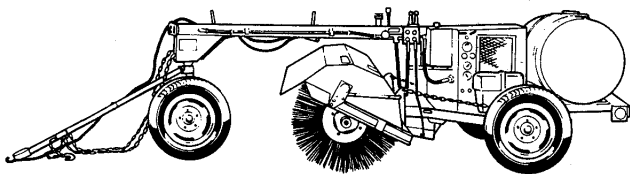


TECHNICAL MANUAL

OPERATOR'S, UNIT, DIRECT SUPPORT AND GENERAL
SUPPORT MAINTENANCE MANUAL
(INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST)



SWEeper, ROTARY TOWED
MODEL 53MH
NSN 3825-01-314-2926

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HEADQUARTERS, DEPARTMENT OF THE ARMY

20 APRIL 1992

CHANGE

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HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington D.C., 24 May 1993

OPERATOR, UNIT, DIRECT SUPPORT AND
GENERAL SUPPORT MAINTENANCE MANUAL
(INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST)

FOR

**SWEEPER, ROTARY TOWED
53MH (3825-01-314-2926)**

Current as of 16 February 1993

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Washington, D.C., 7 October 1992

OPERATOR, UNIT, DIRECT SUPPORT AND
GENERAL SUPPORT MAINTENANCE MANUAL
(INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST)

FOR

**SWEEPER, ROTARY TOWED
53MH (3825-01-314-2926)**

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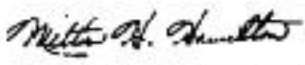
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WARNING**CARBON MONOXIDE (EXHAUST GAS) CAN KILL YOU**

Carbon monoxide is without color or odor, but can cause death. Breathing air with carbon monoxide produces symptoms of headache, dizziness, loss of muscular control, a sleepy feeling, and coma. Brain damage or death can result from heavy exposure. Carbon monoxide occurs in the exhaust fumes of fuel-burning heaters and internal combustion engines. Carbon monoxide can become dangerously concentrated under conditions of no ventilation. Precautions must be followed to ensure crew safety when the personnel heater or engine of any vehicle is operated for any purpose.

1. DO NOT operate engine of vehicle in a closed place without proper ventilation.
2. DO NOT operate with inspection plates, cover plates, or engine compartment covers removed unless necessary for maintenance purposes.
3. BE ALERT at all times during vehicle operation for exhaust odors and exposure symptoms. If either are present, IMMEDIATELY VENTILATE personnel compartments. If symptoms persist, remove affected crew to fresh air and keep warm. DO NOT PERMIT PHYSICAL EXERCISE. If necessary, give artificial respiration and get immediate medical attention. For artificial respiration, refer to FM 21-11 and get medical attention.

FIRST AID. If symptoms of exhaust gas (CO) poisoning are present, remove affected personnel from vehicle, or confined area, and treat as follows:

1. Expose to fresh air.
2. Keep warm.
3. Do not permit physical exercise.
4. If not breathing, administer artificial respiration.

NOTE

The Army-approved Cardiopulmonary Resuscitation (CPR) method is contained in the Soldier's Manual of First Aid, FM 21-11, which is available to all soldiers.

5. Administer oxygen, if available.
6. Seek prompt medical attention for possible delayed onset of lung congestion.

THE BEST DEFENSE AGAINST CARBON MONOXIDE POISONING IS GOOD VENTILATION.

WARNING

Be careful not to short out battery terminals. Do not smoke or use open flame near batteries. Batteries may explode from a spark. Battery acid is harmful to skin and eyes.

WARNING

DO NOT use a dry brush or compressed air to clean brakeshoes. There may be asbestos dust on brakeshoes which can be dangerous to your health if you breath it. (Brakeshoes must be wet, and a soft bristle brush must be used.)

WARNING

Dry cleaning solvent P-D-680 is toxic and flammable. Wear protective goggles, face mask, and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapor. Do not use near open flame or excessive heat. The flashpoint for type I dry cleaning solvent is 100°F (38°C) and for type II is 140°F (60°C). If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, flush eyes with water and get medical aid immediately.

WARNING

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

WARNING

Compressed air used for cleaning purposes will not exceed 30 psi (207 kPa). Use only with effective chip guarding and personal protective equipment (goggles/shield, gloves, etc).

WARNING

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine. When working with fuel, post signs that read "NO SMOKING WITHIN 50 FEET" (15.24 m) of vehicle.

WARNING

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

WARNING

Hearing protection must be worn when performing adjustments in close proximity to the sweeper. Long term exposure may cause hearing damage.

WARNING

If NBC exposure is suspected, all air filter media should be handled by personnel wearing protective equipment. Consult your unit NBC Officer or NBC NCO for appropriate handling or disposal procedures.

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TECHNICAL MANUAL

No. 5-3825-230-14&P

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D.C., 20 April 1992

**OPERATOR, UNIT, DIRECT SUPPORT AND
GENERAL SUPPORT MAINTENANCE MANUAL
(INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST)**

FOR

**SWEEPER, ROTARY TOWED
53MH (3825-01-314-2926)**

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual direct to: Commander, U.S. Army Tank-Automotive Command, ATTN: AMSTA -MB, Warren, MI 48397-5000. A reply will be furnished to you.

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HOW TO USE THIS MANUAL

This manual is designed to help operate and maintain the 53MH Rotary Towed Sweeper, NSN 3825-01-314-2926. Listed below are some of the special features that have been included to help locate and use the needed information:

A front cover Table of Contents is provided for quick reference to chapters and sections that will be used often.

Warning, caution and note headings, subject headings, and certain other essential information are printed in bold type to make them easier to see.

The maintenance tasks describe what must be done to the sweeper before starting the task, and what must be done to return the sweeper to operating condition after the task is finished.

The appendixes are located at the end of the manual. They contain a reference guide to other manuals, guidelines to reading the Maintenance Allocation Chart (MAC), a list of expendable supplies and materials, and other material for maintaining the sweeper.

In addition to text, there are exploded-view illustrations showing you how to take the part off and put it on.

Cleaning and inspection procedures are also included, when required.

Chapters 1 and 2 of this manual are directed at the crew/operator of the sweeper. These chapters include an overall description of the sweeper and discuss the controls and indicators, their location and use, and the instructions for operation of the sweeper under different circumstances.

Chapter 3 of this manual covers crew/operator lubrication, preventive maintenance checks and services, and basic troubleshooting. Crew/operator maintenance is also covered in this chapter.

Chapter 4 of this manual covers unit maintenance including troubleshooting and! maintenance procedures.

Chapter 5 of this manual covers direct support and general support maintenance including troubleshooting and maintenance procedures.

FOLLOW THESE GUIDELINES WHEN USING THIS MANUAL:

The operator must read through this manual and become familiar with the contents before attempting to operate the sweeper.

Read all WARNINGS and CAUTIONS before performing any procedure.

The **equipment conditions** listed at the start of a maintenance procedure and any equipment conditions required for those equipment conditions should be performed before the primary maintenance task. The mechanic may be able to perform only certain steps within a procedure to accomplish the equipment condition.

The **follow-on maintenance** tasks listed at the end of a maintenance procedure, and any follow-on tasks listed at the end of those procedures should be performed to return the sweeper to an operational condition.

"Brush" and "broom" are interchangeable and indicate the same component on the sweeper.

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**CHAPTER 1
INTRODUCTION**

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Section I. GENERAL INFORMATION

1-1. SCOPE.

a. Type of Manual Operator's. Unit, Direct Support and General Support Maintenance Manual including Repair Parts and Special Tools List (RPSTL).

b. Model Number and Equipment Name. Rotary Towed Sweeper, Model 53MH, NSN 3825-01-314-2926, produced by M-B Company, Inc. of Wisconsin. (See figures 1-1 and 1-2).

c. Purpose of Equipment The Rotary Towed Sweeper, from here on referred to as the sweeper, is used to clear dirt, snow, and debris from paved surfaces.

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

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

ROTARY TOWED SWEEPER 53 MH - LEFT FRONT VIEW

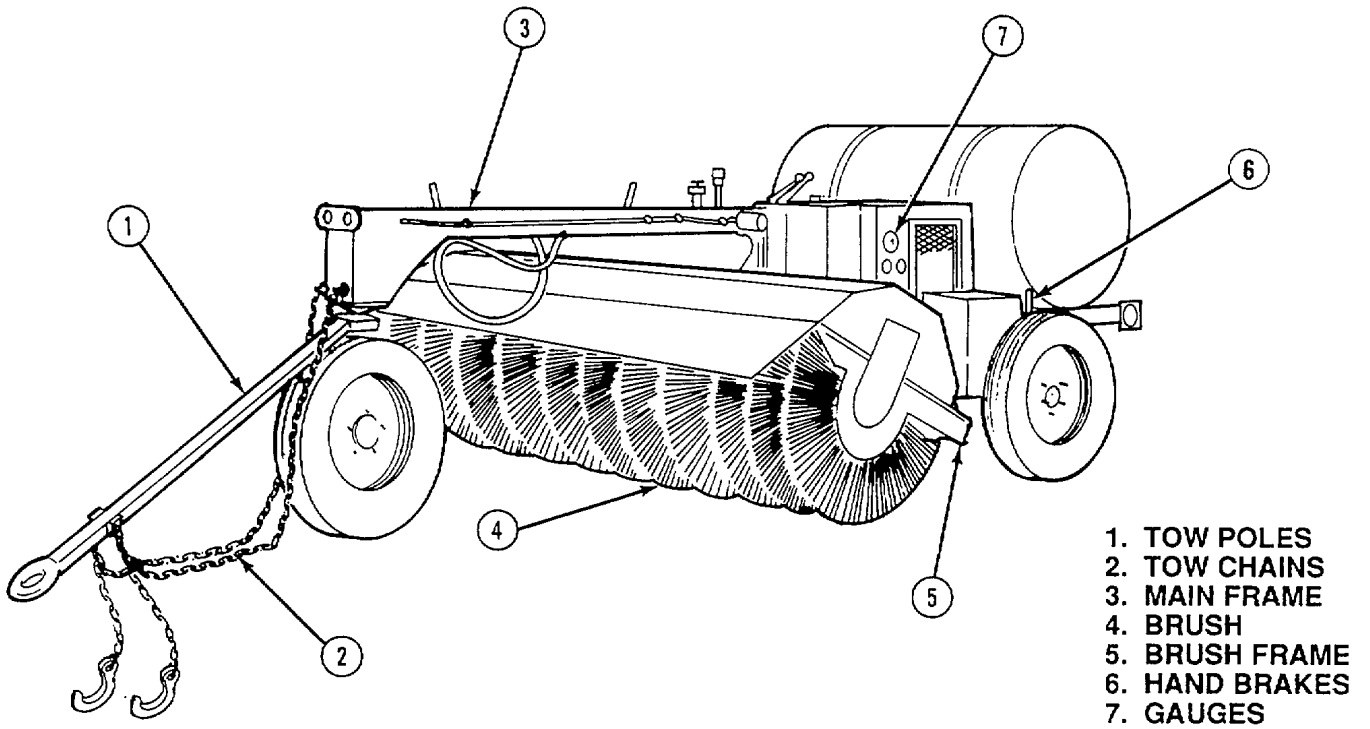


Figure 1-1. Rotary Towed Sweeper 53MH - Left Front View

ROTARY TOWED SWEEPER 53MH - RIGHT REAR VIEW

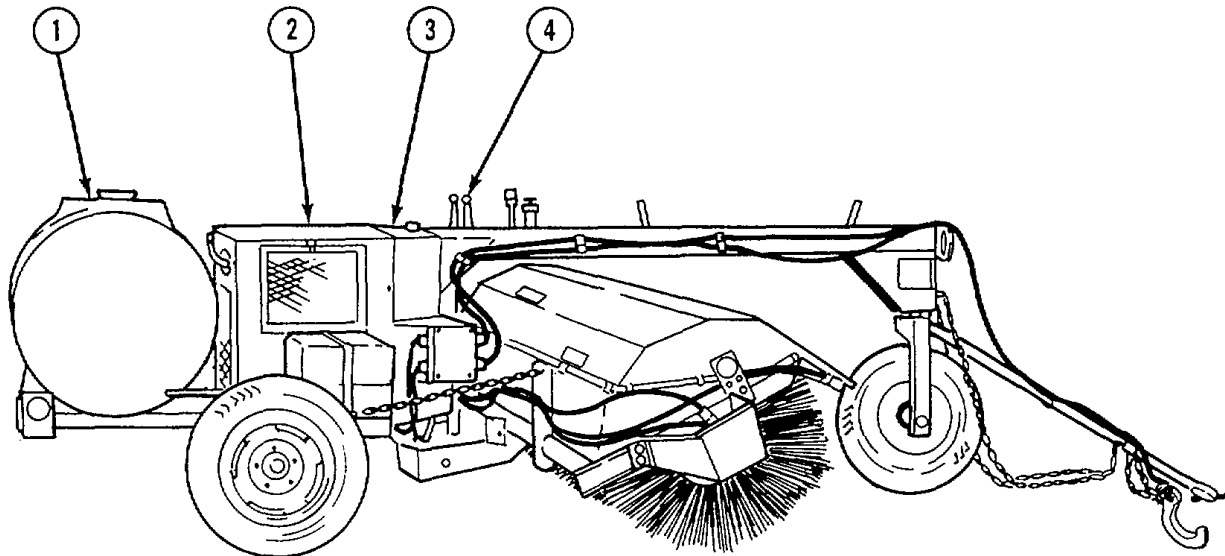


Figure 1-2. Rotary Towed Sweeper 53MH - Right Rear View

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

Command decision, according to the tactical situation, will determine when the destruction of the sweeper, will be accomplished. A destruction plan will be prepared by the using organization unless one has been prepared by a higher authority. For general destruction procedures for this equipment, refer to TM 750-244-6, Procedures for Destruction of Tank-Automotive Equipment to Prevent Enemy Use (U.S. Army Tank-Automotive Command).

1-4. REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR).

If your sweeper needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Put it on an SF 368 (Quality Deficiency Report). Mail it to us at Commander, U. S. Army Tank-Automotive Command, ATTN: AMSTA-Q, Warren, Michigan 48397-5000. A reply will be furnished to you.

1-5. WARRANTY INFORMATION.

Reserved.

1-6. ABBREVIATIONS.

All abbreviations used in this manual conform to MIL STD-12 and its amendments.

1-7. PREPARATION FOR STORAGE OR SHIPMENT.

Refer to Chapter 4, Section VI for preparation for storage or shipment.

1-8. QUALITY ASSURANCE/QUALITY CONTROL (QA/QC).

If there are any Quality Assurance/Quality Control problems with the sweeper, put the problem on a SF 368 Quality Deficiency Report and mail it direct to: Commander, U. S. Army Tank-Automotive Command, ATTN: AMSTA-Q, Warren, Michigan 48397-5000. A reply will be furnished to you.

1-9. SAFETY, CARE, AND HANDLING. The following are significant hazards and safety recommendations.

a. Refueling the Sweeper. This is a normal operating condition. Shut off engine and do not smoke when filling the tank.

b. Connecting/Disconnecting the Sweeper. This is a normal operating condition. Do not go between sweeper and vehicle until both are shut off and brakes are set.

Section II. EQUIPMENT DESCRIPTION AND DATA

1-10. EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES.

a. Purpose of the Sweeper. The sweeper is a model 53MH sweeper having three wheels, designed to follow a 1-1/4 ton cargo truck. It is designed to sweep paved surfaces.

b. Capabilities and Features.

- (1) Low maintenance.
- (2) Easily transported.
- (3) High maneuverability.
- (4) Brush is hydraulically operated and has flotation and angle adjustments to provide maximum sweeping capability.
- (5) A sprayer system wets down surfaces to keep dust to a minimum.
- (6) 12-volt and 24 volt electrical hook-ups to the tow vehicle.

1-11. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS.

Refer to figure 1-3 for location of the following items:

1. **Tow Pole and Strut.** Tow strut provides a simple way to pull and guide the sweeper.
2. **Data Plates.** Data plates provide information on operation and technical details of the sweeper.
3. **Main Frame.** The main frame serves as the hydraulic fluid reservoir and as a mounting point for the vehicle systems.
4. **Hydraulic System.** The hydraulic system consists of hydraulic controls, pump, motor, reservoir and filter.
5. **Fuel Tank.** The fuel tank provides an on-board source for fuel.
6. **Engine.** The engine provides power for the hydraulic pump and hydraulic motor.
7. **Sprinkler System.** The sprinkler system is made up of a water tank, hoses, pump, spray bar, and nozzles. As water is pumped from the tank it travels through the hoses to the spray nozzles.
8. **Hand Brakes.** The hand brakes hold the vehicle in place when parked.
9. **Brush Frame Assembly.** Brush assembly is made up of the brush and the hydraulic core. The brush hood covers the top of the brush to avoid splash back onto the engine and electrical components. The brush frame also serves as a mount for the hydraulic motor.

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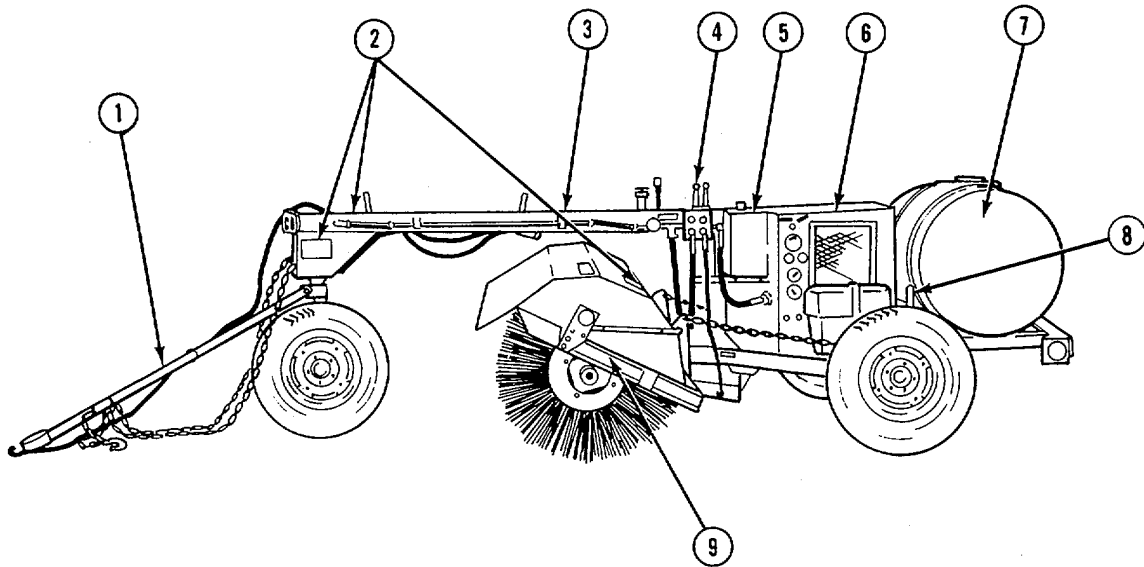


Figure 1-3. Rotary Towed Sweeper Major Components

1-12. EQUIPMENT DATA.

Table 1-1 contains the equipment data that applies to the sweeper.

Table 1-1. Equipment Data

General Specifications:	
Length	165 in. (4.19 m)
Height	54 in. (1.37 m)
Width	108 in. (2.74 m)
Weight	2950 lb (1,338.11 kg)
Fuel	Diesel
Tires:	
Size	ST225/75R15
Pressure	65 psi (4.57 Kg/cm ²)
Maximum Towing Speed	25 mph (40 kph)
Maximum Sweeping Speed	8 mph (12 kph)
Type	Rotary Towed Sweeper
Model	53MH

Table 1-1. Equipment Data - CONT.

Engine Specifications:

Type	Diesel
Manufacturer	Lombardini
Model.....	12LD435-2
Horsepower.....	15.50
Number of Cylinders	2
Total Displacement	53 cu-in (871 cc)
Maximum Operating RPM.....	2850 RPM
Idle Speed	1100-1150 RPM
Bore.....	3.3858 in. (86 mm)
Stroke.....	2.9527 in. (75 mm)
Compression Ratio	18.5:1
Air Cleaner.....	Dry paper element, replaceable
Number of Compression Rings	2
Number of Oil Rings	1
Crankcase capacity with Filter Change.....	2.90 qt (2.75 L)
Cylinder Bore Limits.....	3.3858 to 3.3866 in. (86 to 86.02 mm)
Piston to Cylinder Bore Limits	0.0023 to 0.0039 in. (0.06 to 0.10 mm)
Valve Clearance (Adjustment)	0.0059 to 0.0078 in. (0.15 to 0.20 mm)
Crankshaft Endplay.....	0.0078 to 0.0118 in. (0.20 to 0.30 mm)
Injector Nozzle Depth.....	0.1182 to 0.1379 in. (3.0 to 3.5 mm)
Injector Nozzle Diameter.....	0.0110 in. (0.28 mm)
Injector Nozzle Release Pressure	2986 to 3129 psi (210 to 220 Kg/cm ²)
Crankshaft End Dimension Limits.(Flywheel)	2.8338 to 2.8346 in. (71.98 to 72.00 mm)
Crankshaft End to Bearing Limits.....	0.0027 to 0.0043 in. (0.07 to 0.11 mm)
Crankshaft End Dimension Limits (Pump side)	2.1625 to 2.1633 in. (54.93 to 54.95 mm)
Crankshaft End to Bearing Limits.....	0.0019 to 0.0031 in. (0.05 to 0.08 mm)
Center Bearing Journal	2.1787 to 2.1791 in. (55.34 to 55.35 mm)
Crankcase Crankshaft Opening (rear).....	5.1181 to 5.1188 in. (130 to 130.02 mm)
Crankcase Crankshaft Opening (front)	2.9921 to 2.9929 in. (76 to 76.02 mm)
Center Bearing Journal to Bearing	0.0019 to 0.0035 in. (0.05 to 0.09 mm)
Connecting Rod Journal.....	1.5748 to 1.5755 in. (40.0 to 40.02 mm)
Connecting Rod Bearing to Journal.....	0.0013 to 0.0029 in. (0.035 to 0.076 mm)
Valve Stem Diameter.....	0.3141 to 0.3149 in. (7.98 to 8.0 mm)
Valve Stem to Bore.....	0.00118 to 0.0031 in. (0.03 to 0.08 mm)
Valve Stem Guide Diameter	0.5531 to 0.5535 in. (14.05 to 14.06 mm)
Valve Depth (In cylinder head).....	0.0295 to 0.0492 in. (0.75 to 1.25 mm)
Connecting Rod Pin Diameter.....	0.8659 to 0.8661 in. (21.995 to 22.000 mm)
Connecting Pin to Bearing Limits	0.0005 to 0.0011 in. (0.015 to 0.030 mm)
Connecting Pin Side Play.....	0.0019 in (0.05 mm)
Piston Diameter	3.3858 to 3.3866 in. (86.00 to 86.02 mm)
Oil Consumption	0.036 qt (0.035 Kg/h)
Oil Sump Capacity.....	2.64 qt (2.51 l)
Oil Pressure.....	14.22 psi (1.0 Kg/cm ²)
Oil Pump	Internal, mechanical drive
Oil Filter.....	External, cartridge type

Table 1-1. Equipment Data - CONT.

Engine Specifications (cont):

Oil Filter capacity.....	0.26 qt (0.251)
Camshaft End (flywheel side)	1.6511 to 1.6519 in. (41.94 to 41.96 mm)
Camshaft End (pump side)	1.0999 to 1.1007 in. (27.44 to 27.96 mm)
Injector Lobe.....	1.3307 to 1.3346 in. (33.95 to 34.05 mm)
Valve Spring Length	2.0472 in. (52 mm)

Fuel System:

Fuel Pump.....	Mechanical, external
Fuel Tank Capacity.....	8 gal (30l)
Governor	Mechanical, internal
Fuel Injectors.....	Mechanical, pressure activated
Fuel Injector Pump	Mechanical, internal
Fuel Consumption	0.93 gal/per hour (3.52 l/per hour)

Hydraulic System:

Reservoir Capacity	7.5 gal (28.38 l)
Pump Capability	17.5 gpm (66.23 lpm)
Motor Capability	10.0 gpm (37.85 lpm)

Electrical:

Batteries	Two 12-volt
Starter	24 volt (solenoid attached)
Alternator.....	24 volt/50 amp
Lighting.....	12 volt and 24 volt systems (Discrete)

Sprinkler System:

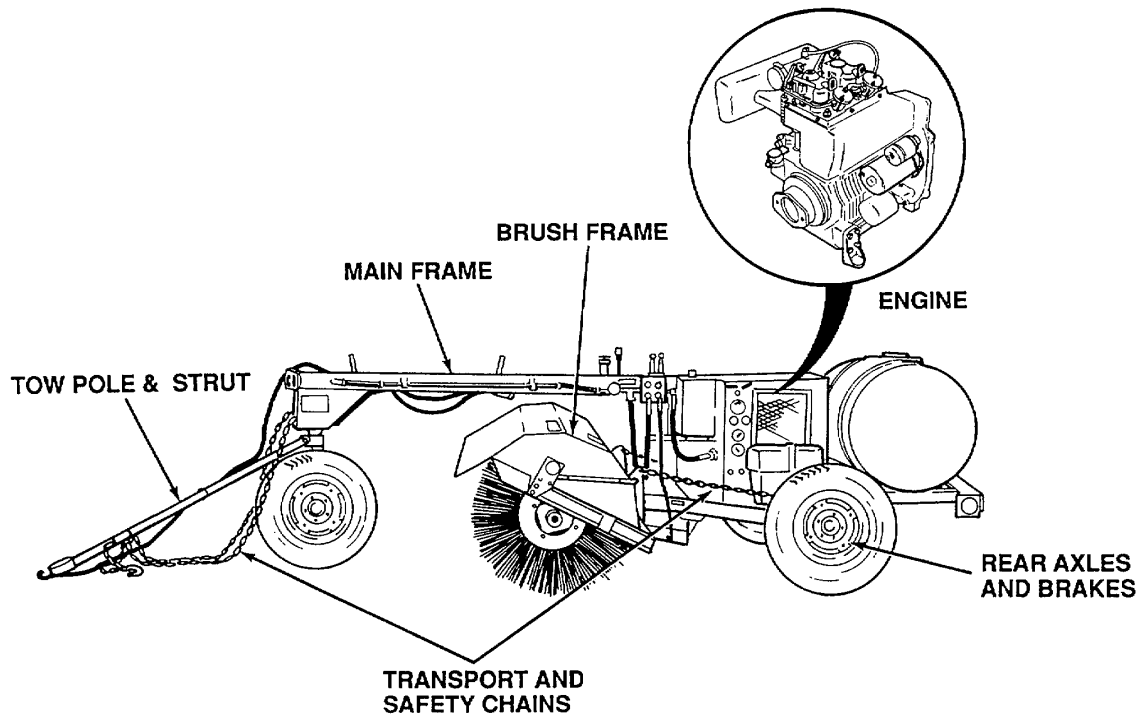
Capacity	120 gal (454l)
Motor.....	12 volt

Brush:

Ground Clearance	Variable
Brush Pattern.....	2 to 4 in (5.08 to 10.16 cm)
Brush Speed.....	Variable

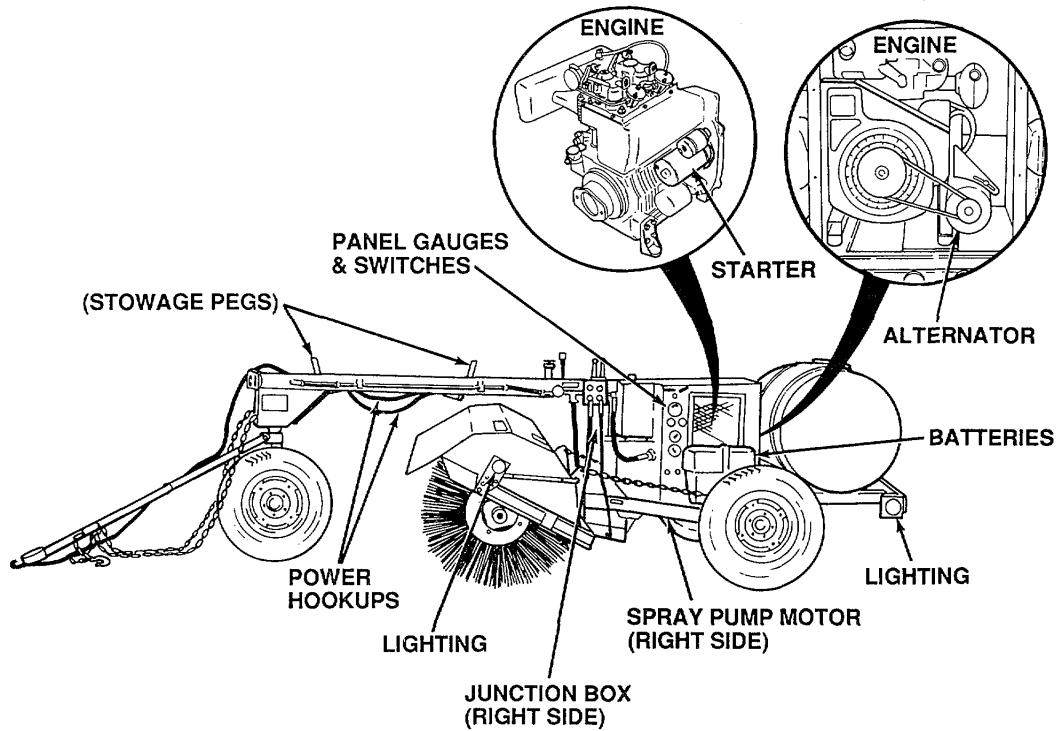
Section III. TECHNICAL PRINCIPLES OF OPERATION

1-13. MECHANICAL SYSTEM.



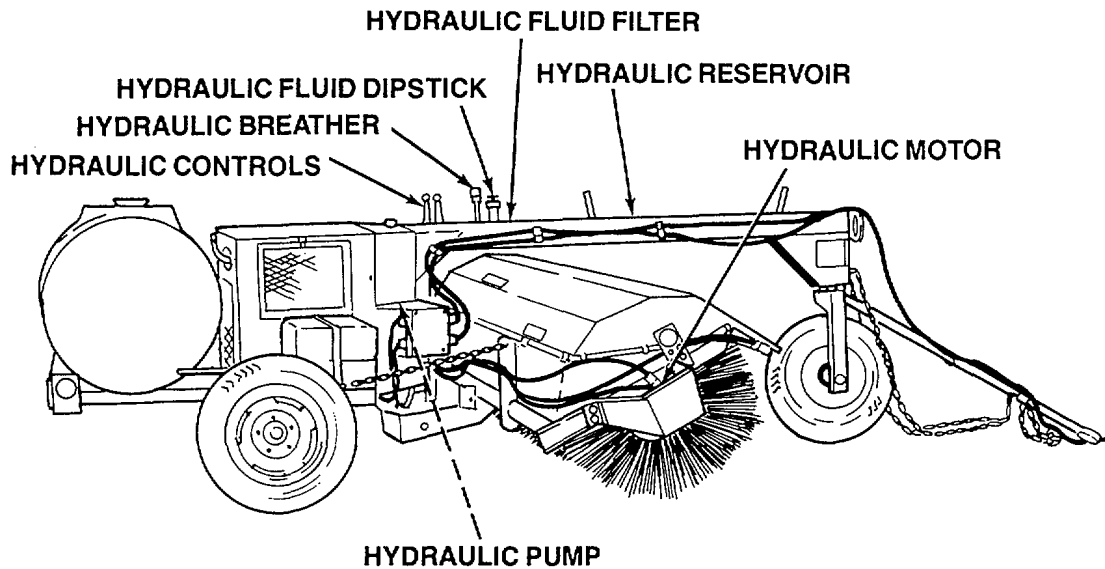
Item	Description
Tow Pole and Strut	Tow pole and strut provide a means to tow and steer the vehicle.
Mainframe	Mainframe provides a mounting place for the rest of the systems. It doubles as the hydraulic fluid reservoir.
Brush Frame	Brush frame holds the rotating brush. The brush is able to be raised and lowered and moved from side to side. The brush frame also acts as a mount for the hydraulic motor. The brush is reversible.
Engine	Engine is a two cylinder diesel that provides power for the hydraulic system.
Rear Axles and Brakes	Rear axles are mounted separately in the mainframe. The two hand brakes are mounted on the mainframe and are manually operated mechanical brakes.
Transport and Safety Chains	Safety chains on the tow pole attach to the tow vehicle and transport chains on the frame attach to the brush frame to stabilize the sweeper during transport.

1-14. ELECTRICAL SYSTEM.



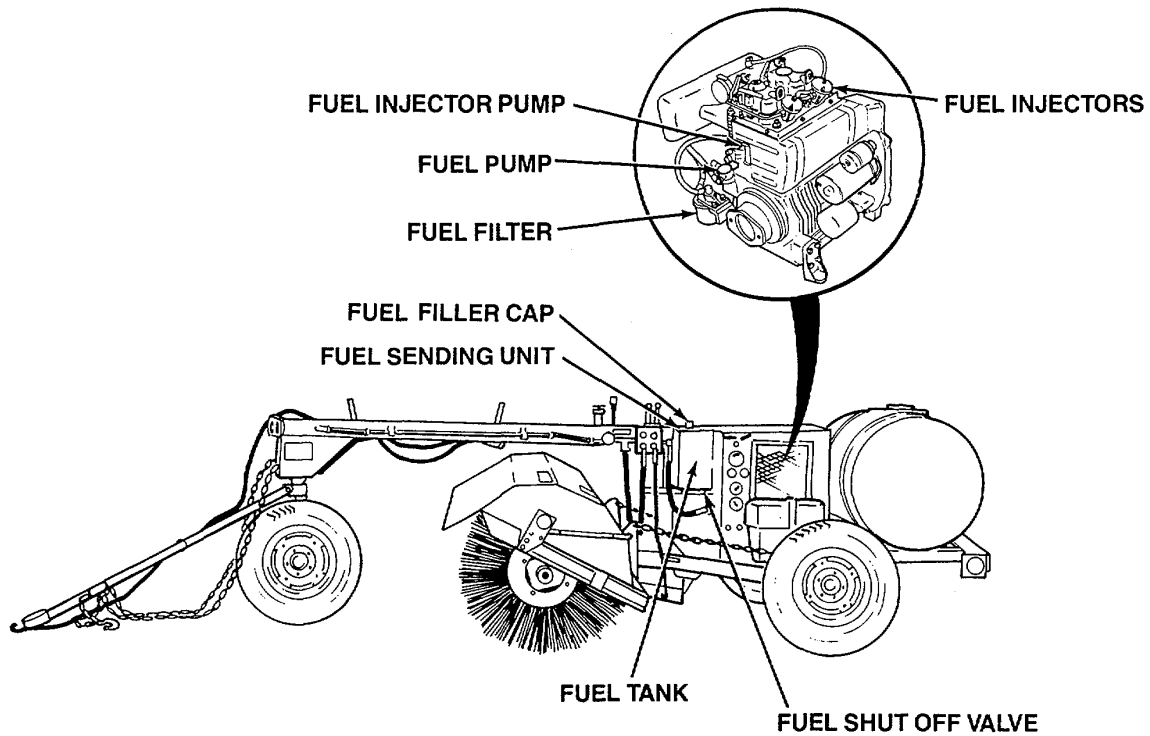
Item	Description
Power Hookups	Vehicle has separate 12 and 24 volt vehicular light hookup capability. They are stored by wrapping around harness stowage pegs.
Panel Gages/Switches	Switches and gages (12 volt) are used to start vehicle and monitor vehicle performance.
Starter	Starter is a 24 volt unit that starts the engine by engaging the flywheel with a gear.
Alternator	Alternator is a 24 volt unit that maintains the battery charge.
Batteries	Batteries consist of two 12 volt units located on each side of the sweeper.
Lighting	Lighting provides rear, side, safety marking, stopping, and signaling capability.
Spray Pump Motor	Constant speed electric motor (12 volt) that pumps water forward to brush assembly.
Junction Box	Junction box provides a way of routing the electrical harnesses. 1

1-15. HYDRAULIC SYSTEM.



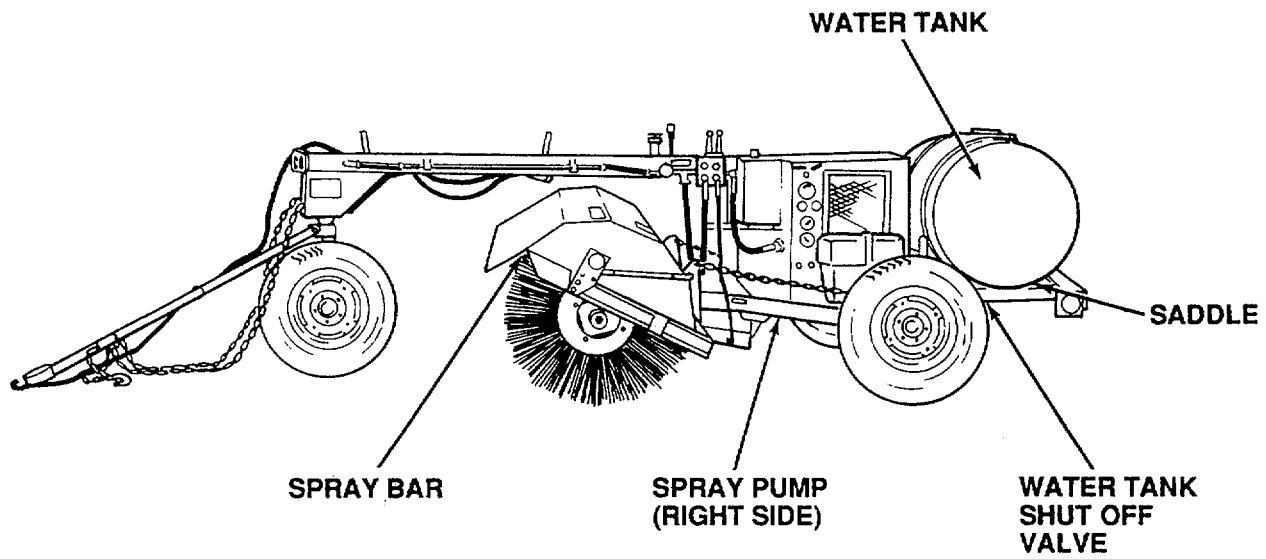
Item	Description
Hydraulic Controls	Hydraulic controls regulate the hydraulic fluid flow, raise and lower the brush assembly, and start and stop the hydraulic motor.
Hydraulic Breather	Eliminates pressure or vacuum in the hydraulic reservoir.
Hydraulic Fluid Dipstick	Hydraulic fluid dipstick provides a means of checking hydraulic fluid level.
Hydraulic Fluid Filter	Hydraulic fluid filter separates particulates from hydraulic fluid.
Hydraulic Reservoir	Hydraulic reservoir is contained in the mainbeam of the mainframe.
Hydraulic Motor broom.	Hydraulic motor uses hydraulic power from hydraulic pump to drive the
Hydraulic Pump	Hydraulic pump is driven by the engine to produce hydraulic pressure providing a capability to lift or lower the brush assembly.

1-16. FUEL SYSTEM.



Item	Description
Fuel Tank	Fuel tank provides an on-board fuel capacity.
Fuel Filler Cap	Fuel filler cap provides a safe way of sealing fuel tank and taking on fuel.
Fuel Sending Unit	Fuel sending unit works with fuel gage to sense and indicate fuel level in fuel tank.
Fuel Pump	Fuel pump forces fuel through fuel filter to injection pump.
Fuel Filter	Fuel filter removes particulates from fuel.
Fuel Injector Pump	Fuel injector pump provides pressurized fuel to fuel injectors.
Fuel Injectors	Fuel injectors provide a measured amount of fuel to cylinders.
Fuel Shutoff Valve	Fuel shutoff valve provides a way to safely shut off fuel at fuel tank by turning valve clockwise.

1-17. SPRINKLER SYSTEM.



Item	Description
Water Tank	Water tank provides an on-board source of water for sprinkler system.
Saddle	Saddle provides a secure support for water tank on the frame.
Water Tank Shut Off Valve	Water tank shut off valve provides a way to shut water off at the tank.
Spray Pump	Spray pump provides pressurized water to spray bar.
Spray Bar	Spray bar spreads water evenly over spray surface to prevent dust during sweeping operations.

**CHAPTER 2
OPERATING INSTRUCTIONS**

Para	Contents	Page
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2-2	Location and Use of Controls and Indicators.....	2-1
2-3	PMCS Introduction	2-7
2-4	Special Instructions.....	2-7
2-5	PMCS Column Entry Explanation	2-8
2-6	PMCS Table.....	2-9
2-7	Assembly and Preparation For Use.....	2-14
2-8	Operating Procedures.....	2-14
2-9	Transportation by Towing.....	2-24
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Section I. DESCRIPTION AND USE OF OPERATOR'S CONTROLS AND INDICATORS

2-1. CONTROLS AND INDICATORS INTRODUCTION.

This section shows the location and describes the use of controls and indicators used to operate the sweeper.

2-2. LOCATION AND USE OF CONTROLS AND INDICATORS.

Know the location and proper use of every control and indicator before operating the sweeper. Use this section to learn how each control and indicator is to be used. Separate illustrations, with keys, are provided in this section.

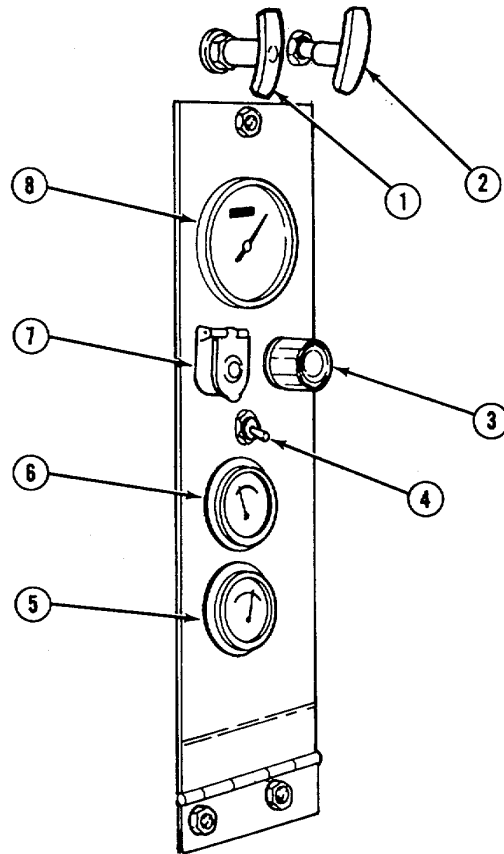


Figure 2-1. Panel Controls and Indicators

Key	Control/Indicator	Function
1	Throttle Handle	Controls engine speed; is able to be locked in position by turning left or right to allow engine to maintain a constant speed. Pull out to increase engine speed.
2	Fuel Shutoff Handle	Pulls out to shut off the fuel supply to the engine and shut the engine down.
3	Push Button (24V)	Provides power to glow plug for cold weather starting. Push in to activate.
4	Toggle Switch	Turns on the spray pump motor; up for "on" down for "off".
5	Ammeter Gage (24V)	Indicates the voltage of the charging system.
6	Fuel Gage	Indicates the fuel level.
7	Key Switch (12V)	Turns on power; provides power to sprinkler switch and gage lights. Starts the engine.
8	Tachometer/Hourmeter	Indicates the engine RPM and records hours of operation.

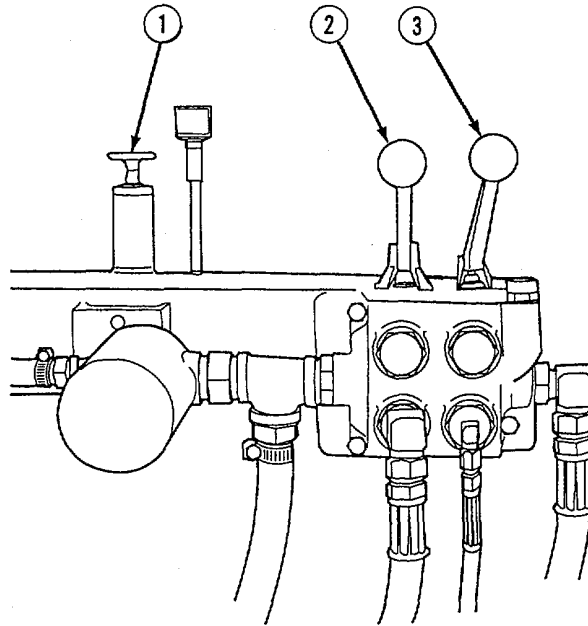


Figure 2-2. Hydraulic Controls and Indicators

Key	Control/Indicator	Function
1	Hydraulic Fluid Dipstick	Indicates the level of hydraulic fluid in the reservoir.
2	Broom Motor Control	Lifts up to turn hydraulic broom motor on, down to turn motor off.
3	Broom Lift Control	Raises and lowers broom to the float position; push forward to raise the broom and pull back to lower the broom.

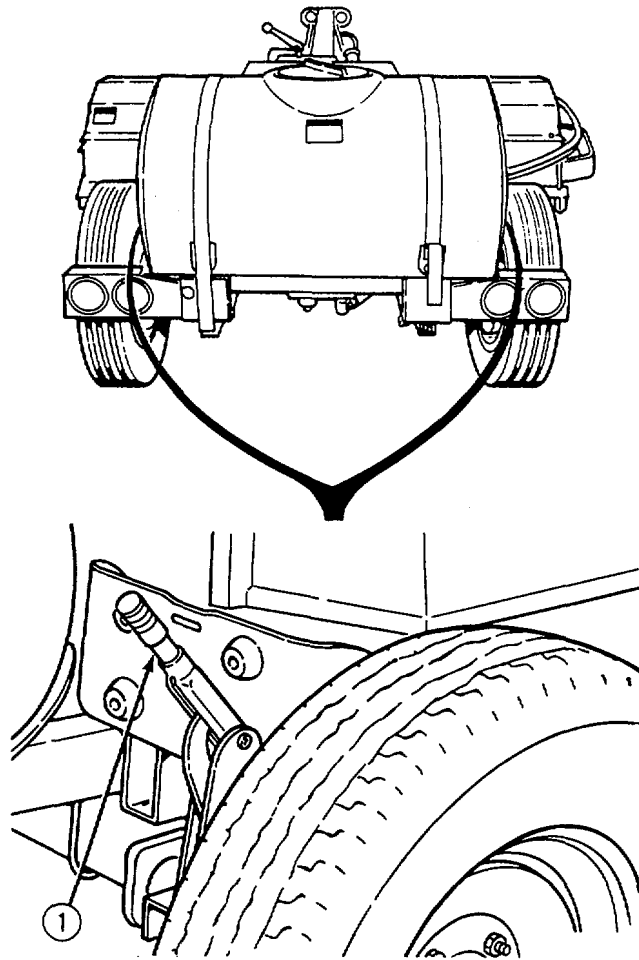


Figure 2-3. Hand Brake Controls

Key	Control/Indicator	Function
1	Hand Brake Controls	Lift up to apply the hand brake, down to disengage. There are two hand brake levers, one on each side of the sweeper.

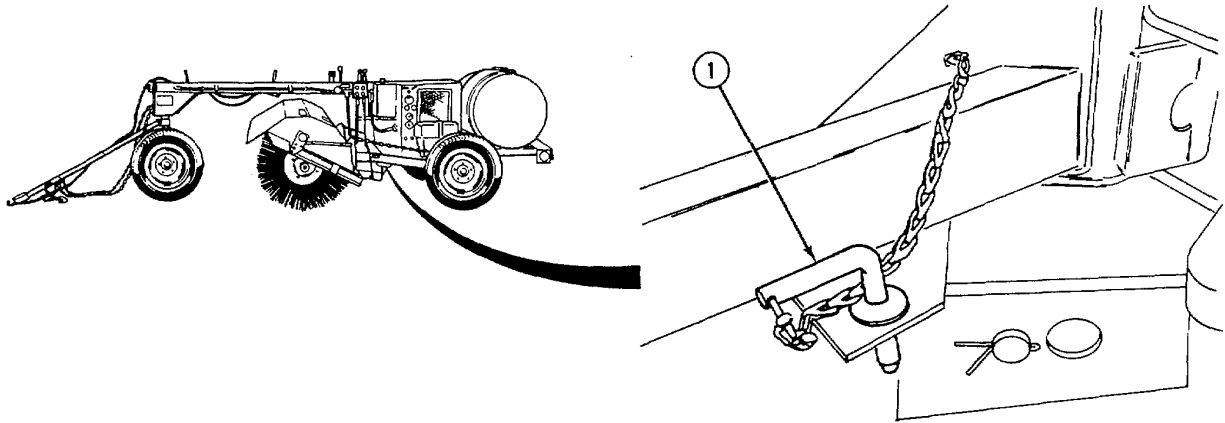


Figure 2-4. Broom System

Key	Control/Indicator	Function
1	Broom Angle Lock	Locks the angle of the broom assembly in left or right position.

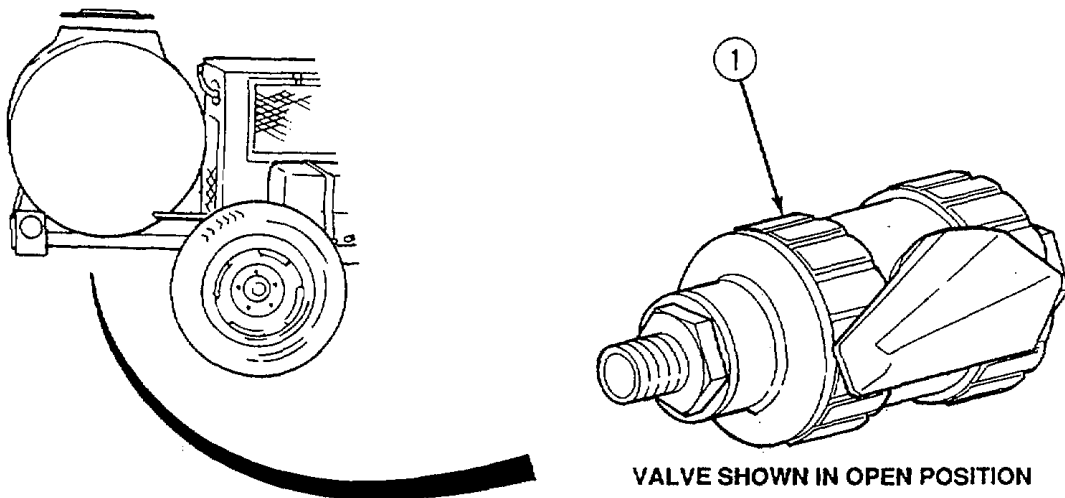


Figure 2-5. Water Tank Shutoff Valve

Key	Control/Indicator	Function
1	Shutoff Valve	Turns water supply off and on by turning lever. Lever is shown in open position.

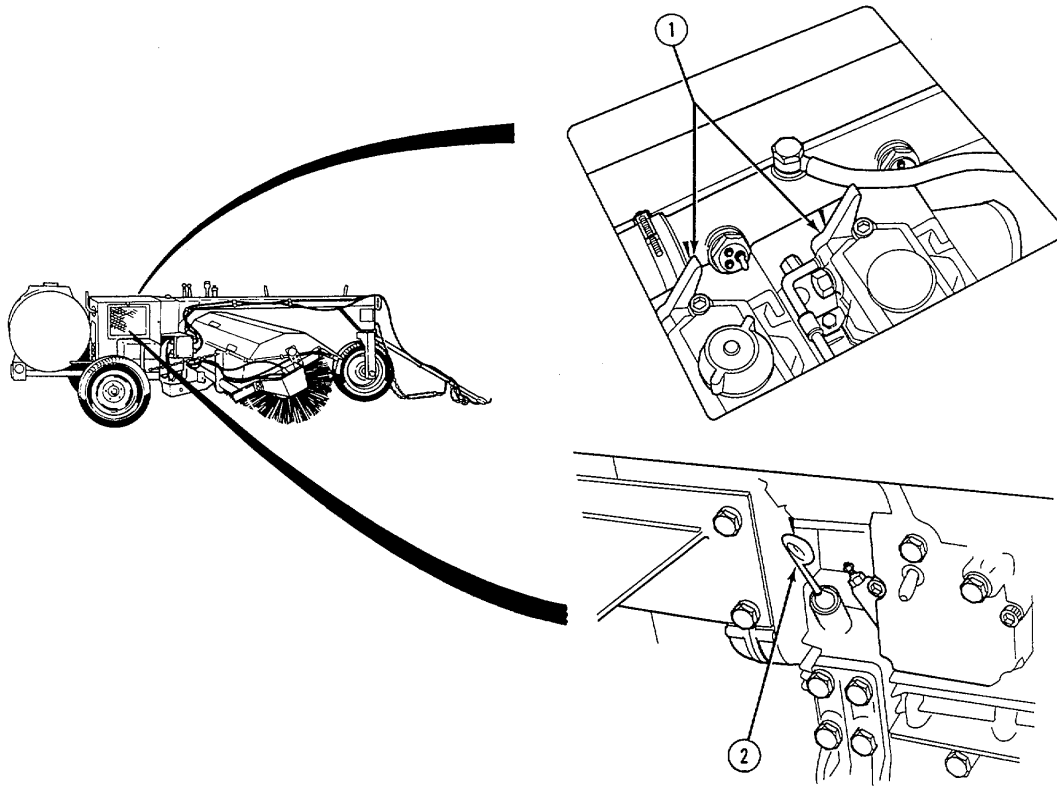


Figure 2-6. Engine Controls and Indicators

Key	Control/Indicator	Function
1	Decompression Levers	Releases compression from the cylinder bores. Used only when engine is off.
2	Engine Oil Dipstick	Indicates the level of the engine oil. The dipstick is located on right side of engine.

Section II. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

2-3. PMCS INTRODUCTION.

a. PMCS Procedures. To ensure that the sweeper is ready for operation at all times, it must be inspected systematically so that defects may be discovered and corrected before they result in serious damage or failure. Table 2-1 contains a tabulated listing of preventive maintenance checks and services to be performed by the operator.

(1) Do the before (B) preventive maintenance just before operating the sweeper. Pay attention to the CAUTIONS and WARNINGS.

(2) Do the during (D) preventive maintenance while the sweeper is in operation. Pay attention to the CAUTIONS and WARNINGS.

(3) Do the after (A) preventive maintenance right after operating the sweeper.

(4) Do the (W) preventive maintenance on a weekly basis.

(5) Do the (M) preventive maintenance on a monthly basis.

(6) If something does not work properly, troubleshoot using the instructions in Chapter 3. Report any deficiencies using the proper forms.

(7) Always do preventive maintenance in the same order until it gets to be a habit. Once practiced, problems can be spotted in a hurry.

(8) When doing preventive maintenance, take along the tools needed and a rag or two to make all the checks.

(9) Report all deficiencies on DA Form 2404.

b. Equipment is not ready/available if: procedures. The terms ready/available and mission capable refer to the same status: equipment is on hand and is able to perform its combat mission (see AR 700-138).

2-4. SPECIAL INSTRUCTIONS.

a. Shortened Maintenance Instructions. Local conditions of extreme heat, dust, cold, or wetness dictate that service intervals may need to be shortened.

b. Additional Maintenance Inspections. Additional maintenance inspections may be required for the following reasons:

(1) Prolonged storage. Vehicles having been stored for a period of three months or more should be inspected.

(2) Initial preparation upon receipt.

(3) Preparation for storage.

c. Fluid Leakage. It is necessary to know that fluid leakage affects the status of fuel, oil, coolant, and the hydraulic systems. The following are definitions of the different types/classes of leakage that determine the status of the sweeper.

2-4. SPECIAL INSTRUCTIONS (CONT).

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

- (1) Class I. Seepage of fluid (as indicated by wetness or discoloration) not great enough to form drops.
- (2) Class II. Leakage of fluid great enough to form drops but not enough to cause drops to drip from item being checked/inspected.
- (3) Class III. Leakage of fluid great enough to form drops that fall from the item being checked/inspected.

2-5. PMCS COLUMN ENTRY EXPLANATION.

a. Item Number Column. The checks and services are numbered in chronological order showing a logical sequence around the sweeper.

b. Interval Column. This column contains a dot (•) opposite the appropriate check. Thus, if a given check is performed before operation, a dot is opposite the check in the "B" column; if the dot is in the "D" column the check should be performed during operation; and if the check is made in two or more periods, a dot is placed in each applicable column.

c. Item to be Inspected Column. The items listed in this column are divided into groups indicating the portion of the equipment of which they are a part, i.e. brakes, fuel, engine. Under these groupings a few common words are used to identify the specific item being checked.

d. Procedures Column. This column contains a brief description of the procedure by which the check is performed.

e. Equipment is not Ready/Available if: Column. This column contains the criteria that causes the equipment to be classified as NOT READY/NOT AVAILABLE because of inability to perform its primary mission. An entry in this column will:

- (1) Identify conditions that make the equipment not ready/available for readiness reporting purposes.
- (2) Deny use of the equipment until corrective maintenance has been performed.

2-6. PMCS TABLE.

Refer to Table 2-1 for the preventive maintenance checks and services for the sweeper.

Table 2-1. Operator Preventive Maintenance Checks and Services

NOTE: Within designated interval, these checks are to be performed in the order listed.

Item No.	Interval					Item To Be Inspected	Procedure Check for and have repaired or adjusted as necessary	Equipment Is Not Ready/ Available If:
	B	D	A	W	M			
1	•		•			Exterior General	Visually inspect for damage, loose or missing parts.	Any component is damaged that would impair sweeper mission.
2	•					Fluid Leakage	Look under sweeper for fluid leakage (hydraulic or water).	Class III leakage is evident.
3	•					Lights and Reflectorsreflectors (para 3-10).	Check condition of lights or	If lights are broken or do not work.
4						Wheels and Tires		
	•						a. Check wheels for cracks, broken, or bent surfaces.	A wheel is cracked, broken, or bent.
	•						b. Check that lugnuts are not damaged and are secure on the wheel.	One or more nuts or studs are missing, broken, or bent.
	•						c. Check tires for cuts, gouges, or cracks. Remove any sharp objects.	Tires have cuts, gouges, or cracks which would result in tire failure during operation. One or more missing or unserviceable tires.
	•						d. Check tires for obviously low air pressure, front and rear. Correct as needed, by notifying unit maintenance.	

Table 2-1. Operator Preventive Maintenance Checks and Services - CONT.

NOTE: Within designated interval, these checks are to be performed in the order listed.

B - BEFORE D-DURING A-AFTER W-WEEKLY M-MONTHLY

Item No.	Interval					Item To Be Inspected	Procedure Check for and have repaired or adjusted as necessary	Equipment Is Not Ready/ Available If:
	B	D	A	W	M			
5	•					Hand Brake Assembly	Check hand brake levers. Adjust if necessary (para 3-12).	Hand brake will not adjust, linkage has parts missing or bent. Hand brake will not hold the vehicle.
6						Batteries	<div style="border: 2px solid black; padding: 5px; text-align: center; width: fit-content; margin: 10px auto;">WARNING</div> <p>Do not wear watches, rings, or other jewelry which could short out battery terminals while servicing batteries. Do not smoke or use open flame around batteries. Batteries may explode from a spark. Battery acid is harmful to skin and eyes.</p> <p style="text-align: center;">NOTE It may be necessary to use a flashlight to check fluid level.</p> <p>a. Remove strap and cover of battery box. Remove battery caps and check electrolyte level of each cell. Electrolyte level should be up to split ring (para 3-11).</p> <p>b. Visually inspect battery for cracked or leaking casing, broken or burned terminal posts (para 3-11).</p> <p>c. Check electrical cables and connectors for damage (para 3-11).</p>	<p>Missing battery or battery will not crank engine.</p> <p>Battery is damaged, terminals are broken or burned.</p> <p>Damage found to cables or connectors.</p>

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

NOTE: Within designated interval, these checks are to be performed in the order listed.

B - BEFORE D-DURING A-AFTER W-WEEKLY M-MONTHLY

Item No.	Interval					Item To Be Inspected	Procedure Check for and have repaired or adjusted as necessary	Equipment Is Not Ready/ Available If:
	B	D	A	W	M			
7						Hydraulic System	a. Check that hydraulic fluid reservoir is full. (para 3-13). b. Check condition of hydraulic fluid in reservoir. c. Check hydraulic breather.	Fluid level is low. Fill as needed Fluid appears milky or foamy. Breather is bent or missing.
8						Fuel System	<div style="border: 2px solid black; padding: 5px; text-align: center; width: fit-content; margin: 10px auto;">WARNING</div> <p>Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine. When working with fuel, post signs that read: "NO SMOKING WITHIN 50 FEET (15.24 m) OF VEHICLE."</p> a. Check to see fuel tank is full. Inspect filler screen for obstructions. Fill as necessary (para 3-8). b. Check fuel tank, hoses, and connections for leaks or damage. Make sure all connections are secure.	Any fuel leakage is present or damage that would impair the mission of the sweeper.

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

NOTE: Within designated interval, these checks are to be performed in the order listed.

B - BEFORE D-DURING A-AFTER W-WEEKLY M-MONTHLY

Item No.	Interval					Item To Be Inspected	Procedure Check for and have repaired or adjusted as necessary	Equipment Is Not Ready/ Available If:
	B	D	A	W	M			
9		•				<p>Engine</p> <p>NOTE If engine has been running, wait about five minutes after engine shutdown before checking engine oil level.</p> <p>a. Check engine oil level on dipstick. Oil level should be between low and full mark (para 3-6).</p> <div style="border: 2px solid black; padding: 5px; text-align: center; width: fit-content; margin: 10px auto;">WARNING</div> <p>If NBC exposure is suspected, all air filter media should be handled by personnel wearing protective equipment. Consult your unit NBC Officer or NBC NCO for appropriate handling or disposal procedures.</p> <p>b. Check air filter. Clean before operation or replace as necessary (para 3-7).</p> <p>c. Check alternator belt for looseness or fraying (para 3-9).</p>	<p>Oil level is above full mark or below low mark.</p>	
10		•			•	<p>Sprinkler System</p> <p>a. Check water tank, hoses, and connections for leaks or damage. Inspect nozzles for damage.</p> <p>b. Clean water system strainer (para 3-14).</p>	<p>Air filter or gasket is missing or torn.</p> <p>Belt missing.</p> <p>Damage that would impair the mission of the sweeper.</p> <p>Strainer missing.</p>	

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

NOTE: Within designated interval, these checks are to be performed in the order listed.

B - BEFORE D-DURING A-AFTER W-WEEKLY M-MONTHLY

Item No.	Interval					Item To Be Inspected	Procedure Check for and have repaired or adjusted as necessary	Equipment Is Not Ready/ Available If:
	B	D	A	W	M			
11	•					Brush Assembly	a. Check for loose, damaged, or missing nuts and screws. b. Check hydraulic cylinder for leakage or damage. c. Check dirt deflector assembly for damage. d. Check brush pattern (para 2-8h).	Connecting hardware damaged that would impair the mission of the sweeper. Class III leakage or cylinder damage that would impair the mission of the sweeper. Damage that would impair the mission of the sweeper. Brush pattern is not 2 to 4 in. (5 to 10 cm).
12	•					Broom Head Grease Fittings	Refer to lubrication chart and lubricate fittings (para 3-1).	Fittings are broken off.
13	•					Chains	Check for damaged or missing hardware or links.	Hardware or links broken or missing.
14	•					Controls and Gages	Check gages for operation.	Ammeter showing negative or gages missing.

Section III. OPERATION UNDER USUAL CONDITIONS**2-7. ASSEMBLY AND PREPARATION FOR USE.**

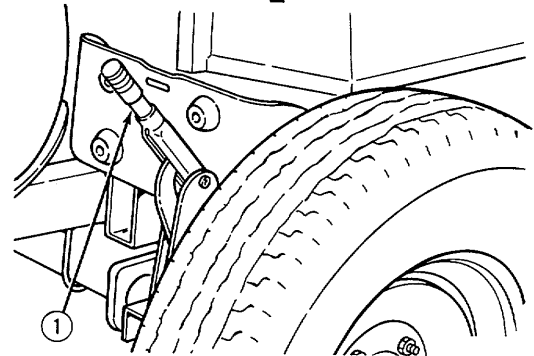
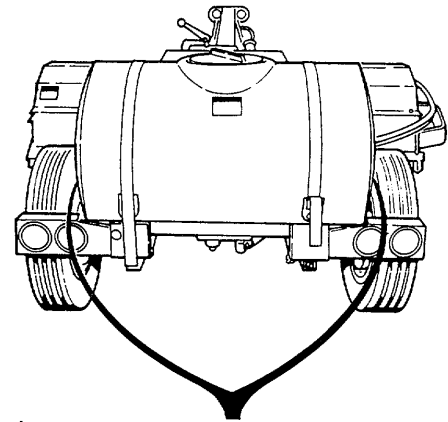
The sweeper may be shipped with the motor guard and hydraulic motor temporarily attached to the main frame rather than the broom head. The mounting hardware is with these items. The hydraulic hoses are connected and bundled with the sprinkler hose. If a unit in this condition is received, notify unit maintenance.

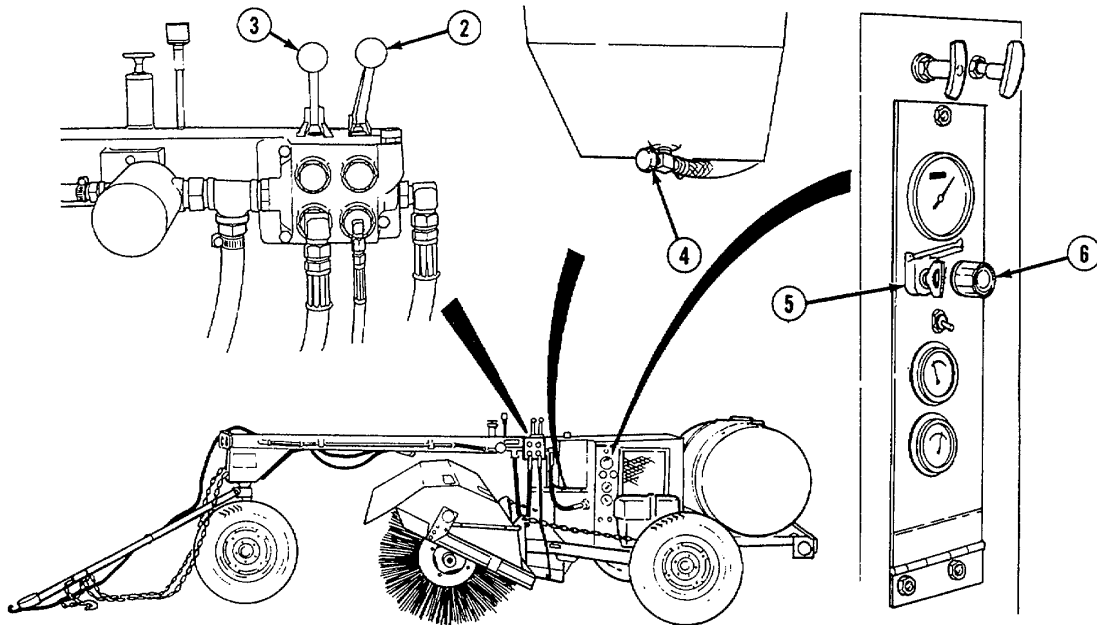
2-8. OPERATING PROCEDURES.**WARNING**

Always set hand brakes before starting the sweeper, or injury to personnel may result.

a. Starting Engine.

- (1) Set hand brakes (1) by pulling handles up.





- (2) Place broom lift control (2) in center position and broom motor control (3) in the OFF position.
- (3) Open fuel shutoff valve (4) (para 3-15).
- (4) To start engine:
 - (a) Turn key (5) to first position.

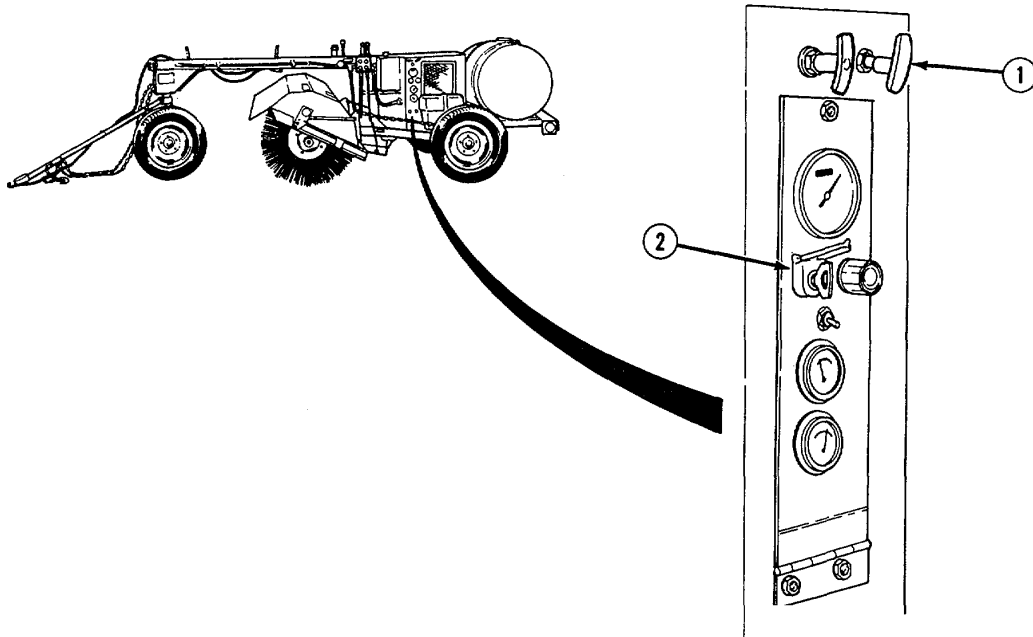
CAUTION

Do not crank engine for more than five seconds. Damage to starter may result.

- (b) In cold weather, press glow plug button (6) located on panel for five seconds. If engine has been running and was shut down for a short period, or during warm weather, pressing button is not necessary.
- (c) In cold weather only, continue to depress the glow plug button (6) and turn key (5) to second position to crank engine. When engine starts release both the glow plug button and the key.
- (d) In warm weather or with a hot engine, turn key (5) to second position to crank engine. Release key when engine starts.
- (e) If engine does not start, turn key (5) switch back to the left. Wait five seconds and repeat steps (a) through (d) as applicable.

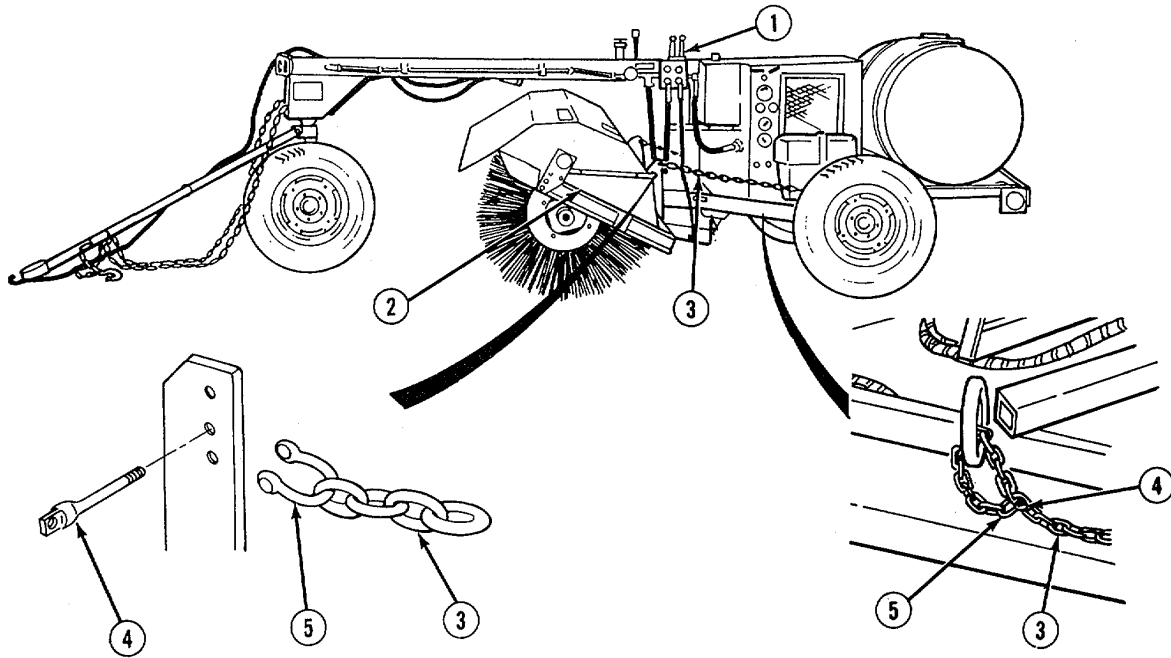
2-8. OPERATING PROCEDURES (CONT).

b. Shutdown Engine.



- (1) Allow engine to idle for five minutes.
- (2) Pull out and hold engine fuel shutoff handle (1) until engine stops running.
- (3) Turn key (2) fully left to the stop position.

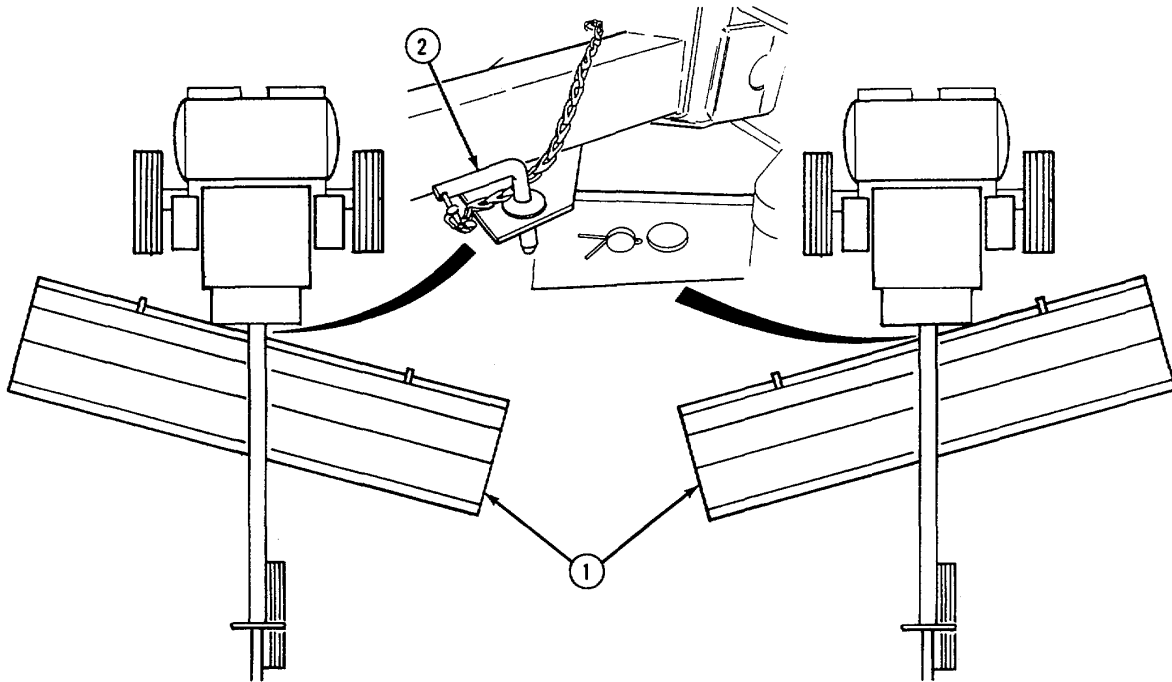
c. **Remove Transport Chains.** Transport chains are connected to the sweeper head to support the sweeper head while the unit is being transported.



- (1) With engine running at idle, use hydraulic control (1) to raise broom head (2).
- (2) Disconnect transport chain (3) from broom head (2) by removing screw (4) from connecting clevis (5).
- (3) Loop chain (3) through tiedown ring (5) and secure by installing screw (4) in clevis (5).

2-8. OPERATING PROCEDURES (CONT).

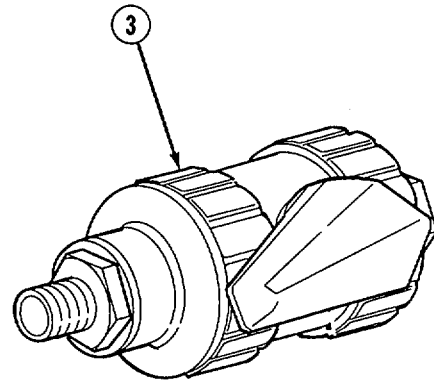
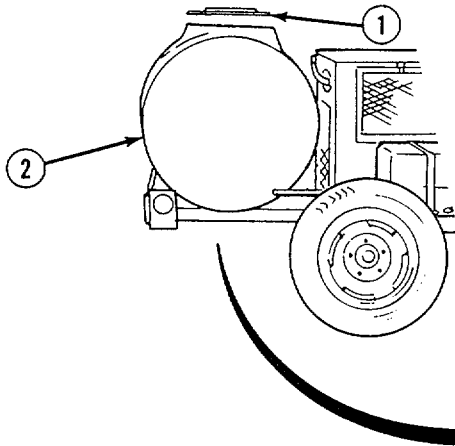
d. Brush Angle Adjustment. Brush angle can be selected to windrow sweepings to either the right or left of the sweeper. Selection of brush angle is largely dependent upon width of surface to be swept and the pattern used to sweep the surface.

**WARNING**

Always set hand brakes before performing this adjustment procedure or injury to personnel may result.

- (1) Raise brush (1) and shut down engine.
- (2) Remove angle securing pin (2) and swing brush (1) to desired angle.
- (3) Replace pin (2) in hole on opposite side the brush (1) is pointing.

e. Sprinkler System Operation. The sprinkler system is used to aid in the sweeping process and to reduce creation of dust during sweeping. The sprinkler system should not be used in temperatures below 32°F (0°C).



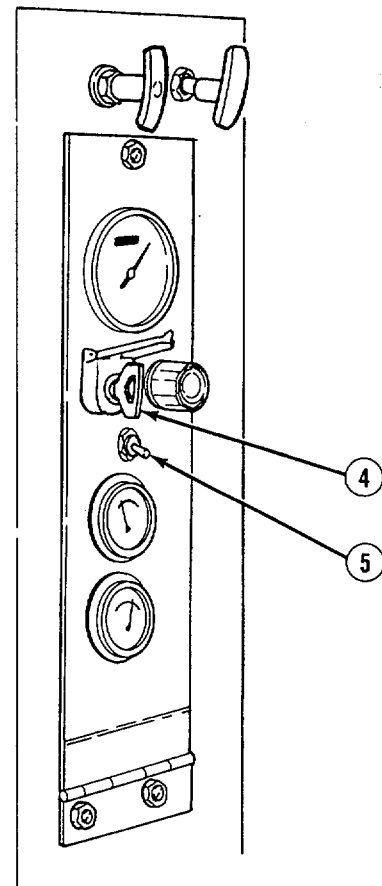
VALVE SHOWN IN OPEN POSITION

- (1) Remove water tank top (1).
- (2) Fill tank (2) with water and install top (1).
- (3) Open water tank shutoff valve (3) located beneath water tank.
- (4) Turn key (4) right to first position.

CAUTION

Do not operate sprinkler system without water in tank or damage to equipment may result.

- (5) Move sprinkler system toggle switch (5) on control panel to the ON position.
- (6) Move sprinkler system toggle switch (5) to the OFF position.
- (7) Turn key (4) fully left to the stop position.

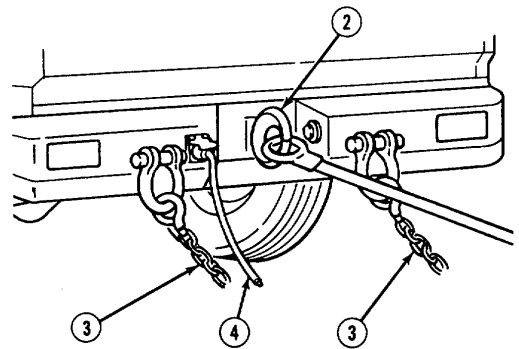
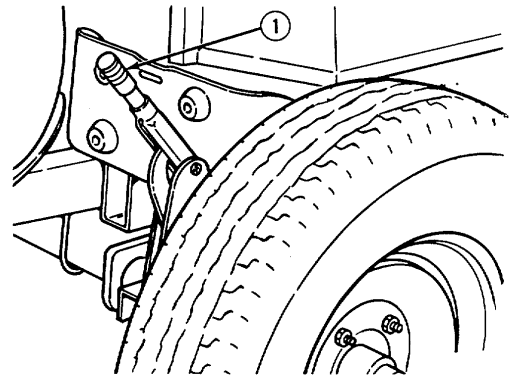


2-8. OPERATING PROCEDURES (CONT).**NOTE**

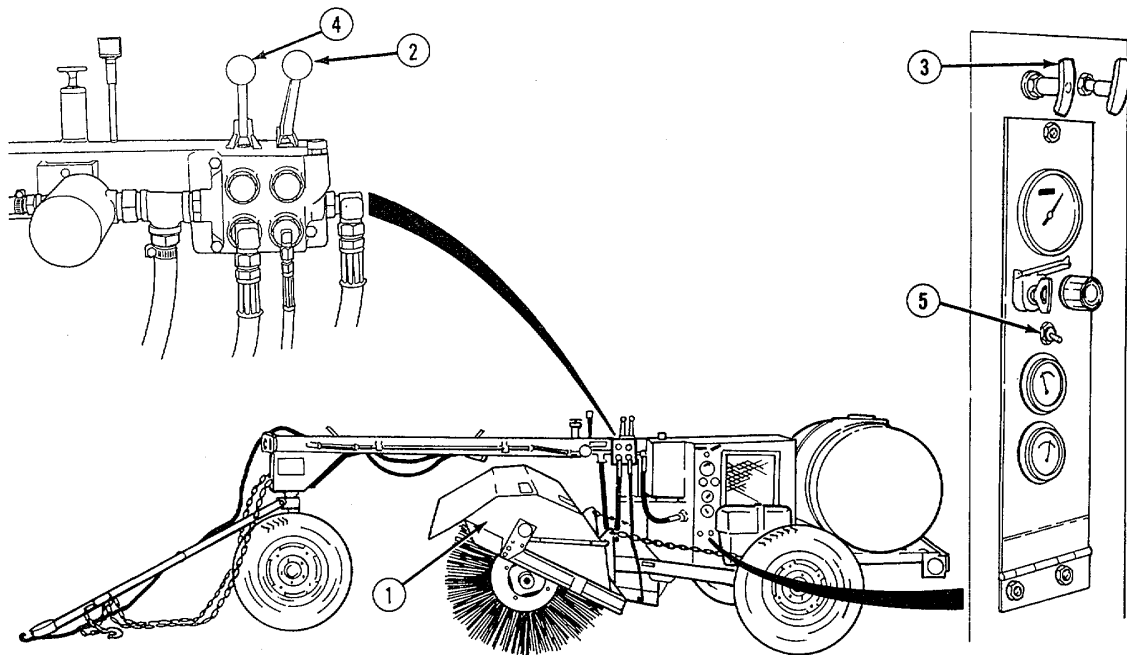
The sweeper is configured to permit towing by a variety of vehicles with both 12V and 24V electrical systems.

f. Connect Unit to Tow Vehicle

- (1) Set hand brakes (1) by pulling handles up.
- (2) Back tow vehicle into position to permit connection of pintle hitch (2).
- (3) Couple tow vehicle and sweeper at pintle hitch (2).
- (4) Connect safety chains (3) to tow vehicle.
- (5) Connect sweeper wiring harness (4) to tow vehicle. The red harness on the sweeper is for use with 12V vehicles and the black for 24V systems.
- (6) Wind unused wiring harness around harness stowage pegs on frame.
- (7) Release hand brakes (1) by moving handles to the down position.



g. Sweeping.



- (1) Connect sweeper to tow vehicle (para 2-8f).
- (2) Select brush angle (para 2-8d).
- (3) Fill water tank and open water tank shutoff valve (para 2-8e), if sprinkler system is to be used.

WARNING

- Failure to follow these instructions may result in injury to personnel.
- Keep body parts away from the space between broom hood and frame when raising the broom or injury to personnel may result. Operator may have to use control levers from right side of vehicle if brush angle is turned to the left side.

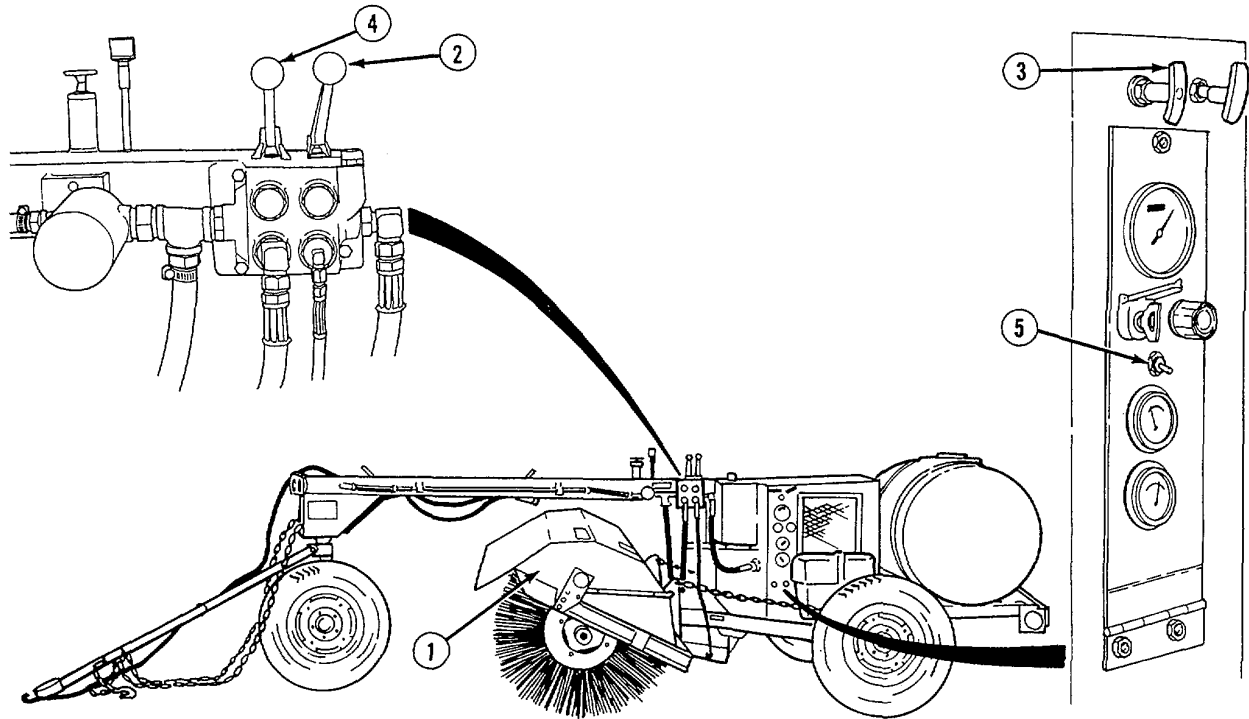
- (4) Start engine (para 2-8a).
- (5) Lower broom (1) to float position by moving broom control lever (2) fully down.

NOTE

For most conditions operation at full throttle is recommended. In light sweeping applications, throttle setting may be reduced. Reduced throttle setting may extend broom life.

- (6) Pull throttle handle (3) fully out and lock it in position by turning it to either the left or right until it tightens.
- (7) Start broom (1) by moving brush motor control lever (4) up.

2-8. OPERATING PROCEDURES (CONT).



- (8) Move sprinkler toggle switch (5) to on position.
- (9) Proceed with sweeping operation:
 - (a) When driving the tow vehicle, keep in mind the overall length of both the sweeper and tow vehicle.
 - (b) When turning allow adequate clearance for the sweeper to turn inside of the turning radius of the tow vehicle.
 - (c) When employing sweeping patterns requiring more than one pass, allow a minimum of six inches of overlap with the last pass.
 - (d) Avoid abrupt stops as the sweeper may swing to the left or right.
 - (e) Whenever possible, an assistant will act as a ground guide to direct the driver when backing.

CAUTION

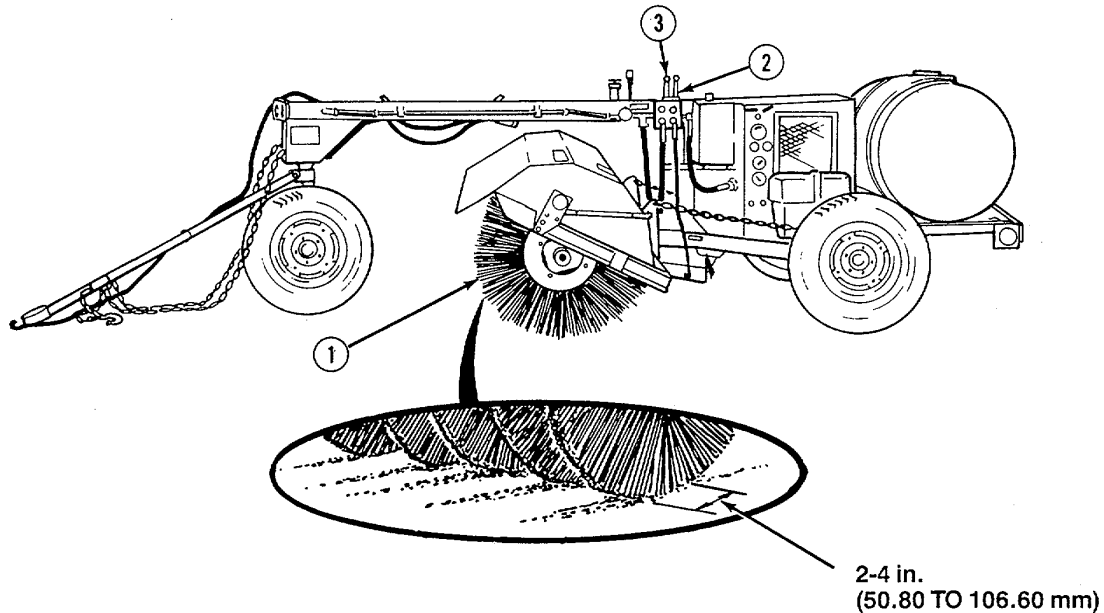
- **Maximum towing speed during sweeping operation is 8 mph (12 kph). Do not exceed this speed or damage to equipment may result.**
 - **Do not run water pump when tank is empty. Damage to equipment may result.**
- (f) Do not exceed a towing speed of 8 mph (12 kph) during sweeping operations.
- (g) Monitor water level in tank during operation.

- (10) To discontinue sweeping operation:
- (a) Move sprinkler system toggle switch (5) to the off position.
 - (b) Turn off broom (1) by moving brush motor control lever (4) down to the off position.
 - (c) Raise broom (1) by moving broom control lever (2) to up position.
 - (d) Shutdown engine (para 2-8b).

NOTE

If temperature is expected to drop below 32°F (0°C), drain water tank (para 3-14).

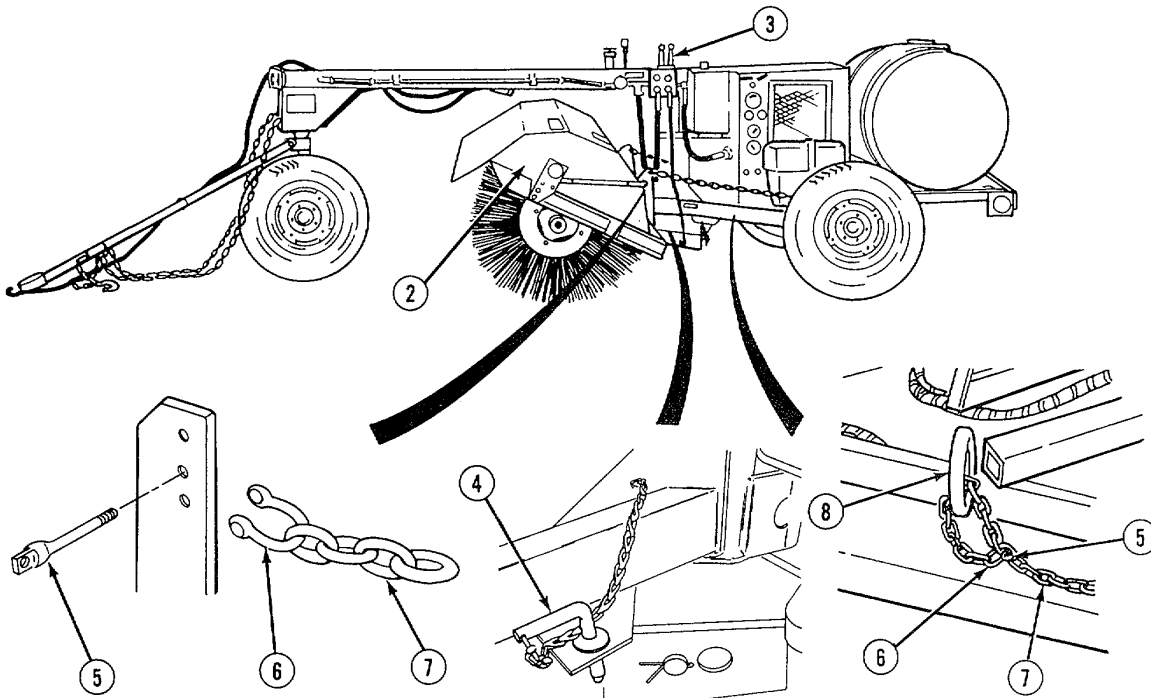
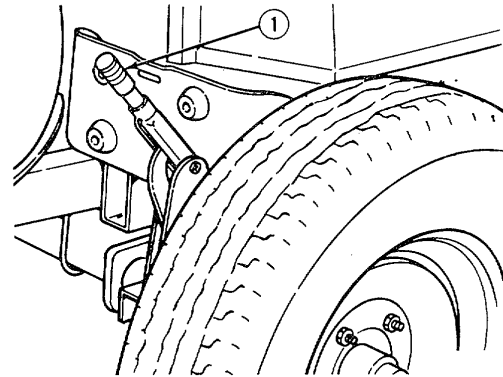
- (e) Park unit for later use or prepare for transport (para 2-9).
 - (f) Wrap wiring harness around harness stowage pegs.
- h. Brush Pattern Check.** It is necessary to check brush pattern during operation. Improper brush pattern is caused by brush wear. If the sweeper does not have the proper brush pattern, notify unit maintenance. To check brush pattern:



- (1) Raise brush (1) two inches above a smooth surface by moving broom lift control lever (2).
- (2) Start broom rotation by lifting broom motor control lever (3).
- (3) Lower brush to its lowest position by moving brush lift control lever (2) down.
- (4) Raise brush (1) and stop broom rotation.
- (5) Shut down engine (para 2-8b).
- (6) Brush pattern should indicate 2 to 4 in. (5 to 10 cm) of contact. If it does not, notify unit maintenance for adjustment.

2-9. TRANSPORTATION BY TOWING.

- (1) Set hand brakes (1) by placing levers in the up position.
- (2) Start engine (para 2-8a).



- (3) Raise broom head (2) by moving broom lift control (3) to the up position.
- (4) Remove angle pin (4) and move brush to the straight position.
- (5) Remove front pins (5) and clevis pins (6) from transport chains (7).
- (6) Remove transport chains (7) from rear tiedowns (8) and connect to broom head (2) using pin (5) and clevis (6).

- (7) Lower broom head (2) by moving broom lift control (3) fully down to float position and shut down engine (para 2-8b).
- (8) Connect sweeper to tow vehicle (para 2-8f).



Maximum towing speed is 25 mph (38 kph). Do not exceed this speed or damage to equipment may result.

- (9) Do not tow the sweeper at speeds in excess of 25 mph (38 kph).

2-10. OPERATING INSTRUCTIONS ON DECALS AND INSTRUCTION PLATES.

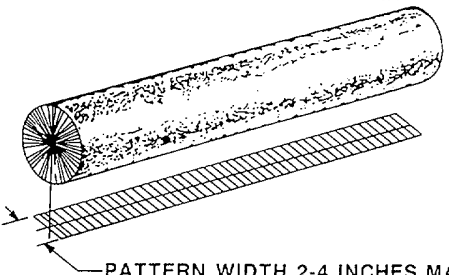
Refer to figure 2-7 for location of sweeper decals and data plates.

⚠ WARNING
MUFFLER AND CONNECTING PARTS ARE HOT - SERVICE MACHINE AFTER PARTS COOL
1-45604

⚠ WARNING
TURN OFF ENGINE BEFORE REFUELING.
1-45607

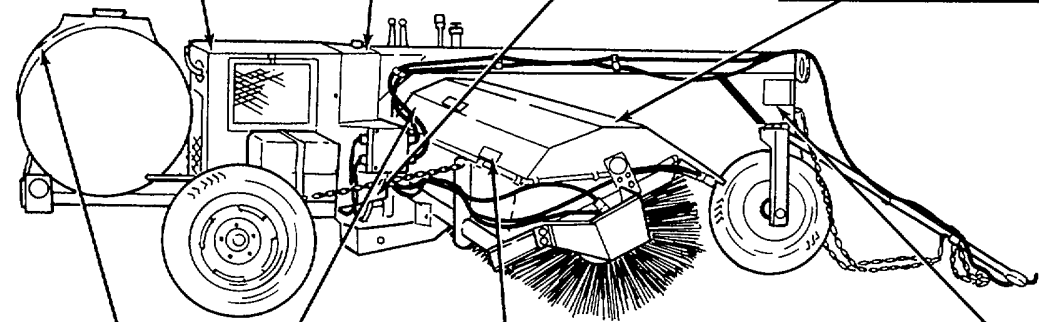
⚠ DANGER
PINCH POINT

"RECOMMENDED BRUSH PATTERN"



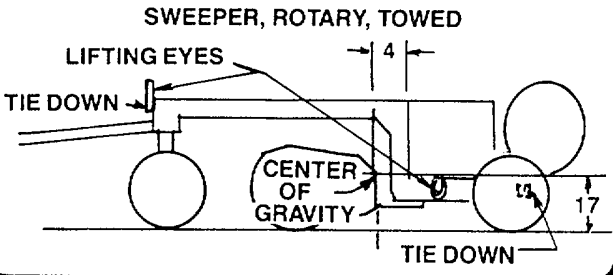
NOTE:
 FAILURE TO FOLLOW ABOVE RECOMMENDATION CAN CAUSE PREMATURE BRUSH WEAR AND IRREVERSIBLE BRUSH DAMAGE. CONSULT OPERATORS MANUAL FOR ADJUSTMENT PROCEDURE.

3-76001



⚠ DANGER
ABSOLUTELY NO RIDERS
 RIDING ON THE SWEEPER CAN CAUSE THE RIDER SEVERE INJURY OR DEATH.
1-72016

SWEEPER, ROTARY, TOWED



MAXIMUM SPEED 25 MPH.
TIRE PRESSURE FRONT AND REAR 65 PSI.
OVER-ALL LENGTH 165 IN. OVERALL HEIGHT 54 IN.
OVER-ALL WIDTH 108 IN. CUBE 559 CU. FT.
GROSS VEHICLE WEIGHT 2950 LBS.

WARNING ⚠

- 1.) BRUSH FRAME SUPPORT CHAINS MUST BE CONNECTED WHILE SWEEPER IS BEING TRANSPORTED.
- 2.) PUT LIFT CYLINDER CONTROL IN THE FLOAT POSITION ONCE CHAINS ARE CONNECTED.

Figure 2-7. Decals and Data Plates (Sheet 1 of 2)

! DANGER

DO NOT OPERATE SWEEPER WITHOUT READING THE OWNER'S MANUAL AND OPERATING INSTRUCTIONS COMPLETELY AND BEING FAMILIAR WITH THE OPERATION OF THE SWEEPER. IF OPERATING INSTRUCTIONS ARE MISSING, CONTACT M.B. CO, INC.

Personnel must be clear of brush and clear of all moving parts before operating sweeper.

Eye protection must be worn at all times by operator, and anyone within the discharge area of brush!

Never sweep toward people, buildings, cars, etc.

Turn off engine and brush and allow all moving parts to stop before adjusting or servicing the sweeper!

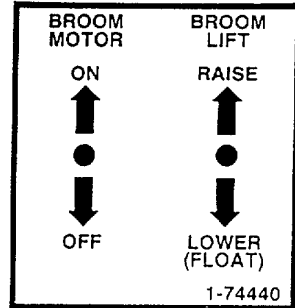
Keep polypropylene material away from intense heat and flame.

No riders on sweeper or vehicle sweeper is mounted on.

Do not operate sweeper or tractor unless PTO Guards and all Shields are in place.

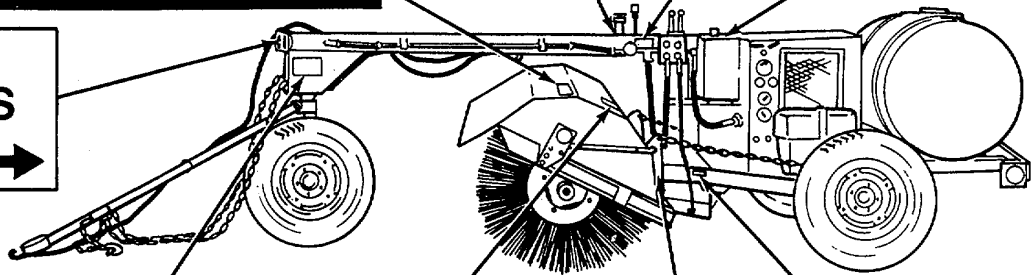
Do not dismount or mount, or work on sweeper or loader with loader arms in a raised position.

All roof areas must comply with Federal OSHA Law Section 1926.500 on perimeter guarding before operating any M.B. Product on the roof area.



HYDRAULIC OIL
1-65612

DIESEL FUEL ONLY



- OPERATING INSTRUCTIONS**
1. START ENGINE WITH BROOM RAISED AND BROOM CONTROL IN OFF POSITION.
 2. RAISE BROOM SLIGHTLY AND REMOVE LIFT LOCK CHAINS.
 3. PLACE BROOM CONTROL IN ON POSITION.
 4. PLACE BROOM LIFT CONTROL IN FLOAT POSITION.

! DANGER
PINCH POINT

U.S. ARMY
SWEEPER, ROTARY TOWED

MODEL [] CONTR NO []
SER [] CAPACITY []
REG NO [] GVW [] LG []
NSN [] DATE MFG [] HGT []
ENG SER [] SHIP WT [] W []
WARRANTY [] CUBE []
DATE SHIPPED [] DATE INSP [] INSP STAMP []
MB COMPANY INC OF WISCONSIN []

WARNING !

- 1.) BRUSH FRAME SUPPORT CHAINS MUST BE CONNECTED WHILE SWEEPER IS BEING TRANSPORTED.
- 2.) PUT LIFT CYLINDER CONTROL IN THE FLOAT POSITION ONCE CHAINS ARE CONNECTED.

Figure 2-7. Decals and Data Plates (Sheet 2 of 2)

Section IV. OPERATION UNDER UNUSUAL CONDITIONS**2-11. OPERATION UNDER UNUSUAL CONDITIONS.**

a. Operation in Hot Weather. During hot weather, operator should avoid allowing engine to idle for extended periods.

b. Operation in Wet, Mud, or Snow.

- (1) Wet weather conditions require no special operating procedures.
- (2) Excessively muddy conditions may require several passes or reduced vehicle speed to obtain desired results.
- (3) The sweeper may remove up to six inches of light powdered snow.
- (4) If the outside temperature falls below 32°F (0°C), the water tank must be drained.

c. Operation in Extreme Dust or Sand. Operation in extreme dust or sand conditions may require additional maintenance of the air cleaner, fuel filter, oil filter, and hydraulic filter as well as other lubricated parts. Severity of the local condition will dictate the level of additional maintenance.

2-12. FORDING.

Do not ford water exceeding 18 in. (45.7 cm) depth. Damage to equipment may result.

While the sweeper is not designed for fording, it may be exposed to high water conditions. If these conditions are encountered it may be necessary to repack the wheel bearings and lubricate all lube points. Do not exceed 18 in. (45.7 cm) fording depth.

2-13. EMERGENCY PROCEDURES.

In case of severe damage to the sweeper assembly, the entire brush assembly may be removed prior to transport. Notify unit maintenance to separate brush assembly from sweeper.

CHAPTER 3

OPERATOR MAINTENANCE INSTRUCTIONS

Para	Contents	Page
3-1	General Lubrication Instructions	3-1
3-2	Troubleshooting Introduction	3-8
3-3	Troubleshooting Symptoms.....	3-8
3-4	Maintenance Introduction	3-14
3-5	Left and Right Access Covers	3-14
3-6	Engine Oil Check	3-15
3-7	Air Filter Inspection	3-16
3-8	Service Fuel Tank Screen/Fill Fuel Tank.....	3-18
3-9	Alternator Belt Check	3-19
3-10	Lights	3-20
3-11	Battery Service	3-21
3-12	Hand Brakes Adjustment/Inspection	3-22
3-13	Hydraulic Fluid Check/Bleed Hydraulic System	3-23
3-14	Sprayer System Strainer Service/Water Draining.....	3-24
3-15	Fuel Shutoff	3-25

Section I. LUBRICATION INSTRUCTIONS

3-1. GENERAL LUBRICATION INSTRUCTIONS.



Do not start engine or move sweeper when anyone is under sweeper. Severe injury or death could result.

NOTE

These instructions are mandatory.

a. Intervals. Intervals (on-condition or hard time) and the related man-hour times are based on normal operation. The man-hour time specified is the time needed to do all the services prescribed for a particular interval. Change the hard time interval if lubricants are contaminated or if operating the equipment under adverse operating conditions, including longer-than-usual operating hours. The calendar interval may be extended during periods of low activity. If extended, adequate preservation precautions must be taken. Hard time intervals must be applied during the warranty period. Intervals shown in this lubrication section are based on calendar and hourly times or calendar times and mileage. An example of a calendar and hourly lubrication is: M/60 HR, in which M stands for monthly and 60 HR stands for 60 hours of vehicle operation. The lubrication is to be performed, at whichever interval occurs first for the sweeper. Special lubrication intervals and services are shown by the use of an asterisk (*) symbol.

3-1. GENERAL LUBRICATION INSTRUCTIONS (CONT).

b. Determination of Operating Hours. The reading on the hourmeter is the basis of all lubrication intervals that are based on hours of operation.



Dry cleaning solvent P-D-680 is toxic and flammable. Wear protective goggles, face mask, and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapor. Do not use near open flame or excessive heat. The flashpoint for type I dry cleaning solvent is 100°F (38°C) and for type II is 140°F (60°C). If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, flush eyes with water and get medical aid immediately.

c. Clean Fitting Before Lubricating. Clean parts with dry cleaning solvent, item 31, Appendix E, or equivalent. Dry before lubricating. Dotted arrow points indicate lubrication on both sides of the sweeper.

d. Lubrication After Fording. If fording occurs, lubricate all fittings below fording depth. Fording is not recommended.

e. Lubrication after High-Pressure Washing. After washing, lubricate all grease fittings and oil can points outside and underneath sweeper.

f. Level of Maintenance. The lowest level of maintenance authorized to lubricate a point is indicated by either Operator/Crew (C) or Unit Maintenance (O). Operator can lubricate points authorized for unit maintenance when authorized by unit maintenance.

g. Localized Views. A reference to the appropriate localized view is given after most lubrication entries.

h. Oil Filter Statement. Oil filters shall be changed as applicable, when:

- (1) They are known to be contaminated or clogged.
- (2) At prescribed hard time intervals.

i. Warranty Hard Time Statement. For equipment under manufacturers' warranty, hard time oil service intervals shall be followed. Intervals shall be shortened if lubricants are known to be contaminated or if operation is under adverse conditions (such as longer-than-usual operating hours, extended idling periods, extreme dust).

j. Lubrication Interval Symbols. The following lubrication interval symbols are used. Refer to figure 3-1 and figure 3-2 for lubrication instructions for the sweeper.

- | | |
|---------------|----------------------|
| D - daily | A - annually |
| W - weekly | B - biannually |
| M - monthly | H - hours (operated) |
| Q - quarterly | S - semiannually |

LUBRICATION CHART

SWEeper, ROTARY, TOWED

WARNING

Dry cleaning solvent P-D-680 is toxic and flammable. Wear protective goggles, face mask, and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapor. Do not use near open flame or excessive heat. The flashpoint for type I dry cleaning solvent is 100°F (38°C) and for type II is 140°F (60°C). If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, flush eyes with water and get medical aid immediately.

Intervals are based on normal operation. Reduce to compensate for abnormal operation and severe conditions or contaminated lubricants. During inactive periods, intervals may be extended commensurate with adequate preservation. Relubricate after washing or fording. Clean fittings before lubricating. Clean parts with PD-680, SD-2 SOLVENT, dry cleaning. Dry before lubricating. LUBRICATE DOTTED ARROW POINTS ON BOTH SIDES OF THE EQUIPMENT.

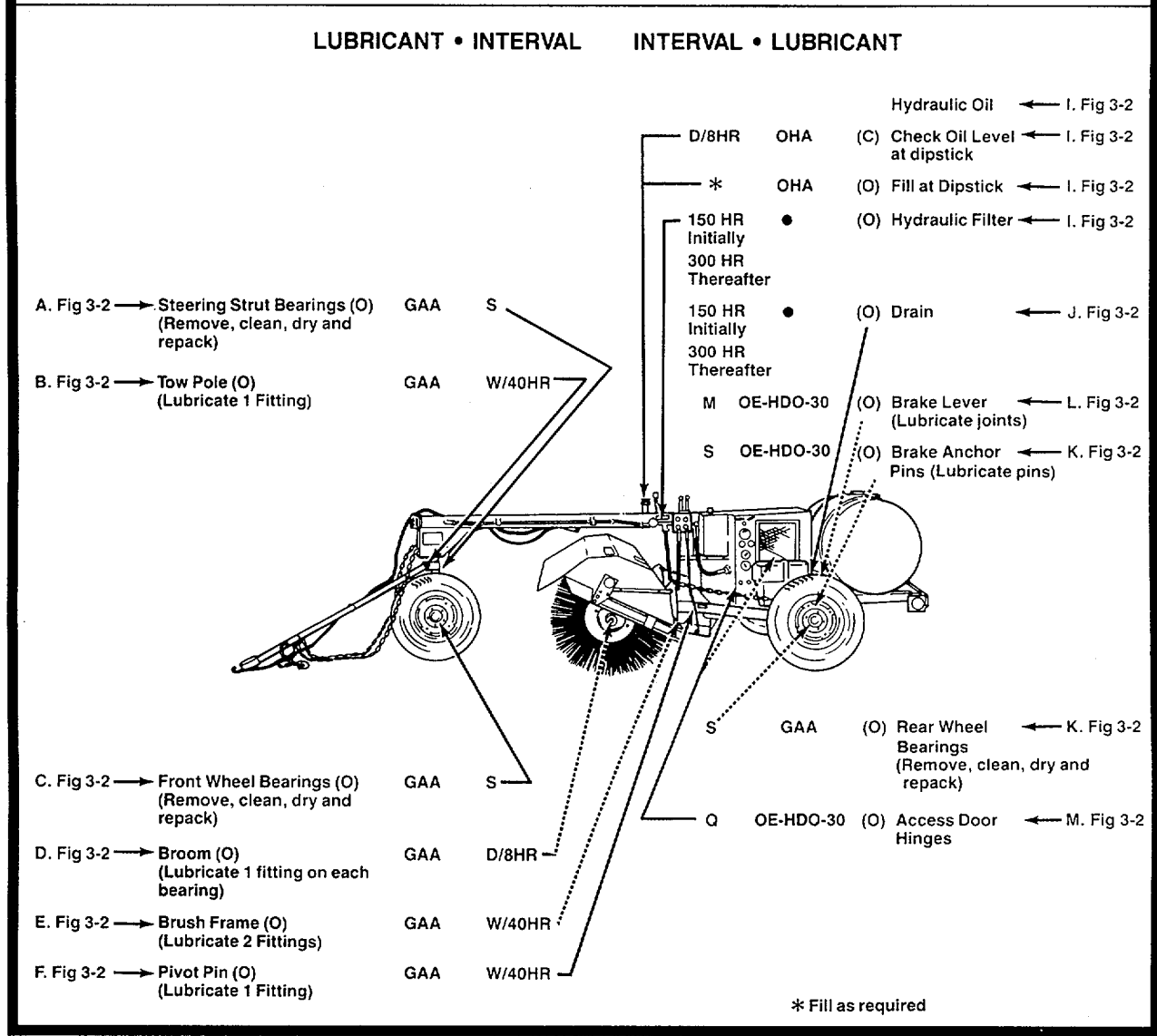


Figure 3-1. Lubrication Chart (Sheet 1 of 3)

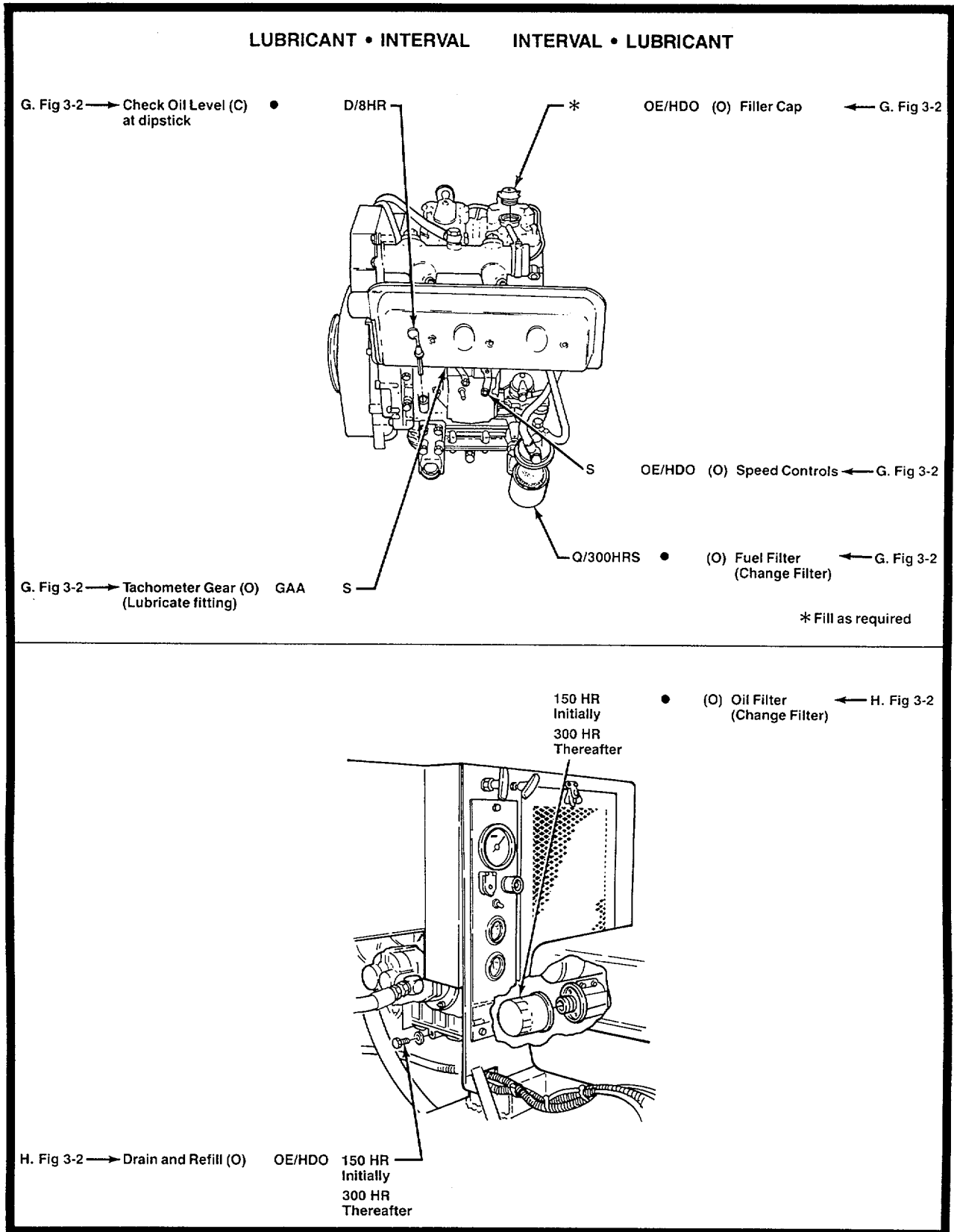


Figure 3-1. Lubrication Chart (Sheet 2 of 3)

— KEY —

Lubricants	Components & Capacity (APP)	EXPECTED TEMPERATURES																In ter vals																																						
		°F	<-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90		100	110	120																																			
		°C	<-46	-40	-34	-29	-23	-18	-12	-7	-1	4	10	16	21	27	32		38	44	49																																			
OE/HDO (MIL-L-2104) Lubricating Oil, Combat/Tactical Service OEA (MIL-L-46167) Lubricating Oil, ICE, Artic	Engine	2.9 Qt 2.75 L	OE/HDO-30 (0-238)																D Daily (After every opera- tion)																																					
	Speed Controls	As Req.	OEA (0-183) OE/HDO-15/40 ¹ (0-236)																																																					
	Door Hinge ²	As Req.	OE/HDO-18 (0-237)																																																					
FRH (MIL-H-46170) Hydraulic Fluid, Rust Inhibited, Fire Resistant, Synthetic, Hydrocarbon Base OHT (MIL-H-6083) Hydraulic Fluid Petroleum Base For Preservation and Operation	Hydraulic System	7.5 Gal 28.38 L	FRH (H-544)																W Weekly																																					
			OHT (C-635)																M Monthly																																					
			ALL TEMPERATURES																Q Quarter- ly																																					
GAA (MIL-G-10924) Grease, Automotive and Artillery	Steering Strut	A	ALL TEMPERATURES																S ³ Semi- Annually A Annually (Every 2nd "S" P.M. service																																					
	Tow Pull	S																																																						
	Broom	R																																																						
	Pivot Pin	E																																																						
	Brush Frame	Q																																																						
	Brake Level and Anchor Pin	U																																																						
	Tachometer Gear	I																																																						
	Front and Rear Wheel Bearings	R																																																						
		E																																																						
	D																																																							
			<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>°F</td> <td><-50</td> <td>-40</td> <td>-30</td> <td>-20</td> <td>-10</td> <td>0</td> <td>10</td> <td>20</td> <td>30</td> <td>40</td> <td>50</td> <td>60</td> <td>70</td> <td>80</td> <td>90</td> <td>100</td> <td>110</td> <td>120</td> </tr> <tr> <td>°C</td> <td><-46</td> <td>-40</td> <td>-34</td> <td>-29</td> <td>-23</td> <td>-18</td> <td>-12</td> <td>-7</td> <td>-1</td> <td>4</td> <td>10</td> <td>16</td> <td>21</td> <td>27</td> <td>32</td> <td>38</td> <td>44</td> <td>49</td> </tr> </table>																°F	<-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120	°C	<-46	-40	-34	-29	-23	-18	-12	-7	-1	4	10	16	21	27	32	38	44	49
°F	<-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120																																						
°C	<-46	-40	-34	-29	-23	-18	-12	-7	-1	4	10	16	21	27	32	38	44	49																																						

- 1 - Preferred lubricant when temperatures are above 0°F (-18°C).
- 2 - Oil Can Points - Quarterly Lubricate door hinges with OE/HDO.
- 3. - LUBRICATION INTERVALS - Points requiring lubrication at 6 months will be lubricated at time of "S" P.M. service.

Figure 3-1. Lubrication Chart (Sheet 3 of 3)

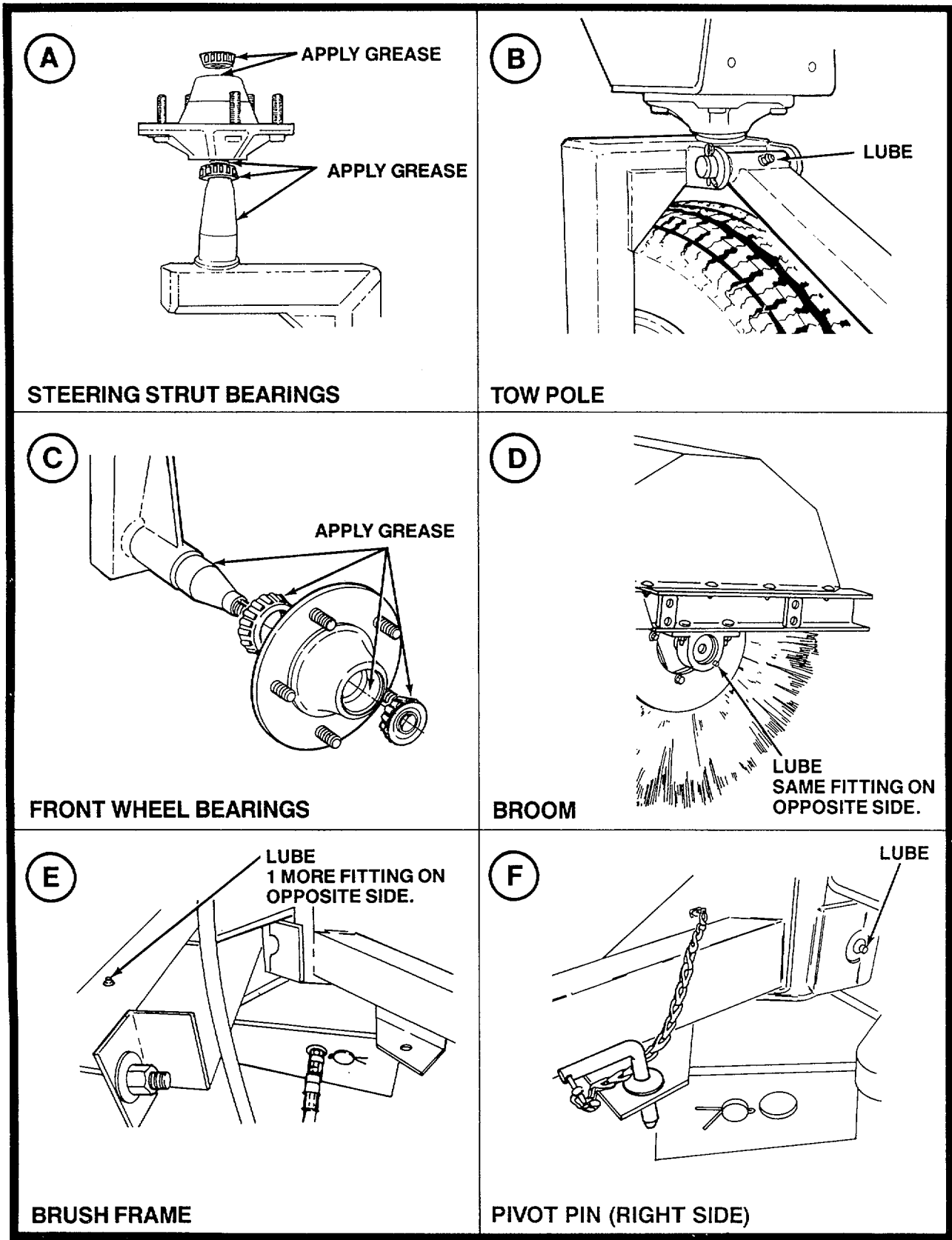


Figure 3-2. Localized Lubrication Points (Sheet 1 of 2)

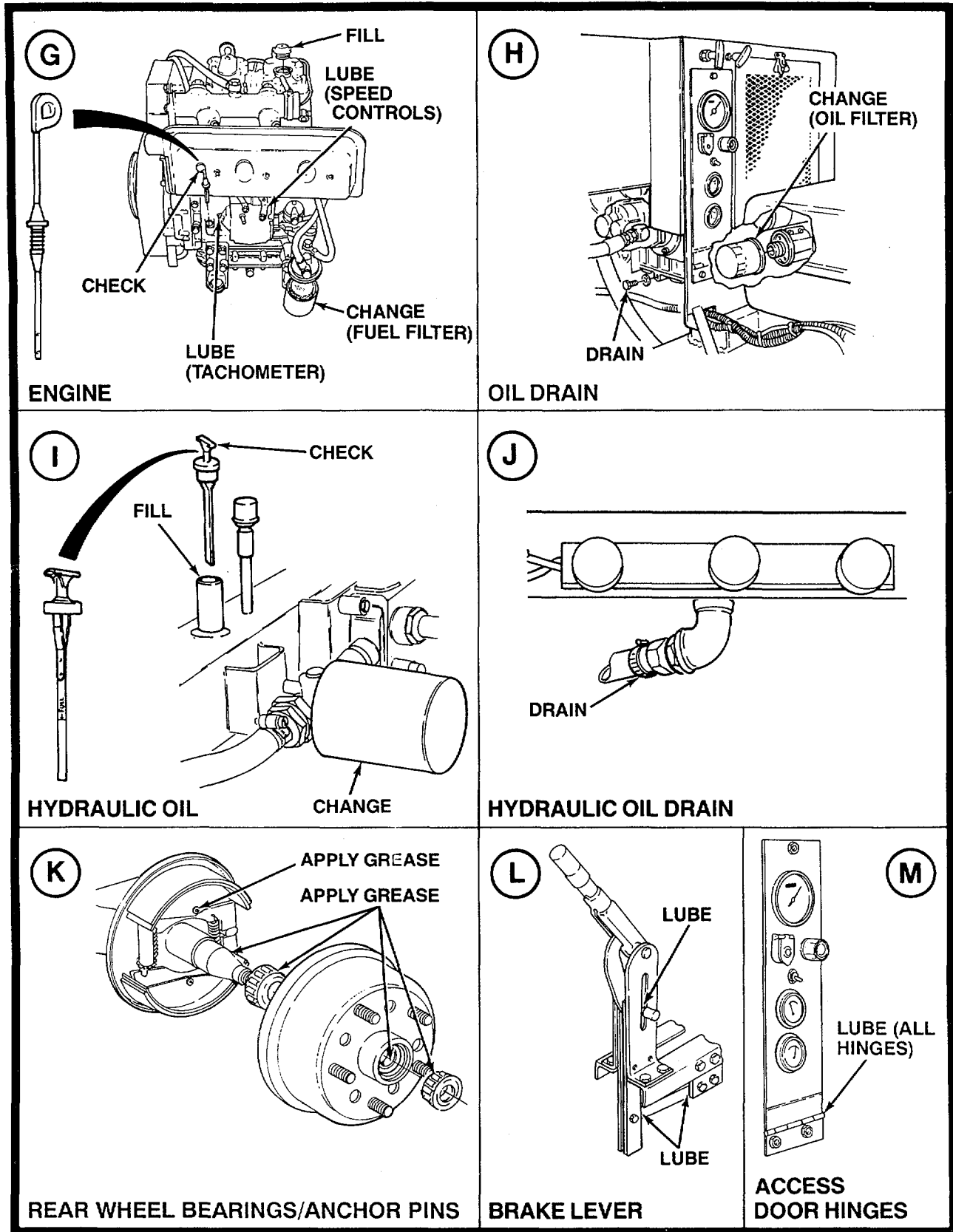


Figure 3-2. Localized Lubrication Points (Sheet 2 of 2)

Section II. TROUBLESHOOTING

3-2. TROUBLESHOOTING INTRODUCTION.

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

3-3. TROUBLESHOOTING SYMPTOMS.

Refer to table 3-1 for a list of common malfunctions. Table 3-2 lists the most common malfunctions found during operation or maintenance of the sweeper or its components. Tests or inspections and corrective actions should be performed in the order listed. If a malfunction is not listed, or is not corrected by listed corrective actions, notify the supervisor.

Table 3-1. System Symptom Index

Troubleshooting Procedure	Page
ENGINE	
1 Fails to crank when engine start switch is engaged	3-9
2 Cranks but fails to start	3-9
3 Engine does not develop full power	3-10
4 Excessive engine oil consumption	3-10
5 Engine will not stop running	3-10
WHEELS, TIRES, AND HUBS	
1 Wheel wobbles	3-10
2 Tire pressure low	3-11
ELECTRICAL SYSTEM	
1 Lighting does not operate	3-11
2 Gages do not operate	3-11
HYDRAULIC SYSTEM	
Brush operates too fast, too slow, or jerky	3-12
BRAKE SYSTEM	
1 Hand brake will not apply	3-12
2 Hand brakes will not hold	3-12
FUEL SYSTEM	
Engine starts and stops	3-12
SPRINKLER SYSTEM	
Fails to spray when switch is engaged	3-13

Table 3-2. Troubleshooting

Malfunction	Test or Inspection	Corrective Action
ENGINE		
1. FAILS TO CRANK WHEN ENGINE START SWITCH IS ENGAGED.		
Remove straps and open battery boxes. Check for dirty connections and loose or broken battery cables (para 3-11).		
If battery connections are dirty, or cables are loose or damaged, notify unit maintenance.		
If battery has been serviced and engine fails to start, notify unit maintenance.		
2. CRANKS BUT FAILS TO START.		
Step 1. Check indication on fuel gage.		
If fuel gage shows there is enough fuel but engine still will not start, go to step 2.		
If fuel gage reads empty, fill tank (para 3-8).		
Step 2. Check that the fuel shutoff valve is open (para 3-15).		
If valve is open, go to step 3.		
Step 3. Visually check fuel level in fuel tank.		
If tank is empty, fill (para 3-8) and notify unit maintenance that fuel gage does not work.		
If tank is not empty, go to step 4.		
<u>WARNING</u>		
If NBC exposure is suspected, all air filter media should be handled by personnel wearing protective equipment. Consult your unit NBC Officer or NBC NCO for appropriate handling or disposal procedures.		
Step 4. Check air filter (para 3-7).		
If air filter is clogged, notify unit maintenance.		
If engine still does not start, notify unit maintenance.		

Table 3-2. Troubleshooting

Malfunction	Test or Inspection	Corrective Action
ENGINE (CONT)		
3. ENGINE DOES NOT DEVELOP FULL POWER.	Step 1. Check that the fuel shutoff valve is completely open (para 3-15).	If the valve is open, go to step 2.
	Step 2. Check that the air cleaner is not clogged (para 3-7).	If the air cleaner is not clogged, notify the supervisor.
4. EXCESSIVE ENGINE OIL CONSUMPTION.	Check engine for oil leaks or loose lines.	If any leaks or loose lines are found, notify unit maintenance. Also notify unit maintenance about the oil consumption.
5. ENGINE WILL NOT STOP RUNNING.	Make sure key switch is turned off and the engine cutoff has been pulled (para 2-8b).	Shut off fuel shutoff valve (para 3-15) and notify unit maintenance.
WHEELS, TIRES, AND HUBS		
1. WHEEL WOBBLES.	Step 1. Check wheel for loose, missing, or broken lug nuts.	Notify unit maintenance to have lug nuts tightened to torque requirements.
	Step 2. Check to see if wheel is bent.	If wheel is bent, notify unit maintenance.

