FITTING 16. NUT (6) 17. WASHER (6) 18. SUPPLY LINE 19. GASKET (2) 20. PEDESTAL (2) 21. RUBBER LINER (2) 22. SCREW (6) 23. GASKET (2) 24. HORN (2) 25. WASHER (2) 26. WASHER		
		

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AUXILIARY AIR-POWERED COMPONENT SYSTEMS.**9-45. AIR HORN AND CONTROL VALVE MAINTENANCE (Continued).**

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION (Continued).		
26. Chain (12).	Secure other end to cab roof with screw (10) and washer (11).	
C. OPERATIONAL CHECK.		
27. Engine.	Start up (see TM 9-2320-273-10). Allow system to reach operating pressure of 105-120 psi (724-827 kPa).	
28. Chain (12).	a. Pull. b. Release.	Horn should blow. Horn should stop blowing.
29. Valve (14).	Check for leaks with soap and water solution.	Retighten as necessary.
30. Engine.	Shut down (see TM 9-2320-273-10).	
NOTE		
Reposition headliner, if lowered, and secure with screws and trim washers.		

AUXILIARY AIR-POWERED COMPONENT SYSTEMS.

9-45. AIR HORN AND CONTROL VALVE MAINTENANCE (Continued),

LOCATION/ITEM	ACTION	REMARKS
LEGEND: 1. SCREW (4) 2. COVER PLATE (2) 3. NUT (4) 4. TEE 5. CONNECTOR 6. LINE 7. ELBOW 8. HORN INLET 9. PLUG 10. SCREW 11. WASHER 12. CHAIN 13. S-HOOK 14. VALVE 15. FITTING 16. NUT (6) 17. WASHER (6) 18. SUPPLY LINE 19. GASKET (2) 20. PEDESTAL (2) 21. RUBBER LINER (2) 22. SCREW (6) 23. GASKET (2) 24. HORN (2) 25. WASHER (2) 26. WASHER		

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CHAPTER 10

WHEELS, STEERING, AND SUSPENSION SYSTEMS MAINTENANCE

This chapter provides you with the following information related to wheels, steering, and suspension systems maintenance.

- a. All required special tools and equipment.
- b. Other technical manuals.
- c. Troubleshooting procedures.
- d. Maintenance procedures.

Section I REPAIR PARTS, SPECIAL TOOLS, TMDE AND SUPPORT EQUIPMENT

10-2. COMMON TOOLS AND EQUIPMENT.

For authorized common tools and equipment, refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

10-3. SPECIAL TOOLS, TMDE, SUPPORT EQUIPMENT.

The special tools, TMDE and support equipment required for the wheels, steering, and suspension systems maintenance procedures described in this chapter are limited to the following items: (Refer to Organizational Maintenance RPSTL, TM 9-2320-273-20P for tool description and illustration.)

- a. Toe-in gage.
- b. Valve core removing tool.
- c. Gooseneck tool.
- d. Rim tool.
- e. Safety cage.
- f. 4-inch, 6-point wheel bearing nut wrench.
- g. Wheel bearing packing tool.
- h. Wheel dolly.
- i. Tie rod end puller.
- j. Pitman arm removing tool.
- k. Pitman arm spacer.
- l. Spacer removing tool.
- m. Ball joint puller.

10-4. SPARES AND REPAIR PARTS.

Spares and repair parts are listed and illustrated in the Repair Parts and Special Tools List covering organizational maintenance for this equipment (TM 9-2320-273-20P).

Section II TROUBLESHOOTING

10-5. INTRODUCTION.

Tables 10-1 thru 10-3 contain instructions for troubleshooting the wheels, steering, and vehicle suspension. The correction actions describe how to fix the problem or refer to a procedure for fixing the problem. The troubleshooting tables are arranged by malfunctions in the following order.

WHEELS AND TIRES (table 10-1):

- a. Tires wearing unevenly,
- b. Noisy or bumpy sound while traveling down the road.

STEERING (table 10-2):

- a. Front tires wearing unevenly.
- b. Hard steering.
- c. Vehicle wanders or pulls to one side.
- d. Lost motion or excessive play in steering wheel.
- e. Temporary increase in effort when turning steering wheel.
- f. Vehicle does not fully steer from stop to stop.

SUSPENSION (table 10-3):

- a. Vehicle wanders or shimmies.
- b. Pusher axle will not raise or lower.
- c. Rear axle assembly not tracking properly.

Table 10-1. Wheel and Tire Troubleshooting Procedures.

MALFUNCTION.	
TEST OR INSPECTION.	
CORRECTIVE ACTION.	
1. TIRES WEARING UNEVENLY:	
Step 1.	Check wheel alinement if problem is on front wheels. Aline front wheels (para 10-10).
Step 2.	Check rear brakes for proper adjustment. (Front brakes are self -adjusting.) Adjust brakes (para 9-33, 9-34, 939).
Step 3.	Check wheel bearing for adjustment, lubrication, and damage. Adjust, lubricate, or replace (para 10-13, 10-14, 10-15 or 10-16, as applicable).
2. NOISY OR BUMPING SOUND WHILE TRAVELING ON THE ROAD:	
Step 1.	Check lug wheel stud cap nuts for proper torque. Tighten lug nuts to 450 lb-ft (610 N.m).
Step 2.	Inspect U-bolts for tightness. Tighten U-bolts (125-165 lb-ft (170-224 N.m) for M915, 200-270 lb-ft (271-366 N.m) for M916 thru M920).
Step 3.	Inspect spring shackle pins for looseness using a pry bar. No noticeable movement is allowable. Refer to Direct Support Maintenance.
Step 4.	Check wheel bearings for vertical looseness using a prying bar beneath the tire. Check for proper lubrication and damage. Adjust, lubricate, or replace bearing (para 10-13, 10-14, 10-15 or 10-16, as applicable).
Step 5.	Inspect rear axle shaft for damage by jacking up both wheels. Turn wheels to one extreme and rotate one wheel by hand while listening for a rumbling or grinding sound within the axle. Repeat on other wheel. Replace axle shaft (para 10-15),
Step 6.	Check pusher axle for damaged components or leaking air lines. Replace components as necessary (para 9-38, 10 16) or contact Direct Support Maintenance.

Table 10-1. Wheel and Tire Troubleshooting Procedures (Continued).

MALFUNCTION.
TEST OR INSPECTION.
CORRECTIVE ACTION.
2. NOISY OR BUMPING SOUND WHILE TRAVELING ON THE ROAD (Continued): Step 7. Inspect front driving axle (M916 thru M920) as in Step 5. Refer to paragraph 10-14 or Direct Support Maintenance.

Table 10-2. Steering Troubleshooting Procedures.

MALFUNCTION.	TEST OR INSPECTION.	CORRECTIVE ACTION.
1. FRONT TIRES WEARING UNEVENLY: Step 1. Inspect U-bolts for tightness. Tighten U-bolts (125-165 lb-ft (170-224 N-m) for M915; 200-270 lb-ft (271-366 N-m for M916 thru M920). Step 2. Inspect spring shackle pins for looseness using a pry bar. No noticeable movement is allowable. Refer to Direct Support Maintenance. Step 3. Check wheel bearings for vertical looseness using a pry bar beneath the tire. Check for proper lubrication and damage, Adjust, lubricate, or replace bearing (para 10-13 or 10-14, as applicable). Step 4. Check for proper toe-in (0 to 1/8-inch). Adjust toe-in (para 10-10). Step 5. Check brakes for proper adjustment. Adjust brakes (para 9-31 and 9-32). 2. HARD STEERING: Step 1. Check oil level in power steering pump. Fill to proper level (LO 9-2320-273-12). Step 2. Check all steering linkage for proper lubrication. Lubricate (LO 9-2320-273-12). Step 3. Check U-bolts for tightness. Tighten U-bolts (125-165 lb-ft (170-224 N-m) for M915; 200-270 lb-ft (271-366 N-m) for M916 thru M920). Step 4. Inspect all hydraulic lines and fittings for leakage or damage. Tighten or replace lines or fittings (para 10-22 and 10-23). Step 5. Check tie rod for damage or loose ends. No play is allowable. Tighten or replace (para 10-20).		

Table 10-2. Steering Troubleshooting Procedures (Continued).

MALFUNCTION.	
TEST OR INSPECTION.	
CORRECTIVE ACTION.	
2. HARD STEERING (Continued):	
Step 6. Inspect drag link for damage.	Replace drag link (para 10-19).
Step 7. Check steering gear for proper adjustment.	Refer to Direct Support Maintenance.
Step 8. Inspect axle shaft for damage (M916 thru M920).	Refer problem to Direct Support Maintenance.
3. VEHICLE WANDERS OR PULLS TO ONE SIDE:	
Step 1. Check U-bolts for tightness.	Tighten U-bolts (125-165 lb-ft (170-224 N.m) for M915, 200-270 lb-ft (271-336 N-m) for M916 thru M920).
Step 2. Check front spring pin for damage by using a pry bar. No noticeable play is allowed.	Refer to Direct Support Maintenance.
Step 3. Check auxiliary cylinder for damage (M916 thru M920).	Replace cylinder (para 10-23).
Step 4. Check drag link for damage.	Replace drag link (para 10-19).
Step 5. Check tie rod for looseness or damage.	Adjust or replace tie rod assembly (para 10-20).
Step 6. Check for dragging brake by jacking vehicle and spinning wheel by hand.	Adjust brake (para 9-31 and 9-32).
Step 7. Check hub and drum for damage.	Replace (para 10-13 or 10-14, as applicable).

Table 10-2. Steering Troubleshooting Procedures (Continued).

MALFUNCTION.	
TEST OR INSPECTION.	
CORRECTIVE ACTION.	
3. VEHICLE WANDERS OR PULLS TO ONE SIDE (Continued):	
Step 8.	Check wheel bearing adjustment by using a pry bar. No noticeable play is allowable. Check for proper lubrication or damage. Adjust, lubricate, or replace bearing (para 10-13 or 10-14, as applicable).
4. LOST MOTION OR EXCESSIVE PLAY IN STEERING WHEEL:	
Step 1.	Check free play. Tape a piece of stiff wire or weld rod to the instrument panel so that one end is near the rim of the steering wheel. Turn the wheel to one extreme of free travel (wheels do not move) and mark the wheel at the wire. Turn the wheel the other way to the end of the free play and mark the wire position on the wheel. Measure the free play around the circumference of the steering wheel. Maximum free play with engine running is 2-1/2 inches. Refer to Direct Support Maintenance.
Step 2.	Check drag link for looseness or damage. Replace drag link (para 10-19).
Step 3.	Check tie rod for damage or loose end. No free play is allowable in tie rod end. Adjust or replace tie rod (para 10-20).
Step 4.	Check pitman arm for damage. Replace pitman arm (para 10-21).
Step 5.	Check pump reservoir for damage. Replace reservoir (para 10-22).
Step 6.	Check auxiliary cylinder for damage. (M916 thru M920). Replace cylinder (para 10-23).
5. TEMPORARY INCREASE IN EFFORT WHEN TURNING STEERING WHEEL.	
Step 1.	Check all steering linkage for proper lubrication. Lubricate (LO 9-2320-273-12).
Step 2.	Check hydraulic reservoir for damage and leakage. Replace reservoir (para 10-22).

Table 10-2. Steering Troubleshooting Procedures (Continued).

MALFUNCTION.	TEST OR INSPECTION.	CORRECTIVE ACTION.
5. TEMPORARY INCREASE IN EFFORT WHEN TURNING STEERING WHEEL (Continued):		
	Step 3. Check steering gear mounting bolts for tightness.	Tighten to 180 lb-ft (244 N-m).
	Step 4. Check steering gear adjustment.	Refer to Direct Support Maintenance.
	Step 5. Check auxiliary cylinder for damage or leakage (M916 thru M920).	Replace cylinder (para 10-23).
	Step 6. Inspect drag link for damage.	Replace drag link (para 10-19).
	Step 7. Inspect tie rod for damage or loose end. No play is allowable.	Replace tie rod end (para 10-20).
	Step 8. (All models except M915). Inspect axle shaft for damage by jacking up both wheels, turning wheels to one extreme, and rotating one wheel by hand. Listen for rumbling or grinding sound within the axle. Repeat on other wheel.	Refer to Direct Support Maintenance.
6. VEHICLE DOES NOT FULLY STEER FROM STOP TO STOP:		
	Step 1. Check all steering linkage for proper lubrication.	Lubricate (LO 9-2320-273-12).
	Step 2. Check pitman arm for damage.	Replace pitman arm (para 10-21).
	Step 3. Check drag link for damage or looseness. No play is allowable.	Replace drag link (para 10-19).
	Step 4. Check the tie rod for damage or loose end. No play is allowable.	Replace tie rod end if loose (para 10-20).
	Step 5. Check steering gear mounting bolts for tightness,	
	a. Tighten bolts to 180 lb-ft (244 N.m).	
	b. Refer to Direct Support Maintenance.	

Table 10-3. Suspension Troubleshooting Procedures

MALFUNCTION.	
TEST OR INSPECTION.	
CORRECTIVE ACTION.	
1. VEHICLE WANDERS OR SHIMMIES:	
Step 1. Check for insufficient lubrication.	Lubricate (LO 9-2320-273-12).
Step 2. Check for loose wheel stud cap nuts.	Tighten nuts to 450 lb-ft (610 N-m).
Step 3. Check for loose spring U-bolts.	Tighten nuts on U-bolts (125-165 lb-ft (170-224 N-m) for M915, 200-270 lb-ft (271-366 N-m) for M916 thru M920).
Step 4. Check wheel bearings for play using a pry bar.	Adjust or replace bearing (para 10-13 or 10-14, as applicable).
Step 5. Inspect tie rod for damage and ends for looseness. No play is allowable.	Replace tie rod end if loose (para 10-20).
Step 6. Inspect drag link for damage.	Replace drag link (para 10-19).
Step 7. Check propeller shafts and universal joints for wear and damage. Wear is indicated by any movement between the shaft and the joint in any direction.	Replace (para 8-11).
Step 8. Check spring pins for wear using a pry bar, No noticeable movement is allowed.	Refer to Direct Support Maintenance.
Step 9. (N/A M915). Check front axle shaft for damage by jacking up both wheels, turning wheels to one extreme and rotating one wheel by hand. Listen for a rumbling or grinding sound within the axle. Repeat on other wheel.	Refer to Direct Support Maintenance.

Table 10-3. Suspension Troubleshooting Procedures (Continued)

MALFUNCTION.	
TEST OR INSPECTION.	
CORRECTIVE ACTION.	
2. PUSHER AXLE WILL NOT RAISE OR LOWER:	
Step 1.	Check air bags for damage and leakage by listening for a hissing sound or using a soap solution and watching for bubbles. Replace air bags (para 8-14).
Step 2.	Check air lines for leakage using a soap solution. Replace lines (para 8-14 and 8-15).
Step 3.	Check lifting bags for damage. Replace defective bags (para 8-15).
Step 4.	Inspect all brackets and connecting arms for bends or other damage. Refer to Direct Support Maintenance.
Step 5.	Check control valves for damage and leakage using a soap solution with valve under pressure. A 1-inch bubble in 5 seconds is permissible. Tighten connections and/or replace the control valves (para 8-17 pusher axle pressure regulator valve, or para 8-18 pusher axle up-down selector valve).
Step 6.	Check shock absorbers for damage and tight mounting. Tighten or replace (para 10-25).
3. REAR AXLE ASSEMBLY NOT TRACKING PROPERLY:	
Step 1.	(M915, M916, M920). Check fifth wheel for secure mounting. This step applies only if a trailer is attached. Tighten, refer to torque table, para 3-9.
Step 2.	Check torque rod for security and damage. Tighten (105 lb-ft (142 N-m) for the M915, 180 lb-ft (244 N-m) for the M916 thru M920), or replace (para 10-26).
Step 3.	Check for dragging brake by jacking vehicle and rotating wheels by hand. Adjust or replace (para 9-33, 9-34). Refer to Direct Support Maintenance.

Table 10-3. Suspension Troubleshooting Procedures (Continued).

MALFUNCTION. TEST OR INSPECTION. CORRECTIVE ACTION.
3. REAR AXLE ASSEMBLY NOT TRACKING PROPERLY (Continued): Step 4. Check wheel bearing adjustment using a pry bar. No noticeable movement is allowable. Check for damage and proper lubrication. Adjust, lubricate, or replace (para 10-15 or 10-16). Step 5. Check hubs and drums for damage. Replace (para 10-15 or 10-16).

Section III MAINTENANCE PROCEDURES

10-6. INTRODUCTION.

This section provides you with Organizational Level maintenance procedures for the wheels, steering, and suspension systems. To find a specific maintenance procedure, see one of the following task summaries:

- a. Wheels and Tires (para 10-7).
- b. Steering Mechanism (para 10-8).
- c. Suspension System (para 10-9).

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10-7. WHEEL AND TIRE MAINTENANCE TASK SUMMARY.			
<u>INITIAL SETUP</u> <u>APPLICABLE CONFIGURATIONS</u>		<u>EQUIPMENT</u> <u>CONDITION PARAGRAPH</u>	<u>CONDITION DESCRIPTION</u>
All.		(See TM 9-2320-273-10.) (See TM 9-2320-273-10.)	Wheel and Tire Assembly Removed. Axle Jacked Up.
<u>TEST EQUIPMENT</u>			
None.			
<u>SPECIAL TOOLS</u>			
Toe-in Gage. Ball Joint Puller.			
<u>MATERIALS/PARTS (P/N)</u>			
Soap Solution, Hub Gasket, 2208-M-819 (78500). Bearing Seal, A-1205-L-1338 (78500). GAA (Refer to Appendix C). Nonflammable Cleaning Solvent SD-2 (Refer to Appendix C). Seal Installer. Wheel Bearing Packing Tool. Wheel Dolly. Wheel Bearing Nut Wrench, Permatex (Refer to Appendix C). Silicone (RTV) Gasket Material (Refer to Appendix C). Cotter Pin (2) K-2616 (78500). Inner Bearing Seal, 1205-P-1212 (78500).		Hub Cap Gasket, 2208-P-796 (78500). Oil Seal, A-1205-Y-1533 (78500). Inner Bearing Seal M915, A-1205-T-696 (78500). M916/M920, A-1 205-T-774 (78500). Outer Bearing Seal M915, A1205-N-612 (78500). M916/M920, A-1 205-U-619 (78500). Star Washers (16), 1229-X-518 (78500). Gasket (2) M915, 2208-X-440 (78500). M916/M920, 2208-W-41 3 (78500). Brass Drift.	
<u>PERSONNEL REQUIRED</u>		<u>SPECIAL ENVIRONMENTAL CONDITIONS</u>	
One or Two (MOS-63B20).		Vehicle Parked on Level Ground.	
<u>REFERENCES (TM)</u>		<u>GENERAL SAFETY INSTRUCTIONS</u>	
TM 9-2320-273-10. TM 9-2320-273-20P. LO 9-2320-273-12.		Wheels Blocked. Engine OFF. Transmission in Neutral. Park Brake Set	
<u>REFERENCES (TROUBLESHOOTING)</u>			
Table 10-1, 10-2, 10-3.			
LIST OF TASKS			
TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
1.	Front Wheels Maintenance:	10-10	10-1
	A. Checking Alinement.	10-10A	
	B. Adjustment of Alinement (M915).	10-10B	
	C. Adjustment of Alinement (M916 thru M920).	10-10C	
2.	Tire and Tube Maintenance (M915):	10-11	10-1
	A. Removal.	10-11A	
	B. Inspection.	10-11B	
	C. Installation.	10-11C	

10-7. WHEEL AND TIRE MAINTENANCE TASK SUMMARY (Continued).

LIST OF TASKS			
TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
3.	Tire and Tube Maintenance (M916 thru M920):	10-12	10-1
	A. Removal.	10-12A	
	B. Inspection.	10-12B	
	C. Installation.	10-12C	
4.	Front Wheel Bearings and Seals Maintenance (M915):	10-13	10-2
	A. Removal.	10-13A	
	B. Inspection.	10-13B	
	C. Packing and Installation of Bearings.	10-13C	
5.	Front Wheel Bearings and Seals Maintenance (M916 thru M920):	10-11	10-2
	A. Removal.	10-14A	
	B. Inspection.	10-14B	
	c. Packing and Installation of Bearings.	10-14C	
6.	Rear Wheel Bearings, Shafts, and Seals Maintenance:	10-15	10-3
	A. Removal.	10-15A	
	B. Inspection.	10-15B	
	c. Packing and Installation of Bearings.	10-15C	
7.	Pusher Axle Bearings and Seals:	10-16	10-3
	A. Removal.	10-16A	
	B. Inspection.	10-16B	
	C. Packing and Installation of Bearings.	10-16C	

10-8. STEERING MECHANISM MAINTENANCE TASK SUMMARY.			
<u>INITIAL SETUP</u> <u>APPLICABLE CONFIGURATIONS</u> All. <u>TEST EQUIPMENT</u> None. <u>SPECIAL TOOLS</u> None. <u>MATERIALS/PARTS (P/N)</u> GAA (Refer to Appendix C). Nonflammable Cleaning Solvent SD-2 (Refer to Appendix C). Cotter Pin, 103415 (24617). Cotter Pin, 103389 (24617). Snapping, 100475 (15434). Gasket, Oil Pump to Adapter (5330-01-071-5727). O-Ring, 008771-026 (19954). Wheel Puller. Silicone RTV Sealant (Refer to Appendix C). Cotter Pin (2), K-2616 (78500). <u>PERSONNEL REQUIRED</u> One or Two MOS-63B20). <u>REFERENCES (TM)</u> TM 9-2320-273-10. LO 9-2320-273-12. TM 9-2320-273-20P. <u>REFERENCES (TROUBLESHOOTING)</u> Table 10-2.		<u>EQUIPMENT</u> <u>CONDITION PARAGRAPH</u> 5-67A. 11-14A or C. 11-16A. 5-37A. 4-18A. Balljoint Puller. Jack Stands. Power Steering Fluid (Refer to Appendix C). Liquid Teflon (Refer to Appendix C). Clean Container (Quart). Grease Gun. Plugs. Cable Tie, PLT4H-MO (06383). Cable Tie, MS-3367-2-O (96906). <u>SPECIAL ENVIRONMENTAL CONDITIONS</u> Vehicle Parked on Level Ground. <u>GENERAL SAFETY INSTRUCTIONS</u> Engine OFF. Transmission in Neutral. Park Brake Set.	
<u>LIST OF TASKS</u>			
TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
1.	Steering Wheel Maintenance:	10-17	10-2
	A. Removal.	10-17A	
	B. Installation.	10-17B	
	C. Operational Check.	10-17C	
2.	Lower Steering Shaft Maintenance:	10-18	10-2
	A. Removal.	10-18A	
	B. Disassembly.	10-18B	
	C. Assembly.	10-18C	

10-8. STEERING MECHANISM MAINTENANCE TASK SUMMARY (Continued).**LIST OF TASKS**

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
2.	Lower Steering Shaft Maintenance (Continued):		
	D. Installation.	10-18D	
	E. Operational Check,	10-18E	
3.	Drag Link Maintenance:	10-19	10-2
	A. Removal.	10-19A	
	B. Inspection of Mating Connections.	10-19B	
	C. Installation.	10-19C	
	D. Operational Check.	10-19D	
4.	Tie Rod Maintenance:	10-20	10-2
	A. Removal.	10-20A	
	B. Inspection.	10-20B	
	C. Installation.	10-20C	
5.	Pitman Arm Maintenance:	10-21	10-2
	A. Removal.	10-21A	
	B. Inspection of Mating Surfaces.	10-21B	
	C. Installation.	10-21C	
6.	Hydraulic Power Steering Pump and Cooler Maintenance:	10-22	10-2
	A. Removal.	10-22A	
	B. Inspection of Lines, Fittings, and Cooler.	10-22B	
	C. Installation.	10-22C	
	D. Filling and Bleeding System.	10-22D	
	E. Operational Check.	10-22E	

10-8. STEERING MECHANISM MAINTENANCE TASK SUMMARY (Continued).			
LIST OF TASKS			
TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
7.	Auxiliary Cylinder (M916 Thru M920):	10-23	10-2
	A. Removal.	10-23A	
	B. Inspection.	10-23B	
	C. Installation.	10-23C	
	D. Operational Check.	10-23D	

10-9. SUSPENSION SYSTEM MAINTENANCE TASK SUMMARY.**INITIAL SETUP****APPLICABLE CONFIGURATIONS**

All.

**EQUIPMENT CONDITION
PARAGRAPH**

None.

CONDITION DESCRIPTION

None.

TEST EQUIPMENT

None.

TOOLS

None.

MATERIALS/PARTS (P/N)

GAA (Refer to Appendix C).

Shock Absorbers (2) (2540-00-740-961 7).

Rubber Bushings (8) (6365-00-740-9618).

Nonflammable Cleaning Solvent SD-2 (Refer to Appendix C).

Shock Absorbers (2) (2540-01-011-0614).

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TM 9-2320-273-20P.

LO 9-2320-273-12.

REFERENCES (TROUBLESHOOTING)

Table 10-3.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.

Transmission in Neutral.

Park Brake Set.

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
1.	Front Axle Shock Absorbers Maintenance (M91 5):	10-24	10-3
	A. Removal.	10-24A	
	B. Cleaning and Inspection.	10-24B	
	C. Installation.	10-24C	

10-9. SUSPENSION SYSTEM MAINTENANCE TASK SUMMARY (Continued).			
LIST OF TASKS			
TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
2.	Pusher Axle Shock Absorbers Maintenance:	10-25	10-3
	A. Removal.	10-25A	
	B. Cleaning and Inspection.	10-25B	
	C. Installation.	10-25C	
3.	Torque Rods Maintenance:	10-26	10-3
	A. Removal (M915).	10-26A	
	B. Removal (M916 Thru M920).	10-26B	
	C. Cleaning and Inspection (All).	10-26C	
	D. Installation (M915).	10-26D	
	E. Installation (M916 Thru M920).	10-26E	

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WHEELS AND TIRES.

10-10. FRONT WHEELS MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Checking Alinement.	(10)
b. Adjustment of Alinement (M915).	
c. Adjustment of Alinement (M916 thru M920).	<u>(25)</u>
	35 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

EQUIPMENT CONDITION

PARAGRAPH

None.

CONDITION DESCRIPTION

None.

TEST EQUIPMENT

None.

SPECIAL TOOLS

Toe-In Gage.
Ball Joint Puller.

MATERIALS/PARTS (P/N)

Cotter Pin (2) K-2616 (78500).

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

GENERAL SAFETY INSTRUCTIONS

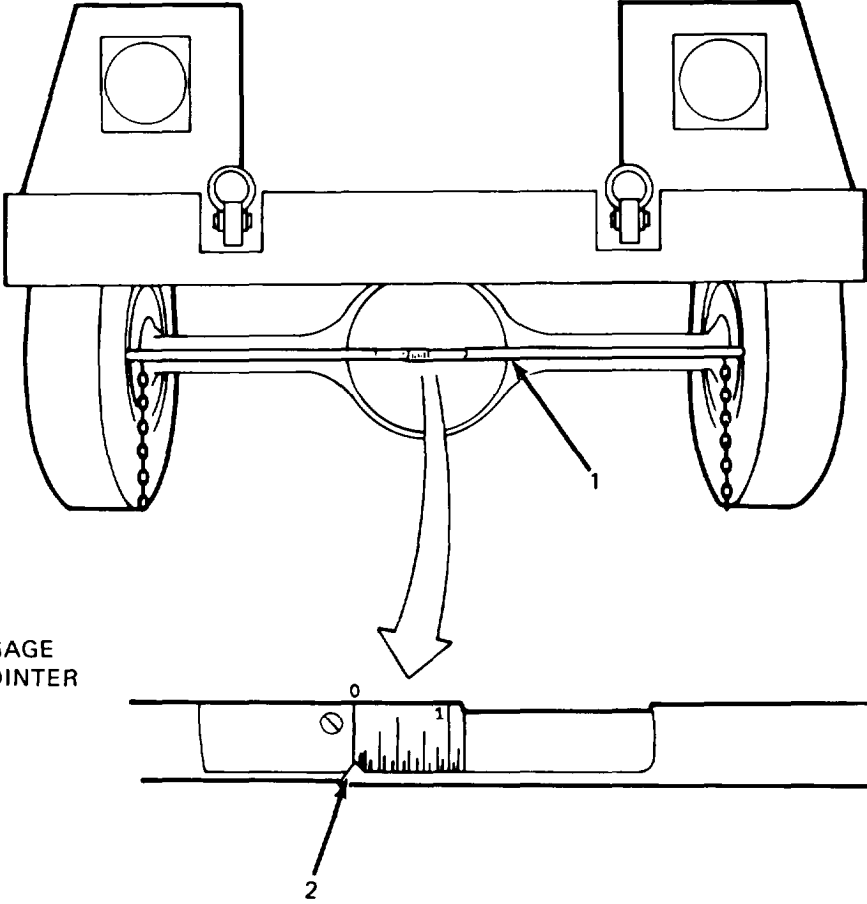
Engine OFF.
Transmission in Neutral.
Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 10-1.

WHEELS AND TIRES.

10-10. FRONT WHEELS MAINTENANCE (Continued).

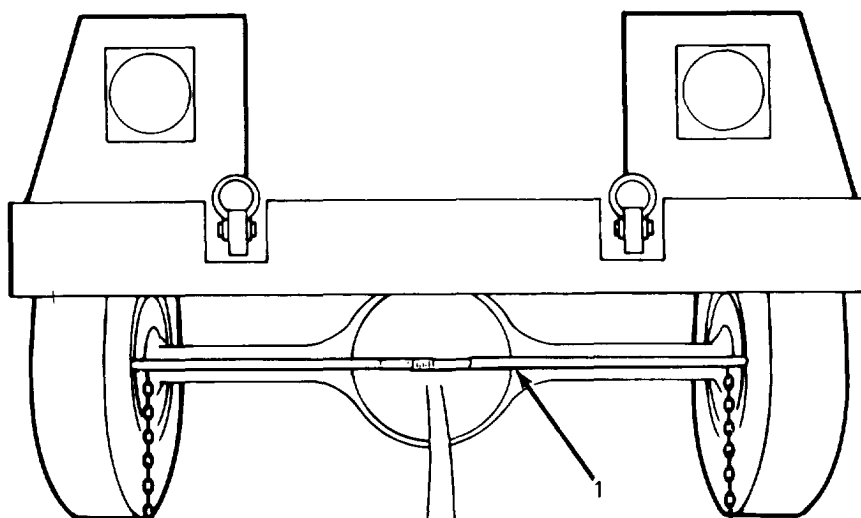
LOCATION/ITEM	ACTION	REMARKS
NOTE Before checking or adjusting toe-in, be sure tires are properly inflated (see TM 9-2320-273-10), Truck should be parked in a level area, When parking truck, straighten wheels and pull straight forward for final fifteen feet.		
A. CHECKING ALINEMENT. 1. Front wheels - front side. a. Place toe-in gage (1) between wheels on front side. Chain should just touch ground. See illustration below.		
 The diagram illustrates the process of checking toe-in on a truck. It shows a top-down view of the front axle and wheels. A horizontal bar, labeled '1', is placed between the two wheels. A chain is attached to the center of this bar and hangs down to the ground. A large arrow points from the chain to a detailed view of the toe-in gage. This detailed view shows a horizontal bar with a scale marked from 0 to 1. A pointer, labeled '2', is attached to the bar and points to the ground. The legend identifies '1' as the TOE-IN GAGE and '2' as the GAGE POINTER.		
LEGEND: 1. TOE-IN GAGE 2. GAGE POINTER		

TA 074870

WHEELS AND TIRES.

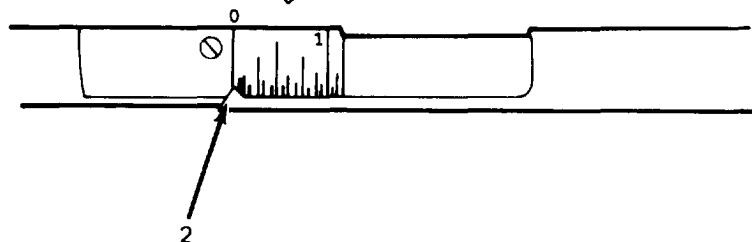
10-10. FRONT WHEEL MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. CHECKING ALINEMENT (Continued).		
	b. Set gage pointer (2) to zero.	See illustration below.
	c. Remove gage.	
2. Front wheels - back side.	a. Place gage between front wheels on back side. Chains should just touch ground. b. Gage should read 0-1/8 inch (0-3.175 mm). Adjust toe-in (step 8) if necessary.	



LEGEND:

- 1. TOE-IN GAGE
- 2. GAGE POINTER

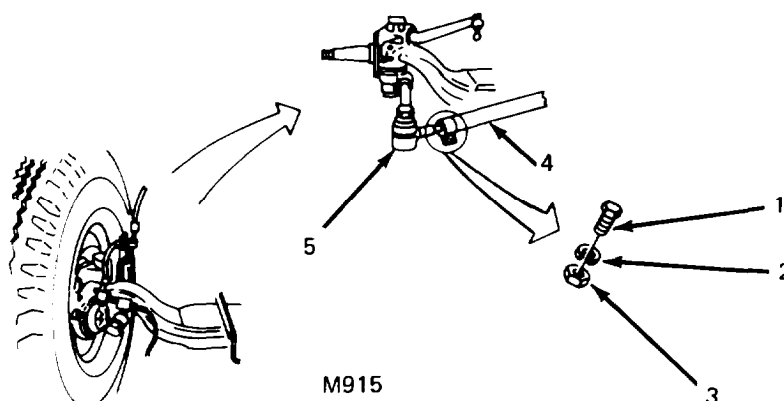


TA 074971

WHEELS AND TIRES.

10-10. FRONT WHEEL MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. ADJUSTMENT OF ALINEMENT (M915).		
3. Two bolts (1), lockwashers (2), and clamp nuts (3).	Loosen.	
4. Tie rod (4).	Screw further onto ball joint (5) to decrease toe-in. Unscrew to increase toe-in.	
5. Front wheels.	a. Check toe-in (para A). b. Repeat adjustment procedure until toe-in is $1/16 \pm 1/16$ inch (1.6 ± 1.6 mm).	
6. Two bolts (1), lockwashers (2), and clamp nuts (3).	Tighten clamp nut to 40-55 lb-ft (54-68 N-m).	



LEGEND:

1. BOLT (2)
2. LOCKWASHER (2)
3. CLAMP NUT (2)
4. TIE ROD
5. BALL JOINT

TA 074972

WHEELS AND TIRES.

10-10. FRONT WHEEL MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
C. ADJUSTMENT OF ALINEMENT (M916 THRU M920).		
NOTE		
Do one end at a time because you have to drop the tie rod to adjust.		
7. Bolt (2), lockwasher (8) and clamp locknut (4).	Loosen from clamp (5),	
8. Cotter pin (1) and castellated nut (9).	Remove from top stud of ball joint (6).	
9. Ball joint (6).	a. Use ball joint puller and remove from steering knuckle (7), or tap with rawhide hammer. b. Screw ball joint in to tie rod (3) to decrease toe-in and out to increase toe-in. c. Repeat adjustment procedure until toe-in is 1/16 + 1/16 inch (1.6 +1.6 mm).	
10. Bolt (2), lockwasher (8) and clamp locknut (4).	Torque to 40-55 lb-ft (54-68 N-m).	
11. Ball joint (6).	Install back into steering knuckle (7).	
12. Castellated nut (9).	a. Install on top stud of ball joint (6). b. Torque to 110-125 lb-ft (149-169 N-m).	
13. Cotter pin (1).	Insert new cotter pin through nut (9) and top ball joint stud; then bend ends over.	

WHEELS AND TIRES.

10-10. FRONT WHEEL MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
The diagram shows a side view of a vehicle's front wheel and steering knuckle assembly. Numbered callouts point to the following parts: 1. Cotter pin at the top of the tie rod end; 2. Bolt on the tie rod end; 3. Tie rod end; 4. Locknut on the steering knuckle; 5. Clamp on the steering knuckle; 6. Ball joint on the steering knuckle; 7. Steering knuckle; 8. Lockwasher on the steering knuckle; 9. Castellated nut on the steering knuckle. LEGEND: 1. COTTER PIN 2. BOLT 3. TIE ROD 4. LOCKNUT 5. CLAMP 6. BALL JOINT 7. STEERING KNUCKLE 8. LOCKWASHER 9. CASTELLATED NUT M916 THRU M920		

TA 074973

WHEELS AND TIRES.**10-11. TIRE AND TUBE MAINTENANCE (M915).****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

- a. Removal. (20)
 b. Inspection. (10)
 c. Installation. (30)
 60 Minutes Total,

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

M915.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Soap Solution.

**EQUIPMENT CONDITION
PARAGRAPH**

(See TM 9-2320-273 -10.)

CONDITION DESCRIPTIONWheel and Tire Assembly
Removed.**PERSONNEL REQUIRED**

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
 Transmission in Neutral.
 Park Brake Set.
 Wheels Blocked.

TROUBLESHOOTING REFERENCES

Table 10-1.

WHEELS AND TIRES.

10-11. TIRE AND TUBE MAINTENANCE (M915) (Continued).

LOCATION/ITEM

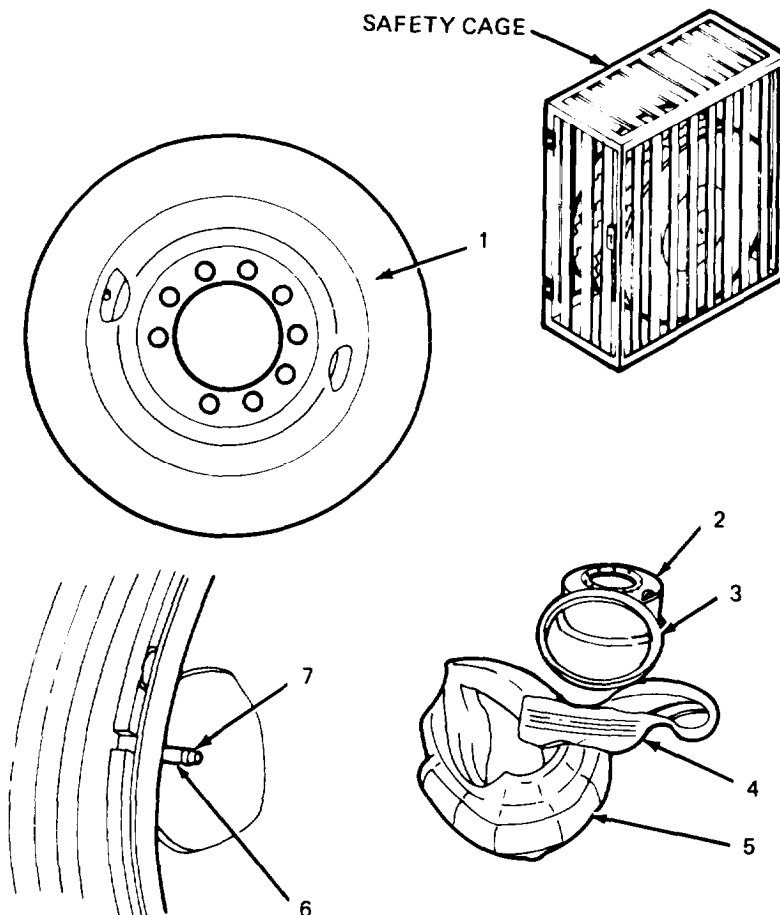
ACTION

REMARKS

WARNING

Always remove the valve core and exhaust all air from a single tire and from both tires of a dual assembly prior to removing any rim components, or any wheel components, such as nuts and rim clamps.

Check the valve stem by running a piece of wire through the stem to make sure it is not plugged.



LEGEND:

1. TIRE
2. RIM
3. LOCKRING
4. INNER LINER
5. TUBE
6. VALVE STEM
7. VALVE CAP

M915 CONFIGURATION

TA 074974

WHEELS AND TIRES.

10-11. TIRE AND TUBE MAINTENANCE (M915) (Continued).		
LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Valve cap (7).	Remove.	Cap can also be used to remove core.
2. Valve stem (6).	Remove core with valve core removing tool or valve cap.	
3. Tire (1).	Use gooseneck tool to free tire bead from lockring (3) all around tire.	A heavy soft headed mallet may be helpful in breaking tire loose from lockring.
4. Lockring (3).	Use rim tool to pry lockring (3) free from rim (2).	
5. Tire (1) and rim (2) assembly.	a. Turn over. b. Use gooseneck tool to separate second tire bead from rim. c. Remove tire (1), inner liner (4) and tube (5).	
6. Tube (5) and inner liner (4).	Remove from tire (1).	
7. Tire (1), tube (5) and inner liner (4).	Inspect for: a. Excessive wear. b. Uneven wear. c. Cracks. d. Leaks.	Replace, if necessary, or repair. See TM 9-2610-200-20 for information on pneumatic tires and tubes.
8. Rim (2).	Inspect for: a. Rust streaks. b. Corrosion. c. Cracked rims. d. Damaged threads on studs. e. Wheel cracks.	Replace, if necessary. For rust streaks or corrosion, wire brush and repaint.

WHEELS AND TIRES.

10-11. TIRE AND TUBE MAINTENANCE (M915) (Continued).

LOCATION/ITEM

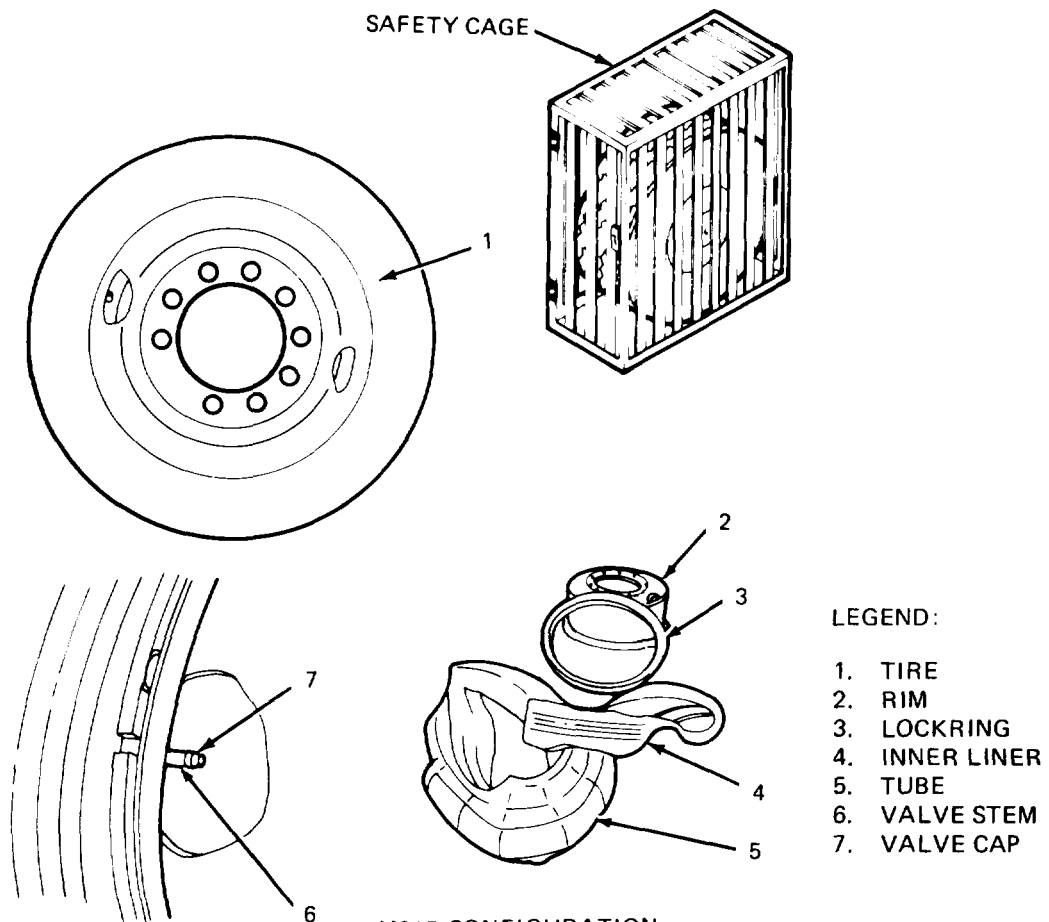
ACTION

REMARKS

C. INSTALLATION.

WARNING

Mismatched tires will make truck handle poorly and may cause accidents. All tires on an axle should have the same diameter, $\pm 1/8$ inch (3.2 mm). When replacing a tire, measure it and the other tires on the axle to be sure that the distances from top to bottom do not vary by more than $1/4$ inch (6.4 mm). Use a depth gage to measure tires.



M915 CONFIGURATION

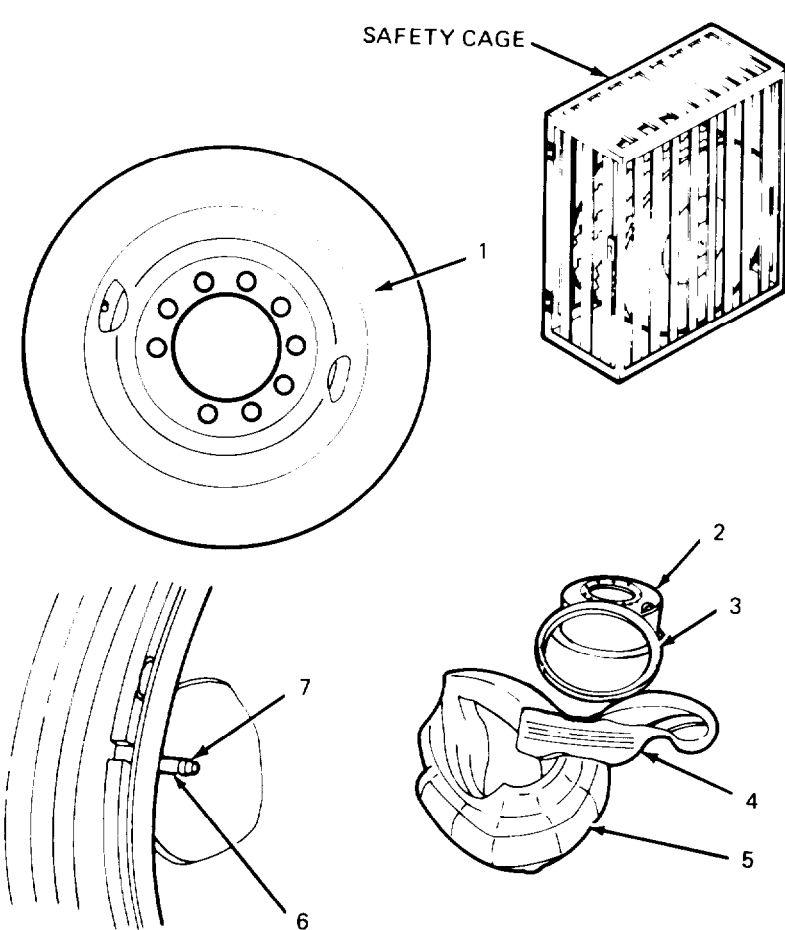
TA 074975

WHEELS AND TIRES.

10-11. TIRE AND TUBE MAINTENANCE (M915) (Continued).

LOCATION/ITEM	ACTION	REMARKS
C. INSTALLATION (Continued):		
9. Tire (1), tube (5), rim (2) and inner liner (4).	a. Place tube in tire. b. Place liner over tube. c. Lubricate both beads of tire with soap solution and, using gooseneck tool, work both tire beads onto rim. d. Place valve stem (6) through hole in rim.	Rim should be laying with outer side on top.
10. Lockring (3).	Set in place.	
 Heavy hammer blows will damage rim. Tap bead into rim gently.		
11. Lockring (3).	a. Insert one end into rim (2). b. Walk along ring to push it into place. c. Tap final few inches into rim with hammer. d. Check to be sure that ring is securely seated all the way around.	

WHEELS AND TIRES.

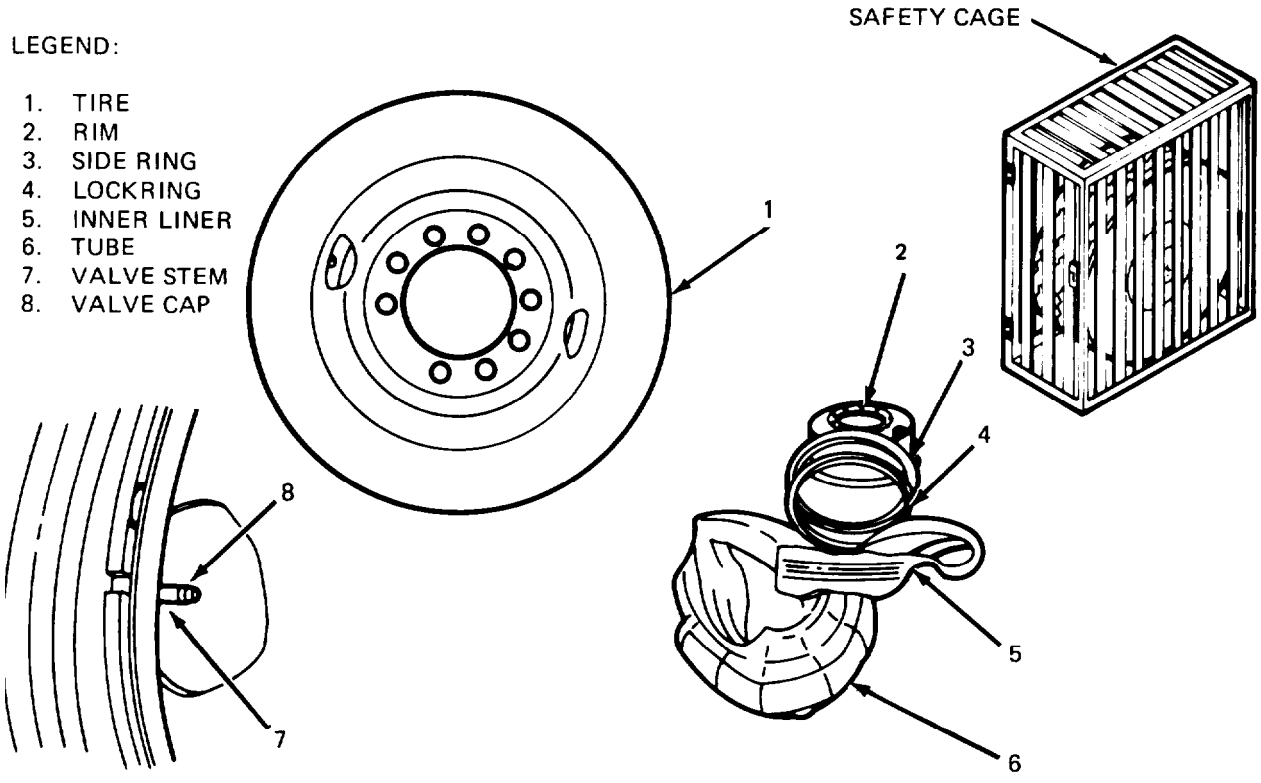
10-11. TIRE AND TUBE MAINTENANCE (M915) (Continued).		
LOCATION/ITEM	ACTION	REMARKS
WARNING When inflating tires (wheel removed from vehicle) always use safety cage to prevent injury if ring should fly off. 12. Tire and wheel assembly. a. Place in safety cage and inflate. b. Install valve cap. c. Mount on truck (see TM-9-2320-273-10).  SAFETY CAGE 1 2 3 4 5 6 7 LEGEND: 1. TIRE 2. RIM 3. LOCKRING 4. INNER LINER 5. TUBE 6. VALVE STEM 7. VALVE CAP		
TA 074976		

WHEELS AND TIRES.

10-12. TIRE AND TUBE MAINTENANCE (M916 THRU M920)		
THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)		
a. Removal. (20) b. Inspection. (10) c. Installation. (30) 60 Minutes Total.		
<u>INITIAL SETUP</u> <u>APPLICABLE CONFIGURATIONS</u> M916 thru M920. <u>TEST EQUIPMENT</u> None. <u>SPECIAL TOOLS</u> None. <u>MATERIALS/PARTS (PIN)</u> Soap Solution.	<u>EQUIPMENT CONDITION</u> <u>PARAGRAPH</u> (See TM 9-2370-273-10).	<u>CONDITION DESCRIPTION</u> Wheel and Tire Assembly Removed.
<u>PERSONNEL REQUIRED</u> One (MOS-63B20).	<u>SPECIAL ENVIRONMENTAL CONDITIONS</u> Vehicle Parked on Level Ground.	
<u>REFERENCES (TM)</u> TM 9-2320-273-10.	<u>GENERAL SAFETY INSTRUCTIONS</u> Engine OFF. Transmission in Neutral. Park Brake Set. Wheels Blocked.	
<u>TROUBLESHOOTING REFERENCES</u> Table 10-1.		

WHEELS AND TIRES.

10-12. TIRE AND TUBE MAINTENANCE (M916 THRU M920) (Continued).

LOCATION/ITEM	ACTION	REMARKS
WARNING Always remove the valve core and exhaust all air from a single tire and from both tires of a dual assembly prior to removing any rim components, or any wheel components, such as nuts and rim clamps. Check the valve stem by running a piece of wire through the stem to make sure it is not plugged.		
A. REMOVAL. 1. Valve cap (8). 2. Valve stem (7). Remove. Remove core with valve core removing tool, or valve cap. Cap can also be used to remove core.		
LEGEND: 1. TIRE 2. RIM 3. SIDE RING 4. LOCKRING 5. INNER LINER 6. TUBE 7. VALVE STEM 8. VALVE CAP		
		
M916-M920 CONFIGURATION TA 074977		

WHEELS AND TIRES

10-12. TIRE AND TUBE MAINTENANCE (M916 THRU M920) (Continua).		
LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
3. Tire (1).	Use gooseneck tool to free tire bead from side ring all around tire.	A heavy soft headed mallet may be used in breaking tire loose from ring.
4. Lockring (4) and side ring (3).	a. Use rim tool to pry side ring (3) free from rim (2). b. Remove both rings.	
5. Tire (1) and rim (2).	a. Turn over. b. Use gooseneck tool to separate second tire bead from rim. c. Remove tire (1), inner liner (5) and tube (6).	
6. Tube (6) and inner liner (5).	Remove from tire (1).	
B. INSPECTION.		
7. Tire (1) tube (6) and inner liner (5).	Inspect for: a. Excessive wear. b. Uneven wear. c. Cracks. d. Leaks.	Replace, if necessary, or repair. See TM 9-2610-200-20 for information on pneumatic tires and tubes.
8. Rim (2).	Inspect for: a. Rust streaks. b. Corrosion. c. Cracked rims. d. Damaged threads on studs. e. Wheel cracks.	Replace, if necessary. For rust streaks or corrosion, wire brush and repaint.

WHEELS AND TIRES

10-12. TIRE AND TUBE MAINTENANCE (M916 THRU M920) (Continued).

LOCATION/ITEM

ACTION

REMARKS

C. INSTALLATION.

WARNING

Mismatched tires will make truck handle poorly and may cause accidents. All tires on an axle should have the same diameter, $\pm 1/8$ inch (3.2 mm) when replacing a tire, measure it and the other tires on the axle to be sure that the distances from top to bottom do not vary by more than $1/4$ inch (6.4 mm). Use a depth gage to measure tires.

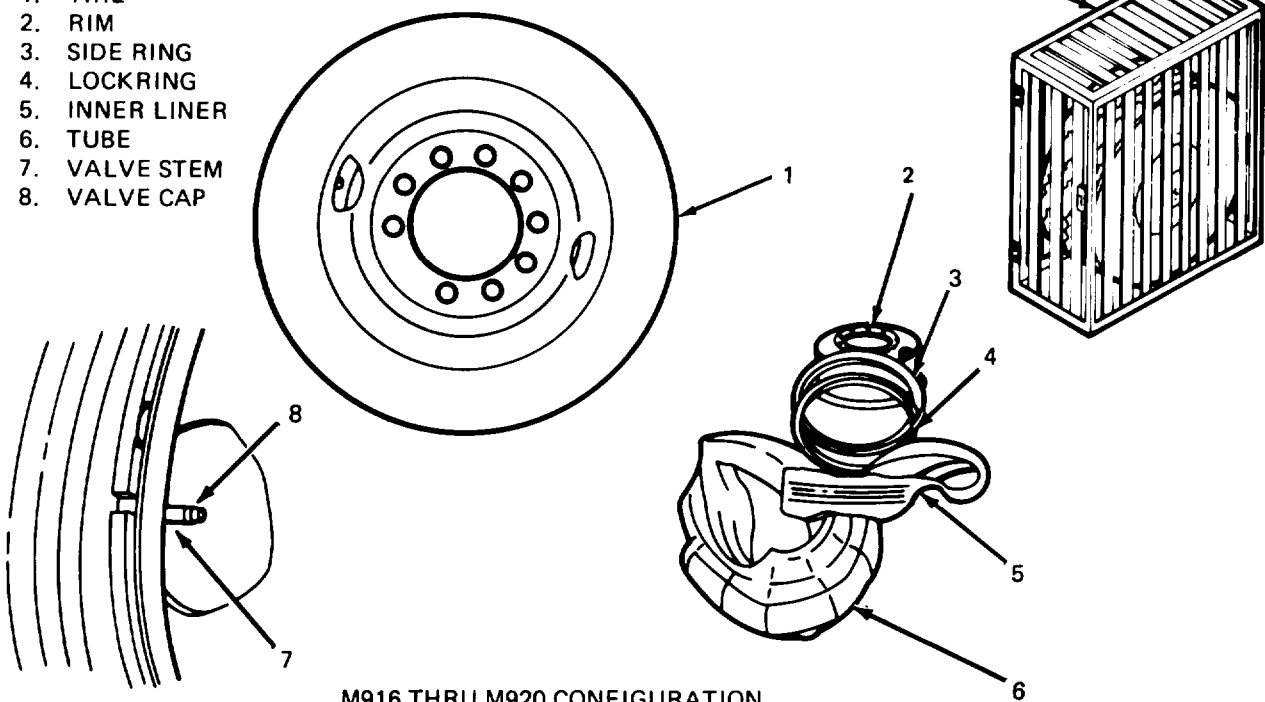
9. Tire (1), tube (6), rim (2), and inner liner (5).

- a. Place tube in tire.
b. Place liner over tube.
c. Lubricate both beads of tire with soap solution.
d. Place valve stem (7) through hole in rim.

Rim should be laying with outer side on top.

LEGEND:

1. TIRE
2. RIM
3. SIDE RING
4. LOCKRING
5. INNER LINER
6. TUBE
7. VALVE STEM
8. VALVE CAP



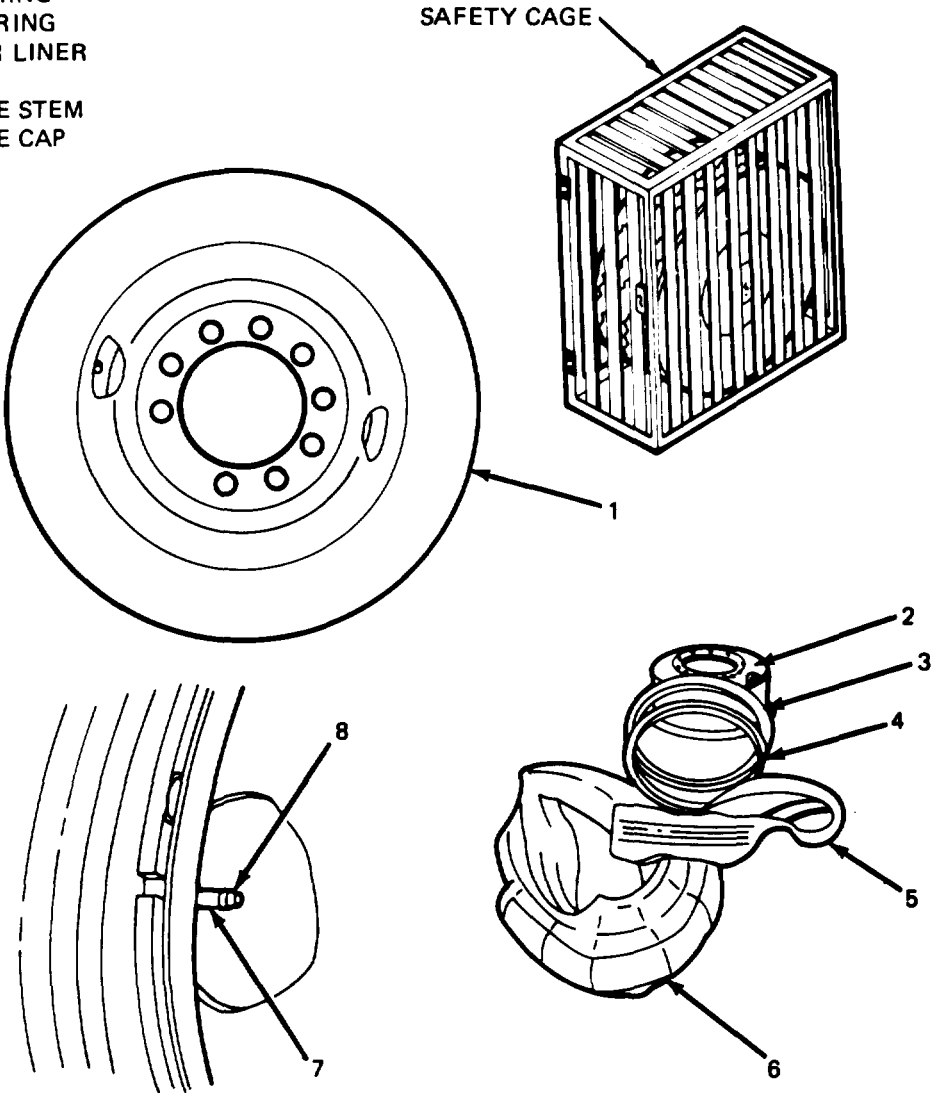
M916 THRU M920 CONFIGURATION

TA 074978

WHEELS AND TIRES.

D-12. TIRE AND TUBE MAINTENANCE (M916 THRU M920) (Continued).		
LOCATION/ITEM	ACTION	REMARKS
<u>C. INSTALLATION (Continued).</u>		
	CAUTION Heavy hammer blows will damage rim. Tap bead into rim gently.	
10. Lockring (4).	a. Insert one end into rim (2). b. Walk along ring to push it into place. c. Tap final few inches into gutter with hammer. d. Check to be sure that ring is securely seated all the way around. e. Install side ring (3).	
	WARNING When inflating tires (wheel removed from vehicle) always use a safety cage to prevent injury if ring should fly off.	
11. Tire and wheel assembly.	a. Place in safety cage and inflate. b. Install valve cap. c. Mount on truck (see TM 9-2320-273-10).	

WHEELS AND TIRES.

10-12. TIRE AND TUBE MAINTENANCE (M916 THRU M920) (Continued).		
LOCATION/ITEM	ACTION	REMARKS
LEGEND: 1. TIRE 2. RIM 3. SIDE RING 4. LOCKRING 5. INNER LINER 6. TUBE 7. VALVE STEM 8. VALVE CAP  M916-M920 CONFIGURATION		

TA 074979

WHEELS AND TIRES.**10-13. FRONT WHEEL BEARINGS AND SEALS MAINTENANCE (M915).****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

a. Removal.	(10)
b. Inspection.	(5)
c. Packing and Installation of Bearings.	(30)
45 Minutes Total.	

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

M915.

TEST EQUIPMENT

None.

EQUIPMENT CONDITION**PARAGRAPH**

(See TM 9-2320-273-10).

(See TM 9-2320-273-10).

CONDITION DESCRIPTION

Axle Jacked-Up.

Wheel and Tire Assembly
Removed.**SPECIAL TOOLS**

Outside Wheel Bearing Nut Wrench, P/N 1920 (45152)

NSN 5120-01-089-9068.

Inside Wheel Bearing Nut Wrench, P/N 1922 (45152)

NSN 5120-01-112-0593.

MATERIALS/PARTS (P/N)

Seal Installer.

Wheel Bearing Packing Tool.

Hub Gasket, 2208-M-819 (78500).

Bearing Seal, A-1 205-L-1338 (78500).

GAA (Refer to Appendix C).

Washer.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.

TM 9-2320-273-20P.

LO 9-2320-273-12.

GENERAL SAFETY INSTRUCTIONS

Engine Off.

Transmission in Neutral.

Park Brake Set.

Wheel Blocked.

TROUBLESHOOTING REFERENCES

Table 10-2.

WHEELS AND TIRES.

10-13. FRONT WHEEL BEARINGS AND SEALS MAINTENANCE (M915) (Continued).

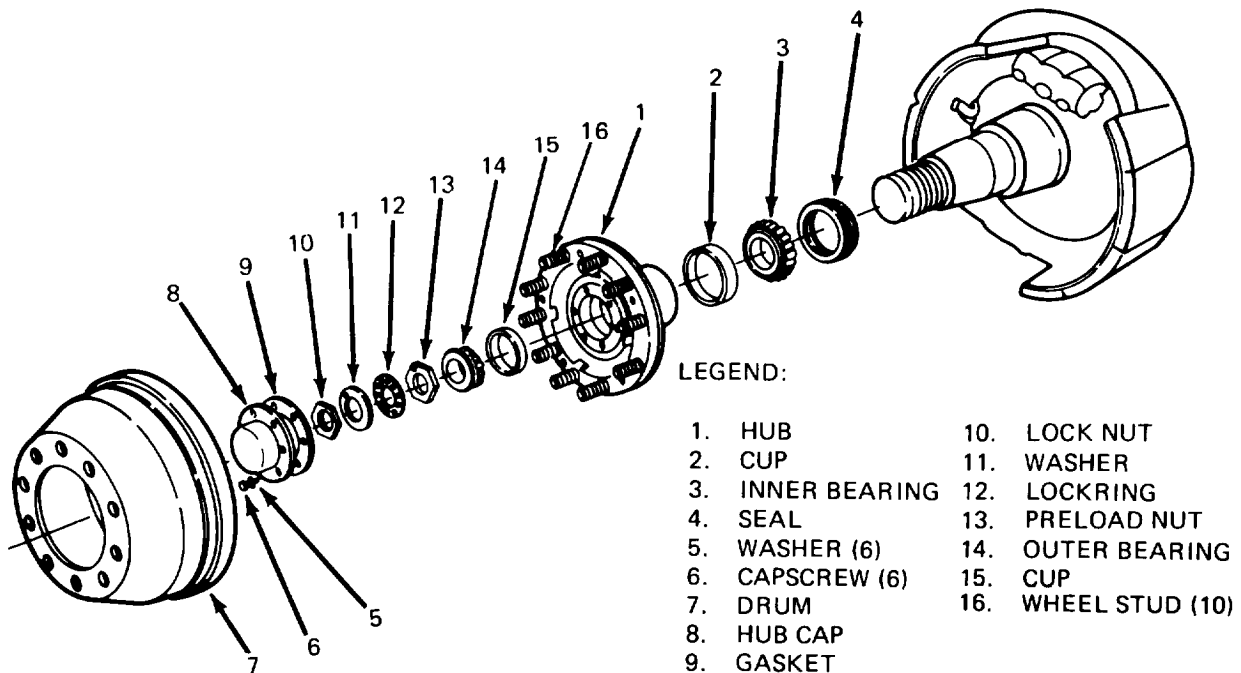
LOCATION/ITEM

ACTION

REMARKS

A. REMOVAL.

1. Drum (7).	Remove.	It may be necessary to tap with hammer to break drum loose.
2. Six capscrews (6) and washers (5)	Unscrew and remove.	
3. Hub cap (8) and gasket (9)	a. Remove. b. Throw gasket away.	
4. Nut (10), washer (11), and lockring (12).	Remove.	Install new washer (11).
5. Nut (13).	Remove.	
6. Outer Bearing (14).	Remove.	
7. Hub (1).	a. Remove. b. Damaged wheel studs (16) can be removed with an arbor press and a new stud pressed in.	



TA 237235

WHEELS AND TIRES

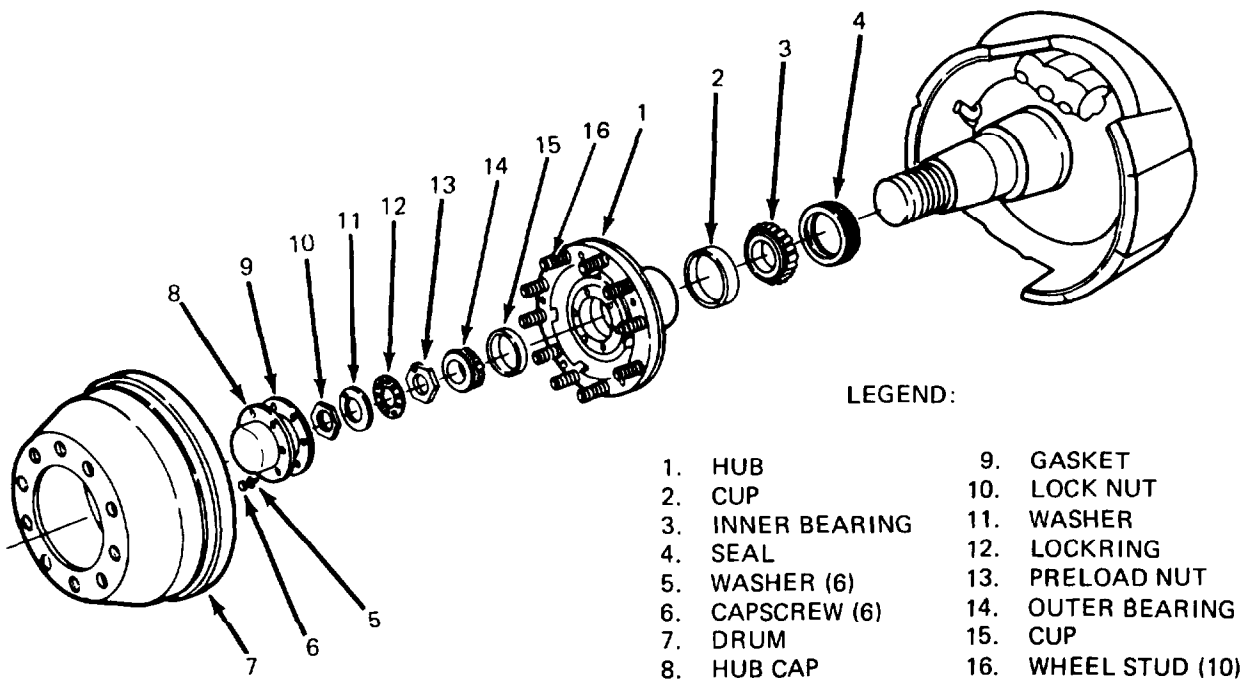
10-13. FRONT WHEEL BEARINGS AND SEALS MAINTENANCE (M1915) (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
8. Seal (4) and inner bearing (3).	Remove and throw seal away.	Tap out from inside of hub (1) using hammer and wood block.
9. Cup (2).	Remove.	
10. Cup (15).	Remove.	
NOTE		
Clean all component parts with SD-2 solvent.		
WARNING		
Do not use compressed air to clean bearings.		
B. INSPECTION.		
11. Inner bearing (3) and outer bearing (14).	Inspect for: a. Flat spots or chips in bearing rollers. b. Cracks. c. Breaks. d. Smooth operation. e. Discoloration.	Replace as necessary.
12. Cups (2) and (15).	Inspect for: a. Flat spots. b. Cracks. c. Gouges. d. Discoloration.	Replace as necessary.
13. Axle spindle.	Inspect for: a. Grooves. b. Gouges. c. Abnormal wear. d. Discoloration.	Notify Direct Support Maintenance.
NOTE		
All component parts must be clean and free of all dirt and foreign matter.		

WHEELS AND TIRES.

10-13. FRONT WHEEL BEARINGS AND SEALS MAINTENANCE (M915) (Continued).

LOCATION/ITEM	ACTION	REMARKS
C. PACKING AND INSTALLATION OF BEARINGS.		
14. Inner bearing (3) and outer bearing (14).	Use bearing packing tool and pack bearings. If packing tool is not available, bearings may be hand packed.	
15. Cup (2).	Place in hub (1).	
16. Inner bearing (3).	Place in cup (2).	
17. Seal (4).	Tap new seal in hub (1), using a seal installer.	Lettering on seal should face truck.
18. Cup (15).	Place in hub (1).	
19. Hub (1).	Place in axle spindle.	
20. Outer bearing (14).	Place in cup (15).	



TA 237236 ■

WHEELS AND TIRES.

10-13. FRONT WHEEL BEARINGS AND SEALS MAINTENANCE (M915) (Continued).		
LOCATION/ITEM	ACTION	REMARKS
C. PACKING AND INSTALLATION OF BEARINGS (Continued).		
21. Preload nut (13).	a. Install the preload nut using wheel bearing nut wrench. b. If reusing the same bearings, torque to 50 lb-ft (68 N•m) while rotating wheel in both directions. c. If new bearings have been installed, torque to 100 lb-ft (136 N•m) while rotating wheel in both directions, back off to 0 lb-ft. Torque to 50 lb-ft (68 N•m). d. Back off preload nut no more than 1/4 turn counterclockwise to install cotter pin.	Alining pin must face out.

WHEELS AND TIRES.

10-13. FRONT WHEEL BEARINGS AND SEALS MAINTENANCE (M915) (Continued).

LOCATION/ITEM	ACTION	REMARKS
C. PACKING AND INSTALLATION OF BEARINGS (Continued).		
22. Lockring (12).	Install.	Adjust nut (13) to slip into nearest hole in lockring (12).
23. Washer (11).	Slide over axle.	
24. Locknut (10).	a. Install. b. Torque to 125 lb-ft (169.5 N•m).	
25. Washer (11).	Bend tabs over nut (10).	
26. Deleted.		
27. Gasket (9) and hubcap (8).	Align with hub (1).	
28. Six capscrews (6) and washers (5)	a. Install. b. Torque to 9-12 lb-ft (12-16 N•m).	See inset for sequence.
29. Drum (7).	Place over hub (1) and seat into position by installing two nuts equally spaced, then remove nuts and install tire and wheel assembly. Re-install lug nuts and torque lug nuts to 450 lb-ft (610 N•m) (see TM 9-2320-273-10).	Lug nuts on left side of vehicle are left-handed threads.
30. Remove jack.	Road test vehicle.	
NOTE Follow-on maintenance action required: Install wheel and tire, road test vehicle, refer to TM 9-2320-273-10.		

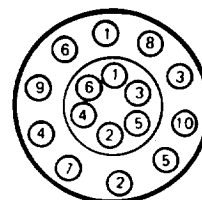
WHEELS AND TIRES.

10-13. FRONT WHEEL BEARINGS AND SEALS MAINTENANCE (M915) (Continued).

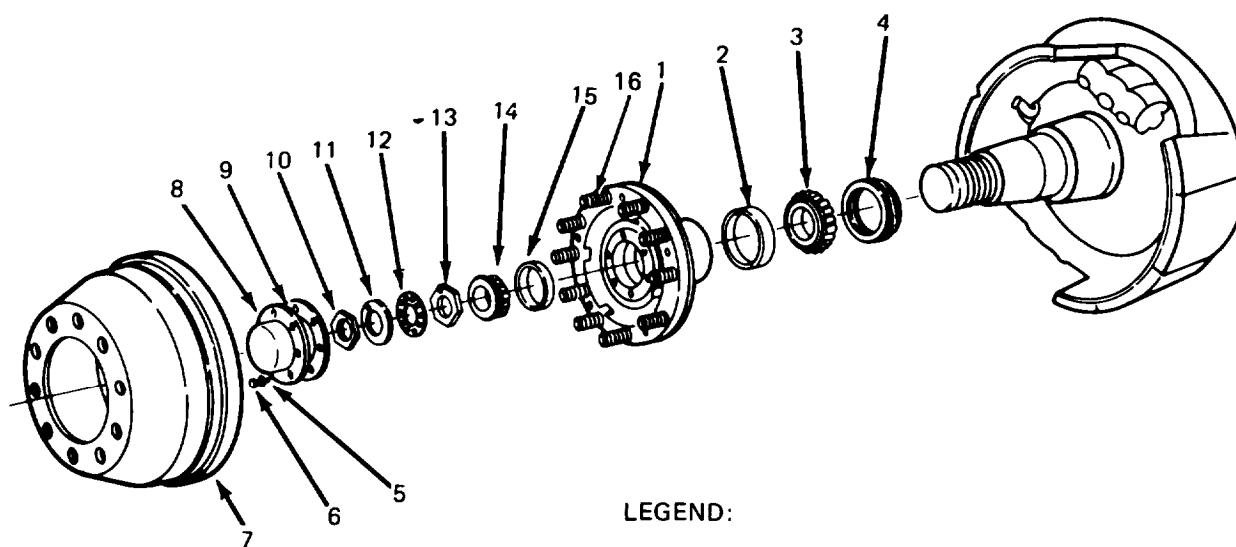
LOCATION/ITEM

ACTION

REMARKS



TORQUE SEQUENCE



LEGEND:

1. HUB	9. GASKET
2. CUP	10. LOCK NUT
3. INNER BEARING	11. WASHER
4. SEAL	12. LOCKRING
5. WASHER (6)	13. PRELOAD NUT
6. CAPSCREW (6)	14. OUTER BEARING
7. DRUM	15. CUP
8. HUB CAP	16. WHEEL STUD (10)

TA 237237

WHEELS AND TIRES.**10-14. FRONT WHEEL BEARINGS AND SEALS MAINTENANCE (M916 THRU M920).****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

a. Removal.	(25)
b. Inspection of Bearings.	(5)
c. Packing and Installation of Bearings.	(30)
60 Minutes Total.	