Table 3-2. Troubleshooting

Malfunction	Test or Inspection	Corrective Action
WHEELS, TIRES, AND HUBS (CONT)		
2. TIRE PRESSURE LOW.		
Step 1. Check for cuts, gouges, or damage to tire.		
Notify unit maintenance to change tire.		
Step 2. Check tire valve stem for damage.		
Notify unit maintenance to change valve stem. E		
ELECTRICAL SYSTEM		
NOTE		
Refer to Appendix H for electrical schematics, to aid in troubleshooting the electrical system.		
1. LIGHTING DOES NOT OPERATE.		
Step 1. For panel lights, check to ensure that the key switch is in the on position (para 2-8a).		
If lights do not go on, go to step 2.		
Step 2. Check to see if sweeper wire harness is properly connected to towing vehicle (para 2-8f).		
If wire harness is connected properly, notify unit maintenance.		
2. GAGES DO NOT OPERATE.		
Check battery connections (para 3-11).		
If battery connections are good, notify unit maintenance.		

Table 3-2. Troubleshooting

Malfunction	Test or Inspection	Corrective Action
HYDRAULIC SYSTEM		
BRUSH OPERATES TOO FAST, TOO SLOW, OR JERKY.		
Step 1. Check for low hydraulic fluid level (para 3-13).		
If low, notify unit maintenance.		
Step 2. Check to see if hydraulic connections and hoses are loose, damaged, or leaking.		
If hydraulic connections and hoses are loose, damaged or leaking, notify unit maintenance.		
BRAKE SYSTEM		
1. HAND BRAKE WILL NOT APPLY.		
If brake lever will not operate, notify unit maintenance.		
2. HAND BRAKES WILL NOT HOLD.		
Adjust hand brakes (para 3-12).		
If hand brakes will not hold, notify unit maintenance.		
FUEL SYSTEM		
ENGINE STARTS AND STOPS.		
Step 1. Check for kinks in fuel line.		
If line is kinked or clogged, notify unit maintenance.		
Step 2. Check to see if the fuel shutoff valve is fully open (para 3-15).		
Notify unit maintenance to change filter.		

Table 3-2. Troubleshooting

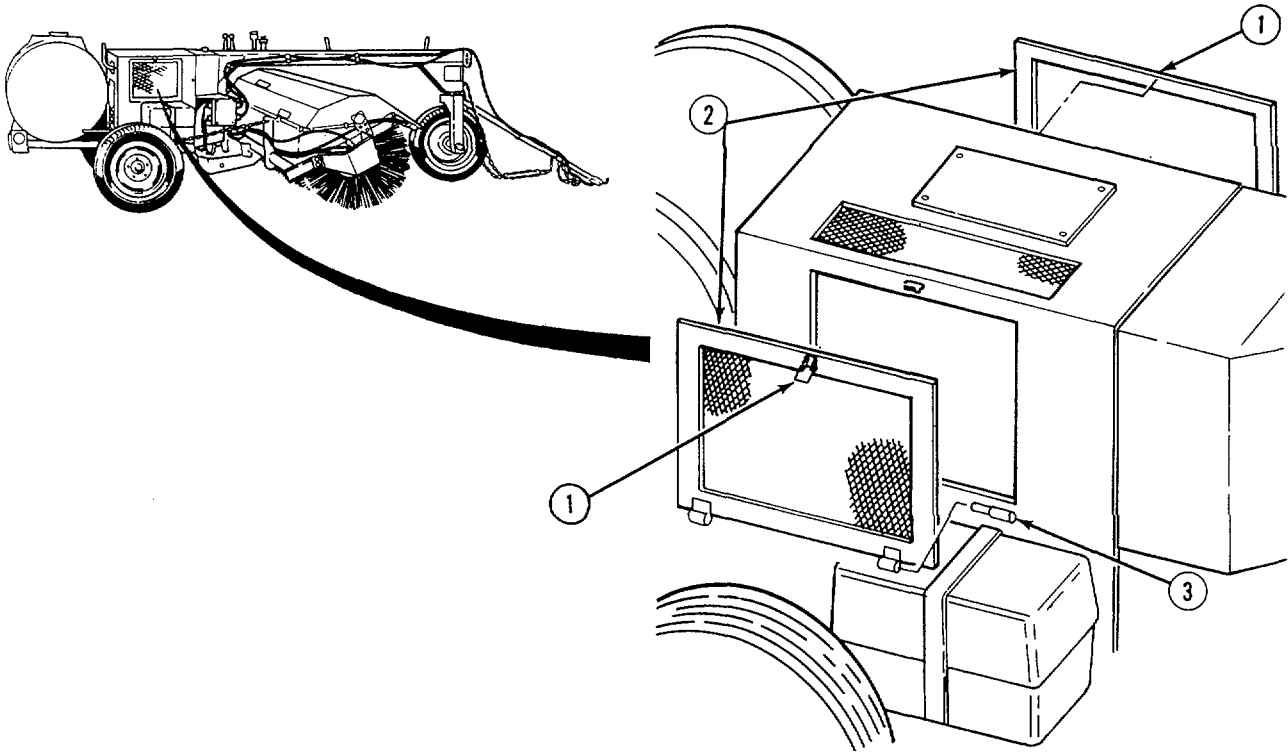
Malfunction	Test or Inspection	Corrective Action
SPRINKLER SYSTEM		
FAILS TO SPRAY WHEN SWITCH IS ENGAGED.		
Step 1. Check water level.	If tank is empty fill the tank (para 2-8e).	
Step 2. Check water strainer.	If strainer is clogged, clean it (para 3-14) and fill tank (para 2-8e). If filter is not clogged go to step 3.	
Step 3. Check for loose connections or kinks at spray bar.	If loose or kinked, notify unit maintenance.	

Section III. MAINTENANCE PROCEDURES

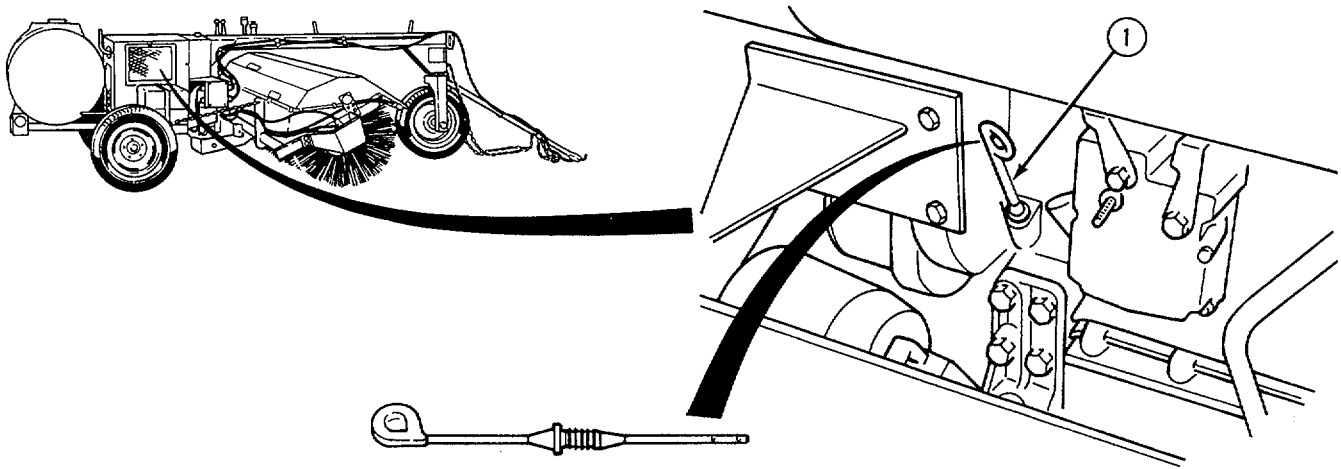
3-4. MAINTENANCE INTRODUCTION.

This section covers maintenance tasks authorized at the operator/crew level of maintenance. The tasks provided in this section include maintenance tasks done on a scheduled basis (PMCS).

3-5. LEFT AND RIGHT ACCESS COVERS.



- a. **Opening.** Turn key (1) counterclockwise to release latch and open access cover (2).
- b. **Removing.** Slide access cover (2) off hinges (3).
- c. **Installing.** Slide access cover (2) on hinges (3).
- d. **Closing.** Close cover (2) and turn key clockwise to secure.

3-6. ENGINE OIL CHECK.**NOTE**

To obtain a proper oil level reading, shut off engine and allow to sit for five minutes on level ground so oil can settle in oil pan.

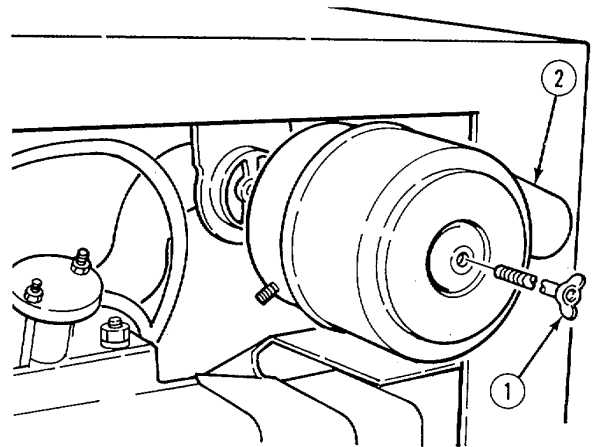
- a. Open right side access cover (para 3-5).
- b. Remove dipstick (1) and check oil level.
- c. Install dipstick (1).
- d. Close access cover (para 3-5).
- e. Notify unit maintenance if oil level is low.

3-7. AIR FILTER INSPECTION.**WARNING**

If NBC exposure is suspected, all air filter media should be handled by personnel wearing protective equipment. Consult your unit NBC Officer or NBC NCO for appropriate handling or disposal procedures.

a. Removal.

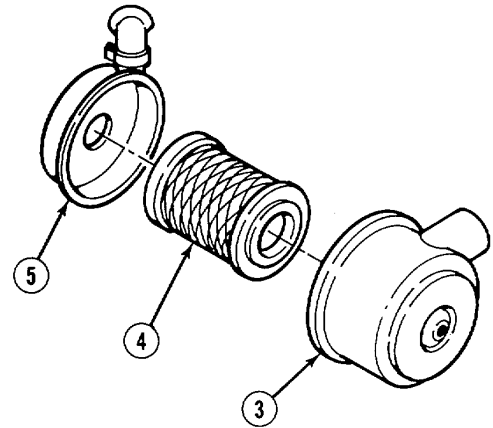
- (1) Shut off engine (para 2-8b) and open left side access cover (para 3-5).
- (2) Remove wingstud (1) and air cleaner assembly (2).



- (3) Remove cover (3).
- (4) Remove air filter element (4) from air cleaner base (5).

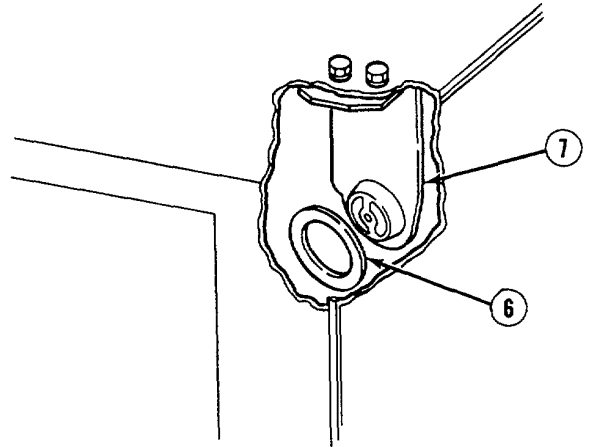
b. Inspection.

- (1) Inspect air filter element (4) for tears, damage, or excessive dust build-up.



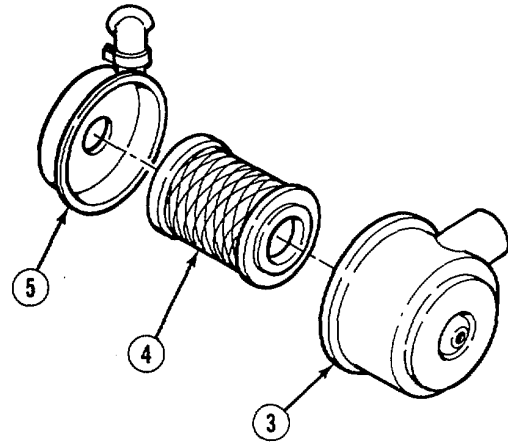
3-7. AIR FILTER INSPECTION (CONT).

- (2) Visually inspect gasket (6) on bracket (7) for tears or damage.
- (3) Notify unit maintenance if any of the above conditions exist.

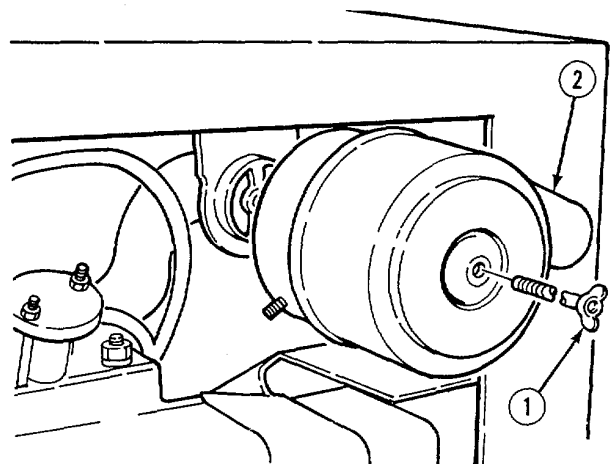


c. Installation.

- (1) Install air filter element (4) in air cleaner base (5).
- (2) Install cover (3) on base (5).



- (3) Install air cleaner assembly (2) using wingstud (1).
- (4) Close access cover (para 3-5).



3-8. SERVICE FUEL TANK SCREEN/FILL FUEL TANK.**WARNING**

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine. When working with fuel, post signs that read **NO SMOKING WITHIN 50 FEET (15.24 m)** of vehicle.

a. Inspect Fuel Tank Screen.

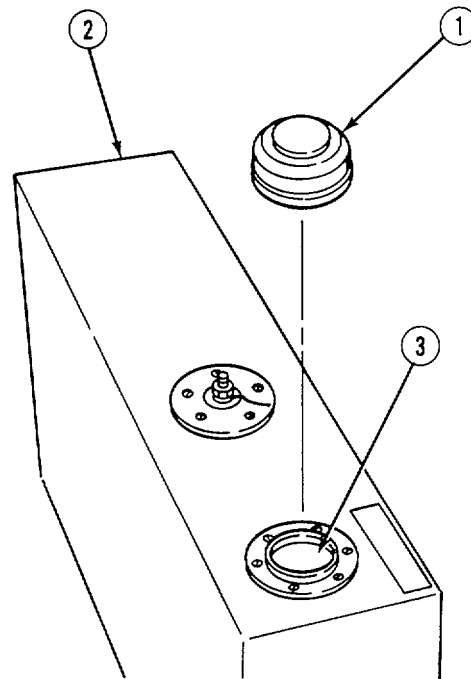
- (1) Shut off engine (para 2-8b).
- (2) Remove filler cap (1) from fuel tank (2).
- (3) Inspect fuel tank screen (3) for debris.

b. Clean Fuel Tank Screen.

- (1) Remove any debris that can be reached using fingers.
- (2) If screen (3) is clogged or debris cannot be reached, install cap (1) and notify unit maintenance.

c. Fill Fuel Tank.

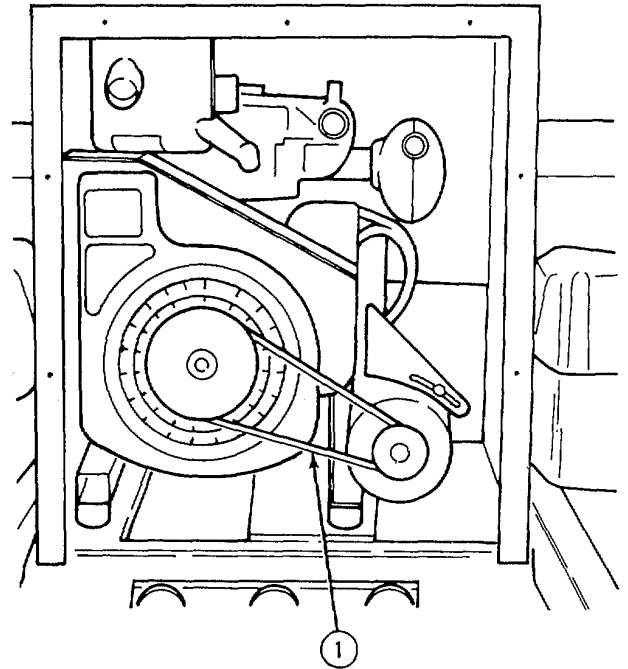
- (1) Shut off engine (para 2-8b).
- (2) Remove filler cap (1).
- (3) Fill tank. Capacity is 8 gal. (30 l).
- (4) Install filler cap (1).

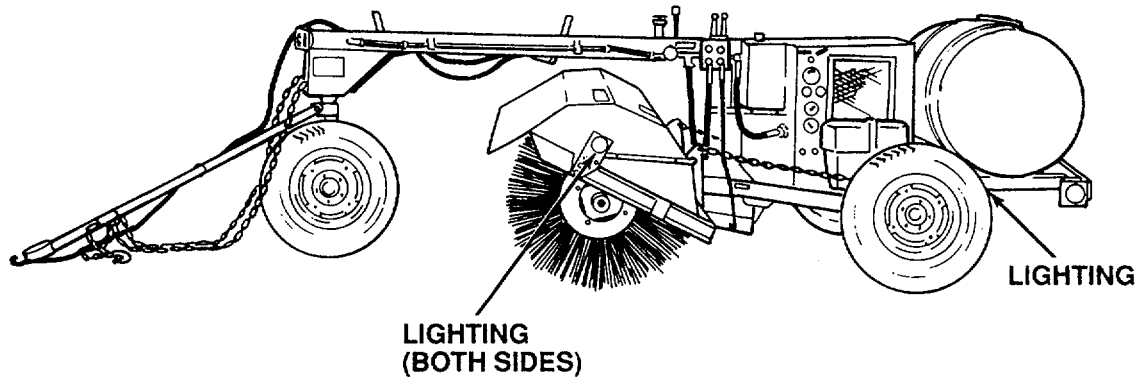


3-9. ALTERNATOR BELT CHECK.

- (1) Stop engine (para 2-8b).
- (2) Open right side access cover (para 3-5) and inspect belt (1)
- (3) Check belt (1) for obvious looseness, cracks, or fraying.
- (4) If loose, cracked, or frayed, notify unit maintenance.
- (5) Close right side access cover (para 3-5).

REAR PANEL REMOVED FOR CLARITY



3-10. LIGHTS.

Check for obvious signs of damage to lights. Connect power hookups to tow vehicle and test lights while an assistant visually observes to make sure lights are operable. Notify unit maintenance if lights do not work.

3-11. BATTERY SERVICE.**WARNING**

- Be careful not to short out battery terminals. Do not smoke or use open flame near batteries. Batteries may explode from a spark. Battery acid is harmful to skin and eyes. Wear eye protection when performing this procedure.
- Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working on batteries. Jewelry can catch on equipment and cause injury, or may short across an electrical circuit and cause severe burns or electrical shock.

a. **Access to Batteries.** Remove holddown strap (1) and open battery box cover (2).

b. **Inspect Battery Terminals.** Inspect battery terminals (3). Clean battery with water and a clean cloth. Make certain battery terminal clamps are tight.

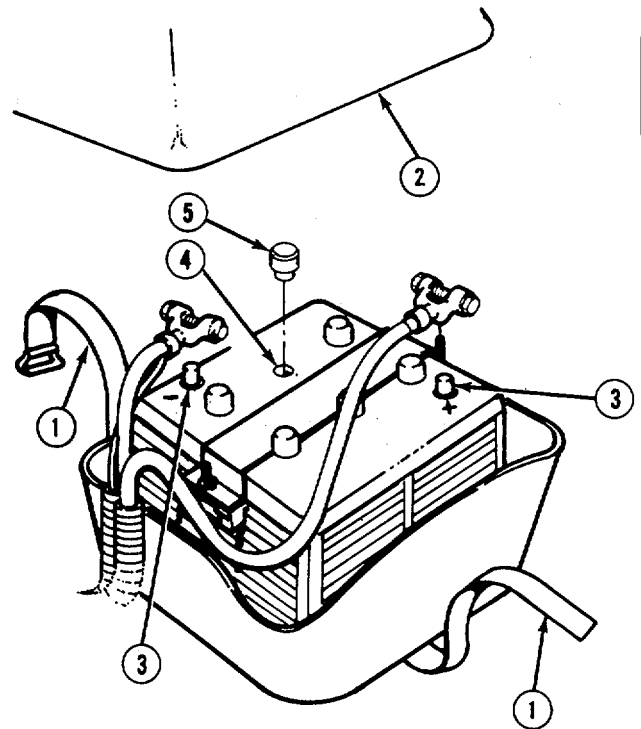
c. **Cleaning Top of Battery.** Clean top of battery and around cell filler holes (4) with water and a clean cloth.

d. **Filling Battery Cells.**

(1) Remove filler caps (5), and clean vent holes in caps as needed.

(2) Fill battery cell with distilled water to a level of 3/8 in. (9.5 mm) above plates. Install filler caps (5).

e. Close battery box cover (2) and install holddown strap (1).



3-12. HAND BRAKES ADJUSTMENT/INSPECTION.**NOTE**

- There are two hand brakes, one on each side of the sweeper.
- When applied, hand brakes should hold sweeper in place.

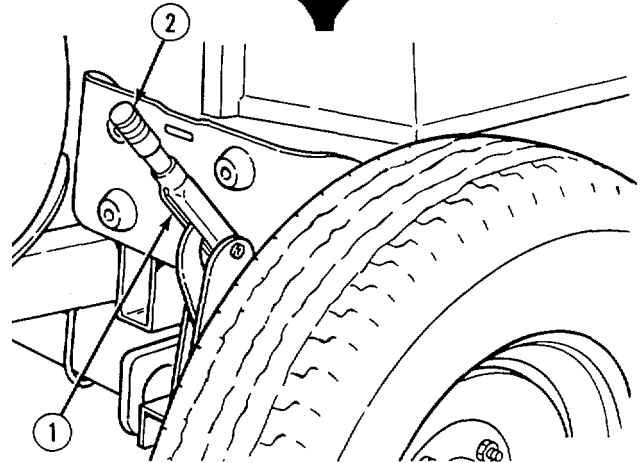
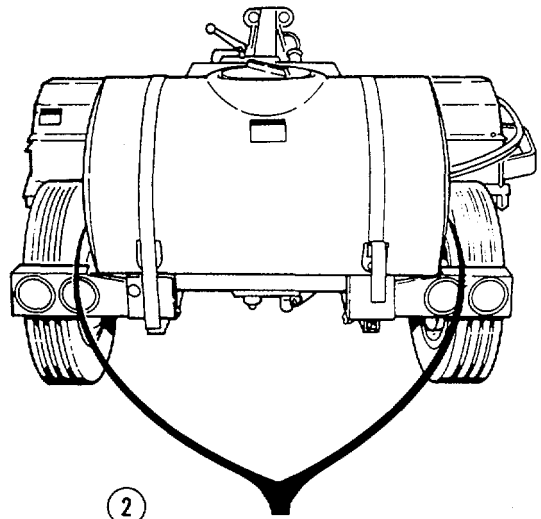
a. Operation. Lift up on hand brake levers (1). Hand brakes should require firm pressure to lift into "on" (up) position.

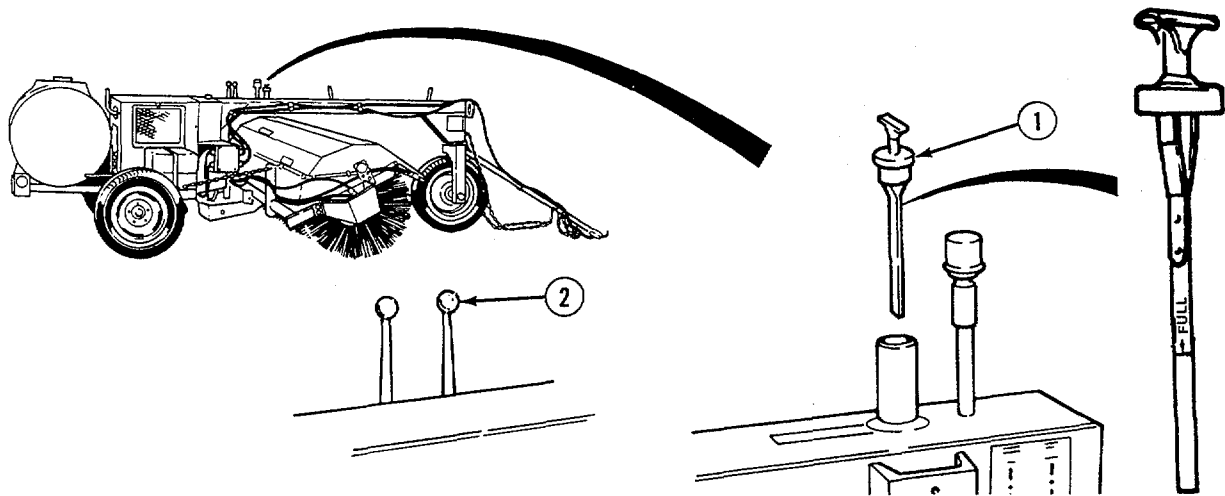
b. Adjustment.

(1) Turn adjusting knob (2) clockwise to increase breaking resistance, counterclockwise to decrease breaking resistance.

(2) If hand brakes will not raise to "on" position, or will not stay in "on" position after adjustment, report condition to unit maintenance.

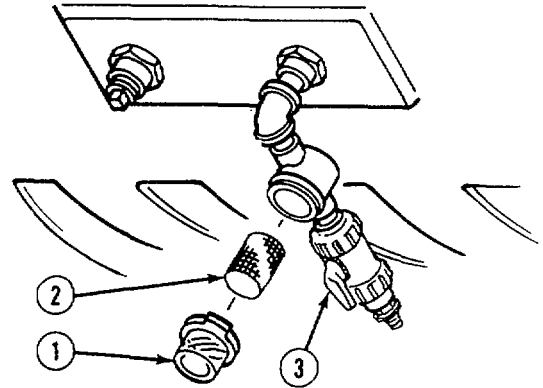
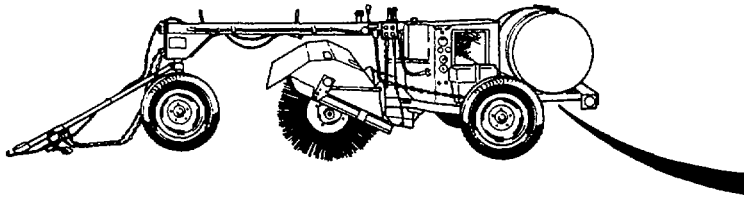
c. Inspection. Inspect hand brakes for loose and missing parts, if found, report condition to unit maintenance.



3-13. HYDRAULIC FLUID CHECK/BLEED HYDRAULIC SYSTEM.**a. Fluid Check.**

- (1) Place vehicle on level ground.
- (2) Bleed hydraulic system (para 3-13b).
- (3) Remove dipstick (1) and check the fluid level.
- (4) If fluid level is low, notify unit maintenance.

b. Bleed Hydraulic System. Shut off engine and work both control levers (2) for approximately 30 seconds. Bleed the hydraulic system before checking fluid or performing any hydraulic system maintenance.

3-14. SPRAYER SYSTEM STRAINER SERVICE/WATER DRAINING.**a. Prepare Sweeper.**

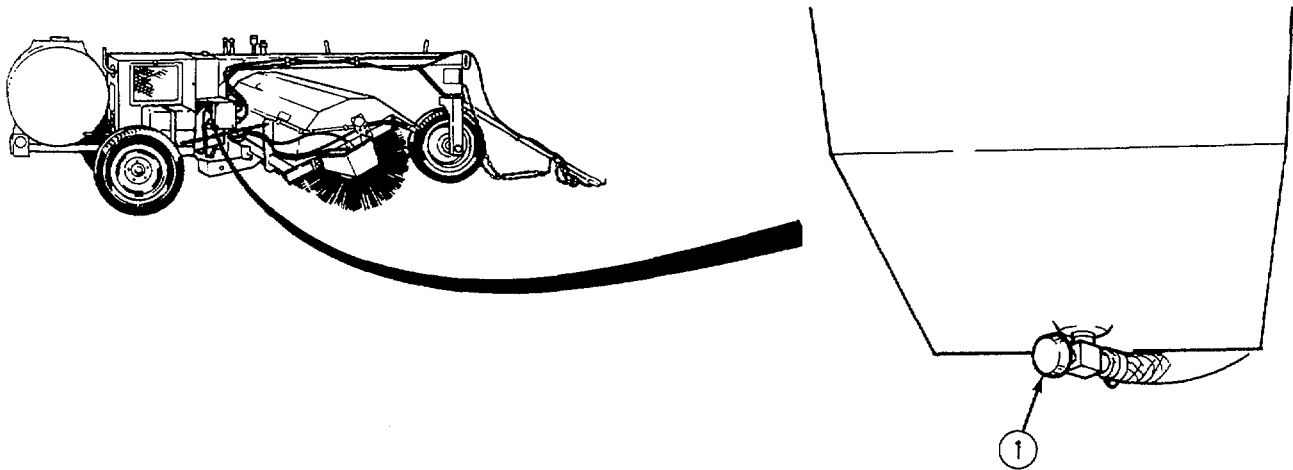
- (1) Set hand brakes (para 2-8a).
- (2) Shut engine off (para 2-8b).

b. Removal.

- (1) Remove clear cup (1) and strainer (2).
- (2) Open water tank shut off valve (3) and allow water in tank and lines to drain.

c. Cleaning. Clean strainer (2) as required.**d. Installation.**

- (1) Install strainer (2) and clear cup (1).
- (2) Close water tank shut off valve (3).
- (3) Fill water tank (para 2-8e).
- (4) Inspect system for leaks, missing parts, and kinked lines.

3-15. FUEL SHUTOFF.**WARNING**

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine. When working with fuel, post signs that read **NO SMOKING WITHIN 50 FEET (15.24 m)** of vehicle.

To safely shutoff the fuel at fuel tank, turn fuel shutoff valve (1) clockwise. Open fuel shut off valve by turning counterclockwise.

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CHAPTER 4

UNIT MAINTENANCE INSTRUCTIONS

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Section I. REPAIR PARTS, SPECIAL TOOLS, TEST, MEASUREMENT AND DIAGNOSTIC EQUIPMENT, AND SUPPORT EQUIPMENT

4-1. COMMON TOOLS AND EQUIPMENT.

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

4-2. SPECIAL TOOLS, TMDE AND SUPPORT EQUIPMENT.

Refer to Section III of the Maintenance Allocation Chart (MAC) for a list of tool kits authorized for the sweeper.

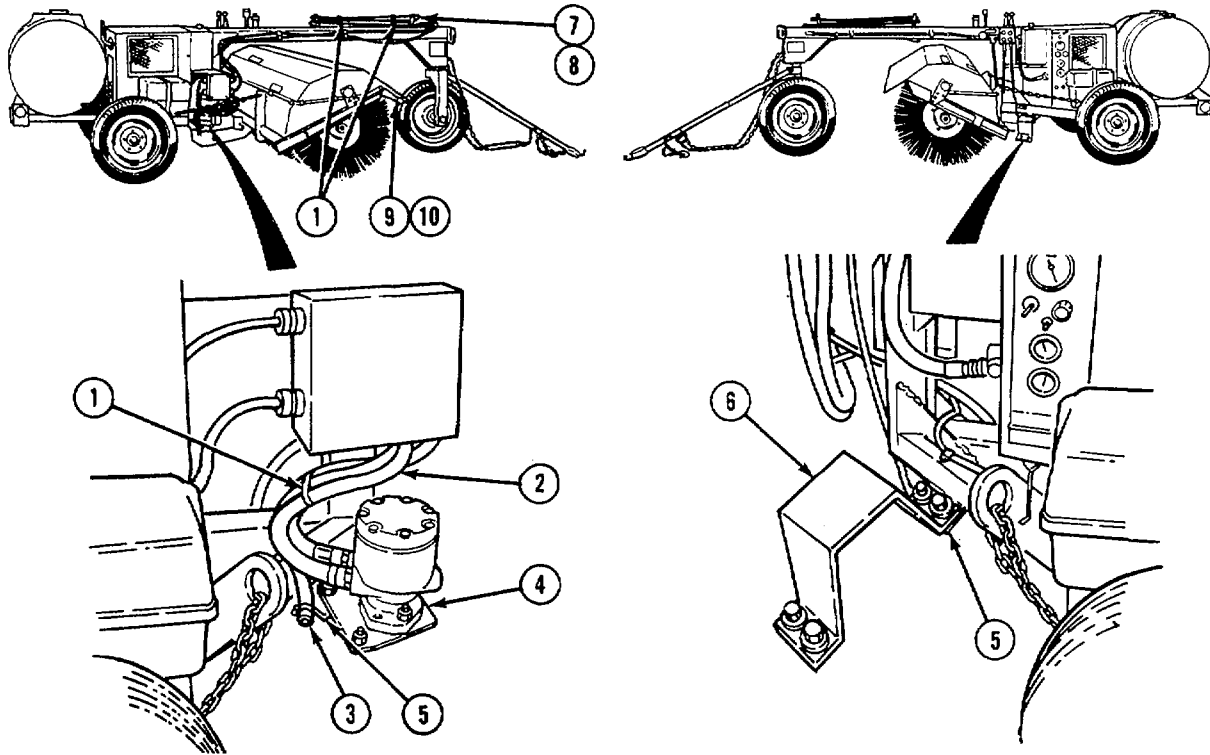
4-3. REPAIR PARTS.

Repair parts are listed and illustrated in the Repair Parts and Special Tool List, Appendix F covering unit maintenance for the sweeper.

Section II. SERVICE UPON RECEIPT

4-4. SERVICE UPON RECEIPT.

The sweeper may be shipped or received with the motor guard and hydraulic motor temporarily attached to the main frame rather than the broom head. The hydraulic hoses are connected and bundled with the sprinkler hose. Perform the following to prepare the unit for use.



NOTE

Tie wraps are used only to secure lines and harness for shipping. Quantity of tie wraps used may vary.

- (1) Remove tie wraps (1) securing broom motor hydraulic lines (2) to sprinkler line (3).
- (2) Remove hydraulic motor and bracket assembly (4) from stowage position on frame (5) using a 3/4 in. open end wrench, ratchet and 3/4 in. socket. Retain hardware for use during installation.
- (3) Remove hydraulic motor guard (6) from stowage position on frame (5). Retain hardware for use during installation.
- (4) Remove plastic tie wraps which secure wiring harnesses (7 and 8) together.
- (5) Connect sprinkler line (3) to spray bar fitting (9) and tighten clamp (10) using a flat tip screwdriver.
- (6) Install hydraulic motor and mount (para 4-102).
- (7) Install hydraulic motor guard (para 4-116).

4-5. SERVICE UPON RECEIPT FROM STORAGE.

If the unit has been received from long term storage, perform the steps in para 4-4 if applicable and change engine oil and filter (para 4-22) and perform PMCS prior to operating engine.

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

4-6. INTRODUCTION.

a. PMCS Instructions. The PMCS table is used to prevent equipment failure as well as to detect defects. The following paragraphs explain the use of the PMCS table as well as instructions as to what to look for.

WARNING

Dry cleaning solvent P-D-680 is toxic and flammable. Wear protective goggles, face mask, and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapor. Do not use near open flame or excessive heat. The flashpoint for type I dry cleaning solvent is 100°F (38°C) and for type II is 140°F (60°C). If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, flush eyes with water and get medical aid immediately.

b. Cleanliness. Dirt, grease, oil and debris only get in the way and may cover up a serious problem. Use dry cleaning solvent P-D-680 (item 31, Appendix E) on all metal surfaces.

c. Bolts, Nuts and Screws. Check bolts, nuts and screws for obvious looseness, missing, bent, or broken condition. Look for loose or chipped paint, bare metal, or rust around bolt heads. If any part seems loose, tighten it. If the part is missing, bent or broken, report it to the supervisor.

d. Welds. Look for loose or chipped paint, rust or gaps where parts are welded together. If a bad weld is found, report it.

e. Electrical 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. If a bad wire or connector is found, report it.

f. Hydraulic Lines and Fittings. Look for wear, damage, leaks and make sure that clamps and fittings are tight. Wet spots show leaks and a stain around a fitting or connector can mean a leak. If a leak comes from a loose fitting or connector, tighten it. If something is broken or worn out, report it.

g. Unusual Environment. When the sweeper is being used in an unusual environment, extreme heat, cold, wet and dry conditions, PMCS should be performed more often than indicated on the PMCS table.

h. First Use Inspections. When the sweeper is first being put into use or is being used for the first time after a long period of non-use, perform all the PMCS inspections.

4-6. INTRODUCTION (CONT).

i. Fluid Leakage. It is necessary to know how fluid leakage affects the status of fuel, oil, coolant and the hydraulic systems. The following are definitions of the different types/classes of leakage that determine the status of the sweeper.

CAUTION

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

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

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

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

4-7. PMCS TABLE.

a. Item Number Column. The checks and services are numbered in chronological order showing a logical sequence around the sweeper.

b. Interval Column. This column contains a dot (.) opposite the appropriate procedure. Thus if a given procedure is performed quarterly, a dot is opposite the procedure in the "Q" column; if the dot is in the "S" column, the procedure should be performed semiannually; and if the procedure is performed in two or more periods, a dot is placed in each applicable column.

c. Item to be Inspected Column. The items listed in this column are divided into groups indicating the portion of the equipment of which they are a part, i.e. fuel, brakes, engine. Under these groupings a few common words are to identify the specific item being checked.

d. Procedures Column. This column contains a brief description of the procedure by which the check is performed.

Refer to table 4-1 for the unit preventive maintenance checks and services for the sweeper.

Table 4-1. Unit Preventive Maintenance Checks and Services

Q - Quarter

S - Semiannually

A - Annually

Item No.	Interval			Item to Be Inspected	Procedure
	Q	S	A		
1	•			ENGINE ENCLOSURE	a. Check for dents, cracks and general damage.
					b. Check for missing or loose nuts, screws and washers. Tighten as necessary.
2	•			ENGINE	
				Oil Filter	Replace initially at 150 hours of operation and 300 hours of operation thereafter (para 4-22).
3	•			FUEL SYSTEM	
				Fuel Tank	Check for cracks, leaks, missing parts, and dents.
4	•			Fittings, Joints and Valves	Check for cracks, leaks and dents.
5	•			Fuel Filter	Replace on a quarterly basis or after 300 hours of operation (para 4-48).
6	•			HYDRAULIC SYSTEM	
				Hydraulic Lines	Check lines for leaks, kinks, cracks, dents, and for deteriorated rubber on flexible hoses.
7	•			Fittings	Check for leaks, kinks, cracks, or dents.
8	•			Hydraulic Pump	Check for leaks.
9	•			Reservoir	a. Check reservoir for leaks.
					b. Check filler cap for proper seal.
10	•			Breather	Cap should be present and not be cracked or dented. Check filter for dirt or clogging. Clean per para 4-104.
11	•			Controls	Check for proper operation.
12	•			Hydraulic Filter	Replace initially at 150 hours of operation and 300 hours of operation thereafter (para 4-22).

Item No.	Interval			Item to Be Inspected	Procedure
	Q	S	A		
					<u>WARNING</u>
13	•			AIR CLEANER	<p>If NBC exposure is suspected, all air filter media should be handled by personnel wearing protective equipment. Consult your unit NBC Officer or NBC NCO for appropriate handling or disposal procedures.</p> <p>Check for cracks and dents in housing, deteriorated gaskets and deterioration of the filter element. Replace filter quarterly or every 300 hours of operation (para 4-37).</p>
				BROOM ASSEMBLY	
14	•			Bearings	Check bearings for excessive endplay.
15	•			Broom	Check for missing pieces and excessive wear.
16	•			Dirt Guards	Check dirt guards for tears or missing nuts or screws.
17	•			CONTROLS AND GAGES	Check gages for operation.
					<u>WARNING</u>
					Brake linings contain asbestos. Asbestos dust can cause cancer. Avoid breathing dust from brake linings or creating dust while servicing.
18	•			BRAKES	Check hand brakes and linkages for proper tension and missing or bent parts.
19	•			MAINFRAME	Check mainframe for broken welds, cracks or bent crossmembers.

Section IV. TROUBLESHOOTING

4-8. TROUBLESHOOTING INTRODUCTION.

This section contains step by step procedures for identifying, locating and isolating equipment malfunctions at the unit maintenance level.

4-9. TROUBLESHOOTING INSTRUCTIONS.

Refer to table 4-2 for a list of common malfunctions. The troubleshooting procedures are in table 4-3 and contain tests, inspections and corrective actions. Before troubleshooting, be sure all preventive maintenance checks and services (PMCS) have been performed. Perform tests, inspections and corrective actions in the order listed. Try to return the sweeper or component to operation after each test, inspection and corrective action has been performed.

Table 4-2. System Symptom Index

Troubleshooting Procedure	Page
ENGINE	
1. Engine fails to crank.....	4-10
2. Engine fails to develop full power/does not run smoothly.....	4-10
3. Engine overheats.....	4-11
4. High oil consumption.....	4-11
FUEL SYSTEM	
1. Engine will not start, or stalls.....	4-12
2. Fuel level gage does not register, or registers inaccurately.....	4-12
ELECTRICAL SYSTEM	
1. Battery weak or fails to maintain charge.....	4-13
2. One or more lights not working.....	4-13
SPRINKLER SYSTEM	
1. Failure of spray pump to prime.....	4-14
2. Spray pump motor fails to turn on.....	4-14
3. Low sprinkler flow and pressure.....	4-14
HYDRAULIC SYSTEM	
1. Broom or lift does not operate.....	4-15
2. Broom motor works but lift does not, or lift works but broom motor does not.....	4-15

Table 4-3. Unit Troubleshooting

Malfunction	Test or Inspection	Corrective Action
ENGINE		
1. ENGINE FAILS TO CRANK.		
Step 1. Check voltage at right battery for 24 volts.		
If voltage is below 24 volts, service battery (para 3-11). Tighten loose battery cable connections and clean corroded battery connections. Repair or replace any broken connections.		
Step 2. Check engine key switch for loose or damaged connections.		
Tighten or repair loose or damaged connections (para 4-60).		
Step 3. Check starter solenoid wiring and connections for cracks, burns, or looseness.		
Tighten loose connections or wiring. Replace damaged wiring and connections (para 4-81).		
Step 4. Check starter for looseness or damaged connections.		
Tighten loose connections. Replace starter if damaged (para 4-58).		
Step 5. If engine still fails to crank, notify the supervisor.		
2. ENGINE FAILS TO DEVELOP FULL POWER/DOES NOT RUN SMOOTHLY.		
Step 1. Check throttle position. Engine should run at 2100 RPM with throttle fully open.		
Ensure throttle is in correct position.		
<u>WARNING</u>		
If NBC exposure is suspected, all air filter media should be handled by personnel wearing protective equipment. Consult your unit NBC Officer or NBC NCO for appropriate handling or disposal procedures.		
Step 2. Check air filter. Replace filter quarterly or every 300 hours of operation.		
Change if needed (para 4-37).		

Malfunction	Test or Inspection	Corrective Action
ENGINE (CONT)		
2. ENGINE FAILS TO DEVELOP FULL POWER/DOES NOT RUN SMOOTHLY (CONT).		
	Step 3. Replace fuel filter quarterly or every 300 hours of operation (para 4-48).	
	Step 4. Inspect fuel lines and connections for leaks or damage.	Tighten or replace lines and connections as necessary (para 4-42 thru 4-46).
	Step 5. If problem has not been solved, notify your supervisor.	
3. ENGINE OVERHEATS.		
	Step 1. Inspect cylinder and cylinder head cooling fins for dirt or damage.	Notify direct support to clean cooling fins or repair damage as necessary.
	Step 2. If still overheating, notify your supervisor.	
4. HIGH OIL CONSUMPTION.		
	Step 1 Check oil filter, oil lines, engine cover, and oil pan for leaks.	Tighten leaking connections and covers. Tighten or replace oil filter (para 4-22).
	Step 2. If high oil consumption continues, notify your supervisor.	

Malfunction**Test or Inspection****Corrective Action****FUEL SYSTEM****WARNING**

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine. When working with fuel, post signs that read **NO SMOKING WITHIN 50 FEET (15.24 m)** of vehicle.

1. ENGINE WILL NOT START, OR STALLS.

Step 1. Check fuel level in tank and if fuel shutoff valve is open.

If tank is empty, check for damage.

If tank is damaged, replace (para 4-40).

If no damage, add fuel and bleed air from system (para 4-36).

Step 2. Check fuel lines for loose connections and fittings.

Tighten loose connections and fittings.

Step 3. Inspect for damaged fuel lines.

Replace damaged fuel lines (para 4-42 thru 4-46).

Step 4. Check fuel filter for damage. Replace quarterly or every 300 hours of operation.

Replace filter if damaged (para 4-48).

Step 5. If engine does not start, notify your supervisor.

2. FUEL LEVEL GAGE DOES NOT REGISTER, OR REGISTERS INACCURATELY.

Step 1. Check fuel level in tank.

Fill tank if necessary (para 3-8).

Step 2. Inspect fuel gage and sending unit.

Replace component that is malfunctioning (para 4-63 or 4-72).

Table 4-3. Unit Troubleshooting - CONT.

Malfunction	Test or Inspection	Corrective Action
ELECTRICAL SYSTEM		
NOTE		
Refer to Appendix H for electrical schematics to aid in troubleshooting the electrical system.		
1. BATTERY WEAK OR FAILS TO MAINTAIN CHARGE.		
Step 1.	Attach a multimeter between positive battery terminal of right battery and a good frame ground. Check that battery produces 24 volts with engine switch on.	
	If not, service battery (para 3-11).	
Step 2.	Check for loose, corroded or damaged battery cables and posts. Repair broken wires or connectors (para 4-83).	
Step 3.	Check battery cables and alternator wiring for continuity. Replace or repair broken wires or connectors (para 4-81 or 4-83).	
Step 4.	Test alternator (para 4-57). Replace alternator regulator as necessary (para 4-57).	
2. ONE OR MORE LIGHTS NOT WORKING.		
Step 1.	Connect 12V wiring harness to tow vehicle. Make visual check for burned out light bulb. Replace light bulb (para 4-68, 4-69, or 4-71).	
Step 2.	Check socket and/or contacts for corrosion.	
Step 3.	Check for proper ground. Clean ground connection.	
Step 4.	Turn light switch on and check for voltage. If there is voltage, replace defective lamp or bulb.	
Step 5.	Check wiring for loose connections or broken parts. Repair or replace wiring or broken parts (para 4-79 or 4-83).	
Step 6.	If lights still do not work, notify supervisor.	

Table 4-3. Unit Troubleshooting - CONT.

Malfunction	Test or Inspection	Corrective Action
SPRINKLER SYSTEM		
1. FAILURE OF SPRAY PUMP TO PRIME.		
Step 1. Check for restricted intake or discharge lines. Open all lines and valves and check for jammed or clogged lines.		Clean or replace lines (para 4-123) or valves (para 4-124) as necessary.
Step 2. Check for air leak in intake line.		Replace line (para 4-123).
Step 3. Defective pump.		Replace pump or repair as needed; check for ruptured diaphragm, defective check valve, crack in pump housing, debris in pump head (para 4-120).
2. SPRAY PUMP MOTOR FAILS TO TURN ON.		
Step 1. Pump or equipment not plugged in electrically. Check for loose wiring connection.		Replace or repair as needed (para 4-120).
Step 2. Check switch.		Repair or replace as needed (para 4-64).
Step 3. Check motor.		Repair or replace as needed (para 4-120).
3. LOW SPRINKLER FLOW AND PRESSURE.		
Step 1. Check for air leak at pump intake.		Tighten fittings or replace lines as needed (para 4-123).
Step 2. Check for dirt or debris inside pump or plumbing.		Clean pump and system (para 4-120 and 4-123).
Step 3. If excessively noisy, check for worn pump bearing.		Replace pump or bearing as necessary (para 4-120).

Table 4-3. Unit Troubleshooting - CONT.

Malfunction	Test or Inspection	Corrective Action
SPRINKLER SYSTEM (CONT)		
3. LOW SPRINKLER FLOW AND PRESSURE (CONT).		
	Step 4. Check for punctured pump diaphragm.	Replace pump or repair diaphragm as necessary (para 4-120).
	Step 5. Check for defective pump motor.	Replace as necessary (para 4-120).
	Step 6. Check for insufficient voltage to pump.	Troubleshoot battery (see electrical system troubleshooting).
HYDRAULIC SYSTEM		
NOTE		
Refer to Appendix H for hydraulic schematic to aid in troubleshooting.		
1. BROOM OR LIFT DOES NOT OPERATE.		
	Step 1. Check fluid level in hydraulic reservoir (para 3-13).	If fluid is low identify source of leak and repair.
		If unit does not operate with full fluid level replace hydraulic pump (para 4-101).
2. BROOM MOTOR WORKS BUT LIFT DOES NOT, OR LIFT WORKS BUT BROOM MOTOR DOES NOT.		
	Step 1. Check fluid level in hydraulic reservoir (para 3-13).	If level is ok go to step 2.
		If not, fill to operating level and test operation.
	Step 2. Switch hydraulic lines at valve and check operation.	If component now operates, replace hydraulic control valve (para 4-103).
		If component does not operate, replace component not operating.

Section V. UNIT MAINTENANCE PROCEDURES

4-10. UNIT MAINTENANCE INTRODUCTION.

Instructions in this section provide general procedures to be followed for inspection, removal, cleaning, repair, replacement, or installation of components and testing authorized at the unit level as specified by the Maintenance Allocation Chart (MAC).

4-11. SERVICING EQUIPMENT.

- a. Perform the PMCS contained in table 4-1.
- b. Lubricate all points as shown in the lubrication table, Chapter 3, figure 3-1.
- c. Schedule the next preventive maintenance checks and services on DD Form 314, Preventive Maintenance Schedule and Record.

4-12. GROUND HANDLING.

- a. Towing Forward. Sweeper must be properly attached to towing vehicle before use. Tow pole must be properly attached to towing pintle of towing vehicle. Safety chains must be properly attached to towing vehicle. The appropriate wiring hookup must be attached to the towing vehicle.
- b. Towing Backward. Sweeper must not be towed backwards.
- c. Jacking. Jacking of vehicle must be done with wheels blocked and hand brakes set. Select jack points only on the main frame. Jacks will not be used to support vehicle during maintenance procedures. Personnel must be careful to keep body parts out from under sweeper while it is in raised position. Jacks and jackstands must be capable of lifting and/or supporting 3000 lbs (1361 kg).
- d. Parking. While parked, sweeper must have hand brakes set and wheels blocked.
- e. Mooring. Sweeper can be moored by attaching tiedowns to lifting shackles.
- f. Hoisting. Sweeper can be hoisted by attaching lifting devices to lifting shackles on sweeper. Water tank must be drained.

4-13. OPERATIONAL CHECKS.

All operational checks included in the maintenance procedures will include the techniques and methods required to assure the satisfactory performance of the sweeper. Reference the operator's instructions for starting, run-up and shutdown procedures.

4-14. INSPECTION OF COMPONENTS.

- a. Examine bearings for rusted or pitted rollers, balls, races, or separator. Examine balls and races for abrasion and/or serious discoloration. The following are conditions for bearing rejection.

- (1) Cuts or grooves parallel to ball or roller rotation.

NOTE

Nicks and gouges outside race load areas are not cause for rejection unless deep enough to cause bearing binding or misalignment.

- (2) Fatigue pits (as opposed to minor machine marks or scratches).

- (3) Clean all parts before inspection. Check for defects such as physical distortion, wear, cracks, and pitting.

b. Check all hose surfaces for broken or frayed fabric, breaks caused by sharp kinks, or chafing against other parts of the unit. Inspect metal tubing lines for kinks. Inspect fitting threads for damage. Replace any defective part. Check for leaks after assembly and during initial operation period.

c. Visually inspect all castings and weldments for cracks.

d. Inspect all wiring for chafed or burned insulation. Inspect all terminal connectors for loose connections and broken parts.

e. Inspect gears and splines for cracks, pitting, and discoloration.

4-15. UNIT CLEANING PROCEDURES.

WARNING

Dry cleaning solvent P-D-680 is toxic and flammable. Wear protective goggles, face mask, and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapor. Do not use near open flame or excessive heat. The flashpoint for type I dry cleaning solvent is 100°F (38°C) and for type II is 140°F (60°C). If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, flush eyes with water and get medical aid immediately.

a. When cleaning ball or roller bearings, place in a basket and suspend in a container of dry cleaning solvent, P-D-680 (item 31, Appendix E). If necessary, use a brush (item 6, Appendix E) to remove caked grease or chips. Avoid rotating bearings before solid particles are removed to prevent damaging races and balls.

b. Do not clean O-rings or other rubber parts in dry cleaning solvent. Wipe with a clean, dry, lint-free cloth.

c. For exterior cleaning of frame and structural components, use detergent (item 17, Appendix E) in a solution as recommended on the container. Leave application on items surface for approximately 10 minutes before rinsing. Rinse with hot or cold water under pressure. If available, use hot water under 80 to 120 lb (36 to 54 kg) pressure. An ordinary garden hose may be used if no other equipment is available. If pressurized water supply is not available, wash painted surfaces with a solution of 1/4 cup soap chips (item 7, Appendix E) to one gallon of water.

4-15. UNIT CLEANING PROCEDURES (CONT).**WARNING**

Dry cleaning solvent P-D-680 is toxic and flammable. Wear protective goggles, face mask, and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapor. Do not use near open flame or excessive heat. The flashpoint for type I dry cleaning solvent is 100°F (38°C) and for type II is 140°F (60°C). If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, flush eyes with water and get medical aid immediately.

d. Electrical parts such as coils, connectors, switches, and insulated wiring, should not be soaked or sprayed with cleaning solutions. Clean these parts with a clean, dry cloth moistened with dry cleaning solvent P-D-680 (item 31, Appendix E).

CAUTION

Do not use gasoline, diesel fuel, or other petroleum base products to clean or preserve hydraulic components. Use of petroleum based products can change the lubricating quality of hydraulic oil and cause failure or damage to equipment.

e. When cleaning hydraulic system components, use petroleum-free solvents. Clean and dry parts thoroughly to make sure no residue remains. If preservative is required before reassembly, apply a light film of hydraulic fluid (item 19, Appendix E).

4-16. REMOVAL AND DISASSEMBLY OF COMPONENTS.

a. Before removal of any electrical component, disconnect battery ground cables.

b. Ensure that adequate clearance is available for removal of the component. Disassemble the sweeper to the extent necessary to provide adequate working clearance.

WARNING

All personnel must stand clear during lifting operations. A swinging or shifting load may cause injury or death to personnel.

c. Use a chain hoist, jack or other aid when lifting heavier components. Lifting device should be positioned and attached to components to remove all strain from mounting hardware, before last hardware is removed.

d. Discard O-rings, gaskets, seals and similar material when removed. Be sure that all traces of oil, gaskets and sealants are removed. When possible, use wood or plastic probes and scrapers to prevent damage to machined surfaces.

e. Cotter pins, lockwashers, lockwire, self-locking nuts and similar devices should be discarded when removed. Self locking fasteners that loosen up must be replaced, not tightened.

f. To prevent moisture and foreign matter from entering open housings, lines, and other openings, use protective coverings as soon as possible after disassembly. Wrap all parts in clean paper or dip parts in preservative oil (item 27, Appendix E) or equivalent.

g. Remove parts only if repair or replacement is required. Do not disassemble a component any further than necessary to accomplish needed repairs.

4-17. PAINTING.

Instructions for preparation of material to paint, how to paint and material to be used are in TM 43-0139. Instruction for camouflage painting are contained in FM 5-20. Stenciling and marking military vehicles are listed in TB 43-0209. Data plate location and description is listed in Chapter 2.

4-18. LUBRICATION.

Refer to Chapter 3 for lubrication procedures and requirements for the sweeper. The instructions include types and grades of lubricant used, lube points, locations, and frequency of the required lubrication.

4-19. ASSEMBLY.

a. Remove protective grease coatings from new parts before installation.

b. To replace O-rings, first clean groove, then stretch ring into position. A light coating of fluid, which the ring will operate in, will make assembly easier.

c. Coat oil seals evenly with oil (item 25, Appendix E) or grease (item 22, Appendix E) before installing. Install oil seals with seal lip facing in, applying an even force to the outer edge of seal. If oil seals are to be installed over keyed or splined shafts, use a guide to prevent sharp edges of the keyway or spline from cutting the seal. Guides can be very thin gauge sheet metal shaped to the required diameter. Make certain guide edges are not sharp and are bent slightly inward so they do not cut the seal.

d. Lubricate bearings before reassembly with the type of lubricant normally used in the related housing or container. This will provide lubrication during the run-in until lubricant from the system can reach the bearings.

4-20. INSTALLATION.

Put hoses, tubes, lines and electrical wiring in place by matching identification tags, markings on equipment, and using illustrations presented. Replace cable ties (item 36, Appendix E) as necessary. Use sealing compounds as required in each maintenance task. When installing screws and nuts, be sure to tighten to torque values given. Refer to tables 4-4 and 4-5 for standard and metric torque values. All torques listed are dry torques.

4-21. ADJUSTMENT.

Make changes to equipment pressures, settings and positions only as required in each maintenance task. Adjustments will bring the equipment into proper operating conditions.

Table 4-4. U.S. Standard Torque Values.

Thread Size	Minimum Breakaway Torque Valve Grade 8.8		Minimum Breakaway Torque Valve Grade R10		Minimum Breakaway Torque Valve Grade 12	
	U.S.	Metric	U.S.	Metric	U.S.	Metric
1/4-20	5 lb-ft	7 N•m	8 lb-ft	11 N•m	12 lb-ft	16 N•m
1/4-28	6 lb-ft	8 N•m	10 lb-ft	14 N•m	14 lb-ft	19 N•m
5/16-18	11 lb-ft	15 N•m	17 lb-ft	23 N•m	24 lb-ft	33 N•m
5/16-24	13 lb-ft	18 N•m	19 lb-ft	26 N•m	27 lb-ft	37 N•m
3/8-16	20 lb-ft	27 N•m	30 lb-ft	41 N•m	45 lb-ft	61 N•m
3/8-24	22 lb-ft	30 N•m	35 lb-ft	48 N•m	50 lb-ft	68 N•m
7/16-14	30 lb-ft	41 N•m	50 lb-ft	68 N•m	70 lb-ft	95 N•m
7/16-20	35 lb-ft	48 N•m	55 lb-ft	75 N•m	80 lb-ft	109 N•m
1/2-13	50 lb-ft	68 N•m	75 lb-ft	102 N•m	105 lb-ft	142 N•m
1/2-20	55 lb-ft	75 N•m	85 lb-ft	115 N•m	120 lb-ft	163 N•m
9/16-12	70 lb-ft	95 N•m	110 lb-ft	149 N•m	155 lb-ft	210 N•m
9/16-18	80 lb-ft	109 N•m	120 lb-ft	163 N•m	170 lb-ft	230 N•m
5/8-11	100 lb-ft	136 N•m	150 lb-ft	203 N•m	210 lb-ft	285 N•m
5/8-11	110 lb-ft	149 N•m	170 lb-ft	230 N•m	240 lb-ft	325 N•m
3/4-10	170 lb-ft	231 N•m	270 lb-ft	366 N•m	375 lb-ft	508 N•m
3/4-16	190 lb-ft	258 N•m	300 lb-ft	407 N•m	420 lb-ft	569 N•m
7/8-9	165 lb-ft	224 N•m	430 lb-ft	583 N•m	610 lb-ft	827 N•m
7/8-14	180 lb-ft	244 N•m	475 lb-ft	642 N•m	670 lb-ft	908 N•m
1-8	250 lb-ft	339 N•m	645 lb-ft	875 N•m	910	1234 N•m
1-12	270 lb-ft	366 N•m	705 lb-ft	956 N•m	1000	1356 N•m
1-14	280 lb-ft	380 N•m	720 lb-ft	1376 N•m	1015	1376 N•m

Table 4-5. Metric Torque Values

Thread Size	Minimum Breakaway Torque Valve Grade 8.8		Minimum Breakaway Torque Valve Grade R10		Minimum Breakaway Torque Valve Grade 12	
	U.S.	Metric	U.S.	Metric	U.S.	Metric
4 mm	3 lb-ft	4 N•m	4 lb-ft	5 N•m	5 lb-ft	7 N•m
5 mm	5 lb-ft	7 N•m	7 lb-ft	9 N•m	9 lb-ft	14 N•m
6 mm	9 lb-ft	14 N•m	13 lb-ft	18 N•m	15 lb-ft	20 N•m
7 mm	15 lb-ft	20 N•m	21 lb-ft	28 N•m	25 lb-ft	34 N•m
8 mm	22 lb-ft	30 N•m	31 lb-ft	42 N•m	37 lb-ft	50 N•m
9 mm	28 lb-ft	38 N•m	40 lb-ft	54 N•m	47 lb-ft	64 N•m
10 mm	39 lb-ft	53 N•m	55 lb-ft	75 N•m	66 lb-ft	89 N•m
12 mm	66 lb-ft	89 N•m	93 lb-ft	126 N•m	111 lb-ft	150 N•m
14 mm	100 lb-ft	136 N•m	140 lb-ft	190 N•m	169 lb-ft	229 N•m
16 mm	152 lb-ft	206 N•m	214 lb-ft	290 N•m	256 lb-ft	347 N•m
18 mm	190 lb-ft	258 N•m	268 lb-ft	363 N•m	321 lb-ft	435 N•m
20 mm	265 lb-ft	359 N•m	372 lb-ft	504 N•m	447 lb-ft	606 N•m
22 mm	321 lb-ft	435 N•m	451 lb-ft	611 N•m	542 lb-ft	735 N•m
24 mm	412 lb-ft	559 N•m	578 lb-ft	784 N•m	695 lb-ft	942 N•m

4-22. ENGINE OIL AND FILTER CHANGE

This task covers:

- a. Drain
- b. Fill

INITIAL SETUP

Tools

Tool Kit, General Mechanic's: Automotive

Shop Equipment, Automotive Maintenance and Repair; Organizational Maintenance, Common No. 1, Less Power

Materials/Parts

Oil filter
Oil, engine, item 25, Appendix E

Equipment Condition

TM or Para
Para 3-5

Para 4-98

Condition Description

Open left and right access covers.

Top access panel removed.

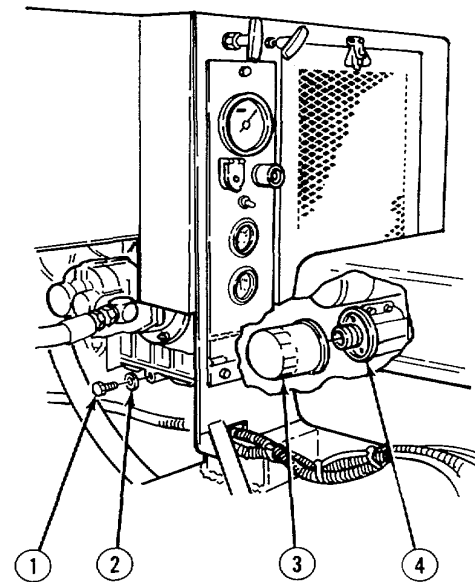
- a. Drain.

WARNING

Use caution when draining hot engine oil or severe injury to personnel may result.

NOTE

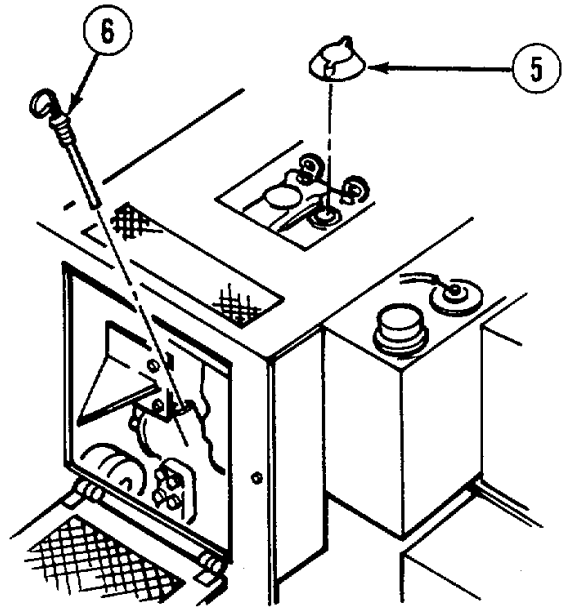
- Place a suitable container (2.9 qt, 2.75 l) under engine to catch oil as it drains.
- Drain engine oil while hot to ensure removing all contaminants.



- (1) Remove drain plug (1) and washer (2) using a ratchet, extension and 3/4 in. socket.
- (2) Allow oil to drain into suitable container. Dispose of oil in accordance with local policy.
- (3) Remove oil filter (3) from housing (4) using a filter wrench. Discard filter in accordance with local policy.
- (4) If necessary, remove any gasket material from housing (4).

b. Fill.

- (1) Install washer (2) and drain plug (1). Tighten to 66 lb-ft (89 N•m) using a torque wrench, extension and 3/4 in. socket.
- (2) Lubricate gasket on oil filter (3) using fresh engine oil.
- (3) Install oil filter (3) on housing (4) hand tight, then tighten 1/3 turn using oil filter wrench.
- (4) Remove filler cap (5).
- (5) Refer to lubrication chart (Chapter 3) and fill engine with the proper amount and grade of oil.
- (6) Replace filler cap (5).
- (7) Start engine to circulate oil (para 2-8). Stop engine (para 2-8).
- (8) Remove engine oil dipstick (6) and check engine oil level.
- (9) Replace dipstick (6).

**NOTE****Follow-on Maintenance:**

- Close left and right access covers (para 3-5)
- Install top access panel (para 4-98)

END OF TASK

4-23. ENGINE SPEED ADJUSTMENT

This task covers:

- a. Cable Initial Adjustment
- b. Idle Speed Adjustment
- c. Throttle Adjustment
- d. Injection Pump Delivery

INITIAL SETUP

Tools

Tool Kit, General Mechanic's: Automotive

Equipment Condition

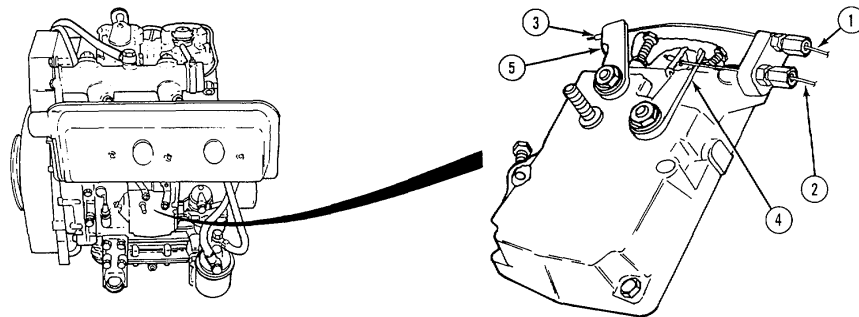
TM or Para
Para 3-5

Condition Description

Open right access cover.

Materials/Parts

Lockwire



a. Cable Initial Adjustment.

- (1) Push throttle cable (1) and engine stop cable (2) in and adjust cable stops (3). Cables should be tight against stop lever (4) and throttle lever (5). All slack must be removed from cables.

WARNING

Hearing protection must be worn when performing adjustments in close proximity to the sweeper. Long term exposure may cause hearing damage.

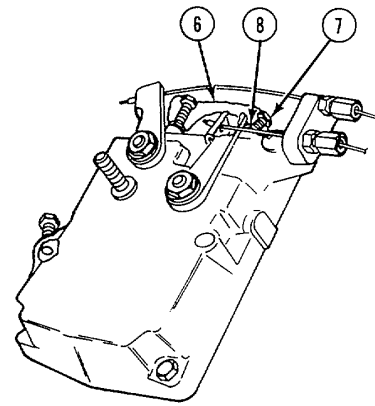
CAUTION

If engine speed immediately exceeds 2850 RPM shut down engine. Damage to equipment may result.

- (2) Start engine (para 2-8) and let run for five minutes.

b. Idle Speed Adjustment.

- (1) With engine running, push both cables (1 and 2) all the way in.
- (2) Remove lockwire (6) from idle speed adjustment screw (7) and nut (8). Loosen nut (8) using 10 mm open end wrench.
- (3) Turn adjusting screw (7) using 10 mm open end wrench clockwise to increase engine RPM and counterclockwise to decrease engine RPM. Engine idle should be set to between 1100-1150 RPM.
- (4) Shut off engine and tighten nut (8) and replace lockwire (6).



c. Throttle Adjustment.

WARNING

Hearing protection must be worn when performing adjustments in close proximity to the sweeper. Long term exposure may cause hearing damage.

CAUTION

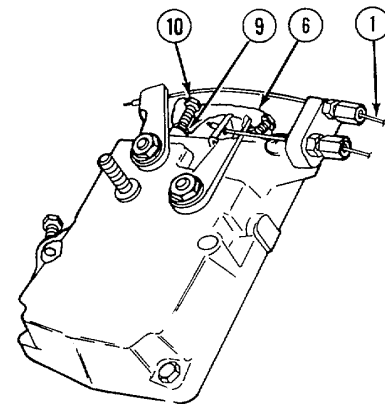
If engine speed immediately exceeds 2850 RPM shut down engine. Damage to equipment may result.

- (1) With engine running, slowly pull throttle cable (1) all the way out. Engine speed should be 2850 RPM. If higher, shut down engine immediately. If engine does not reach 2850 RPM, note the reading and shutdown engine.
- (2) Remove lockwire (6) and loosen nut (9) slightly.

NOTE

Engine must be shut off for this procedure.

- (3) Turn screw (9), using 10 mm open end wrench, 1/4 to 1/2 turn clockwise to reduce RPM and counterclockwise to increase RPM.
- (4) Start engine (para 2-8) and check RPM. If not correct, shut off engine; repeat step (3) until RPM of 2850 is reached.
- (5) Shut down engine (para 2-8). Tighten nut (10) using a 10 mm open end wrench and replace lockwire (6).



4-23. ENGINE SPEED ADJUSTMENT (CONT).**CAUTION**

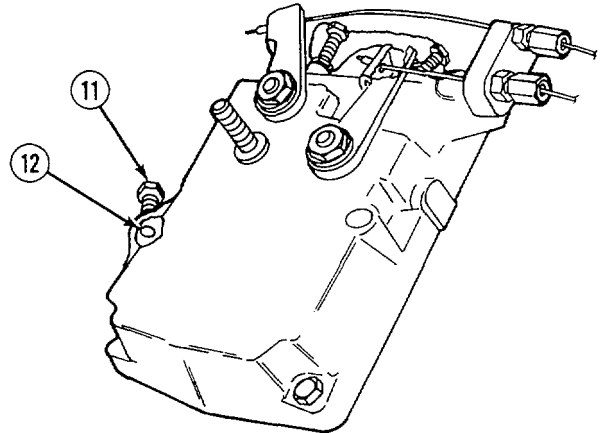
Injection pump delivery screw is preset at the factory and must never be adjusted.

d. Injection Pump Delivery. Injection pump delivery screw (11) must never be adjusted. It is set at the factory and is locked with a seal (12) that must not be removed.

NOTE

Follow-on Maintenance: Close right access cover (para 3-5)

END OF TASK



4-24. ENGINE REMOVAL.

This task covers:

- a. Removal
- b. Installation

INITIAL SETUP

Tools

Tool Kit, General Mechanic's: Automotive

Shop Equipment, Automotive Maintenance and Repair; Organizational Maintenance, Common No. 1, Less Power

Lifting device and chains

Materials/Parts

Locknuts

Equipment Condition

TM or Para

Para 4-22

Para 4-98

Para 4-101

Para 4-57

Para 4-47

Para 4-37

Para 4-42

Para 4-81

thru 4-82

Para 4-49

Condition Description

Engine oil drained.

Engine enclosure removed.

Hydraulic pump removed.

Alternator removed.

Throttle and engine cut-off cables disconnected.

Air cleaner removed.

Fuel line disconnected.

Engine wiring tagged and removed.

Fuel filter housing removed.

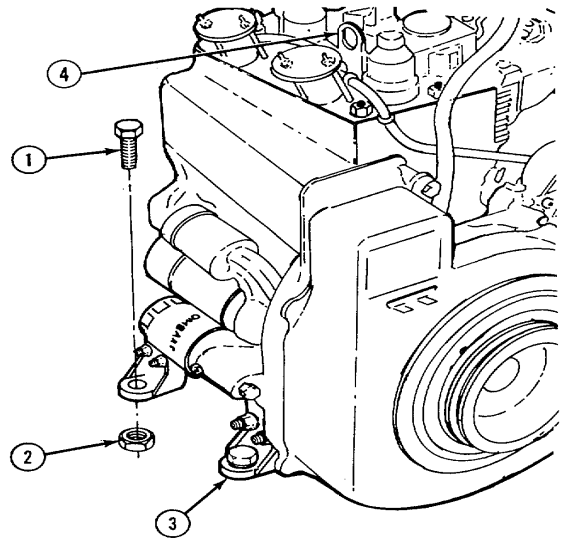
a. Removal

- (1) Remove four screws (1) and four locknuts (2) from engine mounts (3) using a ratchet, 15/16 in. socket and 15/16 in. open end wrench.

WARNING

Engine weighs 203 lbs (92 kg). All personnel must stand clear during lifting operations. A swinging or shifting load may cause serious injury or death to personnel.

- (2) Attach a suitable lifting device to angle brackets (4) and remove engine.



b. Installation.

- (1) Attach a suitable lifting device to engine angle brackets (4) and lower engine into place
- (2) Install four screws (1) and four locknuts (2) and tighten to 152 lb-ft (206 N•m) using a torque wrench, 15/16 in. socket and 15/16 in. open end wrench.

4-24. ENGINE REMOVAL (CONT).

NOTE

Follow-on Maintenance:

- Install fuel filter housing (para 4-49)
- Install engine wiring (para 4-81 thru 4-82)
- Connect fuel line (para 4-42)

- Install air cleaner (para 4-37)
- Connect throttle and engine cut-off cables (para 4-47)
- Install alternator (para 4-57)
- Install hydraulic pump (para 4-101)
- Install engine enclosure (para 4-98)
- Replace engine oil (para 4-22)

END OF TASK

4-25. MOTOR MOUNTING BRACKET REPLACEMENT.

This task covers:

- a. Removal b. Installation

INITIAL SETUP*Tools*

Tool Kit, General Mechanic's: Automotive

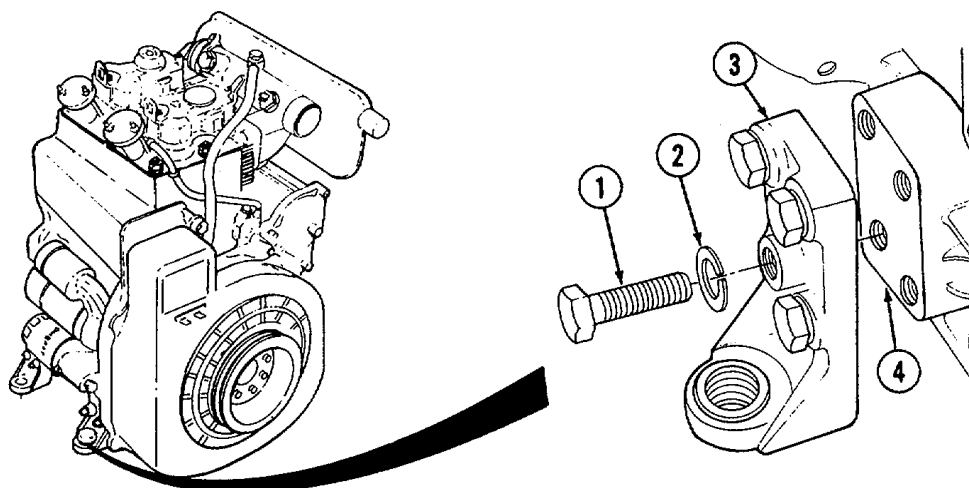
Materials/Parts

Lockwashers

Equipment Condition

TM or Para
Para 4-24

Condition Description
Engine removed.

**NOTE**

- Ground lead may be attached to mount. Tag and install lead when installing mount.
- This procedure is the same for all motor mount brackets.

- a. Removal.** Remove four screws (1), four lockwashers (2) and mounting bracket (3) from crankcase (4) using ratchet and 17 mm socket.
- b. Installation.** Install mounting bracket (3) on crankcase (4) using four screws (1) and four lockwashers (2). Tighten using ratchet and 17 mm socket.

NOTE

Follow-on Maintenance: Install engine (para 4-24)

END OF TASK

4-26. ENGINE SHOCK AND MOUNT REPLACEMENT.

This task covers:

- a. Removal
- b. Installation

INITIAL SETUP

Tools

Tool Kit, General Mechanic's: Automotive

Equipment Condition

TM or Para
Para 4-24

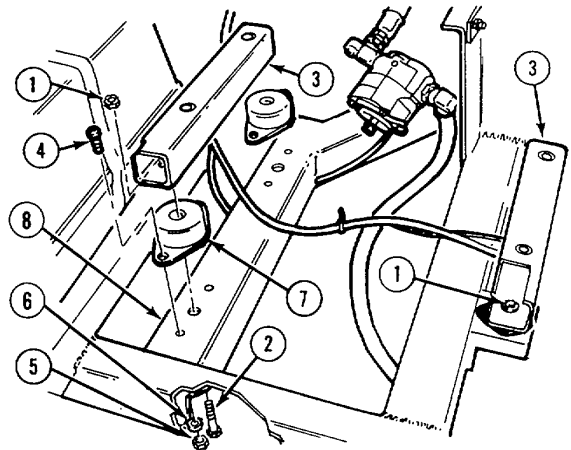
Condition Description
Engine removed.

Materials/Parts

Lockwashers
Locknuts

a. Removal.

- (1) Remove four locknuts (1), four screws (2) and two engine mounts (3) using a 9/16 in. open end wrench, ratchet and 9/16 in. socket.
- (2) Remove eight screws (4), eight nuts (5), eight lockwashers (6) and four shocks (7) from main frame (8) using a screwdriver and 3/8 in. open end wrench.



b. Installation.

- (1) Install four shocks (7), using eight screws (4), eight lockwashers (6) and eight nuts (5). Tighten using a screwdriver and 3/8 in. open end wrench.
- (2) Install engine mounts (3) on mainframe (7) using four screws (2) and four locknuts (1). Tighten using a 9/16 in. open end wrench, ratchet and 9/16 in. socket.

NOTE

Follow-on maintenance: Install engine (para 4-24)

END OF TASK

4-27. ANGLE BRACKET REPLACEMENT

This task covers:

- a. Removal b. Installation

INITIAL SETUP*Tools*

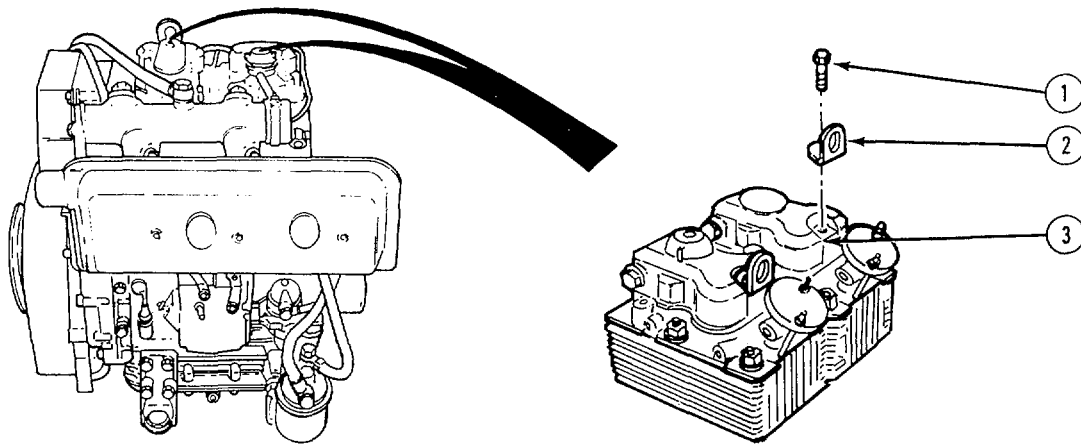
Shop Equipment, Automotive Maintenance and Repair; Organizational Maintenance, Common No. 1, Less Power

Equipment Condition

TM or Para
Para 4-98

Condition Description

Top access panel
removed.



- a. Removal** Remove two screws (1) and two angle brackets (2) from rocker box caps (3) using a 6 mm hex head wrench.
- b. Installation.** Position two angle brackets (2) on rocker box caps (3) and install using two screws (1). Tighten to 108 lb-in (14 N•m) using a torque wrench and 6 mm hex head socket.

NOTE

Follow-on maintenance: Install top access panel (para 4-98)

END OF TASK

4-28. ROCKER ARM COVER REPLACEMENT.

This task covers:

- a. Removal
- b. Installation

INITIAL SETUP

Tools

Shop Equipment, Automotive Maintenance and Repair; Organizational Maintenance, Common No. 1, Less Power

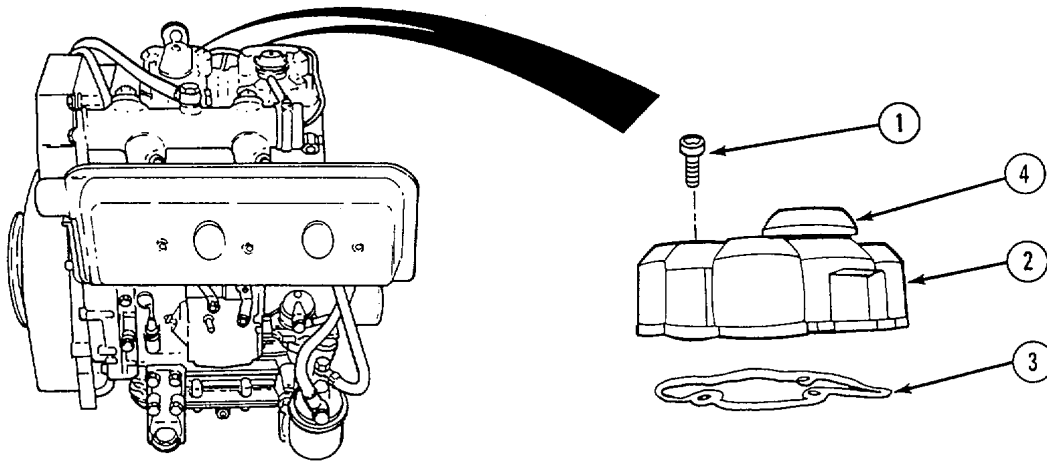
Equipment Condition

TM or Para
Para 4-27

Condition Description
Angle brackets removed.

Materials/Parts

Gaskets



NOTE

- There is only one filler cap.
- This procedure is the same for both rocker arm covers.

- a. **Removal.** Remove two screws (1), two rocker covers (2), two gaskets (3) and filler cap (4) using a 6 mm hex head wrench.
- b. **Installation.** Install two gaskets (3), filler cap (4), two rocker covers (2) and two screws (1) and tighten to 108 lb-in (14 N•m) using a torque wrench and 6 mm hex head socket.

NOTE

Follow-on maintenance: Install angle brackets (para 4-27)

END OF TASK

4-29. OIL FILTER HOUSING REPLACEMENT.

This task covers:

- a. Removal b. Installation

INITIAL SETUP*Tools*

Tool Kit, General Mechanic's: Automotive

Shop Equipment, Automotive Maintenance and Repair; Organizational Maintenance, Common No. 1, Less Power Para 4-98

Materials/Parts

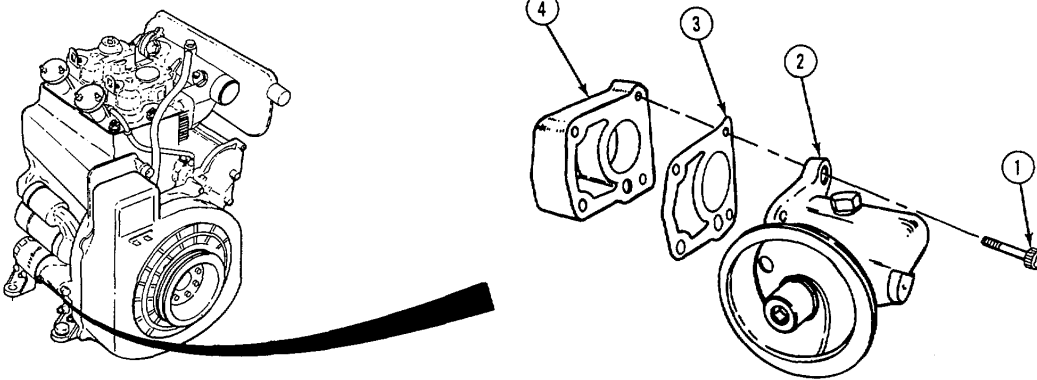
Gasket

Equipment Condition

TM or Para
Para 4-22
Para 4-75

Condition Description

Oil filter removed.
Left side battery box removed.
Engine enclosure removed.



- a. **Removal** Remove four screws (1), housing (2), and gasket (3) from crankcase (4) using a 5 mm hex head wrench.
- b. **Installation.** Install gasket (3) and housing (2) on crankcase (4) using four screws (1). Tighten to 60 lb-in (7 N•m) using a torque wrench and 5 mm hex head socket.

NOTE**Follow-on maintenance:**

- Install engine enclosure (para 4-98)
- Install left side battery box (para 4-75)
- Install oil filter (para 4-22)

END OF TASK

4-30. OIL PAN ASSEMBLY REPLACEMENT.

This task covers:

- a. Removal c. Installation

INITIAL SETUP

Tools

Shop Equipment, Automotive Maintenance and Repair; Organizational Maintenance, Common No. 1, Less Power

Equipment Condition

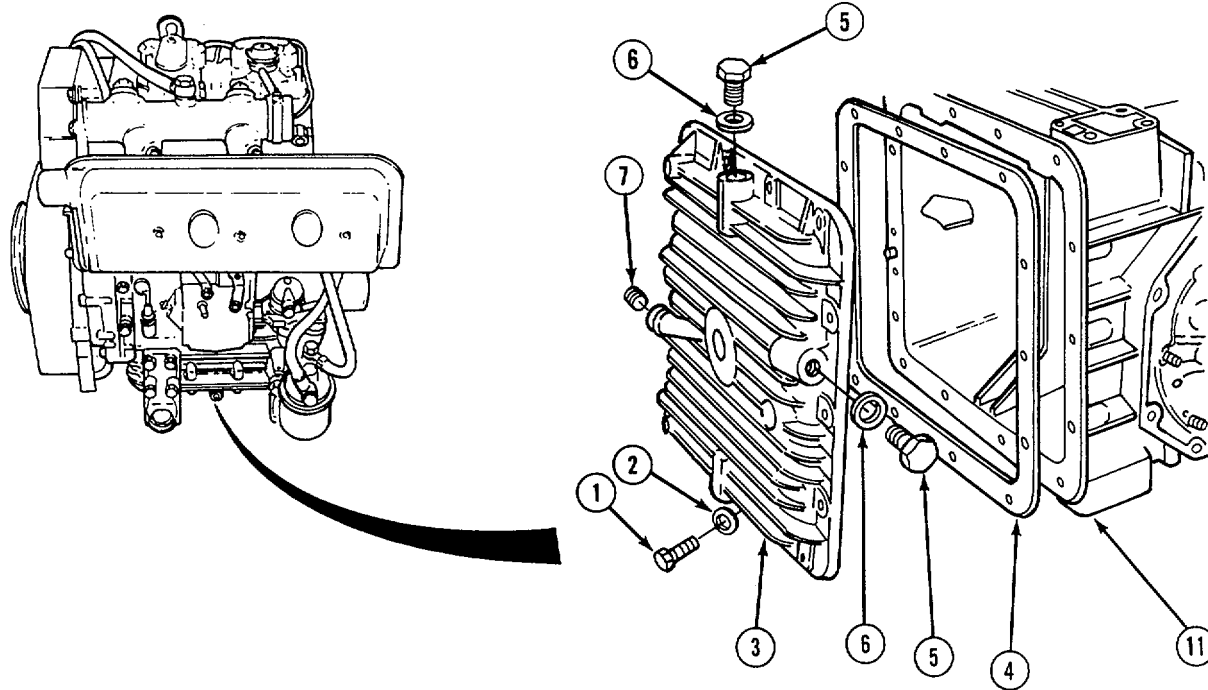
TM or Para
Para 4-24

Condition Description
Engine removed and laying on right side.

Materials/Parts

Gasket
Copper Washers

a. Removal



- (1) Remove 14 screws (1) and 14 washers (2) using a ratchet and 13 mm socket.
- (2) Remove oil pan (3) and gasket (4).
- (3) Remove two oil drain plugs (5) and two copper washers (6) using a ratchet and 19 mm socket.
- (4) Remove setscrew (7) using a 5 mm hex head wrench.

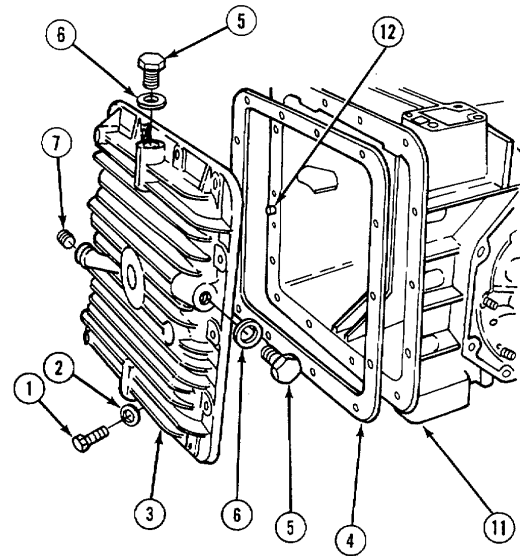
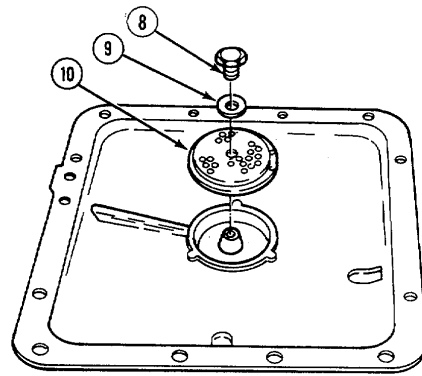
(5) Remove screw (8), washer (9), and filter panel (10) using a 10 mm open end wrench.

b. Cleaning/Inspection. Clean out reservoir under filter panel (10), and filter panel with a clean cloth.

c. Installation.

(1) Install filter panel (10), washer (9), and screw (8) using a 10 mm open end wrench.

- (2) Position gasket (4) on oil pan (3).
- (3) Carefully position oil pan (3) on crankcase (11) using locking needle (12) as a guide.
- (4) Install oil pan (3), 14 screws (1), and 14 washers (2). Tighten to 22 lb-ft (30 N•m) using a torque wrench and 13 mm socket.
- (5) Install setscrew (7) using a 5 mm hex head wrench.
- (6) Install two oil drain plugs (5) and two copper washers (6). Tighten plugs to 22 lb-ft (30 N•m) using a torque wrench and 3/4 in. socket.



NOTE
Follow-on maintenance: Install

engine (para 4-24)

END OF TASK

4-31. PRESSURE VALVE REPLACEMENT.

This task covers:

- a. Removal b. Installation

INITIAL SETUP*Tools*

Tool Kit, General Mechanic's: Automotive

Shop Equipment, Automotive Maintenance and Repair; Organizational Maintenance, Common No. 1, Less Power removed.

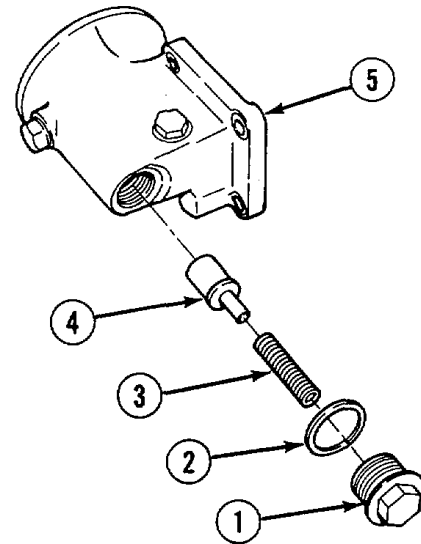
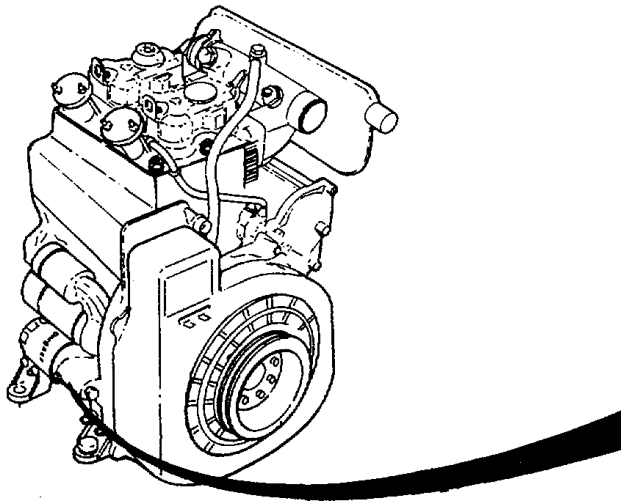
Materials/Parts

Copper gasket

Equipment Condition

TM or Para
Para 4-29

Condition Description
Oil filter housing



- a. Removal.** Remove cap (1), copper gasket (2), spring (3), and pressure valve (4) from oil filter housing (5) using a 14 mm open end wrench.
- b. Installation.** Install pressure valve (4), spring (3), copper gasket (2), and cap (1) in oil filter housing (5) using a 14 mm open end wrench.

NOTE

Follow-on maintenance: Install oil filter housing (para 4-29)

END OF TASK

4-32. INTAKE MANIFOLD REPLACEMENT.

This task covers:

- a. Removal b. Installation

INITIAL SETUP

Tools

Shop Equipment, Automotive Maintenance and Repair; Organizational Maintenance, Common No. 1, Less Power Para 4-38

Materials/Parts

Gasket
Lockwashers

Equipment Condition

TM or Para
Para 4-50
Para 4-51

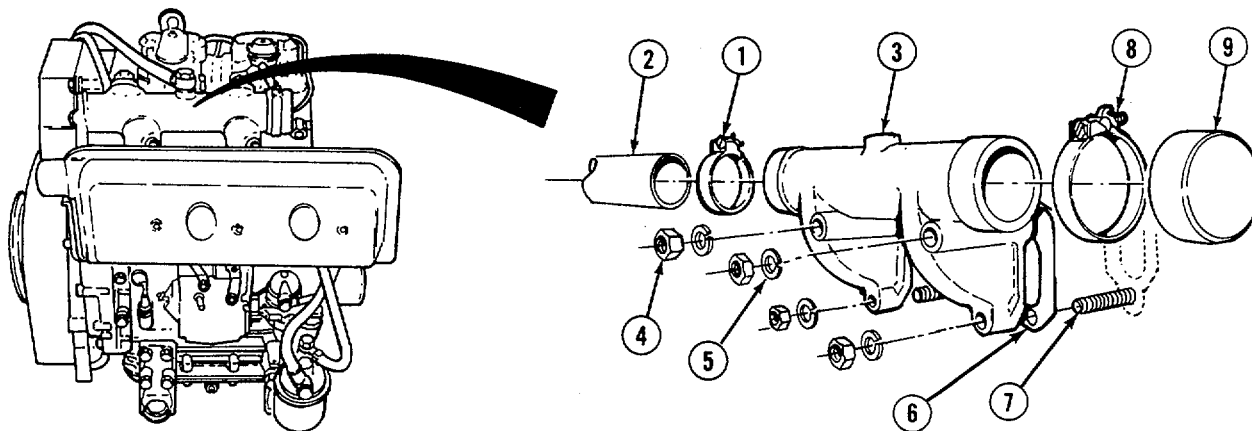
Condition Description

Glow plugs removed.
Muffler removed.
Vapor separator fitting removed

General Safety Instructions

Muffler and manifold cooled completely.

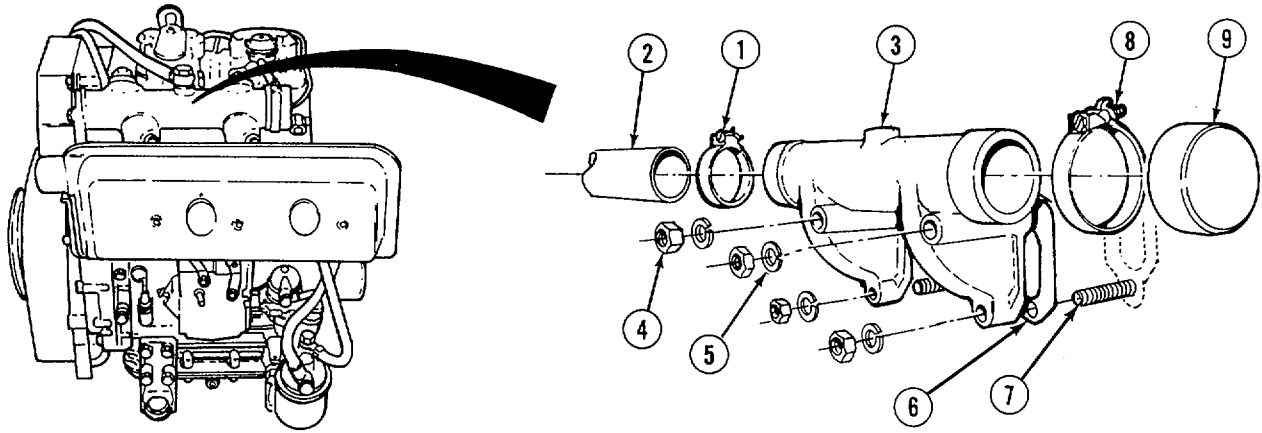
a. Removal



WARNING

Make sure that manifold has cooled before starting work or injury to personnel may result.

- (1) Loosen clamp (1) using a flat tip screwdriver. Disconnect hose (2) from manifold (3).
- (2) Remove four nuts (4), four lockwashers (5), manifold (3), and two gaskets (6) from studs (7) using a ratchet, extension and 13 mm socket.
- (3) Loosen clamp (8) and remove rubber cap (9) using a flat tip screwdriver.

4-32. INTAKE MANIFOLD REPLACEMENT (CONT).**b. Installation.**

- (1) Position gaskets (6) and manifold (3) on studs (7), and install four lockwashers (5) and four nuts (4). Tighten nuts to 22 lb-ft (30 N•m) using a torque wrench, extension and 13 mm socket.
- (2) Position clamp (1) loosely on hose (2) and install hose on manifold (3). Tighten clamp using a flat tip screwdriver.
- (3) Position clamp (8) loosely on rubber cap (9) and install cap on manifold (3). Tighten clamp using a flat tip screwdriver.

NOTE**Follow-on maintenance:**

- Install glow plugs (para 4-50)
- Install muffler (para 4-51)
- Install vapor separator fitting (para 4-38)

END OF TASK

4-33. ALTERNATOR DRIVE PULLEY REPLACEMENT (ENGINE).

This task covers:

- a. Removal b. Installation

INITIAL SETUP

Tools

Tool Kit, General Mechanic's: Automotive

Materials/Parts

Lockwashers

Equipment Condition

TM or Para

Para 4-121

Para 4-98

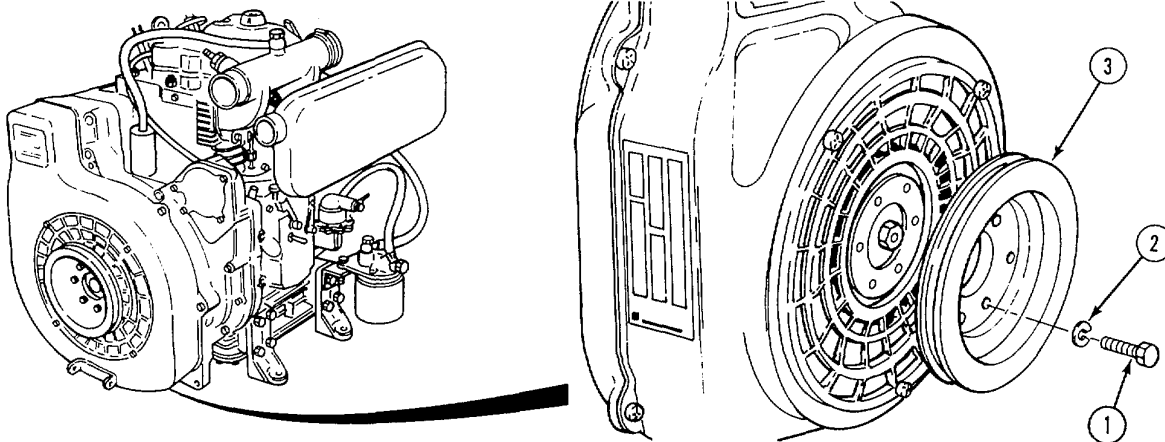
Para 4-56

Condition Description

Water tank removed.

Rear panel removed.

Alternator belt removed.



NOTE

It may be necessary to hold flywheel screw with a ratchet and 24 mm socket to prevent it from turning.

- a. **Removal** Remove six screws (1), six lockwashers (2), and alternator drive pulley (3) using a ratchet, extension and 13 mm socket.
- b. **Installation.** Install alternator drive pulley (3), six screws (1), and six lockwashers (2). Tighten using a ratchet, extension and 13 mm socket.

NOTE

Follow-on maintenance:

- Install alternator belt (para 4-56)
- Install rear panel (para 4-98)
- Install water tank (para 4-121)

END OF TASK

4-34. HYDRAULIC PUMP DRIVE ASSEMBLY REPLACEMENT.

This task covers:

a. Removal

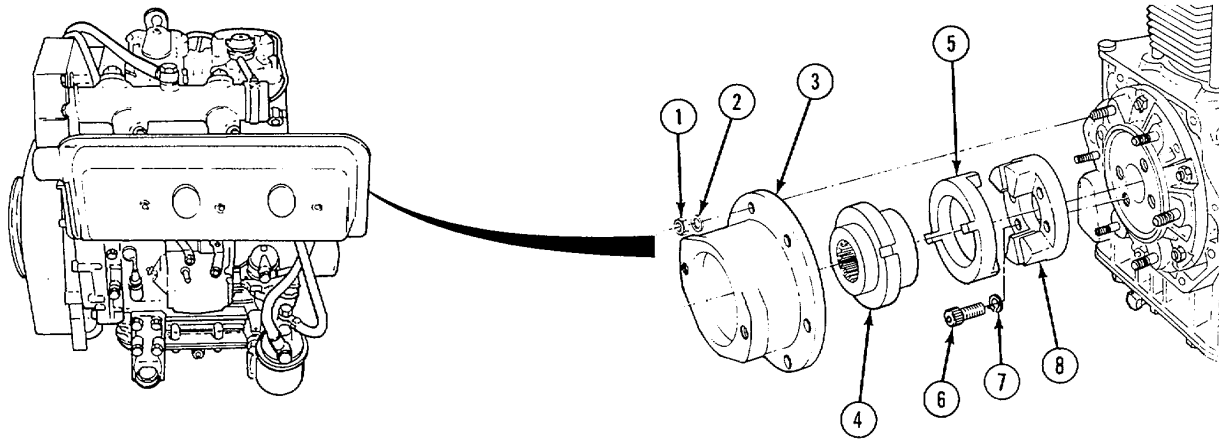
b. Installation

INITIAL SETUP*Tools*

Tool Kit, General Mechanic's: Automotive

*Equipment Condition*TM or Para
Para 4-101*Condition Description*
Hydraulic pump
removed.*Materials/Parts*

Lockwashers

**a. Removal**

- (1) Remove six nuts (1), six lockwashers (2), and hydraulic pump support (3) using a 13 mm open end wrench.
- (2) Remove nine tooth coupling (4) and coupling (5).
- (3) Remove four screws (6), four lockwashers (7), and half coupling (8) using a 6 mm hex head wrench.

b. Installation.

- (1) Install half coupling (8), four lockwashers (7), and four screws (6) using a 6 mm hex head wrench.
- (2) Install coupling (5) and nine tooth coupling (4).
- (3) Install hydraulic pump support (3), six lockwashers (2), and six nuts (1) using a 13 mm open end wrench.

NOTE**Follow-on maintenance: Install hydraulic pump (para 4-101)****END OF TASK**

4-35. FUEL PUMP REPLACEMENT.

This task covers:

- a. Removal
- b. Installation

INITIAL SETUP

Tools

Shop Equipment, Automotive Maintenance and Repair; Organizational Maintenance, Common No. 1, Less Power

Equipment Condition

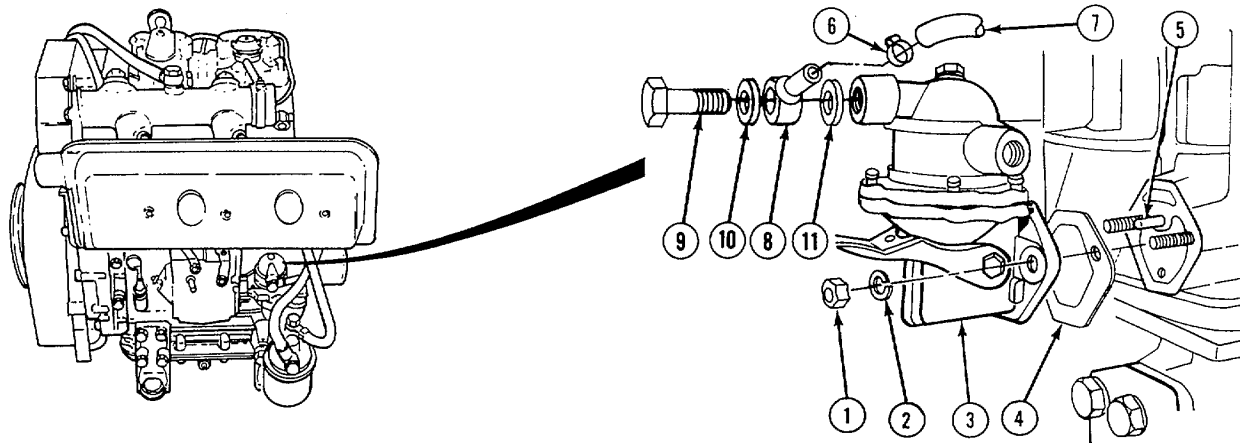
TM or Para
Para 4-43

Condition Description

Disconnect fuel line
(pump to filter)

Materials/Parts

Gasket
Lockwashers
Copper washers



a. Removal

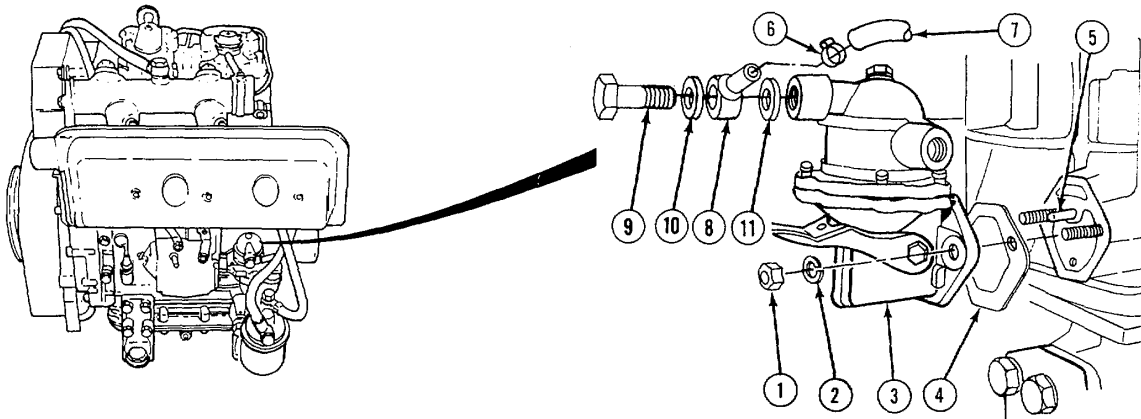
WARNING

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine. When working with fuel, post signs that read NO SMOKING WITHIN 50 FEET (15.24 m) of vehicle.

NOTE

Remove left nut first to aid in removal.

- (1) Remove two nuts (1), two lockwashers (2), and fuel pump (3) using a ratchet, extension and 12 mm socket.

4-35. FUEL PUMP REPLACEMENT (CONT).

- (2) Remove gasket (4) from fuel pump (3) and remove pin (5). Make sure all pieces of gasket are removed.
- (3) Loosen clamp (6) and remove hose (7) from barbed fitting (8) using a flat tip screwdriver.
- (4) Remove connecting bolt (9), copper washer (10), barbed fitting (8), and copper washer (11) from fuel pump (3) using a 19 mm open end wrench.

b. Installation.**NOTE**

For ease of installation, install left nut first.

- (1) Install pin (5), gasket (4), fuel pump (3), two lockwashers (2), and two nuts (1). Tighten nuts to 22 lb-ft (30 N•m) using a torque wrench, extension and 12 mm socket.
- (2) Install copper washer (11), barbed fitting (8), copper washer (10), and connecting bolt (9) on fuel pump (3) using a 19 mm open end wrench.
- (3) Position clamp (6) loosely on hose (7).
- (4) Install hose (7) on barbed fitting (8). Tighten clamp (6) using a flat tip screwdriver.

NOTE

Follow-on maintenance: Connect fuel line (pump to filter) (para 4-43)

END OF TASK

4-36. FUEL SYSTEM BLEEDING.

This task covers:

System Bleeding

INITIAL SETUP:

Tools

Tool Kit, General Mechanic's: Automotive

Equipment Condition

TM or Para

Para 2-8

Para 3-5

Condition Description

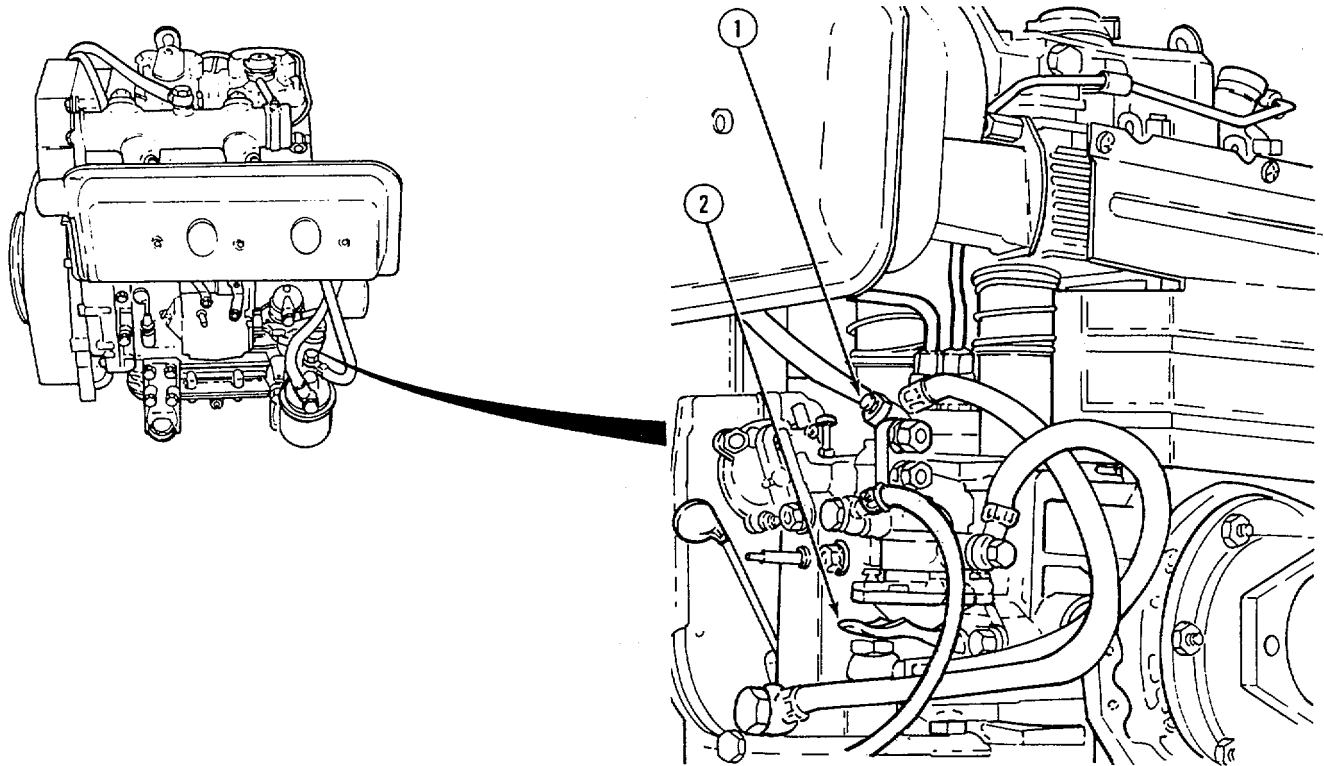
Engine shut off.

Right side access cover opened.

Text begins on next page.



4-36. FUEL SYSTEM BLEEDING (CONT).

**WARNING**

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine. When working with fuel, post signs that read **NO SMOKING WITHIN 50 FEET (15.24 m)** of vehicle.

NOTE

After changing fuel filter or performing maintenance on fuel system, fuel system should be bled to remove air.

System Bleeding

- (1) Loosen deaeration plug (1) using a flat tip screwdriver.
- (2) Prime fuel system using lever (2) until fuel flows out of deaeration plug (1) hole.
- (3) Tighten deaeration plug (1) using a flat tip screwdriver. Wipe off any spilled fuel.

NOTE

Follow-on maintenance: Close right side access cover (para 3-5) and check for any fuel leaks

END OF TASK

4-37. AIR CLEANER ASSEMBLY REPLACEMENT.

This task covers:

- a. Removal
- b. Installation

INITIAL SETUP:

Tools

Tool Kit, General Mechanic's: Automotive

Equipment Condition

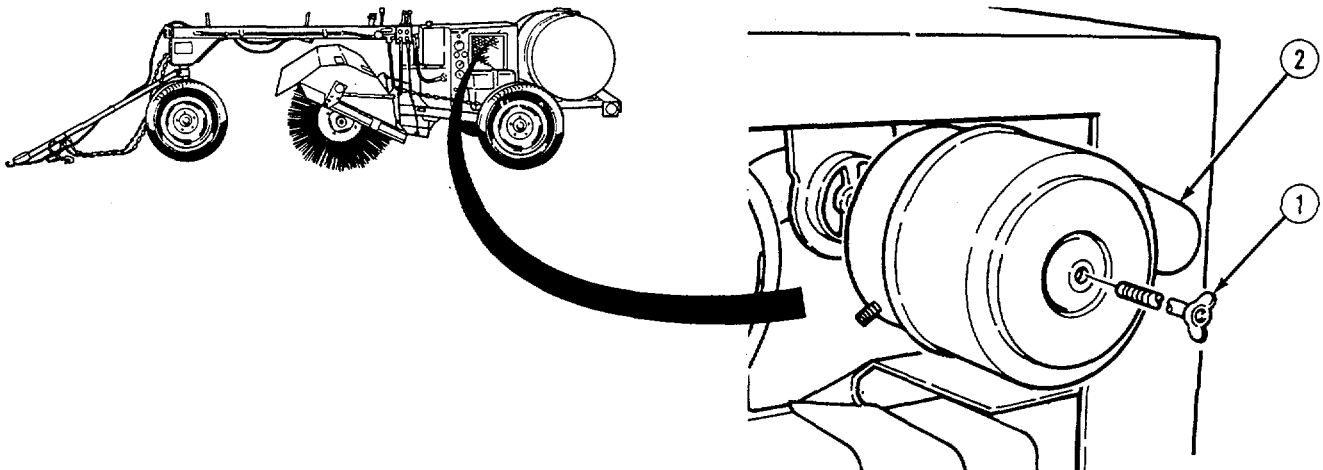
TM or Para
Para 3-5

Condition Description

Left and right side access covers opened.

Materials/Parts

Locknuts
Gasket
Hose (See Appendix G for fabrication)



WARNING

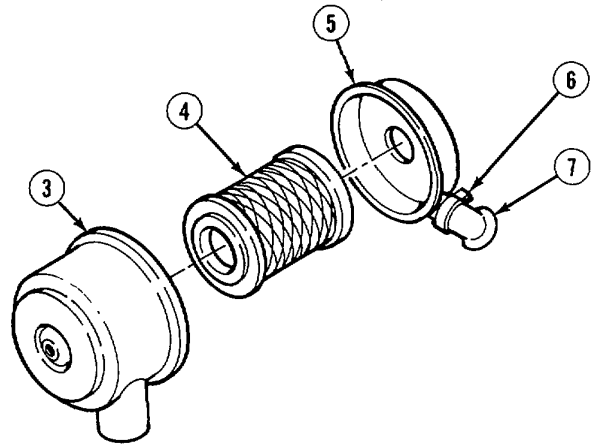
If NBC exposure is suspected, all air filter media should be handled by personnel wearing protective equipment. Consult your unit NBC Officer or NBC NCO for appropriate handling or disposal procedures.

a. Removal.

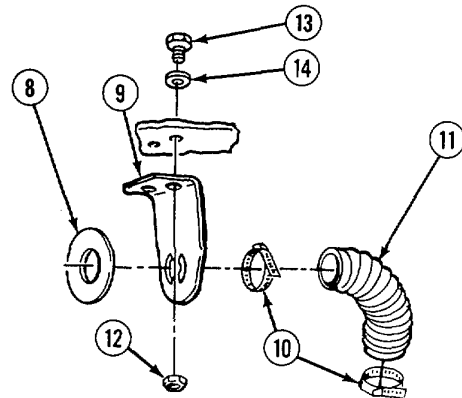
- (1) Remove wingstud (1) and air cleaner assembly (2).

4-37. AIR CLEANER ASSEMBLY REPLACEMENT (CONT).

- (2) Remove cover (3).
- (3) Remove air filter element (4) from air cleaner base (5).
- (4) If damaged, loosen clamp (6) and remove flutter valve (7) using a flat tip screwdriver.



- (5) Remove gasket (8) from bracket (9).
- (6) Loosen two clamps (10) and remove hose (11) using a flat tip screwdriver.
- (7) Remove two locknuts (12), two screws (13), two washers (14), and bracket (9) using a 9/16 in. open end wrench, ratchet and 9/16 in. socket.

**b. Installation.**

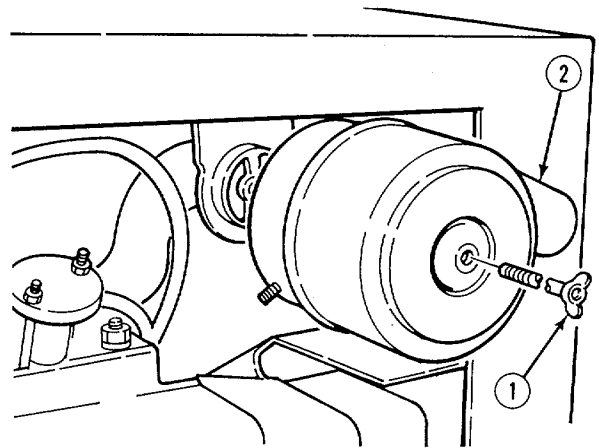
- (1) Position bracket (9) and install two washers (14), two screws (13), and two locknuts (12). Tighten using a 9/16 in. open end wrench, ratchet and 9/16 in. socket.
- (2) Install hose (11) and tighten clamps (10) using a flat tip screwdriver.
- (3) Install gasket (8) on bracket (9).
- (4) If removed, install flutter valve (7) and tighten clamp (6) using a flat tip screwdriver.
- (5) Install air filter element (4) in air cleaner base (5).
- (6) Install cover (3) on base (5).

- (7) Install air cleaner assembly (2) using wingstud (1).

NOTE

Follow-on maintenance: Close left and right side access covers (para 3-5)

END OF TASK



4-38. VAPOR SEPARATOR REPLACEMENT.

This task covers:

- a. Removal
- b. Installation

INITIAL SETUP:

Tools

Tool Kit, General Mechanic's: Automotive

Materials/Parts

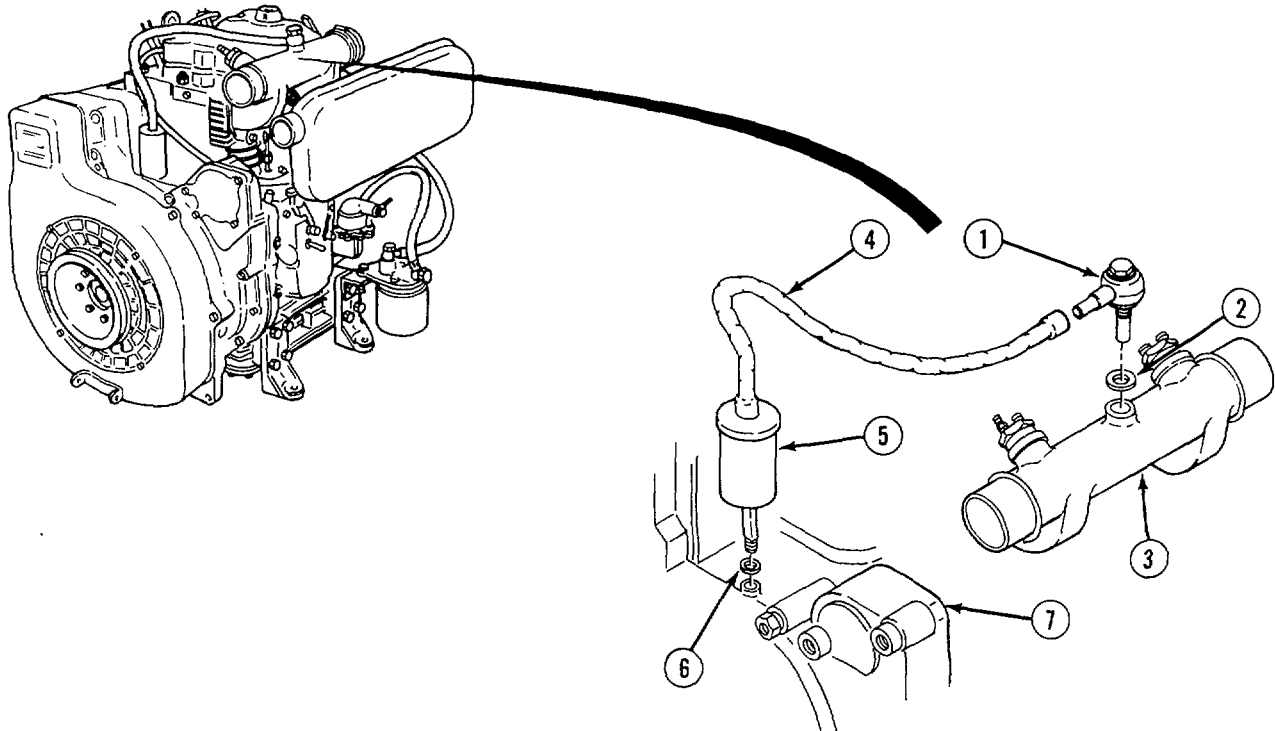
Copper washer

Equipment Condition

TM or Para
Para 4-98

Condition Description

Top access panel removed.
Right side access cover opened.



WARNING

Be sure engine is cool before starting this procedure. Injury to personnel may result.

a. Removal.

- (1) Remove fitting (1) and copper washer (2) from intake manifold (3) using a 19 mm open end wrench.

- (2) Remove hose (4) from vapor separator (5), and fitting (1).
- (3) Remove vapor separator (5) and copper washer (6) from crankcase (7) using a 17 mm open end wrench.

b. Installation.

- (1) Install copper washer (6) and vapor separator (5) in crankcase (7) using a 17 mm open end wrench.
- (2) Install copper washer (2) and fitting (1) on intake manifold (3) using a 19 mm open end wrench.
- (3) Install hose (4) on fitting (1) and vapor separator (5).

NOTE

Follow-on maintenance:

- **Install top access panel (para 4-98)**
- **Close right side access cover (para 3-5)**

END OF TASK



4-39. FUEL STRAINER REPLACEMENT.

This task covers:

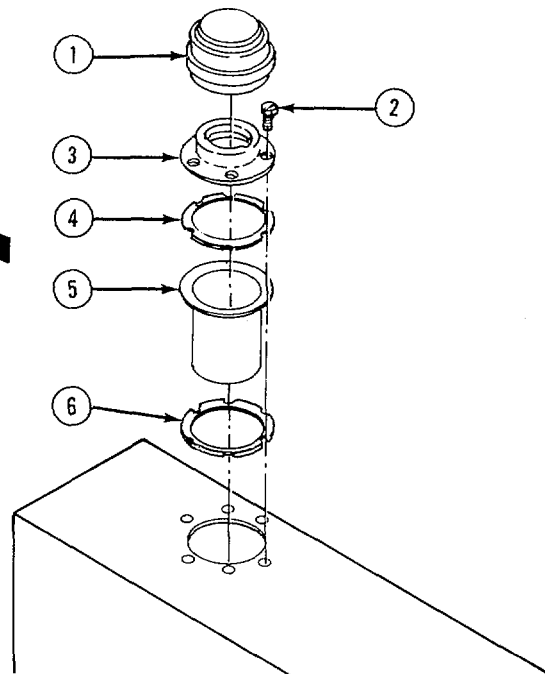
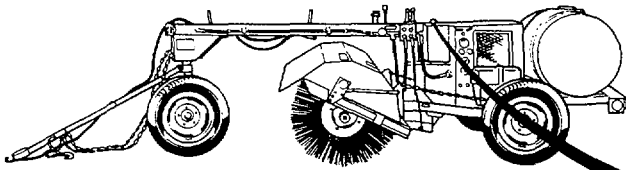
- a. Removal b. Installation

INITIAL SETUP:*Tools*

Tool Kit, General Mechanic's: Automotive

Materials/Parts

Gasket

**a. Removal****WARNING**

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine. When working with fuel, post signs that read NO SMOKING WITHIN 50 FEET (15.24 m) of vehicle.

- (1) Remove fuel cap (1).
- (2) Remove six screws (2), bracket (3), gasket (4), strainer (5), and gasket (6) using a flat tip screwdriver.

b. Installation.

- (1) Install gasket (6), strainer (5), gasket (4), bracket (3), and six screws (2) using a flat tip screwdriver.
- (2) Install fuel cap (1).

END OF TASK



4-40. FUEL TANK REPLACEMENT.

This task covers:

- a. Removal
- b. Installation

INITIAL SETUP:

Tools

Tool Kit, General Mechanic's: Automotive

Materials/Parts

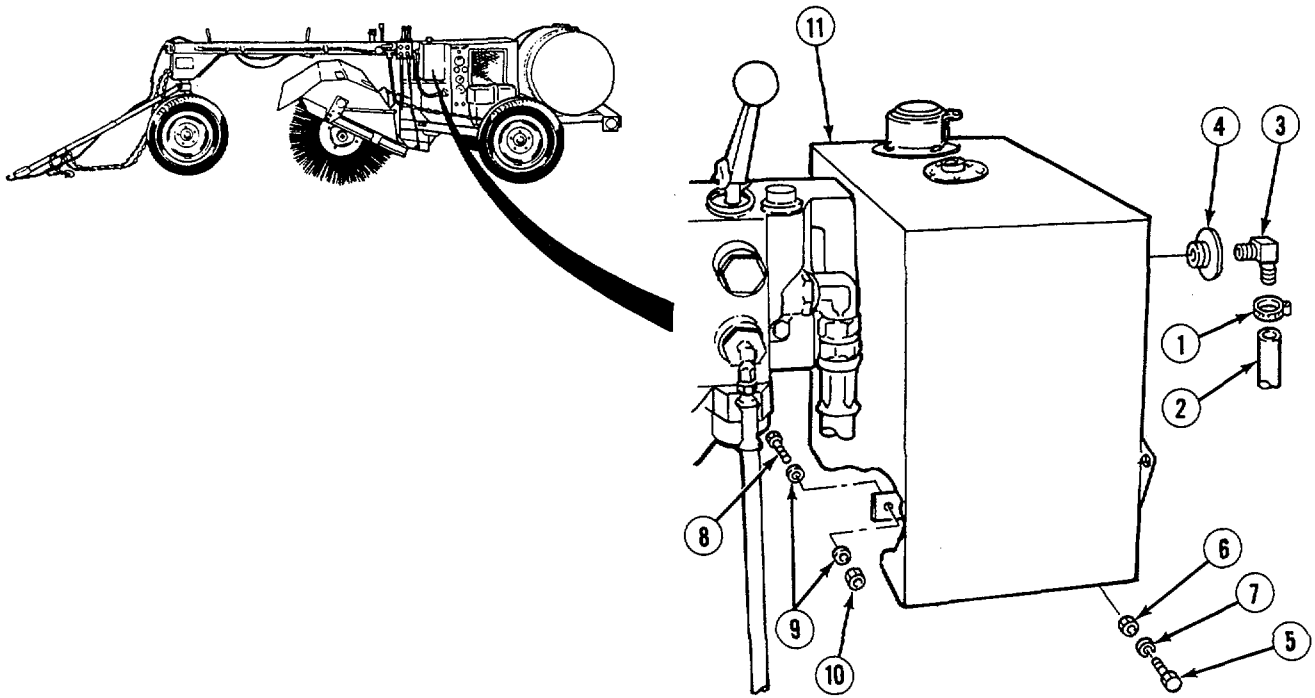
Lockwashers
 Locknut
 Compound, sealing, pipe thread, item 16
 Appendix E

Equipment Condition

TM or Para
 Para 4-41

Condition Description

Fuel shutoff valve removed.
 Engine enclosure removed.
 Fuel sending unit removed.
 Fuel strainer removed.



a. Removal.**WARNING**

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine. When working with fuel, post signs that read NO SMOKING WITHIN 50 FEET (15.24 m) of vehicle.

- (1) Loosen clamp (1) using a flat tip screwdriver. Disconnect fuel hose (2) and remove elbow (3) and reducer fitting (4) using a 5/8 open end wrench.
- (2) Remove four screws (5), four nuts (6), and four lockwashers (7) using a ratchet, 9/16 in. socket and 9/16 in. open end wrench.
- (3) Remove screw (8), two washers (9), and locknut (10) using a 7/16 in. open end wrench, ratchet and 7/16 in. socket.
- (4) Remove fuel tank (11).

b. Installation.

- (1) Position fuel tank (11). and install four screws (5), four nuts (6), and four lockwashers (7). Tighten using a ratchet, 9/16 in. socket and 9/16 in. open end wrench.
- (2) Install two washers (9), screw (8), and locknut (10) using a 7/16 open end wrench, ratchet and 7/16 in. socket.
- (3) Install reducer fitting (4) and elbow (3) using a 5/8 in. open end wrench.
- (4) Position clamp (1) on fuel hose (2) and install hose on fitting (3) using a flat tip screwdriver.

NOTE**Follow-on maintenance:**

- **Install fuel strainer (para 4-39)**
- **Install fuel sending unit (para 4-72)**
- **Install fuel shutoff valve (para 4-41)**
- **Install engine enclosure (para 4-98)**
- **Bleed fuel system (para 4-36)**

END OF TASK

4-41. FUEL TANK SHUTOFF VALVE REPLACEMENT (FUEL DRAINING).

This task covers:

- a. Removal
- b. Installation

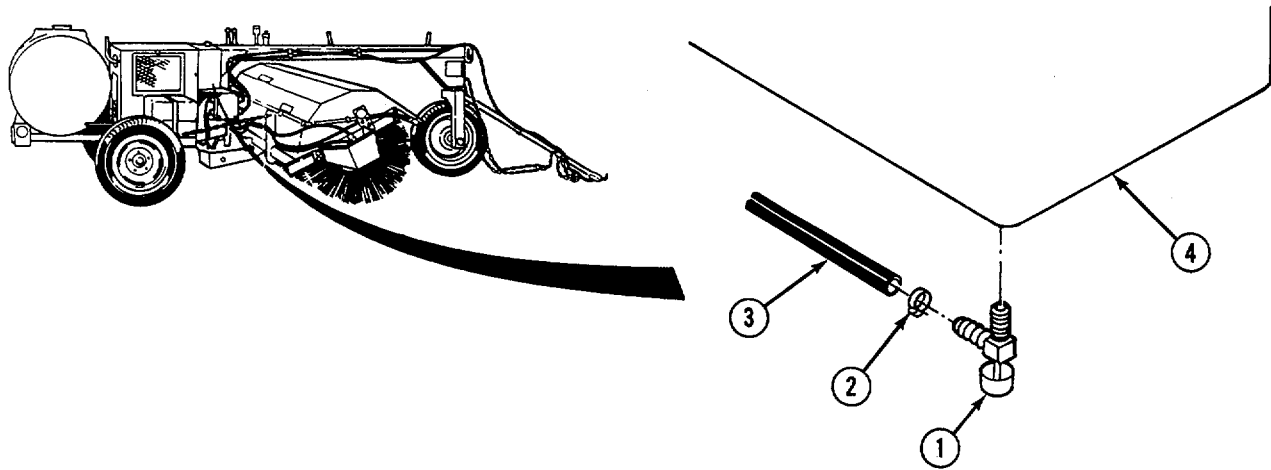
INITIAL SETUP:

Tools

Tool Kit, General Mechanic's: Automotive

Materials/Parts

Compound, locking, thread item 14 Appendix E



a. Removal

WARNING

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine. When working with fuel, post signs that read **NO SMOKING WITHIN 50 FEET (15.24 m)** of vehicle.

- (1) Place a suitable container (8 gal, 30l) under valve (1).
- (2) Shut off fuel valve (1) by turning clockwise.
- (3) Loosen clamp (2) and remove hose (3) using a flat tip screwdriver. Allow fuel to drain from hose.
- (4) Open fuel valve (1) and allow fuel to drain from tank (4).
- (5) Remove valve (1) from tank (4) using a 11 mm open end wrench.

b. Installation.**WARNING**

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

- (1) Apply thread locking compound to threads of valve (1).
- (2) Install valve (1) in tank (4) using a 11 mm open end wrench.
- (3) Position clamp (2) on hose (3).
- (4) Install hose (3) on valve (1) and tighten clamp (2) using a flat tip screwdriver.
- (5) Fill fuel tank (para 3-8).
- (6) Check for leaks.

END OF TASK

4-42. FUEL LINE REPLACEMENT (TANK TO PUMP).

This task covers:

- a. Removal
- b. Installation

INITIAL SETUP:

Tools

Tool Kit, General Mechanic's: Automotive

Materials/Parts

Fuel hose (See Appendix G for fabrication)

Equipment Condition

TM or Para

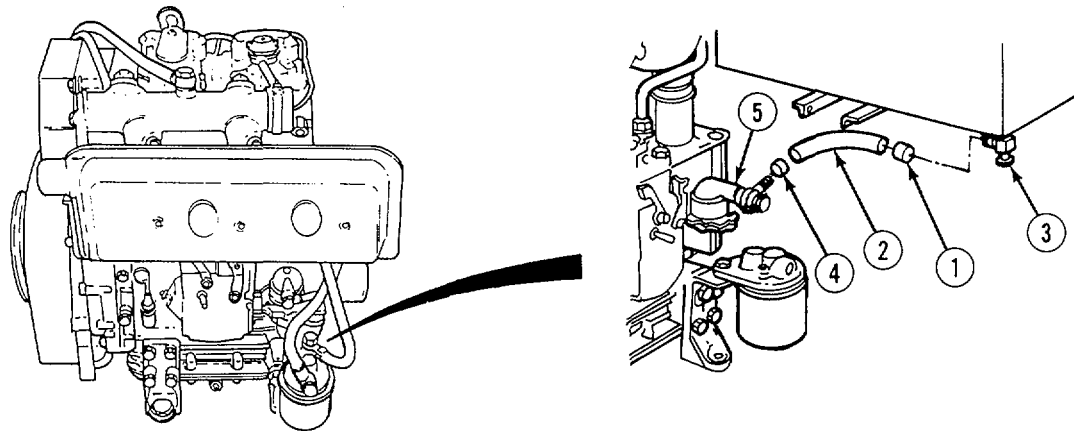
Para 3-15

Para 3-5

Condition Description

Fuel valve shut off.

Right side access cover opened.



a. Removal

WARNING

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine. When working with fuel, post signs that read **NO SMOKING WITHIN 50 FEET (15.24 m)** of vehicle.

- (1) Loosen clamp (1) and disconnect fuel line (2) from fuel shutoff valve (3) using a flat tip screwdriver.
- (2) Loosen clamp (4) and remove fuel line (2) from barbed fitting (5).

b. Installation.

- (1) Position clamp (4) on fuel line (2).
- (2) Install fuel line (2) on barbed fitting (5). Tighten clamp (4) using a flat tip screwdriver.
- (3) Position clamp (1) on fuel line (2).
- (4) Install fuel line (2) on fuel shutoff valve (3). Tighten clamp (1) using a flat tip screwdriver.

NOTE

Follow-on maintenance:

- **Open fuel shutoff valve (para 3-15)**
- **Bleed fuel system (para 4-36)**

END OF TASK



4-43. FUEL LINE REPLACEMENT (PUMP TO FILTER).

This task covers:

- a. Removal
- b. Installation

INITIAL SETUP:

Tools

Tool Kit, General Mechanic's: Automotive

Materials/Parts

Copper washers

Equipment Condition

TM or Para

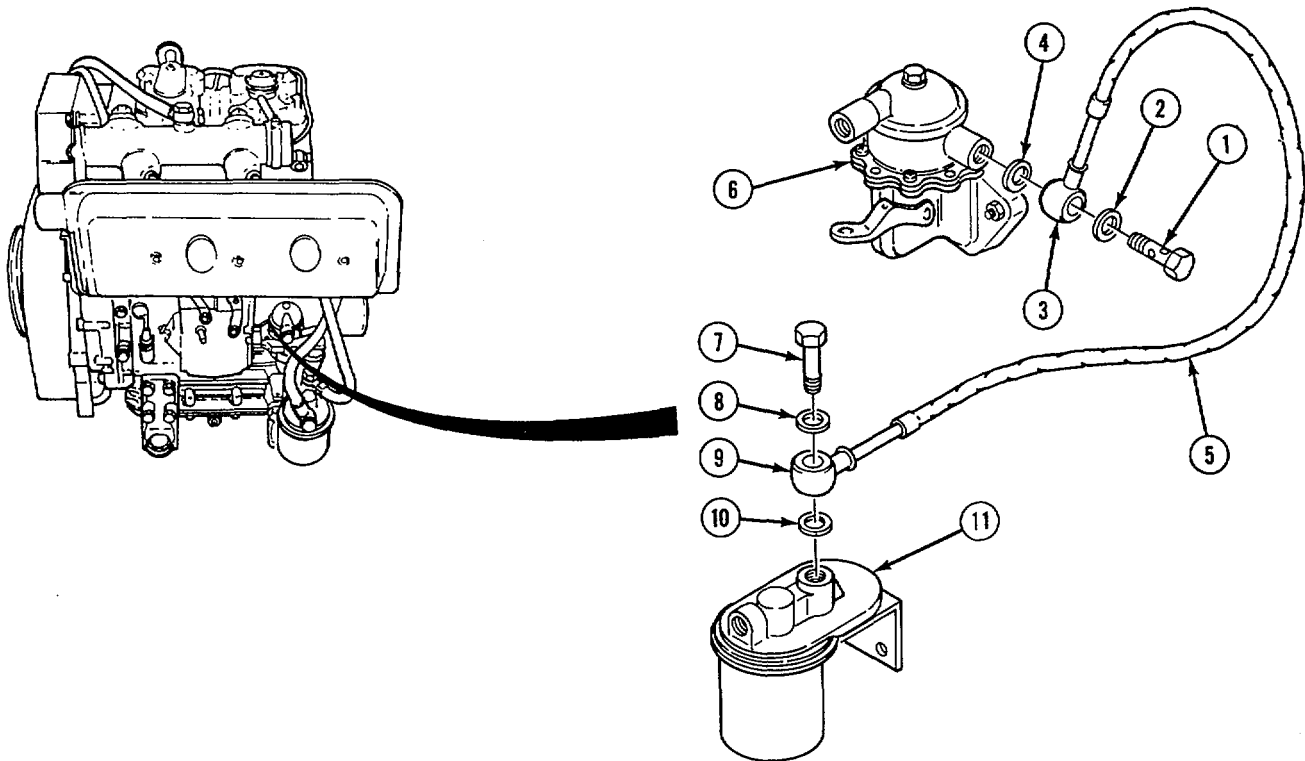
Para 3-15

Para 3-5

Condition Description

Fuel valve shut off.

Right side access cover opened.



a. Removal

WARNING

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine. When working with fuel, post signs that read NO SMOKING WITHIN 50 FEET (15.24.m) of vehicle.

- 1) Remove connecting bolt (1), copper washer (2), barbed fitting (3), copper washer (4), and fuel line (5) from fuel pump (6) using a 14 mm open end wrench.

- (2) Remove connecting bolt (7), copper washer (8), barbed fitting (9), copper washer (10), and fuel line (5) from fuel filter housing (11) using a 19 mm open end wrench.

b. Installation.

- (1) Install copper washer (2), barbed fitting (3), fuel line (5), copper washer (4), and connecting bolt (1) to fuel pump (6). Tighten using a 14 mm open end wrench.
- (2) Install copper washer (8), barbed fitting (9), fuel line (5), copper washer (10), and connecting bolt (7) to fuel filter housing (11). Tighten using a 19 mm open end wrench.

NOTE

Follow-on maintenance:

- fuel valve (para 3-15)
- fuel system (para 4-36)

END OF TASK



4-44. FUEL REPLACEMENT (FILTER TO INJECTOR LINE).

This task covers:

- a. Removal
- b. Installation

INITIAL SETUP:

Tools

Tool Kit, General Mechanic's: Automotive

Materials/Parts

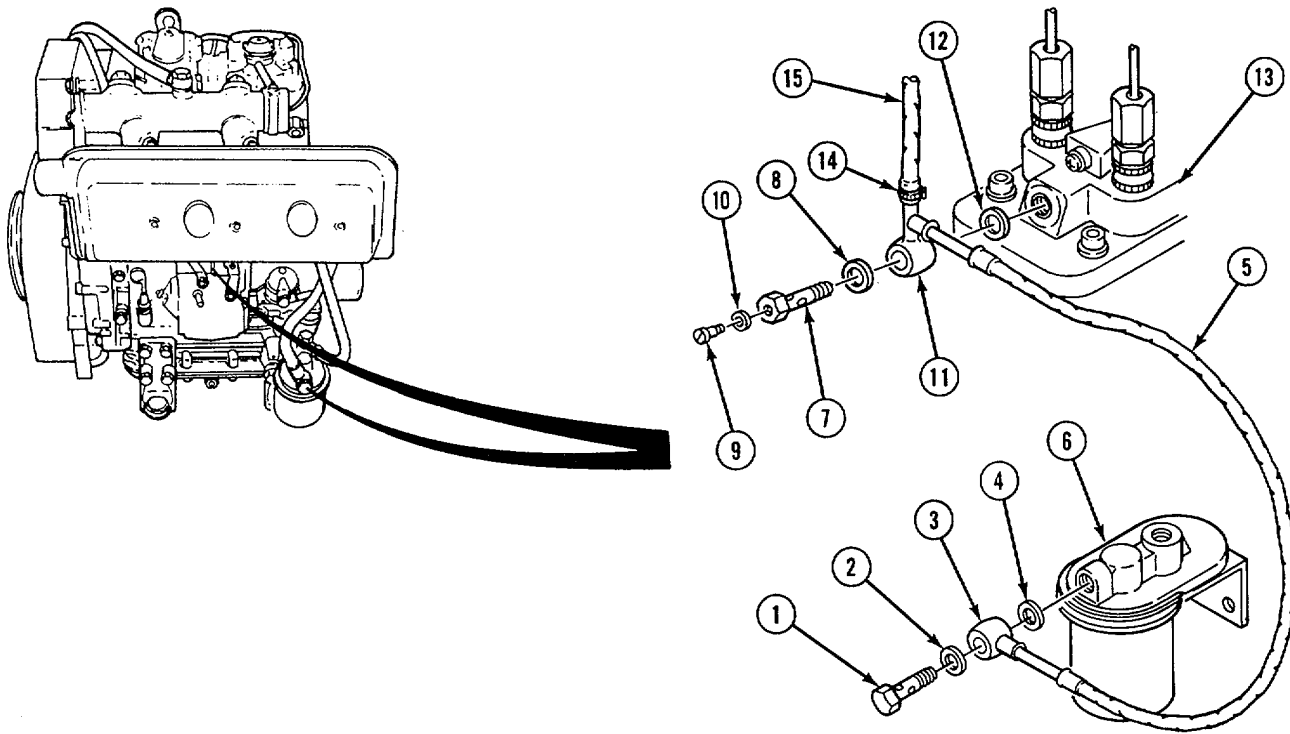
Copper washers
Plastic washer

Equipment Condition

TM or Para
Para 3-15
Para 3-5

Condition Description

Fuel valve shut off.
Right side access cover opened.



a. Removal.**WARNING**

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine. When working with fuel, post signs that read **NO SMOKING WITHIN 50 FEET (15.24 m)** of vehicle.

- (1) Remove connecting bolt (1), copper washer (2), barbed fitting (3), copper washer (4), and fuel line (5) from fuel filter housing (6) using a 19 mm open end wrench.
- (2) Remove connecting bolt (7), copper washer (8), deaeration plug (9), plastic washer (10), barbed fitting (11), copper washer (12), and fuel line (5) from injector pump (13) using a 17 mm open end wrench and flat tip screwdriver.
- (3) Remove clamp (14) and hose (15) using pliers.

b. Installation.

- (1) Install copper washer (4), barbed fitting (3), fuel line (5), copper washer (2), and connecting bolt (1) to fuel filter housing (6). Tighten using a 19 mm open end wrench.
- (2) Install copper washer (12), barbed fitting (11), fuel line (5), plastic washer (10), deaeration plug (9), copper washer (8), and connecting bolt (7) to injector pump (13). Tighten using a 17 mm open end wrench and flat tip screwdriver.
- (3) Install clamp (14) and hose (15) using a crimper.

NOTE**Follow-on maintenance:**

- Fuel valve opened (para 3-15)
- Bleed fuel system (para 4-36)

END OF TASK

4-45. FUEL LINE REPLACEMENT (INJECTOR PUMP TO NOZZLE).

This task covers:

- a. Removal
- b. Installation

INITIAL SETUP:

Tools

Tool Kit, General Mechanic's: Automotive

Equipment Condition

TM or Para
Para 4-98

Condition Description

Top access panel removed.
Fuel lines (bleed lines) removed.

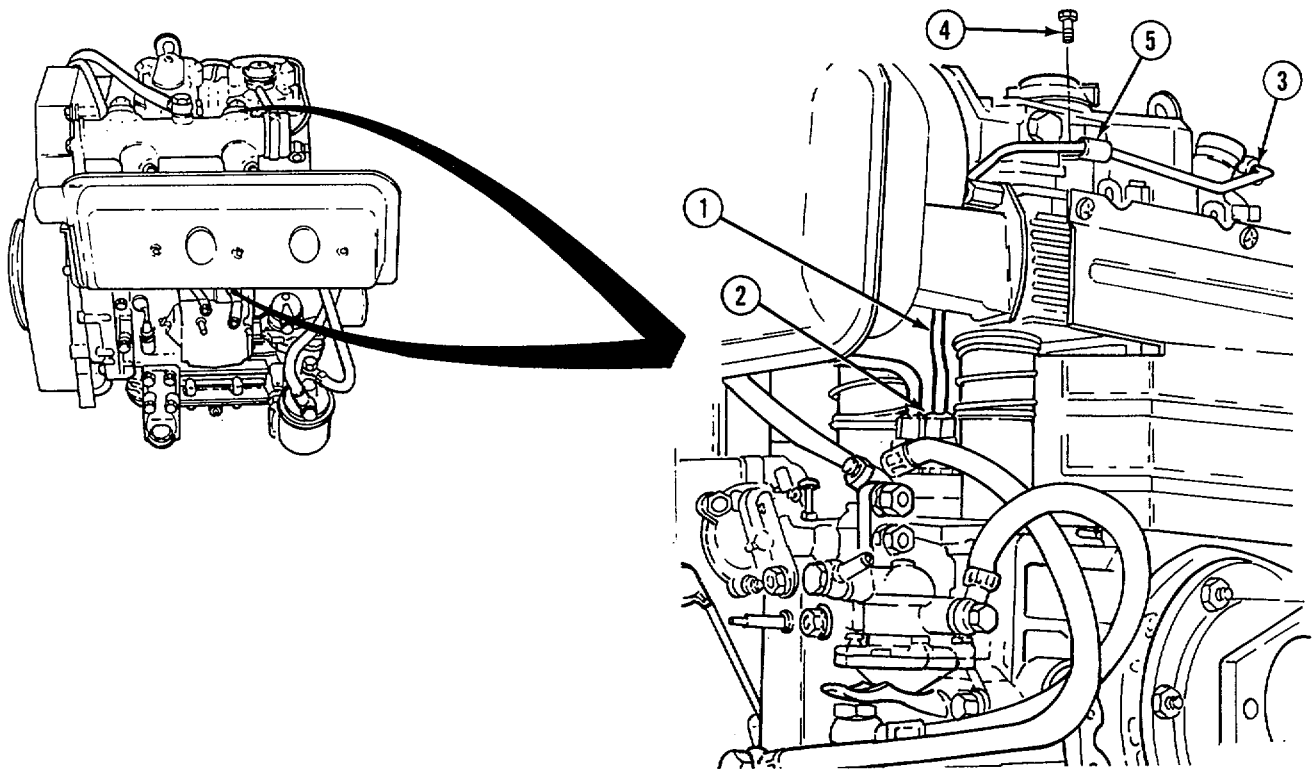
Materials/Parts

Tags, identification, item 35 Appendix E

Para 4-46

NOTE

Both lines are removed and installed the same way.



WARNING

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine. When working with fuel, post signs that read **NO SMOKING WITHIN 50 FEET (15.24 m)** of vehicle.

NOTE

Tag fuel lines before removal to aid in installation.

a. Removal

- (1) Tag and remove two fuel lines (1) from injector pump (2) using a 17 mm and 19 mm open end wrenches.
- (2) Remove two fuel lines (1) from injectors (3) using a 17 mm and 19 mm open end wrenches.
- (3) Remove two screws (4) and clamps (5) using a ratchet and 8 mm socket and remove two fuel lines (1) from sweeper.

b. Installation.

- (1) Install two fuel lines (1) on injector pump (2) using a 17 mm and 19 mm open end wrenches.
- (2) Install two fuel lines (1) on injectors (3) using a 17 mm and 19 mm open end wrenches.
- (3) Install two screws (4) and clamps (5) using a ratchet and 8 mm socket.

NOTE**Follow-on maintenance:**

- Install bleed lines (para 4-46)
- Bleed fuel system (para 4-36)
- Install top access panel (para 4-98)

END OF TASK

4-46. FUEL LINE REPLACEMENT (BLEED LINES).

This task covers:

- a. Removal
- b. Installation

INITIAL SETUP:

Tools

Tool Kit, General Mechanic's: Automotive

Materials/Parts

Copper washers
 Washer Para 4-98
 Loop clamp
 Fuel hose (See Appendix G for fabrication)

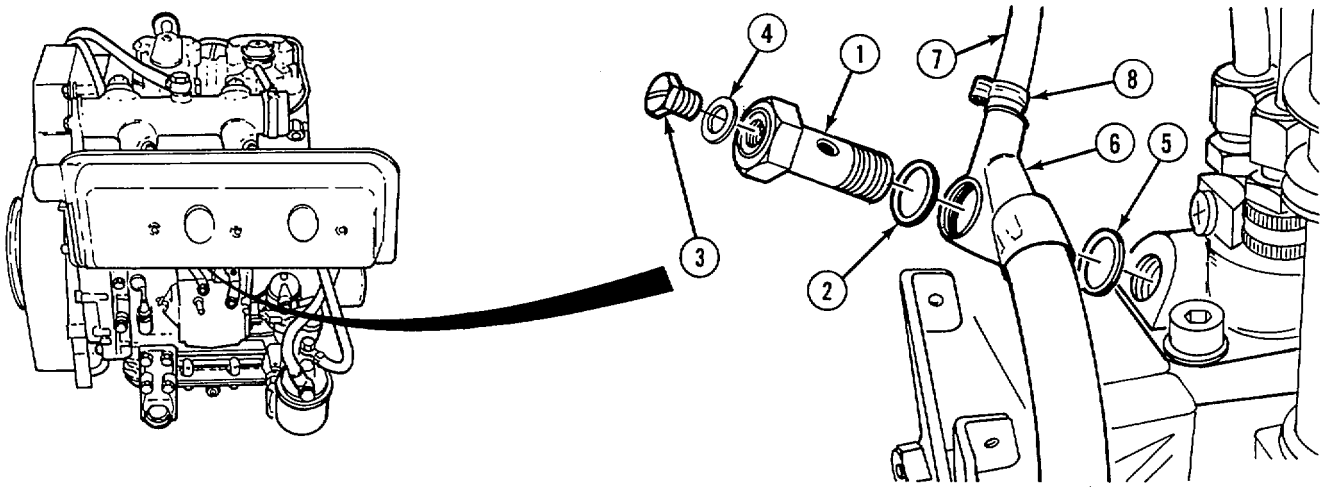
Equipment Condition

TM or Para
 Para 3-15
 Para 3-5

Condition Description

Fuel valve shut off.
 Left and right side access covers opened.
 Top access panel removed.

a. Removal.

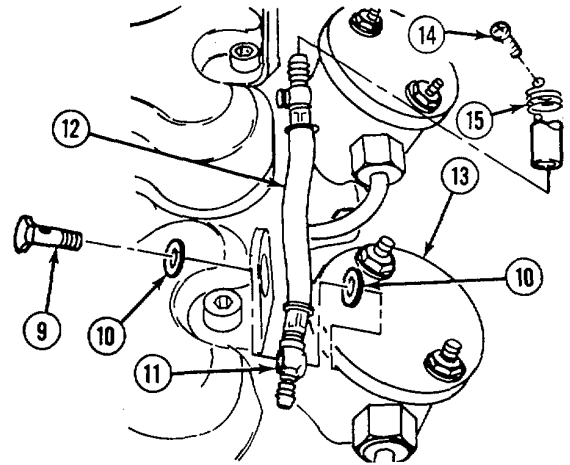


WARNING

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine. When working with fuel, post signs that read NO SMOKING WITHIN 50 FEET (15.24 m) of vehicle.

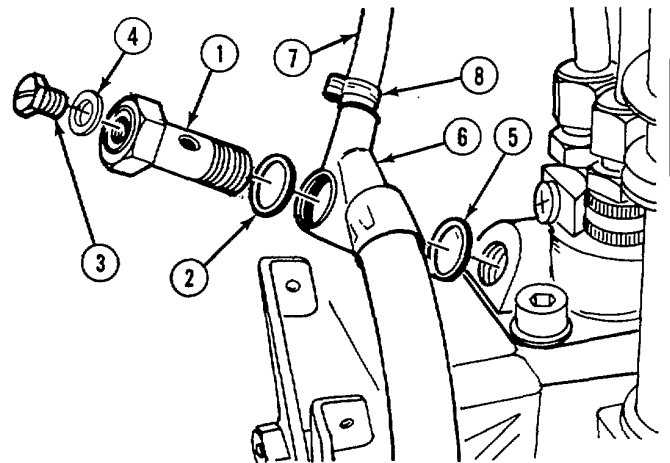
- (1) Remove connecting bolt (1), copper washer (2), deairation valve (3), washer (4), copper washer (5), barbed fitting (6), bleed line (7), and clamp (8) using a 17 mm open end wrench and flat tip screwdriver.

- (2) Remove two connecting bolts (9), four copper washers (10), two barbed fittings (11), and bleed line (12) from injector assemblies (13) using a 12 mm open end wrench.
- (3) Remove screw (14) and wire clamp (15) using a cross tip screwdriver.

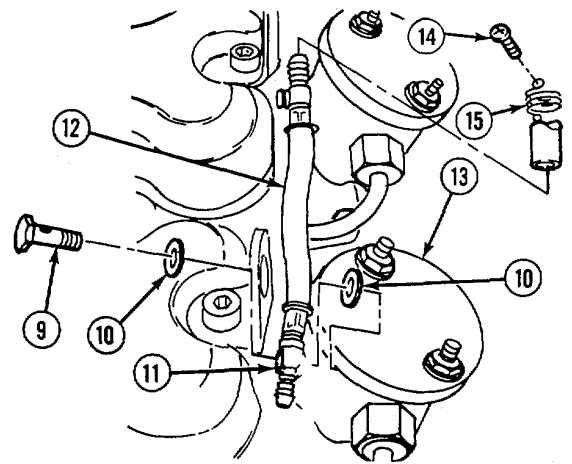


b. Installation.

- (1) Install copper washer (5), barbed fitting (6), washer (4), deaeration plug (3), copper washer (2), and connecting bolt (1). Tighten with 17 mm open end wrench and flat tip screwdriver.
- (2) Install clamp (8) on bleed line (7).
- (3) Install bleed line (7) on barbed fitting (6), and crimp clamp (8) using crimpers.



- (4) Install two copper washers (10), two barbed fittings (11), two copper washers (10), bleed line (12), and two connecting bolts (9) on injector assemblies (13). Tighten using a 12 mm open end wrench.
- (5) Install screw (14) and wire clamp (15) using a cross tip screwdriver.



NOTE

Follow-on maintenance:

- Fuel valve opened (para 3-15)
- Bleed fuel system (para 4-36)
- Top access panel installed (para 4-98)
- Left and right side access covers closed (para 3-5)

END OF TASK

4-47. THROTTLE CONTROL CABLE AND ENGINE CUT-OFF CABLE REPLACEMENT.

This task covers:

- a. Removal
- b. Installation

INITIAL SETUP:

Tools

Tool Kit, General Mechanic's: Automotive

Equipment Condition

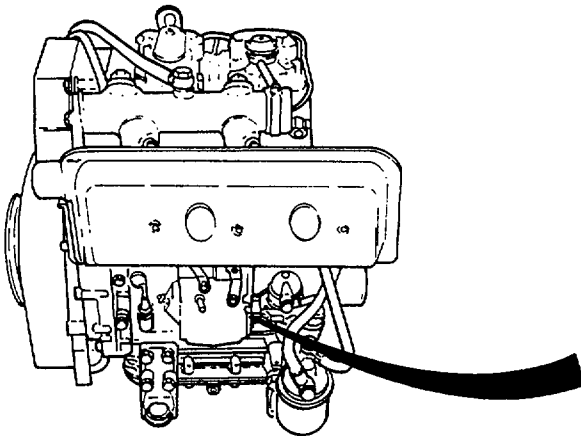
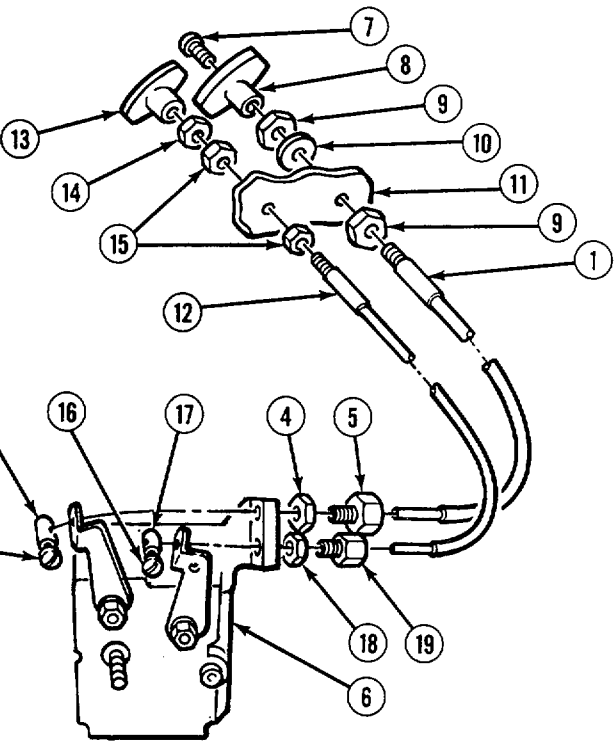
TM or Para
Para 3-5

Condition Description

Left and right access covers removed.
Top access panel removed.

Materials/Parts

Tags, identification, item 35 Appendix E



NOTE

Tag cables prior to removal to aid in installation.

a. Removal

- (1) Tag throttle cable (1).
- (2) Loosen screw (2) using a flat tip screwdriver and remove cable lock (3).

- (3) Remove nut (4), screw (5), and throttle cable (1) from throttle assembly (6) using a 12 mm and 13 mm open end wrenches.
- (4) Remove screw (7), handle (8), two nuts (9), and washer (10) using a cross tip screwdriver and 7/8 in. open end wrench.
- (5) Pull throttle cable (1) out of engine cowling (11) (to inside).
- (6) Tag engine cut-off cable (12).
- (7) Remove handle (13) and nut (14) using a 3/8 in. open end wrench.
- (8) Remove two nuts (15) using a 1/2 in. open end wrench.
- (9) Loosen screw (16) using a flat tip screwdriver and remove cable lock (17).
- (10) Remove nut (18), screw (19), and engine cut-off cable (12) from throttle assembly (6) using a 12 mm and 13 mm open end wrenches.
- (11) Pull engine cut-off cable (12) out of engine cowling (11).

b. Installation.

- (1) Install engine cut-off cable (12), screw (19), and nut (18) on throttle assembly (6) using a 12 mm and 13 mm open end wrenches.
- (2) Install cable lock (17) on engine cut-off cable (12) and tighten screw (16) using a flat tip screwdriver.
- (3) Install engine cut-off cable (12) and two nuts (15) in engine cowling (11). Tighten nuts using a 1/2 in. open end wrench.
- (4) Install handle (13) and nut (14). Tighten nut using a 3/8 in. open end wrench.
- (5) Install throttle cable (1), screw (5), and nut (4) on throttle assembly (6) using a 12 mm and 13 mm open end wrenches.
- (6) Install cable lock (3) on throttle cable (1) and tighten screw (2) using a flat tip screwdriver.
- (7) Install throttle cable (1), washer (10), two nuts (9), handle (8), and screw (7). Tighten using a 7/8 in. open end wrench.

NOTE

Follow-on maintenance:

- **Adjust engine speed (para 4-23)**
- **Install top access panel (para 4-98)**
- **Install left and right access covers (para 3-5)**

END OF TASK

4-48. FUEL FILTER REPLACEMENT.

This task covers:

- a. Removal
- b. Installation

INITIAL SETUP:

Tools

Tool Kit, General Mechanic's: Automotive
 Shop Equipment, Automotive Maintenance and Organizational Maintenance, Common
 No. 1, Less Power

Equipment Condition

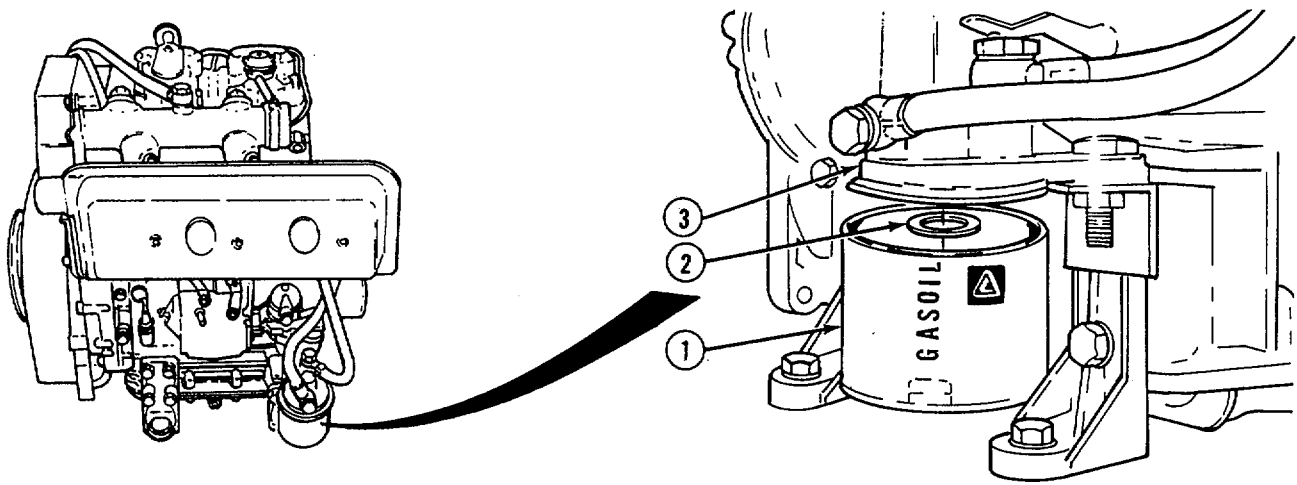
TM or Para
 Para 3-15
 Para 3-5

Condition Description

Fuel valve shut off.
 Open right side access Repair; cover.

Materials/Parts

Fuel filter Gasket



WARNING

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine. When working with fuel, post signs that read NO SMOKING WITHIN 50 FEET (15.24 m) of vehicle.

- a. **Removal.** Remove filter (1) and gasket (2) from housing (3) using a filter wrench.

CAUTION

Do not over-tighten fuel filter. Damage to equipment may result.

b. Installation. Coat gasket (2) and filter (1) with diesel fuel and install gasket and filter on housing (3). Tighten until gasket seats and then an additional 1/4 turn.

NOTE

Follow-on maintenance:

- Fuel valve opened (para 3-15)
- Bleed fuel system (para 4-36)

END OF TASK



4-49. FUEL FILTER HOUSING REPLACEMENT.

This task covers:

- a. Removal
- b. Installation

INITIAL SETUP:

Tools

Tool Kit, General Mechanic's: Automotive

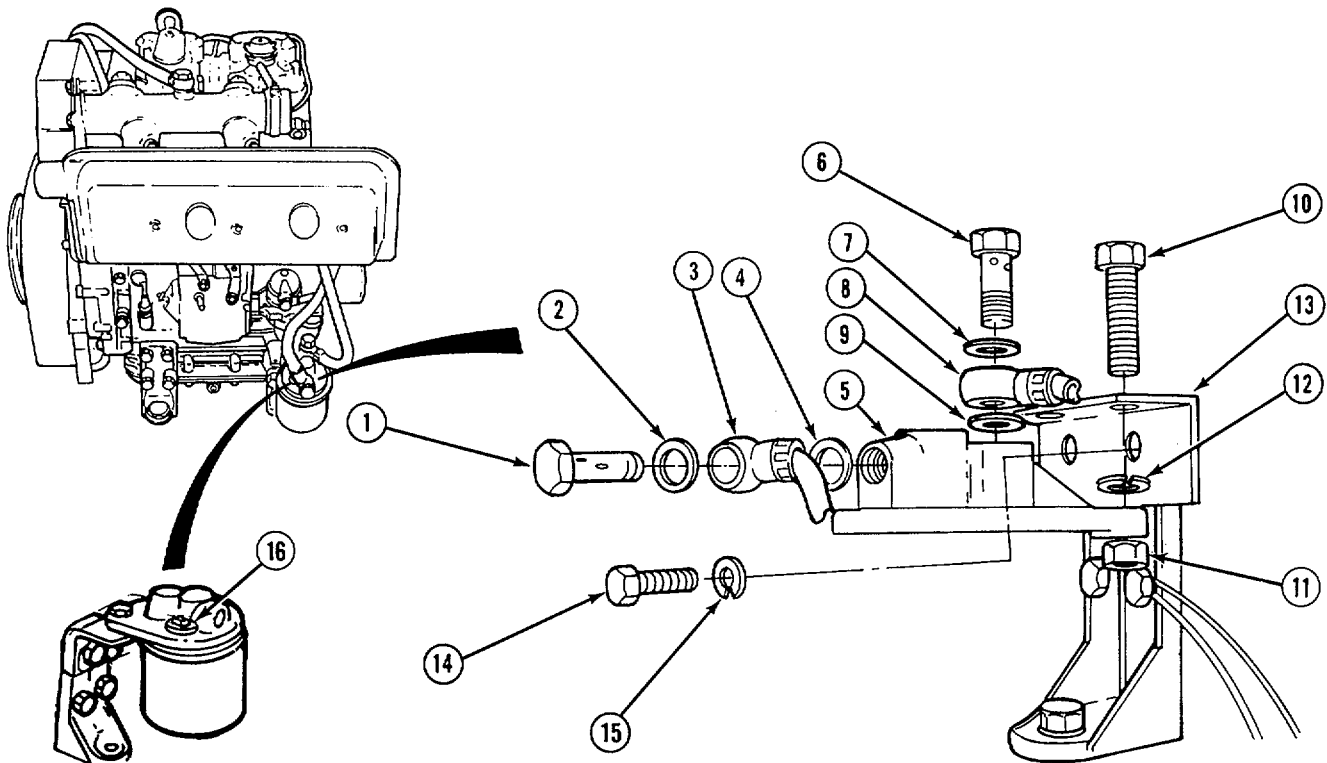
Shop Equipment, Automotive Maintenance and Repair; Organizational Maintenance, Common No. 1, Less Power TM or Para

Materials/Parts

Copper washers
Lockwashers

Equipment Condition

Condition
Para 4-48
Description
Fuel filter removed.



a. Removal**WARNING**

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine. When working with fuel, post signs that read **NO SMOKING WITHIN 50 FEET (15.24 m)** of vehicle.

- (1) Remove connecting bolt (1), copper washer (2), fuel filter-to-injector pump line (3), and copper washer (4) from housing (5) using a 19 mm open end wrench.
- (2) Remove connecting bolt (6), copper washer (7), pump-to-filter line (8), and copper washer (9) from housing (5) using a 19 mm open end wrench.
- (3) Remove two screws (10), two nuts (11), and two lockwashers (12) using two 17 mm open end wrenches.
- (4) Remove housing (5) from mounting bracket (13).
- (5) Remove two screws (14), two lockwashers (15), and mounting bracket (13) using a 17 mm open end wrench.
- (6) Do not remove bleed screw (16). Bleeding the fuel system is accomplished in para 4-36.

b. Installation.

- (1) Install bracket (13), two lockwashers (15), and two screws (14). Tighten screws 39 lb-ft (53 N•m) using a torque wrench, extension and 17 mm socket.
- (2) Install housing (5), two screws (10), two lockwashers (12), and two nuts (11). Tighten screws 39 lb-ft (53 N•m) using a torque wrench, 17 mm socket and 17 mm open end wrench.
- (3) Install copper washer (9), pump-to-filter line (8), copper washer (7), and connecting bolt (6) on housing (5) using a 19 mm open end wrench.
- (4) Install copper washer (4), filter-to-injector pump line (3), copper washer (2), and connecting bolt (1) on housing (5) using a 19 mm open end wrench.

NOTE

Follow-on maintenance: Fuel filter installed (para 4-48)

END OF TASK

4-50. GLOW PLUG REPLACEMENT.

This task covers:

- a. Removal
- b. Installation

INITIAL SETUP:

Tools

Tool Kit, General Mechanic's: Automotive

Equipment Condition

TM or Para
Para 4-98

Condition Description

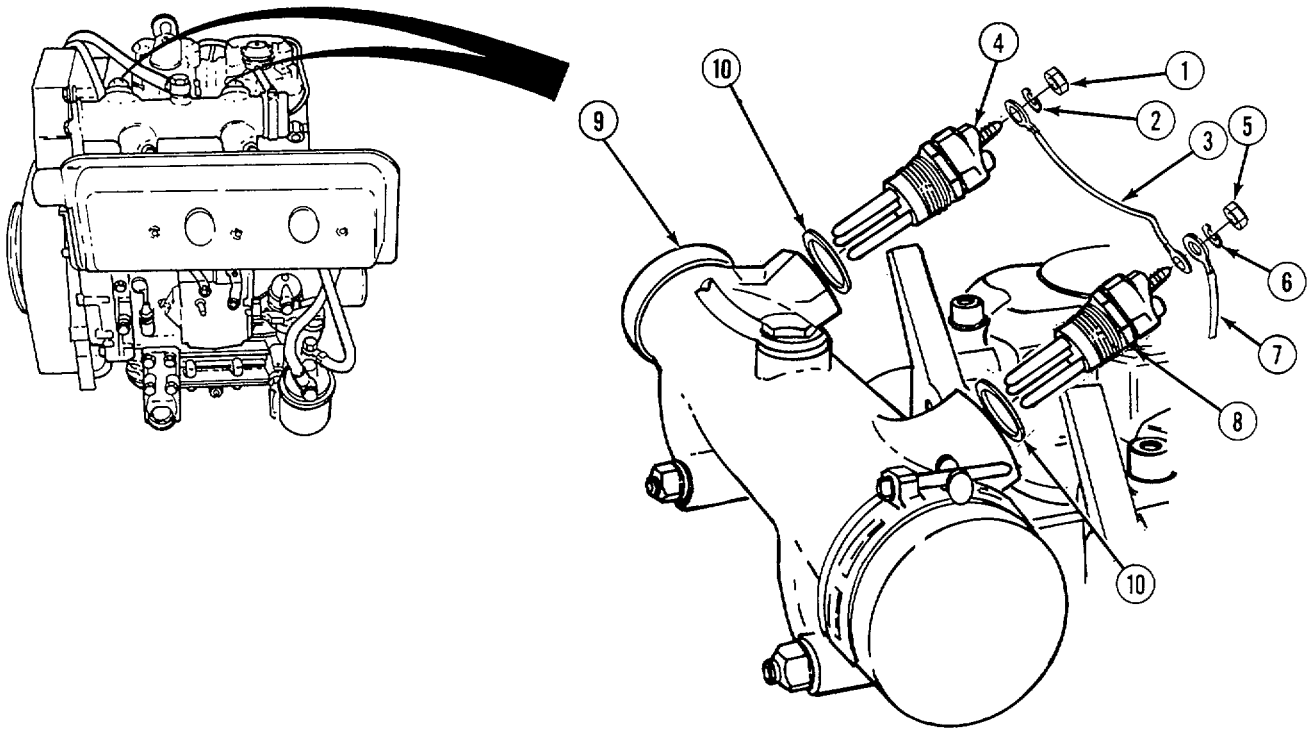
Top access panel
removed.

Materials/Parts

Lockwashers
Compound, locking, thread item 14 Appendix E
Tags, identification, item 35 Appendix E

Para 4-73

Battery cables
disconnected.



WARNING

Be sure engine is cool before starting this procedure or injury to personnel may result.

a. Removal.**NOTE**

Tag all wires before removal to aid installation.

- (1) Remove nut (1), lockwasher (2), and tag and remove wire (3) from glow plug (4) using a 5/16 in. open end wrench.
- (2) Remove nut (5), lockwasher (6), wire (3) and tag and remove wire (7) from glow plug (8) using a 5/16 in. open end wrench.
- (3) Remove glow plugs (4 and 8) from intake manifold (9) using a 1 in. box end wrench.
- (4) Remove washers (10) from glow plugs (4 and 8).

b. Installation.

- (1) Install washers (10) on glow plugs (4 and 8).

WARNING

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

- (2) Apply thin coat of thread locking compound to glow plugs (4 and 8) threads.
- (3) Install glow plugs (4 and 8) in intake manifold (9) using a 1 in. box end wrench.
- (4) Refer to tags and install wires (3 and 7), lockwasher (6), and nut (5) on glow plug (8) using a 5/16 in. Open end wrench.
- (5) Refer to tags and install wire (3), lockwasher (2), and nut (1) on glow plug (4) using a 5/16 in. open end wrench.

NOTE**Follow-on Maintenance:**

- **Install top access panel (para 4-98)**
- **Connect battery cables (para 4-73)**

END OF TASK

4-51. MUFFLER REPLACEMENT.

This task covers:

- a. Removal
- b. Installation

INITIAL SETUP

Tools

Shop Equipment, Automotive Maintenance and Repair; Organizational Maintenance, Common No.1, Less Power

Equipment Condition

TM or Para
Para 4-98

Condition Description

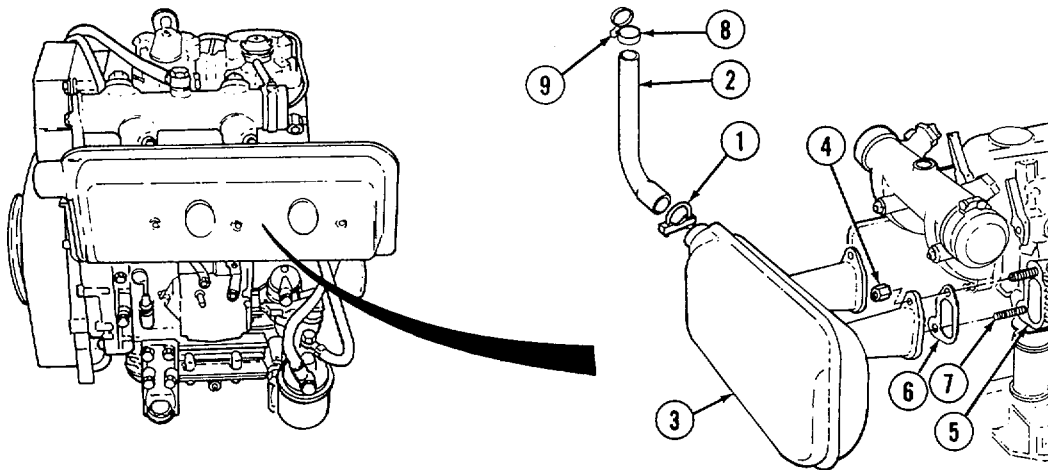
Top access panel removed.

Para 3-5

Right side access cover opened.

Materials/Parts

Gasket



a. Removal.

WARNING

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.

- (1) Loosen clamp (1) using a 1/2 in. open end wrench. Remove pipe (2) from muffler (3).
- (2) Remove four nuts (4) and muffler (3) from engine (5) using a 12 mm open end wrench.

NOTE

Make sure all old gasket material is removed from engine.

- (3) Remove two gaskets (6) from engine (5), muffler (3), and studs (7).

- (4) If damaged, remove four studs (7) using pliers.
- (5) Remove rain cap (8) from pipe (2) by loosening nut (9) using a 7/16 in. open end wrench.

b. Installation.

- (1) If removed, install four studs (7) using pliers.
- (2) Position gasket (6) on studs (7) and install muffler (3) and four nuts (4). Tighten nuts to 22 lb-ft (30 N•m) using a torque wrench and 12 mm socket.
- (3) Position clamp (1) on pipe (2).
- (4) Install pipe (2) on muffler (3). Tighten clamp (1) using a 1/2 in. open end wrench.
- (5) Install rain cap (8) on pipe (2) and tighten nut (9) using a 7/16 in. open end wrench.

NOTE

Follow-on maintenance:

- **Install top access panel (para 4-98)**
- **Close right side access cover (para 3-5)**

END OF TASK

4-52. FLYWHEEL GUARD REPLACEMENT.

This task covers:

- a. Removal
- b. Installation

INITIAL SETUP

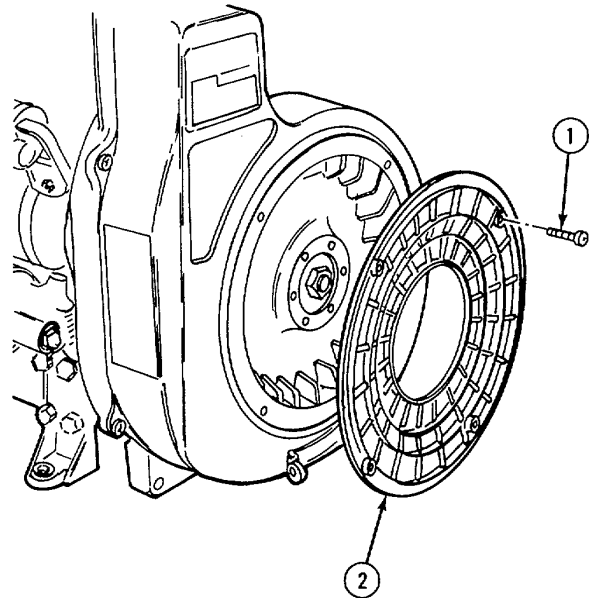
<i>Tools</i>	<i>Equipment Condition</i>	<i>TM or Para</i>	<i>Condition Description</i>
Tool Kit, General Mechanic's:	Automotive	TM or Para	Alternator drive pulley removed.
	Para 4-33		

- a. **Removal.** Remove four screws (1) and flywheel guard (2) using a cross tip screwdriver.
- b. **Installation.** Install flywheel guard (2) and four screws (1) using a cross tip screwdriver.

NOTE

Follow-on maintenance: Install alternator drive pulley (para 4-33)

END OF TASK



4-53. FLYWHEEL HOUSING REPLACEMENT.

This task covers:

- a. Removal
- b. Installation

INITIAL SETUP

Tools

Tool Kit, General Mechanic's: Automotive
Para 4-52

Equipment Condition

TM or Para
Flywheel guard
removed.

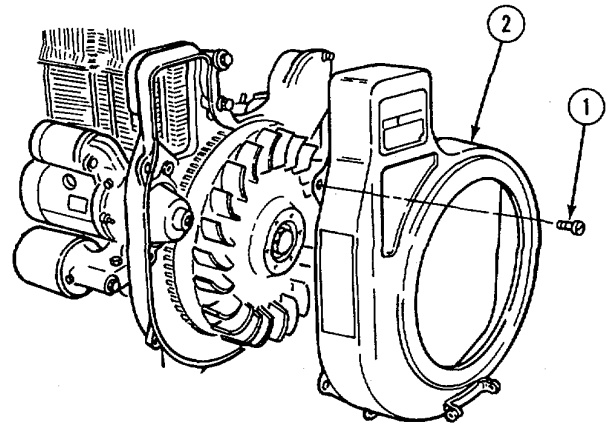
Condition Description

a. Removal Remove seven screws (1) and flywheel housing (2) using a cross tip screwdriver.

b. Installation. Install flywheel housing (2) and seven screws (1) using a cross tip screwdriver.

NOTE

Follow-on maintenance: Install flywheel guard (para 4-52)



END OF TASK

4-54. HEAT DEFLECTOR REPLACEMENT.

This task covers:

- a. Removal
- b. Installation

INITIAL SETUP

Tools

Tool Kit, General Mechanic's: Automotive

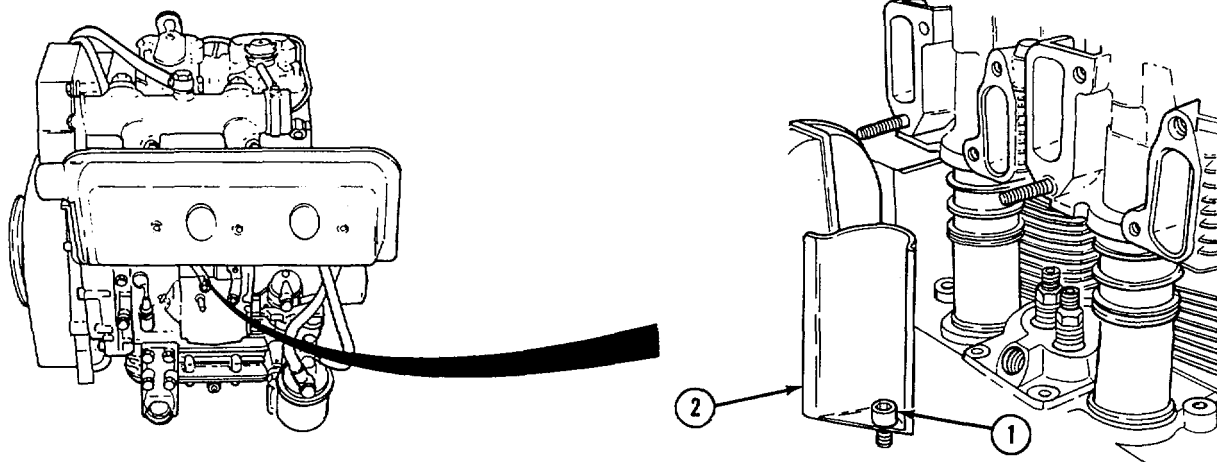
Equipment Condition

TM or Para
Para 4-98

Condition Description
Right side door panel
removed.

Para 4-32
Para 4-45

Intake manifold removed.
Injector pump fuel lines
removed.



- a. **Removal** Remove screw (1) and heat deflector (2) using a 6 mm hex head wrench.
- b. **Installation.** Install heat deflector (2) and screw (1) using a 6 mm hex head wrench.

NOTE

Follow-on maintenance:

- **Install injector fuel lines (para 4-45)**
- **Install intake manifold (para 4-32)**
- **Install right side door panel (para 4-98)**

END OF TASK

4-55. NOISE SHROUDS REPLACEMENT.

This task covers:

- a. Front Shroud
- b. Fan Shroud
- c. Left Shroud
- d. Rear Shroud

INITIAL SETUP

Tools

Tool Kit, General Mechanic's: Automotive

Shop Equipment, Automotive Maintenance and Repair; Organizational Maintenance, Common No.1, Less Power

Equipment Condition

TM or Para
Para 4-98

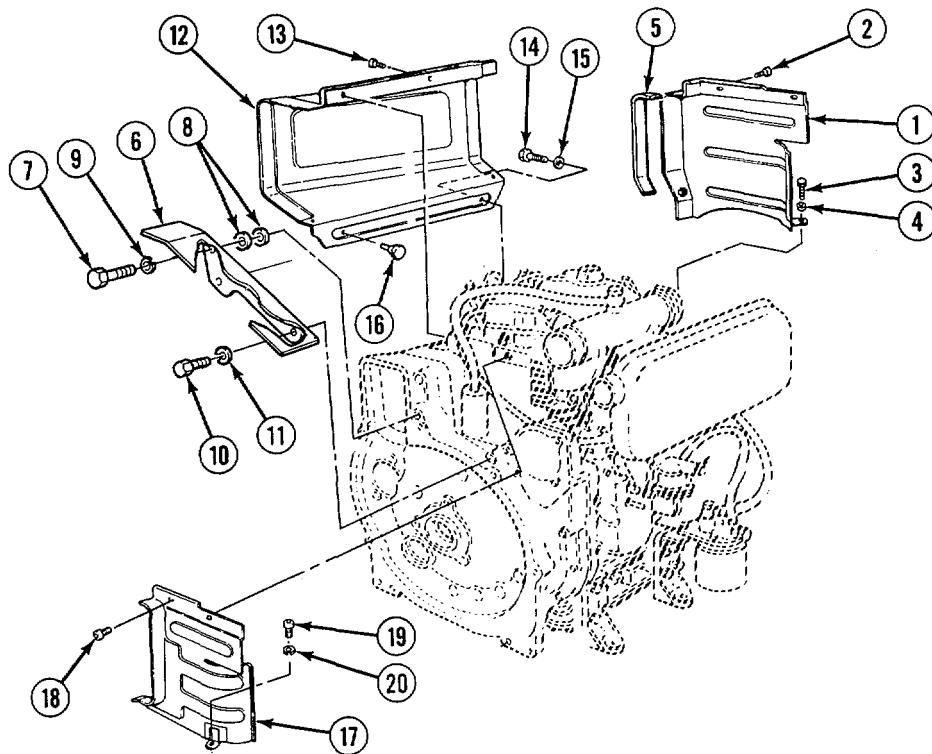
Para 3-5

Condition Description

Rear and top panels removed.
Left and right access covers removed.

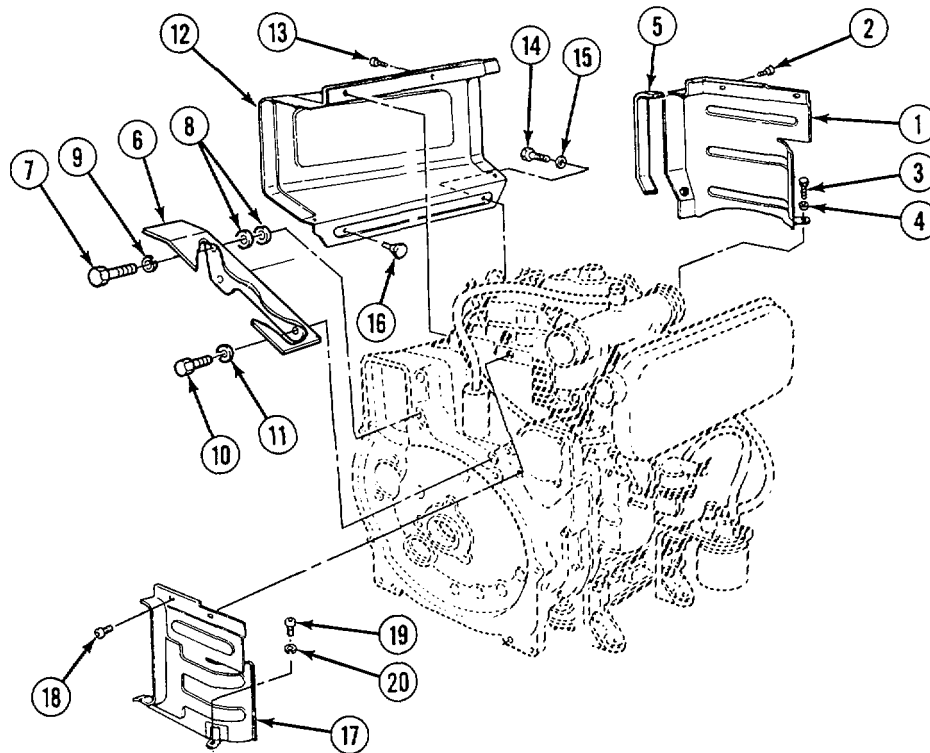
Materials/Parts

Lockwashers



a. Front Shroud.

- (1) Remove front shroud (1) as follows:
 - (a) Remove two screws (2) using a cross tip off-set screwdriver.
 - (b) Remove screw (3) and washer (4) using a 10 mm open end wrench.
 - (c) Remove rubber seal (5) and front shroud (1).
 - (c) Remove rubber seal (5) and front shroud (1).

4-55. NOISE SHROUDS REPLACEMENT (CONT).

(2) Install front shroud (1) as follows:

- (a) Install rubber seal (5) on front shroud (1).
- (b) Position front shroud (1) and install screw (3), and washer (4) using a 10 mm open end wrench.
- (c) Install two screws (2) using a cross tip off-set screwdriver.

b. Fan Shroud.

(1) Remove fan shroud (6) as follows:

- (a) Remove two screws (7), four washers (8), and two lockwashers (9) using a 17 mm open end wrench.
- (b) Remove screw (10) and lockwasher (11) using a 13 mm open end wrench.
- (c) Remove fan shroud (6).

(2) Install fan shroud (6) as follows:

- (a) Position fan shroud (6) and install lockwasher (11), and screw (10) using a 13 mm open end wrench.
- (b) Install two lockwashers (9), two screws (7), and four washers (8) using a 17 mm open end wrench.

c. Left Shroud.

- (1) Remove left shroud (12) as follows:
 - (a) Remove three screws (13) using a cross tip screwdriver.
 - (b) Remove screw (14) and washer (15) using a ratchet, extension and 13 mm socket.
 - (c) Remove left shroud (12).
 - (d) Remove spacer (16) from left shroud (12).
- (2) Install left shroud (12) as follows:
 - (a) Install spacer (16) in left shroud (12).
 - (b) Position left shroud (12) and install screw (14) and washer (15) using a ratchet, extension and 13 mm socket.
 - (c) Install three screws (13) using a cross tip screwdriver.

d. Rear Shroud.

- (1) Remove rear shroud (17) as follows:
 - (a) Remove vapor separator (para 4-38).
 - (b) Remove two screws (18) using a cross tip screwdriver.
 - (c) Remove screw (19) and lockwasher (20) using a ratchet and 10 mm socket.
 - (d) Remove rear shroud (17).
- (2) Install rear shroud (17) as follows:
 - (a) Position rear shroud (17) and install screw (19) and lockwasher (20) using a ratchet and 10 mm socket.
 - (b) Install two screws (18) using a cross tip screwdriver.
 - (c) Install vapor separator (para 4-38).

NOTE**Follow-on maintenance:**

- **Install rear and top panels (para 4-98)**
- **Install left and right access covers (para 3-5)**

END OF TASK

4-56. ALTERNATOR BELT REPLACEMENT.

This task covers:

- a. Removal
- b. Installation

INITIAL SETUP

Tools

Tool Kit, General Mechanic's: Automotive

Materials/Parts

Alternator belt

Equipment Condition

TM or Para

Para 3-5

Condition Description

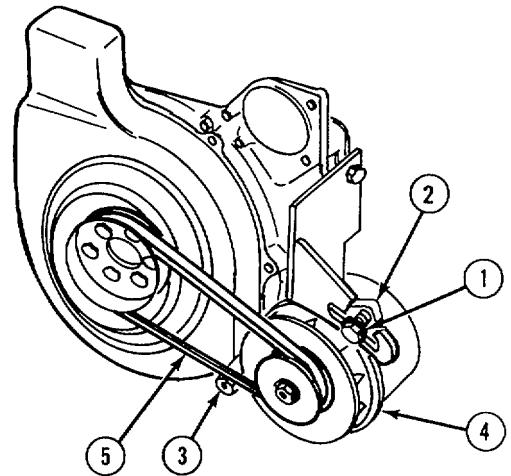
Right side access cover opened.

a. Removal

- (1) Loosen screw (1) on mounting ear (2) using a 1/2 in. open end wrench.
- (2) Loosen nut (3) using a ratchet and 3/4 in. socket.
- (3) Pivot alternator (4) and remove belt (5).

b. Installation.

- (1) Install belt (5) on alternator (4), and pivot alternator away from engine until thumb pressure at center of belt causes approximately 1/2 in. (13 mm) deflection.
- (2) Tighten screw (1) to 24 lb-ft (33 N•m) using a torque wrench and 1/2 in. socket.
- (3) Tighten nut (3) using a ratchet and 3/4 in. socket.



END OF TASK

NOTE

Follow-on maintenance: Close right access cover (para 3-5)

4-57. ALTERNATOR AND MOUNTING BRACKET REPLACEMENT/REPAIR.

This task covers:

- | | | |
|----------------|-----------------|------------|
| a. Removal | c. Assembly | e. Testing |
| b. Disassembly | d. Installation | |

INITIAL SETUP

Tools

Shop Equipment, Automotive Maintenance and Repair; Organizational Maintenance, Common No.2, Less Power

Equipment Condition

TM or Para
Para 4-73

Condition Description

Battery cables disconnected.
Alternator belt removed.

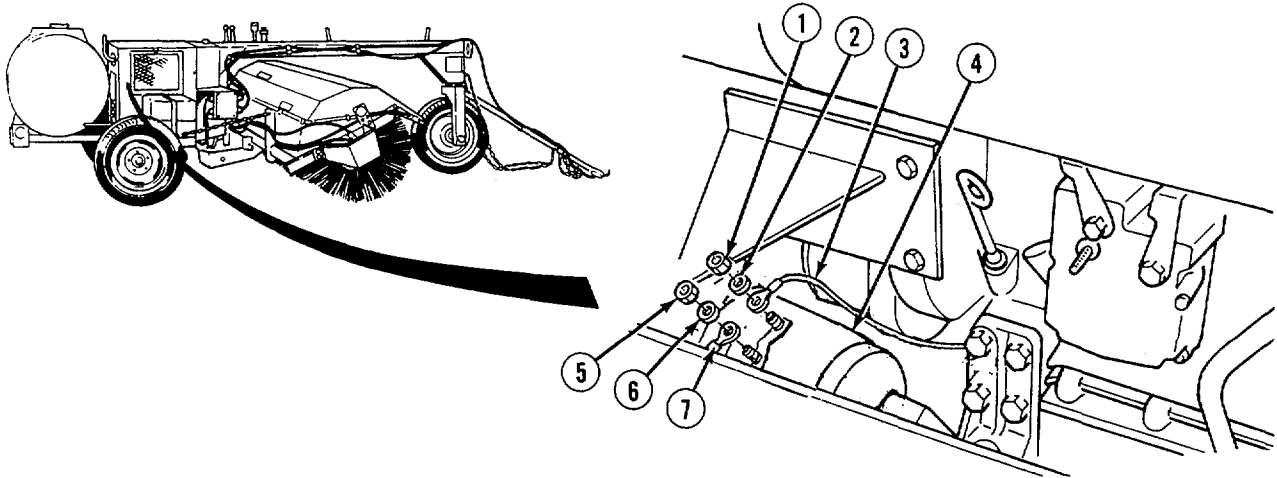
Materials/Parts

Locknuts
Lockwashers
Tags, identification, item 35 Appendix E

NOTE

Tag all wires before removal to aid in installation.

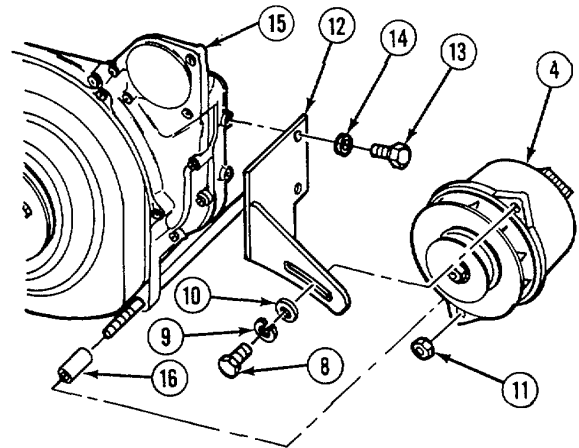
a. Removal.



- (1) Remove nut (1), washer (2), and tag and remove ground wire (3) from alternator (4) using a 7/16 in. Open end wrench.
- (2) Remove nut (5), washer (6), and tag and remove main harness wire (7) from alternator (4) using a 7/16 in. open end wrench.

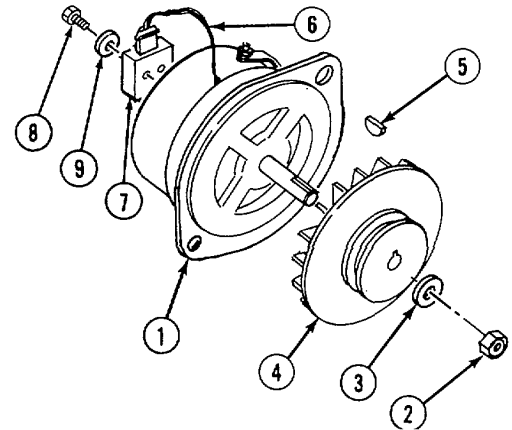
4-57 ALTERNATOR AND MOUNTING BRACKET REPLACEMENT/REPAIR (CONT).

- (3) Remove screw (8), lockwasher (9), and washer (10) using a 1/2 in. open end wrench.
- (4) Remove locknut (11) using a 3/4 in. Open end wrench.
- (5) Remove alternator (4) from mounting bracket (12).
- (6) Remove two screws (13) and two lockwashers (14) using a ratchet and 1/2 in. socket.
- (7) Remove mounting bracket (12) from engine (15). Remove spacer (16).



b. Disassembly.

- (1) Place alternator (1) in a vise and remove nut (2) and washer (3) using a ratchet and 3/4 in. socket.
- (2) Using a puller, remove pulley (4).
- (3) Remove woodruff key (5).
- (4) Remove wire (6) from regulator (7).
- (5) Remove two screws (8), two washers (9), and regulator (7) from alternator (1) using a flat tip screwdriver.

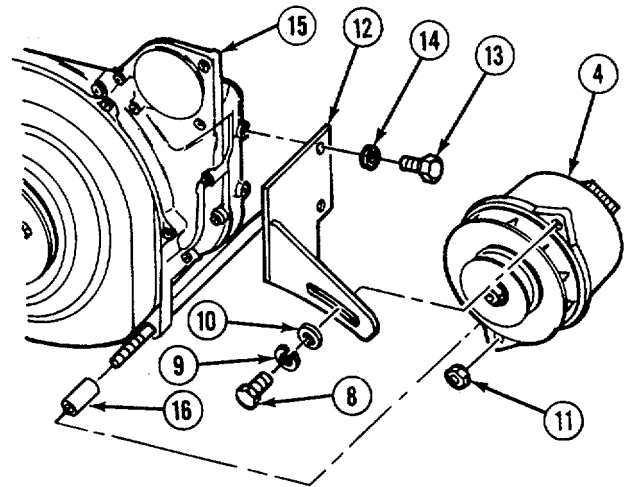


c. Assembly.

- (1) Install regulator (7), two washers (9), and two screws (8) on alternator (1) using a flat tip screwdriver.
- (2) Connect wire (6) on regulator (7).
- (3) Install woodruff key (5).
- (4) Install pulley (4).
- (5) Place alternator (1) in a vise and install washer (3) and nut (2). Tighten to 50 lb-ft (68 N•m) using a torque wrench and 3/4 in. socket.

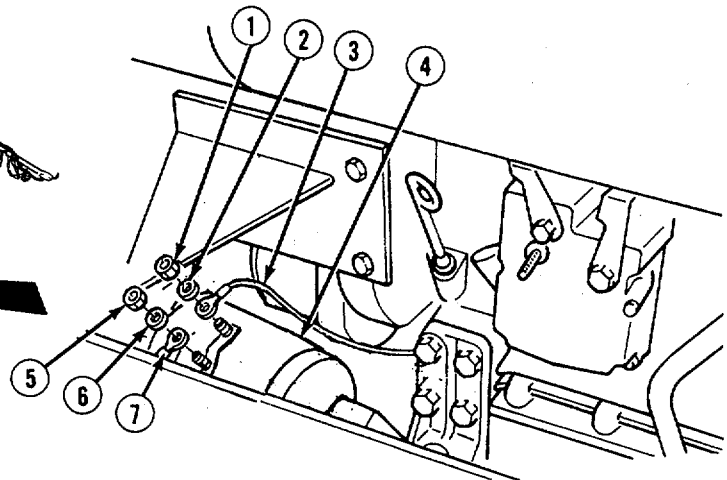
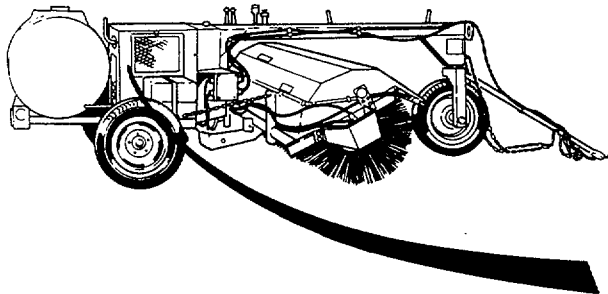
d. Installation.

- (1) Install spacer (16) on mounting bracket (12).
- (2) Install mounting bracket (12) on engine (15) using two lockwashers (14) and screws (13). Tighten using a ratchet and 1/2 in. socket.
- (3) Align alternator (4) on mounting bracket (12) and install locknut (11) finger tight.
- (4) Install washer (10), lockwasher (9), and screw (8) finger tight.



NOTE

Ground wire to engine is connected to terminal marked BAT- on alternator. Main harness wire is connected to terminal marked BAT+ on alternator.



- (5) Install main harness wire (7), washer (6), and nut (5) on alternator (4) using a 7/16 in. open end wrench.
- (6) Install ground wire (3), washer (2), and nut (1) on alternator (4) using a 7/16 in. open end wrench.

4-57. ALTERNATOR AND MOUNTING BRACKET REPLACEMENT/REPAIR (CONT).

e. Testing.

NOTE

If testing is to be accomplished, alternator follow-on tasks must be performed first.

- (1) Turn all lights and accessories on, then pull shutoff handle while cranking engine 10-15 seconds (para 2-8). This discharges the battery.
- (2) Release fuel shutoff handle and turn off lights and accessories.
- (3) Open right side access cover and attach voltmeter and ammeter as shown.

CAUTION

If voltmeter reading exceeds 30.3 volts, shut engine down immediately or damage to equipment may result. Refer to table 4-6.

- (4) Start engine (para 2-8), and accelerate to 1500-2000 RPM. Normal voltage is 24 V, and normal amperage is 28.2 to 28.8 amps. Take readings and refer to table 4-6.
- (5) Remove voltmeter and ammeter and close right side engine access cover.

NOTE

Follow-on maintenance:

- Connect battery cables (para 4-73)
- Install alternator belt (para 4-56)

END OF TASK

Negative Ground

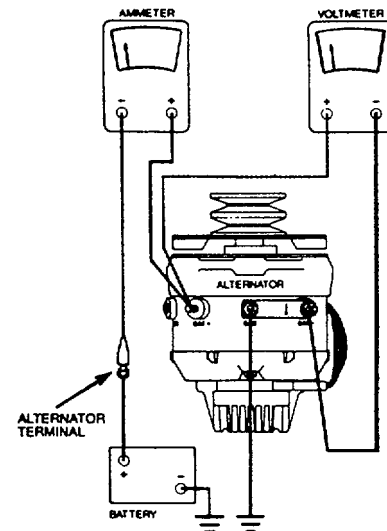


Table 4-6. Alternator Testing.

Amps	Volts	Diagnosis
High	Low	Charging system OK. Battery not yet fully charged. Wait for charging system to bring battery to full charge: amps should fall and volts should stabilize within Normal Range.
High	Normal	Watch until amps fall or volts exceed Normal Range. If amps fall and volts remain normal, charging system OK. If volts exceed normal, regulator should be replaced.
High	High	Regulator should be replaced.
Low	Low	Make sure voltmeter leads are attached to alternator, not battery. If no affect observed, replace alternator.
Low	Normal	Charging system OK
Low	High	If battery checks OK, regulator should be replaced.

4-58. STARTER REPLACEMENT.

This task covers:

- a. Removal
- b. Installation

INITIAL SETUP

Tools

Tool Kit, General Mechanic's: Automotive

Materials/Parts

Lockwashers
 Starwasher
 Tags, identification, item 35 Appendix E

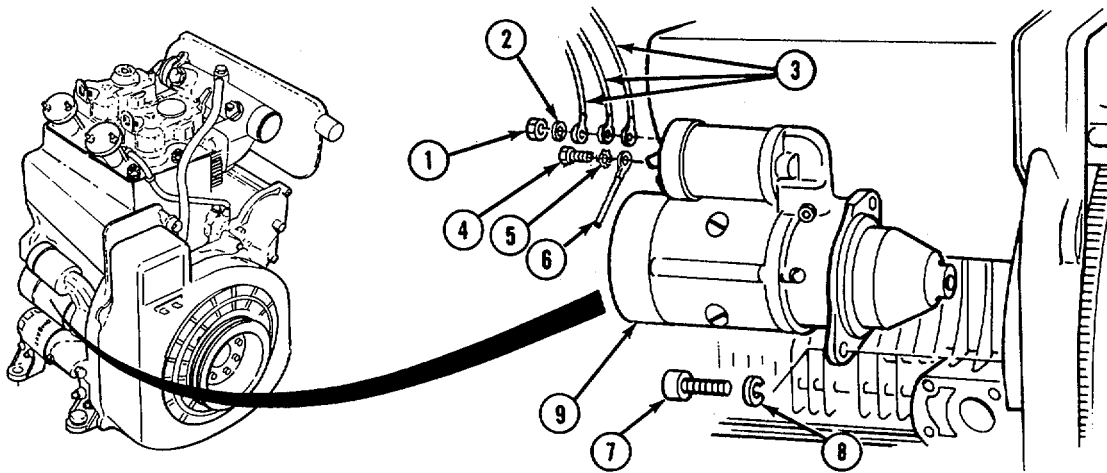
Equipment Condition

TM or Para	Condition Description
Para 4-73	Battery cables disconnected.
Para 4-55	Left shroud removed.

General Safety Instructions

Engine completely cooled.

a. Removal



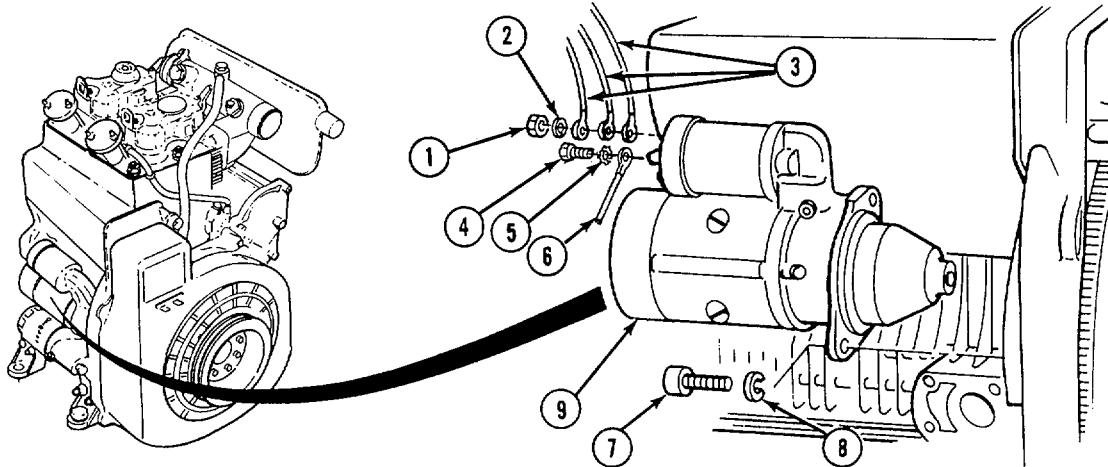
WARNING

Make sure engine has completely cooled before starting this procedure. Injury to personnel may result.

NOTE

Tag all wires before removal to aid in installation.

- (1) Remove nut (1), lockwasher (2), and tag and remove three wires (3) using a 13 mm open end wrench.
- (2) Remove screw (4), starwasher (5), and tag and remove wire (6) using a flat tip screwdriver.
- (3) Remove two screws (7), lockwashers (8), and starter (9) using a 8 mm hex head wrench.

4-58. STARTER REPLACEMENT (CONT).**b. Installation.**

- (1) Position starter (9) and install two lockwashers (8) and two screws (7) using a 8 mm hex head wrench.
- (2) Install three wires (3), lockwasher (2), and nut (1) using a 13 mm open end wrench.
- (3) Install wire (6), starwasher (5), and screw (4) using a flat tip screwdriver.

NOTE**Follow-on maintenance:**

- **Connect battery cables (para 4-73)**
- **Install left noise shroud (para 4-55)**

END OF TASK

4-59. GAGE BULB REPLACEMENT.

This task covers:

- a. Removal
- b. Installation

INITIAL SETUP

Tools

Tool Kit, General Mechanic's: Automotive

Materials/Parts

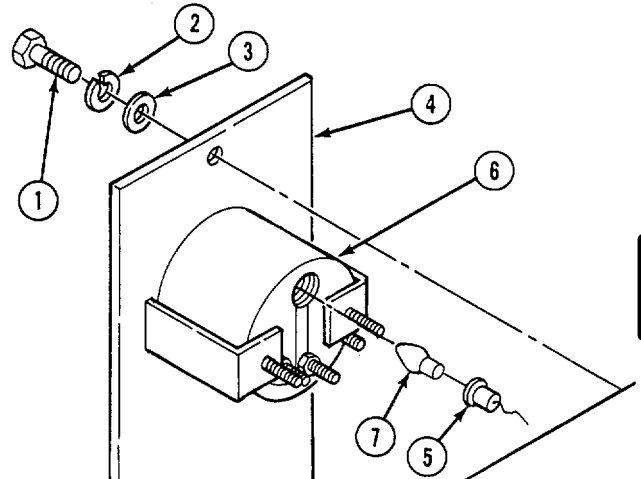
Lockwasher
Bulb

a. Removal

- (1) Remove screw (1), lockwasher (2), and washer (3) using a 7/16 in. open end wrench. Lower panel (4).
- (2) Pull socket (5) from rear of gage (6).
- (3) Remove bulb (7) from socket (5).

b. Installation.

- (1) Install bulb (7) in socket (5).
- (2) Install socket (5) in rear of gage (6).
- (3) Raise panel (4) and install washer (3), lockwasher (2), and screw (1) using a 7/16 in. open end wrench.



END OF TASK

4-60. KEY SWITCH REPLACEMENT.

This task covers:

- a. Removal
- b. Installation

INITIAL SETUP

Tools

Tool Kit, General Mechanic's: Automotive

Equipment Condition

TM or Para
Para 4-73

Condition Description

Battery cables disconnected.

Materials/Parts

Lockwashers
Tags, identification, item 35 Appendix E

a. Removal

- (1) Remove screw (1), lockwasher (2), and washer (3) using a 7/16 in. open end wrench. Lower panel (4).

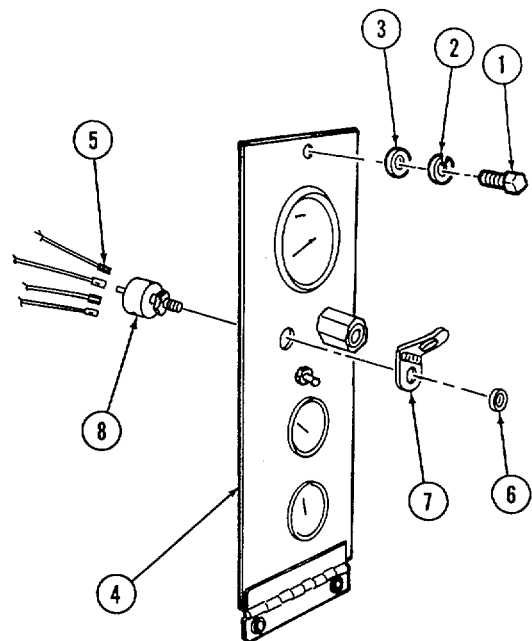
NOTE

Tag all wires before removal to aid in installation.

- (2) Tag and disconnect four wires (5).
- (3) Remove nut (6) using pliers.
- (4) Remove cover (7).
- (5) Remove switch (8) from rear of panel (4).

b. Installation.

- (1) Install switch (8) in rear of panel (4).
- (2) Install cover (7).
- (3) Install nut (6) using pliers.
- (4) Install four wires (5).
- (5) Raise panel (4) install washer (3), lockwasher (2), and screw (1) using a 7/16 in. open end wrench.



NOTE

Follow-on maintenance: Connect battery cables (para 4-73)

END OF TASK

4-61. PUSH BUTTON REPLACEMENT.

This task covers:

- a. Removal
- b. Installation

INITIAL SETUP

Tools

Tool Kit, General Mechanic's: Automotive

Materials/Parts

Lockwashers
Tags, identification, item 35 Appendix E

Equipment Condition

TM or Para
Para 4-73

Condition Description

Battery cables disconnected.

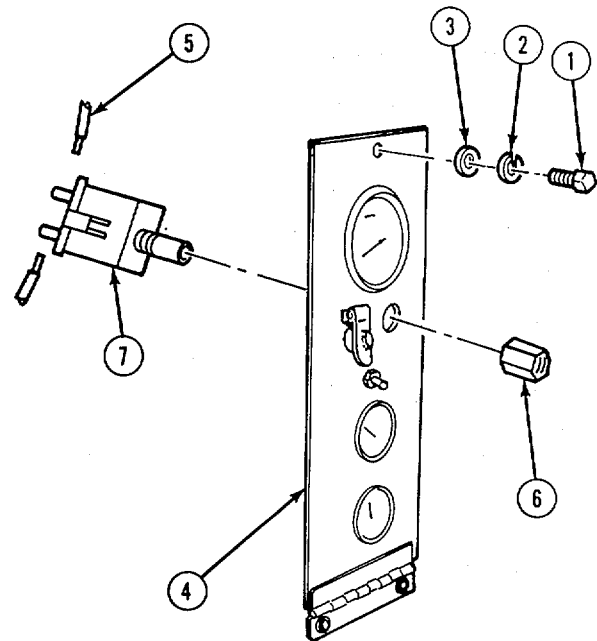
a. Removal.

- (1) Remove screw (1), lockwasher (2), and washer (3) using a 7/16 in. open end wrench. Lower panel (4).

NOTE

Tag all wires before removal to aid in installation.

- (2) Tag and disconnect two wires (5) using a flat tip screwdriver.
- (3) Raise panel (4) and remove push-button housing (6).
- (4) Lower panel (4) and remove push-button (7).



b. Installation.

- (1) Lower panel (4) and install push-button (7).
- (2) Raise panel (4) and install push-button housing (6).
- (3) Lower panel (4) and install two wires (5) using a flat tip screwdriver.
- (4) Raise panel (4) and install washer (3), lockwasher (2), and screw (1) using a 7/16 in. open end wrench.

NOTE

Follow-on maintenance: Connect battery cables (para 4-73)

END OF TASK

4-62. AMMETER SCALE REPLACEMENT.

This task covers:

- a. Removal
- b. Installation

INITIAL SETUP

<i>Tools</i>	<i>Equipment Condition</i>	<i>TM or Para</i>	<i>Condition Description</i>
Tool Kit, General Mechanic's:	Automotive	TM or Para	
	Para 4-73	Battery cables disconnected.	
<i>Materials/Parts</i>			
Lockwashers			
Star washers			
Tags, identification, item 35 Appendix E			

a. Removal

- (1) Remove screw (1), lockwasher (2), and washer (3) using a 7/16 in. open end wrench. Lower panel (4).

NOTE

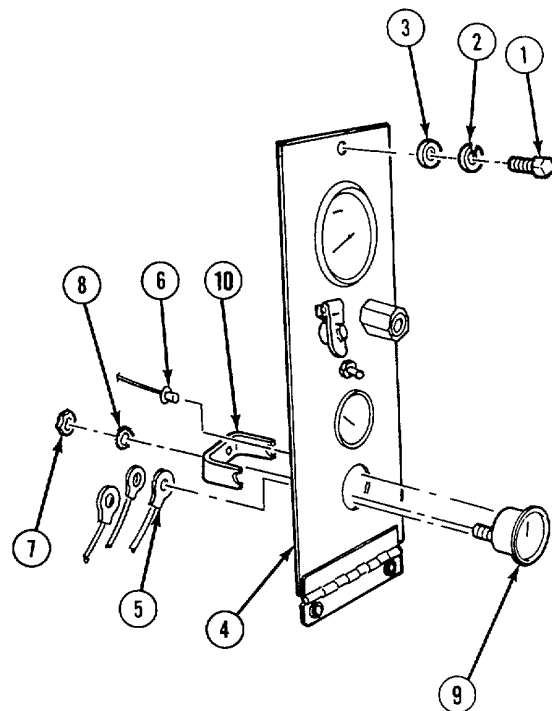
Tag all wires before removal to aid in installation.

- (2) Remove three nuts (7), star washers (8), and tag and disconnect three wires (5) using a ratchet and 11/32 in. socket.
- (3) Remove bulb (6) from socket attached to lead behind gage (9).

CAUTION

Hold gage from front or damage to gage may occur.

- (4) Remove two nuts (7), two star washers (8), and bracket (10) using a 11/32 in. open end wrench.
- (5) Remove gage (9) from front of panel (4).



b. Installation.

- (1) Install gage (9) in front of panel (4).
- (2) Install bracket (10), two star washers (8), and two nuts (7) on panel (4) using a 11/32 in. open end wrench.
- (3) Install bulb (6) in socket and secure on back of gage (9).
- (4) Install three wires (5), three star washers (8), and three nuts (7) using a ratchet and 11/32 in. socket.
- (5) Raise panel (4) and install lockwasher (2), washer (3), and screw (1), using a 7/16 in. open end wrench.

NOTE

Follow-on maintenance: Connect battery cables (para 4-73)

END OF TASK



4-63. FUEL GAGE REPLACEMENT.

This task covers:

- a. Removal
- b. Installation

INITIAL SETUP

Tools

Tool Kit, General Mechanic's: Automotive

Materials/Parts

Lockwashers
 Star washers
 Tags, identification, item 35 Appendix E

Equipment Condition

TM or Para
 Para 4-73

Condition Description

Battery cables disconnected.

a. Removal.

- (1) Remove screw (1), lockwasher (2), and washer (3) using a 7/16 in. open end wrench. Lower panel (4).

NOTE

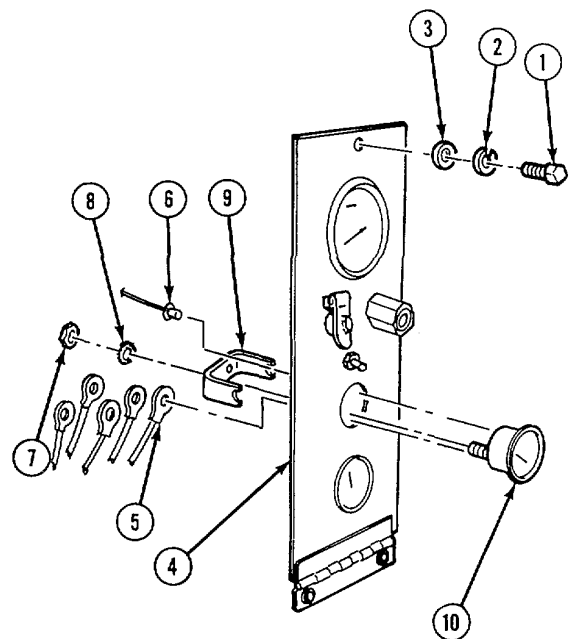
Tag all wires before removal to aid in installation.

- (2) Remove three nuts (7), three star washers (8), and tag and disconnect five wires (5) using a 11/32 in. open end wrench.
- (3) Remove bulb (6) from socket.

CAUTION

Hold gage from front or damage to gage may result.

- (4) Remove two nuts (7), two star washers (8), and bracket (9) using a 11/32 in. open end wrench.
- (5) Remove gage (10) from front of panel (4).



b. Installation.

- (1) Install gage (10) in front of panel (4).
- (2) Install bracket (9), two star washers (8), and two nuts (7) on panel (4) using a 11/32 in. open end wrench.
- (3) Install bulb (6).
- (4) Install five wires (5), three nuts (7), and three star washers (8) using a 11/32 in. open end wrench.
- (5) Raise panel (4) and install washer (3), lockwasher (2), and screw (1) using a 7/16 in. open end wrench.

NOTE

Follow-on maintenance: Connect battery cables (para 4-73)

END OF TASK

4-64. SPRAY PUMP TOGGLE SWITCH REPLACEMENT.

This task covers:

- a. Removal
- b. Installation

INITIAL SETUP

Tools

Tool Kit, General Mechanic's: Automotive

Materials/Parts

Lockwasher

Tags, identification, item 35 Appendix E

Equipment Condition

TM or Para

Para 4-73

Condition Description

Battery cables disconnected.

a. Removal.

- (1) Remove screw (1), lockwasher (2), and washer (3) using a 7/16 in. open end wrench. Lower panel (4).

NOTE

Tag all wires before removal to aid in installation.

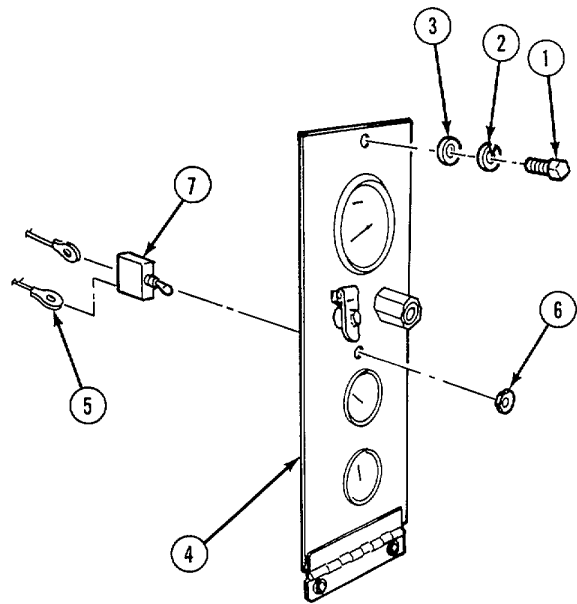
- (2) Tag and disconnect two wires (5) using a flat tip screwdriver.

NOTE

Nut and plastic cover are one piece that can be pulled off the switch.

- (3) Remove nut (6) using a 5/8 in. open end wrench.

- (4) Remove switch (7) from rear of panel (4).



b. Installation.

- (1) Install switch (7).
- (2) Install nut (6) using a 5/8 in. open end wrench.
- (3) Install two wires (5) using a flat tip screwdriver.
- (4) Raise panel (4) and install washer (3), lockwasher (z), and screw (1) using a 7/16 in. open end wrench.

NOTE

Follow-on maintenance: Connect battery cables (para 4-73)

END OF TASK

4-65. FUSE AND HOLDER REPLACEMENT.

This task covers:

- a. Removal
- b. Installation

INITIAL SETUP

Tools

Tool Kit, General Mechanic's: Automotive

Equipment Condition

TM or Para
Para 4-73

Condition Description

Battery cables
disconnected.

Materials/Parts

Lockwasher
Fuse
Fuse holder
Tags, identification, item 35 Appendix E

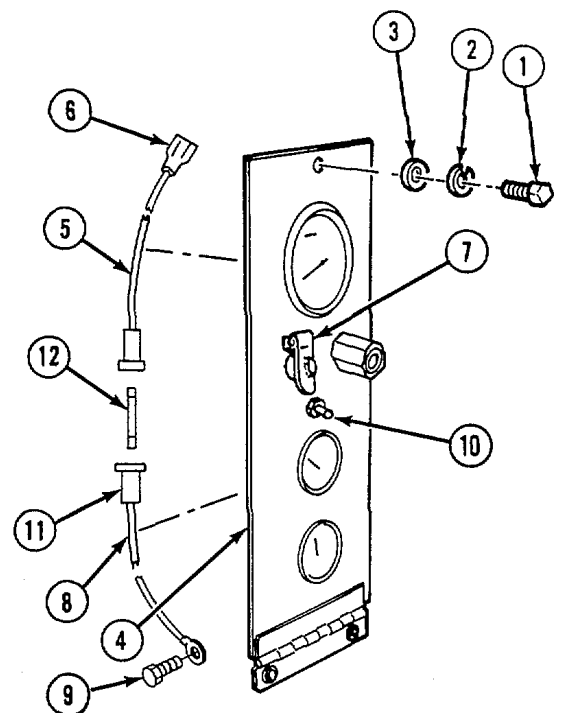
a. Removal.

- (1) Remove screw (1), lockwasher (2), and washer (3) using a 7/16 in. open end wrench. Lower panel (4).

NOTE

Tag all wires before removal to aid in installation.

- (2) Tag wire (5) and unplug connector (6) from back of ignition switch (7).
- (3) Tag wire (8) and remove screw (9) from back of spray pump toggle switch (10) using a flat tip screwdriver. Remove wires (5 and 8).
- (4) Remove fuse holder (11), and fuse (12).



b. Installation.

- (1) Install fuse (12) in holder (11).
- (2) Install wire (8) and screw (9) on back of spray pump toggle switch (10) using a flat tip screwdriver.
- (3) Connect wire (5) on back of ignition switch (7).
- (4) Raise panel (4) and install washer (3), lockwasher (2), and screw (1) using a 7/16 in. open end wrench.

NOTE

Follow-on maintenance: Connect battery cables (para 4-73)

END OF TASK

4-66. JUNCTION BOX REPLACEMENT/REPAIR.

This task covers:

- | | |
|----------------|-----------------|
| a. Removal | c. Assembly |
| b. Disassembly | d. Installation |

INITIAL SETUP

Tools

Tool Kit, General Mechanic's: Automotive

Materials/Parts

Locknuts
 Lockwashers
 Tags, identification, item 35 Appendix E

NOTE

- Ensure harness (12V or 24V) to tow vehicle is disconnected.
- Refer to Appendix H for electrical schematic.

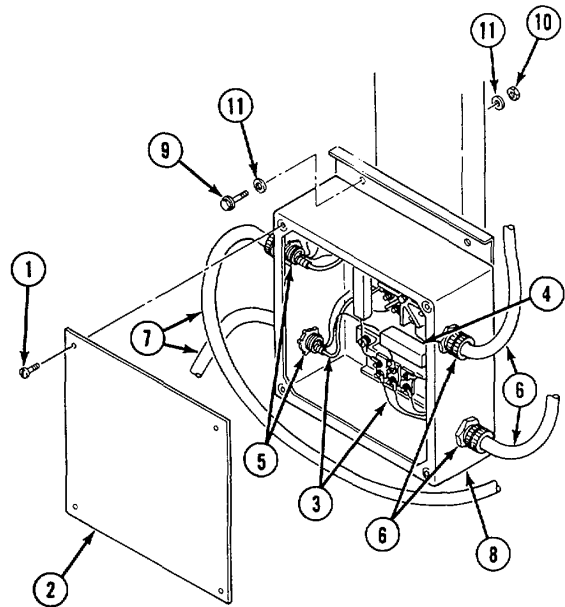
a. Removal

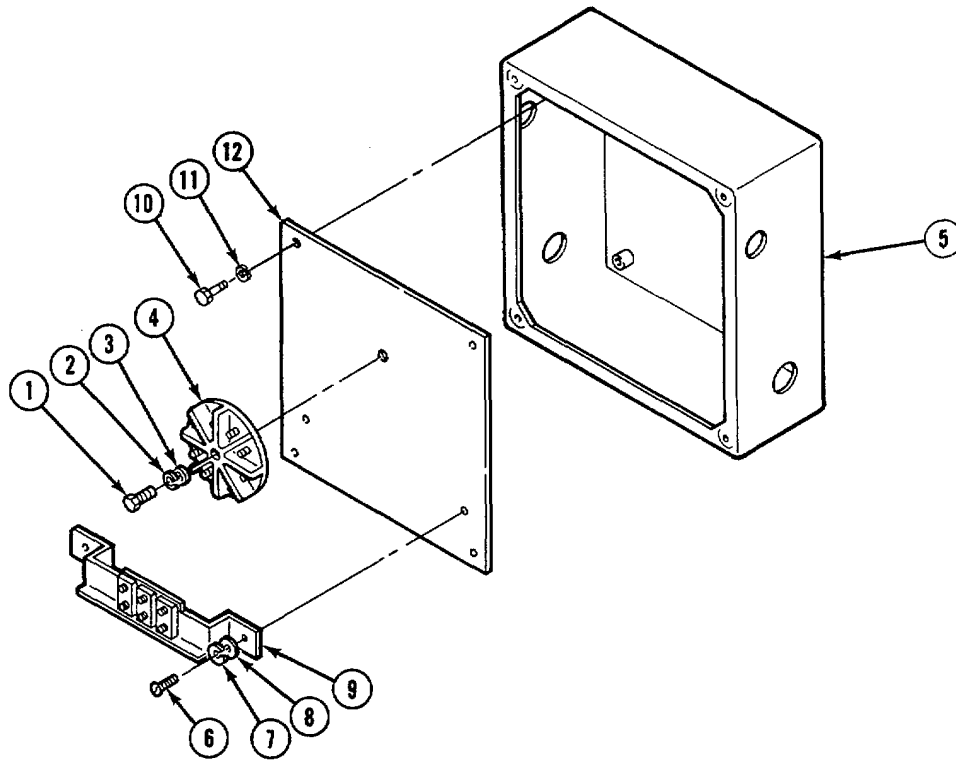
- (1) Remove four screws (1) and cover (2) using flat tip screwdriver.

NOTE

Tag and mark all wires before removal.

- (2) Tag and remove wires (3) and three resistors (4) using 3/8 in. socket and drive.
- (3) Remove four locking rings (5) using pliers.
- (4) Loosen four knurled knobs (6) and remove four wiring cables (7) from junction box (8) using pliers.
- (5) Remove four screws (9), four locknuts (10), eight washers (11) and junction box (8) using 7/16 in. open end wrench, ratchet and 7/16 in. socket.





b. Disassembly.

- (1) Remove screw (1), lockwasher (2), washer (3) and terminal block (4) from junction box (5) using flat tip screwdriver.
- (2) Remove two screws (6), two lockwashers (7), two washers (8) and circuit breaker base (9) using flat tip screwdriver.
- (3) Remove four screws (10), four lockwashers (11) and plate (12) using flat tip screwdriver.

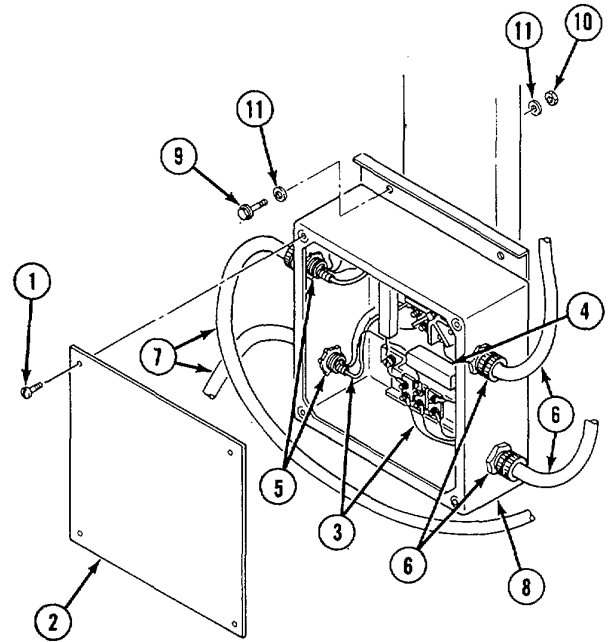
c. Assembly.

- (1) Install plate (12), four lockwashers (11) and four screws (10) in junction box (5) using flat tip screwdriver.
- (2) Install circuit breaker base (9), two washers (8), two lockwashers (7) and two screws (6) using flat tip screwdriver.
- (3) Install terminal block (4), washer (3), lockwasher (2) and screw (1) in junction box (5) using flat tip screwdriver.

4-66. JUNCTION BOX REPLACEMENT/REPAIR (CONT).

d. Installation.

- (1) Install junction box (8), four screws (9), eight washers (11) and four nuts (10) using 7/16 in. open end wrench, ratchet and 7/16 in. socket.
- (2) Install four cables (7), four locking rings (5) and tighten four knurled knobs (6) using pliers.
- (3) Install wires (3) and three resistors (4) using 3/8 in. socket and drive.
- (4) Install cover (2) and four screws (1) using flat tip screwdriver.



END OF TASK

4-67. CIRCUIT BREAKER AND RESISTOR REPLACEMENT (JUNCTION BOX).

This task covers:

- a. Removal
- b. Installation

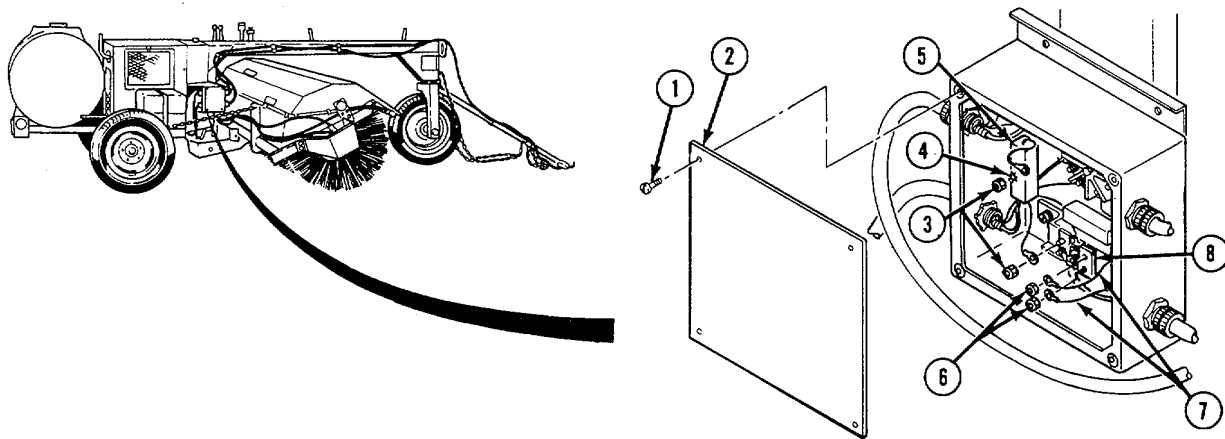
INITIAL SETUP

Tools

Tool Kit, General Mechanic's: Automotive

Materials/Parts

Star washers
Tags, identification, item 35 Appendix E



NOTE

- wire harness (12V or 24V) to tow vehicle is disconnected.
- fuses and resistors are removed and replaced in the same manner.
- all wires before removal to aid in installation.
- to Appendix H for electrical schematics.

a. Removal

- (1) Remove four screws (1) and junction box cover (2) using a flat tip screwdriver.
- (2) Remove two nuts (3), star washer (4), and resistor (5) using a 3/8 in. socket and drive.
- (3) Remove two nuts (6), tag and remove wires (7), and circuit breaker (8) using a 3/8 in. socket and drive.

b. Installation.

- (1) Install circuit breaker (8), wires (7), and two nuts (6) using a 3/8 in. socket and drive.
- (2) Install resistor (5), star washer (4), and two nuts (3) using a 3/8 in. socket and drive.
- (3) Install junction box cover (2) and four screws (1) using a flat tip screwdriver.

END OF TASK

4-68. FUSE AND HOLDER REPLACEMENT.

This task covers:

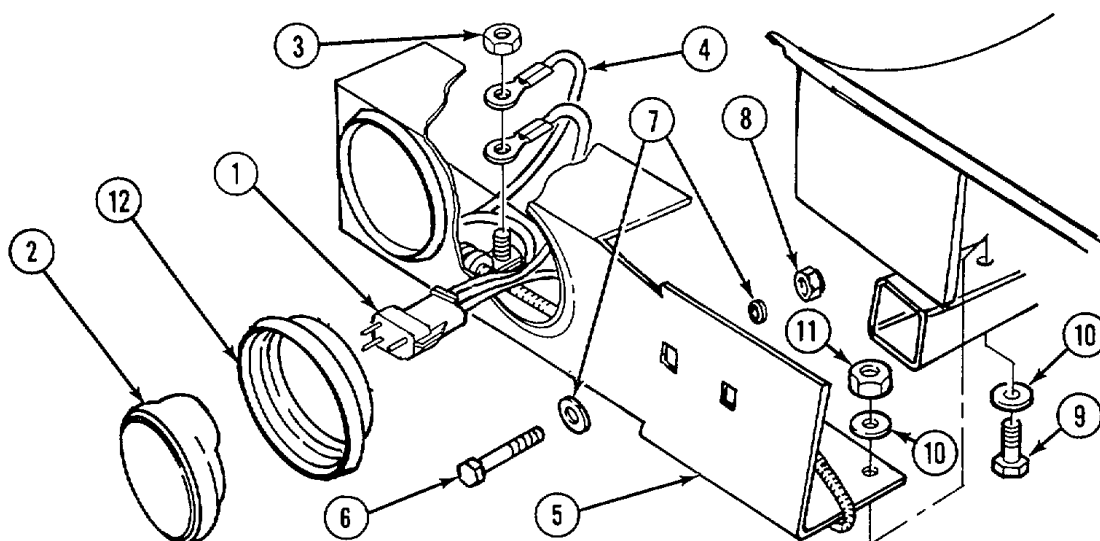
- a. Removal b. Installation

INITIAL SETUP*Tools*

Tool Kit, General Mechanic's: Automotive

*Equipment Condition*TM or Para
Para 4-69*Condition Description*
Side lamp removed.*Materials/Parts*

Locknut

a. Removal.**NOTE****Ensure the wiring harness (12V or 24V) to tow vehicle is disconnected.**

- (1) Unplug wire (1) from light (2).
- (2) Remove nut (3) and two wires (4) from fender (5) using a 7/16 in. open end wrench.
- (3) Remove screw (6), two washers (7), and locknut (8) using a 3/4 in. open end wrench, ratchet and 3/4 in. socket.
- (4) Remove screw (9), two washers (10), locknut (11), and fender (5) using a 3/4 in. open end wrench, ratchet and 3/4 in. socket.
- (5) Remove light (2) and diaphragm (12) from back of fender (5).

b. Installation.

- (1) Install light (2) into diaphragm (12).
- (2) Install diaphragm (12) into back of fender (5).
- (3) Position fender (5) and install screw (9), washers (10), and locknut (11) using a 3/4 in. open end wrench and 3/4 in. socket.
- (4) Install screw (6), two washers (7), and locknut (8) using a 3/4 in. open end wrench, ratchet and 3/4 in. socket.
- (5) Install wires (4) and nut (3) on fender (5) using a 7/16 in. open end wrench.
- (6) Plug wire (1) on light (2).

NOTE

Follow-on maintenance: Install side lamp (para 4-69)

END OF TASK

4-69. SIDE LAMP REPLACEMENT.

This task covers:

- a. Removal
- b. Installation

INITIAL SETUP

Tools

Tool Kit, General Mechanic's: Automotive

Materials/Parts

Lamp

NOTE

- All side lamps are removed the same.
- Ensure the wiring harness (12V or 24V) to tow vehicle is disconnected.

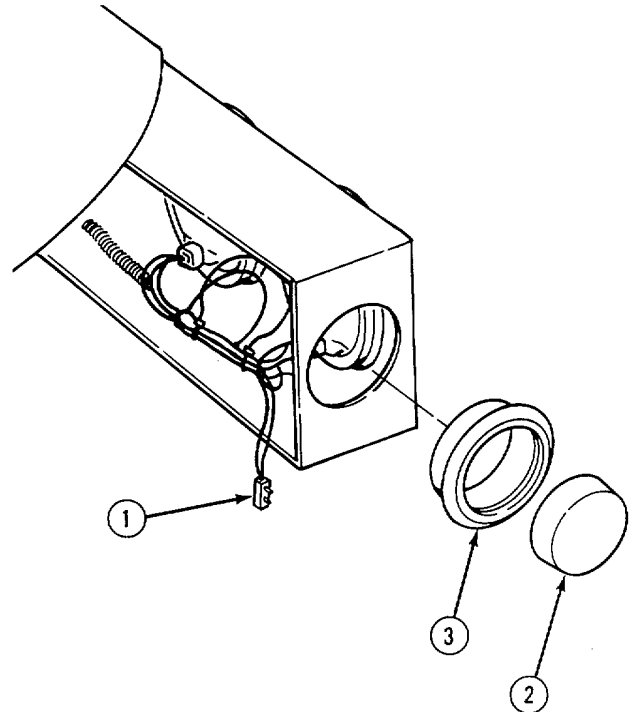
a. Removal.

- (1) Remove wire (1).
- (3) Remove light (2) and diaphragm (3).

b. Installation.

- (1) Install diaphragm (3) and light (2).
- (2) Install wire (1).

END OF TASK



4-70. SIDE LAMP BRACKET REPLACEMENT (FRONT).

This task covers:

- a. Removal
- b. Installation

INITIAL SETUP

Tools

Tool Kit, General Mechanic's: Automotive

Equipment Condition

TM or Para
Para 4-69

Condition Description
Side lamp removed.

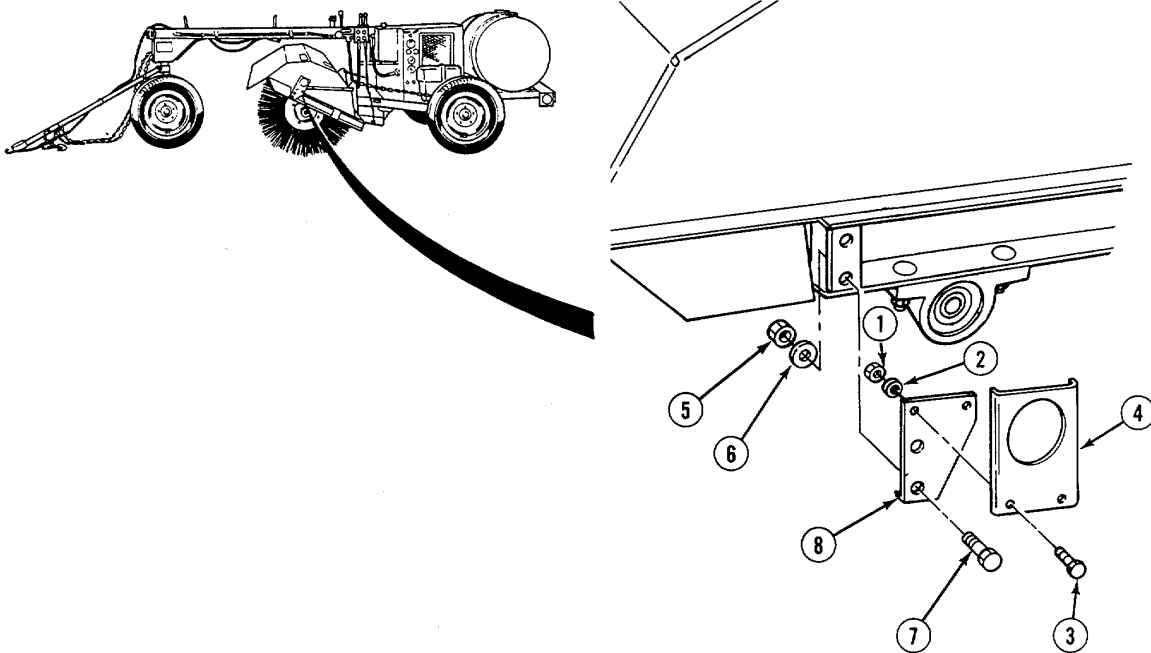
Materials/Parts

Lockwashers
Locknuts

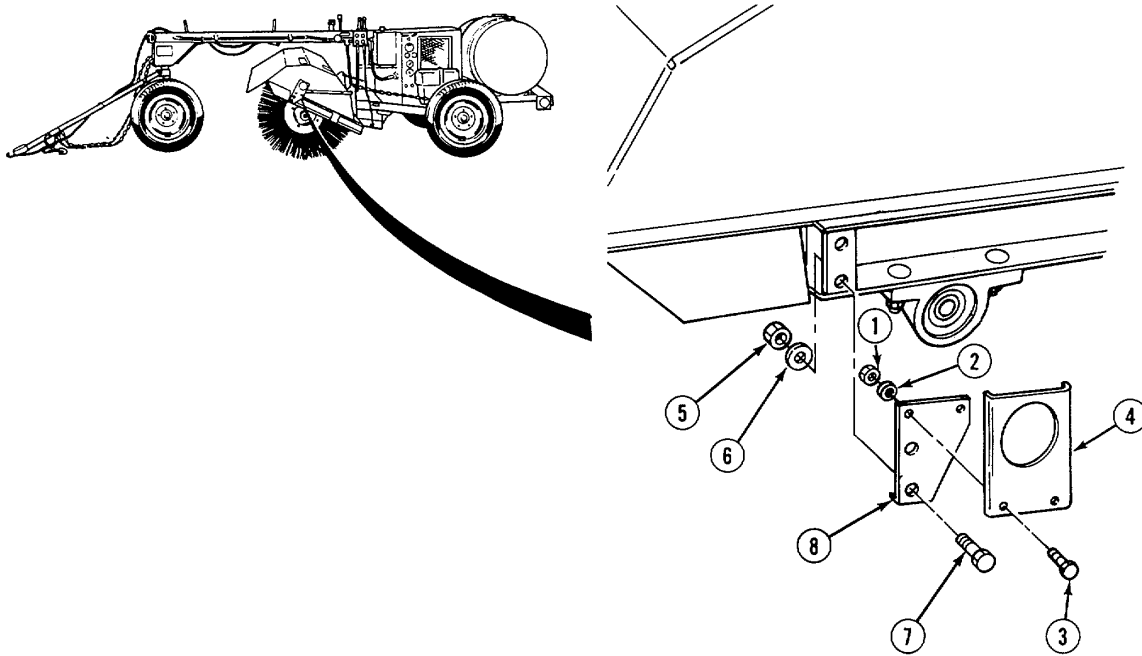
a. Removal

NOTE

Both side lamp brackets are replaced the same way.



- (1) Remove two nuts (1), two lockwashers (2), two screws (3), and bracket (4) using a 9/16 in. open end wrench, ratchet and 9/16 in. socket.
- (2) Remove two locknuts (5), two washers (6), two screws (7), and bracket assembly (8) using a 3/4 in. open end wrench, ratchet and 3/4 in. socket.

4-70. SIDE LAMP BRACKET REPLACEMENT (CONT).**b. Installation.**

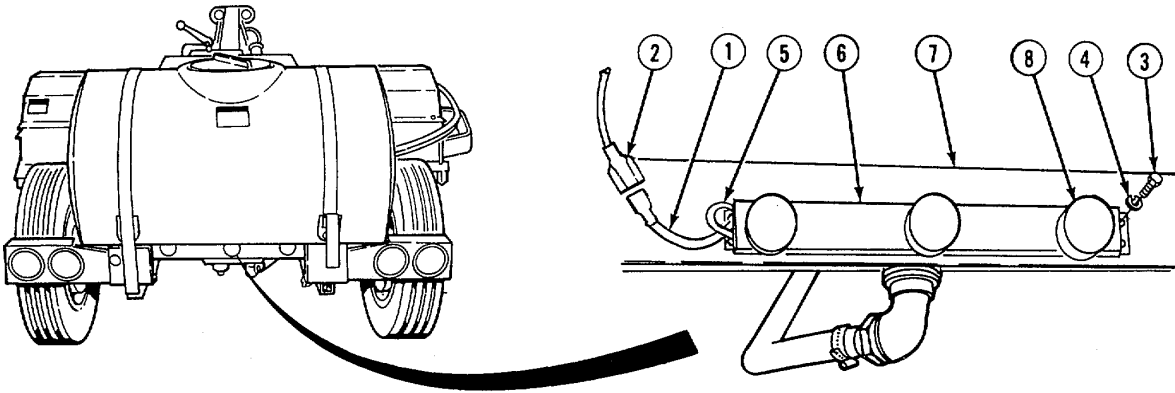
- (1) Position bracket assembly (8) and install two screws (7), two washers (6), and two locknuts (5) using a 3/4 in. open end wrench, ratchet and 3/4 socket.
- (2) Position bracket (4) and install two screws (3), two lockwashers (2), and two locknuts (1) using a 9/16 in. open end wrench, ratchet and 9/16 in. socket.

NOTE

Follow-on maintenance: Install side lamp (para 4-69)

END OF TASK

4-71. CENTER LIGHT AND MOUNT REPLACEMENT.	
This task covers :	
a. Removal	b. Installation
INITIAL SETUP	
<i>Tools</i> Tool Kit, General Mechanic's: Automotive	<i>Materials/Parts</i> Lockwashers



NOTE
Ensure wire harness (12V or 24V) to tow vehicle is disconnected.

a. Removal

- (1) Unplug wire (1) from connector (2).
- (2) Remove four screws (3), four lockwashers (4), ground wire (5), and bracket (6) from frame (7) using a flat tip screwdriver.
- (3) Remove three lamps (8) from bracket (6).

b. Installation.

- (1) Install three lamps (8) in bracket (6).
- (2) Position bracket (6) and install ground wire (5), four lockwashers (4), and screws (3) using a flat tip screwdriver.
- (3) Connect wire (1) to connector (2).

END OF TASK

4-72. FUSE AND HOLDER REPLACEMENT.

This task covers:

- a. Removal
- b. Cleaning/Inspection
- c. Installation

INITIAL SETUP

Tools

Tool Kit, General Mechanic's: Automotive

Equipment Condition

TM or Para
Para 4-73

Condition Description

Battery cables
disconnected.

Materials/Parts

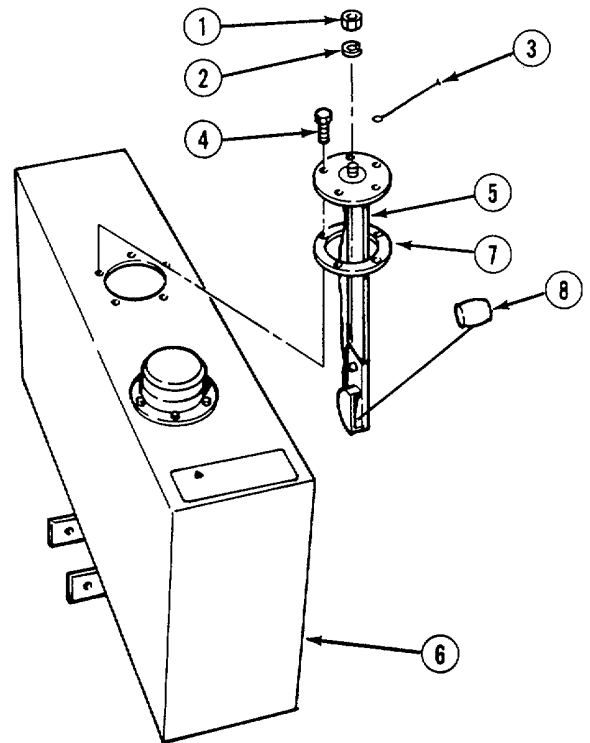
Lockwasher
Gasket
Compound, sealing, item 15 Appendix E
Solvent, dry cleaning, item 31 Appendix E

a. Removal.

WARNING

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine. When working with fuel, post signs that read **NO SMOKING WITHIN 50 FEET (15.24 m) of vehicle.**

- (1) Remove nut (1) and lockwasher (2) using a 3/8 in. open end wrench.
- (2) Disconnect wire (3).
- (3) Remove five screws (4) using a flat tip screwdriver.
- (4) Lift sending unit (5) out of fuel tank (6).
- (5) Remove gasket (7) from tank (6) using a putty knife. Discard gasket.



b. Cleaning/Inspection.**WARNING**

Dry cleaning solvent P-D-680 is toxic and flammable. Wear protective goggles, face mask, and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapor. Do not use near open flame or excessive heat. The flashpoint for type I dry cleaning solvent is 100°F (38°C) and for type II is 140°F (60°C). If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, flush eyes with water and get medical aid immediately.

- (1) Remove any remaining gasket material from fuel tank using dry cleaning solvent P-D-680.
- (2) Visually inspect inside of fuel tank for any debris that may have fallen in during removal of the sending unit.

c. Installation.**WARNING**

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

- (1) Coat gasket (7) with sealing compound and slide gasket over float (8) and install on sending unit (5).
- (2) Install sending unit (5) in fuel tank (6). Align holes in fuel tank and sending unit.
- (3) Install five screws (4) in sending unit (5) using a flat tip screwdriver.
- (4) Install wire (3), lockwasher (2), and nut (1) using a 3/8 in. open end wrench.

NOTE

Follow-on maintenance: Connect battery cables (para 4-73)

END OF TASK

4-73. BATTERY CABLE DISCONNECT.

This task covers:

- a. Removal
- b. Installation

INITIAL SETUP

Tools

Tool Kit, General Mechanic's: Automotive

Materials/Parts

Tags, identification, item 35, Appendix E

NOTE

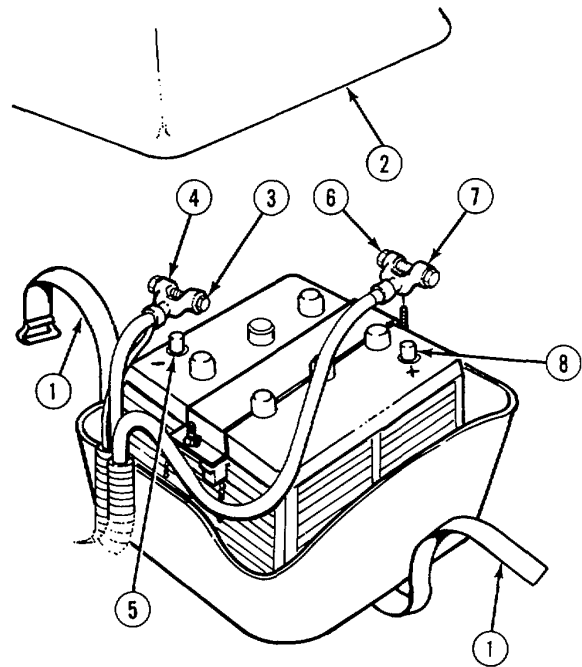
- Refer to Appendix H for electrical schematic.
- Tag all clamps prior to removal to aid in installation.

a. Removal

- (1) Remove strap (1) and battery box cover (2).

WARNING

- Do not wear watches, rings, or other jewelry which could short out battery terminals while servicing batteries. Do not smoke or use open flame around batteries. Batteries may explode from a spark. Battery acid is harmful to skin and eyes.
- Always remove negative (ground) cable on right (muffler) side first, or injury to personnel may occur.



- (2) Loosen nut (3) on negative clamp (4) using a 1/2 in. open end wrench.
- (3) Tag and remove negative clamp (4) from negative post (5) using battery clamp puller.
- (4) Loosen nut (6) on positive battery clamp (7) using a 1/2 in. open end wrench.
- (5) Tag and remove clamp (7) from positive post (8) using a battery clamp puller.
- (6) Repeat steps (1) through (5) for left side battery.

b. Installation.

WARNING

Always install left side battery clamps first or injury to personnel may occur.

- (1) Install positive battery clamp (7) on positive post (8) and tighten nut (6) using a 1/2 in. open end wrench.
- (2) Install negative battery clamp (4) on negative post (5) and tighten nut (3) using a 1/2 in. open end wrench.
- (3) Install battery box cover (2) and strap (1).
- (4) Repeat steps (1) through (3) for right side battery.

END OF TASK

4-111



4-74. FUSE AND HOLDER REPLACEMENT.

This task covers:

- a. Removal
- b. Installation

INITIAL SETUP

Tools

Tool Kit, General Mechanic's: Automotive

Equipment Condition

TM or Para
Para 4-73

Condition Description

Battery cables disconnected.

Materials/Parts

Locknuts

a. Removal.

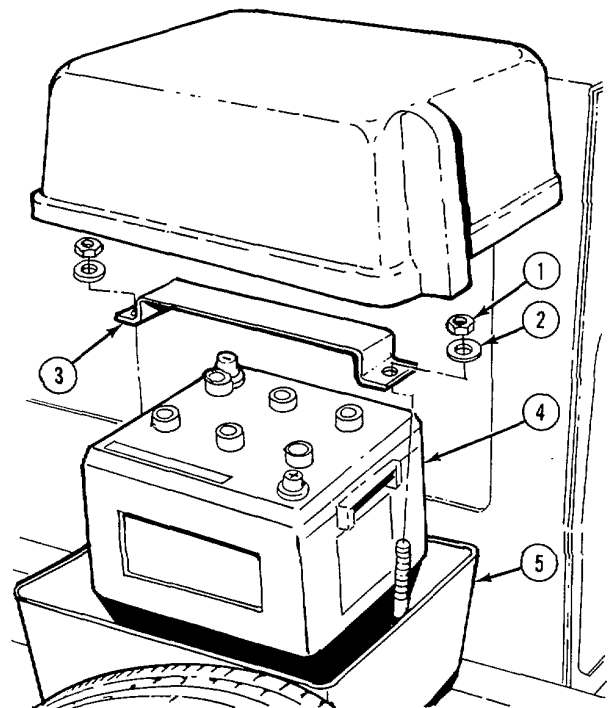
WARNING

Be careful not to short out battery terminals. Do not smoke or use open flame near batteries. Batteries may explode from a spark. Battery acid is harmful to skin and eyes.

NOTE

Right and left side batteries are positioned differently but removed the same way.

- (1) Remove two locknuts (1), two washers (2), and bracket (3) using a 7/16 in. open end wrench.
- (2) Note placement of terminals and lift out battery (4).



b. Installation.

- (1) Position battery (4) in battery box (5) with terminals in proper position.
- (2) Secure battery using bracket (3), two locknuts (1), and two washers (2). Tighten locknuts using a 7/16 in. open end wrench.

NOTE

Follow-on maintenance: Connect battery cables (para 4-73)

END OF TASK

4-75. BATTERY BOX REPLACEMENT.

This task covers:

- a. Removal
- b. Installation

INITIAL SETUP

Tools

Tool Kit, General Mechanic's: Automotive

Equipment Condition

TM or Para
Para 4-74

Condition Description

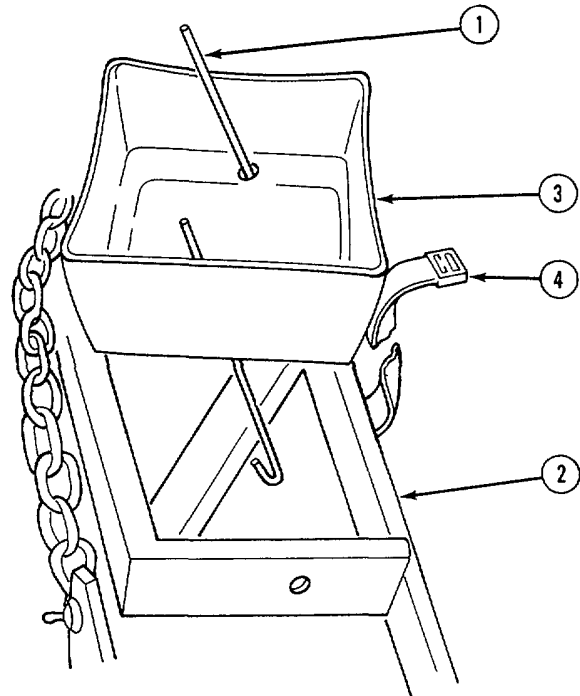
Battery removed.

a. Removal. Unhook two J-bolts (1) from sweeper frame (2) and remove battery box (3), strap (4), and J-bolts.