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

M916 Thru M920.

EQUIPMENT CONDITION**PARAGRAPH****CONDITION DESCRIPTION**

(see TM 9-2320-273-10).

Front Axle Jacked Up.

(see TM 9-2320-273-10).

Wheel Removed.

TEST EQUIPMENT

None.

SPECIAL TOOLS

Wheel Bearing Nut Wrench, PN 1919 (45152)

Part of Wrench Set, NSN 5120-00-169-4586.

MATERIALS/PARTS (P/N)

Wheel Dolly.

Wheel Bearing Nut Wrench.

Permatex (Refer to Appendix C).

Silicone (RTV) Gasket Material (Refer to Appendix C).

Oil Seal, A-1205-Y-1533 (78500).

GAA (Refer to Appendix C).

PERSONNEL REWIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.

TM 9-2320-273-20P.

LO 9-2320-273-12.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.

Transmission in Neutral.

Park Brake Set.

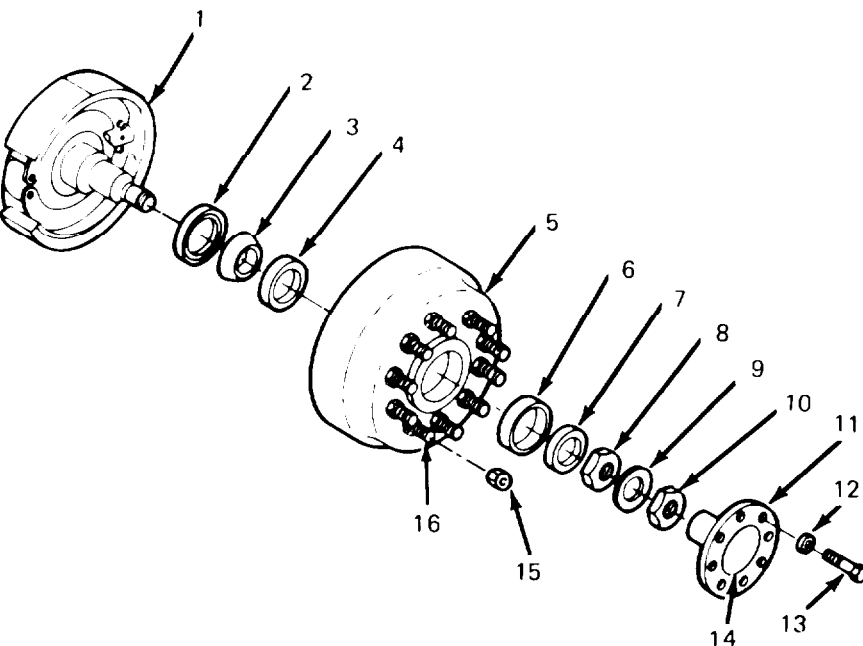
Wheels Blocked.

TROUBLESHOOTING REFERENCES

Table 10-2.

WHEELS AND TIRES.

10-14. FRONT WHEEL BEARINGS AND SEALS MAINTENANCE (M916 THRU M920) (Continued).

LOCATION/ITEM	ACTION	REMARKS
WARNING Block rear wheels of truck to keep it from rolling. Block up axle so that truck will not fall if jacks give way.		
A. REMOVAL.		
Eight capscrews (13) and washers (12).	Unscrew and remove.	
2. Drive flange (11).	a. Remove.	Several blows with a hammer may be needed to loosen drive flange. Do not hit studs.
	b. Drive out expansion plug (14) with hammer and punch.	Replace expansion plug (14) only if damaged.
 LEGEND: 1. SPINDLE 2. OIL SEAL 3. INNER BEARING CONE 4. INNER BEARING CUP 5. HUB AND DRUM ASSEMBLY 6. OUTER BEARING CUP 7. OUTER BEARING CONE 8. PRELOAD NUT 9. RETAINER 10. LOCK NUT 11. DRIVE FLANGE 12. WASHER (8) 13. CAPSCREW (8) 14. EXPANSION PLUG 15. WHEEL STUD NUT (10) 16. WHEEL STUD (10)		
TA 237238		

WHEELS AND TIRES.

10-14. FRONT WHEEL BEARINGS AND SEALS MAINTENANCE (M916 THRU M920) (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
3. Jam Nut (10), retainer (9), and bearing adjusting nut (8).	Use wheel bearing nut wrench to remove.	
NOTE		
Outer bearing cone (7) is loose and will drop out when hub is removed and shook.		
4. Hub and drum assembly (5).	Remove.	
5. Oil seal (2), and inner bearing cone (3).	a. Remove. b. Throw away oil seal (2).	
6. Inner and outer bearing cups (4) and (6).	a. Clean and inspect these items. If discoloration or pitting is noted, refer problem to DS/GS, as inner and outer bearings cups (4) and (6) must be pressed out and in. b. Damaged wheel studs (15) can be pressed out and installed with an arbor press.	Wheel studs (15) on left side of vehicle will have LH threads and RH threads on right side of vehicle.
B. INSPECTION OF BEARINGS.		
7. Inner and outer bearing cones (3) and (7).	a. Inspect for: 1. Missing rollers. 2. Flat, chipped, or pitted surfaces. 3. Secure fit. b. If bearings are to be reused: 1. Remove surface oil and gum deposits. 2. Soak in hot oil (140°F, 60°C) to loosen hardened oil and grease. 3. Wipe dry. Do not use compressed air. 4. Coat with a light film of oil. Wrap bearings in paper until you are ready to install.	Replace if necessary. See TM 9-214 for information on maintenance of bearings.

WHEELS AND TIRES.

10-14. FRONT WHEEL BEARINGS AND SEALS MAINTENANCE (M916 THRU M920) (Continued).

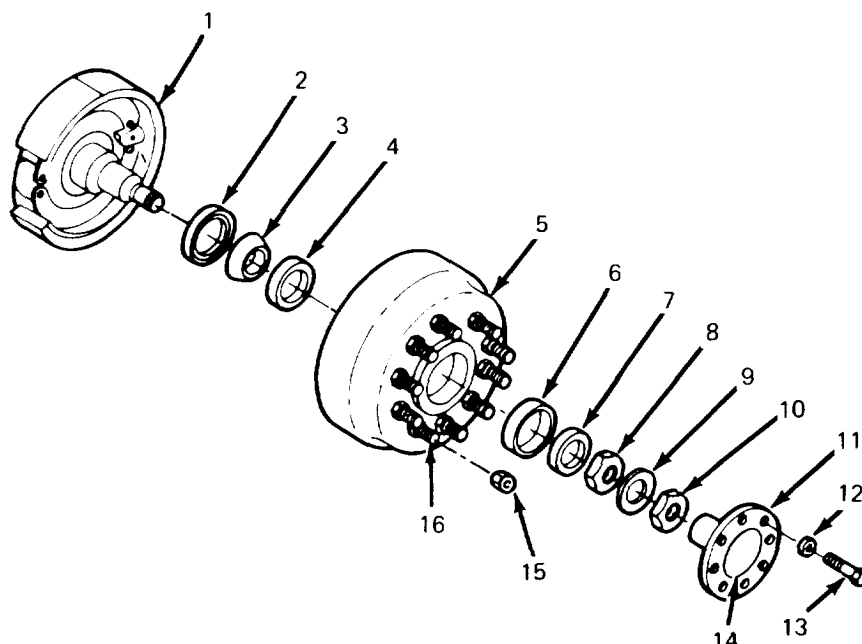
LOCATION/ITEM	ACTION	REMARKS

C. PACKING AND INSTALLATION OF BEARINGS.

8. Inner bearing cone (3).	a. Use bearing packing tool to pack with grease, or pack by hand. b. Place in hub and drum assembly (5) so that smaller end will point away from truck.
9. New oil seal (2).	Place in hub and drum assembly (5).

CAUTION

Do not use excessive pressure to install seal. Do not tap seal after it has bottomed. These actions will crush the set sleeve and damage the seal.

**LEGEND:**

1. SPINDLE
2. OIL SEAL
3. INNER BEARING CONE
4. INNER BEARING CUP
5. HUB AND DRUM ASSEMBLY
6. OUTER BEARING CUP
7. OUTER BEARING CONE
8. PRELOAD NUT
9. RETAINER
10. LOCK NUT
11. DRIVE FLANGE
12. WASHER (8)
13. CAPSCREW (8)
14. EXPANSION PLUG
15. WHEEL STUD NUT (10)
16. WHEEL STUD (10)

TA 237239 ■

WHEELS AND TIRES.

10-14. FRONT WHEEL BEARINGS AND SEALS MAINTENANCE (M916 THRU M920) (Continued.)

LOCATION/ITEM

ACTION

REMARKS

C. PACKING AND INSTALLATION OF BEARINGS (Continued).

CAUTION

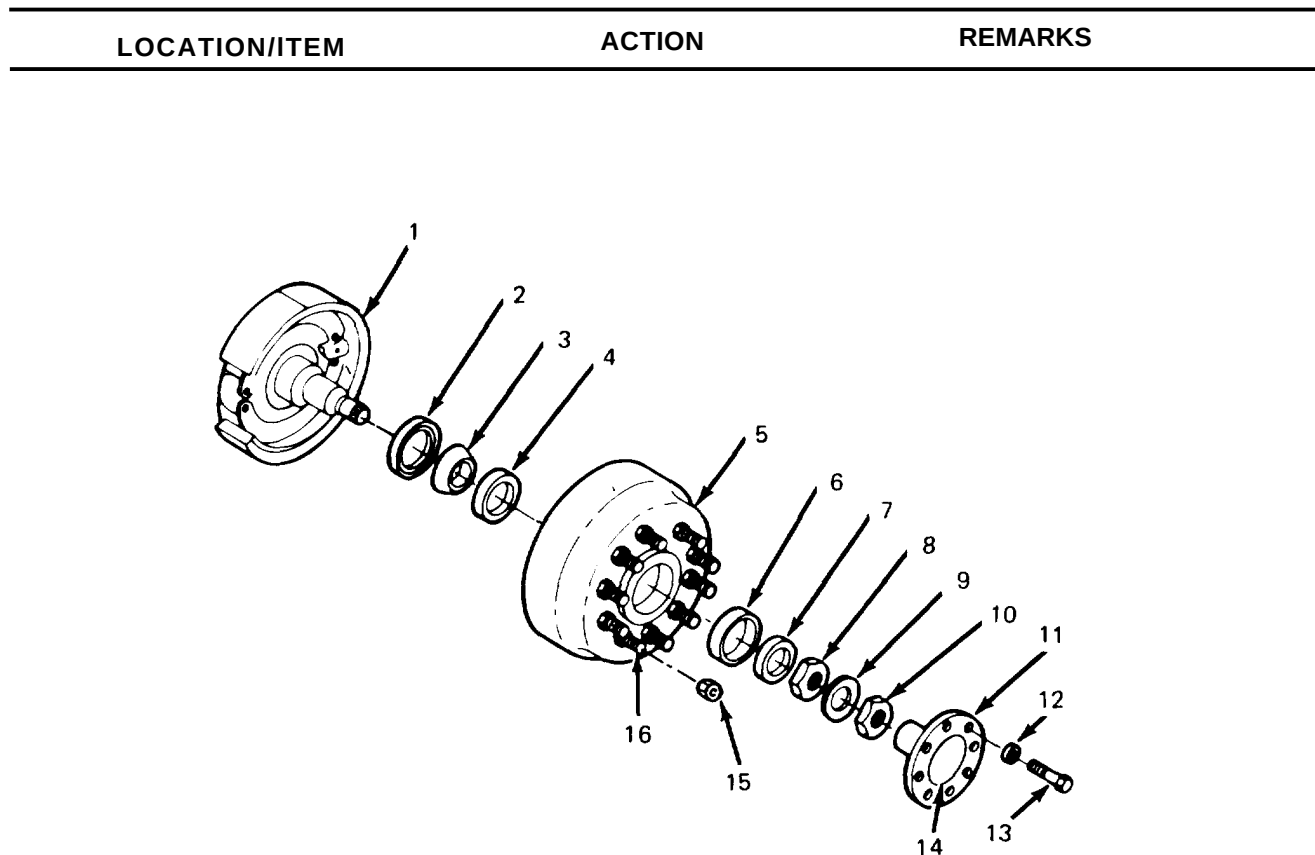
Be careful not to damage oil seal (2) as you install the hub and drum assembly.

10. Hub and drum assembly (5).

- a. Mount assembly on spindle (1).
- b. Press hub until inner bearing cone (3) is seated flush on spindle.

11. Outer bearing cone (7).

- a. Use wheel bearing packing tool to pack with grease, or pack by hand.
- b. Place on spindle (1) against outer bearing cup (6). Small end of bearing should point towards truck.

WHEELS AND TIRES.**10-14. FRONT WHEELS BEARINGS AND SEALS MAINTENANCE (M916 THRU M920 (Continued.****LEGEND:**

1. SPINDLE
2. OIL SEAL
3. INNER BEARING CONE
4. INNER BEARING CUP
5. HUB AND DRUM ASSEMBLY
6. OUTER BEARING CUP
7. OUTER BEARING CONE
8. PRELOAD NUT
9. RETAINER
10. LOCK NUT
11. DRIVE FLANGE
12. WASHER (8)
13. CAPSCREW (8)
14. EXPANSION PLUG
15. WHEEL STUD NUT (10)
16. WHEEL STUD (10)

TA 237240 ■

WHEELS AND TIRES.

10-14. FRONT WHEEL BEARINGS AND SEALS MAINTENANCE (M916 THRU M920) (Continued).

LOCATION/ITEM	ACTION	REMARKS
C. PACKING AND INSTALLATION OF BEARINGS (Continued).		
12. Preload nut (8).	a. Install the preload nut using wheel bearing nut wrench. b. If reusing the same bearings, torque to 50 lb-ft (68 N•m) while rotating wheel in both directions. c. If new bearings have been installed, torque to 100 lb-ft (136 N•m). While rotating wheel in both directions, back off to 0 lb-ft. Torque to 50 lb-ft (68 N•m). d. Back off preload nut no more than 1/4 turn counterclockwise to install cotter pin.	
13. Retainer (9) and locknut (10).	a. Screw onto spindle (1). b. Tighten locknut (10) to 250 to 400 lb-ft, (340-544 N•m).	

WHEELS AND TIRES.**10-14. FRONT WHEEL BEARINGS AND SEALS MAINTENANCE (M916 THRU M920) (Continued).**

LOCATION/ITEM	ACTION	REMARKS
C. PACKING AND INSTALLATION OF BEARINGS (Continued).		
14. Drive flange (11).	a. Coat inside surface with silicone (RTV) gasket material. b. Attach to hub with eight cap-screws (13) and washers (12). c. Install expansion plug (14), if removed.	
15. Eight capscrews (13) and washers (12).	Tighten to 175-205 lb-ft (237-282 N•m) with torque wrench. Tighten as shown.	
16. Tire and wheel assembly	Install (refer to TM 9-2320-273-10). Tighten wheel stud nuts (15) with torque wrench to 450 lb-ft (610 N•m), in sequence shown.	

WHEELS AND TIRES.

10-14. FRONT WHEEL BEARINGS AND SEALS MAINTENANCE (M916 THRU M920) (Continued).

LOCATION\ITEM	ACTION	REMARKS
LEGEND: 1. SPINDLE 2. OIL SEAL 3. INNER BEARING CONE 4. INNER BEARING CUP 5. HUB AND DRUM ASSEMBLY 6. OUTER BEARING CUP 7. OUTER BEARING CONE 8. PRELOAD NUT 9. RETAINER 10. LOCK NUT 11. DRIVE FLANGE 12. WASHER (8) 13. CAPSCREW (8) 14. EXPANSION PLUG 15. WHEEL STUD NUT (10) 16. WHEEL STUD (10)		

TA 237241

WHEELS AND TIRES.**10-15. REAR WHEEL BEARINGS, SHAFTS, AND SEALS MAINTENANCE.****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

- a. Removal. (25)
 - b. Inspection of Bearings. (5)
 - c. Packing and Installation of Bearings. (30)
- 60 Minutes Total

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

EQUIPMENT CONDITION**PARAGRAPH**

None.

CONDITION DESCRIPTION

None.

TEST EQUIPMENT

None.

SPECIAL TOOLS

Wheel Bearing Nut Wrench, PN 1914 (45152)
 Part of Wrench Set, NSN 5120-00-169-4586.

MATERIALS/PARTS (P/N)

Non-Flammable Cleaning Solvent SD-2 (Refer to Appendix C).
 Inner Bearing Seal M915 (A1205-T-696) M916 Thru M920 (A1205-T-774) (78500).
 Outer Bearing Seal M915 (A1205-N-612) M916 Thru M920 (A1205-4-619) (78500).
 Star Washers (16) (1229-X-518) (78500).
 Gasket (2) M915 (2208-X-440) M916 Thru M920 (2208-W-413) (78500).

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.
 TM 9-2320-273-20P.
 LO 9-2320-273-12.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
 Transmission in Neutral.
 Park Brake Set.
 Wheels Blocked.

TROUBLESHOOTING REFERENCES

Table 10-3.

WHEELS AND TIRES.

10-15. REAR WHEEL BEARINGS, SHAFTS, AND SEALS MAINTENANCE.

LOCATION/ITEM

ACTION

REMARKS

A. REMOVAL.

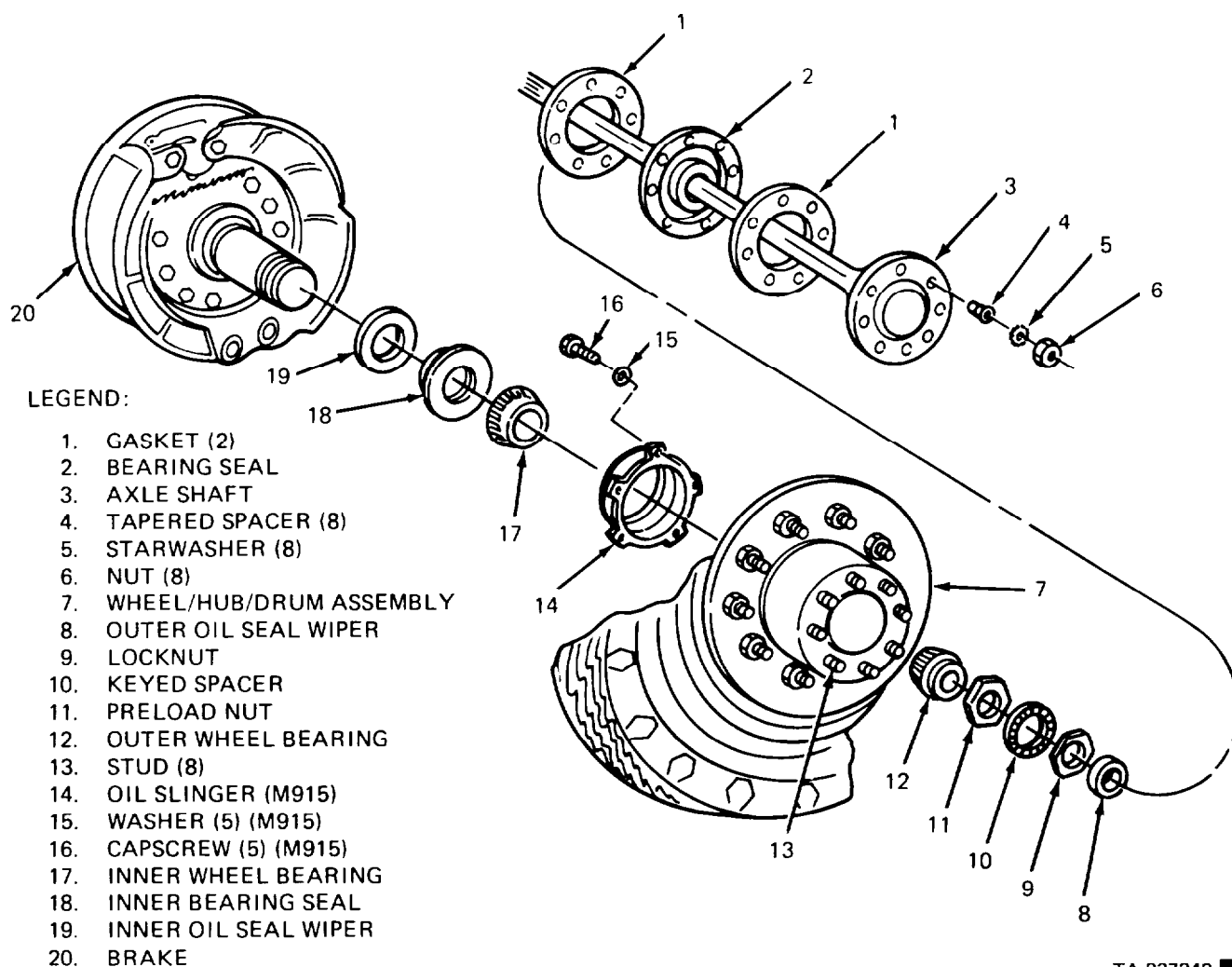
1. Eight nuts (6) and star washers (5).

a. Remove.

- b. Throw away star washers (5).

CAUTION

Do not pry between flange of axle shaft (3) and mating surface of hub. Do not hit studs (13).



TA 237242 ■

WHEELS AND TIRES.

10-15. REAR WHEEL BEARINGS, SHAFTS, AND SEALS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
2. Axle shaft (3) and eight tapered spacers (4).	a. Use slide hammer to pound until tapered spacers (4) loosen. b. Remove.	Do not hit studs (13).
3. Two gaskets (1), bearing seal (2), and outer oil seal wiper (8).	a. Remove. b. Throw away bearing seal (2) and two gaskets (1).	Replace outer oil seal wiper (8), if damaged.
4. Locknut (9), keyed spacer (10), and preload nut (11).	Remove with wheel nut wrench.	
5. Outer wheel bearing (12).	Pull out.	
WARNING Do not depend on jacks to support truck. Block it securely so that it will not fall if jack gives way.		
6. Rear wheels	Jack up (see TM 9-2320-273-10).	
7. Wheel, hub, and drum assembly (7).	Remove.	
8. (M915 Only) Oil Slinger (14), five washers (15) and capscrews (16).	Remove.	
9. Inner bearing seal (18), inner wheel bearing (17), and inner oil seal wiper (19).	a. Remove. b. Throw away inner bearing seal (18).	a. You should now be reaching into the side of the hub that was facing the truck. b. Replace inner oil seal wiper (18), if damaged.

WHEELS AND TIRES.

10-15. REAR WHEEL BEARINGS, SHAFTS, AND SEALS MAINTENANCE (Continued).

LOCATION/ITEM

ACTION

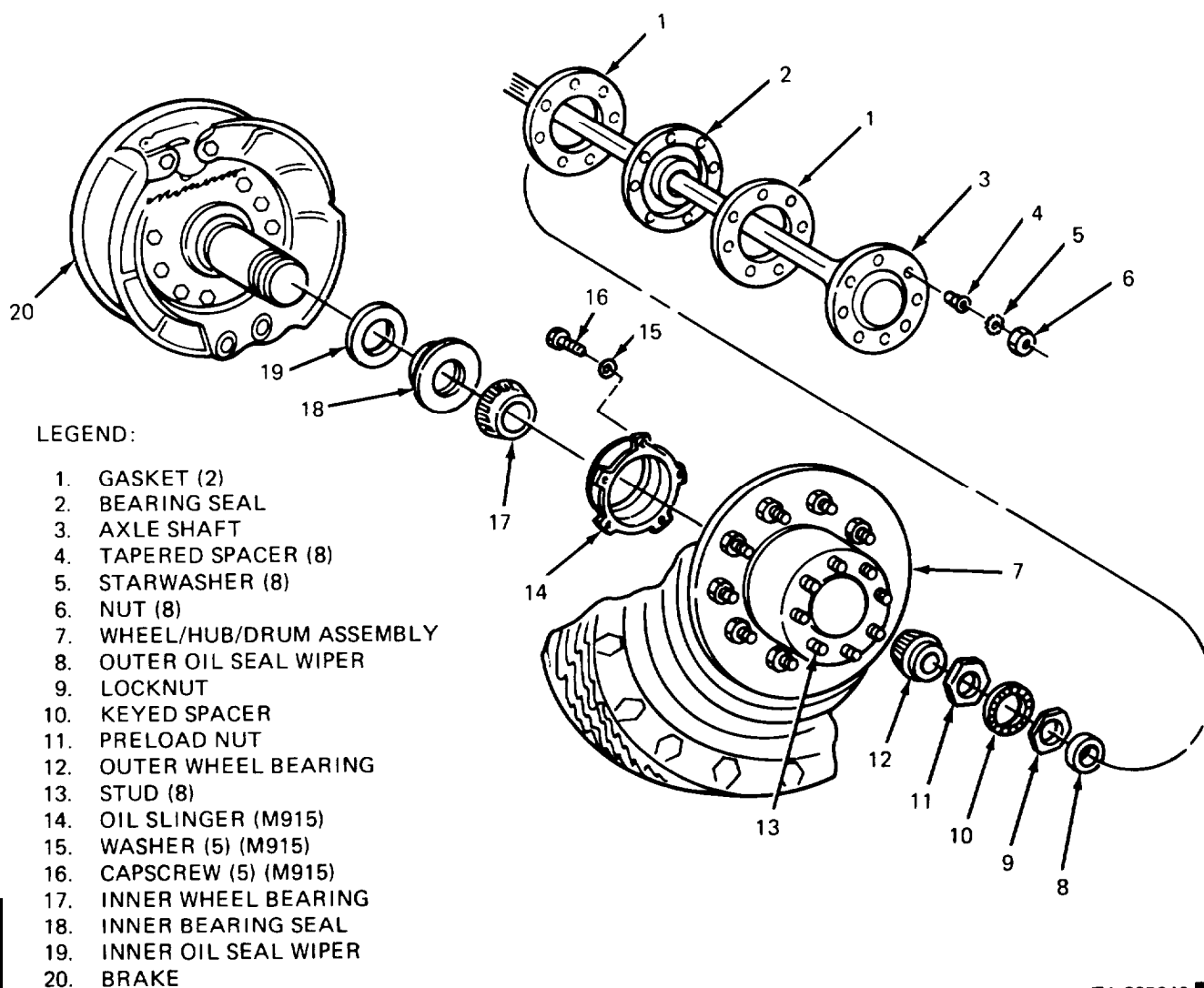
REMARKS

B. INSPECTION OF BEARINGS.

10. Outer wheel bearing (12) and inner wheel bearing (17).

Replace, if necessary.

- a. Inspect for:
1. Missing rollers.
 2. Flat, chipped, or pitted surfaces.
 3. Discoloration.
 4. Secure fit.



TA 237243 ■

WHEELS AND TIRES.

10-15. REAR WHEEL BEARINGS, SHAFTS, AND SEALS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSPECTION OF BEARINGS (Continued).		
10. Outer wheel bearing (12) and inner wheel bearing (17) (continued).	b. If bearings are to be reused: 1. Remove surface oil and gum deposits. 2. Clean with solvent. 3. Wipe dry, Do not use compressed air. 4. Coat with a light film of oil. Wrap bearings in paper until you are ready to install them.	See TM 9-214 for information on maintenance.
C. PACKING AND INSTALLATION OF BEARINGS.		
11. (M915 only) Oil slinger (14), five washers (15) and capscrews (16).	Install.	
12. Inner wheel bearing (17).	a. Use bearing packing tool to pack with grease. b. Place in wheel/hub/drum assembly (7) so that smaller end will point away from truck.	
13. New inner bearing seal (18) and inner oil seal wiper (19).	Place over inner wheel bearing (17) in wheel/hub/drum assembly (7). Lettering should face truck when wheel is mounted.	
14. Wheel/hub/drum assembly (7).	Place in position over brake (20), using wheel dolly.	
15. Outer wheel bearing (12).	a. Use bearing packing tool to pack with grease. b. Place on hub with small end towards truck.	

WHEELS AND TIRES.

10-15. REAR WHEEL BEARINGS, SHAFTS, AND SEALS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
C. PACKING AND INSTALLATION OF BEARINGS.		
16. Preload nut (11).	a. Install preload nut using wheel bearing nut wrench. b. If reusing the same bearings, torque to 50 lb-ft (68 N•m) while rotating wheel in both directions, c. If new bearings have been installed, torque to 100 lb-ft (136 N•m) while rotating wheel in both directions, back off to 0 lb-ft. Torque to 50 lb-ft. d. Back off preload nut no more than 1/4 turn counterclockwise.	
17. Keyed spacer (10) and locknut (9).	a. Install with wheel bearing nut wrench. b. Torque locknut (9) to 250-400 lb-ft (340-544 N•m).	

WHEELS AND TIRES.

10-15. REAR WHEEL BEARINGS, SHAFTS, AND SEALS MAINTENANCE (Continued).

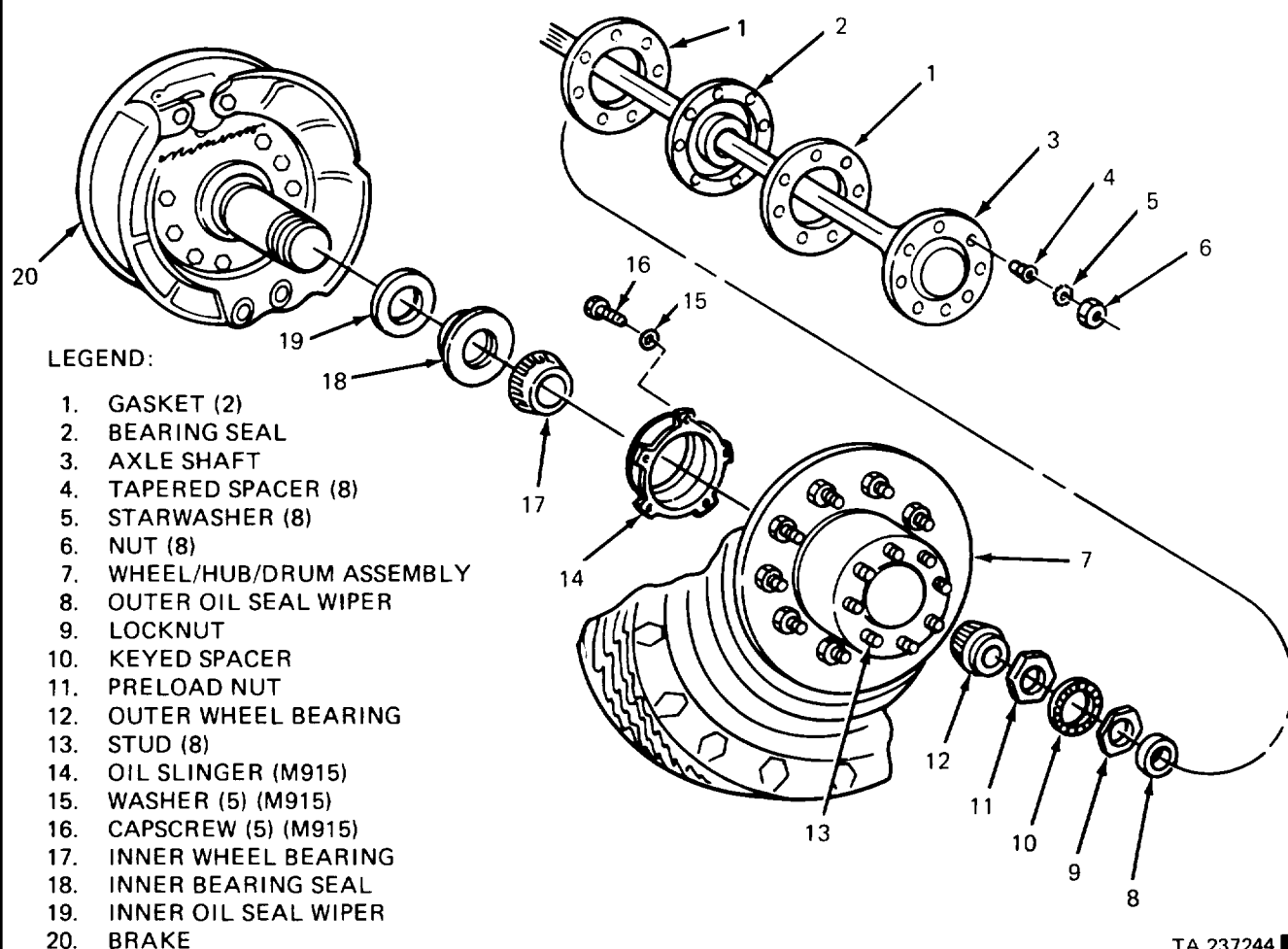
LOCATION/ITEM	ACTION	REMARKS

C. PACKING AND INSTALLATION OF BEARINGS (Continued)

18. New bearing seal (2), two new flange gaskets (1), and outer oil seal wiper (8).	Put in place over studs (13).	
19. Axle shaft (3).	Set in place.	
20. Eight tapered spacers (4), star washers (5), and nuts (6).	Screw on. Tighten to 175 lb-ft (237 N•m) with torque wrench. Tighten in this order:	

NOTE

Follow-on maintenance action required:
After road testing vehicle, check for oil leaks.



TA 237244 ■

WHEELS AND TIRES.**10-16. PUSHER AXLE BEARINGS AND SEALS.****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

a. Removal.	(30)
b. Inspection.	(10)
c. Packing and Installation of Bearings.	(30)
70 minutes Total.	

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

M917, M919, M920.

**EQUIPMENT
PARAGRAPH**

None.

CONDITION**CONDITION DESCRIPTION**

None.

TEST EQUIPMENT

None.

SPECIAL TOOLS

Outside Wheel Bearing Nut Wrench, PN 1909, Part of Set NSN 5120-00-169-4586.

Inside Wheel Bearing Nut Wrench, PN 1927, Part of Set NSN 5120-00-169-4586.

MATERIALS/PARTS (P/N)

Seal Installer.

Brass Drift.

GAA (Refer to Appendix C).

Non-Flammable Cleaning Solvent SD-2 (Refer to Appendix C).

Inner Bearing Seal, 1205-P-1212 (78500).

Hub Cap Gasket, 2208-P-796 (78500).

PERSONNEL REQUIRED

Two (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.

TM 9-2320-273-20P.

LO 9-2320-273-12.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.

Transmission in Neutral.

Park Brake Sat.

Wheels Blocked.

TROUBLESHOOTING REFERENCES

Table 10-3.

WHEELS AND TIRES.

10-16. PUSHER AXLE BEARINGS AND SEALS (Continued).

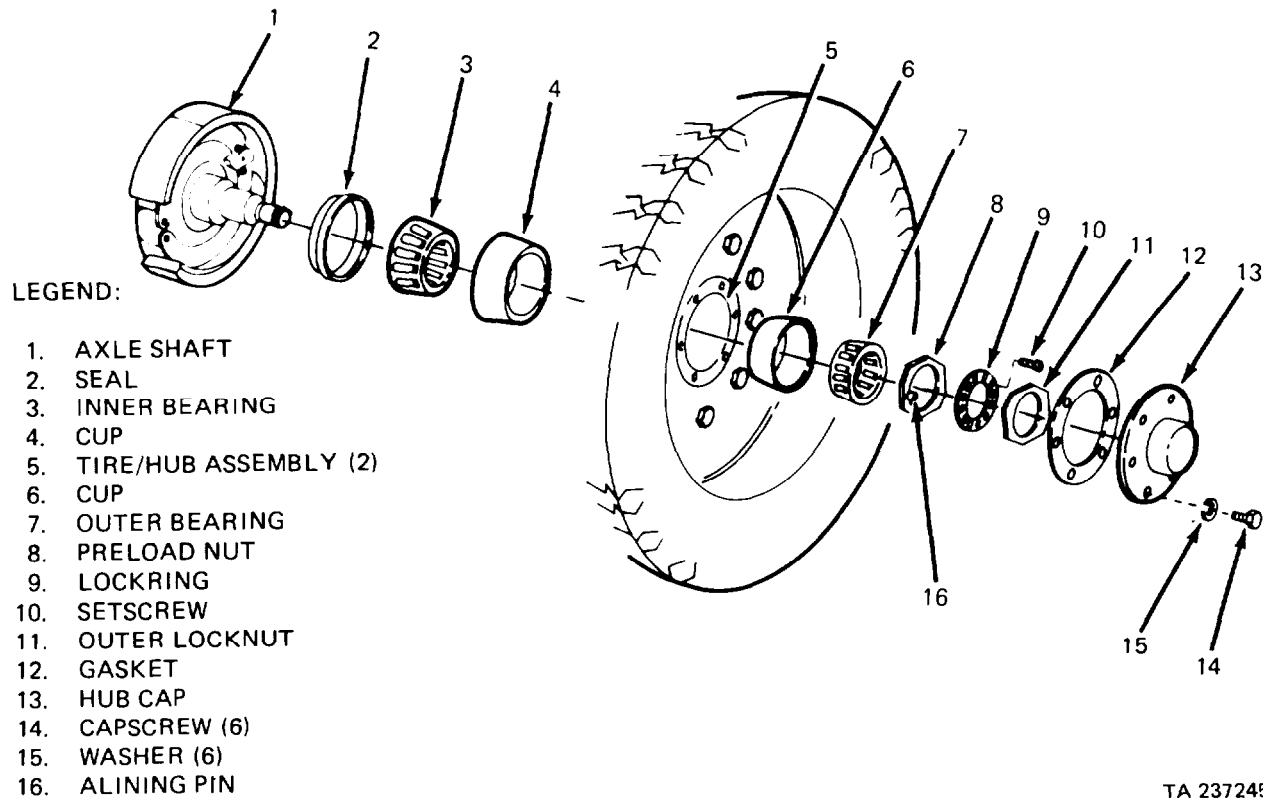
LOCATION/ITEM

ACTION

REMARKS

A. REMOVAL.

1. Axle.	Jack up.	
2. Tire/hub assembly (5).	Place on wheel dolly.	
3. Six capscrews (14) and washers (15).	Remove.	
4. Hub cap (13) and gasket (12).	Remove.	Discard gasket.
5. Allen head setscrew (10).	Remove.	
6. Outer locknut (11).	Remove.	
7. Lockring (9).	Remove.	
8. Preload nut (8).	Remove.	



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WHEELS AND TIRES.

10-16. PUSHER AXLE BEARINGS AND SEALS (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
9. Outer bearing (7).	Remove.	
10. Tire/hub assembly (5).	Slide off axle shaft (1).	
11. Inner bearing (3) and seal (2).	Remove.	Use hammer and brass drift. Tap out bearing and seal. Discard seal (2).
NOTE		
Clean all parts with cleaning solvent SD-2.		
WARNING		
Do not use compressed air to clean bearings.		
B. INSPECTION.		
12. Inner bearing (3) and outer bearing (7).	Inspect for: a. Cracks. b. Chips. c. Breaks. d. Flat spots on rollers. e. Smooth operation. f. Discoloration (straw colored or bluish tint).	Replace as necessary. Refer to TM 9-2320-273-20P.
13. Cups (4) and (6).	Inspect for: a. Flat Spots. b. Roughness. c. Cracks. d. Gouges. e. Wear. f. Discoloration (straw colored or bluish tint).	Refer to Direct Support Maintenance. If replacement is needed, cups must be pressed out and in.
14. Axle Shaft (1).	Inspect for: a. Grooves. b. Gouges. c. Abnormal wear. d. Discoloration.	Refer to Direct Support Maintenance. If replacement is needed, cups must be pressed out and in.

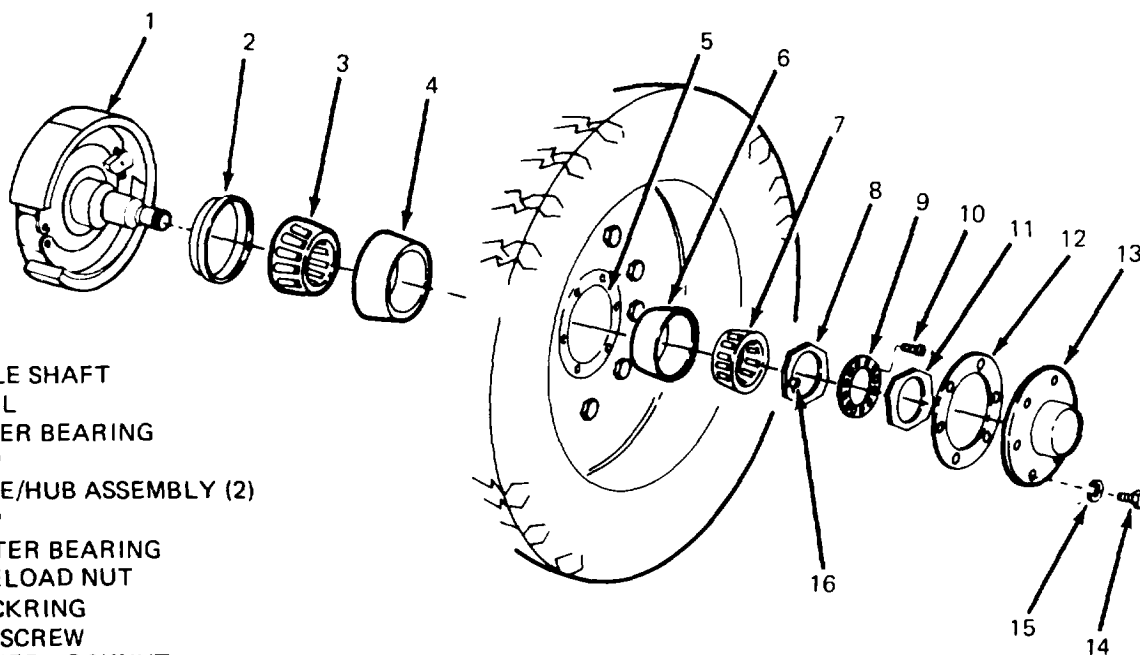
WHEELS AND TIRES.

10-16. PUSHER AXLE BEARING AND SEALS (Continued).

LOCATION/ITEM	ACTION	REMARKS
C. PACKING AND INSTALLATION OF BEARINGS.		
15. Inner bearings (3).	a. Use bearing packing tool to pack with grease or pack by hand. b. Place in cup (4) inside of hub (5).	
16. New seal (2).	Tap in place.	Use hammer and seal installer.
17. Tire/hub assembly (5).	Slide over axle shaft (1), using wheel dolly.	
18. Outer bearing (7).	a. Use bearing packing tool to pack with grease or pack by hand. b. Insert in cup (6) inside of hub (5).	

LEGEND:

1. AXLE SHAFT
2. SEAL
3. INNER BEARING
4. CUP
5. TIRE/HUB ASSEMBLY (2)
6. CUP
7. OUTER BEARING
8. PRELOAD NUT
9. LOCKRING
10. SETSCREW
11. OUTER LOCKNUT
12. GASKET
13. HUB CAP
14. CAPSCREW (6)
15. WASHER (6)
16. ALINING PIN



TA 237246 ■

WHEELS AND TIRES.

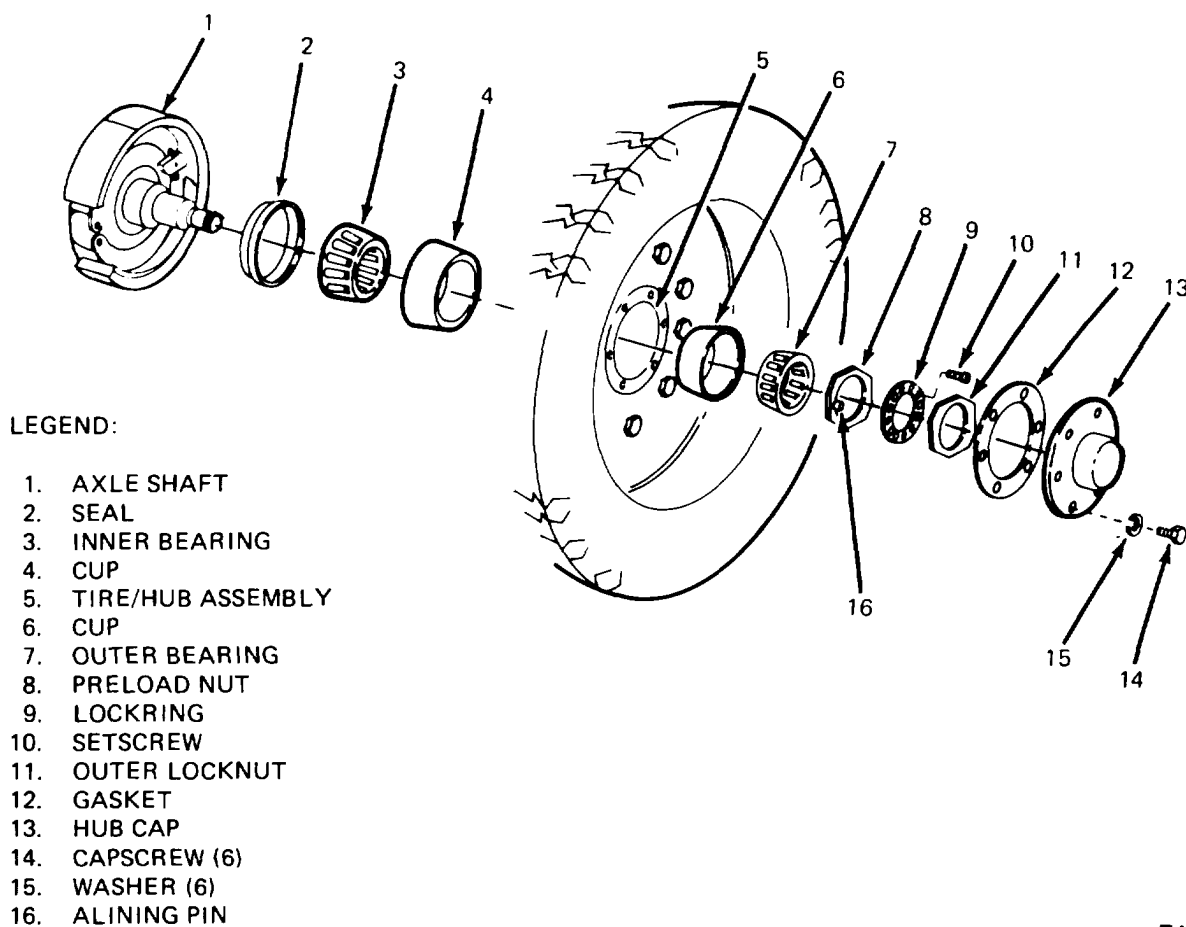
10-16. PUSHER AXLE BEARINGS AND SEALS (Continued).

LOCATION/ITEM	ACTION	REMARKS
C. PACKING AND INSTALLATION OF BEARINGS (Continued).		
19. Preload nut (8).	a. Install preload nut using wheel bearing nut wrench. b. If reusing the same bearings, torque to 50 lb-ft (68 N•m) while rotating wheel in both directions. c. If new bearings have been installed, torque to 100 lb-ft (136 N•m) while rotating wheel in both directions, back off to 0 lb-ft. Torque to 50 lb-ft (68 N•m). d. Back off preload nut no more than 1/4 turn counterclockwise to install cotter pin.	Alining pin (16) must face toward lockring (9).
20. Lockring (9).	Install.	Adjust preload nut (8) so that alining pin (16) slips into nearest hole in lockring (9).
21. Outer locknuts (11).	a. Install. b. Torque to 250-300 lb-ft (339-406.8 N•m).	

WHEELS AND TIRES.

10-16. PUSHER AXLE BEARINGS AND SEALS (Continued).

LOCATION/ITEM	ACTION	REMARKS
C. PACKING AND INSTALLATION OF BEARINGS (Continued).		
22. Setscrew (10).	Install in one of four tappings.	
23. Gasket (12) hub cap (13).	Line up holes.	
24. Capscrews (14) and washers (15).	Tighten to 25–31 lb-ft (33.90–42.04 N•m) in sequence shown.	
25. Jack.	Remove from axle.	



TA 237247 ■

STEERING MECHANISM.**10-17. STEERING WHEEL MAINTENANCE.****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

- a. Removal. (7)
 - b. Installation. (7)
 - c. Operational Check. (1)
- 15 Minutes Total.

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Wheel Puller.

EQUIPMENT CONDITION**PARAGRAPH**

5-67A.

CONDITION DESCRIPTIONHorn Button Assembly
Removed.

5-37A.

Batteries Disconnected.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.

TM 9-2320-273-20P:

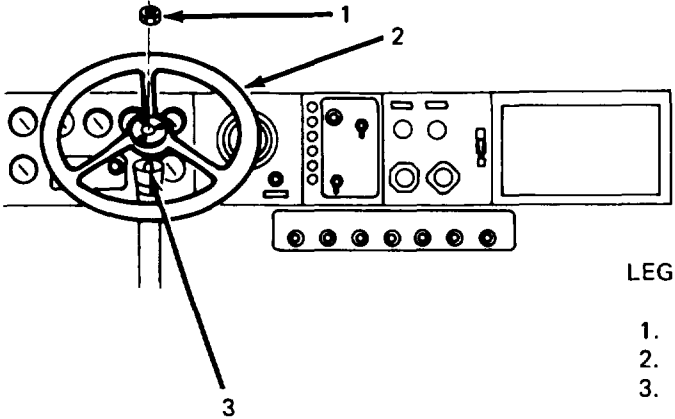
GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 10-2.

STEERING MECHANISM.**10-17. STEERING WHEEL MAINTENANCE (Continued).**

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Nut(1).	Unscrew and remove.	
2. Steering wheel (2).	Remove using suitable wheel puller.	
B. INSTALLATION.		
3. Steering wheel (2).	Place on steering column. Turn gently to seat splines.	
4. Nut (1).	Screw onto shaft (3) and tighten.	
C. OPERATIONAL CHECK.		
5. Engine.	Start up (see TM 9-2320-273-10).	
6. Steering wheel (2).	Turn both directions. Check that front wheels turn. Follow on Maintenance. a. Install horn button assembly (para 5-67B). b. Connect batteries (para 5-37B).	
 The diagram shows a side view of the steering wheel assembly. A steering wheel is mounted on a vertical shaft. A nut is shown being tightened onto the top of the shaft. The steering wheel has four spokes. To the right of the steering wheel is a control panel with various buttons and switches. A legend box is located to the right of the diagram.		
LEGEND: 1. NUT 2. STEERING WHEEL 3. SHAFT		

TA 074993

STEERING MECHANISM.**10-18. LOWER STEERING SHAFT MAINTENANCE.****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

- a. Removal. (10)
- b. Disassembly. (18)
- c. Assembly. (18)
- d. Installation. (30)
- e. Operational Check. (2)

78 Minutes Total.

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

EQUIPMENT CONDITION**PARAGRAPH**

None.

CONDITION DESCRIPTION

None.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

GAA (Refer to Appendix C).

Non-Flammable Dry Cleaning Solvent SD-2 (Refer to Appendix C).

PERSONNEL REQUIRED

Two (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.

TM 9-2320-273-20P.

LO 9-2320-273-12.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.

Transmission in Neutral.

Park Brake Set.

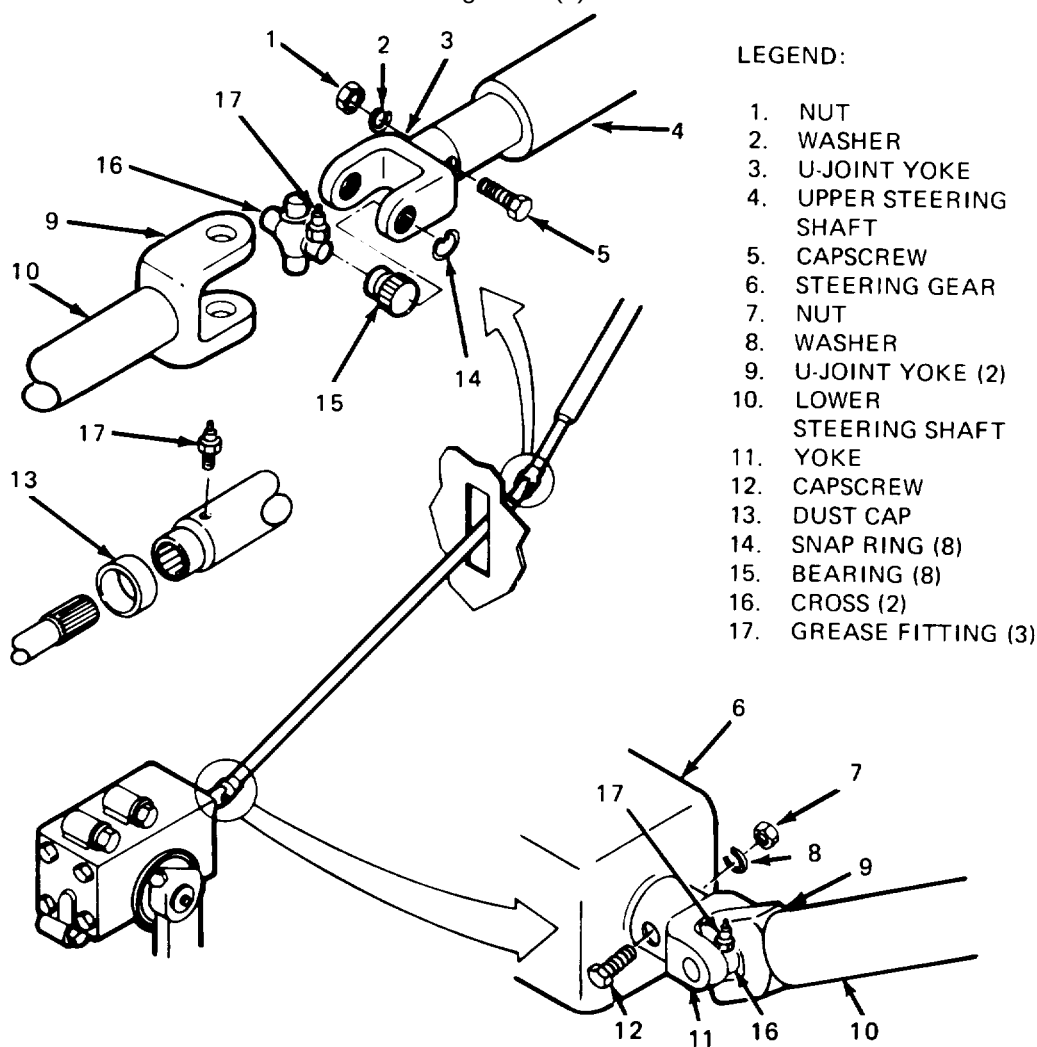
TROUBLESHOOTING REFERENCES

Table 10-2.

STEERING MECHANISM

10-18. LOWER STEERING SHAFT MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
NOTE		
Turn wheels to left for better access.		
A. REMOVAL.		
1. Nut (1), washer (8), and capscrow (12).	Unscrew and remove.	
2. Yoke (11).	Remove from steering gear (6).	
3. Nut (7), washer (2), and capscrow (5).	Unscrew and remove.	
4. Universal joint yoke (3).	Slide off of upper steering shaft (4).	



TA 074994

STEERING MECHANISM

10-18. LOWER STEERING SHAFT MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
5. Lower steering shaft (10).	Remove through firewall from under hood.	U-Joints and yokes will still be attached.
B. DISASSEMBLY.		
CAUTION Tap bearings only hard enough to break them away from snap rings.		
6. Four snap rings (14).	Remove.	
7. Four bearings (15).	Remove.	You can push out the first bearing of each yoke by pressing gently on the opposite bearings. Press cross end to push out second bearing.
8. Three grease fittings (17).	Remove from two crosses (16) and lower steering shaft (10).	Check for thread or ball tip damage and replace as necessary.
9. Two crosses (16) and four yokes (9), (11), and (3).	Separate.	
10. Lower steering shaft (10).	Slide splined sections apart.	
11. Dust cap (13).	Inspect.	If damage is evident, remove by prying up tabs and install new dust cap by staking tabs with a center punch.
WARNING COMPRESSED AIR USED FOR CLEANING PURPOSES WILL NOT EXCEED 30 PSI. USE ONLY WITH EFFECTIVE CHIP GUARDING AND PERSONAL PROTECTIVE EQUIPMENT (GOGGLES/SHIELD, GLOVES, ETC).		

STEERING MECHANISM

10-18. LOWER STEERING SHAFT MAINTENANCE (Continued).

LOCATION/ITEM

ACTION

REMARKS

B. DISASSEMBLY (Continued).

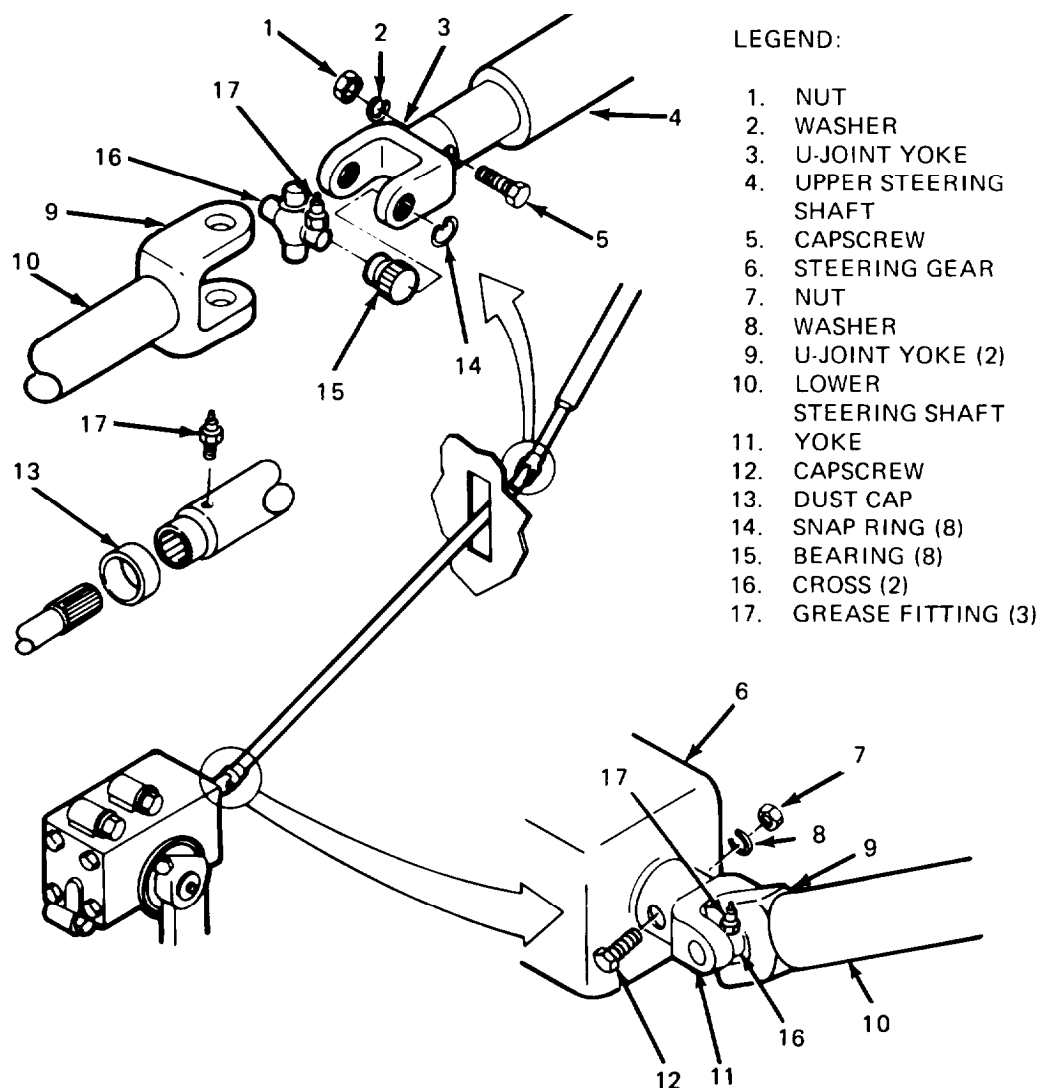
CAUTION

Do not allow SD-2 dry cleaning solvents to come in contact with seals or flexible hoses. These cleaners may damage leather, rubber, and synthetic materials.

12. Four yokes (3), (9), (11), two crosses (16), and eight bearings (15).

- a. Clean with SD-2 dry cleaning solvent and dry with compressed air.
b. Inspect for cracks, wear, nicks, burrs, and scratches.

Use Fine stone to remove light marks. Replace as necessary as a set.



TA 074995

STEERING MECHANISM

10-18. LOWER STEERING SHAFT MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
NOTE Bearings and cross should be replaced as a set. If the cross or any bearing is damaged, replace the set.		
C. ASSEMBLY.		
13. Lower steering shaft (10).	Slide splined sections together at dust cap (13).	
14. Three grease fittings (17).	Install in two crosses (16) and lower steering shaft (10).	
15. Two crosses (16).	a. Place between four yokes (3), (9), and (11). b. Lubricate assembly with GAA.	
16. Eight bearings (15).	a. Lubricate with GAA. b. Use soft hammer to carefully tap bearings into yokes.	
17. Eight snap rings (14).	Seat in yoke grooves.	
D. INSTALLATION.		
18. Lower steering shaft (10).	From under hood, insert through hole in firewall.	Upper and lower U-joints and yokes are attached to shaft at this time.
19. U-joint yoke (3).	Push onto splined shaft of upper steering shaft (4).	
20. Yoke (11).	Push onto splined shaft of steering gear (6).	
21. Capscrew (12), washer (8), and nut (7).	Screw in and tighten.	
22. Capscrew (5), washer (2), and nut (1).	Screw on and tighten.	
23. Three grease fittings (17).	Use grease gun and apply GAA.	

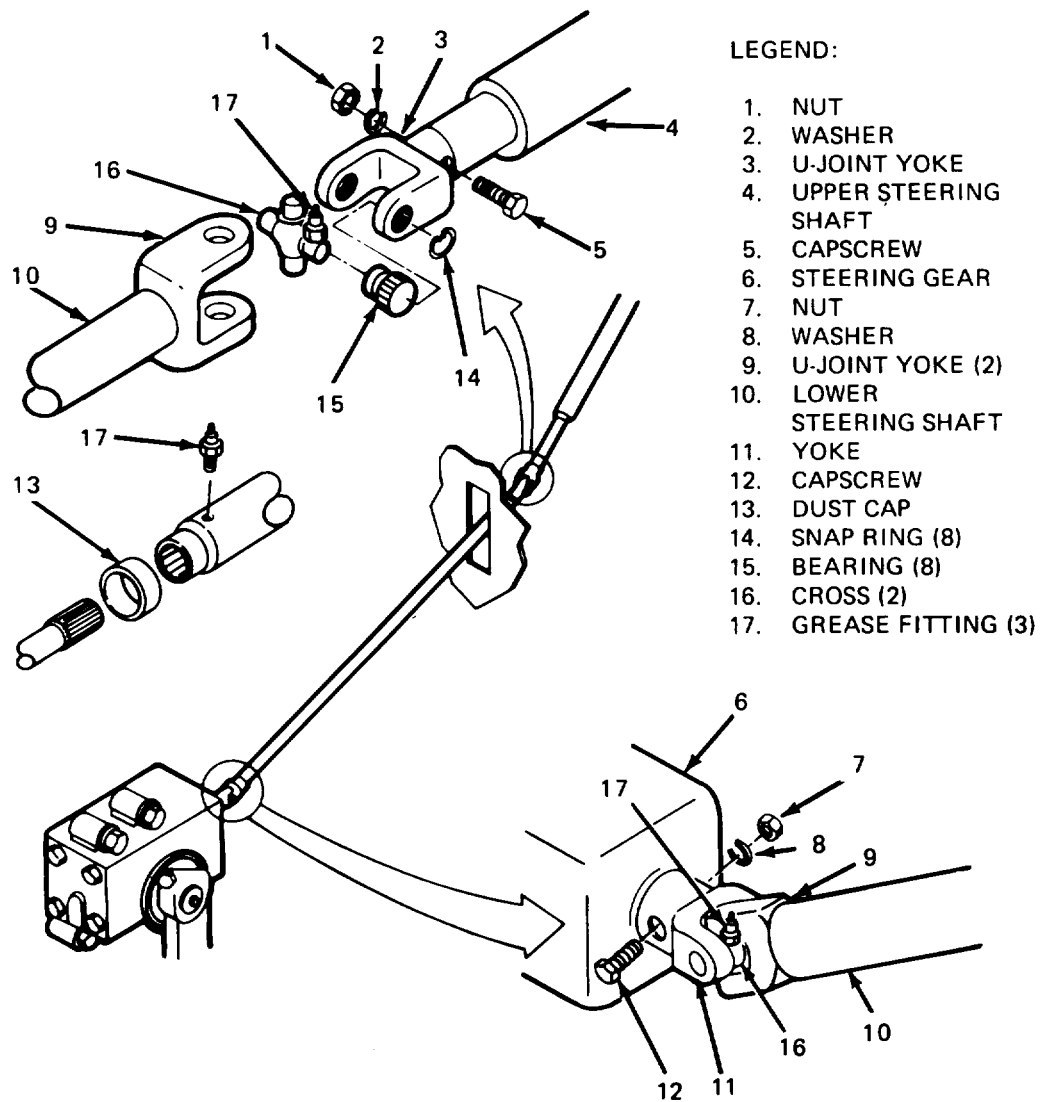
STEERING MECHANISM.

10-18. LOWER STEERING SHAFT MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS

E. OPERATIONAL CHECK.

24. Engine.	Start up (see TM 9-2320-273-10).
25. Steering wheel.	Turn. Check that front wheels turn freely.



TA 074996

STEERING MECHANISM.**10-19. DRAG LINK MAINTENANCE.****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

a. Removal.	(20)
b. Inspection of Mating Connections.	(5)
c. Installation.	(20)
d. Operational Check.	(15)
60 Minutes Total.	

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

EQUIPMENT CONDITION**PARAGRAPH**

None.

CONDITION DESCRIPTION

None.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Cotter Pin (2), K-2616 (78500).
 Grease Gun
 GAA (refer to Appendix C).

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.
 TM 9-2320-273-20P.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
 Transmission in Neutral.
 Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 10-2.

STEERING MECHANISM.**10-19. DRAG LINK MAINTENANCE (Continued).****LOCATION/ITEM****ACTION****REMARKS****NOTE**

Turn wheel left or right for easy accessibility in performing task.

A. REMOVAL.

1. Cotter pins (2) and (5).

Remove with pliers and throw away.

If pins stick, tighten or loosen castle nuts (3) and (6) slightly to align slot.

2. Castle nuts (3) and (6).

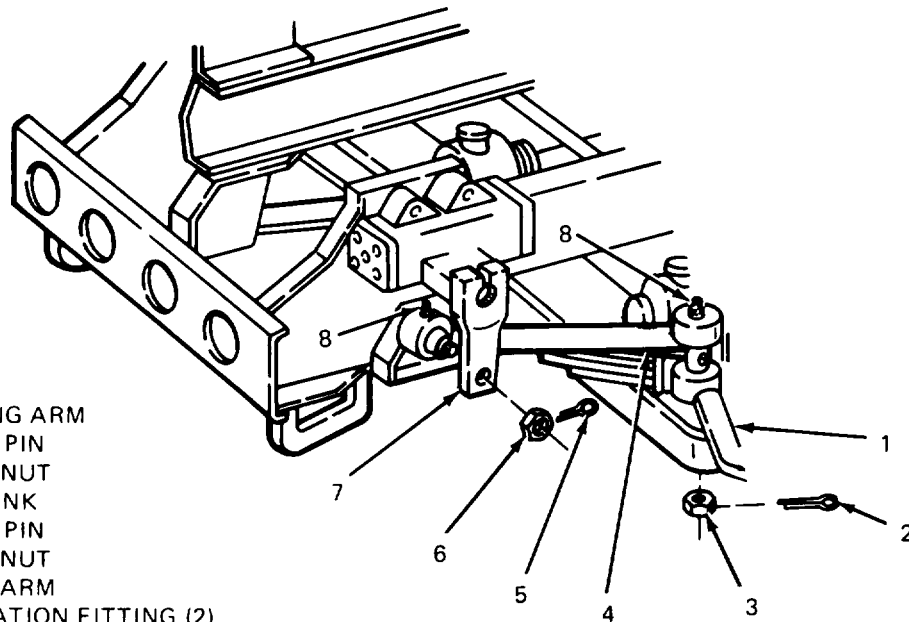
a. Back off nuts until they are flush with threaded portion of shaft.

b. Using a sledge hammer hit this area until drag link unseats.

c. Unscrew and remove.

LEGEND:

1. STEERING ARM
2. COTTER PIN
3. CASTLE NUT
4. DRAG LINK
5. COTTER PIN
6. CASTLE NUT
7. PITMAN ARM
8. LUBRICATION FITTING (2)



TA 074997

STEERING MECHANISM.**10-19. DRAG LINK MAINTENANCE (Continued).**

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
3. Drag link (4).	Remove.	
4. Two lubrication fittings (8).	Unscrew and remove.	
B. INSPECTION OF MATING CONNECTIONS.		
5. Drag link (4), steering arm (1), and pitman arm (7).	Inspect mating surfaces for: a. Scoring. b. Gouging. c. Excess or uneven wear.	Replace if necessary, If connections are damaged, troubleshoot steering system (para 10-5).
6. Two lubrication fittings (8).	Inspect for: a. Damaged ball end seal. b. Damaged threads.	Replace as necessary.
C. INSTALLATION.		
7. Two lubrication fittings (8).	Install at either end of drag link.	
8. Drag link (4).	a. Place one end in steering arm (1). b. Place the other end in pitman arm (7).	
9. Castle nuts (3) and (6).	Screw on and tighten to 120 lb-ft (163 N•m) with torque wrench.	
10. New cotter pins (2) and (5).	Insert cotter pins (2) and (5) with pliers and bend ends over.	It may be necessary to tighten castle nuts (3) and (6) further in order to align slots with hole.
11. Two lubrication fittings (8).	Grease with GAA until grease is visible at either end connection.	Use grease gun.
D. OPERATIONAL CHECK.		
12. Engine.	Start up (see TM 9-2320-273-10).	
13. Steering wheel.	Check to see that wheels turn freely.	
14. Engine.	Shut down (see TM 9-2320-273-10).	

STEERING MECHANISM.

10-19. DRAG LINK MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
LEGEND: 1. STEERING ARM 2. COTTER PIN 3. CASTLE NUT 4. DRAG LINK 5. COTTER PIN 6. CASTLE NUT 7. PITMAN ARM 8. LUBRICATION FITTING (2)		
		TA 074998

STEERING MECHANISM.

10-20. TIE ROD MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(20)
b. Inspection of End Assemblies.	(5)
c. Installation.	_____ (25)

50 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

EQUIPMENT CONDITION

PARAGRAPH

11-14A or C.

CONDITION DESCRIPTION

Front Fenders Removed.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Ball joint Puller.
Jack Stands.
Cotter Key (2), K-2616 (78500).

PERSONNEL REQUIRED

Two (MOS-63820).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 10-2.

STEERING MECHANISM.

10-20. TIE ROD MAINTENANCE (Continued).

LOCATION/ITEM

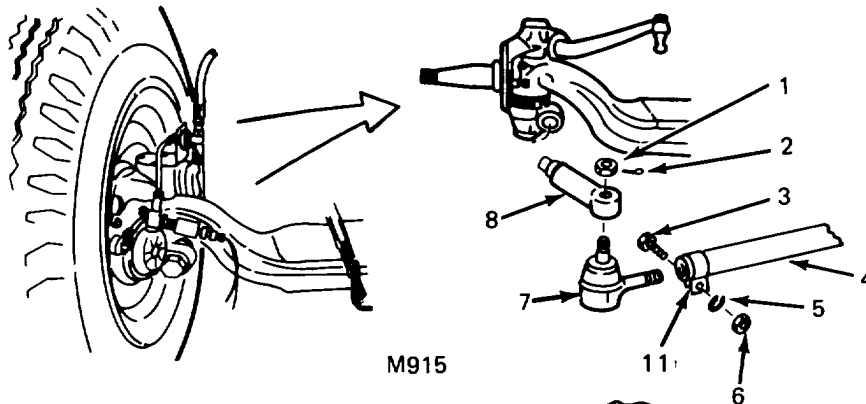
ACTION

REMARKS

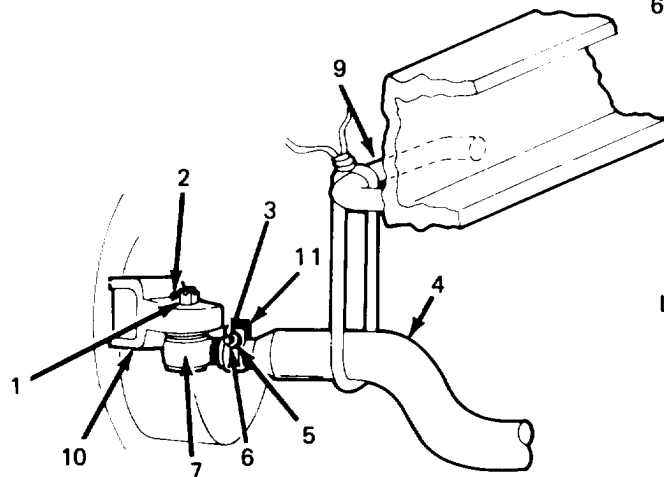
A. REMOVAL.

1. Tie downs (9) and tie rod (4).

Tie a suitable rope between these two points, on either side, to support weight of tie rod ends when disconnected.



M915



M916 thru M920

LEGEND:

1. NUT (2)
2. COTTER KEY (2)
3. BOLT (2)
4. TIE ROD
5. WASHER (2)
6. NUT (2)
7. BALL JOINT (2)
8. STEERING ARM (2)
9. TIE DOWN (2)
10. KNUCKLE (2)
11. CLAMP (2)

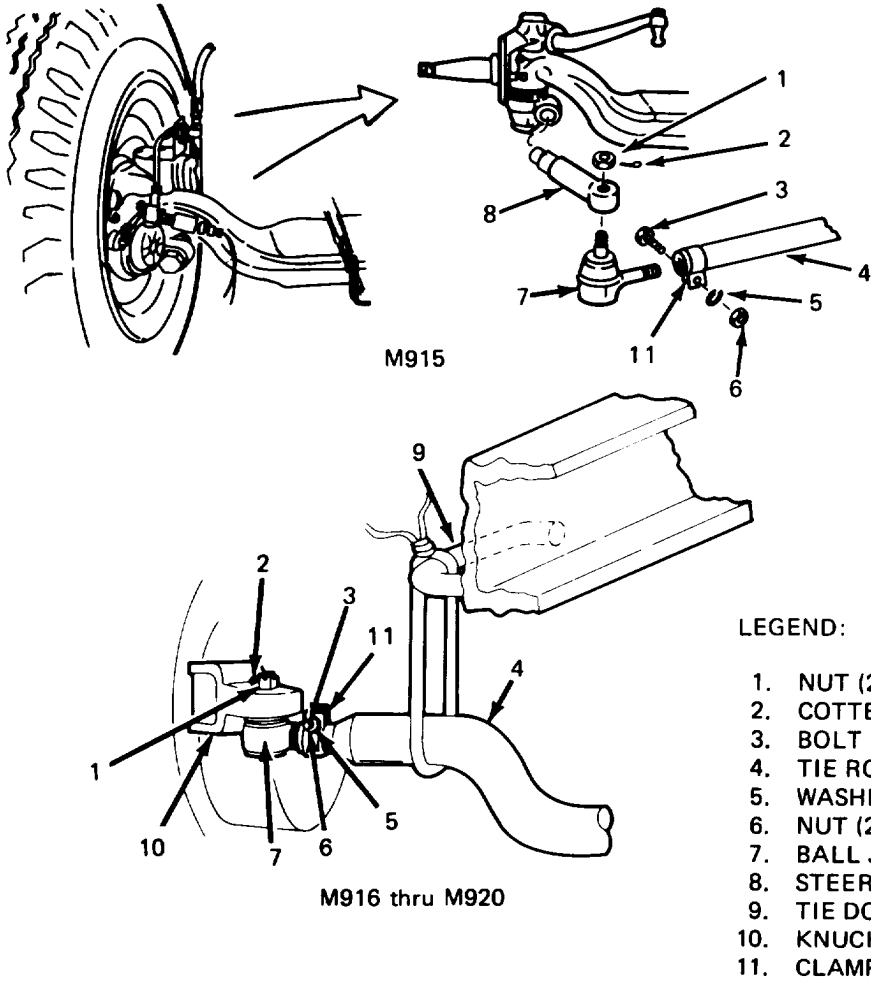
TA 074999

STEERING MECHANISM.**10-20. TIE ROD MAINTENANCE (Continued).**

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
2. Two cotter keys (2) and nuts (1).	Remove from ball joints (7) on each side.	
3. Two ball joints (7).	a. Using ball joint puller or tapping with mallet remove from steering arms (8) on each side (M915). Remove from knuckles (10) (M916 thru M920). b. Lower and remove tie rod (4) with ball joints (7) by unfastening and lowering rope sling on either side.	
4. Two bolts (3), washers (5), and nuts (6).	Loosen.	
5. Two ball joints (7).	a. Counting the number of turns, unscrew from tie rod (4). b. Slide off clamp (11) from tie rod (4).	
B. INSPECTION OF END ASSEMBLIES.		
6. Two ball joints (7).	Holding tie rod connection in one hand and steering arm connection in other hand, check for any play or looseness.	If there is any looseness, replace assembly.
C. INSTALLATION.		
7. Two ball joints (7).	a. Slide one clamp (11) onto either end of tie rod (4). b. Screw onto tie rod (4), using same number of turns as you counted in step 5.	
8. Two bolts (3), washers (5), and nuts (6).	Install thru two clamps (11) and torque to 40-55 lb-ft (54-74 N•m).	
9. Two ball joints (7).	Fasten ropes to tie downs (9) and tie rods (4) and hoist up into steering arms (8) (M915) or knuckles (10) (M916 thru M920). Tie rope sling securely.	

STEERING MECHANISM.

10-20. TIE ROD MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
C. INSTALLATION (Continued).		
10. Two nuts (1).	a. Torque to 110-125 lb-ft (149-169 Nžm). b. Secure with new cotter key (2) at each end.	
NOTE Follow-on maintenance action required: Check wheel alinement; refer to paragraph 10-10A. Install front fenders; refer to paragraph 11-14 B or D.		
 M915 M916 thru M920 LEGEND: 1. NUT (2) 2. COTTER KEY (2) 3. BOLT (2) 4. TIE ROD 5. WASHER (2) 6. NUT (2) 7. BALL JOINT (2) 8. STEERING ARM (2) 9. TIE DOWN (2) 10. KNUCKLE (2) 11. CLAMP (2)		
TA 075000		

STEERING MECHANISM.

10-21. PITMAN ARM MAINTENANCE.		
THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)		
a. Removal. (15) b. Inspection of Mating Surfaces. (5) c. Installation. (20) 40 Minutes Total.		
INITIAL SETUP	EQUIPMENT CONDITION	
<u>APPLICABLE CONFIGURATIONS</u>	<u>PARAGRAPH</u>	<u>CONDITION DESCRIPTION</u>
All.	None.	None.
<u>TEST EQUIPMENT</u>		
None.		
<u>SPECIAL TOOLS</u>		
None.		
<u>MATERIALS/PARTS (P/N)</u>		
Cotter Pin, K-2616 (78500).		
<u>PERSONNEL REQUIRED</u>	<u>SPECIAL ENVIRONMENTAL CONDITIONS</u>	
One (MOS-63B20).	Vehicle Parked on Level Ground.	
<u>REFERENCES (TM)</u>	<u>GENERAL SAFETY INSTRUCTIONS</u>	
TM 9-2320-273-10.	Engine OFF. Transmission in Neutral. Park Brake Set.	
<u>TROUBLESHOOTING REFERENCES</u>		
Table 10-2.		

STEERING MECHANISM.

10-21. PITMAN ARM MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
NOTE Check for alinement marks (1) and (3) on pitman arm (7) and steering gear shaft (9). If none are found, put scribe lines on at this time.		
A. REMOVAL.		
1. Cotter pin (5), nut (6), and drag link (4).	Remove.	Discard cotter pin (5).
2. Nut (2) and bolt (8).	Unscrew and remove.	
CAUTION Be careful not to damage shaft when removing pitman arm.		
3. Pitman arm (7).	Remove.	
LEGEND: 1. ALINEMENT MARK 2. NUT 3. ALINEMENT MARK 4. DRAG LINK 5. COTTER PIN 6. NUT 7. PITMAN ARM 8. BOLT 9. STEERING GEAR SHAFT		
TA 075001		

STEERING MECHANISM.**10-21. PITMAN ARM MAINTENANCE (Continued).**

LOCATION/ITEM	ACTION	REMARKS
<u>B. INSPECTION OF MATING SURFACES.</u>		
4. Pitman arm (7) and steering gear shaft (9).	Inspect mating surfaces for: a. Burrs. b. Gouges. c. Uneven or excess wear.	If pitman arm is damaged, replace. If shaft is damaged, replace steering gear or refer problem to Direct Support Maintenance.
<u>C. INSTALLATION.</u>		
5. Pitman arm (7) and steering gear shaft (9).	a. Aline marks (1) and (3). b. Insert wedge to open arm slightly. c. Drive on with mallet. d. Check that marks are still alined.	
6. Nut (2) and bolt (8).	Screw on. Tighten to 400 lb-ft (542 N•m) with torque wrench.	
7. Drag link (4), nut (6), and new cotter pin (5).	a. Install. b. Torque nut to 120 lb-ft (163 N•m).	

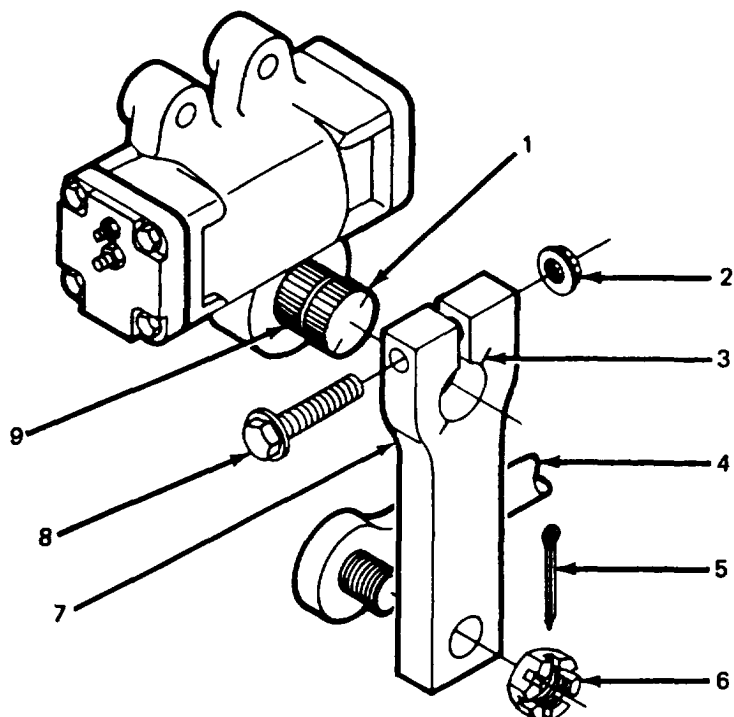
STEERING MECHANISM.

10-21. PITMAN ARM MAINTENANCE (Continued).

LOCATION/ITEM

ACTION

REMARKS



LEGEND:

1. ALINEMENT MARK
2. NUT
3. ALINEMENT MARK
4. DRAG LINK
5. COTTER PIN
6. NUT
7. PITMAN ARM
8. BOLT
9. STEERING GEAR SHAFT

STEERING MECHANISM.**10-21.1. STEERING ARM MAINTENANCE.****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

a. Preparation	c. Cleaning/Inspection
b. Disassembly	d. Assembly
2 Hours Total.	

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

M915

EQUIPMENT CONDITION**PARAGRAPH**

None

CONDITION DESCRIPTION

None

TEST EQUIPMENT

Analyzer, Power Steering, NSN 4910-01-160-3618
P/N J26487 (33287)

SPECIAL TOOLS

Pushrod Driver (fabricate IAW Section 10-21.4, page 10-85)
P/N DTA177323 (19207)
Puller, NSN 5120-00-595-9305
P/N GGG-P-781 (81348)
Torque Wrench, NSN 5120-00-221-7983
P/N SW130-301 (10001)
Multiplier, Torque Wrench NSN 5120-01-142-6941
P/N 392 (87641)
Steering Stop Template (fabricate IAW Section 10-21.4, page 10-85)

MATERIALS/PARTS (P/N)

Steering Arm Kit, 2MPS-3993 (78500)
Includes:
Cotter Pin, (MS24665-498 (96906)
Key, 16X202 (78500)
Nut, Drag Link/Steering Arm, MS35692-69 (96906)
Nut, Knuckle/Steering Arm, MS35692-1824 (96906)
Boot, Grease, 415172C1 (89346)
Steering Arm, 3133-G-6663 (78500)

PERSONNEL REQUIRED

One (MOS-63S)

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10
TM 9-2320-273-24&P
TM 9-2320-273-34

GENERAL SAFETY INSTRUCTIONS

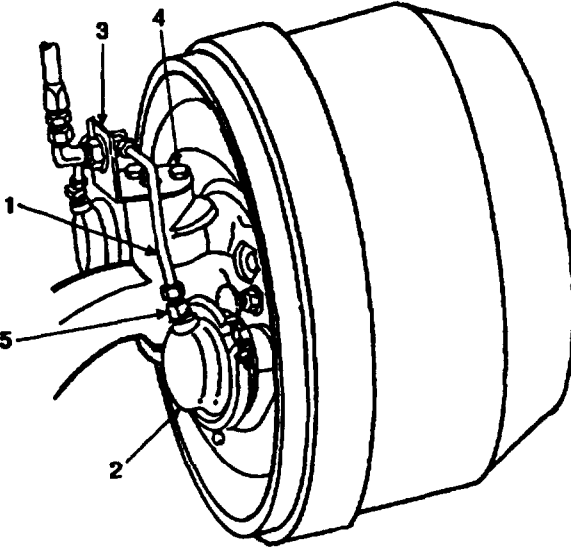
Engine OFF.
Transmission in Neutral.
Parking Brake Set.
Rear Wheels Chocked.

TROUBLESHOOTING REFERENCES

Table 10-2.

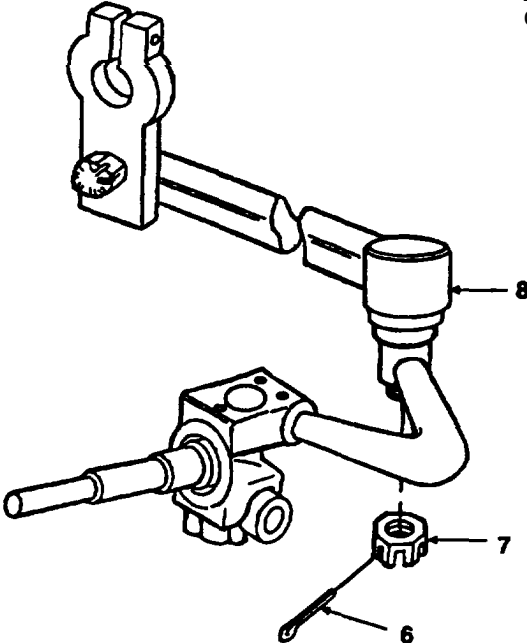
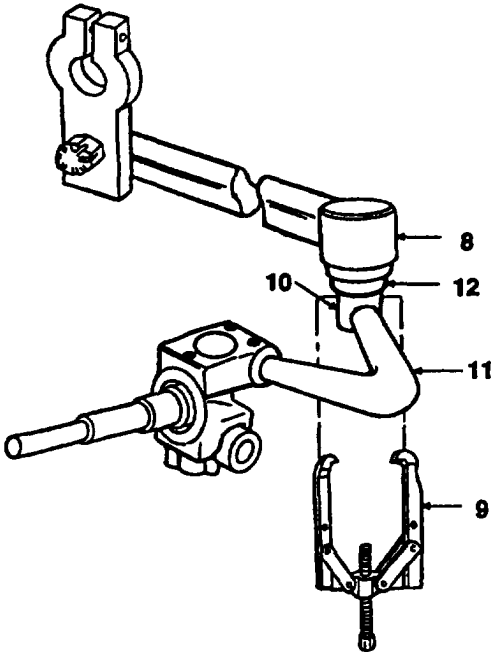
STEERING MECHANISM.

10-21.1. STEERING ARM MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. PREPARATION. 1. Perform front axle toe-in/toe-out check. (See paragraph 10-1 0). 2. Chock rear wheels. 3. Set parking brakes and break loose both front wheel lug nuts. 4. Lift front of vehicle off ground and secure with floor jacks. 5. Remove both front wheels. IAW TM 9-2320-273-10. 6. Turn steering wheel fully left.		
B. DISASSEMBLY. 1. Brake line (1), left front brake chamber (2) and fitting (5). 2. Three bolts (4), bracket and king pin cover plate (3). Disconnect and remove. Remove. Do not discard. Move bracket and brake line to one side. Cover exposed fitting hole.		
		

STEERING MECHANISM.

10-21.1. STEERING ARM MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. DISASSEMBLY (Continued)		
3. Cotter pin (6), castle nut (7) and drag link (8).	Remove.	Discard cotter pin and castle nut.
		
4. Steering arm boss (10), drag link (8), steering arm (11), and dust boot (12).	Remove using puller tool (9).	Discard dust boot (12).
		

STEERING MECHANISM.

10-21.1. STEERING ARM MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. DISASSEMBLY (Continued)		
5. Cotter pin (13), castle nut (14), and steering arm (11).	Remove.	Discard cotter pin and castle nut.
 NOTE If push rod driver (15) does not align with steering arm (11), perform step (6) first, to permit more steering travel and alignment of tool.		
6. Push rod driver (15), steering arm (11), and knuckle housing (16).	Thread pushrod driver (15) squarely onto end of steering arm.	Drive steering arm out of knuckle housing.
7. Key (17)	Remove.	Discard.
8. Steering arm (11).	Remove.	Destroy. (Not for reuse)
9. Jam nut (18) and stop bolt (19).	Loosen nut and Remove bolt.	

STEERING MECHANISM.

10-21.1. STEERING ARM MAINTENANCE (Continued).

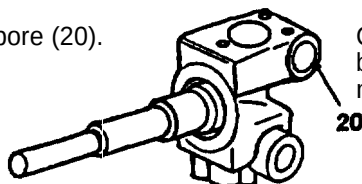
LOCATION/ITEM

ACTION

REMARKS

C. CLEANING AND INSPECTION.

Knuckle assembly bore (20).



Clean off rust, burrs, and foreign material.

Inspect for obvious damage.

D. ASSEMBLY**NOTE**

Before performing step 1 verify that a new key (17) is in place on the tapered end of the steering arm (11).

1. Steering arm (11)

Clean and install onto knuckle assembly (16).

2. Castle nut (14) and steering arm (11).

Install castle nut (14)

Place nut on threaded end of steering arm (11), and finger tighten. If dust boot (12) was removed during disassembly, install dust boot onto drag link (8) and insert into steering arm boss (10). Secure with castle nut (7) and finger tighten.

CAUTION

- Do not exceed 785 lb-ft (1064 N-m). Do not back off castle nut (14) during this step.
- Do not exceed 230 lb-ft (312 N-m). Do not back off castle nut (7) during this step.

3. Castle nut (14), steering arm cotter pin hole (14).

Torque castle nut.

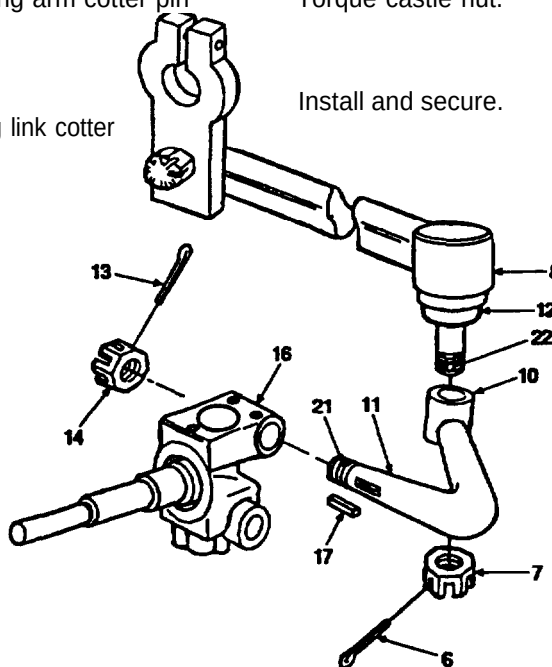
Torque to minimum of 560 lb-ft (759 N-m). Align with steering arm cotter pin hole.

4. Cotter pin (13)

Install and secure.

5. Castle nut (7) and drag link cotter pin hole (22).

Torque to minimum of 165 lb-ft (224 N-m), align and secure.



STEERING MECHANISM.**10-21.2. STEERING STOP INSPECTION AND ADJUSTMENT PROCEDURES.****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

- a. Inspection
- b. Adjustment

1/2 Hour Total.

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

M915

EQUIPMENT CONDITION**PARAGRAPH**

None

CONDITION DESCRIPTION

None

TEST EQUIPMENT

Analyzer, Power Steering, NSN 4910-01-160-3618
P/N J26487 (33287)

SPECIAL TOOLS

Pushrod Driver (fabricate IAW Section 10-21.1 G, page 10-85)
P/N DTA177323 (19207)
Puller, NSN 5120-00-595-9305
P/N GGG-P-781 (81348)
Torque Wrench, NSN 5120-00-221-7983
P/N SW130-301 (10001)
Multiplier, Torque Wrench NSN 5120-01-142-6941
P/N 392 (87641)
Steering Stop Template (fabricate IAW Section 10-21.1 G, page 10-85)

MATERIALS/PARTS(P/N)

Steering Arm Kit, 2MPS-3993 (78500)
Includes:
Cotter Pin, (MS24656-498 (96906)
Key, 16X202 (78500)
Nut, Drag Link/Steering Arm, MS35692-69 (96906)
Nut, Knuckle/Steering Arm, MS35692-1824 (96906)
Boot, Grease, 415172C1 (89346)
Steering Arm, 3133-G-6663 (78500)

PERSONNEL REQUIRED

One (MOS-63S)

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10
TM 9-2320-273-24&P
TM 9-2320-273-34

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Parking Brake Set.
Rear Wheels Chocked.

TROUBLESHOOTING REFERENCES

Table 10-2.

STEERING MECHANISM.

10-21.2. STEERING STOP INSPECTION AND ADJUSTMENT PROCEDURES (Continued).

LOCATION/ITEM

ACTION

REMARKS

NOTE

Check that alignment marks on the pitman arm steering gear sector shaft are in alignment before performing the steering stop adjustment procedure.

1. Template (23), steering knuckle housing (16), and three cover bolts (4).

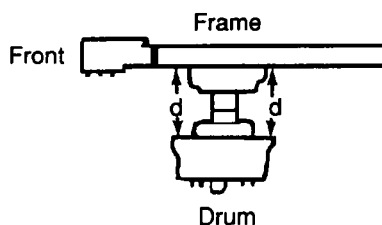
Install.

Put template on top of housing, and partially install bolts to position template.

2. Front brake drums (24).

Center and measure.

Make two measurements, the first at the forward side of the brake drum, measuring the distance "d" from the frame to the back of the brake drum. Then make the same measurement at the rear of the brake drum. Adjust as necessary to make the measurements equal.



3. Template (23).

Mark lines.

Put straight edge on zero degree reference line (25) and mark a line (26) across the king pin. Line (26) should be perpendicular to the line of travel (27).

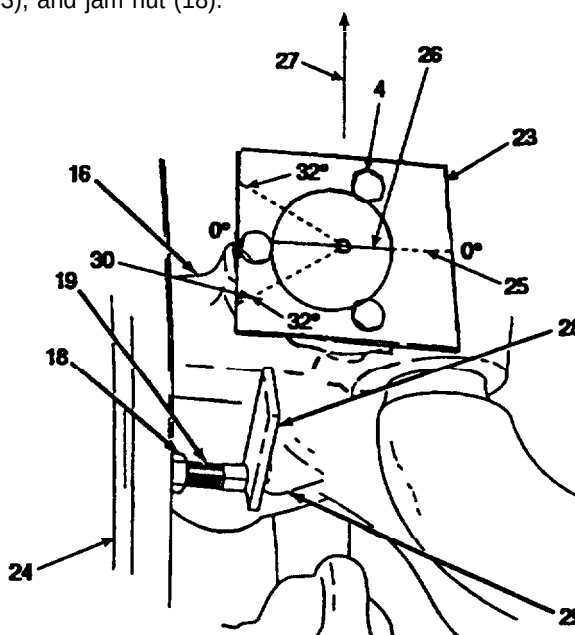
NOTE

A 1/8-inch spacer must be used when adjusting the steering stops in order to acquire the correct steer angle.

4. 1/8-inch spacer (28), steering stop bolt (19), steering stop boss (29), brake drum (24), king pin line (26), 32 degree reference line (30), template (23), and jam nut (18).

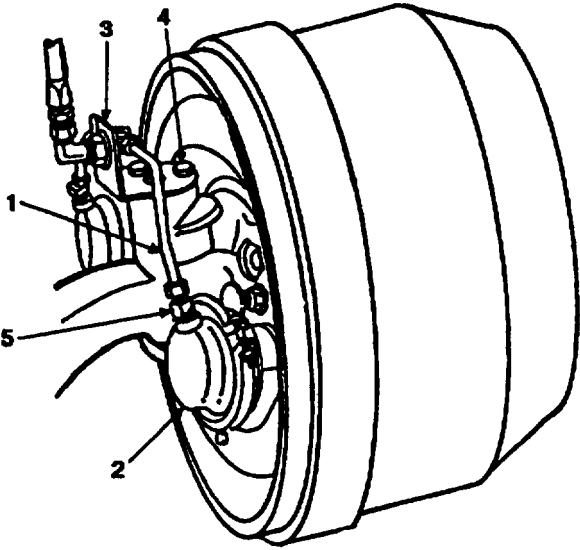
Position, adjust, and tighten.

Put spacer between steering stop bolt and steering stop boss, turn brake drum full left until king pin line aligns with 32 degree reference line on template. If the 32 degree reference line does not line up with the king pin line, adjust steering stop bolt. Tighten jam nut and remove spacer.



STEERING MECHANISM.

10-21.2. STEERING STOP INSPECTION AND ADJUSTMENT PROCEDURES (Continued).

LOCATION/ITEM	ACTION	REMARKS
NOTE Brake drum must be turned full right before performing step 6.		
6. Template (23).	Remove.	Perform same procedure (steps 1 thru 5) for the right side steering stop adjustment.
7. Fitting threads (5) and left front brake chamber (2).	Coat and install.	Coat threads using teflon sealant.
8. King pin cover plate and bracket (3), bolts (4) and fitting (5).	Install and secure onto knuckle assembly.	
		
9.		Paint new steering arm and touch Up IAW TB 43-0209. Grease the steering knuckle and drag link IAW LO 9-2320-273-12. Torque lug nuts IAW para 3-9.
10.		
11. Wheels and tires.	Install.	

STEERING MECHANISM.**10-21.3. STEERING GEAR POPPET ADJUSTMENT.****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

- a. Analyze
- b. Adjustment

 1/2 Hour Total.

<u>INITIAL SETUP</u>	<u>EQUIPMENT CONDITION</u>	<u>CONDITION DESCRIPTION</u>
<u>APPLICABLE CONFIGURATIONS</u>	<u>PARAGRAPH</u>	
M915	None	None
<u>TEST EQUIPMENT</u>		
Analyzer, Power Steering, NSN 4910-01-160-3618 P/N J26487 (33287)		
<u>SPECIAL TOOLS</u>		
Pushrod Driver (fabricate IAW Section 10-21.1 G, page 10-85) P/N DTA177323 (19207) Puller, NSN 5120-00-595-9305 P/N GGG-P-781 (81348) Torque Wrench, NSN 5120-00-221-7983 P/N SW130-301 (10001) Multiplier, Torque Wrench NSN 5120-01-142-6941 P/N 392 (87641) Steering Stop Template (fabricate IAWSection 10-21.1 G, page 10-85)		
<u>MATERIAL/PARTS (P/N)</u>		
Steering Arm Kit, 2MPS-3993 (78500) Includes: Cotter Pin, (MS24656-498 (96906) Key, 16X202 (78500) Nut, Drag Link/Steering Arm, MS35692-69 (96906) Nut, Knuckle/Steering Arm, MS35692-1824 (96906) Boot, Grease, 415172C1 (89346) Steering Arm, 3133-G-6663 (78500)		
<u>PERSONNEL REQUIRED</u>		<u>SPECIAL ENVIRONMENTAL CONDITIONS</u>
One (MOS-63S)		Vehicle Parked on Level Ground.
<u>REFERENCE (TM)</u>		<u>GENERAL SAFETY INSTRUCTIONS</u>
TM 9-2320-273-10 TM 9-2320-273-24&P TM 9-2320-273-34		Engine OFF. Transmission in Neutral. Parking Brake Set. Rear Wheels Chocked.
<u>TROUBLESHOOTING REFERENCES</u>		
Table 10-2.		

STEERING MECHANISM

10-21.3. STEERING GEAR POPPET ADJUSTMENT (Continued).

LOCATION/ITEM

ACTION

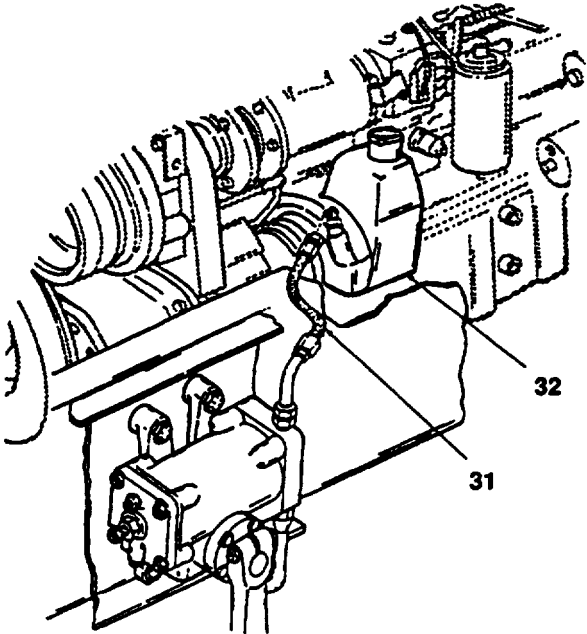
REMARKS

NOTE

The following procedure sets the steering gear poppet adjusting screws so that power steering system pressure is reduced before the steering stop bolts contact the axle beam boss.

1. Discharge line (31) on power steering pump (32).

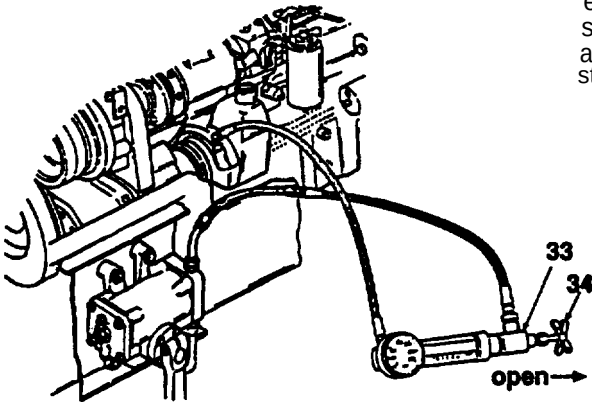
Remove line at pump side only.



2. Power steering analyzer (33) and valve (34).
3. Analyzer (33).

Install and fully open valve on analyzer.
Start engine.

Run at idle (600 rpm).
Cycle steering wheel full left and right 3-4 times to purge all air from analyzer and warm fluid. Shut off engine. Check power steering fluid level and adjust as necessary. Re-start engine.



STEERING MECHANISM.

10-21.3. STEERING GEAR POPPET ADJUSTMENT (Continued).

LOCATION/ITEM

ACTION

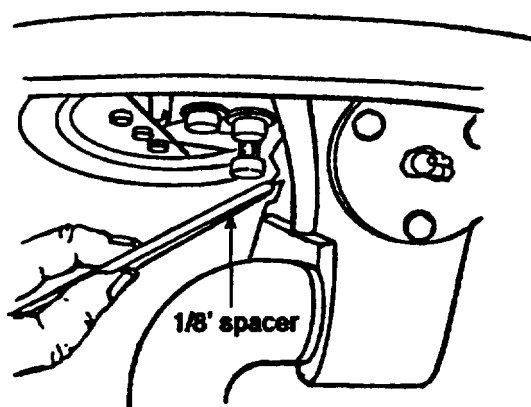
REMARKS

CAUTION

When setting poppets, do not hold steering in full lock position for more than 15 seconds. If full lock position is held for more than 15 seconds, excessive heat will build up in system and extensive damage may occur.

NOTE

Poppet adjusting screws are adjusted to relieve pressure at 32 degree steering angle. Make sure 1/8-inch (3mm) spacer is between steering knuckle stop screw and axle beam boss when adjusting poppet adjusting screws.



NOTE

The power steering pump has an internal system relief valve to limit maximum pump pressure to 1850-2050 psi (12756-14135 kPa). Observed operating pressure is variable and dependent on the resistance within the steering system (e.g. tire inflation, floor surface). Typically, system pressure will be approximately 1100-1500 psi (7585-10343 kPa) with properly inflated tires on concrete floor.

4. Rear poppet adjusting screw (35), and locknut (36).

Adjust, lock and tighten.

Note system operating pressure on analyzer as you turn wheel from straight ahead to full left. Pressure should be above 900 psi (6205 kPa) until the steering stop contacts the 1/8-inch spacer and steering stop boss, then drops to 400-900 psi (2758-6205 kPa). If observed operating pressure does not hold until the stop makes contact, back out the left side rear poppet adjusting screw.

STEERING MECHANISM.

10-21.3. STEERING GEAR POPPET ADJUSTMENT (Continued).

LOCATION/ITEM

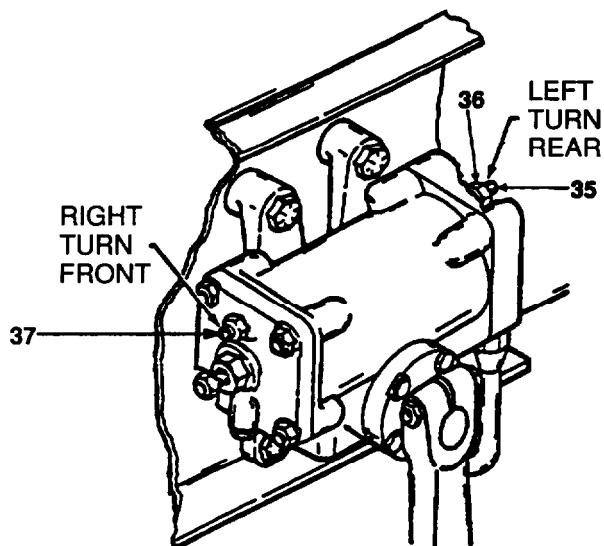
ACTION

REMARKS

4. Rear poppet adjusting screw (35), and locknut (36) (Continued).

Adjust, lock and tighten.

If system pressure does not relieve as the stop makes contact, turn poppet adjusting screw in. Leek poppet adjusting screw in this position by tightening nut. Torque to 12-18 lb-ft (16-23 N-m) and remove spacer.



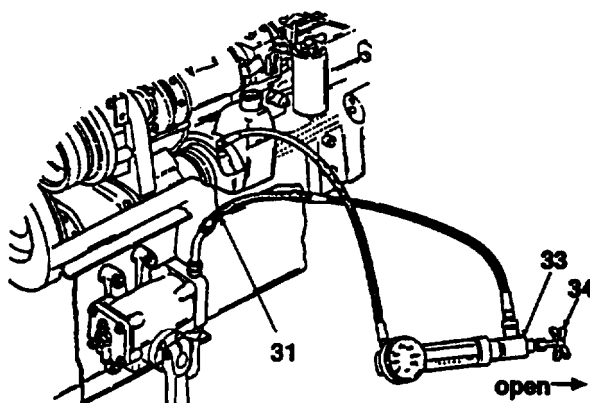
5. Right turn poppet adjusting screw (37)

Repeat step 4 for the right side poppet adjusting screw.

6. Engine
7. Power steering analyzer (33).
8. Discharge line (31).

Shut Off.
Remove.
Install onto power steering pump.

Cycle system and recheck fluid level.



STEERING MECHANISM.

10-21.4. FABRICATION OF PUSHROD DRIVER AND STEERING STOP TEMPLATE.

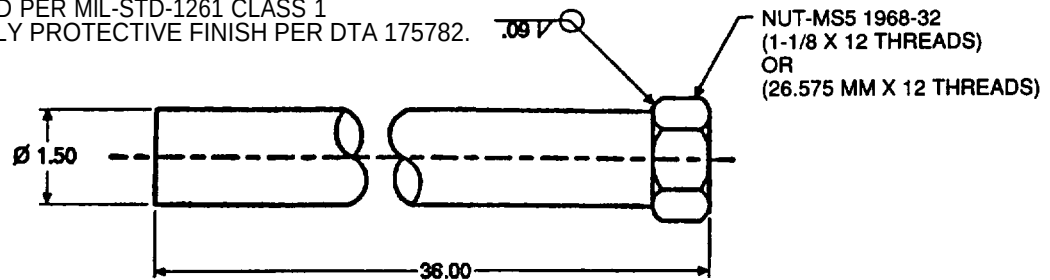
LOCATION/ITEM	ACTION	REMARKS
THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)		

a. Fabrication

1 Hour Total.

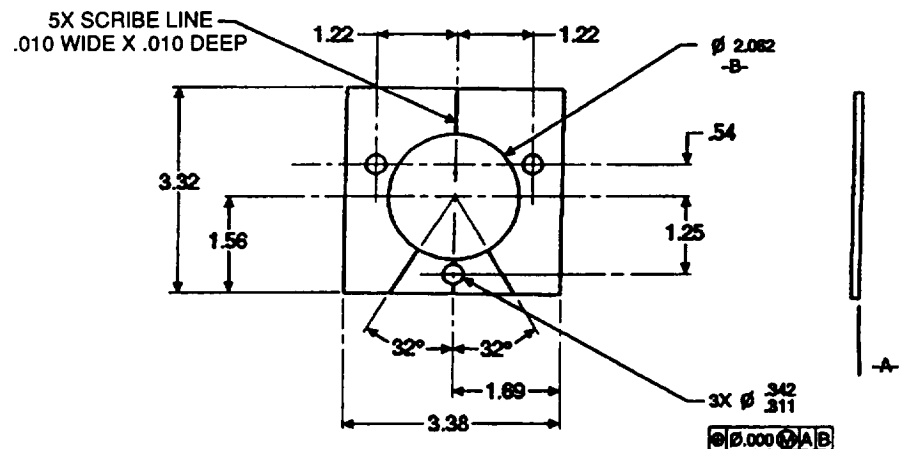
NOTES:

1. APPLICABLE STANDARDS:
 - A. DOD-STD-0010D (AR)
 - B. ANSI-Y14.5M-1982
2. MATERIAL: STEEL, CARBON, 1010-1025
SPEC ASTM A108 OR ASTM A576
3. ALL EDGES SHALL BE FREE FROM BURRS AND BROKEN .005-.030
4. WELD PER MIL-STD-1261 CLASS 1
5. APPLY PROTECTIVE FINISH PER DTA 175782.



NOTES:

1. APPLICABLE STANDARDS:
 - A. DOD-STD-00100D (AR)
 - B. ANSI-Y14.5M-1982
2. MATERIAL: ALUMINUM ALLOY SHEET 6061 -T6
SPEC QQ-A-250/11
.125 THICK
3. ALL EDGES SHALL BE FREE FROM BURRS AND BROKEN .005-.030



STEERING MECHANISM.**10-22. HYDRAULIC POWER STEERING PUMP AND COOLER MAINTENANCE.****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

a. Removal.	(20)
b. Inspection of Lines, Fittings, and Cooler.	(5)
c. Installation.	(20)
d. Filling and Bleeding System.	(10)
e. Steering Operational Check.	(5)
60 Minutes Total.	

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Plugs.
 Gasket, Adapter to Oil Pump (5330-01-071-5727).
 Silicone RTV Sealant (Refer to Appendix C).
 Power Steering Fluid (Refer to Appendix C).
 Snapring, 100475(15434).
 O-Ring, 008771-026 (19954).

EQUIPMENT CONDITION**PARAGRAPH**

11-14A or C.

11-16A.

4-18A.

CONDITION DESCRIPTION

Left Front Fender Removed.
 Grille Removed.
 Fuel Filter and
 Adapter Removed
 (M916 Thru M920 Only).

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10
 TM 9-2320-273-20P
 LO 9-2320-273-12

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
 Transmission in Neutral.
 Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 10-2.

STEERING AND ALINEMENT.

10-22. HYDRAULIC POWER STEERING PUMP AND OIL COOLER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
CAUTION Dirt may severely damage the power steering system. Make sure your work area is clean. Cover openings in the pump to keep dust out.		
A. REMOVAL. 1. Two capscrews (6) and washers (5). Remove. Push engine retarder switch (4) aside. LEGEND: 1. HOSE CLAMP 2. CAP 3. HYDRAULIC PUMP AND RESERVOIR ASSEMBLY 4. ENGINE RETARDER SWITCH 5. WASHER (2) 6. CAPSCREW (2) 7. OIL LINE 8. HOSE STRAP 9. WASHER 10. CAPSCREW 11. FITTING 12. HOSE (2) 13. FITTING (2) 14. HOSE 15. BOLT 16. LOCKWASHER 17. FLATWASHER 18. NUT AND WASHER (4) 19. HOSE RETAINER 20. BOLT AND LOCKWASHER (4) 21. OIL PUMP 22. HOSE CLAMP (2) 23. COOLER 24. COUPLING 25. SNAP RING 26. LOCKNUT (2) 27. O-RING 28. STUD (2) 29. CAPSCREW (2) 30. WASHER (2) 31. ADAPTER 32. GASKET		

TA 075003

STEERING AND ALINEMENT.

10-22. HYDRAULIC POWER STEERING PUMP AND COOLER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
2. Hydraulic pump and reservoir assembly (3).	Wipe away surface dirt and grease.	
NOTE Plug openings as soon as you disconnect lines.		
3. Two hose clamps (22).	Remove.	
4. Bolt (15), lockwasher (16) and flat washer (17).	Unscrew and remove hose retainer (19).	
5. Hose clamp (1).	Remove.	
6. Hose (14).	Remove from upper rear connection on hydraulic pump and reservoir assembly (3) and lower fitting on cooler (23).	Mark location for reassembly.
7. Two fittings (13) and one (11).	Unscrew and remove two hoses (12),	Mark locations for reassembly.
8. Four bolts and lockwashers (20),	Unscrew from four nuts and washers (18); remove cooler (23).	
9. Capscrew (10) and washer (9).	a. Unscrew and remove from hose strap (8). b. Push oil line (7) out of way.	
10. Two locknuts (26).	a. Unscrew and remove. b. Pull hydraulic pump and reservoir assembly (3) free from adapter (31), c. Throw away O-ring (27).	Remove from bottom through frame rail notch (M915). Remove from top over frame rail (M916 thru M920).
NOTE Coupling (24) may fall out when adapter (31) is removed. Do not lose it.		
11. Snapping (25).	Remove from coupling (24); slide coupling from shaft.	Throw away snapping.

STEERING AND ALINEMENT.

10-22. HYDRAULIC POWER STEERING PUMP AND COOLER MAINTENANCE (Continued).

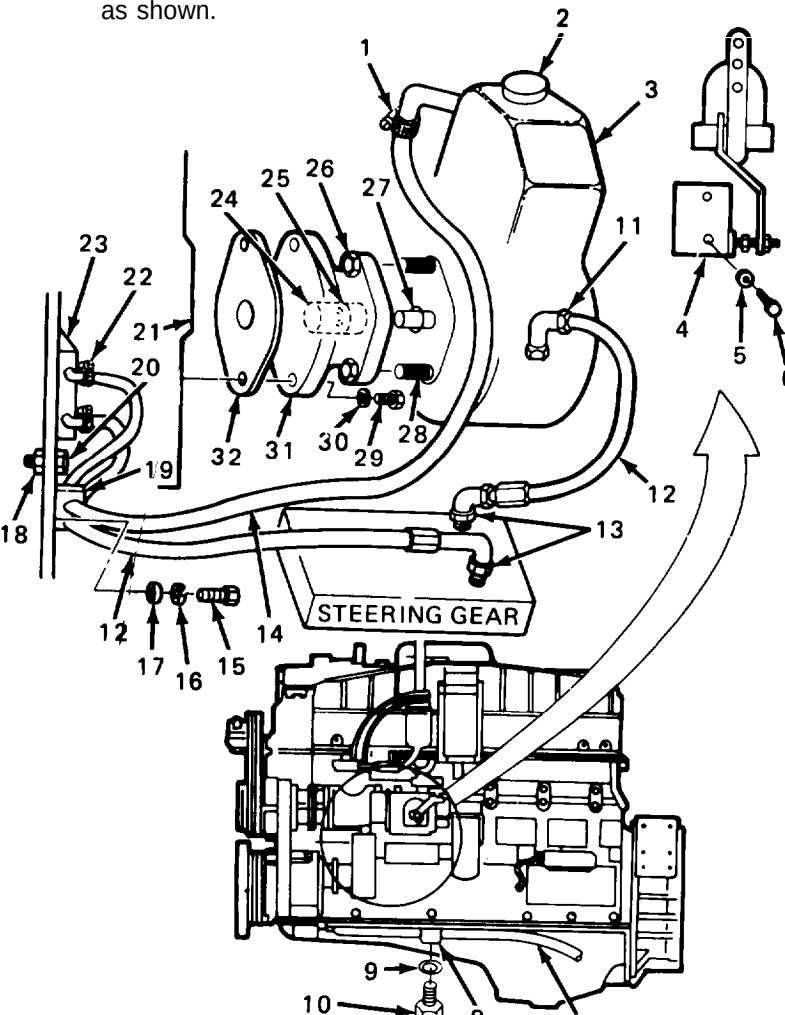
LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
12. Two capscrews (29) and washers (30).	a. Unscrew and remove. b. Remove adapter (31) from oil pump (21), c. Throw away gasket (32).	You may need to tap adapter (31) loose with a brass drift.
13. Two studs (28).	Unscrew from hydraulic pump and reservoir assembly (3).	
B. INSPECTION OF LINES, FITTINGS, AND COOLER.		
14. Two hoses (12) and one hose (14).	Inspect for: a. Cracks. b. Discoloration/staining. c. Damaged fittings.	Replace as necessary.
LEGEND: 1. HOSE CLAMP 2. CAP 3. HYDRAULIC PUMP AND RESERVOIR ASSEMBLY 4. ENGINE RETARDER SWITCH 5. WASHER (2) 6. CAPSCREW (2) 7. OIL LINE 8. HOSE STRAP 9. WASHER 10. CAPSCREW 11. FITTING 12. HOSE (2) 13. FITTING (2) 14. HOSE 15. BOLT 16. LOCKWASHER 17. FLATWASHER 18. NUT AND WASHER (4) 19. HOSE RETAINER 20. BOLT AND LOCKWASHER (4) 21. OIL PUMP 22. HOSE CLAMP (2) 23. COOLER 24. COUPLING 25. SNAP RING 26. LOCKNUT (2) 27. O-RING 28. STUD (2) 29. CAPSCREW (2) 30. WASHER (2) 31. ADAPTER 32. GASKET		
		TA 075004

STEERING AND ALINEMENT.**10-22. HYDRAULIC POWER STEERING PUMP AND COOLER MAINTENANCE (Continued).**

LOCATION/ITEM	ACTION	REMARKS
B. INSPECTION OF LINES, FITTINGS AND COOLER (Continued).		
15. Oil cooler (23).	Inspect for: a. Bent or broken cooling fins and tubing, b. Debris lodged between fins.	Clean or replace as necessary.
C. INSTALLATION.		
16. Two studs (28),	Screw into hydraulic pump and reservoir assembly (3).	
17. Adapter (31).	a. Coat oil pump side with silicone RTV sealant. b. Put new gasket (32) on oil pump side. c. Attach to oil pump (21) with two capscrews (29) and washers (30).	
18. Coupling (24).	Slide on and install new snapping (25).	
19. Adapter (31).	a. Coat power steering pump side with silicone RTV sealant. b. Put new O-ring (27) in position.	
NOTE		
Before installing pump, be sure oil line (7) is pushed out of way.		
20. Hydraulic pump and reservoir assembly (3).	a. Hold with fill cap (2) on top and shaft pointed away from engine. Push up between frame and engine until shaft catches on frame (M915). b. Turn fill cap towards cab. Tilt shaft upwards. Lift into position.	On M916 thru M920, lift pump over frame rail and into position. Pump shaft may have to be turned slightly to aline splines in coupling (24).
21. Two locknuts (26).	Screw onto two studs (28) and tighten.	

STEERING AND ALINEMENT.

10-22. HYDRAULIC POWER STEERING PUMP AND COOLER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
C. INSTALLATION (Continued).		
22. Cooler (23).	a. Aline flange holes with those on front metal. b. Attach with four bolts and lockwashers (20), and four nuts and washers (18).	
23. Two hoses (12) and one hose (14).	a. Unplug openings. b. Fasten with two hose clamps (22), and one hose clamp (1) as shown. c. Screw in two hose fittings (13) and one fitting (11) as shown.	Install in locations marked upon removal.
LEGEND: 1. HOSE CLAMP 2. CAP 3. HYDRAULIC PUMP AND RESERVOIR ASSEMBLY 4. ENGINE RETARDER SWITCH 5. WASHER (2) 6. CAPSCREW (2) 7. OIL LINE 8. HOSE STRAP 9. WASHER 10. CAPSCREW 11. FITTING 12. HOSE (2) 13. FITTING (2) 14. HOSE 15. BOLT 16. LOCKWASHER 17. FLATWASHER 18. NUT AND WASHER (4) 19. HOSE RETAINER 20. BOLT AND LOCKWASHER (4) 21. OIL PUMP 22. HOSE CLAMP (2) 23. COOLER 24. COUPLING 25. SNAP RING 26. LOCKNUT (2) 27. O-RING 28. STUD (2) 29. CAPSCREW (2) 30. WASHER (2) 31. ADAPTER 32. GASKET		
		

TA 075005

STEERING AND ALINEMENT.

10-22. HYDRAULIC POWER STEERING PUMP AND COOLER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
C. INSTALLATION (Continued).		
24. Engine retarder switch (4).	Attach to fuel pump with two capscrews (6) and washers (5).	
25. Oil line (7).	Attach with capscrew (10), washer (9), and hose strap (8); tighten capscrew to 18 lb-ft (24 N·m).	
26. Hose retainer (19).	Install over hoses (12) and (14) to front metal with bolt (15), lockwasher (16), and flatwasher (17).	
D. FILLING AND BLEEDING SYSTEM.		
27. Fill cap (2).	a. Remove. b. Add fluid if needed.	Fluid should be checked when warm with engine off.
 Be prepared to add fluid to the system as soon as pump begins operating.		
28. Engine.	Start up (see TM 9-2320-273-10).	
29. Filler cap (2).	a. Watch fluid level. If it drops, add more fluid immediately. Continue until fluid stabilizes. b. Replace cap. c. Check for oil leaks.	
E. STEERING OPERATIONAL CHECK.		
30. Steering wheel.	Turn in both directions. Wheel should turn easily with no jogging,	
31. Engine.	Shut down (see TM 9-2320-273-10).	

STEERING AND ALINEMENT.

10-22. HYDRAULIC POWER STEERING PUMP AND COOLER MAINTENANCE (Continued).

LOCATION/ITEM

ACTION

REMARKS

NOTE

Follow-on maintenance required:

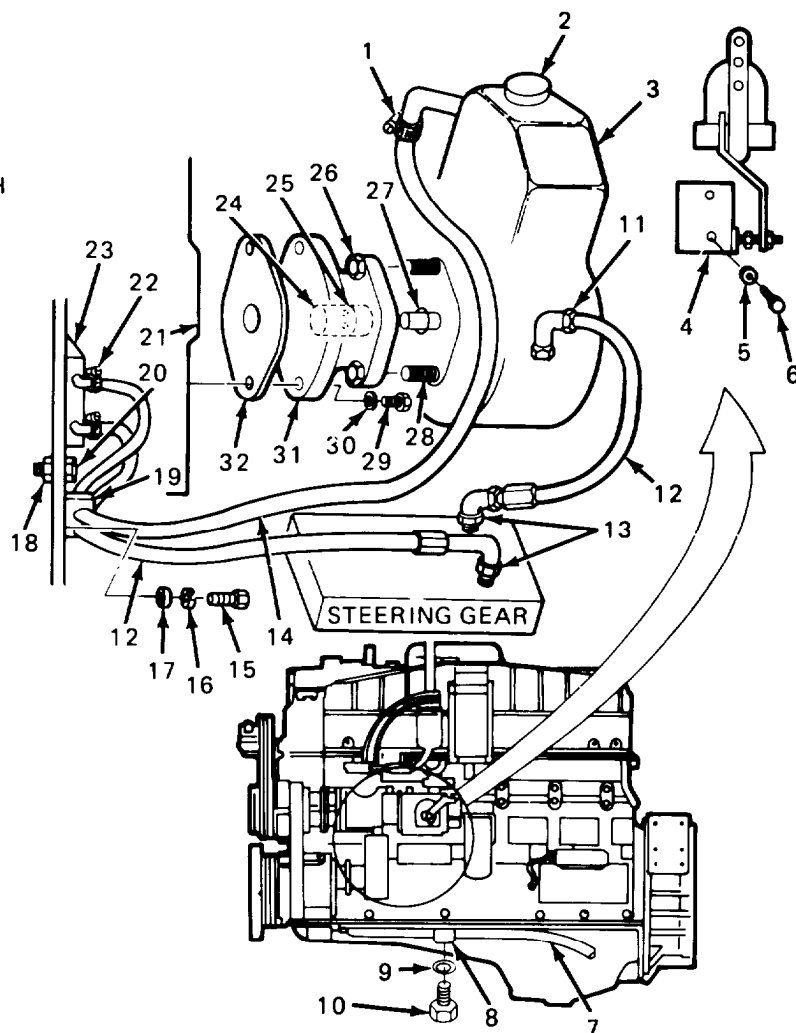
Install fender; refer to paragraph 11-14B OR D.

Install grille; refer to paragraph 11-16D.

Install fuel filter and adapter; refer to paragraph 4-18B (M916 thru M920).

LEGEND:

1. HOSE CLAMP
2. CAP
3. HYDRAULIC PUMP AND RESERVOIR ASSEMBLY
4. ENGINE RETARDER SWITCH
5. WASHER (2)
6. CAPSCREW (2)
7. OIL LINE
8. HOSE STRAP
9. WASHER
10. CAPSCREW
11. FITTING
12. HOSE (2)
13. FITTING (2)
14. HOSE
15. BOLT
16. LOCKWASHER
17. FLATWASHER
18. NUT AND WASHER (4)
19. HOSE RETAINER
20. BOLT AND LOCKWASHER (4)
21. OIL PUMP
22. HOSE CLAMP (2)
23. COOLER
24. COUPLING
25. SNAP RING
26. LOCKNUT (2)
27. O-RING
28. STUD (2)
29. CAPSCREW (2)
30. WASHER (2)
31. ADAPTER
32. GASKET



TA 075006

STEERING AND ALINEMENT.

10-22. HYDRAULIC POWER STEERING PUMP AND COOLER MAINTENANCE (Continued).

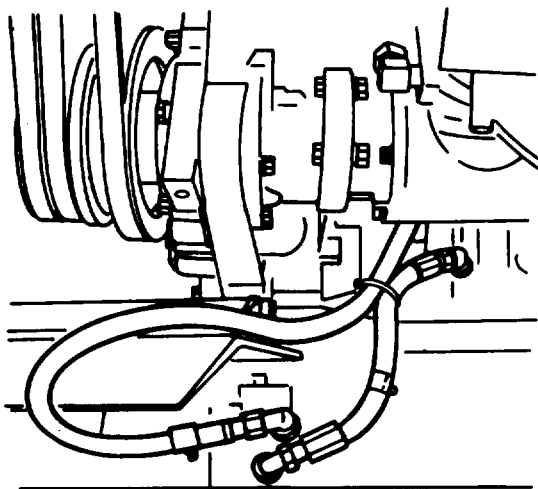
LOCATION/ITEM

ACTION

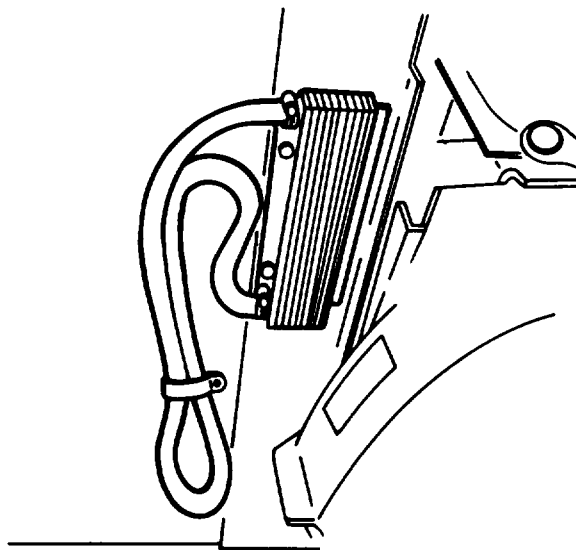
REMARKS

CAUTION

At temperatures at or below 0°F, the cooler must be disconnected from the power steering fluid system. Failure to do so may cause the cooler tubing to rupture. The proper procedure is to disconnect one hose (12) which runs from the steering gear to the cooler (20) and reconnect same to the hydraulic pump and reservoir assembly (3). Then, the hose from the cooler to the reservoir should be taken off and reconnected to the cooler input per illustration below.



PUMP TO STEERING
GEAR HOSE ROUTING



FLUID COOLER HOSE
ROUTING

TA 075007

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STEERING MECHANISM.**10-23. AUXILIARY CYLINDER (M916 THRU M920).****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

a. Removal.	(22)
b. Inspection.	(5)
c. Installation.	(30)
d. Operational Check.	<u>(5)</u>
62 Minutes Total.	

INITIAL SETUP**EQUIPMENT CONDITION****APPLICABLE CONFIGURATIONS****PARAGRAPH****CONDITION DESCRIPTION**

M916 Thru M920.

11-14C.

Right Front Fender
Removed.**TEST EQUIPMENT**

None.

SPECIAL TOOLS

None.

MATERIAL/PARTS (P/N)

Container, 1 Pint.
 Liquid Teflon (Refer to Appendix C).
 Power Steering Fluid (Refer to Appendix C).
 Cotter Pin, 103415 (24617).
 Cotter Pin, 103389 (24617).
 GAA (Refer to Appendix C).
 Cable Tie, PLT44-MO (06383).
 Cable Tie, MS-3367-2-0 (96906).

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.
 TM 9-2320-273-20P.
 LO 9-2320-273-12.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
 Transmission in Neutral.
 Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 10-2.

STEERING AND ALINEMENT.

10-23. AUXILIARY CYLINDER (M916 THRU M920) (Continued).

LOCATION/ITEM	ACTION	REMARKS
NOTE If lines (6) and (13) are to be removed entirely from vehicle, unscrew from bottom of steering gear.		
A. REMOVAL.		
1. Line (6).	Disconnect from elbow (14) and drain oil.	Approximately 1/2 pint.
2. Line (13).	Disconnect from elbow (14) and drain oil.	Approximately 1/2 pint.
3. Bolt (8), lockwasher (10) and nut (12).	Unscrew and remove two hose retainers (7) from bracket (9).	
4. Two cable ties (11).	Snip off.	Discard. Lines (6) and (13) may now be removed from vehicle, if needed.
LEGEND: 1. BALL JOINT 2. CLAMP NUT 3. CLAMP 4. CLAMP BOLT 5. CYLINDER 6. LINE 7. HOSE RETAINER (2) 8. BOLT 9. BRACKET 10. LOCKWASHER 11. CABLE TIE (2) 12. NUT 13. LINE 14. FITTING (2) 15. END CAP 16. SPRING 17. BALL CUP (2) 18. COTTER PIN 19. BALL JOINT 20. WASHER 21. NUT 22. COTTER PIN 23. NUT 24. STEERING ARM 25. RUBBER BOOT		
TO POWER STEERING GEAR FRONT CONNECTION TO POWER STEERING GEAR REAR CONNECTION GREASE FITTING GREASE FITTING GREASE FITTING		
TA 075008		

STEERING AND ALINEMENT.**10-23. AUXILIARY CYLINDER (M916 THRU M920) (Continued).**

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
5. Two fittings (14).	Unscrew and remove.	
6. Cotter pin (22).	Remove and throw away.	
7. Nut (23).	Remove.	
8. Ball joint (1).	Remove from steering arm (24), Tap out with hammer.	
9. Rubber boot (25).	Lift out of steering arm (24).	
10. Cotter pin (18).	Remove and throw away.	
11. End cap (15), spring (16), and outer ball cup (17).	Unscrew end cap (15) and remove cap, spring, and outer ball cup.	
12. Cylinder (5).	Line up ball portion of slot with head of ball joint (19) and remove from ball. Set cylinder (5) with ball joint (1) and clamp (3) on bench.	
13. Inner ball cup (17).	Remove from cylinder (5).	
14. Nut (21) and washer (20).	Remove from back side of ball joint (19) stud.	
15. Ball joint (19).	Remove from frame mounting plate.	
16. Clamp nut (2).	See NOTE below, then unscrew from clamp bolt (4) and remove clamp (3).	
NOTE		
Before proceeding with step (17), count number of threads showing between ball joint (1) and cylinder (5) on cylinder shaft for installation.		
17. Ball joint (1).	Unscrew from shaft on cylinder (5).	
B. INSPECTION.		
18. Ball joint (1).	Inspect for wear.	Replace as necessary.
19. Ball joint (19).	Inspect for wear.	Replace as necessary.
20. Steering arm (24).	Inspect for wear.	Replace as necessary.

STEERING AND ALINEMENT.

10-23. AUXILIARY CYLINDER (M916 THRU M920) (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSPECTION (Continued).		
21. Cylinder (5).	Hole worn (out of round). Inspect for: a. Wear. b. Dents c. Cracks.	Replace as necessary.
22. Spring (16).	Inspect for coil breaks.	Replace as necessary.
23. Two ball cups (17).	Inspect for wear or scoring.	Replace as necessary.
24. Rubber boot (25).	Inspect for tears or cracking.	Replace as necessary.

LEGEND:

- BALL JOINT
- CLAMP NUT
- CLAMP
- CLAMP BOLT
- CYLINDER
- LINE
- HOSE RETAINER (2)
- BOLT
- BRACKET
- LOCKWASHER
- CABLE TIE (2)
- NUT
- LINE
- FITTING (2)
- END CAP
- SPRING
- BALL CUP (2)
- COTTER PIN
- BALL JOINT
- WASHER
- NUT
- COTTER PIN
- NUT
- STEERING ARM
- RUBBER BOOT

TO POWER STEERING GEAR FRONT CONNECTION

TO POWER STEERING GEAR REAR CONNECTION

GREASE FITTING

GREASE FITTING

GREASE FITTING

TA 075009

STEERING AND ALINEMENT.

10-23. AUXILIARY CYLINDER (M916 THRU M920) (Continued).

LOCATION/ITEM	ACTION	REMARKS
C. INSTALLATION.		
25. Ball joint (1).	Screw onto shaft of cylinder (5).	Screw on shaft until same number of threads that were showing on disassembly are showing now.
26. Clamp (3).	Slide over ball joint arm and secure with clamp bolt (4) and clamp nut (2).	
27. Ball joint (19).	Slide joint stud through the frame mounting plate. Use mallet if necessary.	
28. Nut (21) and washer (20).	a. Screw onto stud of ball joint (19) and tighten. b. Apply GAA to ball.	
29. Inner ball cup (17).	a. Apply GAA to cup surface. b. Slide into cylinder end until seated with cup surface facing out.	
30. Cylinder (5).	Line up ball portion of slot and slide over ball joint (19).	
31. Rubber boot (25).	Place in steering arm (24).	Small end down.
32. Ball joint (1).	Insert in steering arm (24).	
33. Nut (23).	Screw on until tight, then advance nut for cotter pin hole alinement.	
34. New cotter pin (22).	Insert through hole in stud of ball joint (1) and bend tabs over.	
35. Outer ball cup (17), spring (16) and end cap (15).	a. Apply GAA to ball face of cup (17) outer. b. insert outer cup into cylinder with cup face inward toward ball (19). c. Slide Spring (16) into cylinder and seat against outer cup flat face. d. Screw in cap (15) until flush. e. Aline cap slot with next cotter pin hole in cylinder.	

STEERING AND ALINEMENT.

10-23. AUXILIARY CYLINDER (M916 THRU M920) (Continued).

LOCATION/ITEM	ACTION	REMARKS
C. INSTALLATION (Continued).		
36. New cotter pin (18).	Install through cylinder end and bend over tabs.	
37. Two fittings (14).	Apply liquid teflon to threads; insert in cylinder and tighten; advance so that line end faces up.	
38. Line (6).	Install to one elbow (14) and tighten in position shown.	
39. Line (13).	Install to one elbow (14) and tighten in position shown.	
NOTE If lines (6) and (13) were removed from vehicle, install to bottom of steering gear in positions shown.		
LEGEND: 1. BALL JOINT 2. CLAMP NUT 3. CLAMP 4. CLAMP BOLT 5. CYLINDER 6. LINE 7. HOSE RETAINER (2) 8. BOLT 9. BRACKET 10. LOCKWASHER 11. CABLE TIE (2) 12. NUT 13. LINE 14. FITTING (2) 15. END CAP 16. SPRING 17. BALL CUP (2) 18. COTTER PIN 19. BALL JOINT 20. WASHER 21. NUT 22. COTTER PIN 23. NUT 24. STEERING ARM 25. RUBBER BOOT		
		TA 075010

STEERING AND ALINEMENT.**10-23. AUXILIARY CYLINDER (M916 THRU M920) (Continued).**

LOCATION/ITEM	ACTION	REMARKS
C. INSTALLATION (Continued).		
40. Two hose retainers (7).	Place over lines (6) and (13) and secure to bracket (9) with bolt (8), lockwasher (10), and nut (12).	
41. Two new cable ties (11).	Install around two lines (6) and (13) and front cross frame tube.	
42. Cylinder (5).	Lubricate with GAA at two ball joint grease fittings as shown.	
43. Power steering fluid level.	Check (refer to LO 9-2320-273-12).	
NOTE		
Follow on maintenance action required: Install fender; refer to paragraph 11- 14D.		
D. OPERATIONAL CHECK.		
44. Engine.	Start up.	Refer to TM 9-2320-273-10.
45. Wheels.	Turn all the way to left and to right.	
46. Cylinder (5), line (6) and line (13).	Check for leaks.	Tighten as necessary.
47. Engine.	Shut down.	Refer to TM 9-2320-273-10.

STEERING AND ALINEMENT.

10-23. AUXILIARY CYLINDER (M916 THRU M920) (Continued).

LOCATION/ITEM	ACTION	REMARKS
LEGEND: 1. BALL JOINT 2. CLAMP NUT 3. CLAMP 4. CLAMP BOLT 5. CYLINDER 6. LINE 7. HOSE RETAINER (2) 8. BOLT 9. BRACKET 10. LOCKWASHER 11. CABLE TIE (2) 12. NUT 13. LINE 14. FITTING (2) 15. END CAP 16. SPRING 17. BALL CUP (2) 18. COTTER PIN 19. BALL JOINT 20. WASHER 21. NUT 22. COTTER PIN 23. NUT 24. STEERING ARM 25. RUBBER BOOT TO POWER STEERING GEAR FRONT CONNECTION TO POWER STEERING GEAR REAR CONNECTION GREASE FITTING GREASE FITTING GREASE FITTING		

TA 075714

SUSPENSION SYSTEM.**10-24. FRONT AXLE SHOCK ABSORBERS MAINTENANCE.****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

- a. Removal. (10)
 b. Cleaning and inspection. (10)
 c. Installation. (10)
 30 Minutes Total.

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

M915.

EQUIPMENT CONDITION**PARAGRAPH**

None.

CONDITION DESCRIPTION

None.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

GAA (Refer to Appendix C).
 Shock Absorbers (2) (2540-00-740-961 7).
 Rubber Bushings (8) (6365-00-740-9618).
 Nonflammable Cleaning Solvent SD-2 (Refer to Appendix C).

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.
 TM 9-2320-273-20P.
 LO 9-2320-273-12.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
 Transmission in Neutral.
 Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 10-3.

SUSPENSION SYSTEM.

10-24. FRONT AXLE SHOCK ABSORBERS MAINTENANCE (Continued).

LOCATION/ITEM

ACTION

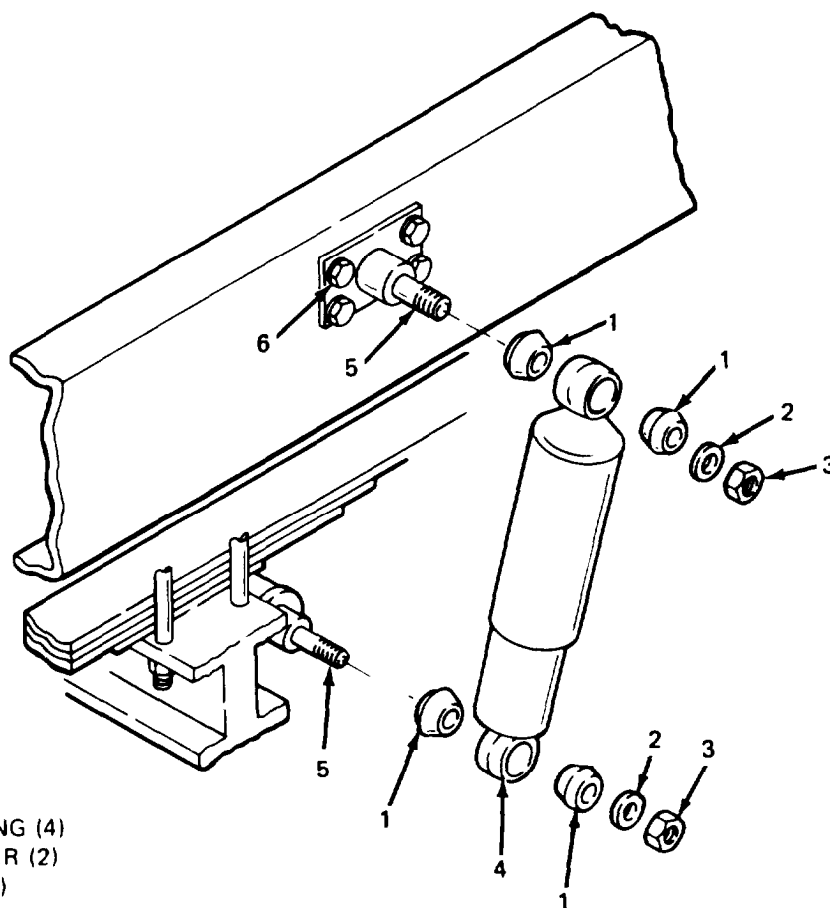
REMARKS

NOTE

- a. Shock absorbers should be replaced in pairs. Perform the following procedure twice, once on each side of the truck.
- b. Shock absorbers should be replaced if:
 1. Spring action is not dampened, indicating worn shock absorbers.
 2. Fluid leakage is noted on outer shock absorber surfaces; bottom section.
- c. Procedure is written based upon need for new shock absorbers.

LEGEND:

1. BUSHING (4)
2. WASHER (2)
3. NUT (2)
4. SHOCK
ABSORBER
5. SHAFT (2)
6. NUT, WASHER AND BOLT (4)



TA 075011

SUSPENSION SYSTEM.

10-24. FRONT AXLE SHOCK ABSORBERS MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Two nuts (3).	Unscrew and remove from axle and two shafts (5).	
2. Two washers (2), four bushings (1), and shock absorbers (4).	Remove.	
B. CLEANING AND INSPECTION.		
3. Clean and inspect shaft thread (5) and nuts (3).	a. Clean in solvent and blow dry. b. Apply GAA to threads.	Replace shafts if threads are worn or damaged. a. Replace upper shaft (5) by removing four bolts, nuts and washers. b. Notify Direct Support Maintenance for replacement of lower shaft (5).
C. INSTALLATION.		
4. Two new inner bushings (1).	Place on axle and two shafts (5) with large ends toward truck.	
5. New shock absorber (4).	Place against bushings on shafts (5).	
6. Two new outer bushings (1).	Place on axle and two shafts (5) with small ends toward shock absorber.	
7. Two washers (2) and nuts (3).	a. Screw on to shafts (5). b. Tighten nuts to 125-165 lb-ft (170-224 N·m).	

SUSPENSION SYSTEM.

10-24. FRONT AXLE SHOCK ABSORBERS MAINTENANCE (Continued).

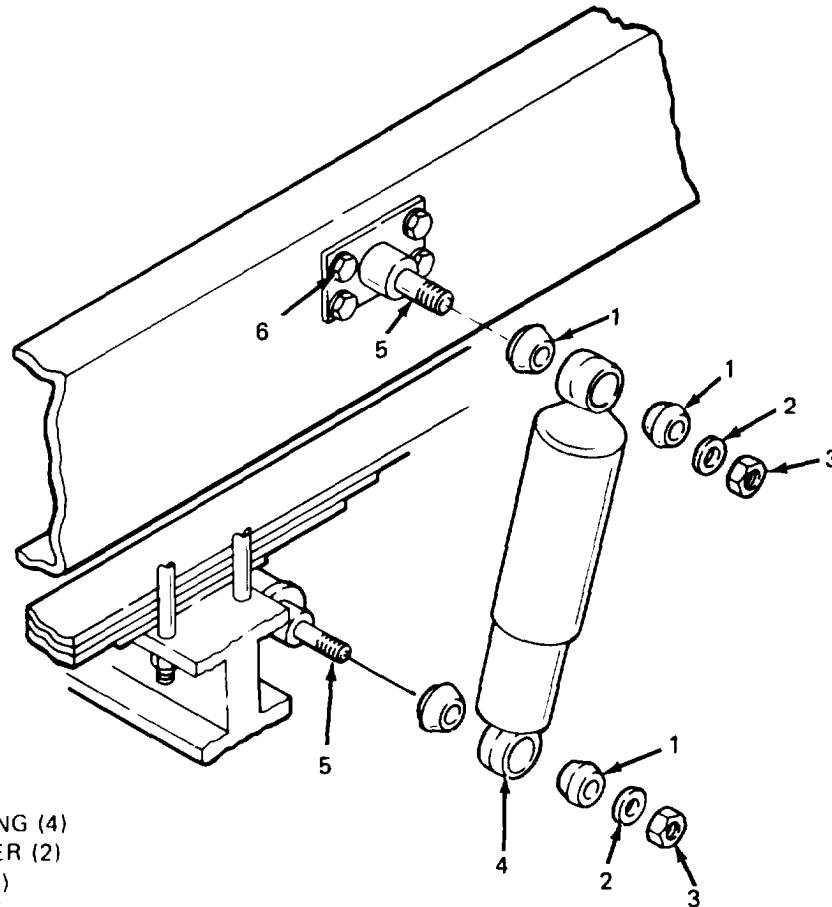
LOCATION/ITEM

ACTION

REMARKS

LEGEND:

1. BUSHING (4)
2. WASHER (2)
3. NUT (2)
4. SHOCK
ABSORBER
5. SHAFT (2)
6. NUT, WASHER AND BOLT (4)



TA 075012

SUSPENSION SYSTEM.**10-25. PUSHER AXLE SHOCK ABSORBERS MAINTENANCE.****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

- a. Removal. (10)
 b. Cleaning and Inspection. (10)
 c. Installation. (10)
 30 Minutes Total.

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

M917, M919, M920.

**EQUIPMENT CONDITION
PARAGRAPH**

None.

CONDITION DESCRIPTION

None.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Shock Absorbers (2) (2540-01 -011-061 4).
 Rubber Bushings (8) (6365-00-740-961 8).
 Nonflammable Cleaning Solvent SD-2 (Refer to Appendix C).

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.
 TM 9-2320-273-20P.
 LO 9-2320-273-12.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
 Transmission in Neutral.
 Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 10-3.

SUSPENSION SYSTEM.

10-25. PUSHER AXLE SHOCK ABSORBERS MAINTENANCE (Continued).

LOCATION/ITEM

ACTION

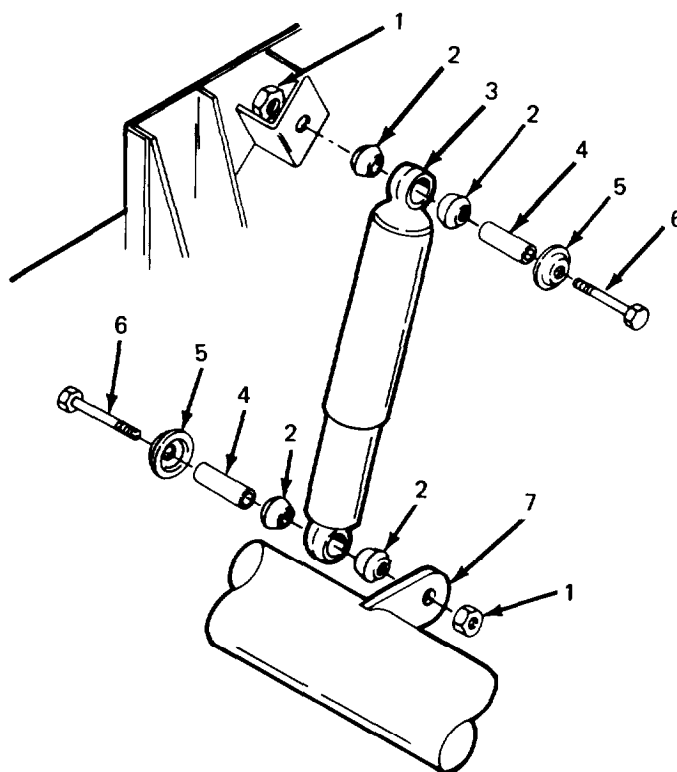
REMARKS

NOTE

Shock absorbers should be replaced in pairs. Perform the following procedures twice, once on each side of the truck. Shock absorbers should be replaced if spring action is not dampened or if fluid leakage is noted on outer shock absorber surfaces, bottom section. This procedure is based upon need for new shock absorbers.