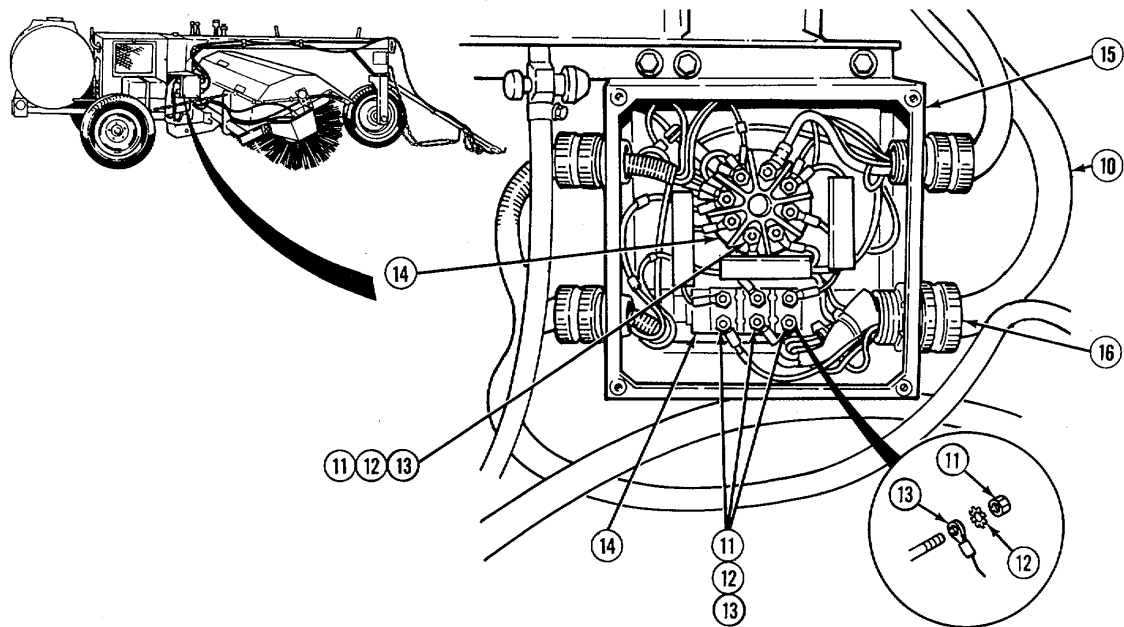
b. Installation. Position strap (4) and battery box (3) on frame (2) and hook two J-bolts (1) on sweeper frame.

NOTE

Follow-on maintenance: Install battery (para 4-74)



END OF TASK

**NOTE**

Tag and mark all wires prior to removal to aid in installation.

- (4) Remove seven nuts (11), seven star washers (12), and tag and remove seven wires (13) from terminal block (14) in junction box (15) using a 3/8 in. socket and drive.
 - (5) Remove knurled nut (16) and harness (10) from junction box (15).
- b. Repair.** Repair of the 12V wire harness consists of replacing damaged terminals (para 4-83). Refer to the electrical schematic, Appendix H, for cable lead diagram.
- c. Installation.**
- (1) Install harness (10) in junction box (15) using knurled nut (16). Tighten using split jaw pliers.
 - (2) Install seven wires (13), seven nuts (11), and seven star washers (12) using a 3/8 in. socket and drive.

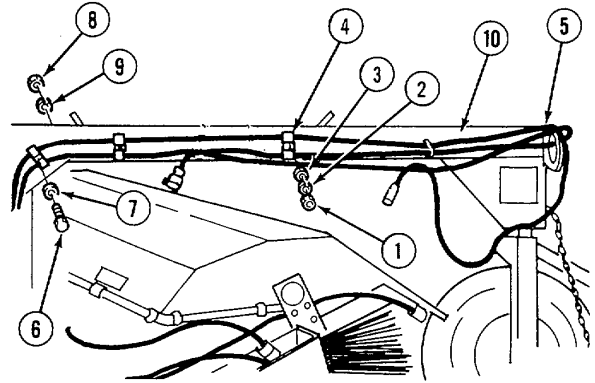
4-76. TOW VEHICLE TO JUNCTION BOX WIRE HARNESS (12V) REPLACEMENT/REPAIR (CONT).

- (3) Install harness (10), three clamps (4), three nuts (1), three lockwashers (2), and three washers (3) on front boom (6) using a ratchet and 7/16 in. socket.
- (4) Install clamp (4), screw (6), washer (7), lockwasher (9), and nut (8) using a ratchet, 7/16 in. socket and 7/16 in. open end wrench.
- (5) Wrap unused 12V wiring harness around harness stowage pegs.

NOTE

Follow-on maintenance: Install junction box cover (para 4-66)

END OF TASK



4-77. TOW VEHICLE TO JUNCTION BOX WIRE HARNESS (24V) REPLACEMENT/REPAIR.

This task covers:

- a. Removal
- b. Repair
- c. Installation

INITIAL SETUP

Tools

Tool Kit, General Mechanic's: Automotive

Equipment Condition

TM or Para
Para 4-66

Condition Description

Junction box cover removed.

Materials/Parts

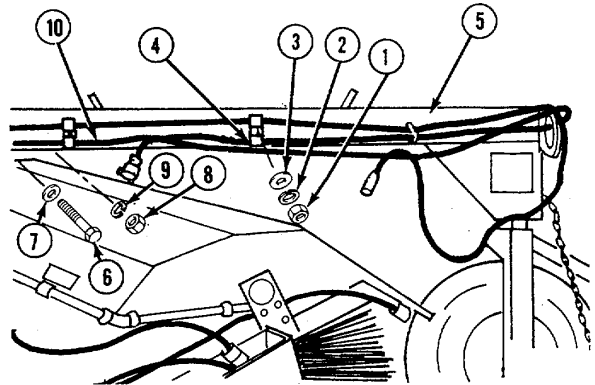
Lockwashers
Star washer
Tags, identification, item 35 Appendix E

NOTE

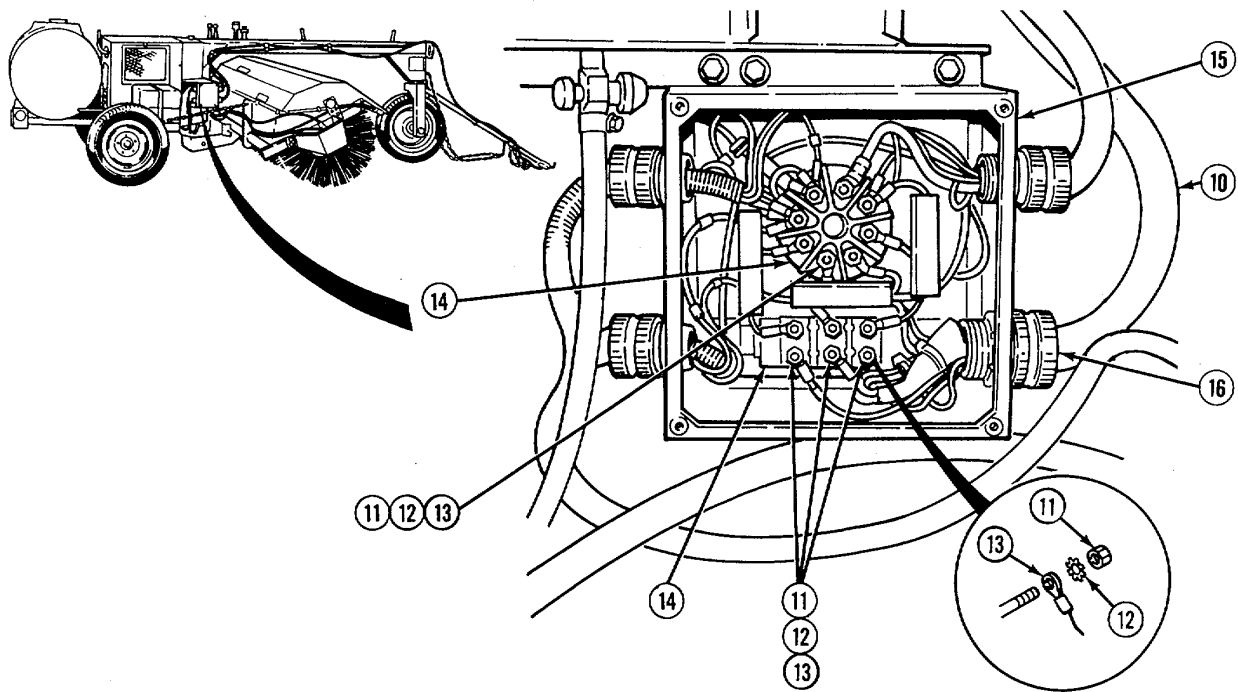
- Ensure the wiring harness (12V or 24V) to tow vehicle is disconnected.
- Refer to Appendix H for electrical schematic.

a. Removal

- (1) If stowed, unwrap 24V wiring harness from harness stowage pegs.
- (2) Remove three nuts (1), three lockwashers (2), three washers (3), and clamps (4) from front boom (5) using a ratchet and 7/16 in. socket.
- (3) Remove screw (6), washer (7), nut (8), lockwasher (9), clamp (4), and black 24V harness (10) from front boom (5) using a ratchet, 7/16 in. socket and 7/16 in. open end wrench.



4-77. TOW VEHICLE TO JUNCTION BOX WIRE HARNESS (24V) REPLACEMENT/REPAIR (CONT).

**NOTE**

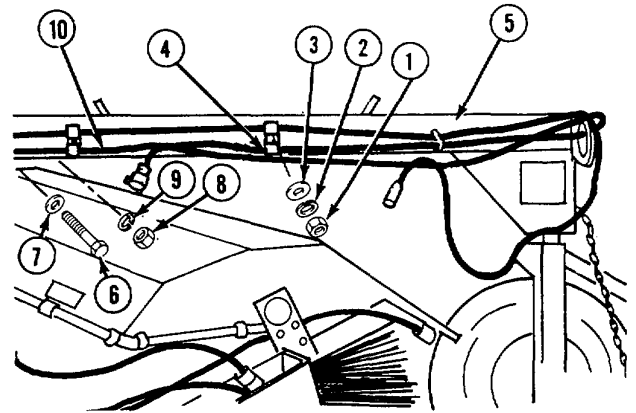
Tag and mark all wires prior to removal to aid in installation.

- (4) Remove four nuts (11), four star washers (12), and tag and remove five wires (13) from terminal block (14) in junction box (15) using a 3/8 in. socket and drive.
 - (5) Remove knurled nut (16) using pliers and remove harness (10).
- b. Repair.** Repair of the 24V wire harness consists of replacing damaged terminals (para 4-83). Refer to the electrical schematic, Appendix H, for cable lead diagram.
- c. Installation.**
- (1) Install harness (10) and knurled nut (16) on junction box (15).
 - (2) Install five wires (13), four star washers (12), and four nuts (11) on terminal block (14) using a 3/8 in. socket and drive.

- (3) Install harness (10), clamp (4), three nuts (1), three lockwashers (2), and three washer (3) on front boom (5) using a ratchet and 7/16 in. socket.
- (4) Install clamp (4), screw (6), washer (7), lockwasher (9), and nut (8) using a ratchet, 7/16 in. socket and 7/16 in. open end wrench
- (5) Wrap unused 24V wiring harness around harness stowage pegs.

NOTE

Follow-on maintenance: Install junction box cover (para 4-66)



END OF TASK

4-78. BROOM HOOD WIRING HARNESS/CONDUIT REPLACEMENT/REPAIR.

This task covers:

a. Removal

b. Repair

c. Installation

INITIAL SETUP

Tools

Tool Kit, General Mechanic's: Automotive

Equipment Condition

TM or Para
Para 4-66

Condition Description

Junction box cover removed.

Materials/Parts

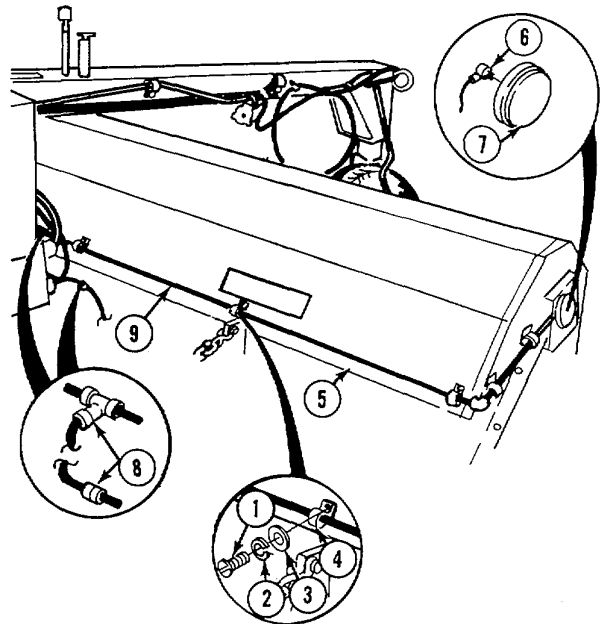
Lockwashers
Star washers
Adhesive, PVC, item 1, appendix E
Primer, PVC, item 28, appendix E
Tags, identification, item 35 appendix E
Conduit (See Appendix G for fabrication)

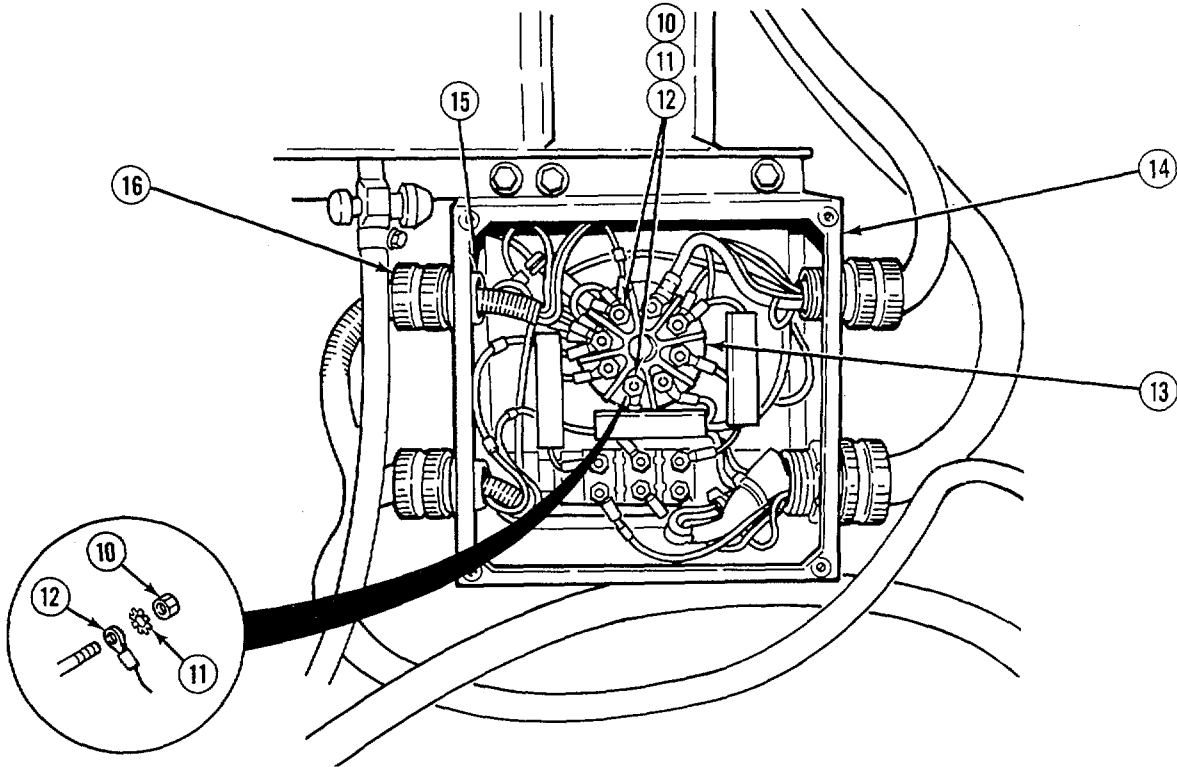
NOTE

- Ensure the wiring harness (12V or 24V) to tow vehicle is disconnected.
- Refer to Appendix H for electrical schematic.

a. Removal.

- (1) Remove 10 screws (1), 10 lockwashers (2), 10 washers (3), and 10 conduit clamps (4) from hood (5) using a flat tip screwdriver.
- (2) Disconnect two connectors (6) from front lights (7).
- (3) Disconnect pigtail connector (8) and remove hood wiring conduit assembly (9) from front hood (5).





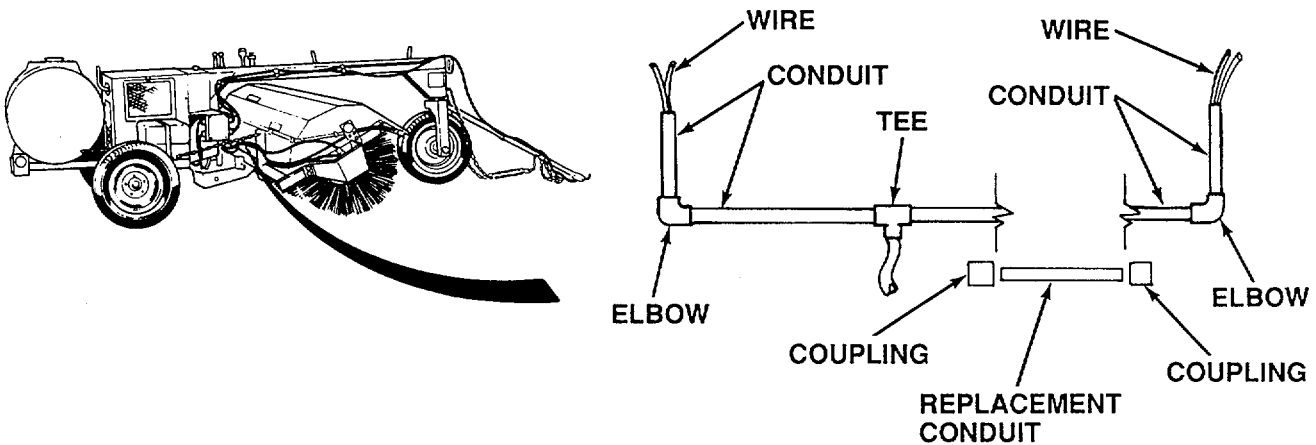
NOTE

Tag and mark all wires prior to removal to aid in installation.

- (4) Remove two nuts (10), two star washers (11), and tag and remove three wires (12) from terminal block (13) in junction box (14) using a 3/8 in. socket and drive.
- (5) Remove knurled nut (15) and harness (16) from junction box (14).

4-78. BROOM HOOD WIRING HARNESS/CONDUIT REPLACEMENT/REPAIR (CONT).

b. Repair.



NOTE

Repair is accomplished with front hood wiring harness and conduit removed from vehicle.

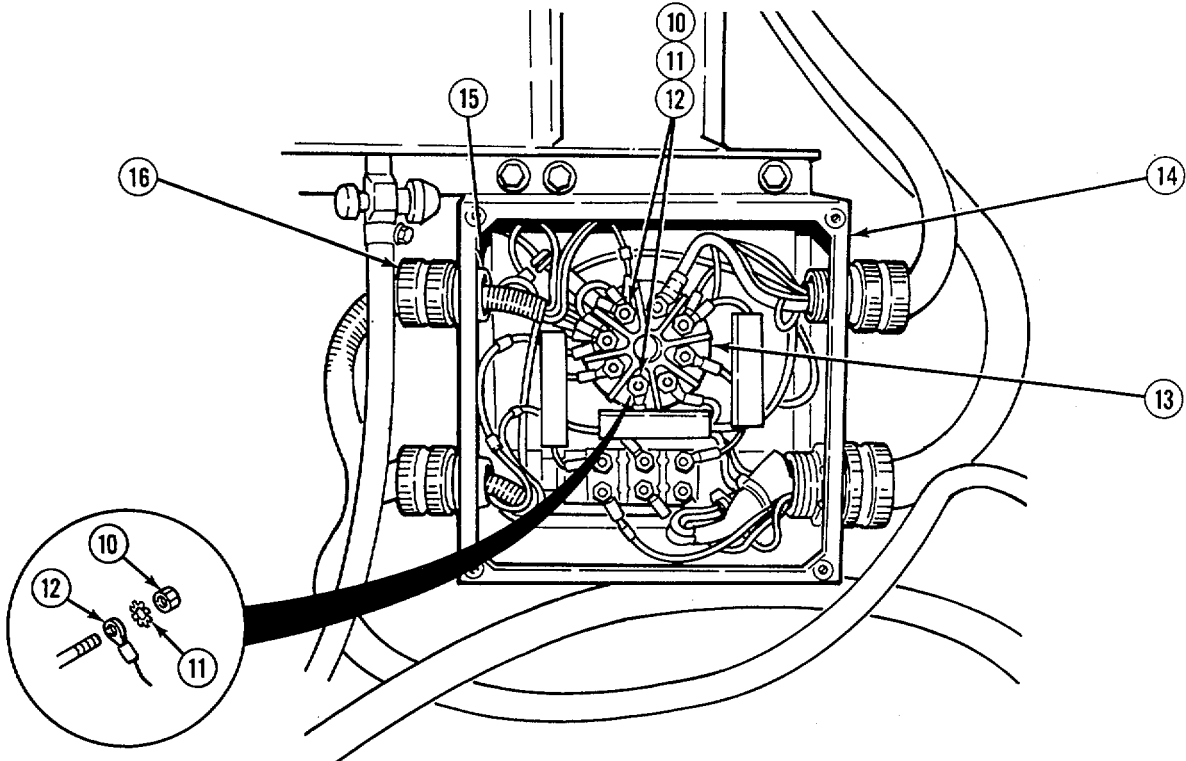
- (1) Carefully open holes in end of conduit and pull wires through.
- (2) Cut out or remove damaged conduit.
- (3) Cut replacement conduit (refer to Appendix G).

WARNING

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

- (4) Clean outside diameter of conduit, inside diameter of couplings, tees, elbows and end caps using PVC primer.
- (5) Pull wires through elbows, couplings, replacement conduit, tee, existing conduit and end caps.
- (6) Apply PVC adhesive to inside diameter of couplings, tees, elbows and end cap and assemble items.

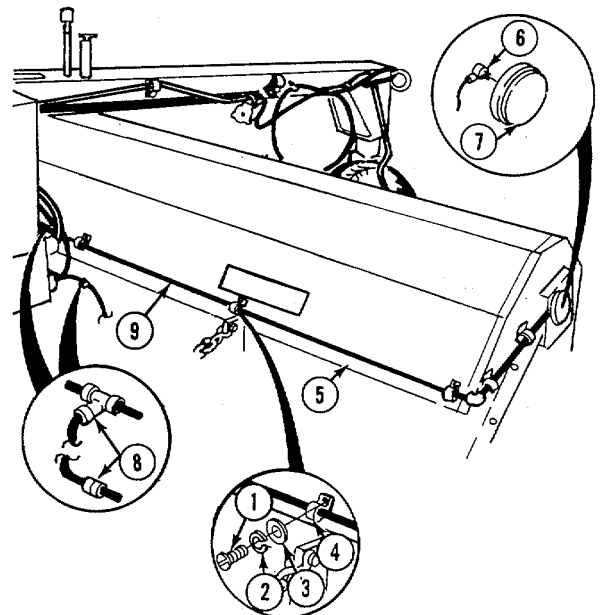
c. *Installation.*



- (1) Install harness (16) and knurled nut (15) on junction box (14) using pliers.
- (2) Install three wires (12), two nuts (10), and two star washers (11) on terminal block (13) in junction box (14) using a 3/8 in. socket and drive.
- (3) Install conduit assembly (9) on front hood (5) and connect pigtail (8) and two connectors (6) to front lights (7).
- (4) Install 10 conduit clamps (4), 10 washers (3), 10 lockwashers (2), and 10 screws (1) on front hood (5) using a flat tip screwdriver.

NOTE

Follow-on maintenance: Install junction box cover (para 4-66)



END OF TASK

4-79. REAR LIGHT WIRE HARNESS REPLACEMENT

This task cover:

a. Removal

b. Installation

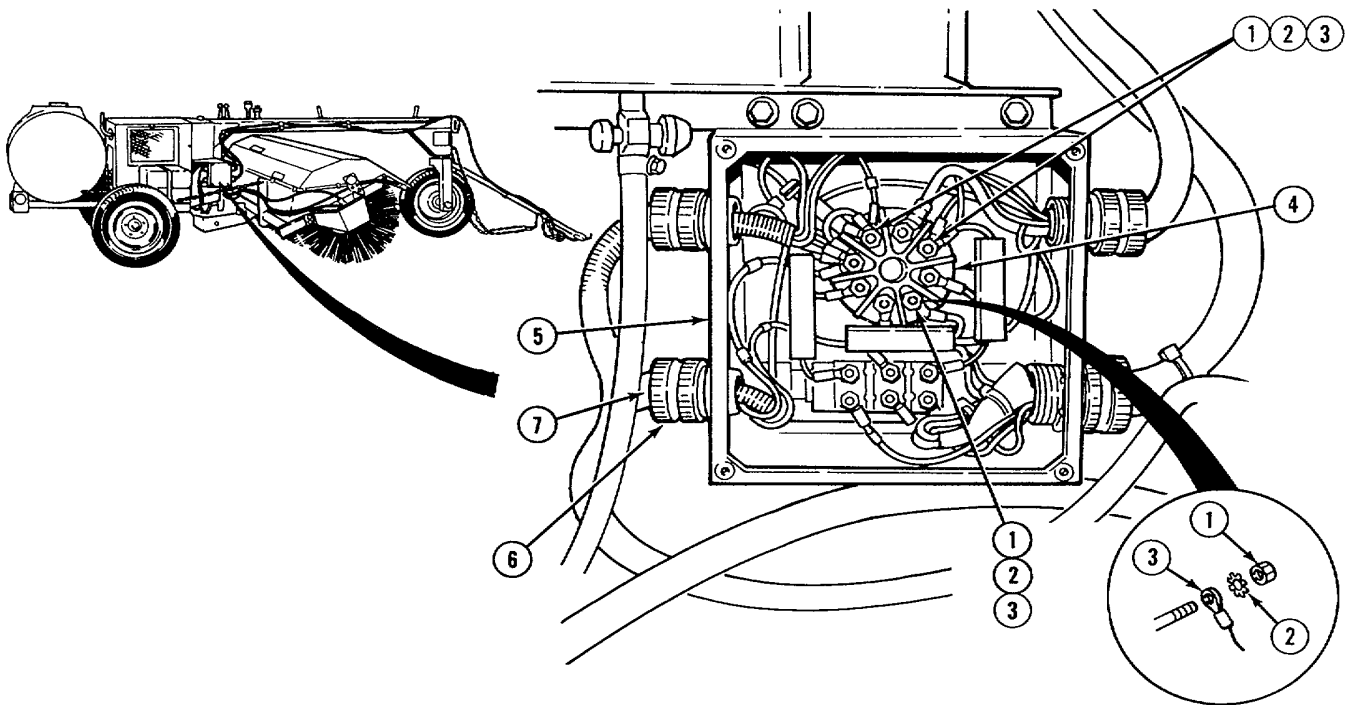
INITIAL SETUP*Tools*

Tool Kit, General Mechanic's Automotive

*Equipment Condition*TM or Para
Para 4-66*Condition Description*Junction box Cover
removed*Materials/Parts*

Star washers

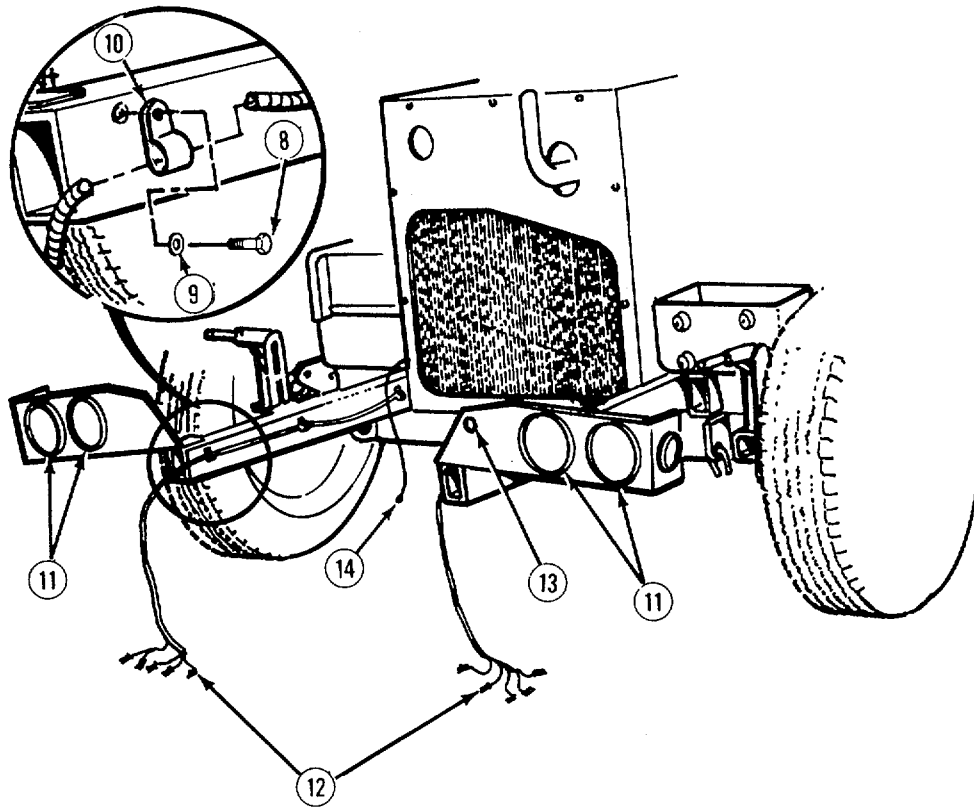
Tags, identification, Item 35 Appendix E

a. Removal.**NOTE**

- Tag all wires and connectors prior to removal to aid in installation.
- Ensure wiring harness (12V or 24V) to tow vehicle is disconnected.
- Refer to Appendix H for electrical schematic.

(1) Remove three nuts (1), three star washers (2), and tag and remove three wires (3) from terminal block (4) in junction box (5) using a 3/8 in. socket and drive.

(2) Loosen knurled nut (6) and remove harness (7) from junction box (5) using a pliers.

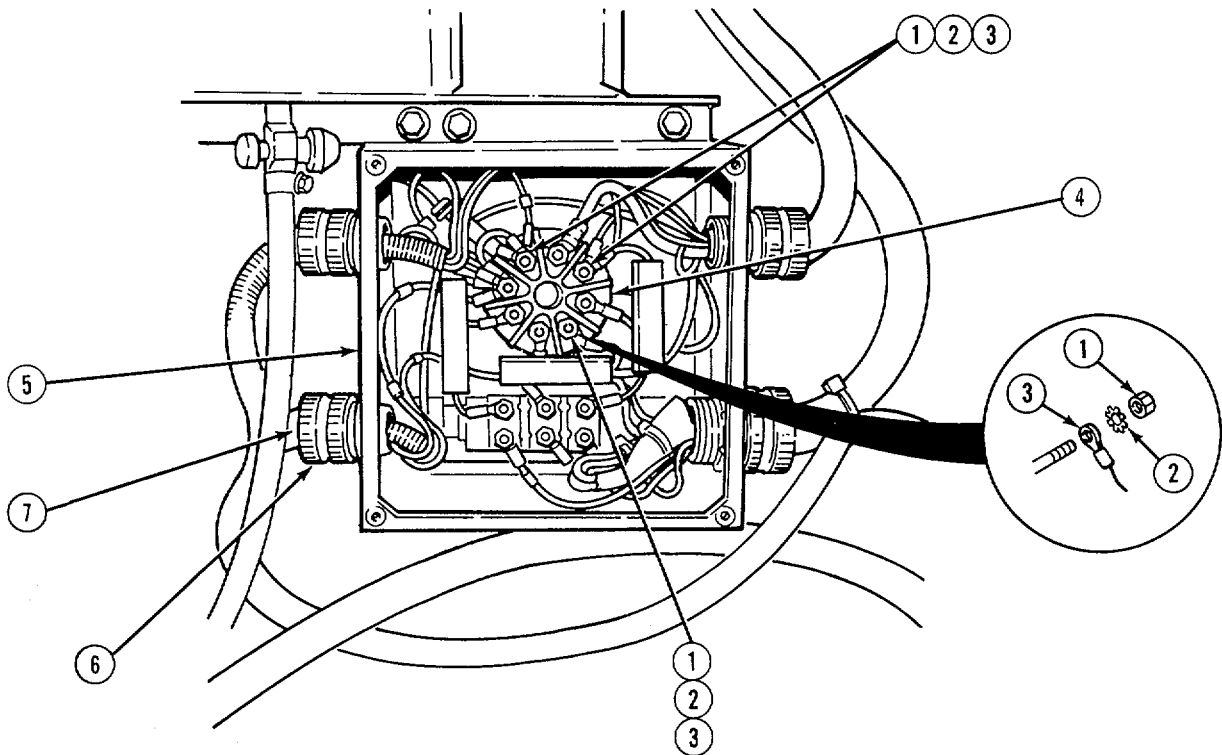


- (3) Remove 14 screws (8), 14 washers (9), and 14 conduit grommets (10) from harness (7) using a ratchet and 7/16 in. socket.
- (4) Tag and remove 10 connectors (12) from rear lights (11).
- (5) Tag and remove wire (14) from center light mount (13).

b. Installation .

- (1) Install wire (14) on center light mount (13).
- (2) Install 10 connectors (12) to rear lights (11).
- (3) Install 14 conduit grommets (10), 14 washers (9), and 14 screws (8) on harness (7) using a ratchet and 7/16 in. socket.

4-79. REAR LIGHT WIRE HARNESS REPLACEMENT (CONT).



- (4) Install harness (7) in junction box (4) and tighten knurled nut (6) using pliers.
- (5) Install three wires (3), three star washers (2), and three nuts (1) on terminal block (4) using a 3/8 in. Socket and drive.

NOTE

Follow-on maintenance: Install junction box cover (para 4-66)

END OF TASK

4-80. REAR LIGHT WIRE HARNESS REPLACEMENT

This task cover:

- a. Removal
- b. Installation

INITIAL SETUP

Tools

Tool Kit, General Mechanic's Automotive

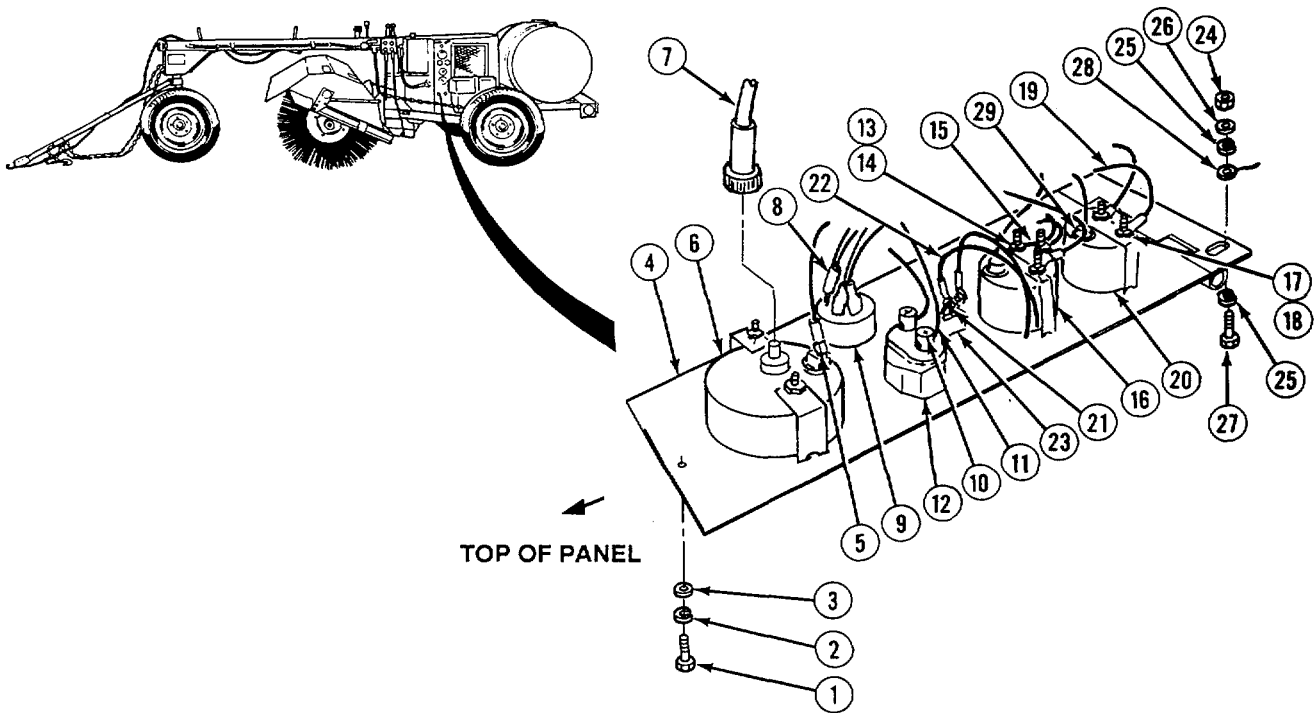
Equipment Condition

TM or Para
Para 4-73

Condition Description
Battery Cables
Disconnected

Materials/ Parts

Lockwashers
Star washers
Tags, identification, Item 35 Appendix E



NOTE

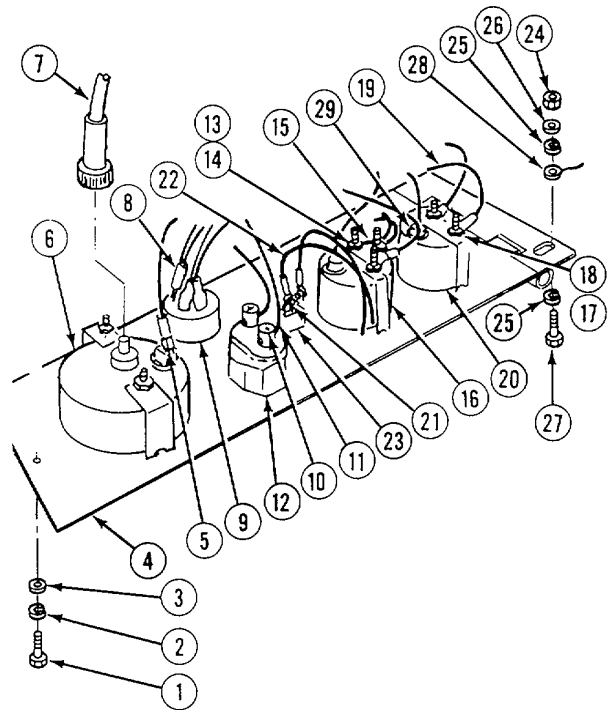
Tag all wires prior to removal to aid installation.

a. Removal

- (1) Remove screw (1), lockwasher (2), and washer (3) using a ratchet and 7/16 in. socket. Lower panel (4).
- (2) Tag and remove bulb wire (5) from tachometer gage (6).
- (3) Remove tachometer cable (7) from tachometer gage (6).

4-80. CONTROL PANEL REPLACEMENT (CONT).

- (4) Tag and remove four wires (8) from key switch (9).
- (5) Loosen two screws (10) using a flat tip screwdriver and tag and remove two wires (11) from push-button (12).
- (6) Remove three nuts (13) and three star washers (14) using a 11/32 in. open end wrench.
- (7) Tag and remove five wires (15) from fuel gage (16).
- (8) Remove three nuts (17) and three star washers (18) using a 11/32 in. open end wrench.
- (9) Tag and remove three wires (19) from ammeter scale (20).
- (10) Remove two screws (21) using a flat tip screwdriver and tag and remove two wires (22) from spray pump switch (23).
- (11) Remove two nuts (24), four lockwashers (25), two washers (26), and two screws (27) using a 7/16 in. open end wrench, ratchet, and 7/16 in. socket. Remove panel (4) from vehicle.
- (12) Tag and remove panel ground wire (28).
- (13) Tag and remove panel light sockets (29) from ammeter scale (20) and fuel gage (16).



b. Installation.

- (1) Install panel ground wire (28), two screws (27), two washers (26), four lockwashers (25), and two nuts (24) using a 7/16 in. open end wrench, ratchet and 7/16 in. socket.
- (2) Install two wires (22) and two screws (21) on spray pump switch (23) using a flat tip screwdriver.
- (3) Install three wires (19), three star washers (18), and three nuts (17) on ammeter gage (20) using a 11/32 in. open end wrench.
- (4) Install five wires (15), three star washers (14), and three nuts (13) on fuel gage (16) using a 11/32 in. open end wrench.
- (5) Install two wires (11) and two screws (10) on push-button (12) using a flat tip screwdriver.
- (6) Install three wires (8) on key switch (9).

- (7) Install tachometer cable (7) on tachometer gage (6).
- (8) Install bulb wire (5) on tachometer gage (6).
- (9) Install light socket (29) on fuel gage (16), and ammeter scale (20).

NOTE

Follow-on maintenance: Connect battery cables (para 4-73)

END OF TASK

4-81. ENGINE AND BATTERY WIRE HARNESS REPLACEMENT

This task cover:

- a. Removal
- b. Installation

INITIAL SETUP

Tools

Tool Kit, General Mechanic's Automotive

Equipment Condition

TM or Para
Para 4-73

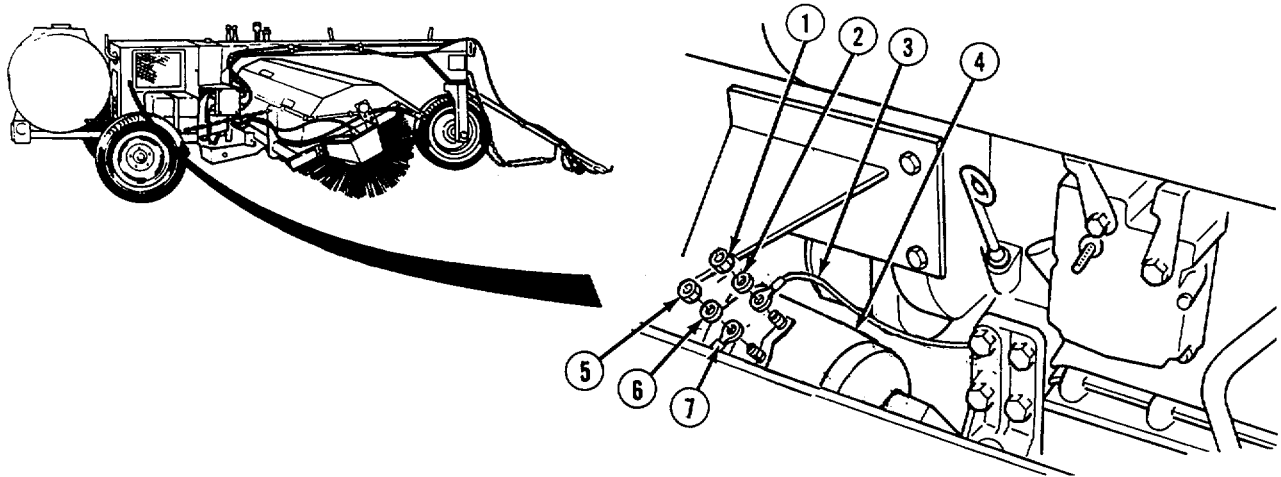
Condition Description

Batteries cables disconnected
Left and right access covers opened.

Materials/ Parts

Star washers
lockwashers
Tags, identification, Item 35 Appendix E

Para 3-5

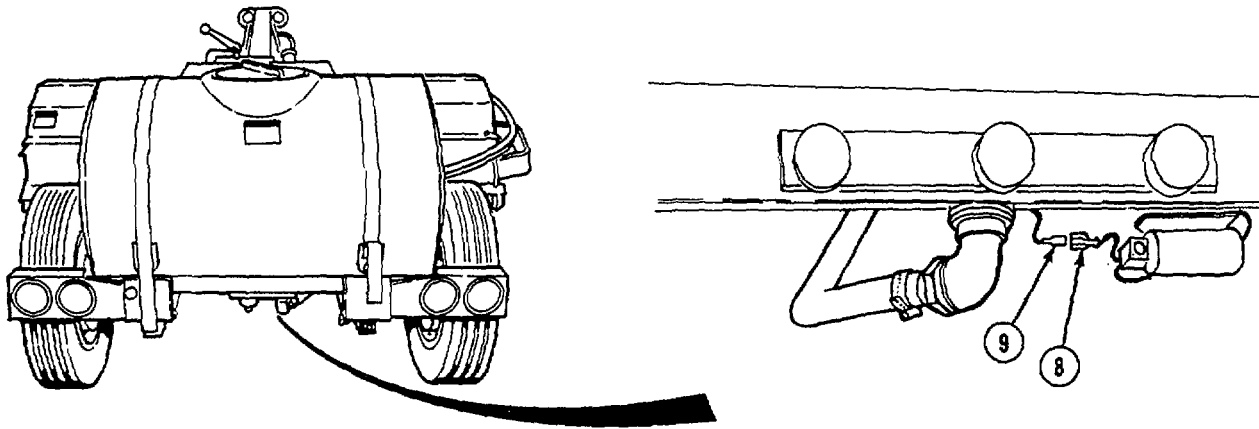


NOTE

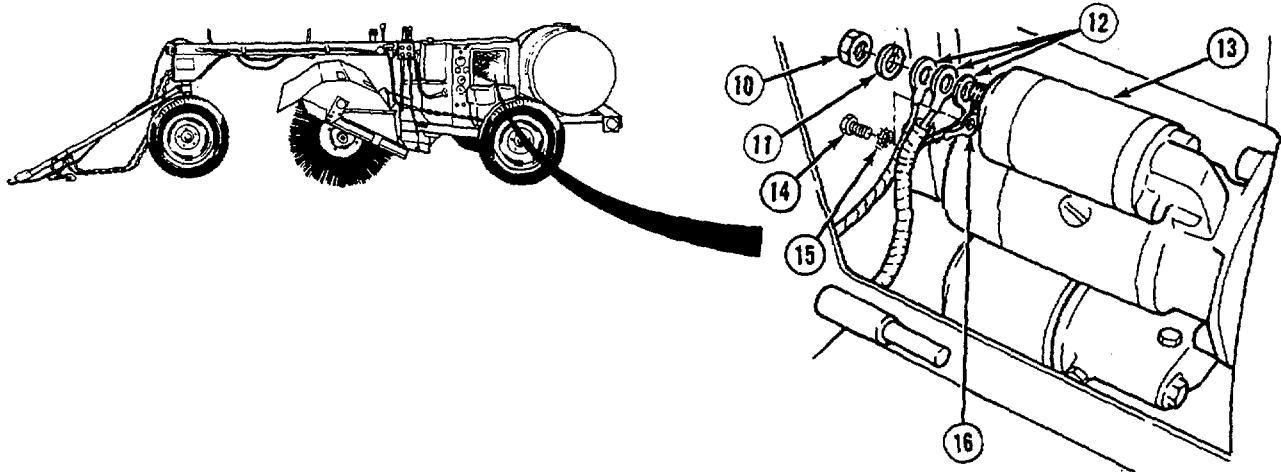
Tag all wires before removal to aid in installation.

a. Removal.

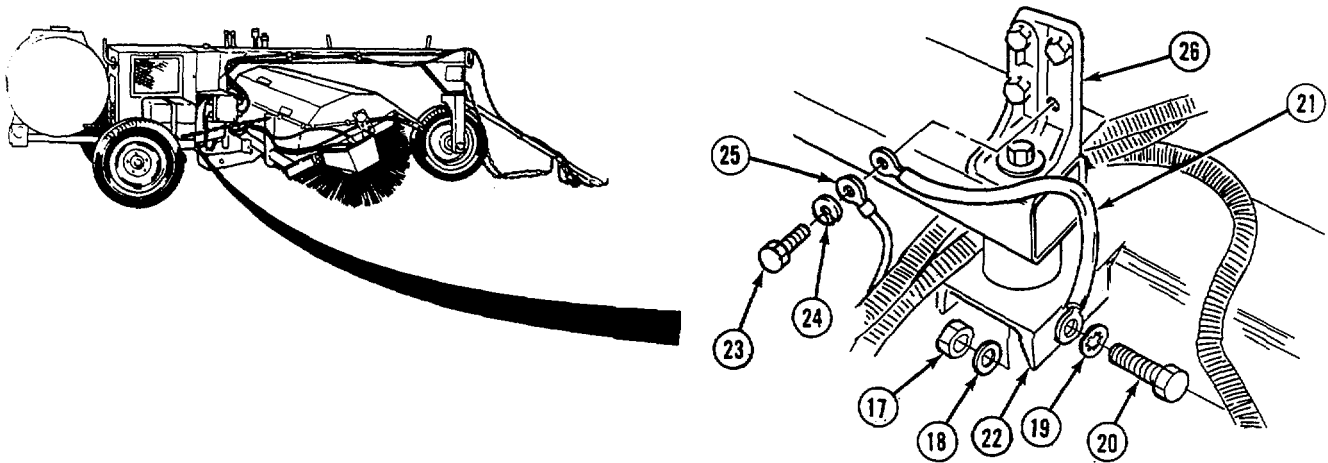
- (1) Remove nut (1), washer (2), and tag and remove ground wire (3) from alternator (4) using a 7/16 in. open end wrench.
- (2) Remove nut (5), washer (6), and tag and remove main harness wire (7) from alternator (4) using a 7/16 in. open end wrench.



- (3) Tag and disconnect spray pump wire (8) from connector (9).



- (4) Remove nut (10), lockwasher (11), and tag and remove three wires (12) from solenoid (13) using a 13 mm open end wrench.
- (5) Remove screw (14), star washer (15), and tag and remove wire (16) from solenoid (13) using a flat tip screwdriver.

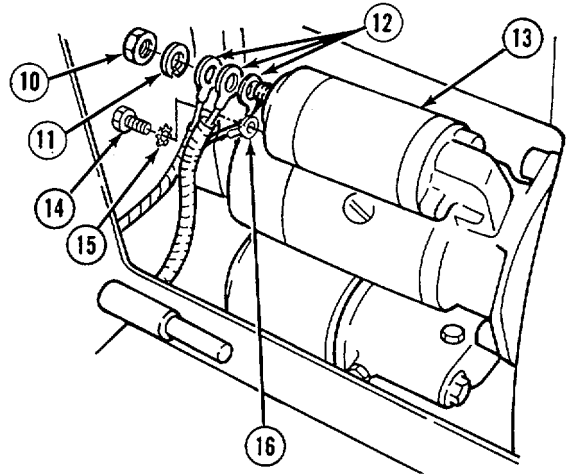
4-81. ENGINE AND BATTERY WIRE HARNESS REPLACEMENT (CONT).

- (6) Remove nut (17), washer (18), star washer (19), screw (20), and tag and remove ground wire (21) from frame (22) using a 9/16 in. open end wrench.
- (7) Remove screw (23), lockwasher (24), tag and remove ground wire (25), and wire (21) from motor mount (26) using a 17 mm open end wrench.
- (8) Remove key switch wires (para 4-60).
- (9) Remove ammeter wires (para 4-62).

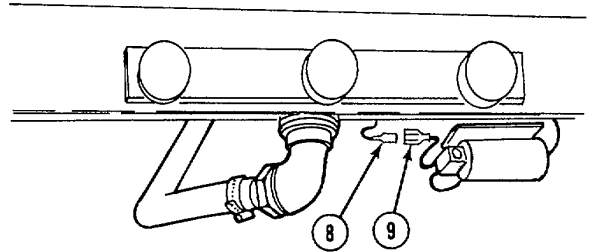
b. Installation.

- (1) Install ammeter wires (para 4-62).
- (2) Install key switch wires (para 4-60).
- (3) Install ground wires (21 and 25), lockwasher (24), and screw (23) on motor mount (26) using a 17 mm open end wrench.
- (4) Install ground wire (21), star washer (19), screw (20), washer (18), and nut (17) on frame (22) using a 9/16 in. open end wrench.

- (5) Install wire (16), star washer (15), and screw (14) on solenoid (13) using a flat tip screwdriver.
- (6) Install three wires (12), lockwasher (11), and nut (10) on solenoid (13).



- (7) Connect spray pump wire (8) on connector (9).



NOTE

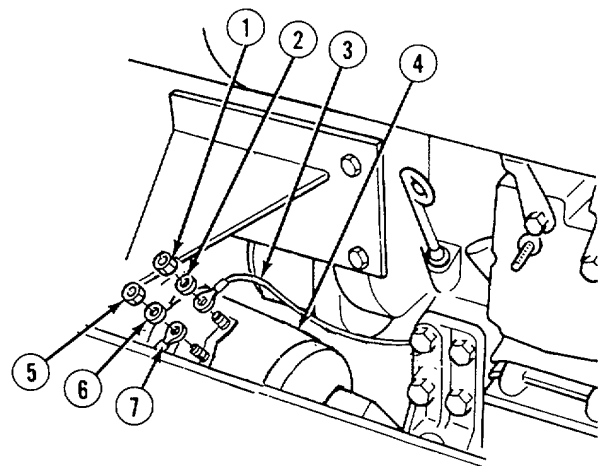
Ground wire to engine is connected to terminal marked **BAT-** on alternator. Main harness wire is connected to terminal marked **BAT+** on alternator.

- (8) Install main harness wire (7), washer (6), and nut (5) on alternator (4) using a 7/16 in. open end wrench.
- (9) Install ground wire (3), washer (2), and nut (1) on alternator (4) using a 7/16 in. open end wrench.

NOTE

Follow-on maintenance:

- Connect battery cables (para 4-73)
- Close access covers (para 3-5)



END OF TASK

4-82. FUEL AND GLOW PLUG WIRE HARNESS REPLACEMENT

This task cover:

- a. Removal
- b. Installation

INITIAL SETUP

Tools

Tool Kit, General Mechanic's Automotive

Equipment Condition

TM or Para
Para 4-73

Condition Description

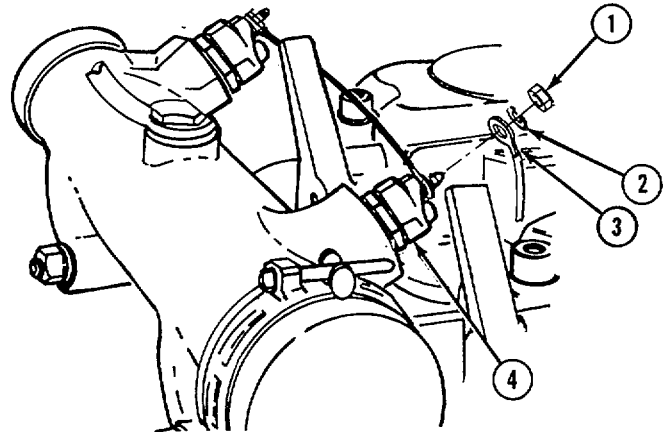
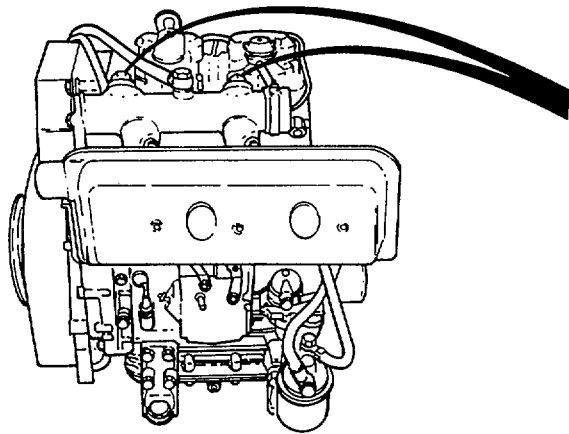
Junction box Cover removed
Top Access and right door panels removed

Materials/ Parts

Star washers
Lockwashers
Tags, identification, Item 35 Appendix E

Para 4-98

a. Removal

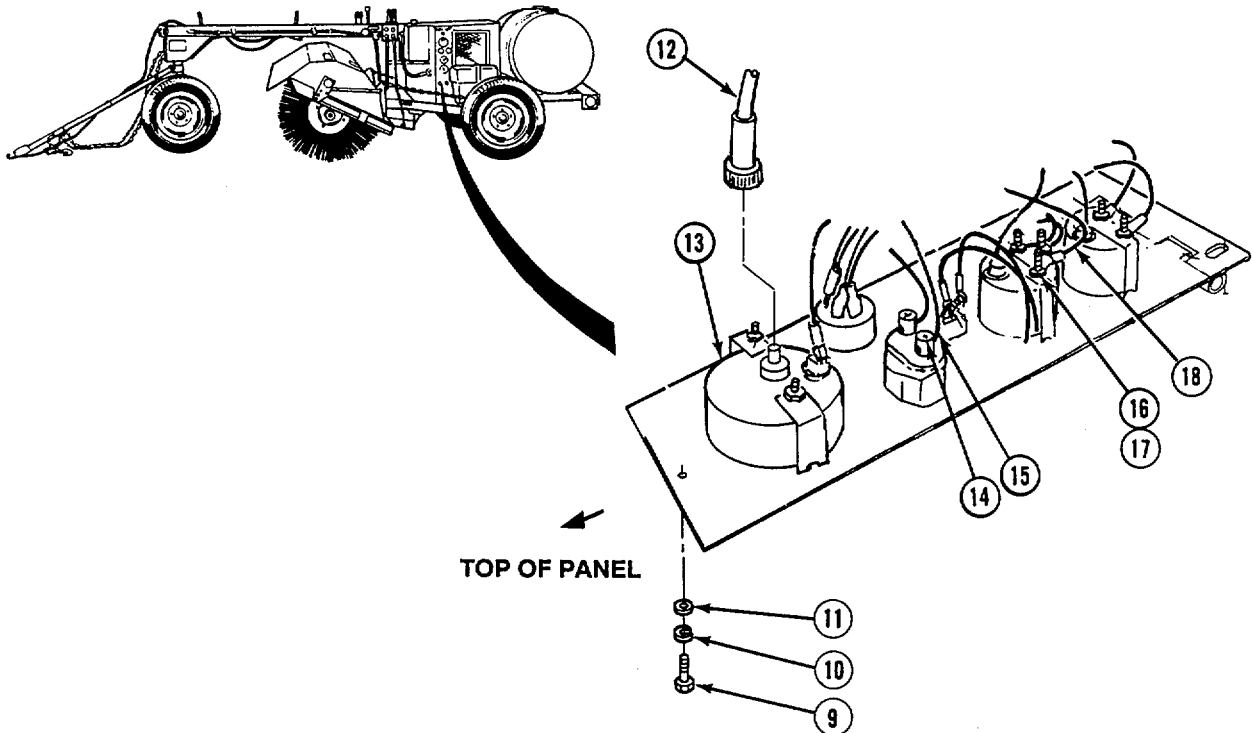
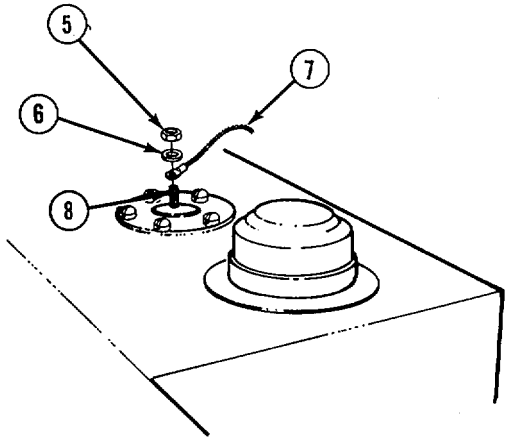


NOTE

- Crossover wire between glow plugs is not removed.
- Tag wires before removal to aid in installation.

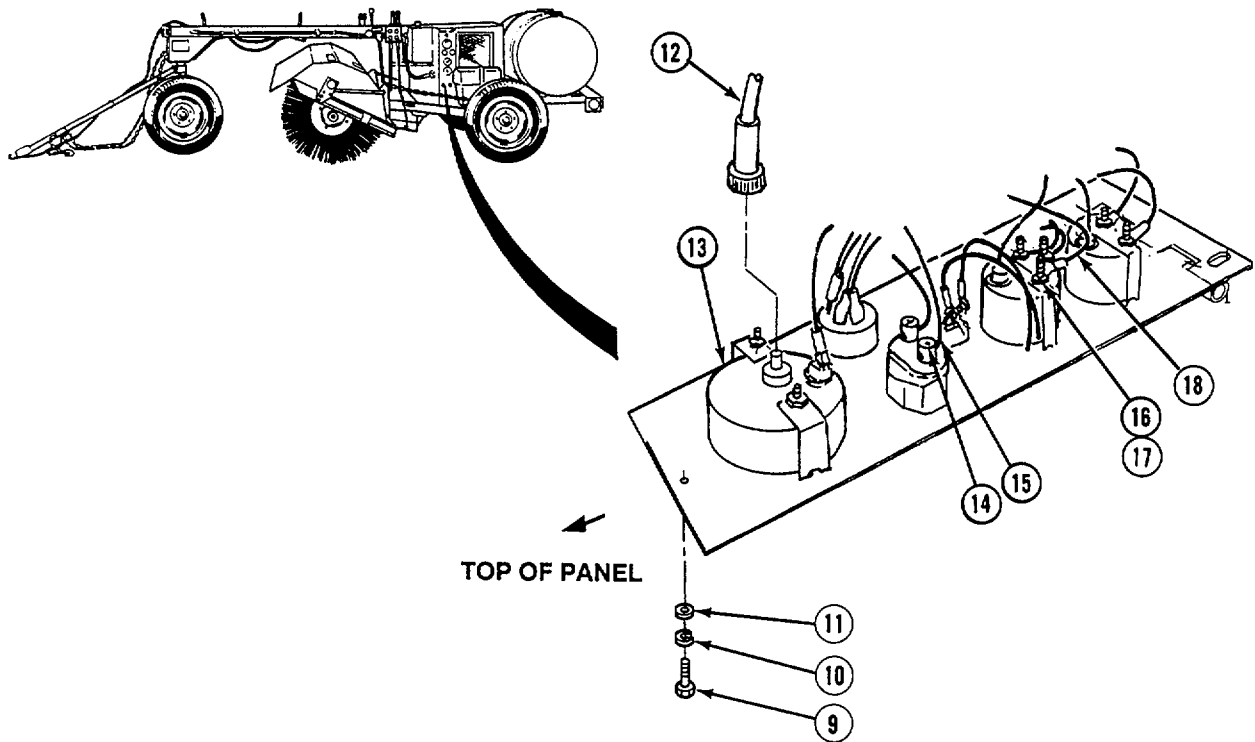
(1) Remove nut (1), lockwasher (2), and tag and remove wire (3) from glow plug (4) using a 5/16 in. open end wrench.

- (2) Remove nut (5), and lockwasher (6), and tag and remove wire (7) from fuel sending unit (8) using a 3/8 in. open end wrench.



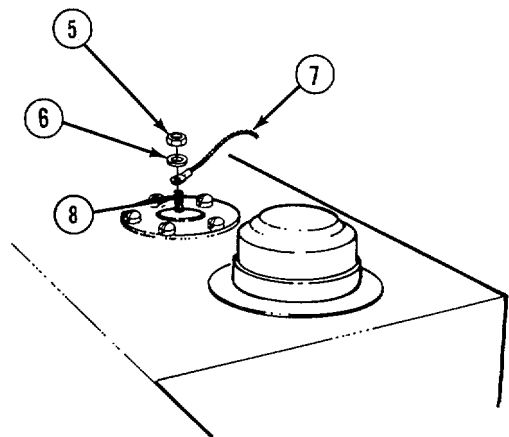
- (3) Remove screw (9), lockwasher (10), and washer (11) using a 7/16 in. open end wrench.
- (4) Remove tachometer cable (12) from tachometer gage (13).
- (5) Remove screw (14), and tag and remove wire (15) using a flat tip screwdriver.
- (6) Remove nut (16), star washer (17), and tag and remove wire (18) using a 11/32 in. open end wrench.

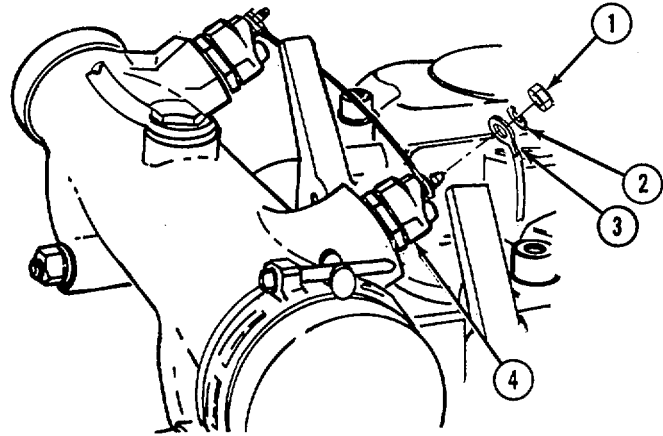
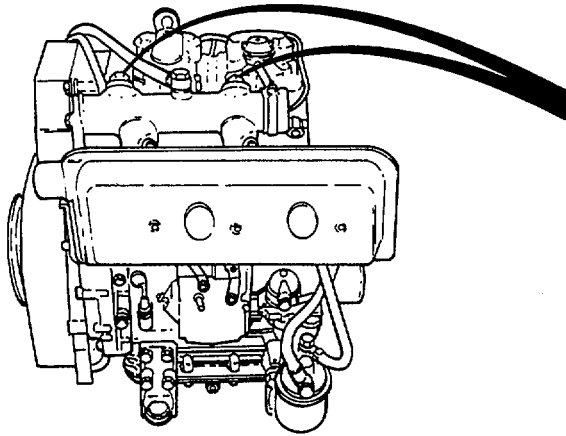
4-82. FUEL AND GLOW PLUG WIRE HARNESS REPLACEMENT (CONT).



b. Installation.

- (1) Install wire (18), star washer (17), and nut (16) using a 11/32 in. open end wrench.
- (2) Install wire (15), and screw (14) using a flat tip screwdriver.
- (3) Install tachometer cable (12) on tachometer gage (13).
- (4) Install washer (11), lockwasher (10), and screw (9) using a 7/16 in. open end wrench.
- (5) Install wire (7), lockwasher (6), and nut (5) on fuel sending unit (8) using a 3/8 in. Open end wrench.





(6) Install wire (3), lockwasher (2), and nut (1) on glow plug (4) using a 5/16 in. open end wrench.

NOTE

Follow-on maintenance:

- Connect battery cables (para 4-73)
- Install top access and right door panels (para 4-98)

END OF TASK

4-83. TERMINAL/CONNECTOR REPLACEMENT

This task covers:

- a. Removal
- b. Installation

INITIAL SETUP

Tools

Tool Kit, General Mechanic's: Automotive

Equipment Condition

TM or Para
Para 4-73

Condition Description
Battery cables
disconnected.

NOTE

Ensure the wiring harness (12V or 24V) to tow vehicle is disconnected.

a. Removal

- (1) Remove components as necessary to gain access to damaged terminal.

NOTE

- **Record wire to terminal relationship for ease of assembly.**
- **Refer to Appendix H for electrical schematic.**

- (2) Cut off damaged terminal or connector.
- (3) Strip wire as appropriate for replacement terminal or connector.

b. Installation.

- (1) Connect wire(s) to terminal or connector and crimp or tighten as necessary.
- (2) Reconnect terminal or connector to unit.
- (3) Install any components removed.

NOTE

Follow-on maintenance: Connect battery cables (para 4-73)

END OF TASK

4-84. HAND BRAKE LEVER REPLACEMENT.

This task covers:

- a. Removal
- b. Installation

INITIAL SETUP

Tools

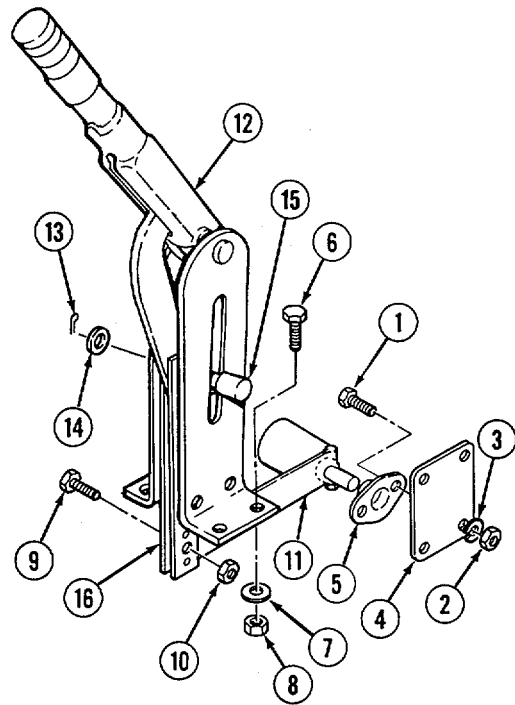
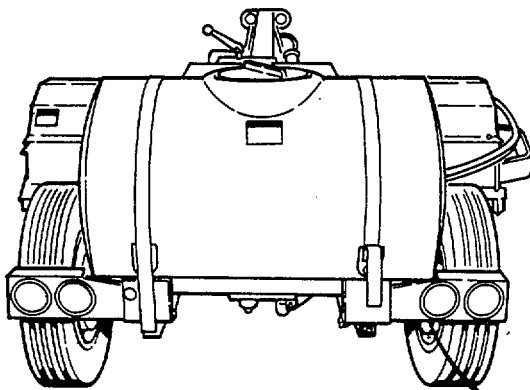
Tool Kit, General Mechanic's: Automotive

General Safety Instructions

Sweeper on level ground and wheels blocked.

Materials/Parts

- Locknuts
- Lockwashers
- Cotter pin



a. Removal

NOTE

This procedure is the same for both hand brake levers.

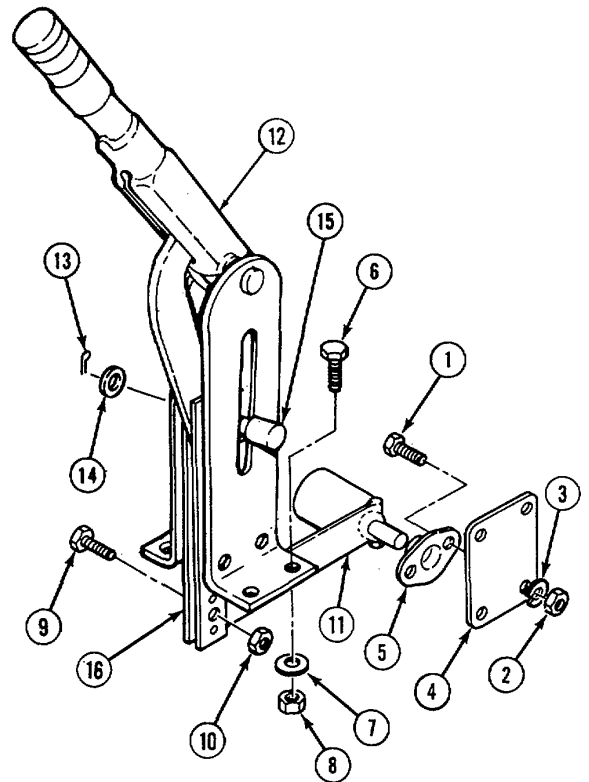
- (1) Remove four screws (1), nuts (2), and lockwashers (3) using a 7/16 in. open end wrench, ratchet and 7/16 in. socket.
- (2) Remove bracket (4), and bushing (5).

4-84. HAND BRAKE LEVER REPLACEMENT (CONT).

- (3) Remove four screws (6), four lockwashers (7), and four nuts (8) using a 1/2 in. open end wrench, ratchet and 1/2 in. socket.
- (4) Remove screw (9), locknut (10), and socket shaft linkage (11) using a 7/16 in. open end wrench, ratchet and 7/16 in. socket.
- (5) Remove hand brake assembly (12).
- (6) Remove cotter pin (13), washer (14), two bars (16), and pin (15) using needle nose pliers.

b. Installation.

- (1) Install washer (14), two bars (16), pin (15), and cotter pin (13) using needle nose pliers.
- (2) Install hand brake assembly (12), four screws (6), washers (7), and locknuts (8) using a 1/2 in. open end wrench, ratchet and 1/2 in. socket.
- (3) Install screw (9), locknut (10), and socket shaft linkage (11) on hand brake assembly (12) using a 7/16 in. open end wrench, ratchet and 7/16 in. socket.



- (4) With end of shaft linkage in bushing, install bushing (5) on bracket (4) using four screws (1), four lockwashers (3), and four nuts (1). Tighten using a 7/16 in. open end wrench, ratchet and 7/16 in. socket.

NOTE

Follow-on maintenance: Adjust hand brake (para 3-12)

END OF TASK

4-85. BRAKE ASSEMBLY ADJUSTMENT.

This task covers:

Adjustment

INITIAL SETUP

Tools

Tool Kit, General Mechanic's: Automotive

General Safety Instructions

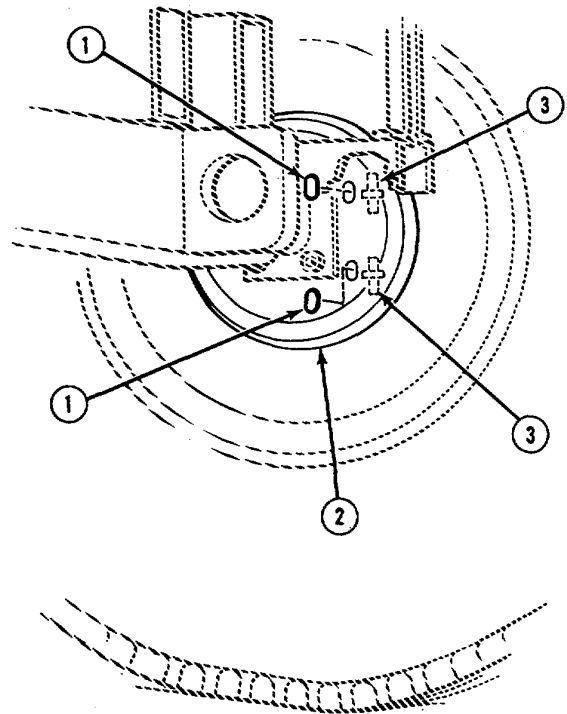
Sweeper supported on jackstand under affected side of axle and hand brake released.

NOTE

- This task will normally be done when brake shoes are replaced. It is the same for both sides.
- Be careful not to loose dust covers.

Adjustment.

- (1) Block wheels and set hand brake on unaffected side of vehicle.
- (2) Jack up axle and support it with jackstand.
- (3) Remove dust caps (1) from backing plate (2).
- (4) Turn adjusting wheels (3) equally but in opposite directions with flat tip screwdriver until unable to rotate wheel.
- (5) Back off adjustment until wheel turns.
- (6) Replace dust caps (1).
- (7) Raise sweeper, remove jackstand and lower sweeper.



NOTE

Follow-on maintenance: Test operation of hand brakes (para 3-12)

END OF TASK

4-86. BRAKE DRUM AND HUB REPLACEMENT/REPAIR.

This task covers:

- | | | |
|----------------|------------------------|-----------------|
| a. Removal | c. Cleaning/Inspection | e. Installation |
| b. Disassembly | d. Assembly | |

INITIAL SETUP

Tools

Tool Kit, General Mechanic's: Automotive

Shop Equipment, Automotive Maintenance and Repair; Organizational Maintenance Common No. 1, Less Power

Equipment Condition

TM or Para
Para 4-88

Condition Description
Wheel removed.

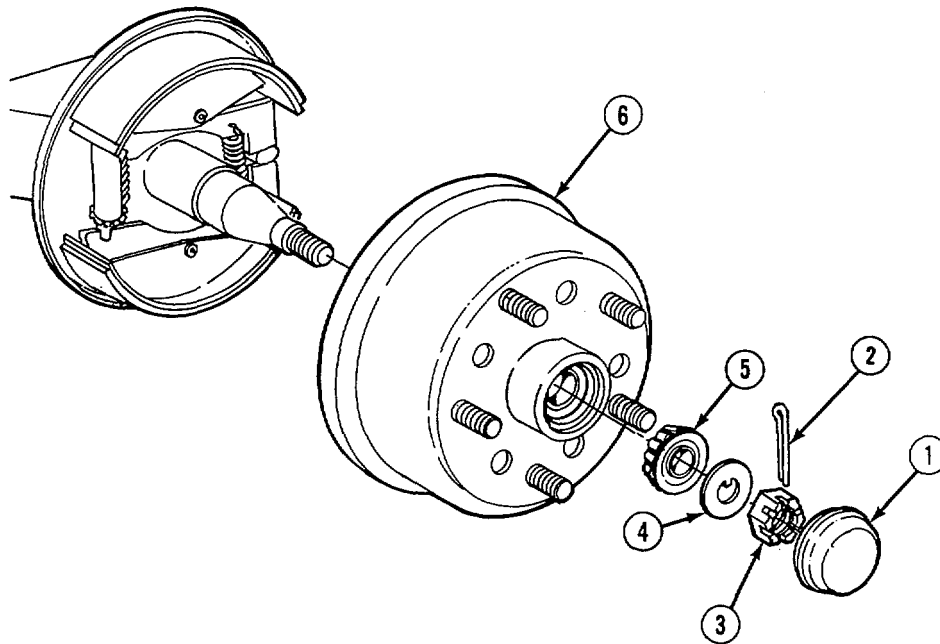
General Safety Instructions

Sweeper on level ground and unaffected wheel blocked.

Materials/Parts

Seal
Cotter pin
Grease, item 22 Appendix E
Solvent, dry cleaning, item 31 Appendix E

a. Removal.



WARNING

Brake linings contain asbestos. Asbestos dust can cause cancer. Avoid breathing dust from brake linings or creating dust while servicing.

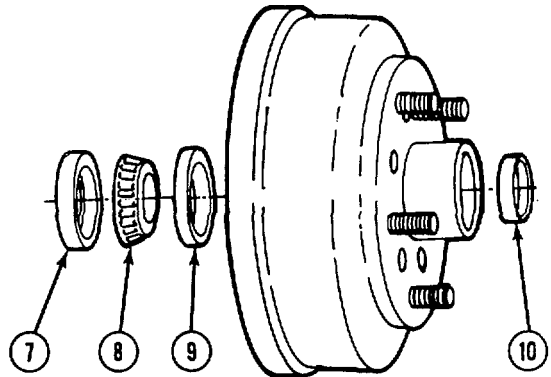
NOTE

This procedure is the same for the left or right side.

- (1) Remove dust cap (1) using a hammer and chisel, and cotter pin (2) using pliers.
- (2) Remove nut (3), washer (4), and outer bearing (5) using a ratchet and 1-1/8 in. socket.
- (3) Remove hub (6) using a slide hammer.

b. Disassembly.

- (1) Remove inner seal (7), inner bearing (8), and inner bearing race (9) using a brass drift and hammer.
- (2) If damaged, drive out outer bearing race (10) using a brass drift and hammer.



4-86. BRAKE DRUM AND HUB REPLACEMENT/REPAIR (CONT).***c. Cleaning/Inspection.*****WARNING**

- Dry cleaning solvent P-D-680 is toxic and flammable. Wear protective goggles, face mask, and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapor. Do not use near open flame or excessive heat. The flash point for type I dry cleaning solvent is 100°F (38°C), and for type II is 140°F (60°C). If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, flush eyes with water and get medical aid immediately.
- DO NOT use a dry brush or compressed air to clean brake shoes. There may be asbestos dust on brake shoes which can be dangerous to your health if you breath it. (Brake shoes must be wet and a soft bristle brush must be used.)

CAUTION

Do not "spin dry" bearings with compressed air, the bearing may fly apart.

- (1) Clean all metal parts with dry cleaning solvent P-D-680 and dry.
- (2) Check bearings for pitting, rusting or wear.
- (3) Check races for grooves.

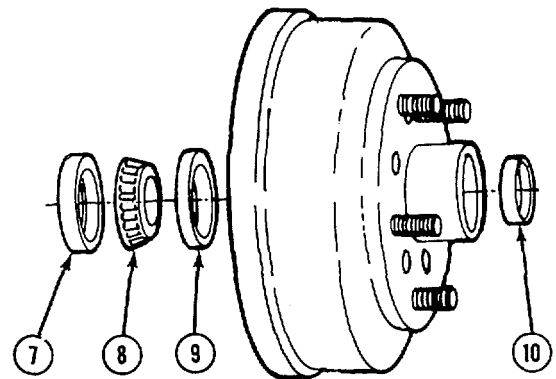
NOTE

Brake shoes, drums and brake adjustment mechanisms must be cleaned of dirt, mud and debris before inspection.

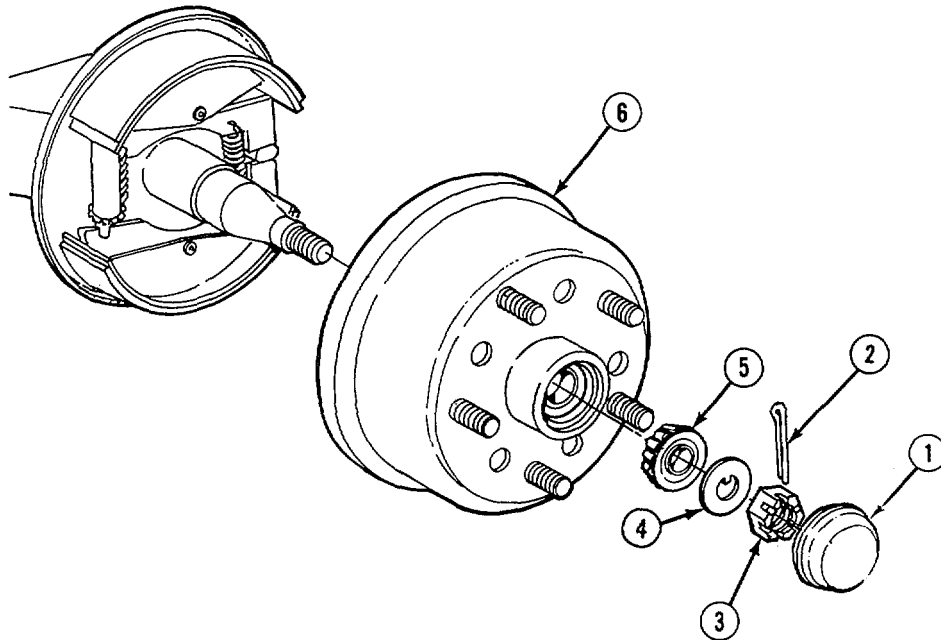
- (4) Measure edge thickness of brake lining. If brake lining is less than 1/8 in. (3.18 mm) at thinnest point, replace brake shoes.
- (5) Inspect brake linings and drums for obvious grooves and uneven wear.
 - (a) If brake linings are worn unevenly and less than 1/8 in. (3.18 mm), replace brake shoes.
 - (b) If drum has deep grooves, replace drum.

d. Assembly.

- (1) Pack bearing (8) with grease.
- (2) Install inner bearing race (9), inner bearing (8), and inner seal (7) using a block of wood and ball peen hammer.
- (3) If removed, install outer bearing race (10) using a block of wood and ball peen hammer.



e. Installation.



- (1) Install hub (6).
- (2) Pack outer bearing (5) with grease and install bearing in hub (6).
- (3) Install washer (4), and nut (3).
- (4) Using a torque wrench and 1-1/8 in. socket, tighten nut (3) to 40 lb.-ft (54 N.m) while rotating hub right and left. Wheel should turn freely. Backoff nut 1/4 to 1/3 turn.
- (5) Install cotter pin (2) using pliers and dust cap (1) using a hammer.

4-86. BRAKE DRUM AND HUB REPLACEMENT/REPAIR (CONT).

NOTE

Follow-on maintenance:

- **Install wheel (para 4-88)**
- **Adjust brake assembly (para 4-85)**

END OF TASK

4-87. BRAKE ASSEMBLY/MODIFIED SPINDLE REPLACEMENT/REPAIR

This task covers:

- a. Disassembly
- b. Assembly

INITIAL SETUP

Tools

Tool Kit, General Mechanic's: Automotive

Equipment Condition

TM or Para

Para 4-86

Condition Description

Brake drum/hub removed.

Shop Equipment, Automotive Maintenance and Repair; Organizational Maintenance, Common No. 1, Less Power

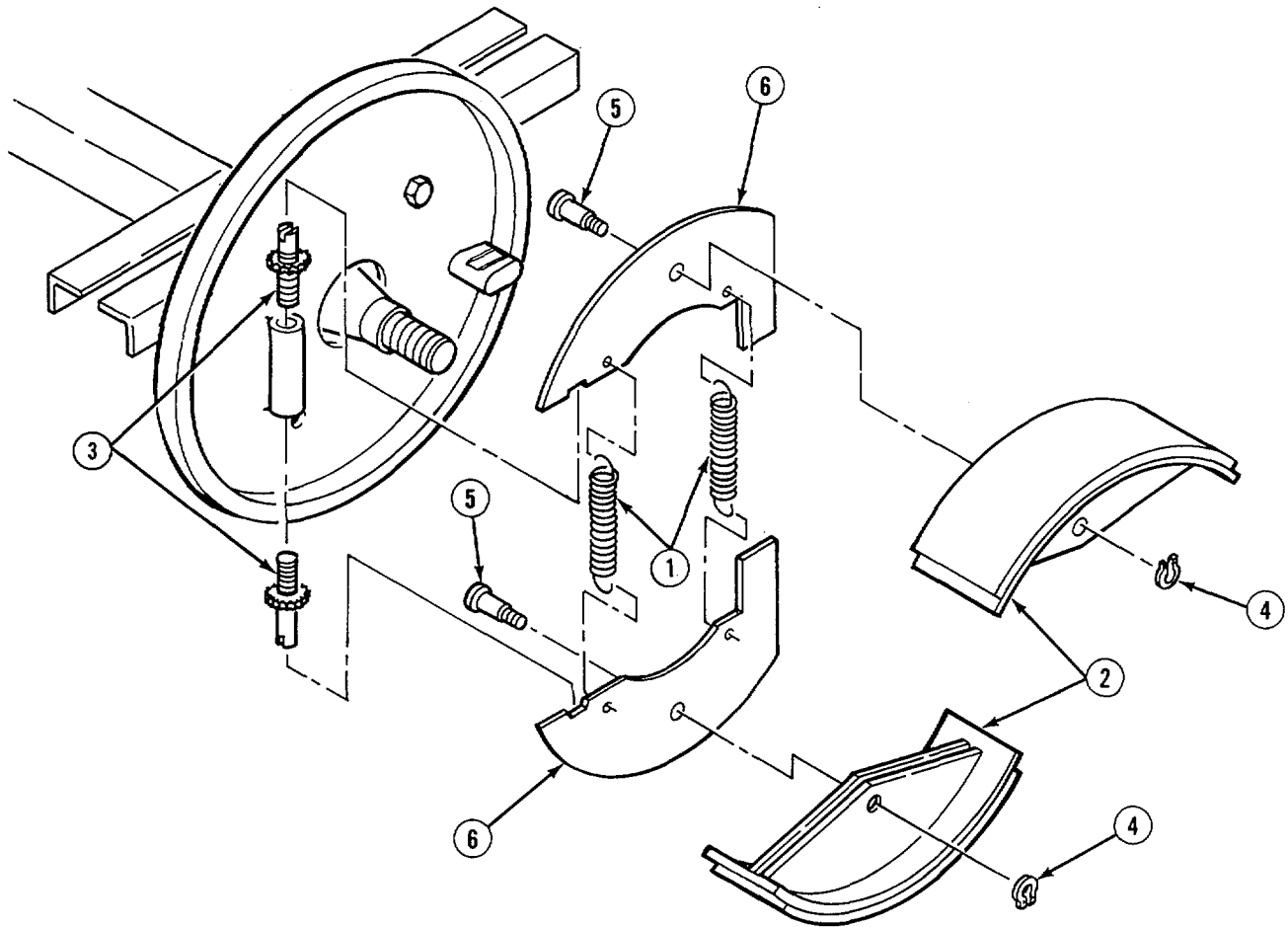
Para 4-84

Hand brake linkage disconnected.

Materials/Parts

Locknuts

Text begins on next page.

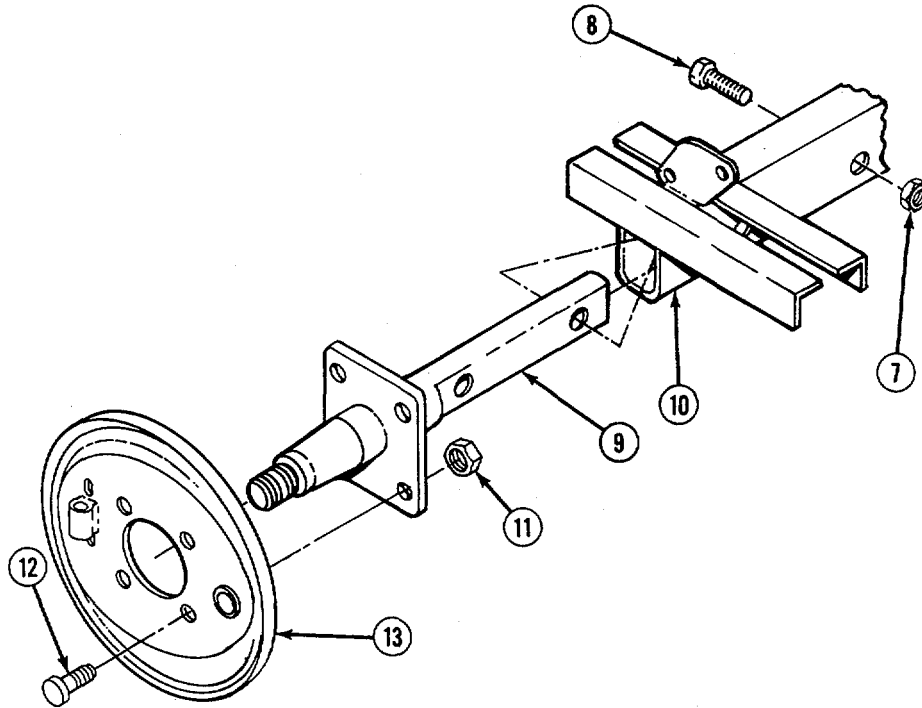
4-87. **BRAKE ASSEMBLY/MODIFIED SPINDLE REPLACEMENT/REPAIR (CONT)**a. **Disassembly.****WARNING**

Brake linings contain asbestos. Asbestos dust can cause cancer. Avoid breathing dust from brake linings or creating dust while servicing.

NOTE

Procedure is the same for both right and left sides.

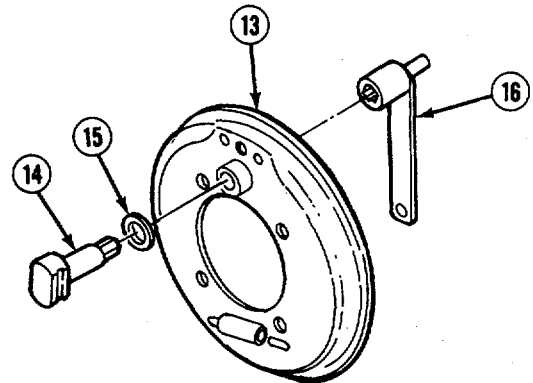
- (1) Remove springs (1) using brake spring pliers and remove brake shoes (2).
- (2) Remove two adjusting screw assemblies (3).
- (3) Remove two snap rings (4) using snap ring pliers and remove two anchor pins (5).
- (4) Remove brake shoes (2) from two shoe levers (6).



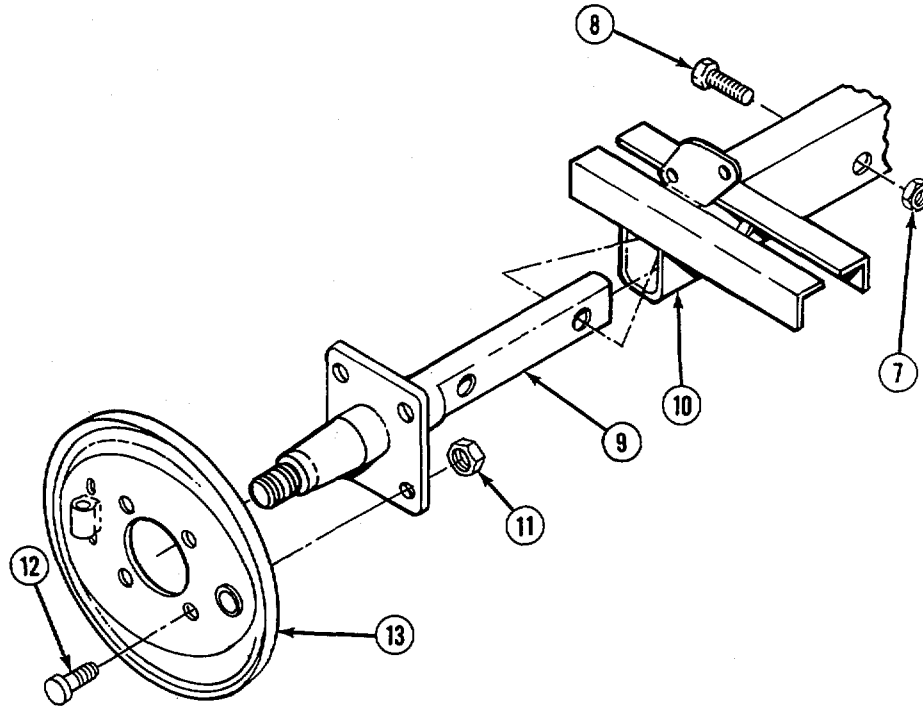
- (5) Remove two locknuts (7), and two screws (8) using a 15/16 in. open end wrench, ratchet and 15/16 in. socket.
- (6) Remove spindle (9) from frame (10).
- (7) Remove four locknuts (11), four screws (12), and backing plate (13) using a ratchet and 5/8 in. socket.
- (8) Remove actuating camshaft (14), spacer (15), and manual control lever (16) from backing plate (13).

b. Assembly .

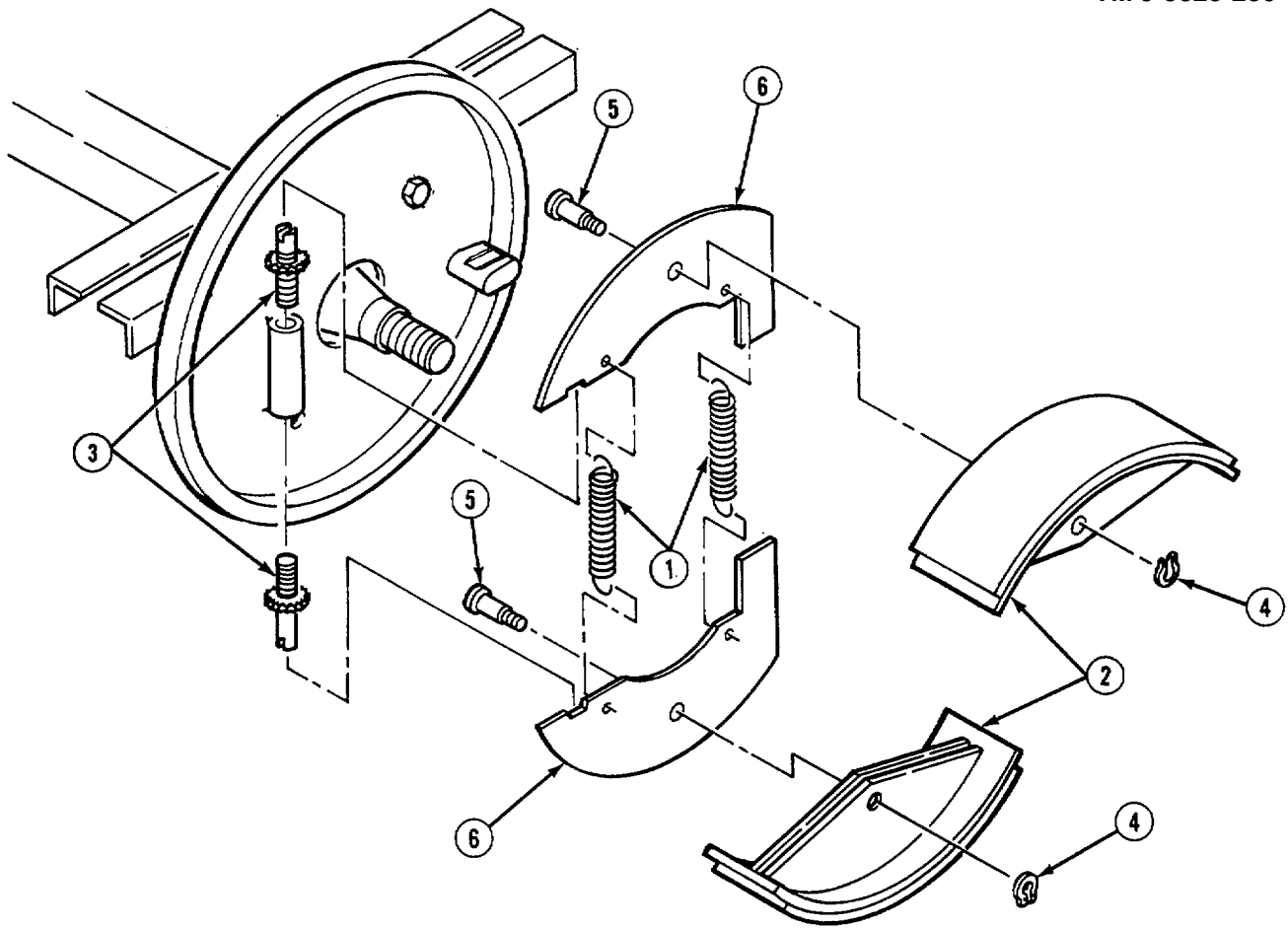
- (1) Install control lever (16), spacer (15), and actuating camshaft (14) on backing plate (13).



4-87. BRAKE ASSEMBLY/MODIFIED SPINDLE REPLACEMENT/REPAIR (CONT)



- (2) Install backing plate (13), four screws (12), and four locknuts using a ratchet and 5/8 in. socket.
- (3) Install spindle (9) in frame (10).
- (4) Install two screws (8), and two locknuts (7) using a 15/16 in. open end wrench, ratchet and 15/16 in. socket.



- (5) Install two shoe levers (6), two anchor pins (5), and two snap rings (4) using snap ring pliers on brake shoes (2).
- (6) Install two adjusting screw assemblies (3).
- (7) Position top brake shoe assembly (2), and hook springs (1).
- (8) Position bottom brake shoe assembly (2), and install spring (1) using brake spring pliers.

NOTE

Follow-on maintenance:

- **Install brake drum/hub (para 4-86)**
- **Hand brake linkage connected (para 4-84)**

END OF TASK

4-88. WHEEL REPLACEMENT.

This task covers:

- a. Front Wheel
- b. Rear Wheel

INITIAL SETUP

Tools

Tool Kit, General Mechanic's: Automotive

Shop Equipment, Automotive Maintenance and Repair; Organizational Maintenance, Common No. 1, Less Power

Lifting device with chains

Jack stands

General Safety Instructions

Sweeper on level ground, wheels blocked, hand brake set.

a. Front Wheel

WARNING

If wheel must be changed during travel, set out markers to avoid an accident.

(1) Removal.

- (a) Loosen five lug nuts (1) slightly using a breaker bar, extension and 13/16 in. socket.

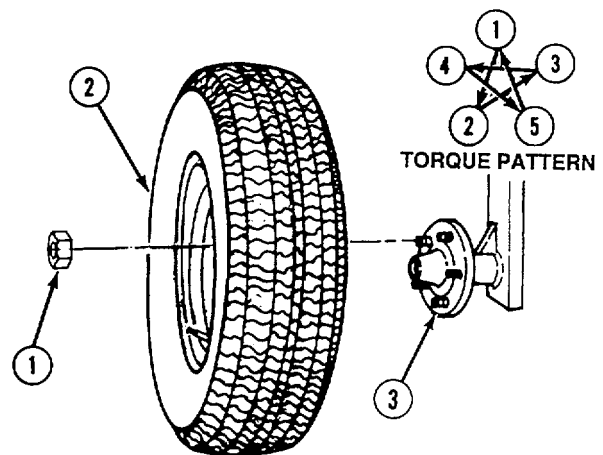
NOTE

Do not raise sweeper any higher than needed to remove wheel off hub.

- (b) Raise front of sweeper using a suitable lifting device with chains attached to front lifting eye/tie down point.
- (c) Remove five lug nuts (1), and wheel (2) from hub (3).

(2) Installation.

- (a) Position wheel (2) on hub (3), and install five lug nuts (1) using a breaker bar, extension and 13/16 in. socket.
- (b) Slowly lower and remove lifting device and chains.
- (c) Tighten lug nuts to 80 lb-ft (108 N.m) using a torque wrench and 13/16 in. socket in pattern shown.
- (d) If used, stow markers.



b. *Rear Wheel.*

WARNING

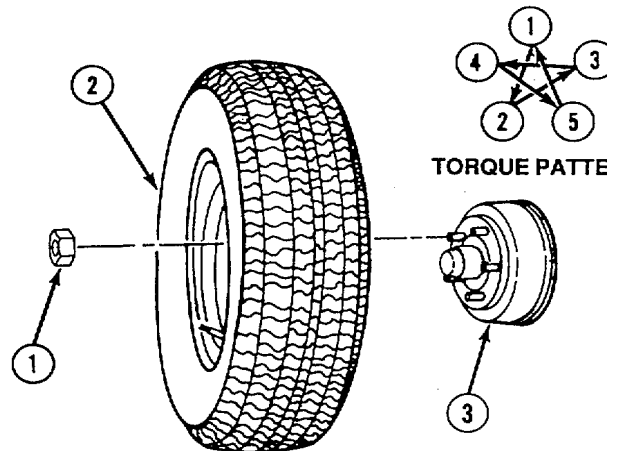
If wheel must be changed during travel, set out markers to avoid an accident.

NOTE

This procedure is the same for both left and right rear tires.

(1) Removal.

- (a) Loosen five lug nuts (1) slightly using a breaker bar, extension and 13/16 in. socket.



WARNING

Do not work on any item supported only by lift jacks or hoist. Always use blocks or proper stands to support the item prior to any work. Equipment may fall and cause injury or death to personnel.

NOTE

Do not raise sweeper any higher than needed to remove wheel off hub.

- (b) Raise side of sweeper with bad wheel using a jack positioned under rear lifting eye. Install jack stands.
 - (c) Remove five lug nuts (1), and wheel (2) from hub (3).
- (2) Installation.
- (a) Position wheel (2) on hub (3), and install five lug nuts (1) using a breaker bar, extension and 13/16 in. socket.
 - (b) Remove jackstands and slowly lower and remove jack.
 - (c) Tighten lug nuts to 80 lb-ft (108 N.m) using a torque wrench and 13/16 in. socket in pattern shown.
 - (d) If used, stow markers.

END OF TASK

4-89. FRONT HUB ASSEMBLY REPLACEMENT/REPAIR.

This task covers:

- | | | |
|----------------|------------------------|-----------------|
| a. Removal | c. Cleaning/Inspection | e. Installation |
| b. Disassembly | d. Assembly | |

INITIAL SETUP

Tools

Shop Equipment, Automotive Maintenance and Repair; Organizational Maintenance, Common No. 1, Less Power

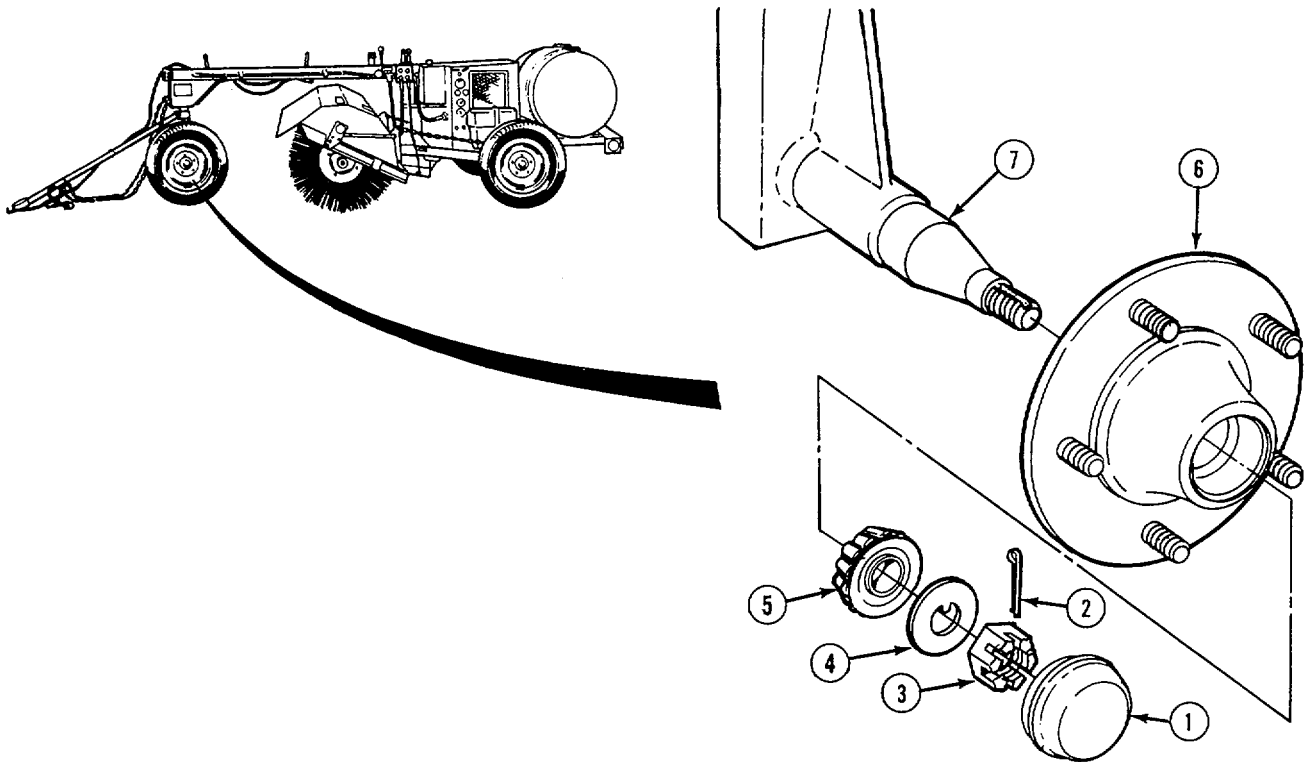
Equipment Condition

TM or Para
Para 4-88

Condition Description
Front wheel and tire removed.

Materials/Parts

Cotter pins
Seal
Grease, item 22 Appendix E
Solvent, dry cleaning, item 31 Appendix E



a. Removal.

- (1) Remove dust cap (1) using a hammer and chisel.

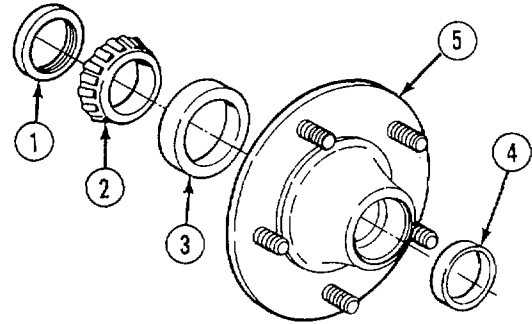
NOTE

Washer and outer bearing may fall out during this step.

- (2) Remove cotter pin (2) using pliers and remove nut (3) using a ratchet and 15/16 in. socket.
- (3) Remove washer (4) and outer bearing (5) from hub (6).
- (4) Remove hub (6) from spindle (7).

b. Disassembly.

- (1) Remove seal (1) using pliers, chisel and ball peen hammer.
- (2) Remove inner bearing (2) and race (3) using a drift and ball peen hammer.
- (3) Remove outer race (4) using a drift and ball peen hammer.

**c. Cleaning/Inspection.**

- (1) Clean grease out of hub.

WARNING

Dry cleaning solvent P-D-680 is toxic and flammable. Wear protective goggles, face mask, and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapor. Do not use near open flame or excessive heat. The flashpoint for type I dry cleaning solvent is 100°F (38°C) and for type II is 140°F (60°C). If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, flush eyes with water and get medical aid immediately.

CAUTION

Do not "spin dry" bearings with compressed air, the bearing may fly apart.

- (2) Clean all metal parts with dry cleaning solvent P-D-680 and dry.
- (3) Check bearings for pitting, rusting and wear.
- (4) Check races for grooves.

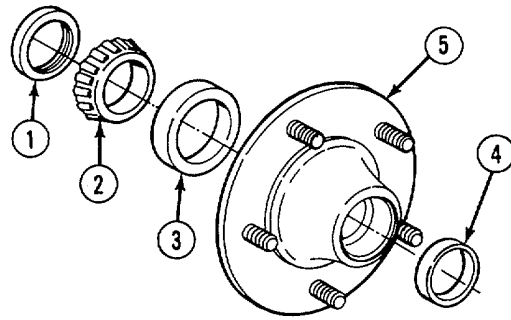
4-89. FRONT HUB ASSEMBLY REPLACEMENT/REPAIR (CONT).

d. Assembly.

NOTE

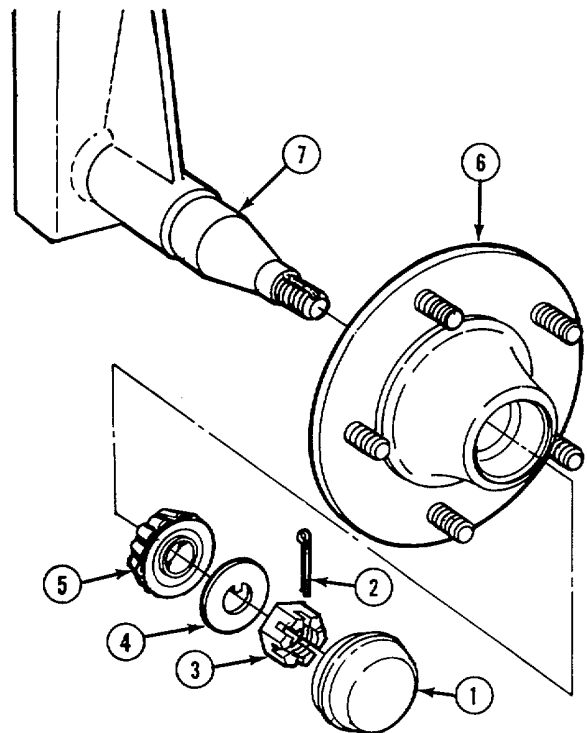
- Bearings must be packed with fresh grease before assembly.
- For ease of installation use a block of wood and ball peen hammer to start the race in the hub, then use a drift and ball peen hammer to seat the race fully.

- (1) Pack inner bearing (2) with grease and install inner bearing, race (3), and seal (1) using a block of wood and ball peen hammer.
- (2) Install outer race (4) in hub (5) using a block of wood and ball peen hammer.



e. Installation.

- (1) Coat spindle (7), and hub races (6) with grease.
- (2) Position hub (6) on spindle (7).
- (3) Pack outer bearing (5) with grease and install bearing, washer (4), and nut (3).
- (4) Using a torque wrench and 15/16 in. socket, tighten nut (3) to approximately 40 lb-ft (54 N.m) while rotating hub right and left. The hub should turn freely. Back off nut 1/4 to 1/3 turn.
- (5) Install cotter pin (2) using pliers and dust cap (1) using a hammer.



NOTE

Follow-on maintenance: Install front wheel and tire (para 4-88)

END OF TASK

4-90. TIRE REPLACEMENT.

This task covers:

- a. Removal
- b. Cleaning/Inspection
- c. Installation

INITIAL SETUP

Tools

Shop Equipment, Automotive Maintenance and Repair; Organizational Maintenance, Common No. 1, Less Power

Equipment Condition

TM or Para
Para 4-88

Condition Description
Wheel removed.

Materials/Parts

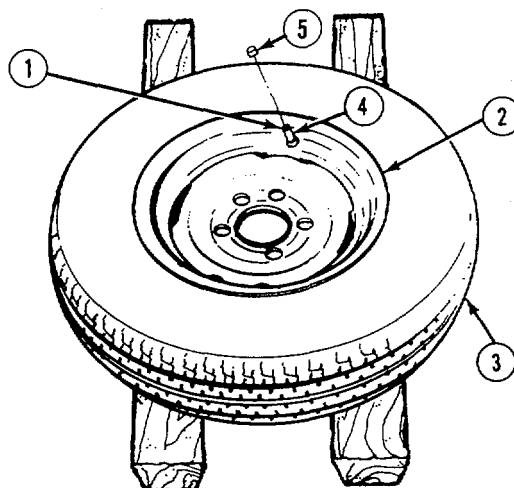
Lubricant, tire bead, item 23 Appendix E

General Safety Instructions

Always inflate tire in a safety cage.

a. Removal.

- (1) Slowly remove valve core (1), and allow all air to escape.
- (2) Place rim (2), and tire assembly (3) on wooden blocks.
- (3) Attach pneumatic tire bead breaker to sides of tire (3), and break tire bead away from rim (2).
- (4) Insert curved end of two tire irons between rim and tire bead about 5 in. (12 cm) apart.
- (5) Force both tools down and out to lift bead over wheel rim.
- (6) Leave one tool in place and put second 5 in. (12 cm) away from first position. Repeat steps (5) and (6) until side of tire is removed from rim.
- (7) Turn tire over and repeat steps (3) thru (6) driving other edge of tire over same side of rim as the first.
- (8) Remove valve stem (4) from rim (2).

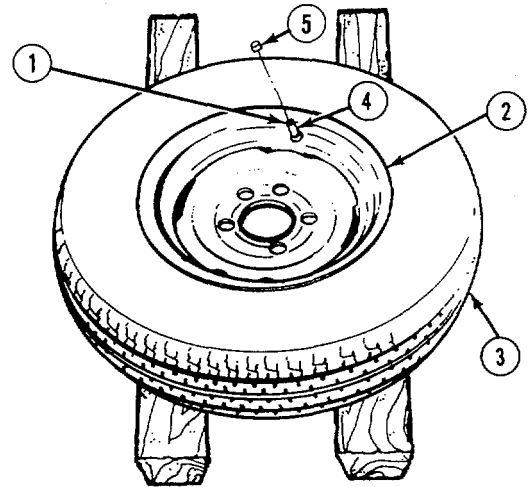


b. Cleaning/Inspection.

- (1) Use wire brush to remove all dirt and corrosion from rim.
- (2) Inspect rim (2) for cracks, deep pitting or dents.
- (3) Replace rim (2) if any significant damage is found (e.g. cracked weld, bent rim.)

4-90. TIRE REPLACEMENT (CONT).**c. Installation.**

- (1) Install valve stem (4) in rim (2), and remove valve cap (5).
- (2) Place rim (2) on wooden blocks.
- (3) Lubricate bead and rim (2) with tire bead lubricant.
- (4) Place tire (3) on top of rim (2). Move tire (3) until part of lower bead is resting between rims of wheel.
- (5) Insert tire iron between wheel rim (2), and lower tire bead. Lever bead over rim.
- (6) Force part of top tire bead over edge of rim (2). Insert tire iron between wheel rim and top tire bead. Lever the bead over rim.

**WARNING**

To avoid personal injury, never stand close to tire while inflating; inflate in safety cage.

- (7) Place tire in safety cage and inflate tire to 40 psi (276 kPa) until tire bead moves over center of rim
- (8) Inflate tire to a maximum pressure of 65 psi (448 kPa), and ensure tire bead is seated on rim.
- (9) Adjust to operating pressure of 65 psi (448 kPa), and fit valve cap (5).
- (10) Remove tire from safety cage.

NOTE

Follow-on maintenance: Install wheel and tire (para 4-88)

END OF TASK

4-91. TIRE REPAIR.

Refer to TM 9-2610-200-14, Operator/Unit/Direct Support/General Support Maintenance Manual for care, maintenance, repair and inspection of pneumatic tires and inner tubes.

4-92. DECONTAMINATION BRACKET REPLACEMENT.

This task covers:

- a. Removal
- b. Installation

INITIAL SETUP

Tools

Tool Kit, General Mechanic's: Automotive

Materials/Parts

Locknuts

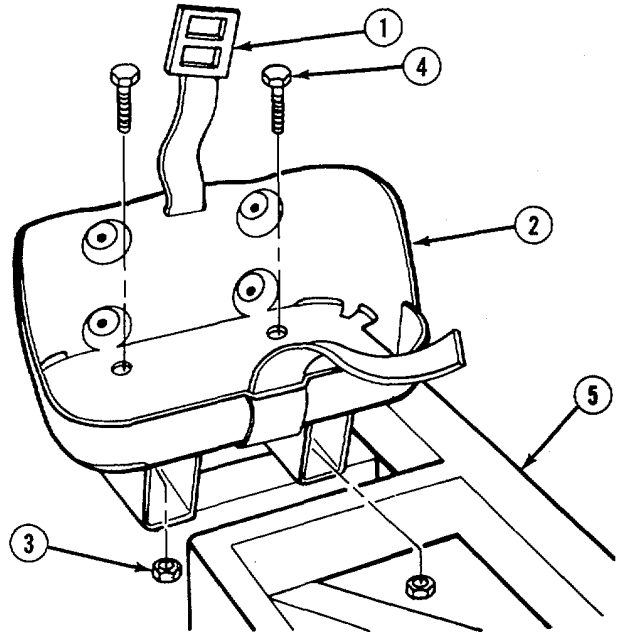
a. Removal

- (1) Remove strap (1) from bracket (2).
- (2) Remove four locknuts (3), four screws (4), and bracket (2) from frame (5) using a 9/16 in. open end wrench, ratchet, extension and 9/16 in. socket.

b. Installation.

- (1) Install bracket (2) on frame (5) using four screws (4), and four locknuts (3). Tighten using a 9/16 in. open end wrench, ratchet, extension and 9/16 in. socket.
- (2) Install strap (1) on bracket (2).

END OF TASK



4-93. TRANSPORT CHAIN ASSEMBLY REPLACEMENT.

This task covers:

- a. Removal
- b. Installation

INITIAL SETUP

Tools

Tool Kit, General Mechanic's: Automotive

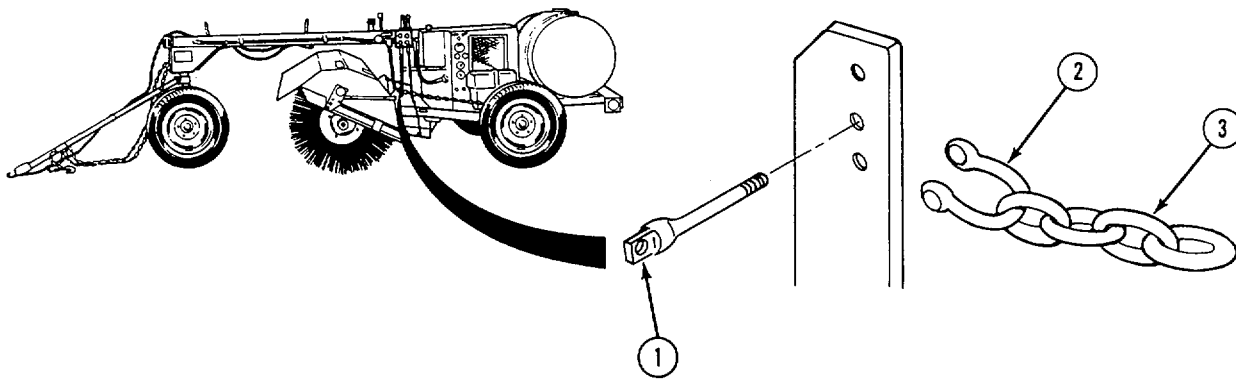
Equipment Condition

TM or Para
Para 2-8

Condition Description
Broom head raised.

Materials/Parts

Chain (See Appendix G for fabrication)



NOTE

Procedure is the same for both ends of chain on both sides of vehicle.

- a. **Removal.** Remove screw (1), and U-bolt (2) from each end of chain (3) using pliers.
- b. **Installation.** Position chain (3), and install using U-bolt (2), and screw (1) using pliers.

END OF TASK

4-94. SWING FRAME REPLACEMENT.

This task covers:

- a. Removal
- b. Installation

INITIAL SETUP

Tools

Tool Kit, General Mechanic's: Automotive
 Lifting device and chains

Materials/Parts

Lockwashers
 Locknut
 Chain (See Appendix G for fabrication)

Equipment Condition

TM or Para
 Para 4-78

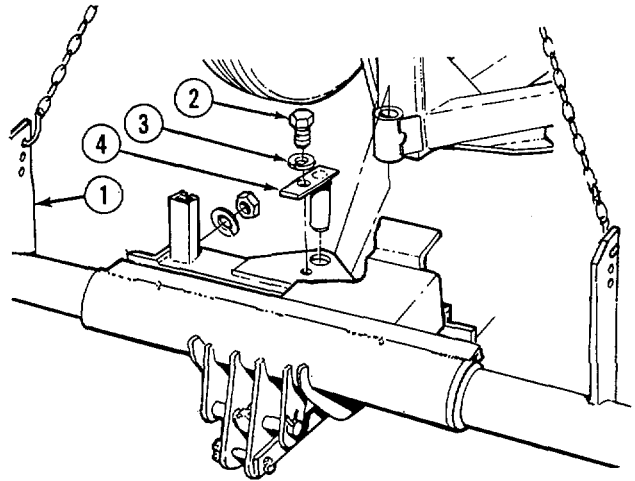
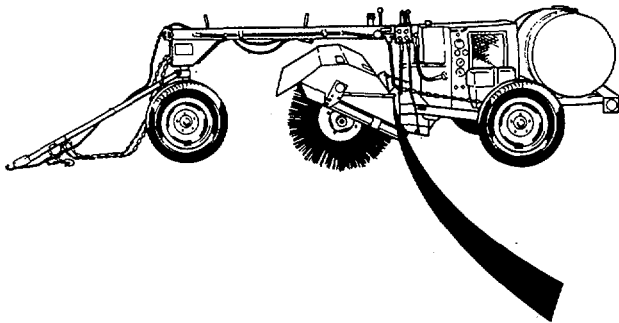
Para 4-105

Para 4-123

Condition Description
 Broom hood wiring harness disconnected.
 Hydraulic hoses disconnected.
 Sprinkler lines disconnected.

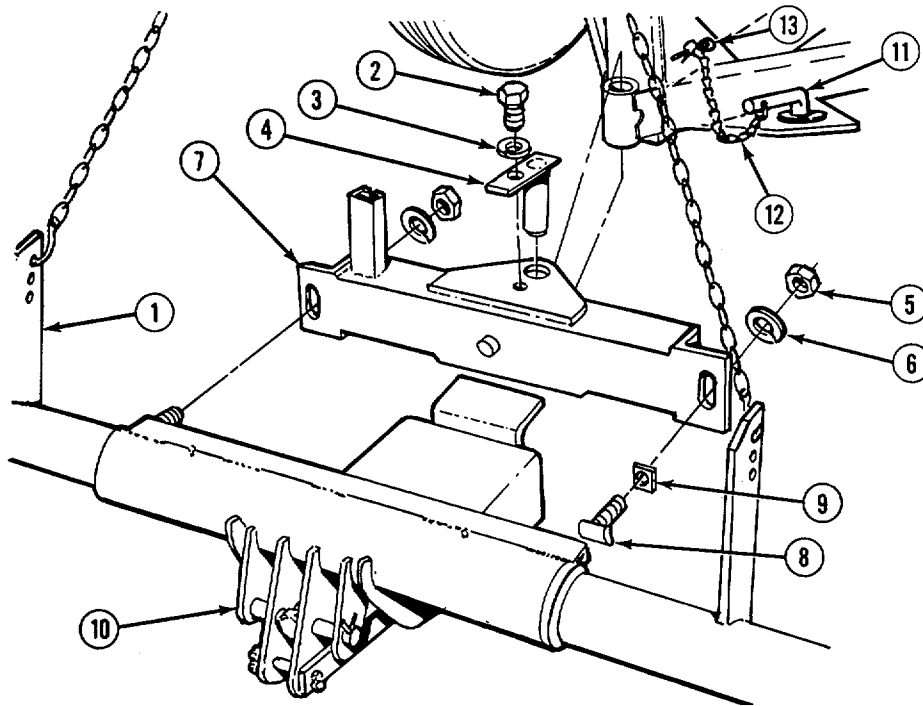
General Safety Instructions

Be sure to attach a suitable lifting device to frame before starting this procedure.



a. Removal

- (1) Attach lifting device and chains to transport brackets (1).
- (2) Remove screw (2), lockwasher (3), and pivot pin (4) using a ratchet and 1/2 in. socket.

4-94. SWING FRAME REPLACEMENT (CONT).

- (3) Remove two locknuts (5), two washers (6), and swing frame (7), two screws (8), and spacers (9) from brush frame (10) using a ratchet and 1-1/16 in. socket.
- (4) If damaged, remove securing pin (11), chain (12), and cotter pin (13).

b. Installation.

- (1) If removed, install securing pin (11), chain (12), and cotter pin (13).
- (2) Install two spacers (9) and screws (8) and align swing frame (7) over brush frame (10) and install two washers (6) and two locknuts (5) using a ratchet and 1-1/16 in. socket.
- (3) Install pivot pin (4), screw (2) and lockwasher (3) using a ratchet and 1/2 in. socket.
- (4) Remove lifting device and chains from transport brackets (1).

NOTE**Follow-on maintenance:**

- **Connect broom hood wiring harness (para 4-78)**
- **Connect hydraulic hoses (para 4-105)**
- **Connect sprinkler lines (para 4-123)**

END OF TASK

4-95. SAFETY CHAIN ASSEMBLY REPLACEMENT.

This task covers:

- a. Removal
- b. Installation

INITIAL SETUP

Tools

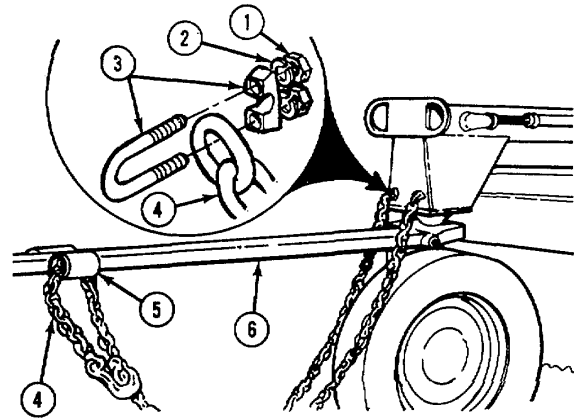
Tool Kit, General Mechanic's: Automotive

Materials/Parts

Lockwashers

a. Removal.

- (1) Remove four nuts (1), four lockwashers (2), and two U-bolts (3) using a ratchet, extension and 9/16 in. socket.
- (2) Pull chains (4) through guides (5) in tow pole (6).



b. Installation.

- (1) Install chains (4) through guides (5) in tow pole (6).
- (2) Install two U-bolts (3), and chains (4).
- (3) Install four lockwashers (2), and four nuts (1) using a ratchet, extension and 9/16 in. socket.

END OF TASK

4-96. TOW POLE REPLACEMENT.

This task covers:

- a. Removal
- b. Installation

INITIAL SETUP

Tools

Tool Kit, General Mechanic's: Automotive

Equipment Condition

TM or Para
Para 3-12
Para 4-95

Condition Description

Hand brake set.
Safety chains removed.

Materials/Parts

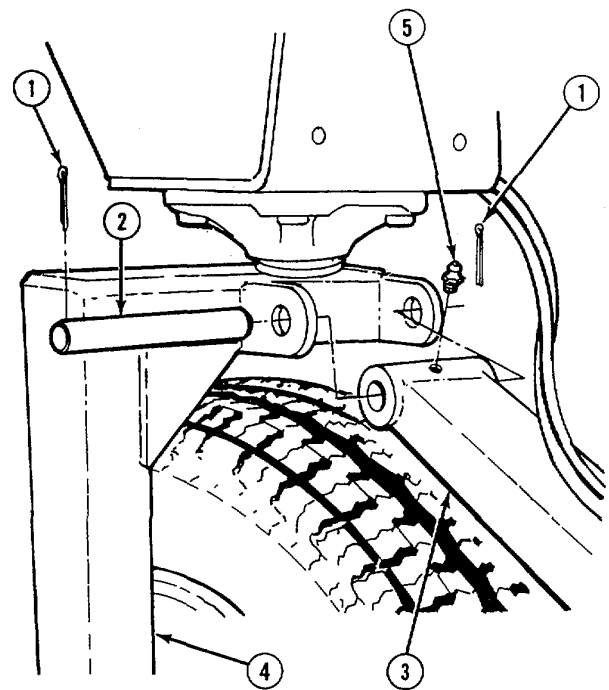
Cotter pins

a. Removal.

- (1) Using pliers, remove two cotter pins (1), and drive out pivot pin (2) using a brass drift and ball peen hammer to release tow pole (3) from strut (4).
- (2) Remove tow pole (3).
- (3) Remove grease fitting (5) using a 5/16 in. open end wrench.

b. Installation.

- (1) Align hole in tow pole (3) with hole in steering strut (4), and install pivot pin (2).
- (2) Using pliers install two cotter pins (1) in pivot pin (2).
- (3) Install grease fitting (5) using a 5/16 in. Open end wrench.



NOTE

Follow-on maintenance: Install safety chains (para 4-95)

END OF TASK

4-97. STEERING STRUT REPLACEMENT/REPAIR.

This task covers:

- | | | |
|----------------|------------------------|-----------------|
| a. Removal | c. Cleaning/Inspection | e. Installation |
| b. Disassembly | d. Assembly | |

INITIAL SETUP

Tools

Tool Kit, General Mechanic's: Automotive

Personnel Required

MOS 62B Construction Equipment Repairer (2)

Shop Equipment, Automotive Maintenance and Repair; Organizational Maintenance, Common No. 1, Less Power

Equipment Condition

TM or Para

Para 3-12

Para 4-96

Para 4-89

Condition Description

Hand brake set.

Tow pole removed.

Front hub removed.

Materials/Parts

Locknuts

Seal

Cotter pins

Grease, item 22 Appendix E

Solvent, dry cleaning, item 31, Appendix E

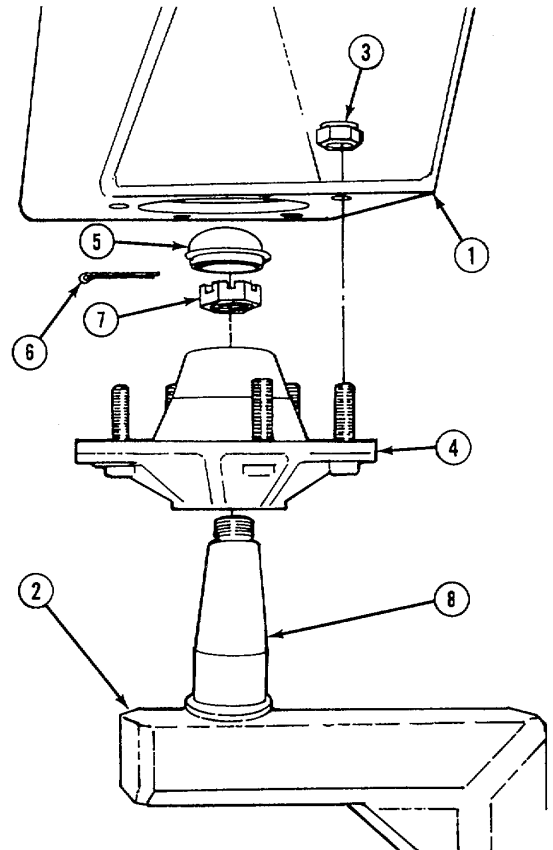
4-97. STEERING STRUT REPLACEMENT/REPAIR (CONT).

a. Removal

WARNING

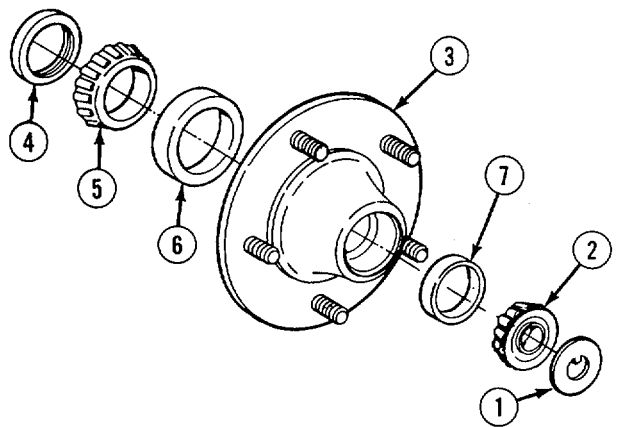
- Frame weighs 1500 lbs (680 kg). Attach suitable lifting device prior to removal to prevent possible injury to personnel.
- Steering strut weighs 100 lbs (45.4 kg). Two mechanics are required for removal to prevent possible injury to personnel.

- (1) Attach a suitable lifting device to frame (1) behind strut (2).
- (2) Remove five locknuts (3) from hub (4) using a ratchet, extension and 3/4 in. socket.
- (3) Lower strut (2), and move it away from mainframe (1).
- (4) Remove dust cap (5) using a chisel and hammer.
- (5) Remove cotter pin (6) using pliers.
- (6) Remove nut (7), and hub (4) using a ratchet and 15/16 in. socket.



b. Disassembly.

- (1) Remove washer (1), and outer bearing (2) from hub (3).
- (2) Remove seal (4), inner bearing (5), and inner bearing race (6) using a drift and ball peen hammer.
- (3) Remove outer bearing race (7) using a drift and ball peen hammer.



c. Cleaning/Inspection.

- (1) Clean grease out of hub.

WARNING

Dry cleaning solvent P-D-680 is toxic and flammable. Wear protective goggles, face mask, and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapor. Do not use near open flame or excessive heat. The flashpoint for type I dry cleaning solvent is 100°F (38°C) and for type II is 140°F (60°C). If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, flush eyes with water and get medical aid immediately.

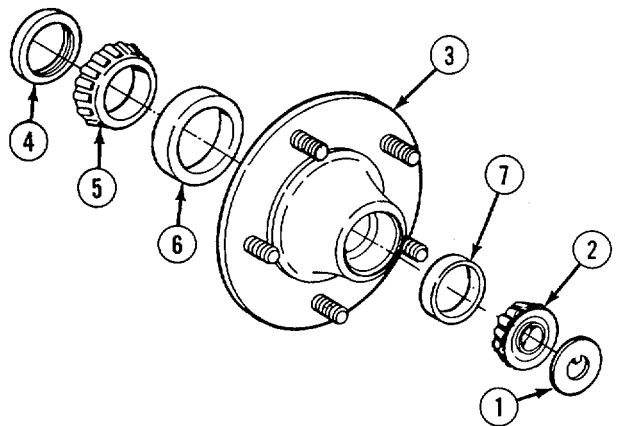
CAUTION

Do not "spin dry" bearings with compressed air. The bearings may fly apart.

- (2) Clean all metal parts with dry cleaning solvent P-D-680 and dry.
- (3) Check bearings for pitting, rusting and wear.
- (4) Check races for grooves.

d. Assembly.**NOTE**

- Bearings must be packed with fresh grease before assembly.
 - When installing bearing races, use a block of wood, drift, and a hammer to seat races in hub.
- (1) Pack inner bearing (5) with grease and install inner bearing race (6), bearing and seal (4) using a block of wood and a ball peen hammer.
 - (2) Install outer bearing race (7) using a block of wood and a ball peen hammer.
 - (3) Pack outer bearing (2) with grease and install bearing in hub (3).
 - (4) Install washer (1).

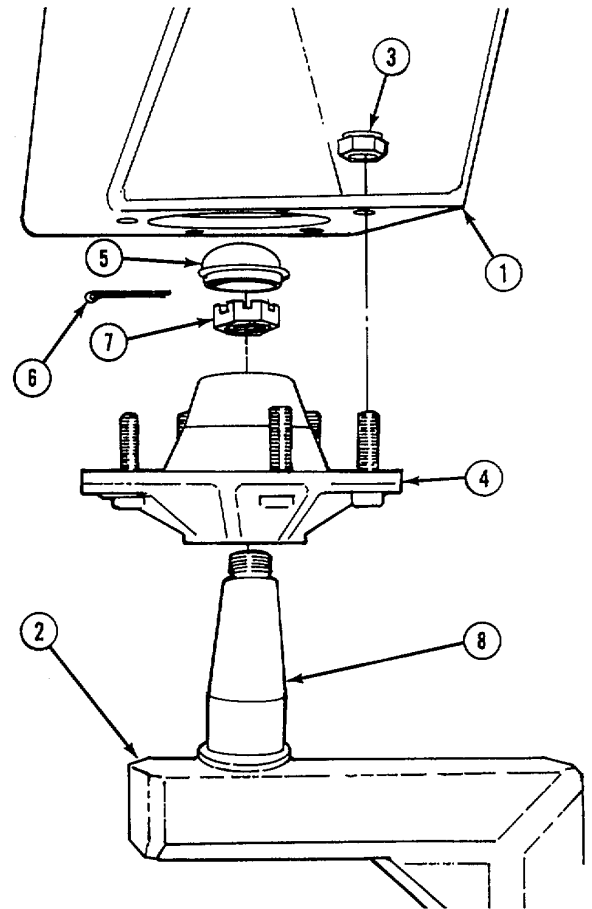


4-97. STEERING STRUT REPLACEMENT/REPAIR (CONT).**e. Installation.**

- (1) Coat spindle (8), and inner hub (4) with grease.
- (2) Position hub (4) on spindle (8).
- (3) Install nut (7) finger tight.
- (4) Using a torque wrench and 15/16 in. socket, tighten nut (7) to 40 lb-ft (54 N.m) while rotating hub left and right. Hub should move freely.
- (5) Back off nut (7) 1/4 to 1/3 turn.
- (6) Install cotter pin (6) using pliers and dust cap (5) using a hammer.
- (7) Lift strut (2), and position it under mainframe (1).
- (8) Install five locknuts (3) on hub (4) using a ratchet, extension and 3/4 in. socket.
- (9) Remove lifting device from frame.

NOTE**Follow-on maintenance:**

- Install front hub (para 4-89)
- Install tow pole (para 4-96)

END OF TASK

4-98. ENGINE ENCLOSURE REPLACEMENT.

This task covers:

- | | | |
|---------------------|---------------------|--------------------------|
| a. Door Panels | d. Rear Panel | f. Main Engine Enclosure |
| b. Front Panels | e. Top Access Panel | g. Hasp and Latch |
| c. Instrument Panel | | |

INITIAL SETUP

Tools

Tool Kit, General Mechanic's: Automotive

Shop Equipment, Automotive Maintenance and Repair; Organizational Maintenance, Common No. 1, Less Power

Materials/Parts

Lockwashers
Rivets

Equipment Condition

TM or Para

Instrument Panel:

Para 4-80

Para 4-47

Rear Panel:

Para 4-37

Para 4-51

Main Engine Enclosure:

Para 4-80

Para 4-47

Para 4-37

Para 4-51

Condition Description

Control panel wires removed.
Throttle control cable and engine cut off cable removed.

Air cleaner removed.
Exhaust pipe removed.

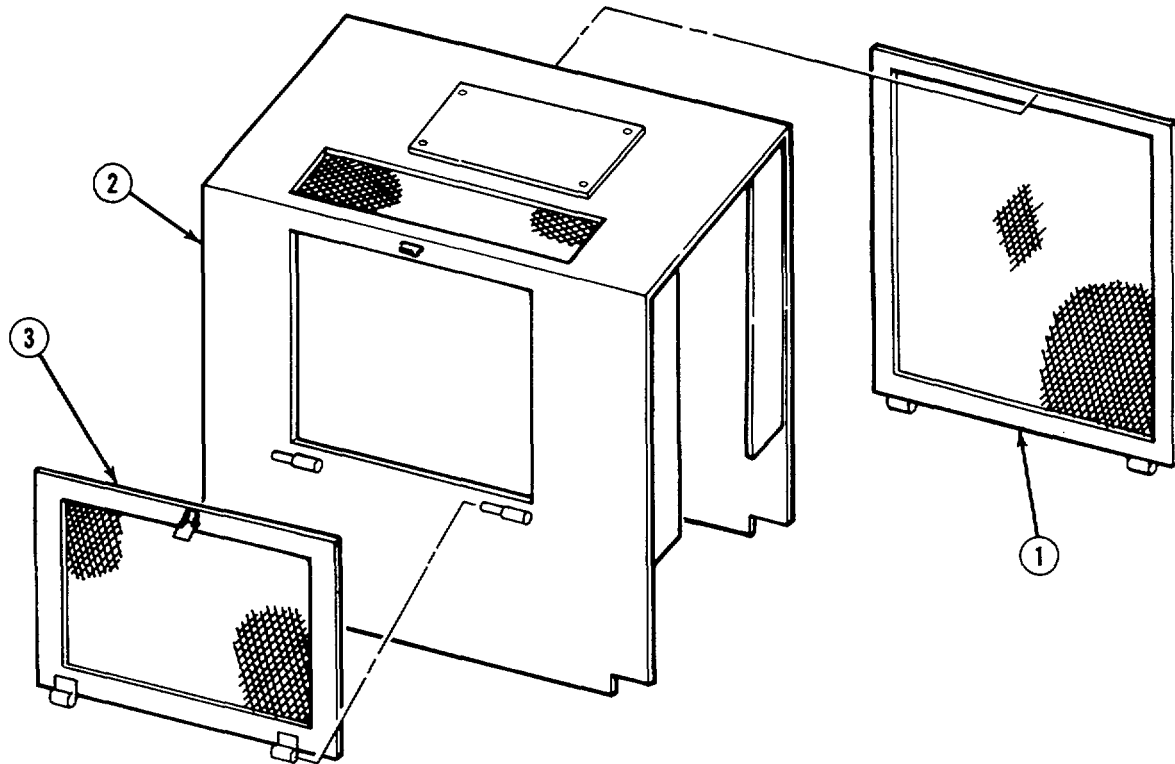
Control panel wires removed.
Throttle control cable and engine cut off cable removed.

Air cleaner removed.
Exhaust pipe removed.

NOTE

Each panel may be removed separately or the entire engine enclosure may be removed as one piece with panels attached.

Text begins on next page.

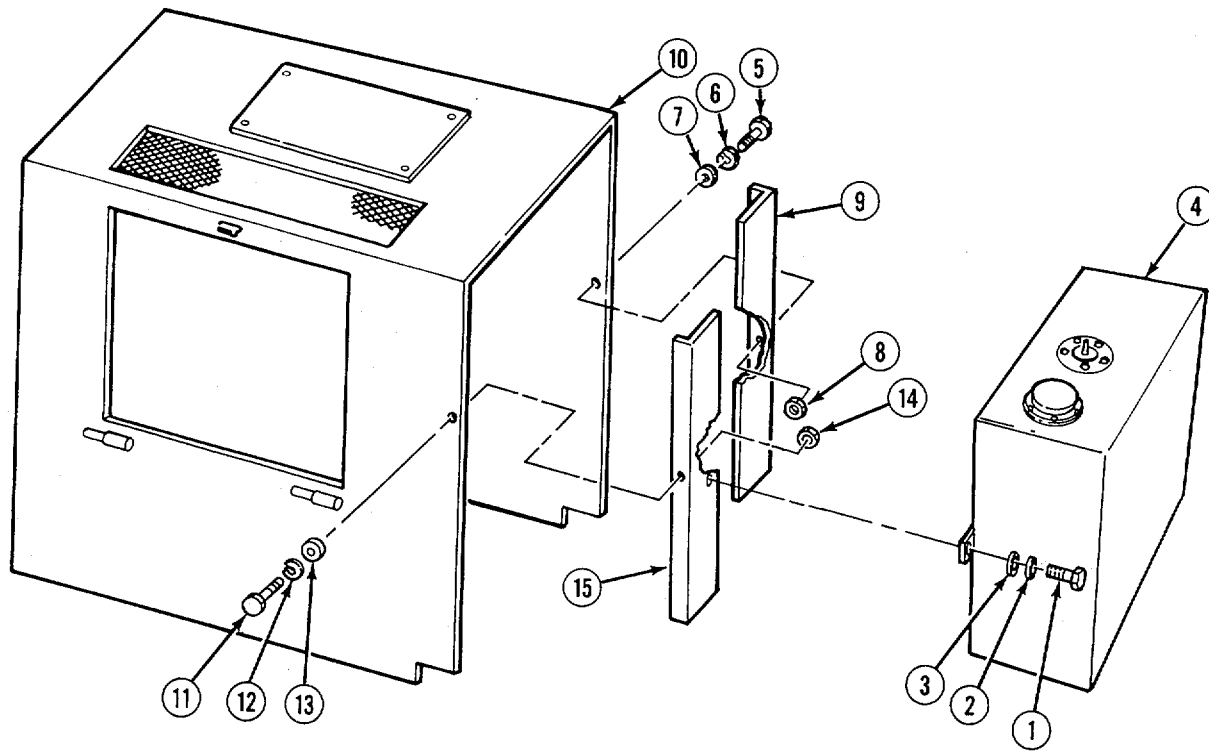
4-98. ENGINE ENCLOSURE REPLACEMENT (CONT).**a. Door Panels.****(1) Removal.**

- (a) Slide door panel (1) (instrument side) off main engine enclosure (2).
- (b) Slide door panel (3) (muffler side) off main engine enclosure (2).

(2) Installation.

- (a) Slide door panel (3) (muffler side) on main engine enclosure (2).
- (b) Slide door panel (1) (instrument side) on main engine enclosure (2).

b. **Front Panels.**

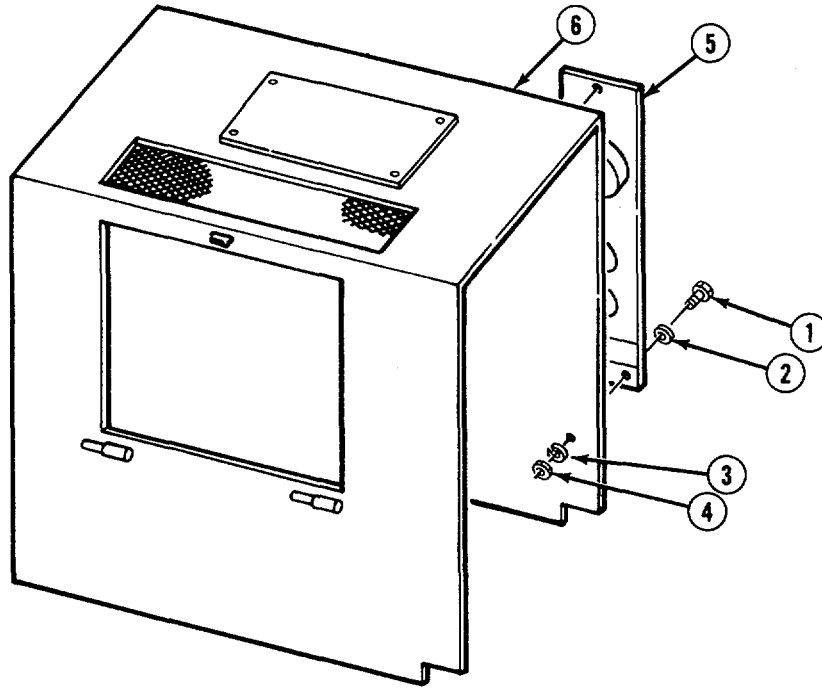


(1) Removal.

- (a) Remove two screws (1), two lockwashers (2), and two washers (3) from fuel tank (4) using a ratchet and 7/16 in. socket.
- (b) Remove screw (5), lockwasher (6), washer (7), nut (8), and panel (9) (instrument side) from main engine enclosure (10) using a 7/16 in. open end wrench, ratchet and 7/16 in. socket.
- (c) Remove screw (11), lockwasher (12), washer (13), nut (14), and panel (15) (muffler side) from main engine enclosure (10) using a 7/16 in. open end wrench, ratchet and 7/16 in. socket.

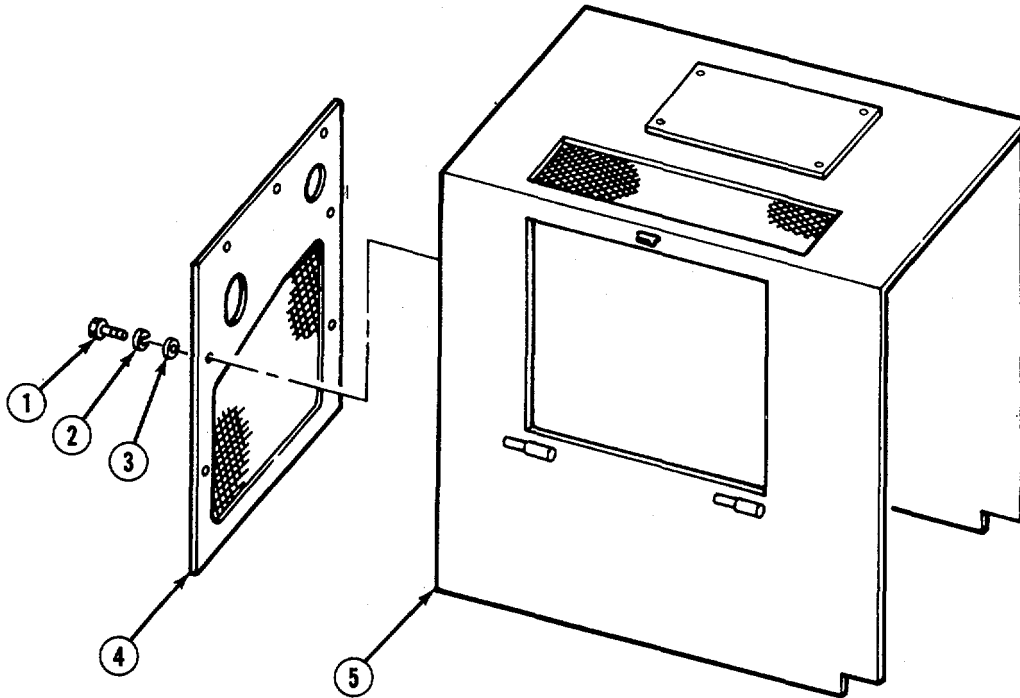
(2) Installation .

- (a) Install washer (13), lockwasher (12), screw (11), panel (15) (muffler side), and nut (14) on main engine enclosure (10) using a 7/16 in. open end wrench, ratchet and 7/16 in. socket.
- (b) Install washer (7), lockwasher (6), screw (5), panel (9) (instrument side) and nut (8) on main engine enclosure (10) using a 7/16 in. open end wrench, ratchet and 7/16 in. socket.
- (c) Install two washers (3), two lockwashers (2), and two screws (1) on fuel tank (4) using a ratchet and 7/16 in. socket.

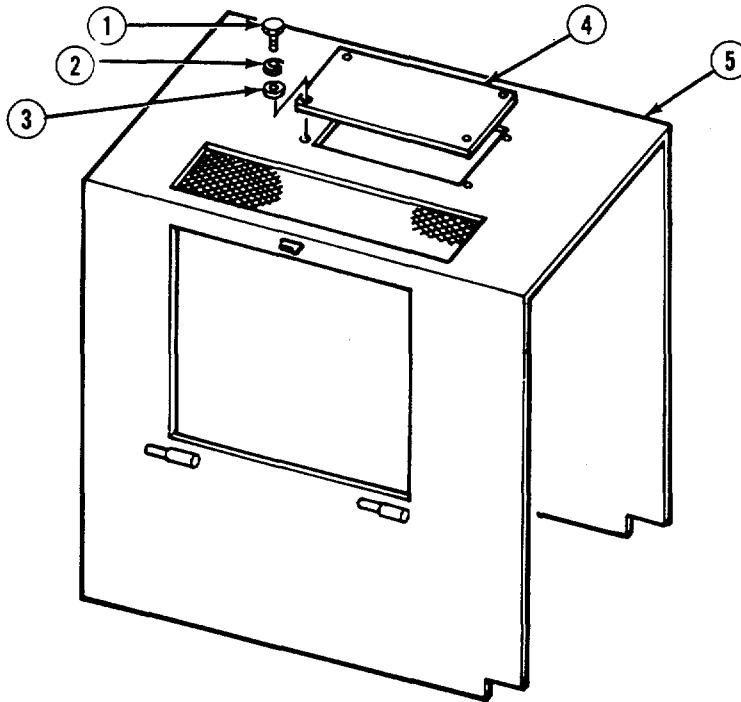
4-98. ENGINE ENCLOSURE REPLACEMENT (CONT).**c. Instrument Panel.**

- (1) Removal. Remove two screws (1), two washers (2), two lockwashers (3), two nuts (4), and panel (5) from main engine enclosure (6) using a 7/16 in. open end wrench, ratchet and 7/16 in. socket.
- (2) Installation. Install two washers (2), two screws (1), panel (5), two lockwashers (3), and two nuts (4) on main engine enclosure (6) using a 7/16 in. open end wrench, ratchet and 7/16 in. socket.

d. *Rear Panels.*

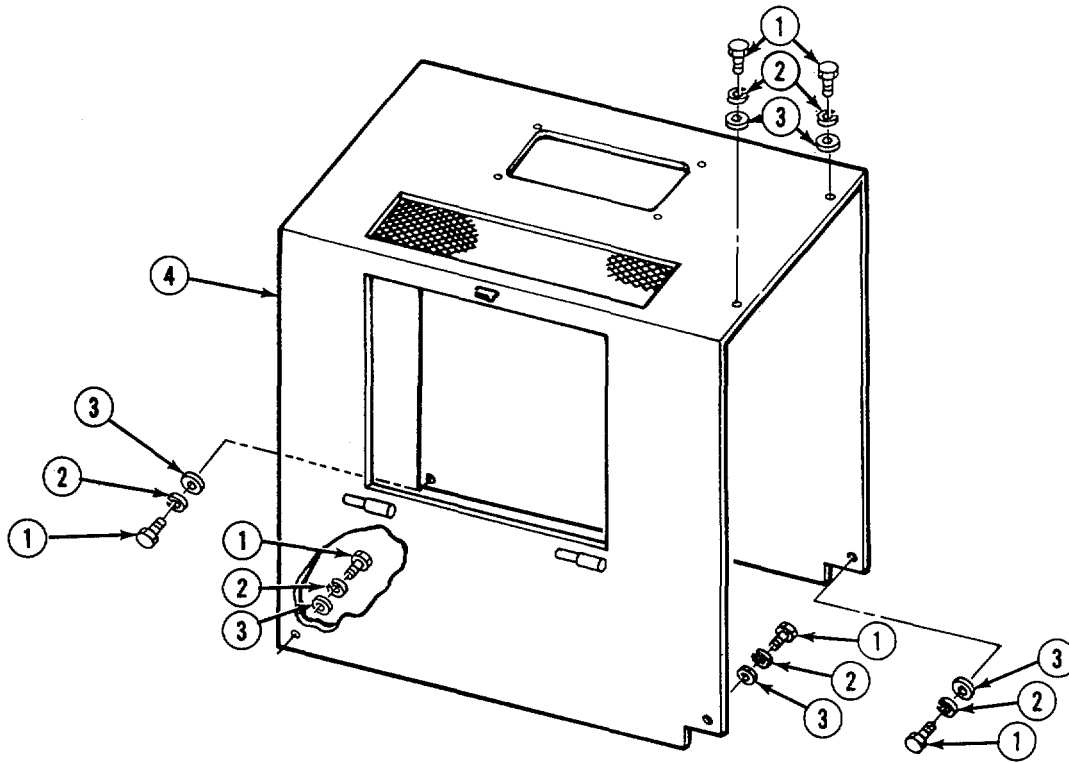


- (1) Removal. Remove seven screws (1), seven lockwashers (2), seven washers (3), and rear panel (4) from main engine enclosure (5) using a 7/16 in. open end wrench.
- (2) Installation. Install rear panel (4), seven washers (3), seven lockwashers (2), and seven screws (1) on main engine enclosure (5) using a 7/16 in. open end wrench.

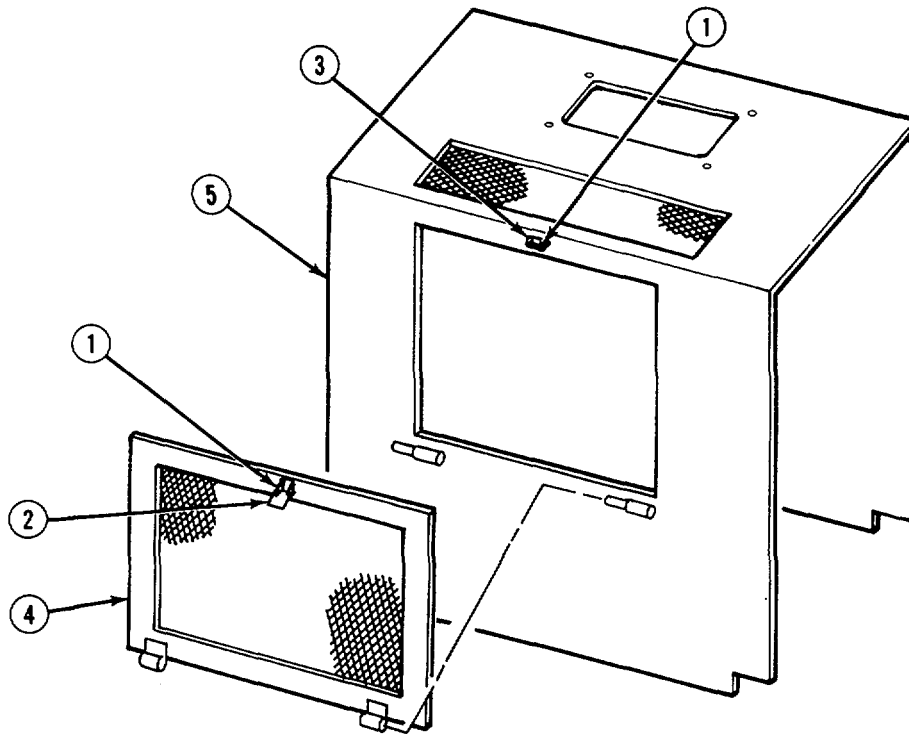
4-98. ENGINE ENCLOSURE REPLACEMENT (CONT).**e. Top Access Panel**

- (1) Removal. Remove four screws (1), four lockwashers (2), four washers (3), and panel (4) from main engine enclosure (5) using a ratchet, and 7/16 in. socket.
- (2) Installation. Install panel (4), four washers (3), four lockwashers (2), and four screws (1) on main engine enclosure (5), using a ratchet and 7/16 in. socket.

f. **Main Engine Enclosure.**



- (1) Removal. Remove six screws (1), six lockwashers (2), six washers (3), and main engine enclosure(4) using a 7/16 in. open end wrench.
- (2) Installation. Position main engine enclosure (4), and install six washers (3), six lockwashers (2), and six screws (1) using a 7/16 in. open end wrench.

4-98. ENGINE ENCLOSURE REPLACEMENT (CONT).**g. Hasp and Latch.**

- (1) Removal. Drill out four rivets (1) using an electric drill and 1/8 in. drill bit and remove hasps (2), and latches (3) from door panels (4), and main engine enclosure (5).
- (2) Installation. Install latch (3) on main engine enclosure (5), and hasps (2) on door panels (4). Secure latches and hasps with rivets (1) using a rivet gun.

NOTE**Follow-on maintenance:****Instrument Panel:**

- . Install Control panel wires (para 4-80)
- . Install throttle control cable and engine cut off cable (Para 4-47)

Rear Panel:

- . Install air cleaner (para 4-37)
- . Exhaust pipe removed (para 4-51)

Main Engine Enclosure:

- . Install control panel wires (para 4-80)
- . Install throttle control cable and engine cut off cable (para 4-47)
- . Install air cleaner (para 4-37)
- . Install exhaust pipe (para 4-51)

END OF TASK

4-99. DATA PLATE REPLACEMENT.

This task covers:

- a. Removal
- b. Installation

INITIAL SETUP

Tools

Tool Kit, General Mechanic's: Automotive

Materials/Parts

Lockwashers

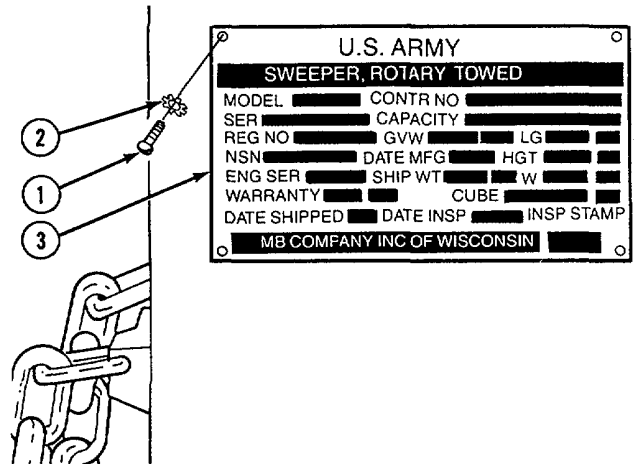
- a. **Removal.** Remove four screws (1), lockwashers (2), and plate (3).

NOTE

Make sure surface is clean and dry before installing data plate.

- b. **Installation.** Install plate (3), lockwashers (2), and screws (1).

END OF TASK



4-100. DECAL REPLACEMENT.

This task covers:

a. Removal

b. Cleaning/Inspection

c. Installation

INITIAL SETUP

Tools

Tool Kit, General Mechanic's: Automotive

Materials/Parts

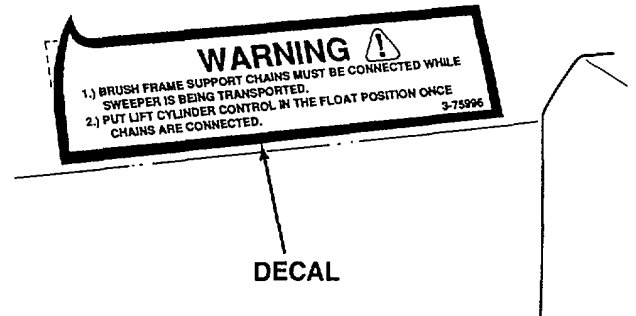
Decal

Solvent, dry cleaning, item 31, Appendix E

- a. **Removal** Peel damaged decal from vehicle using a putty knife.

WARNING

Dry cleaning solvent P-D-680 is toxic and flammable. Wear protective goggles, face mask, and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapor. Do not use near open flame or excessive heat. The flashpoint for type I dry cleaning solvent is 100°F (38°C) and for type II is 140°F (60°C). If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, flush eyes with water and get medical aid immediately.



- b. **Cleaning/Inspection.** Using dry cleaning solvent P-D-680, thoroughly clean area where decal will be installed.

NOTE

Surface should be clean and dry before applying new decal.

- c. **Installation.** Remove paper backing and install new decal.

END OF TASK

4-101. HYDRAULIC PUMP ASSEMBLY REPLACEMENT.

This task covers:

- a. Removal
- b. Installation

INITIAL SETUP

Tools

Tool Kit, General Mechanic's: Automotive

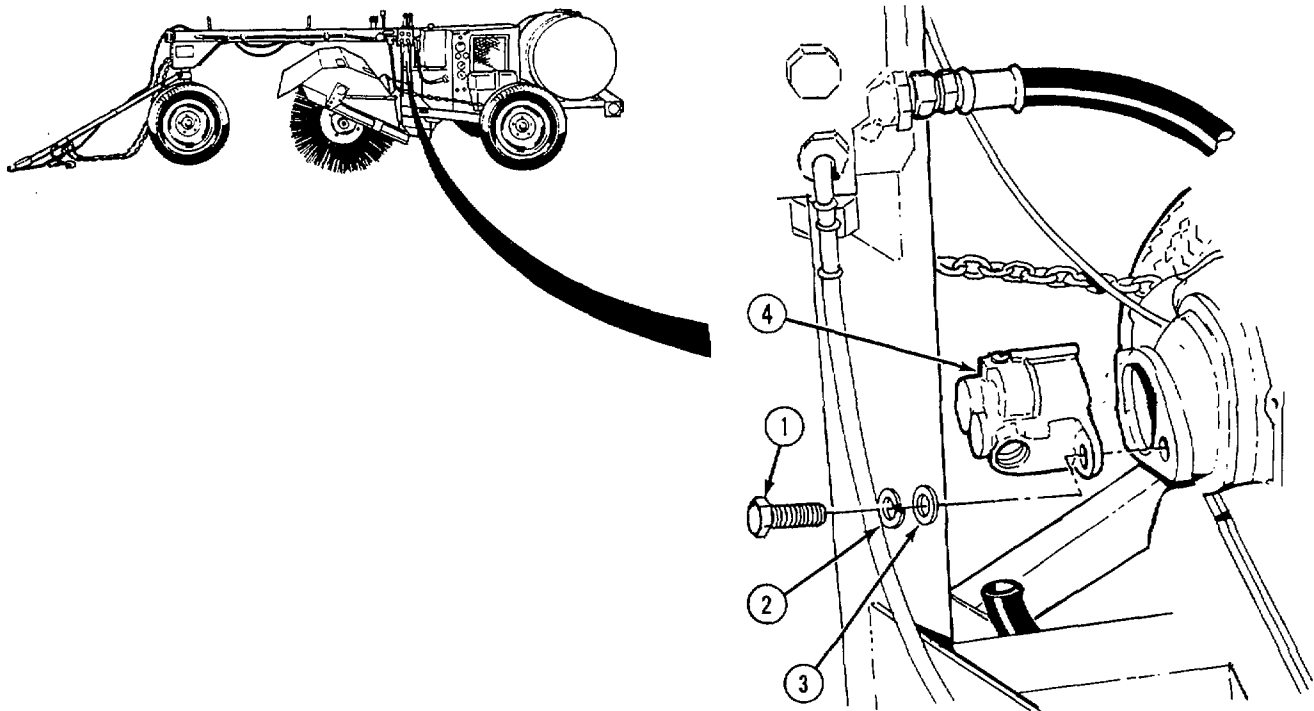
Materials/Parts

Lockwashers

Equipment Condition

TM or Para
Para 4-105

Condition Description
Hydraulic hoses
disconnected from pump.



NOTE

Place suitable container beneath hydraulic pump prior to removal.

- a. **Removal.** Remove two mounting screws (1), two lockwashers (2), two washers (3), and hydraulic pump (4) using a 17 mm open end wrench.
- b. **Installation.** Install hydraulic pump (4), two washers (3), two lockwashers (2), and two mounting screws (1) using a 17 mm open end wrench.

NOTE

Follow-on maintenance: Connect hydraulic hoses (para 4-105)

END OF TASK

4-102. HYDRAULIC MOTOR AND MOUNT REPLACEMENT.

This task covers:

- a. Removal
- b. Installation

INITIAL SETUP

Tools

Tool Kit, General Mechanic's: Automotive

Shop Equipment, Automotive Maintenance and Repair; Organizational Maintenance, Common No. 1, Less Power

Materials/Parts

Locknuts

Equipment Condition

TM or Para
Para 4-116
Para 4-105

Condition Description
Motor guard removed
Hydraulic motor inlet and outlet hoses removed.

a. Removal.

- (1) Remove two locknuts (1), two screws (2), two washers (3), and mount (4) using a 3/4 in. open end wrench, ratchet and 3/4 in. socket.
- (2) Remove two locknuts (5) using a 3/4 in. open end wrench.
- (3) Remove motor (6) by pulling out and away from mount (4)

b. Installation.

NOTE

Make sure hose connections are pointing to rear of sweeper.

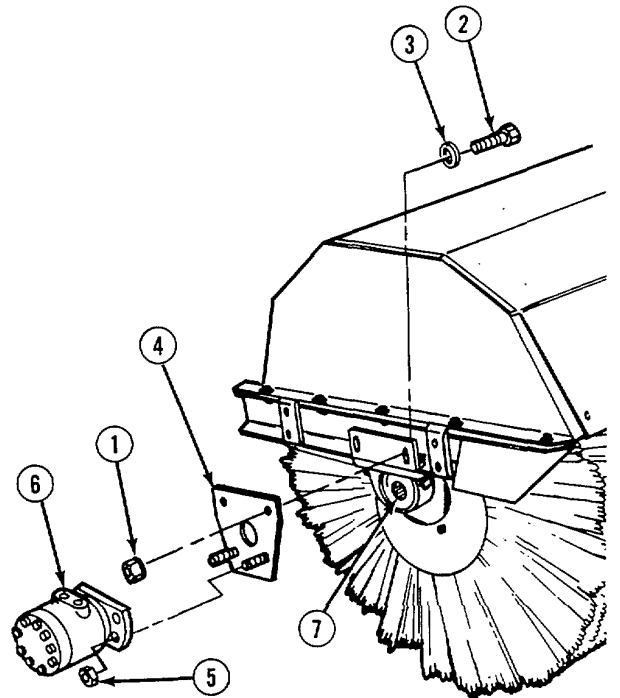
- (1) Position motor (6) on mount (4), and install two locknuts (5) using a 3/4 in. open end wrench.
- (2) Install motor (6) shaft into core shaft (7).
- (3) Install screws (2), washers (3), and locknuts (1) using a 3/4 in. open end wrench, ratchet and 3/4 in. socket.

NOTE

Follow-on maintenance:

- Install motor inlet and outlet hoses (para 4-105)
- Install motor guard (para 4-116)

END OF TASK



4-103. HYDRAULIC CONTROL VALVE REPLACEMENT.

This task covers:

- a. Removal
- b. Installation

INITIAL SETUP:

Tools

Tool Kit, General Mechanic's: Automotive

Shop Equipment, Automotive Maintenance and Repair; Organizational Maintenance, Common No. 1, Less Power

Equipment Condition

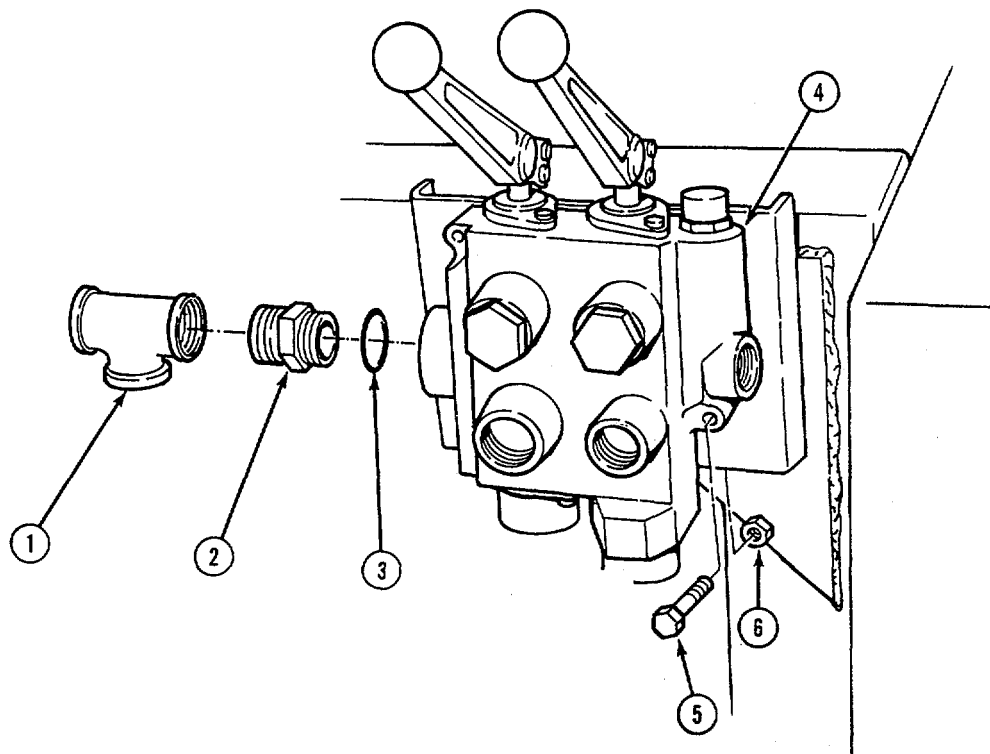
TM or Para
Para 4-108

Para 4-105

Condition Description
Hydraulic filter housing removed.
Hydraulic hoses disconnected from valve.

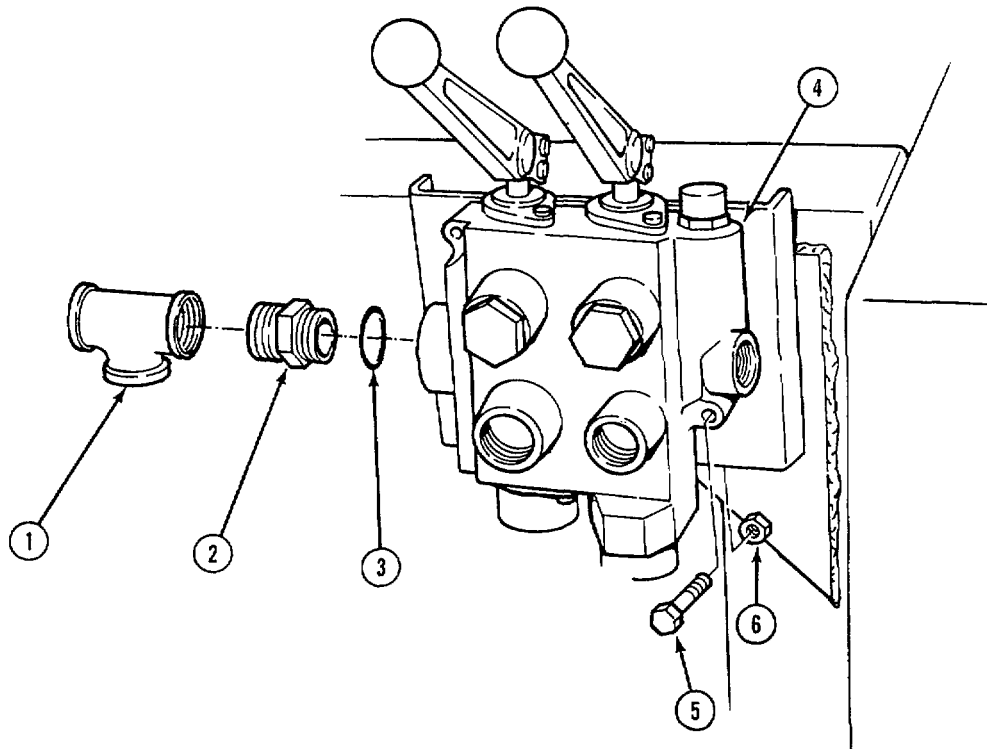
Materials/Parts

Locknuts
O-ring
Tape, Teflon, item 34 Appendix E



a. Removal

- (1) Remove tee pipe (1), adapter (2), and O-ring (3) from valve (4) using a 1-1/4 in. open end wrench.
- (2) Remove three screws (5), three locknuts (6), and remove valve (4) using two 9/16 in. open end wrenches.

4-103. HYDRAULIC CONTROL VALVE REPLACEMENT (CONT).**b. Installation.**

- (1) Install valve (4), three screws (5), and three locknuts (6) using two 9/16 in. open end wrenches.

NOTE

Teflon tape is applied to threads of adapter opposite O-ring side.

- (2) Wrap Teflon tape on threads of adapter (2) .
- (3) Install O-ring (3), adapter (2), and tee pipe (1) using a 1-1/4 in. open end wrench.

NOTE**Follow-on maintenance:**

- Install hydraulic filter housing (para 4-108)
- Connect hydraulic hoses to control valve (para 4-105)

END OF TASK

4-104. BREATHER REPLACEMENT.

This task covers:

- a. Removal
- b. Installation

INITIAL SETUP:

Tools

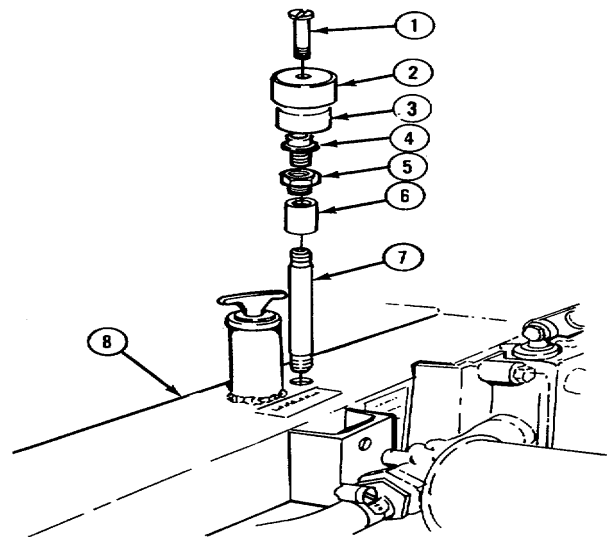
Tool Kit, General Mechanic's: Automotive
Appendix E
Solvent, dry cleaning, item 31, Appendix E

Materials/Parts

Compound, sealing, pipe thread item 16

a. Removal

- (1) Remove screw (1), breather (2), and filter (3) using a cross tip screwdriver.
- (2) Remove reducer (4) using a 7/8 in. open end wrench.
- (3) Remove reducer fitting (5), connector (6), and breather pipe (7) from hydraulic reservoir (8) using pliers and 5/8 in. Open end wrench.



WARNING

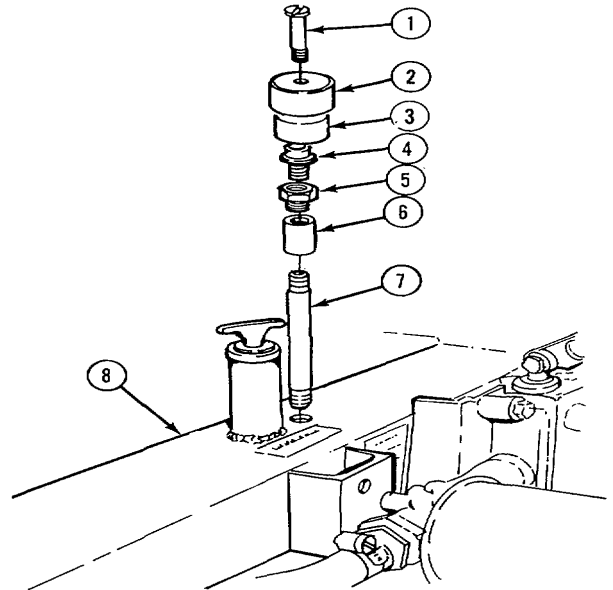
Dry cleaning solvent P-D-680 is toxic and flammable. Wear protective goggles, face mask, and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapor. Do not use near open flame or excessive heat. The flashpoint for type I dry cleaning solvent is 100°F (38 °C) and for type II is 140°F (60 °C). If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, flush eyes with water and get medical aid immediately.

b. Cleaning/ Inspection. Clean filter (3) in P-D-680 and allow to dry.

4-104. BREATHER REPLACEMENT (CONT)**c. Installation.****WARNING**

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

- (1) Apply pipe thread sealing compound to all threads.
- (2) Assemble connector (6), and breather pipe (7) using pliers.
- (3) Install breather pipe (7) in hydraulic reservoir (8), and tighten using pliers.
- (4) Install reducer fitting (5), and reducer (4) using a 7/8 in. and 5/8 in. open end wrenches.
- (5) Install filter (3), breather (2), and screw (1) using cross tip screwdriver.

**END OF TASK**

4-105. HYDRAULIC HOSE ASSEMBLY REPLACEMENT/REPAIR.

This task covers:

- a. Return Tube Replacement
- b. Motor Inlet Hose Replacement
- c. Motor Outlet Hose Replacement
- d. Cylinder Hose Replacement
- e. Pump Outlet Hose Replacement
- f. Pump Inlet Hose Replacement
- g. Hose Repair

INITIAL SETUP:

Tools

Tool Kit General Mechanic: Automotive

Shop Equipment, Automotive Maintenance and Repair; Organizational Maintenance, Common No. 1, Less Power

Equipment Condition

TM or Para
Para 4-98

Para 4-106

Condition Description
Front panel (instrument side) removed.
Hydraulic system drained.

Materials/Parts

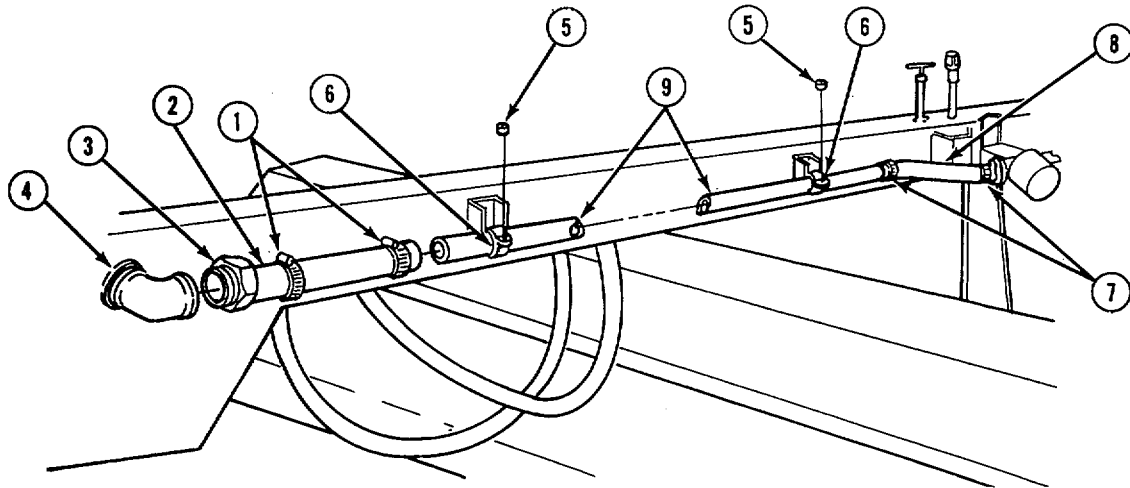
Locknuts
O-rings
Compound, sealing, pipe thread, item 16 Appendix E
Fluid, hydraulic, item 19 Appendix E
Ties, plastic, item 36 Appendix E
Hydraulic hose (See Appendix G for fabrication)
Hose Guard (See Appendix G for fabrication)

General Safety Instructions

Hydraulic system is under extreme pressure, do not remove hydraulic lines while engine is running.

CAUTION

Plug all hydraulic lines, ports and fittings to prevent contamination when removed.

4-105. HYDRAULIC HOSE ASSEMBLY REPLACEMENT/REPAIR (CONT) .**a. Return Tube Replacement .****(1) Removal.**

- (a) Remove clamps (1), and hose (2) using a flattip screwdriver.
- (b) Remove insert bead (3), and elbow (4) using a 1-1/8 in. open end wrench and pipe wrench.
- (c) Remove two locknuts (5) using a ratchet and 7/16 in. socket. Remove clamps (6) using a flat tip screwdriver.
- (d) Remove two clamps (7), and tube (8) using a flat tip screwdriver.

(2) Installation.

- (a) Install hose (2), and clamps (1) using a flat tip screwdriver.

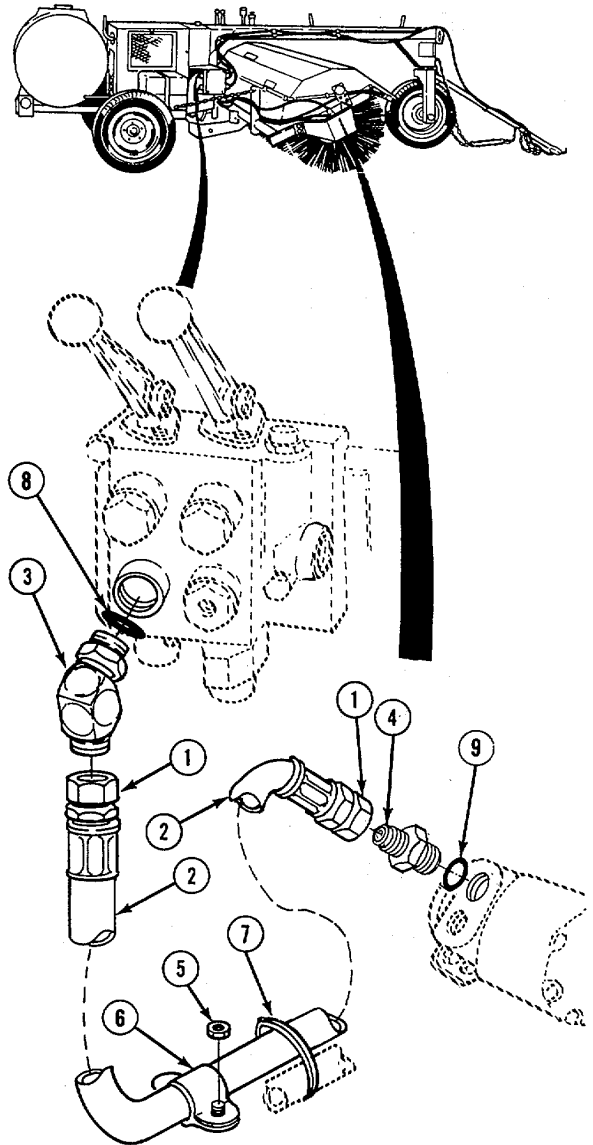
WARNING

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

- (b) Apply pipe thread sealing compound on elbow (4) threads.
- (c) Install insert bead (3), and elbow (4) using a 1-1/8 in. open end wrench and a pipe wrench.
- (d) Install two clamps (6), and two locknuts (5) using a ratchet and 7/16 in socket.
- (e) Install hose (8) using two clamps (7). Tighten using a flat tip screwdriver.

b. Motor Inlet Hose Replacement.

- (1) Removal.
 - (a) Loosen couplings (1) using a 1-1/4 in. open end wrench and remove hose (2) from fittings (3 and 4).
 - (b) Remove fittings (3 and 4) using a 1-1/4 in. and 1-1/8 in. open end wrenches.
 - (c) Remove nut (5), and clamp assembly (6) using a ratchet and 7/16 in. socket. Remove plastic ties (7).
 - (d) Remove O-rings (8 and 9) from fittings (3 and 4).
- (2) Installation.
 - (a) Install O-rings (8 and 9) on fittings (3 and 4).
 - (b) Install fittings (3 and 4) using a 1-1/4 in. and 1-1/8 in. open end wrench.
 - (c) Secure hose (2) to fittings (3 and 4) using couplings (1). Tighten using a 1-1/4 in. open end wrench.
 - (d) Install clamp (6), and locknut (5) on hose (2) using a ratchet and 7/16 in. socket. Install plastic ties (7), as needed.



**4-105. HYDRAULIC HOSE ASSEMBLY
REPLACEMENT/REPAIR (CONT).**

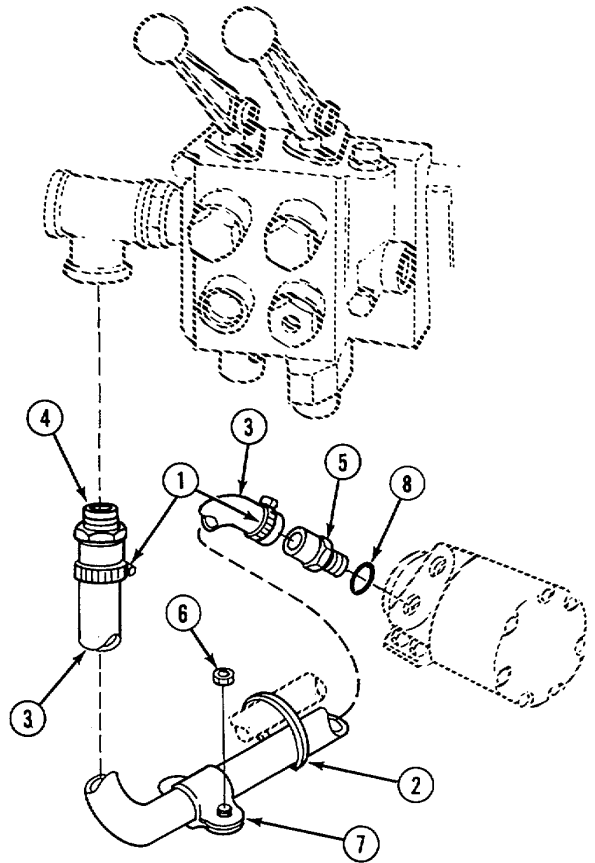
c. Motor Outlet Hose Replacement.

(1) Removal.

- (a) Remove two clamps (1), and plastic ties (2), and pull hose (3) off insert beads (4 and 5).
- (b) Remove nut (6), clamp assembly (7), and hose (3) using a ratchet and 7/16 in. socket.
- (c) Remove insert bead (4) using a 1-1/8 in. open end wrench.
- (d) Remove insert bead (5) using a 1 in. open end wrench.
- (e) Remove O-ring (8) from insert bead (5).

(2) Installation.

- (a) Install O-ring (8) on insert bead (5).
- (b) Install insert bead (5) using a 1 in. Open end wrench.
- (b) Install insert bead (4) using a 1-1/8 in. open end wrench.
- (c) Install hose (3) using clamp assembly (7), nut (6), and clamps (1). Tighten using a ratchet and 7/16 in. socket.
- (d) Install plastic ties (2), as needed.



d. Cylinder Hose Replacement.

(1) Removal.

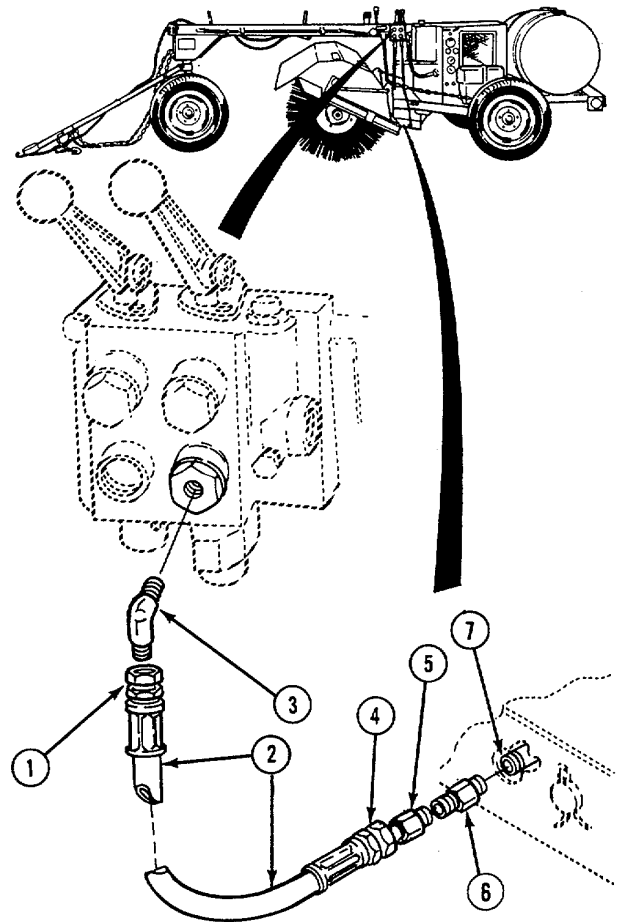
- (a) Remove coupling (1) using a 9/16 in. open end wrench and remove cylinder hose (2).
- (b) Remove fitting (3) using a 1/2 in. open end wrench.
- (c) Remove hose coupling (4) using a 9/16 open end wrench.
- (d) Remove restrictor (5), straight adapter (6), and pipe nipple (7) using a 11/16 in. open end wrench and pliers.

(2) Installation.

WARNING

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

- (a) Apply pipe thread sealing compound to threads of pipe nipple (7).
- (b) Install pipe nipple (7), adapter (6), and restrictor fitting (5) using a 11/16 open end wrench and pliers.
- (c) Install hose (2), and coupling (4). Tighten using a 9/16 in. open end wrench.
- (d) Install fitting (3) using a 1/2 in. open end wrench.
- (e) Install hose (2), and coupling (1). Tighten using a 9/16 in. open end wrench.

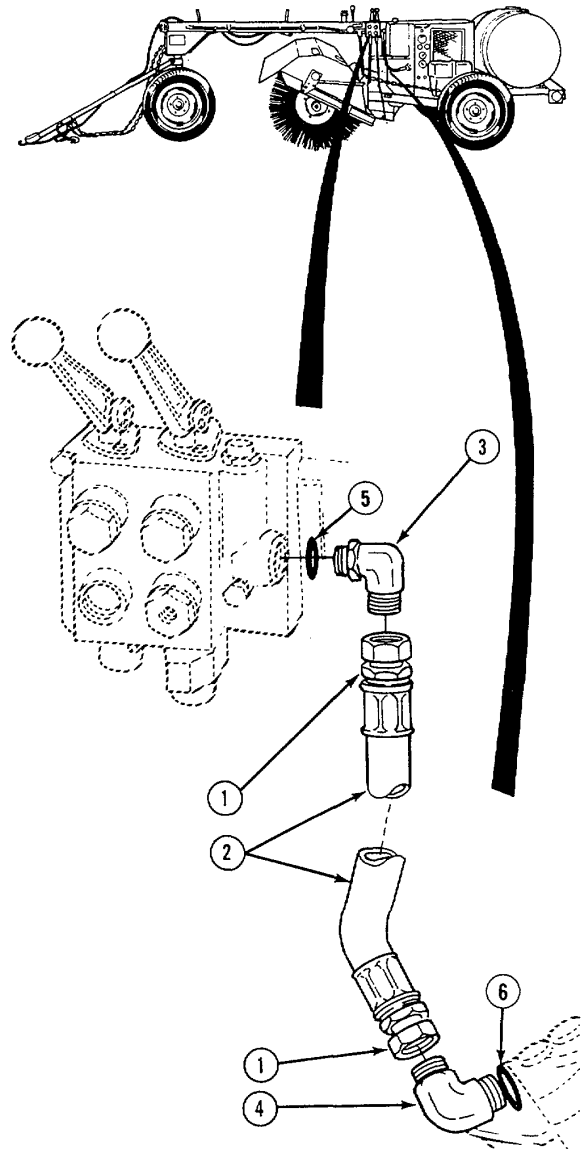


4-105. HYDRAULIC HOSE ASSEMBLY REPLACEMENT/REPAIR (CONT).**e. Pump Outlet Hose Replacement.****(1) Removal.**

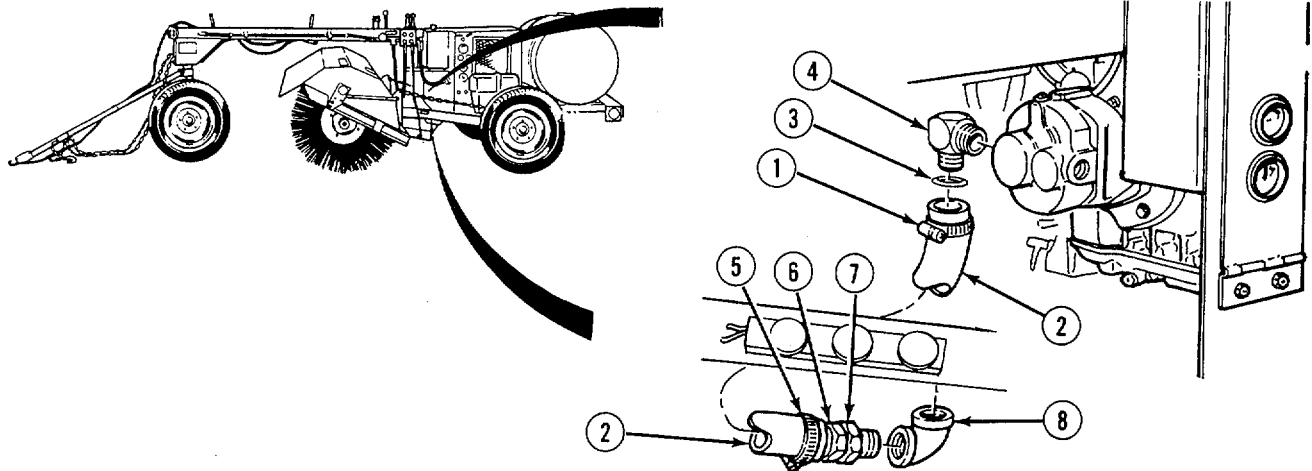
- (a) Loosen two couplings (1) using a 1-1/4 in. open end wrench and remove hose (2).
- (b) Remove fitting (3) using a 1-1/4 in. open end wrench.
- (c) Remove fitting (4) using a 1-1/4 in. open end wrench.
- (d) Remove O-ring (5) from fitting (3).
- (e) Remove O-ring (6) from fitting (4).

(2) Installation.

- (a) Install O-ring (6) on fitting (4).
- (b) Install fitting (4) using a 1-1/4 in. Open end wrench.
- (c) Install O-ring (5) on fitting (3).
- (d) Install fitting (3) using a 1-1/4 in. Open end wrench.
- (e) Install hose (2) and couplings (1) on fittings (3 and 4) using a 1-1/4 in. Open end wrench.



f. Pump Inlet Hose Replacement.



(1) Removal.

- (a) Remove clamp (1) and hose (2) using a flat tip screwdriver.
- (b) Remove O-ring (3) from fitting (4).
- (c) Remove fitting (4) using a 1-5/8 in. open end wrench.
- (d) Remove clamp (5) from hose (2).
- (e) Remove bead insert (6) using a 1-3/8 in. open end wrench.
- (f) Remove reducer bushing (7) using a 1-13/16 in. open end wrench and elbow (8) using a pipe wrench.

(2) Installation .

WARNING

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

- (a) Apply thread sealing compound to threads of elbow (8).
- (b) Install reducer bushing (7), using a 1-13/16 in. open end wrench and elbow (8) using a pipe wrench.
- (c) Install bead insert (6) using a 1-3/8 in. open end wrench.
- (d) Install hose (2) on bead insert (6) using clamp (5). Tighten using a flat tip screwdriver.
- (e) Install fitting (4) using a 1-5/8 in. open end wrench.
- (f) Install O-ring (3) on fitting (4).
- (g) Install hose (2) on fitting (4) using clamp (1). Tighten using a flat tip screwdriver.

g. Hose Repair. Refer to Appendix G for hydraulic hose repair.

NOTE

Follow-on maintenance:

- **Front panel (instrument side) installed (para 4-98)**
- **Fill hydraulic system as needed (para 4-106)**
- **Start vehicle and check hydraulic system for leaks**

END OF TASK

4-106. HYDRAULIC OIL DRAIN/FILL.

This task covers:

- a. Drain
- b. Fill

INITIAL SETUP:

Tools

Tool Kit, General Mechanic's: Automotive

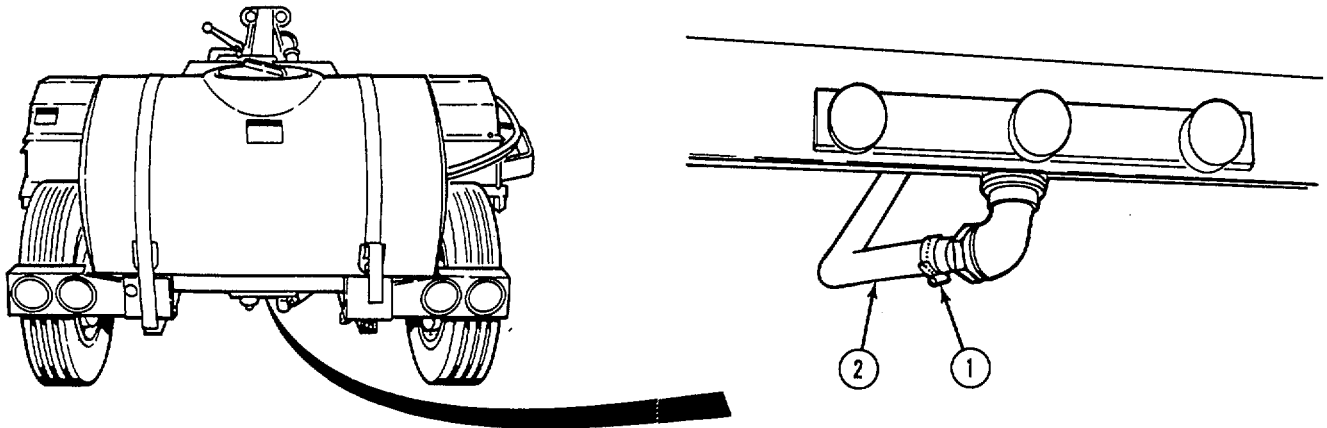
Equipment Condition

TM or Para
Para 3-13

Condition Description
Bleed hydraulic system.

Materials/Parts

Fluid, hydraulic, item 19, Appendix E



a. Drain.

NOTE

Hydraulic system capacity is 7.5 gal. (28.38 l).

- (1) Place a suitable container under sweeper.
- (2) Loosen clamp (1) using a flat tip screwdriver and remove hose (2). Allow oil to drain.
- (3) Dispose of hydraulic oil in accordance with local policy.

b. Fill.

- (1) Install hose (2), and tighten clamp (1) using a flat tip screwdriver.

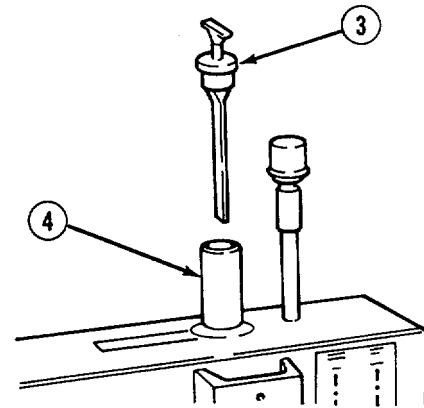
4-106. HYDRAULIC OIL DRAIN/FILL (CONT).

- (2) Remove dipstick (3) and fill hydraulic reservoir (4) in accordance with lubrication instructions (Chapter 3, Section I).
- (3) Install dipstick (3).

NOTE

Follow-on maintenance: Start vehicle and check hydraulic system for leaks.

END OF TASK



4-107. HYDRAULIC FILTER REPLACEMENT.

This task covers:

- a. Removal
- b. Installation

INITIAL SETUP:

Tools

Tool Kit, General Mechanic's: Automotive

Equipment Condition

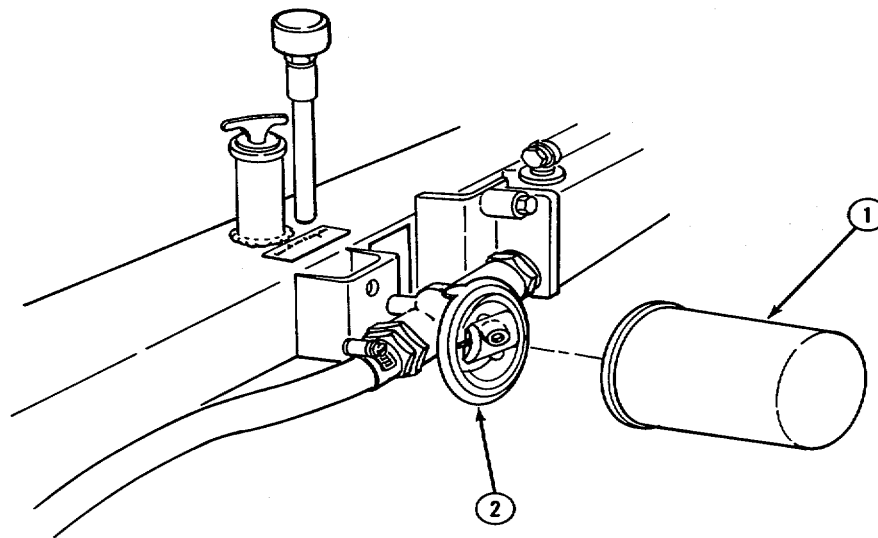
TM or Para
Para 4-106

Condition Description

Hydraulic system
drained.

Materials/Parts

Filter



NOTE

Place a suitable container beneath hydraulic filter prior to removal.

- a. Removal.** Remove filter (1) from housing (2) using a filter wrench. Dispose of filter in accordance with location policy.
- b. Installation.** Lubricate gasket on filter (1) with fresh hydraulic oil and install filter on housing (2). Tighten using a filter wrench.

NOTE

Follow-on maintenance: Fill hydraulic system (para 4-106)

END OF TASK

4-108. HYDRAULIC FILTER HOUSING REPLACEMENT.

This task covers:

- a. Removal
- b. Installation

INITIAL SETUP:*Tools*

Shop Equipment, Automotive Maintenance and Repair; Organizational Maintenance, Common No. 1, Less Power

Equipment Condition

TM or Para
Para 4-105

Condition Description

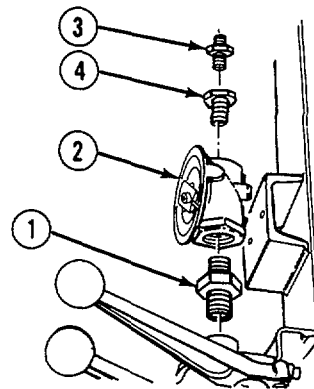
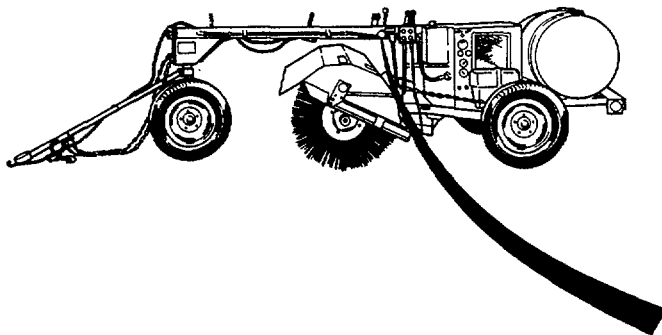
Hydraulic hoses disconnected from filter housing.

Materials/Parts

Compound, sealing, pipe thread item 16 Appendix E
Fluid, hydraulic, item 19 Appendix E

Para 4-107

Hydraulic filter removed.

**a. Removal.**

- (1) Remove straight adapter (1), and filter housing (2) as an assembly using a 1-3/8 in. open end wrench.
- (2) Remove straight adapter (1) from filter housing (2) using a 1-3/8 in. open end wrench.
- (3) Remove bead insert (3) from reducer bushing (4) using a 1-1/8 and 1-3/8 in. open end wrenches.
- (4) Remove reducer bushing (4) from filter housing (2) using a 1-3/8 in. open end wrench.

b. Installation.**WARNING**

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

- (1) Apply pipe thread sealing compound to threads of adapter (1), reducer bushing (4), and bead insert (3).
- (2) Install reducer bushing (4) into filter housing (2) using a 1-3/8 in. open end wrench.
- (3) Install bead insert (3) into reducer bushing (4) using a 1-1/8 in. open end wrench.
- (4) Install straight adapter (1) into filter housing (2) using a 1-3/8 in. open end wrench.
- (5) Install straight adapter (1), and filter housing (2) as an assembly using a 1-3/8 in. open end wrench.

NOTE**Follow-on maintenance:**

- **Install hydraulic filter (para 4-107)**
- **Connect hydraulic hoses to filter housing (para 4-105)**

END OF TASK

4-109. TACHOMETER GEAR ASSEMBLY REPLACEMENT.

This task covers:

- a. Removal
- b. Installation

INITIAL SETUP:

Tools

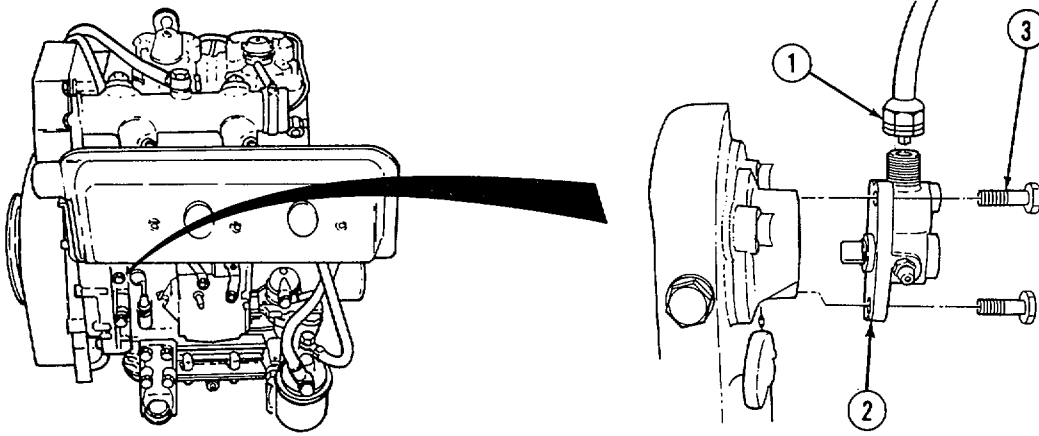
Tool Kit, General Mechanic's: Automotive

Equipment Condition

TM or Para
Para 3-5

Condition Description

Open right access cover.



a. Removal

- (1) Remove tachometer cable end (1) from tachometer gear assembly (2) using a 14 mm wrench.
- (2) Remove two screws (3) and tachometer gear assembly (2) using a 4 mm hex head wrench.

b. Installation.

- (1) Install tachometer gear assembly (2) using two screws (3). Tighten using a 4 mm hex head wrench.
- (2) Install tachometer cable end (1) on tachometer gear assembly (2) using a 14 mm wrench.

NOTE

Follow-on maintenance: Close right access cover (para 3-5)

END OF TASK

4-110. TACHOMETER AND TACHOMETER CABLE REPLACEMENT.

This task covers:

- a. Removal
- b. Installation

INITIAL SETUP:

Tools

Tool Kit, General Mechanic's: Automotive

Equipment Condition

TM or Para
Para 4-73

Condition Description

Battery cable disconnected.
Tachometer cable disconnected from

Materials/Parts

Star washers
Lockwashers
tachometer gear.

Para 4-109

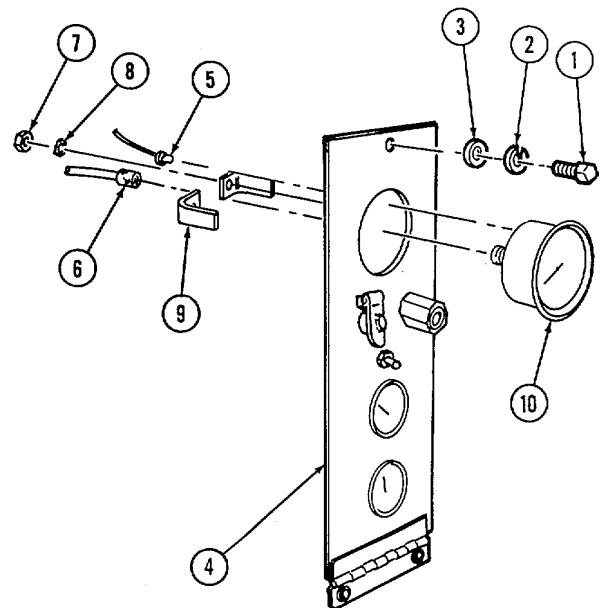
a. Removal

- (1) Remove screw (1), lockwasher (2), and washer (3) using a 7/16 in. open end wrench. Lower panel (4).
- (2) Remove wire and bulb (5).
- (3) Remove tachometer cable (6).

CAUTION

Hold gage from front or damage to gage may result.

- (4) Remove two nuts (7), two star washers (8), and two brackets (9) using a 5/16 in. Open end wrench.
- (5) Remove gage (10) from front of panel (4).



b. Installation.

- (1) Install gage (10) in front of panel (4).
- (2) Lower panel (4), and install two brackets (9), two star washers (8), and two nuts (7) using a 5/16 in. Open end wrench.
- (3) Install tachometer cable (6) using pliers.
- (4) Install wire and bulb (5).
- (5) Raise panel (4), and install washer (3), lockwasher (2), and screw (1) using a 7/16 in. open end wrench.

NOTE

Follow-on maintenance:

- **Connect battery cables (para 4-73)**
- **Connect tachometer cable to tachometer gear (para 4-109)**

END OF TASK

4-111. BROOM PATTERN ADJUSTMENT.

This task covers:

Adjustment

INITIAL SETUP:*Tools*

Tool Kit, General Mechanic's: Automotive

WARNING

Hearing protection must be worn when performing adjustments in close proximity to the sweeper. Long term exposure may cause hearing damage.

NOTE

This adjustment must be made frequently to compensate for brush wear.

- (1) Start engine (para 2-8a), and raise brush (1) two inches (10 cm) above a smooth surface.

- (2) Shutdown engine (para 2-8b), and loosen locknut (2), and adjust spring adjustment nuts (3) on spring assemblies (4) on each side of cylinder attachment until there is no space between nuts (3), spring spacer (5), and spring (4) using a 1-1/8 in. open end wrench.
- (3) Start engine (para 2-8a) and lower brush by moving valve lever (6) until it catches in full lowered position.
- (4) Raise brush (1), and measure width of area contacted by brush (para 2-8h).

NOTE

Ideal width of brush contact (brush pattern) should be 2-4 in. (5 to 10 cm).

- (5) If brush pattern (7) is wider than 4 in. (10 cm), increase spring tension by turning adjusting nuts away from brush. If pattern is less than 2 in. (5 cm) decrease spring tension by turning adjusting nuts toward brush.
- (6) Repeat steps (3) through (5) until correct pattern is attained. Tighten locknuts (2) against adjusting nuts (3) to secure spring tension. Shut down engine (para 2-8b).

END OF TASK

4-114. BRUSH FRAME ASSEMBLY REPLACEMENT.

This task covers:

- a. Removal
- b. Installation

INITIAL SETUP:

Tools

Tool Kit, General Mechanic's: Automotive

Equipment Condition

TM or Para
Para 4-102

Condition Description
Hydraulic motor removed.

Materials/Parts

Locknuts
Lockwashers

Para 4-78
Para 4-105

Broom hood wiring harness disconnected.
Hydraulic hoses disconnected.
Brush removed.

Personnel Required

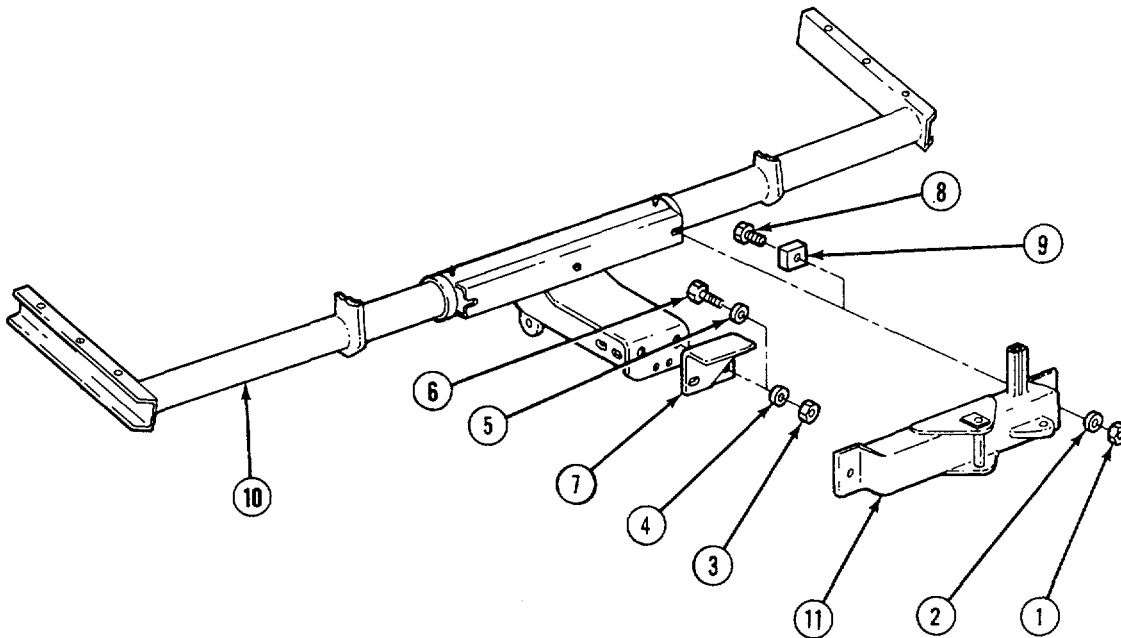
MOS 62B Construction Equipment Repairer (2)

Para 4-117

NOTE

This task requires a mechanic and an assistant.

a. Removal.



- (1) Remove two locknuts (1), and two washers (2) using a ratchet and 1-1/16 in. socket. Remove brush frame assembly.

- (2) Remove two nuts (3), two lockwashers (4), two washers (5), two screws (6), and snubber bracket (7) using a 9/16 in. open end wrench, ratchet and 9/16 in. socket.
- (3) Remove two screws (8) and two carriage washers (9) from brush frame (10) using a ratchet and 1-1/16 in. socket.

b. Installation.

- (1) Install snubber bracket (7) using two screws (6), two washers (5), two lockwashers (4), and two locknuts (3). Tighten using a 9/16 in. open end wrench, ratchet and 9/16 in. socket
- (2) Install two screws (8) and two carriage washers (9) on brush frame (10) using a ratchet and 1-1/6 in. socket.
- (3) Install brush frame assembly on swing frame (11) using two washers (2) and two locknuts (1).

NOTE

Follow-on maintenance:

- Install brush (para 4-117)
- Install hydraulic motor (para 4-102)
- Connect hydraulic hoses (para 4-105)
- Connect broom hood wiring harness (para 4-78)

END OF TASK

4-115. BROOM HOOD REPLACEMENT.

This task covers:

- a. Removal
- b. Installation

INITIAL SETUP:

Tools

Tool Kit, General Mechanic's: Automotive

Equipment Condition

TM or Para
Para 4-112

Condition Description

Front dirt deflector removed.

Materials/Parts

Locknuts Para 4-113

Side dirt deflectors removed.

Personnel Required

MOS 62B Construction Equipment Repairer (2)

Para 4-124
Para 4-78

Spray bar removed.
Broom hood wiring harness removed.

NOTE

- This task requires a mechanic and an assistant.
- Brush shown removed for clarity.

- a. Removal.** Remove six locknuts (1), six screws (2), and 12 washers (3) using a 7/16 in. open end wrench, ratchet, extension and 7/16 in. socket. Remove broom hood (4) from brush frame (5).
- b. Installation.** Install broom hood (4) on brush frame (5), and secure with 12 washers (3), six screws (2), and six locknuts (1) using a 7/16 in. open end wrench, ratchet, extension and 7/16 in. socket.

NOTE

Follow-on Maintenance:

- **Install broom hood wiring harness (para 4-78)**
- **Install spray bar (para 4-124)**
- **Install side dirt deflectors (para 4-113)**
- **Install front dirt deflector (para 4-112)**

END OF TASK

4-116. MOTOR GUARD REPLACEMENT.

This task covers:

- a. Removal
- b. Installation

INITIAL SETUP

Tools

Tool Kit, General Mechanic's: Automotive

Equipment Condition

TM or Para
Para 4-70

Condition Description
Right side lamp bracket assembly removed.

Materials/Parts

Locknuts

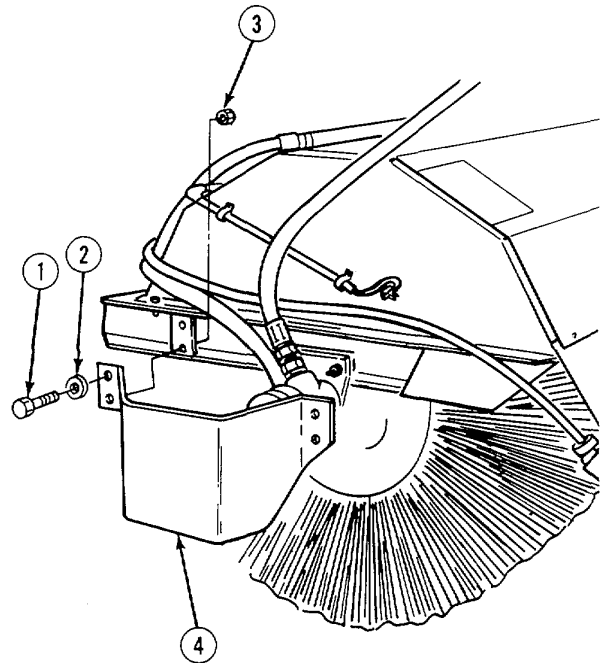
a. Removal. Remove two screws (1), two washers (2), two locknuts (3), and guard (4) using a 3/4 in. open end wrench, ratchet and 3/4 in. socket.

b. Installation. Install guard (4) using two locknuts (3), two washers (2), and two screws (1). Tighten using a 3/4 in. open end wrench, ratchet and 3/4 in. socket.

NOTE

Follow-on maintenance: Install right side lamp bracket assembly (para 4-70).

END OF TASK



4-117. BRUSH REPLACEMENT.

This task covers:

- a. Removal
- b. Installation

INITIAL SETUP

Tools

Tool Kit, General Mechanic's: Automotive

Equipment Condition

TM or Para

Para 4-115

Para 4-102

Condition Description

Broom hood removed.

Hydraulic motor

removed.

Materials/Parts

Locknuts

NOTE

This task may also be used to reverse the entire brush assembly as one piece to increase the lift of the brush.

a. Removal

CAUTION

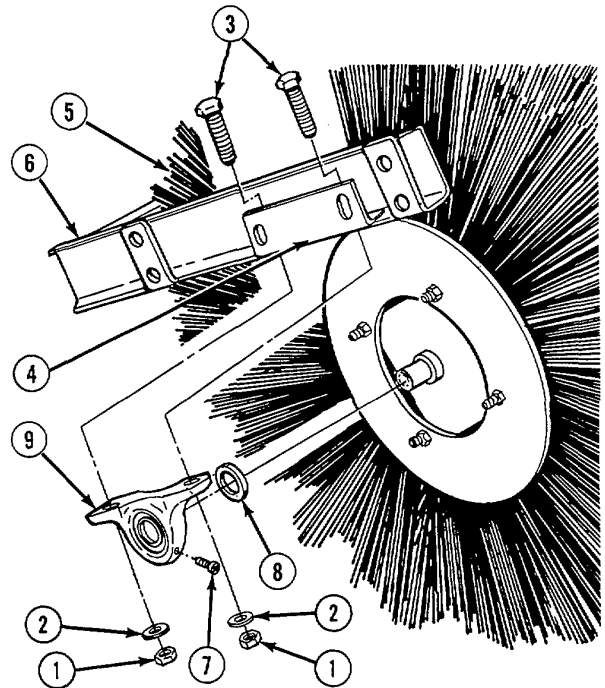
Release spring tension on hydraulic cylinder to allow brush to drop. Damage to equipment may occur.

- (1) Refer to para 4-119 to back off nut and release tension on hydraulic cylinder.

NOTE

Bracket is located on right side only.

- (2) Remove two locknuts (1), two washers (2), two screws (3), and bracket (4) using a ratchet and 3/4 in. socket.
- (3) Repeat step (2) for opposite side.
- (4) Remove brush assembly (5) from brush frame (6).
- (5) Loosen setscrew (7) using a 15/16 in. Hex head wrench.



4-117. BRUSH REPLACEMENT (CONT).**NOTE**

Collar contains an unthreaded hole to insert drift pin.

- (6) Using a drift and hammer, tap locking collar (8) counterclockwise to loosen and remove collar from bearing (9).
- (7) Remove bearing (9) from end of brush assembly (5).
- (8) Repeat steps (5), (6), and (7) on opposite side.

b. Installation.

- (1) Install locking collar (8), and bearings (9) on end of brush assembly (5).

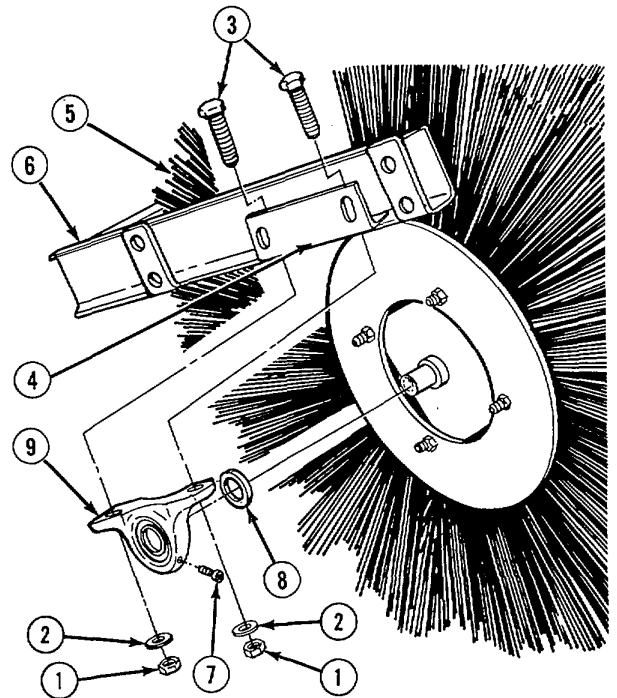
NOTE

Bearing and locking collar are slightly oval shaped.

- (2) Rotate collar (8) clockwise until it matches with bearing (9), and bearing slides into lock against the rotation of broom. Tap in collar until it locks using a drift and hammer.
- (3) Tighten setscrew (7) in locking collar (8) using a 15/16 in. hex head wrench.
- (4) Repeat steps (1), (2), and (3) on opposite side.
- (5) Position brush assembly (5) within brush frame (6).
- (6) Install bracket (4) on right side of frame (6).
- (5) Secure bearing (9) to brush frame (6) using two screws (3), two washers (2), and two locknuts (1). Tighten using a 3/4 in. open end wrench, ratchet and 3/4 in. socket.
- (6) Repeat steps (5) and (6) on opposite side.

NOTE**Follow-on maintenance:**

- **Install broom hood (para 4-115)**
- **Install hydraulic motor (para 4-102)**
- **Adjust broom pattern (para 4-111)**



END OF TASK

4-118. HYDRAULIC CORE/BRUSH SET REPLACEMENT.

This task covers:

- a. Removal
- b. Installation

INITIAL SETUP

Tools

Tool Kit, General Mechanic: Automotive

Personnel Required

MOS 62B Construction Equipment Repairer (2)

Materials/Parts

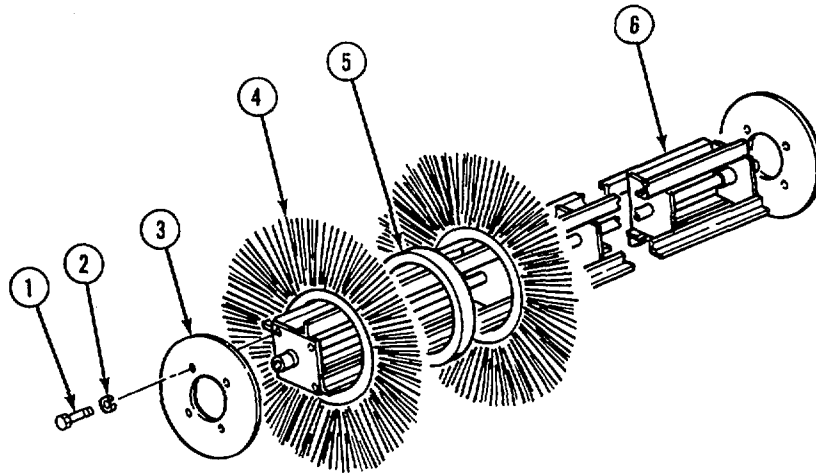
Lockwashers

Equipment Condition

TM or Para
Para 4-117

Condition Description
Brush assembly removed.

a. Removal .



- (1) Remove eight screws (1), eight lockwashers (2), and two discs (3) using a ratchet and 1/2 in. socket.
- (2) Slide plastic bristle wafers (4), and spacers (5) off core (6).

4-118. HYDRAULIC CORE/BRUSH SET REPLACEMENT (CONT)

b. Installation.

- (1) Install disk (3), four lockwashers (2), and four screws (1) using a ratchet and 1/2 in. socket.

CAUTION

Use a pallet or suitable cribbing to support core upright during assembly to prevent damage to brush.

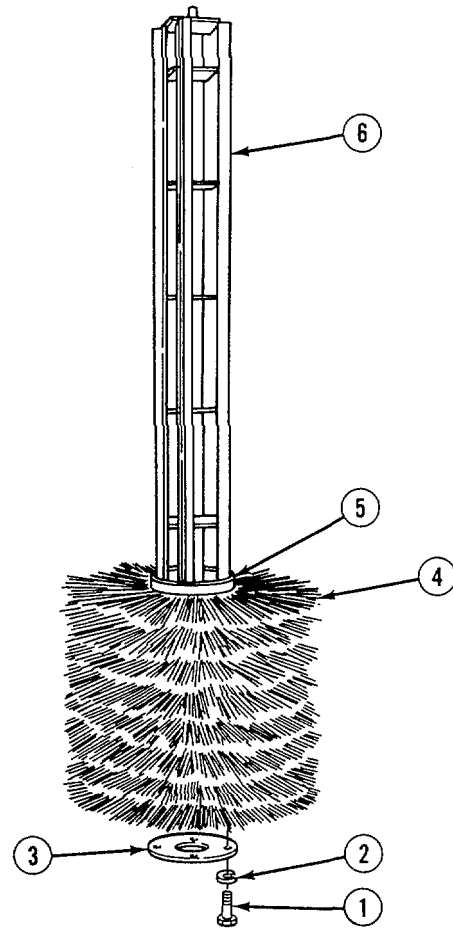
- (2) Stand core (6) upright, on disc (3).

NOTE

- A ladder is required to install wafers and spacers on core.
- Plastic bristle wafers are located at both ends.

- (3) Alternately install plastic bristle wafers (4) and spacers (5) over full length of core (6).

- (4) Install remaining disc (3), four lockwashers (2), and four screws (1) on upper end of core (6) using a ratchet and 1/2 in. socket.



WARNING

Stand clear of brush assembly during lowering procedure. Personal injury may result from falling brush.

- (5) Lower brush assembly to horizontal position.

NOTE

Follow-on maintenance: Install brush assembly (para 4-117)

END OF TASK

4-119. HYDRAULIC CYLINDER REPLACEMENT.

This task covers:

- a. Removal
- b. Installation

INITIAL SETUP

Tools

Shop Equipment, Automotive Maintenance and Repair; Organizational Maintenance, Common No. 1, Less Power

Personnel Required

MOS 62B Construction Equipment Repairer (2)

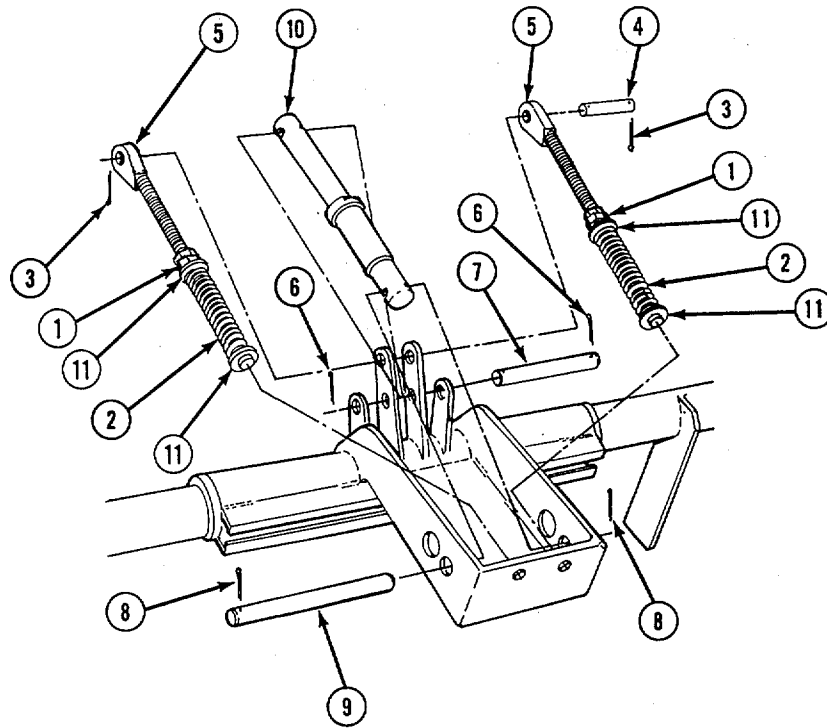
Equipment Condition

TM or Para
Para 4-114

Condition Description
Brush frame assembly removed.

Materials/Parts

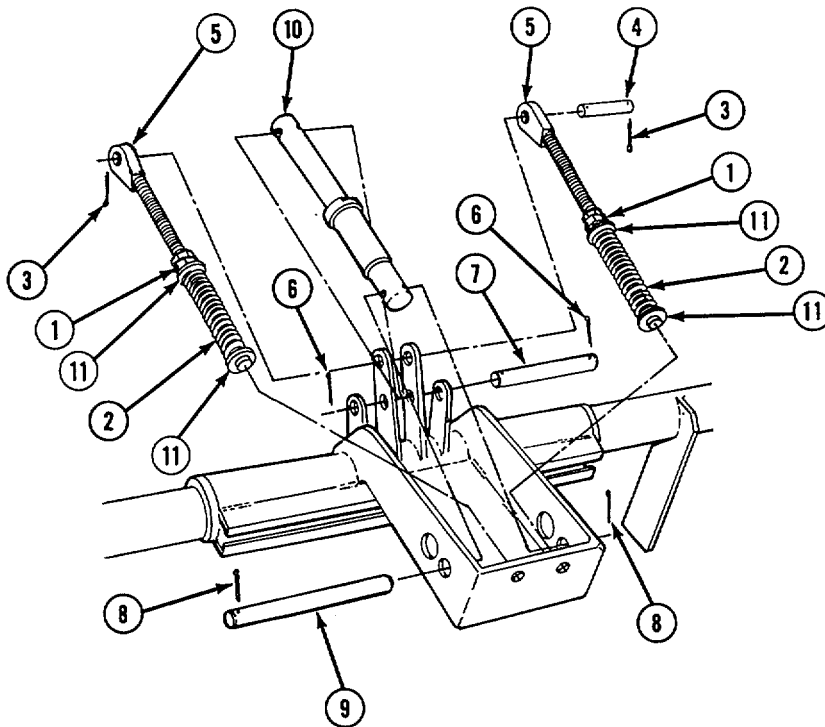
Cotter pins



a. Removal .

- (1) Turn nuts (1), and release tension on springs (2) using a 1-1/8 in. open end wrench.
- (2) Remove cotter pins (3) using pliers and drive out pin (4) using a drift and ball peen hammer.
- (3) Remove balance rod assemblies (5).
- (4) Remove cotter pins (6) using pliers and drive out pins (7) using a drift and ball peen hammer.

4-119. HYDRAULIC CYLINDER REPLACEMENT (CONT).



- (5) Remove cotter pins (8) using pliers and drive out pin (9) using a drift and ball peen hammer.
- (6) Remove hydraulic cylinder (10).
- (7) Remove two springs (2), and four washers (11).

b. Installation.

- (1) Install hydraulic cylinder (10).
- (2) Install pin (9), and cotter pin (8) using pliers and ball peen hammer.
- (3) Install pin (7), and install cotter pins (6) using pliers and ball peen hammer.
- (4) Install two springs (2), and four washers (11) on balance rod assemblies (5).
- (5) Install balance rod assemblies (5) with washers (11), and springs (2).
- (6) Install pin (4), and cotter pins (3) using pliers.
- (7) Tighten nuts (1) using a 1-1/8 in. open end wrench.

NOTE

Follow-on maintenance:

- **Install brush frame (para 4-114)**
- **Adjust broom pattern (para 4-111)**

END OF TASK

4-120. SPRAY PUMP AND BRACKET REPLACEMENT.

This task covers:

- a. Removal
- b. Installation

INITIAL SETUP

Tools

Tool Kit, General Mechanic's: Automotive

Equipment Condition

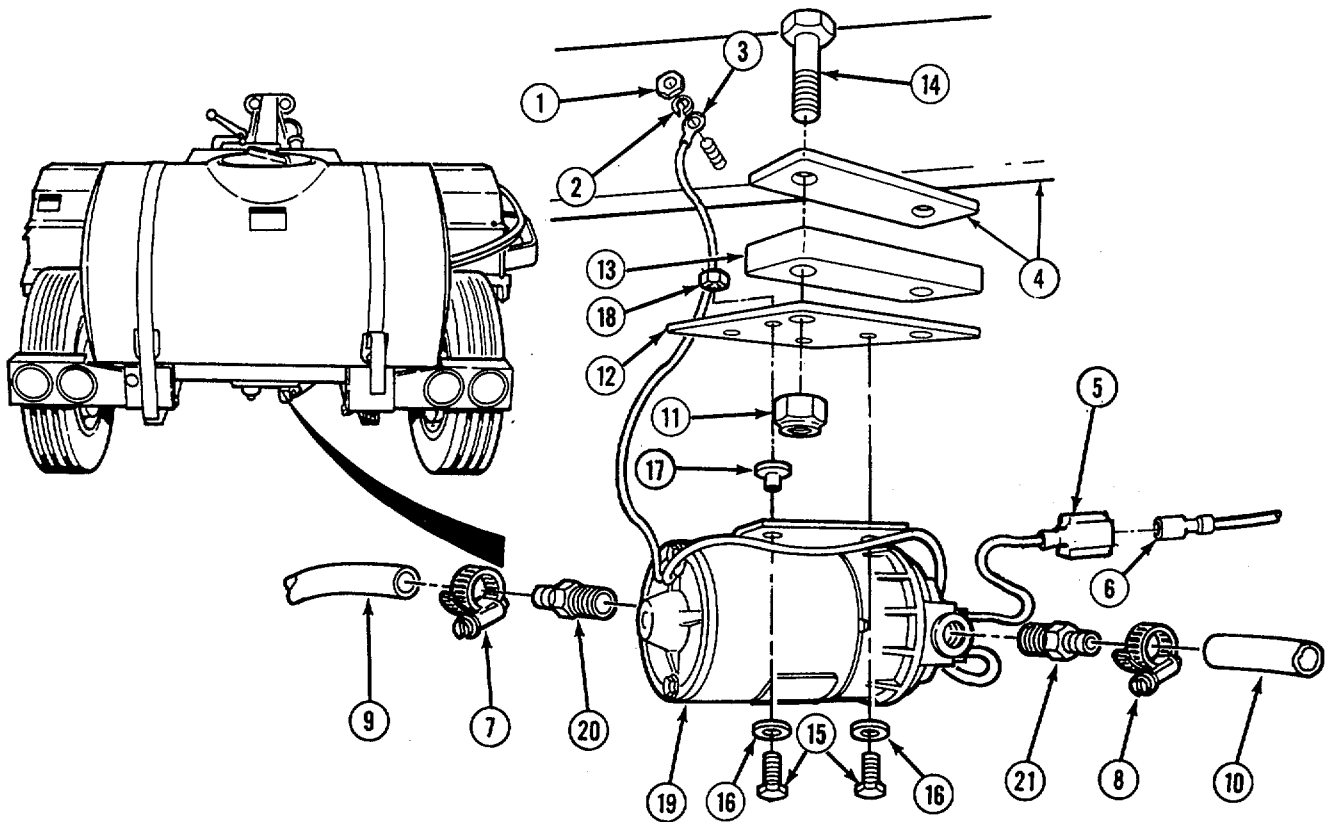
TM or Para
Para 4-73

Condition Description

Battery cables disconnected.
Water tank shutoff valve closed.

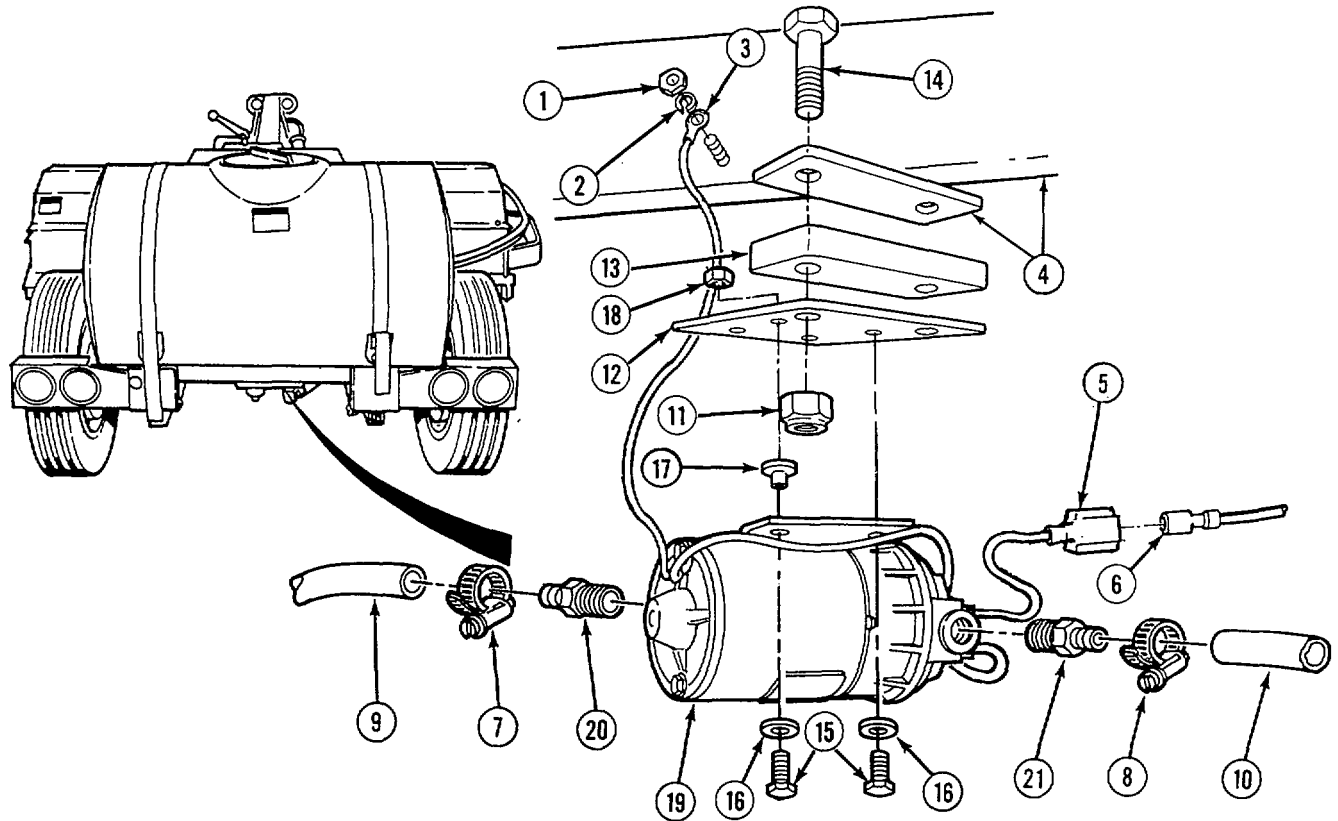
Materials/Parts

Locknuts
Rubber Grommets
Compound, pipe sealing, item 16 Appendix E



a. Removal.

- (1) Remove nut (1), lockwasher (2), and ground wire (3) from frame (4) using a ratchet and 7/16 in. socket.

4-120. SPRAY PUMP AND BRACKET REPLACEMENT (CONT.)

- (2) Remove wire (5) from connector (6).
- (3) Loosen clamps (7 and 8) using a screwdriver and remove hoses (9 and 10).
- (4) Remove two locknuts (11), brackets (12 and 13), and screws (14) from frame (4) using a 3/4 in. open end wrench, ratchet and 3/4 in. socket.
- (5) Remove four screws (15), four washers (16), four grommets (17), and four locknuts (18) using a 7/16 in. open end wrench, ratchet and 7/16 in. socket. Remove bracket (12) from pump (19).
- (6) Remove beaded adapters (20 and 21) from pump (19) using a 11/16 in. open end wrench.

b. Installation.**WARNING**

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

- (1) Lightly apply pipe thread sealing compound to threads of beaded adapters (20 and 21).
- (2) Install beaded adapters (20 and 21) in pump (19) using a 11/16 in. open end wrench.
- (3) Position bracket (12) on pump (19) and install four screws(15), four washers (16), four grommets (17), and four locknuts (18) using a 7/16 in. open end wrench, ratchet and 7/16 in. socket.

NOTE

Position rear of pump facing tire.

- (4) Install brackets (13 and 12), screws (14), and locknuts (11) on frame (4) using a 3/4 in. open end wrench, ratchet and 3/4 in. socket.
- (5) Install hoses (9 and 10) on beaded inserts (20 and 21), and tighten clamps (7 and 8) using a screwdriver.
- (6) Connect wire (5) to connector (6).
- (7) Position ground wire (3) on frame (4) and install lockwasher (2) and nut (1) using a ratchet and 7/16 in. socket.

NOTE**Follow-on maintenance:**

- **Connect battery cables (para 4-73)**
- **Open water tank shut off valve (para 2-8)**
- **Check spray system for leaks**

END OF TASK

4-121. WATER TANK ASSEMBLY REPLACEMENT.

This task covers:

- a. Removal
- b. Installation

INITIAL SETUP

Tools

Tool Kit, General Mechanic's: Automotive

Shop Equipment, Automotive Maintenance and Repair; Organizational Maintenance, Common No. 1, Less Power

Materials/Parts

Locknuts
Gaskets

Personnel Required

MOS 62B Construction Equipment Repairer (2)

Equipment Condition

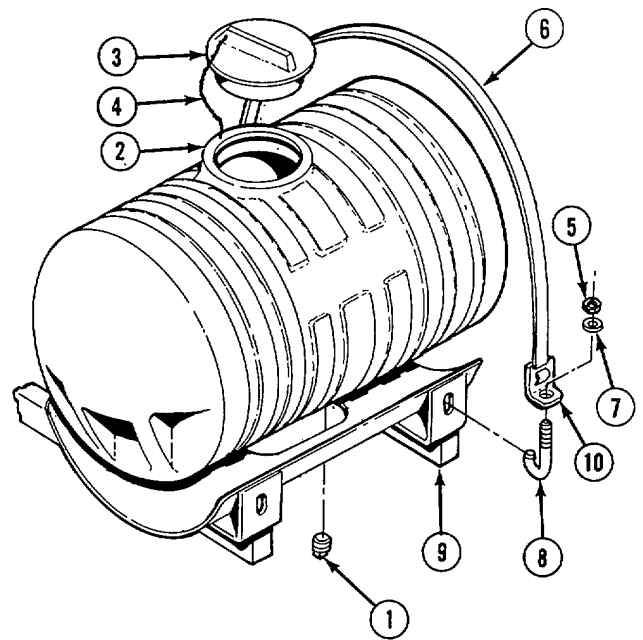
TM or Para
Para 4-123

Condition Description

Sprinkler lines disconnected from water tank.

a. Removal.

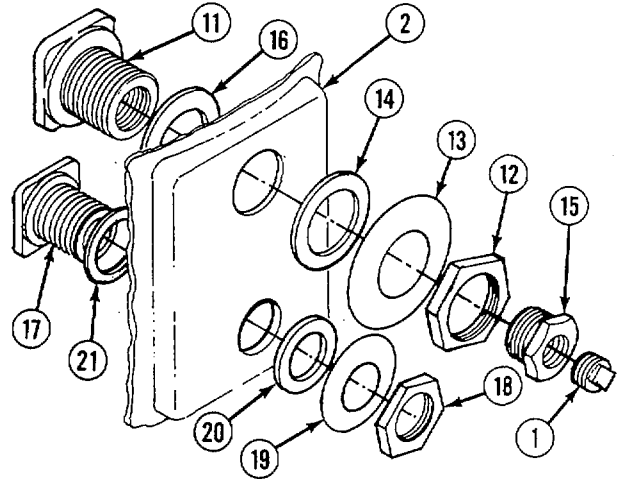
- (1) Remove drain plug (1) using a 13/16 in. Open end wrench. Allow tank (2) to drain.
- (2) Install drain plug (1).
- (3) Remove cap (3) from tank (2).
- (4) If necessary, remove rope (4) from tank (2), and cap (3).
- (5) Slowly loosen two locknuts (5) to take pressure off straps (6) using a 3/4 in. Open end wrench.
- (6) Remove two locknuts (5), and washers (7).
- (7) Remove two J-bolts (8) from saddle (9). Remove two clips (10) from J-bolts.
- (8) Remove two straps (6) from tank (2).
- (7) Carefully lift tank (2), and remove from saddle (9).



NOTE

Water tank fittings are all left hand threads.

- (8) While assistant holds pipe plug (1) using a 13/16 in. open end wrench, remove nut (12) using a pipe wrench.
- (9) Remove plastic seal (13), and rubber seal (14).
- (10) Remove fitting (11), reducer (15), and drain plug (1) as an assembly through tank.
- (11) Remove drain plug (1) from reducer (15) using a 13/16 in. open end wrench.
- (12) Remove reducer (15) from fitting (11) using a pipe wrench.
- (13) Remove rubber seal (16) from fitting (11).
- (14) While assistant reaches through tank (2), and holds fitting (17) with channel locks, remove nut (18) using a pipe wrench.
- (15) Remove plastic seal (19), rubber seals (20 and 21), and fitting (17).



b. Installation.

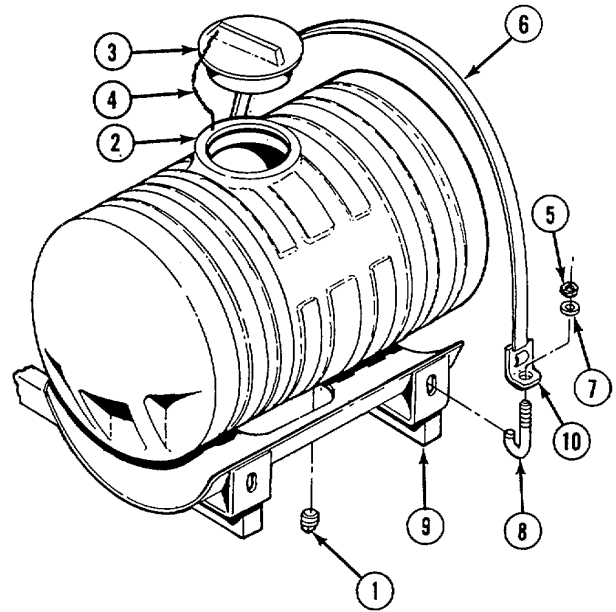
NOTE

Water tank fittings are all left hand threads.

- (1) Install rubber seal (21) on fitting (17).
- (2) While assistant reaches through tank (2), and holds fitting (17) with channel locks, install rubber seal (20), plastic seal (19), and nut (18) using a pipe wrench.
- (3) Install rubber seal (16) on fitting (11).
- (4) While assistant reaches through tank (2), and holds fitting (11) with channel locks, install rubber seal (14), plastic seal (13), and nut (12) using a pipe wrench.
- (5) Install reducer (15) in fitting (11) using a pipe wrench.
- (6) Install drain plug (1) using a 13/16 in. open end wrench.

4-121. WATER TANK ASSEMBLY REPLACEMENT (CONT).

- (7) Position tank (2) on saddle (9).
- (8) Adjust two straps (6) over tank (2).
- (9) Install two clips (10) on straps (6).
- (10) Install clips (10) on two J-bolts (8).
- (11) Install two J-bolts (8) on saddle (9).
- (12) Install two washers (7) and locknuts (5) on J-bolts (8) using a 3/4 in. open end wrench.
- (13) If removed, install rope (4) on tank (2) and cap (3).
- (14) Install cap (3) on tank (2).



NOTE

Follow-on maintenance: Connect sprinkler lines (para 4-123)

END OF TASK

4-122. SADDLE REPLACEMENT.

This task covers:

- a. Removal
- b. Installation

INITIAL SETUP

Tools

Tool Kit, General Mechanic's: Automotive

Equipment Condition

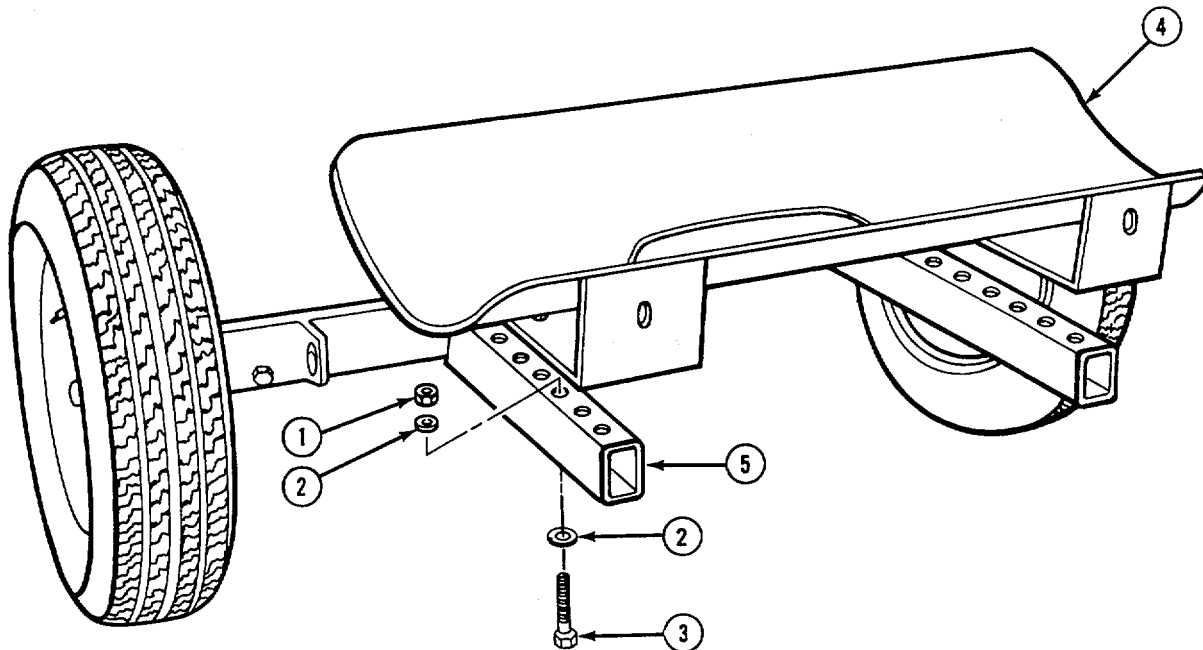
TM or Para
Para 4-121
Para 4-68

Condition Description

Water tank removed.
Rear light mount removed.

Materials/Parts

Locknuts
Foam pad and edge trim (See Appendix G for fabrication)



- a. **Removal.** Remove four locknuts (1), eight washers (2), four screws (3), and saddle (4) from support (5) using a 3/4 in. open end wrench, ratchet and 3/4 in. socket.
- b. **Installation.** Position saddle (4) on support (5), and secure with screws (3), washers (2), and locknuts (1) using a 3/4 in. open end wrench, ratchet and 3/4 in. socket.

NOTE

Follow-on maintenance:

- Install rear light mount kit (para 4-68)
- Install water tank (para 4-121)

END OF TASK

4-123. SPRINKLER LINES REPLACEMENT.

This task covers:

- a. Removal
- b. Installation

INITIAL SETUP

Tools

Tool Kit, General Mechanic's: Automotive

Equipment Condition

TM or Para

Para 3-14

Para 4-124

Condition Description

Spray system drained.

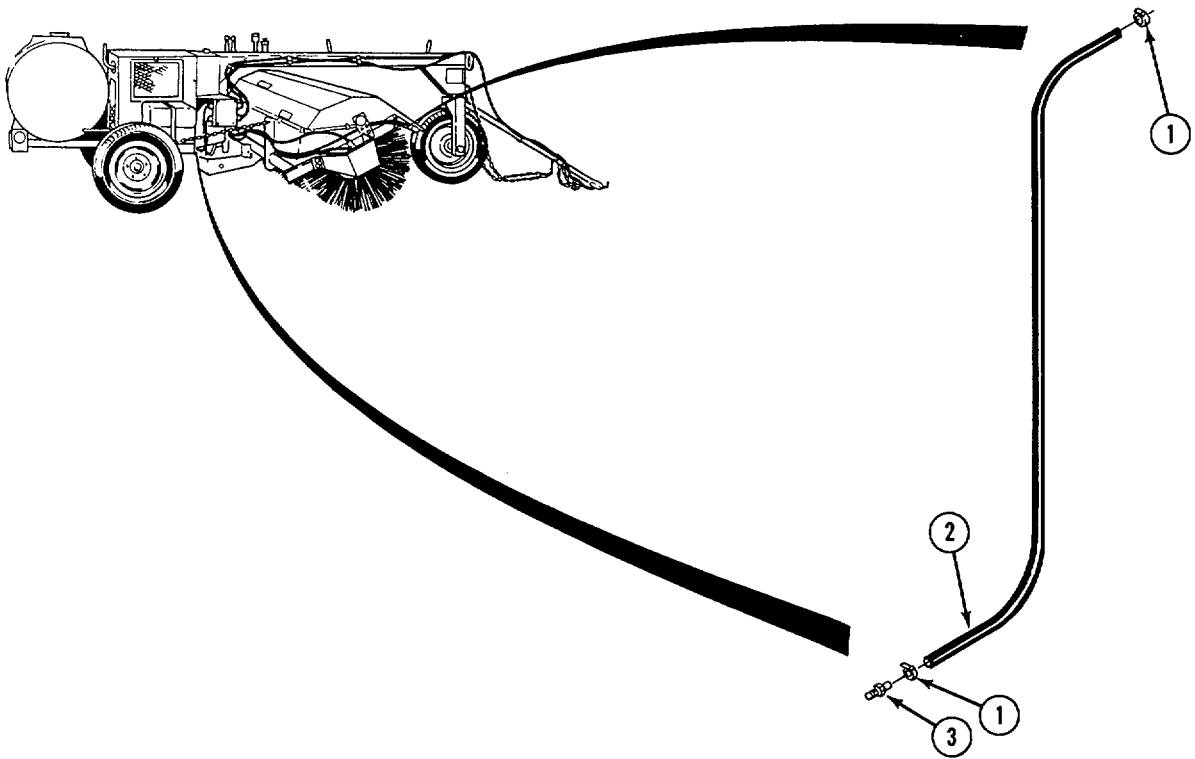
Spray bar removed.

Materials/Parts

Compound, pipe sealing, item 15 Appendix E

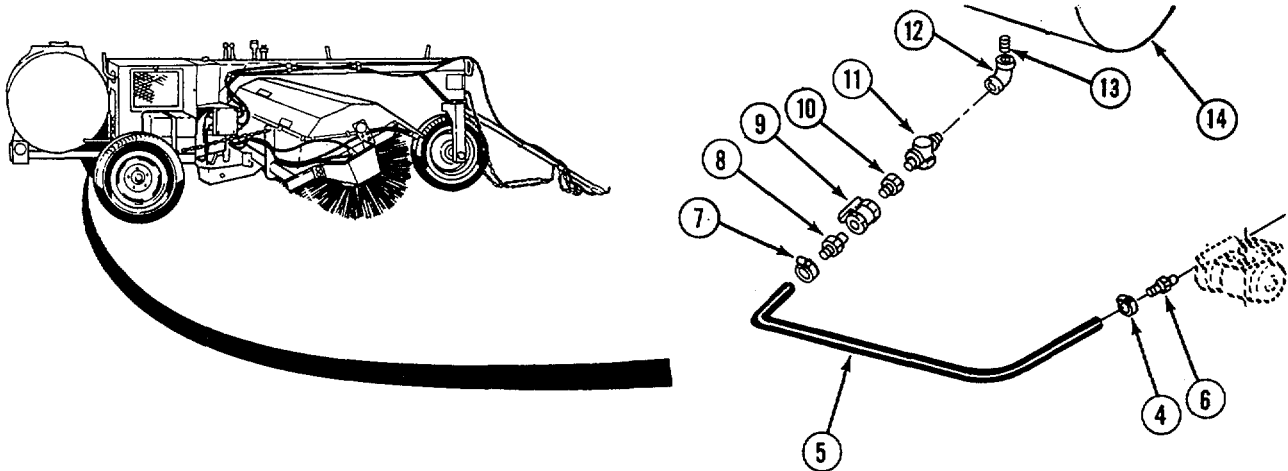
Ties, cable, item 36 Appendix E

Water lines (See Appendix G for fabrication)



a. Removal.

- (1) Remove cable ties as necessary.
- (2) Loosen clamps (1) using a flat tip screwdriver and remove hose (2) from beaded adapter (3).



- (3) Loosen clamp (4) using a flat tip screwdriver and remove hose (5) from beaded adapter (6).
- (4) Loosen clamp (7) using a flat tip screwdriver and remove hose (5) from beaded adapter (6).
- (5) Remove beaded adapter (8) from coupling (9) using a 7/8 in. open end wrench and adjustable wrench.
- (6) Remove coupling (9), and reducer bushing (10) from line strainer (11) using a 7/8 in. open end wrench and adjustable wrench.
- (7) Remove line strainer (11) from elbow (12).
- (8) Remove elbow (12) with nipple (13) from tank (14) using a pipe wrench.
- (9) Remove nipple (13) from elbow (12) using a pipe wrench.

b. Installation.

WARNING

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

- (1) Lightly apply pipe sealing compound to elbow (12), and nipple (13).
- (2) Install nipple (13) in elbow (12) using a pipe wrench.
- (3) Install nipple (13), and elbow (12) in tank (14).
- (4) Install line strainer (11) on elbow (12).
- (5) Lightly apply pipe sealing compound to coupling (9), and install coupling and reducer bushing (10) using a 7/8 in. open end wrench and adjustable wrench.

4-123. SPRINKLER LINES REPLACEMENT (CONT).