LEGEND:

1. NUT (2)
2. BUSHING (4)
3. SHOCK ABSORBER
4. SLEEVE (2)
5. SPACER (2)
6. BOLT (2)
7. BRACKET



TA 075013

SUSPENSION SYSTEM.**10-25. PUSHER AXLE SHOCK ABSORBERS MAINTENANCE (Continued).**

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Two nuts (1).	Unscrew and remove.	
2. Four bushings (2), two spacers (5), two bolts (6), two sleeves (4) and shock absorber (3).	Pull bolt (6) out to disassemble spacers (4), bushings (2) and sleeves (4).	
B. CLEANING AND INSPECTION.		
3. Bolts (6) and nuts (1).	a. Soak in non-flammable solvent and wipe dry. b. Inspect threads for wear, chips, and crossed threads.	Replace as necessary.
C. INSTALLATION.		
4. Two new bushings (2) and sleeve (4).	Place in top end of shock absorber (3).	Small ends of bushings should face shock absorber.
5. New shock absorber (3) and spacer (5).	Attach to top bracket with nut (1) and bolt (6) in order illustrated.	
6. Two new bushings (2) and sleeve (4).	Place in bottom end of shock absorber (3).	Small ends of bushings should face shock absorber.
7. New shock absorber (3) and spacer (5).	Attach to bottom bracket (7) with nut (1) and bolt (6) in order illustrated.	

SUSPENSION SYSTEM.

10-25. PUSHER AXLE SHOCK ABSORBERS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
LEGEND: 1. NUT (2) 2. BUSHING (4) 3. SHOCK ABSORBER 4. SLEEVE (2) 5. SPACER (2) 6. BOLT (2) 7. BRACKET		

TA 075014

SUSPENSION SYSTEM.**10-26. TORQUE RODS MAINTENANCE.****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

- a. Removal (M915). (5)
- b. Removal (M916 Thru M920). (10)
- c. Cleaning and Inspection (All). (10)
- d. Installation (M915). (10)
- e. Installation (M916 Thru M920). (15)

50 Minutes Total.

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

EQUIPMENT CONDITION**PARAGRAPH**

None.

CONDITION DESCRIPTION

None.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Nonflammable Cleaning Solvent SD-2 (Refer to Appendix C).

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.
 TM 9-2320-273-20P.
 LO 9-2320-273-12.

GENERAL SAFETY INSTRUCTIONS

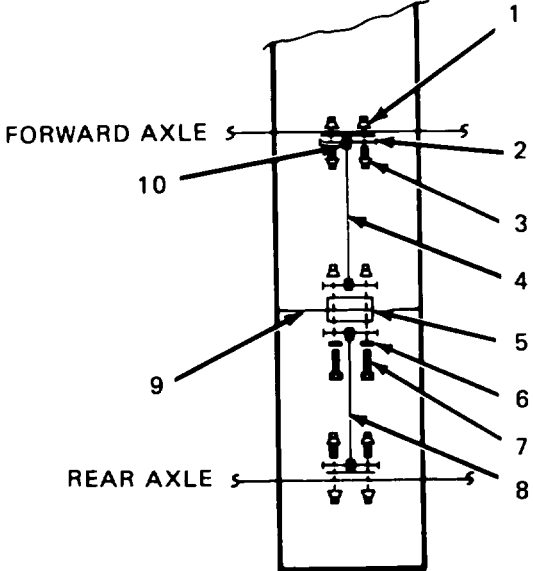
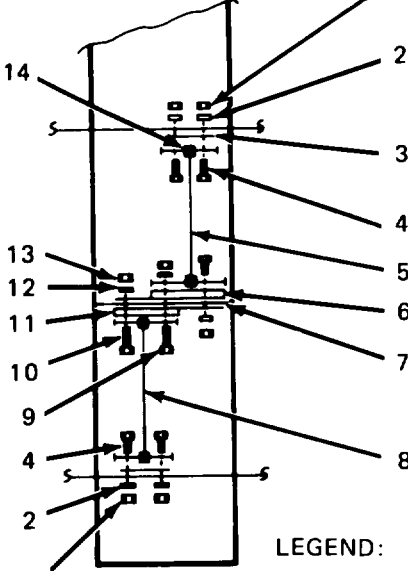
Engine OFF.
 Transmission in Neutral.
 Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 10-3.

SUSPENSION SYSTEM.

10-26. TORQUE RODS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (M915).		
1. Four washer base nuts (1) and four washer base bolts (3).	Unscrew and remove from two axle brackets (2) and torque rods (4) and (8).	
2. Two hex head bolts (7), two flat washers (6), and two washer base nuts (1).	Unscrew and remove from center torque rod connections at shim sets (5).	Shim sets (5) may drop from cross-member (9) when torque rods are removed.
3. Torque rods (4) and (8).	Remove.	
M915  REAR OF CHASSIS M916 thru M920  REAR OF CHASSIS LEGEND: 1. HEX NUT (7) 2. FLAT WASHER (7) 3. AXLE BRACKET (2) 4. BOLT (7) 5. TORQUE ROD 6. SHIM SET 7. CROSS MEMBER 8. TORQUE ROD 9. PLATE 10. RUBBER BUSHING (4) LEGEND: 1. HEX NUT (4) 2. FLAT WASHER (4) 3. AXLE BRACKET (2) 4. BOLT (4) 5. TORQUE ROD 6. SHIM SET 7. CROSS MEMBER 8. TORQUE ROD 9. BOLT 10. BOLT (2) 11. PLATE 12. FLAT WASHER (3) 13. HEX NUT (3) 14. RUBBER BUSHING (4)		

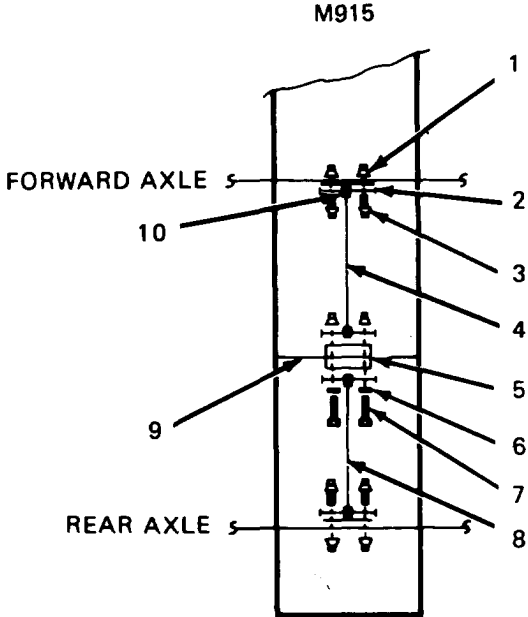
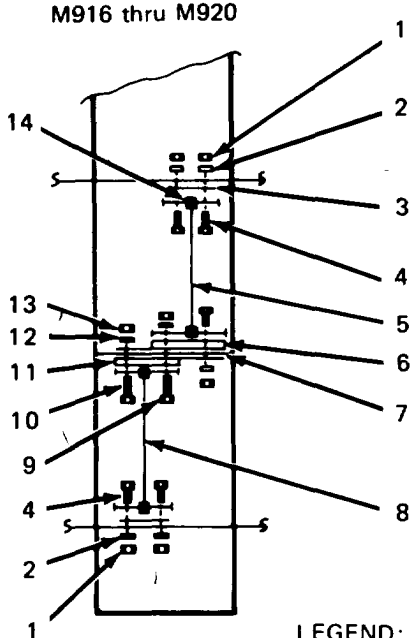
TA 075015

SUSPENSION SYSTEM.**10-26. TORQUE RODS MAINTENANCE (Continued).**

LOCATION/ITEM	ACTION	REMARKS
B. REMOVAL (M916 THRU M920).		
4. Four hex nuts (1), flatwashers (2), and bolts (4).	Unscrew and remove from two axle brackets (3) and torque rods (5) and (8).	
5. Two hex nuts (13), flatwashers (12), and bolts (10).	Unscrew and remove from center torque rod connections at shim sets (6).	Shim sets (6) may drop from cross-member (7) and cross-member plates (11) when torque rods are removed. Plates (11) are welded to cross-member (7).
6. Hex nut (13), flatwasher (12), and bolt (9).	Unscrew and remove from center torque rod connections at shim sets (6).	
7. Torque rods (5) and (8).	Remove.	
C. CLEANING AND INSPECTION (ALL).		
8. Fasteners (1), (2), and (4) plus shim block sets (5) (M915) or (6) (M916 thru M920).	Clean in solvent and wipe dry. Inspect for: a. Crossed threads. b. Burrs. c. Egg shaped holes (5) or (6).	Replace as necessary.
9. Torque rod rubber bushings (14).	Wipe clean and inspect for: a. Egg shaped bushing b. Deterioration and cracking.	
D. INSTALLATION (M915).		
10. Torque rods (4) and (8), shim block sets (5).	Aline mounting holes with those in cross member (9).	
11. Two hex head bolts (7), flat washer base nuts (1).	Install bolts through torque rods (4) and (8), shim block sets (5) and cross-member (9), washers and nuts as illustrated. Torque to 105 lb-ft (142 N·m).	

SUSPENSION SYSTEM.

10-26. TORQUE RODS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
D. INSTALLATION (M915) (Continued).		
12. Torque rod (4) and (8), axle brackets (2).	Aline mounting holes.	
13. Four washer base bolts (3) and washer base nuts (1).	Install bolts through outer torque rod ends and fasten to axle brackets (2) with nuts (1). Torque to 105 lb-ft (142 N·m).	
M915  REAR OF CHASSIS M916 thru M920  REAR OF CHASSIS LEGEND: 1. HEX NUT (7) 2. FLAT WASHER (7) 3. AXLE BRACKET (2) 4. BOLT (7) 5. TORQUE ROD 6. SHIM SET 7. CROSS MEMBER 8. TORQUE ROD 9. PLATE 10. RUBBER BUSHING (4) LEGEND: 1. HEX NUT (4) 2. FLAT WASHER (4) 3. AXLE BRACKET (2) 4. BOLT (4) 5. TORQUE ROD 6. SHIM SET 7. CROSS MEMBER 8. TORQUE ROD 9. BOLT 10. BOLT (2) 11. PLATE 12. FLAT WASHER (3) 13. HEX NUT (3) 14. RUBBER BUSHING (4)		

TA 075016

SUSPENSION SYSTEM.**10-26. TORQUE RODS MAINTENANCE (Continued).**

LOCATION/ITEM	ACTION	REMARKS
E. INSTALLATION (M916 THRU M920).		
14. Torque rods (5) and (8), shim block sets (6).	Aline mounting holes with those in cross member (7) and cross member plates (11).	
15. Three bolts (9) and (10), flatwashers (12) and hex nuts (13).	Install bolts through torque rods (5) and (8), shim block sets (6), cross member plates (11) and cross member (7) as illustrated. Install washers and nuts. Torque to 180 lb-ft (244 N·m).	
16. Torque rods (5) and (8), axle brackets (3).	Aline mounting holes.	
17. Four bolts (4), flat washers (2), and hex nuts (1).	Install bolts through outer torque rod ends and fasten to axle brackets (3) with washers (2) and nuts (1). Torque to 180 lb-ft (142 N·m).	

SUSPENSION SYSTEM.

10-26. TORQUE RODS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
M915 FORWARD AXLE REAR AXLE REAR OF CHASSIS LEGEND: 1. HEX NUT (7) 2. FLAT WASHER (7) 3. AXLE BRACKET (2) 4. BOLT (7) 5. TORQUE ROD 6. SHIM SET 7. CROSS MEMBER 8. TORQUE ROD 9. PLATE 10. RUBBER BUSHING (4) M916 thru M920 REAR OF CHASSIS LEGEND: 1. HEX NUT (4) 2. FLAT WASHER (4) 3. AXLE BRACKET (2) 4. BOLT (4) 5. TORQUE ROD 6. SHIM SET 7. CROSS MEMBER 8. TORQUE ROD 9. BOLT 10. BOLT (2) 11. PLATE 12. FLAT WASHER (3) 13. HEX NUT (3) 14. RUBBER BUSHING (4)		

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CHAPTER 11**FRAME, BODY AND CAB MAINTENANCE**

11-1. OVERVIEW.

This chapter provides you with the following information related to frame, body and cab maintenance:

- a. All required special tools and equipment.
- b. Other technical manuals.
- c. Troubleshooting procedures.
- d. Maintenance procedures.

CAUTION

- a. Do not drill holes in frame flanges.
- b. Do not weld frame.

Section I REPAIR PARTS, SPECIAL TOOLS, TMDE AND SUPPORT EQUIPMENT

11-2. COMMON TOOLS AND EQUIPMENT.

For authorized common tools and equipment, refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

11-3. SPECIAL TOOLS, TMDE, SUPPORT EQUIPMENT.

The special tools, TMDE and support equipment required for the frame, body and cab maintenance procedures described in this chapter are limited to the 1000-lb hoist and lift hook. (Refer to Organizational Maintenance RPSTL, TM 9-2320-273-20P for tool description and illustrations.)

11-4. SPARES AND REPAIR PARTS.

Spares and repair parts are listed and illustrated in the Repair Parts and Special Tools List covering Organizational Maintenance for this equipment (TM 9-2320-273-20P).

Section II TROUBLESHOOTING

11-5. INTRODUCTION.

Table 11-1 contains instructions for troubleshooting the frame components. The corrective actions describe how to fix a problem or refer to a procedure for fixing the problem. The Troubleshooting table is arranged by malfunctions in the following order:

FRAME :

- a. Towing pintle does not pivot or latch, or jaw is stuck (Malfunction No. 1).
- b. Excessive jerking of towed trailer (Malfunction No. 2).
- c. Excessive noise or popping sounds from fifth wheel when turning (Malfunction No. 3).

Table 11-1. Frame Troubleshooting Procedures.

MALFUNCTION.	TEST OR INSPECTION.	CORRECTIVE ACTION.
	1. TOWING PINTLE DOES NOT PIVOT OR LATCH, OR JAW IS STUCK: - Step 1. Check for proper lubrication. Lubricate (LO 9-2320-273-12). - Step 2. Check lock for damage. Replace (para 11-10). 2. EXCESSIVE JERKING OF TOWED TRAILER: - Step 1. Check for proper lubrication of fifth wheel. Lubricate (LO 9-2320-273-12). - Step 2. Check bolts and bracket on fifth wheel for tightness. Tighten, refer to torque table (para 3-9). - Step 3. Inspect coupler jaw and locks for damage. Replace fifth wheel (para 11-13). 3. EXCESSIVE NOISE OR POPPING SOUNDS FROM FIFTH WHEEL WHEN TURNING: - Step 1. Check for proper lubrication of fifth wheel. Lubricate (LO 9-2320-273-12). - Step 2. Check all mounting bolts on fifth wheel for tightness. Tighten, refer to torque table (para 3-9). - Step 3. Inspect locks for damage. Replace fifth wheel (para 11-13).	

Section III MAINTENANCE PROCEDURES

11-6. INTRODUCTION.

This section provides you with Organizational Level Maintenance procedures for the frame, body, and cab. To find a specific maintenance procedure, see one of the following task summaries.

- a.* Frame (para 11-7).
- b.* Body and Cab (para 11-8).

11-7. FRAME MAINTENANCE TASK SUMMARY.**INITIAL SETUP****APPLICABLE CONFIGURATIONS**

All.

EQUIPMENT CONDITION**PARAGRAPH**(See TM 9-2320-273-10).
11-16E.**CONDITION DESCRIPTION**Spare Wheel/Tire Removed.
Brush Guard Removed (M916
Thru M920).**TEST EQUIPMENT**

None.

TOOLS1,000 lb Hoist.
Lift Hook.
M916 and M920 5th Wheel Adjustment Tool (CT447ALX2).**MATERIALS/PARTS (P/N)**

Lithium (Chassis) Grease (Refer to Appendix C).	Sleeve (M915), 188-4-VM (97706).
Cotter Pin, 108656 (24617).	Sleeve (M916), S409-1SB (75535).
GAA (Refer to Appendix C).	Cable (M915), 1/8 x 15/7 x 19 (75535).
Cotter Pin, 773 (74410).	Cable (M916), 1/8 x 15 ft/7 x 19 (75535).

PERSONNEL REQUIRED

One MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)TM 9-2320-273-10.
LO 9-2320-273-12
TM 9-2320-273-20P.**GENERAL SAFETY INSTRUCTIONS**Engine OFF.
Transmission in Neutral.
Park Brake Set.**REFERENCES (TROUBLESHOOTING)**

Table 11-1.

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
1.	Bumper and Towing Eyes Maintenance:	11-9	11-1
	A. Removal.	11-9A	
	B. Installation.	11-9B	
2.	Pintle Maintenance (M915 thru M917 and M920) :	11-10	11-1
	A. Removal.	11-10A	
	B. Cleaning and Inspection.	11-10B	
	C. Installation.	11-10C	
	D. Lubrication and Adjustment.	11-10D	

11-7. FRAME MAINTENANCE TASK SUMMARY (Continued).			
LIST OF TASKS			
TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
3.	Spare Tire Hoist Cable (M915 and M916):	11-11	11-1
	A. Removal.	11-11A	
	B. Installation.	11-11B	
4.	Spare Tire Hoist Maintenance (M915 and M916)	11-12	11-1
	A. Removal.	11-12A	
	B. Installation.	11-12B	
5.	Fifth Wheel Maintenance:	11-13	11-1
	A. Removal.	11-13A	
	B. Lubrication.	11-13B	
	C. Adjustment.	11-13C	
	D. Installation.	11-13D	

11-8. BODY AND CAB MAINTENANCE TASK SUMMARY.**INITIAL SETUP****APPLICABLE CONFIGURATIONS**

All.

TEST EQUIPMENT

None.

TOOLS

None.

MATERIALS/PARTS (P/N)

Lubriplate (Refer to Appendix C).
 GAA (Refer to Appendix C).
 Non Flammable Cleaning Solvent (SD-2)
 (Refer to Appendix C).
 Cotter Pin, 137155 (24617)
 Rivet (10), SSLQ-66 (05693).
 Rivet (30), SSLQ-64 (05693).
 Grease Gun.
 Electrical Tape.
 Clean Container.
 Hose Tie (3), PLT 4H-MO (06363).
 Hoist.
 Jack Stands.

PERSONNEL REQUIRED

Two (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
 LO 9-2320-273-12.
 TM 9-2320-273-20P.

REFERENCES (TROUBLESHOOTING)

Table 4-1.

**EQUIPMENT CONDITION
PARAGRAPH**

11-26A.
 11-14A or C.
 11-20A and 11-21A.
 4-25A.
 4-42A.
 5-44A.

 11-16E.

 11-16A.
 11-32A.
 11-19A.
 11-9A.
 5-50A.

CONDITION DESCRIPTION

Heater Removed.
 Fenders Removed.
 Seats Removed.
 Air Cleaner Removed.
 Coolant Drained.
 Headlamp Assembly
 Removed.
 Brush Guard Removed
 (M916 Thru M920)
 Grille Removed.
 Hood Removed.
 Mud Flaps Removed.
 Tow Eyes Removed,
 Blackout Taillamps
 Removed.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
 Transmission in Neutral.
 Park Brake Set.

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
1.	Fender Maintenance:	11-14	
	A. Removal of Front Fender (M915).	11-14A	
	B. Installation of Front Fender (M915).	11-14B	
	C. Removal of Front Fender (M916 thru M920).	11-14C	
	D. Installation of Front Fender (M916 thru M920).	11-14D	
	E. Removal of Rear Fender.	11-14E	
	F. Installation of Rear Fender.	11-14F	

11-8. BODY AND CAB MAINTENANCE TASK SUMMARY (Continued).**LIST OF TASKS**

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
2.	Ventilator Maintenance:	11-15	
	A. Removal.	11-15A	
	B. Installation.	11-15B	
3.	Grille Maintenance:	11-16	
	A. Removal.	11-16A	
	B. Disassembly.	11-16B	
	C. Assembly.	11-16C	
	D. Installation.	11-16D	
	E. Brush Guard Removal.	11-16E	
	F. Brush Guard Installation.	11-16F	
4.	Optional Winter Front Maintenance:	11-17	
	A. Original Installation.	11-17A	
	B. Removal.	11-17B	
	C. Installation	11-17C	
5.	Grille Support Brackets Maintenance:	11-18	
	A. Removal.	11-18A	
	B. Installation.	11-18B	
6.	Mud Flaps Maintenance:	11-19	
	A. Removal.	11-19A	
	B. Installation.	11-19B	
7.	Driver's Seat Maintenance:	11-20	
	A. Removal.	11-20A	
	B. Cleaning and Lubricating of Hardware.	11-20B	
	C. Installation.	11-20C	
8.	Passenger's Seat Maintenance:	11-21	
	A. Removal.	11-21A	
	B. Cleaning and Lubricating Adjusting Mechanism.	11-21B	
	C. Installation.	11-21C	
9.	Seat Riser and Tool Box Maintenance:	11-22	
	A. Removal.	11-22A	
	B. Installation.	11-22B	

11-8. BODY AND CAB MAINTENANCE TASK SUMMARY (Continued).			
LIST OF TASKS			
TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
10.	Windshield Wiper and Blade Assembly Maintenance:	11-23	
	A. Removal.	11-23A	
	B. Installation.	11-23B	
	C. Operational Check.	11-23C	
11.	Windshield Wiper Arms Maintenance:	11-24	
	A. Removal.	11-24A	
	B. Installation.	11-24B	
	C. Operational Check.	11-24C	
12.	Rear View Mirror Maintenance:	11-25	
	A. Removal.	11-25A	
	B. Disassembly,	11-25B	
	C. Assembly.	11-25C	
	D. Installation.	11-25D	
	E. Adjustment.	11-25E	
13.	Heater Maintenance:	11-26	4-1
	A. Removal.	11-26A	
	B. Installation.	11-26B	
14.	Heater Hose Maintenance:	11-27	4-1
15.	Heater Control Panel Maintenance:	11-28	4-1
	A. Removal of Knob and Cable.	11-28A	
	B. Installation of Knob and Cable.	11-28B	
	C. Operational Check.	11-28C	
16.	Heater Control Valve Maintenance:	11-29	4-1
	A. Removal.	11-29A	
	B. Installation.	11-29B	

11-8. BODY AND CAB MAINTENANCE TASK SUMMARY (Continued).**LIST OF TASKS**

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
17.	Heater Air Ducts Maintenance:	11-30	4-1
	A. Removal.	11 -30A	
	B. Installation.	11-30B	
	C. Checking for Leaks.	11-30C	
18.	Data and Instruction Plates Maintenance:	11-31	
19.	Hood Maintenance:	11-32	
	A. Removal.	11-32A	
	B. Installation.	11-32B	
20.	Tail Roller Maintenance:	11-33	
	A. Removal.	11-33A	
	B. Installation.	11-33B	

FRAME.**11-9. BUMPER AND TOWING EYES MAINTENANCE.****THIS TASK COVERS: (Approximate TIME REQUIRED FOLLOWS TASK Description.)**

- a. Removal. (15)
 b. Installation. (15)
 30 Minutes Total.

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

**EQUIPMENT CONDITION
PARAGRAPH**

11-16E

CONDITION DESCRIPTIONBrush Guard Removed
(M916 Thru M920).**TEST EQUIPMENT**

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Cotter Pin, 108656 (24617).

PERSONNEL REQUIRED

Two (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.

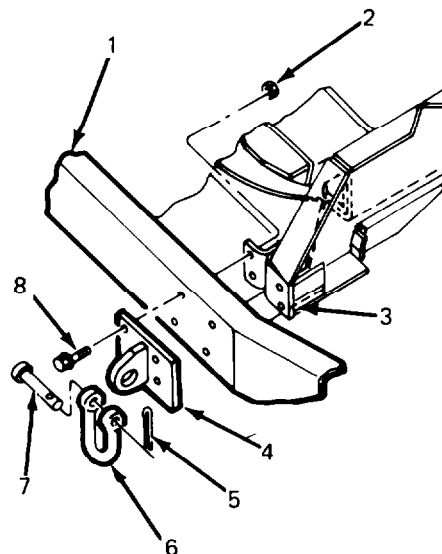
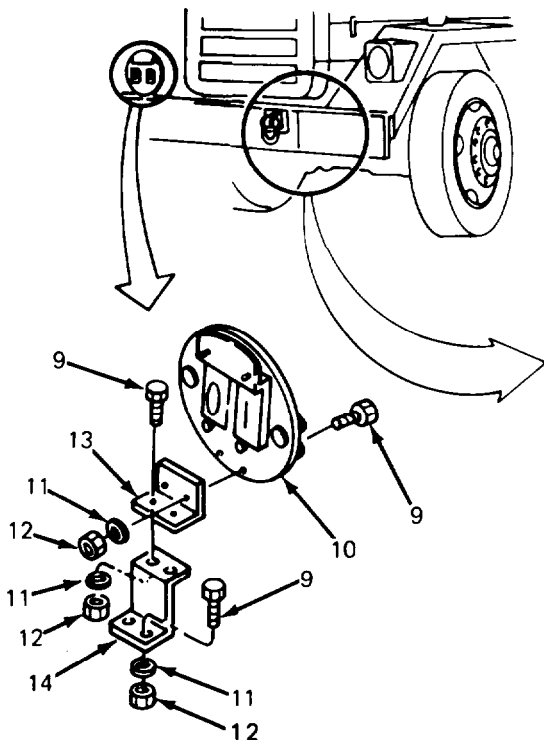
GENERAL SAFETY INSTRUCTIONSEngine Off.
Transmission In Neutral.
Park Brake Set.**TROUBLESHOOTING REFERENCES**

Table 11-1.

FRAME.

11-9. BUMPER AND TOWING EYES MAINTENANCE.

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Two cotter pins (5).	Remove and throw away.	
2. Clevis (6) and pin (7).	Slide pin (7) out and remove clevis (6).	
3. Four screws (9), washers (11), and nuts (12).	Unscrew and remove classification sign (10) and bracket (13).	M915 thru M920.
4. Two screws (9), washers (11), and nuts (12).	Unscrew and remove bracket (14).	M916 thru M920.
NOTE Before removing capscrews (8) support bumper to keep it from falling.		
5. Eight capscrews (8) and nuts (2).	Unscrew and remove.	If you want to change a single towing eye, remove only the four capscrews on that side.



LEGEND:

1. BUMPER
2. NUT (8)
3. FRONT EXTENSION (2)
4. TOWING EYE (2)
5. COTTER PIN (2)
6. CLEVIS (2)
7. PIN (2)
8. CAPSCREW (8)
9. CAPSCREW (6)
10. CLASSIFICATION SIGN
11. WASHER (6)
12. NUT (6)
13. BRACKET
14. BRACKET

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FRAME.

11-9. BUMPER AND TOWING EYES MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
6. Bumper (1) and two towing eyes (4).	a. Remove. b. Inspect for rust or damage.	Replace if necessary.
B. INSTALLATION.		
7. Bumper (1).	Put in place against front extension (3).	
8. Two towing eyes (4) and eight capscrews (8).	Put eyes in place and insert capscrews.	
9. Eight nuts (2).	Put on; tighten capscrews (8) and nuts (2).	
10. Clevis (6).	Position, slide in pin (7), and secure with new cotter pin (5).	
11. Bracket (14).	Install to bumper (1) with two screws (9), washers (11) and nuts (12).	M916 thru M920.
12. Bracket (13).	a. Install to bracket (14) with two screws (9), washers (11), and nuts (12).	M916 thru M920.
	b. Install to bumper (1) with two screws (9), washers (11), and nuts (12).	M915.
13. Classification sign (10).	Install to bracket (13) with two screws (9), washers (11), and nuts (12).	M915 thru M920.
Follow-on maintenance action required:		
Install brush guard (M916 thru M920 only); refer to para 11-16F.		

FRAME.

11-9. BUMPER AND TOWING EYES MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
		LEGEND: 1. BUMPER 2. NUT (8) 3. FRONT EXTENSION (2) 4. TOWING EYE (2) 5. COTTER PIN (2) 6. CLEVIS (2) 7. PIN (2) 8. CAPSCREW (8) 9. CAPSCREW (6) 10. CLASSIFICATION SIGN 11. WASHER (6) 12. NUT (6) 13. BRACKET 14. BRACKET

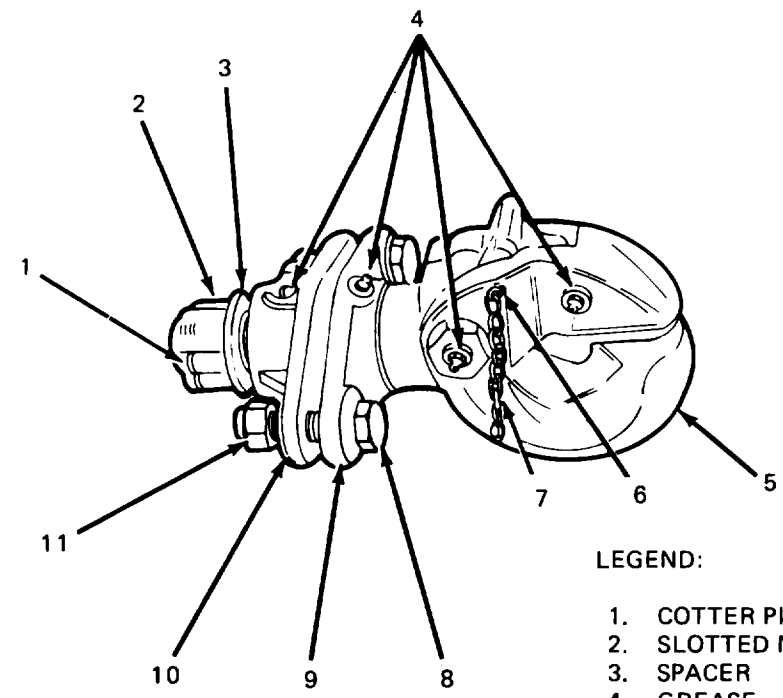
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FRAME.

11-10. PINTLE MAINTENANCE (M915 THRU M917 AND M920).		
THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)		
a. Removal.	(15)	
b. Cleaning and Inspection.	(15)	
c. Installation.	(20)	
d. Lubrication and Adjustment.	(15)	
65 Minutes Total.		
INITIAL SETUP APPLICABLE CONFIGURATIONS M915 Thru M917 and M920. TEST EQUIPMENT None. SPECIAL TOOLS None. MATERIALS/PARTS (P/N) Lithium (Chassis) Grease (Refer to Appendix C). Cotter Pin, 773 (74410). EQUIPMENT CONDITION PARAGRAPH None. CONDITION DESCRIPTION None. PERSONNEL REQUIRED One (MOS-63B20). SPECIAL ENVIRONMENTAL CONDITIONS Vehicle Parked on Level Ground. REFERENCES (TM) TM 9-2320-273-10. TM 9-2320-273-20P. LO 9-2320-273-12. GENERAL SAFETY INSTRUCTIONS Engine OFF. Transmission in Neutral. Park Brake Set. TROUBLESHOOTING REFERENCES Table 11-1.		

FRAME.

11-10. PINTLE MAINTENANCE (M915 THRU M917 AND M920) (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Cotter Pin (1).	Remove and discard.	
2. Slotted nut (2) and spacer (3).	a. Unscrew and remove. b. Remove hook assembly (5).	
NOTE If you do not need to remove brackets (9) go directly to step 6.		
 LEGEND: 1. COTTER PIN 2. SLOTTED NUT 3. SPACER 4. GREASE FITTING (4) 5. HOOK ASSEMBLY 6. COTTER PIN 7. CHAIN 8. CAPSCREW (2) 9. BRACKET (2) 10. WASHER (2) 11. NUT (2)		

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FRAME.

11-10. PINTLE MAINTENANCE (M915 THRU M917 AND M920) (Continued).		
LOCATION/ITEM	ACTION	REMARKS
<u>A. REMOVAL (Continued).</u>		
3. Two capscrews (8), washers (10), nuts (11).	a. Unscrew and remove. b. Remove two brackets (9).	
<u>B. CLEANING AND INSPECTION.</u>		
4. Cotter pin (6).	Remove from hook assembly (5) and spread jaws.	Check that chain (7) is securely riveted to hook assembly (5) and that links are not damaged.
5. All parts.	Clean and lubricate with diesel fuel or suitable light oil. inspect for signs of damage or wear and replace as necessary.	
<u>C. INSTALLATION.</u>		
6. Two brackets (9).	Hold in position.	
7. Two capscrews (8), washers (10) and nuts (11).	Screw in loosely.	Insure grease fittings face down.
8. Hook assembly (5).	Push through bracket (9) from back end.	
9. Spacer (3) and slotted nut (2).	Screw on loosely.	
10. Two capscrews (8) and nuts(11).	Tighten.	
<u>D. LUBRICATION AND ADJUSTMENT.</u>		
11. Cotter pin (6)	Install in hook assembly (5).	
12. Four grease fittings (4).	Apply grease with grease gun.	
13. Slotted nut (2).	a. Tighten until pintle hook binds when turned. b. Loosen just until hook turns with some resistance.	
14. New cotter pin (1).	a. Insert to hold slotted nut (2) in place. b. Spread ends.	

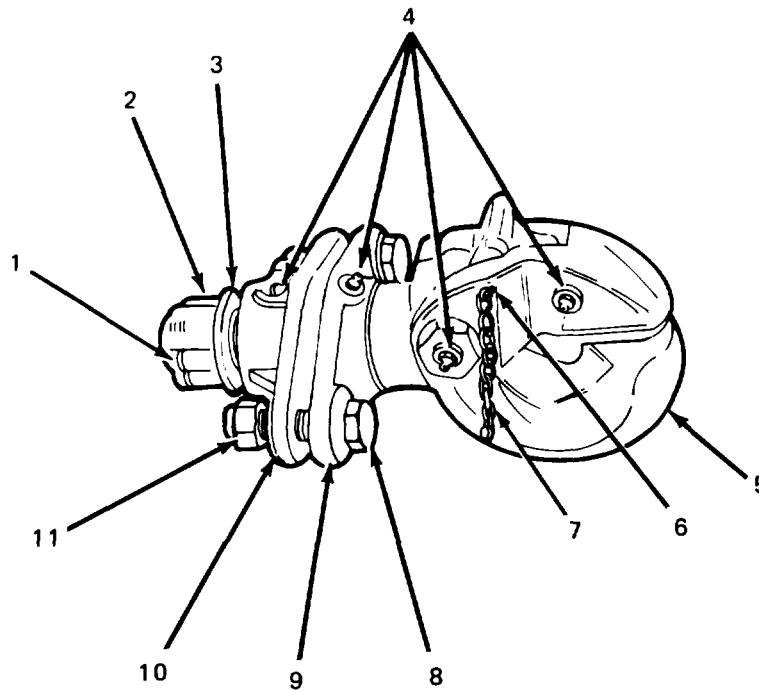
FRAME.

11-10. PINTLE MAINTENANCE (M915 THRU M917 AND M920) (Continued).

LOCATION/ITEM

ACTION

REMARKS



LEGEND:

1. COTTER PIN
2. SLOTTED NUT
3. SPACER
4. GREASE FITTING (4)
5. HOOK ASSEMBLY
6. COTTER PIN
7. CHAIN
8. CAPSCREW (2)
9. BRACKET (2)
10. WASHER (2)
11. NUT (2)

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FRAME.		
11-11. SPARE TIRE HOIST CABLE (M915 AND M916).		
THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)		
a. Removal. (5) b. Installation. (10) 15 Minutes Total.		
INITIAL SETUP	EQUIPMENT CONDITION	
APPLICABLE CONFIGURATIONS M915 and M916.	PARAGRAPH (See TM 9-2320-273-10).	CONDITION DESCRIPTION Spare Wheel and Tire Removed.
TEST EQUIPMENT None.		
SPECIAL TOOLS None.		
MATERIALS/PARTS (P/N) Sleeve (M915), 188-4-VN (97706). Sleeve (M916), S409-1SB (75535). Cable (M915), 1/8 x 15/7 x 19 (75535). Cable (M916), 1/8 x 15 ft/7 x 19 (75535).		
PERSONNEL REQUIRED One (MOS-63B20).	SPECIAL ENVIRONMENTAL CONDITIONS Vehicle Parked on Level Ground.	
REFERENCES (TM) TM 9-2320-273-10.	GENERAL SAFETY INSTRUCTIONS Engine OFF. Transmission in Neutral. Park Brake Set.	
TROUBLESHOOTING REFERENCES Table 11-1.		

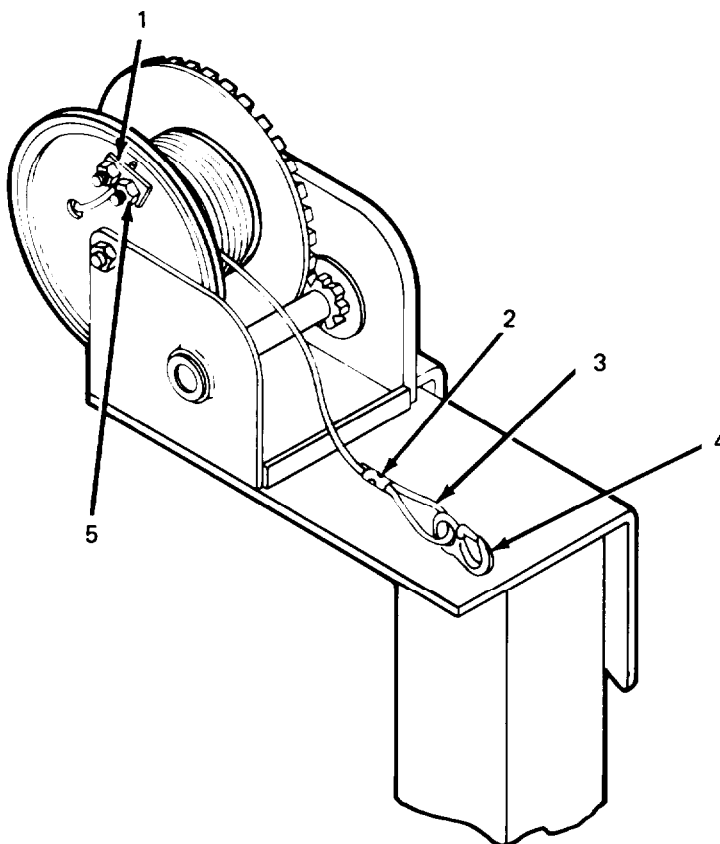
FRAME.

11-11. SPARE TIRE HOIST CABLE (M915 AND M916) (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Two nuts (5).	Loosen.	
2. Cable (3).	Unwind. Pull cable end out from under clamp (1) and remove.	
3. Hook (4).	Remove by cutting old cable (3).	
B. INSTALLATION.		
4. New cable (3).	Install sleeve (2), pass thru hook (4), place end of cable thru other side of sleeve (2) and secure with suitable crimping tool.	
5. Cable (3).	Insert under clamp (1).	
6. Two nuts (5).	Tighten.	

LEGEND:

1. CLAMP
2. SLEEVE
3. CABLE
4. HOOK
5. NUT (2)



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FRAME.**11-12. SPARE TIRE HOIST MAINTENANCE (M915 and M916).****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

- a. Removal (30)
 b. Installation. (35)
 65 Minutes Total.

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

M915 and M916.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

**EQUIPMENT CONDITION
PARAGRAPH**

(See TM 9-2320-273-10).

CONDITION DESCRIPTIONSpare Wheel and
Tire Removed.**PERSONNEL REQUIRED**

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.

GENERAL SAFETY INSTRUCTIONSEngine Off.
Transmission in Neutral.
Park Brake Set.**TROUBLESHOOTING REFERENCES**

Table 11-1.

FRAME.

11-12. SPARE TIRE HOIST MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Four screws (17), washers (22), and nuts (21).	Unscrew and remove frame (10) with assembled hoist from pedestal (26).	
2. Retaining ring(1).	Remove.	
3. Spring (2), handle (3), and disk (4).	Remove.	
		NOTE
		If M916 pedestal is to be serviced, remove one bolt and nut attaching thru frame rail.
LEGEND: 1. RETAINING RING 2. SPRING 3. HANDLE 4. DISK 5. RATCHET GEAR 6. BRAKE FACE 7. PINION SHAFT ASSEMBLY 8. RETAINING RING 9. BUSHING 10. FRAME & PLATE ASSEMBLY 11. BUSHING 12. LOCKNUT 13. RATCHET SPRING 14. RATCHET SPACER 15. RATCHET PAWL 16. RATCHET BOLT 17. MOUNTING SCREW (4) 18. DRUM ASSEMBLY 19. FRAME SPACER 20. LOCKNUT 21. MOUNTING NUT (4) 22. MOUNTING WASHER (4) 23. SCREW 24. PEDESTAL 25. TIE DOWN 26. PEDESTAL 27. NUT (2) 28. BOLT (2) 29. CARRIER 30. COTTER PIN 31. CLEVIS PIN 32. BOLT (2) 33. CABLE ROLLER (2) 34. WASHER (2) 35. NUT (2) 36. CLEVIS 37. TENSION ROD 38. NUT 39. NUT (2) 40. TENSION ROD SUPPORT ASSEMBLY		

TA 075023

FRAME.

11-12. SPARE TIRE HOIST MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
<u>A. REMOVAL (Continued).</u>		
4. Screw (23) and locknut (20).	Unscrew and remove frame spacer (19) and drum assembly (18).	
5. Retaining ring (8).	Remove, slide pinion shaft assembly (7) to side and remove brake face (6), and ratchet gear (5).	
6. Ratchet bolt (16) and locknut (12).	Unscrew and remove ratchet spring (13), ratchet spacer (14), and ratchet pawl (15).	
7. Bushings (9), and (11).	Remove.	
8. Cotter pin (30) and clevis pin (31).	Remove and unscrew clevis (36) from tension rod (37).	Discard cotter pin.
9. Three nuts (38) and (39).	Unscrew and remove tension rod (37) from tension rod support assy (40) and clevis (36).	Nut (38) attaches to clevis (36) and two nuts (39) attach at either side of tension rod support assy (40).
10. Tie down (25) and two pedestal mounting nuts (24).	Unscrew and remove pedestal (26).	
11. Two bolts (32), washers (34), and nuts (35).	Unscrew and remove two cable rollers (33).	
12. Two bolts (28) and nuts (27).	Unscrew and remove carrier (29).	
<u>B. INSTALLATION.</u>		
13. Carrier (29),	Install with two bolts (28) and nuts (27).	
14. Two cable rollers (33).	Install to pedestal (26) with two bolts (32), washers (34), and nuts (35).	
15. Pedestal (26).	Install with tie down (25) and two pedestal mounting nuts (24).	
16. Tension Rod (37).	Install with three nuts (38) and (39) to tension rod support assy (40) and clevis (36).	Nut (38) attaches to clevis (36) and two nuts (39) attach at either side of tension rod support assy (40).
17. Clevis (36).	Screw onto tension rod (37) and fasten to pedestal with clevis pin (31) and new cotter pin (30).	
18. Bushings (9) and (11).	Install in frame (10).	

FRAME.

11-12. SPARE TIRE HOIST MAINTENANCE (M915 and M916) (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION (Continued).		
19. Ratchet spring (13), ratchet spacer (14), and ratchet pawl (15).	Install to frame (10) with ratchet bolt (16) and locknut (12).	
20. Ratchet gear (5), brake face (6).	Install on pinion shaft (7), slide shaft (7) into frame (10), and fasten with retaining ring (8).	
21. Spacer (19) and drum (18).	Install to frame (10) with screw (23) and nut (20).	
22. Disk (4), handle (3), and spring (2).	Install on pinion shaft (7) and fasten with retaining ring (1).	
23. Frame (10) with assembled hoist.	Install to pedestal (26) with four screws (17), washers (22), and nuts (21).	
NOTE		
Follow on maintenance required:		
Install spare tire and wheel (see TM 9-2320-273-10).		
LEGEND:		28. BOLT (2) 29. CARRIER 30. COTTER PIN 31. CLEVIS PIN 32. BOLT (2) 33. CABLE ROLLER (2) 34. WASHER (2) 35. NUT (2) 36. CLEVIS 37. TENSION ROD 38. NUT 39. NUT (2) 40. TENSION ROD SUPPORT ASSEMBLY TA 075024
1. RETAINING RING	8. RETAINING RING	15. RATCHET PAWL
2. SPRING	9. BUSHING	16. RATCHET BOLT
3. HANDLE	10. FRAME & PLATE ASSEMBLY	17. MOUNTING SCREW (4)
4. DISK	11. BUSHING	18. DRUM ASSEMBLY
5. RATCHET GEAR	12. LOCKNUT	19. FRAME SPACER
6. BRAKE FACE	13. RATCHET SPRING	20. LOCKNUT
	14. RATCHET SPACER	21. MOUNTING NUT (4)
		22. MOUNTING WASHER (4)
		23. SCREW
		24. PEDESTAL
		25. TIE DOWN
		26. PEDESTAL
		27. NUT (2)

FRAME.

11-13. FIFTH WHEEL MAINTENANCE.		
THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)		
a. Removal. (15)		
b. Lubrication. (10)		
c. Adjustment. (10)		
d. Installation. (25)		
60 Minutes Total.		
INITIAL SETUP	EQUIPMENT CONDITION	
<u>APPLICABLE CONFIGURATIONS</u>	<u>PARAGRAPH</u>	<u>CONDITION DESCRIPTION</u>
M915, M916, M920	None.	None.
<u>TEST EQUIPMENT</u>		
None.		
<u>SPECIAL TOOLS</u>		
1,000 Lb Hoist.		
Lift Hook.		
M916 and M920 Fifth Wheel Adjustment Tool (CT447ALX2).		
<u>MATERIALS/PARTS (P/N)</u>		
GAA (Refer to Appendix C).		
<u>PERSONNEL REQUIRED</u>	<u>SPECIAL ENVIRONMENTAL CONDITIONS</u>	
One (MOS-63B20).	Vehicle Parked on Level Ground.	
<u>REFERENCES (TM)</u>	<u>GENERAL SAFETY INSTRUCTIONS</u>	
TM 9-2320-273-10.	Engine Off.	
TM 9-2320-273-20P.	Transmission In Neutral.	
LO 9-2320-273-12.	Park Brake Set.	
<u>TROUBLESHOOTING REFERENCES</u>		
Table 11-1.		

FRAME.

11-13. FIFTH WHEEL MAINTENANCE.

LOCATION/ITEM

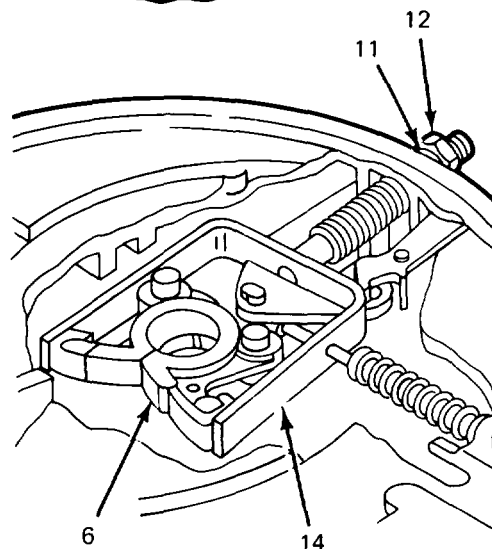
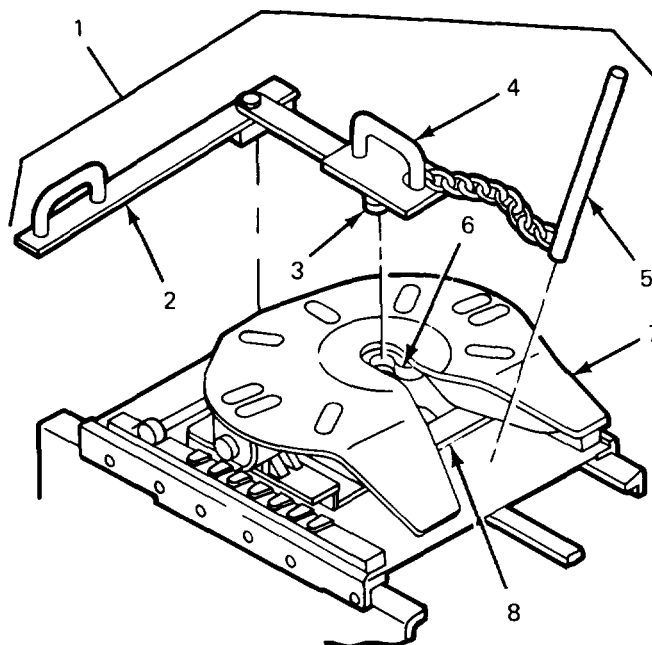
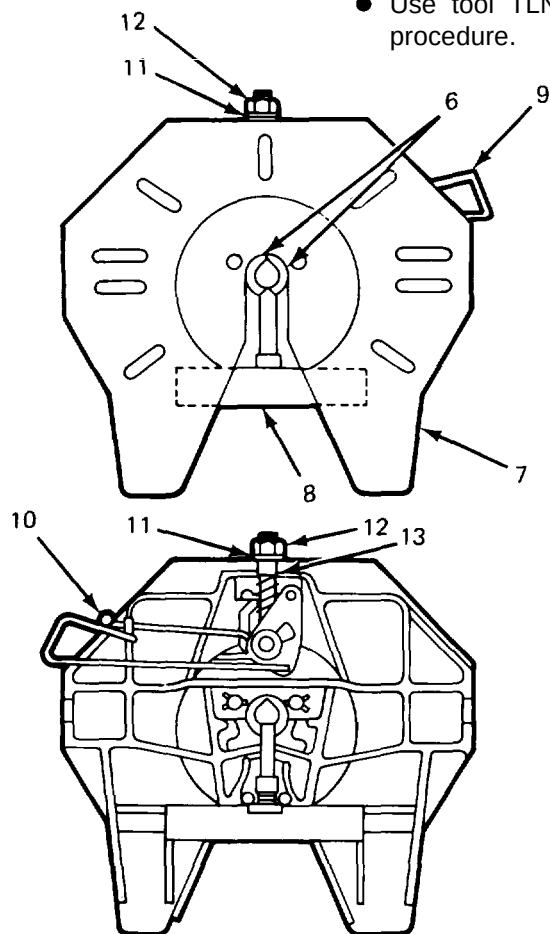
ACTION

REMARKS

A. ADJUSTMENT (M915 ONLY).

NOTE

- Clean 5th wheel thoroughly before making adjustment.
- Use tool TLN 1000 in the following procedure.



LEGEND:

1. FIFTH WHEEL LOCK TESTER	7. FIFTH WHEEL PLATE ASSY
2. LEVER	8. GROSS TIE
3. KING PIN	9. RELEASE HANDLE
4. KING PIN PLATE	10. SECONDARY LOCK HANDLE
5. BAR	11. LOCK ADJUSTING TAG
6. LOCK JAW (2)	12. HEXAGON HEAD NUT
	13. RUBBER BLOCK
	14. YOKE

TA 237248

FRAME.

11-13. FIFTH WHEEL MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. ADJUSTMENT (M915 ONLY) (Continued).		
NOTE		
To install the fifth wheel lock tester, the fifth wheel lock jaws must be open. Do step 1 to open lock jaws, if necessary.		
1. Secondary lock handle (10) release handle (9), and lock jaws (6).	a. Pull out secondary lock handle (10) until it catches on the 5th wheel plate assembly (7). b. Pull out release handle and pry open lock jaws (6).	
2. 5th wheel lock tester (1).	a. Grasp handle of king pin plate (4) and place king pin (3) into lock jaws (6). b. Place lever (2) over front of 5th wheel plate assembly (7). c. While pushing down on king pin plate (4), rotate lever (2), away from 5th wheel plate assembly (7) until king pin (3) is locked in lock jaws (6). d. Position bar (5) over edge of cross tie (8). e. Pry forward with lever (2) and rearward with bar (5) to check for play (1/8" (.31 cm) or less).	Be sure king pin plate (4) is flat against 5th wheel plate assembly (7) during this operation. Do step 3 to adjust lock jaws (6), if necessary.
3. Nut (11).	a. Turn nut counter-clockwise to allow for yoke (13) to slide down and reposition on the lock jaws (6). b. Tighten nut (11) until rubber block (12) fits snugly against the 5th wheel plate assembly, but still can be turned by hand.	If there is still play after adjusting lock jaws (6), refer to Direct Support and General Support Maintenance.
4. Fifth wheel lock tester (1).	a. Rotate lever (2) towards 5th wheel plate assembly (7). b. Position bar (5) on edge of cross tie (8), using leverage remove king pin (3) from lock jaws (6).	

FRAME.

11-13. FIFTH WHEEL MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. ADJUSTMENT (M915 ONLY) (Continued).		
NOTE Repeat this procedure to verify proper adjustment of fifth wheel. Follow-on maintenance action required: Re-lubricate as per LO 9-2320-273-12.		
B. ADJUSTMENT (M916 and M920 ONLY).		
NOTE ● Clean 5th wheel thoroughly before making adjustment. ● Use tool TLN 1500 in the following procedure.		

FRAME.

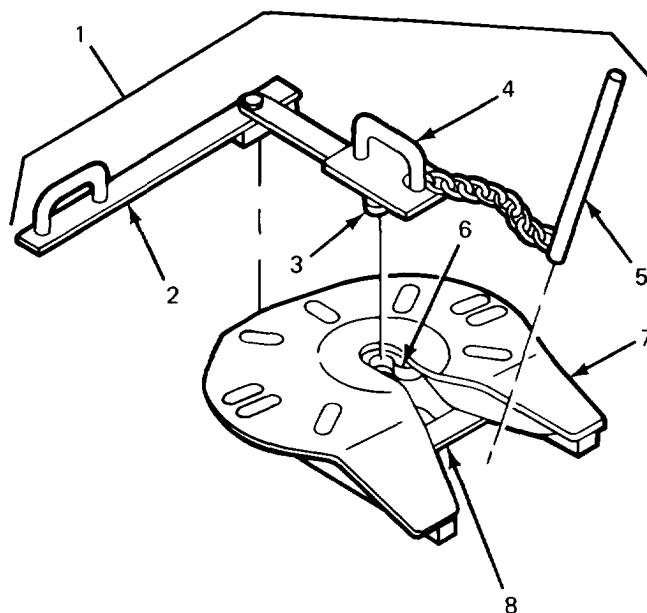
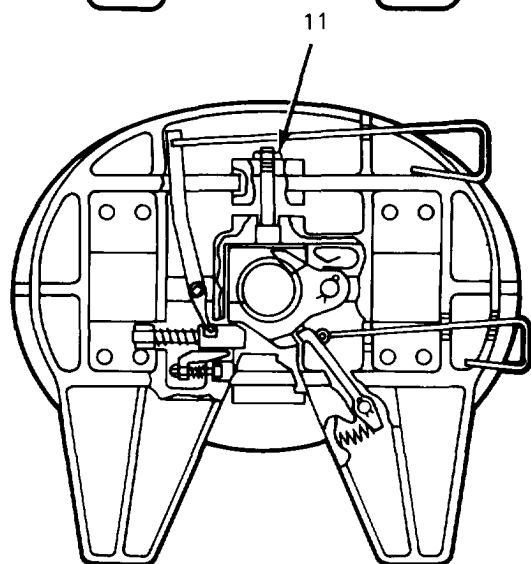
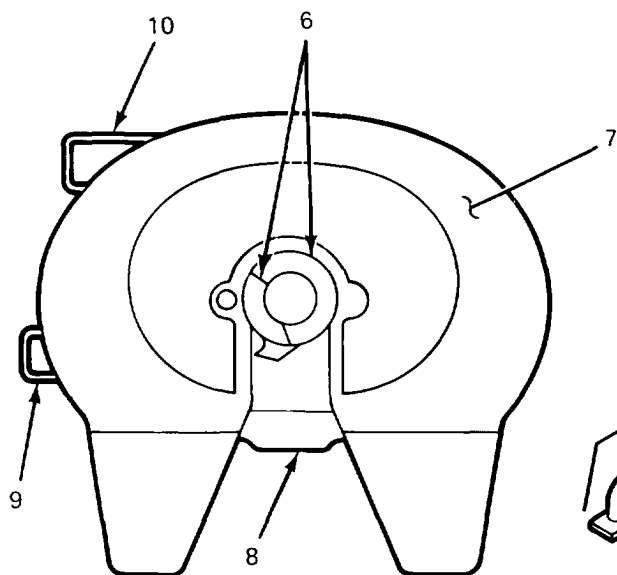
11-13. FIFTH WHEEL MAINTENANCE (Continued).

LOCATION/ITEM

ACTION

REMARKS

B. ADJUSTMENT (M916 and M920 ONLY) (Continued).



LEGEND:

- 1. FIFTH WHEEL LOCK TESTER
- 2. LEVER
- 3. KING PIN
- 4. KING PIN PLATE
- 5. BAR
- 6. LOCK JAW (2)

- 7. FIFTH WHEEL PLATE ASSY
- 8. CROSS TIE
- 9. RELEASE HANDLE
- 10. SECONDARY LOCK HANDLE
- 11. HEXAGON HEAD NUT

TA 237249

FRAME.

11-13. FIFTH WHEEL MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. ADJUSTMENT (M916 and M920 ONLY) (Continued).		
NOTE To install the fifth wheel lock tester, the fifth wheel lock jaws must be open. Do step 1 to open lock jaws, if necessary.		
1. Secondary lock handle (10), release handle (9) and lock jaws (6).	a. Pull out secondary lock handle (10), until it catches on 5th wheel plate assembly (7). b. Pull out release handle (9), and pry open lock jaws (6).	
2. Fifth wheel lock tester (1).	a. Grasp handle of king pin plate (4) and place king pin (3) into lock jaws (6). b. Place lever (2) over front of 5th wheel plate assembly. c. While pushing down on king pin plate (4), rotate lever (2) away from 5th wheel plate assembly (7) until king pin (3) is locked in lock jaws (6). d. Position bar (5) over edge of cross tie (8). e. Pry forward with lever (2) and rearward with bar (5) to check for play (1/8" (.31 cm) or less).	Be sure king pin plate (4) is flat against the 5th wheel plate assembly (7) during this operation. Do step 3 to adjust lock jaws (6), if necessary.
3. Hexagon head nut (11).	Tighten or loosen to obtain a snug fit against 5th wheel plate assembly (7).	If there is still play after adjusting lock jaws (6) refer to Direct Support and General Support Maintenance.
4. Fifth wheel lock tester (1).	a. Rotate lever (2) towards 5th wheel plate assembly (7). b. Position bar (5) on edge of cross tie (8), using leverage remove king pin (3) from lock jaws (6).	

FRAME.

11-13. FIFTH WHEEL MAINTENANCE (Continued).

LOCATION/ITEM

ACTION

REMARKS

B. ADJUSTMENT (M916 and M920 ONLY) (Continued).

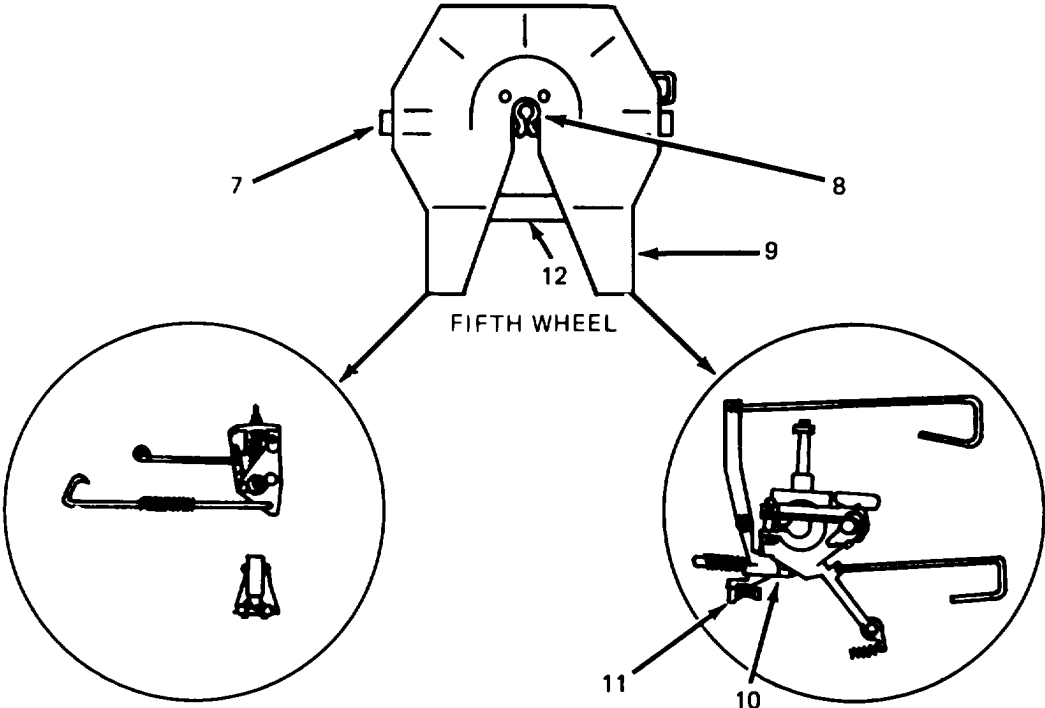
NOTE

Repeat this procedure to verify proper adjustment of fifth wheel.

Follow-on maintenance action required:
Re-lubricate as per LO 9-2320-273-12.

FRAME.

11-13. FIFTH WHEEL MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
 MODEL M915 MODELS M916 & M920 FIFTH WHEEL LEGEND: 7. LOCK 8. JAW 9. WHEEL PLATE SURFACE 10. CAPSCREW 11. SUPPORT PIN 12. FIFTH WHEEL CROSS BRACE		

TA 075030

BODY AND CAB.**11-14. FENDER MAINTENANCE.****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

a. Removal of Front Fender (M915).	(10)
b. Installation of Front Fender (M915).	(10)
c. Removal of Front Fender (M916 Thru M920).	(15)
d. Installation of Front Fender (M916 Thru M920).	(15)
e. Removal of Rear Fender.	(5)
f. Installation of Rear Fender.	(5)

60 Minutes Total.

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

EQUIPMENT CONDITION**PARAGRAPH**

5-44A

CONDITION DESCRIPTION

If damaged Front Fenders
are to be Removed:
Headlamp Assembly
Removed.

11-16E

Brush guard removed
(M916 thru M920).

PERSONNEL REQUIRED

Two (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.

GENERAL SAFETY INSTRUCTIONS

Engine Off.
Park Brake Set.
Transmission in Neutral.

TROUBLESHOOTING REFERENCES

None.

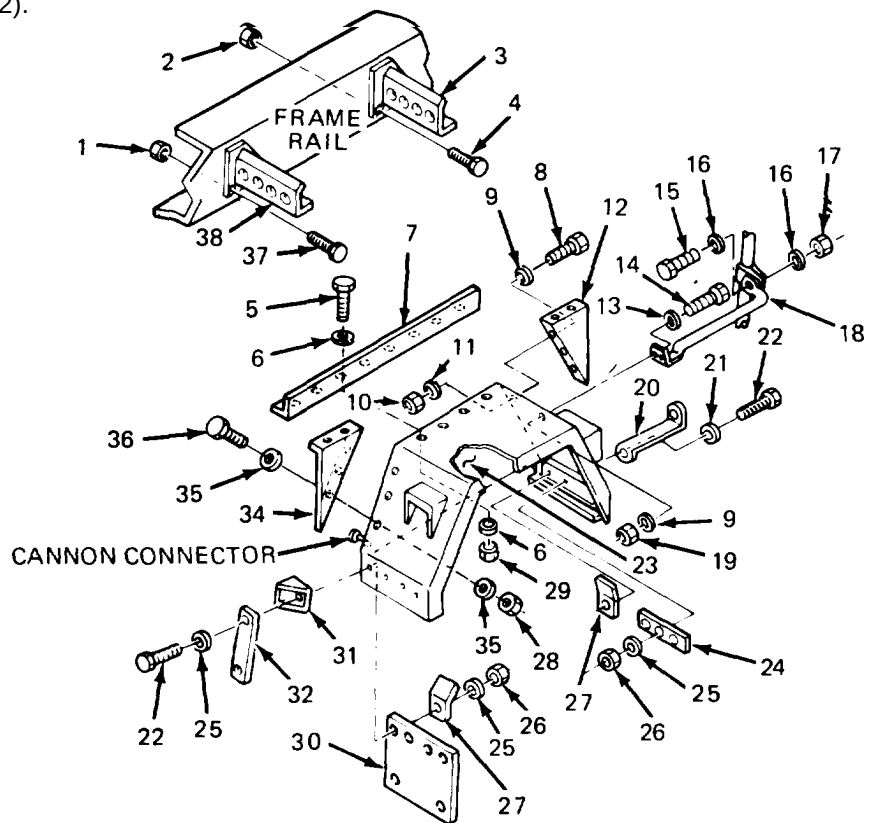
BODY AND CAB.

11-14. FENDER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL OF FRONT FENDER (M915).		
1. Unlatch hood.	Refer to TM 9-2320-273-10.	
2. Cannon connector.	Twist and remove from firewall connector.	
3. Ten bolts (22), washer (21), nineteen washers (25) and ten nuts (26).	Remove.	Fender to bumper brace (20) and fender to cab support brace (31) may be removed from vehicle by unscrewing one existing nut.
4. Front fender (33), two inner stiffeners (27), one outer stiffener (24), mud flap (30), and two anti-sail braces (32).	Remove from fender supports (3) and (38).	Second mechanic to assist.

LEGEND:

1. NUT (3)
2. NUT (3)
3. FENDER SUPPORT
4. BOLT (3)
5. BOLT (8)
6. WASHER (16)
7. TOP FILLER PANEL
8. BOLT (7)
9. WASHER (14)
10. WASHER (2)
11. NUT (2)
12. FORWARD FILLER PANEL
13. WASHER (2)
14. BOLT (2)
15. BOLT
16. WASHER (2)
17. NUT
18. BRUSH GUARD SUPPORT
19. NUT (7)
20. FENDER TO BUMPER BRACE
21. WASHER
22. BOLT (10)
23. SPLASH SHIELD
24. OUTER STIFFENER
25. WASHER (19)
26. NUT (10)
27. INNER STIFFENER (2)
28. NUT (6)
29. NUT (8)
30. MUD FLAP
31. FENDER TO CAB SUPPORT BRACE



32. ANTI SAIL BRACE (2)
33. FRONT FENDER
34. REAR FILLER PANEL
35. WASHER (12)
36. BOLT (6)
37. BOLT (3)
38. FENDER SUPPORT

TA 075654

BODY AND CAB.

11-14. FENDER MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL OF FRONT FENDER (M915) (Continued).		
5. Eight bolts (5), sixteen washers (6), and eight nuts (29).	Unscrew and remove top filler panel (7).	
6. Six bolts (36), twelve washers (35), and six nuts (28).	Unscrew and remove forward filler panel (12) and rear filler panel (34).	
7. Three bolts (37) and nuts (1).	Unscrew and remove fender support (38).	
8. Three bolts (4) and nuts (2).	Unscrew and remove fender support (3).	
B. INSTALLATION OF FRONT FENDER (M915).		
9. Fender support (3).	install to frame rail with three bolts (4) and nuts (2).	
10. Fender support (38).	Install to frame rail with three bolts (37) and nuts (1).	
11. Forward filler panel (12) and rear filler panel (34).	a. Aline with mounting holes on fender (33). b. Attach with six bolts (36), twelve washers (35), and six nuts (28).	
12. Top filler panel (7).	a. Aline with mounting holes on fender (33), forward filler panel (12), and rear filler panel (34). b. Attach with eight bolts (5), sixteen washers (6), and eight nuts (29).	
13. Front fender (33), two inner stiffeners (27), one outer stiffener (24), mud flap (30), two anti-sail braces (32), fender to bumper brace (20) and fender to cab support brace (31).	a. Aline with mounting holes on fender supports (3) and (38). b. Attach with ten bolts (22), washer (21), nineteen washers (25) and ten nuts (26).	If braces (20) or (31) were removed from vehicle, reinstall with one existing nut.
14. Cannon connector.	Twist onto firewall connector.	
15. Latch hood.	Refer to TM 9-2320-273-10.	
C. REMOVAL OF FRONT FENDER (M916 thru M920).		
16. Unlatch hood.	Refer to TM 9-2320-273-10.	
17. Cannon connector.	Twist and remove from firewall connector.	

BODY AND CAB.

11-14. FENDER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS

LEGEND:

1. NUT (3)	16. WASHER (2)	26. NUT (10)
2. NUT (3)	17. NUT	27. INNER STIFFENER (2)
3. FENDER SUPPORT	18. BRUSH GUARD SUPPORT	28. NUT (6)
4. BOLT (3)	19. NUT (7)	29. NUT (8)
5. BOLT (8)	20. FENDER TO BUMPER BRACE	30. MUD FLAP
6. WASHER (16)	21. WASHER	31. FENDER TO CAB SUPPORT BRACE
7. TOP FILLER PANEL	22. BOLT (10)	32. ANTI-SAIL BRACE (2)
8. BOLT (7)	23. SPLASH SHIELD	33. FRONT FENDER
9. WASHER (14)	24. OUTER STIFFENER	34. REAR FILLER PANEL
10. WASHER (2)	25. WASHER (19)	35. WASHER (12)
11. NUT (2)		36. BOLT (6)
12. FORWARD FILLER PANEL		37. BOLT (3)
13. WASHER (2)		38. FENDER SUPPORT
14. BOLT (2)		
15. BOLT		

TA 075655

BODY AND CAB.

11-14. FENDER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
C. REMOVAL OF FRONT FENDER (M916 thru M920) (Continued).		
18. Two nuts (11), washers (10), washers (13), and bolts (14).	Unscrew and remove.	
19. Bolt (15), two washers (16) and nut (17).	Unscrew and remove with brush guard support (18).	
20. Ten bolts (22), washer (21), nineteen washers (25) and ten nuts (26).	Remove.	Fender to bumper brace (20) and fender to cab support brace (31) may be removed from vehicle by unscrewing one existing nut.
21. Front fender (33), two inner stiffeners (27), one outer stiffener (24), mud flap (30), and two anti-sail braces (32).	Remove from fender supports (3) and (38).	Second mechanic to assist.
22. Eight bolts (5), sixteen washers (6), and eight nuts (29).	Unscrew and remove top filler panel (7).	
23. Six bolts (36), twelve washers (35), and six nuts (28).	Unscrew and remove forward filler panel (12) and rear filler panel (34).	
24. Three bolts (37) and nuts (1).	Unscrew and remove fender support (38).	
25. Three bolts (4) and nuts (2).	Unscrew and remove fender support (3).	
D. INSTALLATION OF FRONT FENDER (M916 thru M920).		
26. Fender support (3).	Install to frame rail with three bolts (4) and nuts (2).	
27. Fender support (38).	Install to frame rail with three bolts (37) and nuts (1).	
28. Forward filler panel, (12) and rear filler panel (34).	a. Aline with mounting holes on fender (33). b. Attach with six bolts (36), twelve washers (35), and six nuts (28).	
29. Top filler panel (7).	a. Aline with mounting holes on fender (33), forward filler panel (12), and rear filler panel (34). b. Attach with eight bolts (5), sixteen washers (6), and eight nuts (29).	
30. Front fender (33), two inner stiffeners (27), one outer stiffener (24), mud flap (30), two anti-sail braces (32), fender to bumper brace (20) and fender to cab support brace (31).	a. Aline with mounting holes on fender supports (3) and (38), b. Attach with ten bolts (22), washer (21), nineteen washers (25) and ten nuts (26).	If braces (20) or (31) were removed from vehicle, reinstall with one existing nut.

BODY AND CAB.

11-14. FENDER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS

LEGEND

1. NUT (3)	16. WASHER (2)	26. NUT (10)
2. NUT (3)	17. NUT	27. INNER STIFFENER (2)
3. FENDER SUPPORT	18. BRUSH GUARD SUPPORT	28. NUT (6)
4. BOLT (3)	19. NUT (7)	29. NUT (8)
5. BOLT (8)	20. FENDER TO BUMPER BRACE	30. MUD FLAP
6. WASHER (16)	21. WASHER	31. FENDER TO CAB SUPPORT BRACE
7. TOP FILLER PANEL	22. BOLT (10)	32. ANTI-SAIL BRACE (2)
8. BOLT (7)	23. SPLASH SHIELD	33. FRONT FENDER
9. WASHER (14)	24. OUTER STIFFENER	34. REAR FILLER PANEL
10. WASHER (2)	25. WASHER (19)	35. WASHER (12)
11. NUT (2)		36. BOLT (6)
12. FORWARD FILLER PANEL		37. BOLT (3)
13. WASHER (2)		38. FENDER SUPPORT
14. BOLT (2)		
15. BOLT		

TA 075656

BODY AND CAB.

11-14. FENDER MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
<u>D. INSTALLATION OF FRONT FENDER (M916 thru M920) (Continued).</u>		
31. Brush guard support (18).	a. Aline mounting holes. b. Install to fender with two bolts (14), washers (10), washers (13), and nuts (11). c. Install to brush guard with bolt (15), two washers (16) and nut (17).	
32. Cannon connector.	Twist onto firewall connector.	
33. Latch hood.	Refer to TM 9-2320-273-10.	

BODY AND CAB.

11-14. FENDER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS

LEGEND:

1. NUT (3)	16. WASHER (2)	26. NUT (10)
2. NUT (3)	17. NUT	27. INNER STIFFENER (2)
3. FENDER SUPPORT	18. BRUSH GUARD SUPPORT	28. NUT (6)
4. BOLT (3)	19. NUT (7)	29. NUT (8)
5. BOLT (8)	20. FENDER TO BUMPER BRACE	30. MUD FLAP
6. WASHER (16)	21. WASHER	31. FENDER TO CAB SUPPORT BRACE
7. TOP FILLER PANEL	22. BOLT (10)	32. ANTI-SAIL BRACE (2)
8. BOLT (7)	23. SPLASH SHIELD	33. FRONT FENDER
9. WASHER (14)	24. OUTER STIFFENER	34. REAR FILLER PANEL
10. WASHER (2)	25. WASHER (19)	35. WASHER (12)
11. NUT (2)		36. BOLT (6)
12. FORWARD FILLER PANEL		37. BOLT (3)
13. WASHER (2)		38. FENDER SUPPORT
14. BOLT (2)		
15. BOLT		

TA 075657

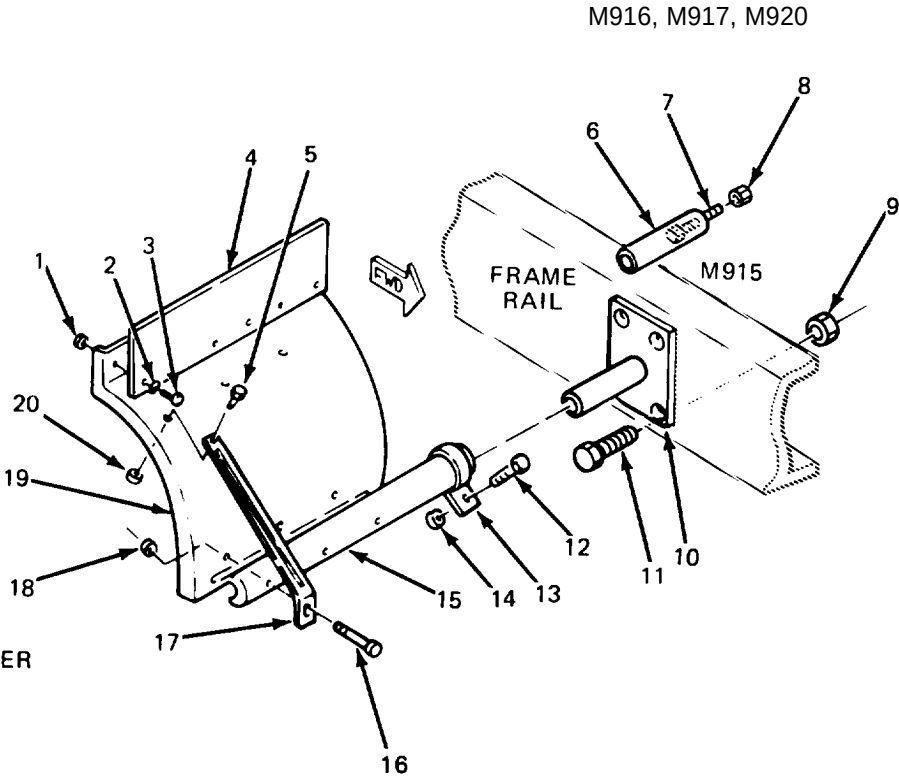
BODY AND CAB.