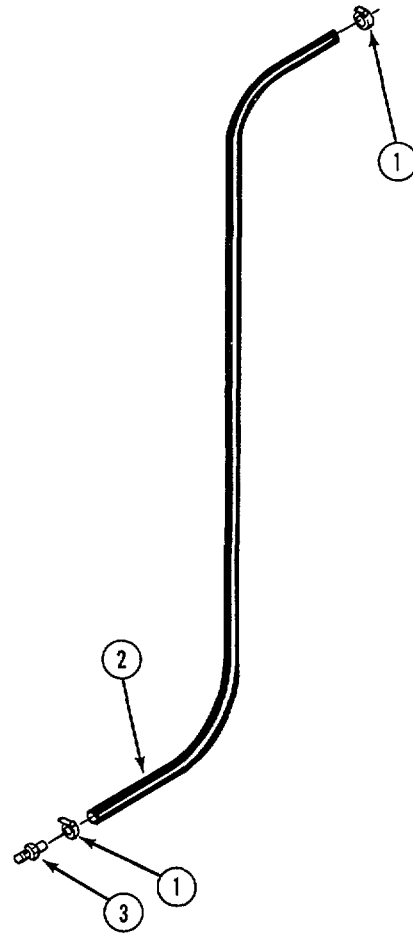
- (6) Install beaded adapter (8) on coupling (9) using a 7/8 in. open end wrench and adjustable wrench.
- (7) Loosely position clamp (7) on hose (5) and install hose on beaded adapter (8) using clamp (7). Tighten using a flat tip screwdriver.
- (8) Loosely position clamp (4) on hose (5) and install hose on beaded adapter (6) using clamp (4). Tighten using a flat tip screwdriver.
- (9) Loosely position clamps (1) on hose (2) and install hose on beaded adapter (3) using clamp (1). Tighten using a flat tip screwdriver.
- (10) Install cable ties as necessary.

NOTE

Follow-on maintenance:

- **Fill water tank (para 2-8)**
- **Install spray bar (para 4-124)**
- **Check system for leaks**

END OF TASK



4-124. SPRAY BAR REPLACEMENT/REPAIR.

This task covers:

- a. Removal
- b. Disassembly
- c. Assembly
- d. Installation

INITIAL SETUP

Tools

Tool Kit, General Mechanic's: Automotive

Shop Equipment, Automotive Maintenance and Repair; Organizational Maintenance, Common No.2, Less Power

Materials/Parts

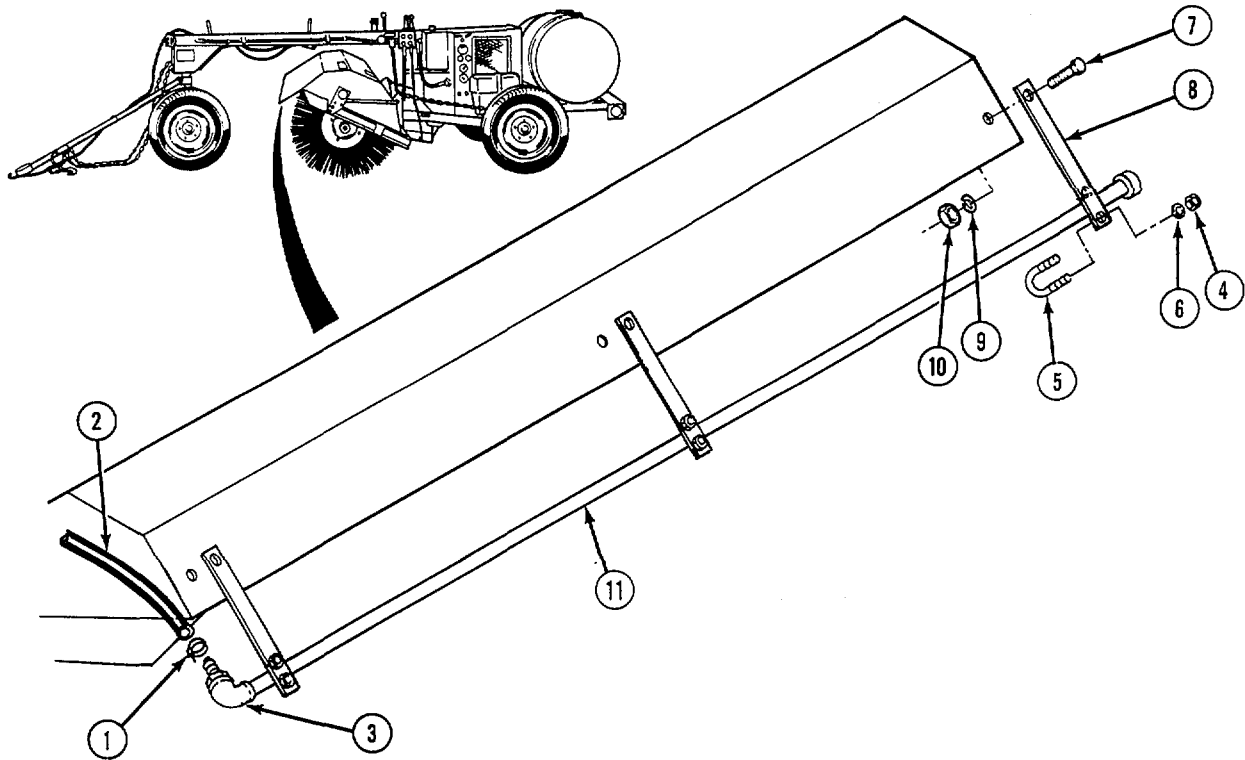
Lockwashers
Compound, sealing, pipe thread, item 16, Appendix E

Equipment Condition

TM or Para
Para 2-8
Para 4-112

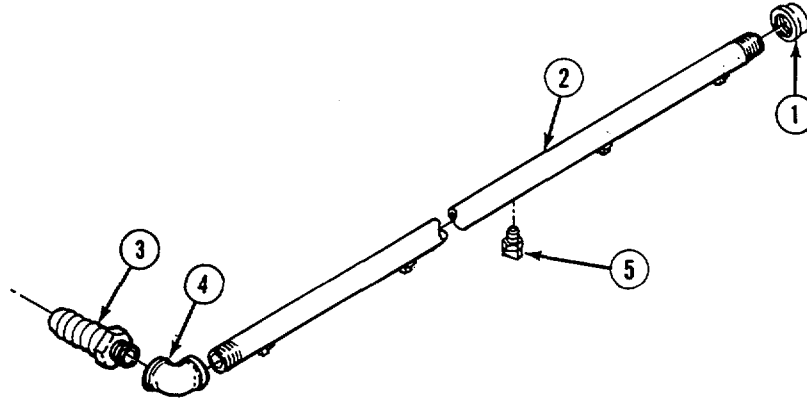
Condition Description
Water shut off.
Front dirt deflector removed.

a. Removal



- (1) Loosen hose clamp (1) using a flat tip screwdriver and disconnect hose (2) from adapter (3).
- (2) Remove six nuts (4), three U-bolts (5), and six lockwashers (6) using a ratchet and 7/16 in. socket.
- (3) Remove spray bar (11).
- (4) If damaged, remove three screws (7), brackets (8), lockwashers (9), and nuts (10) using a 1/2 in. open end wrench, ratchet and 1/2 in. socket.

4-124. SPRAY BAR REPLACEMENT/REPAIR (CONT).

b. *Disassembly.***NOTE**

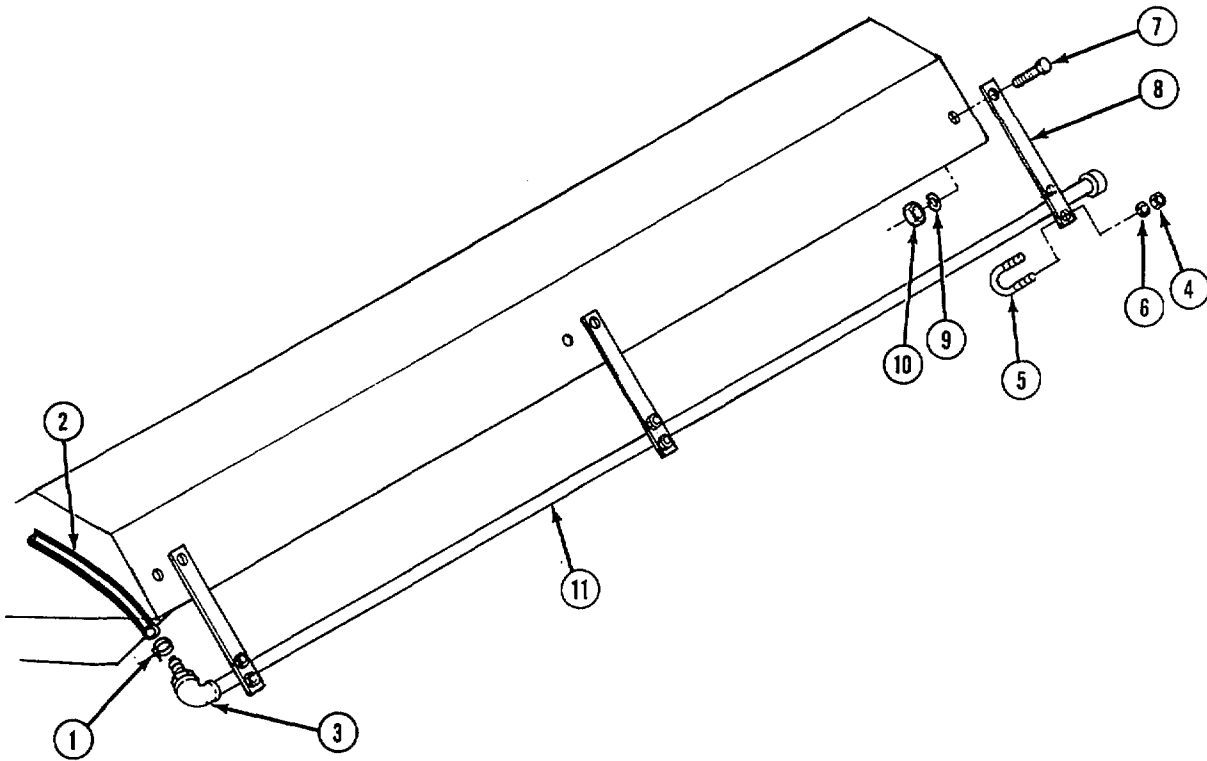
- To ensure proper spray pattern when reassembled, note orientation of spray bar nozzles. Groove in nozzles should be parallel with spray bar.
 - Before removing elbow, note its direction to ensure proper orientation upon installation.
- (1) Clamp spray bar in a vise and remove end cap (1) from spray bar (2) using a pipe wrench.
 - (2) Remove beaded insert (3) using a 1-1/8 in. open end wrench.
 - (3) Remove elbow (4) using a pipe wrench.
 - (4) Remove eight nozzles (5) using a 9/16 in. open end wrench.

c. *Assembly.***WARNING**

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

- (1) Apply pipe thread sealing compound to threads of nozzles (5).
- (2) Install nozzles (5) on spray bar (2) using a 9/16 in. open end wrench.
- (3) Apply pipe thread sealing compound to threads of elbow (4).
- (4) Install elbow (4) using a pipe wrench.
- (5) Install beaded insert (3) using a 1-1/8 in. open end wrench.
- (6) Install end cap (1) using a pipe wrench.

d. Installation.



- (1) If removed, install three brackets (8), three screws (7), three lockwashers (9), and three nuts (10) using a 12 in. open end wrench, ratchet and 1/2 in. socket.
- (2) Install spray bar (11), three U-bolts (5), six lockwashers (6), and six nuts (4) using a 7/16 in. open end wrench, ratchet and 7/16 in. socket.
- (3) Position hose clamp (1) and connect hose (2) to adapter (3). Tighten hose clamp with flatip screwdriver.

NOTE

Follow-on maintenance:

- Install front dirt deflector (para 4-112)
- Open water tank shut off valve (para 2-8)
- Check system for leaks

END OF TASK

Section VI. PREPARATION FOR STORAGE OR SHIPMENT**4-125. GENERAL.**

Commanders are responsible for insuring that all material issued or assigned to their command is maintained in a serviceable condition, properly cared for, and that personnel under their command comply with technical instructions. Lack of time, lack of trained personnel or lack of proper tools may result in a unit being incapable of performing maintenance for which it is responsible. In such cases, unit commanders, with approval of major commanders, may place material that is beyond the maintenance capability of the unit in administrative storage or return it to supply agencies. When preparing the sweeper for administrative storage, the unit commander will be responsible for processing the material, including all tools and equipment, in such a manner as to protect it against corrosion, deterioration and physical damage during shipment or periods of administrative storage.

4-126. STORAGE INSTRUCTIONS.

a. Short Term Storage. No special provisions are required for short term storage of the sweeper. The unit should be started and operated at intervals no greater than 90 days.

b. Long Term Storage. To prepare the unit for long term storage:

- (1) Lubricate all fittings and oil can points in accordance with Chapter 3, Section I.
- (2) Fill fuel tank to capacity (para 3-8).
- (3) Drain oil and replace oil filter (para 4-22).
- (4) Fill crankcase to operating level with Type II Grade 30, MIL-L-21260 preservation oil (item 27, Appendix E).
- (5) Remove air cleaner (para 4-37).
- (6) With fuel shut-off valve pulled out to prevent engine from starting, crank engine while spraying preservative oil (item 27, Appendix E) into intake manifold to coat valves and combustion chamber.
- (7) Install air cleaner (para 4-37).
- (8) Disconnect battery cables (para 4-73).
- (9) Wipe a thin coat of grease (item 22, Appendix E) on exposed portion of hydraulic lift cylinder.
- (10) Tag unit using identification tag (item 35, Appendix E) indicating crankcase is filled with preservative oil and batteries are disconnected.
- (11) Drain water tank and lines completely (para 2-9).

4-127. SHIPPING INSTRUCTIONS.

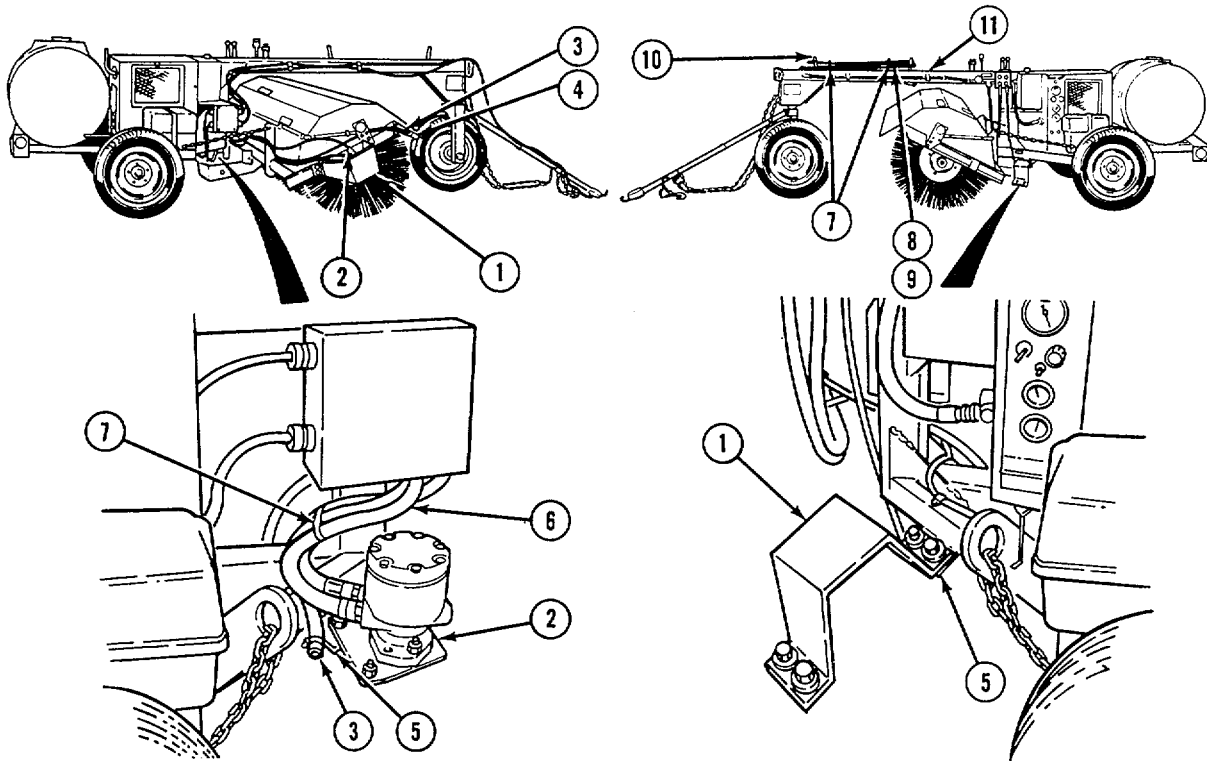
a. Preparation for Shipment. Preservation and other protective measures taken in the preparation of material and accompanying tools and equipment for shipment must be sufficient to protect the sweeper against deterioration and physical damage during shipment.

WARNING

Dry cleaning solvent P-D-680 is toxic and flammable. Wear protective goggles, face mask, and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapor. Do not use near open flame or excessive heat. The flashpoint for type I dry cleaning solvent is 100°F (380C) and for type II is 140°F (600C). If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, flush eyes with water and get medical aid immediately.

- (1) Cleaning. Use P-D-680 dry cleaning solvent (item 31, Appendix E) to clean or wash grease or oil from all metal parts. All exposed machined surfaces must be cleaned to insure removal of corrosion, soil, grease, or other acid alkali residues.
- (2) Drying. After cleaning, use cold water to rinse all parts. Use a clean cloth to dry all parts thoroughly.
- (3) Lubrication. Lubricate items as specified in Chapter 3, Section I.
- (4) Preservation.
 - (a) All critical unpainted metal surfaces must be protected during shipment. Coat frame, unpainted exterior hardware and chassis with corrosion preventive compound (item 11, Appendix E).
 - (b) Spray data plates with a thin coating of ignition insulation compound (item 13, Appendix E). Control overspray to avoid coating adjacent surfaces.
 - (c) Cover all exterior reflectors and lights with masking tape (item 33, Appendix E).
 - (d) Drain water tank (para 2-9).

4-127. SHIPPING INSTRUCTIONS (CONT).



(5) To reduce the width of the unit for shipping the hydraulic motor and mount and motor guard can be removed from the broom head for shipment. They are then stowed on the main frame as follows:

- (a) Remove hydraulic motor guard (1) (para 4-116).
 - (b) Remove hydraulic motor and mount (2) (para 4-102).
 - (c) Disconnect sprinkler hose (3) at spray bar (4).
 - (d) Connect hydraulic motor and mount (2) to mainframe (5) using hardware removed.
 - (e) Connect hydraulic motor guard (1) to opposite side of main frame (5) using hardware removed.
 - (f) Secure sprinkler line (6) to hydraulic lines with cable ties (7) as required.
 - (g) Wind vehicle connection harnesses (8 and 9) around posts (10) on main frame (11). Secure with cable ties (7) as required.
- (6) Marking. Refer to AR 746 -80 for Marking of Supplies for Shipment.

b. Army Shipping Documents. Prepare all Army shipping documents accompanying freight in accordance with AR 725-5.

CHAPTER 5

DIRECT SUPPORT/GENERAL SUPPORT MAINTENANCE INSTRUCTIONS

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5-5	Troubleshooting Instructions	5-2
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Section I. REPAIR PARTS, SPECIAL TOOLS, TEST, MEASUREMENT AND DIAGNOSTIC EQUIPMENT AND SUPPORT EQUIPMENT

5-1. COMMON TOOLS AND EQUIPMENT.

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

5-2. SPECIAL TOOLS, TMDE AND SUPPORT EQUIPMENT.

Refer to Section III of the Maintenance Allocation Chart (MAC) for a list of tool kits authorized for the sweeper. Refer to the Repair Parts and Special Tools List (RPSTL), Appendix F for a list of special tools.

5-3. REPAIR PARTS.

Repair parts are listed and illustrated in the RPSTL, Appendix F, covering direct support/general support maintenance for the sweeper.

Section II. TROUBLESHOOTING

5-4. TROUBLESHOOTING INTRODUCTION.

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

5-5. TROUBLESHOOTING INSTRUCTIONS.

Refer to table 5-1 for a list of common malfunctions. The troubleshooting procedures are in table 5-2 and contain tests, inspections and corrective actions. Before troubleshooting, be sure all preventive maintenance checks and services (PMCS) have been performed. Perform tests, inspections and corrective actions in the order listed. Try to return the sweeper or component to operation after each test, inspection and corrective action has been performed.

Table 5-1. DS/GS System Symptom Index

Troubleshooting Procedure	Page
ENGINE	
1. Engine does not develop full power	5-3
2. Engine overheats.....	5-3
3. Low oil pressure	5-3
4. High oil consumption	5-4
5. Excessive black or gray smoke.....	5-4
6. Blue exhaust smoke	5-4

Table 5-2. DS/GS Troubleshooting

Malfunction	Test or Inspection	Corrective Action
ENGINE		
1. ENGINE DOES NOT DEVELOP FULL POWER.		
Step 1. Check manifold and gasket for leaks or damage.	If no leaks or damage are present go to step 2.	Repair or replace gaskets or manifold as needed (para 4-32).
Step 2. Check engine timing.	If timing is correct go to step 3.	If timing is off, reset (para 5-7).
Step 3. Check for misfiring cylinder.	Remove and check each fuel injector and inspect for clogged parts. If clogged, clean or replace as necessary (para 5-30 or 5-31).	
Step 4. Check engine compression.		
2. ENGINE OVERHEATS.		
Check cooling fins for dirt or debris.	Clean fins.	
3. LOW OIL PRESSURE.		
Step 1. Check for clogging of oil filter.	Remove oil filter. Replace as required (para 4-22).	
Step 2. Inspect oil pressure valve for clogging or damage.	Remove and clean oil pressure valve. Inspect valve, valve seat, and valve spring for damage. Replace damaged parts (para 4-31).	
Step 3. Inspect oil pump for damaged parts.	Remove and clean oil pump. Inspect oil pump for worn, scored, or damaged parts. Replace worn or damaged parts (para 5-27).	
5-3		

Table 5-2. DS/GS Troubleshooting - CONT.

Malfunction	Test or Inspection	Corrective Action
ENGINE (CONT)		
4. HIGH OIL CONSUMPTION.		
Step 1. Check for head gasket leaks.		
Replace leaking gasket (para 5-13).		
Step 2. Check for damaged or broken piston rings, pistons, or cylinders.		
Replace damaged or broken piston rings, pistons, or cylinders (para 5-19).		
Step 3. Check exhaust pipe for wetness or oil discharge.		
If wetness or oil discharge is present, replace valve guides.		
5. EXCESSIVE BLACK OR GRAY SMOKE.		
Step 1. Check throttle control screws for proper adjustment.		
Reset adjustments if not properly set (para 4-23).		
If settings are OK go to step 2.		
Step 2. Check for worn or clogged fuel injectors.		
Replace injectors as required (para 5-30).		
6. BLUE EXHAUST SMOKE.		
Indicates oil being burned in cylinder. Refer to "High Oil Consumption" troubleshooting procedure.		

Section III. MAINTENANCE PROCEDURES

5-6. MAINTENANCE INTRODUCTION.

Instructions in this section provide general procedures to be followed for inspection, removal, cleaning, repair, replacement, or installation of components, and testing authorized at the direct support/general support maintenance level as specified by the Maintenance Allocation Chart (MAC).

a. Servicing. All services are performed at the unit support level of maintenance according to the MAC. If the sweeper needs further service, refer to Chapter 4, paragraph 4-11.

b. Ground Handling. For ground handling instructions refer to Chapter 4, paragraph 4-12.

c. Operational Checks. All operational checks included in the maintenance procedures will include the techniques and methods required to assure the satisfactory performance of the sweeper. Reference the operator's instructions, Chapter 2, for starting, sweeping, and shutdown procedures.

d. Inspection of Components.

(1) Inspect all surfaces in contact with gaskets, packings, or seals for nicks and burrs which might damage the new seal upon assembly. If any defect is found, remove it before assembly.

NOTE

Defects which may cause bearing binding or misalignment are cause for rejection. Nicks or gouges outside race load areas are not cause for rejection.

(2) Inspect bearings for rusted or pitted balls, races, or separators. Inspect balls and races for abrasion and serious discoloration.

(3) Cuts or grooves parallel to ball or roller rotation and fatigue pits (not minor machine marks or scratches and cracks found during magnetic particle inspection) are causes for bearing rejection.

(4) Remove drain plugs from engine system components and inspect the sediment sticking to the plug. Grit or fine metal particles may indicate actual or potential component failure. A few fine particles are normal. This inspection will help to show defective parts before internal inspection of the component.

(5) Guidelines for rejection of gears by visual inspection are not listed because of varying conditions for gear application. The following descriptions of wear conditions may help to determine when parts are defective.

(a) Initial pitting may occur when gears are first started in service. When pitting reduces local high spots to allow enough contact area to carry load without further impairment, initial pitting is not serious.

(b) Destructive pitting continues to progress after initial pitting. If there is not enough contact area remaining to carry the load, rapid destruction may occur from continued use.

(c) Abrasive wear is surface damage caused by fine particles carried in lubricant or particles imbedded in tooth surfaces. Particles may be metal, sand, scale, or other impurities in oil or surrounding atmosphere.

(6) Inspect all hose surfaces for broken or frayed fabric. Check for breaks caused by sharp kinks or contact with other parts of the sweeper. Inspect the fitting threads for damage. Replace any defective part. After assembly and during initial sweeper operation, check for leaks.

(7) Inspect all wiring for chafed or burned insulation. Inspect all terminal connectors for loose connections and broken parts.

(8) Visually inspect all castings and weldments for cracks.

(9) Clean all parts before inspection. Check for defects such as physical distortion, wear, cracks and pitting.

5-6. MAINTENANCE INTRODUCTION (CONT).**e. *Cleaning Procedures.*****WARNING**

- **Dry cleaning solvent P-D-680 is toxic and flammable. Wear protective goggles, face mask, and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapor. Do not use near open flame or excessive heat. The flashpoint for type I dry cleaning solvent is 100°F (38°C) and for type II is 140°F (60 °C). If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, flush eyes with water and get medical aid immediately.**
- **Compressed air used for cleaning and drying purposes will be reduced to 30 psi. (207 kPa.) and used only with adequate chip guarding and personal protection equipment.**

(1) Do not use wire brushes, abrasive wheels, or compounds to clean parts, unless specifically approved in the detailed instructions. Dimensional characteristics of machined surfaces can be altered and may weaken a highly stressed part.

(2) Soak parts in dry cleaning solvent P-D-680 (item 31, Appendix E) and wash away deposits by sloshing or spraying. When necessary, brush with a soft bristle brush (not wire) moistened in dry cleaning solvent. Use a jet of dry compressed air to dry parts, except bearings, after cleaning. Bearings must drip and air dry.

(3) Do not clean rubber parts in dry cleaning solvent. Wipe clean with a dry, clean, lint-free cloth.

WARNING

Trichloroethylene is toxic to skin, eyes and breathing passages. Avoid all exposure. Skin and eye protection and exhaust hood are required. Contact safety officer for local procedure regulations concerning the use of trichloroethylene before using.

(4) A degreasing tub may be used to remove heavy grease and oil from metal parts. Trichloroethylene is used as a degreasing agent.

CAUTION

To prevent corrosion, part should be dipped in rust preventive within two hours of degreasing.

(5) Remove parts from degreasing machine and check all oil passages and cavities for cleanliness and freedom from obstruction before coating with rust preventive. Run a thin, flexible wire through oil passages to make sure they are not clogged. Use a pressure spray gun and dry cleaning solvent to clean dirty passages.

(6) Parts soaked in carbon removal solution should be rinsed with dry cleaning solvent. Rinse in a solvent spray booth equipped with a filter and hand spray gun, then use a soft bristle brush to remove carbon deposits. A cloth buffing wheel may also be used.

WARNING

Dry cleaning solvent P-D-680 is toxic and flammable. Wear protective goggles, face mask, and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapor. Do not use near open flame or excessive heat. The flashpoint for type I dry cleaning solvent is 100°F (38°C) and for type II is 140°F (60°C). If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, flush eyes with water and get medical aid immediately.

(7) Electrical parts, such as coils, connectors, junction blocks, insulated wiring and switches, should not be soaked or sprayed with cleaning solutions. Clean these parts with a clean lint-free cloth moistened with dry cleaning solvent P-D-680 (item 31, Appendix E).

(8) When cleaning ball or roller bearings, place in a basket and suspend in a container of dry cleaning solvent, P-D-680 (item 31, Appendix E). If necessary, use brush to remove caked grease or chips. Avoid rotating bearings before solid particles are removed to prevent damage to races and balls. When bearings have been cleaned, spin immediately in light lubricating oil (item 27, Appendix E) to remove solvent.

(9) Do not clean preformed packings or other rubber parts in dry cleaning solvent. Wipe with clean, dry lint-free cloth.

(10) For exterior cleaning of frame and structural components, use detergent (item 17, Appendix E), in a solution as recommended on the container. Leave application on items surface for approximately 10 minutes before rinsing. Rinse with hot or cold water under pressure. If available, use hot water under 80 to 120 lb (36 to 54 kg) pressure. An ordinary garden hose may be used if no other equipment is available. If pressurized water supply is not available, wash painted surfaces with a solution of 1/4 cup of soap chips (item 7, Appendix E), to one gallon of water.

(11) Before disassembly of sweeper, clean exterior parts of sweeper thoroughly with dry cleaning solvent P-D-680 (item 31, Appendix E) to remove accumulated mud, tar and grease.

CAUTION

Do not use gasoline, diesel fuel, or other petroleum base products to clean or preserve hydraulic system components. Use of petroleum base products can change the lubricating quality of hydraulic oil and cause failure or damage to equipment.

(12) When cleaning hydraulic system components, use petroleum-free solvents. Clean and dry parts thoroughly to make sure no residue remains. If preservative coating is required before reassembly, apply a light film of preservative oil, (item 27, Appendix E). If petroleum-free solvents are not available for cleaning, use hydraulic fluid compatible with that used in the sweeper system.

f. Removal and Disassembly of Components.

(1) When unpacking items, remove all packing material, barrier paper, tape, plastic bags, protective caps, and protective grease coatings.

5-6. MAINTENANCE INTRODUCTION (CONT).

(2) Use protective covers on open housings, lines, engine inlets, exhaust ducts, and other openings as soon as possible after disassembly to prevent moisture and foreign matter from entering engine. Wrap all parts in clean paper or dip parts in preservative oil, (item 27, Appendix E) or equivalent.

(3) Cap or tape over all open tubes, hoses, fittings and engine component openings as soon as parts are removed.

CAUTION

Do not use tape to close off fuel or oil openings. Sticky surface of tape can mix with fuel and oil and cause engine malfunctions.

(4) Use suitable containers to catch fuel or oil when removing hoses and fittings. Dispose of fuel and oil in accordance with local policy.

(5) Remove and handle components carefully.

(6) Inspect parts as removed for breaks, dents, cracks, surface defects or other obvious damage.

(7) Remove burrs from gear teeth with a fine-cut file.

(8) Remove residue from bearing races with crocus cloth (item 8, Appendix E).

(9) Welding and brazing processes may be used to repair cracks in external parts, such as brackets, panels, and framework. Because of time required and the chance of subsequent failure, such repairs should be attempted only when replacement parts are not available. Welding and brazing of castings and running parts or parts under great stress will only be done in emergencies.

(10) When installing studs in engine block use a proper driver. A worn stud driver may damage the end thread. Then a chasing die must be used before a nut can be screwed on. This procedure will remove plating and allow corrosion. Before installing a stud, inspect hole for chips. Blow out foreign matter and start stud by hand. Before final insertion, coat thread with a film of anti-seize compound. Install stud to proper "setting height," which is the total projecting length.

(11) Replace all broken, worn, or burned electrical wiring. Wires with broken strands must be replaced.

(12) Replace all broken, frayed, crimped, or soft flexible hoses. Replace stripped or damaged fittings. Replace entire flexible hose if fittings are damaged. Hose clamp should not crimp hoses.

(13) Replace any screw, nut, or fitting with damaged threads. Inspect tapped holes for thread damage. If cross threading is evident, retap the hole for the next oversize screw or stud. If retapping will weaken the part, or if the cost of the part makes retapping impractical, replace the part. Chasing the threads with proper size tap or die may be adequate.

(14) Reshape elongated mounting holes to round and drill to receive bushing with required inner diameter. Stake bushing in place with center punch.

(15) Remove protective grease coatings from new parts before installation.

(16) To replace a preformed packing, first clean groove, then stretch packing and place into position. Place component on flat surface and uniformly press packing into position.

(17) Use a nonhardening pipe-joint compound (item 16, Appendix E) or Teflon tape (item 34 Appendix E) to join piping.

(18) Coat both sides of gasket with sealant (item 15, Appendix E). Remove all traces of previous gasket and sealant before installing new gasket.

(19) Coat oil seals evenly with oil or grease before installing. Install oil seals with seal lip facing in, applying an even force to outer edge of seal. If oil seals are to be installed over keyed or splined shafts, use a guide to prevent sharp edge of the keyway or splines from cutting the seal. Construct guides of very thin gauge sheet metal and shape to the required diameter. Make certain guide edges are not sharp and are bent slightly inward so they do not cut the seal.

(20) When mounting bearings on shafts, always apply force to the inner races. When mounting bearings into housing, always apply the force to the outer races. Lubricate bearings before assembly with lubricant used in the related housing or container to provide the first run-in until lubricant from the system can reach the bearings.

(21) To ease assembly and installation, tag and mark shims, connectors, wires, and mating ends of lines before disconnecting them. Identify similar parts to ensure correct assembly.

(22) Before removal of any electrical component, disconnect battery cables (para 4-73) and ensure 12V or 24V wire harness to tow vehicle is disconnected.

(23) Ensure that adequate clearance is available for removal of component. Disassemble sweeper to the extent necessary to provide adequate working clearance.

(24) Use chain hoist, jack, or other aid when lifting heavy components. Lifting device should be positioned and attached to components to remove all strain from mounting hardware before last hardware is removed.

(25) Discard preformed packings, gaskets, seals, and similar material when removed. Be sure that all traces of oil, gaskets, and sealants are removed. When possible, use wood or plastic probes and scrapers to prevent damage to machines surfaces.

(26) Cotter pins, lockwashers, star washers, lockwire, self-locking nuts, and any similar locking devices must be discarded when removed. Self-locking fasteners that loosen up must be replaced, not tightened.

(27) Remove parts only if repair or replacement is required. Do not disassemble a component any further than necessary to accomplish needed repairs.

g. Painting. Instructions for preparation of material for paint, how to paint, and materials to be used are in TM 43-0139. Instructions for camouflage painting are contained in FM 5-20. Stenciling and marking military vehicles are called out in TB 43-0209. Data plates location and description are referenced in Chapter 2.

h. Lubrication. Refer to Chapter 3, Section I for lubrication procedures and requirements for the sweeper. The instructions include types and grades of lubrications used, lube points, locations and frequency of required lubrication.

i. Assembly.

(1) Remove protective grease coatings from new parts before installation.

(2) To replace preformed packings, first clean groove, then stretch packing into position. Rotate component on flat surface applying downward pressure to uniformly press packing into position. A light coating of fluid which the packing will operate in, will make assembly easier.

5-6. MAINTENANCE INTRODUCTION (CONT).

(3) Coat oil seals evenly with oil or grease before installing. Install oil seals with seal lip facing in, applying an even force to the outer edge of seal. If oil seals are to be installed over keyed or splined shafts, use a guide to prevent sharp edges of the keyway or splines from cutting the seal. Guides can be very thin gauge sheet metal shaped to the required diameter. Make certain guide edges are not sharp and are bent slightly inward so they do not cut the seal.

(4) Lubricate bearings before reassembly with the type of lubricant normally used in the related housing or container. This will provide lubrication during the first run-in until lubricant from the system can reach the bearings.

j. Installation. Put hoses, tubes, lines and, electrical wiring in place by matching identification tags, markings on equipment, and using illustrations presented. Replace cable ties (item 36, Appendix E) as necessary. Use sealing compounds as required in each maintenance task. When installing screws and nuts, be sure to tighten to torque values given. For torque values, refer to tables 4-4 and 4-5.

k. Welding Procedures. Welding may be used to repair cracks in steel parts. These repairs should be made only when replacement parts are not available. Do not weld running parts. Visually inspect all welds for cracks. Parts that carry a great load should receive magnetic particle inspection. Critical nonferrous parts may be inspected with fluorescent penetrant.

l. Sheet Metal Repair. Straighten minor body dents by bumping with a soft-faced hammer while using a wooden block backing. Repair minor skin cracks by installing patches.

5-7. ENGINE TIMING.

This task covers:

- a. Gear Timing
- b. Flywheel Timing

INITIAL SETUP

Tools

Tool Kit, General Mechanic's: Automotive

Shop Equipment, Machine Shop; Field Maintenance, Basic, Less Power

Equipment Condition

TM or Para
Para 5-12

Para 5-13

Condition Description

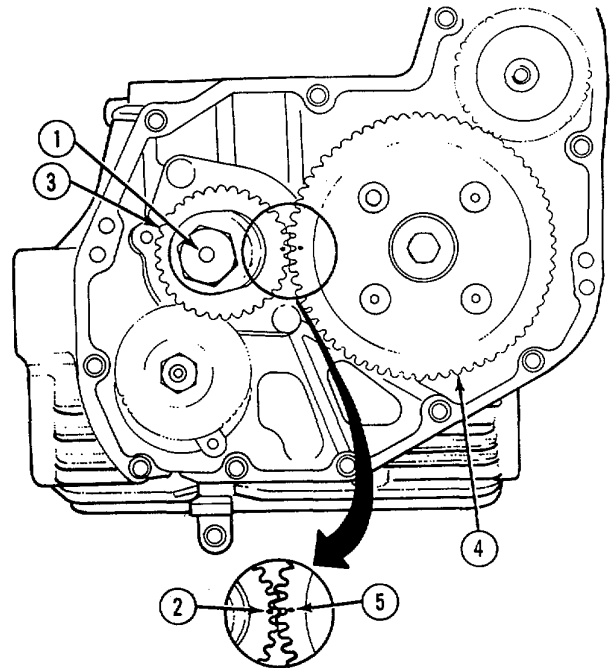
Rear engine housing removed.
No. 1 cylinder head removed.

a. Gear Timing.

NOTE

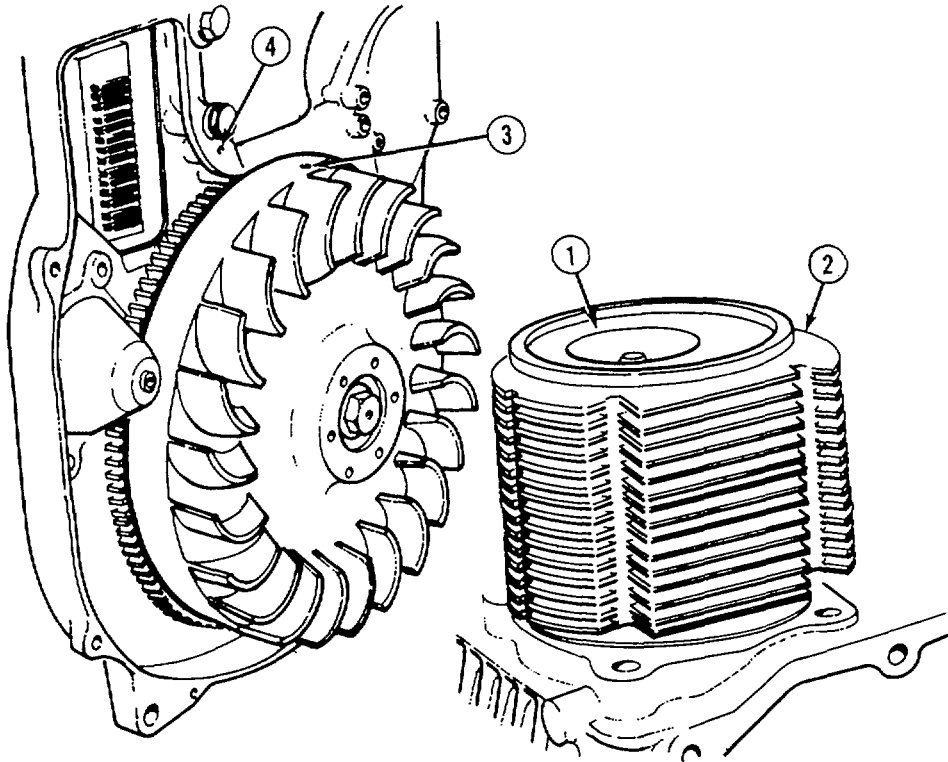
This task is required after engine crankshaft or camshaft have been removed from crankcase.

- (1) Turn crankshaft (1) so that No. 1 piston (on drive end of engine) is at Top Dead Center (TDC). Piston bumping clearance must be 0.00275 to 0.0295 in. (0.70 to 0.75 mm) (para 5-8).
- (2) Timing mark (2) on crankshaft gear (3) should be at 3 o'clock position.
- (3) Position gear (4) to align timing marks (2 and 5). Timing mark (5) should be in 9 o'clock position.



5-7. ENGINE TIMING (CONT).

b. Flywheel Timing.



- (1) Refer to para 5-12 and install rear engine housing.
- (2) Refer to para 5-17 and install flywheel.

NOTE

This step is normally done as part of troubleshooting or valve adjustment (para 5-25).

- (3) Piston (1) in No. 1 cylinder (2) should be at TDC. No. 1 cylinder is cylinder on drive side of engine. Top of piston must be between 0. to 0.0295 in. (0.70 to 0.75 mm) from top of head gasket. This clearance is called bumping clearance.
- (4) Align flywheel timing mark (3) with timing mark (4) on rear engine housing.

NOTE

Follow-on maintenance:

- Install No. 1 cylinder head (para 5-13)
- Install rear engine housing (para 5-12)
- Check injection pump timing (para 5-32)

5-8. ENGINE BUMPING CLEARANCE.

This task covers:

Adjustment

INITIAL SETUP

Tools

Tool Kit, General Mechanic's: Automotive

Shop Equipment, Machine Shop; Field Maintenance, Basic, Less Power

Materials/Parts

Head gaskets

Equipment Condition

TM or Para
Para 5-13

Condition Description

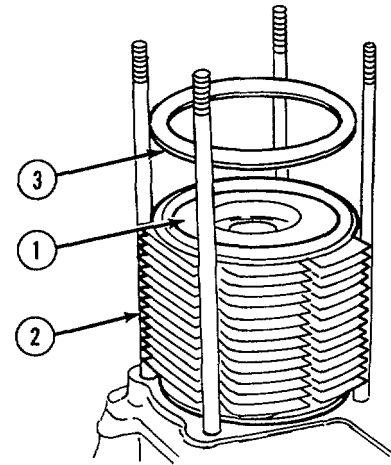
Cylinder heads removed.

Adjustment.

NOTE

Procedure is the same for both cylinders.

- (1) Move piston (1) to TDC (para 5-7).
- (2) Measure depth of piston (1) in cylinder (2) with piston at highest point using a depth gage. Clearance should be 0.0275 to 0.0295 in. (0.70 to 0.75 mm) from top of piston to top of head gaskets (3).



CAUTION

Make sure cylinder does not "ride up" during this procedure or damage to cylinder may result.

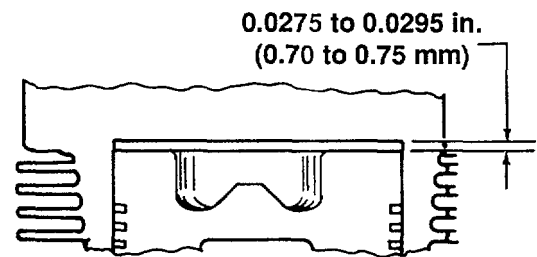
NOTE

Gaskets are available in different thicknesses and must be measured before installing.

- (3) Adjust clearance by adding or removing gaskets (3) to obtain proper clearance.

NOTE

Follow-on maintenance: Install cylinder heads (para 5-13)



END OF TASK

5-9. ENGINE CYLINDER REPLACEMENT.

This task covers:

- a. Removal
- b. Cleaning/Inspection
- c. Installation

INITIAL SETUP

Tools

Tool Kit, General Mechanic's: Automotive

Shop Equipment, Machine Shop; Field Maintenance, Basic, Less Power

Equipment Condition

TM or Para
Para 4-30
Para 5-13

Condition Description

Oil pan removed.
Cylinder head removed.

Materials/Parts

- Copper washers
- Compound, thread locking, item 14 Appendix E
- Oil, engine, item 26 Appendix E
- Solvent, dry cleaning, item 31 Appendix E

a. Removal.

NOTE

Matchmark cylinders to crankcase before removal.

- (1) Remove cylinder (1) from studs (2), crankcase (3), and piston (4).

NOTE

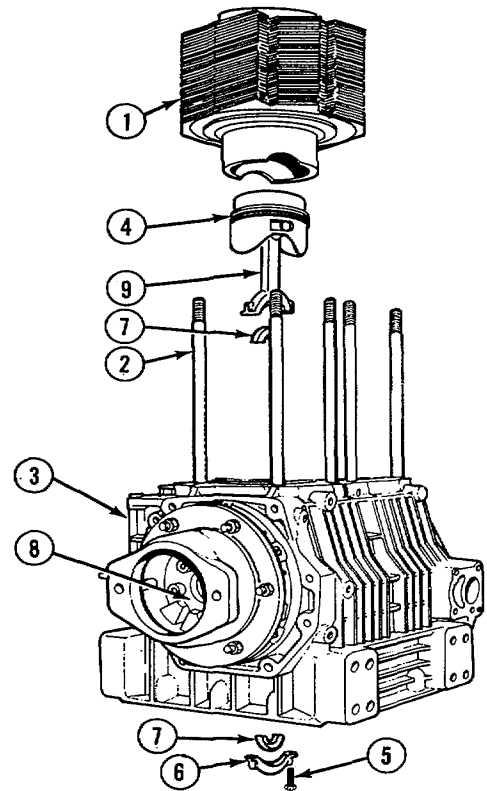
It may be necessary to tap out rod bearings.

- (2) Remove two rod cap screws (5) connecting rod cap (6), and bearings (7) at crankshaft (8), using a ratchet, extension and a 10 mm socket.

NOTE

Matchmark pistons to cylinder before removal. Note orientation of notch in piston to ensure correct assembly.

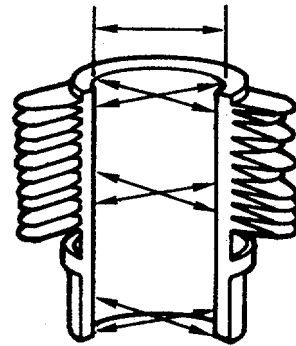
- (3) Remove piston (4) and connecting rod assembly (9) as an assembly.
- (4) Remove piston rings (para 5-20).



b. Cleaning/Inspection.**WARNING**

Dry cleaning solvent P-D-680 is toxic and flammable. Wear protective goggles, face mask, and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapor. Do not use near open flame or excessive heat. The flashpoint for type I dry cleaning solvent is 100°F (38°C) and for type II is 140°F (60°C). If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, flush eyes with water and get medical aid immediately.

- (1) Clean all parts with dry cleaning solvent P-D-680.
- (2) Inspect cylinder bore for wear, pits or scratches.
- (3) Inspect pistons for scratches, cracks and scoring.
- (4) Measure and record cylinder bore using a micrometer. Acceptable tolerance is 3.3858 to 3.3866 in. (86 to 86.02 mm). If out of tolerance, replace cylinder.



3.3858 TO 3.3866 in. (86 to 86.02 mm)

5-9. ENGINE CYLINDER REPLACEMENT (CONT).

c. Installation.

- (1) Install piston rings (para 5-20).
- (2) Coat inside of cylinder (1) with fresh engine oil.

NOTE

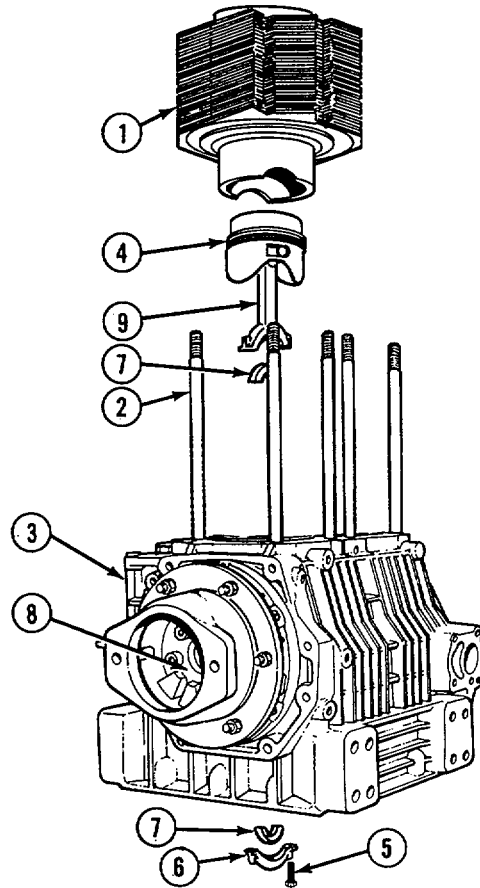
Compress piston rings by hand or use a piston ring compressor. Compress rings enough to insert in cylinder.

- (3) Using matchmarks made during removal align piston (4) to cylinder (1), compress piston rings with fingers and install piston with connecting rod (9) in cylinder.

CAUTION

Do not allow connecting rod to scratch crankshaft or damage to equipment may result.

- (4) Lubricate with engine oil and install rod bearing half (7) in connecting rod (9).
- (5) While moving crankshaft (8) to align with connecting rod assembly (9), place cylinder (1) on studs (2) and crankcase (3).



WARNING

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

- (6) Install rod bearing half (7) and connecting rod cap (6) with two screws (5) using a ratchet, extension and 10 mm socket. Apply thread locking compound to screws.
- (7) Tighten screws (5) to 29 lb-ft (39 N•m) using a torque wrench and 10 mm socket.

NOTE

Follow-on maintenance:

- **Check engine bumping clearance (para 5-8)**
- **Install cylinder heads (para 5-13)**
- **Install engine oil pan (para 4-30)**

END OF TASK

5-10. CRANKCASE ASSEMBLY REPLACEMENT.

This task covers:

- a. Removal
- b. Installation

INITIAL SETUP

Tools

Tool Kit, General Mechanic's: Automotive

Shop Equipment, Machine Shop; Field Maintenance, Basic, Less Power

Equipment Condition

TM or Para
Para 5-14

Condition Description
Crankshaft removed.

Materials/Parts

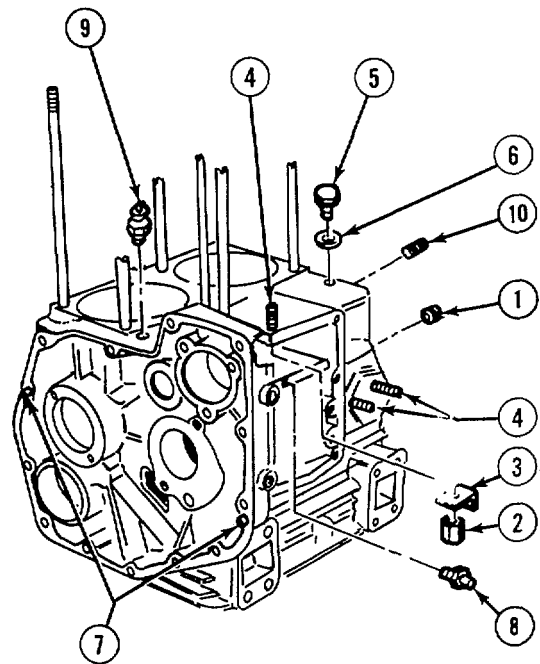
Copper washer
Compound, sealing, pipe thread, item 16, Appendix E

a. Removal

NOTE

Remove expansion cap only if necessary.

- (1) Remove expansion cap (1) using a 17 mm hex head wrench.
- (2) Remove nut (2) and lever stop (3) using a 13 mm open end wrench.
- (3) Remove all studs (4) using a stud remover/installer.
- (4) Remove plug (5) and copper washer (6) using a 13 mm open end wrench.
- (5) Remove taper pins (7) using pliers.
- (6) Remove pin (8) and sending unit (9) using a 10 mm and 24 mm open end wrenches.
- (7) Remove setscrew (10) using a 4 mm hex head wrench.



b. Installation.**WARNING**

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

- (1) Apply pipe thread sealing compound to threads of setscrew (10) and plug (5).
- (2) Install setscrew (10) using a 4 mm hex head wrench.
- (3) Install sending unit (9) and pin (8) using a 10 mm and 24 mm open end wrenches.
- (4) Install taper pins (7) using a hammer and drift.
- (5) Install plug (5). and copper washer (6) using a 13 mm open end wrench.
- (6) Install studs (4) using a stud remover/installer.
- (7) Install lever stop (3) and nut (2) using a 13 mm open end wrench.
- (8) Install expansion cap (1) using a 17 mm hex head wrench.

NOTE

Follow-on maintenance: Install crankshaft (para 5-14)

END OF TASK

5-11. TACHOMETER GEAR WHEEL AND HOUSING REPLACEMENT.

This task covers:

- a. Removal
- b. Installation

INITIAL SETUP

Tools

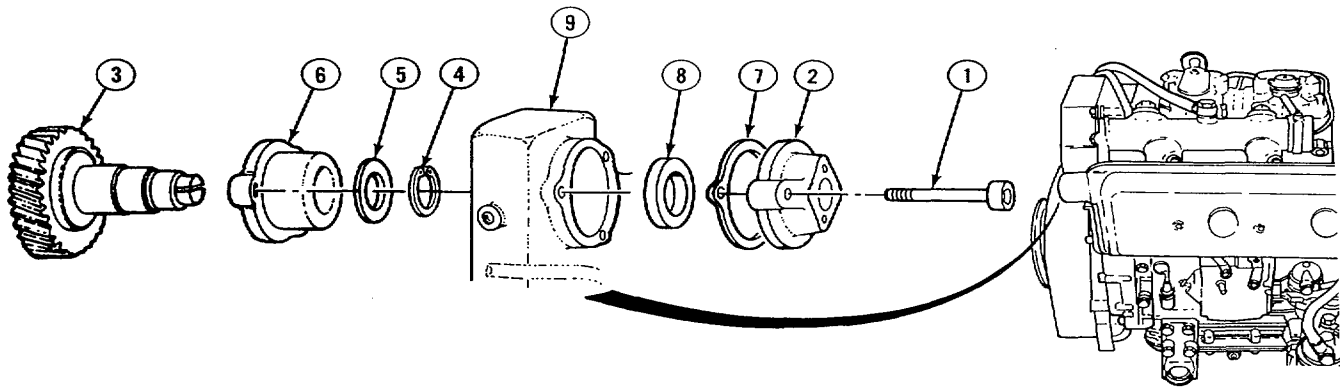
Tool Kit, General Mechanic's: Automotive

Shop Equipment, Automotive Maintenance and Repair; Organizational Maintenance, Common No. 1, Less Power

Materials/Parts
Gasket

Equipment Condition
TM or Para
Para 5-12

Condition Description
Rear engine housing removed.



a. Removal.

- (1) Remove three screws (1) and housing (2) using a 6 mm hex head wrench.
- (2) Remove gearwheel (3), retaining ring (4) using retaining ring pliers, washer (5), and housing (6).
- (3) Remove gasket (7) and bushing (8) from housing (2).

b. Installation.

- (1) Install gear wheel (3) in housing (6) with washer (5), and retaining ring (4).
- (2) Install parts assembled in step (1) in housing (9).
- (3) Install gasket (7) on housing (2).
- (4) Install bushing (8) and housing (2) with three screws (1). Tighten screws to 108 lb-in. (14 N•m) using a torque wrench and 6 mm hex head socket.

NOTE

Follow-on maintenance: Install rear engine housing (para 5-12).

END OF TASK

5-12. REAR ENGINE HOUSING REPLACEMENT.

This task covers:

- a. Removal
- b. Installation

INITIAL SETUP

Tools

Shop Equipment, Automotive Maintenance and Repair; Organizational Maintenance, Common No. 1, Less Power

Equipment Condition

TM or Para
Para 5-17

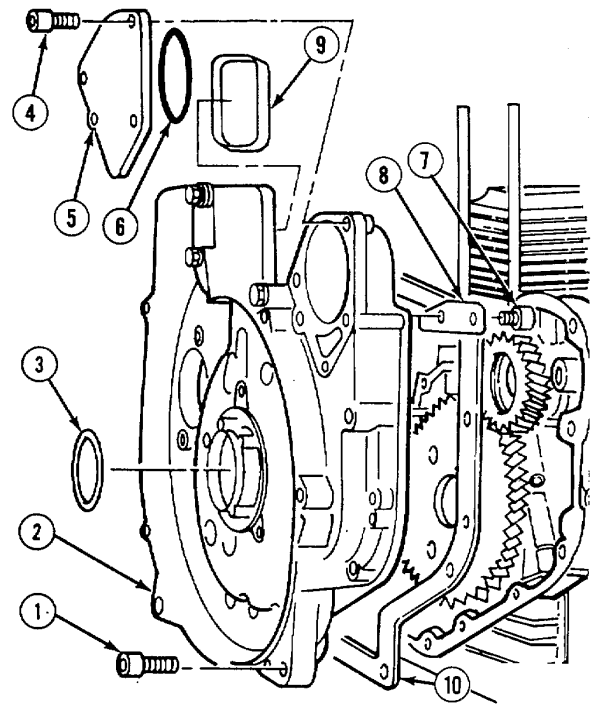
Condition Description
Flywheel removed.

Materials/Parts

Seal
Gaskets
Adhesive, sealant, item 3 Appendix E

a. Removal

- (1) Remove 13 screws (1) and rear engine housing (2) using a 6 mm hex head wrench.
- (2) Remove oil seal (3).
- (3) Remove two screws (4), cover (5), and O-ring (6) using a 6 mm hex head wrench.
- (4) Remove two screws (7) and panel (8) using a 10 mm open end wrench.
- (5) Remove gaskets (9 and 10).



5-12. REAR ENGINE HOUSING REPLACEMENT (CO NT).

b. Installation.

- (1) Install panel (8) and two screws (7) using a 10 mm open end wrench.
- (2) Install O-ring (6), cover (5), two screws (4), and oil seal (3) using a 6 mm hex head wrench.

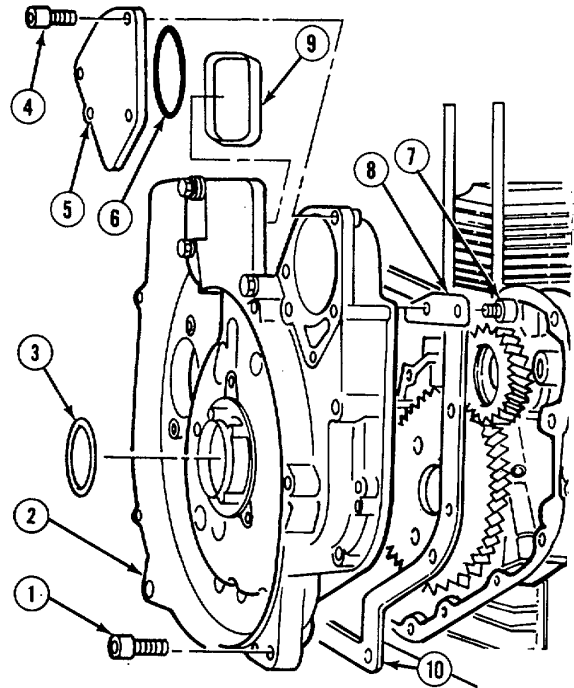
WARNING

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

- (3) Coat gasket (10) with sealing compound.
- (4) Install gasket (10), rear engine housing (2), and 13 screws (1). Tighten screws to 22 lb-ft (30 N•m) using a torque wrench and 6 mm hex head socket.
- (5) Install gasket (9).

NOTE

Follow-on maintenance: Install fly-wheel (para 5-17).



END OF TASK

5-7. CYLINDER HEAD ASSEMBLY REPLACEMENT/REPAIR.

This task covers:

- | | | |
|----------------|------------------------|-----------------|
| a. Removal | b. Cleaning/Inspection | c. Installation |
| b. Disassembly | d. Assembly | |

INITIAL SETUP

Tools

Tool Kit, General Mechanic's: Automotive

Shop Equipment, Machine Shop; Field
Maintenance, Basic, Less Power

Spring Compressor (7535.1460.009)

Equipment Condition

TM or Para

Para 4-24

Para 4-32

Para 4-55

Para 4-42 thru 4-44

Para 5-30

Para 5-23

Condition Description

Engine removed.

Intake manifold removed.

Noise shrouds removed.

Fuel lines removed.

Fuel injectors removed.

Rocker arms removed.

Materials/Parts

Gasket

Head gasket

Text begins on next page.

5-13. CYLINDER HEAD ASSEMBLY REPLACEMENT/REPAIR (CONT).

CAUTION

Do not remove cylinder head while it is hot. Damage to cylinder head may occur.

NOTE

Procedure is the same for both cylinder heads.

a. Removal

- (1) Remove four pushrods (1) from crankcase (2).
- (2) Remove four nuts (3), washers (4), and cylinder head (5) using a ratchet and 17 mm socket.

WARNING

Spring is under extreme pressure when compressed. Wear eye protection to avoid injury.

- (3) Remove oil tube (6), gasket (7), spacer (8), spring (9), pushrod tube (10), and gasket (11) from crankcase (2).

NOTE

Measure and record thickness of head gasket after removal.

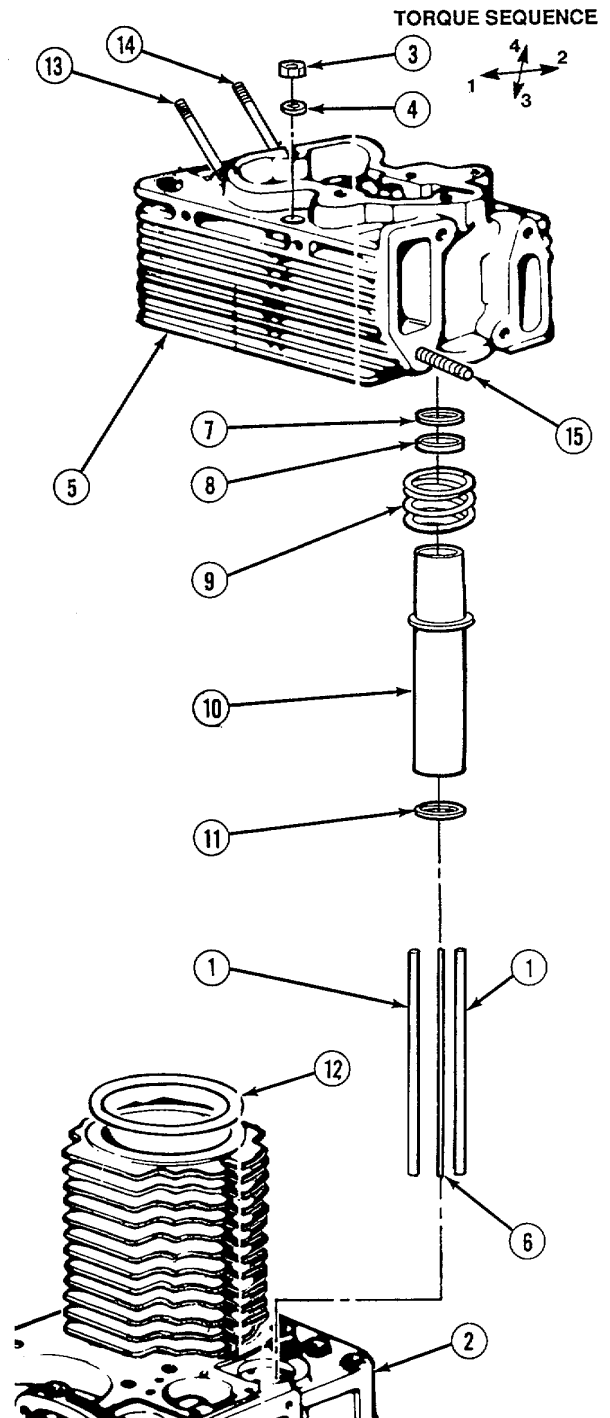
- (4) Remove head gasket (12).

b. Disassembly.

NOTE

Matchmark position of long nut on each cylinder head.

- (1) Remove studs (13, 14 and 15), if required.
- (2) Refer to para 5-24 and remove valves if required.



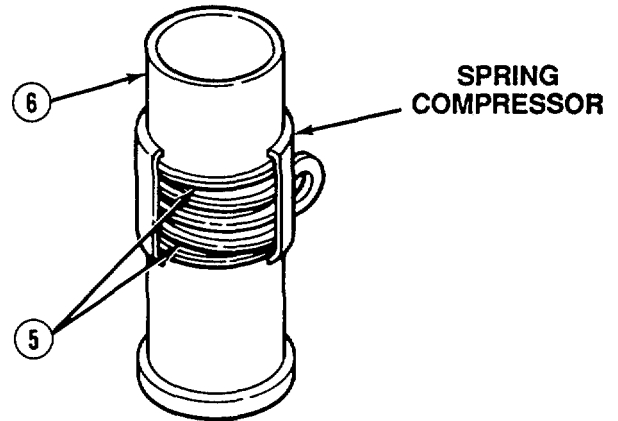
c. **Cleaning/Inspection.** Inspect cylinder head for cracks or warping. Warpage that causes leaks is not acceptable.

d. **Assembly.**

- (1) Refer to para 5-24 and install valves, if removed.
- (2) If removed, install studs (13, 14, and 15).

NOTE

When installing cylinder head, it will be necessary to compress spring that is around pushrod tube. If spring is not compressed, gasket on top of pushrod tube will not seat properly.



- (3) Install gasket (11), pushrod tube (10), spring (9) spacer (8), gasket (7), oil tube (6), and pushrods (1) in crankcase (2).
- (4) Install head gasket (12) and check engine bumping clearance (para 5-8).

e. **Installation.** Install cylinder head (5), four washers (4), and four nuts (3). Follow torque sequence shown and tighten nuts to 36 lb-ft (48 N•m) using a torque wrench and 17 mm socket. Remove spring compressor.

NOTE

Follow-on maintenance:

- Install rocker arms (para 5-23)
- Install fuel injectors (para 5-30)
- Install fuel lines (para 4-42 thru 4-44)
- Install noise shrouds (para 4-55)
- Install intake manifold (para 4-32)
- Install engine (para 4-24)

END OF TASK

5-14. CRANKSHAFT REPLACEMENT.

This task covers:

a. Removal

b. Cleaning/Inspection

c. Installation

INITIAL SETUP*Tools*

Tool Kit, General Mechanic's: Automotive

Shop Equipment, Machine Shop; Field
Maintenance, Basic, Less Power*Materials/Parts*

Safety plate

Gage: Plastic adjustment, item 20 Appendix E

Oil, engine, item 26 Appendix E

Equipment Condition

TM or Para

Para 5-9

Para 5-28

Para 5-34

Para 5-11

Para 5-27

Para 5-15

Para 5-16

Condition Description

Cylinders removed.

Throttle control
assembly removed.Speed governor support
yoke assembly removed.Tachometer gear wheel
and housing removed.

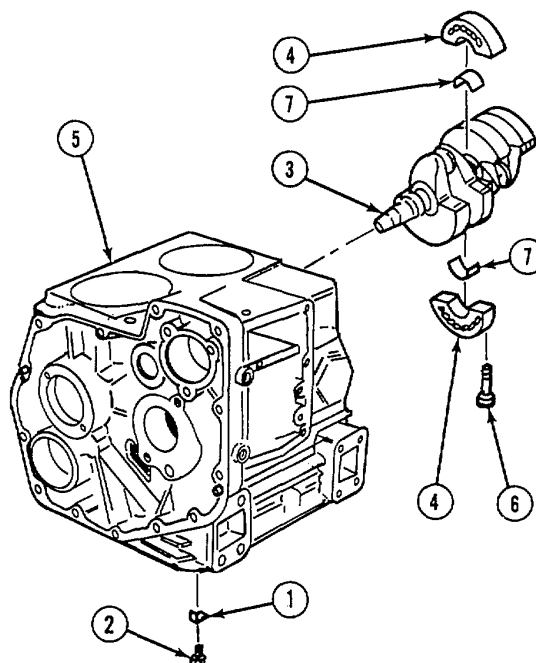
Oil pump removed.

Front support removed.

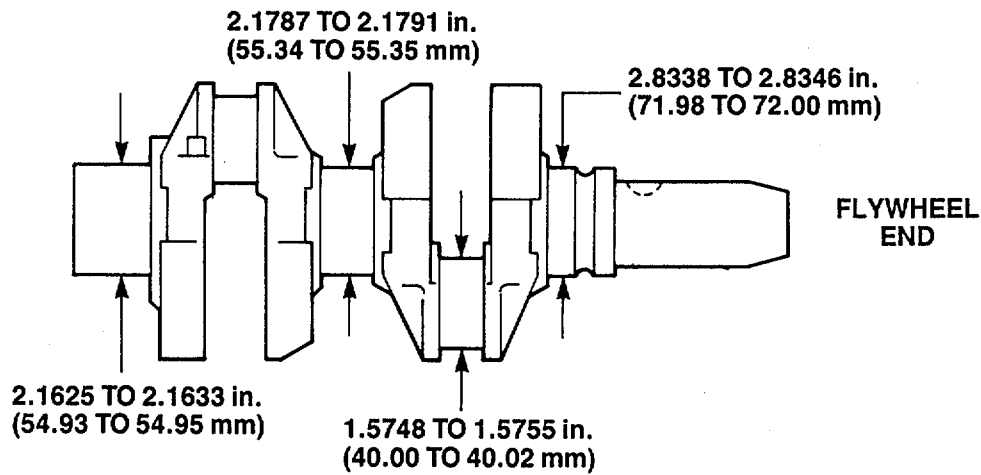
Rear support removed.

a. Removal

- (1) Flatten tabs on safety plate (1) and remove screw (2), and safety plate using a ratchet and 17 mm socket.
- (2) Tap crankshaft (3) towards drive side of engine using a ball peen hammer and drift. Center support (4) will slide out of its position in crankcase (5).
- (3) Once center support (4) has cleared its support in crankcase (5), remove two screws (6) using a 6 mm hex head wrench and separate halves of center support (4).
- (4) Remove center support halves (4) and center support bearing halves (7).
- (5) Continue sliding crankshaft (3) toward drive end of crankcase (5) and remove crankshaft.



b. Cleaning/Inspection.



NOTE

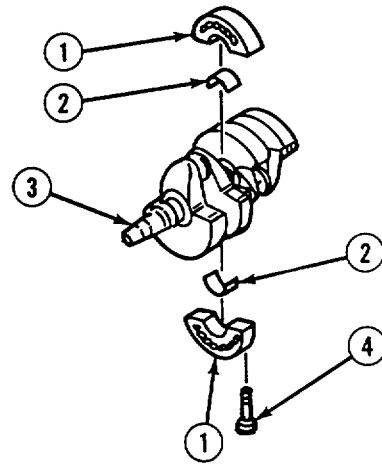
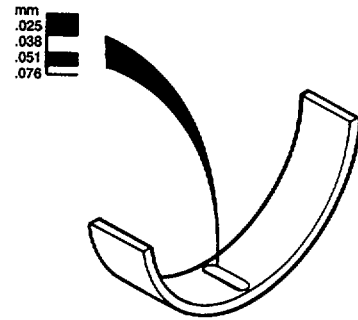
Oversize bearings are available at 0.010 and 0.020 in. (0.25 and 0.50 mm).

- (1) Inspect crankshaft for scratches and grooves.
- (2) Measure five crankshaft journals using calipers:
 - (a) Shaft end (flywheel side) 2.8338 to 2.8346 in. (71.98 to 72.00 mm).
 - (b) Two connecting rod journals 1.5748 to 1.5755 in. (40.00 to 40.02 mm).
 - (c) Center support journal 2.1787 to 2.1791 in. (55.34 to 55.35 mm).
 - (d) Shaft end (drive side) 2.1625 to 2.1633 in. (54.93 to 54.95 mm).
- (3) Replace crankshaft if journal dimension is out of tolerance.
- (4) Check crankshaft clearance bores in crankcase using calipers:
 - (a) Clearance (flywheel side) 0.0027 to 0.0043 in. (0.0685 to 0.1092 mm).
 - (b) Clearance (drive side) 0.0019 to 0.0031 in. (0.0482 to 0.0787 mm).
- (5) If clearance is not within tolerances, check respective crankshaft journal. If journal diameter is acceptable replace respective bearing and recheck tolerances. If crankshaft journal diameter is not acceptable, replace crankshaft.
- (6) Inspect crankshaft for straightness using a dial indicator at center support bearing journal. Runout should not exceed 0.0019 to 0.0031 in. (0.0482 to 0.0787 mm).

5-14. CRANKSHAFT REPLACEMENT (CONT).

(7) Center support bearing to crankshaft clearance inspection:

- (a) Insert plastic gage in center journal.
 - (b) Install center support (1) and bearings (2) on crankshaft (3) with two screws (4). Tighten to 22 lb-ft (30 N•m) using a torque wrench and 6 mm hex head socket.
 - (c) Remove two screws (4), bearings (2), and center support (1).
 - (d) Measure plastic gage. Clearance should be 0.0019 to 0.0035 in. (0.05 to 0.09 mm) on wrapper scale.
 - (e) Clean plastic gage off bearings.
- (8) If clearance is not within tolerance check center support journal. If journal diameter is acceptable replace center support bearing and recheck tolerance.



c. Installation.

- (1) Coat all parts with clean engine oil.

NOTE

- Be sure when bearings are installed, they are not covering lubrication passages.
- Center supports are beveled. Be sure to install supports so they match bevels on crankcase.
- Ensure that bearings do not bind on shaft.

- (2) Install center support bearings (7), center supports (4), and two screws (6), on shaft (3). Tighten to 22 lb-ft (30 N•m) using a torque wrench and 6 mm hex head socket.

- (3) Install crankshaft (3) in crankcase (5).

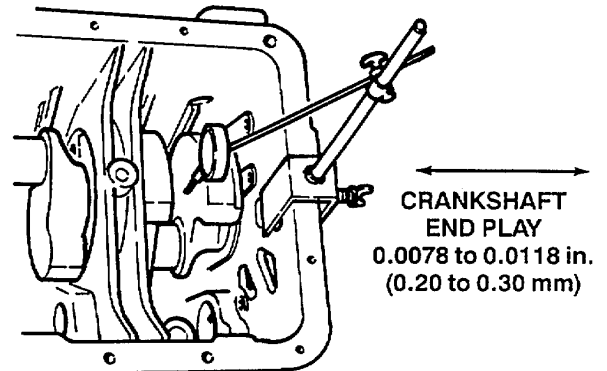
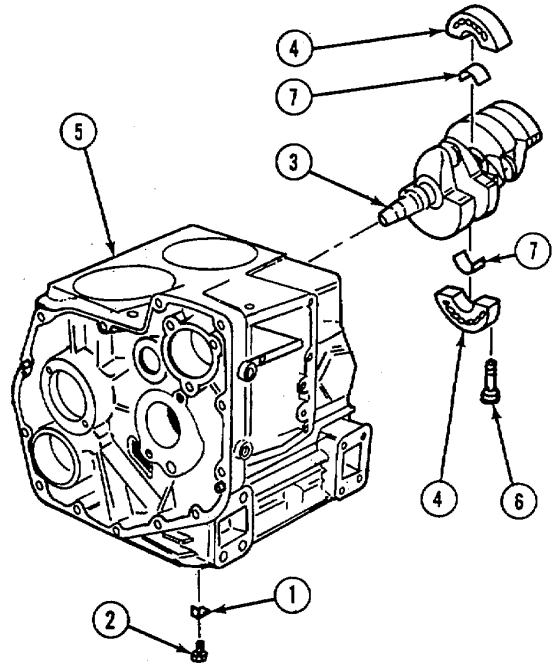
- (4) Install screw (1) and safety plate (2) using a ratchet and 17 mm socket.

- (5) Install rear support (para 5-16).

- (6) Install front support (para 5-15).

- (7) Check crankcase end play by:

- (a) Mount dial indicator as shown on crankcase with needle against crankshaft counter weight.
- (b) Move crankshaft fully towards flywheel, then fully towards drive end. Crankshaft endplay (movement) should be between 0.0078 and 0.0118 in. (0.200 to 0.0300 mm).



5-14. CRANKSHAFT REPLACEMENT (CONT).

NOTE

Follow-on maintenance:

- Install oil pump (para 5-27)
- Install tachometer gear wheel and housing (para 5-11)
- Install speed governor support yoke assembly (para 5-34)
- Install throttle control assembly (para 5-28)
- Install pistons (para 5-19)
- Install cylinders (para 5-9)
- Check bumping clearance (para 5-8)
- Reset engine timing (para 5-7)
- Reset valve clearance (para 5-25)
- Reset engine speed adjustment (para 4-23)

END OF TASK

5-15. FRONT SUPPORT REPLACEMENT.

This task covers:

- a. Removal
- b. Cleaning/Inspection
- c. Installation

INITIAL SETUP

Tools

Tool Kit, General Mechanic's: Automotive

Shop Equipment, Machine Shop; Field Maintenance, Basic, Less Power

Materials/Parts

Lockwashers

Equipment Condition

TM or Para Para 5-27

Para 5-34 Para 5-11

Condition Description

Oil pump gear wheel removed. Speed governor removed. Tachometer gear wheel and housing removed.

a. Removal

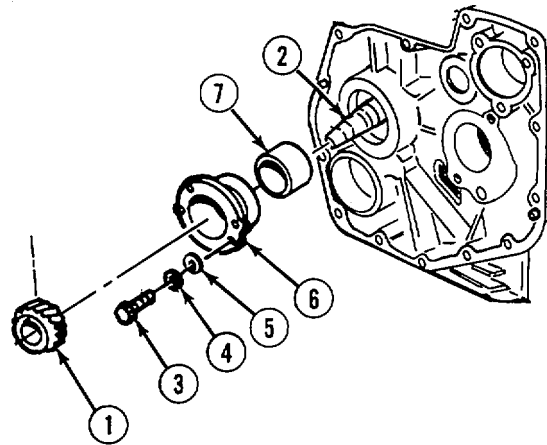
WARNING

Unsafe torching practices can cause serious injury from fire, explosions, or harmful gasses. Allow only authorized personnel to heat metals. Protective clothing and goggles must be worn. Adequate protective equipment must be used. A suitable fire extinguisher must be kept near by, and requirements of TM 9237 strictly followed.

NOTE

Gear will normally have to be heated to allow it to slip off and on. Be careful not to heat gear too much, since this may remove temper from the metal.

- (1) Using a torch, heat gear (1).
- (2) Using a gear puller remove gear (1) from crankshaft (2).
- (3) Remove two screws (3), lockwashers (4), washers (5), and front support (6) using a ratchet and 13 mm socket.
- (4) If required, remove bearing (7) from support (6) using a press.



5-15. FRONT SUPPORT REPLACEMENT (CONT).

b. **Cleaning/Inspection.** Measure clearance between crankshaft and bearing using a micrometer by subtracting OD of crankshaft from ID of bearing. Clearance must be 0.0019 to 0.0031 in. (0.05 to 0.08 mm). If out of tolerance refer to para 5-14, Cleaning/Inspection step (4).

c. **Installation.**

- (1) If removed, install bearing (7) in front support (6).
- (2) Install front support (6), two lockwashers (4), and screws (3) using a ratchet and 13 mm socket.

CAUTION

Do not overheat gear. Damage may result.

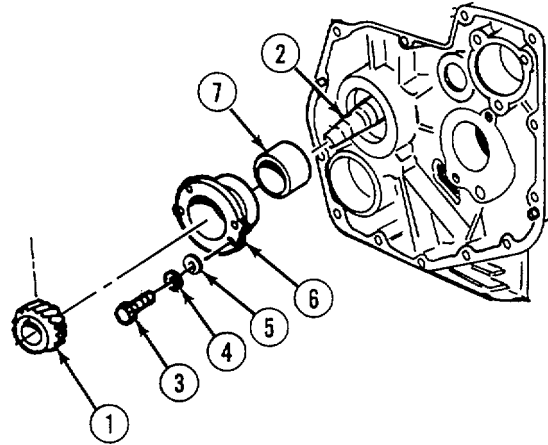
NOTE

If heated properly, gear will drop onto shaft easily.

- (3) Heat gear (1) and install on crankshaft (2) using pliers and/or mallet.

NOTE**Follow-on maintenance:**

- Install tachometer gear wheel and housing (para 5-11)
- Install speed governor (para 5-34)
- Install oil pump gear wheel (para 5-27)
- Check engine timing (para 5-7)



END OF TASK

5-16. REAR SUPPORT REPLACEMENT.

This task covers:

- a. Removal
- b. Cleaning/Inspection
- c. Installation

INITIAL SETUP

Tools

Tool Kit, General Mechanic's: Automotive

Shop Equipment, Machine Shop; Field Maintenance, Basic, Less Power

Equipment Condition

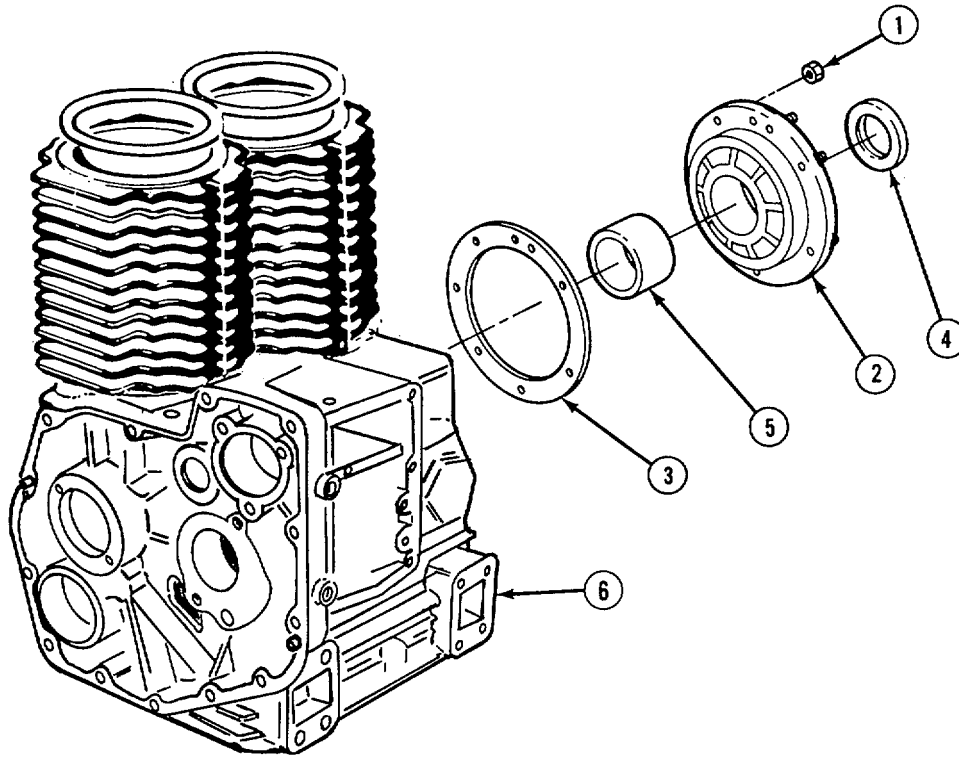
TM or Para Para 4-34

Para 4-24

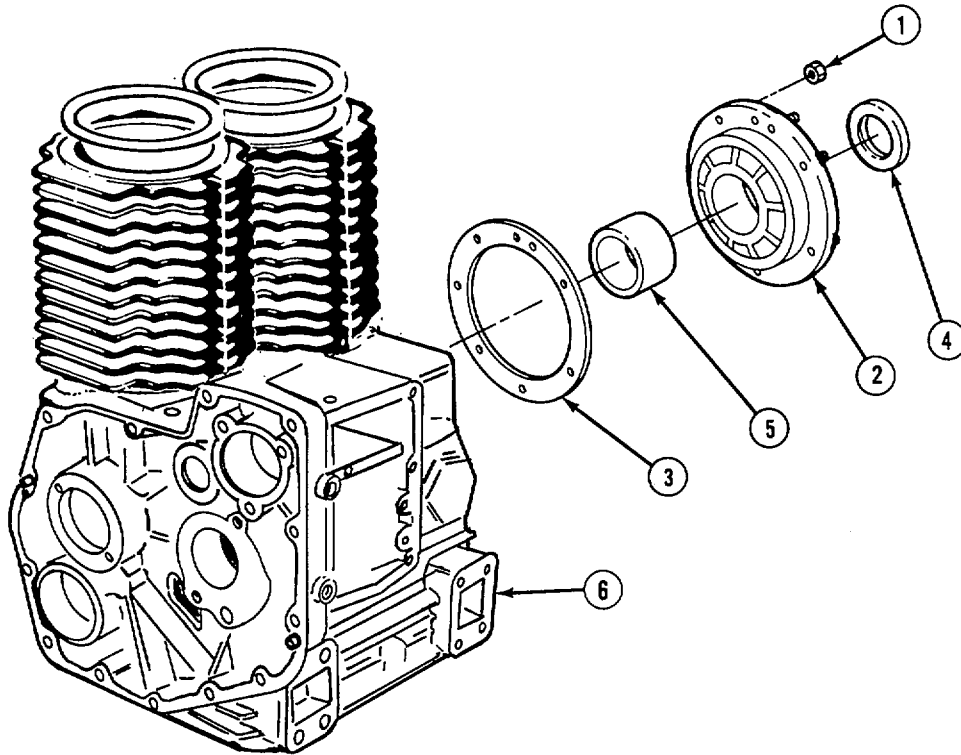
Condition Description
Hydraulic pump drive removed.
Engine removed.

Materials/Parts

Gasket
Seal



- a. **Removal.** Remove six nuts (1), rear support (2), gasket (3), seal (4), and rear support bearing (5) from engine block (6) using a ratchet and 13 mm socket.
- b. **Cleaning/inspection.** Measure clearance, using a micrometer, between crankshaft and rear support bearing (5) by subtracting OD of crankshaft from ID of rear support bearing (5) Clearance must be 0.0019 to 0.0031 in. (0.05 to 0.08 mm). If clearance is out of tolerance refer to para 5-14, Cleaning/Inspection step (4).

5-16. REAR SUPPORT REPLACEMENT (CONT.)

c. **Installation.** If removed install rear support bearing (5) and seal (4), in rear support (2). Install gasket (3), rear support (2), and six nuts (1). Tighten nuts to 30 to 35 lb-ft (41 to 48 N•m) using a torque wrench and 13 mm socket.

NOTE

- Follow-on maintenance:
- Install hydraulic pump drive assembly (para 4-34)
- Install engine (para 4-24)

END OF TASK

5-17. FLYWHEEL WITH CROWN GEAR REPLACEMENT.

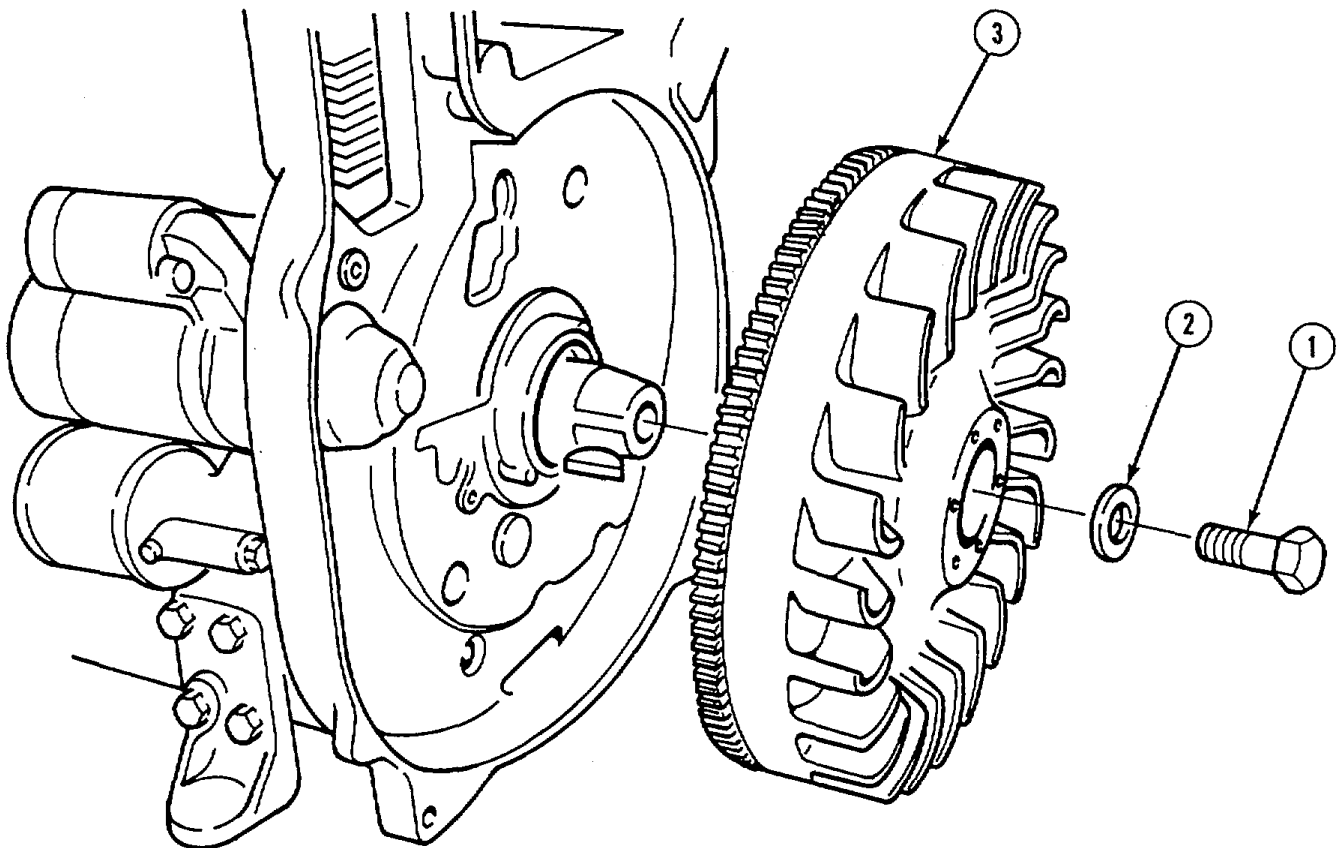
This task covers:

- a. Removal
- b. Installation

INITIAL SETUP

<i>Tools</i>	<i>Equipment Condition</i>	<i>Condition Description</i>
Tool Kit, General Mechanic's; Automotive	TM or Para Para 4-53	Flywheel housing removed.
Shop Equipment, Machine Shop; Field Maintenance, Basic, Less Power	Para 4-58	Starter removed.

a. Removal

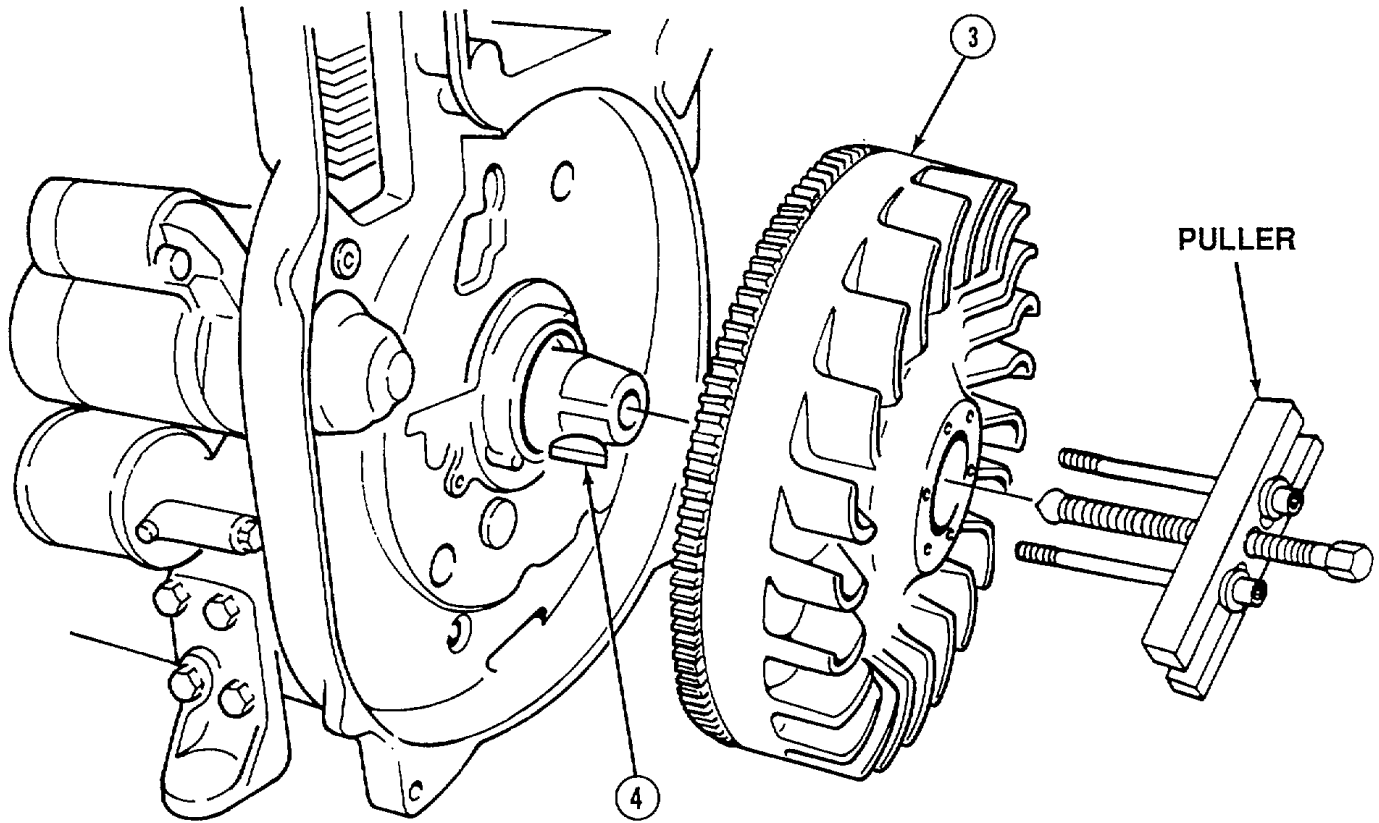


NOTE

Flywheel bolt is removed in a clockwise direction.

- (1) Remove flywheel bolt (1) and washer (2) from flywheel (3) using a ratchet and 24 mm socket.

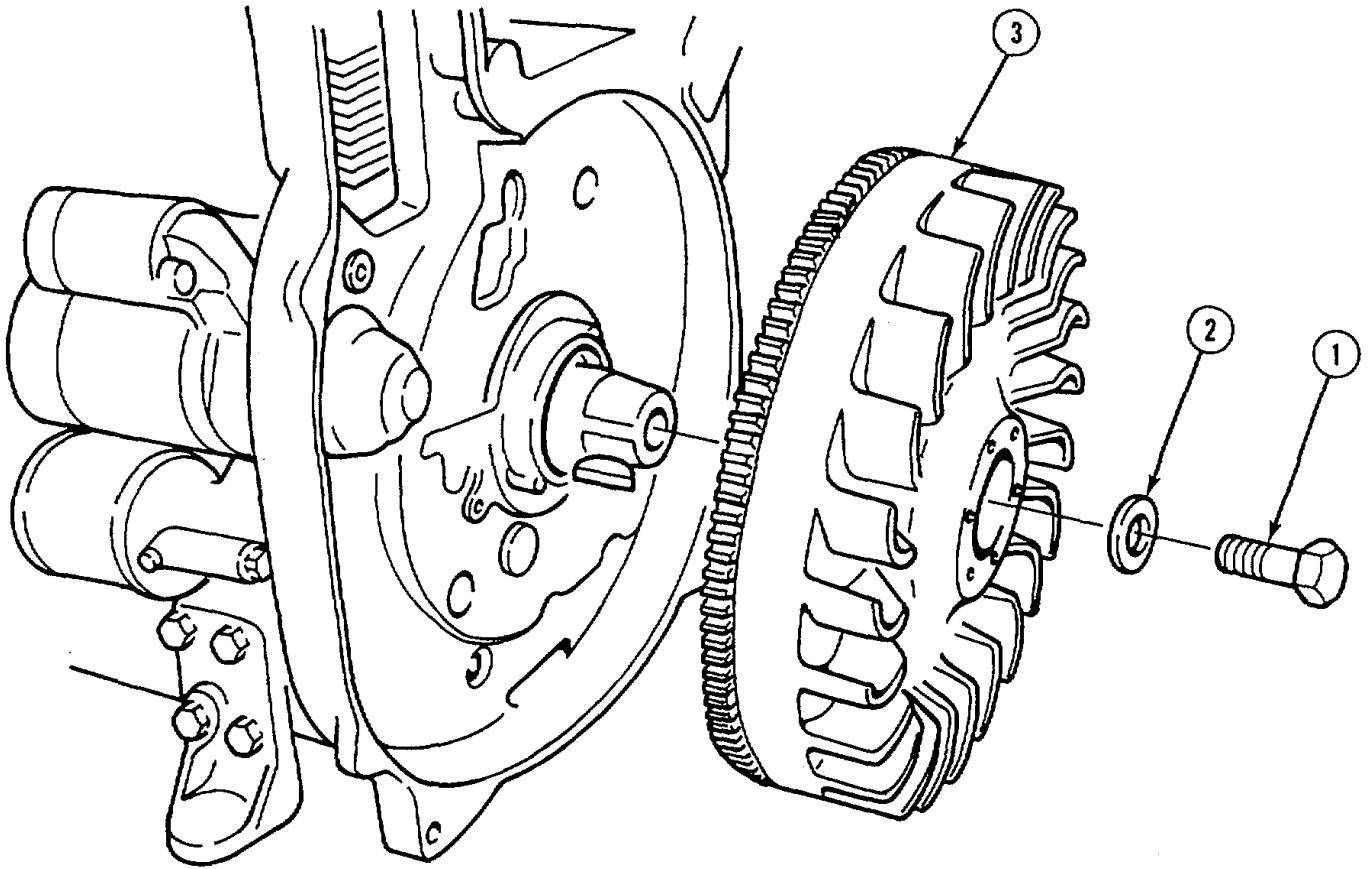
5-17. FLYWHEEL WITH CROWN GEAR REPLACEMENT (CONT)



(2) Remove flywheel (3) and key (4) using flywheel puller.

b. Installation.

(1) Install key (4) and flywheel (3) on shaft.



- (2) Install flywheel washer (2) and bolt (1). Tighten to 130 lb-ft (176 N•m) using a torque wrench and 24 mm socket.

NOTE

Follow-on maintenance:

- Install flywheel housing (para 4-53)
- Install starter (para 4-58)

END OF TASK

5-18. CROWN GEAR REPLACEMENT.

This task covers:

- a. Removal
- b. Cleaning/Inspection
- c. Installation

INITIAL SETUP

Tools	<i>Equipment Condition</i>	<i>Condition Description</i>
Tool Kit, General Mechanic's; Automotive, Shop Equipment, Machine Shop; Field Maintenance, Basic, Less Power	TM or Para Para 5-17	Flywheel removed.

WARNING

Unsafe torching practices can cause serious injury from fire, explosions, or harmful gasses. Allow only authorized personnel to heat metals. Protective clothing, gloves and goggles must be worn. Adequate protective equipment must be used. A suitable fire extinguisher must be kept near by, and requirements of TM 9-237 strictly followed.

- a. Removal

CAUTION

When heating crown gear, be careful not to heat flywheel or damage to equipment may result.

- (1) Heat crown gear (1) evenly on all sides using a torch.
- (2) Remove crown gear (1) by tapping using a hammer and drift.

- b. Cleaning/inspection. Check crown gear for chipped or missing teeth and cracks. Replace if necessary.

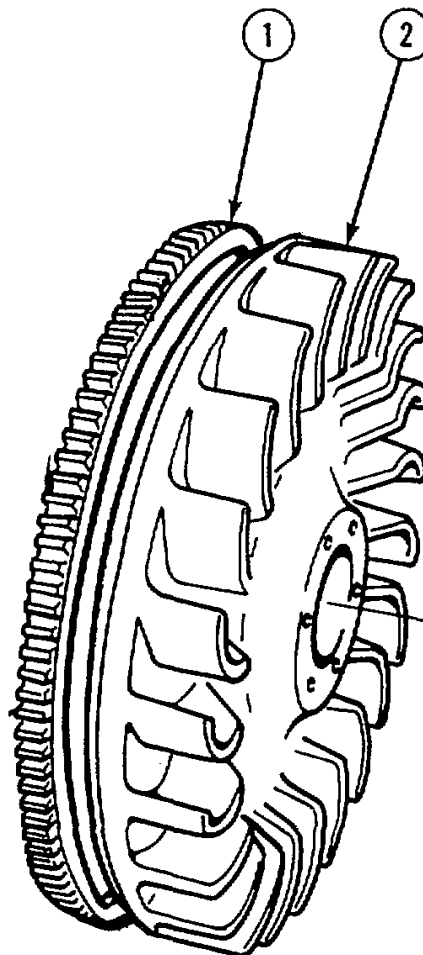
- c. Installation.

- (1) Heat crown gear (1) evenly on all sides using a torch.
- (2) Install crown gear (1) using a hammer and drift.

NOTE

Follow-on maintenance: Install flywheel (para 5-17)

END OF TASK



5-19. PISTON ASSEMBLY REPLACEMENT.

This task covers:

a. Removal

b. Cleaning/Inspection

c. Installation

INITIAL SETUP

Tools

Tool Kit, Master Mechanic's

Equipment Condition

TM or Para
Para 5-9

Condition Description

Engine cylinder removed.

Shop Equipment, Machine Shop, Field
Maintenance, Basic, Less Power

Materials/Parts

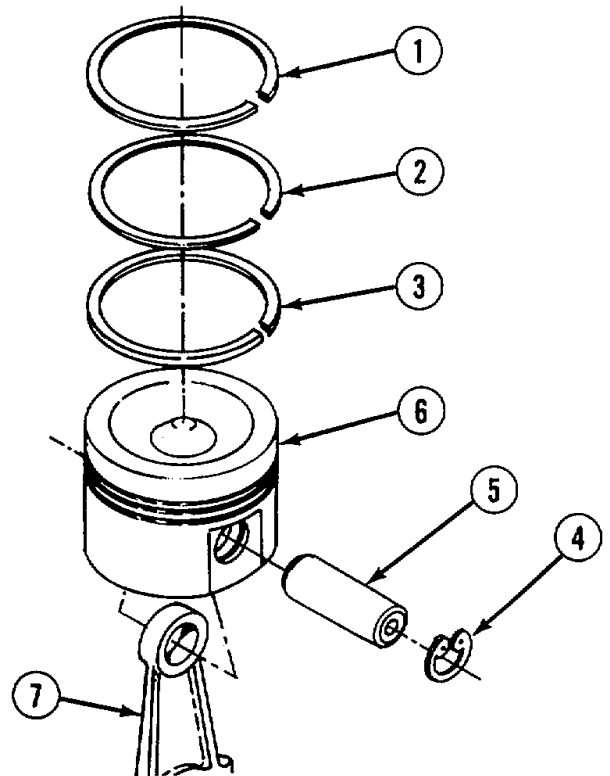
Oil, engine, item 26 Appendix E

a. Removal

- (1) Remove and discard piston rings (1, 2, and 3).
- (2) Remove two retaining rings (4) using retaining ring pliers and remove wrist pin (5) using a press.
- (3) Remove piston (6) from connecting rod (7).

b. Cleaning/inspection.

- (1) Inspect pistons for scratches, cracks and scoring. Replace if visually damaged.
- (2) Measure pistons for wear using calipers. Replace piston if diameter is not within 3. to 3.3866 in. (86.00 to 86.02 mm).

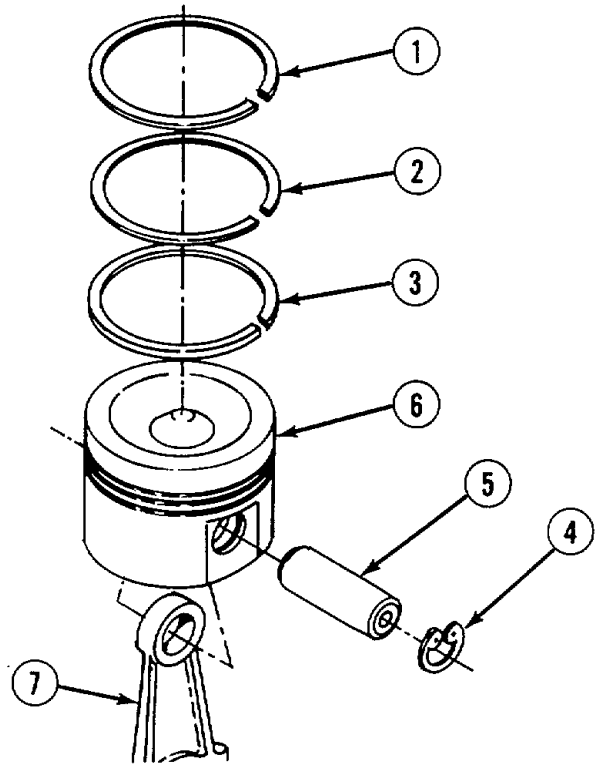


5-19. PISTON ASSEMBLY REPLACEMENT (CONT).**c. Installation.**

- (1) Coat wrist pin bore in piston (6) with clean engine oil.
- (2) Install piston (6) on connecting rod (7).
- (3) Use press to install wrist pin (5) into piston (6), and connecting rod (7).
- (4) Install two retaining rings (4) into wrist pin bore of piston (6) using snap ring pliers.
- (5) Refer to ring set replacement (para 5-20), and install piston rings (1, 2, and 3) on piston (6).

NOTE

Follow-on maintenance: **Install**
engine cylinder (para 5-9)

END OF TASK

5-20. PISTON RING SET REPLACEMENT.

This task covers:

- a. Removal b. Cleaning/Inspection c. Installation

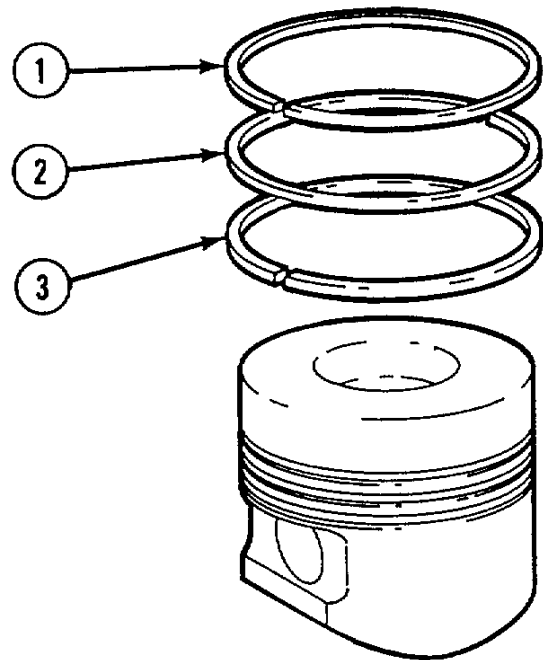
INITIAL SETUP

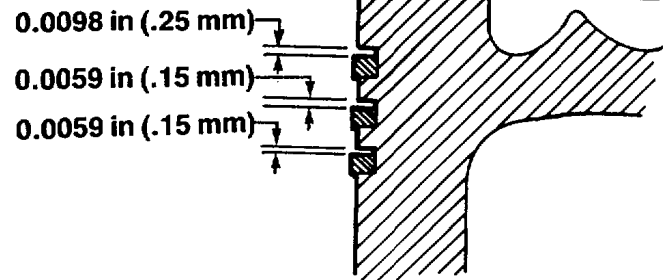
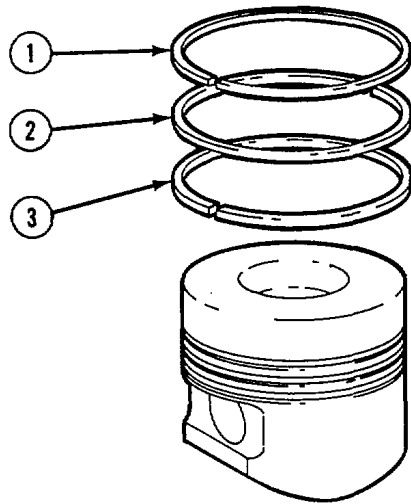
<i>Tools</i>	<i>Equipment Condition</i>	<i>Condition Description</i>
Shop Equipment, Machine Shop, Field Maintenance, Basic, Less Power removed.	TM or Para Para 5-9	Engine cylinder
<i>Materials/Parts</i>		
Ring set, piston		

a. Removal. Remove compression rings (1 and 2), and oil ring (3) using a piston ring expander.

b. Cleaning/Inspection.

- (1) Measure new ring end gap (3 rings) by placing ring to be checked in cylinder and pushing down with top of piston approximately one inch.
- (2) Remove piston and measure gap between ring ends using calipers. Gaps should be as follows:
 - (a) Two compression rings 0.011 to 0.019 in. (0.3 to 0.5 mm).
 - (b) Oil control ring 0.009 to 0.019 in. (0.25 to 0.5 mm).
- (3) If gap is too small, file ring ends to achieve desired gap.



5-20. PISTON REPAIR/RING SET REPLACEMENT (CONT).**c. Installation.**

(1) Install compression rings (1 and 2) using a piston ring expander, mount with ring end gaps staggered 180° starting just to either side of wrist pin. Mount chromium-edged ring at top.

(2) Install oil ring (3) 180° staggered from bottom compression ring (2).

(3) Coat rings and piston with lubricating oil.

(4) Measure ring to ring groove clearance using calipers. If excessive, replace piston.

(a) Top compression ring clearance 0.0098 in. (0.25 mm).

(b) Second compression ring clearance 0.0059 in. (0.15 mm).

(c) Lower ring (oil control) clearance 0.0059 in. (0.15 mm).

NOTE

Follow-on maintenance: Install engine cylinder (para 5-9)

END OF TASK

5-21. CONNECTING ROD ASSEMBLY REPLACEMENT/REPAIR

This task covers:

- a. Removal b. Cleaning/Inspection c. Installation

INITIAL SETUP

Tools

Tool Kit, Master Mechanic's

Shop Equipment, Machine Shop; Field
Maintenance, Basic, Less Power

Equipment Condition

TM or Para
Para 5-9

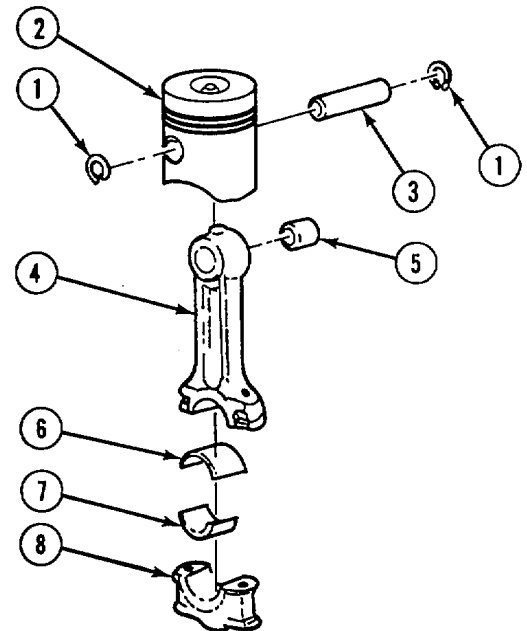
Condition Description
Engine cylinder removed.

Materials Parts

Bushings
Gage: Plastic adjustment, item 20 Appendix E
Oil, engine, item 26 Appendix E

a. Disassembly.

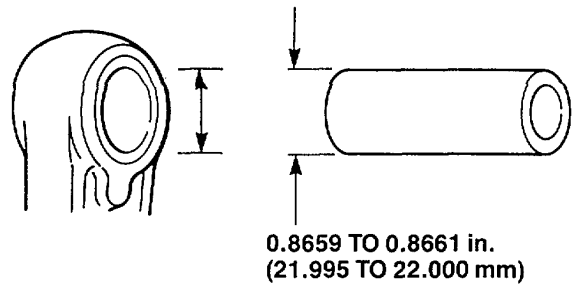
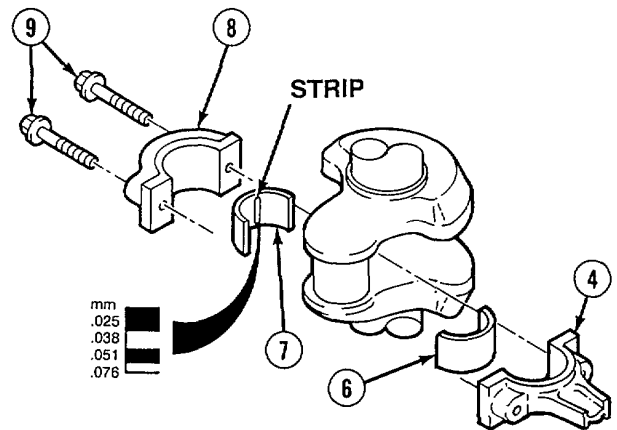
- (1) Remove two retaining rings (1) from piston (2) using snap ring pliers.
- (2) Remove wrist pin (3) from piston (2) using a press.
- (3) Remove piston (2) from connecting rod (4).
- (4) Drive out upper bushing (5) from connecting rod (4) using a press.
- (5) Remove bearing (6) from connecting rod (4).
- (6) Remove lower bearing (7) from rod cap (8) using a drift and ball peen hammer.



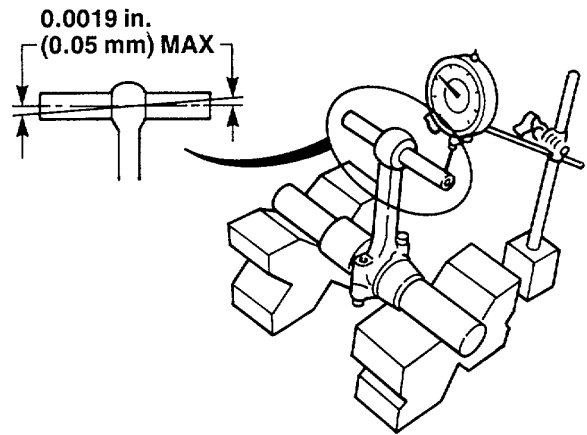
5-21. CONNECTING ROD ASSEMBLY REPLACEMENT/REPAIR (CONT).

b. Cleaning/Inspection.

- (1) Inspect rod for cracks or warping.
- (2) Inspect rod bearings and crankshaft for excessive wear.
- (3) Measure crankshaft rod journal using a micrometer (1.5748 to 1.5755 in. [40.0 to 40.01 mm]).
- (4) Measure connecting rod bearings (6 and 7) to crankshaft clearance:
 - (a) Install bearings (6) in connecting rod (4).
 - (b) Install bearing (7) in rod cap (8).
 - (c) Place plastic gage strip on bearing (7).
 - (d) Install two screws (9) into rod cap (8) and install on connecting rod (4). Tighten to 29 lb-ft (39 N•m).
 - (e) Remove two screws (9) and rod cap (8).
 - (f) Width on plastic gage should be 0.0013 to 0.0029 in. (0.033 to 0.073 mm) on wrapper scale.
 - (g) Clean plastic gage off bearing (7).
- (5) If connecting rod bearing to crankshaft clearance is not within tolerance, refer to step (3).
- (6) If crankshaft rod journal diameter measurement is within tolerance, replace connecting rod bearings and recheck.
- (7) Measure inside diameter of upper connecting rod bushing and the outside diameter of wrist pin using calipers. The difference between the two must be between 0.0005 to 0.0011 in. (0.015 to 0.030 mm).

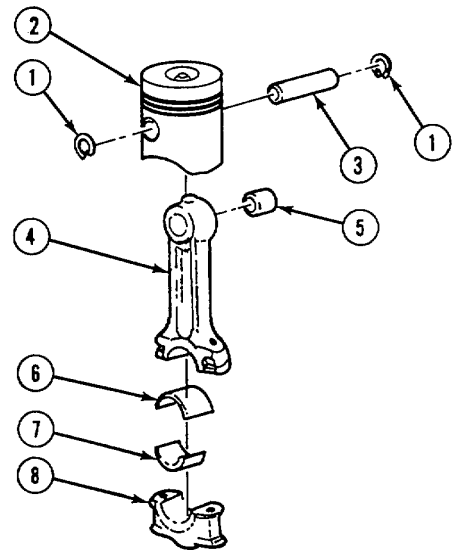


- (8) Attach dial indicator to connecting rod as shown and inspect connecting pin for side play. Value should not exceed 0.0019 in. (0.05 mm).



c. Assembly.

- (1) Coat upper bushing (5) with engine oil and install into connecting rod (4) using a press.
- (2) Install piston (2) on connecting rod (4).
- (3) Coat wrist pin bore in piston (2) with clean engine oil.
- (4) Coat wrist pin (3) with clean engine oil and install in piston (2) and connecting rod (4).
- (5) Install two retaining rings (1) into wrist pin bore in piston (2) using snap ring pliers.
- (6) Coat lower bearing half (7) with engine oil and install on lower part of connecting rod (8).



NOTE

Follow-on maintenance: Install engine cylinder (para 5-9)

END OF TASK

5-22. ROCKER ARM COVER ASSEMBLY REPAIR**This task covers:**

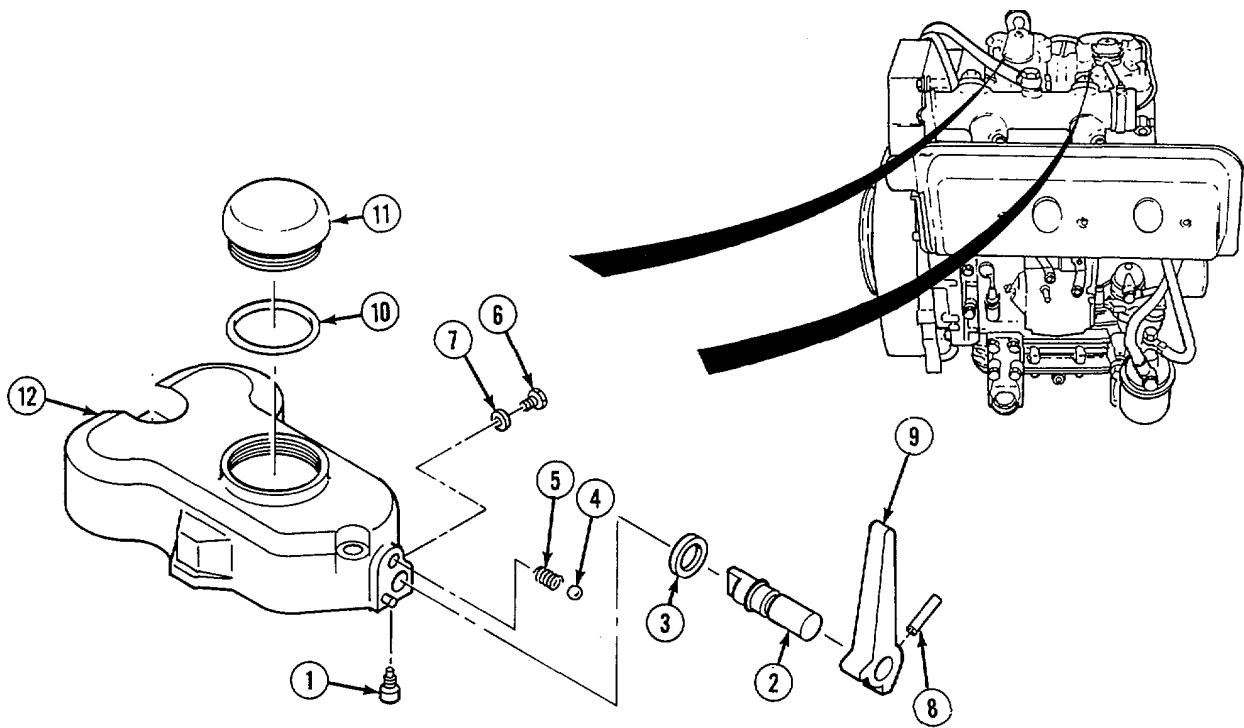
a. Disassembly

b. Cleaning/Inspection

c. Assembly

INITIAL SETUP**Tools**

Tool Kit, Master Mechanic's

Equipment ConditionTM or Para
Para 4-28Condition Description
Rocker arm cover
removed.**Materials/Parts**Seal
O-ring**a. Disassembly.****NOTE****This task shows repair of the right rocker arm cover.**

- (1) Remove screw (1), pin (2), seal (3), ball (4), and spring (5) using a 4 mm hex head wrench.
- (2) Remove screw (6) and washer (7) using a 17 mm open end wrench.
- (3) Remove pin (8) and lever (9) from pin (2).
- (4) If necessary, remove O-ring (10) and cap (11) from cover (12).

b. Cleaning/Inspection. Inspect cover for cracks and warping sufficient to cause leaks. Replace if damaged.

c. Assembly.

- (1) Install pin (8) and lever (9) on pin (2).
- (2) Install spring (5), ball (4), seal (3), pin (2), and screw (1) on cover (12) using a 4 mm hex head wrench.
- (3) Install washer (7) and screw (6) using a 17 mm open end wrench.
- (4) If removed, install O-ring (10) and cap (11).

NOTE

Follow-on Maintenance: Install rocker arm cover (para 4-28)

END OF TASK

5-23. ROCKER ARM ASSEMBLY REPLACEMENT.

This task covers:

- a. Removal
- b. Installation

INITIAL SETUP

Tools

Tool Kit, Master Mechanic's

Equipment Condition

TM or Para
Para 4-28
removed.

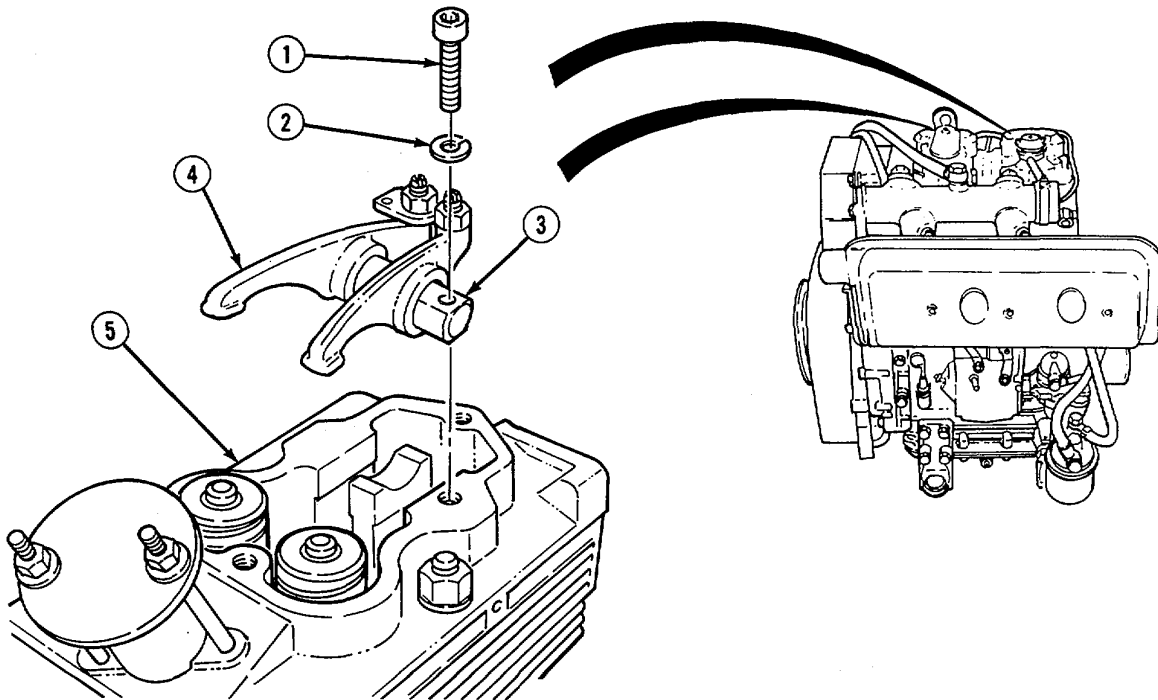
Condition Description
Rocker arm covers

Materials/Parts

Tags, identification, item 35 Appendix E
removed.

Para 4-45

Fuel injector lines



a. Removal.

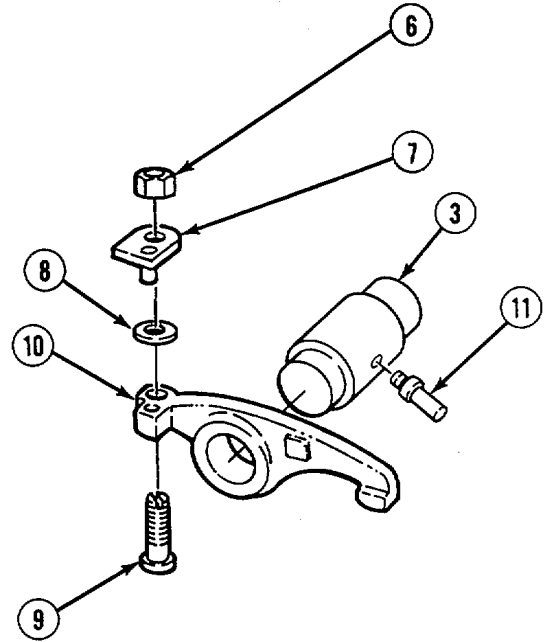
NOTE

There are two rocker arm assemblies. Left and right rocker arm assemblies are not the same. Be sure to tag both arms in each assembly before removal.

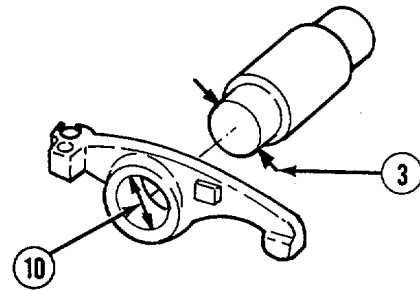
- (1) Remove two screws (1) and two washers (2) from lubrication pin (3) using a 6 mm hex head wrench.
- (2) Lift rocker assembly (4) from cylinder head (5).

NOTE

- **Shims are on left rocker arm only.**
 - **Rocker arms on flywheel side of pins will not have plate.**
- (3) Remove two nuts (6), plate (7), two shims (8), and two screws (9) from rocker arm (10) using a 11 mm open end wrench.
 - (4) Remove rocker arm (10) from lubrication pin (3).
 - (5) Remove lubrication tube (11) from lubrication pin (3).



- (6) Measure the OD of lubrication pin (3), and ID of rocker arm (10). If difference exceeds 0.03937 (1 mm) replace parts.



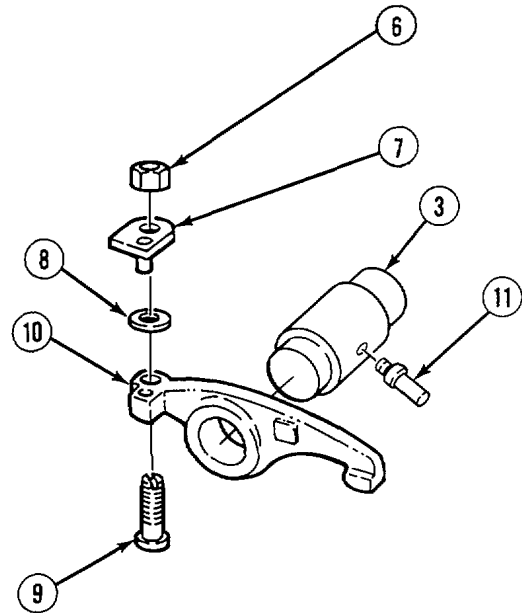
5-23. ROCKER ARM ASSEMBLY REPLACEMENT (CONT).

b. Installation.

NOTE

Right rocker arm does not have a shim.

- (1) Install two shims (8), plate (7), two nuts (6), and two screws (9) on rocker arm (10) using a 11 mm open end wrench.
- (2) Install lubrication tube (11). and align it in lubrication pin (3).

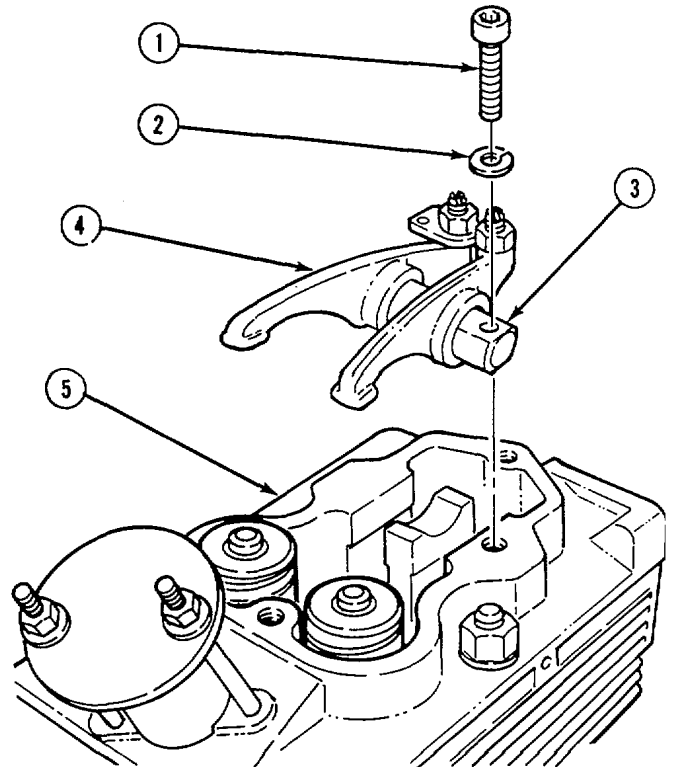


- (3) Install rocker arms (4) on lubrication pin (3).
- (4) Ensure that rocker arm assembly (4) aligns with push rods and install two screws (1) and two washers (2) in lubrication pin (3) using a 6 mm hex head wrench.
- (5) Install rocker assembly (4) onto head (5).

Tighten two screws (1) 66 to 72 lb-in (7.4 to 8.1 N•m) using a torque wrench and 6 mm hex head socket.

NOTE

- **Follow-on maintenance:**
- **Reset valve clearance (para 5-25)**
- **Install fuel injector lines (para 4-45)**
- **Install rocker arm covers (para 4-28)**



END OF TASK

5-24. INTAKE AND EXHAUST VALVE REPLACEMENT.

This task covers:

- a. Removal
- b. Cleaning/Inspection
- c. Installation

INITIAL SETUP

Tools

Tool Kit, General Mechanic's; Automotive
 Shop Equipment, Automotive Maintenance and Repair; Organizational Maintenance, Common No. 1, Less Power

Equipment Condition

TM or Para
 Para 5-13
 Para 5-23

Condition Description
 Cylinder head removed.
 Rocker arm assembly removed.

Materials/Parts

Seal
 Cloth, abrasive, item 8, Appendix E
 Compound, grinding, item 12 Appendix E
 Oil, lubricating engine, item 25 Appendix E
 Solvent, dry cleaning, item 31 Appendix E

Text begins on next page.

5-24. INTAKE AND EXHAUST VALVE REPLACEMENT (CONT.)

a. Removal

NOTE

Intake and exhaust valves are removed and installed the same way.

- (1) If same valves are to be installed, matchmark each valve head, so they can be installed in same positions.

CAUTION

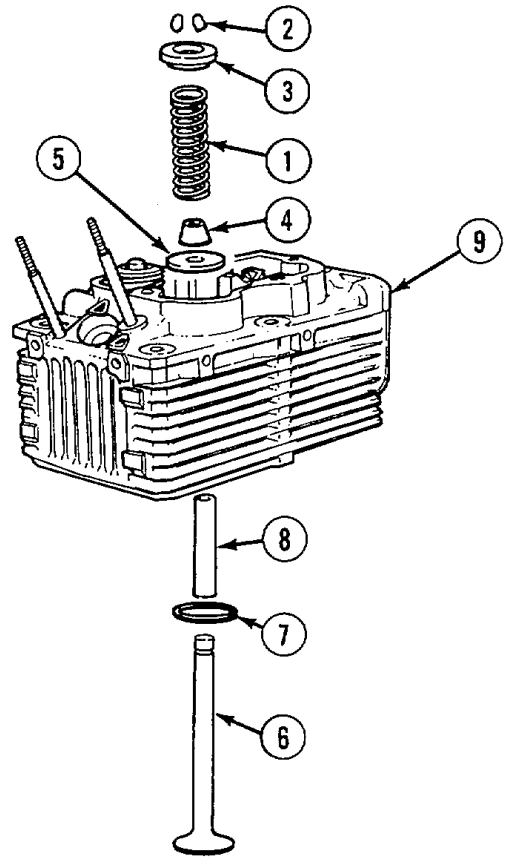
Make sure valve spring is compressed parallel to valve stem or valve stem can be damaged.

- (2) Using valve spring compressor, compress valve spring (1) and remove circlips (2).
- (3) Release valve stem compressor. Remove retainer (3), valve spring (1), seal (4), washer (5), and valve (6).

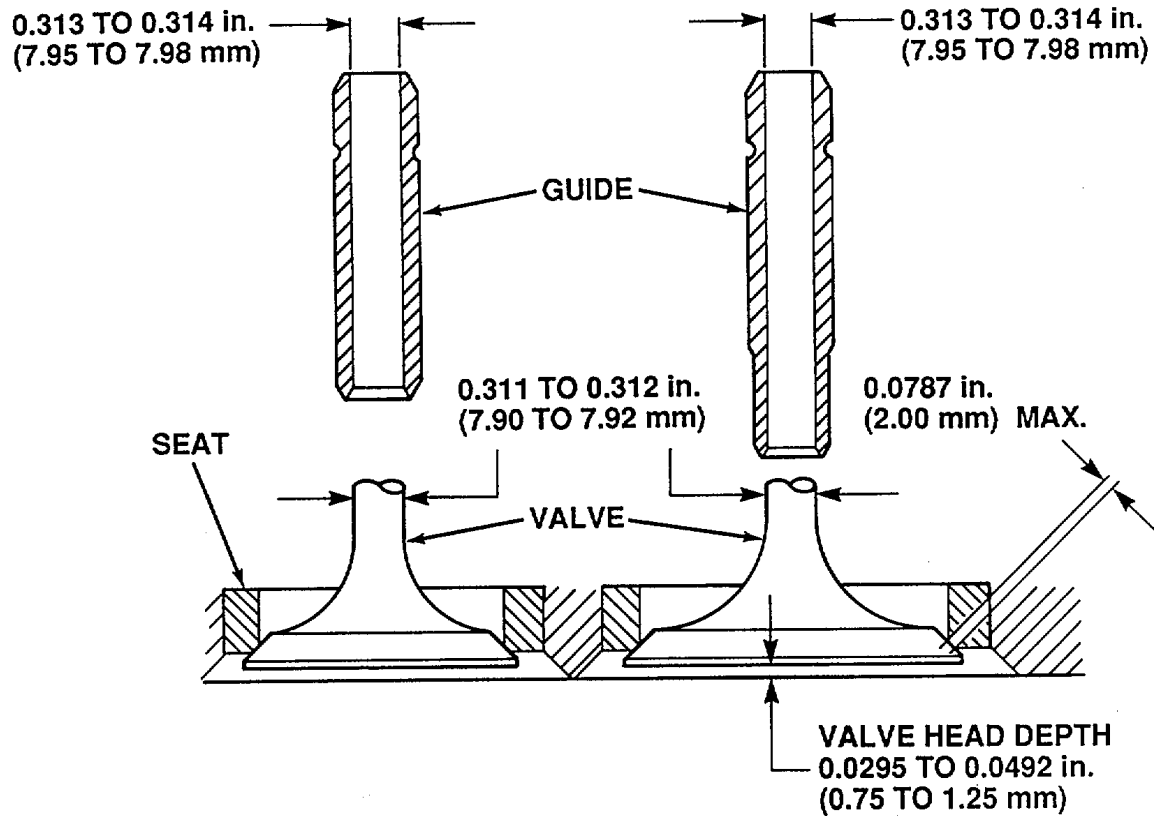
NOTE

Refer to b. Cleaning/inspection, to determine damage to valve seats and guides.

- (4) If damaged, remove valve seats (7).
- (5) If damaged, remove valve guides (8) from head (9).



b. Cleaning/Inspection.

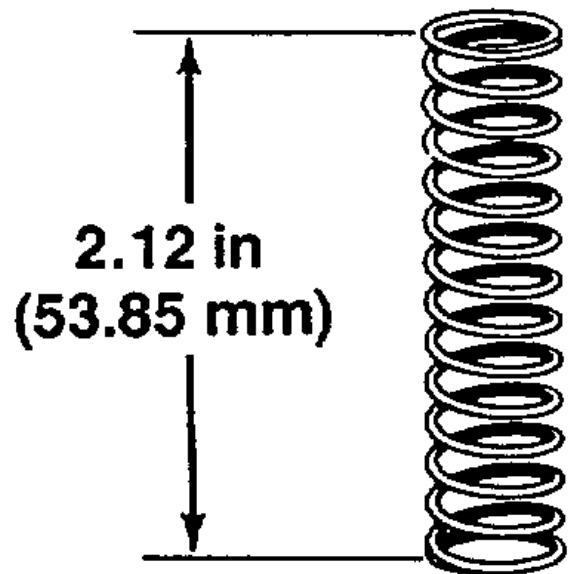
**WARNING**

Dry cleaning solvent P-D-680 is toxic and flammable. Wear protective goggles, face mask, and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapor. Do not use near open flame or excessive heat. The flashpoint for type I dry cleaning solvent is 100°F (38°C) and for type II is 140°F (60°C). If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, flush eyes with water and get medical aid immediately.

- (1) Clean all parts with dry cleaning solvent P-D-680.
- (2) Inspect valves for pits, evidence of burrs, or cracks.
- (3) Measure valve stem and valve guides for wear using calipers.
 - (a) If valve stem OD (0.311 to 0.312 in. [7.90 to 7.92 mm]) is not within tolerance, replace valve.
 - (b) If valve guide ID (0.313 to 0.314 in. [7.95 to 7.98 mm]) is not within tolerance, replace guide.

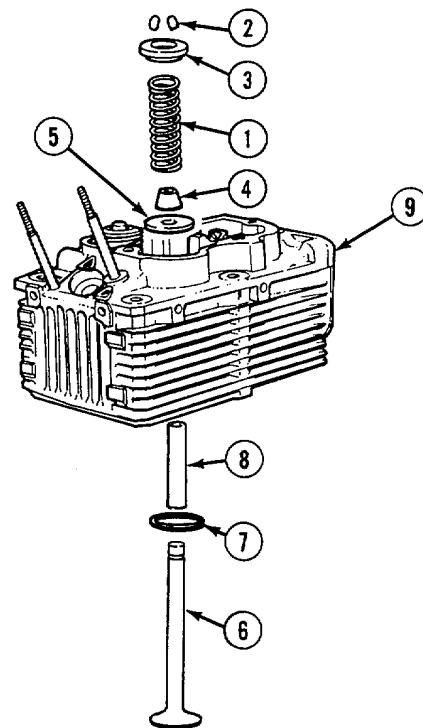
5-24. INTAKE AND EXHAUST VALVE REPLACEMENT (CONT).

- (4) Measure valve springs using calipers. Length should be 2.12 in. (53.85 mm). Replace springs if length is shorter than specified.

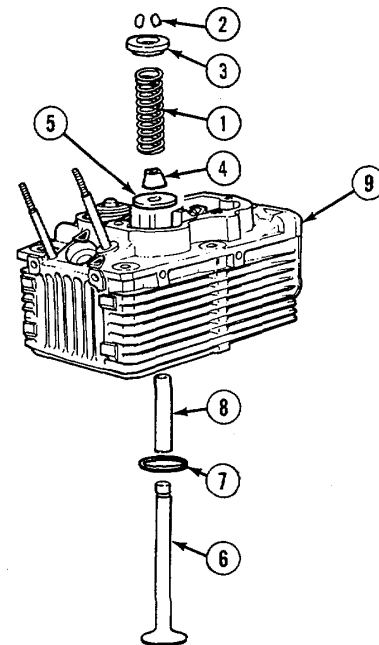
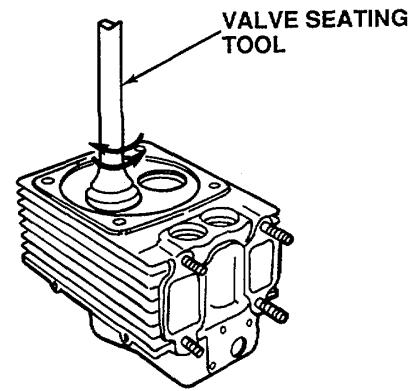
**c. Installation.****WARNING**

Unsafe torching practices can cause serious injury from fire, explosions, or harmful gasses. Allow only authorized personnel to heat metals. Protective clothing and goggles must be worn. Adequate protective equipment must be used. A suitable fire extinguisher must be kept near by, and requirements of TM 9-237 strictly followed.

- (1) Heat head (9) uniformly to 328° to 356°F (164° to 180°C) using a torch.
- (2) If removed, press valve guides (8) into head (9), while hot, until seated firmly.
- (3) Heat head (9) uniformly to 320° to 360°F (160° to 182°C) using a torch.
- (4) If removed, press valve seats (7) into head (9), while hot, until seated firmly.



- (5) Install valve (6) in cylinder head (9).
- (6) Seat valve using a valve seating tool and small amount of grinding compound.
- (7) Remove valve (6). Clean grinding compound from valve (6), and cylinder head (9) using a clean cloth. Inspect valve and valve seat for continuous ring indicating proper contact.
- (8) Lubricate valve stems with engine oil.
- (9) Install valve (6), washer (5), seal (4), spring (1), and retainer (3).
- (10) Using a valve spring compressor, compress spring (1) and install circlips (2).
- (11) Valve heads should seat 0.0295 to 0.0492 (0.75 to 1.25 mm) deep in cylinder head.
 - (a) If valve head is too shallow in cylinder head, check proper valve seat installation.
 - (b) If valve head is too deep in cylinder, check valve seat and valve face for excessive wear. Replace as necessary.



NOTE

Follow-on maintenance:

- Install cylinder head (para 5-13)
- Install rocker arm assemblies (para 5-23)
- Reset engine timing (para 5-7)
- Bleed fuel system (para 4-36)

END OF TASK

5-25. VALVE ADJUSTMENT.

This task covers:
Adjustment

INITIAL SETUP*Tools*

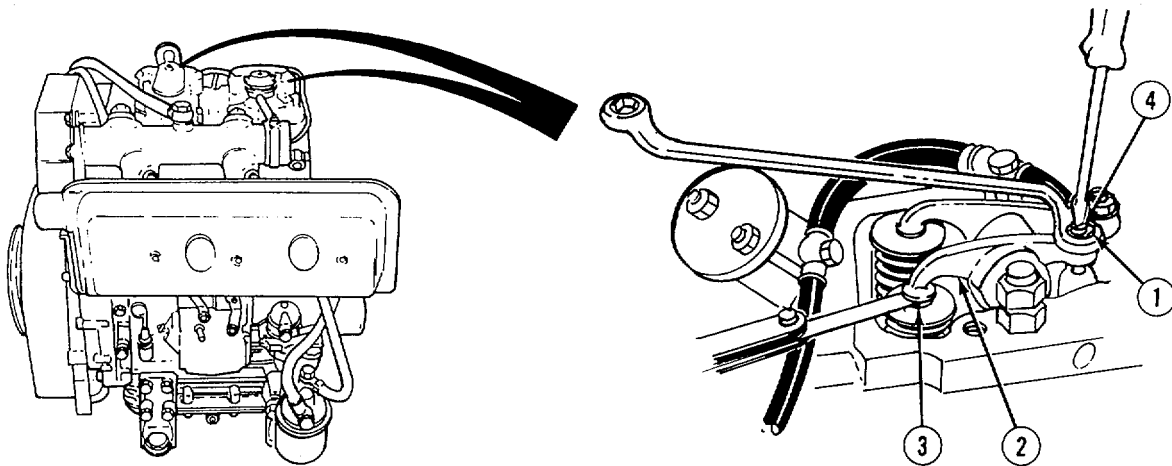
Tool Kit, General Mechanic's: Automotive

General Safety Instructions

Be sure engine is cool before starting this procedure or injury to personnel may result.

Equipment Condition

TM or Para	Condition Description
Para 4-28	Rocker arm covers removed.
Para 4-98	Rear panel removed.

**Adjustment.**

- (1) Turn flywheel until piston is in TDC (top dead center) position and piston is in compression stroke (para 5-7).
- (2) Loosen nut (1) slightly with a 11 mm box end wrench. Insert a feeler gage between rocker arm (2), and top of valve (3).
- (3) Adjust valve clearance by turning adjusting screw (4) while holding nut (1) with a 11 mm box end wrench. Adjust channel to between 0.005 to 0.007 in. (0.15 to 0.20 mm). Repeat step for other valve.
- (4) Repeat steps (1) thru (3) for other cylinder.

NOTE**Follow-on maintenance:**

- Install rear panel (para 4-98)
- Install rocker arm covers (para 4-28)

END OF TASK

5-26. CAMSHAFT REPLACEMENT.

This task covers:

- a. Removal
- b. Cleaning/Inspection
- c. Installation

INITIAL SETUP

Tools

Shop Equipment, Machine Shop; Field Maintenance, Basic, Less Power

Materials/Parts

Gasket
Oil, lubricating, item 25 Appendix E

Equipment Condition

TM or Para	Condition Description
Para 4-24	Engine removed.
Para 5-13	Cylinder head removed.
Para 4-58	Starter removed.

Equipment Condition

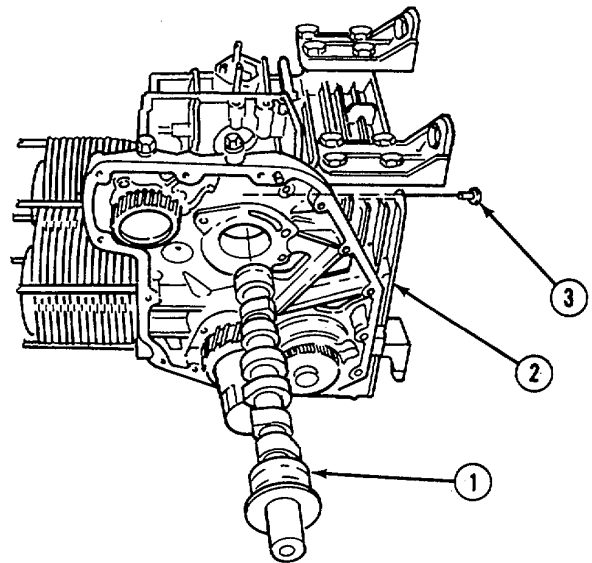
TM or Para	Condition Description
Para 4-29	Oil filter housing removed.
Para 4-49	Fuel filter housing removed.
Para 5-33	Injection pump removed.
Para 5-34	Speed governor and support yoke removed.
Para 4-30	Oil pan removed.
Para 4-35	Fuel pump removed.

a. Removal

CAUTION

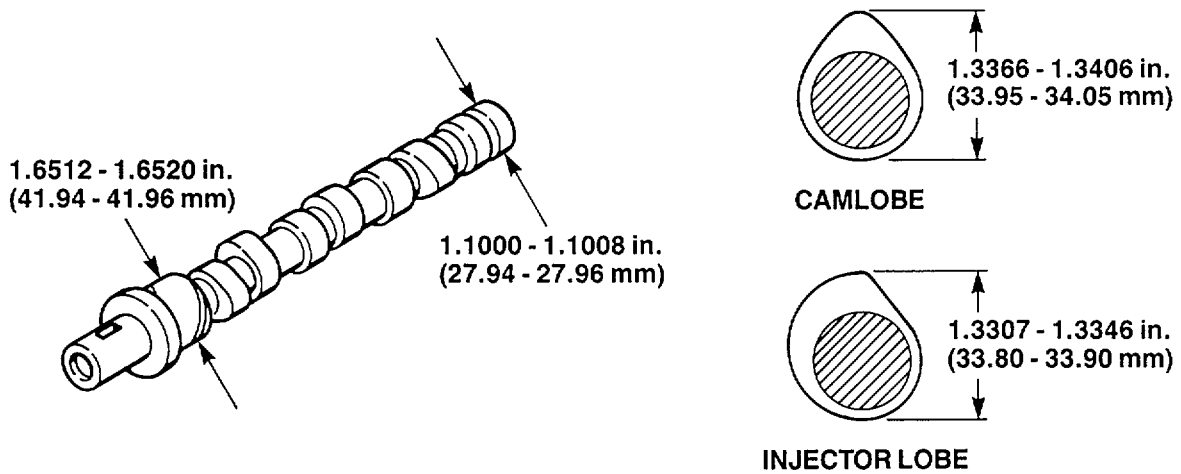
- To prevent damage to the camshaft and lobes during camshaft removal, turn engine on its side or upside down. This will prevent tappets from falling down between camshaft lobes during removal.
- When removing or installing camshaft, rotate camshaft continuously to avoid damage.

- (1) Remove camshaft (1) from crankcase (2).
- (2) Remove four valve tappets (3).



5-26. CAMSHAFT REPLACEMENT (CONT).

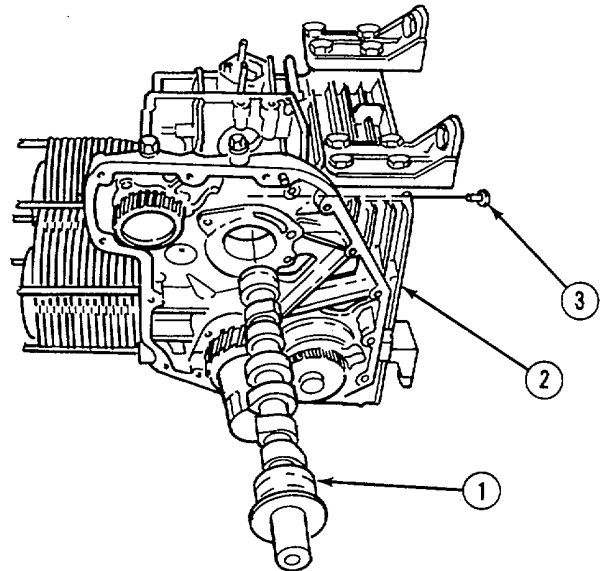
b. Cleaning/inspection.



- (1) Inspect camshaft lobes for cracks, scratches, grooves, or pitting.
- (2) Check camshaft for wear using a micrometer.
- (3) If camshaft does not measure within indicated tolerances, replace camshaft.

c. Installation.

- (1) Coat all parts with clean engine oil.
- (2) Install four valve tappets (3).
- (3) Install camshaft (1) in crankcase (2).



NOTE

Follow-on maintenance:

- **Install oil pan (para 4-30)**
- **Install speed governor and support yoke assembly (para 5-34)**
- **Install injection pump (para 5-33)**
- **Install fuel filter housing (para 4-49)**
- **Install fuel pump (para 4-35)**
- **Install oil filter housing (para 4-29)**
- **Install starter (para 4-58)**
- **Install cylinder head (para 5-13)**
- **Check valve clearance (para 5-25)**
- **Install engine (para 4-24)**
- **Reset engine timing (para 5-7)**

END OF TASK

5-27. OIL PUMP REPLACEMENT.

This task covers:

- a. Removal
- b. Installation

INITIAL SETUP

Tools

Tool Kit, General Mechanic's: Automotive

Equipment Condition

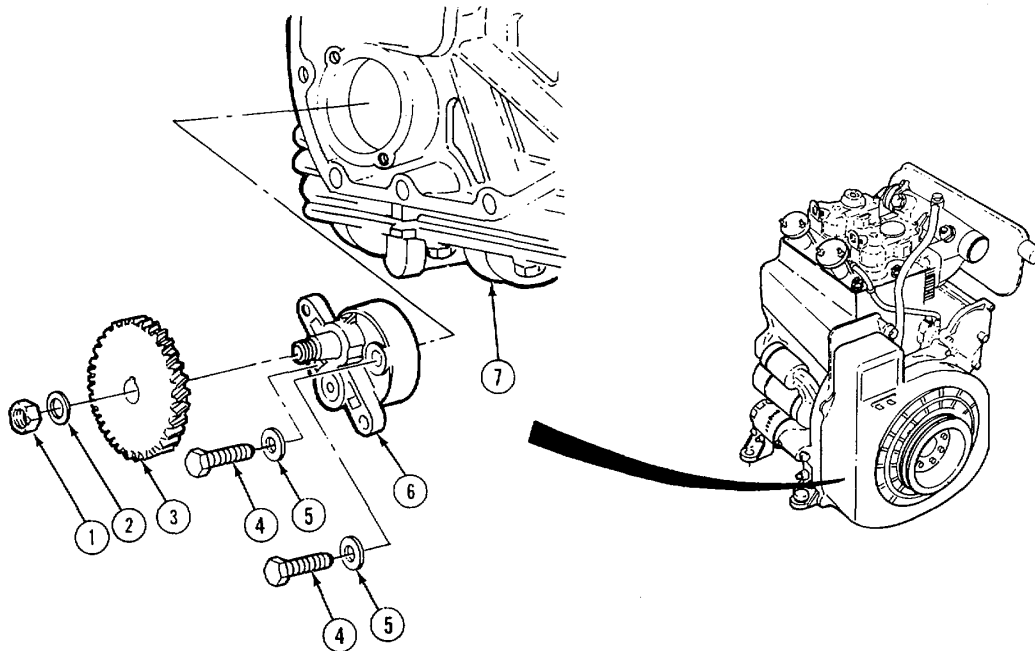
Shop Equipment, Automotive Maintenance and Repair; Organizational Maintenance, Common No. 1, Less Power

TM or Para
Para 5-12

Condition Description
Rear engine housing removed.

Materials/Parts

Oil, engine, item 25 Appendix E



a. Removal

- (1) Remove nut (1), washer (2), and gear wheel (3) using a ratchet and 17 mm socket.

CAUTION

Be sure to matchmark oil pump housing in relation to crankcase before removal to ensure correct installation. Holes in oil pump must align with oil flow holes in crankcase.

- (2) Remove two screws (4), two washers (5), and oil pump assembly (6) from crankcase (7) using a ratchet and 13 mm socket.

b. Installation.

- (1) Coat pump housing with fresh engine oil and install pump assembly (6) in crankcase (7).
- (2) Install two washers (5) and two screws (4). Tighten to 66 lb-in (7.4 N•m) using a ratchet and 13 mm socket.
- (3) Install gear wheel (3), washer (2), and nut (1). Tighten to 92 lb-in (10.4 N•m) using a ratchet and 17 mm socket.

NOTE

Follow-on maintenance: Install rear engine housing (para 5-12)

END OF TASK

5-28. THROTTLE CONTROL ASSEMBLY REPLACEMENT/REPAIR.

This task covers:

- a. Removal
- b. Disassembly
- c. Assembly
- d. Installation

INITIAL SETUP

Tools

Tool Kit, General Mechanic's; Automotive

Shop Equipment, Automotive Maintenance and Repair; Organizational Maintenance, Common No. 1, Less Power

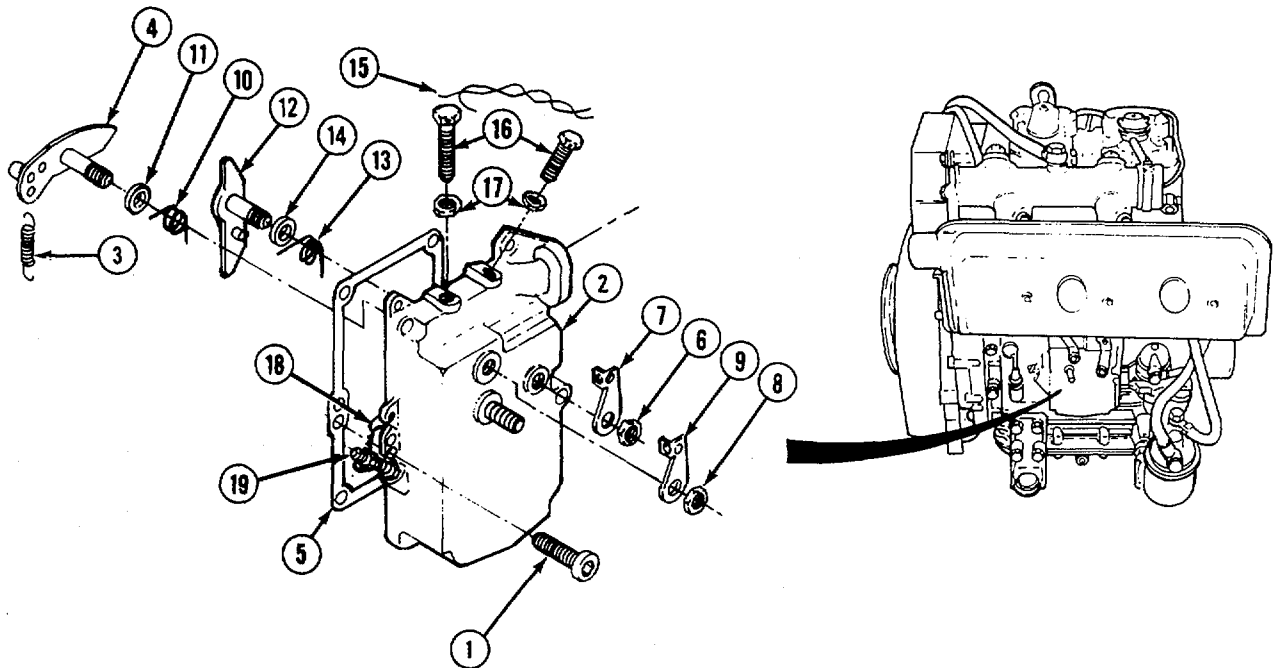
Equipment Condition

TM or Para Para 4-47

Condition Description Throttle control cable and engine cut-off cable disconnected.

Materials/Parts

Gasket
Seals
Locknuts
Tag, identification, item 35 Appendix E
Lockwire (See Appendix G for fabrication)



a. Removal.

- (1) Remove six screws (1) using a 5 mm hex head wrench.

NOTE

Tag spring and note its mounting position.

- (2) Remove cover (2) and disconnect spring (3) from lever (4).
- (3) Remove gasket (5) from cover (2).

b. Disassembly.

- (1) Remove nut (6) and lever (7) using a 13 mm open end wrench.
- (2) Remove nut (8) and lever (9) using a 13 mm open end wrench.
- (3) Remove lever (4), spring (10), and seal (11) using pliers.
- (4) Remove lever (12), spring (13), and seal (14) using pliers .
- (5) Cut lockwire (15).

NOTE

Matchmark positions of screws and nuts to assure correct depth at assembly. (6) Remove two screws (16) and two locknuts (17) with 10 mm open end wrench.

CAUTION

Tampering with preset screw will cause damage to equipment.

- (7) Do not remove lockwire (18) and screw (19). The screw is preset by the manufacturer.

c. Assembly.

- (1) Refer to matchmarks and install two locknuts (17), two adjusting screws (16), and lockwire (15) using a 10 mm open end wrench.
- (2) Install seal (14), spring (13), and lever (12) using pliers.
- (3) Install seal (11), spring (10), and lever (4) using pliers.
- (4) Install lever (9) and nut (8) using a 13 mm open end wrench.
- (5) Install lever (7) and nut (6) using a 13 mm open end wrench.

d. Installation.

- (1) Install gasket (5) on cover (2) and install spring (3) on lever (4).
- (2) Install cover (2) and six screws (1). Tighten screws to 60 lb-in (7 N•m) using a torque wrench and 5 mm hex head socket.

NOTE

Follow-on maintenance: Connect throttle control cable and engine cut-off cable (para 4-47)

END OF TASK

5-29. GOVERNOR CONTROL LEVER ASSEMBLY REPLACEMENT/REPAIR.

This task covers:

- | | | |
|----------------|------------------------|-----------------|
| a. Removal | c. Cleaning/Inspection | e. Installation |
| b. Disassembly | d. Assembly | f. Adjustment |

INITIAL SETUP

Tools

Tool Kit, General Mechanic's; Automotive
 Solvent, dry cleaning, item 31 Appendix E
 Shop Equipment, Automotive Maintenance and Repair; Organizational Maintenance, Common No. 1, Less Power

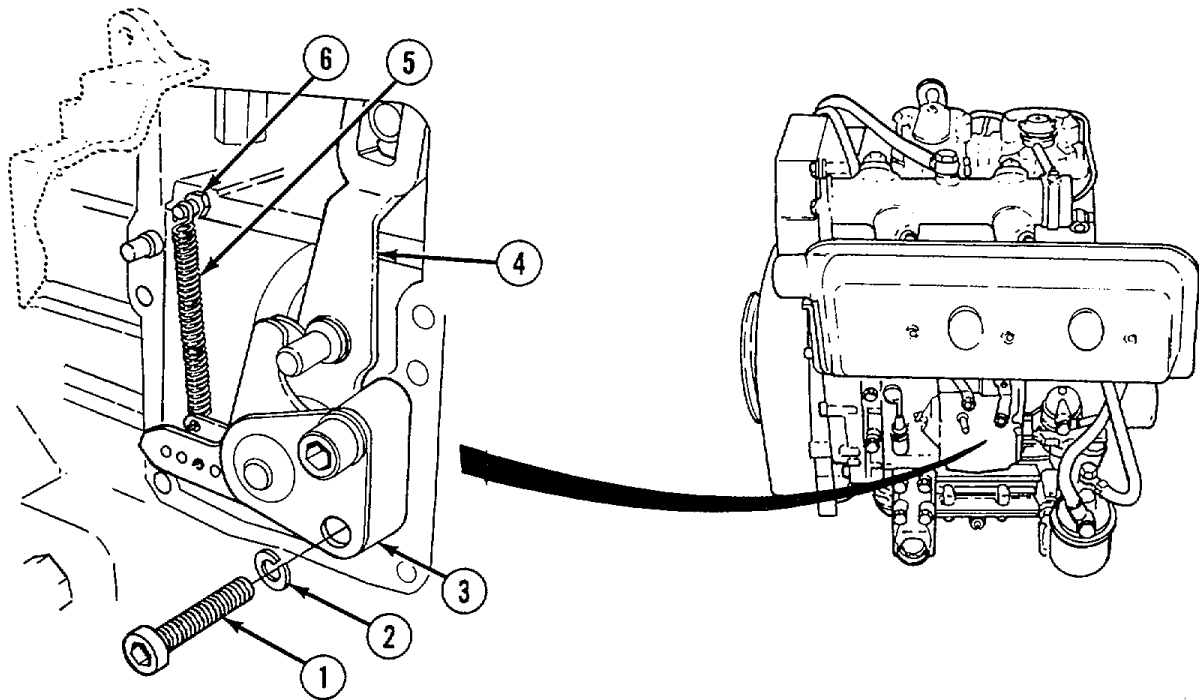
Materials/Parts

Lockwashers

Equipment Condition

TM or Para
 Para 5-28

Condition Description
 Throttle control assembly removed.

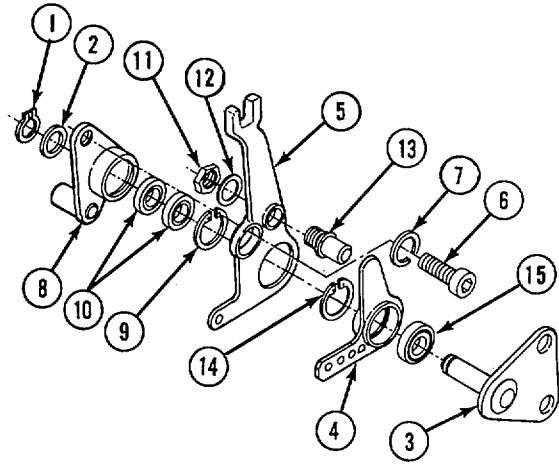


a. Removal

- (1) Remove two screws (1), two lockwashers (2), support (3), and governor control assembly (4) using a 6 mm hex head wrench.
- (2) Disconnect spring (5) from pin (6).

b. Disassembly.

- (1) Remove retaining ring (1) and washer (2) using snap ring pliers.
- (2) Separate levers (3 and 4) from control lever (5).
- (3) Remove screw (6), lockwasher (7), and brass lever (8) using a 6 mm hex head wrench.
- (4) Remove retaining ring (9) using snap ring pliers, from brass lever (8) and drive out two bearings (10) using a hammer and drift.
- (5) Remove nut (11), washer (12), and pin (13) from control lever (5) using a 10 mm open end wrench.
- (6) Remove retaining ring (14) and drive out bearing (15) from lever (4) using snap ring pliers, hammer and drift.

**c. Cleaning/Inspection.****WARNING**

Dry cleaning solvent P-D-680 is toxic and flammable. Wear protective goggles, face mask, and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapor. Do not use near open flame or excessive heat. The flashpoint for type I dry cleaning solvent is 100°F (38°C) and for type II is 140°F (60°C). If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, flush eyes with water and get medical aid immediately.

- (1) Clean all parts with dry cleaning solvent P-D-680.
- (2) Inspect bearings for pits, cracks, and signs of wear.

d. Assembly.

- (1) Install bearing (15) in lever (4) using a hammer and drift and install retaining ring (14).
- (2) Install pin (13) on control lever (5) with washer (11) and nut (12) using a 10 mm open end wrench.
- (3) Install two bearings (10) using a hammer and drift and retaining ring (9), in brass lever (8).
- (4) Install brass lever (8) on control lever (5), screw (6), and washer (7). Tighten using a 6 mm hex head wrench.
- (5) Install control lever (5) on lever (4), and install on lever (3).
- (6) Install washer (2) and retaining ring (1).

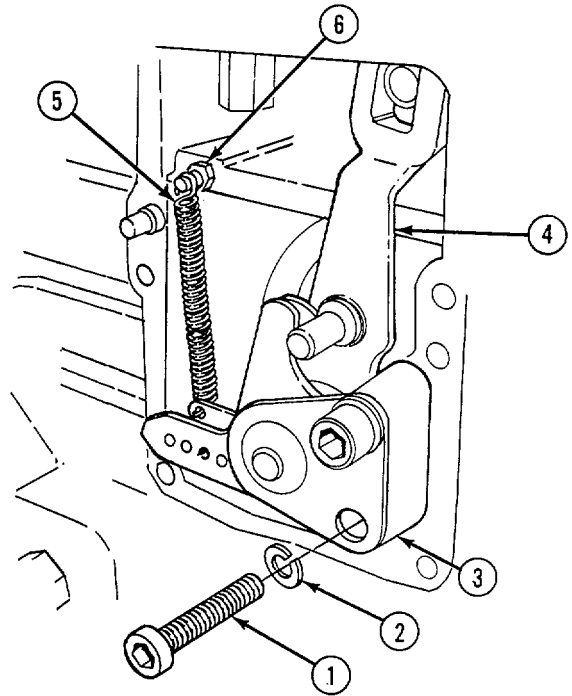
5-29. GOVERNOR CONTROL LEVER ASSEMBLY REPLACEMENT/REPAIR (CONT).

e. Installation.

NOTE

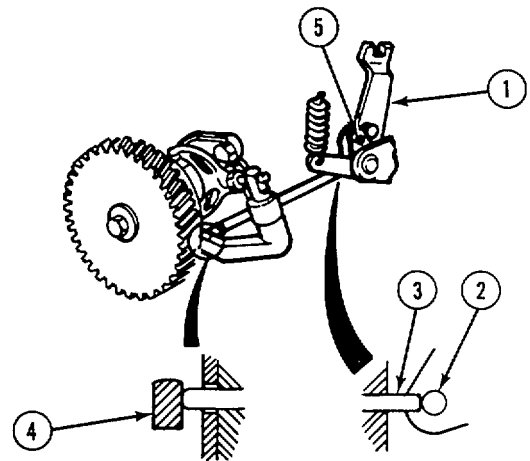
Make sure that fork fits on slide knob of injector pump.

- (1) Install governor control assembly (4), support (3), two lockwashers (2), and two screws (1) using a 6 mm hex head wrench.
- (2) Connect spring (5) to pin (6)



f. Adjustment.

- (1) Push governor control lever (1) all the way right.
- (2) Pin (2), located on lower governor control lever (1), must just make contact with pin (3) that connects governor control lever with lower speed governor lever (4).
- (3) Adjust by turning screw (5) using a 6 mm hex head wrench.



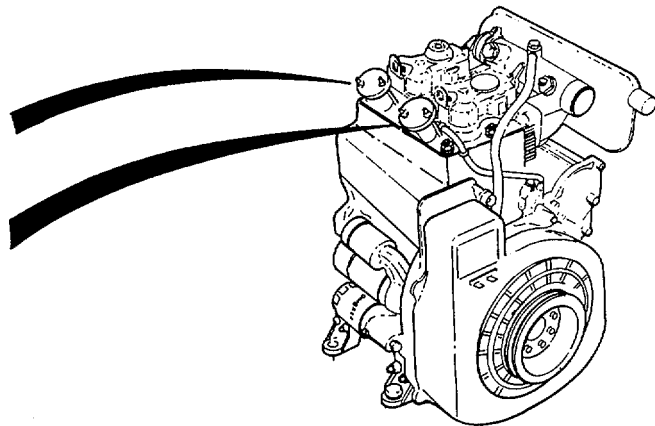
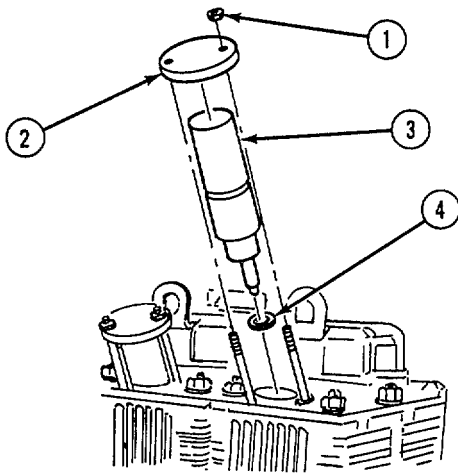
NOTE

Follow-on maintenance: Install throttle control assembly (para 5-28)

END OF TASK

5-30. FUEL INJECTOR ASSEMBLY REPLACEMENT.

This task covers:		
a. Removal	b. Cleaning/Inspection	c. Installation
INITIAL SETUP		
<i>Tools</i> Tool Kit, General Mechanic's: Automotive	<i>Equipment Condition</i> TM or Para Para 4-45 and 4-46	<i>Condition Description</i> Fuel lines removed.
<i>Materials/Parts</i> Copper washers		



a. Removal.

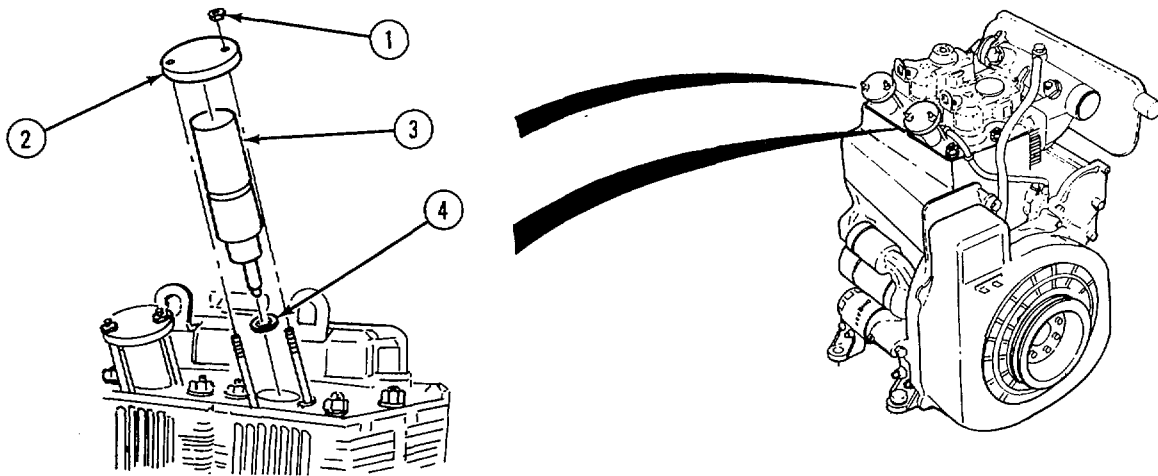
WARNING

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine. When working with fuel, post signs that read NO SMOKING WITHIN 50 FEET (15.24 m) of vehicle.

- (1) Remove two nuts (1) and flange (2) using a 10 mm open end wrench.
- (2) Remove injector assembly (3) and copper washer (4).

b. Cleaning/Inspection. Measure opening in injector nozzle using calipers. Opening should be 0.0110 (0.28 mm) in diameter.

5-30. FUEL INJECTOR ASSEMBLY REPLACEMENT (CONT).



c. Installation.

- (1) Install copper washer (4) and injector assembly (3).

NOTE

Be sure to line up locating pin on flange with locating hole on top of injector assembly.

- (2) Install flange (2) and two nuts (1). Tighten to 66 lb-in (7.4 N•m) using a torque wrench and 10 mm open end wrench.

NOTE

Follow-on maintenance: Install fuel lines (para 4-45 and 4-46)

END OF TASK

5-31. FUEL INJECTOR NOZZLE ASSEMBLY SERVICE.

This task covers:

- a. Disassembly b. Cleaning/Inspection c. Assembly

INITIAL SETUP

Tools

Tool Kit, Master Mechanic's

Materials/Parts

Copper washer
Solvent, dry cleaning, item 31 Appendix E

Equipment Condition

TM or Para
Para 5-30
removed.

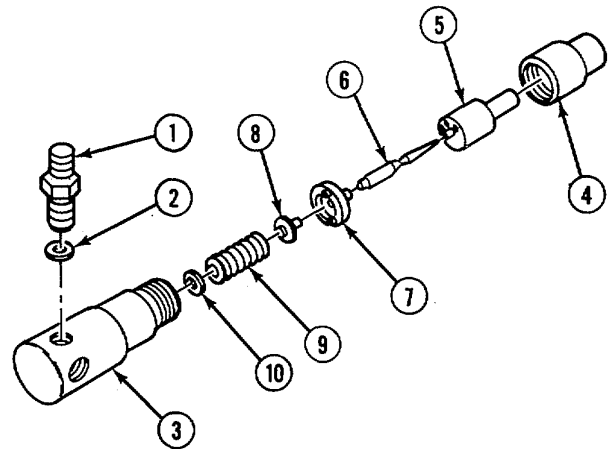
Condition Description
Fuel injector assembly

a. Disassembly.

NOTE

- **Fuel injector is replaced as an assembly. Take care not to lose any parts of the fuel injector assembly.**
- **Both injectors are serviced the same way.**

- (1) Remove tube fitting (1) and copper washer (2) from injector body (3) using a 14 mm open end wrench.
- (2) Remove nozzle holder (4) using a 19 mm open end wrench and remove nozzle (5), pin (6), cap (7), spacer (8), spring (9), and washer (10).



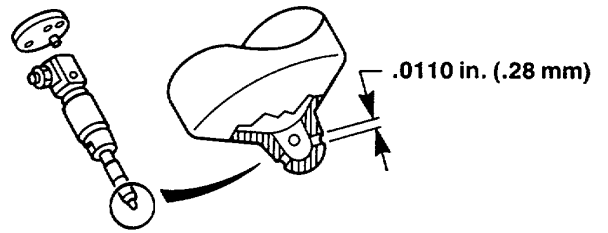
WARNING

Dry cleaning solvent P-D-680 is toxic and flammable. Wear protective goggles, face mask, and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapor. Do not use near open flame or excessive heat. The flashpoint for type I dry cleaning solvent is 100°F (38°C) and for type II is 140°F (60°C). If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, flush eyes with water and get medical aid immediately.

- (1) Clean using dry cleaning solvent P-D-680.
- (2) Inspect parts for cracks, pits, and signs of burned ports.

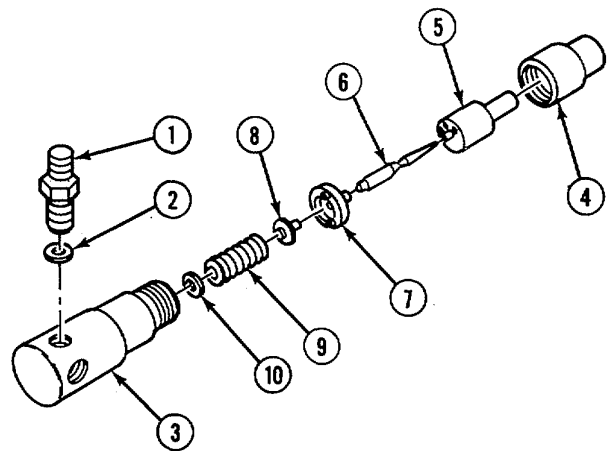
5-31. FUEL INJECTOR NOZZLE ASSEMBLY SERVICE (CONT).

- (3) Measure opening of injector nozzle using calipers, it should be 0.0110 in. (0.28 mm).
- (4) If any parts are damaged or lost, replace fuel injector assembly.



c. Assembly.

- (1) Install washer (10), spring (9), spacer (8), cap (7), pin (6), and nozzle (5) on injector (3).
- (2) Install nozzle holder (4) onto injector body (3), tighten using a 19 mm open end wrench.
- (3) Install copper washer (2) and tube fitting (1) on injector body (3) using a 14 mm open end wrench.



NOTE

Follow-on maintenance: Install fuel injector assembly (para 5-30)

END OF TASK

5-32. INJECTION PUMP TIMING.

This task covers:

Adjustment

INITIAL SETUP

Tools

Tool Kit, General Mechanic's: Automotive

Equipment Condition

TM or Para
Para 4-121
Para 4-98
Para 4-53

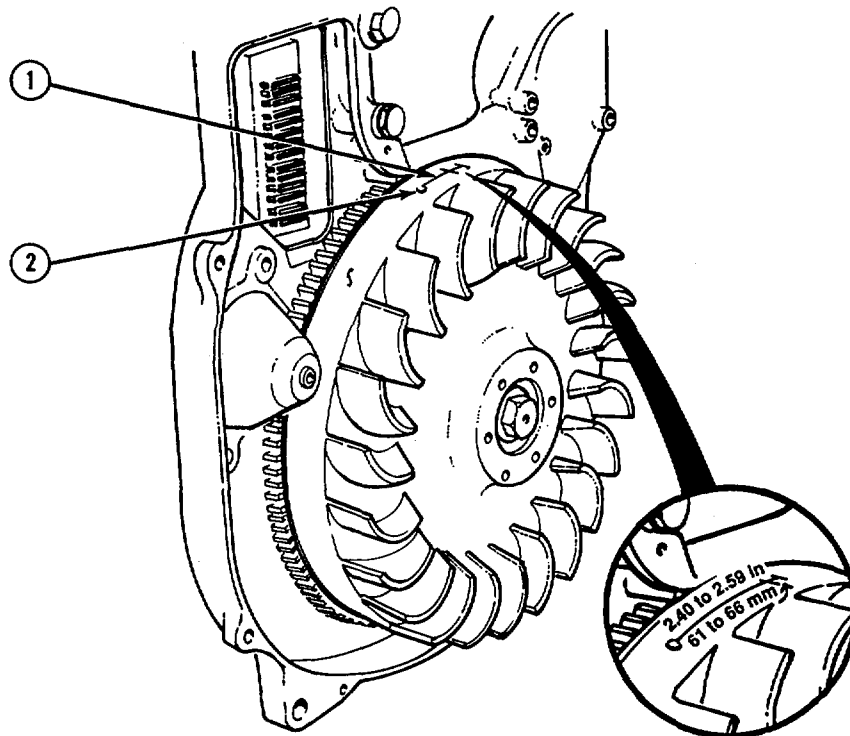
Condition Description
Water tank removed.
Rear panel removed.
Flywheel housing removed.
Battery cables disconnected.

Para 4-73

NOTE

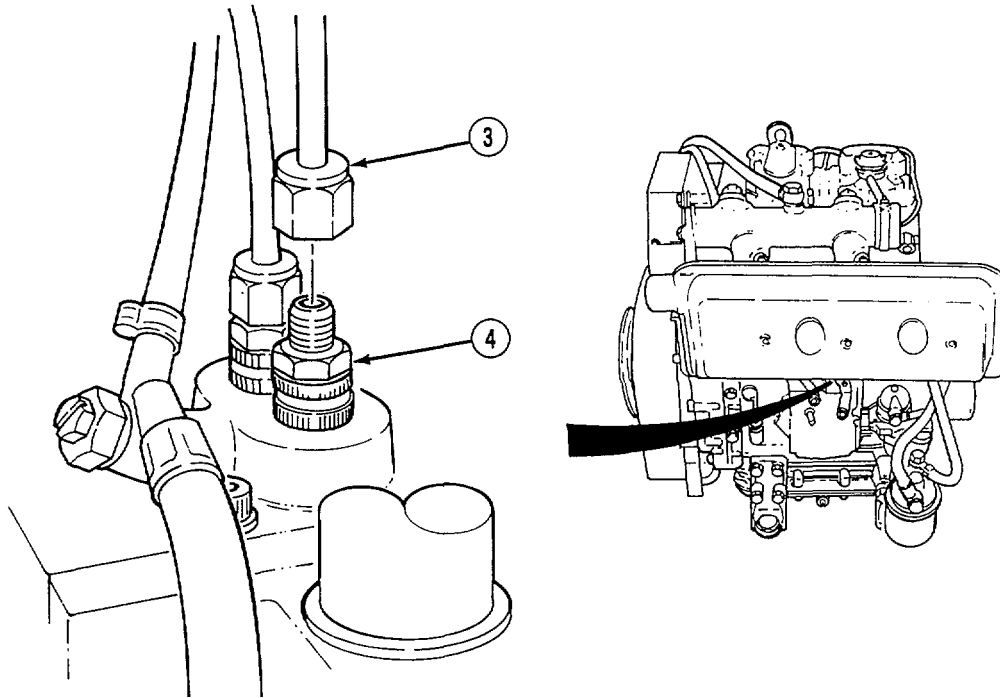
- If engine is installed, completely bleed fuel lines (para 4-36) before starting this procedure.
- If engine is removed, attach fuel intake and return lines to fuel source and bleed system (para 4-36) before starting this procedure.

Adjustment.



- (1) Mark out a distance of 2.40 to 2.59 in. (61 to 66 mm) along the circumference of the flywheel (1) beginning at the No. 1 cylinder timing mark (2) and moving clockwise.

5-32. INJECTION PUMP TIMING (CONT).

**WARNING**

- Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine. When working with fuel, post signs that read NO SMOKING WITHIN 50 FEET (15.24 m) of vehicle.
 - Wear safety goggles while performing this procedure.
 - Flywheel must be slowly rotated by hand during this procedure to prevent the engine from starting. Be careful not to let your hands or fingers become caught between the flywheel and engine.
- (2) Using a 17 mm open end wrench remove fuel pipe (3) to No. 1 cylinder (No. 1 cylinder is nearest the hydraulic pump side of the engine), and tube fitting (4).

- (3) Rotate flywheel clockwise 2.40 to 2.59 in. (61 to 66 mm), fuel should squirt out of tube fitting (4) when measured distance is passing timing mark (5) on engine.

NOTE

If fuel does not appear, refer to para 4-36 and bleed the fuel system again.

- (4) If timing is not correct refer to para 5-33 and add or remove injector pump shims.

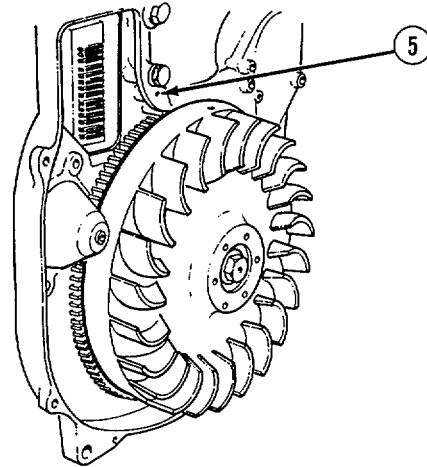
- (a) If fuel squirts before timing marks meet, add one injector pump shim and recheck. Repeat step if fuel still appears before timing marks meet.

- (b) If fuel squirts after timing marks meet, remove one injector pump shim and recheck. Repeat step if fuel still appears after timing marks meet.

- (5) Refer to para 5-33 to install pump.

- (6) Repeat previous procedures until timing is correct.

- (7) Install tube fitting (4) and pipe (3) using a 17 mm open end wrench.



NOTE

Follow-on maintenance:

- **Connect battery cables (para 4-73)**
- **Install flywheel housing (para 4-53)**
- **Install rear panel (para 4-98)**
- **Install water tank (para 4-121)**

END OF TASK

5-33. INJECTION PUMP REPLACEMENT.

This task covers:

- a. Removal b. Cleaning/Inspection c. Installation

INITIAL SETUP

Tools

Tool Kit, General Mechanic's: Automotive

Spring compressor 7535.1460.009

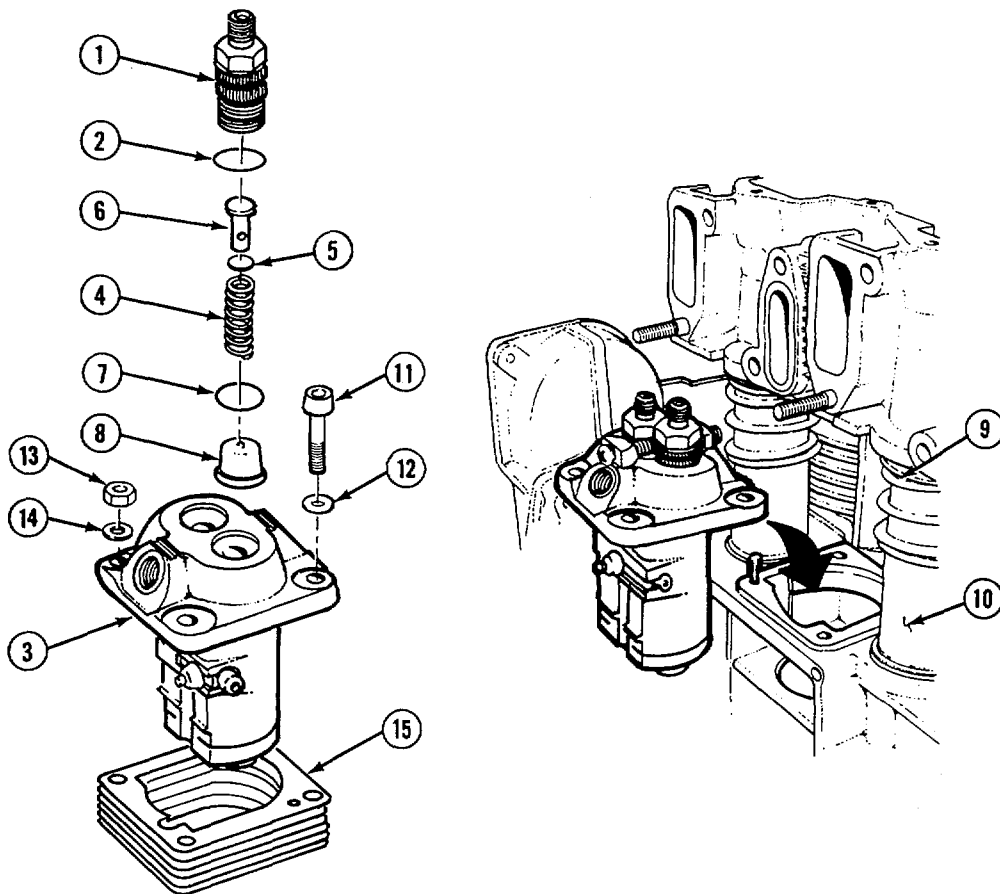
Materials/Parts

Copper washers
Solvent, dry cleaning, item 31 Appendix E

Equipment Condition

TM or Para	Condition Description
Para 4-24	Engine removed.
Para 4-32	Intake manifold removed.
Para 5-29	Governor control lever assembly removed.
Para 4-44 and 4-45	Injector fuel lines removed.

a. Removal



NOTE

Injection pump is replaced as an assembly. Take care not to lose any parts of the injection pump.

- (1) Remove tube fitting (1) and oil seal (2) from fuel injector pump (3) using a 19 mm open end wrench.
- (2) Remove spring (4), shim (5), and filler (6) from tube fitting (1).

NOTE

The spring, shim and filler, may drop out of tube fitting when you remove it and remain on delivery valve. Both fittings are same.

- (3) Remove copper gasket (7) and delivery valve (8) from injector pump (3).
- (4) Repeat steps (1) through (3) to remove other injector side.
- (5) Compress springs (9) on push rod tube (10).
- (6) Remove three screws (11) and three washers (12) using a 6 mm hex head wrench.
- (7) Remove nut (13) and washer (14) using a 13 mm open end wrench.

NOTE

Be sure to keep metal shims in proper order. These shims are available in three thicknesses and are used to adjust injector timing (para 5-32).

- (8) Remove injector pump (3) and metal shims (15).

b. Cleaning/Inspection.**WARNING**

Dry cleaning solvent P-D-680 is toxic and flammable. Wear protective goggles, face mask, and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapor. Do not use near open flame or excessive heat. The flashpoint for type I dry cleaning solvent is 100°F (38 °C) and for type II is 140°F (60 °C). If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, flush eyes with water and get medical aid immediately.

- (1) Clean all parts with dry cleaning solvent P-D-680.
- (2) Inspect parts for pits and corrosion.

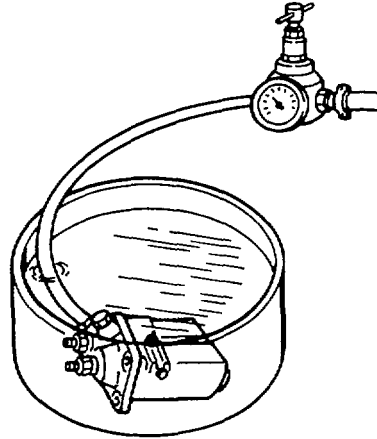
c. Installation.

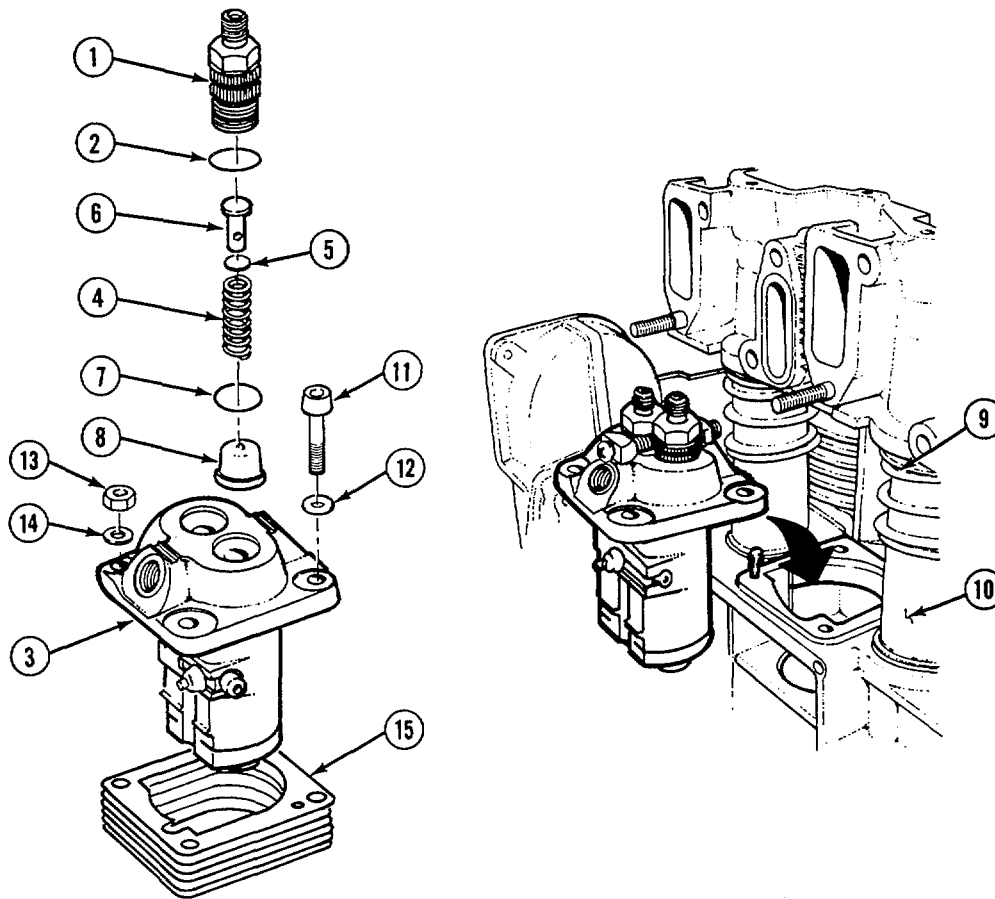
- (1) Install delivery valves (8) and copper gaskets (7) in injector pump (3).
- (2) Install oil seals (2) on tube fittings (1).
- (3) Install fillers (6), shims (5), and springs (4) in tube fittings (1).
- (4) Install tube fittings (1) on injector pump (3) using a 19 mm open end wrench.

5-33. INJECTION PUMP REPLACEMENT (CONT).**WARNING**

- Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine. When working with fuel, post signs that read **NO SMOKING WITHIN 50 FEET (15.24 m)** of vehicle.
- Compressed air must be used only with effective chip guarding and personal protective equipment (goggles/shield, gloves, etc).

- (5) Check pump for internal leakage.
- (a) Connect air gage and air line to pump inlet.
 - (b) Submerge pump in diesel fuel.
 - (c) Apply 70 to 75 psi (482 to 516 kPa) air pressure, using compressed air and air gage, for 20 seconds.
 - (d) If bubbles are present, internal leakage is indicated, replace pump.





- (6) Remove two tube fittings (1) using a 19 mm open end wrench.
- (7) Compress springs (9) on push rod tubes (10).
- (8) Install metal shims (15) and injector pump (3).
- (9) Install washer (14) and nut (13). Tighten to 66 lb-in (7.4 N•m) using a torque wrench and 13 mm open end wrench.
- (10) Install three washers (12) and screws (11). Tighten to 66 lb-in (7.4 N•m) using a torque wrench and 6 mm hex head wrench.
- (11) Install tube fittings (1) using a 19 mm open in wrench.

NOTE

Follow-on maintenance:

- Install injector pump fuel lines (para 4-44 and 4-45)
- Install governor control lever assembly (para 5-29)
- Install intake manifold (para 4-32)
- Check injector timing (para 5-32)
- Install engine (para 4-24)

END OF TASK

5-34. SPEED GOVERNOR AND SUPPORT YOKE REPLACEMENT/REPAIR.

This task covers:

- a. Removal
- b. Disassembly
- c. Cleaning/Inspection
- d. Assembly
- e. Installation

INITIAL SETUP

Tools

Tool Kit, General Mechanic's: Automotive

Equipment Condition

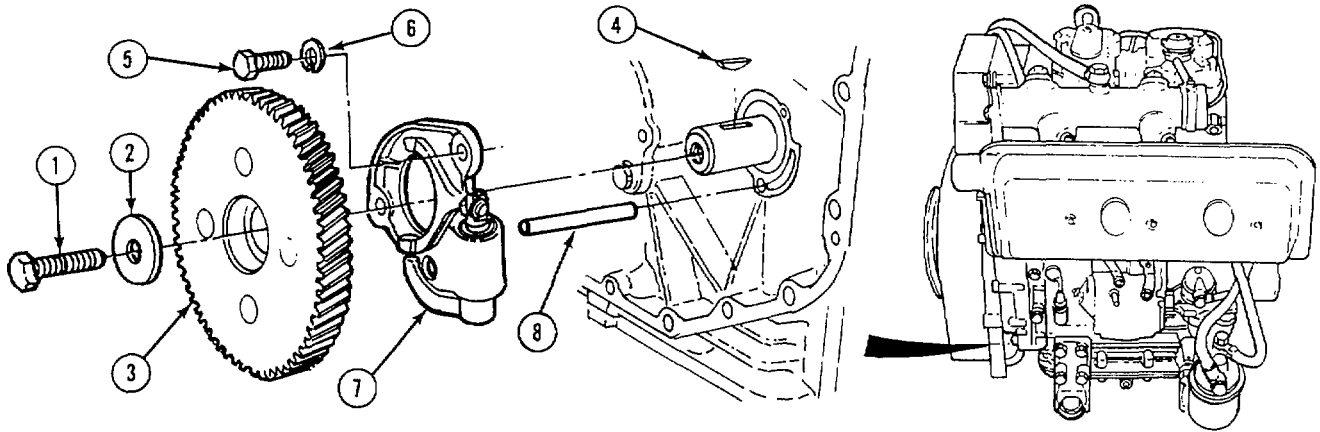
TM or Para
Para 5-12

Condition Description
Rear engine housing
removed.

Materials/Parts

Solvent, dry cleaning item 31 Appendix E

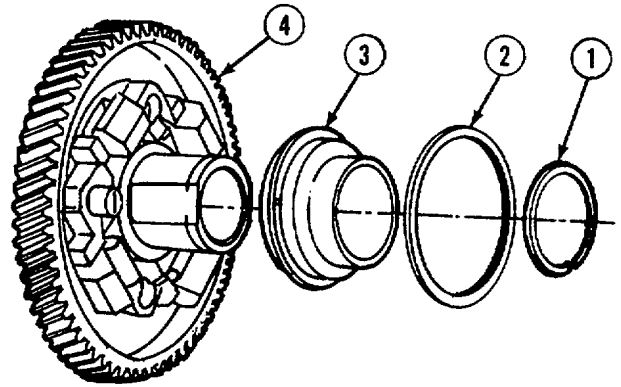
a. Removal.



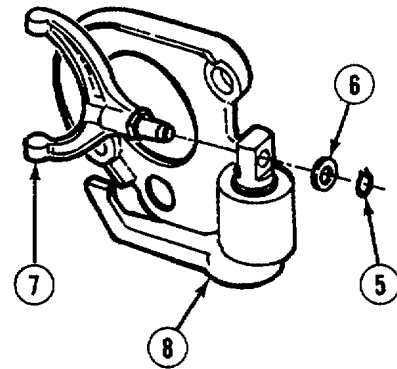
- (1) Remove screw (1) and washer (2) using a ratchet and 17 mm socket.
- (2) Remove speed governor (3) and key (4).
- (3) Remove two screws (5), two washers (6), and governor support yoke assembly (7) using a ratchet and 13 mm socket.
- (4) Remove pin (8).

b. Disassembly.

- (1) Remove retaining ring (1), thrust bearing (2), and governor bell (3), from speed governor (4).



- (2) Remove retaining ring (5) using snap ring pliers, washer (6), and upper part of governor lever (7) from governor support yoke (8).



5-34. SPEED GOVERNOR AND SUPPORT YOKE REPLACEMENT/REPAIR (CONT).

- (3) Remove retaining ring (9) using snap ring pliers, washer (10), lower part of governor lever (11), and washer (12) from governor support yoke (8).
- (4) Drive out two bearings (13) using a hammer and drift from governor support yoke (8).
- (5) Matchmark lower part of governor lever (11) and lever (14).
- (6) Remove screw (15) and lever (14) using a 5 mm hex head wrench.

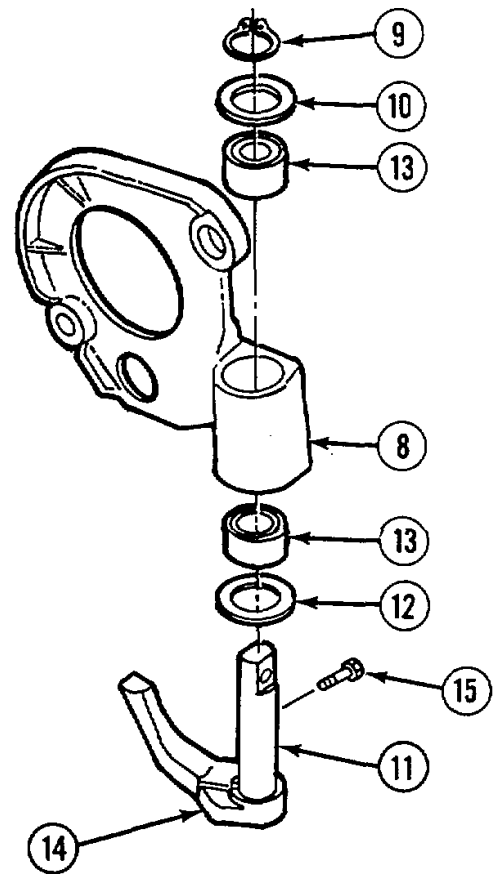
c. Cleaning/inspection.**WARNING**

Dry cleaning solvent P-D-680 is toxic and flammable. Wear protective goggles, face mask, and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapor. Do not use near open flame or excessive heat. The flashpoint for type I dry cleaning solvent is 100°F (38°C) and for type II is 140°F (60°C). If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, flush eyes with water and get medical aid immediately.

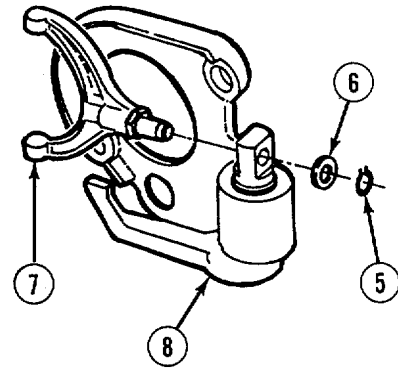
- (1) Clean all parts with dry cleaning solvent P-D-680.
- (2) Inspect parts for burrs, cracks or obvious signs of wear.
- (3) Replace any defective parts.

d. Assembly.

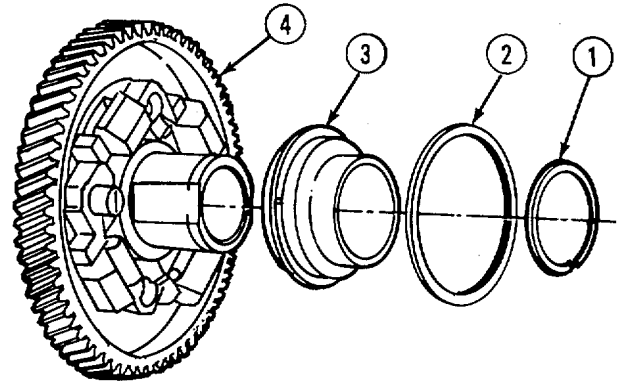
- (1) Install screw (15) and lever (14) on lever (11) using a 5 mm hex head wrench.
- (2) Install two bearings (13) in governor support yoke (8) using a press.
- (3) Install washer (12) and lower part of governor lever (11) on governor support yoke (8).
- (4) Install washer (10) and retaining ring (9) on shaft of lower part of governor lever (11).

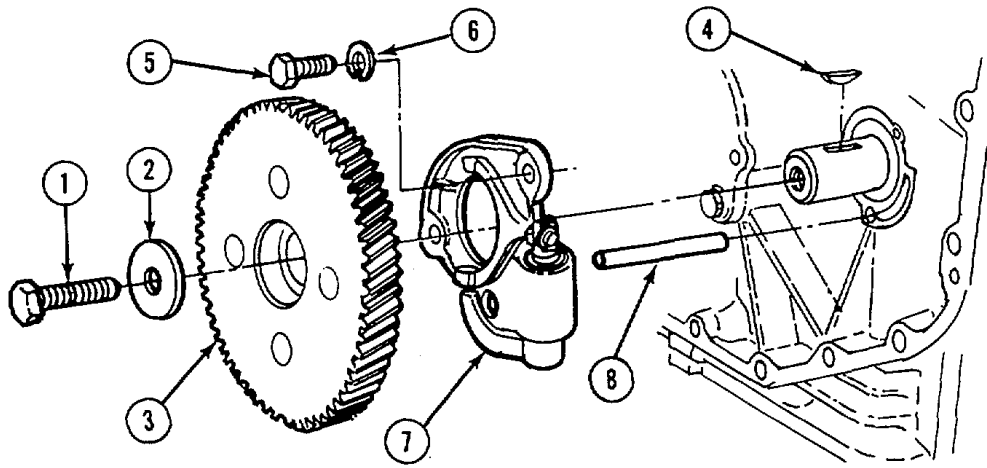


- (5) Install upper part of governor (7), washer (6), and retaining ring (5) on governor support yoke (8).



- (6) Install governor bell (3), thrust bearing (2), and retaining ring (1) on speed governor (4).



5-34. SPEED GOVERNOR AND SUPPORT YOKE REPLACEMENT/REPAIR (CONT).**e. Installation.**

- (1) Install pin (8) in crankcase.
- (2) Refer to para 5-7 and ensure that timing marks on crankshaft gear and speed governor are aligned.
- (3) Install governor support yoke assembly (7) using two washers (6) and two screws (5). Tighten using a ratchet and 13 mm socket.

NOTE

Insure that key is aligned with slots in speed governor and shaft.

- (4) Install speed governor assembly (3) using key (4), washer (2), and screw (1). Tighten using a ratchet and 17 mm socket.

NOTE**Follow-on maintenance:**

- **Set engine timing (para 5-7).**
- **rear engine housing (para 5-12).**
- **engine speed adjustments (para 4-23).**

END OF TASK

4-76. TOW VEHICLE TO JUNCTION BOX WIRE HARNESS (12V) REPLACEMENT/REPAIR.

This task covers:

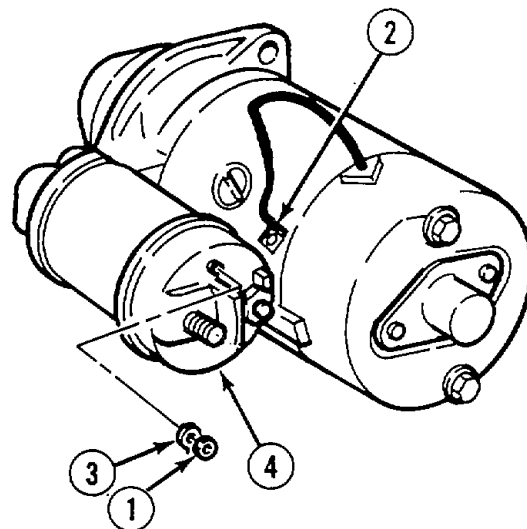
- a. Disassembly
- b. Cleaning/Inspection
- c. Assembly

INITIAL SETUP

<p><i>Tools</i></p> <p>Shop Equipment, Automotive Maintenance and Repair; Field Maintenance, Basic No. 1, Less Power</p>	<p><i>Equipment Condition</i></p> <p>TM or Para Para 4-58</p>	<p><i>Condition Description</i></p> <p>Starter removed.</p>
<p><i>Materials/Parts</i></p> <p>Lockwashers Compound, locking, thread item 14 Appendix E Solder, item 30 Appendix E Solvent, dry cleaning, item 31 Appendix E Cloth, abrasive, item 8 Appendix E</p>		

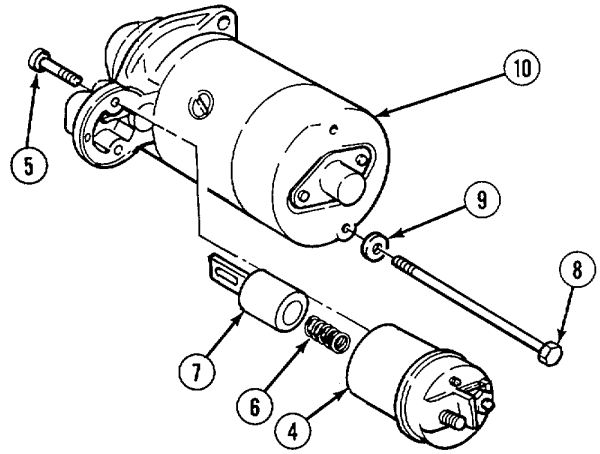
a. Disassembly.

- (1) Matchmark starter assembly and solenoid.
- (2) Remove nut (1), connector (2), and copper washer (3) from solenoid (4) using a 13 mm open end wrench.

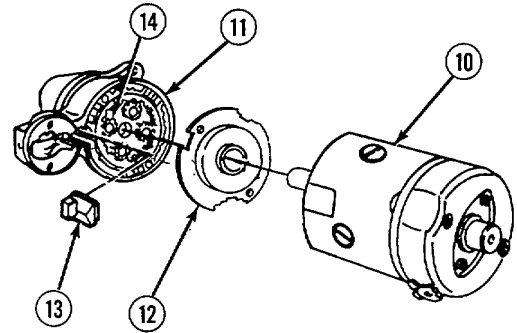


5-35. STARTER REPAIR (CONT).

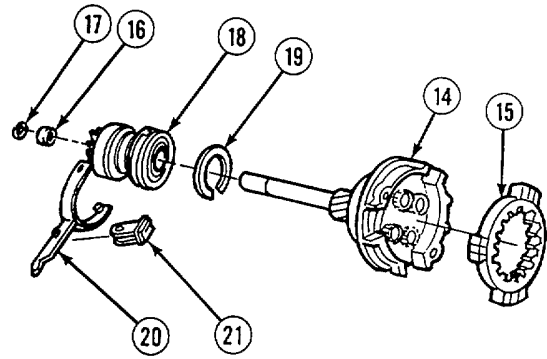
- (3) Remove three screws (5) and solenoid (4) using a cross tip screwdriver.
- (4) Remove spring (6) and actuator (7) by pushing down and out.
- (5) Remove two screws (8) and two washers (9) from starter (10) using a 9 mm open end wrench.



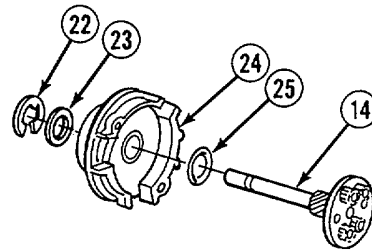
- (6) Matchmark drive housing (11) and starter (10) and separate.
- (7) Remove planetary gear cover (12), weather seal (13), and planetary assembly (14) from drive housing (11).



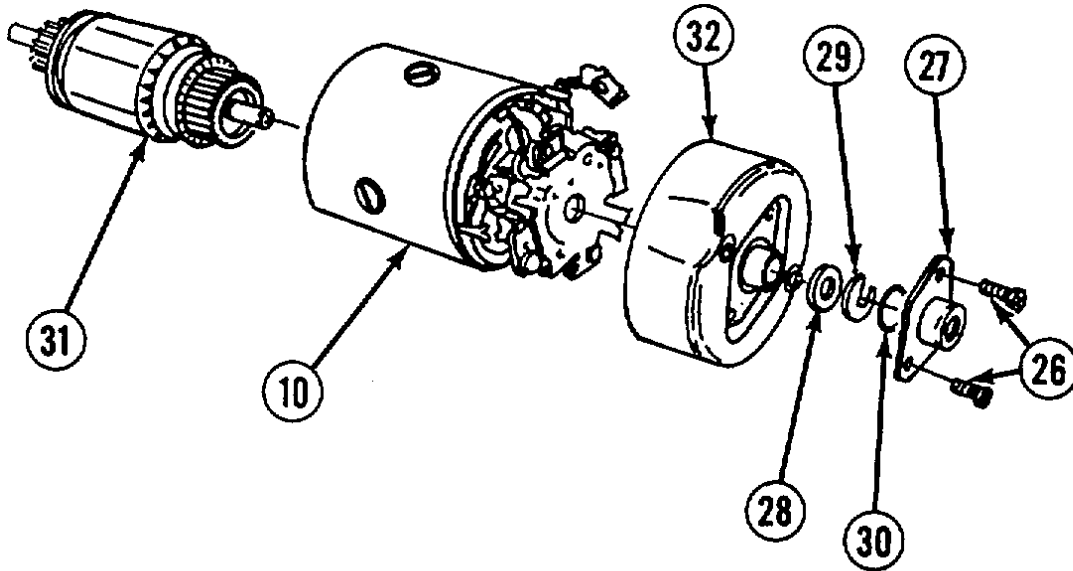
- (8) Remove gear ring (15).
- (9) Push in on bushing (16) to expose stop ring (17). Remove stop ring using needle nose pliers.
- (10) Remove drive gear (18) from planetary (14).
- (11) Remove snap ring (19) using snap ring pliers and remove drive fork (20).
- (12) Remove fork pivot (21) from drive fork (20).



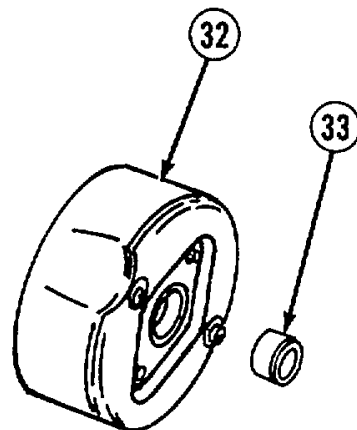
- (13) Remove snap ring (22) using snap ring pliers, fiber washer (23), planetary housing (24), and fiber washer (25) from planetary (14).



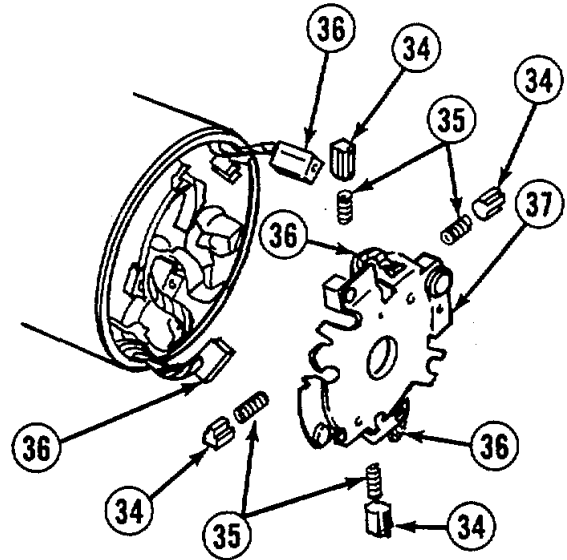
5-35. STARTER REPAIR (CONT).



- (14) Remove two screws (26), capsule (27), washer (28), clip (29), O-ring (30), and armature (31) using a cross tip screwdriver.
- (15) Matchmark commutator end shield (32) and starter (10).
- (16) Separate commutator end shield (32) from starter (10).
- (17) If damaged, press out bushing (33) from commutator end shield (32) using a press.



- (18) Remove four clips (34), four springs (35), and four brushes (36) from brush plate (37).



b. Cleaning/Inspection.

WARNING

- cleaning solvent P-D-680 is toxic and flammable. Wear protective goggles, face mask, and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapor. Do not use near open flame or excessive heat. The flashpoint for type I dry cleaning solvent is 1000F (38°C) and for type II is 140°F (60°C). If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, flush eyes with water and get medical aid immediately.
- Compressed air used for cleaning purposes will not exceed 30 psi (206 kPa). Use only with effective chip guarding and personal protective equipment (goggles/shield, gloves, etc).

- (1) Clean all non-electrical parts with dry cleaning solvent P-D-680.
- (2) Clean electrical components with compressed air.
- (3) Inspect all wiring for damage. Replace any component with damaged wiring.
- (4) Inspect brushes for excessive wear. Brushes must be long enough to contact commutator segments on armature.
- (5) Inspect brush springs for wear, distortion, or discoloration. Replace if damaged.
- (6) Inspect frame for deformities which would affect fit of windings. Replace if damaged.
- (7) Inspect armature for signs of wear or missing segments.
- (8) Perform continuity check of solenoid to check for an open or shorted coil. Replace defective solenoid.
- (9) Perform continuity check between contacts of solenoid by applying 24 VDC to coil. When coil is energized contacts should be closed.
- (10) Apply voltage to solenoid coil. Armature of solenoid should retract.

5-35. STARTER REPAIR (CONT).

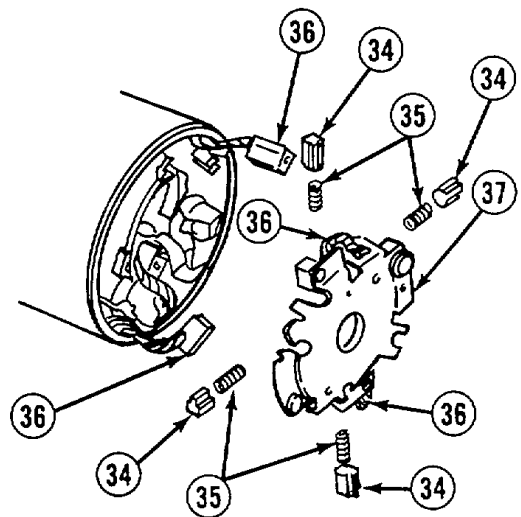
- (11) Perform continuity check of windings for shorted or open condition. Replace if shorted or open.
- (12) Visually inspect windings for evidence of extreme heat or chafing against armature. Replace winding if damaged.
- (13) Check for binding of clutch on shaft. If shaft is damaged, dress with crocus cloth. If bore of clutch is damaged, replace clutch or bushing.
- (14) Inspect bushings for cracks or chipping.

c. Assembly.

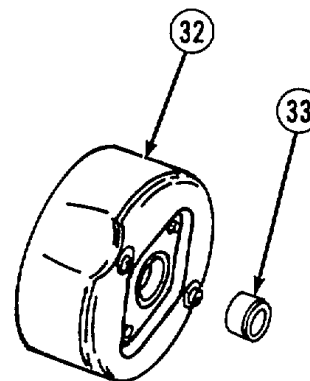
NOTE

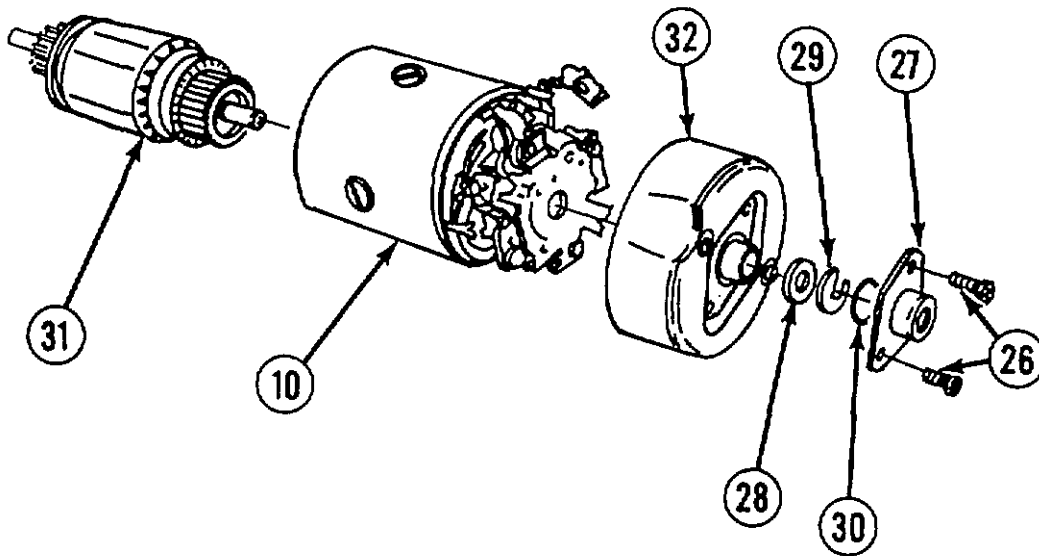
- If brushes were removed from brush plate, it may be necessary to solder wires leading from the brush plate.
- Brushes must be in contact around end of armature as they are installed.

- (1) Install four brushes (36), four springs (35), and four clips (34) on brush plate (37).

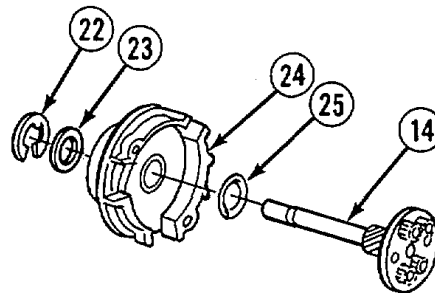


- (2) If removed install bushing (33) in commutator end shield (32) using a press.



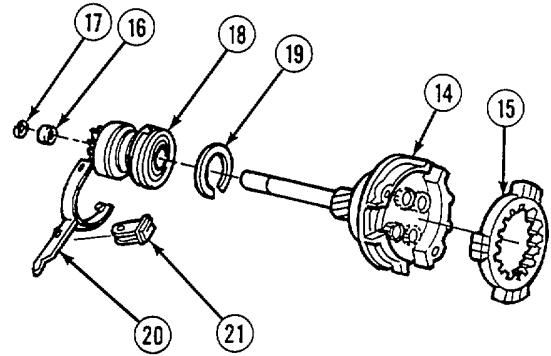


- (3) Refer to matchmarks and install commutator end shield (32) on starter (10).
- (4) Install armature (31), washer (28), clip (29), O-ring (30), capsule (27), and two screws (26) using a cross tip screwdriver.
- (5) Install fiber washer (25), planetary housing (24), fiber washer (23), and snap ring (22) on planetary (14).

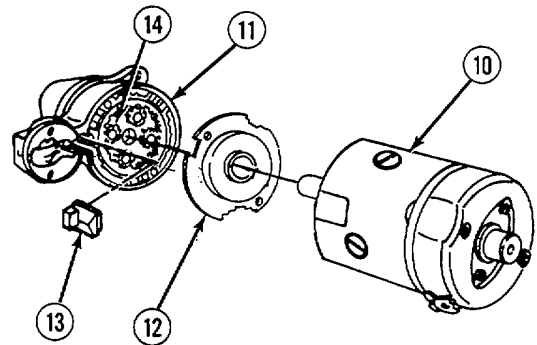


5-35. STARTER REPAIR (CONT).

- (6) Install fork pivot (21) on drive fork (20).
- (7) Install drive fork (20) and snap ring (19) on drive gear (18).
- (8) Install drive gear (18) on planetary (14).
- (9) Install stop ring (17) and bushing (16).
- (10) Install gear ring (15).

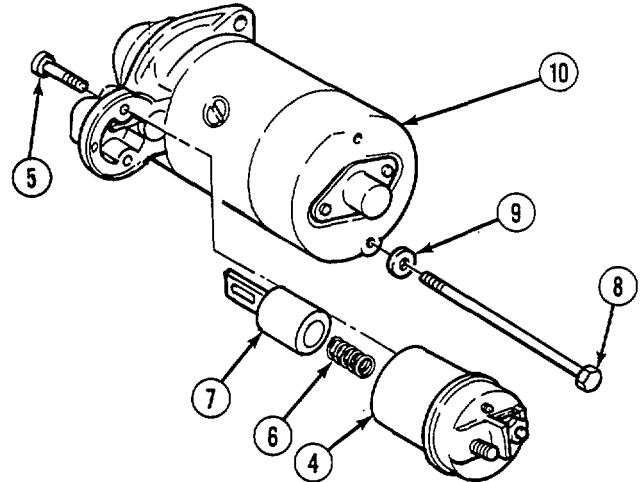


- (11) Install planetary assembly (14), weather seal (13), and planetary gear cover (12) in drive housing (11).
- (12) Refer to matchmarks and install drive housing (11) on starter (10).



WARNING

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



(13) Coat threads of two screws (8) and three screws (5) using thread locking compound.

(14) Install two washers (9) and two screws (8) in starter (10) using a 9 mm open end wrench.

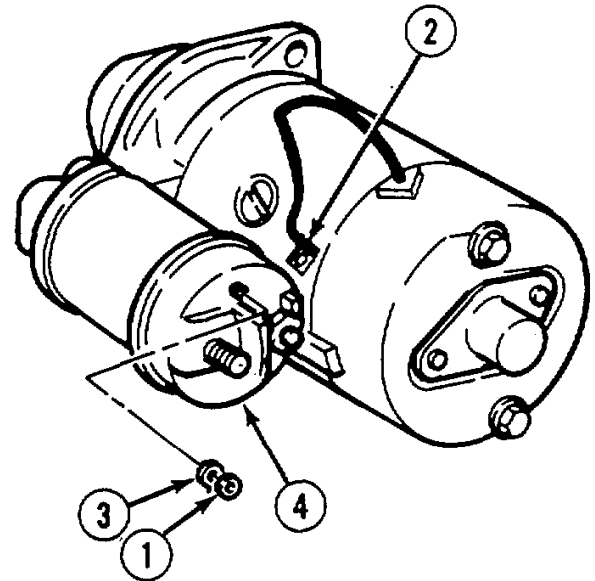
(15) Install actuator (7) and spring (6).

(16) Refer to matchmarks and install solenoid (4) and three screws (5) using a cross tip screwdriver.

(17) Install copper washer (3), connector (2), and nut (1) on solenoid (4) using a 13 mm open end wrench.

NOTE

Follow-on maintenance: Install starter (para 4-58)



END OF TASK

5-36. BATTERY REPAIR.

Refer to TM 9-6140-200-14, Operator/Unit/Direct Support/General Support Maintenance Manual for care, maintenance, repair, and inspection of lead-acid storage batteries.

5-37. MAIN FRAME REPAIR.

This task covers:

- a. Repair
- b. Cleaning/Inspection

INITIAL SETUP

Tools

Tool Kit, Master Mechanic's

Shop Equipment, Machine Shop; Field Maintenance, Basic, Less Power

Equipment Condition

TM or Para Para 4-77	<i>Condition Description</i> 24V wire harness removed.
Para 4-78	Broom hood wire harness removed.
Para 4-75	Battery box removed.
Para 4-122	Saddle removed.
Para 4-87	Modified spindle removed.
Para 4-40	Fuel tank removed.
Para 4-106	Hydraulic reservoir drained.

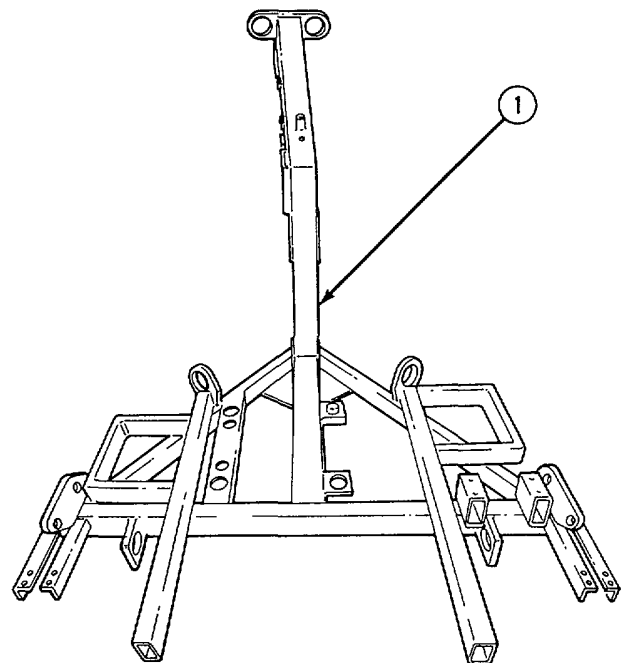
Equipment Condition

<i>TM or Para</i>	<i>Condition Description</i>
Para 4-24	Engine removed.
Para 4-94	Swing frame removed.
Para 4-123	Sprinkler lines removed.
Para 4-105	Hydraulic hoses removed.
Para 4-76	12V wire harness removed.

a. Repair.

- (1) Welding and brazing may be used to repair cracks in external steel parts, such as brackets, panels, and light framework. Do not weld or braze parts under great stress.
- (2) Bent or dented frame parts may be repaired by straightening.
- (3) Painting. Instructions for preparation of material for painting, how to paint, and material to be used are in TM 43-0139. Stenciling and working markings for military vehicles are called out in TB 43-0209. Data plates location and description are referenced in Chapter 2.

b. Cleaning/inspection. Inspect mainframe for cracks, dents, corrosion and warpage.



NOTE**Follow-on maintenance:**

- Install fuel tank (para 4-40)
- Install modified spindle (para 4-87)
- Install saddle (para 4-122)
- Install battery box (para 4-75)
- Install broom hood wire harness (para 4-78).
- 24V wire harness (para 4-77)
- Install 12V wire harness (para 4-76)
- Install hydraulic hoses (para 4-105)
- Install sprinkler lines (para 4-123)
- Install swing frame (para 4-94)
- Install engine (para 4-24)
- Fill hydraulic reservoir (para 4-106)

END OF TASK**5-38. HYDRAULIC HOSE FABRICATION AND TESTING.**

Refer to Appendix G for fabrication and testing of hydraulic hoses.

4-76. TOW VEHICLE TO JUNCTION BOX WIRE HARNESS (12V) REPLACEMENT/REPAIR.

This task covers:

- a. Disassembly
- b. Cleaning/Inspection
- c. Assembly

INITIAL SETUP

Tools

Tool Kit, General Mechanic's: Automotive

Shop Equipment, Machine Shop, Field Maintenance, Basic Less Power

Equipment Condition

TM or Para
Para 4-101

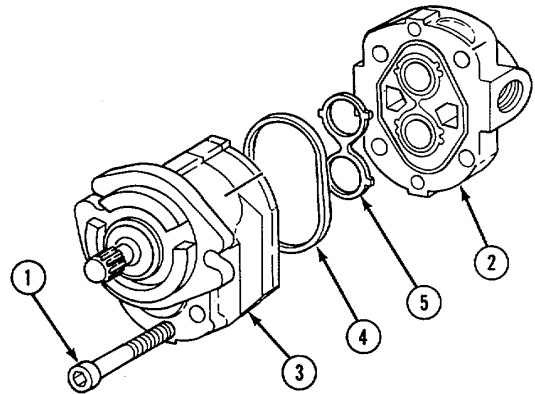
Condition Description
Hydraulic pump removed.

Materials/Parts

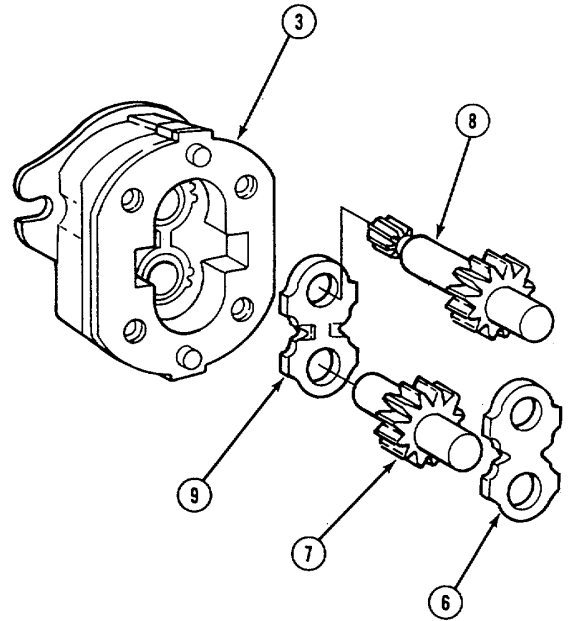
Seals
Thrust plates
Compound, thread locking, item 14 Appendix E
Solvent, dry cleaning, item 31 Appendix E

a. Disassembly.

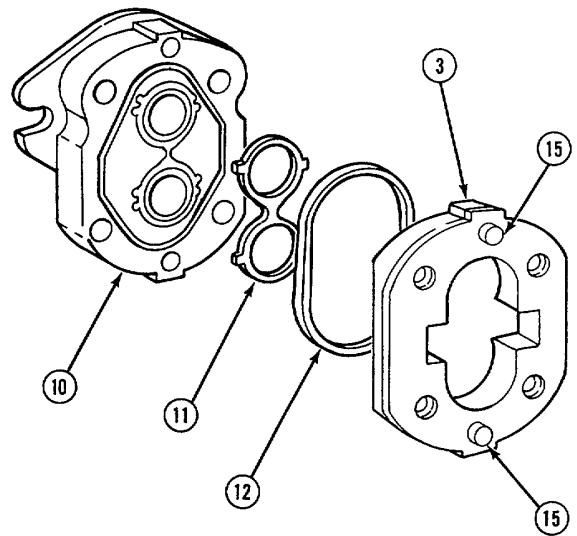
- (1) Remove four screws (1) and separate rear cover (2) from pump body (3) using a 5/16 in. hex head wrench.
- (2) Remove static seal (4) and loading seal (5) from rear cover (2).



- (3) Remove thrust plate (6).
- (4) Pull driven gear (7) from body (3).
- (5) Push drive gear (8) out to rear of body (3).
- (6) Remove remaining thrust plate (9).

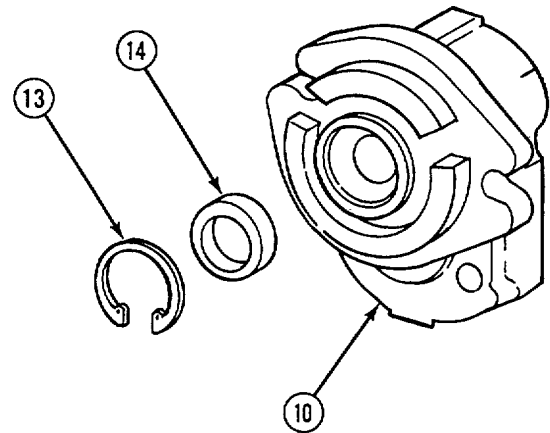


- (7) Separate front cover (10) from body (3).
- (8) Remove loading seal (11) and static seal (12) from front cover (10).



5-39. HYDRAULIC PUMP ASSEMBLY REPAIR (CONT).

- (9) Remove snap ring (13) and seal (14) from front cover (10) using snap ring pliers.

**b. Cleaning/inspection.**

- (1) Inspect pump parts for wear, warped, parts or corrosion.

WARNING

Dry cleaning solvent P-D-680 is toxic and flammable. Wear protective goggles, face mask, and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapor. Do not use near open flame or excessive heat. The flashpoint for type I dry cleaning solvent is 100°F (38°C) and for type II is 140°F (60°C). If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, flush eyes with water and get medical aid immediately.

- (2) Clean all metal parts with dry cleaning solvent P-D-680.
 (3) Replace any damaged or worn parts.

c. Assembly.

- (1) Install seal (14) and snap ring (13) in front cover (10) using snap ring pliers.

NOTE

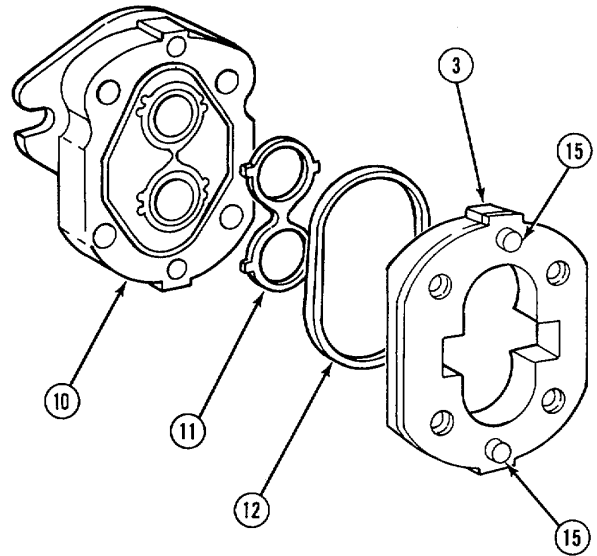
Smooth side of loading seal faces up.

- (2) Install static seal (12) and loading seal (11) on front cover (10).

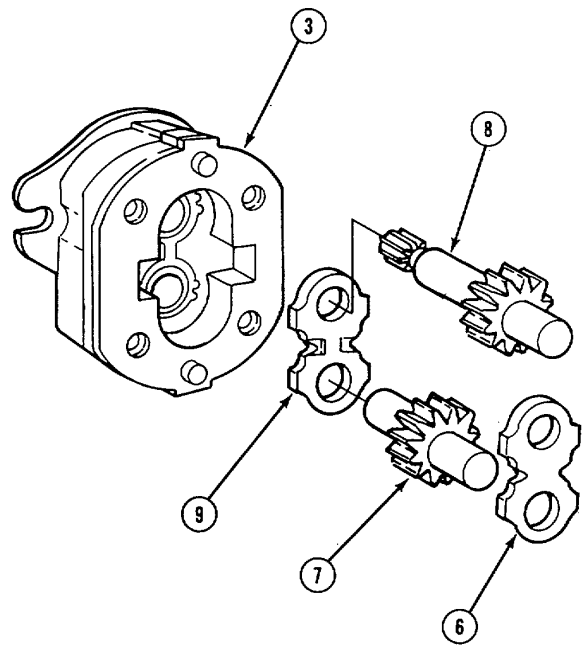
NOTE

Smooth side of thrust plates should be against seals.

- (3) Align pins (15), assemble body (3), and front cover (10).



- (4) Install thrust plate (9), driven gear (7), drive gear (8), and thrust plate (6) on pump body (3).



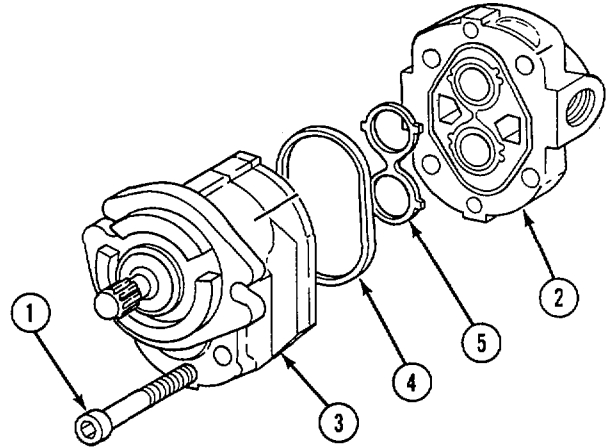
5-39. HYDRAULIC PUMP ASSEMBLY REPAIR (CONT).**NOTE**

Smooth side of loading seal faces up.

- (5) Install static seal (4) and loading seal (5) c rear cover (2).

WARNING

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



- (6) Apply thread locking compound to threads of four screws (1).
- (7) Install rear cover (2) and four screws (1) on body (3). Tighten screws to 35 to 40 lb-ft (47 to 54 N•m) using a torque wrench and 5/16 in. hex head socket.

NOTE

Follow-on maintenance: Install hydraulic pump (para 4-101)

END OF TASK

5-40. HYDRAULIC MOTOR REPAIR.

This task covers:

- a. Disassembly b. Cleaning/Inspection c. Assembly

INITIAL SETUP:

Tools

Tool Kit, General Mechanic's: Automotive

Shop Equipment, Machine Shop; Field Maintenance, Basic Less Power

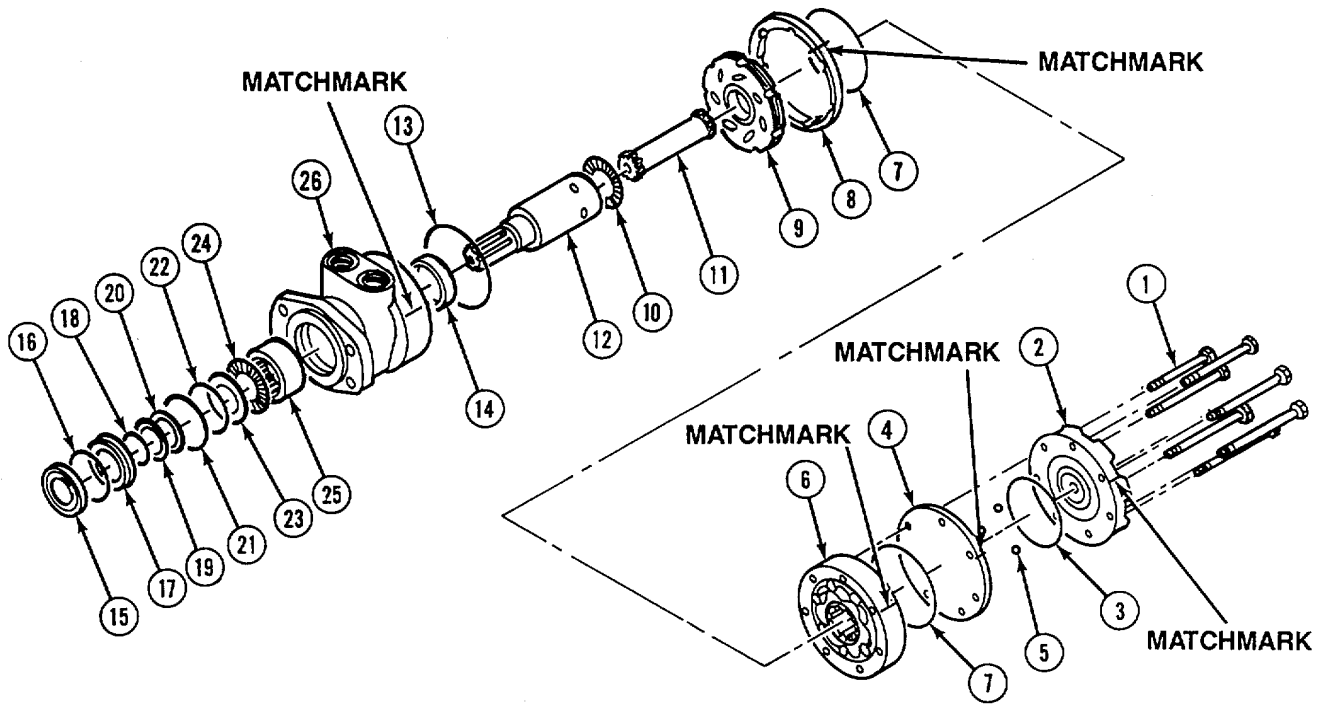
Equipment Condition

TM or Para
Para 4-102

Condition Description
Hydraulic motor removed.

Materials/Parts

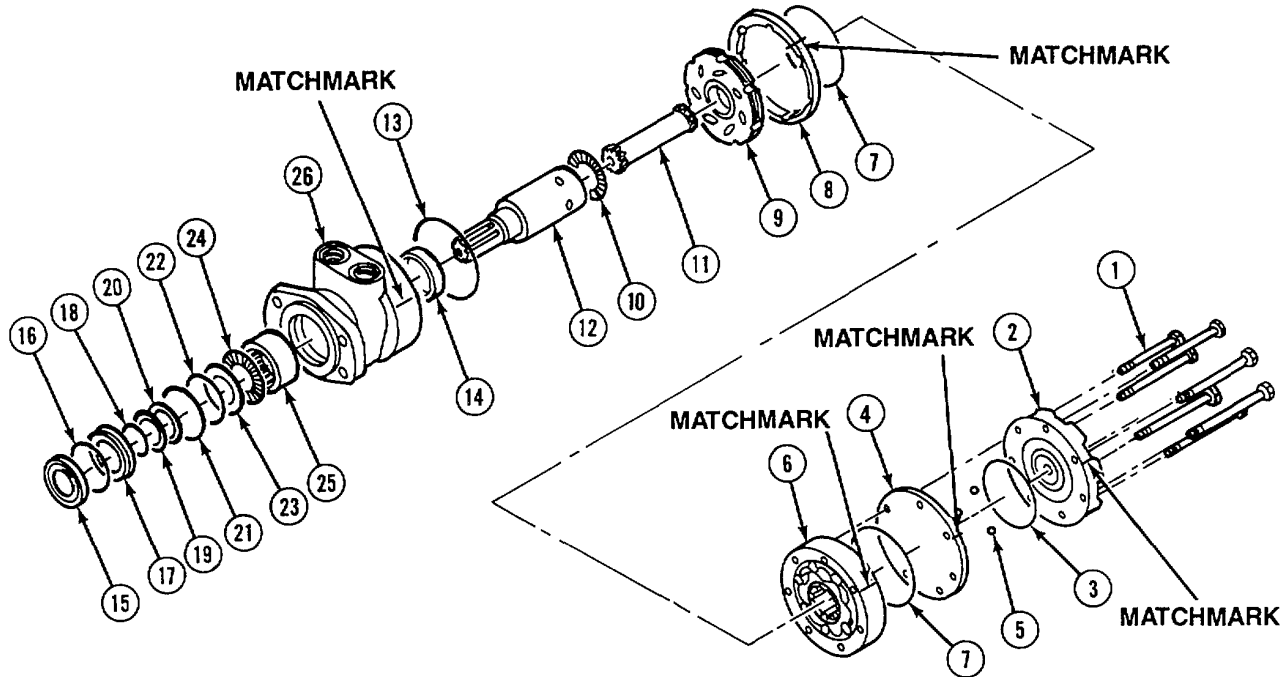
Seal kit (PE4440002)
Seal kit (PE4440003)
Compound, thread locking, item 14 Appendix E



a. Disassembly.

- (1) Matchmark motor assembly.
- (2) Remove seven bolts (1), end cover (2), and seal (3) using a ratchet and 9/16 in. socket.

5-40. HYDRAULIC MOTOR REPAIR (CONT).



- (3) Remove balance plate (4) and four steel balls (5) from balance plate (4).
- (4) Matchmark exposed side of rotor assembly (6) and remove from motor assembly.
- (5) Remove two seals (7) from rotor assembly (6).
- (6) Matchmark exposed side of manifold boot (8) and manifold plate (9).
- (7) Remove manifold boot (8) and manifold plate (9).
- (8) Remove thrust bearing (10) and drive link (11).
- (9) Push shaft (12) out to rear of housing (26) and remove seal (13) from housing (26).
- (10) Remove seal (15).
- (11) Press seal carrier (17) in and remove snap wire (16) using needle nose pliers.
- (12) Remove seal carrier (17), (includes: backup shim (18), backup seal (19), and shaft seal (20)), backup shim (21), square cut seal (22), thrust washer (23), and thrust bearing (24).
- (13) Drive out front roller bearing (25) and rear roller bearing (14) from housing (26) using a drift and ballpeen hammer.

b. Cleaning/Inspection.

- (1) Inspect motor parts for signs of wear, warping, or corrosion.
- (2) Replace any damage or worn parts.

c. Assembly.

- (1) Install rear roller bearing (14) and front roller bearing (25) in housing (26) using a press.
- (2) Install thrust bearing (24), thrust washer (23), square cut seal (22), backup shim (21), shaft seal (20), backup seal (19), backup shim (18), seal carrier (17), snap wire (16), and seal (15).
- (3) Install shaft (12) into rear of housing (26) and install seal (13).

NOTE

Flat end of drive link goes in first.

- (4) Install thrust bearing (10) and drive link (11) in housing (26).
- (5) Refer to matchmarks and install manifold plate (9) and manifold boot (8) over drive link (11) .
- (6) Install two seals (7) on rotor assembly (6).
- (7) Refer to matchmarks and install rotor assembly (6) on end of drive link (11).
- (8) Install four steel balls (5) in holes in balance plate (4) and place flat side of balance plate (4) against rotor assembly (6).
- (9) Install seal (3) on cover (2).

WARNING

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

- (10) Apply thread locking compound to threads of seven screws (1) and install cover (2). Tighten screws to 45 to 55 lb-ft (61 to 74 N•m) using a torque wrench and 9/16 in. socket.

NOTE

Follow-on maintenance: Install hydraulic motor (para 4-102)

END OF TASK

5-41. HYDRAULIC CONTROL VALVE REPAIR.

This task covers:

- a. Disassembly b. Cleaning/Inspection c. Assembly

INITIAL SETUP:

Tools

Tool Kit, General Mechanic's: Automotive

Shop Equipment, Machine Shop; Field Maintenance, Basic Less Power

Equipment Condition

TM or Para
Para 4-103

Condition Description
Hydraulic control valve removed.

Materials/Parts

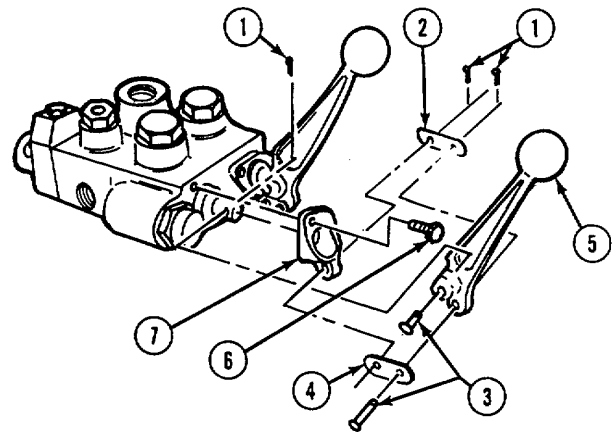
Cotter pins
O-rings
Lockwasher
Compound, thread sealing, item 14 Appendix E
Solvent, dry cleaning, item 31 Appendix E
Tags, identification, item 35 Appendix E

a. Disassembly.

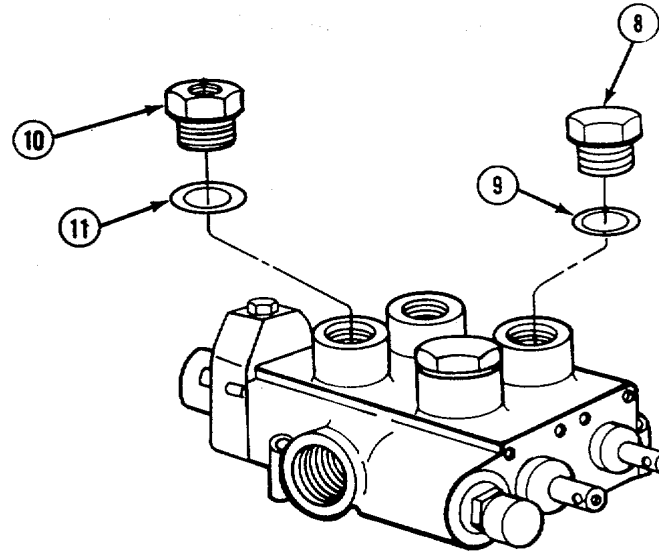
NOTE

Both control handles are removed the same way.

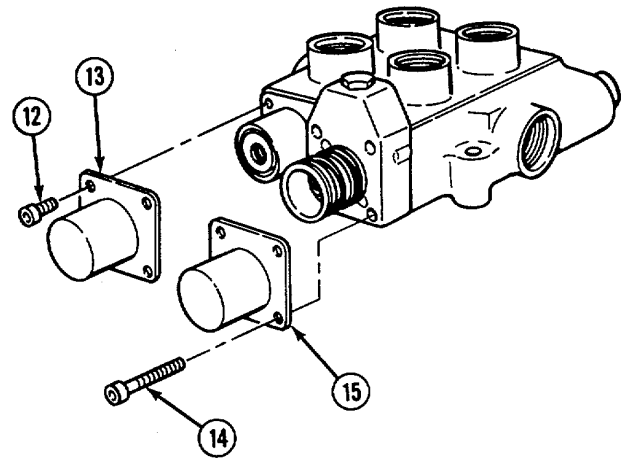
- (1) Remove three cotter pins (1), bracket (2), three pins (3), bracket (4), and control handle (5) using pliers.
- (2) Remove two screws (6) and handle bracket (7) using a 3/16 in. hex head wrench.

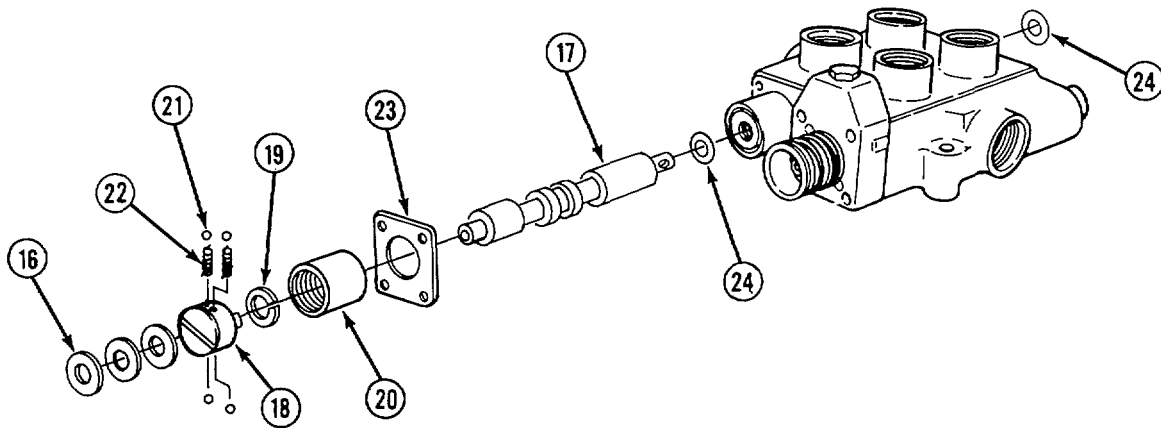


- (3) Remove two port plugs (8) and two O-rings (9) using a 1-1/4 in. open end wrench.
- (4) Remove plug (10) and O-ring (11) using a 1-1/4 in. open end wrench.



- (5) Remove four screws (12) and end cap (13) using a 3/16 in. hex head wrench.
- (6) Remove four screws (14) and end cap (15) using a 3/16 in. hex head wrench.



5-41. HYDRAULIC CONTROL VALVE REPAIR (CONT).

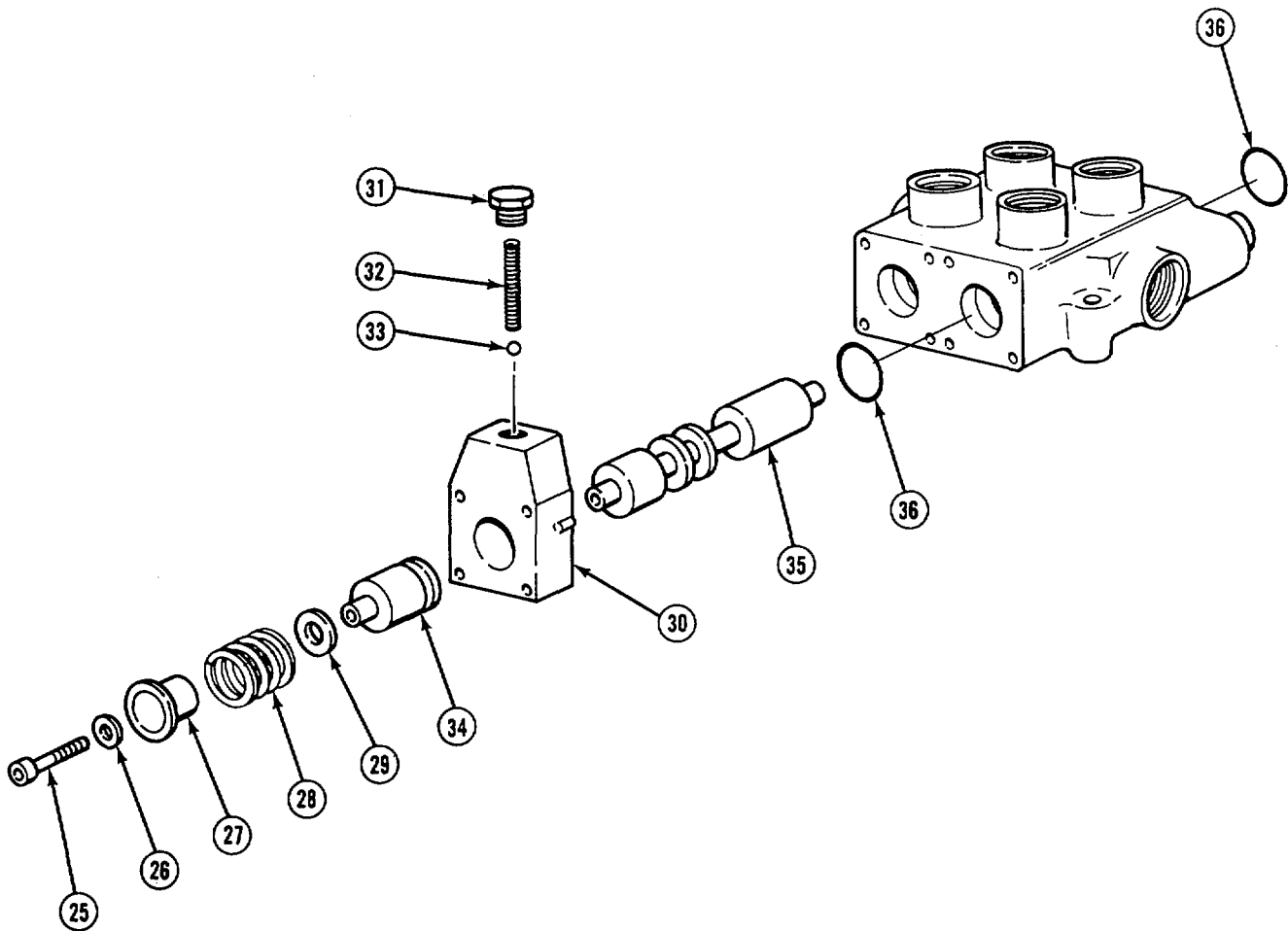
(7) Disassemble control valve as follows:

- (a) Remove three flat washers (16).
- (b) Remove control valve spool (17).
- (c) Remove detent retainer (18), lockwasher (19), and detent sleeve (20) as one piece using a flat tip screwdriver.

WARNING

Steel balls and springs in detent retainer are under extreme pressure and may come out with velocity. Wear eye protection during this procedure.

- (d) Remove detent retainer (18) from detent sleeve (20).
- (e) Remove four steel balls (21) and two springs (22).
- (f) Remove retainer (23).
- (g) Tag valve spool (17) and remove two O-rings (24).



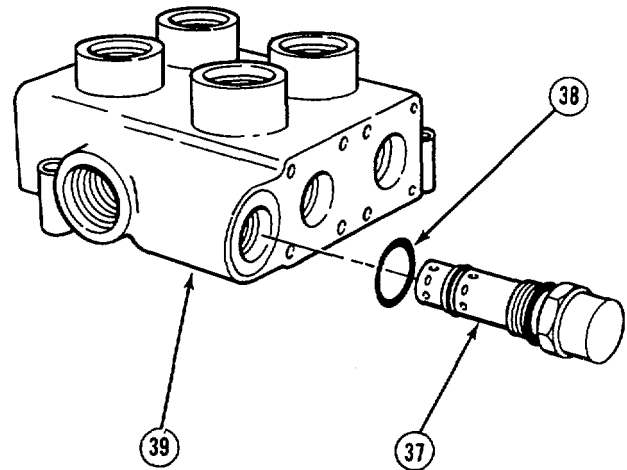
WARNING

Spring is under extreme pressure and may come out with velocity. Use extreme caution and wear eye protection.

- (h) Remove screw (25), washer (26), stop collar (27), spring (28), lockwasher (29), and detent sleeve housing (30) using a 3/16 in. hex head wrench.
- (i) Remove detent plug (31), spring (32), steel ball (33), and detent sleeve (34) using a 5/8 in. open end wrench.
- (j) Tag and remove valve spool (35) and two O-rings (36).

5-41. HYDRAULIC CONTROL VALVE REPAIR (CONT).

- (k) Remove cartridge (37) and O-ring (38) from valve body (39) using a 1 in. open end wrench.

***b. Cleaning/Inspection.***

- (1) Inspect valve spools for cracks, wear, and signs of corrosion

WARNING

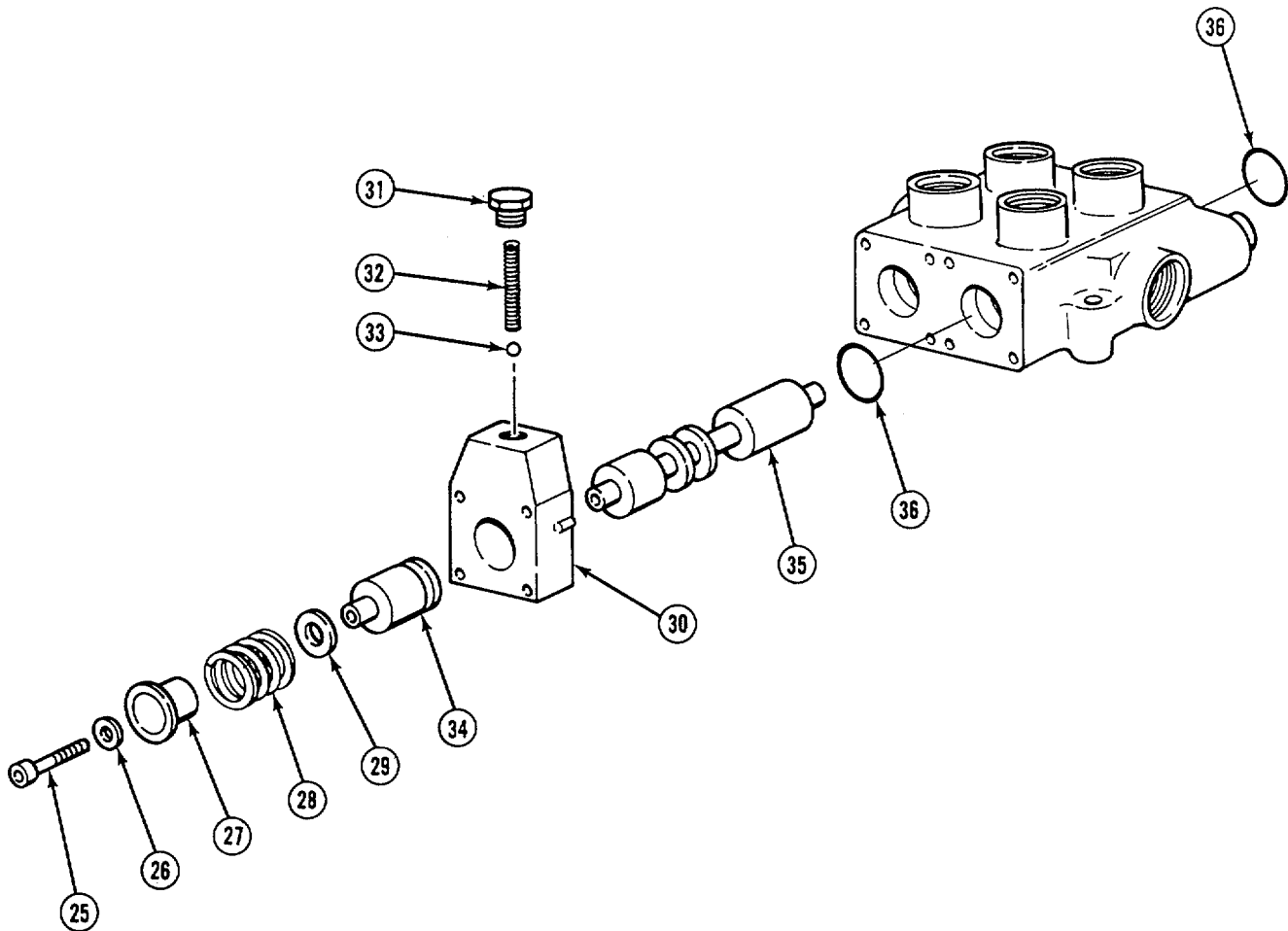
Dry cleaning solvent P-D-680 is toxic and flammable. Wear protective goggles, face mask, and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapor. Do not use near open flame or excessive heat. The flashpoint for type I dry cleaning solvent is 100°F (38°C) and for type II is 140°F (60°C). If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, flush eyes with water and get medical aid immediately.