11-14. FENDER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
E. REMOVAL OF REAR FENDER.		
34. Bolt (12) and nut (14).	a. Unscrew, loosen clamp (13), and slide mounting tube (15) with fender (19) attached, from mounting pin (6) or mounting pin plate (10). b. Slide clamp (13) off mounting tube (15).	Mounting pin (6) used on M916, M917, M920; mounting pin plate (10) used on M915.
35. Three bolts (16) and nuts (18).	Unscrew and remove mounting tube (15).	
36. Three bolts (5) and nuts (20).	Unscrew and remove with three supports (17).	
37. Six bolts (3), washers (2), and nuts (1).	Unscrew and remove mud guard (4).	
38. Bolt (7) and nut (6).	Unscrew from frame rail and remove mounting pin (6).	M916, M917, and M920 only.
39. Four bolts (11) and nuts (9).	Unscrew from frame rail and remove mounting pin plate (10).	M915 only.
F. INSTALLATION OF REAR FENDER.		
40. Mounting pin plate (10).	a. Aline with frame rail holes. b. Attach with four bolts (11) and nuts (9).	M915 only.
41. Mounting pin (6).	a. Aline with frame rail hole. b. Attach with bolt (7) and nut (8).	M916, M917, and M920 only.
42. Mud guard (4).	a. Aline with mounting at top of rear quarter fender (19). b. Attach with six bolts (3), washers (2), and nuts (1).	
43. Three supports (17).	a. Aline with mounting holes on rear quarter fender (19). b. Attach with three bolts (5) and nuts (20) at upper fender curvature.	
44. Mounting tube (15).	a. Aline with lower mounting holes on three supports (17) and rear quarter fender (19). b. Attach with three bolts (16) and nuts (18).	
45. Clamp (13).	Slide over mounting tube (15).	

BODY AND CAB.

11-14. FENDER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
F. INSTALLATION OF REAR FENDER (Continued).		
46. Mounting tube (15).	a. Slide over mounting pin (6) (M916, M917, and M920), or mounting pin plate (10) (M915). b. Secure with bolt (12) and nut (14) thru clamp (13).	
LEGEND: 1. NUT (6) 2. WASHER (6) 3. BOLT (6) 4. MUD GUARD 5. BOLT (3) 6. MOUNTING PIN 7. BOLT 8. NUT 9. NUT (4) 10. MOUNTING PIN PLATE 11. BOLT (4) 12. BOLT 13. CLAMP 14. NUT 15. MOUNTING TUBE 16. BOLT (3) 17. SUPPORT (3) 18. NUT (3) 19. REAR QUARTER FENDER 20. NUT (3)		

TA 075658

BODY AND CAB.

1-15. VENTILATOR MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(10)
b. Installation.	(10)
	<u>20 Minutes Total.</u>

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

EQUIPMENT CONDITION

PARAGRAPH

11-26A.

CONDITION DESCRIPTION

Heater Removed.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES TM

TM 9-2320-273-10.

GENERAL SAFETY INSTRUCTIONS

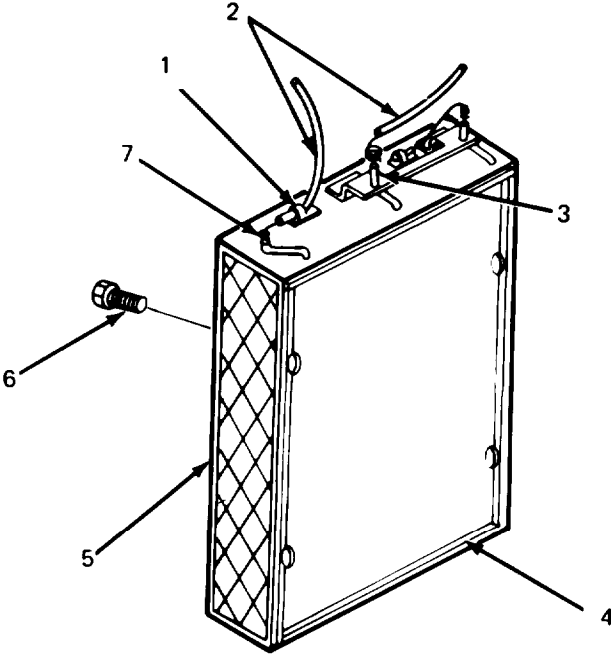
Engine Off.
Transmission In Neutral.
Park Brake Set.

TROUBLESHOOTING REFERENCES

None.

BODY AND CAB.

11-15. VENTILATOR MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
NOTE The driver's side ventilator is riveted into the side of the cab. It is not maintained at the Organizational level.		
A. REMOVAL. 1. Two clips (1). Loosen, Remove two cable wires (2) from clips. 2. Two wire ends (7). Slide off of two pins (3). If necessary, tag for location.		
 LEGEND: 1. CLIP (2) 2. CABLE WIRE (2) 3. PIN (2) 4. SEAL 5. VENTILATOR 6. SCREW (4) 7. WIRE END (2)		
TA 075032		

BODY AND CAB.

11-15. VENTILATOR MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
<u>A. REMOVAL (Continued).</u>		
3. Four screws (6)	Unscrew and remove.	
4. Ventilator (5).	Remove.	
5. Seal (4).	a. Inspect seal for deterioration. If necessary, remove using a suitable tool. b. If seal is being replaced, cut seal to desired length and remove adhesive backing. Install seal on ventilator applying firm and even pressure.	
<u>B. INSTALLATION.</u>		
6. Ventilator (5).	Set in place.	
7. Four screws (6).	Screw in and tighten.	
8. Two wire ends (7).	Slide onto two pins (3).	
9. Two clips (1).	Fasten over cable wires (2).	
NOTE Follow-on maintenance action required: Install heater; refer to paragraph 11-24B.		

BODY AND CAB.

11-15. VENTILATOR MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
LEGEND: 1. CLIP (2) 2. CABLE WIRE (2) 3. PIN (2) 4. SEAL 5. VENTILATOR 6. SCREW (4) 7. WIRE END (2)		

TA 075663

BODY AND CAB.

11-16. GRILLE AND BRUSH GUARD MAINTENANCE.**THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

a. Removal.	(10)
b. Disassembly.	(5)
c. Assembly.	(10)
d. Installation.	(10)
e. Brush Guard Removal.	(10)
f. Brush Guard Installation.	(10)
55 Minutes Total	

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

EQUIPMENT CONDITION**PARAGRAPH**

None.

CONDITION DESCRIPTION

None.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES TM

TM 9-2320-273-10.

GENERAL SAFETY INSTRUCTIONS

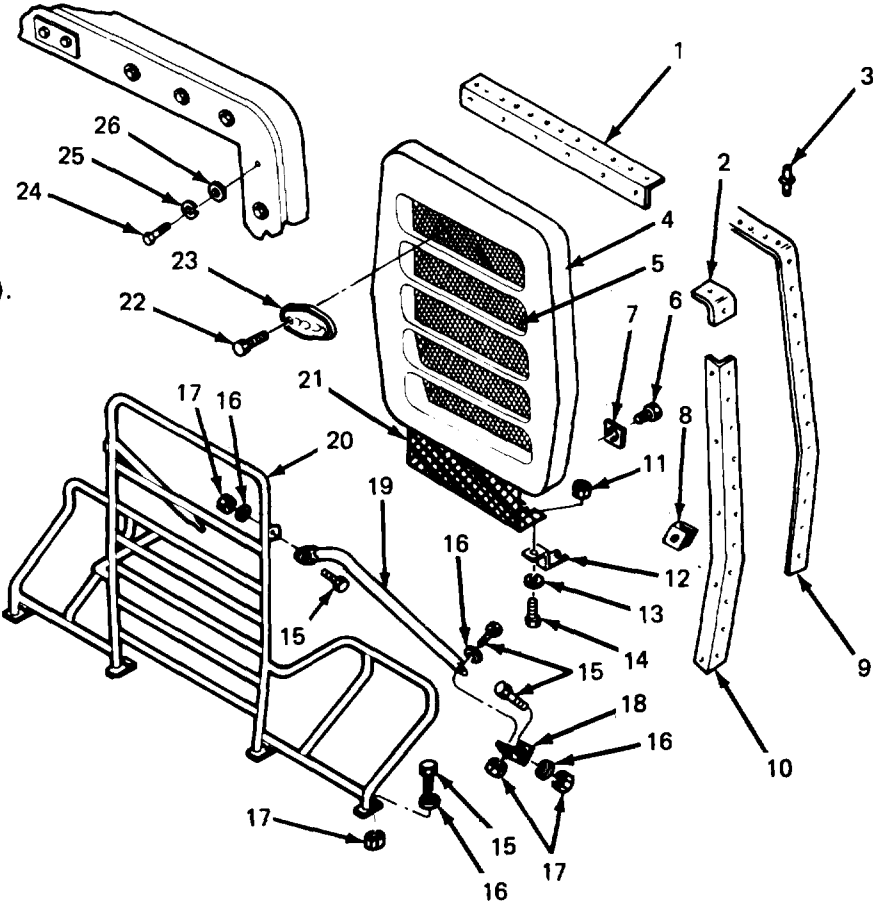
Engine Off.
Transmission In Neutral.
Park Brake Set.

TROUBLESHOOTING REFERENCES

None.

BODY AND CAB.

11-16. GRILLE AND BRUSH GUARD MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
NOTE		
On M916 thru M920, remove brush guard; refer to para 11-16E.		
1. Sixteen capscrews (24), lockwashers (25) and washers (26).	Unscrew and remove grille (4).	
2. Two bolts (14), washers (13), nuts (11), and brackets (12).	Unscrew and remove screen (21).	Top of grille will need to be tipped forward to remove bolts (M916 thru M920).
LEGEND:		
1. RAIL		
2. FILLER (2)		
3. RIVET		
4. GRILLE		
5. SCREEN		
6. CAPSCREW (23)		
7. PLATE (23)		
8. STEEL SPRING NUT (16).		
9. FILLER (2)		
10. RAIL (2)		
11. NUT (2)		
12. BRACKET (2)		
13. WASHER (2)		
14. BOLT (2)		
15. SCREW (16)		
16. WASHER (16)		
17. NUT (16)		
18. BRACKET (2)		
19. BRACE (2)		
20. BRUSH GUARD		
21. SCREEN		
22. TAP SCREW (2)		
23. PLATE		
24. CAPSCREW (16)		
25. LOCKWASHER (16)		
26. WASHER (16).		

TA 075034

BODY AND CAB.

11-16. GRILLE AND BRUSH GUARD MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. DISASSEMBLY.		
3. Rail (1) two fillers (2), two fillers (9), and two rails (10).	Drill out rivets (3) and remove.	It is not necessary to remove steel spring nuts (8) unless they are broken.
4. Twenty-three capscrews (6) and plates (7).	Unscrew and remove screen 5).	
5. Two tap screws (22) and plate (23).	Unscrew and remove.	
C. ASSEMBLY.		
6. Plate (23).	Fasten to grille (4) with two tap screws (22).	
7. Screen (5).	Aline with grille (4) and attach with twenty-three capscrews (6) and plates (7).	
8. Rail (1), two fillers (2), two fillers (9), and two rails (10).	Install to grille (4) with new rivets (3).	Replace any broken steel spring nuts (8) as needed.
D. INSTALLATION.		
9. Grille (4).	Position on truck.	
10. Screen (21).	Install with two bolts (14), washers (13), brackets (12), and nuts (11).	Top of grille must be tipped forward to install bolts (M916 thru M920).
11. Grille (4).	Install with sixteen capscrews (24), lockwashers (25) and washers (26).	
12. Install brush guard.	Refer to para 11-16F.	M916 thru M920 only.
E. BRUSH GUARD REMOVAL (M916 thru M920 only).		
13. Eight screws (15), washers (16), and nuts (17).	Unscrew and remove two brackets (18) and braces (19).	
14. Eight screws (15), washers (16), and nuts (17).	Unscrew and remove brush guard (20) from front bumper.	
F. BRUSH GUARD INSTALLATION (M916 thru M920 only).		
15. Brush guard (20).	Aline with mounting holes on top of bumper and secure with eight screws (15), washers (16), and nuts (17).	
16. Two braces (19) and brackets (18).	Aline with mounting holes at front fenders and brush guard (20) and secure with eight screws (15), washers (16), and nuts (17).	

BODY AND CAB.

11-16. GRILLE AND BRUSH GUARD MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS

LEGEND:

1. RAIL	11. NUT (2)	19. BRACE (2)
2. FILLER (2)	12. BRACKET (2)	20. BRUSH GUARD
3. RIVET	13. WASHER (2)	21. SCREEN
4. GRILLE	14. BOLT (2)	22. TAP SCREW (2)
5. SCREEN	15. SCREW (16)	23. PLATE
6. CAPSCREW (23)	16. WASHER (16)	24. CAPSCREW (16)
7. PLATE (23)	17. NUT (16)	25. LOCKWASHER (16)
8. STEEL SPRING NUT (16).	18. BRACKET (2)	26. WASHER (16).
9. FILLER (2)		
10. RAIL (2)		

TA 075033

BODY AND CAB

11-17. OPTIONAL WINTER FRONT MAINTENANCE.		
<u>THIS TASK COVERS: (Approximate TIME REQUIRED FOLLOWS TASK DESCRIPTION.)</u> a. Original Installation. (30) b. Removal. (15) c. Installation (15) 30 minutes total.* *Not including original installation.		
<u>INITIAL SETUP</u> <u>APPLICABLE CONFIGURATIONS</u> All. <u>TEST EQUIPMENT</u> None. <u>SPECIAL TOOLS</u> None. <u>MATERIALS/PARTS (P/N)</u> None.	<u>EQUIPMENT CONDITION</u> <u>PARAGRAPH</u> 11-16A. 11-16E.	<u>CONDITION DESCRIPTION</u> Grille Removed. Brush Guard Removed (M916 thru M920).
<u>PERSONNEL REQUIRED</u> Two (MOS-63B20). <u>REFERENCES (TM)</u> TM 9-2320-273-10. <u>TROUBLESHOOTING REFERENCES</u> None.	<u>SPECIAL ENVIRONMENTAL CONDITIONS</u> Vehicle Parked on Level Ground. <u>GENERAL SAFETY INSTRUCTIONS</u> Engine Off. Transmission In Neutral. Park Brake Set.	

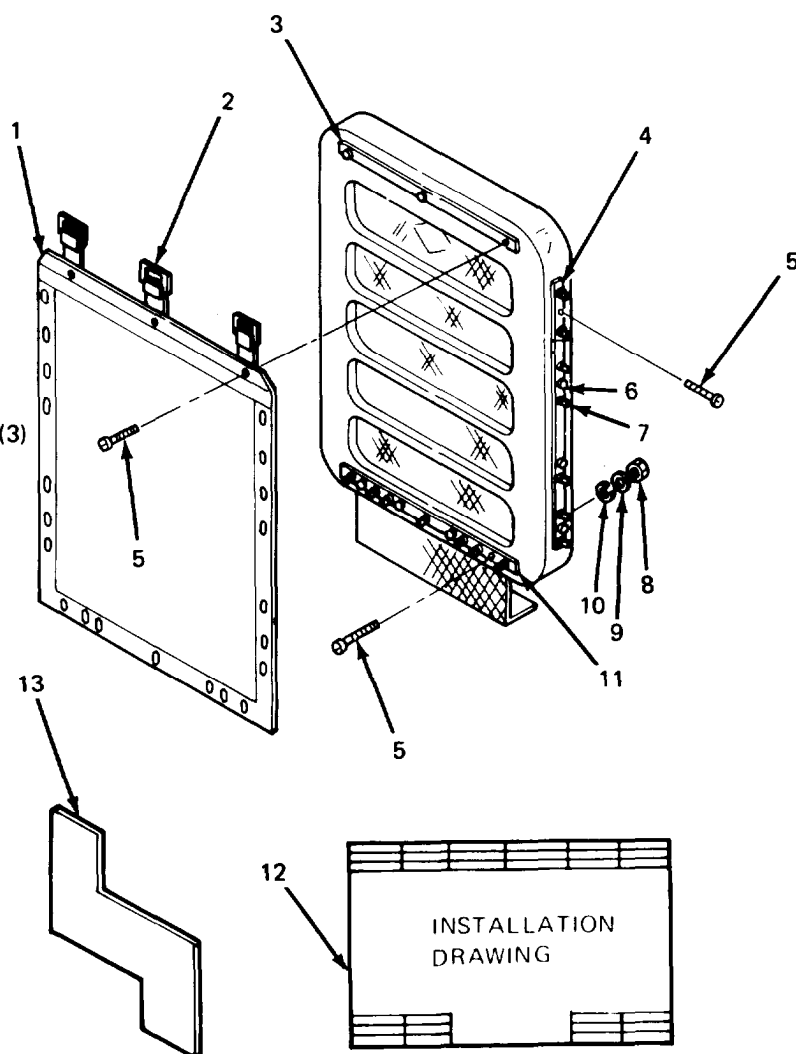
BODY AND CAB.

11-17. OPTIONAL WINTER FRONT MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. ORIGINAL INSTALLATION.		
1. Installation drawing (12) and template (13).	Follow the instructions contained within the installation drawing and use the template for proper drill locations on the grille.	An installation drawing and drill template is sup- plied with each Winter Front Kit.

LEGEND:

1. WINTER FRONT
2. STRAP AND BUCKLE ASSEMBLY (3)
3. TOP BAR ASSEMBLY
4. SIDE BAR ASSEMBLY (2)
5. SCREW (15)
6. LOCKWASHER (21)
7. TWIST LOCK (21)
8. NUT (15)
9. FLAT WASHER (15)
10. LOCKWASHER (15)
11. BOTTOM BAR ASSEMBLY
12. INSTALLATION
DRAWING
13. TEMPLATE



TA 075656

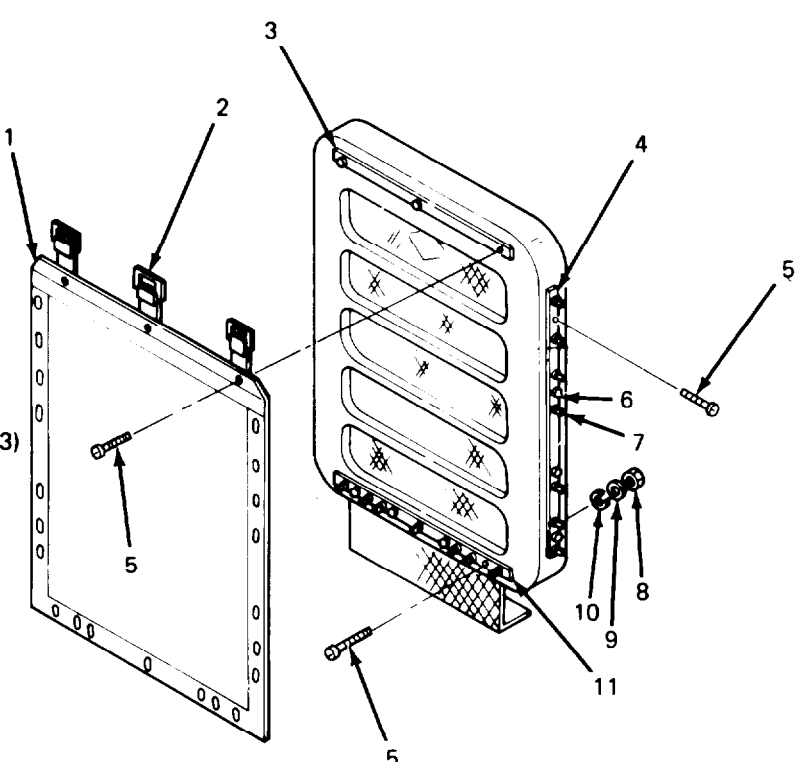
BODY AND CAB.

11-17. OPTIONAL WINTER FRONT MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
<u>B. REMOVAL.</u>		
2. Three screws (5), lockwashers (10), flat washers (9), and nuts (8).	Unscrew and remove top bar assembly (3) along with three strap and buckle assemblies (2).	
3. Twenty-one twist locks (7) and lockwashers (6).	a. Turn to unlock and remove winter front (1). b. Unscrew from two side bar assemblies (4) and bottom bar assembly (11).	
4. Twelve screws (5), lockwashers (10), flat washers (9) and nuts (8).	Unscrew and remove two side bars (4) and bottom bar (11).	
<u>C. INSTALLATION.</u>		
5. Two side bars (4) and bottom bar (11).	Attach to grille with twelve screws (5), lockwashers (10), flat washers (9), and nuts (8).	Twist locks (7) and lockwashers (6) are replaced only with bottom bar (11) and side bars (4).
6. Winter front (1), three strap and buckle assemblies (2), and top bar (3).	Fasten to grille with three screws (5), lockwashers (10), flat washers (9) and nuts (8).	
7. Winter front (1).	Adjust grille coverage for weather conditions with strap and buckle assemblies (2) and twist locks (7).	
Follow on Maintenance Action required:		
a. Install grille; refer to para 11-16D. b. Install brush guard (M916 thru M920); refer to para 11-16F.		

BODY AND CAB.

11-17. OPTIONAL WINTER FRONT MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
LEGEND: 1. WINTER FRONT 2. STRAP AND BUCKLE ASSEMBLY (3) 3. TOP BAR ASSEMBLY 4. SIDE BAR ASSEMBLY (2) 5. SCREW (15) 6. LOCKWASHER (21) 7. TWIST LOCK (21) 8. NUT (15) 9. FLAT WASHER (15) 10. LOCKWASHER (15) 11. BOTTOM BAR ASSEMBLY 		

TA 075660

BODY AND CAB.**11-18. GRILLE SUPPORT BRACKETS MAINTENANCE.****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

a. Removal. (15)

b. Installation. (15)

30 Minutes Total.

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

EQUIPMENT CONDITION**PARAGRAPH****CONDITION DESCRIPTION**

11-16E.

Brush Guard Removed
(M916 thru M920).**TEST EQUIPMENT**

None.

11-16A.

Grille Removed.

SPECIAL TOOLS

None.

11-29A.

Hood Removed.

MATERIALS/PARTS (P/N)

Rivet (10) SSLQ-66 (05693).

Rivet (30) SSLQ-64 (05693).

PERSONNEL REQUIRED

Two (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.

GENERAL SAFETY INSTRUCTIONS

Engine Off.

Transmission In Neutral.

Park Brake Set.

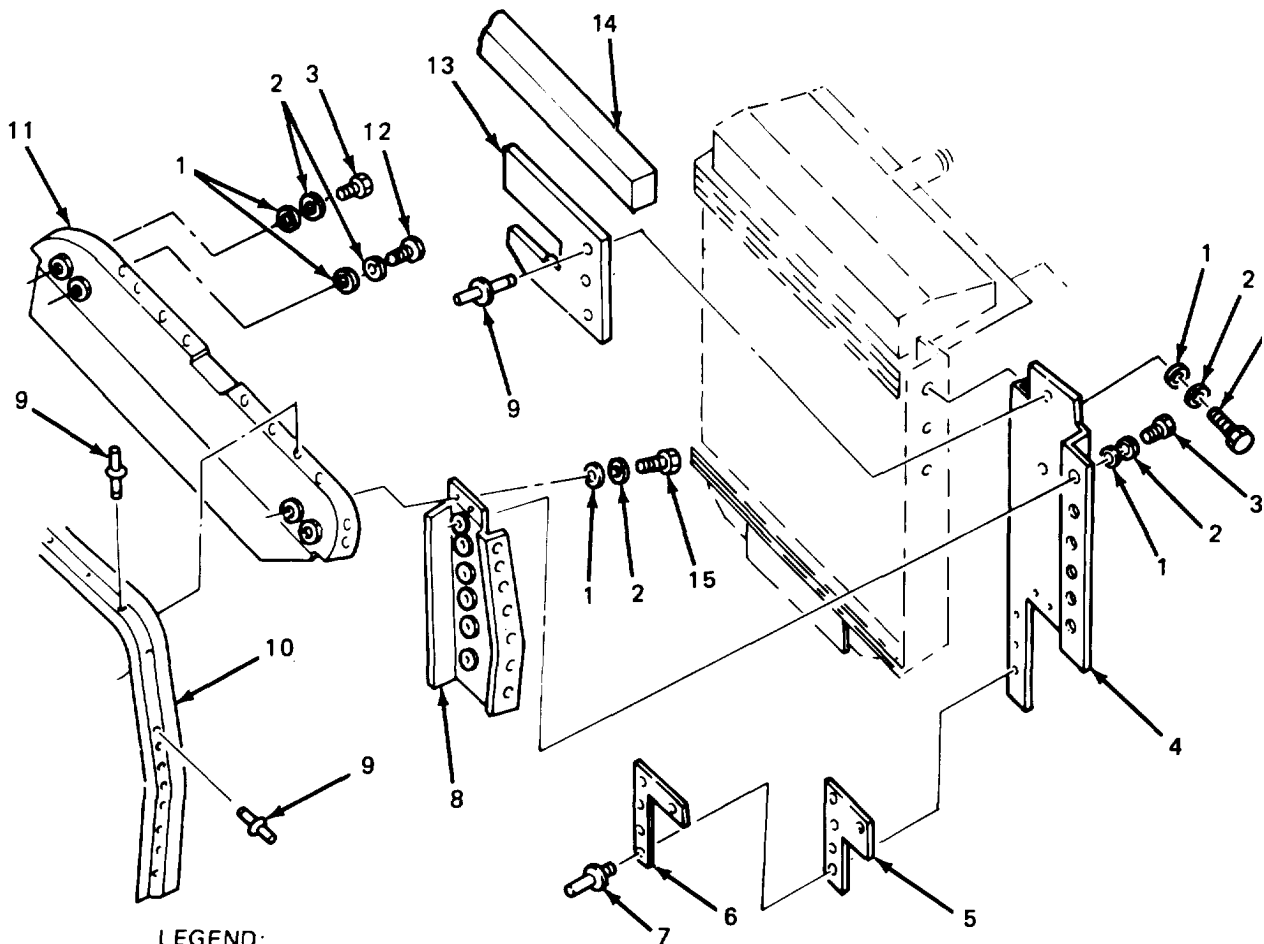
TROUBLESHOOTING REFERENCES

None.

BODY AND CAB.

11-18. GRILLE SUPPORT BRACKETS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Thirty rivets (9) and seal (10).	Drill out rivets (9) and remove seal (10).	
2. Bolt (15), six capscrews (3), lockwashers (2) and washers (1).	Remove bracket (8) from bracket (4).	
3. Three rivets (9).	Drill out and remove baffle (13) and seal (14).	



LEGEND:

1. WASHER (12)	6. RETAINER (2)	11. BRACKET
2. LOCKWASHER (12)	7. RIVET (10)	12. CAPSCREW
3. CAPSCREW (12)	8. BRACKET (2)	13. BAFFLE (2)
4. BRACKET (2)	9. RIVET (30)	14. SEAL
5. SHIELD (2)	10. SEAL	15. BOLT

TA 075661

BODY AND CAB.

11-18. GRILLE SUPPORT BRACKETS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
4. Six capscrews (3), lock-washers (2) and washers (1).	Unscrew and remove bracket (4).	
5. Five rivets (7), retainer (6), and shield (5).	Drill out rivets (7) to remove shield (5) and retainer (6).	
6. Bracket (11).	Repeat steps (2), (3), (4), and (5) on opposite side and remove bracket (11).	
B. INSTALLATION.		
7. Bracket (4), shield (5), retainer (6), and five new rivets (7).	Install onto bracket (4) with new rivets (7).	
8. Six capscrews (3), washers (1) and lockwasher (2).	Install bracket (4) to radiator support.	
9. Bracket (8), bolt (16), bracket (11), six capscrews (3), washer (1), and lockwasher (2).	Install.	
10. Three new rivets (9), baffle (13) and seal (14).	Install and secure with rivets (9).	
11. Brackets (4) and (5).	Repeat steps (7), (8), (9) and (10) for opposite side.	
12. Thirty-seven new rivets (9) and seal (10).	Install rivets to secure seal (10).	
Follow on Maintenance Action required:		
a. Install grille; refer to para 11-16D.		
b. Install brush guard (M916 thru M920); refer to para 11-16F.		
c. Install hood; refer to para 11-29B.		

BODY AND CAB.

11-18. GRILLE SUPPORT BRACKETS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS															
LEGEND: <table border="0"> <tbody> <tr> <td>1. WASHER (12)</td><td>6. RETAINER (2)</td><td>11. BRACKET</td></tr> <tr> <td>2. LOCKWASHER (12)</td><td>7. RIVET (10)</td><td>12. CAPSCREW</td></tr> <tr> <td>3. CAPSCREW (12)</td><td>8. BRACKET (2)</td><td>13. BAFFLE (2)</td></tr> <tr> <td>4. BRACKET (2)</td><td>9. RIVET (30)</td><td>14. SEAL</td></tr> <tr> <td>5. SHIELD (2)</td><td>10. SEAL</td><td>15. BOLT</td></tr> </tbody> </table>	1. WASHER (12)	6. RETAINER (2)	11. BRACKET	2. LOCKWASHER (12)	7. RIVET (10)	12. CAPSCREW	3. CAPSCREW (12)	8. BRACKET (2)	13. BAFFLE (2)	4. BRACKET (2)	9. RIVET (30)	14. SEAL	5. SHIELD (2)	10. SEAL	15. BOLT		
1. WASHER (12)	6. RETAINER (2)	11. BRACKET															
2. LOCKWASHER (12)	7. RIVET (10)	12. CAPSCREW															
3. CAPSCREW (12)	8. BRACKET (2)	13. BAFFLE (2)															
4. BRACKET (2)	9. RIVET (30)	14. SEAL															
5. SHIELD (2)	10. SEAL	15. BOLT															

TA 075662

BODY AND CAB.

11-19. MUD FLAPS MAINTENANCE.**THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

- a. Removal. (5)
 b. Installation. (10)
 15 Minutes Total.

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

M915, M916, M920.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

EQUIPMENT CONDITION**PARAGRAPH****CONDITION DESCRIPTION**

None.

None.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked On Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.

GENERAL SAFETY INSTRUCTIONS

Engine Off.
 Transmission In Neutral.
 Park Brake Set.

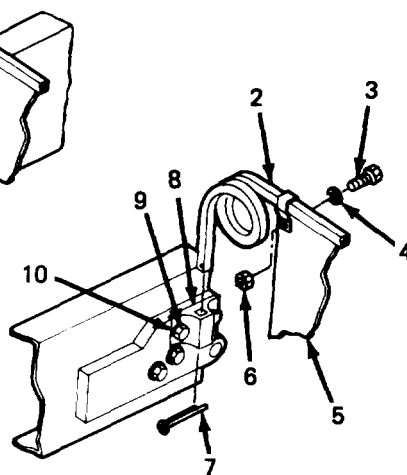
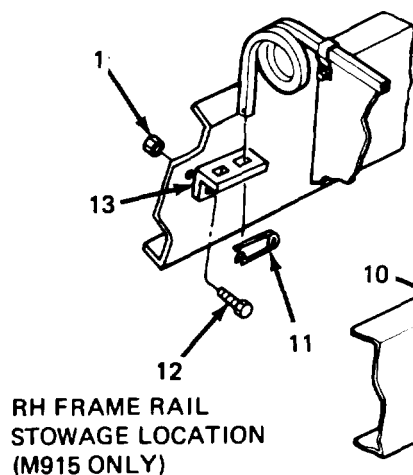
TROUBLESHOOTING REFERENCES

None.

BODY AND CAP.

11-19. MUD FLAPS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
NOTE Procedure is same for removal of either flap.		
A. REMOVAL		
1. Spring pin (11) (M915) or cotter pin (7) (M916, and M920).	Remove from spring bracket (2).	
2. Spring bracket (2).	Lift out of mounting bracket (8).	
3. Mud flap (5).	Remove from spring bracket (2) by removing four bolts (3), washers (4) and four nuts (6).	
4. Two bolts (9) and washers (10).	Unscrew and remove mounting bracket (8).	
5. Two bolts (12) and nuts (1).	Unscrew and remove stowage bracket (13).	M915 only.
B. INSTALLATION.		
6. Stowage bracket (13).	Attach to RH frame rail with two bolts (12) and nuts (1).	M915 only.
7. Mounting bracket (8).	Attach to rear frame with two washers (10) and bolts (9).	
8. Mud flap (5)	Install mud flap onto spring bracket (2) and secure with four bolts (3), washers (4) and four nuts (6).	
9. Spring bracket (2).	Insert into mounting bracket (8) and install spring pin (11) (M915) or cotter pin (7) (M916 and M920).	



LEGEND:

1. NUT (2)
2. SPRING BRACKET
3. BOLT (4)
4. WASHER (4)
5. MUD FLAP
6. NUT (4)
7. COTTER PIN
8. MOUNTING BRACKET
9. BOLT (2)
10. WASHER (2)
11. SPRING PIN
12. BOLT (2)
13. STOWAGE BRACKET

TA 075036

BODY AND CAB.

11-20. DRIVERS SEAT MAINTENANCE.**THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

- a. Removal. (4)
- b. Cleaning and Lubricating Hardware. (5)
- c. Installation. (6)

15 Minutes Total.

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

EQUIPMENT CONDITION**PARAGRAPH**

None.

CONDITION DESCRIPTION

None.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Grease Gun.

GAA (Refer to Appendix C).

Lubriplate (Refer to Appendix C).

Non-Flammable Dry Cleaning Solvent SD-2 (Refer to Appendix C).

PERSONNEL REQUIRED

Two (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked On Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.

TM 9-2320-273-20P.

LO 9-2320-273-12.

GENERAL SAFETY INSTRUCTIONS

Engine Off.

Transmission In Neutral.

Park Brake Set.

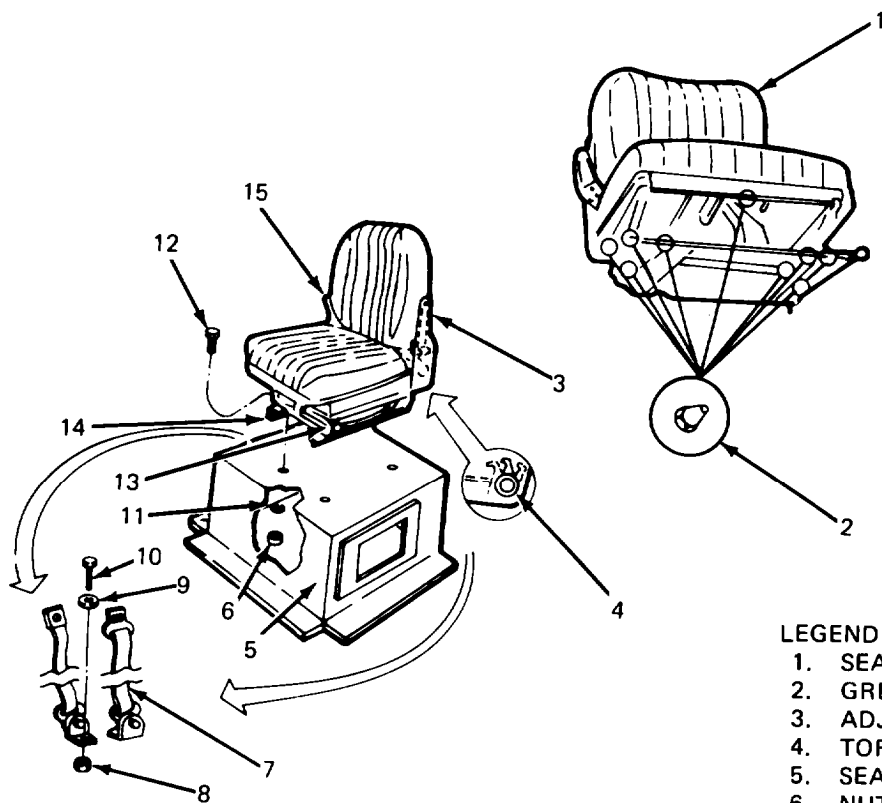
TROUBLESHOOTING REFERENCES

None.

BODY AND CAB.

11-20. DRIVERS SEAT MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL		
1. Four nuts (6), washers (11), and bolts (12).	Unscrew and remove.	
2. Seat (1).	Lift out and remove from seat base (5).	Two mechanics.
3. Two bolts (10), lockwashers (9), and nuts (8).	Unscrew and remove seat belt assembly (7).	



LEGEND:

- 1. SEAT
- 2. GREASE FITTING (9)
- 3. ADJUSTING MECHANISM
- 4. TORSION BAR END
- 5. SEAT BASE
- 6. NUT (4)
- 7. SEAT BELT ASSEMBLY
- 8. NUT (2)
- 9. LOCKWASHER (2)
- 10. BOLT (2)
- 11. WASHER (4)
- 12. BOLT (4)
- 13. ADJUSTING MECHANISM
- 14. SLIDE RAILS
- 15. ADJUSTING MECHANISM

TA 075037

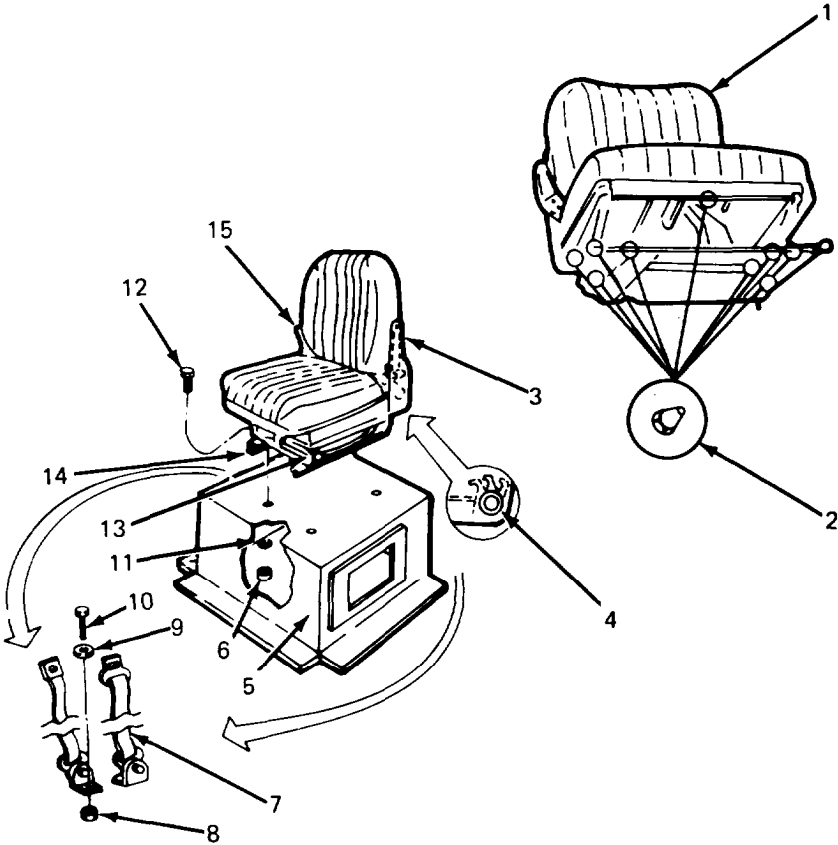
BODY AND CAB.

11-20. DRIVERS SEAT MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. CLEANING AND LUBRICATING HARDWARE.		
CAUTION Do not allow dry cleaning solvents to come in contact with non-metal materials. These cleaners may damage leather, rubber, and synthetics.		
4. Slide rails (14) and other metal parts.	Clean with SD-2 dry cleaning solvent.	
5. Grease fittings (2).	Lubricate, using grease gun.	See LO 9-2320-273-12.
6. Two torsion bar ends (4), three adjusting mechanisms (3), (13), and (15), and slide rails (14).	Lubricate liberally with Lubriplate.	
C. INSTALLATION.		
7. Adjusting mechanisms (3), (13), and (15).	Move to center positions.	
8. Seat (1).	Set in place and aline mounting holes.	
9. Four washers (11), bolts (12), and nuts (6).	Screw on and tighten to secure seat (1) to seat base (5).	
10. Seat belt assembly (7).	a. Aline mounting holes. b. Install with two bolts (10), lockwashers (9), and nuts (8).	

BODY AND CAB.

11-20. DRIVERS SEAT MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
		
LEGEND: 1. SEAT 2. GREASE FITTING (9) 3. ADJUSTING MECHANISM 4. TORSION BAR END 5. SEAT BASE 6. NUT (4) 7. SEAT BELT ASSEMBLY 8. NUT (2) 9. LOCKWASHER (2) 10. BOLT (2) 11. WASHER (4) 12. BOLT (4) 13. ADJUSTING MECHANISM 14. SLIDE RAILS 15. ADJUSTING MECHANISM		

TA 075038

BODY AND CAB.

11-21. PASSENGER'S SEAT MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REWIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(5)
b. Cleaning and Lubricating Adjusting Mechanism.	(5)
c. Installation.	(7)
17 Minutes Total.	

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Lubriplate (Refer to Appendix C).

EQUIPMENT CONDITION

PARAGRAPH

CONDITION DESCRIPTION

None.

None.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked On Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.

GENERAL SAFETY INSTRUCTIONS

Engine Off.
Transmission In Neutral.
Park Brake Set.

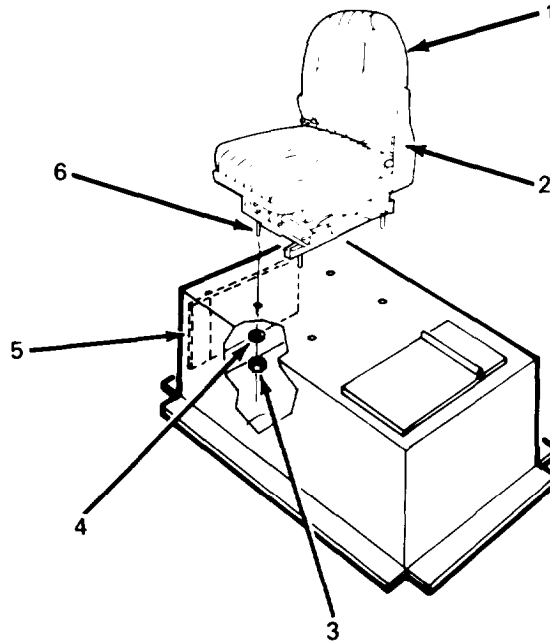
TROUBLESHOOTING REFERENCES

None.

BODY AND CAB.

11-21. PASSENGER'S SEAT MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL		
1. Tool box door (5).	Open for access to nuts (3) and washers (4).	Remove tools if necessary.
2. Four nuts (3) and washers (4).	Unscrew and remove.	
3. Seat (1).	Lift out and remove.	
B. CLEANING AND LUBRICATING ADJUSTING MECHANISM.		
4. Adjusting rack and tooth mechanism (2).	a. Clean with soap and water. Dry thoroughly. b. Apply Lubriplate to both sides.	
C. INSTALLATION		
5. Seat (1).	a. Place back in position. b. Set in place with studs (6) in holes.	
6. Four washers (4) and nuts (3).	Screw on and tighten.	
7. Tool box door (5).	Close.	Put tools back in if you took them out.



LEGEND:

- 1. SEAT
- 2. ADJUSTING RACK & TOOTH MECHANISM
- 3. NUT (4)
- 4. WASHER (4)
- 5. TOOL BOX DOOR
- 6. STUD (4)

TA 075039

CAB AND BODY.

11-22. SEAT RISER AND TOOL BOX MAINTENANCE.**THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

- a. Removal. (45)
 b. Installation. (45)
 90 Minutes Total.

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

EQUIPMENT CONDITION**PARAGRAPH****CONDITION DESCRIPTION**

11-20A.

Drivers Seat Removed (for
Seat Riser Removal).

11-21A.

Passenger's Seat Removed
(For Tool Box Removal).**PERSONNEL REQUIRED**

Two (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked On Level Ground

REFERENCES (TM)

TM 9-2320-273-10

GENERAL SAFETY INSTRUCTIONS

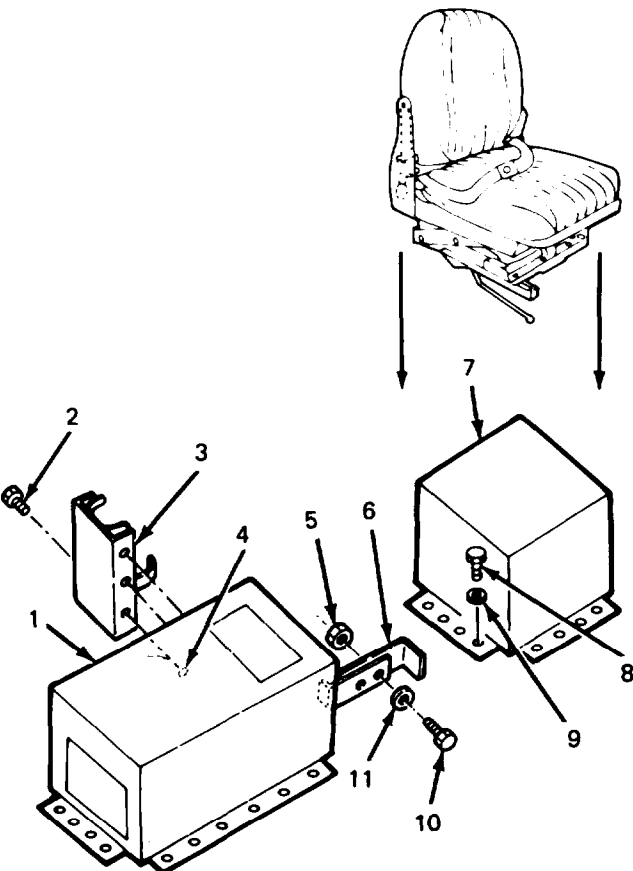
Engine Off.
 Park Brake Set.
 Transmission In Neutral.

TROUBLESHOOTING REFERENCES

None.

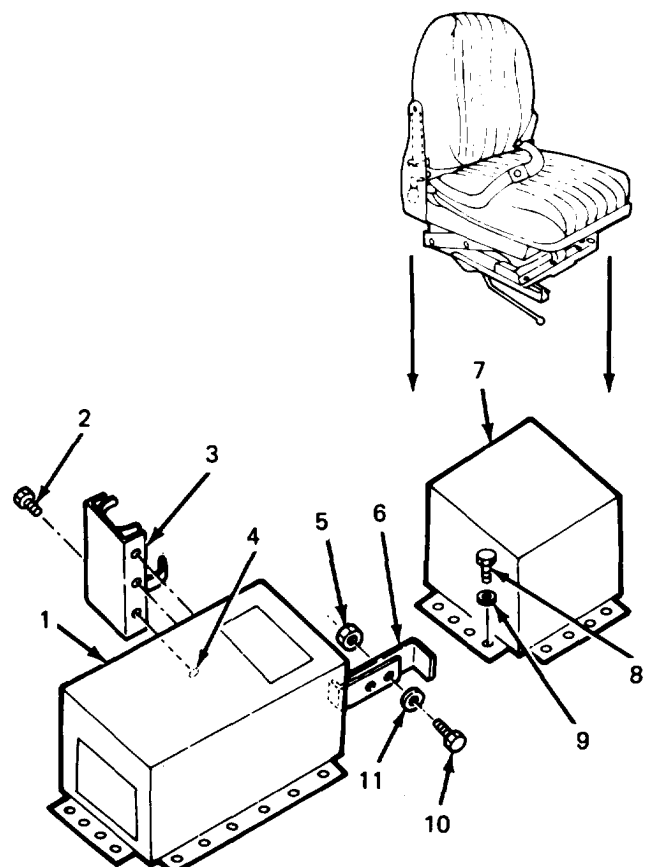
CAB AND BODY.

11-22. SEAT RISER AND TOOL BOX MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS												
NOTE Instructions for repairing metal tool box and seat riser may be found in FM 43-2.														
A. REMOVAL <table><tr><td>1. Three bolts (2) and nuts (4).</td><td>Unscrew and remove fire extinguisher bracket (3).</td><td></td></tr><tr><td>2. Four bolts (10), nuts (5), and eight washers (11).</td><td>Unscrew and remove two piece ratio selector brace (6).</td><td></td></tr><tr><td>3. Thirty-six bolts (8), washers (9).</td><td>Unscrew and remove.</td><td>Total fasteners for both riser and tool box.</td></tr><tr><td>4. Seat riser (7) and tool box (1).</td><td>Remove</td><td></td></tr></table>			1. Three bolts (2) and nuts (4).	Unscrew and remove fire extinguisher bracket (3).		2. Four bolts (10), nuts (5), and eight washers (11).	Unscrew and remove two piece ratio selector brace (6).		3. Thirty-six bolts (8), washers (9).	Unscrew and remove.	Total fasteners for both riser and tool box.	4. Seat riser (7) and tool box (1).	Remove	
1. Three bolts (2) and nuts (4).	Unscrew and remove fire extinguisher bracket (3).													
2. Four bolts (10), nuts (5), and eight washers (11).	Unscrew and remove two piece ratio selector brace (6).													
3. Thirty-six bolts (8), washers (9).	Unscrew and remove.	Total fasteners for both riser and tool box.												
4. Seat riser (7) and tool box (1).	Remove													
 LEGEND: 1. TOOL BOX 2. BOLT (3) 3. FIRE EXTINGUISHER BRACKET 4. NUT (3) 5. NUT (4) 6. RATIO SELECTOR BRACE (2) 7. SEAT RISER 8. BOLT (36) 9. WASHER (36) 10. BOLT (4) 11. WASHER (8)														
TA 075040														

CAB AND BODY.

11-22. SEAT RISER AND TOOL BOX MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION		
5. Seat riser (7) and tool box (1).	Place in cab. Aline with bolt holes in cab floor.	
6. Thirty-six bolts (8) and washers (9).	Screw in and tighten.	
7. Ratio selector brace (6).	Install with four bolts (10), nuts (5), and eight washers (11).	
8. Fire extinguisher bracket (3).	Install with three bolts (2) and nuts (4).	
Follow-on maintenance actions required.		
a. Install driver's seat; refer to para 11-20 C.		
b. Install passenger's seat; refer to para 11-21 C.		
		
LEGEND:		
1. TOOL BOX		
2. BOLT (3)		
3. FIRE EXTINGUISHER BRACKET		
4. NUT (3)		
5. NUT (4)		
6. RATIO SELECTOR BRACE (2)		
7. SEAT RISER		
8. BOLT (36)		
9. WASHER (36)		
10. BOLT (4)		
11. WASHER (8)		

TA 075041

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BODY AND CAB.

11-23. WINDSHIELD WIPER BLADE AND ASSEMBLY MAINTENANCE.**11-23. WINDSHIELD WIPER BLADE AND ASSEMBLY MAINTENANCE.**

- a. Removal. (4)
- b. Installation. (3)
- c. Operational Check. (1)

8 Minutes Total.

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

EQUIPMENT CONDITION**PARAGRAPH****CONDITION DESCRIPTION**

None.

None.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked On Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.

GENERAL SAFETY INSTRUCTIONS

Engine Off.
Transmission In Neutral.
Park Brake Set.

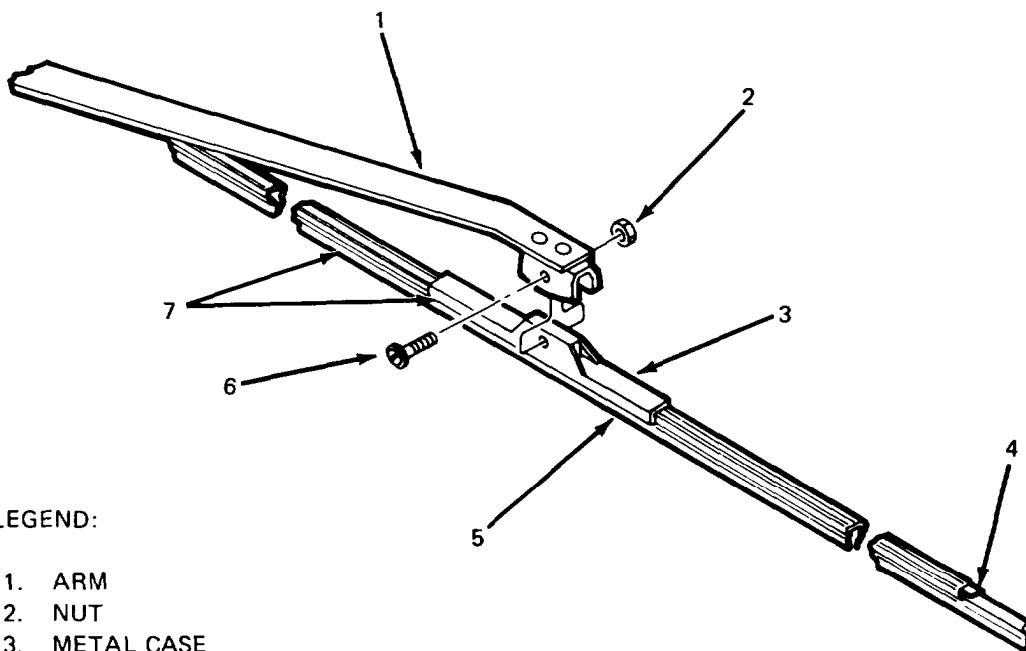
TROUBLESHOOTING REFERENCES

None.

BODY AND CAB.

11-23. WINDSHIELD WIPER BLADE AND ASSEMBLY MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL		
1. Screw (6) and nut (2).	Unscrew and remove.	
2. Wiper blade assembly (7).	Remove from arm (1).	
3. Locking tab (4)	Pry up.	
4. Rubber blade (5).	Slide out of metal case (3).	



LEGEND:

- 1. ARM
- 2. NUT
- 3. METAL CASE
- 4. LOCKING TAB
- 5. RUBBER BLADE
- 6. SCREW
- 7. WIPER BLADE ASSEMBLY

TA 075042

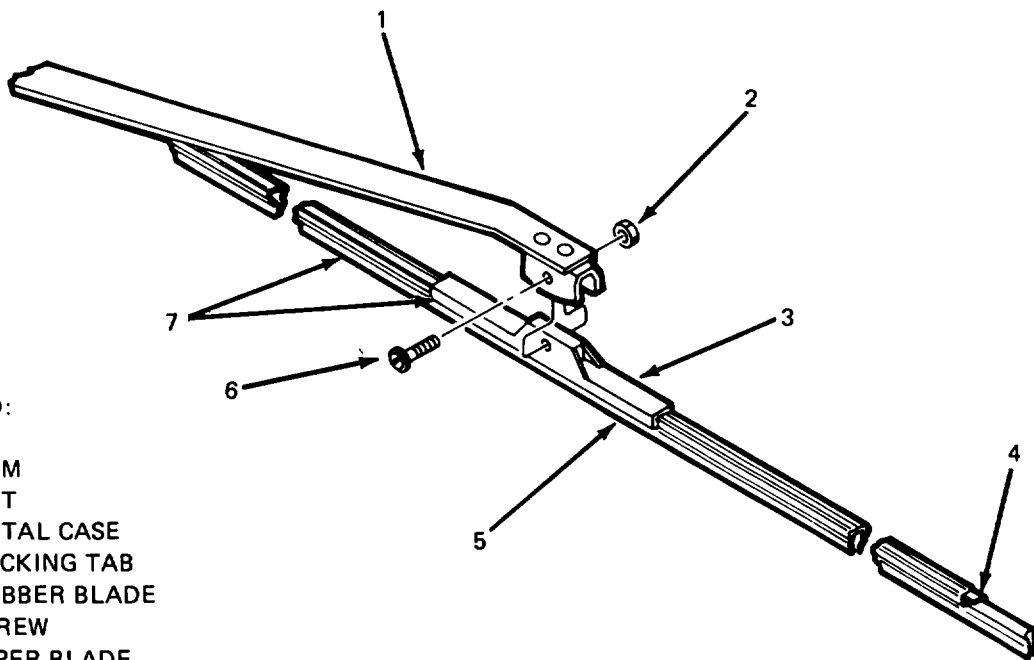
BODY AND CAB.

11-23. WINDSHIELD WIPER BLADE AND ASSEMBLY MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION.		
5. Rubber blade (5).	Slide into metal case (3).	
6. Locking tab (4).	Push down over rubber blade (5).	
7. Blade assembly (7).	Align with arm (1).	
8. Screw (6) and nut (2).	a. Put screw through arm (1) and blade assembly (7). b. Screw nut on and tighten.	
C. OPERATIONAL CHECK.		
9. Wiper knob.	Pull out.	
10. Wiper blade (5).	Check to see that blade moves across windshield with good contact.	Squirting windshield with washer fluid will make it easy to tell if wiper blade is operating properly.

LEGEND:

- 1. ARM
- 2. NUT
- 3. METAL CASE
- 4. LOCKING TAB
- 5. RUBBER BLADE
- 6. SCREW
- 7. WIPER BLADE ASSEMBLY



TA 075043

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BODY AND CAB.

11-24. WINDSHIELD WIPER ARMS MAINTENANCE.**THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

a. Removal.	(4)
b. Installation.	(3)
c. Operational Check.	(1)
	8 Minutes Total.

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

EQUIPMENT CONDITION**PARAGRAPH**

None.

CONDITION DESCRIPTION

None.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked On Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.

GENERAL SAFETY INSTRUCTIONS

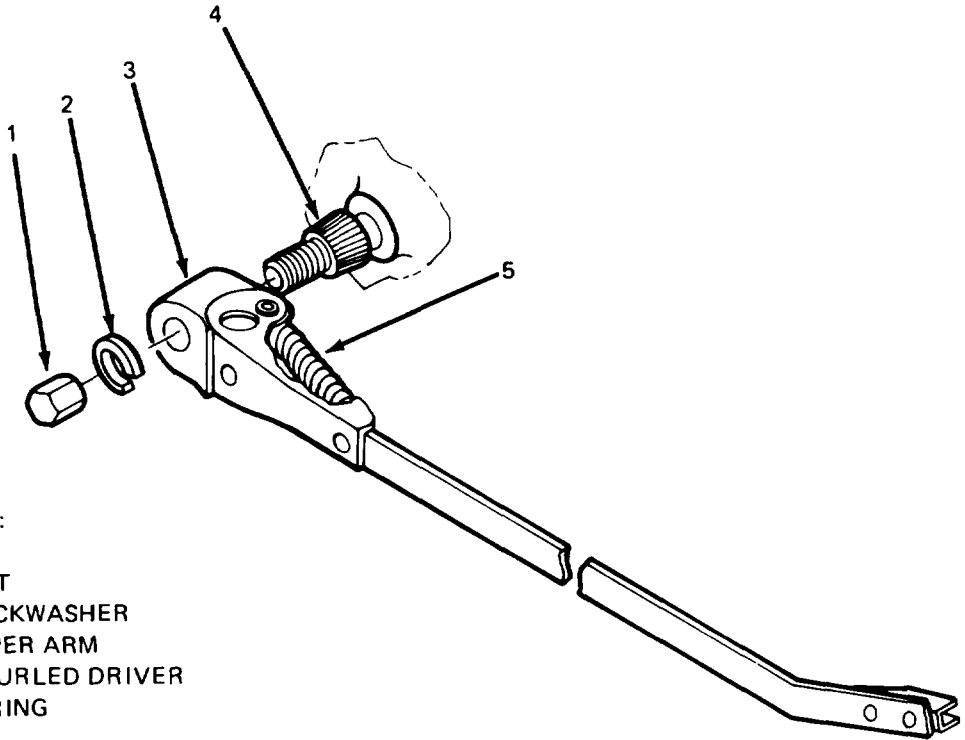
Engine Off.
Transmission In Neutral.
Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 9-1.

BODY AND CAB.

11-24. WINDSHIELD WIPER ARMS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Nut (1) and lockwasher (2).	Unscrew and remove.	
2. Wiper arm (3).	Lift off of knurled driver (4).	
3. Spring (5).	Unhook and remove.	If spring is stretched so that it does not hold arm tightly, replace.
NOTE Procedures for removing and installing blade are given in para 11-23.		
 The diagram shows a wiper arm assembly. Callout 1 points to a nut, callout 2 points to a lockwasher, callout 3 points to the wiper arm, callout 4 points to a knurled driver, and callout 5 points to a spring. The wiper arm is shown attached to a bracket, with the knurled driver and spring also shown. LEGEND: 1. NUT 2. LOCKWASHER 3. WIPER ARM 4. KNURLED DRIVER 5. SPRING		
TA 075044		

BODY AND CAB.

11-24. WINDSHIELD WIPER ARMS MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION		
4. Spring (5).	Lock into place.	Arm should be in same position as when you removed it.
5. Arm (3).	Seat firmly on knurled driver (4).	
6. Lockwasher (2) and nut(1).	Screw on and tighten.	
C. OPERATIONAL CHECK.		
NOTE		
Operate wipers to see that they move normally. Squirt windshield with washer fluid and check that it is removed without streaking. Park wipers.		
If wipers do not operate correctly, troubleshoot wiper system as described in Table 9-1.		

BODY AND CAB.

11-24. WINDSHIELD WIPER ARMS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
The diagram shows a side view of a windshield wiper arm assembly. A long, thin metal arm is attached to a larger, more complex mounting bracket. Five numbered callouts point to specific components: 1 points to a hexagonal nut, 2 points to a small circular lockwasher, 3 points to the main wiper arm, 4 points to a knurled driver (a bolt with a textured, cylindrical head), and 5 points to a coiled spring. LEGEND: 1. NUT 2. LOCKWASHER 3. WIPER ARM 4. KNURLED DRIVER 5. SPRING		

TA 075045

BODY AND CAB.

11-25. REAR VIEW MIRROR MAINTENANCE.**THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

- a. Removal. (10)
 - b. Disassembly. (15)
 - c. Assembly. (15)
 - d. Installation. (10)
 - e. Adjustment. (10)
- 60 Minutes Total.

INITIAL SETUP**APPLICABLE CONFIGUTATIONS**

All.

EQUIPMENT CONDITION**PARAGRAPH**

None.

CONDITION DESCRIPTION

None.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked On Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.

GENERAL SAFETY INSTRUCTIONS

Engine Off.
Transmission In Neutral.
Park Brake Set.

TROUBLESHOOTING REFERENCES

None.

BODY AND CAB.

11-25. REAR VIEW MIRROR MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
NOTE Procedure shown is for right side mirror. Identical procedure is used for left side mirror.		
A. REMOVAL		
1. Six bolts (1) and lockwashers (2).	Loosen and remove.	
2. Mirror assembly (5).	Remove.	
LEGEND: 1. BOLT (6) 2. LOCKWASHER (6) 3. BRACKET (UPPER) 4. BRACKET (LOWER) 5. MIRROR ASSEMBLY 6. ACORN NUT (2) 7. COMPRESSION SPRING (2) 8. PIVOT ROD 9. CROSS BRACE BRACKET 10. JAM NUT (4) 11. LOOP CROSS BRACE 12. CAPSCREW 13. ACORN NUT (2) 14. LOOP DETENT ASSEMBLY 15. MIRROR HEAD ASSEMBLY 16. TUBE CLAMP (2) 17. ACORN NUT 18. LOCKWASHER 19. TUBE CLAMP 20. LOCKWASHER (2) 21. SPACER (2) 22. SCREW (4) 23. MIRROR ASSEMBLY (2) (PRESSURE SENSITIVE)		
TA 075046		

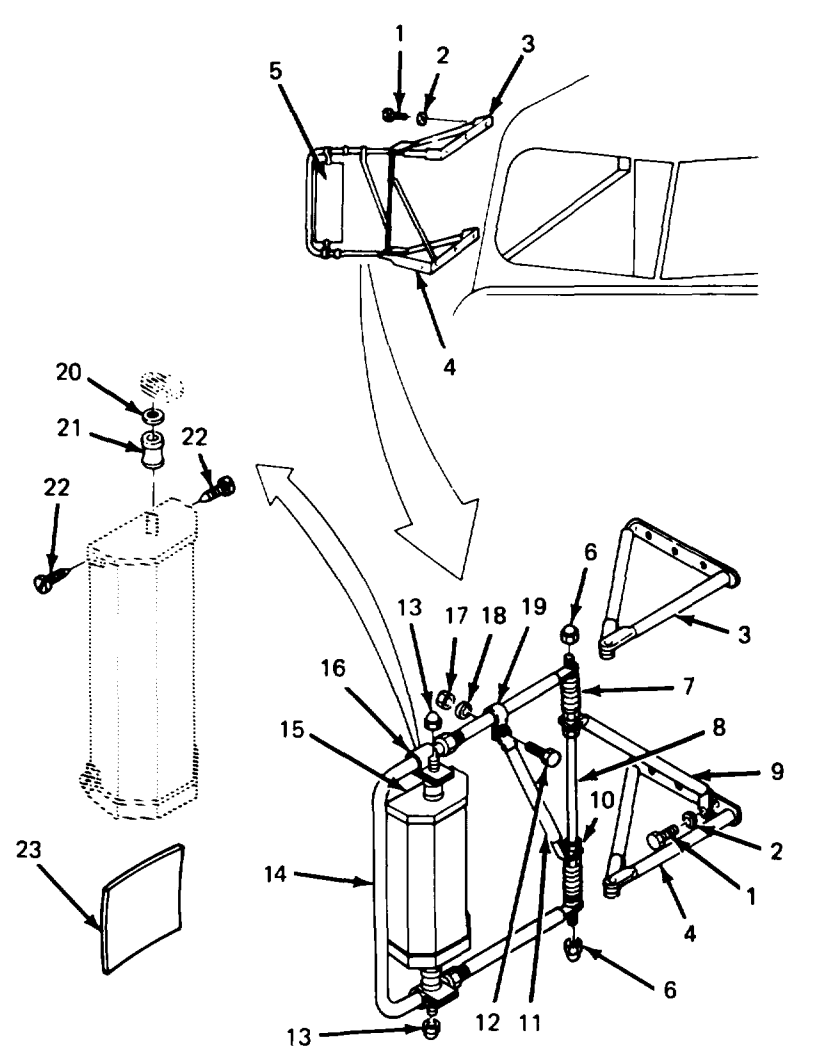
BODY AND CAB.

11-25. REAR VIEW MIRROR MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
<u>B. DISASSEMBLY.</u>		
3. Two acorn nuts (13).	Loosen and remove.	
4. Two tube clamps (16), two lockwashers (20) and spacers (21).	Remove.	
5. Mirror assembly (23).	Pull free from face of mirror head assembly (15).	If damaged.
6. Capscrew (12), acorn nut (17) and lockwasher (18).	Loosen and remove.	
7. Two acorn nuts (6).	Loosen and remove.	
8. Loop detent assembly (14), bracket (upper) (3), bracket (lower) (4) and two compression springs (7).	Remove from pivot rod (8).	
9. Cross brace bracket (9) and loop cross brace (11).	Remove by unthreading two outer jam nuts (10) and removing from pivot rod (8).	
<u>C. ASSEMBLY.</u>		
10. Cross brace bracket (9) and loop cross brace (11).	Install on pivot rod (8) and secure with jam nuts (10).	
11. Two compression springs (7), loop detent assembly (14), bracket (upper) (3) and bracket (lower) (4).	Install on pivot rod (8).	
12. Two acorn nuts (6).	Install and tighten.	
13. Capscrew (12), acorn nut (17), and lockwasher (18).	Install to fasten loop cross brace (11) to tube clamp (19) and tighten.	
14. Two tube clamps (16),	Position mirror head assembly (15) and pivot tube clamps over screws (22) to secure.	
15. Two acorn nuts (13).	Install and tighten.	
16. Mirror assembly (23).	Stick onto face of mirror head assembly (15).	If removed.
<u>D. INSTALLATION.</u>		
17. Mirror assembly (5).	Position on door and align mounting holes.	
18. Six bolts (1) and lockwashers (2).	Install and tighten.	

BODY AND CAB.

11-25. REAR VIEW MIRROR MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
E. ADJUSTMENT		
19. Mirror head assembly (15).	Adjust for best view.	
NOTE If hauling extra wide loads, loosen two nuts on loop detent assembly (14). Mirrors can be telescoped an additional five inches.  LEGEND: 1. BOLT (6) 2. LOCKWASHER (6) 3. BRACKET (UPPER) 4. BRACKET (LOWER) 5. MIRROR ASSEMBLY 6. ACORN NUT (2) 7. COMPRESSION SPRING (2) 8. PIVOT ROD 9. CROSS BRACE BRACKET 10. JAM NUT (4) 11. LOOP CROSS BRACE 12. CAPSCREW 13. ACORN NUT (2) 14. LOOP DETENT ASSEMBLY 15. MIRROR HEAD ASSEMBLY 16. TUBE CLAMP (2) 17. ACORN NUT 18. LOCKWASHER 19. TUBE CLAMP 20. LOCKWASHER (2) 21. SPACER (2) 22. SCREW (4) 23. MIRROR ASSEMBLY (2) (PRESSURE SENSITIVE)		

TA 075047

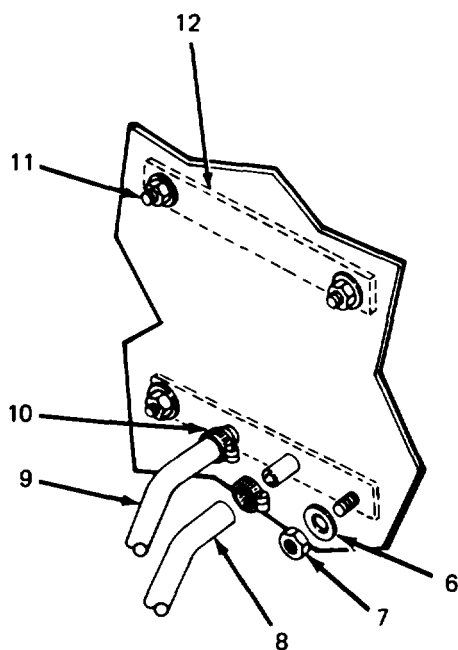
BODY AND CAB.

11-26. HEATER MAINTENANCE.		
THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)		
a. Removal. (27)		
b. Installation. (55)		
82 Minutes Total.		
INITIAL SETUP	EQUIPMENT CONDITION	
APPLICABLE CONFIGURATIONS	PARAGRAPH	CONDITION DESCRIPTION
All.	4-25A.	Air Cleaner Cannister Removed.
TEST EQUIPMENT		
None.	4-42A.	Radiator Drained.
SPECIAL TOOLS		
None.		
MATERIALS/PARTS (P/N)		
Electrical Tape.		
PERSONNEL REQUIRED	SPECIAL ENVIRONMENTAL CONDITIONS	
One (MOS-63B20).	Vehicle Parked On Level Ground.	
REFERENCES (TM)	GENERAL SAFETY INSTRUCTIONS	
TM 9-2320-273-10.	Engine Off.	
	Transmission In Neutral.	
	Park Brake Set.	
TROUBLESHOOTING REFERENCES		
Table 4-1.		

BODY AND CAB.

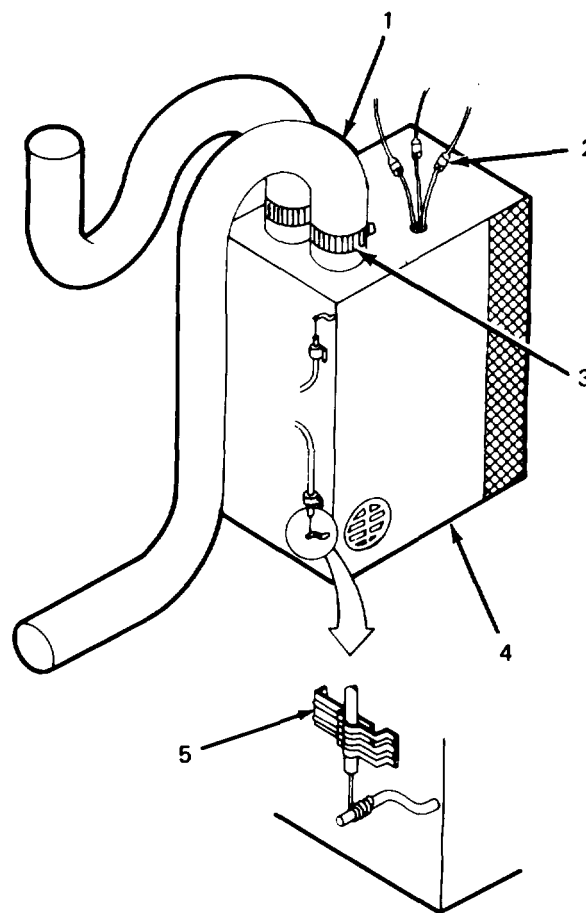
11-26. HEATER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. ENGINE COMPARTMENT/ Heater hoses (8) and (9).	a. Loosen two clamps (10). b. Disconnect hoses.	Keep hose ends raised to prevent coolant from run- ning out.
2. ENGINE COMPARTMENT/ Four nuts (7) and washers (6).	Loosen and remove.	

ENGINE
COMPARTMENT

LEGEND:

1. AIR DUCT (2)	7. NUT (4)
2. WIRE (3)	8. HEATER HOSE
3. CLAMP (2)	9. HEATER HOSE
4. HEATER	10. CLAMP (2)
5. CABLE CLIP (2)	11. HEATER MOUNTING STUD (4)
6. WASHER (4)	12. INSULATOR (2)



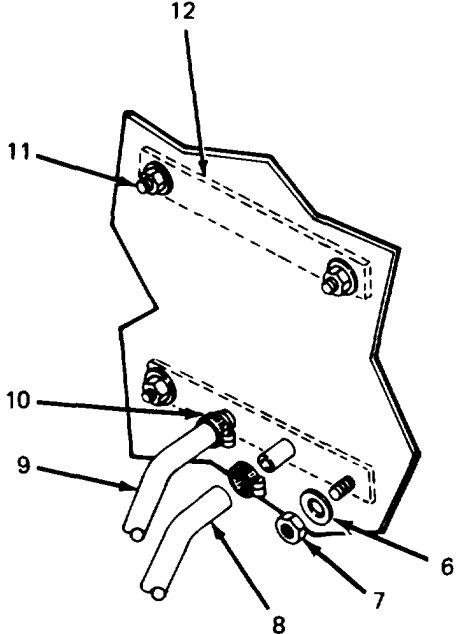
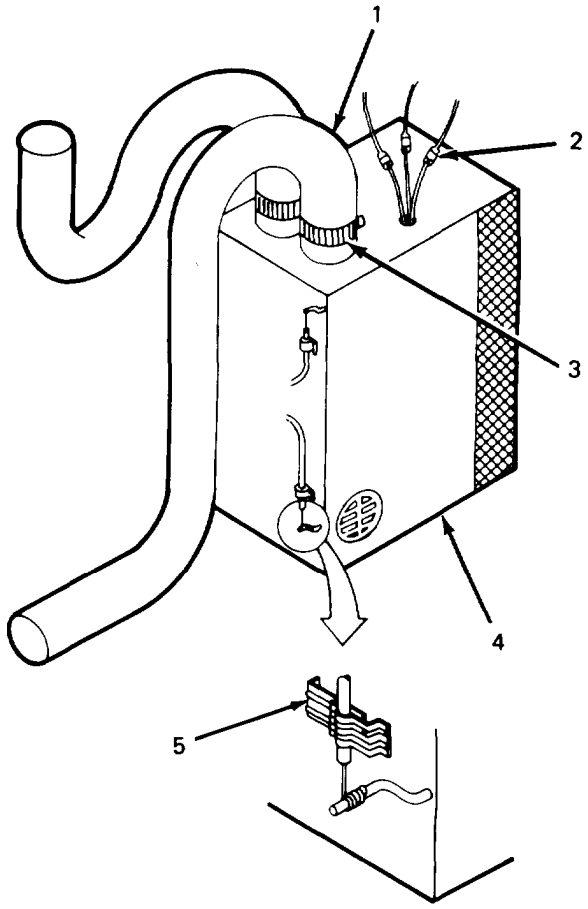
TA 075049

BODY AND CAB.

11-26 HEATER MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
3. CAB/Three wires (2).	Remove electrical tape and disconnect wires.	
4. CAB/Two air ducts (1).	a. Loosen clamps (3). b. Remove ducts.	
5. CAB/Two cable clips (5).	a. Loosen. b. Remove cables.	
6. CAB/Heater (4).	a. Remove eight screws from runner and slide floor mat out of way of heater. b. Remove.	
7. Two insulators (12).	Remove from four heater mounting studs (11).	
B. INSTALLATION.		
8. Two insulators (12).	Install over four heater mounting studs (11).	
9. CAB/Heater (4).	Set in place.	
10. CAB/Two cable clips (5).	a. Attach cables. b. Tighten clips.	PASSENGER cable goes to bottom, DRIVER cable goes to top.
11. CAB/Two air ducts (1).	Attach and tighten clamps (3).	
12. CAB/Three wires (2).	a. Connect. b. Wrap connections with electrical tape.	Wires are color-coded to help you match them up.
13. Floor mat.	Install eight screws to secure runner over floor mat.	
14. ENGINE COMPARTMENT/ four nuts (7) and washers (6).	Install and tighten.	
15. ENGINE COMPARTMENT/ Heater hoses (8) and (9).	a. Install hoses. b. Secure with two clamps (10).	

BODY AND CAB.

11-26 HEATER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS												
NOTE														
Follow-on Maintenance Action required:														
a. Fill cooling system; refer to para 4-42C and D.														
b. Install air cleaner cannister; refer to para 4-25D.														
c. Bleed heater; refer to para 4-50C.														
 														
ENGINE COMPARTMENT LEGEND: <table> <tr> <td>1. AIR DUCT (2)</td> <td>7. NUT (4)</td> </tr> <tr> <td>2. WIRE (3)</td> <td>8. HEATER HOSE</td> </tr> <tr> <td>3. CLAMP (2)</td> <td>9. HEATER HOSE</td> </tr> <tr> <td>4. HEATER</td> <td>10. CLAMP (2)</td> </tr> <tr> <td>5. CABLE CLIP (2)</td> <td>11. HEATER MOUNTING STUD (4)</td> </tr> <tr> <td>6. WASHER (4)</td> <td>12. INSULATOR (2)</td> </tr> </table>			1. AIR DUCT (2)	7. NUT (4)	2. WIRE (3)	8. HEATER HOSE	3. CLAMP (2)	9. HEATER HOSE	4. HEATER	10. CLAMP (2)	5. CABLE CLIP (2)	11. HEATER MOUNTING STUD (4)	6. WASHER (4)	12. INSULATOR (2)
1. AIR DUCT (2)	7. NUT (4)													
2. WIRE (3)	8. HEATER HOSE													
3. CLAMP (2)	9. HEATER HOSE													
4. HEATER	10. CLAMP (2)													
5. CABLE CLIP (2)	11. HEATER MOUNTING STUD (4)													
6. WASHER (4)	12. INSULATOR (2)													
TA 075048														

TA 075048

BODY AND CAB.

11-27. HEATER HOSE MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

EQUIPMENT CONDITION

PARAGRAPH

4-42a.

CONDITION DESCRIPTION

Radiator Drained.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.

GENERAL SAFETY INSTRUCTIONS

Engine Off.

Park Brake Set.

Transmission In Neutral.

TROUBLESHOOTING

Table 4-1.

BODY AND CAB.

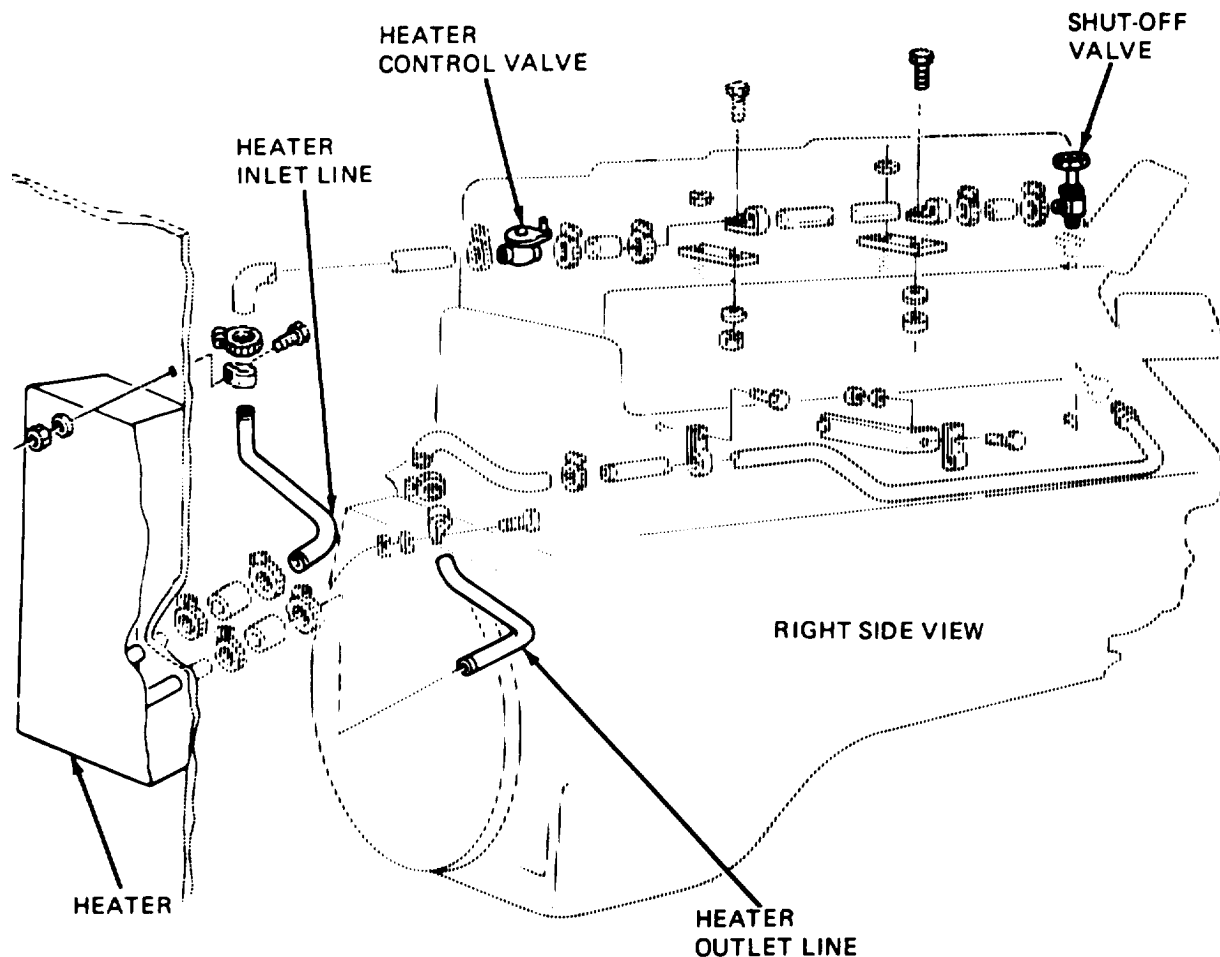
11.27. HEATER HOSE MAINTENANCE (Continued).

NOTE

All heater hoses and clamps are maintained using standard shop practices and techniques. Replace hoses that are cracked or deteriorated and any defective clamps.

Follow on maintenance action required:

- a. Fill cooling system; refer to para 4-42 C and D.
- b. Bleed heater; refer to para 4-50C.
- c. Check for leaks.



TA 075698

BODY AND CAB.

11-28. HEATER CONTROL PANEL MAINTENANCE.		
THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)		
a. Removal of Knob and Cable.	(5)	
b. Installation of Knob and Cable.	(10)	
c. Operational Check.	(6)	
	20 Minutes	Total.
INITIAL SETUP	EQUIPMENT CONDITION	
APPLICABLE CONFIGURATIONS	PARAGRAPH	CONDITION DESCRIPTION
All.	None.	None.
TEST EQUIPMENT		
None.		
SPECIAL TOOLS		
None.		
MATERIALS/PARTS (P/N)		
Cable tie, MS-3367-1-9 (96906)		

BODY AND CAB.

11-28 HEATER CONTROL PANEL MAINTENANCE (Continued).

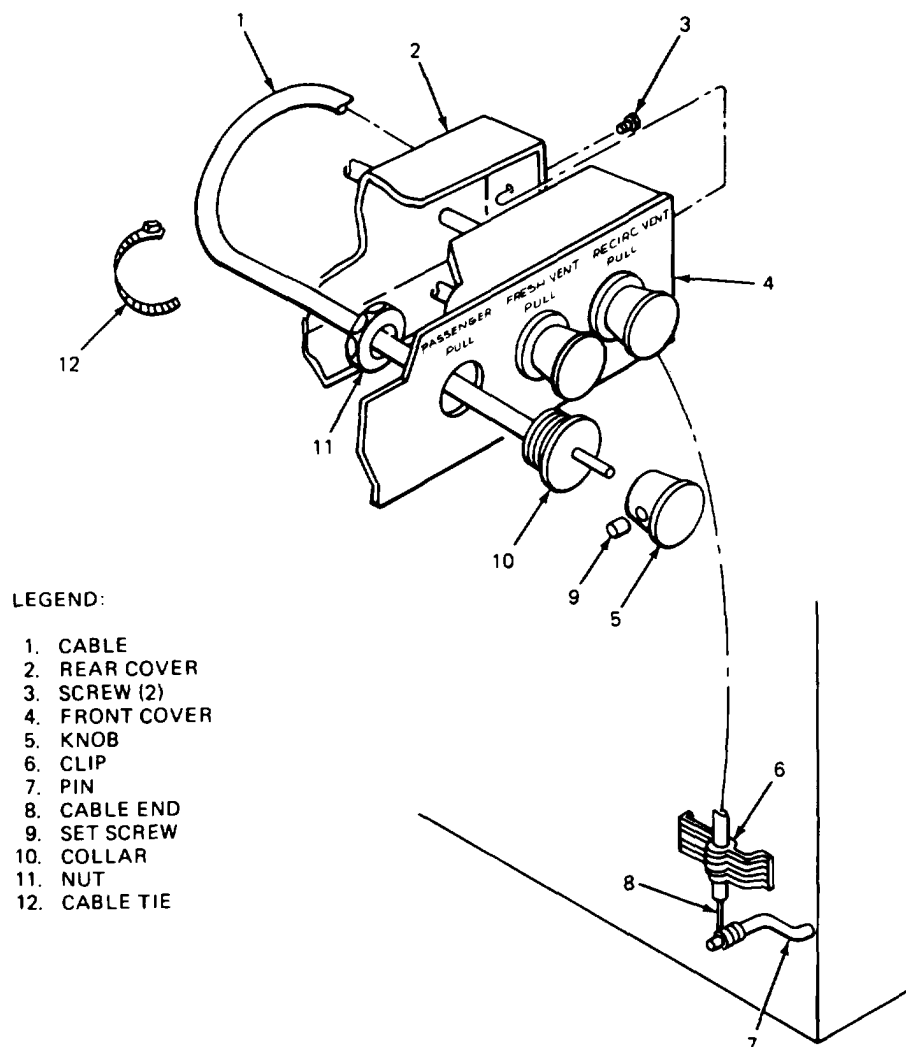
LOCATION/ITEM

ACTION

REMARKS

CAUTION

This procedure tells you how to remove and install the passenger heat control knob and cable. Follow the same steps to replace controls for driver heat, fresh vent, recirculation vent, and heater. Be sure to secure a new cable tie around cables after task completion to prevent contact and possible electrical short against air pressure warning switch located on the firewall.



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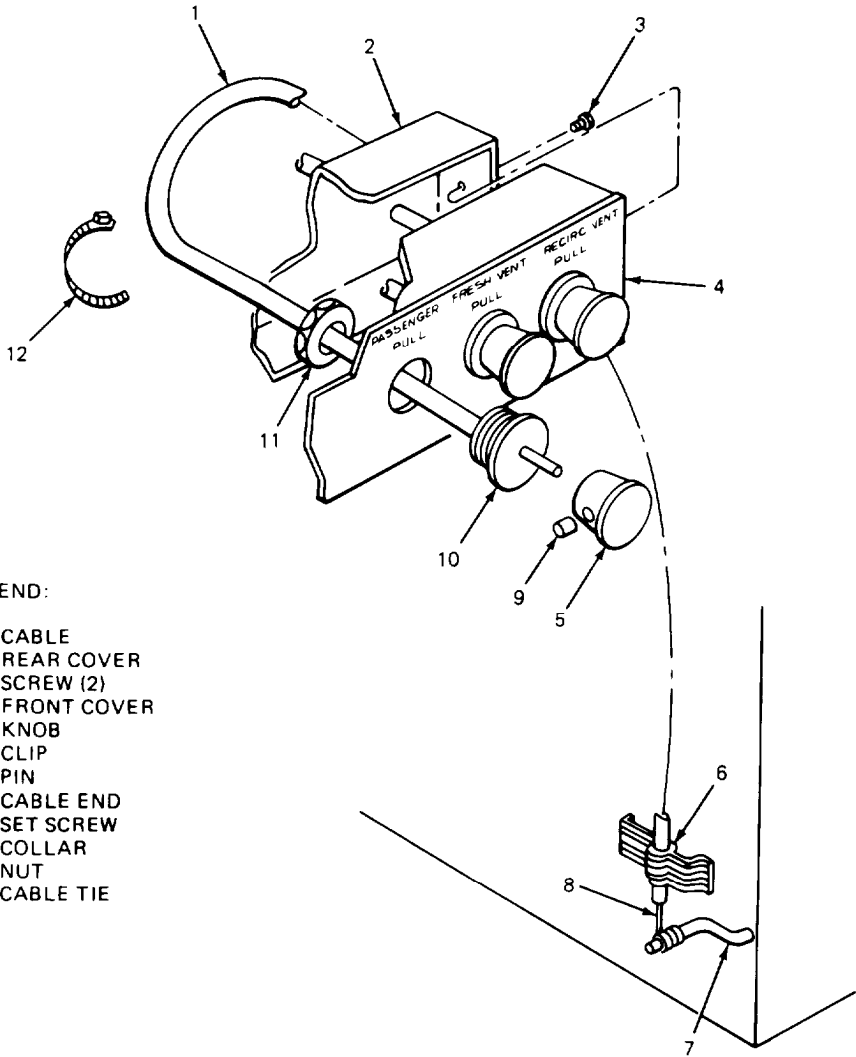
BODY AND CAB.

11-28. HEATER CONTROL PANEL MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
<u>A. REMOVAL OF KNOB AND CABLE.</u>		
1. Clip (6).	Loosen. Remove cable (1) from clip.	
2. Cable end (8).	Slide off of pin (7).	
3. Setscrew (9).	Loosen. Remove knob (5).	
4. Two screws (3).	Remove rear cover (2) from front cover (4).	
5. Nut (11).	Unscrew from collar (10).	
6. Cable tie (12)	Cut and remove from cable (1) and four other cables.	
7. Cable (1).	Remove through rear cover (2), nut (11), and front cover (4).	
<u>B. INSTALLATION OF KNOB AND CABLE.</u>		
8. Cable (1).	Thread cable end (8) through front cover (4), nut (11), and rear cover (2).	
9. Cable tie (12)	Install around cable (1) and four other cables.	
10. Nut(n).	Screw onto collar (10) and tighten.	
11. Rear cover (2).	Slide onto front cover (4) and secure with two screws (3).	
12. Knob (5).	a. Place onto cable (1). b. Tighten setscrew (9).	
13. Cable end (8).	Slide onto pin (7).	
14. Cable (1).	Fasten with clip (6).	
<u>C. OPERATIONAL CHECK.</u>		
15. Knob (5).	Pull out and push in. Check that pin (7) swings as you move the knob.	Check for binding in cable (1), if pin (7) fails to swing.

BODY AND CAB.

11-28. HEATER CONTROL PANEL MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
 LEGEND: 1. CABLE 2. REAR COVER 3. SCREW (2) 4. FRONT COVER 5. KNOB 6. CLIP 7. PIN 8. CABLE END 9. SET SCREW 10. COLLAR 11. NUT 12. CABLE TIE		

TA211958

BODY AND CAB.**11-29. HEATER CONTROL VALVE MAINTENANCE.****THIS TASK COVERS: (APPROXIMATE TIME REWIRED FOLLOWS TASK DESCRIPTION.)**

- a. Removal. (15)
 b. Installation. (15)
 30 Minutes Total.

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

EQUIPMENT CONDITION**PARAGRAPH****CONDITION DESCRIPTION**

None.

None.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Clean Container.

PERSONNEL REWIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked On Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.

GENERAL SAFETY INSTRUCTIONS

Engine Off.
 Transmission In Neutral.
 Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 4-1.

BODY AND CAB.

11-29. HEATER CONTROL VALVE MAINTENANCE (Continued).

LOCATION/ITEM

ACTION

REMARKS

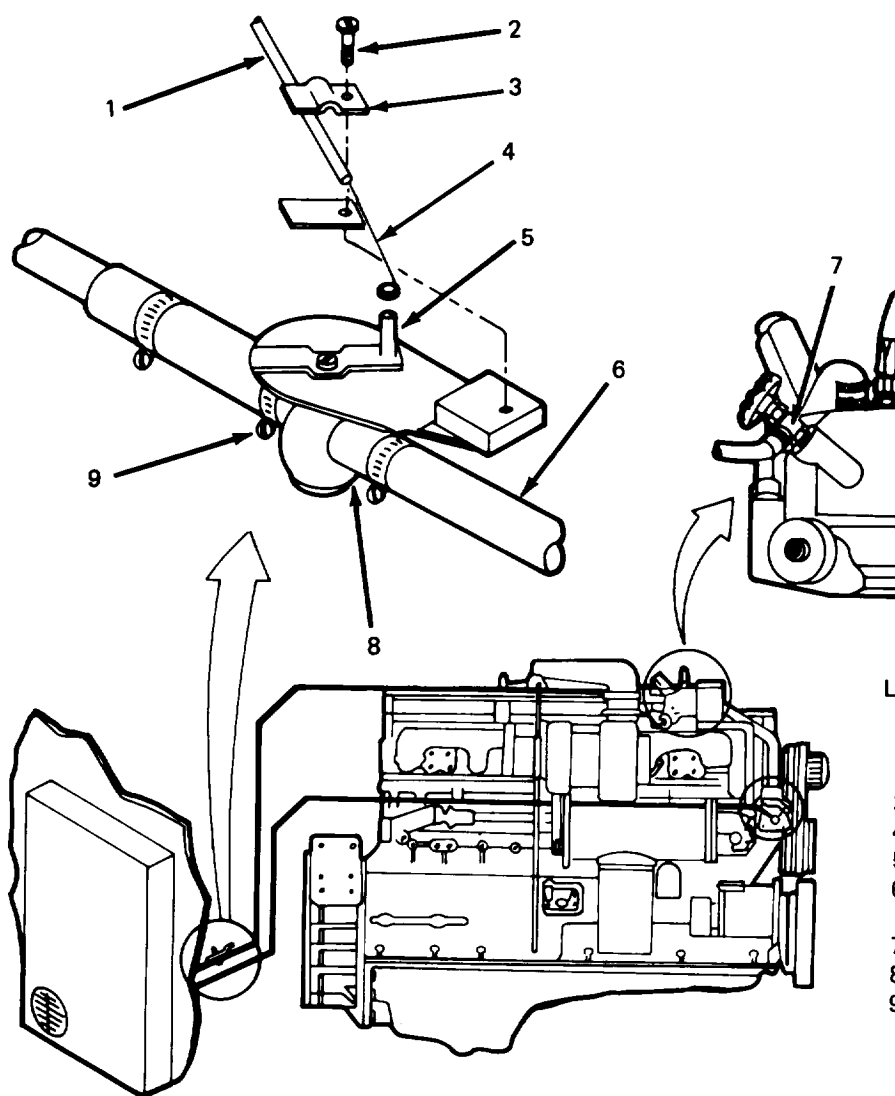
NOTE

Control knob and cable replacement procedures are given in paragraph 11-28.

A. REMOVAL

1. Shutoff valve (7).

Close (turn handle clockwise).



LEGEND:

1. CABLE
2. SCREW
3. CLIP
4. CABLE END
5. PIN
6. RUBBER CONNECTOR (2)
7. SHUTOFF VALVE
8. CONTROL VALVE
9. CLAMP (2)

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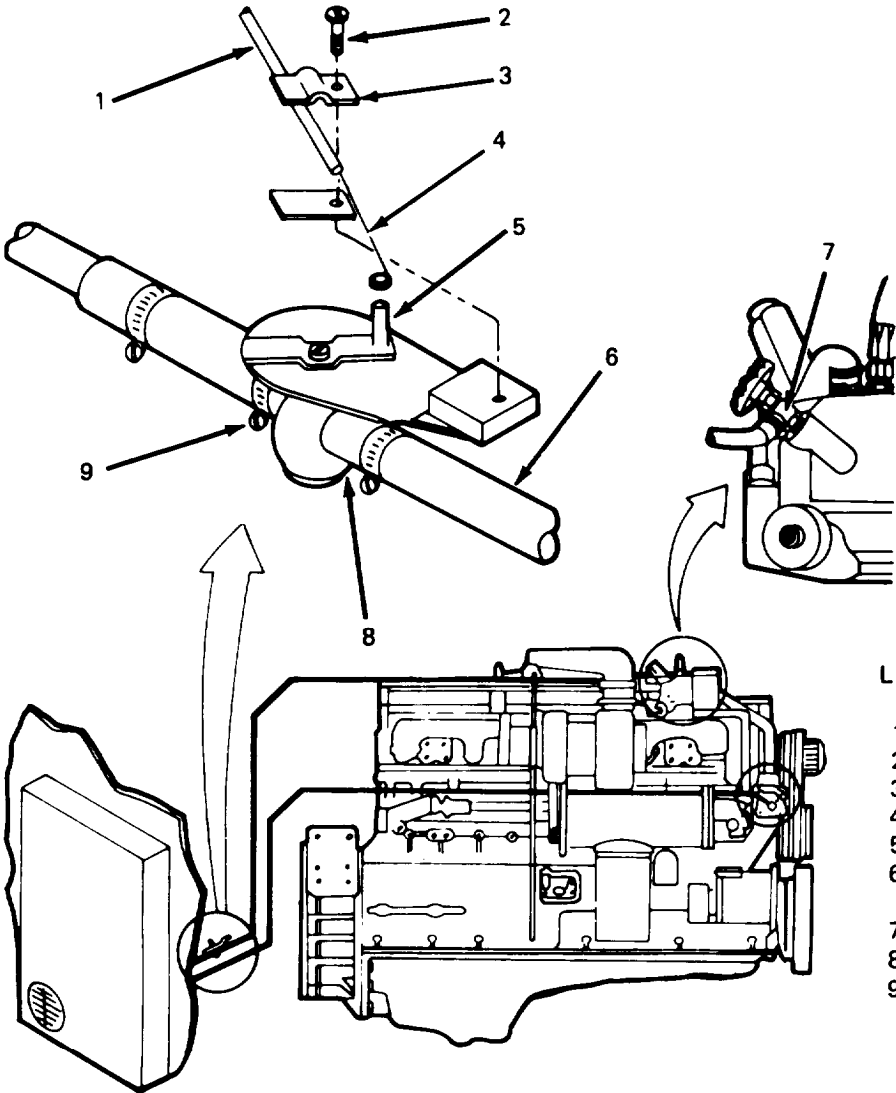
BODY AND CAB.

11-29. HEATER CONTROL VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
<u>A. REMOVAL (Continued).</u>		
2. Screw (2).	Loosen. Remove cable (1) from clip (3).	
3. Cable end (4).	Slide off of pin (5).	
NOTE Before removing control valve (8), place clean container underneath to catch spilled coolant.		
4. Two clamps (9).	Loosen.	
5. Control valve (8).	Remove from two rubber connectors (6).	
<u>B. INSTALLATION.</u>		
6. Control valve (8).	Push into two rubber connectors (6).	
7. Two clamps (9).	Tighten.	
8. Cable (1).	Place in clip (3) and tighten screw (2).	
9. Cable end (4).	Slide onto pin (5).	
NOTE Follow-on maintenance action required: Bleed heater and adjust shutoff valve; refer to paragraph 4-50C.		

BODY AND CAB.

11-29. HEATER CONTROL VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
		
LEGEND: 1. CABLE 2. SCREW 3. CLIP 4. CABLE END 5. PIN 6. RUBBER CONNECTOR (2) 7. SHUTOFF VALVE 8. CONTROL VALVE 9. CLAMP (2)		

TA 075300

BODY AND CAB.

11-30. HEATER AIR DUCTS MAINTENANCE.**THIS TASK COVERS: (APPROXIMATE TIME REWIRED FOLLOWS TASK DESCRIPTION.)**

- a. Removal. (7)
- b. Installation. (8)
- c. Checking for Leaks. (5)

20 Minutes Total.

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All.

EQUIPMENT CONDITION**PARAGRAPH****CONDITION DESCRIPTION**

None.

None.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Hose Tie (3), PLT4A-MO (06383).

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked On Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.

GENERAL SAFETY INSTRUCTIONS

Engine Off.
Transmission In Neutral.
Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 4-1.

BODY AND CAB.

11-30. HEATER AIR DUCTS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Clamps (2), (3), and (4).	Loosen.	
2. Three hose ties (7)	Cut and remove.	
3. Air ducts (1) and (8).	Remove.	

The diagram is an exploded view of a heater air duct assembly. It shows a main rectangular unit with a circular fan grille on the front. Various components are shown in their relative positions as they would be assembled. Numbered callouts point to specific parts: 1 points to an air duct fitting on top; 2 points to a clamp on a hose; 3 points to another clamp; 4 points to a third clamp; 5 points to a bracket on the side; 6 points to a screw; 7 points to a hose tie; and 8 points to another air duct fitting. The diagram illustrates the removal process for these components.

LEGEND:

- 1. AIR DUCT
- 2. CLAMP
- 3. CLAMP
- 4. CLAMP
- 5. BRACKET (3)
- 6. SCREW (3)
- 7. HOSE TIE (3)
- 8. AIR DUCT

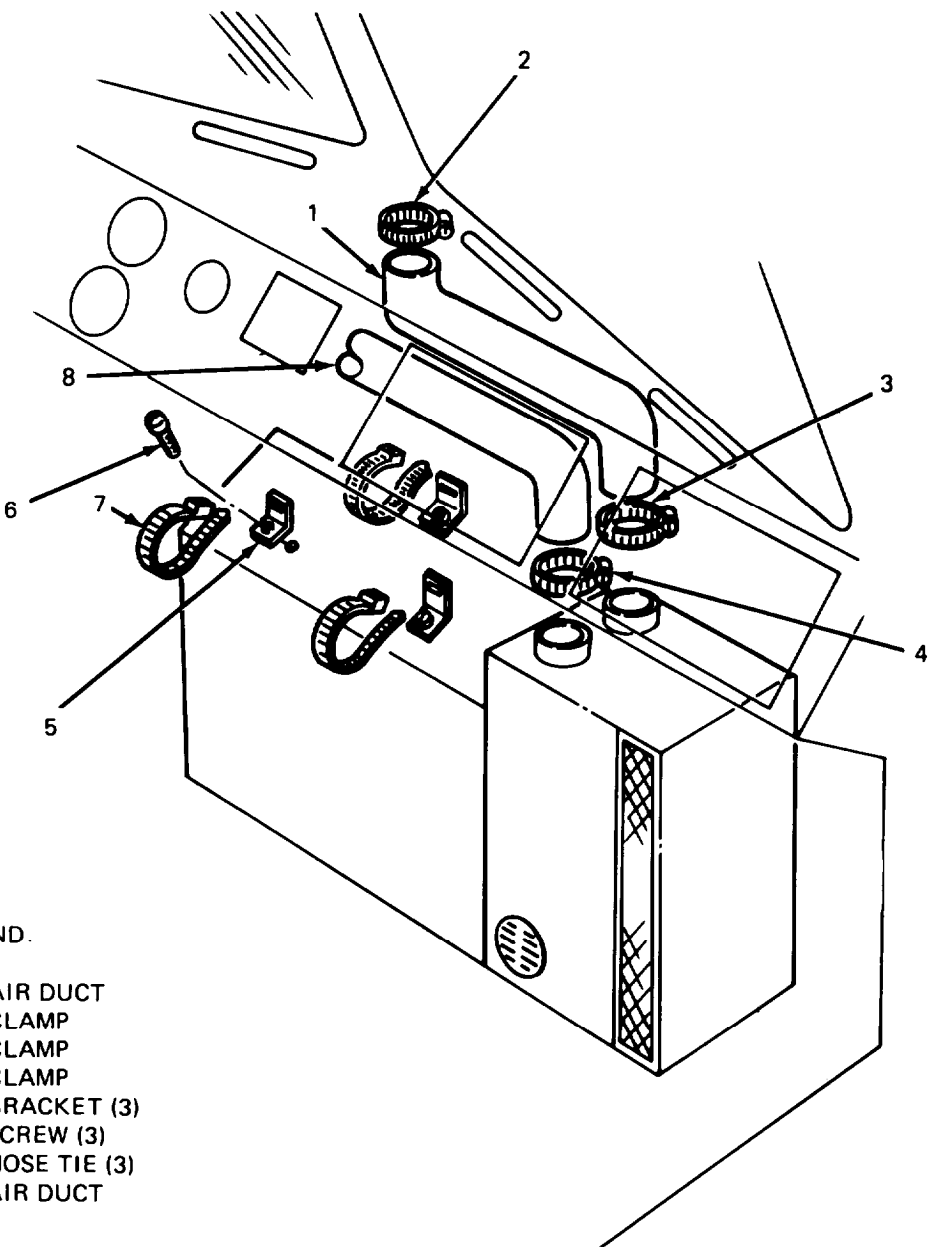
TA 075301

BODY AND CAB.

11-30. HEATER AIR DUCTS MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
<u>A. REMOVAL (Continued).</u>		
4. Three screws (6). and three brackets (5).	Remove.	
<u>B. INSTALLATION.</u>		
5. Three screws (6) and brackets (5).	Install.	
6. Air ducts (1) and (8).	Set in place.	
7. Clamps (2), (3), and (4).	Tighten.	
8. Three new hose ties (7).	Install thru brackets (5) and around air ducts (1) and (8).	
<u>C. CHECKING FOR LEAKS.</u>		
9. Engine.	Start up (see TM 9-2320-273-10).	
10. INSTRUMENT PANEL/ heater controls.	Turn on heater and fan.	
11. Air ducts (1) and (8).	Check for leaks. Tighten clamps (2), (3) or (4) as necessary.	
12. Engine.	Shut down (see TM 9-2320-273-10).	

BODY AND CAB.

11-30. HEATER AIR DUCTS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
 The diagram shows an exploded view of the heater air duct assembly. Callout 1 points to the main air duct. Callout 2 points to a clamp on the top of the duct. Callout 3 points to a clamp on the side of the duct. Callout 4 points to a clamp on the bottom of the duct. Callout 5 points to a bracket on the side of the duct. Callout 6 points to a screw on the bracket. Callout 7 points to a hose tie on the bracket. Callout 8 points to another air duct component. LEGEND. 1. AIR DUCT 2. CLAMP 3. CLAMP 4. CLAMP 5. BRACKET (3) 6. SCREW (3) 7. HOSE TIE (3) 8. AIR DUCT		

TA 075302

BODY AND CAB.

1-31. DATA AND INSTRUCTION PLATES MAINTENANCE.		
THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)		
<u>INITIAL SETUP</u>	<u>EQUIPMENT CONDITION</u>	
<u>APPLICABLE CONFIGURATIONS</u>	<u>PARAGRAPH</u>	<u>CONDITION DESCRIPTION</u>
All.	None.	None.
<u>TEST EQUIPMENT</u>		
None.		
<u>SPECIAL TOOLS</u>		
None.		
<u>MATERIALS/PARTS (P/N)</u>		
None.		
<u>PERSONNEL REQUIRED</u>	<u>SPECIAL ENVIRONMENTAL CONDITIONS</u>	
One (MOS-63B20).	Vehicle Parked On Level Ground.	
<u>REFERENCES (TM)</u>	<u>GENERAL SAFETY INSTRUCTIONS</u>	
TM 9-2320-273-10.	Engine Off. Transmission In Neutral. Park Brake Set.	
<u>TROUBLESHOOTING REFERENCES</u>		
None.		

BODY AND CAB.

11-31. DATA AND INSTRUCTION PLATES MAINTENANCE.		
LOCATION/ITEM	ACTION	REMARKS
All data and instruction plates are identified in TM 9-2320-273-10. Maintenance is limited to cleaning and replacement. To clean, use a shop rag and dry cleaning solvent. Replace by removing existing means of attachment; then install new plate and fasten with identical attaching parts.		

BODY AND CAB.

11-32. HOOD MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

- a. Removal. (20)
b. Installation. (25)
45 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Cotter Pin, 137155 (24617).

EQUIPMENT CONDITION

PARAGRAPH

None.

CONDITION DESCRIPTION

None.

PERSONNEL REQUIRED

Two (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked On Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

GENERAL SAFETY INSTRUCTIONS

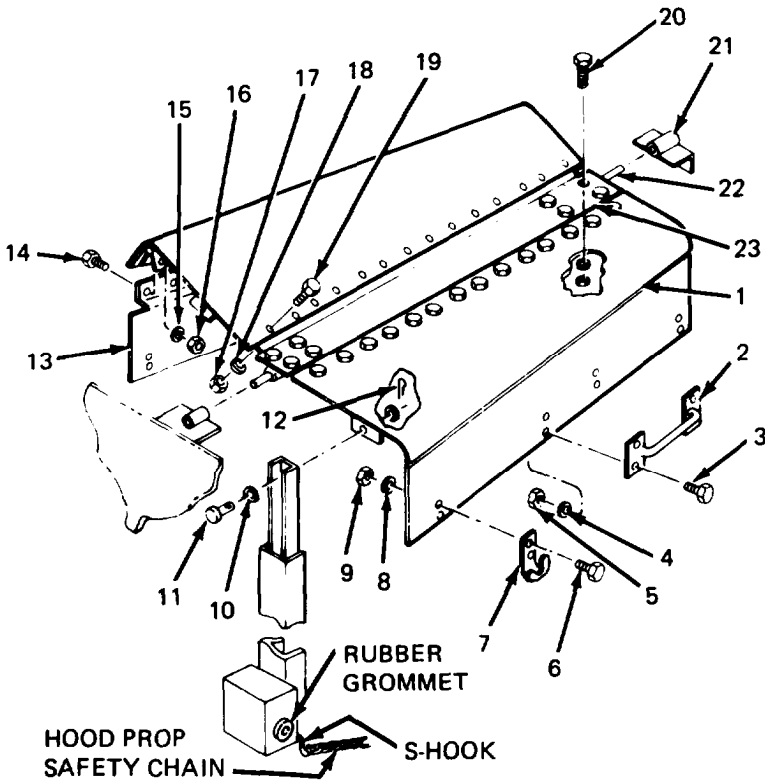
Engine Off.
Transmission In Neutral.
Park Brake Set.

TROUBLESHOOTING REFERENCES

None.

BODY AND CAB.

11-32. HOOD MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
NOTE The following procedure is applicable to both the left or right hood top and side panels.		
A. REMOVAL.		
1. Cotter pin (12).	a. Remove and discard.	
	b. Remove pin (11) and two washers (10).	
2. Four capscrews (3), washers (4) and nuts (5).	Unscrew and remove handle (2).	
3. Four capscrews (6), washers (8) and nuts (9).	Unscrew and remove two hook brackets (7).	
LEGEND: 1. HOOD TOP PANEL 2. HANDLE 3. CAPSCREW (4) 4. WASHER (4) 5. NUT (4) 6. CAPSCREW (4) 7. HOOK BRACKET (2) 8. WASHER (4) 9. NUT (4) 10. WASHER (2) 11. PIN 12. COTTER PIN 13. HOOD SIDE PANEL 14. CAPSCREW (14) 15. WASHER (14) 16. NUT (14) 17. NUT (14) 18. WASHER (28) 19. CAPSCREW (14) 20. CAPSCREW, WASHER, AND NUT (4) 21. FRONT BRACKET 22. PIN PLATE 23. HOOD CENTER PANEL		
 The diagram is an exploded view of a vehicle hood assembly. It shows the top panel (1) being detached from the side panel (13) and center panel (23). A handle (2) is shown being removed from the top panel. Various fasteners like capscrews (3, 6, 14, 19), washers (4, 8, 10, 15, 18, 28), nuts (5, 9, 14, 16, 17), a cotter pin (12), a pin (11), a front bracket (21), a pin plate (22), and a hook bracket (7) are shown in their respective positions. Other components like a rubber grommet, S-hook, and hood prop safety chain are also labeled.		
		TA 075303

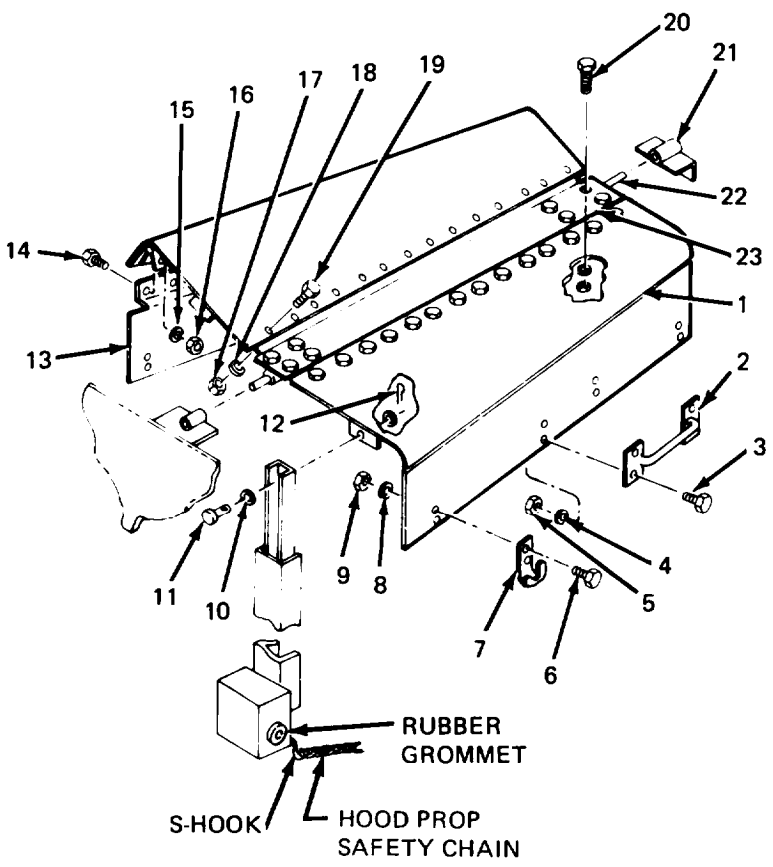
BODY AND CAB.

11-32. HOOD MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
4. Fourteen capscrews (14), washers (15) and nuts (16).	Unscrew and remove hood side panel (13).	
5. Fourteen capscrews (19), twenty-eight washers (18), and fourteen nuts (17).	Unscrew and remove hood top panel (1).	
6. Four capscrews, washers, and nuts (20).	a. Remove from pin plate (22). b. Slide pin plate (22) from front bracket (21).	
7. Hood center panel (23).	Remove from rear bracket (21) on firewall.	
NOTE Inspect hood prop safety chains, S-hooks, and rubber grommets for damage. Replace as necessary.		
B. INSTALLATION.		
8. Hood center panel (23).	Insert pin into rear bracket (21) on firewall.	
9. Four capscrews, washers, and nuts (20).	a. Insert pin plate (22) into front bracket (21). b. Install pin plate (22) to center panel (23).	
10. Hood top panel (1).	Position and secure with fourteen capscrews (19), twenty-eight washers (18) and fourteen nuts (17).	
11. Hood side panel (13).	Position and secure with fourteen capscrews (14), washers (15) and nuts (16).	
12. Hood brackets (7).	Position on hood side panel (13) and secure with four capscrews (6), washers (8) and nuts (9).	
13. Handle (2).	Position and secure with four capscrews (3), washers (4) and nuts (5).	

BODY AND CAB.

11-32. HOOD MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION (Continued).		
14. Two washers (10) and pin (11).	Insert and secure with cotter pin (12).	
LEGEND: 1. HOOD TOP PANEL 2. HANDLE 3. CAPSCREW (4) 4. WASHER (4) 5. NUT (4) 6. CAPSCREW (4) 7. HOOK BRACKET (2) 8. WASHER (4) 9. NUT (4) 10. WASHER (2) 11. PIN 12. COTTER PIN 13. HOOD SIDE PANEL 14. CAPSCREW (14) 15. WASHER (14) 16. NUT (14) 17. NUT (14) 18. WASHER (28) 19. CAPSCREW (14) 20. CAPSCREW, WASHER, AND NUT (4) 21. FRONT BRACKET 22. PIN PLATE 23. HOOD CENTER PANEL  RUBBER GROMMET S-HOOK HOOD PROP SAFETY CHAIN		

TA 075304

BODY AND CAB.**11-33. TAIL ROLLER MAINTENANCE.****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

- a. Removal. (20)
 b. Installation. (20)
 40 Minutes Total.

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

M916 and M920.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Hoist.
 Jack Stands.

**EQUIPMENT CONDITION
PARAGRAPH**

11-19A.
 11-9A.
 5-50A.

CONDITION DESCRIPTION

Mud Flaps Removed.
 Tow Eyes Removed.
 Blackout Tail Lamps
 Removed.

PERSONNEL REQUIRED

Two (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
 TM 9-2320-273-20P.
 LO 9-2320-273-12.

REFERENCES (TROUBLESHOOTING)

None.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
 Transmission in Neutral.
 Park Brake Set.
 Use Suitable Jack Stands and Hoist to Support
 Tail Roller Assembly; it is Very Heavy.

BODY AND CAB.

11-33. TAIL ROLLER MAINTENANCE (Continued).

LOCATION/ITEM

ACTION

REMARKS

WARNING

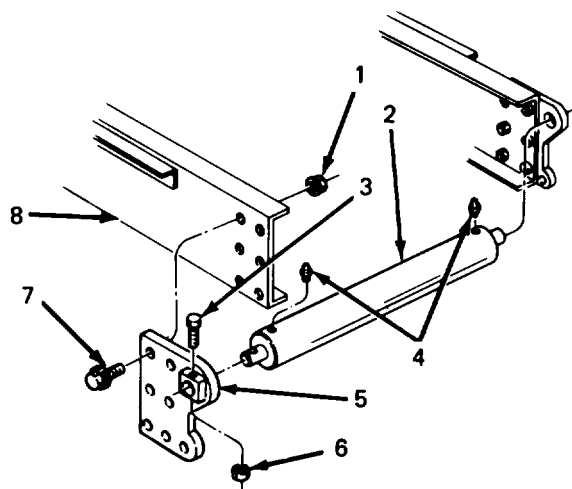
The Tail Roller is very heavy. Use extreme caution when raising or lowering to prevent injury if it should fall.

A. REMOVAL.

1. One roller mounting bracket (5).	Support with suitable jack stand.	Choose the roller mounting bracket on the side where bolt (3) and nut (6) are used.
2. Tail roller (2).	Support with suitable hoist.	
3. Four washer base bolts (7) and washer base nuts (2).	Remove from roller mounting bracket (5) and the frame rail (8).	
4. Tail roller (2) with assembled roller mounting bracket (5).	a. Move tail roller in the direction of the roller mounting bracket without bolts. The tail roller's axle shaft will be pulled out of the other roller mounting bracket. b. Slowly lower jackstand and hoist.	Second mechanic guides assembly to the ground.

LEGEND:

1. WASHER BASE NUT (8)
2. TAIL ROLLER
3. BOLT
4. LUBRICATION FITTING (2)
5. ROLLER MOUNTING BRACKET (2)
6. NUT
7. WASHER BASE BOLT (8)
8. FRAME RAIL (2)



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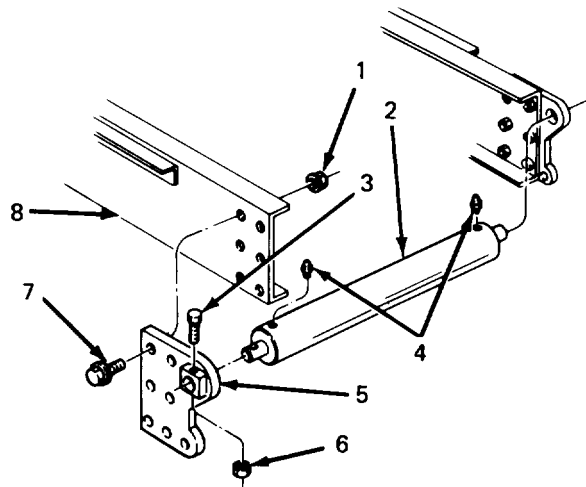
BODY AND CAB.

11-33. TAIL ROLLER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
5. One bolt (3), one nut (6), and the roller mounting bracket (5).	Remove.	
6. Roller mounting bracket (5) and tail roller (2).	Pull tail roller's axle shaft out of roller mounting bracket.	
7. Four washer base nuts (1) and washer base bolts (7).	Unscrew and remove second roller mounting bracket (4).	Removal is necessary only if replacement is needed due to wear or damage.
NOTE If bearings inside tail roller or axle shaft are to be serviced, refer to Direct Support Maintenance.		
B. INSTALLATION.		
8. One roller mounting bracket (5).	Aline with holes in frame rail (8) and install with four washer base bolts (7) and washer base nuts (1).	Make sure you use correct holes in roller mounting bracket. M916 uses two top rows; M920 uses bottom two rows.
9. Second roller mounting bracket (5).	Slide over axle shaft of tail roller (2) and secure with bolt (3) and nut (6).	
10. Tail roller (2) with assembled roller mounting bracket (5).	a. Lift into position with hoist and aline mounting holes with those in frame rails (8) and tail roller axle into first roller mounting bracket already installed. b. Block in position with axle stands.	First mechanic operates hoist while second guides assembly.
11. Four washer base bolts (7) and washer base nuts (1).	Install thru second roller mounting bracket (5) and frame rail (8).	Make sure you use correct bolt holes in roller mounting bracket. M916 uses two top rows; M920 uses bottom two rows.

BODY AND CAB.

11-33. TAIL ROLLER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION (Continued).		
12. Two lubrication fittings (4).	Clean, inspect and lubricate using grease gun (see LO 9-2320-273-12).	Refer to Direct Support Maintenance if replacement is necessary.
Follow-on maintenance action required:		
a. Install blackout tail lamps (para 5-50B).		
b. Install tow eyes (para 11-9B).		
c. Install mud flaps (para 11-19B).		
LEGEND: 1. WASHER BASE NUT (8) 2. TAIL ROLLER 3. BOLT 4. LUBRICATION FITTING (2) 5. ROLLER MOUNTING BRACKET (2) 6. NUT 7. WASHER BASE BOLT (8) 8. FRAME RAIL (2) 		
TA 075700		

CHAPTER 12

WINCH AND PTO LINKAGE MAINTENANCE

12-1. OVERVIEW.

This chapter provides you with the following information related to winch and power takeoff maintenance:

- a. All required special tools and equipment.
- b. Other technical manuals.
- c. Troubleshooting procedures.
- d. Maintenance procedures.

Section I REPAIR PARTS, SPECIAL TOOLS, TMDE AND SUPPORT EQUIPMENT

12-2. COMMON TOOLS AND EQUIPMENT.

For authorized common tools and equipment, refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

12-3. SPECIAL TOOLS, TMDE, SUPPORT EQUIPMENT.

The special tools, TMDE and support equipment required for the winch and power takeoff maintenance procedures described in this chapter are limited to the oil filter strap wrench. (Refer to Organizational Maintenance RPSTL, TM 9-2320-273-20P for tool description and illustration.)

12-4. SPARES AND REPAIR PARTS.

Spares and repair parts are listed and illustrated in the Repair Parts and Special Tools List covering Organizational Maintenance for this equipment (TM 9-2320-273-20P).

Section II TROUBLESHOOTING

12-5. INTRODUCTION.

Tables 12-1 and 12-2 contain instructions for troubleshooting the winch and the power takeoff, which are driven by the transmission. The corrective actions tell you how to fix the

12-5. INTRODUCTION (Continued).

problem or refer you to a procedure that will fix the problem. The Troubleshooting tables are arranged by malfunctions in the following order:

WINCH (M916 and M920) (Table 12-1)

- a. Winch operates in one direction only.
- b. Winch does not operate in either direction.
- c. Winch operates at one speed only.
- d. Winch will not hold suspended load.

POWER TAKEOFF (PTO) (M916 thru M920) (Table 12-2).

- a. PTO will not engage.
- b. PTO is excessively noisy.

Section III MAINTENANCE PROCEDURES

12-6. INTRODUCTION.

This section provides you with Organizational Level maintenance procedures for the winch. The scope of maintenance is limited to the work listed in the following summary of task procedures.

Table 12-1. Winch Troubleshooting Procedures.

MALFUNCTION.	
TEST OR INSPECTION.	
CORRECTIVE ACTION.	
1. WINCH OPERATES IN ONE DIRECTION ONLY:	
Step 1. Inspect all oil lines for damage and leakage.	Replace lines (para 12-13).
Step 2. Inspect directional control valve for leakage.	Tighten connections or replace valve (para 12-11).
Step 3. Check winch motor for leakage and visible signs of overheating.	Replace winch motor (para 12-14).
Step 4. Check to see if pilot orifice in winch brake valve is plugged.	Clean orifice.
2. WINCH DOES NOT OPERATE IN EITHER DIRECTION:	
Step 1. Check all oil lines for damage and leakage.	Tighten loose connections and replace defective components.
Step 2. Check pump inlet strainer and in line filter for clogging.	Replace filter element (para 12-9 and 12-10).
Step 3. Check reservoir for proper oil level.	Fill to proper level (LO 9-2320-273-12).
Step 4. Check pump for leakage and visible signs of overheating.	Replace pump (para 12-15).
Step 5. Connect a pressure gage in line between each control valve and winch motor (one at a time) and attempt to operate.	If pressure is normal (2350 psi maximum), refer winch to Direct Support Maintenance for replacement.

Table 12-1. Winch Troubleshooting Procedures (Continued).

MALFUNCTION.	
TEST OR INSPECTION.	
CORRECTIVE ACTION.	
3. WINCH OPERATES AT ONE SPEED ONLY:	
	Check the auxiliary control valve for damage and leakage.
	a. Tighten or repair leaking connections or lines.
	b. Replace valve (para 12-11).
	c. Check rear gear section of dual pump (refer to Direct Support).
4. WINCH WILL NOT HOLD SUSPENDED LOAD:	
Step 1.	Check failsafe brake disk to see if it is oil soaked.
	Replace brake assembly.
Step 2.	Check failsafe brake disks for wear.
	Replace brake.

Table 12-2. Power Takeoff (PTO) Troubleshooting Procedures.

MALFUNCTION.	
TEST OR INSPECTION.	
CORRECTIVE ACTION.	
1.	PTO WILL NOT ENGAGE: Have an assistant attempt to engage the PTO (TM 9-2320-273-10) and visually check the shift rod (lever) on the PTO for movement. a. If shift does not move, replace PTO linkage (para 12-16). b. If the shift rod moves, refer the problem to Direct Support Maintenance for PTO replacement.
2.	PTO IS EXCESSIVELY NOISY: Notify Direct Support Maintenance.

2-7. WINCH MAINTENANCE TASK SUMMARY.		
INITIAL SETUP	EQUIPMENT CONDITION	
<u>APPLICABLE CONFIGURATIONS</u>	<u>PARAGRAPH</u>	<u>CONDITION DESCRIPTION</u>
M916 and M920.	None.	None.
<u>TEST EQUIPMENT</u>		
None.		
<u>TOOLS</u>		
None.		
<u>MATERIALS/PARTS (P/N)</u>		
Clean Container. Marking Pen. Filter Element, 74011 (34623). Oil (1 qt). Gasket (9995). Gasket (2), 11027 (34623). Pin Kit, 1V1701 (34623). Non-flammable Dry Cleaning Solvent SD-2 (Refer to Appendix C). Liquid Teflon (Refer to Appendix C). Masking Tape. Plugs. Gasket, Hydraulic Motor to Failsafe Brake, 28426 (34625).		
<u>PERSONNEL REQUIRED</u>	<u>SPECIAL ENVIRONMENTAL CONDITIONS</u>	
Two MOS-63B20)	Vehicle Parked Level.	
<u>REFERENCES (TM)</u>	<u>GENERAL SAFETY INSTRUCTIONS</u>	
TM 9-2320-273-10 TM 9-2320-273-20P LO 9-2320-273-12	Engine OFF. Transmission in Neutral. Park Brake Set.	
<u>REFERENCES (TROUBLESHOOTING)</u>		
Table 12-1, 12-2.		

12-7. WINCH MAINTENANCE TASK SUMMARY (Continued).			
LIST OF TASKS			
TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
1.	Winch Cable Maintenance:	12-8	
	A. Removal.	12-8A	12-1
	B. Installation.	12-8B	12-2
2.	Inline Filter Maintenance:	12-9	12-1
	A. Removal.	12-9A	12-2
	B. Installation.	12-9B	
	C. Checking for Leaks.	12-9C	
3.	Reservoir Screen and Strainer Maintenance:	12-10	12-1
	A. Removal.	12-10A	12-2
	B. Cleaning.	12-10B	
	C. Installation.	12-10C	
4.	Control Valves Maintenance:	12-11	
	A. Removal.	12-11A	12-1
	B. Installation.	12-11B	12-2
	C. Operational Check.	12-11C.	
5.	Throttle Maintenance:	12-12	
	A. Removal.	12-12A	12-1
	B. Cleaning and Inspection.	12-12B	12-2
	C. Installation.	12-12C	
	D. Operational Check.	12-12D	
6.	Hydraulic Lines and Fittings Maintenance:	12-13	12-1
	A. Removal.	12-13A	12-2
	B. Installation.	12-13B	
	C. Checking for Leaks.	12-13C	

12-7. WINCH MAINTENANCE TASK SUMMARY (Continued).			
LIST OF TASKS			
TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
7.	Hydraulic Motor Maintenance:	12-14	12-1
	A. Removal.	12-14A	12-2
	B. Cleaning and Inspection.	12-14B	
	C. Installation and Operational Check.	12-14C	
8.	Hydraulic Pump Maintenance:	12-15	12-1
	A. Removal.	12-15A	12-2
	B. Installation.	12-15B	
	C. Operational Check.	12-15C	
9.	PTO Linkage Maintenance:	12-16	12-1
	A. Removal.	12-16A	12-2
	B. Installation.	12-16B	
	C. Operational Check.	12-16C	

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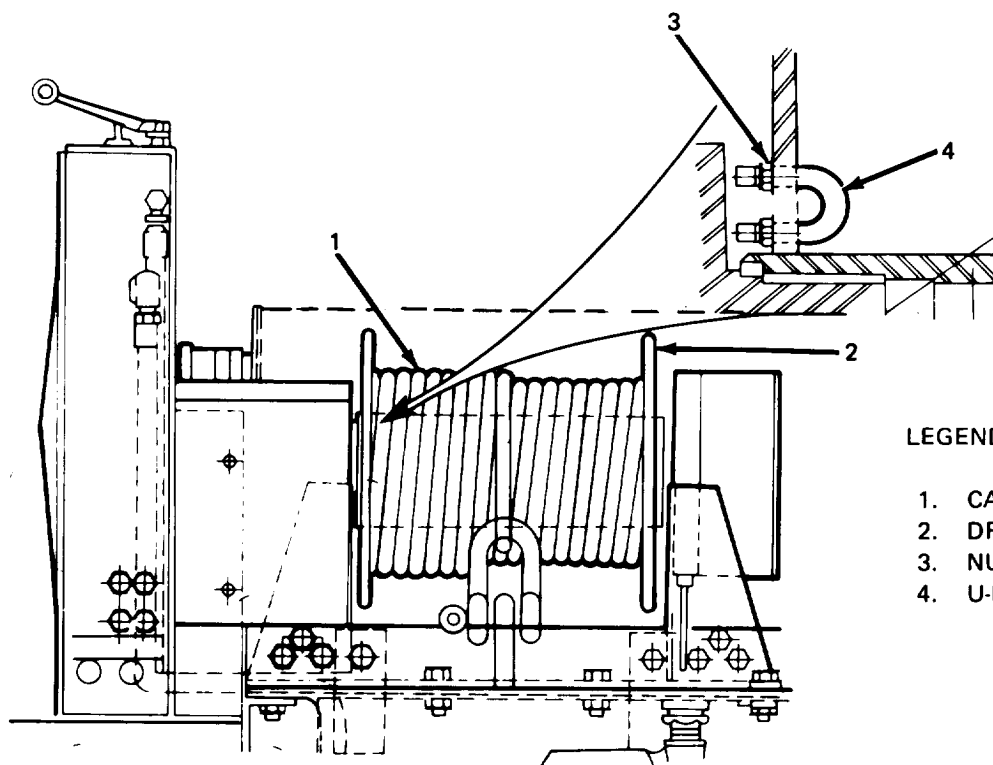
WINCH.

2-8. WINCH CABLE MAINTENANCE.		
<u>THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)</u>		
a. Removal. (15) b. Installation. (20) 35 Minutes Total.		
<u>INITIAL SETUP</u>	<u>EQUIPMENT CONDITION</u>	<u>CONDITION DESCRIPTION</u>
<u>APPLICABLE CONFIGURATIONS</u>	<u>PARAGRAPH</u>	
M916 and M920.	None.	None.
<u>TEST EQUIPMENT</u>		
None.		
<u>SPECIAL TOOLS</u>		
None.		
<u>MATERIALS/PARTS (P/N)</u>		
None.		
<u>PERSONNEL REQUIRED</u>	<u>SPECIAL ENVIRONMENTAL CONDITIONS</u>	
Two (MOS-63B20) .	Vehicle Park ad on Level Ground.	
<u>REFERENCES (TM)</u>	<u>GENERAL SAFETY INSTRUCTIONS</u>	
TM 9-2320-273-10.	Engine OFF. Transmission in Neutral. Park Brake Set.	
<u>TROUBLESHOOTING REFERENCES</u>		
Table 12-1, 12-2.		

WINCH.

12-8. WINCH CABLE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Cable (1).	Unreel from drum (2).	Refer to TM 9-2320-273-10.
2. Nuts (3).	Remove.	
3. U-bolt (4).	Remove.	
B. INSTALLATION.		
4. U-bolt (4).	Install through holes on side of drum.	
5. Nuts (3).	Screw onto U-bolt (4). Do not tighten at this time.	
6. Cable (1).	Slide unswaged end of cable between U-bolt (4) and drum (2). Cable should protrude approximately 1.00 inch.	
7. Nuts (3).	Tighten.	
8. Cable (1).	Rewind on drum (2).	Refer to TM 9-2320-273-10.



LEGEND:

- 1. CABLE
- 2. DRUM
- 3. NUT (2)
- 4. U-BOLT

TA 075306

WINCH.

12-9. INLINE FILTER MAINTENANCE.		
THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)		
a. Removal. (5) b. Installation. (5) c. Checking for Leaks. (5) 15 Minutes Total.		
INITIAL SETUP	EQUIPMENT CONDITION	
<u>APPLICABLE CONFIGURATIONS</u>	<u>PARAGRAPH</u>	<u>CONDITION DESCRIPTION</u>
M916 and M920.	None.	None.
<u>TEST EQUIPMENT</u>		
None.		
<u>SPECIAL TOOLS</u>		
None.		
<u>MATERIALS/PARTS (P/N)</u>		
Filter Element, 74011 (34623).		
Oil, 1 qt (1 liter) (refer to appendix C).		
Container.		
<u>PERSONNEL REQUIRED</u>	<u>SPECIAL ENVIRONMENTAL CONDITIONS</u>	
One (MOS-63B20).	Vehicle Parked on Level Ground.	
<u>REFERENCES (TM)</u>	<u>GENERAL SAFETY INSTRUCTIONS</u>	
TM 9-2320-273-10.	Engine OFF.	
TM 9-2320-273-20P.	Transmission in Neutral.	
LO 9-2320-273-12.	Park Brake Set.	
<u>TROUBLESHOOTING REFERENCES</u>		
Table 12-1, 12-2.		

WINCH.

12-9. INLINE FILTER MAINTENANCE (Continued).

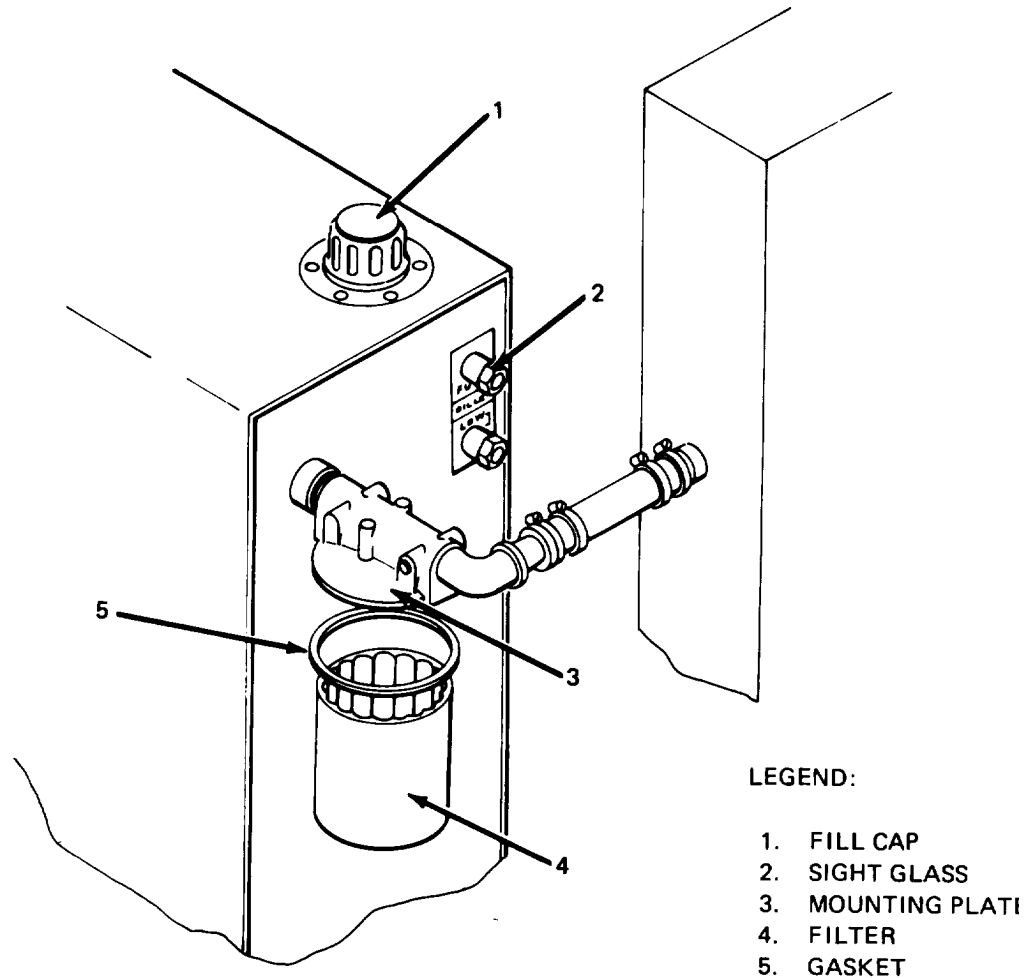
LOCATION/ITEM

ACTION

REMARKS

WARNING

Winch system retains some pressure even when not in use. Before you begin maintenance, vent pressure by carefully removing fill cap (1).



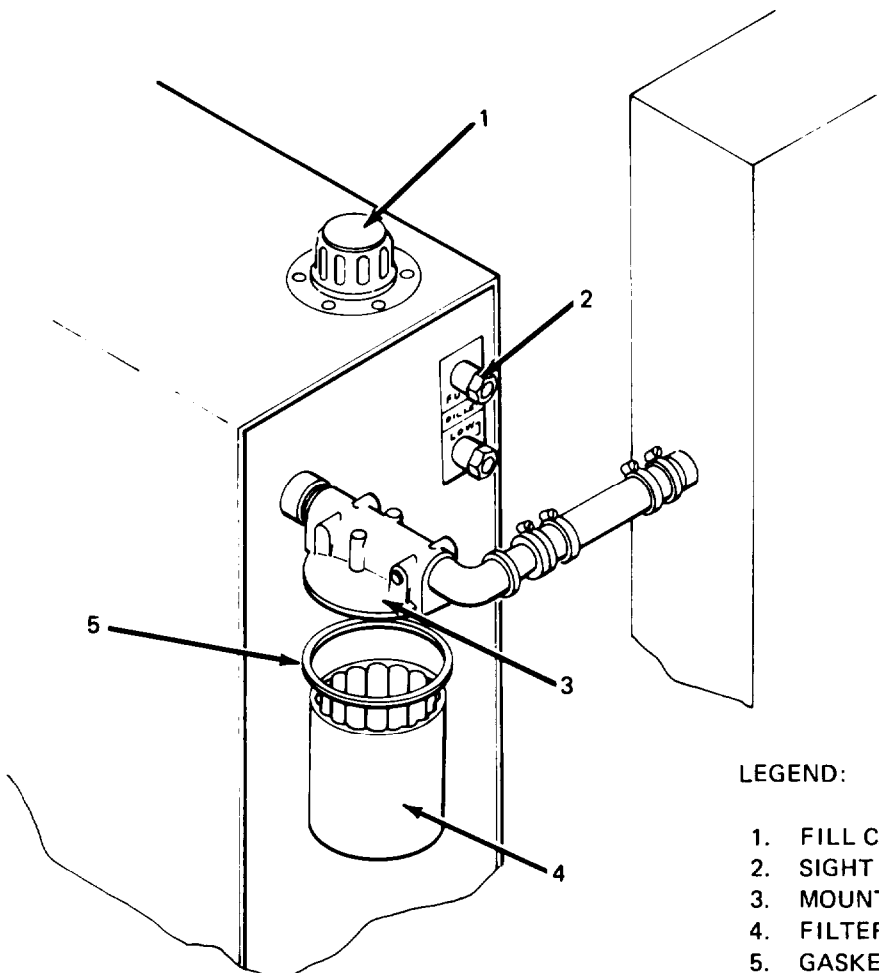
TA 076307

WINCH.

12-9. INLINE FILTER MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Filter (4).	Using wrench, unscrew and throw away.	Place container under filter.
2. Gasket (5).	Inspect.	Replace if necessary.
B. INSTALLATION .		
CAUTION Do not use strap wrench to install filter.		
3. Filter (4).	a. POur in 1 qt (1 liter) b. Install gasket (5). c. Screw on until filter top just touches mounting plate (3). d. Tighten 1/4 turn more.	
4. Sight glass (2).	Check that oil is visible in top sight glass.	Add oil if necessary.
5. Fill cap (1).	Screw on and tighten.	
C. CHECKING FOR LEAKS.		
6. Engine.	Start up (see TM 9-2320-273-10).	
7. PTO.	Engage (see TM 9-2320-273-10).	
8. Filter (4).	Check for oil leaks.	Tighten as necessary.
9. Engine.	Shut down (see TM 9-2320-273-10).	

WINCH.

12-9. INLINE FILTER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
NOTE The reservoir screen and strainer should be cleaned or replaced each time you service the inline filter. See para 12-10.  LEGEND: 1. FILL CAP 2. SIGHT GLASS 3. MOUNTING PLATE 4. FILTER 5. GASKET		
TA 075308		

WINCH.**12-10. RESERVOIR SCREEN AND STRAINER MAINTENANCE.****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

- a. Removal. (5)
 - b. Cleaning. (10)
 - c. Installation. (5)
- 20 Minutes Total.

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

M916 and M920.

EQUIPMENT CONDITION**PARAGRAPH**

None.

CONDITION DESCRIPTION

None.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Non-flammable Cleaning Solvent SD-2 (refer to appendix C).

Clean Container.

Gasket (2), 11027 (34623).

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.

TM 9-2320-273-20P.

LO 9-2320-273-12.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.

Transmission in Neutral.

Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 12-1, 12-2.

WINCH.

12-10. RESERVOIR SCREEN AND STRAINER MAINTENANCE (Continued).

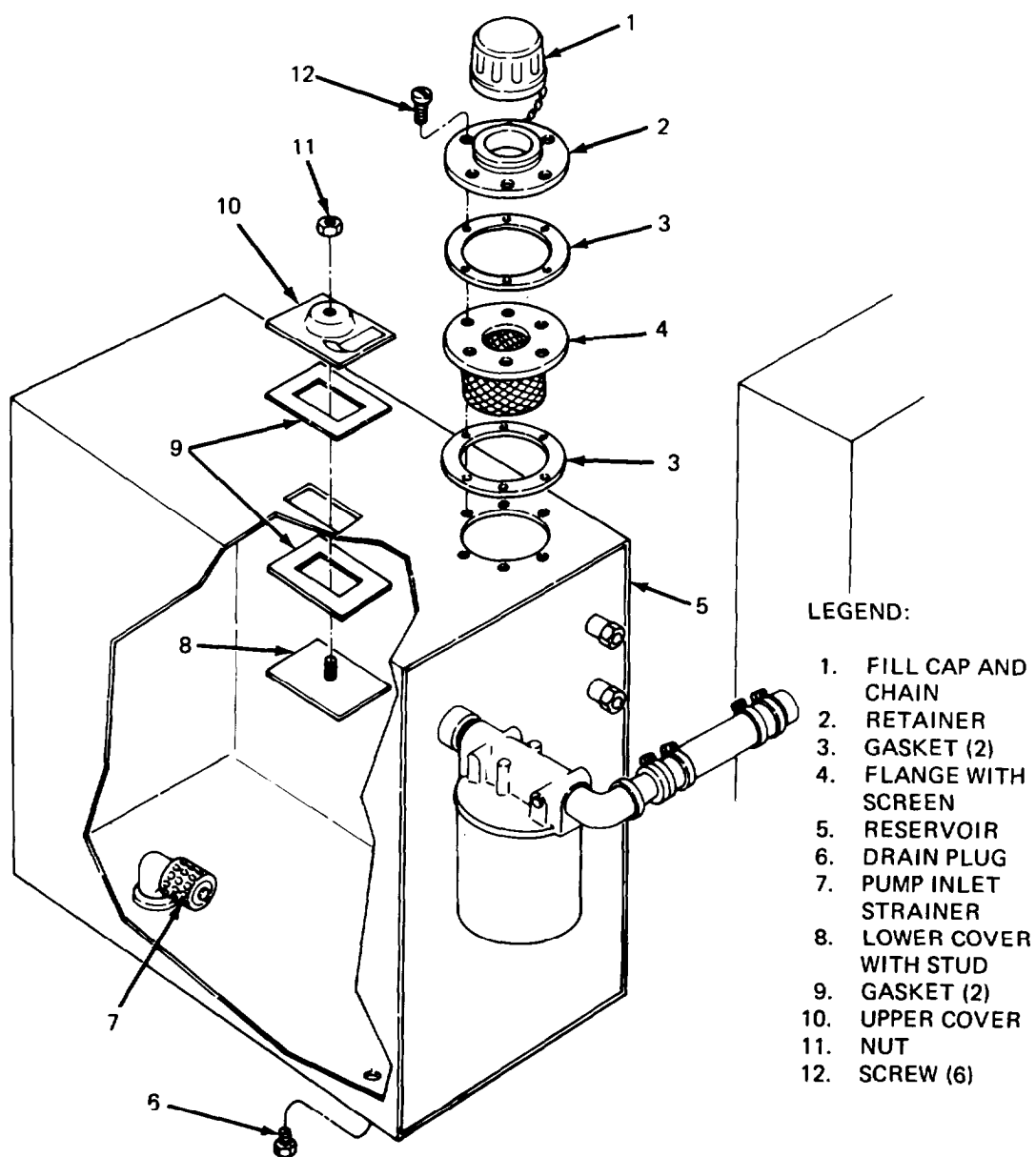
LOCATION/ITEM

ACTION

REMARKS

WARNING

Winch system retains some pressure even when not in use. Remove fill cap (1) slowly.



TA 075309

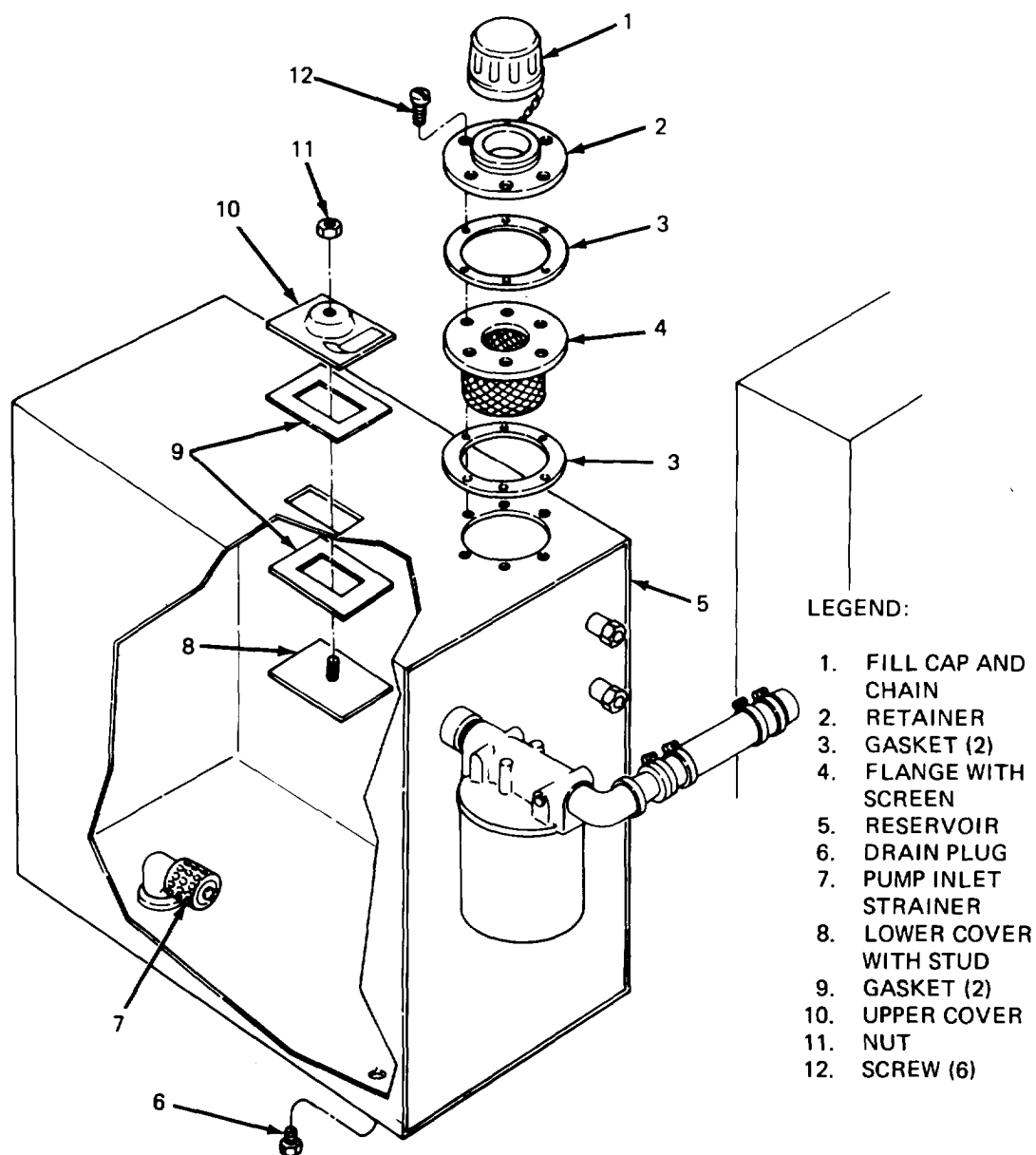
WINCH.

12-10. RESERVOIR SCREEN AND STRAINER MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Fill cap with chain (1).	Unscrew.	
2. Drain plug (6).	Unscrew and drain fluid into clean container.	
3. Nut (11).	a. Loosen. b. Remove nut (11) with other hand.	Slide upper cover (10), two gaskets (9) and lower cover, with stud (8) to the side with one hand.
4. Upper cover (10), two gaskets (9), and lower cover with stud (8).	Lift out of reservoir (5).	Discard gaskets (9).
5. Pump inlet strainer (7).	Unscrew and remove.	
6. Six screws (12).	Remove and lift out retainer (2), two gaskets (3), and flange and screen (4).	Inspect gaskets (3). If damaged, make from stock using old gasket for a template.
B. CLEANING.		
 Do not allow dry cleaning solvent SD-2 to come in contact with seals or flexible hoses. Such cleaners may damage leather, rubber, and synthetic materials.		
7. Flange and screen (4) and pump inlet strainer (7).	a. Clean with dry cleaning solvent. b. Allow to dry.	If damaged, replace.
C. INSTALLATION.		
8. Flange and screen (4), two gaskets (3) and retainer (2).	Place in reservoir fill opening and secure with six screws (12).	
9. Pump inlet strainer (7).	Insert thru access hole and screw onto pipe.	
10. Lower cover with stud (8), two new gaskets (9), and upper cover (10).	a. Hold in position with one hand at access hole in reservoir (5). b. Install nut (11) and tighten.	To keep parts in proper position first turn nut (11) by hand while pulling up. Once snug, tighten with wrench.

WINCH.

12-10. RESERVOIR SCREEN AND STRAINER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
C. INSTALLATION (Continued).		
11. Drain plug (6).	Screw into reservoir bottom.	
12. Reservoir (5).	Fill.	See LO 9-2320-273-12.
13. Fill cap with chain (1).	Screw on.	



TA 075310

WINCH.

12-11. CONTROL VALVES MAINTENANCE.		
THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)		
a. Removal. (10) b. Installation. (15) c. Operational Check. (10) 35 Minutes Total.		
INITIAL SETUP	EQUIPMENT CONDITION	
<u>APPLICABLE CONFIGURATIONS</u>	<u>PARAGRAPH</u>	<u>CONDITION DESCRIPTION</u>
M916 and M920.	None.	None.
<u>TEST EQUIPMENT</u>		
None.		
<u>SPECIAL TOOLS</u>		
None.		
<u>MATERIALS/PARTS (P/N)</u>		
Liquid Teflon (refer to appendix C). Plugs. Masking Tape. Marking Pen. Pin Kit, IV1701 (34623).		
<u>PERSONNEL REQUIRED</u>	<u>SPECIAL ENVIRONMENTAL CONDITIONS</u>	
One (MOS-63B20).	Vehicle Parked on Level Ground.	
<u>REFERENCES (TM)</u>	<u>GENERAL SAFETY INSTRUCTIONS</u>	
TM 9-2320-273-10. TM 9-2320-273-20P.	Engine OFF. Transmission in Neutral. Park Brake Set.	
<u>TROUBLESHOOTING REFERENCES</u>		
Table 12-1, 12-2.		

WINCH.

12-11. CONTROL VALVES MAINTENANCE (Continued).

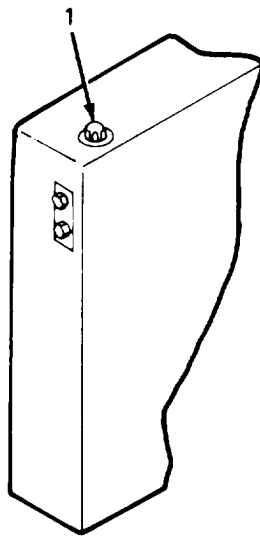
LOCATION/ITEM

ACTION

REMARKS

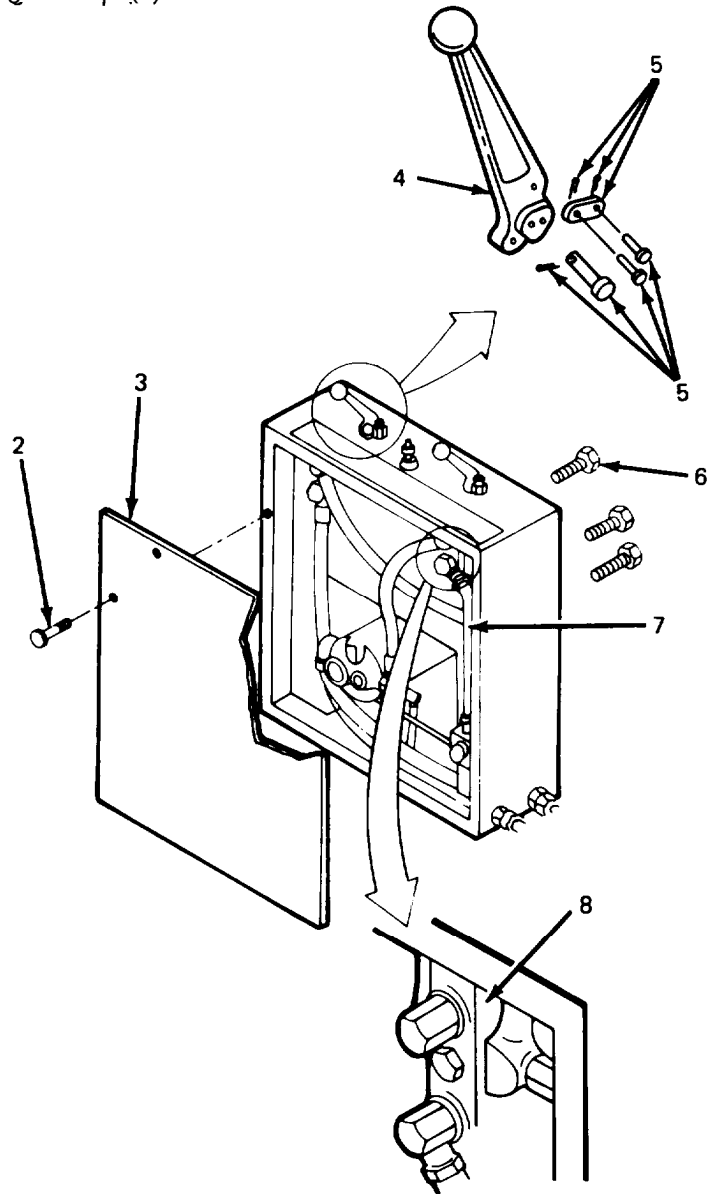
WARNING

Winch system retains some pressure even when not in use. Before you begin maintenance, vent pressure by carefully removing fill cap (1).



LEGEND:

1. FILL CAP
2. SCREW (6)
3. COVER
4. HANDLE
5. PIN KIT
6. BOLT (3)
7. PRESSURE LINE (2)
8. VALVE



TA 075311

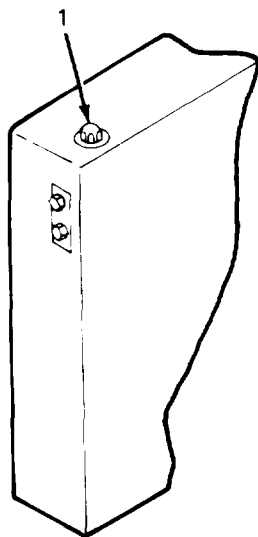
WINCH.

12-11. CONTROL VALVES MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
NOTE The following procedure describes removal and installation of the directional control valve. Follow the same steps to remove and install the auxiliary control valve.		
A. REMOVAL.		
1. Six screws (2).	Unscrew and remove cover (3).	
2. Pin kit (5) and handle (4).	a. Remove three cotter pins. b. Remove three straight pins. c. Remove one plate. d. Lift off handle (4).	Discard pin kit (5).
NOTE Plug each line as soon as you have disconnected it. This will prevent loss of fluid from the system.		
3. Two pressure lines (7).	a. Disconnect at valve (8) and plug. b. Inspect for: 1. Leaks. 2. Cracks. 3. Discoloration. 4. Damaged fittings.	Tag and mark where each line connects. Replace if necessary.
4. Three bolts (6).	Unscrew and remove valve (8).	
B. INSTALLATION.		
5. Valve (8).	a. Set in place. b. Screw on and tighten three bolts (6).	
6. Two pressure lines (7).	Unplug and connect to valve (8).	
7. Handle (4).	Attach to valve (8) with new pin kit (5).	
8. Fill cap (1).	Screw on, and tighten.	
C. OPERATIONAL CHECK.		
9. Engine.	Start up (see TM 9-2320-273-10). Engage PTO.	

WINCH.

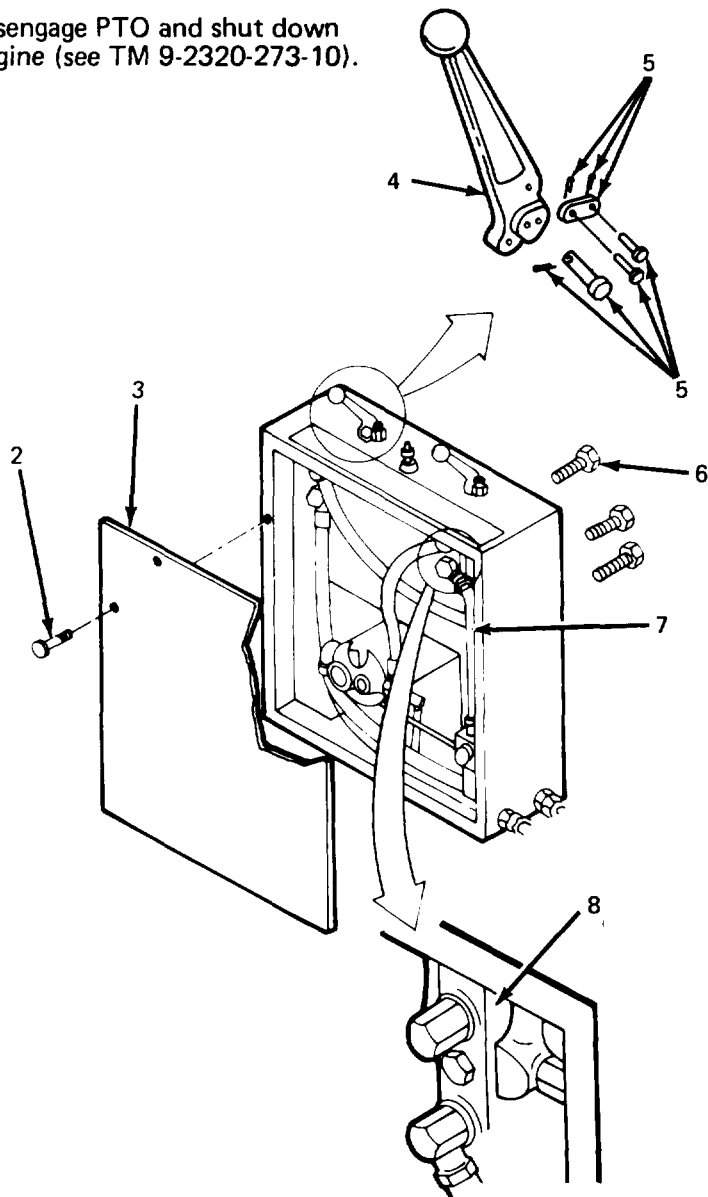
12-11. CONTROL VALVES MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
C. OPERATIONAL CHECK (Continued).		
10. Control valve (8).	Operate winch and check for: a. Leakage. b. Proper operation.	Tighten connections as necessary.
11. Cover (3).	Align with mounting holes in winch control panel and install with six screws (2).	
12. Engine.	Disengage PTO and shut down engine (see TM 9-2320-273-10).	



LEGEND:

- 1. FILL CAP
- 2. SCREW (6)
- 3. COVER
- 4. HANDLE
- 5. PIN KIT
- 6. BOLT (3)
- 7. PRESSURE LINE (2)
- 8. VALVE



TA 075312

WINCH.

2-12. THROTTLE MAINTENANCE.		
THIS TASK COVERS: (APPROXIMATE TIME REWIRED FOLLOWS TASK DESCRIPTION.)		
a. Removal. (10) b. Cleaning and Inspection. (10) c. Installation. (10) d. Operational Check. (5) 35 Minutes Total.		
INITIAL SETUP	EQUIPMENT CONDITION	
<u>APPLICABLE CONFIGURATIONS</u> M916 and M920.	<u>PARAGRAPH</u> None.	<u>CONDITION DESCRIPTION</u> None.
<u>TEST EQUIPMENT</u> None.		
<u>SPECIAL TOOLS</u> None.		
<u>MATERIALS/PARTS (P/N)</u> None.		
<u>PERSONNEL REQUIRED</u> One (MOS-63B20).	<u>SPECIAL ENVIRONMENTAL CONDITIONS</u> Vehicle Parked on Level Ground.	
<u>REFERENCES (TM)</u> TM 9-2320-273-10.	<u>GENERAL SAFETY INSTRUCTIONS</u> Engine OFF. Transmission in Neutral. Park Brake Set.	
<u>TROUBLESHOOTING REFERENCES</u> Table 12-1, 12-2.		

WINCH.

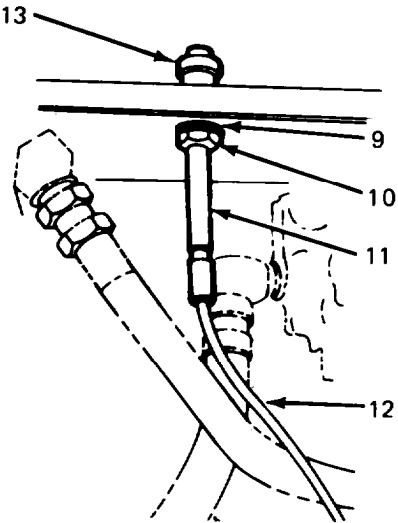
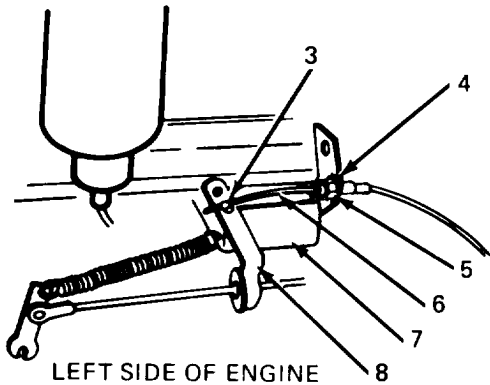
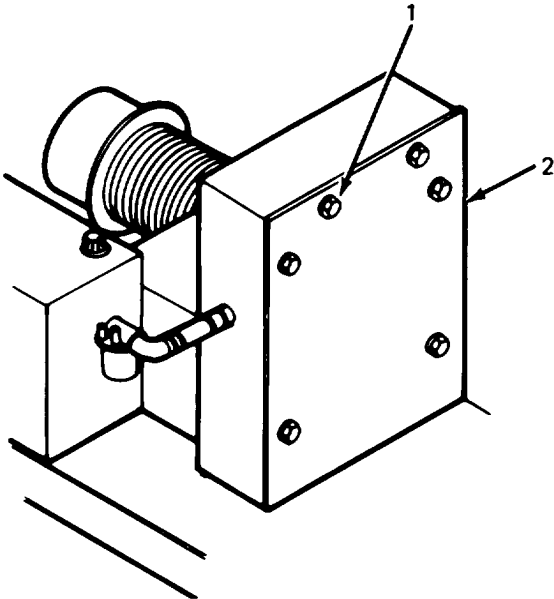
12-12. THROTTLE MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS

A. REMOVAL

1. Setscrew (3).

Loosen from throttle arm (8) on left side of engine.
2. Nut (5) and washer (4).

Unscrew nut from winch throttle cable threaded end (11).



- LEGEND:
- 1. SCREW (6)
 - 2. WINCH PANEL COVER
 - 3. SET SCREW
 - 4. WASHER
 - 5. NUT
 - 6. CABLE WIRE
 - 7. BRACKET
 - 8. THROTTLE ARM
 - 9. STAR WASHER
 - 10. NUT
 - 11. WINCH THROTTLE CABLE THREADED END
 - 12. CABLE
 - 13. WINCH THROTTLE CONTROL

WINCH PANEL WITH COVER REMOVED

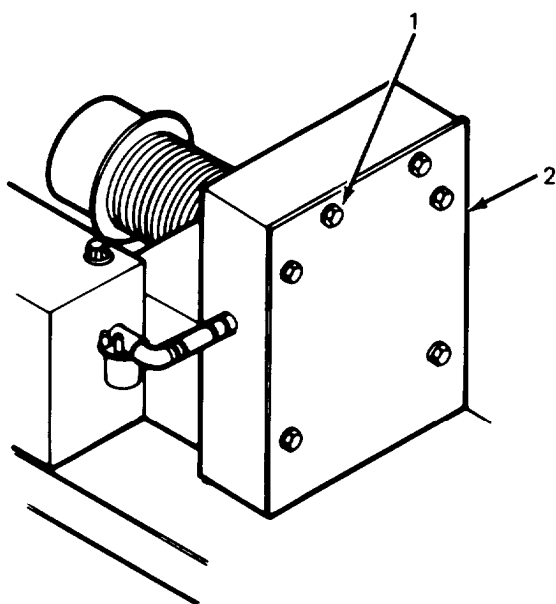
WINCH.

12-12. THROTTLE MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
3. Cable wire (6).	a. Pull free from throttle arm (8) and bracket (7). b. Feed cable wire (6) down underneath chassis.	
4. Six screws (1).	a. Remove. b. Remove winch panel cover (2).	
5. Nut (10), and star-washer (9).	Remove from winch throttle cable threaded end (11).	
6. Winch throttle control (13).	Pull up and out to remove cable (12).	Feed cable from under chassis up through winch control panel carefully so as not to damage cable.
B. CLEANING AND INSPECTION.		
7. Cable (12).	Wipe cable and threaded ends clean and inspect for: a. Cracks in cable exterior. b. Kinks which will cause binding. c. Crossed or burred threads.	Replace as necessary.
C. INSTALLATION.		
8. Winch throttle cable threaded end (11).	Install with starwasher (9) and nut (10). Tighten.	
9. Cable (12).	Feed down under chassis over cross frame brace, and up into engine compartment.	
10. Cable wire (6).	Insert through bracket (7) and into throttle arm (8).	
11. Setscrew (3).	Tighten into cable wire (6).	
12. Winch panel cover (2).	Install with six screws (1).	

WINCH.

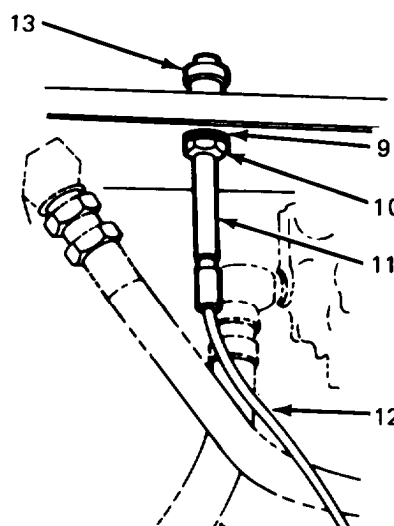
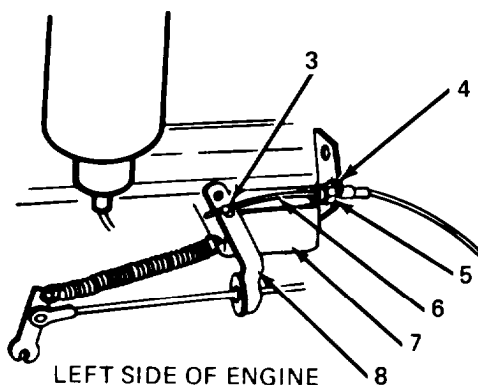
12-12. THROTTLE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
D. OPERATIONAL CHECK.		
12. Engine.	Start up and engage PTO (see TM 9-2320-273-10).	
13. Winch throttle control (13).	Operate and check that engine rpm rises and falls accordingly.	
14. Engine.	Shut down (see TM 9-2320- 273-10).	



LEGEND:

1. SCREW (6)
2. WINCH PANEL COVER
3. SET SCREW
4. WASHER
5. NUT
6. CABLE WIRE
7. BRACKET
8. THROTTLE ARM
9. STAR WASHER
10. NUT
11. WINCH THROTTLE CABLE THREADED END
12. CABLE
13. WINCH THROTTLE CONTROL



TA 075314

WINCH.

12-13. HYDRAULIC LINES AND FITTINGS MAINTENANCE.		
THIS TASK COVERS (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)		
a. Removal. (15) b. Installation. (15) c. Checking for Leaks. (10) 40 Minutes Total.		
INITIAL SETUP	EQUIPMENT CONDITION	
<u>APPLICABLE CONFIGURATIONS</u>	<u>PARAGRAPH</u>	<u>CONDITION DESCRIPTION</u>
M916 and M920.	None.	None.
<u>TEST EQUIPMENT</u>		
None.		
<u>SPECIAL TOOLS</u>		
None.		
<u>MATERIALS/PARTS (P/N)</u>		
Plugs. Liquid Teflon (refer to appendix C). Masking Tape. Marking Pencil.		
<u>PERSONNEL REQUIRED</u>	<u>SPECIAL ENVIRONMENTAL CONDITIONS</u>	
One (MOS-63B20).	Vehicle Parked on Level Ground.	
<u>REFERENCES (TM)</u>	<u>GENERAL SAFETY INSTRUCTIONS</u>	
TM 9-2320-273-10. TM 9-2320-273-20P.	Engine OFF. Park Brake Set. Transmission in Neutral.	
<u>TROUBLESHOOTING REFERENCES</u>		
Table 12-1, 12-2.		

WINCH.

12-13. HYDRAULIC LINES AND FITTINGS MAINTENANCE (Continued).

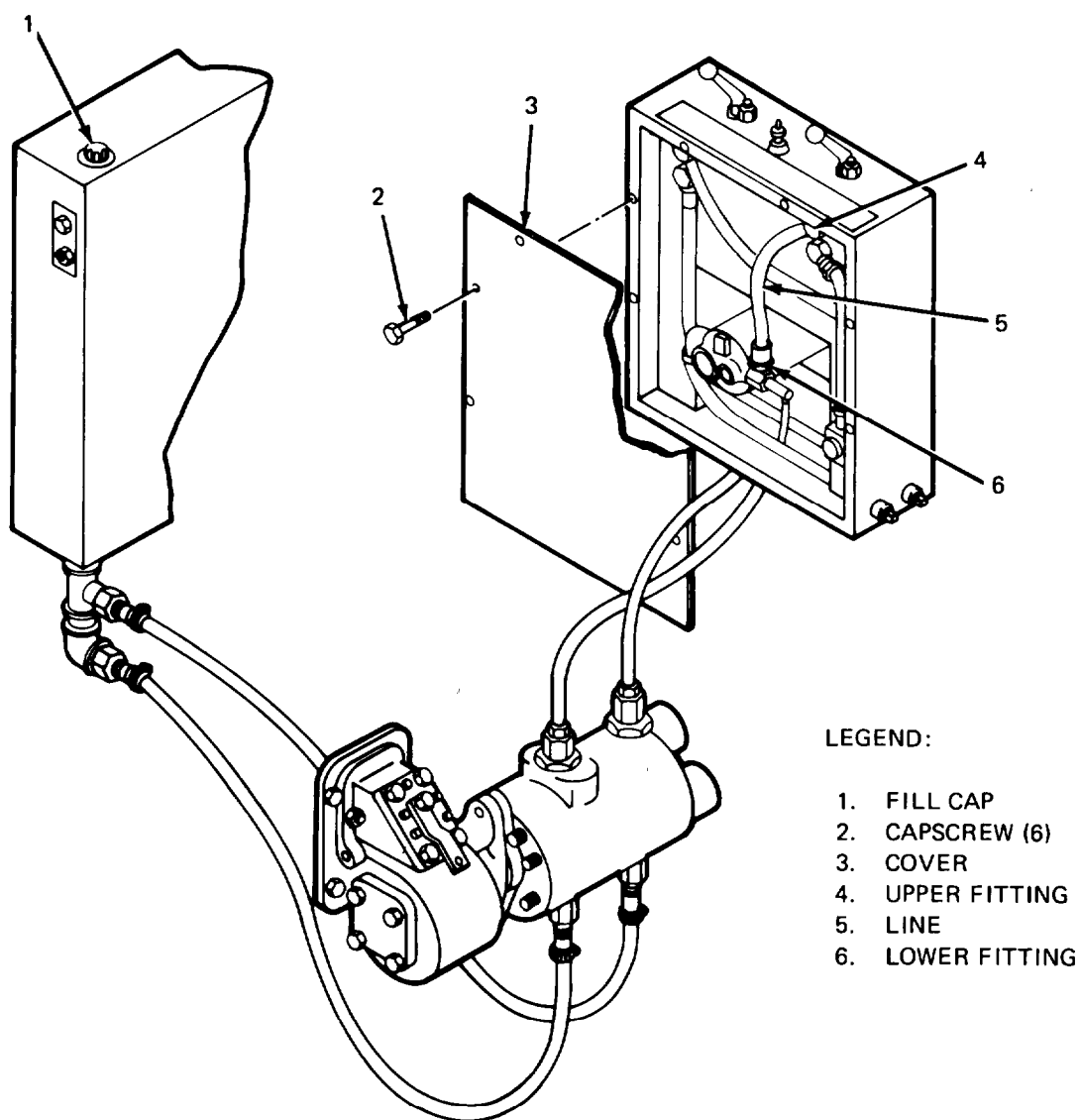
LOCATION/ITEM

ACTION

REMARKS

WARNING

Winch system retains some pressure even when not in use. Before you begin maintenance, vent pressure by carefully removing fill cap (1).



LEGEND:

1. FILL CAP
2. CAPSCREW (6)
3. COVER
4. UPPER FITTING
5. LINE
6. LOWER FITTING

TA 075315

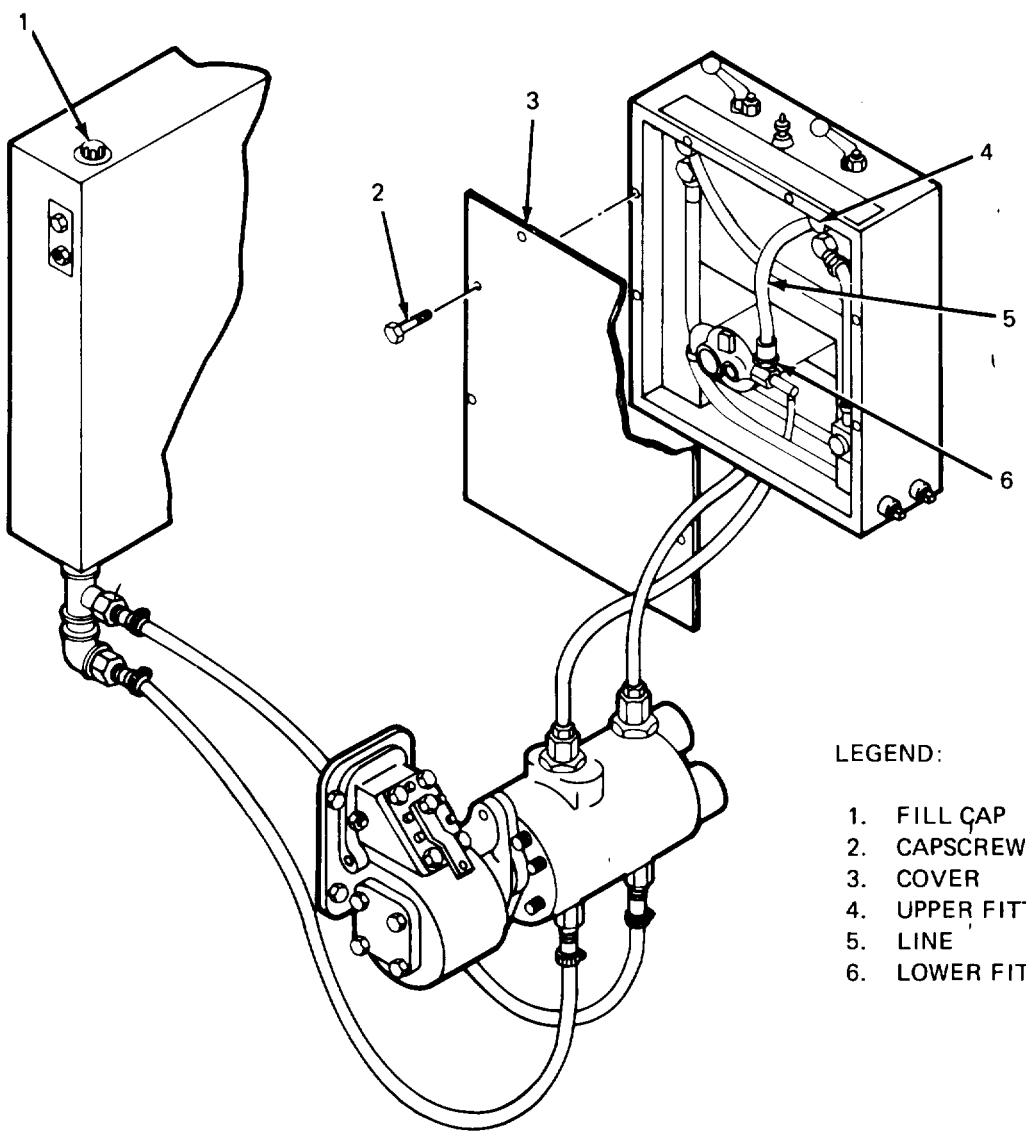
WINCH.

12-13. HYDRAULIC LINES AND FITTINGS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
NOTE The illustration at right shows major lines and fittings of the winch hydraulic system. The procedure describes removal and installation of the directional control valve-to-motor line, but the same steps may be used to remove and install any of the lines.		
A. REMOVAL		
1. Six capscrews (2).	Unscrew and remove cover (3).	Skip this step if you are changing a line outside the winch panel.
NOTE As soon as you disconnect a line, plug the port and the line. Tag and mark all lines.		
2. Upper fitting (4).	Unscrew. Plug port and line.	
3. Lower fitting (6).	Unscrew. Plug port and line.	
4. Line (5).	Remove and inspect for: a. Cracks. b. Leaks. c. Discoloration. d. Damaged fittings.	Replace if necessary.
NOTE If line contains a large amount of fluid, drain the fluid from the line and pour it into reservoir fill neck.		

WINCH.

12-13. HYDRAULIC LINES AND FITTINGS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION. NOTE Be sure that you install line between the proper ports. Use the illustration below as a reference.  LEGEND: 1. FILL CAP 2. CAPSCREW (6) 3. COVER 4. UPPER FITTING 5. LINE 6. LOWER FITTING		

TA 075316

WINCH.

12-13. HYDRAULIC LINES AND FITTINGS MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION (Continued).		
5. Lower fitting (6).	a. Coat threads with liquid teflon. b. Unplug port and line. Screw together and tighten.	
6. Upper fitting (4).	a. Coat threads with liquid teflon. b. Unplug port and line. Screw together and tighten.	
7. Fill cap (1).	Screw on and tighten.	
C. CHECKING FOR LEAKS		
8. Engine.	Start up (see TM 9-2320-273-10). Engage PTO.	
9. Line (5).	a. Wipe away dirt and oil. b. Check for leaks.	Retighten as necessary.
NOTE After checking for leaks, use sight glasses to check winch oil level. Add oil if necessary (refer to LO 9-2320-273-12).		
10. Engine.	Disengage PTO and shut down (see TM 9-2320-273-10).	
11. Cover (3).	Set in place. Screw in and tighten six cap-screws (2).	

WINCH.

2-13. HYDRAULIC LINES AND FITTINGS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
The diagram illustrates the maintenance of a hydraulic system. It shows a winch at the top left, connected by a line to a control valve at the bottom. The control valve is connected to a reservoir. The reservoir has a fill cap (1) on top. A cover (3) is shown being removed from the reservoir, revealing internal components: an upper fitting (4), a line (5), and a lower fitting (6). A cap screw (2) is shown being removed from the cover. The legend identifies these components: 1. FILL CAP, 2. CAPSCREW (6), 3. COVER, 4. UPPER FITTING, 5. LINE, 6. LOWER FITTING.		

TA 075317

WINCH.**2-14. HYDRAULIC MOTOR MAINTENANCE****THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

a. Removal.	(15)
b. Cleaning and Inspection.	(15)
c. Installation and Operational Check.	(15)
	<u>45 Minutes Total.</u>

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

M916 and M920.

EQUIPMENT CONDITION**PARAGRAPH**

None.

CONDITION DESCRIPTION

None.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Clean Container.

Gasket, Hydraulic Motor to Failsafe Brake, 26426 (34625).

Hydraulic Oil (Refer to Appendix C).

Silastic Gasket Sealer (Refer to Appendix C).

Plugs.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.

TM 9-2320-273-20P.

LO 9-2320-273-12.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.

Transmission in Neutral.

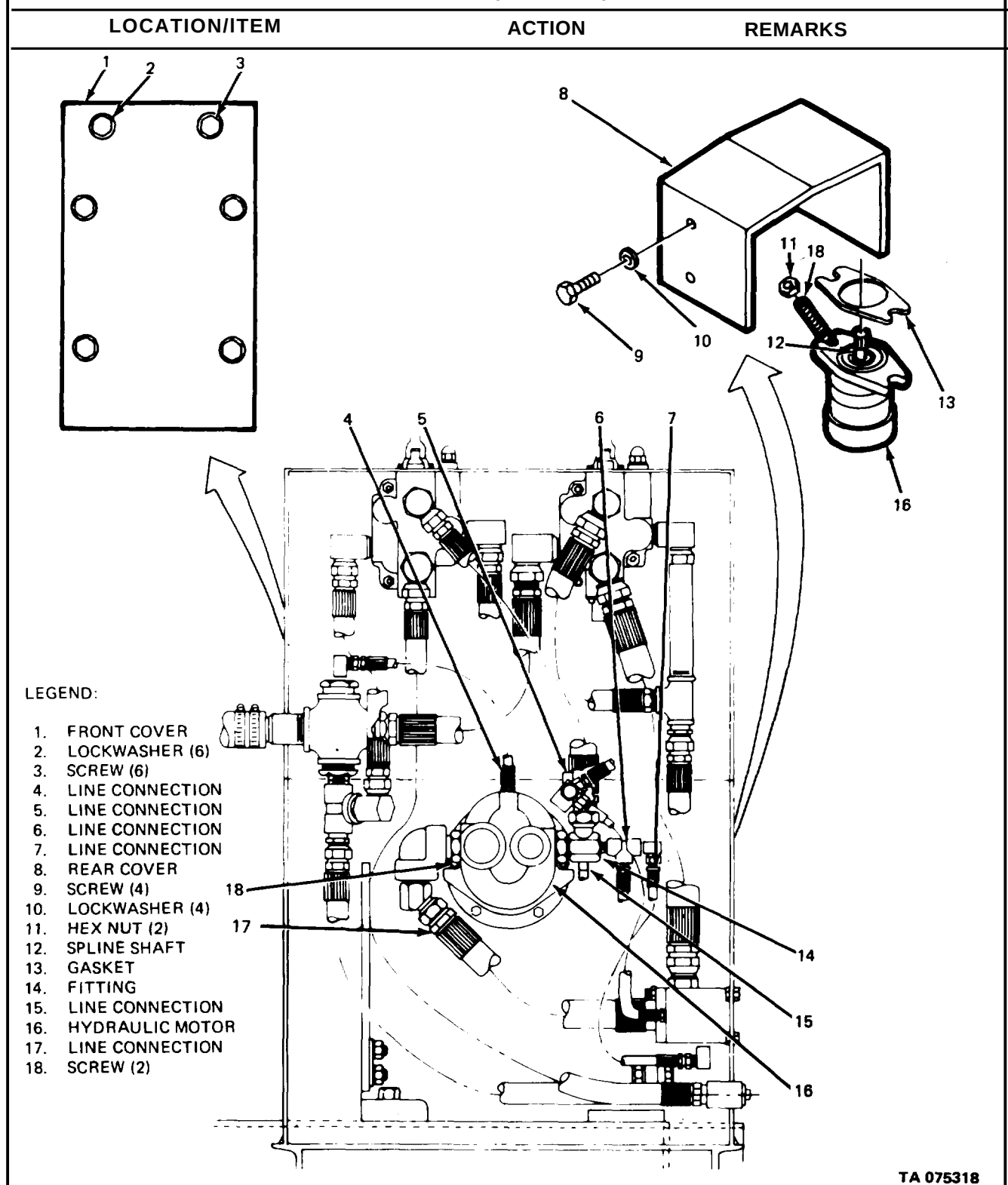
Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 12-1, 12-2.

WINCH.

12-14. HYDRAULIC MOTOR MAINTENANCE (Continued).



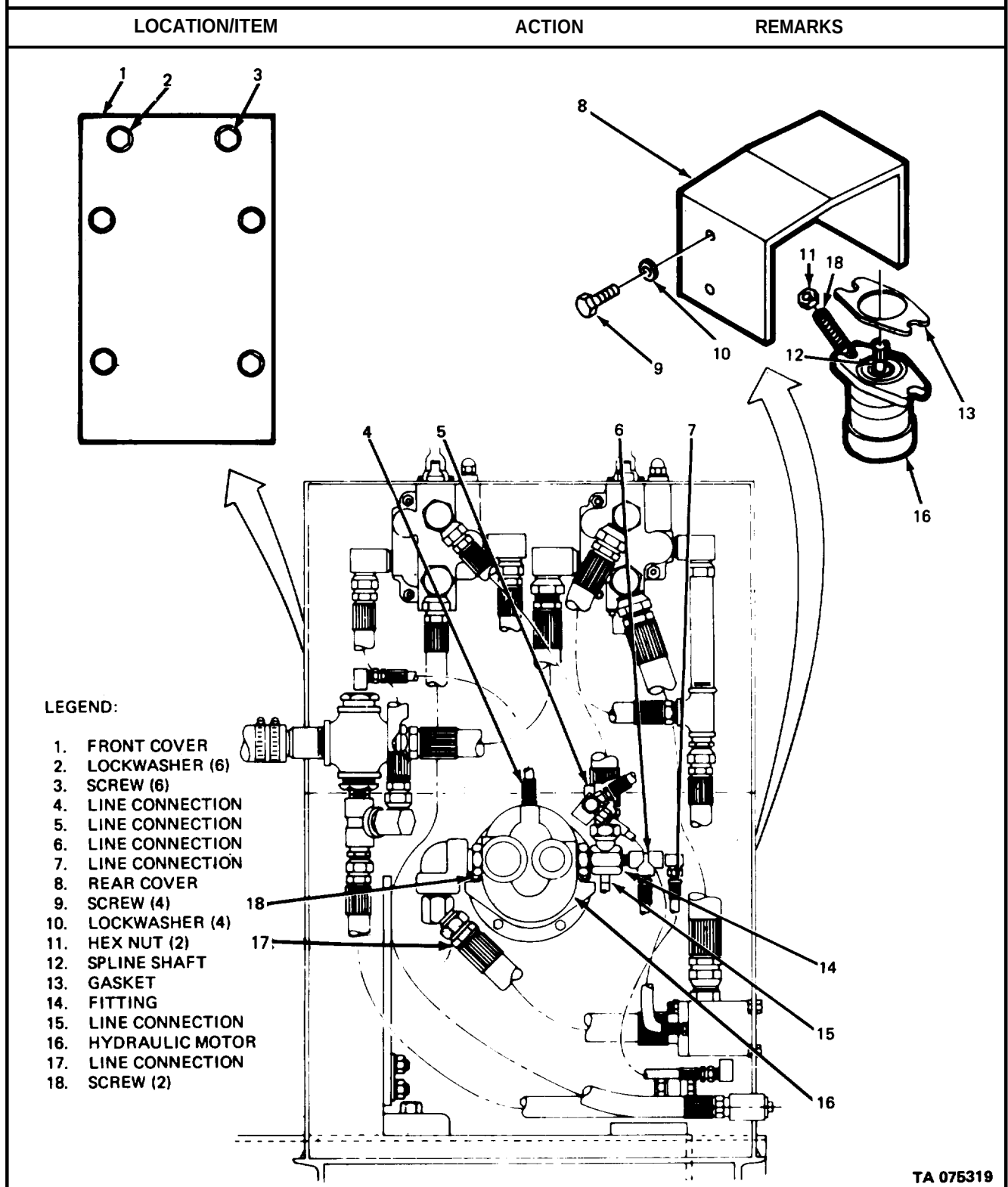
TA 075318

WINCH.**12-14. HYDRAULIC MOTOR MAINTENANCE. (Continued).**

LOCATION/ITEM	ACTION	REMARKS
WARNING Winch system retains some pressure even when not in use. Before you begin maintenance, vent pressure by carefully removing reservoir fill cap.		
A. REMOVAL.		
1. Six screws (3) and lockwashers (2).	Unscrew and remove winch front cover (1).	
2. Four screws (9) and lockwashers (10).	Unscrew and remove winch rear cover (8).	
3. Five hydraulic line connections: (4), (5), (6), (7), and (17).	Unscrew from hydraulic motor (16) and plug connections.	
4. Two screws (18) and hex nuts (11).	Unscrew and pull hydraulic motor (16) straight out from failsafe brake.	
5. Gasket (13).	Discard.	
B. CLEANING AND INSPECTION.		
6. Hose fittings at connections (4), (5), (6), (7), and (17).	Wipe clean and inspect for crossed threads, burrs, and cracked hoses.	Replace fitting as necessary.
7. Motor spline shaft (12).	Wipe clean and inspect for gouges, chips, and broken splines.	Refer to Direct Support/General Support Maintenance if shaft splines or spline sleeve on failsafe brake are damaged.
C. INSTALLATION AND OPERATIONAL CHECK		
8. New gasket (13).	Coat both sides with silastic gasket sealer and place on flange of hydraulic motor (16).	
9. Two screws (18).	Position in flange slots of hydraulic motor (16).	

WINCH

12-14. HYDRAULIC MOTOR MAINTENANCE (Continued).



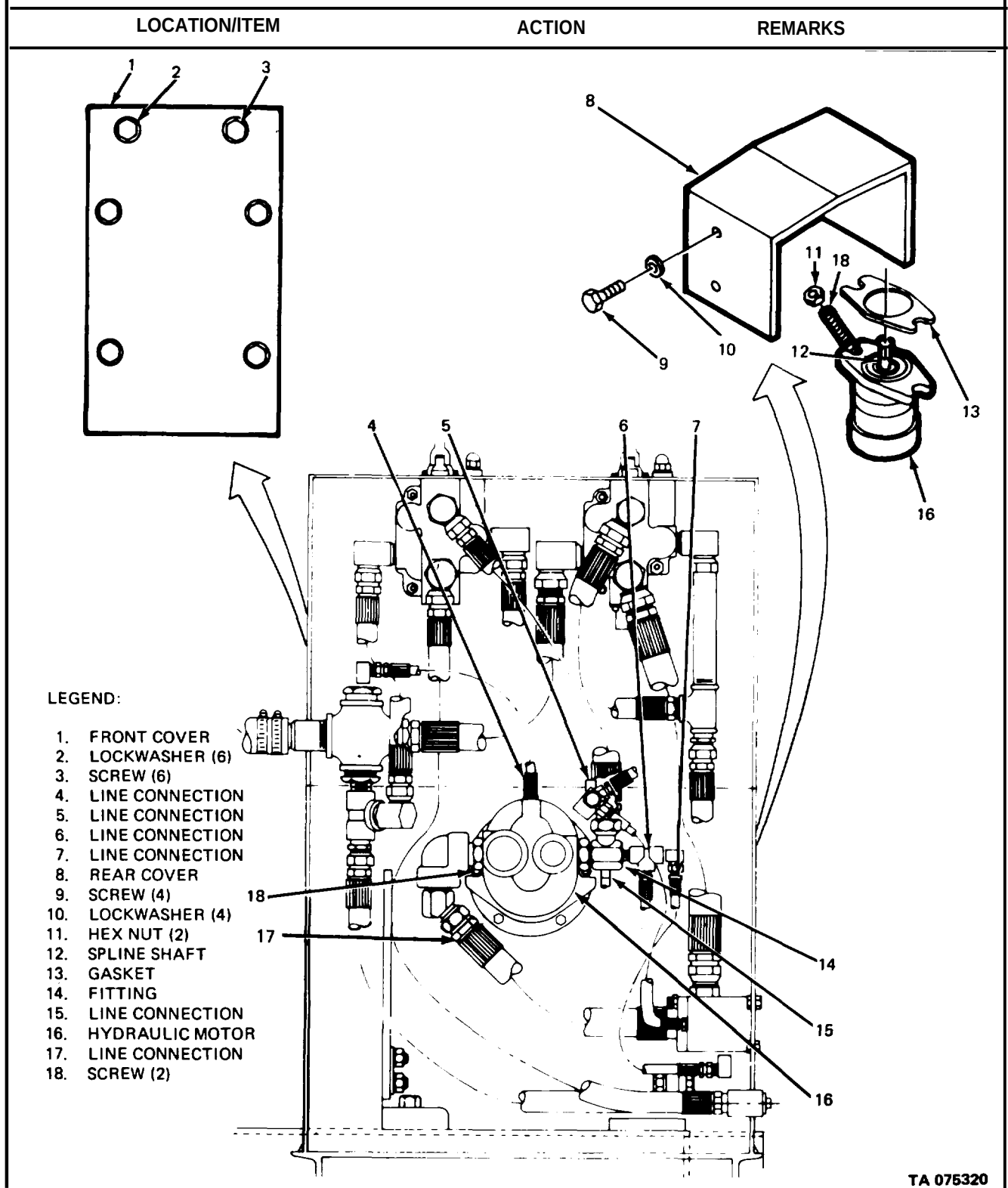
TA 075319

WINCH.**12-14. HYDRAULIC MOTOR MAINTENANCE (Continued).**

LOCATION/ITEM	ACTION	REMARKS
C. INSTALLATION AND OPERATIONAL CHECK (Continued).		
10. Hydraulic motor (16).	Align capscrews (18) and spline shaft (12); push into position against failsafe brake.	
11. Two hex nuts (11).	Screw on to screws (18) and tighten.	
12. Five hydraulic line connections: (4), (5), (6), (7), and (17).	a. Remove plugs. b. Coat threads with liquid teflon. c. Install and tighten as illustrated.	
13. Winch rear cover (8).	Install with four screws (9) and lockwashers (10).	
14. Engine.	Start up and engage PTO (see TM 9-2320-273-10).	
15. Winch.	Engage (see TM 9-2320-273-10). a. Check for leaks. b. Disconnect PTO and shut down engine (see TM 9-2320-273-10).	Tighten fittings as necessary.
16. Winch front cover (1).	Install with six lockwashers (2) and screws (3).	

WINCH.

12-14. HYDRAULIC MOTOR MAINTENANCE (Continued).



TA 075320

WINCH.

2-15. HYDRAULIC PUMP MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REWIRED FOLLOWS TASK DESCRIPTION.)

- a. Removal. (20)
- b. Installation. (20)
- c. Operational Check. (5)

45 Minutes Total.

<u>INITIAL SETUP</u>		<u>EQUIPMENT CONDITION</u>	<u>CONDITION DESCRIPTION</u>
<u>APPLICABLE CONFIGURATIONS</u>		<u>PARAGRAPH</u>	
M916 and M920.		None.	None.
<u>TEST EQUIPMENT</u>			
None.			
<u>SPECIAL TOOLS</u>			
None.			
<u>MATERIALS/PARTS (P/N)</u>			
Clean Container.			
Plugs.			
Liquid Teflon (Refer to Appendix C).			
<u>PERSONNEL REQUIRED</u>		<u>SPECIAL ENVIRONMENTAL CONDITIONS</u>	
One (MOS-63B20).		Vehicle Parked on Level Ground.	
<u>REFERENCES (TM)</u>		<u>GENERAL SAFETY INSTRUCTIONS</u>	
TM 9-2320-273-10.		Engine OFF.	
TM 9-2320-273-20P.		Transmission in Neutral.	
LO 9-2320-273-12.		Park Brake Set.	
<u>TROUBLESHOOTING REFERENCES</u>			
Table 12.1.			

WINCH.

12-15. HYDRAULIC PUMP MAINTENANCE (Continued).

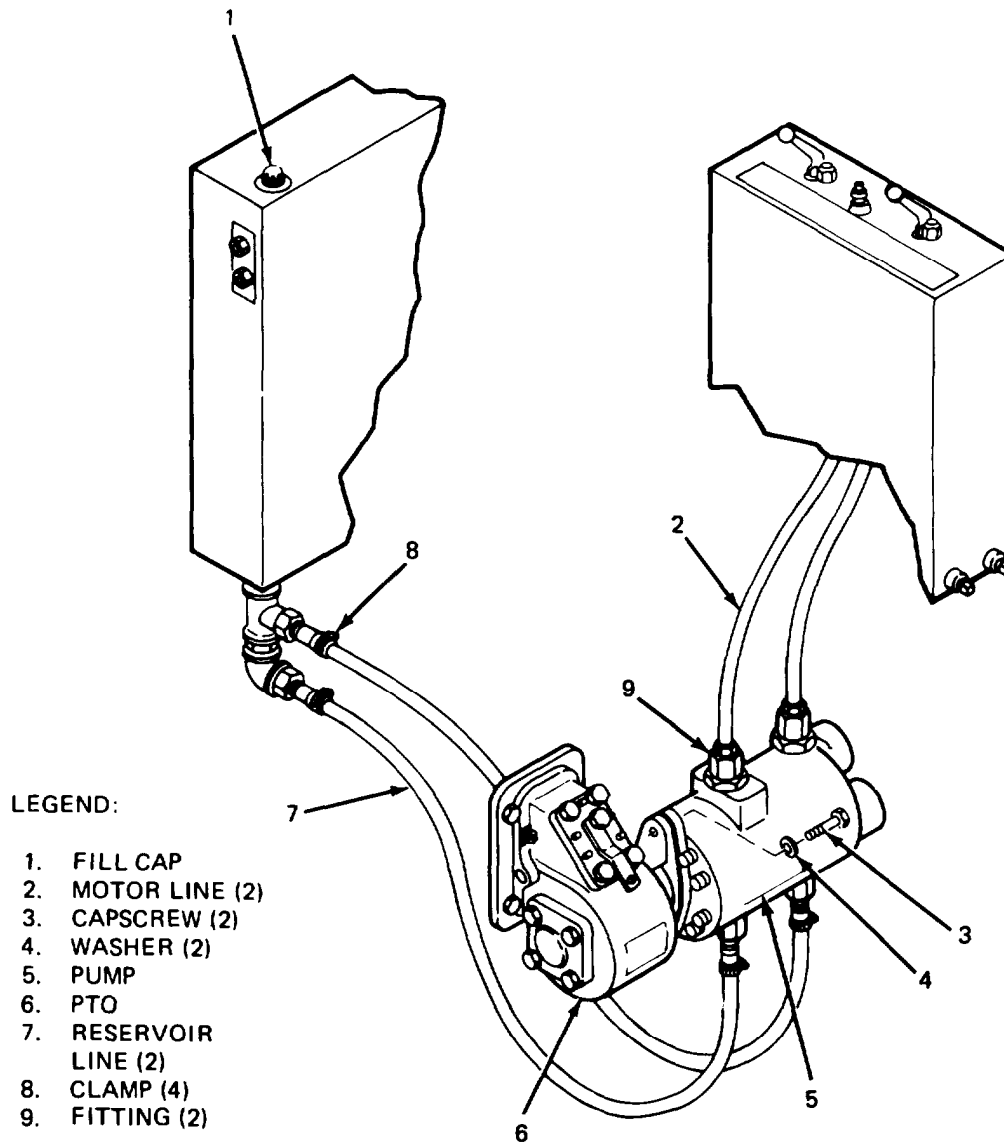
LOCATION/ITEM

ACTION

REMARKS

WARNING

Winch system retains some pressure even when not in use. Before you begin maintenance, vent pressure by carefully removing fill cap (1).



TA 075321

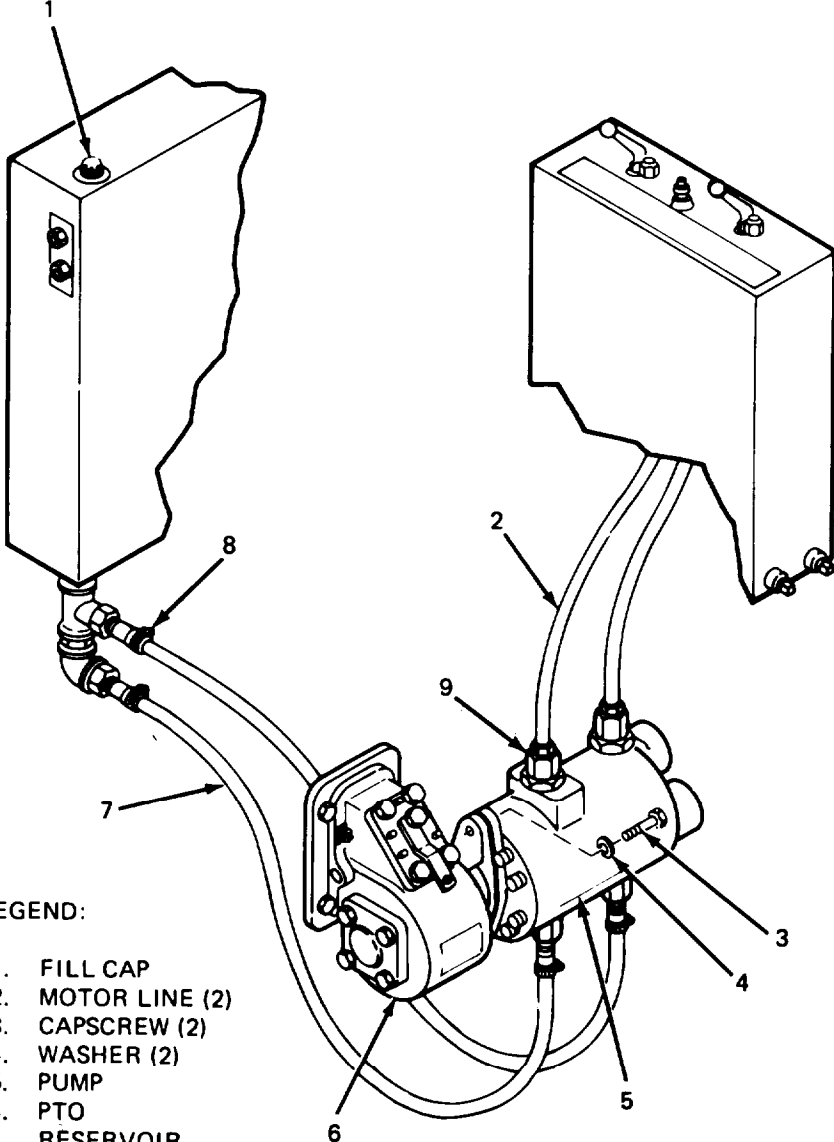
WINCH.

12-15. HYDRAULIC PUMP MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
<u>A. REMOVAL.</u>		
NOTE Plug each line as soon as you have disconnected it. This will prevent loss of fluid from system. As an alternate the reservoir may be drained.		
1. Four clamps (8).	a. Unscrew and remove two reservoir lines (7). b. Inspect for: 1. Cracks. 2. Leaks. 3. Discoloration. 4. Damaged fittings.	Plug lines as removed. Replace if necessary.
NOTE Before you unscrew motor lines, place clean container underneath to catch oil draining from pump.		
2. Two fittings (9).	a. Unscrew and remove two motor lines (2). b. Inspect for: 1. Cracks. 2. Leaks. 3. Discoloration. 4. Damaged fittings.	Plug lines as removed. Replace if necessary.
3. Two capscrews (3) and washers (4).	Unscrew and remove.	
4. Pump (5).	Remove from PTO (6).	
<u>B. INSTALLATION.</u>		
5. Pump (5).	Position against PTO (6).	
6. Two capscrews (3) and washers (4).	Screw in and tighten.	

WINCH.

12-15. HYDRAULIC PUMP MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
 LEGEND: 1. FILL CAP 2. MOTOR LINE (2) 3. CAPSCREW (2) 4. WASHER (2) 5. PUMP 6. PTO 7. RESERVOIR LINE (2) 8. CLAMP (4) 9. FITTING (2)		

TA 075322

WINCH.

12-15. HYDRAULIC PUMP MAINTENANCE (Continued).		
LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION (Continued).		
NOTE Be sure you connect each hose to the proper port.		
7. Two fittings (9) with two motor lines (2) attached.	a. Coat threads with liquid teflon. b. Unplug, screw in, and tighten.	
8. Pump (5).	Using funnel, pour oil from container into top ports.	
9. Two reservoir lines (7).	Attach with four clamps (8).	
10. Fill cap (1).	Screw on and tighten.	
C. OPERATIONAL CHECK.		
11. Engine.	Start up (see TM 9-2320-273-10). Engage PTO.	
12. Winch.	Check operation.	
13. Pump (5).	Check for leaks.	Retighten connections as necessary.
14. Engine.	Disengage PTO and shut down (see TM 9-2320-273-10).	
NOTE Use sight glasses to check oil level in reservoir. Add oil if necessary (refer to LO 9-2320-273-12).		

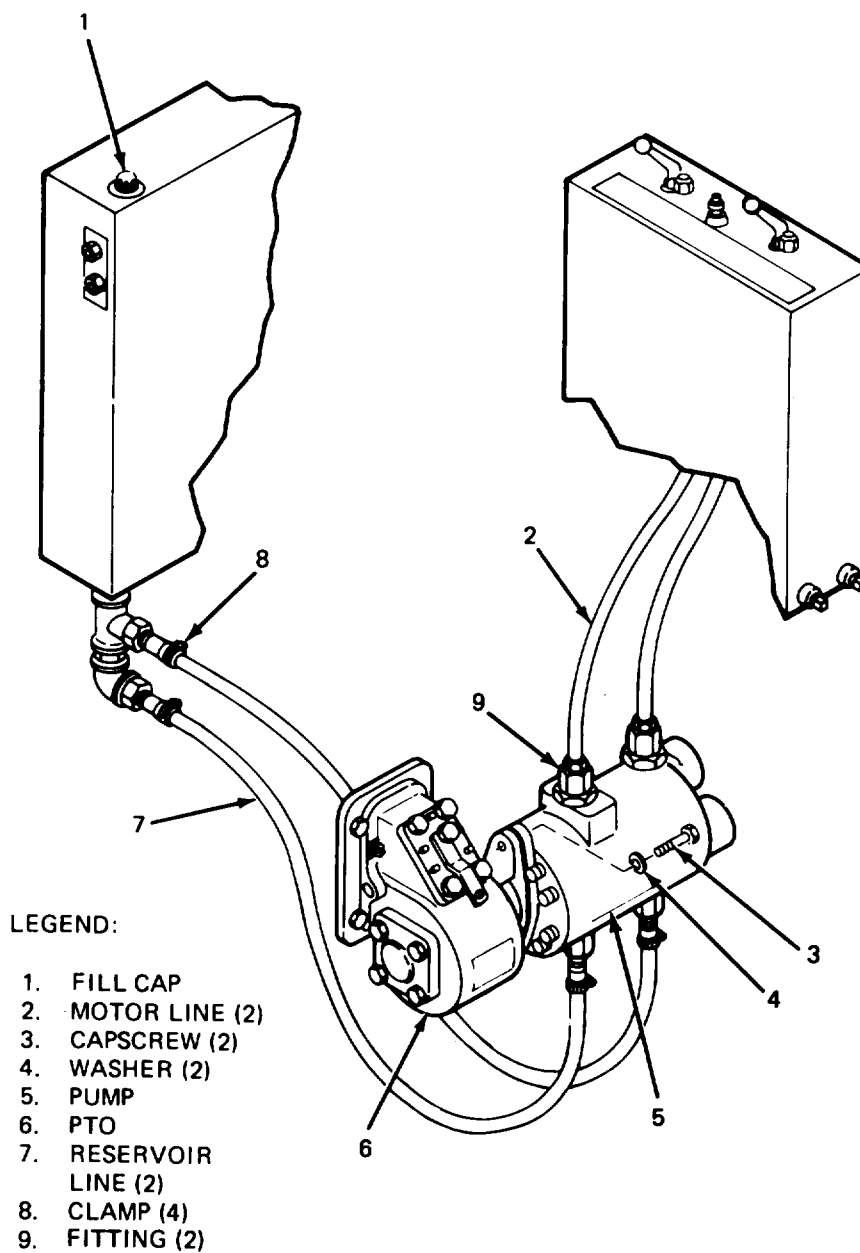
WINCH.

12-15. HYDRAULIC PUMP MAINTENANCE (Continued).

LOCATION/ITEM

ACTION

REMARKS



TA 075323

WINCH.

12-16. PTO LINKAGE MAINTENANCE.		
THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)		
a. Removal. (20)		
b. Installation. (25)		
c. Operational Check. (5)		
50 Minutes Total.		
INITIAL SETUP	EQUIPMENT CONDITION	
<u>APPLICABLE CONFIGURATIONS</u>	<u>PARAGRAPH</u>	<u>CONDITION DESCRIPTION</u>
M916 Thru M920.	None.	None.
<u>TEST EQUIPMENT</u>		
None.		
<u>SPECIAL TOOLS</u>		
None.		
<u>MATERIALS/PARTS (P/N)</u>		
None.		
<u>PERSONNEL REQUIRED</u>	<u>SPECIAL ENVIRONMENTAL CONDITIONS</u>	
One (MOS-63B20).	Vehicle Parked on Level Ground.	
<u>REFERENCES (TM)</u>	<u>GENERAL SAFETY INSTRUCTIONS</u>	
TM 9-2320-273-10.	Engine OFF.	
	Transmission in Neutral.	
	Park Brake Set.	
<u>TROUBLESHOOTING REFERENCES</u>		
Table 12-1, 12-2.		

WINCH.

12-16. PTO LINKAGE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Screw (9) and retaining nut (8).	Loosen.	
2. Capscrew (11).	Remove.	
3. Bracket (12).	Remove.	

LEGEND:

- 1. KNOB
- 2. LOCKNUT
- 3. LOCKNUT
- 4. CABLE
- 5. NUT
- 6. CLAMP
- 7. CAPSCREW
- 8. RETAINING NUT
- 9. SCREW
- 10. PTO ARM
- 11. CAPSCREW
- 12. BRACKET

TA 075324

WINCH.

12-16. PTO LINKAGE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
4. Capscrew (7) and nut (5).	Remove.	
5. Clamp (6).	Remove.	
6. Knob (1).	Remove.	
7. Locknut (2) and (3).	Remove.	
8. Cable (4).	Remove and inspect for kinks or breaks.	
B. INSTALLATION.		
9. Cable (4).	Secure with locknuts (2), and (3).	
10. Knob (1).	Install.	
11. Clamp (6).	Secure with capscrew (7) and nut (5).	
12. Cable (4).	Secure at PTO arm (10) by running thru hole in retaining nut (8) and tightening screw (9).	
13. Bracket (12).	Secure with capscrew (11).	
C. OPERATIONAL CHECK.		
14. Start engine.	(Refer to TM 9-2320-273-10.)	
15. Check PTO operation.	(Refer to TM 9-2320-273-10.)	

WINCH.

12-16. PTO LINKAGE MAINTENANCE (Continued).

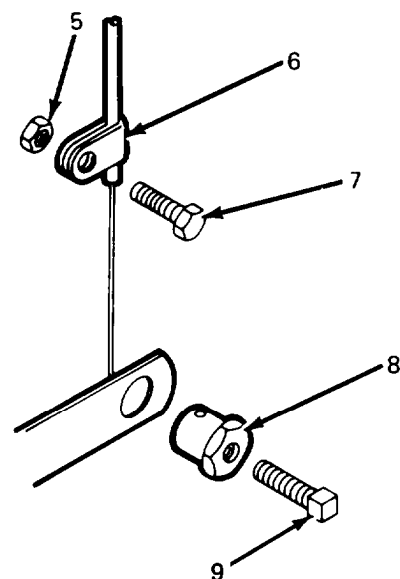
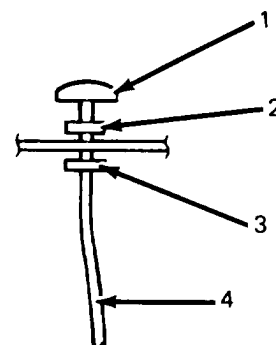
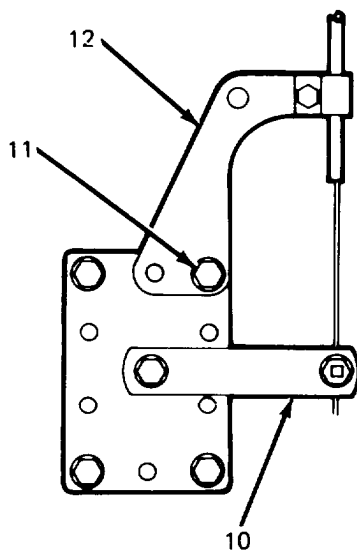
LOCATION/ITEM

ACTION

REMARKS

LEGEND:

1. KNOB
2. LOCKNUT
3. LOCKNUT
4. CABLE
5. NUT
6. CLAMP
7. CAPSCREW
8. RETAINING NUT
9. SCREW
10. PTO ARM
11. CAPSCREW
12. BRACKET



WINCH.

12-17. TAKING HYDRAULIC SYSTEM OIL SAMPLE.**THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)**

- a. Removal. (0.4)
 - b. Installation. (0.4)
 - c. Operational Check. (0.2)
- 1.0 Minutes Total.

INITIAL SETUP**APPLICABLE CONFIGURATIONS**

All

**EQUIPMENT CONDITION
PARAGRAPH**

None.

CONDITION DESCRIPTION

None.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Bushing, MS51847-1 (96906).
 Bushing, MS51847-9 (96906).
 Drain Cock, 7-2177-4 (86768).
 Tape, Antiseizing Item 14, Appendix C.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Work Area Clean and Away from Blowing Dirt and Dust.

REFERENCES (TM)

TM 9-2320-273-20P.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
 Transmission in Neutral.
 Vehicle on Level Ground.
 Wheels Blocked.

TROUBLESHOOTING REFERENCES

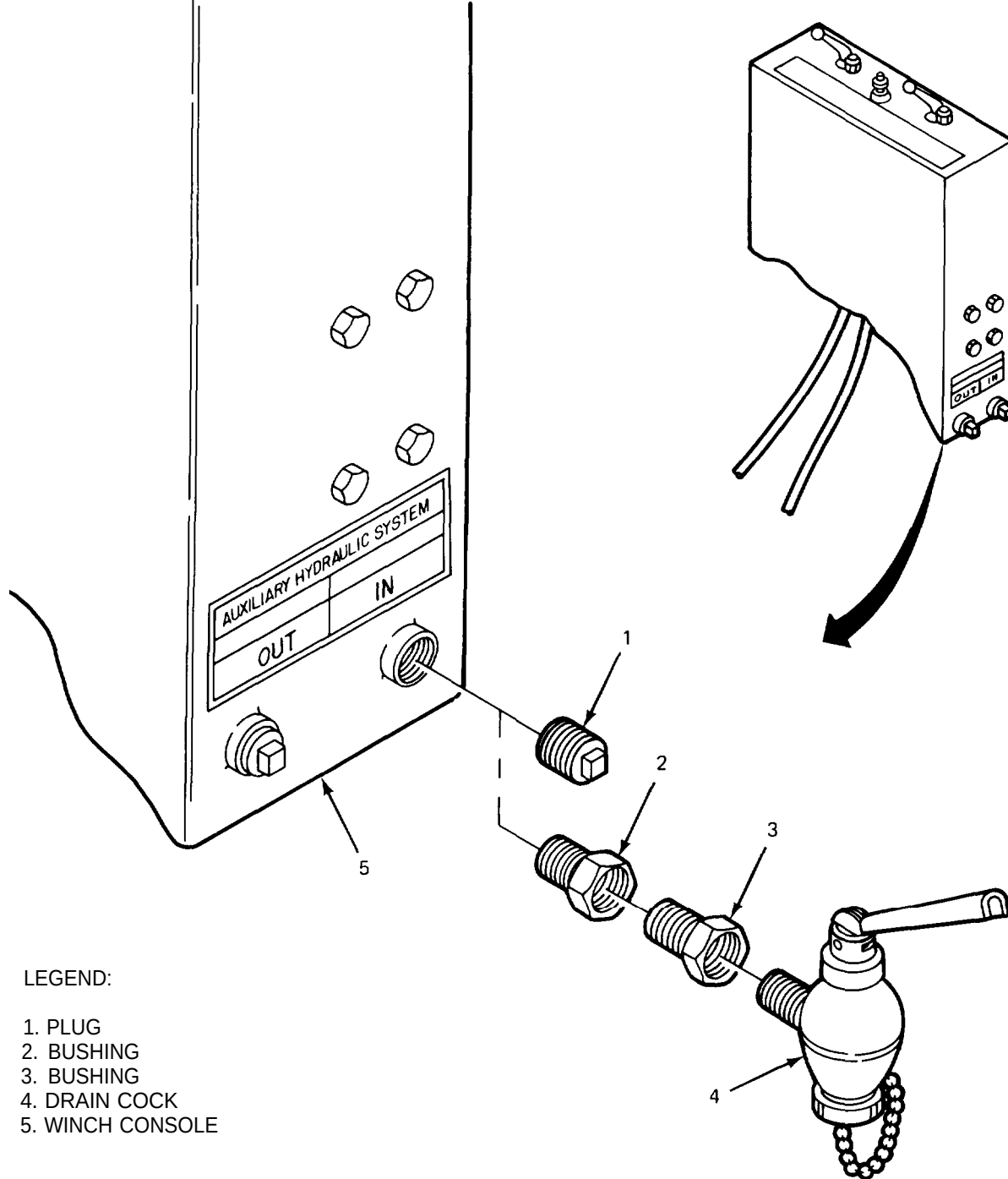
None.

WINCH.**12-17. TAKING HYDRAULIC SYSTEM OIL SAMPLE.**

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Winch Console (5).	Place drain pan under plug (1).	
2.	Remove and discard plug (1).	Allow oil to drain.
B. INSTALLATION.		
NOTE Apply antiseizing tape to all threaded connections.		
3. Winch Console (5).	Install bushing (2).	
4.	Install bushing (3) into bushing (2).	
5.	Install drain cock (4) into bushing (3).	
6. Winch reservoir.	Refill to proper level.	
C. OPERATIONAL CHECK.		
NOTE Start engine (see TM 9-2320-273-10).		
7. Winch Console (5).	Operate winch.	Check bushings (2) and (3) and drain cock (4) for leaks.

WINCH.

12-17. TAKING HYDRAULIC SYSTEM OIL SAMPLE.

LOCATION/ITEM	ACTION	REMARKS
 LEGEND: 1. PLUG 2. BUSHING 3. BUSHING 4. DRAIN COCK 5. WINCH CONSOLE		

TA 237250

APPENDIX A**REFERENCES****A-1. PUBLICATION INDEXES.**

The following indexes should be consulted frequently for latest changes or revisions and for new publications relating to material covered in this technical manual.

Index of Army Motion Pictures and Related Audio-Visual Aids DA PAM 108-1

Consolidated Index of Army Publications and Blank Forms. DA PAM 310-1

A-2. FORMS.

The following forms pertain to this material. (Refer to DA Pamphlet 310-2 for index of blank forms.)

Standard Form 46, U.S. Government Motor Vehicle Operator's Identification Card.

Standard Form 91, Operator's Report of Motor Vehicle Accident.

DA Form 2028, Recommended Changes to Publications and Blank Forms.

Refer to DA PAM 738-750, The Army Maintenance Management Systems (TAMMS), for instructions on the use of maintenance forms pertaining to this material.

A-3. OTHER PUBLICATIONS.

The following publications contain information pertinent to the major item materiel and associated equipment.

a. Operating Vehicle

Operator's Manual for M915, M916, and M920 Truck Tractors and
Chassis for M917, M918, and M919. TM 9-2320-273-10

A-3. OTHER PUBLICATIONS (Continued).

Army Motor Transport: Units and Operations. FM 55-30

Manual for the Wheeled Vehicle Driver. FM 21-305

Prevention of Motor Vehicle Accidents. AR 385-55

Accident Reporting and Records AR 385-40

b. Maintenance and Repair

Organizational Maintenance for M915, M916, and M920 Truck
Tractors and Chassis for M917, M918, and M919. TM 9-2320-273-20

Organizational Maintenance Repair Parts and Special Tools
List for M915, M916, and M920 Truck Tractors and Chassis
for M917, M918, and M919 TM 9-2320-273-20P

Lubrication Order for M915, M916, and M920 Truck Tractors
and Chassis for M917, M918, and M919 LO 9-2320-273-12

Direct Support and General Support Repair Parts and Special
Tools List for M915, M916, and M920 Truck Tractors and
Chassis for M917, M918, and M919 TM 9-2320-273-34P

Organizational Care, Maintenance and Repair of Pneumatic
Tires and Inner Tubes TM 9-2610~200~24

Description, Use, Bonding Techniques, and Properties of
Adhesives TB ORD 1032

Materials Used for Cleaning, Preserving, Abrading, and Cementing
Ordnance Materiel and Related Materials Including Chemicals. TM 9-247

Metal Body Repair and Related Operations. FM 43-2

Welding Theory and Application TM 9-237

Painting instructions for Field Use.. . . . TM 43-0139

Inspection, Care, and Maintenance of Anti-friction Bearings. TM 9-214

Use of Antifreeze Solutions and Cleaning Compounds in Engine
Cooling Systems TB 750-651

A-3. OTHER PUBLICATIONS (Continued).

- Cooling Systems: Tactical Vehicles TM 50-254
- Functional Grouping Codes TB 750-93-1
- c. Cold Weather Operation and Maintenance
- Basic Cold Weather Manual FM 31-70
- Northern Operations FM 31-71
- Operation and Maintenance of Ordnance Materiel in Extreme Cold
 Weather (0°F to -65°F) FM 9-207
- Winterization Kits for Army Tank-Automotive Materiel SB 9-16
- d. Decontamination
- Chemical, Biological, and Radiological (CBR) Decontamination. TM 3-220
- Chemical, Biological, Radiological, and Nuclear Defense. FM 21-40
- e. Truck Bodies
- Organizational, Direct Support and General Support
 Maintenance Manual for M917 Dump Truck Body TM 5-3805-274-24&P
- Organizational, Direct Support and General Support
 Maintenance Manual for M918 Bituminous Distributor
 Truck Body TM 5-3895-371-24&P
- Organizational Maintenance Manual for M919 Concrete-
 Mobile® Mixer Mixer Truck Body TM 5-3895-372-20
- Direct Support and General Support Maintenance Manual
 For M919 Concrete-Mobile® Mixer Truck Body TM 5-3895-372-34
- f. General
- Principles of Automotive Vehicles.. . . . TM 9-8000
- Camouflage FM 5-20
- Procedures for Destruction of Tank-Automotive Equipment to
 Prevent Enemy Use TM 750-244-6
- Administrative Storage of Equipment. TM 740-90-1
- Color, Marking and Camouflage Painting of Military Vehicles. TB 43-0209
- Preservation, Packaging, and Packing of Military Supplies
 and Equipment TM 38-230-1 &
 TM 38-230-2
- Shipment and Limited Storage MI L-V-62038
- Storage Serviceability Standard:
 Tracked Vehicles, Wheeled Vehicles, and Component parts. SB 740-98-1
- g. Warranty TB 9-2300-295-15/17

APPENDIX B

MAINTENANCE ALLOCATION CHART

Section I INTRODUCTION

B-1. GENERAL.

- a. This section provides a general explanation of all maintenance and repair functions authorized at various maintenance levels.
- b. The Maintenance Allocation Chart (MAC) in section II designates overall responsibility for the performance of maintenance functions on the identified end item or component. The implementation of the maintenance functions upon the end item or component will be consistent with the assigned maintenance functions.
- c. Section III lists the special tools and test equipment required for each maintenance function as referenced from section II.
- d. Section IV contains supplemental instructions on explanatory notes for a particular maintenance function.

B-2. MAINTENANCE FUNCTIONS.

- a. *Inspect.* To determine the serviceability of an item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination.
- b. *Test.* To verify serviceability and detect incipient failure by measuring the mechanical 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; i.e., to clean (decontaminate), to preserve, to drain, to paint, or to replenish fuel, lubricants, hydraulic fluids, or compressed air supplies.
- d. *Adjust.* To maintain, within prescribed limits, by bringing into proper or exact position or by setting the operating characteristics to specified parameters.
- e. *Aline.* 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 measuring and diagnostic equipments used in precision measurement. Consists of comparisons of two instruments, one of which is a certified standard of known accuracy to detect and adjust any discrepancy in the accuracy of the instrument being compared.
- g. *Install.* The act of emplacing, seating, or fixing into position an item, part, or module (component or assembly) in a manner to allow the proper functioning of an equipment or system.
- h. *Replace.* The act of substituting a serviceable like type part, subassembly or module (component or assembly) for an unserviceable counterpart.

B-2. MAINTENANCE FUNCTIONS (Continued).

i. Repair. The application of maintenance services¹ or other maintenance actions² to repair serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), and item, or system.

j. Overhaul. That maintenance effort (services/actions) necessary to restore an item to a completely serviceable/operational condition as prescribed by maintenance standards (i.e., DMWR) in appropriate technical publications. Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like new condition.

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 (hours/miles, etc.) considered in classifying Army equipments/components.

B-3. COLUMN ENTRIES USED IN THE MAC.

a. Column 1, Group Number. Column 1 lists group numbers, the purpose of which is to identify components, assemblies, subassemblies, and modules with the next higher assembly.

b. Column 2, Component/Assembly. Column 2 contains the names of components, assemblies, subassemblies, and modules for which maintenance is authorized.

c. Column 3, Maintenance Functions. Column 3 lists the functions to be performed on the item listed in column 2. (For detailed explanation of these functions, see paragraph B-2.)

d. Column 4, Maintenance Level. Column 4 specifies, by the listing of a "work time" figure in the appropriate sub-column(s), the lowest level of maintenance authorized to perform the function listed in column 3. This figure represents the active time required to perform the maintenance function at the indicated level of maintenance. If the number or complexity of the tasks within the listed maintenance function varies at different maintenance levels, appropriate "work time" figures will be shown for each level. The number of manhours specified by the "work time" figure represents the average time required to restore an item (assembly, subassembly, component, module, end item, or system) to a serviceable condition under typical field operating conditions. This time includes preparation time, troubleshooting time, and quality assurance/quality control 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
- O -- Organizational maintenance
- F – Direct Support maintenance
- H – General Support maintenance
- D – Depot maintenance

e. Column 5, Tools and Equipment. Column 5 specifies, by code, those common tool sets (not individual tools) and special tools, test, and support equipment required to perform the designated function.

¹Services – Inspect, test, service, adjust, a line, calibrate, or replace.

²Action – Welding, grinding, riveting, straightening, facing, remachining, or resurfacing.

B-3. COLUMN ENTRIES USED IN THE MAC (Continued).

f. Column 6, Remarks. This column shall contain a letter code in alphabetical order which shall be keyed to the remarks contained in section IV.

B-4. COLUMN ENTRIES USED IN TOOL AND TEST EQUIPMENT REQUIREMENTS.

a. Column 1, Tool or Test Equipment Reference Code. The tool and test equipment reference code correlates with a maintenance function on the identified end item or component.

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/NATO Stock Number. The National or NATO stock number of the tool or test equipment.

e. Column 5, Tool Number. The manufacturer's part number.

B-5. EXPLANATION OF COLUMNS IN SECTION IV.

a. Reference Code. The code scheme recorded in column 6, section II.

b. Remarks. This column lists information pertinent to the maintenance function being performed as indicated on the MAC, section II.

**Section II MAINTENANCE ALLOCATION CHART FOR TRUCK, TRACTOR,
M915, M916, AND M920 AND CHASSIS FOR M917, M918, AND M919.**

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQUIPMENT	(6) REMARKS
			C	O	F	H	D		
01	ENGINE	Repair Adjust Test			19.2 3.8 0.4			2-3-4	
0100	Engine (Diesel)	Service Replace Repair	2.0		11.0	65.0		1 thru 77-81 - 84-85-97	
	Engine Mount	Inspect Replace		0.2	0.4			99 thru 180- 189 thru 221	
0101	Cylinder Head	Inspect Replace Repair			1.0 7.0 10.4			2 thru 44-50- 8.	
	Engine Block	Inspect Repair				2.0 40.0		99 thru 116- 128-129	
	Cylinder and Sleeve Assembly	Inspect Replace			0.5	18.0		99 thru 101- 128	
0102	Crankshaft & Main Bearings	Inspect Replace				0.5 17.3		117 thru 119	
	Main Seals	Inspect Replace			0.1 20.0			120 thru 127- 194-195	
	Vibration Damper	Inspect Replace			0.5 1.0				
0103	Flywheel Assembly	Replace			13.0			45	
0104	Connecting Rods, Bearings and Pistons Assembly	Inspect Replace Repair				0.3 27.0 8.0		207 thru 215- 221	
0105	Valves	Inspect Adjust Replace			0.8 1.8 14.0			71 thru 77 2	
	Cam Shaft and Bearing	Inspect Replace				27.0		197 thru 206	
	Cam Follower Housing	Inspect Replace				0.2 12.0		46 thru 49- 51 thru 54-81	
	Cam Follower	Inspect Replace				0.2 14.0			
	Push Tubes (Valve)	Inspect Replace				0.1 8.0			

**Section II MAINTENANCE ALLOCATION CHART FOR TRUCK, TRACTOR, M915,
M916, AND M920 AND CHASSIS FOR M917, M918, AND M919 (Continued).**

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQUIPMENT	(6) REMARKS
			C	O	F	H	D		
01	ENGINE (Continued)								
	Timing Gear	Inspect Replace				0.6 24.0			
	Rocker Arm Assembly	Inspect Replace			0.6 2.5				
	Valve Cover and Gasket	Inspect Replace		0.1 0.5					
0106	Oil Pump	Inspect Replace Repair			1.5 2.5		3.0		
	Oil Filter	Service Replace		0.6 0.2					
	Oil Filter Adapter	Replace			10.8				
	Bypass Oil Filter	Service Replace		0.6 0.6					
	Oil Pan	Inspect Replace Repair	0.1		2.0 1.3				
	External Lines	Inspect Replace		0.1 1.0					
	Oil Breather	Inspect Service Replace		0.1 0.2 0.2					
	Oil Cooler	Inspect Replace		0.1	3.0			55	
	Oil Pressure Regulator	Inspect Test Replace			0.1 0.8 0.2				
	Level Gage (dipstick)	Replace		0.1					
0108	Aftercooler	Inspect Repair Replace		0.1	2.0 2.5				
	Exhaust Manifold	Inspect Replace		0.1	2.8				
0109	Accessory Drive	Inspect Repair Replace			0.5 2.0 4.5				
								56 thru 65	

**Section II MAINTENANCE ALLOCATION CHART FOR TRUCK, TRACTOR, M915,
M916, AND M920 AND CHASSIS FOR M917, M918, AND M919 (Continued).**

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQUIPMENT	(6) REMARKS
			C	O	F	H	D		
01	ENGINE (Continued)								
0112	Engine Retarder	Inspect Repair Replace Adjust		0.5		6.0		81	
03	FUEL SYSTEM				3.0 1.5				
0301	Fuel Injector Assembly	Test Adjust Replace Calibrate Repair			0.8 4.0 4.0	1.0 1.8		71 thru 77- 84 3 thru 12-84- 152	
0302	Fuel Pump Assembly Service of Filter& Screw	Inspect Service Test Replace		0.5 0.2	4.8 2.0			151 thru 154- 166 thru 171- 188 144 thru 150 196	
		Calibrate				3.5		159 160 166 thru 171 174 192	
		Repair				8.9		155-156 158 161 thru 164 165-172-173 177 thru 179 189 thru 191 193 216 thru 220	
0302	Engine Fuel Lines and Fittings	Inspect Replace		0.5 1.5					

**Section II MAINTENANCE ALLOCATION CHART FOR TRUCK, TRACTOR, M915,
M916, AND M920 AND CHASSIS FOR M917, M918, AND M919 (Continued).**

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQUIPMENT	(6) REMARKS
			C	O	F	H	D		
03	FUEL SYSTEM (Continued)								
0304	Air Cleaner Assembly	Inspect Service Replace	0.1	0.2 0.5					
	Air Cleaner Restriction Indicator	Inspect Replace	0.1	0.2					
0305	Turbocharger	Inspect Replace Repair	0.1		1.8	3.0		175-176- 219	
	Turbocharger Air Inlet	Inspect Replace		0.1 0.3					
0306	Fuel Tank	Inspect Service Repair Replace	0.1 0.2		1.5				
0309	Fuel Filter	Inspect Service Replace	0.1	0.3 0.3					
0311	Ether Quick-Start Kit	Inspect Service Replace Repair	0.1	0.3 0.5 0.5					
0312	Accelerator Pedal and Linkage	Inspect Replace Repair		0.1 0.8 0.5					
	Throttle Control and Linkage	Inspect Replace Adjust		1.0 0.3 0.2					
04	EXHAUST SYSTEM								
	Muffler	Inspect Replace	0.1	0.5					
	Exhaust Pipe	Inspect Replace	0.1	0.4					
	Flex Tube	Inspect Replace	3.1	0.4					

**Section II MAINTENANCE ALLOCATION CHART FOR TRUCK, TRACTOR, M915,
M916, AND M920 AND CHASSIS FOR M917, M918, AND M919 (Continued).**

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQUIPMENT	(6) REMARKS
			C	O	F	H	D		
04	EXHAUST SYSTEM (Continued) Extension Tube	Inspect	0.1						
		Replace		0.4					
	Tailpipe	Inspect	0.1						
		Replace		0.2					
05	COOLING SYSTEM								
0501	Draincock	Inspect	0.1						
		Replace		0.2					
	Radiator Assembly	Inspect	0.2						
		Service	0.2						
		Replace		3.0					
		Repair			2.0				
		Test			0.3				
		Inspect		0.1					
0502	Fan Shrouds	Replace		1.5				97	
0503	Lines, Fittings, Hoses	Inspect	0.1						
		Replace		2.5					
		Replace		1.0					
		Replace		1.0					
		Replace		2.0					
		Repair		2.0					
		Inspect		0.2					
		Replace		0.4					
0504	Water Pump	Inspect	0.1					56 thru 70	
		Replace		3.0	2.0				
0505	Fan	Repair							
		Inspect	0.1						
	Fan Clutch	Replace		0.5					
		Inspect	0.1						
		Replace		1.5					
		Replace		0.5					
		Replace		0.1					
		Inspect		0.2					
	Accessory Drive Belts	Adjust		0.2					
		Replace		1.0					

**Section II MAINTENANCE ALLOCATION CHART FOR TRUCK, TRACTOR, M915,
M916, AND M920 AND CHASSIS FOR M917, M918, AND M919 (Continued).**

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQUIPMENT	(6) REMARKS
			C	O	F	H	D		
05	COOLING SYSTEM (Continued)								
0507	Fan Clutch Actuator	Inspect Replace	0.2	0.5					
	Fan Clutch Actuator Hoses	Inspect Replace	0.1	0.5					
06	ELECTRICAL SYSTEM								
0601	Alternator & Regulator (Internal)	Inspect Replace Adjust Test Repair	0.2	1.0	0.5 0.5 2.0			78-79	
	Alternator Drive Belts	Inspect Adjust Replace	0.1	0.1 0.3					
0603	Starter Motor/Solenoid	Replace Repair		0.9	1.8			80	
	Starter Magnetic Switch	Inspect Replace	0.1	0.5					
0607	Instruments – LH Cluster	Replace		0.5					
0608	Engine Run Switch	Replace		0.5					
	Start Switch	Replace		0.5					
	Ether Quick-Start Button	Replace		0.5					
	Clearance Lamp	Replace		0.5					
	Headlight	Replace		0.5					
	Blackout Switch	Replace		0.5					
	Engine Retarder Selector Switch	Replace		0.5					
	Engine Retarder Foot Switch	Replace		0.5					
	Turn Signal Control	Replace		0.5					
	Backup Alarm Override	Replace		0.5					916/920
	Work Lamp Switch	Replace		0.5					
	Heater Fan Switch	Replace		0.5					
	Dimmer Switch	Replace		0.5					
0609	Service Head Lamps	Replace		0.6					

**Section II MAINTENANCE ALLOCATION CHART FOR TRUCK, TRACTOR, M915,
M916, AND M920 AND CHASSIS FOR M917, M918, AND M919 (Continued).**

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQUIPMENT	(6)
			C	O	F	H	D		
06	ELECTRICAL SYSTEM (Continued)								
	Marker & Turn Signal Lamps	Replace		0.3					
	Clearance Lamps	Replace		0.3					
	Tail, Brake, Turn Signal, Stop, and Backup Lamps	Replace		0.3					
	Work Lamps	Replace		0.3					916 & 920
	Blackout Head Lamp	Replace		0.3					
	Blackout Tail & Stop Lamps	Replace		0.3					
	Dome Lamp & Switch	Replace		0.3					
	Instrument Illumination Lamps	Replace		0.3					
0610	Sending Units								
	Fuel Level	Replace		0.4					
	Water Temperature	Replace		0.2					
	Oil Pressure	Replace		0.2					
	Transmission Oil Temperature	Replace		0.2					
	Switches and Relays								
	High Engine Water Temperature	Replace		0.2					
	Low Engine Oil Pressure	Replace		0.2					
	Low Brake Air Pressure	Replace		0.2					
	Backup	Replace		0.2					916-920
0610	Park Brake Engaged	Replace		0.2					
	Turn Signal Flasher	Replace		0.2					
	PTO Engaged	Replace		0.2					916-920
	Neutral Safety Switch	Replace		0.2					
	Differential Lockout Engaged	Replace		0.2					
	Instrument Panel Circuit Breakers	Replace		0.2					
	instrument Panel Relays	Replace		0.2					
0611	Horn	Replace		0.4					
	Horn Button	Replace		0.5					

**Section II MAINTENANCE ALLOCATION CHART FOR TRUCK, TRACTOR, M915,
M916, AND M920 AND CHASSIS FOR M917, M918, AND M919 (Continued).**

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQUIPMENT	(6) REMARKS
			C	O	F	H	D		
06	ELECTRICAL SYSTEM (Continued)								
	Low Air Buzzer	Replace		0.2					
	Backup Alarm	Replace		0.2					
0612	Batteries, Box & Cables								
	Batteries	Inspect	0.5						
		Replace		0.6					
	Battery Box	Inspect	0.2						
		Replace		1.5					
		Repair		1.0					
	Battery Cable	Inspect	0.2						
		Replace		0.5					
		Repair		0.3					
0613	Chassis Wiring Harnesses	Inspect	0.2						
		Replace		3.5					
		Repair		1.0					
0617	Trailer Coupling (Electric)	Inspect	0.2						
		Replace		0.2					
07	TRANSMISSION								
0706	Ratio Selector	Inspect	0.1						
		Adjust				0.7			
		Replace		0.3					
		Test		0.6					
		Repair				2.0			
	Air Control Line	Replace		0.5					
	Control Group	Inspect	0.3						
		Adjust				0.5			
		Replace			2.3				
		Test				1.0			
		Repair				2.5			
0710	Transmission	Inspect	0.1						
		Service		2.0					
		Replace			8.0				
		Repair			4.0	22.0		183 thru 185	Includes Strainer
	Pump, Oil	Inspect			0.2				
	Oil Cooler	Inspect	0.2						
		Replace	0.1						

**Section II MAINTENANCE ALLOCATION CHART FOR TRUCK, TRACTOR, M915,
M916, AND M920 AND CHASSIS FOR M917, M918, AND M919 (Continued).**

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQUIPMENT	(6) REMARKS
			C	O	F	H	D		
08	POWER TRANSFER								
0801	Transfer Assembly	Inspect Service Replace Repair	0.1	0.5	4.0 3.0				
0803	Power Transfer/Diff. Lockout Control	Replace		0.5					
09	PROPELLER SHAFTS & UNIVERSAL JOINTS								
	Universal Joints	Inspect Service Replace		0.3 0.2 1.4					
	Propeller Shafts	Inspect Service Replace		0.3 0.2 1.0					
10	FRONT AXLE								
1000	Driving Axle Assembly	Inspect Service Replace Repair	0.2	1.0	6.0	40.0			M916 thru M920
	Non-Driving Axle Assembly	Inspect Service Repair Replace	0.1	0.3	6.0 4.0				M915 only
	Bearings, Axle Shaft and Flanges	Inspect Replace	0.1	4.0		10.0		98	
1002	Differential Assembly	Replace Repair Overhaul			4.5 8.0	17.5			M916 thru M920
1004	Front Axle End Assembly	Inspect Replace	0.5	2.0					M915 only

**Section II MAINTENANCE ALLOCATION CHART FOR TRUCK, TRACTOR, M915,
M916, AND M920 AND CHASSIS FOR M917, M918, AND M919 (Continued).**

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQUIPMENT	(6) REMARKS
			C	O	F	H	D		
11	REAR AXLE								
1100	Rear Bogie Axle	Inspect Service Replace Repair	0.1	0.7	4.0 4.0				M915 only (Include filter)
	Rear Axle Housing	Overhaul Inspect Replace	0.1		10.0	17.5			M916 thru M920

Section II MAINTENANCE ALLOCATION CHART FOR TRUCK, TRACTOR, M915, M916, AND M920 AND CHASSIS FOR M917, M918, AND M919 (Continued).

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQUIPMENT	(6) REMARKS
			C	O	F	H	D		
	REAR AXLE (Continued)								
	Differential and Carrier	Replace Repair Overhaul			9.8 9.8	11.8			
	Filter	Inspect Replace	0.1	0.2					
	Flange, Companion Drive Pinion	Inspect Replace	0.1		1.0			87-88-90 thru 95-186- 187	
	Seal, Oil, Drive Pinion Bearing	Inspect Replace	0.1		1.5				
	Rear Axle Shaft, Right or Left	Replace		3.5					
	Differential Lockout Air Chamber	Repair Replace			1.0 1.0				
	Pusher Axle	Inspect Service Replace Repair	0.1	2.0	6.0 6.0				M917, M919 & M920
	Air Bags	Replace		1.0					
	Lift Cylinders	Replace		1.0					
	BRAKES								
	Park Brake Assembly	Inspect Adjust Repair Replace	0.1	0.5 1.4	0.8				
	Foundation Brakes								
	Brake Shoe Assemblies	Inspect Adjust Repair Replace		1.0 0.5 3.0	3.5				Rear Only
	Slack Adjuster	Replace		0.3					Includes Shoe Spring
	S-Cam Mechanism	Replace		3.0					Rear Only

**Section II MAINTENANCE ALLOCATION CHART FOR TRUCK, TRACTOR, M915,
M916, AND M920 AND CHASSIS FOR M917, M918, AND M919 (Continued).**

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQUIPMENT	(6) REMARKS
			C	O	F	H	D		
12	BRAKES (Continued)								
1208	Air Lines and Fittings (Truck Tractor)	Inspect Replace		2.2					Individual Lines
	Air Reservoirs	Inspect Service Replace		1.1					
	Automatic Drain	Replace		0.2					Supply Reservoir Only
1208	Air Brake Chambers	Adjust Replace Repair		0.2 2.0 2.2					Spring Brake Chamber Only
	Double Brake Chambers	Adjust Replace Repair		0.2 2.0	2.2				
	Wedge and Actuator Housing Assemblies	Replace		2.0					Front and Pusher Axle Only
1208	Trailer Hand Brake	Inspect Replace Repair		1.8 1.5					Spring Brake Chamber only
	Dual Brake Volvo and Pedal	Replace		1.5					
	Trailer Protection Valve	Replace		1.5					
	Relay Valve	Replace		1.5					
	Quick Release	Replace		1.5					
	Limiting Valve	Replace		1.5					
	Double Check Valves	Replace		1.5					
1208	Air Compressor	Replace Repair			4.0 2.0			85-177 thru 180-219	
	Air Compressor Governor	Adjust Replace			1.0 0.5				
	Air Dryer	Inspect Service Replace		1.5 0.8					
1211	Trailer Connector Brake Lines and Couplings	Inspect Replace Repair		1.0	1.3				

**Section II MAINTENANCE ALLOCATION CHART FOR TRUCK, TRACTOR, M915,
M916, AND M920 AND CHASSIS FOR M917, M918, AND M919 (Continued).**

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQUIPMENT	(6) REMARKS
			C	O	F	H	D		
13	WHEELS								
1300	Wheel Alinement	Inspect Adjust		0.8 0.5					
1311	Hub Assemblies	Replace		0.5					
	Drums	Replace Repair		1.5	1.5				
	Bearings and Seals	Service Replace		1.5 1.5				82-83-96-98	Inner and Outer Bear- ings and Seals
	Wheel Assembly	Inspect Replace Service	0.1 0.5 0.1						Include Tire
1313	Tire and Tube Assembly	Replace Repair		2.1 1.3					
14	STEERING								
1401	Steering Wheel	Inspect Replace	0.1	0.5					
	Upper Steering Column	Replace Repair			3.0 3.5				
	Lower Steering Column	Replace Repair		1.0 0.5					
	Drag Links	Inspect Adjust Replace Repair	0.1	0.3 1.0 1.5					
	Pitman Arm	Replace		0.8					
	Tie Rod	Inspect Adjust Replace Repair	0.1	1.0 1.5 1.0					
1410	Steering Gear	Adjust Replace Repair			0.2 1.5	2.0			

**Section II MAINTENANCE ALLOCATION CHART FOR TRUCK, TRACTOR, M915,
M916, AND M920 AND CHASSIS FOR M917, M918, AND M919 (Continued).**

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQUIPMENT	(6) REMARKS
			C	O	F	H	D		
14	STEERING (Continued)								
	Hydraulic Steering Pump and Reservoir Assembly	Inspect Service Replace Repair	0.1 0.2	1.0		2.0			
1411	Power Steering Cylinder	Inspect Replace Repair	0.1	2.0	1.5				916-920
15	FRAME ASSEMBLY								
1501	Frame	Inspect	0.5						
	Bumper	Replace		1.0					
1503	Pintle Hook Assembly	Inspect Replace Repair	0.1	0.6 0.2					
1503	Towing Eyes	Inspect Replace	0.1	0.5					
1504	Spare Wheel Carrier	Replace			1.5				
1506	Fifth Wheel Fifth Wheel Assembly	Inspect Adjust Service Repair Replace	0.5	1.0 0.5		3.0		{ 181 182	M915, M916 and M920
16	SPRINGS, SHOCK ABSORBERS, AND TORQUE RODS								
1601	Springs	Inspect Service Replace Repair	0.1	0.2	4.0 6.0				
	Front Spring Pins	Replace	0.1						

**Section II MAINTENANCE ALLOCATION CHART FOR TRUCK, TRACTOR, M915,
M916, AND M920 AND CHASSIS FOR M917, M918, AND M919 (Continued)**

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQUIPMENT	(6) REMARKS
			C	O	F	H	D		
16	SPRINGS, SHOCK ABSORBERS, AND TORQUE RODS (Continued)								
1604	Shock Absorbers	Inspect Replace	0.1 1.0						Non-Driving Front Axle (M915) and Pusher Axle (M917, M919 and M920)
1605	Torque Rods	Replace	1.0						
18	CAB AND BODY								
1801	Cab Mounts	Inspect Replace	0.1 1.0						
	Cab	Inspect	0.1						
	Doors	Inspect Replace Repair	0.1 2.0 1.0						
1601	Steps	Inspect Repair	0.1 1.0						
	Hood Panels and Crossbar support	Inspect Replace Repair	0.1 0.5 0.5			0.5 0.2			
	Ventilators & Control	Inspect Replace Repair	0.1 0.2 0.5						
	Grille	Inspect Replace Repair	0.1 0.5 0.5						
	Splash Shields	Inspect Replace	0.1 0.3						
1602	Fenders	Inspect Replace Repair	0.1 1.0 1.5		.5				
	Windshield	Inspect Replace	0.1 1.2					89	

**Section II MAINTENANCE ALLOCATION CHART FOR TRUCK, TRACTOR, M915,
M916, AND M920 AND CHASSIS FOR M917, M918, AND M919 (Continued).**

(1) GROUP NUMBER	COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQUIPMENT	(6) REMARKS
			C	O	F	H	D		
18	CAB AND BODY [Continued]								
	Seats	Inspect Replace Repair	0.1	0.5	0.5				
1808	Stowage Box	inspect Replace Repair	0.1	1.0 1.0					
2001	WINCH AND POWER TAKEOFF								
	Winch	Inspect Service Replace Repair	0.3 0.3	0.4	4.0 8.0			86	M916 and M920
	Cable Assemblies	Inspect Service Replace	0.2	1.0 1.5					
	Controls, Valves	Replace		0.5					
	Hydraulic Lines & Fittings	Replace Repair		2.0	2.0				
	Hydraulic Motor	Inspect Replace Repair	0.2	3.0	1.5				
	Hydraulic Pump	Inspect Replace Repair	0.1	3.0	1.0				
	Reservoir, In-Line Filter, and Screen	Replace Service		4.0 1.0					
2004	Power Takeoff	Inspect Replace Repair	0.2		1.0 2.0				M916 thru M920
	Power Takeoff Adapter	Replace			1.0				
	Power Takeoff Linkage	Replace		0.8					
	Power Takeoff Coupling	Replace		1.5					

**Section II MAINTENANCE ALLOCATION CHART FOR TRUCK, TRACTOR, M915,
M916, AND M920 AND CHASSIS FOR M917, M918, AND M919 (Continued).**

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQUIPMENT	(6) REMARKS
			C	O	F	H	D		
22	ACCESSORY ITEMS								
	Windshield Wiper Motors	Replace		0.8					
	Windshield Wiper Controls	Replace		0.3					
	Arm and Wiper Blades	Inspect	0.1						
		Replace		0.2					
	Mirrors	Inspect	0.1						
		Replace		0.3					
	Windshield Washer	Inspect	0.1						
		Service	0.2						
		Replace		0.5					
	Windshield Washer Control	Replace		0.3					
	Air Horn and Control Valve	Replace		0.3					
2207	Personnel Heater	Inspect	0.1						
		Replace		2.0					
		Repair			1.0				
	Air Ducts	Inspect	0.1						
		Replace		0.8					
	Heater Control Valve and Cable	Adjust		0.2					
		Replace		0.5					
	Heater Control Panel	Replace		1.0					
		Repair			1.0				
2210	Data and Instruction Plates	Inspect	0.1						
		Replace		0.5					
47	GAGES NON-ELECTRIC								
4701	Tachograph	Service		0.2					
		Replace		0.3					
	Speedometer Cable	Replace		0.4					
	Tachometer Cable	Replace		0.4					
4702	Pressure Gages	Inspect	0.1						
		Replace		0.5					
	Gages	Inspect	0.1						
		Replace		0.5					

Section III TOOL & TEST EQUIPMENT REQUIREMENTS.				
Tool or Test Equipment Number Reference Code	Maintenance Category	Nomenclature	National/Nato Stock Number	Tool
1	F H	Checking Tool, Blow-By		3375150
2	F H	Reamer, Valve Guide	5110-00-980-7347	ST-646
3	F H	Cutting Tool, Bead	5110-00-932-2089	ST-788
4	F H	Expander, Tube, Roller	3441-00-922-6699	ST-880
5	F H	Cage		ST-880-1
6	F H	Roll		ST-880-2
7	F H	Nut, Thrust		ST-880-6
8	F H	Mandrel		ST-880-7
9	F H	Cutter, Injector Sleeve	4910-00-981-3105	ST-884
10	F H	Holder		ST-884-1
11	F H	Cutter		ST-884-3
12	F H	Pilot		ST-884-6
13	F H	Tool, Cylinder Head	4910-00-999-1499	ST-913
14	F H	Lockscrew		ST-913-1
15	F H	Bearing		ST-913-7
16	F H	Plug, Locking		ST-913-11
17	F H	Insert, Fiber		ST-913-18
18	F H	Screw Assembly, Adjusting		ST-913-23
19	F H	Tool Holder		ST-913-14
20	F H	Tool Bit		ST-913-17
21	F H	Tool, Grooving	5120-00-178-0948	ST-1100
22	F H	Body (5-1/2 In. Bore)		ST-1100-10
23	F H	Nut, Adjusting (1 1/4-20 Thread)		ST-1100-7
24	F H	Capscrew (1/4-28x 3/16 In.)		ST-1100-6
25	F H	Sleeve, Rod		ST-1100-8
26	F H	Rod, Tool Adjusting		ST-1100-11
27	F H	Spring, Rod		ST-1100-9
28	F H	Cap, Tool Setting		ST-1100-14
29	F H	Cutting Tool		ST-1100-13
30	F H	Spring, Tool		ST-1100-12
31	F H	Sleeve Injector	4910-00-150-5858	ST-1140
32	F H	Holding Tool, Injector Sleeve	5120-00-104-1795	ST-1179
33	F H	Driver, Injector Sleeve	5120-00-981-3108	ST-1227
34	F H	Puller, Injector Sleeve	5120-00-113-5271	ST-1244
35	F H	Tip, Extractor		ST-1244-7
36	F H	Rod		ST-1244-2

Section III TOOL & TEST EQUIPMENT REQUIREMENTS (Continued).

Tool or Test Equipment Number Reference Code	Maintenance Category	Nomenclature	National/Nato Stock Number	Tool
37	F H	Collar, Forming		ST-1244-6
38	F H	Spacer		ST-1244-9
39	F H	Bridge, Support		ST-1244-1
40	F H	Washer, Thrust		ST-1244-5
41	F H	Nut (1-8 Thread)		ST-1244-4
42	F H	Nut (9/16-12 Thread)		ST-1244-3
43	F H	Driver		ST-1244-8
44	F H	Driver, Valve Guide		3375282
45	F H	Attachment, Dial Gage		ST-1325
46	F H	Bushing, Block and Mandrel, Lever	5180-00-916-1813	ST-249
47	F H	Mandrel		ST-249-1
48	F H	Mandrel		ST-249-2
49	F H	Sleeve		ST-249-3
50	F H	Spacer, Crosshead Guide	4910-00-150-3797	ST-633
51	F H	Mandrel Set, Machine	3460-00-499-1210	ST-691
52	F H	Mandrel		ST-691-1
53	F H	Block		ST-691-2
54	F H	Mandrel		ST-691-3
55	F H	Mandrel, "O" Ring, Lubricating Oil Cooler		ST-1218
56	F H	Pulley Assembly, Tool	5180-00-944-0374	ST-386
57	F H	Arbor		ST-386-2
58	F H	Nut		ST-386-3
59	F H	Adapter, Ball, Thrust Bearing		ST-386-11
60	F H	Spacer		ST-386-5
61	F H	Adapter		3375205
62	F H	Adapter (2-1/4 In. X 7/8 in. Dia.)		ST-386-10
63	F H	Adapter (2-1/4 in. X 1 In. Dia.)		ST-386-9
64	F H	Adapter (2-1/4 In. X 1 In. Dia.)		ST-386-8
65	F H	Adapter (1-7/8 In. X 1 In. Dia.)		ST-386-6
66	F H	Mandrel, Water Pump Seal		ST-658
67	F H	Mandrel, Water Pump Seal	5120-00-159-8916	ST-659
68	F H	Fixture, Bearing Disassembly		ST-1114
69	F H	Water Pump Seal Driver		ST-1159
70	F H	Driver, Water Pump Drive Shaft Oil Seal		3375180
71	F H	Adapter, Torque Wrench	5120-00-103-4687	ST-669
72	F H	Driver, 3/8 In., Plastic Handle		F-40A

Section III TOOL & TEST EQUIPMENT REQUIREMENTS (Continued).				
Tool or Test Equipment Number Reference Code	Maintenance Category	Nomenclature	National/Nato Stock Number	Tool
73	F H	Handle		ST-699-1
74	F H	Blade, Screwdriver 1/2 In. X 0.062 In.		M-1302 A-5
75	F H	Blade, Screwdriver 1/4 In. X 0.032 In.		TM-82
76	F H	Socket, 3/4 In. Deep Double Hex		M-1302B-24
77	F H	Socket, 9/16 In. Deep Double Hex		M-1302B-18
78	F H	Rod, Expanding		CG-40-4
79	F H	Collet 43/64 to 52/64		CG-40-11
80	F H	Socket 1/4 In. 12 Point, 1/4 In. Drive		STMD-8
81	F H	Socket, Jacobs Brake		B1465A
82	O F H	Installing Tool, Seal		RD259A
83	O F H	Handle, Seal Installing Tool		RD263
84	F H	Fixture, Injector Timing	4910-00-712-0537	ST-593
85	F H	Wrench, Air Compressor	5120-01-072-2952	3375159
86	F H	Bar, Bearing Puller		11074
87	F H	Yoke Installer		J-26422-10
88	F H	Wrench, Differential Adjusting Nut		J-972
89	F H	Tool, Remove-Replace Windshield Moulding	5120-00-279-8422	CPR109701
90	F H	Tool, Yoke Installer	4120-01-014-0017	J-26422
91	F H	Shaft, 1 1/4-12 Thread		J-26422-2
92	F H	Nut		J-26422-3
93	F H	Shaft 1 1/4-12		J-26422-4
94	F H	Sleeve		J-26422-1
95	F H	Wear Sleeve Installation Tool		J-26424
96	O F H	Socket, Pusher Axle 3 3/16 In.		J-7757-2
97	O F H	Thermostat Seal Mandrel		ST-1225
98	O F H	Socket, Wheel Bearing		1902
99	H	Tool, Counterbore	5120-00-150-7488	ST-1295
100	H	Holder, Tool	5120-00-150-7489	ST-1065
101	H	Tool Bit, Counterbore		ST-1059-17
102	H	Boring Tool, Liner Counterbore		ST-1168
103	H	Bearing, Drive		ST-1168-4
104	H	Screw, Drive		ST-1168-6
105	H	Shaft, Drive		ST-1168-3
106	H	Sprocket, Drive		ST-1168-5
107	H	Chain, Drive		ST-1168-7
108	H	Sprocket, Drive		ST-1168-10
109	H	Tool Bit		ST-1168-19
110	H	Ring, Snap, Drive Shaft		ST-1168-8

Section III TOOL & TEST EQUIPMENT REQUIREMENTS (Continued).				
Tool or Test Equipment Number Reference Code	Maintenance Category	Nomenclature	National/Nato Stock Number	Tool
111	H	Ring, Snap, Drive Bearing	5120-00-104-1816	ST-1168-9
112	H	Counterbore Tool Liner		ST-1255
113	H	Chamfer Tool, Lower Bore Sleeve		ST-1318
114	H	Tool Bit		ST-1318-23
115	H	Bore Tool, Lower Liner		ST-1287
116	H	Tool Bit		ST-1287-10
117	H	Puller, Shoulder Bolt, Gear Crank		3375081
118	H	Puller, Gear, Crank Bridge Assembly		3375075
119	H	Puller, Jaw, Crankshaft Gear		3375077
120	H	Puller-installer, Oil Seal		ST-1259
121	H	Spacer Ring (1-7/16 In.)		ST-1259-4
122	H	Plate, Top		ST-1259-1
123	H	Spacer Ring (3/16 In.)		ST-1259-2
124	H	Screw, Allen Head (1/4-20 X 1/2 In.)		ST-1259-3
125	H	Screw, Main Puller (1/2-13 X 2 In.)		ST-1259-7
126	H	Screw, Allen Head (1/4-20 X 1-3/4 In.)		ST-1259-5
127	H	Screw, Seal Puller		ST-1259-6
128	H	Clamp, Cylinder Liner		ST-1184
129	H	Driver		3375153
130	H	Gear & Spacer Mandrel, Lubricating Oil Pump		ST-1157
131	H	Bushing Mandrel, Lubricating Pump		ST-1158
132	H	Bushing Tool, Lubrication Pump Body Cover		3375206
133	H	Bushing, Guide		3375223
134	H	Adapter, Drive		3375229
135	H	Housing, Main Bore		3375220
136	H	Knob, Plastic		3375228
137	H	Dial Indicator		3375227
138	H	Tool Bit		3375226
139	H	Tool Bit		3375225
140	H	Tool Bit		3375207
141	H	Knob, Cutter Adjusting		3375224
142	H	Bushing, Guide		3375221
143	H	Bushing, Guide		3375222
144	H	Orifice Torque	5120-01-072-2955	ST-1090
145	H	Driver, Torque Wrench		ST-1090-1
146	H	Screwdriver		ST-1090-2
147	H	Screw, Set		ST-1090-4
148	H	Wrench, Allen, 5/64 In.		ST-1090-3
149	H	Checking Tool, Injector Protrusion		ST-981

Section III TOOL & TEST EQUIPMENT REQUIREMENTS (Continued).				
Tool or Test Equipment Number Reference Code	Maintenance Category	Nomenclature	National/Nato Stock Number	Tool
150	H	Torque Tool, Injector		ST-1145
151	H	Fixture, Top Stop Injector Setting		3375160
152	H	Tool, Adjusting		3375165
153	H	Crowsfoot, 1-3/8 In., Locknut Wrench		3375166
154	H	Wrench, Inch Pound Torque		3375232
155	H	Block, Weight Carrier		ST-1231
156	H	Puller, Tachometer Drive		ST-1326
157	H	Collar		ST-1326-2
158	H	Collet		ST-1326-1
159	H	Adapter Plate, Fuel Filter		3375014
160	H	Gasket		3375015
161	H	Front Cover, Main Shaft Assembly		3375175
162	H	Driver, Front Cover		3375174
163	H	Driver, Main Shaft Seal		3375173
164	H	Installation Tool, Main Shaft & Bearing		3375172
165	H	Installation Tool, Throttle Shaft Ball		3375204
166	H	Adjust Kit, AFC Fuel Pump		3375189
167	H	Installation Tool, No Air Screw "O" Ring		3375148
168	H	Tool, AFC No Air Adjusting		3375140
169	H	Installation Tool, Glyd Ring		3375146
170	H	Forming Tool, Glyd Ring		3375147
171	H	Tool, AFC Adjusting		3375137
172	H	Installation Tool, Cast Governor Weight Carrier		3375230
173	H	Mandrel, Tachometer Drive Cup Plug		3375271
174	H	Throttle Travel Template	5120-01-074-0020	3375355
175	H	Turbo Support Block		ST-608
176	H	Socket, Wrench	5120-00-116-7625	ST-1095
177	H	Puller Assembly	5120-00-065-1031	ST-544
178	H	Screw		ST-544-2
179	H	Puller		ST-544-1
180	H	Holder	5120-00-923-0856	ST-851
181	H	Lock Tester 2 In.		TLN-1000
182	H	Lock Tester 3 In.		ITL42
183	H	Step Plate, Mechanic	5120-00-473-6921	8B7560
184	H	Bracket		FT901
185	H	Installer		2P8260
186	H	Staking Tool, Pinion Bearing		26883

Section III TOOL & TEST EQUIPMENT REQUIREMENTS (Continued).				
Tool or Test Equipment Number Reference Code	Maintenance Category	Nomenclature	National/Nato Stock Number	Tool
187	H	Carrier Stand		J-3409-1
188	H	Adapter Pot, Injector		3375086
189	H	Assembly Tool, "O" Ring	5120-00-396-8089	ST-422
190	H	Assembly Tool, Tube	5120-00-999-1505	ST-835
191	H	Driver, Governor Cylinder	4910-00-150-5801	ST-853
192	H	Adjusting Tool	4910-00-150-5805	ST-984
193	H	Assembly Tool, Tachometer	5120-00-896-8087	ST-1032
194	H	Driver, Seal, Crankshaft	4910-00-150-5810	ST-997
195	H	Pins		ST-997-6
196	H	Wrench, Injector	5120-00-150-7492	ST-995
197	H	Mandrel, Camshaft Bushing	5120-00-055-4013	ST-1228
198	H	Shank, Mandrel		ST-1228-3
199	H	Driver		ST-1228-9
200	H	Puller Assembly		ST-1228-13
201	H	Guide		ST-1228-5
202	H	Guide (2-1/2 In.)		3375154
203	H	Shaft Assembly		ST-1228-4
204	H	Roll Pin		ST-1228-14
205	H	Rod		ST-1228-2
206	H	Slide Hammer		ST-1228-1
207	H	Bushing Driver	4910-00-150-5802	ST-1242
208	H	Block		ST-1242-3
209	H	Cup		ST-1242-2
210	H	Pin, Cotter		ST-1242-6
211	H	Driver (Tapered)		ST-1242-4
212	H	Knock-Out Ring (Tapered)		ST-1242-5
213	H	Knock-Out Ring (Straight)		ST-1242-7
214	H	Driver, Straight		ST-1242-8
215	H	Mandrel		ST-1242-1
216	H	Fixture, Ream, Fuel Pump Front Main Bearing	5110-00-981-3107	ST-490
217	H	Puller, Mechanical	5120-00-999-1504	ST-709
218	H	Puller, Bushing		3375108
219	H	Vise, Ball Joint	4910-00-999-5106	ST-302
220	H	Front Seal Assembly	5120-00-896-8097	ST-419
221	H	Gage, Groove Wear	5210-00-999-1209	ST-560

APPENDIX C

EXPENDABLE SUPPLIES AND MATERIALS LIST

Section I INTRODUCTION.

C-1. SCOPE.

This appendix lists expendable supplies and materials you will need to operate and maintain the M915, M916, M920 Truck Tractors and Chassis for M917, M918, and M919.

These items are authorized to you by CTA 50-970, Expendable Items (Except Medical, Class V, Repair Parts, and Heraldic Items).

C-2. EXPLANATION OF COLUMNS.

a. Column 1 – Item Number. This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the material (e.g., “Use cleaning compound, item 5, App. D”).

b. Column 2 – Level. This column identifies the lowest level of maintenance that requires the listed item.

C – Operator/Crew.

O – Organizational Maintenance.

F – Direct Support Maintenance.

H – General Support Maintenance.

c. Column 3 – National Stock Number. This is the National stock number assigned to the item; use it to request or requisition the item.

d. Column 4 – Description. Indicates the Federal item name and, if required, a description to identify the item. The last line for each item indicates the part number followed by the Federal Supply Code for Manufacturer (BSCM) in parentheses, if applicable.

e. Column 5 – Unit of Measure (U/M). Indicates the measure used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in, pr). If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements.

Section II EXPENDABLE SUPPLIES AND MATERIALS LIST.

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) U/M
1	C	9150-00-065-0029 9150-00-935-1017 9150-00-190-0904 9150-00-190-0905 9150-00-190-0907	Grease, Automotive and Artillery GAA (MIL-G-10924C) 2-1/4-oz tube 14-oz cartridge 1-lb can 5-lb can 35-lb can	 oz oz lb lb lb
2	C	9150-00-234-5197 9150-00-261-7891	Oil, Lubricating, Ex- posed Gear, CW (VV-L-751C) 5-lb can 35-lb pail	 lb lb
3	O	9150-00-261-7904 9150-00-257-5440 9150-00-257-5443	Oil, Lubricating, Gear Subzero, GOS (MIL-L-10324) 1-qt can 5-gal drum 55-gal drum	 qt gal gal
4	C	9150-00-265-9425 9150-00-265-8428 9150-00-265-9429 9150-00-265-9430	Oil, Lubricating OE/HDO 10 (MIL-L-2104C) 1-qt can 5-gal drum 55-gal drum, 16 gage 55-gal drum, 18 gage	 qt gal gal gal
5	C	9150-00-265-9433 9150-00-265-9435 9150-00-265-9436 9150-00-265-9437	Oil, Lubricating, OE/HDO 30 (MIL-L-2104C) 1-qt can 5-gal drum 55-gal drum, 16 gage 55-gal drum, 18 gage	 qt gal gal gal

Section II EXPENDABLE SUPPLIES AND MATERIALS LIST (Continued).

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) U/M
6	C	9150-00-265-9440 9150-00-265-9442 9150-00-265-9441	Oil, Lubricating, OE/HDO 50 (MIL-L-2104C) 1 -qt can 5-gal drum 55-gal drum, 16 gage	qt gal gal
7	O		Oil, Lubricating, OHT, (MI L-H-60830)	
8	O		Oil, Lubricating, OEA, ICE, Subzero, (MIL-L-46167)	
9	O		Lubricant, Gear, Universal, (MIL-L-2106)	
10	C	9140-00-286-5286 9140-00-286-5287 9140-00-286-5288 9140-40-286-5289	Oil, Fuel, Diesel DF-1 Winter (VV-F-800) Bulk 5-gal can 55-gal drum, 16 gage 55-gal drum, 18 gage	gal gal gal gal
11	C	9140-00-286-5294 9140-40-286-5295 9140-00-286-5296 9140-00-286-5297	Oil, Fuel, Diesel DF-2 Regular (VV-F-800) Bulk 5-gal can 55-gal drum, 16 gage 55-gal drum, 18 gage	gal gal gal gal
12	C	6850-00-664-5685 6850-00-281-1985	MISCELLANEOUS Solvent, Dry Cleaning, SD-2 (P-D-680) 1-qt can 1-gal can	qt gal

Section II EXPENDABLE SUPPLIES AND MATERIALS LIST (Continued).

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) U/M
13	c	6850-00-243-1992	Antifreeze, Permanent, Glycol, Inhibited (MIL-A-46153)	1 gal
14	o	8030-00-889-3535	Tape, Antiseizing	
15	0		Soap Solution	
16	0		Lubriplate	
17	0	8030-00-252-3391	Silicone Sealant	

APPENDIX D

SCHEMATIC DIAGRAMS

Section I INTRODUCTION.

D-1. SCOPE.

This appendix provides you with electrical system and compressed air system schematic diagrams.

NOTE

Fold out diagrams are located at the end of this technical manual.

D-2. ELECTRICAL DIAGRAMS.

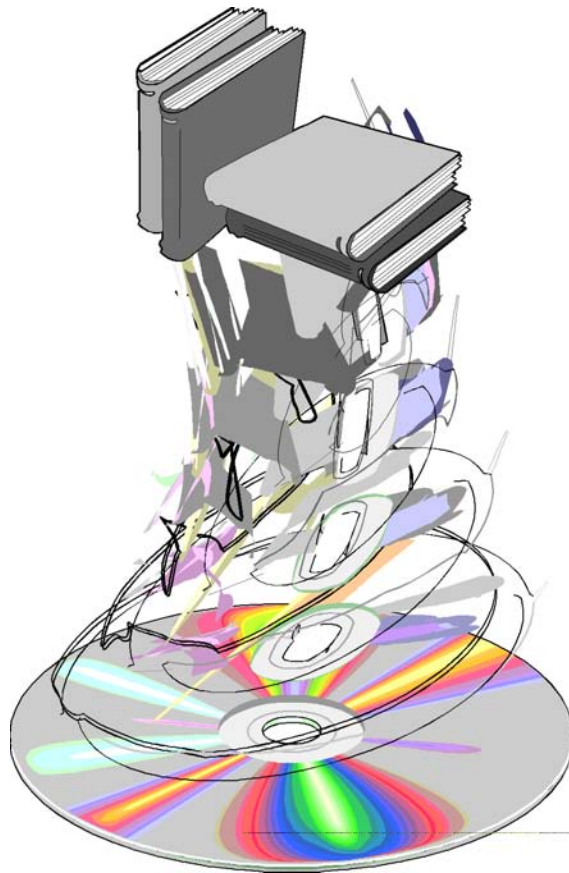
- Figure FO-1. Left and Right Hand Front Signal Lamp Harness Assemblies (M915 thru M920).
- Figure FO-2. Left and Right Hand Fender Harness Assemblies (M915 thru M920).
- Figure FO-3. Engine Harness Assembly (M915 thru M920).
- Figure FO-4. Cab Marker Lamp Harness Assembly (M91681 M920).
- Figure FO-5. Cab Front and Underbody Harness Assembly (M915 thru M920).
- Figure FO-6. Chassis Harness Assembly (M915, M916 & M920).
- Figure FO-7. Chassis Harness Assembly (M917).
- Figure FO-8. Chassis Harness Assembly (M918 & M919).
- Figure FO-9. Instrument Panel Harness Assembly (M915).
- Figure FO-10. Instrument Panel Harness Assembly (M916 and M920).
- Figure FO-11. Instrument Panel Harness Assembly (M917, M918 and M919).
- Figure FO-12. M915, Line Haul Truck Tractor Electrical Diagram.
- Figure FO-13. M916 Light Equipment and M920 Medium Equipment Transporter Truck Tractor Electrical Diagram.
- Figure FO-14. M917, 20-Ton Dump Truck Chassis Electrical Diagram.
- Figure FO-15. M918 Bituminous Distributor and M919 Concrete-Mobile* Mixer Truck Chassis Electrical Diagram.

D-3. COMPRESSED AIR.

- Figure FO-16. M915 Tractor Schematic Diagram.
- Figure FO-17. M916 Tractor Schematic Diagram.
- Figure FO-18. M917 Dump Truck Connecting Schematic Diagram.
- Figure FO-19. M918 Bituminous Distributor Connecting Schematic Diagram.
- Figure FO-20. M919 Concrete-Mobile® Mixer Connecting Schematic Diagram.
- Figure FO-21. M920 Tractor Schematic Diagram.

The fold-outs in this technical
publication are not available.
Please refer to your paper or
microfiche copy as appropriate.

NOT DIGITIZED



APPENDIX E

ILLUSTRATED LIST OF MANUFACTURED ITEMS

Section I INTRODUCTION.

E-1. GENERAL.

a. This appendix includes complete instructions for making items authorized to be manufactured or fabricated at organizational level.

b. A part number index in alphanumeric order is provided for cross-referencing the part number of the item to be manufactured to the figure which covers fabrication criteria.

c. All bulk materials needed for manufacture of an item are listed by part number or specification number in a tabular list on the illustration.

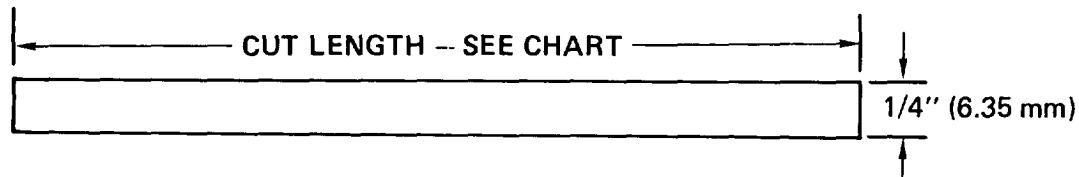
E-2. MANUFACTURED ITEM PART NUMBER INDEX.

PART NO.	FIGURE NO.	PART NO.	FIGURE NO.	PART NO.	FIGURE NO.
M/145-20027	E-5	M/357-20071	E-1	M/357-20101	E-1
M/145-20028	E-5	M/357-20072	E-1	M/357-20102	E-1
M/145-20049	E-5	M/357-20073	E-1	M/357-20103	E-4
M/357-20001	E-1	M/357-20074	E-3	M/357-20112	E-3
M/357-20002	E-2	M/357-20075	E-3	M/357-20113	E-3
M/357-20005	E-3	M/357-20076	E-3	M/357-20114	E-3
M/357-20006	E-3	M/357-20077	E-3	M/357-20115	E-3
M/357-20008	E-4	M/357-20078	E-1	M/357-20116	E-3
M/357-20009	E-4	M/357-20080	E-4	M/357-20117	E-3
M/357-20012	E-4	M/357-20046	E-3	M/357-20118	E-1
M/357-20052	E-4	M/357-20087	E-3	M/357-20119	E-1
M/357-20053	E-4	M/357-20088	E-3	M/357-20120	E-1
M/357-20057	E-3	M/357-20089	E-3	M/357-20126	E-3
M/357-20059	E-1	M/357-20090	E-3	M/357-20127	E-2
M/357-20060	E-1	M/357-20091	E-2	M/357-20128	E-2
M/357-20061	E-2	M/357-20092	E-2	M/357-20129	E-2
M/357-20062	E-1	M/357-20093	E-2	M/357-20130	E-2
M/357-20063	E-1	M/357-20094	E-2	M/357-20131	E-2
M/357-20064	E-2	M/357-20095	E-2	M/357-20132	E-2
M/357-20066	E-1	M/357-20096	E-1	M/357-20133	E-2
M/357-20067	E-1	M/357-20097	E-1	M/357-20134	E-2
M/357-20068	E-2	M/357-20098	E-1	M/357-20135	E-2
M/357-20069	E-2	M/357-20089	E-1	MA145-20001	E-5
M/357-20070	E-2	M/357-20100	E-1	MB147-20001	E-6

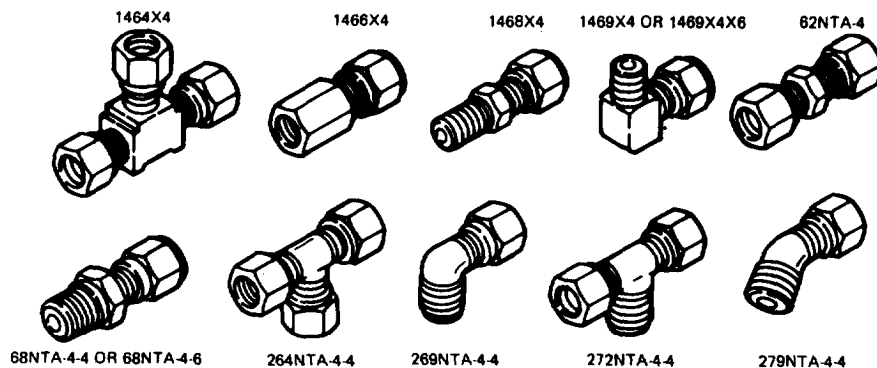
Section II ILLUSTRATED MANUFACTURING INSTRUCTIONS.

MATERIAL BLOCK

STOCK SIZE	DESCRIPTION	SPECIFICATION
1/4" (6.35 mm) OUTER DIA.	TUBE, NONMETALLIC	SAEJ844, TYPE 3A



ITEM NO.	TUBE PART NUMBER	CUT LENGTH Inches (mm)	END FITTINGS PART NUMBER					
			VENDOR NO.	FSCM	NSN	VENDOR NO.	FSCM	NSN
1	M/357-20059	5.50 (139.7)	1468X4	79470	4730-01-055-4017	1468X4	79470	4730-01-055-4017
2	M/357-20097	10.50 (266.7)	68NTA-4-6	30759		68NTA-4-4	30759	
3	M/357-20060	11.00 (279.4)	1468X4	79470	4730-01-055-4017	1468X4	79470	4730-01-055-4017
4	M/357-20062	12.00 (304.8)	1468X4	79470	4730-01-055-4017	1468X4	79470	4730-01-055-4017
5	M/357-20098	14.50 (368.3)	68NTA-4-4	30759		68NTA-4-4	30759	
6	M/357-20119	14.75 (374.6)	1468X4	79470	4730-01-055-4017	1469X4	79470	4730-01-055-4013
7	M/357-20067	16.75 (425.4)	1469X4	79470	4730-01-055-4013	1468X4	79470	4730-01-055-4017
8	M/357-20071	18.00 (457.2)	1466X4	79470		1466X4	79470	
9	M/357-20078	18.00 (457.2)	68NTA-4-6	30759		68NTA-4-6	30759	
10	M/357-20072	19.00 (482.6)	1466X4	79470		1466X4	79470	
11	M/357-20066	20.75 (527.05)	1469X4	79470	4730-01-055-4013	1468X4	79470	4730-01-055-4017
12	M/357-20118	23.00 (584.2)	1468X4	79470	4730-01-055-4017	1469X4	79470	4730-01-055-4013
13	M/357-20102	24.00 (609.6)	1464X4	79470		68NTA-4-4	30759	
14	M/357-20096	24.00 (609.6)	62NTA-4	30759		1469X4	79470	4730-01-055-4013
15	M/357-20120	29.00 (736.6)	1466X4	79470		1469X4	79470	4730-01-055-4013
16	M/357-20001	38.00 (965.2)	68NTA-4-6	30759		68NTA-4-6	30759	
17	M/357-20073	58.25 (1479.5)	272NTA-4-4	30759		68NTA-4-6	30759	
18	M/357-20099	65.00 (1651.0)	68NTA-4-4	30759		1469X4X6	79470	
19	M/357-20063	100.00 (2540.0)	279NTA-4-4	30759		68NTA-4-4	30759	
20	M/357-20101	120.00 (3048.0)	269NTA-4-4	30759		264NTA-4-4	30759	
21	M/357-20100	150.00 (3810.0)	269NTA-4-4	30759		264NTA-4-4	30759	



TA 075725

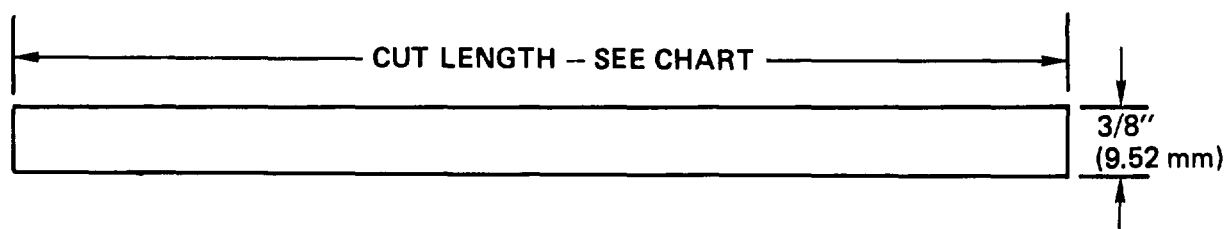
**Figure E-1. 1/4" (6.35mm) O.D. Nonmetallic Tubing and Fittings,
Fabricate Tube From NSN 4720-01-058-7213**

INSTRUCTIONS:

1. Determine tube part number needed from RPSTL and cut squarely to correct length as shown above.
2. Select proper end fittings based upon tube part number.
3. Insert tube into fitting and tighten nut with wrench until one thread remains visible on the fitting body.

MATERIAL BLOCK

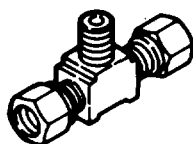
STOCK SIZE	DESCRIPTION	SPECIFICATION
3/8" (9.52 mm) OUTER DIA.	TUBE, NONMETALLIC	SAEJ844, TYPE 3B



ITEM NO.	TUBE PART NUMBER	CUT LENGTH Inches (mm)	END FITTINGS PART NUMBER					
			VENDOR NO.	FSCM	NSN	VENDOR NO.	FSCM	NSN
1	M/357-20002	8.50 (215.9)	1480X6X6	79470		1472X6X6X6	79470	
2	M/357-20061	9.50 (241.3)	68NTA-6-6	30759		269NTA-6-4	30759	4730-01-082-6475
3	M/357-20070	11.00 (279.4)	68NTA-6-4	30759	4730-01-062-2570	269NTA-6-6	30759	
4	M/357-20069	11.50 (292.1)	269NTA-6-6	30759		68NTA-6-6	30759	
5	M/357-20095	12.00 (304.8)	1472X6X6X6	79470		68NTA-6-6	30759	
6	M/357-20092	20.00 (508.0)	269NTA-6-6	30759		68NTA-6-6	30759	
7	M/357-20064	25.00 (635.0)	68NTA-6-4	30759	4730-01-062-2570	68NTA-6-4	30759	4730-01-062-2570
8	M/357-20068	27.00 (685.8)	68NTA-6-4	30759	4730-01-062-2570	269NTA-6-6	30759	
9	M/357-20091	33.00 (838.2)	68NTA-6-4	30759	4730-01-062-2570	269NTA-6-4	30759	4730-01-082-6475
10	M/357-20128	38.50 (977.9)	169NTA-6-8	30759		68NTA-6-6	30759	
11	M/357-20127	38.50 (977.9)	169NTA-6-8	30759		68NTA-6-6	30759	
12	M/357-20133	86.00 (2184.4)	269NTA-6-4	30759	4730-01-082-6475	269NTA-6-8	30759	
13	M/357-20131	103.00 (2616.2)	269NTA-6-4	30759	4730-01-082-6475	169NTA-6-8	30759	
14	M/357-20135	124.00 (3149.6)	68NTA-6-8	30759		68NTA-6-6	30759	
15	M/357-20134	127.00 (3225.8)	68NTA-6-8	30759		68NTA-6-6	30759	
16	M/357-20132	135.00 (3429.0)	68NTA-6-6	30759		269NTA-6-4	30759	4730-01-082-6475
17	M/357-20129	157.00 (3987.8)	68NTA-6-6	30759		68NTA-6-8	30759	
18	M/357-20130	168.00 (4267.2)	1480X6X8	79470		68NTA-6-6	30759	
19	M/357-20093	194.00 (4927.6)	68NTA-6-4	30759	4730-01-062-2570	68NTA-6-4	30759	4730-01-062-2570
20	M/357-20094	207.00 (5257.8)	68NTA-6-4	30759	4730-01-062-2570	1480X6X8	79470	

1472X6X6X6

1480X6X6 OR 1480X6X8

68NTA-6-4 OR 68NTA-6-6
OR 68NTA-6-8169NTA-6-8 OR 269NTA-6-4
OR 269NTA-6-6

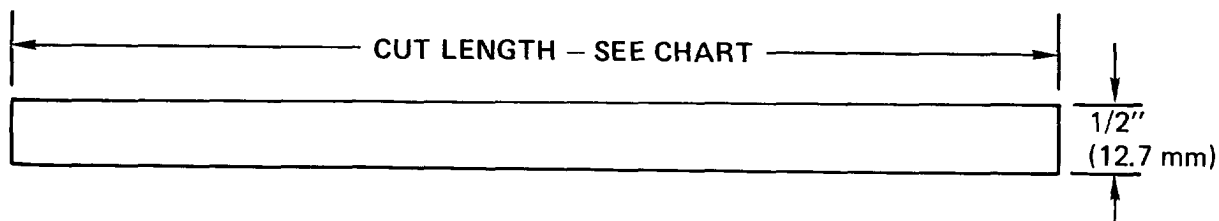
TA 075726

Figure E-2. 3/8" (9.52mm) O. D. Nonmetallic Tubing and Fittings,
Fabricate Tube From NSN 4720-01-040-0591

INSTRUCTIONS:

1. Determine tube part number needed from RPSTL and cut squarely to correct length as shown above.
2. Select proper end fittings based upon tube part number.
3. Insert tube into fitting and tighten nut with wrench until one thread remains visible on the fitting body.

MATERIAL BLOCK		
STOCK SIZE	DESCRIPTION	SPECIFICATION
1/2" (12.7 mm) OUTER DIA.	TUBE, NONMETALLIC	SAEJ844, TYPE 3B



ITEM NO.	TUBE PART NUMBER	CUT LENGTH Inches (mm)	END FITTINGS PART NUMBER					
			VENDOR NO.	FSCM	NSN	VENDOR NO.	FSCM	NSN
1	M/357-20090	12.50 (317.5)	264NTA-8	30759		1469X8	79470	
2	M/357-20005	14.00 (355.6)	68NTA-8-6	30759		68NTA-8-6	30759	
3	M/357-20112	19.50 (495.3)	68NTA-8-6	30759		68NTA-8-6	30759	
4	M/357-20086	20.00 (508.0)	68NTA-8-6	30759		1469X8	79470	
5	M/357-20116	20.50 (520.7)	68NTA-8-6	30759		68NTA-8-6	30759	
6	M/357-20117	23.00 (584.2)	68NTA-8-6	30759		68NTA-8-6	30759	
7	M/357-20057	23.00 (584.2)	68NTA-8-6	30759		68NTA-8-6	30759	
8	M/357-20006	23.50 (596.9)	264NTA-8	30759		68NTA-8-6	30759	
9	M/357-20087	24.00 (609.6)	68NTA-8-6	30759		68NTA-8-6	30759	
10	M/357-20114	24.50 (622.3)	68NTA-8-6	30759		68NTA-8-6	30759	
11	M/357-20076	26.00 (660.4)	1469X8	79470		272NTA-8-6	30759	
12	M/357-20115	26.50 (673.1)	68NTA-8-6	30759		68NTA-8-6	30759	
13	M/357-20089	31.00 (787.4)	269NTA-8-6	30759		68NTA-8-6	30759	
14	M/357-20075	41.00 (1041.4)	1469X8	79470		272NTA-8-6	30759	
15	M/357-20126	69.00 (1752.6)	1469X8	79470		68NTA-8-6	30759	
16	M/357-20077	72.00 (1828.8)	1469X8	79470		1480X8	79470	
17	M/357-20113	73.00 (1854.2)	68NTA-8-6	30759		68NTA-8-6	30759	
18	M/357-20074	75.00 (1905.0)	1469X8	79470		1480X8X6	79470	
19	M/357-20088	100.00 (2540.0)	269NTA-8-6	30759		269NTA-8-6	30759	

1469X8

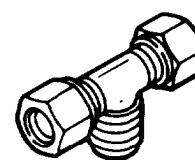
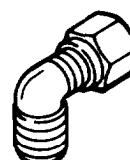
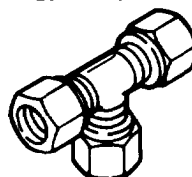
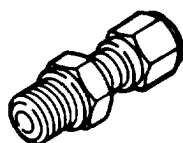
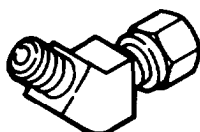
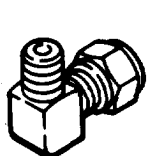
1480X8 OR 1480X8X6

68NTA-8-6

264NTA-8

269NTA-8-6

272NTA-8-6



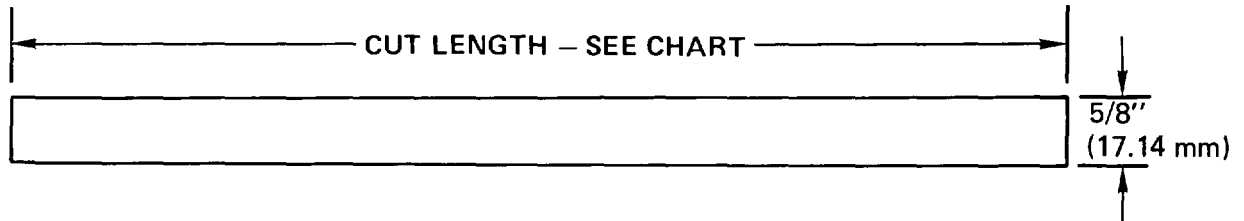
TA 075727

**Figure E-3. 1/2" (12.7mm) O.D. Nonmetallic Tubing and Fittings,
Fabricate Tube From NSN 4720-01-040-0592**

INSTRUCTIONS:

1. Determine tube part number needed from RPSTL and cut squarely to correct length as shown above.
2. Select proper end fittings based upon the part number.
3. Insert tube into fitting and tighten nut with wrench until one thread remains visible on the fitting body.

MATERIAL BLOCK		
STOCK SIZE	DESCRIPTION	SPECIFICATION
5/8" (17.14 mm) OUTER DIA.	TUBE, NONMETALLIC	SAEJ844, TYPE 3B



ITEM NO.	TUBE PART NUMBER	CUT LENGTH Inches (mm)	END FITTINGS PART NUMBER					
			VENDOR NO.	FSCM	NSN	VENDOR NO.	FSCM	NSN
1	M/357-20009	28.00 (711.2)	1468X10	79470	4730-01-082-3799	1468X10	79470	4730-01-082-3799
2	M/357-20008	32.00 (812.8)	1468X10X6	79470		1468X10	79470	
3	M/357-20053	37.50 (952.5)	1480X10	79470		68AB-10-8	30759	
4	M/357-20052	41.50 (1054.1)	1469X10X6	79470		1469X10	79470	
5	M/357-20012	53.50 (1358.9)	1468X10X12	79470		1468X10X6	79470	
6	M/357-20103	56.50 (1435.1)	1469X10	79470		68NTA-10-6	30759	
7	M/357-20080	88.00 (2235.2)	1480X10	79470		1469X10X12	79470	

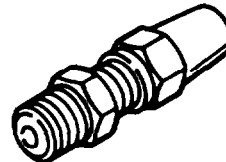
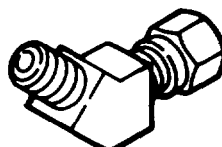
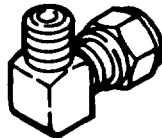
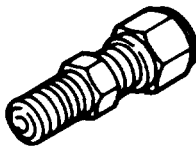
1468X10 OR 1468X10X6
OR 1468X10X12

1469X10X6 OR 1469X10
OR 1469X10X12

1480X10

68AB-10-8

68NTA-10-6



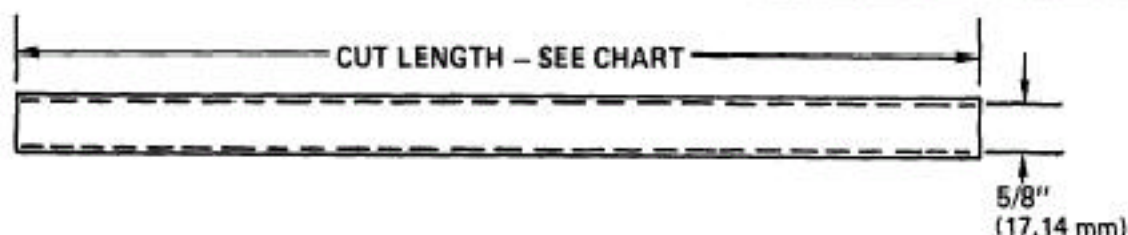
TA 075728

Figure E-4. 5/8" (17.14mm) O.D. Nonmetallic Tubing and Fabricate Tube From NSN 4720-01-009-9058

INSTRUCTIONS:

1. Determine tube part number needed from RPSTL and cut squarely to correct length as shown above.
2. Select proper end fittings based upon tube part number.
3. Insert tube into fitting and tighten nut with wrench until one thread remains visible on the fitting body.

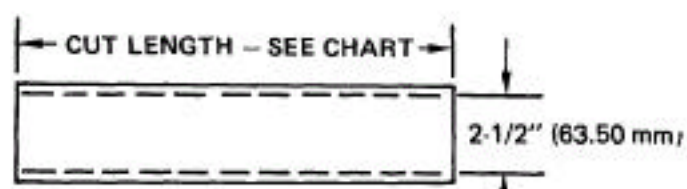
MATERIAL BLOCK		
STOCK SIZE	DESCRIPTION	SPECIFICATION
5/8" (17.14 mm) INNER DIA.	HEATER HOSE	



ITEM NO.	PART NUMBER	CUT LENGTH Inches (mm)	ITEM NO.	PART NUMBER	CUT LENGTH Inches (mm)
1	MA-145-20001	3.00 (76.20)	3	M/145-20049	9.00 (228.60)
2	M/145-20027	4.25 (107.95)	4	M/145-20028	14.00 (355.60)

Figure E-5. 5/8" (17.14mm) I.D. Heater Hose, Fabricate From M/145-20038, FSCM 34623

MATERIAL BLOCK		
STOCK SIZE	DESCRIPTION	SPECIFICATION
2-1/2" (63.50 mm) INNER DIA.	RADIATOR OUTLET HOSE	



ITEM NO.	PART NUMBER	CUT LENGTH Inches (mm)
1	MB147-20001	4.00 (101.60)

TA 075729

Figure E-6. 2-1/2" (63.50mm) I.D. Radiator Outlet Hose, Fabricate From NSN 4720-00-203-3031

ALPHABETICAL INDEX

Subject, Para

Subject, Para

A

Accelerator

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 Rod (Linkage), 4-21
 Troubleshooting, 4-5

Accessory Drive

Description, 2-32

Accessory Drive Belts

(See Fan Belts and Water Pump Belt)

Adapter, Oil Filter

(See Oil Filter Adapter)

Aftercooler

Description, 2-25

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Description, 2-16
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Air Brakes Chambers

(See Air Chambers)

Air Chambers

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E. C. MEYER
General, United States Army
Chief of Staff

Official:

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Major General, United States Army
The Adjutant General

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To be distributed in accordance with DA Form 12-38, organizational maintenance requirements for M915, M916, M920 trucks and truck chassis for M917, M918, and M919,

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2-59

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AND WHAT SHOULD BE DONE ABOUT IT:

Step 1 of engaging interaxle differential
lockup says to pull off the road and
stop the truck. This could mean to
turn the engine off.

should read:

1. Pull to the side of the road
and stop the truck, leave the
engine running.

SAMPLE

PRINTED NAME, GRADE OR TITLE AND TELEPHONE NUMBER

JOHN DOE, PFC

AVN

XXX-XXXX

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John Doe, PFC

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THE METRIC SYSTEM AND EQUIVALENTS**LINEAR MEASURE**

1 Centimeter = 10 Millimeters = 0.01 Meters = 0.3937 Inches
 1 Meter = 100 Centimeters = 1000 Millimeters = 39.37 Inches
 1 Kilometer = 1000 Meters = 0.621 Miles

WEIGHTS

1 Gram = 0.001 Kilograms = 1000 Milligrams = 0.035 Ounces
 1 Kilogram = 1000 Grams = 2.2 Lb
 1 Metric Ton = 1000 Kilograms = 1 Megagram = 1.1 Short Tons

LIQUID MEASURE

1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces
 1 Liter = 1000 Milliliters = 33.82 Fluid Ounces

SQUARE MEASURE

1 Sq Centimeter = 100 Sq Millimeters = 0.155 Sq Inches
 1 Sq Meter = 10,000 Sq Centimeters = 10.76 Sq Feet
 1 Sq Kilometer = 1,000,000 Sq Meters = 0.386 Sq Miles

CUBIC MEASURE

1 Cu Centimeter = 1000 Cu Millimeters = 0.06 Cu Inches
 1 Cu Meter = 1,000,000 Cu Centimeters = 35.31 Cu Feet

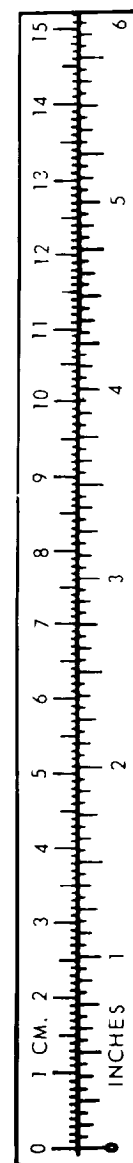
TEMPERATURE

$5 \text{ } ^\circ\text{F} - 32 = ^\circ\text{C}$
 $212^\circ\text{ Fahrenheit is equivalent to } 100^\circ\text{ Celsius}$
 $90^\circ\text{ Fahrenheit is equivalent to } 32^\circ\text{ Celsius}$
 $32^\circ\text{ Fahrenheit is equivalent to } 0^\circ\text{ Celsius}$
 $9 \text{ } ^\circ\text{C} + 32 = ^\circ\text{F}$

APPROXIMATE CONVERSION FACTORS

TO CHANGE	TO	MULTIPLY BY
Inches	Centimeters	2.540
Feet	Meters	0.305
Yards	Meters	0.914
Miles	Kilometers	1.609
Square Inches	Square Centimeters	6.451
Square Feet	Square Meters	0.093
Square Yards	Square Meters	0.836
Square Miles	Square Kilometers	2.590
Acres	Square Hectometers	0.405
Cubic Feet	Cubic Meters	0.028
Cubic Yards	Cubic Meters	0.765
Fluid Ounces	Milliliters	29.573
Pints	Liters	0.473
Quarts	Liters	0.946
Gallons	Liters	3.785
Ounces	Grams	28.349
Pounds	Kilograms	0.454
Short Tons	Metric Tons	0.907
Pound-Feet	Newton-Meters	1.356
Pounds per Square Inch	Kilopascals	6.895
Miles per Gallon	Kilometers per Liter	0.425
Miles per Hour	Kilometers per Hour	1.609

TO CHANGE	TO	MULTIPLY BY
Centimeters	Inches	0.394
Meters	Feet	3.280
Meters	Yards	1.094
Kilometers	Miles	0.621
Square Centimeters	Square Inches	0.155
Square Meters	Square Feet	10.764
Square Meters	Square Yards	1.196
Square Kilometers	Square Miles	0.386
Square Hectometers	Acres	2.471
Cubic Meters	Cubic Feet	35.315
Cubic Meters	Cubic Yards	1.308
Milliliters	Fluid Ounces	0.034
Liters	Pints	2.113
Liters	Quarts	1.057
Liters	Gallons	0.264
Grams	Ounces	0.035
Kilograms	Pounds	2.205
Metric Tons	Short Tons	1.102
Newton-Meters	Pound-Feet	0.738
Kilopascals	Pounds per Square Inch	0.145
Kilometers per Liter	Miles per Gallon	2.354
Kilometers per Hour	Miles per Hour	0.621



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