- (2) Clean valves and pump body with dry cleaning solvent P-D-680.
 (3) Replace any worn or damaged parts.

c. Assembly.

- (1) Assemble valve as follows:

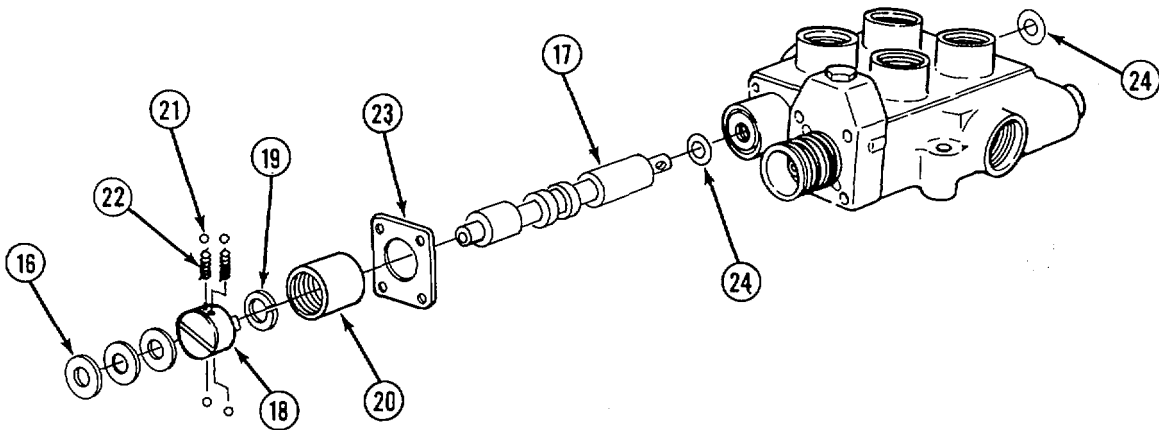
- (a) Install relief cartridge (37) and O-ring (38) in valve body (39) using a 1 in. open end wrench.



- (b) Install two O-rings (36) on valve spool (35), and install spool.
- (c) Install detent sleeve (34) in detent sleeve housing (30) aligning groove in detent sleeve with hole in top of detent sleeve housing.
- (d) Install steel ball (33) and spring (32) in hole and install detent plug (31) using a 5/8 in. open end wrench.

WARNING

- **Adhesives, solvents and sealing compounds can burn easily, can give off harmful vapors and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.**
 - **Spring is under extreme pressure and may come out with velocity. Use extreme caution and wear eye protection.**
- (e) Apply thread sealing compound to lockwasher (29) and install lockwasher, spring (28), stopcollar (27), washer (26), and screw (25) on valve spool (35).

5-41. HYDRAULIC CONTROL VALVE REPAIR (CONT).

- (f) Install two O-rings (24), valve spool (17), and retainer (23).

WARNING

Steel balls and springs in detent retainer are under extreme pressure and may come out with velocity. Wear eye protection during this procedure.

- (g) Install two springs (22) and four steel balls (21) in detentretainer (18).
- (h) Install detent retainer (18) in detent sleeve (20) making sure threaded part of retainer protrudes on other side of sleeve. Install lockwasher (19) on retainer.

WARNING

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

NOTE

The narrow end of detent sleeve should be towards valve body.

- (i) Apply thread locking compound to threads of detent retainer (18) and assemble detent retainer, lockwasher (19), and detent retainer sleeve (20) on valve spool (17) as one piece.
- (j) Install three washers (16).

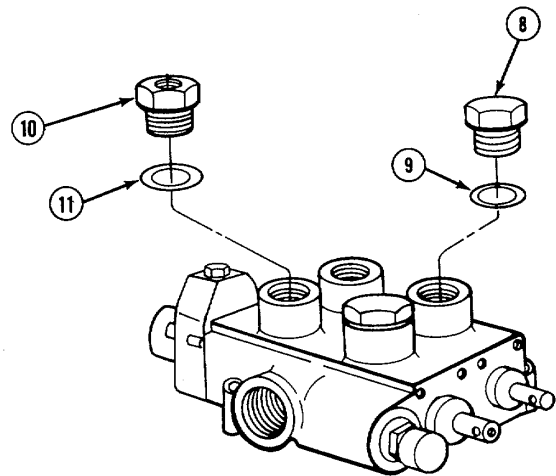
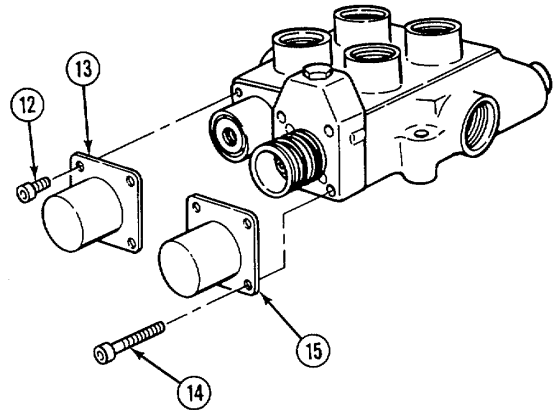
WARNING

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

NOTE

Thread locking compound must be applied to all screws during installation procedures.

- (2) Apply thread locking compound to threads of screws (14, 12, and 6).
- (3) Install four screws (14) and endcap (15) using a 3/16 in. hex head wrench.
- (4) Install four screws (12) and endcap (13) using a 3/16 in. hex head wrench.
- (5) Install O-ring (11) and plug (12) in valve body using a 1-1/4 in. open end wrench.
- (6) Install two O-rings (9) and two port plugs (8) using a 1-1/4 in. open end wrench.



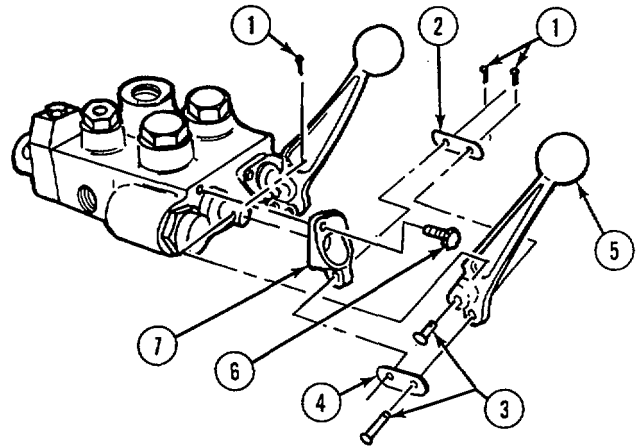
5-41. HYDRAULIC CONTROL VALVE REPAIR (CONT).**NOTE**

Both control handles are installed same way.

- (7) Install handle bracket (7) and two screws (6) using a 3/16 in hex head wrench.
- (8) Install control handle (5), bracket (4), three pins (3), bracket (2), and three cotter pins (1) using a pliers.

NOTE

Follow-on maintenance: Install hydraulic control valve (para 4-103)



END OF TASK

4-38. VAPOR SEPARATOR REPLACEMENT.

This task covers:

- a. Disassembly b. Cleaning/Inspection c. Assembly

INITIAL SETUP:*Tools*

Shop Equipment, Automotive Maintenance and
Repair; Organizational Maintenance, Common
No. 1, Less Power

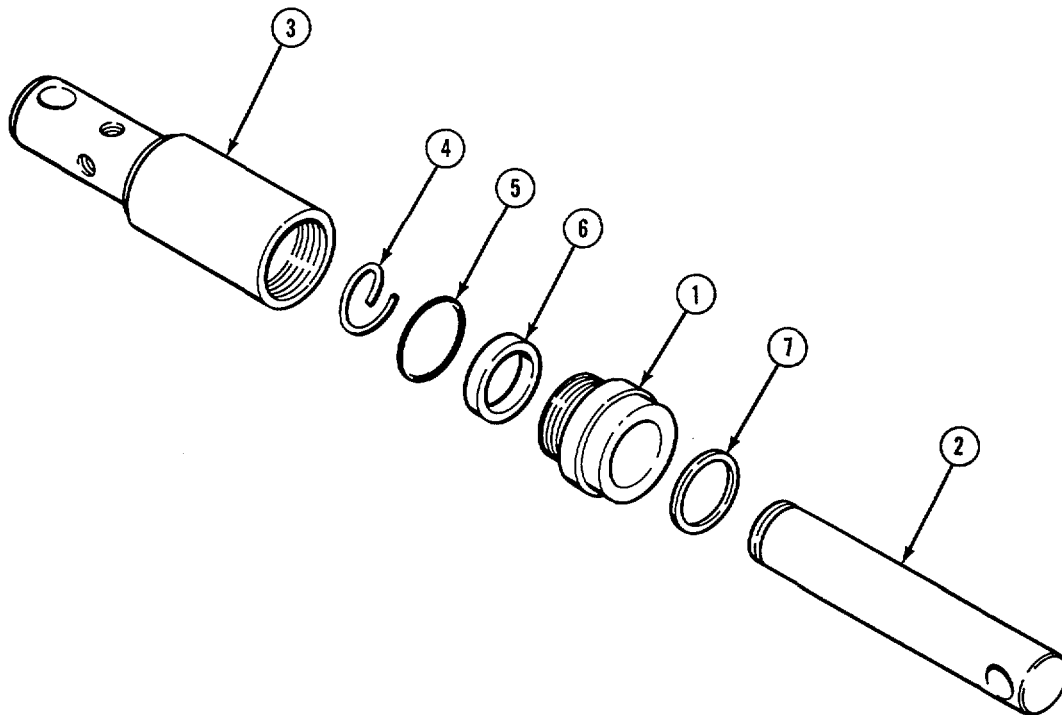
Equipment Condition

TM or Para
Para 4-119

Condition Description
Hydraulic cylinder
removed.

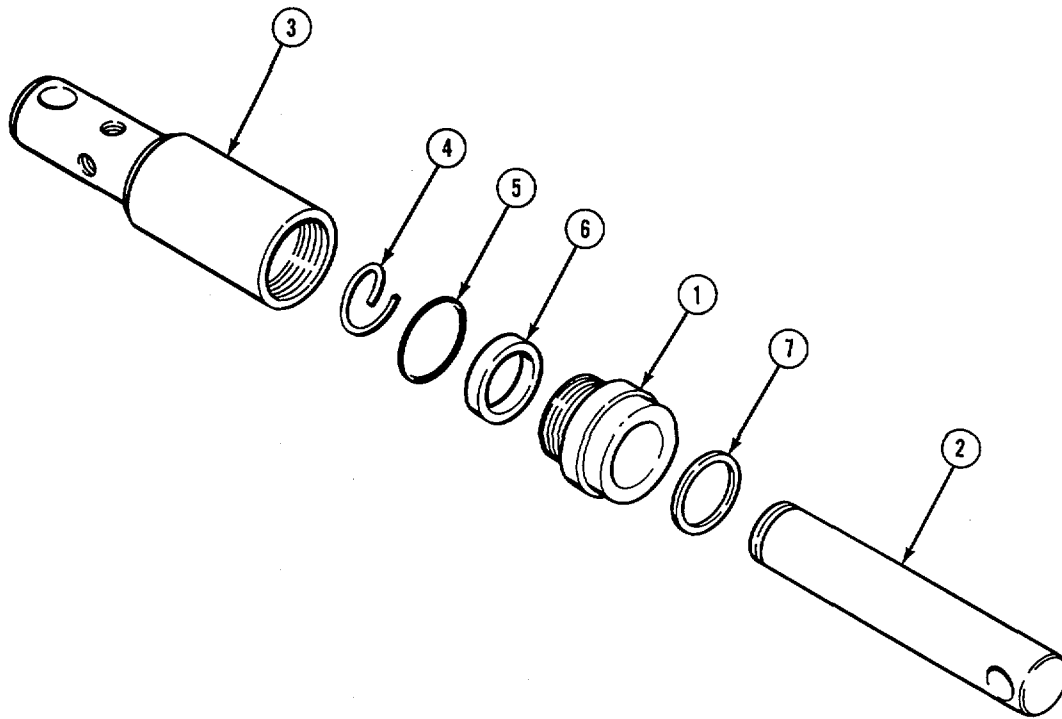
Materials/Parts

O-rings
Seals

**a. Disassembly.**

- (1) Remove head gland (1) and cylinder rod (2) as one piece from cylinder barrel (3) using a crescent wrench.
- (2) Remove retaining ring (4) from end of cylinder rod (2).
- (3) Slide head gland (1) off of cylinder rod (2).
- (4) Remove O-ring (5) from head gland (1).
- (5) Remove seals (6 and 7) from head gland (1).

5-42. HYDRAULIC CYLINDER REPAIR (CONT).

**b. Cleaning/Inspection.**

- (1) Inspect cylinder barrel (3), cylinder rod (2), and head gland (1) for cracks, dents, warpage or corrosion.
- (2) Replace any damaged or worn parts.

c. Assembly.

- (1) Install seals (7 and 6) in head gland (1).
- (2) Install O-ring (5) on head gland (1).
- (3) Slide head gland (1) onto cylinder rod (2).
- (4) Install retaining ring (4) on end of cylinder rod (2).
- (5) Install head gland (1) and cylinder rod (2) as one piece in cylinder barrel (3) using a crescent wrench.

NOTE

Follow-on maintenance: Install hydraulic cylinder (para 4-119)

END OF TASK

5-43. SPRAY PUMP REPAIR.

This task covers:

- a Disassembly
- b. Assembly

INITIAL SETUP:

Tools

Tool Kit, General Mechanic's: Automotive

Shop Equipment, Machine Shop, Field
Maintenance, Basic Less Power

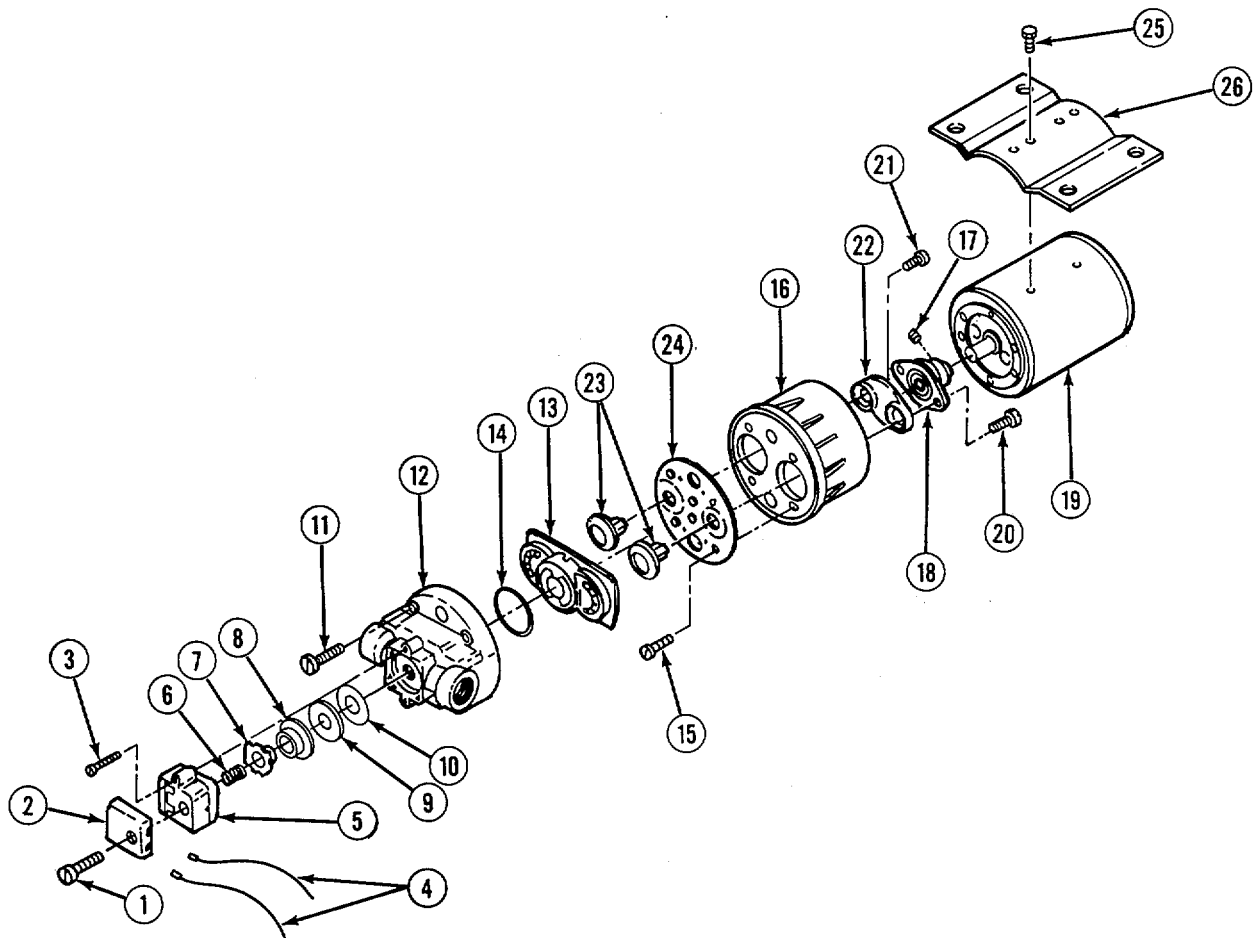
Equipment Condition

TM or Para
Para 4-120

Condition Description
Spray pump removed.

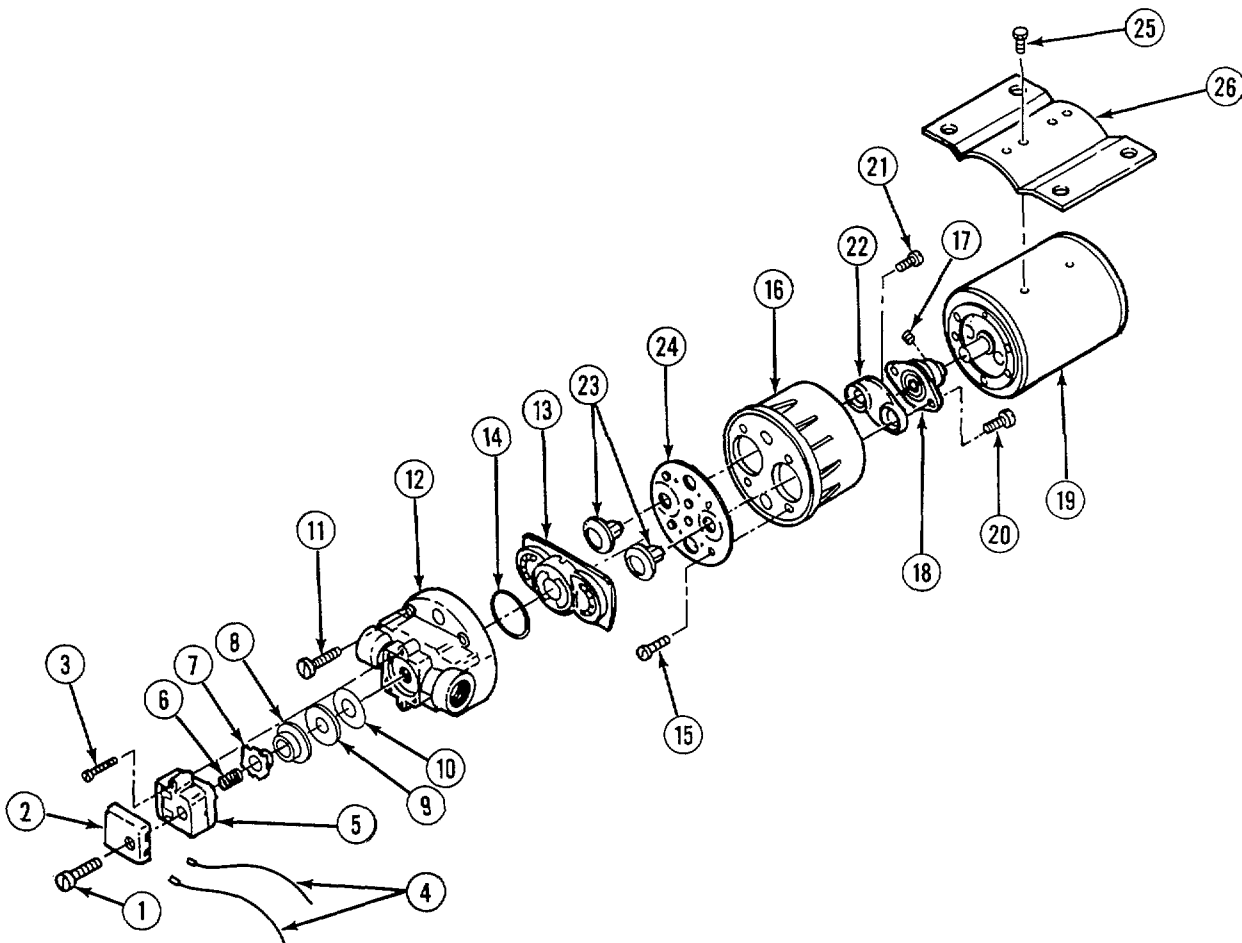
Materials/Parts

Pump diaphragms



a. Disassembly.

- (1) Remove screw (1), and cover (2) using a cross tip screwdriver.

5-43. SPRAY PUMP REPAIR (CONT).

- (2) Remove two screws (3), two wires (4), and pressure switch assembly (5) using a cross tip screwdriver.
- (3) Remove spring (6), spring holder (7), base plate (8), and two seals (9 and 10).
- (4) Remove four screws (11) using a cross tip screwdriver and remove pump housing (12).
- (5) Remove check valve assembly (13) from pump housing (12).
- (6) Remove seal (14) from check valve assembly (13).
- (7) Remove two screws (15) using a cross tip screwdriver.

NOTE

Bearing cover may have to be rotated several times in order to locate setscrew.

- (8) Twist bearing cover (16) to expose two rectangular holes and insert 1/8 in. hex head wrench through hole in bearing cover and loosen setscrew (17) on cam bearing (18).
- (9) Remove bearing cover (16) by sliding it off motor (19).

- (10) Remove two screws (20) using a cross tip screwdriver and remove cam bearing (18).
- (11) Remove two screws (21), inner piston (22), outer pistons (23), and diaphragm (24) using a cross tip screwdriver.
- (12) Remove two screws (25) and plate (26) using a ratchet and 5/16 in. socket.

b. Assembly.

- (1) Install plate (26) and two screws (25) using a ratchet and 5/16 in. socket.
- (2) Install diaphragm (24), outer pistons (23), inner piston (22), and two screws (21) on bearing cover (16) using a cross tip screwdriver.
- (3) Install cam bearing (18) and two screws (20) using a cross tip screwdriver.
- (4) Slide bearing cover (16) on motor (19).
- (5) Tighten setscrew (17) using a 1/8 in. hex head wrench.
- (6) Install two screws (15) using a cross tip screwdriver.
- (7) Install seal (14) on check valve assembly (13).
- (8) Install check valve assembly (13), pump housing (12), and four screws (11) using a cross tip screwdriver.
- (9) Install two seals (10 and 9), base plate (8), spring holder (7), and spring (6).
- (10) Install pressure switch assembly (5) and two screws (3) using a cross tip screwdriver. | (11) Connect two wires (4).
- (12) Install cover (2) and screw (1) using a cross tip screwdriver .

NOTE

Follow-on maintenance: Install spray pump (para 4-120)

END OF TASK

5-115/(5-116 blank)

APPENDIX A

REFERENCES

A-1. SCOPE

This appendix lists forms, field manuals, technical manuals, and other publications either referenced in this manual or which apply to the operation and maintenance of the Sweeper.

A-2. DEPARTMENT OF THE ARMY PAMPHLETS

Consolidated Index of Army Publications and Blank Forms..... DA Pam 25-30
 Using Unit Supply System (Manual Procedures)..... DA Pam 710-2-1
 The Army Maintenance Management System (TAMMS)..... DA Pam 738-750

A-3. FORMS

Recommended Changes to Publications and Blank Forms..... DA Form 2028
 Recommended Changes to Equipment Technical Publications..... DA Form 2028-2
 Organizational Control Record for Equipment..... DA Form 2401
 Equipment Inspection and Maintenance Worksheet..... DA Form 2404
 Maintenance Request..... DA Form 2407
 Preventive Maintenance Schedule and Record..... DD Form 314
 Product Quality Deficiency Report (NSN 7540-00-105-0078)..... SF 368

A-4. FIELD MANUALS

NBC Contamination Avoidance..... FM 3-3
 NBC Protection..... FM 3-4
 NBC Decontamination..... FM 3-5
 NBC Handbook..... FM 3-7
 Camouflage..... FM 5-20
 Operation and Maintenance of Ordnance Materiel in Extreme Cold
 Weather (0 Deg. to Minus 65 Deg. F)..... FM 9-207
 Vehicle Recovery Operations..... FM 20-22
 First Aid for Soldiers..... FM 21-11
 Basic Cold Weather Manual..... FM 31-70
 Northern Operations..... FM 31-71
 Army Motor Transport Units and Operators..... FM 55-30
 Desert Operations (How to Fight)..... FM 90-3
 Operational Symbols..... FM 101-5-1

A-5. SUPPLY BULLETIN

Storage Serviceability Standard - Tracked Vehicles,
 Wheeled Vehicles, and Component Parts..... SB 740-98-1

A-6. TECHNICAL BULLETINS

Equipment Improvement Report and Maintenance Digest
 (US Army Tank-Automotive Command) Tank-Automotive Equipment..... TB 43-0001-39-
 Series

Color, Marking, and Camouflage Painting of Military Vehicles,
 Construction Equipment, and Materiel Handling Equipment..... TB 43-0209

Maintenance in the Desert..... TB 43-0239

Description, Use, Bonding Techniques, and Properties of Adhesives..... TB ORD 1032

A-7. TECHNICAL MANUALS

Inspection, Care, and Maintenance of Antifriction Bearings..... TM 9-214

Operator's Manual for Welding Theory and Application..... TM 9-237

Deepwater Fording of Ordnance Materiel..... TM 9-238

Materials Used for Cleaning, Preserving, Abrading, and Cementing
 Ordnance Materiel and Related Items Including Chemicals..... TM 9-247

Organizational, Direct Support, and General Support Care, Maintenance,
 and Repair of Pneumatic Tires and Inner Tubes..... TM 9-2610-200-24

Tool Outfit Hydraulic System Test and Repair Unit (HYSTRU)..... TM 9-4940-468-14

Painting Instructions for Field Use..... TM 43-0139

Procedures for Destruction of Tank-Automotive Equipment
 to Prevent Enemy Use TM 750-244-6

A-8. OTHER PUBLICATIONS

Army Logistics Readiness and Sustainability..... AR 700-138

Packaging of Army Material for Storage and Shipment..... AR 746-1

Expendable/Durable Items (Except Medical, Class V,
 Repair Parts, and Heraldic Items)..... CTA 50-970

Abbreviations for Use on Drawings Specifications, Standards, and
 Technical Documents..... MILSTD-12

APPENDIX B

MAINTENANCE ALLOCATION CHART (MAC)

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 authority and responsibility for the performance of maintenance functions on the identified end item or component. The application of the maintenance functions to the end item or component will be consistent with the capacities and capabilities of the designated maintenance levels.

c. Section III lists the tools and test equipment required for each maintenance function as referenced from section II.

B-2. MAINTENANCE FUNCTIONS.

Maintenance functions will be limited to and defined as follows:

a. *Inspect.* To determine the serviceability of an item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination (e.g., by sight, sound, or feel).

b. *Test.* To verify serviceability by measuring the mechanical, pneumatic, hydraulic, or electrical characteristics of an item and comparing those characteristics with prescribed standards .

c. *Service.* Operations required periodically to keep an item in proper operating condition, i.e., to clean (includes decontaminate, when required), to preserve, to drain, to paint, or to replenish fuel, lubricants, chemical fluids, or gases.

d. *Adjust.* To maintain or regulate, 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. *Remove/Install.* To remove and install the same item when required to perform service or other maintenance functions. Install may be the act of emplacing, seating, or fixing into position a spare, repair part, or module (component or assembly) in a manner to allow the proper functioning of an equipment or system.

h. *Replace.* To remove an unserviceable item and install a serviceable counterpart in its place. "Replace" is authorized by the MAC and is shown as the 3rd position code of the SMR code.

i. Repair. The application of maintenance services, including fault location/troubleshooting, removal/installation, and disassembly/assembly procedures, and maintenance actions to identify troubles and restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), end item, or system.

B-3. EXPLANATION OF COLUMNS IN SECTION II.

a. Column 1, Group Number. Column 1 lists functional group code numbers, the purpose of which is to identify maintenance significant components, assemblies, subassemblies, and modules with the next higher assembly. End item group number shall be "OO."

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 Function. Column 3 lists the functions to be performed on the item listed in column 2.

d. Column 4, Maintenance Level Column 4 specifies, by the listing of a work time figure in the appropriate subcolumn(s), the level of maintenance authorized to perform the function listed in Column 3. This figure represents the active time required to perform that maintenance function at the indicated level of maintenance. If the number or complexity of the tasks within the listed maintenance function vary at different maintenance levels, appropriate work time figures will be shown for each level. The work time figure represents the average time required to restore an item (assembly, subassembly, component, module, end item, or system) to a serviceable condition under typical field operating conditions. This time includes preparation time (including any necessary disassembly/assembly time), troubleshooting/fault location 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 | H General Support Maintenance |
| O Organizational Maintenance | D Depot Maintenance |
| F Direct Support | |

e. Column 5, Tools and Equipment. Column 5 specifies, by code, those common tool sets (not individual tools) and special tools, TMDE, and support equipment required to perform the designated function.

f. Column 6, Remarks. This column shall, when applicable, contain a letter code in alphabetic order, which shall be keyed to the remarks contained in Section IV.

B-4. EXPLANATION OF COLUMNS IN TOOL AND TEST EQUIPMENT REQUIREMENT, SECTION III.

a. Column 1, Reference Code. The tool and test equipment reference code correlates with a code used in the MAC, Section II, Column 5.

b. Column 2, Maintenance Level The lowest level of maintenance authorized to use the tool or test equipment.

c. Column 3, Nomenclature. Name or identification of the tool or test equipment.

d. Column 4, Tool Kit. The national stock number of the tool or test equipment.

Section II. MAINTENANCE ALLOCATION CHART

(1) GROUP NUMBER	(2) COMPONENT ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS & EQUIPMENT	(6) REMARKS
			UNIT		INTMED		D		
			C	O	F	H			
01	ENGINE								
0100	Engine Assembly	Inspect Service Adjust Replace Repair		0.2	1.0 0.3 1.8		8.6	6 9 4, 6, 9 1, 4, 6, 7, 9, 11	
0101	Crankcase, Block, and Cylinder Head	Replace Repair					8.6 0.4	1, 7, 9, 11 1, 4, 6, 8, 9, 11	
0102	Crankshaft	Replace					8.3	1, 4, 6, 8, 9, 11	
0103	Flywheel Assembly	Replace Repair					1.1 1.2	1, 4, 8, 9 8, 9	
0104	Pistons and Connecting Rods	Replace Repair					5.2 0.7	1, 4, 8, 9, 11 1, 8	
0105	Valves, Camshafts, and Timing System	Adjust Replace Repair					0.4 5.5 0.7	4, 9 1, 4, 6, 8, 9, 11 1, 4, 6, 8, 9	
0106	Engine Lubrication System	Inspect Replace	0.1				2.4 1.1	4, 9	A
0108	Manifolds	Replace		0.5				4, 9	
0109	Accessory Driving Mechanisms	Replace		1.0				4, 9	
03	FUEL SYSTEM								
0301	Fuel Injector	Service Replace			1.2 1.0			1 9	
0302	Fuel Pumps	Adjust Replace		0.4	0.9 3.2			4, 9 4, 9, 11	B

* MAINTENANCE LEVELS:

C - OPERATOR/CREW = UNIT

O - ORGANIZATIONAL = UNIT

F - DIRECT SUPPORT

H - GENERAL SUPPORT

D - DEPOT

Section II. MAINTENANCE ALLOCATION CHART

(1) GROUP NUMBER	(2) COMPONENT ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS & EQUIPMENT	(6) REMARKS
			UNIT		INTMED				
			C	O	F	H	D		
0304	Air Cleaner	Inspect Replace	0.1	0.2				9	
	Vapor Separator	Replace		0.1				9	
0306	Tanks, Lines, Fittings, and Headers	Service Replace	0.2	1.1				4, 9	
0308	Engine Speed Governor and Controls	Adjust Replace Repair		0.3	2.0 1.1			9 1, 4, 8, 9 4, 9	
0309	Fuel Filters	Replace		0.4				4, 9	
0311	Glow Plugs	Replace		0.3				9	
04	EXHAUST SYSTEM								
0401	Muffler and Pipes			0.3				4	
05	COOLING SYSTEM								
0502	Cowling, Deflectors, Air Ducts, Shrouds	Replace		2.8				4, 9	
06	ELECTRICAL SYSTEM								
0601	Generator, Alternator	Replace		1.0				6, 9	
0603	Starting Motor	Replace Repair		0.4	1.0			4, 9 8	
0607	Instruments or Engine Control Panel	Replace		0.7				9	
0608	Miscellaneous Items	Replace Repair		1.9 0.4				9 9	

* MAINTENANCE LEVELS:
C - OPERATOR/CREW = UNIT
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D - DEPOT

Section II. MAINTENANCE ALLOCATION CHART

(1) GROUP NUMBER	(2) COMPONENT ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS & EQUIPMENT	(6) REMARKS
			UNIT		INTMED		D		
			C	O	F	H			
0609	Light Mount	Replace		1.0				9	
	Lights	Inspect Replace	0.1	0.3				9	
0610	Fuel Sending Unit	Replace		0.2				9	
0612	Battery, Storage (Wet or Dry)	Inspect Service Replace Repair	0.2 0.2	0.4	0.5			9	
0613	Hull or Chassis Wiring Harness	Replace Repair		1.9 0.4				9 9	
12	BRAKES								
1201	Hand Brakes	Inspect Service Adjust Replace Repair	0.1 0.1	0.2 1.2 0.7 1.1				9 9 4, 9	C
13	WHEELS								
1311	Wheels and Axles	Inspect Replace Repair	0.1	0.7 0.6				4, 9 4, 9	
1313	Tires	Inspect Service Replace Repair	0.1	0.1 1.1 0.2	0.8			4, 9	D
<p>* MAINTENANCE LEVELS: C - OPERATOR/CREW = UNIT O - ORGANIZATIONAL = UNIT F - DIRECT SUPPORT H - GENERAL SUPPORT D - DEPOT</p>									

Section II. MAINTENANCE ALLOCATION CHART

(1) GROUP NUMBER	(2) COMPONENT ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS & EQUIPMENT	(6) REMARKS
			UNIT		INTMED				
			C	O	F	H	D		
15	FRAME, TOWING ATTACHMENTS, AND DRAWBAR								
1501	Main Frame Assembly	Inspect Service Repair	0.2	0.2		10.1		1, 4, 6, 8, 9	
	Modified Spindle	Replace		1.7				4, 9	
1503	Pintle and Towing Attachments								
	Tow Pole and Strut	Service Replace Repair			0.2 0.5 0.2			4, 9 4, 9	
18	BODY, CAB, HOOD AND HULL								
	Body, Cab, Hood and Hull Assemblies	Replace		1.6				4, 9	
22	BODY CHASSIS OR HULL AND ACCESSORY ITEMS								
2210	Data Plates and Instrument Holders	Replace		0.8				9	
24	HYDRAULIC LIFT COMPONENTS								
2401	Hydraulic Pump	Replace Repair		0.5		0.5		4, 9 4, 8, 9	
	Hydraulic Motor	Replace Repair		0.8		1.0		4, 9 4, 8, 9	
2402	Hydraulic Control Valve	Replace Repair		1.0		1.2		4, 9 4, 8, 9	
<p>* MAINTENANCE LEVELS: C - OPERATOR/CREW = UNIT O - ORGANIZATIONAL = UNIT F - DIRECT SUPPORT H - GENERAL SUPPORT D - DEPOT</p>									

Section II. MAINTENANCE ALLOCATION CHART

(1) GROUP NUMBER	(2) COMPONENT ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS & EQUIPMENT	(6) REMARKS
			UNIT		INTMED		D		
			C	O	F	H			
2406	Hydraulic Lines and Fittings	Inspect Service Replace Repair	0.1	0.5 1.0	0.5			4, 9 4, 9, 10	
47	NON-ELECTRICAL GAUGES								
4701	Tachometer	Replace		0.5				9	
71	SWEEPING EQUIPMENT COMPONENTS								
7111	Sweeper Head	Inspect Service Adjust Replace	0.1	0.3 0.4 3.4				9 6, 9	
7113	Hydraulic Cylinder	Inspect Replace Repair	0.1	2.3	0.5			6, 9 4	
7114	Spray System	Inspect Service Replace Repair	0.1 0.2	1.4 0.2	0.4			6, 9 6, 8, 9	E

* MAINTENANCE LEVELS:
C - OPERATOR/CREW = UNIT
O - ORGANIZATIONAL = UNIT

F - DIRECT SUPPORT
H - GENERAL SUPPORT

D - DEPOT

Section III. TOOL AND TEST EQUIPMENT REQUIREMENTS

Table B-1. Tool and Test Equipment Requirements

TOOL OR TEST EQUIPMENT REF CODE	MAINTENANCE LEVEL	NOMENCLATURE	TOOL KIT STOCK NUMBER
1	F, H	Tool Kit, Master Mechanic's	5180-00-699-5273
2	O	Tool Kit, Body & Fender Repair	5180-00-754-0643
3	O, F, H	Tool Kit, Automotive and Electrical System Repair	5180-00-754-0655
4	O	Shop Equipment, Automotive Maintenance and Repair; Organizational Maintenance, Common No. 1, Less Power	4910-00-754-0654
5	O	Shop Equipment, Automotive Maintenance and Repair; Organizational Maintenance, Supplemental Set No. 1, Less Power	4910-00-754-0653
6	O	Shop Equipment, Automotive Maintenance and Repair Organizational Maintenance Common No. 2, Less Power	4910-00-754-0650
7	F, H	Shop Equipment, Fuel and Electrical System Engine, Field Maintenance, Basic, Less Power	4910-00-754-0714
8	F, H	Shop Equipment, Machine Shop Field Maintenance; Basic, Less Power	3470-00-754-0708
9	O	Tool Kit, General Mechanic's: Automotive	5180-00-177-7033
10	F	Tool Outfit, Hydraulic Systems Test and Repair (HYSTRU)	4740-01-036-5784
11	F	Special Tool: Spring Compressor	CAGE: 2X179 PN 7535.1460.009

Section IV. REMARKS

REFERENCE CODE	REMARKS
A (O),	The oil pan and oil filter housing are replaced at the Organizational Level paragraph 4-29 and paragraph 4-30. The oil pump is replaced at the Direct Support Level (F), paragraph 5-27.
B	The fuel pump is replaced at the Organizational Level (O) using tool kits 4 and 9, paragraph 4-35. The injector pump is replaced at the Direct Support Level (F) using tool kits 4, 9, and 11, paragraph 5-33.
C	The Crew (C) adjustment is addressed in paragraph 3-12. The Organizational Level (O) adjustment is addressed in paragraph 4-85.
D	Repair of tires at Organizational Level (O) is limited to plugging the tire.
E	The spray bar repair is performed at the Organizational Level (O) using tool kits 6 and 9, paragraph 4-124. The spray pump repair is performed at the Direct Support Level (F) using tool kits 6, 8, and 9, paragraph 5-43.

B-9/(B-10 blank)

**APPENDIX C
COMPONENTS OF END ITEM AND BASIC ISSUE ITEMS LIST**

The Rotary Towed Sweeper does not have any Components of End Item or Basic Issue Items.

**APPENDIX D
ADDITIONAL AUTHORIZATION LIST**

The Rotary Towed Sweeper does not have any Additional Authorized items for its support.

C-1/D-1 (D-2 blank)

**APPENDIX E
EXPENDABLE SUPPLIES AND MATERIALS LIST**

Section I. INTRODUCTION

E-1. SCOPE.

This appendix lists expendable supplies and materials you will need to operate and maintain the Rotary Towed Sweeper. These items are authorized to you by CTA 50-970, Expendable Items (Except Medical, Class V, Repair Parts and Heraldic Items) or CTA 8-100, Army Medical Department Expendable/Durable Items.

E-2. EXPLANATION OF COLUMNS. I

a. Column (1) - Item Number. This number is assigned to the entry in the listing and is referenced in the narrative task box to identify the material (e.g., "Compound, cleaning, item 5, appendix E).

b. Column (2) - Level This column identifies the lowest level of maintenance that requires the listed items.

- 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 Commercial And Government Entity (CAGE) code in parentheses followed by the part number.

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. I

Section II. EXPENDABLE SUPPLIES AND MATERIALS LIST

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) UM/UI
1	O	8040-00-573-1502	Adhesive, PVC	ea
2	O	8040-01-152-8104	Adhesive No. PL200	ea
3	O	8040-00-995-0590	Adhesive, Sealant: Silicone RTV, general purpose (MIL-A-46106A) 108 (CAGE 01139)	ea
4	O	8020-00-207-6658	Brush, Paint: Oval, 1-1/8 in. wide	ea
5	O	8020-00-559-0389	Brush, Paint: 2 in. wide	ea
6	O	7920-00-291-5815	Brush, S-Wire: Curved handle, wire lg. outside block: 1-1/8 to 1-1/4 in. 4 rows wide, 18 rows long, 14 in. long	ea
7	C	7930-00-634-3935	Chips, Soap, P-S-579	lb
8	O	5350-00-221-0872	Cloth, Abrasive: Crocus, ferric oxide and quartz. Jean-cloth backing. Exposed coat, 9x11 sh, 50-sh sheave (81348) P-C-458, 42-C-20420-50.	sh
9	O	5350-00-161-9066	Cloth, Abrasive: Al-oxide, jean-cloth backing, closed coat 9x11 sh, 50-sh sheave, P-C-451A, type 1, class 1.	ea
10	O	6850-01-146-8003	Compound, Cleaning	ea
11	O	8030-00-027-4929	Compound, Corrosion Preventive	ea
12	H	5350-00-927-3867	Compound, Grinding (8 oz jar)	oz
13	O	5970-00-166-5697	Compound, Ignition Insulation	oz
14	O	8030-00-833-9116	Compound, Locking, Thread: Grade AV red MIL-S-22473, 6 oz tube.	cc
15	O	8040-00-843-0802	Compound, Sealing, Permatex #14	kt
16	O	8030-01-054-0740	Compound, Sealing, Pipe Thread	cc
17	C	7930-00-282-9699	Detergent: Non sudsing, general purpose, liquid (80244) MIL-D-16791 type 1, 1 gal container	gl
18	O	8010-00-297-2124	Enamel: Green color no. 2430 (81340) Fed Std No. 595 brush and spray application (81348) TT-E-485, type II, 1 gal can.	gl
19	O	9150-00-082-7524	Fluid, Hydraulic, Petroleum Base: Aircraft, missile, and ordinance (MIL-H-5606).	gl

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) UM/UI
20	O	5210-01-222-8068	Gage: Plastic adjustment	ea
21	O	5210-00-640-6177	Gaging Plastic: Green	ea
22	C		Grease, Automotive and Artillery (MIL-6-10924)	
		9150-00-065-0029	2-1/4 oz tube	oz
		9150-00-935-1017	14-oz cartridge	oz
		9150-00-190-0904	1-lb can	lb
		9150-00-190-0905	5-lb can	lb
		9150-00-190-0907	35-lb can	lb
23	F	2640-00-256-5526	Lubricant, Tire Bead (1 qt can)	ea
24	C		Oil, Fuel, Diesel DF-Z regular (VV-F-800)	
		9140-00-286-5294	Bulk	gl
		9140-00-286-5294	5-gal drum	gl
		9140-00-286-5296	55-gal drum, 16 gauge	gl
		9140-00-286-5297	55-gal drum, 18 gauge	gl
25	C	9159-00-186-6681	Oil, Lubricating Engine: MIL-L-2104, OE/HDO 10 (81349)	
		9150-00-189-6727	1 qt can	qt
		9150-00-186-6668	5-gal can	gl
		9150-00-191-2772	55-gal drum	gl
26	O		Oil, Lubricating Engine: Internal Combustion Engine, OE/HDO 15 W/40 (81349) MIL-L-2104	
		9150-01-152-4117	1-qt can	qt
		9150-01-152-4118	5-gal drum	gl
		9150-01-152-4119	55-gal drum	gl
27	C	9150-01-293-2772	Oil, Lubricating: General purpose, preservative, MIL-L-21260	gl
28	O	8040-01-004-2705	Primer, PVC	pt
29	C	7920-00-148-9666	Rag, Wiping: Cotton and cotton-synthetic (58356)	lb
			A-A-531	
30	F	3439-01-088-3256	Solder	lb
31	O		Solvent, Dry Cleaning, SD Type II (P-D-680) (81348)	
		6850-00-664-5685	1-qt can	qt
		6850-00-274-5421	5-gal can	gl
32	O	5970-00-644-3167	Tape, Insulation Electrical (MIL-T-50886) 3/4", 82.5 ft roll	ft

(1)	(2)	(3)	(4)	(5)
ITEM NUMBER	LEVEL	NATIONAL STOCK NUMBER	DESCRIPTION	U/M
33	O	7510-00-266-6711	Tape, Masking, A-A-883	yd
34	O	9320-01-053-8266	Tape, Teflon	rl
35	O	8135-00-178-9200	Tags, Identification (MIL-T-12755) 1, 000/pk	pk
36	O	5975-00-984-6582	Ties, Cable: Plastic MIL-S-29190	hd

APPENDIX F
UNIT, DIRECT SUPPORT, AND GENERAL SUPPORT MAINTENANCE
REPAIR PARTS AND SPECIAL TOOLS LIST
Section I. INTRODUCTION

F-1. SCOPE.

This RPSTL lists and authorizes spares and repair parts; special tools; special test, measurement, and diagnostic equipment (TMDE); and other special support equipment required for performance of unit, direct support, and general support maintenance of the rotary towed sweeper. It authorizes the requisitioning, issue, and disposition of spares, repair parts and special tools as indicated by the source, maintenance, and recoverability (SMR) codes.

F-2. GENERAL.

In addition to Section I, Introduction, this Repair Parts and Special Tools List is divided into the following sections:

a. Section II. Repair Parts List. A list of spares and repair parts authorized by this RPSTL for use in the performance of maintenance. The list also includes parts which must be removed for replacement of the authorized parts. Parts Lists are composed of functional groups in ascending alphanumeric sequence, with the parts in each group listed in ascending figure and item number sequence. Bulk materials are listed by item name in FIG BULK at the end of the section. Repair parts kits or sets are listed separately in their own functional group within Section II. Repair parts for repairable special tools are also listed in the section.

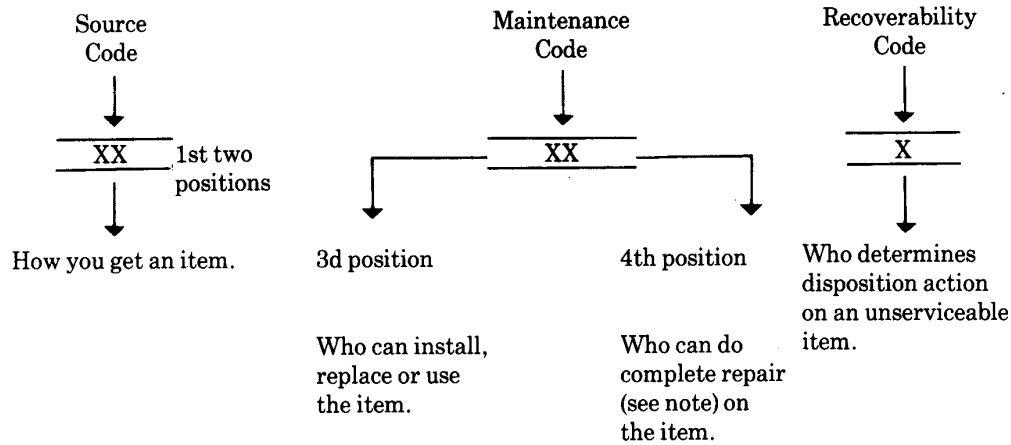
b. Section III. Special Tools List. A list of special tools, special TMDE, and other special support equipment authorized by this RPSTL (as indicated by Basis of Issue (BOI) information in DESCRIPTION AND USABLE ON CODE (UOC) column) for the performance of maintenance.

c. Section IV. Cross-Reference Indexes. A list, in National item identification number (NIIN) sequence, of all National stock numbered items appearing in the listings, followed by a list in alphanumeric sequence of all part numbers appearing in the listings. National stock numbers and part numbers are cross-referenced to each illustration figure and item number appearance. The figure and item number index lists figure and item numbers in alphanumeric sequence and cross-references NSN, CAGEC, and part numbers.

F-3. EXPLANATION OF COLUMNS (SECTIONS II AND III).

a. ITEM NO. (Column (1)). Indicates the number used to identify items called out in the illustration.

b. SMR CODE (Column (2)). The Source, Maintenance, and Recoverability (SMR) code is a 5-position code containing supply/requisitioning information, maintenance category authorization criteria, and disposition instruction, as shown in the following breakout:



* Complete Repair: Maintenance capacity, capability, and authority to perform all corrective maintenance tasks for the "Repair" function in a use/user environment in order to restore serviceability to a failed item.

- (1) Source Code. The source code tells you how to get an item needed for maintenance, repair, or overhaul of an end item/equipment. Explanations of source codes follows:

Explanation

PA
PB
PC
PD
PE
PF
PG

Stocked items; use the applicable NSN to request/requisition items with these source codes. They are authorized to the category indicated by the code entered in the 3rd position of the SMR code.

**NOTE: Items coded PC are subject to deterioration.

KD
KF
KB

Items with these codes are not to be requested/requisitioned individually. They are part of a kit which is authorized to the maintenance category indicated in the 3rd position of the SMR code. The complete kit must be requisitioned and applied.

MO—Made at org/
AVUM category
MF—Made at DS/
AVUM category
MH—Made at GS
category
ML—Made at
Specialized
Repair Activity
(SRA)
MD—Made at Depot

Items with these codes are not to be requested/requisitioned individually. They must be made from bulk material which is identified by the part number in the DESCRIPTION AND USABLE ON CODE (UOC) column and listed in the Bulk Material group of the repair parts list in this RPSTL. If the item is authorized to you by the 3rd position code of the SMR code, but the source code indicates it is made at a higher level, order the item from the higher level of maintenance.

Explanation

AO —Assembled by org/AVUM category
 AF —Assembled by DS/AVUM category
 AH —Assembled by GS category
 AL —Assembled by SRA
 AD —Assembled by Depot

Items with these codes are not to be requested/requisitioned individually. The parts that make up the assembled item must be requisitioned or fabricated and assembled at the level of maintenance indicated by the source code. If the 3^d position code of the SMR code authorizes you to replace the item, but the source code indicated the item is assembled at a higher level, order the item from the higher level of maintenance.

- XA- Do not requisition an "XA"-coded item. Order its next higher assembly. (Also, refer to the NOTE below.)
- XB- If an "XB" item is not available from salvage, order it using the CAGEC and part number given.
- XC Installation drawing, diagram, instruction sheet, field service drawing, that is identified by manufacturer's part number.
- XD- Item is not stocked. Order an "XD"-coded item through normal supply channels using the CAGEC and part number given, if no NSN is available.

NOTE

Cannibalization or controlled exchange, when authorized, may be used as a source of supply for items with the above source codes, except for those source coded "XA".

- (2) Maintenance Code. Maintenance codes tell you the level(s) of maintenance authorized to USE and REPAIR support items. The maintenance codes are entered in the third and fourth positions of the SMR Code as follows:
 - (a) The maintenance code entered in the third position tells you the lowest maintenance level authorized to remove, replace, and use an item. The maintenance code entered in the third position will indicate authorization to one of the following levels of maintenance.

Code	Application/Explanation
C	- Crew or operator maintenance done within organizational maintenance.
O	- Organizational can remove, replace, and use the item .
F	- Direct support level can remove, replace, and use the item.
H	- General support level can remove, replace, and use the item.
L	- Specialized repair activity can remove, replace, and use the item.
D	- Depot level can remove, replace, and use the item.

(b) The maintenance code entered in the fourth position indicates whether the item is to be repaired and identifies the lowest maintenance level with the capability to perform complete repair (i.e., all authorized maintenance functions). (NOTE: Some limited repair may be done on the item at a lower level of maintenance, if authorized by the Maintenance Allocation Chart (MAC) and SMR codes.) This position will contain one of the following maintenance codes:

Code	Application/Explanation
O	-Organizational is the lowest level that can do complete repair of the item.
F	-Direct support is the lowest level that can do complete repair of the item.
H	-General support is the lowest level that can do complete repair of the item.
L	-Specialized repair activity is the lowest level that can do complete repair of the item.
D	-Depot is the lowest level that can do complete repair of the item.
Z	-Nonreparable. No repair is authorized.
B	-No repair is authorized. (No parts or special tools are authorized for the maintenance of a "B"-coded item.) However, the item may be reconditioned by adjusting, lubrication, etc., at the user level.

(3) Recoverability Code. Recoverability codes are assigned to items to indicate the disposition action on unserviceable items. The recoverability code is entered in the fifth position of the SMR Code as follows:

Code	Application/Explanation
Z	- Nonreparable item. When unserviceable, condemn and dispose of the item at the level of maintenance shown in the 3rd position of SMR Code.
O	- Reparable item. When uneconomically reparable, condemn and dispose of the item at organizational level.
F	- Reparable item. When uneconomically reparable, condemn and dispose of the item at the direct support level.
H	- Reparable item. When uneconomically reparable, condemn and dispose of the item at the general support level.
D	- Reparable item. When beyond lower level repair capability, return to depot. Condemnation and disposal of item not authorized below depot level.
L	- Reparable item. Condemnation and disposal not authorized below specialized repair activity (SRA).
A	- Item requires special handling or condemnation procedures because of specific reasons (e.g., precious metal content, high dollar value, critical material or hazardous material). Refer to appropriate manuals/directives for specific instructions.

c. **CAGEC (Column (3)).** The Commercial and Government Entity Code (CAGEC) is a 5-digit numeric code which is used to identify the manufacturer, distributor, or Government agency, etc., that supplies the item.

d. **PART NUMBER (Column (4)).** Indicates the primary number used by the manufacturer (individual, company, firm, corporation, or Government activity), which controls the design and characteristics of the item by means of its engineering drawings, specifications standards, and inspection requirements to identify an item or range of items.

NOTE

When you use a NSN to requisition an item, the item you receive may have a different part number from the part ordered.

e. **DESCRIPTION AND USABLE ON CODE (UOC) (Column (5)).** This column includes the following information:

- (1) The Federal item name and, when required, a minimum description to identify the item.
- (2) Part numbers for bulk materials are referenced in this column in the line item entry for the item to be manufactured/fabricated.
- (3) In the Special Tools List section, the basis of issue (BOI) appears as the last line(s) in the entry for each special tool, special TMDE, and other special support equipment. When density of equipments supported exceeds density spread indicated in the BOI, the total authorization is increased proportionately.
- (4) The statement "END OF FIGURE" appears just below the last item description in Column 5 for a given figure in both Section II and Section III.

f. **QTY (Column (6)).** The QTY (quantity per figure column) indicates the quantity of the item used in the breakout shown on the illustration figure, which is prepared for a functional group, subfunctional group, or an assembly. A "V" appearing in this column in lieu of a quantity indicates that the quantity is variable and the quantity may vary from application to application.

F-4. EXPLANATION OF COLUMNS (SECTION IV).

a. NATIONAL STOCK NUMBER (NSN) INDEX

(1) **STOCK NUMBER** column. This column lists the NSN by National Item Identification Number (NIIN) sequence. The NIIN consists of the last nine digits of the NSN i.e.

$$\text{NSN i.e. } (5305-01-574-1467).$$

$$\begin{array}{r} \text{NSN} \\ \hline \text{NIIN} \end{array}$$

When using this column to locate an item, ignore the first 4 digits of the NSN. However, the complete NSN should be used when ordering items by stock number.

- (2) **FIG.** column. This column lists the number of the figure where the item is identified/located. The figures are in numerical order in Section II and Section III.
- (3) **ITEM** column. The item number identifies the item associated with the figure listed in the adjacent FIG. column. This item is also identified by the NSN listed on the same line.

b. PART NUMBER INDEX. Part numbers in this index are listed by part number in ascending alphanumeric sequence (i.e., vertical arrangement of letter and number combination which places the first letter or digit of each group in order A through Z, followed by the numbers 0 through 9 and each following letter or digit in like order).

(1) CAGEC column. The Commercial and Government Entity Code (CAGEC) is a 5-digit numeric code used to identify the manufacturer, distributor, or Government agency, etc., that supplies the item.

(2) PART NUMBER column. Indicates the primary number used by the manufacturer (individual, firm, corporation, or Government activity), which controls the design and characteristics of the item by means of its engineering drawings, specifications, and inspection requirements to identify an item or range of items.

(3) STOCK NUMBER column. This column lists the NSN for the associated part number and manufacturer identified in the PART NUMBER and CAGEC columns to the left.

(4) FIG. column. This column lists the number of the figure where the item is identified/located in Sections II and III.

(5) ITEM column. This item number is that number assigned to the item as it appears in the figure referenced in adjacent figure number column.

c. FIGURE AND ITEM NUMBER INDEX

(1) FIG. column. This column lists the number of the figure where the item is identified/located in Section II and III.

(2) ITEM column. This item number is that number assigned to the item as it appears in the figure referenced in the adjacent figure number column.

(3) STOCK NUMBER column. This column lists the NSN for the item.

(4) CAGEC column. The Commercial and Government Entity Code (CAGEC) is a 5-digit numeric code used to identify the manufacturer, distributor, or Government agency, etc., that supplies the item.

(5) PART NUMBER column. Indicates the primary number used by the manufacturer (individual, firm, corporation, or Government activity), which controls the design and characteristics of the item by means of its engineering drawings, specifications standards, and inspection requirements to identify an item or range of items.

F-5. SPECIAL INFORMATION.

a. USABLE ON CODE. The usable on code appears in the lower left corner of the Description column heading. Usable on codes are shown as "UOC. in the Description Column (justified left) on the last line applicable item description/nomenclature. Uncoded items are applicable to all models. Identification of the usable code used in this publication is:

Code	Used On
874	Model 53MH

F-6. HOW TO LOCATE REPAIR PARTS.**a. When National Stock Number or Part Number is NOT Known.**

(1) First. Using the table of contents, determine the assembly group or subassembly group to which the item belongs. This is necessary since figures are prepared for assembly groups and subassembly groups, and listings are divided into the same groups.

(2) Second. Find the figure covering the assembly group or subassembly group to which the item belongs.

(3) Third. Identify the item on the figure and note the item number.

(4) Fourth. Refer to the Repair Parts List for the figure to find the part number for the item number noted on the figure.

(5) Fifth. Refer to the Figure and Item Number Index to find the NSN, if assigned.

b. When National Stock Number or Part Number is Known.

(1) First. Using the Index of National Stock Numbers and Part Numbers, find the pertinent National Stock Number or Part Number. The NSN index is in National Item Identification Number (NIIN) sequence (see paragraph F-4a.(1)). The part numbers in the Part Number index are listed in ascending alphanumeric sequence (see paragraph F-4b.). Both indexes cross-reference you to the illustration figure and item number of the item you are looking for.

(2) Second. After finding the figure and item number, verify that the item is the one you are looking for, then locate the item number in the repair parts list for the figure.

F-7. ABBREVIATIONS.

Abbreviations used in this manual are listed in MIL-STD-12.

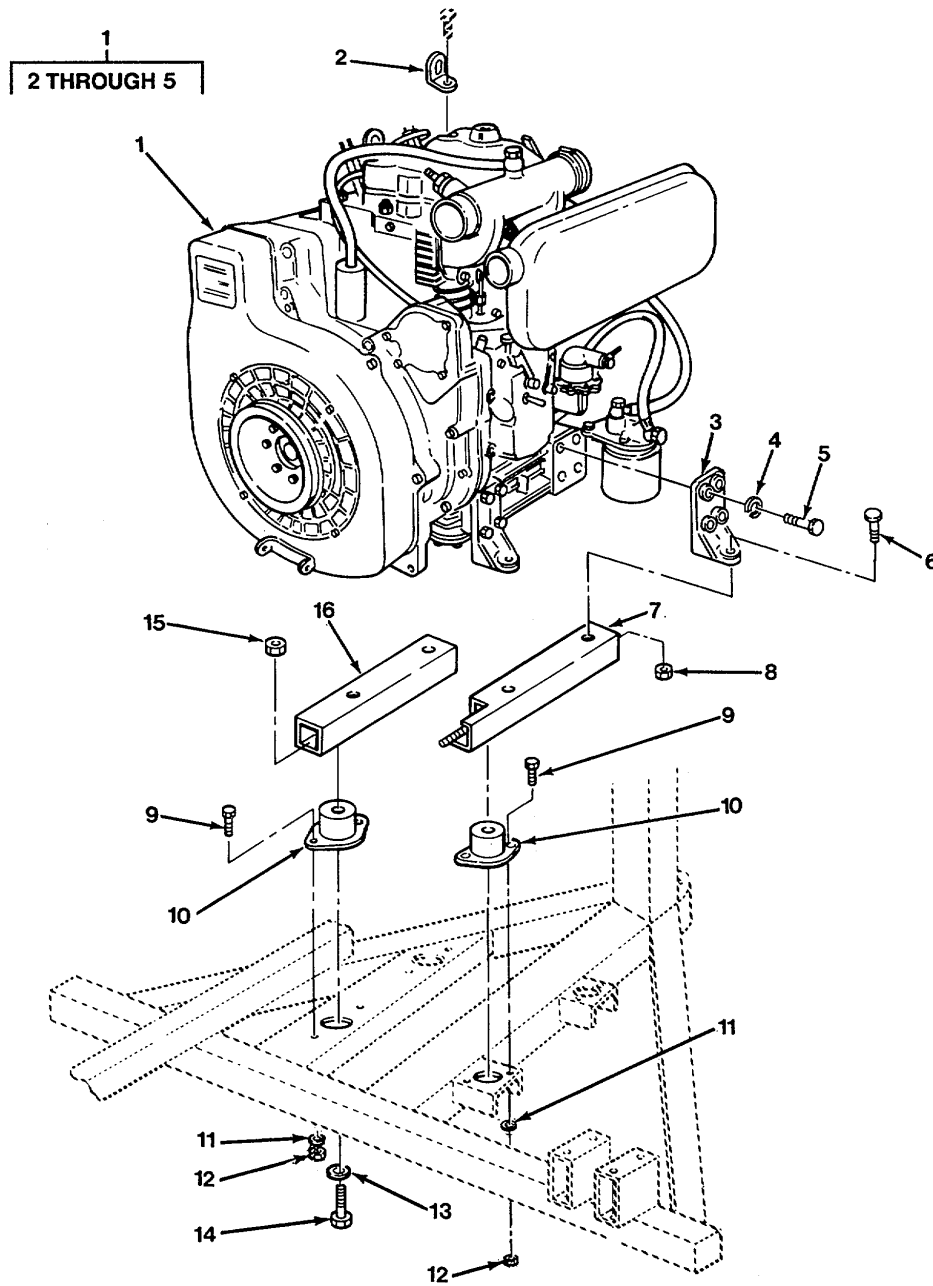


Figure 1. Engine Assembly

SECTION II					
(1)	(2)	(3)	(4)	(5)	(6)
ITEM NO	SMR CODE	CAGEC	PART NUMBER	DESCRIPTION AND USABLE ON CODES (UOC)	QTY
GROUP 01 ENGINE					
GROUP 0100 ENGINE ASSEMBLY					
FIG. 1 ENGINE ASSEMBLY					
1	PAOFF	66234	500-92018	ENGINE, DIESEL.....	1
2	PFOZZ	2X179	904.8506.003	.BRACKET, ANGLE	2
3	PFOZZ	2X179	560.6429.033	.MOUNT, RESILIENT	4
4	PFOZZ	2X179	9.7565.011	.WASHER, LOCK M10.....	16
5	PFOZZ	2X179	9.1780.007	.SCREW, CAP, HEXAGON H M10X1, 50X35.9.....	16
*	PFOZZ	80204	81821BH063C350N	SCREW, CAP, HEXAGON H 5/8-11UNCX3.5.....	4
				GR8	
7	PFOZZ	66234	410-92704	BRACKET, VEHICULAR	1
8	PFOZZ	96906	MS51922-49	NUT, SELF-LOCKING, HE 5/8-11UNC.....	4
9	PFOZZ	96906	MS35206-267	SCREW, MACHINE 10-24UNCX3/4.....	8
10	PFOZZ	76005	200XPD-60	MOUNT, RESILIENT	4
11	PFOZZ	96906	MS35338-43	WASHER, LOCK NO.10.....	8
12	PFOZZ	96906	MS35649-202	NUT, PLAIN, HEXAGON 10-24UNC.....	8
13	PFOZZ	96906	MS27183-13	WASHER, FLAT 3/3.....	4
14	PFOZZ	96906	MS90725-68	SCREW, CAP, HEXAGON H 3/8-16UNCX2.5.....	8
				GR5	
15	PFOZZ	96906	MS51922-17	NUT, SELF-LOCKING, HE 3/8-16UNC.....	8
16	PFOZZ	66234	401-94420	TUBE, METALLIC	1

END OF FIGURE

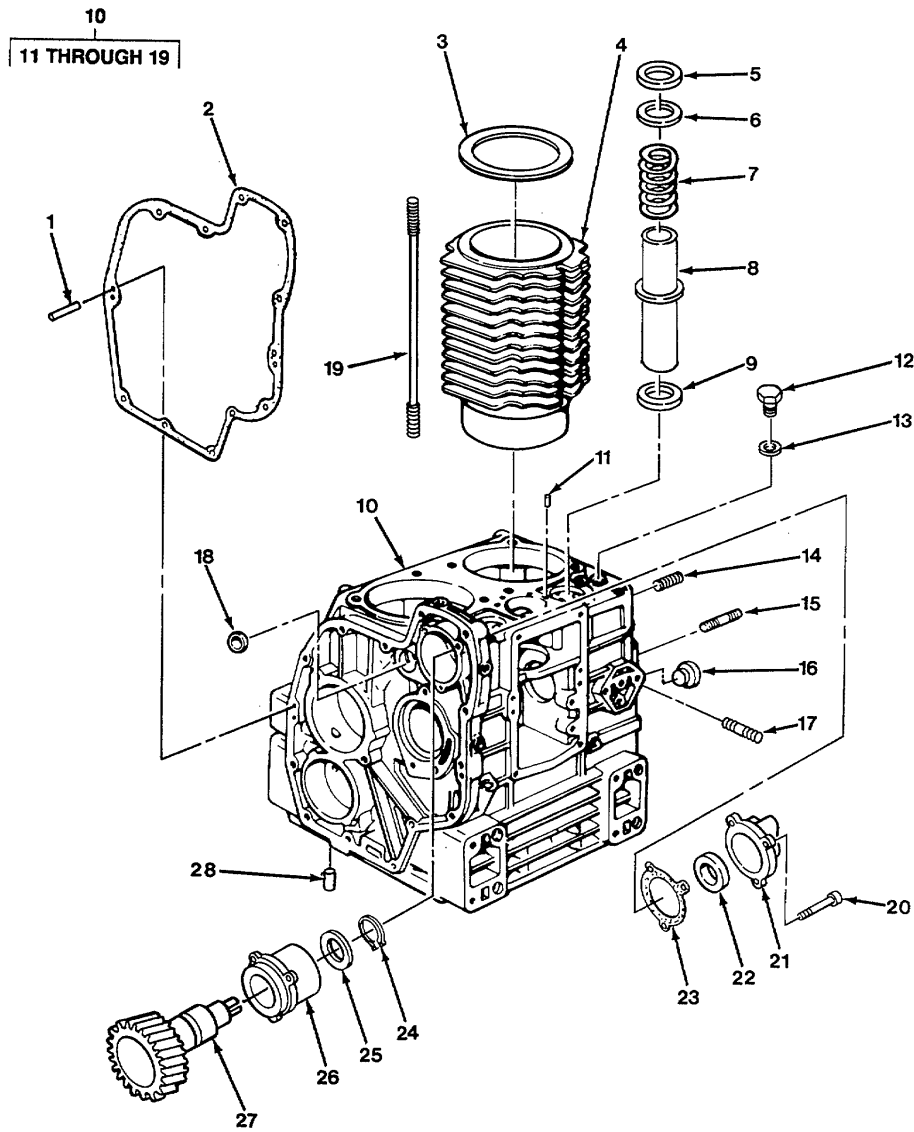


Figure 2. Cylinder and Crankcase Assembly

SECTION II					
(1)	(2)	(3)	(4)	(5)	(6)
ITEM NO	SMR CODE	CAGEC	PART NUMBER	DESCRIPTION AND USABLE ON CODES (UOC)	QTY
GROUP 0101 CRANKCASE, BLOCK, CYLINDER HEAD					
FIG. 2 CYLINDER AND CRANKCASE ASSEMBLY					
1	PFFZZ	2X179	276.8460.055	PIN, TAPERED, PLAIN	2
2	KFFZZ	2X179	360.4701.041	GASKET, CRANKCASE PART OF KIT P/N	1
				395.8180.062	
3	KFFZZ	2X179	395.4730.185	GASKET, HEAD(0, 50) PART OF KIT P/N	2
				395.8180.062	
3	KFFZZ	2X179	395.4730.186	GASKET, HEAD(0, 55) PART OF KIT P/N	2
				395.8180.062	
3	KFFZZ	2X179	395.4730.089	GASKET, HEAD(0, 60) PART OF KIT P/N	2
				395.8180.062	
3	KFFZZ	2X179	395.4730.187	GASKET, HEAD(0, 65) PART OF KIT P/N	2
				395.8180.062	
3	KFFZZ	2X179	395.4730.090	GASKET, HEAD(0, 70) PART OF KIT P/N	2
				395.8180.062	
3	KFFZZ	2X179	395.4730.188	GASKET, HEAD(0, 75) PART OF KIT P/N 2	
				395.8180.062	C
3	KFFZZ	2X179	395.4730091	GASKET, HEAD(0, 80) PART OF KIT P/N	2
				395.8180.062	
3	KFFZZ	2X179	395.4730.189	GASKET, HEAD(0, 85) PART OF KIT P/N	2
				395.8180.062	
3	KFFZZ	2X179	395.4730.092	GASKET, HEAD(0, 90) PART OF KIT P/N	2
				395.8180.062	
3	KFFZZ	2X179	395.4730.190	GASKET, HEAD(0, 95) PART OF KIT P/N	2
				395.8180.3062	
4	PAFZZ	2X179	435.2380.214	CYLINDER HEAD, DIESE	2
5	KFFZZ	2X179	625.4740.029	GASKET, GUARD TUBE PART OF KIT P/N	2
				435.8150.017	
6	PFFZZ	2X179	625.7625.108	WASHER, FLAT	2
7	PAFZZ	2X179	625.5801.153	SPRING, HELICAL, COMP	2
8	PAFZZ	2X179	435.9520.055	TUBE, METALLIC	2
9	PFFZZ	2X179	625.4740.029	GASKET PART OF KIT P/N 435.8150.017	2
10	PAFFF	2X179	435.1510.222	ENGINE BLOCK, DIESEL	1
11	PAFZZ	2X179	9.8400.048	.PIN, TAPERED, PLAIN	1
12	PAFZZ	2X179	9.8965.003	.PLUG, MACHINE THREAD	1
13	PAFZZ	2X179	276.4670.014	.WASHER, FLAT	1
14	PAFZZ	2X179	9.9765.111	.SCREW, MACHINE	1
15	PAFZZ	2X179	9.6780.005	.STUD, PLAIN	6
16	PAFZZ	2X179	360.9000.072	.PLUG, EXPANSION	1
17	PAFZZ	2X179	9.6780.008	.STUD, PLAIN	2
18	PAFZZ	2X179	9.9080.083	.CAP, FILLER OPENING	1
19	PAFZZ	2X179	435.6850.124	.ROD, THREADED END	8
20	PFFZZ	2X179	99730.032	SCREW, CAP, HEXAGON H	3
21	PAFZZ	2X179	8903.050	RACKET, MOUNTING	1
22	PAFZZ	2X179	1213.173	SEAL, PLAIN	1
23	PFFZZ	2X179	560.4776.087	GASKET PART OF KIT P/N 395.8180.062	1
24	PAFZZ	2X179	1240.016	RING, RETAINING	1
25	PFFZZ	2X179	1300.101	BEARING, WASHER, THRU	1

SECTION II					
(1)	(2)	(3)	(4)	(5)	(6)
ITEM	SMR		PART		
NO	CODE	CAGEC	NUMBER	DESCRIPTION AND USABLE ON CODES (UOC)	QTY
26	PAFZZ	2X179	8780.015	COVER, ACCESS.....	1
27	PAFZZ	2X179	4936.077	GEAR, HELICAL.....	1
28	PFOZZ	2X179	9.8430.065	LOCKING PLATE, NUT A.....	1

END OF FIGURE

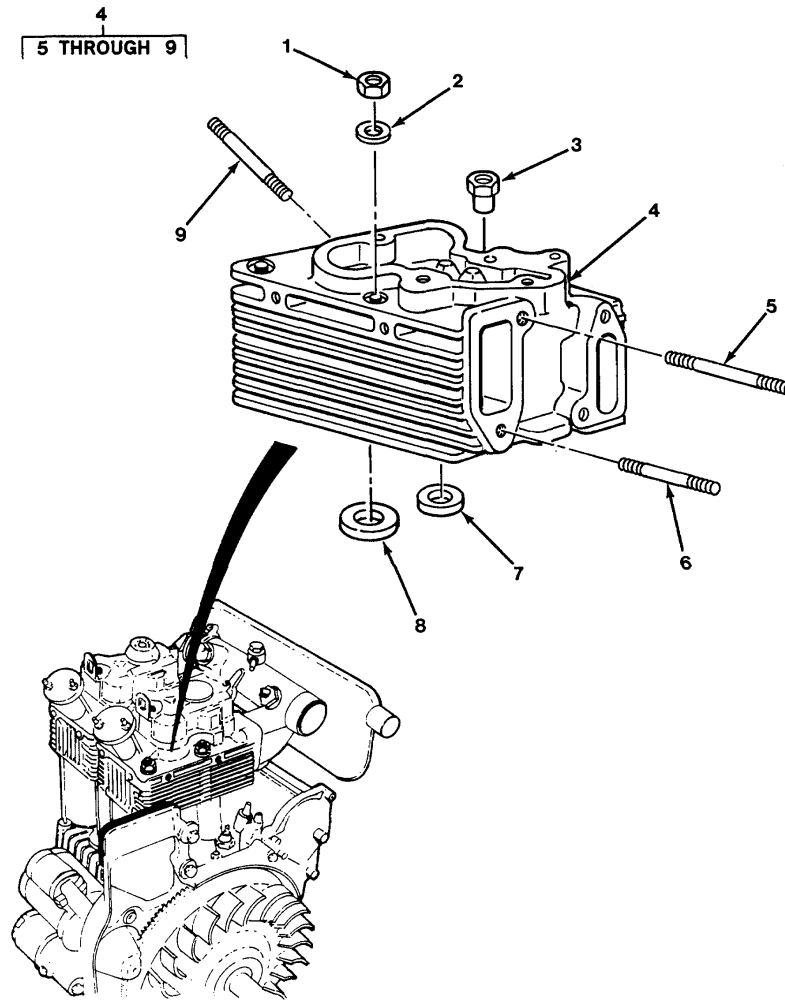


Figure 3. Cylinder Head Assembly

SECTION II					
(1)	(2)	(3)	(4)	(5)	(6)
ITEM NO	SMR CODE	CAGEC	PART NUMBER	DESCRIPTION AND USABLE ON CODES (UOC)	QTY
				GROUP 0101 CRANKCASE, BLOCK, CYLINDER HEAD	
				FIG. 3 CYLINDER HEAD ASSEMBLY	
1	PFFZZ	2X179	9.3240.032	NUT, PLAIN, HEXAGON.....	6
2	PFFZZ	2X179	9.7625.067	WASHER, FLAT.	8
3	PFFZZ	2X179	560.3300.100	NUT, PLAIN, HEXAGON.....	2
4	PAFFF	2X179	435.9200.243	CYLINDER HEAD, DIESE.....	2
5	PFFZZ	2X179	9.6780030	.STUD, PLAIN	1
6	PFFZZ	2X179	9.6780.084	.STUD, PLAIN	1
7	PAFZZ	2X179	560.8000.066	.SEAT, VALVE	1
8	PAFZZ	2X179	560.8000.065	.SEAT, VALVE	1
9	PFFZZ	2X179	9.6760.045	.STUD, PLAIN	2

END OF FIGURE

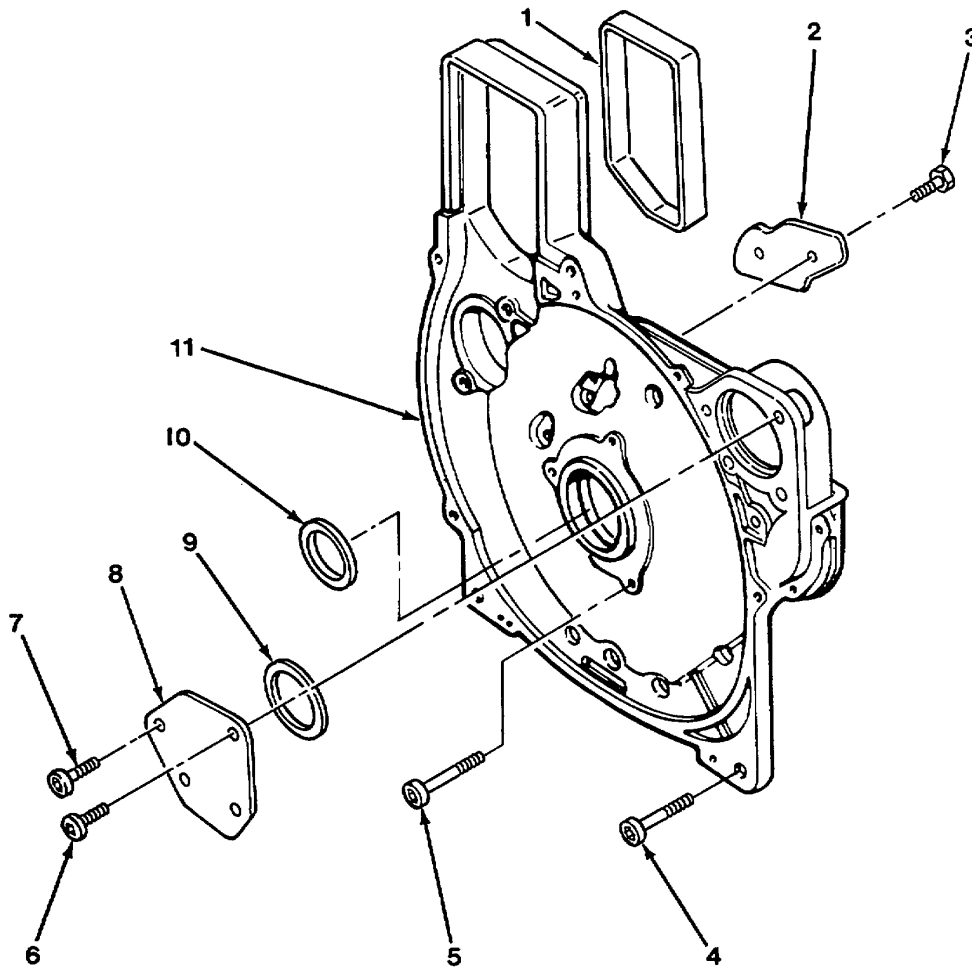


Figure 4. End Plate Assembly

SECTION II					
(1)	(2)	(3)	(4)	(5)	(6)
ITEM NO	SMR CODE	CAGEC	PART NUMBER	DESCRIPTION AND USABLE ON CODES (UOC)	QTY
GROUP 0101 CRANKCASE, BLOCK, CYLINDER HEAD					
FIG. 4 END PLATE ASSEMBLY					
1	PFFZZ	2X179	360.4776089	GASKET	1
2	PFFZZ	2X179	360.5055.026	BRACKET, ANGLE	1
3	PFFZZ	2X179	9.1760.001	BOLT, MACHINE M6X1, 00X10	2
4	PFFZZ	2X179	9.9732.063	SCREW, CAP, SOCKET HE	10
5	PFFZZ	2X179	9.9732.074	SCREW, CAP, SOCKET HE	3
6	PFFZZ	2X179	9.9730.034	SCREW, CAP, SOCKET HE	1
7	PFFZZ	2X179	99730.035	SCREW, CAP, SOCKET HE	3
8	PFFZZ	2X179	435.2615.075	COVER, ACCESS.....	1
9	PFFZZ	2X179	9.1200.174	SEAL, PLAIN PART OF KIT P/N	1
10	PAFZZ	2X179	9.1212.006	435, 8 150.017	1
11	PFFZZ	2X179	435.8900.291	SEAL, PLAIN.....	1
				HOUSING, MECHANICAL	1

END OF FIGURE

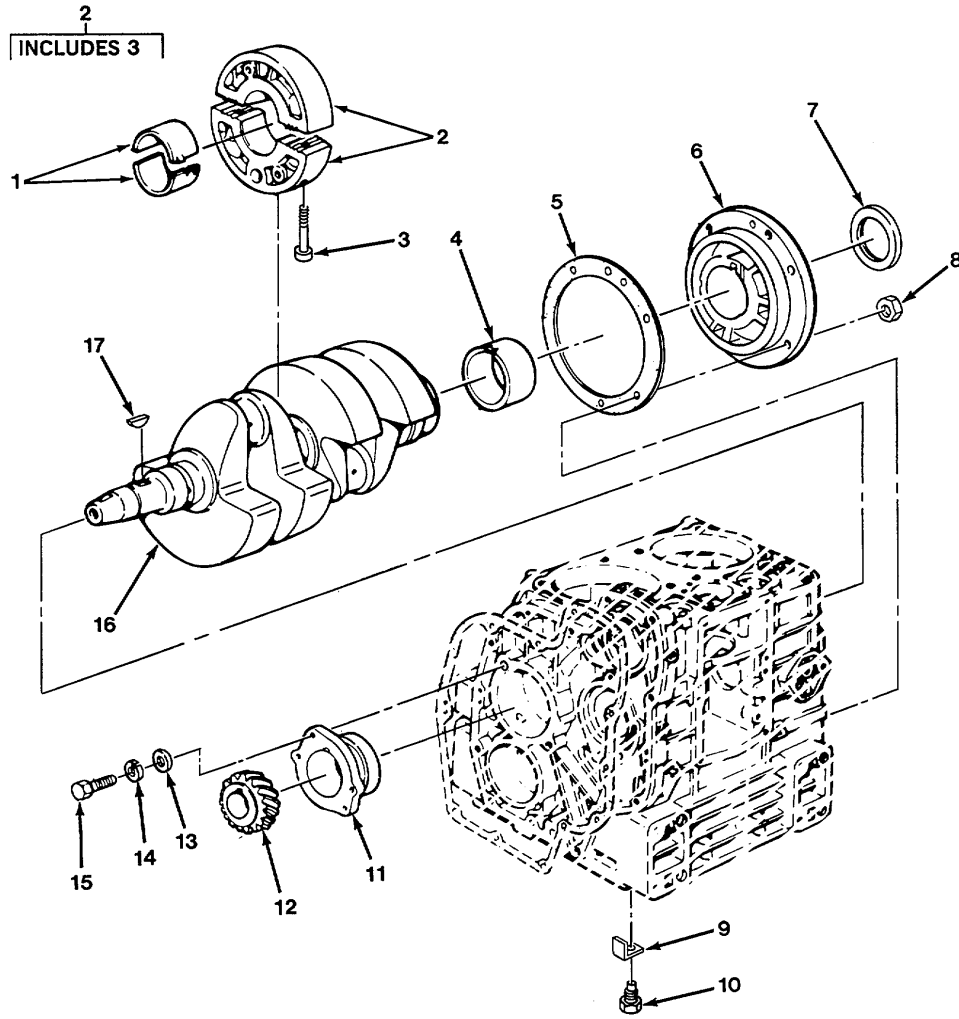


Figure 5. Crankshaft Assembly

SECTION II					
(1)	(2)	(3)	(4)	(5)	(6)
ITEM NO	SMR CODE	CAGEC	PART NUMBER	DESCRIPTION AND USABLE ON CODES (UOC)	QTY
GROUP 0102 CRANKSHAFT					
FIG 5. CRANKSHAFT ASSEMBLY					
1	PAFZZ	2X179	904.1610.082	HOUSING, BEARING UNI STANDARD	1
1	PAFZZ	2X179	904.1610.098	HOUSING, BEARING UNI -0, 25.....	1
1	PAFZZ	2X179	904.1610.099	HOUSING, BEARING UNI -0, 50.....	1
2	PAFZZ	2X179	360.8676.055	CLAMP, HUB	1
3	PFFZZ	2X179	9.9732.075	.SCREW, CAP, SOCKET HE M8X1, 25X50.....	2
4	PAFZZ	2X179	560.1611.055	BEARING, SLEEVE STANDARD.....	1
4	PAFZZ	2X179	560.1611.054	HOUSING, BEARING UNI -0125.....	1
4	PAFZZ	2X179	560.1611.053	HOUSING, BEARING UNI -0, 50.....	1
5	PFFZZ	2X179	360.4701.058	GASKET 0, 20 PART OF KIT P/N.....	1
				395.8180.062	
5	KFFZZ	2X179	360.4701.059	GASKET, CSHAFT SPRT 0, 40 PART OF KIT.....	1
				P/N 395.8180.062.....	
6	PAFZZ	2X179	395.8676.090	HOUSING, BEARING UNI.....	1
7	PAFZZ	2X179	9.1210.079	SEAL RING, METAL	1
8	PFFZZ	2X179	9.3203.047	NUT, PLAIN, HEXAGON.....	6
9	PFFZZ	2X179	560.5111.069	RETAINER, NUT AND BO	1
10	PFFZZ	2X179	560.1862.057	SCREW, CAP, HEXAGON H	1
11	PFFZZ	2X179	560.8676.061	HOUSING, MECHANICAL STANDARD	1
11	PFFZZ	2X179	560.8676.070	HOUSING, MECHANICAL -0, 50.....	1
11	PFFZZ	2X179	560.8676.071	HOUSING, FLYWHEEL -025	1
12	PAFZZ	2X179	360.4936.035	GEAR, HELICAL	1
13	PFFZZ	2X179	9.7625.010	WASHER, FLAT M8.....	2
14	PFFZZ	2X179	9.7565.007	WASHER, FLAT M8.....	2
15	PFFZZ	2X179	9.1770.005	SCREW, CAP, HEXAGON H M8X1, 25X22.....	2
16	PAFZZ	2X179	435.1050.284	CRANKSHAFT, ENGINE,	1
17	PAFZZ	2X179	9.2280.056	KEY, WOODRUFF	2

END OF FIGURE

3
INCLUDES 4

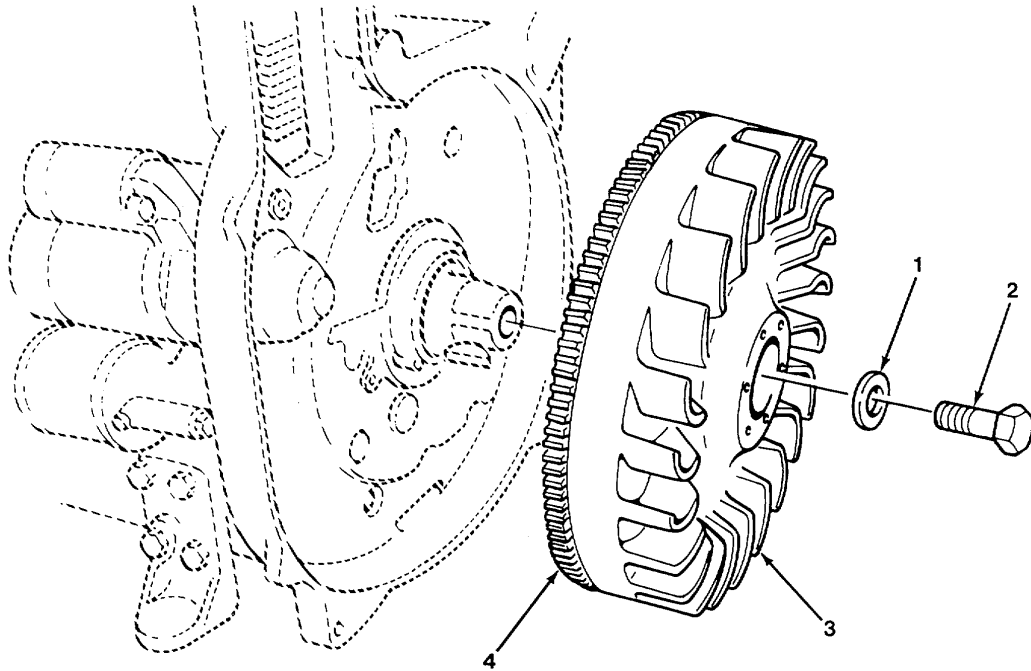


Figure 6. Flywheel Assembly

SECTION II					
(1)	(2)	(3)	(4)	(5)	(6)
ITEM	SMR		PART	DESCRIPTION AND USABLE ON CODES (UOC)	QTY
NO	CODE	CAGEC	NUMBER		
GROUP 0103 FLYWHEEL ASSEMBLY					
FIG. 6 FLYWHEEL ASSEMBLY					
1	PFFZZ	2X179	360.7626.033	WASHER, FLAT.....	1
2	PFFZZ	2X179	9.1805.025	SCREW CAP, HEXAGON H.....	1
3	PAFFF	2X179	435.9880.639	FLYWHEEL, ENGINE.....	1
4	XDFZZ	2X179	435.2816.052	.GEAR, SPUR.....	1

END OF FIGURE

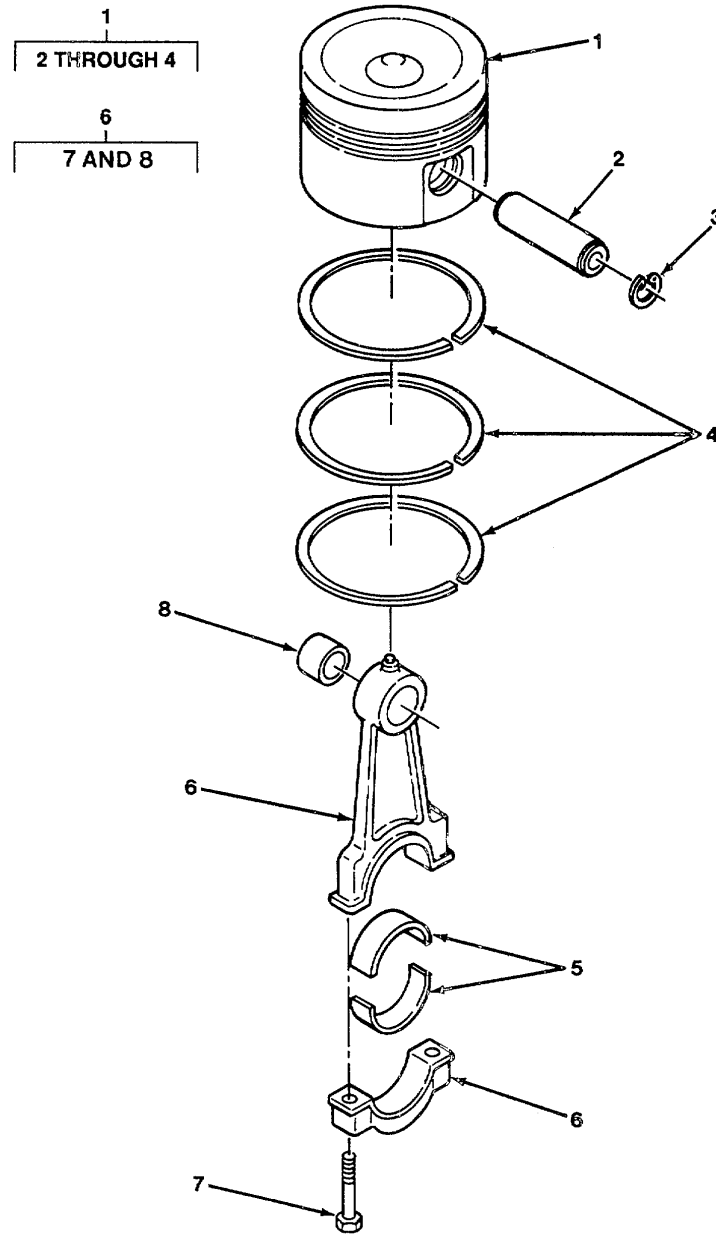


Figure 7. Piston and Connecting Rod Assembly

SECTION II					
(1)	(2)	(3)	(4)	(5)	(6)
ITEM NO	SMR CODE	CAGEC	PART NUMBER	DESCRIPTION AND USABLE ON CODES (UOC)	QTY
GROUP 0104 PISTONS, CONNECTING RODS					
FIG. 7 PISTON AND CONNECTING ROD ASSEMBLY					
* 1	XDFFF	2X179	435.6500.315	PISTON, INTERNAL COM STANDARD	2
1	PAFFF	2X179	435.6500.316	PISTON, INTERNAL COM +0, 50	2
1	PAFFF	2X179	435.6500.317	PISTON, INTERNAL COM +1, 00	2
2	PAFZZ	2X179	435.8480.050	.PIN, PISTON INCLUDED WITH STANDARD.....	1
				PISTON	
2	PAFZZ	2X179	43598480.050	.PIN, PISTON INCLUDED WITH +0, 50	1
				PISTON.....	
2	PAFZZ	2X179	435.8480.050	.PIN, PISTON INCLUDED WITH +1, 00	1
				PISTON.....	
3	PAFZZ	2X179	9.1240.017	.RING, RETAINING INCLUDED WITH	2
				STANDARD PISTON	
3	PAFZZ	2X179	9.1240.017	.RING, RETAINING INCLUDED WITH +0,	2
				50 PISTON.....	
3	PAFZZ	2X179	9.1240.017	.RING, RETAINING INCLUDED WITH +11	2
				00 PISTON.....	1
4	PAFZZ	2X179	395.8211.071	.RING SET, PISTON STANDARD.....	1
4	PAFZZ	2X179	435.8211.089	.RING SET, PISTON +0, 50	1
4	PAFZZ	2X179	395.8211.073	.RING SET, PISTON	1
5	PAFZZ	2X179	435.1640.082	BUSHING, SLEEVE , STANDARD.....	2
5	PAFZZ	2X179	435.1640.083	BUSHING, SLEEVE.-0, 25	2
5	PAFZZ	2X179	435.1640.084	BEARING, SLEEVE -0, 50,	2
6	PAFFF	2X179	435.1526.098	CONNECTING ROD, PIST.....	2
7	PFFZZ	2X179	9.1770.101	.SCREW, CAP, HEXAGON H	2
8	PAFZZ	2X179	435.1630.018	.BUSHING, SLEEVE	1

END OF FIGURE

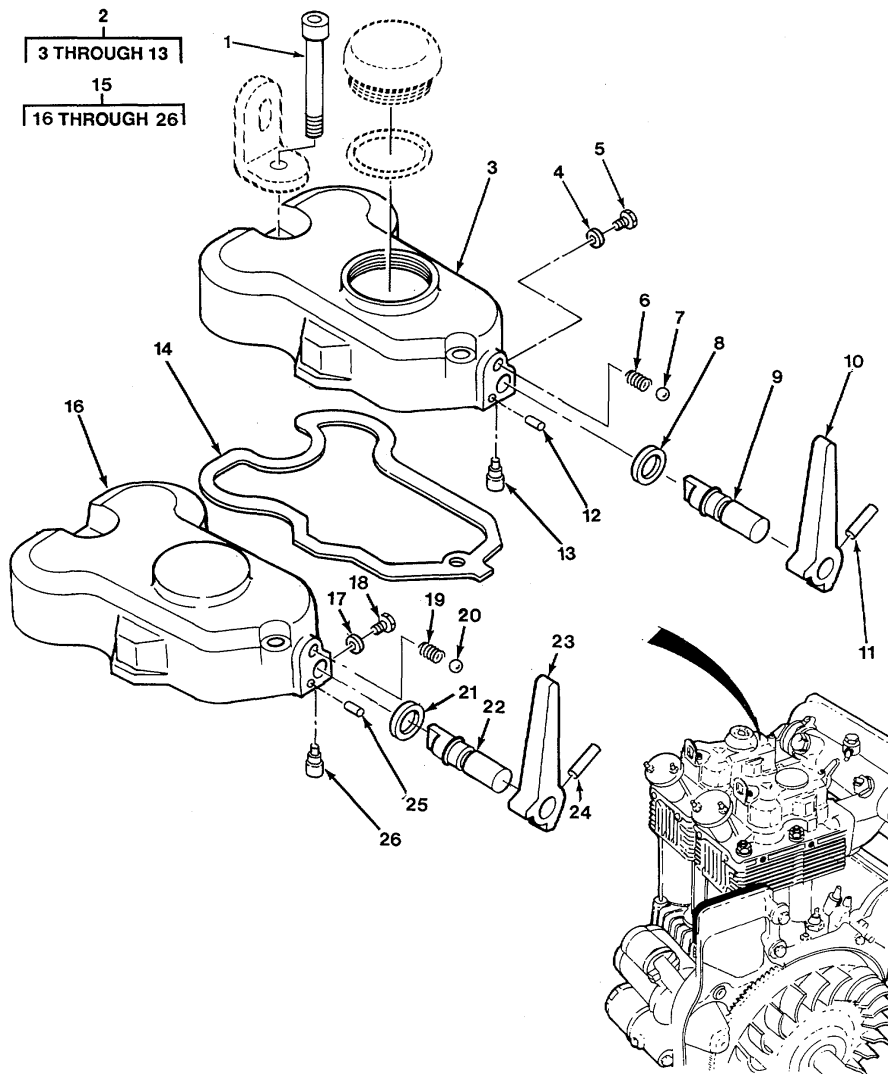


Figure 8. Rocker Cover Assembly

SECTION II					
(1)	(2)	(3)	(4)	(5)	(6)
ITEM NO	SMR CODE	CAGEC	PART NUMBER	DESCRIPTION AND USABLE ON CODES (UOC)	QTY
GROUP 0105 VALVES, CAMSHAFTS, AND TIMING SYSTEM					
FIG. 8 ROCKER COVER ASSEMBLY					
1	PFOZZ	2X179	9.9732.075	SCREW, CAP, SOCKET HE M8X1, 25X50	4
2	PFOFF	2X179	560.2125.100	COVER, ENGINE POPPET.....	1
3	PFOZZ	2X179	560.2125.093	.COVER, ACCESS.....	1
4	PFFZZ	2X179	276.4670.014	.WASHER, FLAT.....	1
5	PFFZZ	2X179	9.9000.064	.PLUG, EXPANSION.....	1
6	PFFZZ	2X179	9040.5780.011	.SPRING, HELICAL, COMP.	1
7	PFFZZ	2X179	9.8245.005	.BALL, BEARING	1
8	PFFZZ	20072	9.1200.034	.SEAL.....	1
9	PFFZZ	2X179	560.6095.010	.PIN, STRAIGHT, HEADLE	1
10	XAFZZ	2X179	LEVER	.LEVER, COVER, VALVE.....	1
11	PFFZZ	2X179	9.8430.005	.PIN, SPRING	1
12	PFFZZ	2X179	9.8430.004	.PIN, SPRING	1
13	PFFZZ	2X179	560.9820.085	.SCREW, CAP, SOCKET HE	1
14	PAOZZ	2X179	560.4400.022	GASKET PART OF KIT P/N 395.8180.062.....	2
15	PFOFF	2X179	560.2125.101	COVER, ENGINE POPPET.....	1
16	PFOZZ	2X179	560.2125.094	.COVER, ACCESS.....	1
17	PFFZZ	2X179	276.4670.014	.WASHER, FLAT.....	1
18	PFFZZ	2X179	9.9000.064	.PLUG, EXPANSION.....	1
19	PFFZZ	2X179	9040.5780.011	.SPRING, HELICAL, COMP	1
20	PFFZZ	2X179	9.8245.005	.BALL, BEARING	1
21	PFFZZ	2X179	9.1200.034	.SEAL, PLAIN.....	1
22	PFFZZ	2X179	560.6095.010	.PIN, STRAIGHT, HEADLE	1
23	XAFZZ	2X179	LEVER	.LEVER, COVER, VALVE.....	1
24	PFFZZ	2X179	9.8430.005	.PIN, SPRING	1
25	PFFZZ	2X179	9.8430.004	.PIN, SPRING	1
26	PFFZZ	2X179	560.9820.085	.SCREW, CAP, SOCKET HE	1

END OF FIGURE

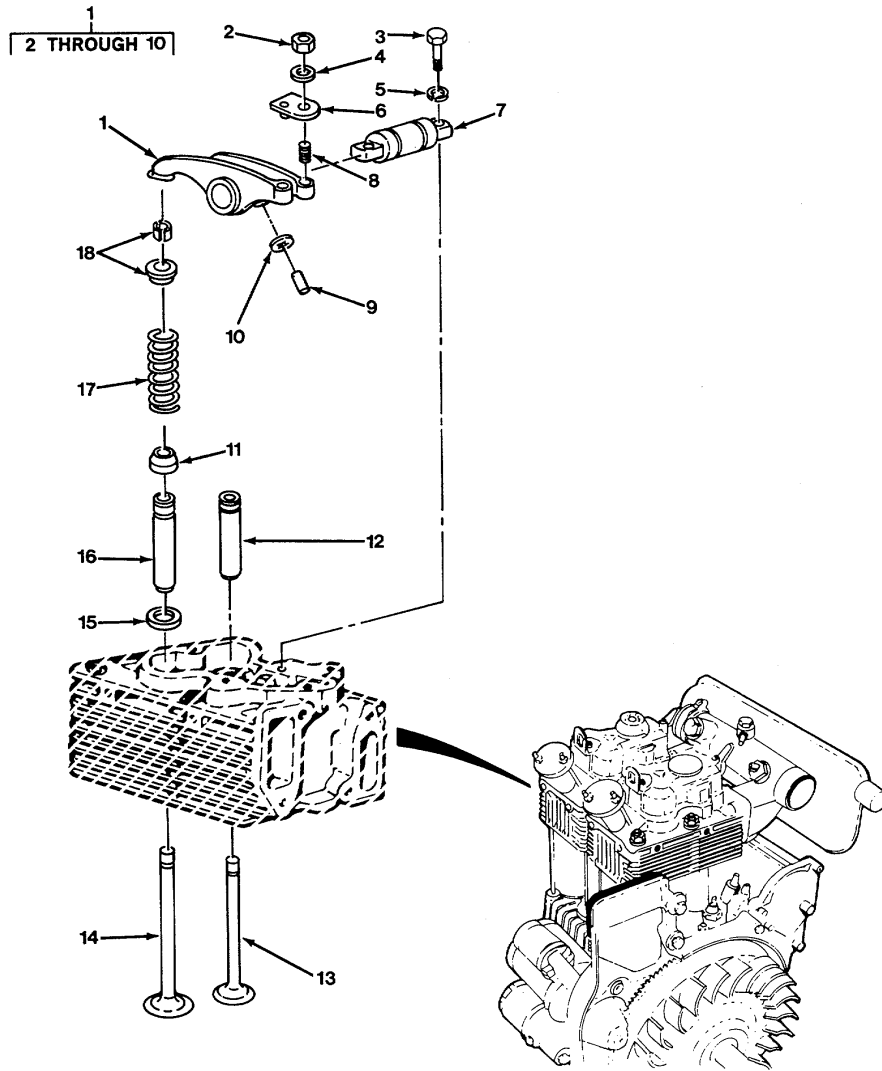


Figure 9. Rocker Arm Assembly

SECTION II

TM 5-3825-230-14&P

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
GROUP 0105 VALVES, CAMSHAFTS, AND TIMING SYSTEM					
FIG. 9. ROCKER ARM ASSEMBLY					
1	PAFFF	2X179	560.4330.037	ROCKER ARM, ENGINE P	2
2	PFFZZ	2X179	9.3240.010	.NUT, PLAIN, HEXAGON.....	2
3	PFFZZ	2X179	9.9730.100	.SCREW, CAP, SOCKET HE M8X1125X25.....	2
4	PFFZZ	2X179	276.8335.084	.SHIM.....	1
5	PFFZZ	2X179	9.7565.007	.WASHER, FLAT M8.....	2
6	PFFZZ	2X179	560.6372.098	.SPACER, PLATE,.....	1
7	PFFZZ	2X179	560.6045.040	.PIN, STRAIGHT, HEADLE	1
8	PFFZZ	2X179	270.9850.002	.SCREW, ADJUSTING, VAL.....	2
9	PFFZZ	2X179	560.9455.053	.TUBE, BENT, METALLIC.....	1
10	PFFZZ	2X179	560.1350.011	.RING, WIPER	1
11	PFFZZ	2X179	500.2135.072	CAP, PROTECTIVE, DUST PART OF KIT P/N	2
				435.8150.017	
12	PAFZZ	2X179	629.4845.184	GUIDE, VALVE STEM STANDARD	2
12	PAFZZ	2X179	629.4845.185	GUIDE, VALVE STEM +0, 50.....	2
13	PAFZZ	2X179	435.9685.067	VALVE, POPPET, ENGINE.....	2
14	PAFZZ	2X179	435.9652.061	VALVE, POPPET, ENGINE.....	2
15	PAFZZ	2X179	710.3430.067	LOCK, VALVE SPRING R.....	4
16	PAFZZ	2X179	560.4845.182	GUIDE, VALVE STEM STANDARD	2
16	PAFZZ	2X179	4845-181	GUIDE, VALVE STEM +0, 50.....	2
17	PAFZZ	2X179	395.5755.065	SPRING, HELICAL, COMP	4
18	PAFZZ	2X179	260.6410.018	LOCK, VALVE SPRING R.....	4

END OF FIGURE

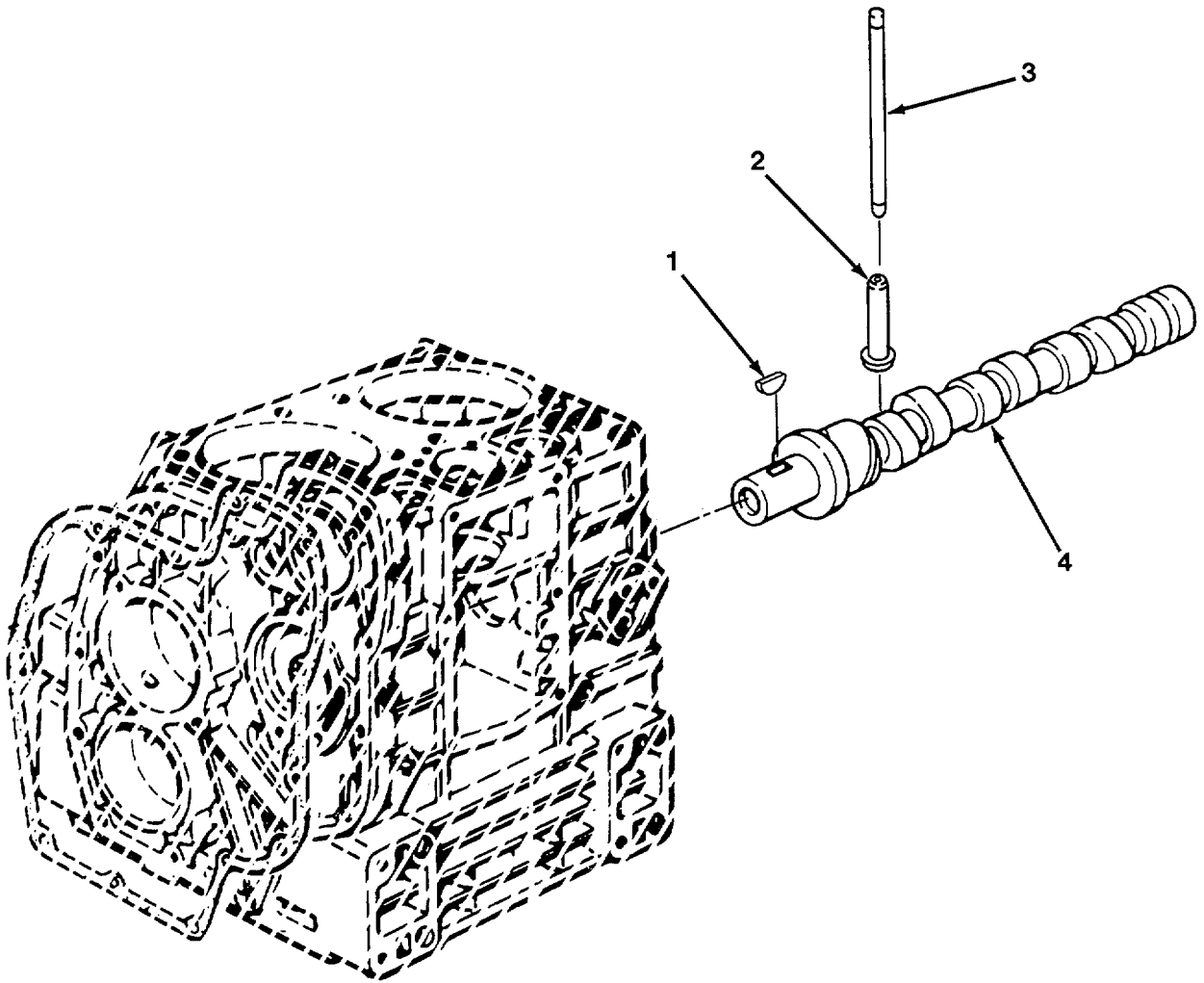


Figure 10. Camshaft Assembly

SECTION II

TM 5-3825-230-14&P

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
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GROUP 0105 VALVES, CAMSHAFTS, AND
TIMING SYSTEM

FIG.10. CAMSHAFT ASSEMBLY

1	PAFZZ	2X179	9.2280.047	KEY, WOODRUFF	1
2	PAFZZ	2X179	904.7215.043	TAPPET, ENGINE POPPE	4
3	PAFZZ	2X179	435.1410.088	PUSH ROD, ENGINE POP	4
4	PAFZZ	2X179	435.1011.110	CAMSHAFT, ENGINE	1

END OF FIGURE

1
INCLUDES 2

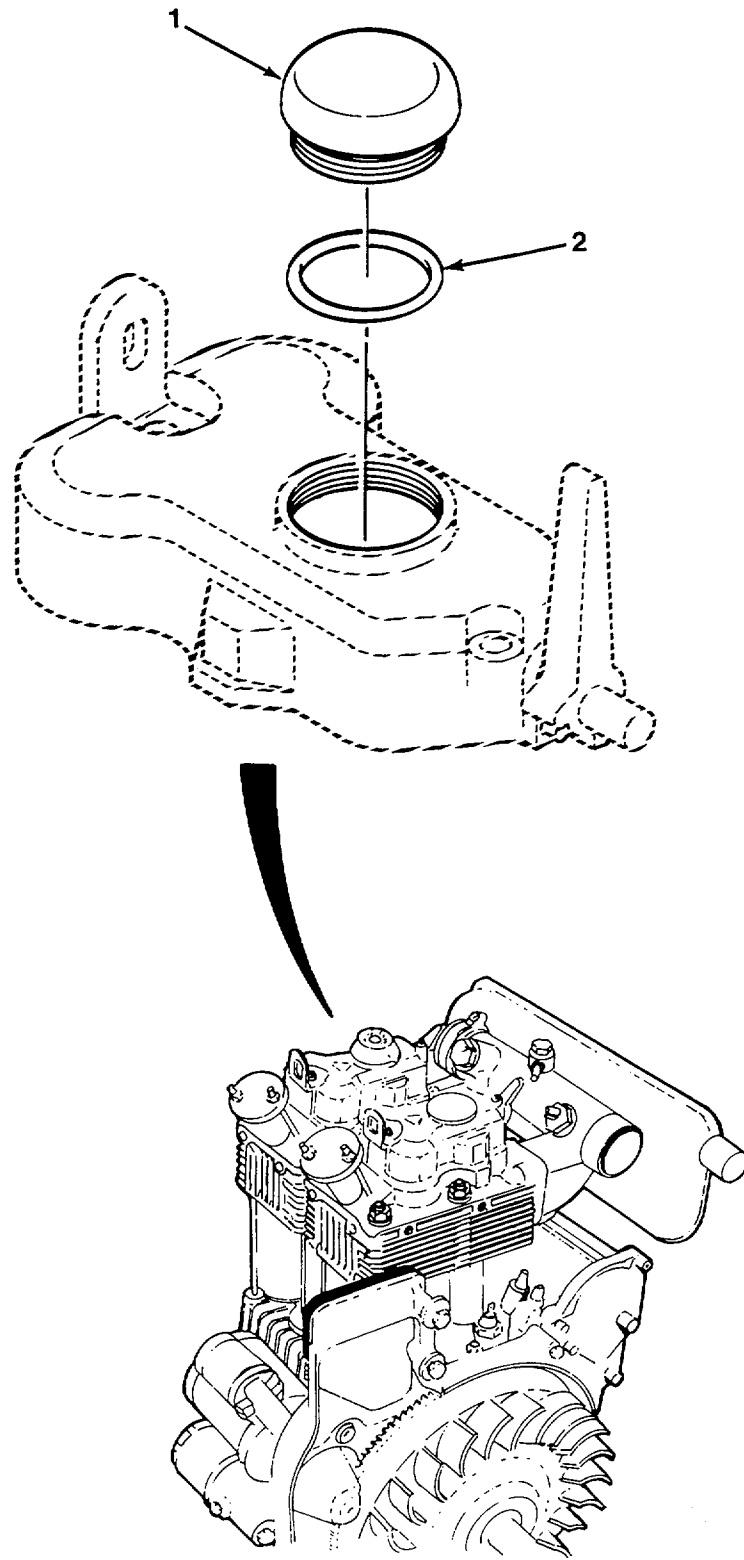


Figure 11. Oil Cap Assembly

SECTION II

TM 5-3825-230-14&P

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
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GROUP 0106 ENGINE LUBRICATION SYSTEM

FIG. 11. OIL CAP ASSEMBLY

1	PAOZZ	2X179	276.9032.019	CAP, FILLER OPENING	1
2	PAOZZ	2X179	9.1200.015	SEAL, PLAIN.....	1

END OF FIGURE

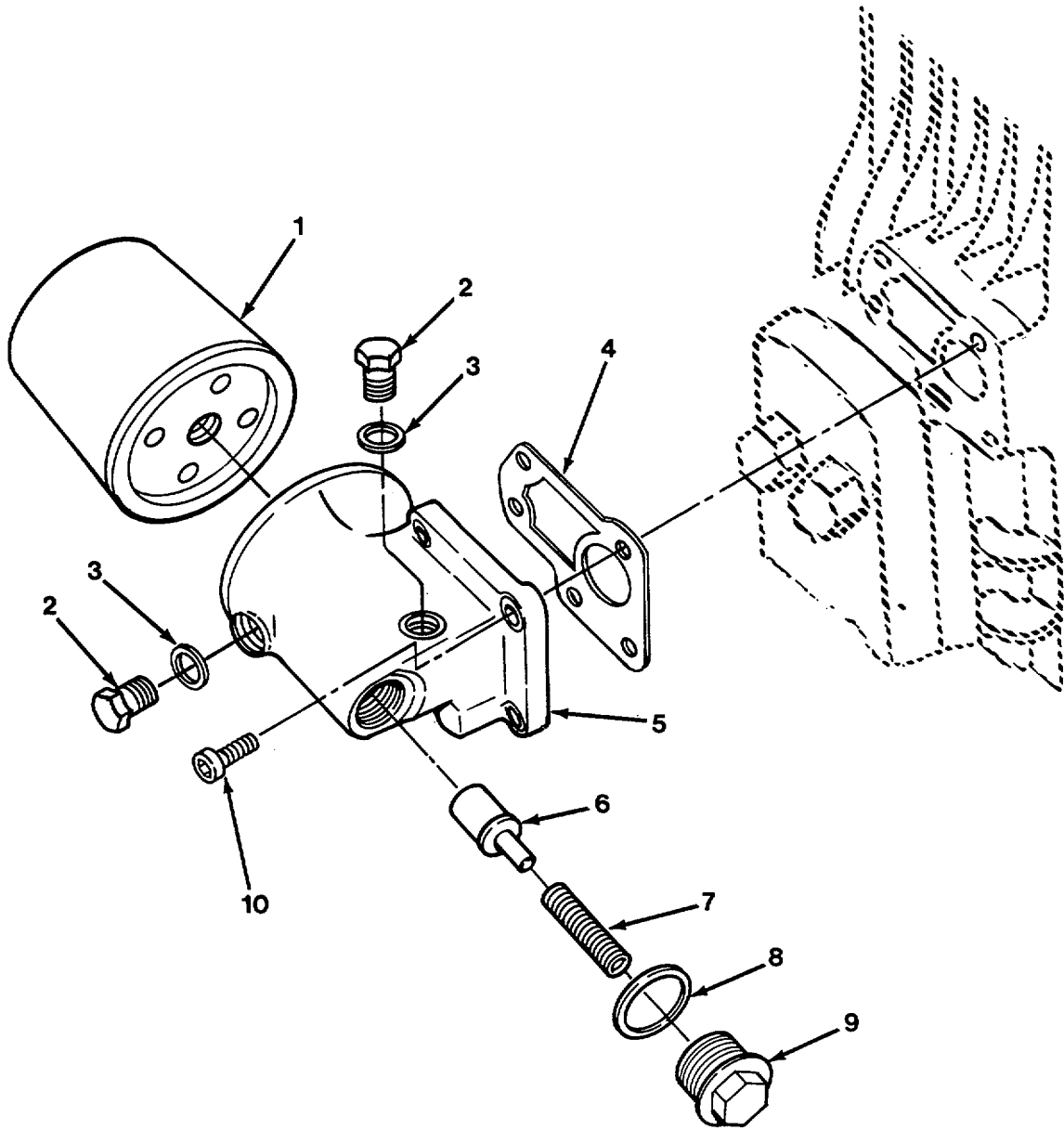


Figure 12. Oil Filter Assembly

SECTION II

TM 5-3825-230-14&P

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
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GROUP 0106 ENGINE LUBRICATION
SYSTEM

FIG.12. OIL FILTER ASSEMBLY

1	PAOZZ	2X179	904.2175.040	FILTER ELEMENT,FLUI	1
2	PAOZZ	2X179	9.1770.042	SCREW, CAP, HEXAGON H	2
3	PAOZZ	2X179	9.4670.058	WASHER, FLAT	2
4	PAOZZ	2X179	560.4501.022	GASKET PART OF KIT P/N 395.8180.062	1
5	PFOZZ	2X179	5600.3902.052	ELBOW, FLANGE TO PIP	1
6	PAOZZ	2X179	560.9680.013	VALVE, REGULATING, FL	1
7	PAOZZ	2X179	500.5755.049	SPRING, HELICAL, COMP	1
8	PAOZZ	2C072	9.4670.021	SEAL, PLUG	1
9	PAOZZ	2X179	500.9070.012	CAP, ENGINE POPPET V	1
10	PAOZZ	2X179	9.9730.012	SCREW, CAP, SOCKET HE	4

END OF FIGURE

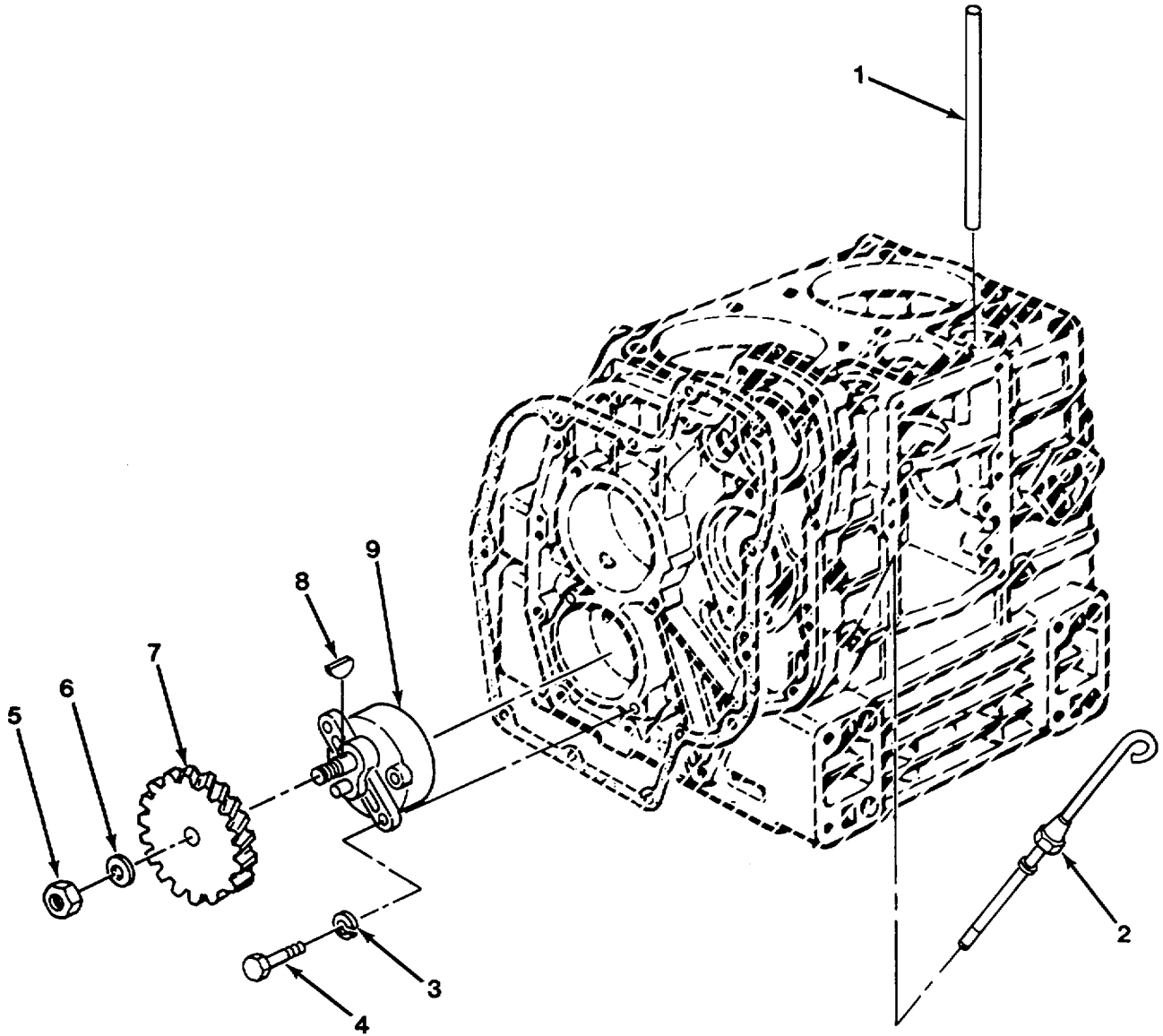


Figure 13. Oil Pump Assembly

SECTION II

TM 5-3825-230-14&PC02

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
GROUP 0106 ENGINE LUBRICATION SYSTEM					
FIG. 13 OIL PUMP ASSEMBLY					
1	PAFZZ	2X179	435.9455.074	TUBE, METALLIC	2
2	PAOZZ	2X179	1400-077	GAGE ROD, LIQUID LEV	1
3	PFFZZ	2X179	9.7565.007	WASHER, FLAT M8	2
4	PFFZZ	2X179	9.1770.009	SCREW, CAP, HEXAGON H M8X1,25X35	2
5	PFFZZ	2X179	9.3240.036	NUT, PLAIN, HEXAGON	1
6	PFFZZ	2X179	9.7565.011	WASHER, LOCK	1
7	PAFZZ	2X179	560.4936.009	GEAR, SPUR	1
8	PAFZZ	2X179	9.2200.001	KEY, MACHINE	1
9	PAFZZ	2X179	560.6605.037	OIL PUMP ASSEMBLY, E	1

END OF FIGURE

2
3 THROUGH 8

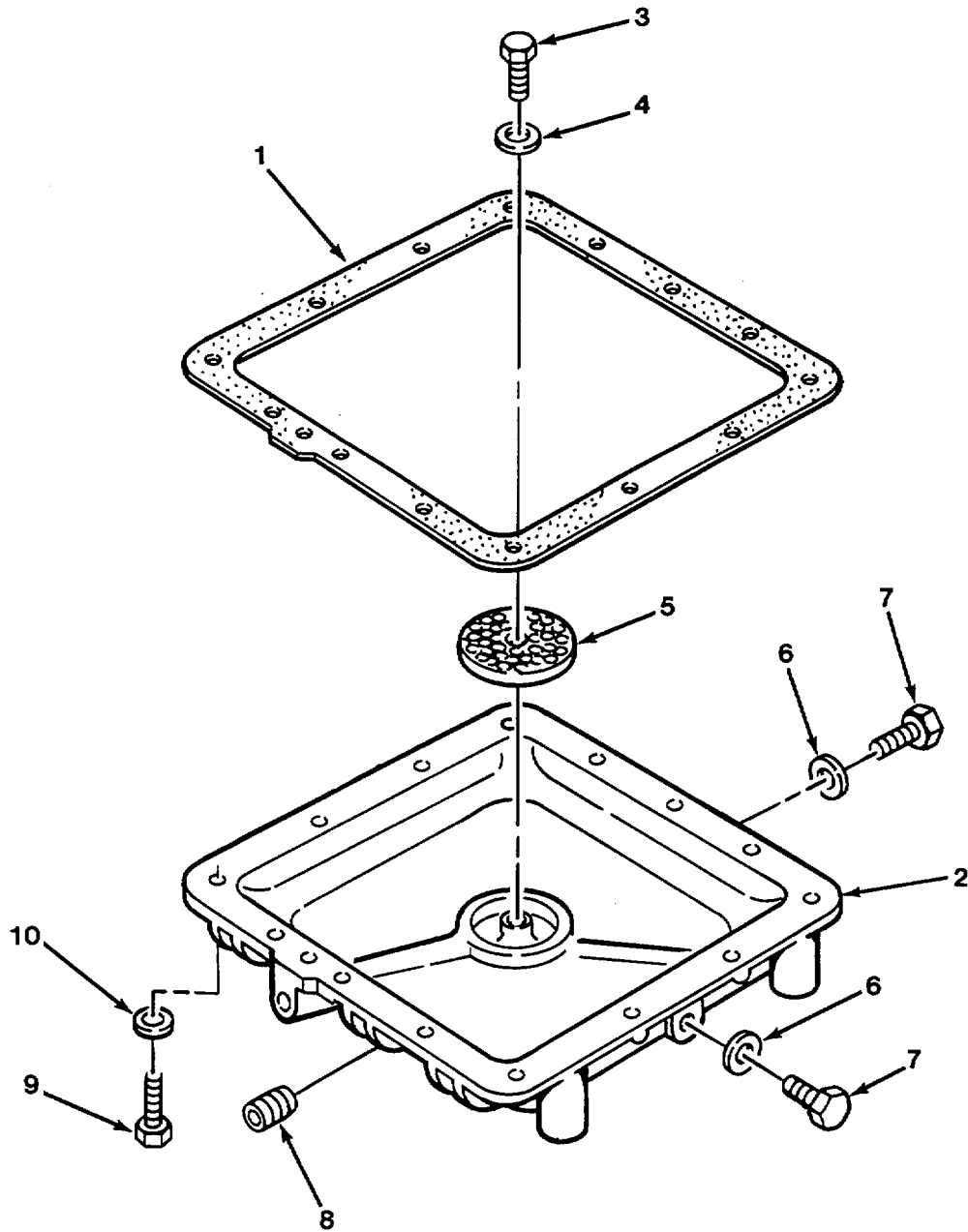


Figure 14. Oil Pan Assembly

SECTION II

TM 5-3825-230-14&P

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
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GROUP 0106 ENGINE LUBRICATION SYSTEM

FIG. 14 OIL PAN ASSEMBLY

1	PAOZZ	2X179	360.4601.042	GASKET PART OF KIT P/N 395.8180.062.....	1
2	PAOOO	2X179	3600.6645.113	OIL PAN.....	1
3	PAOZZ	2X179	9.1760.001	.BOLT, MACHINE,	1
4	PAOZZ	2X179	9.7565.004	.WASHER, LOCK.....	1
5	PAOZZ	2X179	560.5090.010	.FILTER ELEMENT, FLUI	1
6	PAOZZ	2X179	4670.016	.WASHER, FLAT.....	2
7	PAOZZ	2X179	9.8965.005	.PLUG, MACHINE THREAD.....	2
8	PAOZZ	2X179	9.9765.108	.SCREWICAP1SOCKET HE	2
9	PFOZZ	2X179	9.1770.039	SCREW, CAP, HEXAGON H	14
10	PFOZZ	2X179	9.7625.010	WASHER, FLAT.....	14

END OF FIGURE

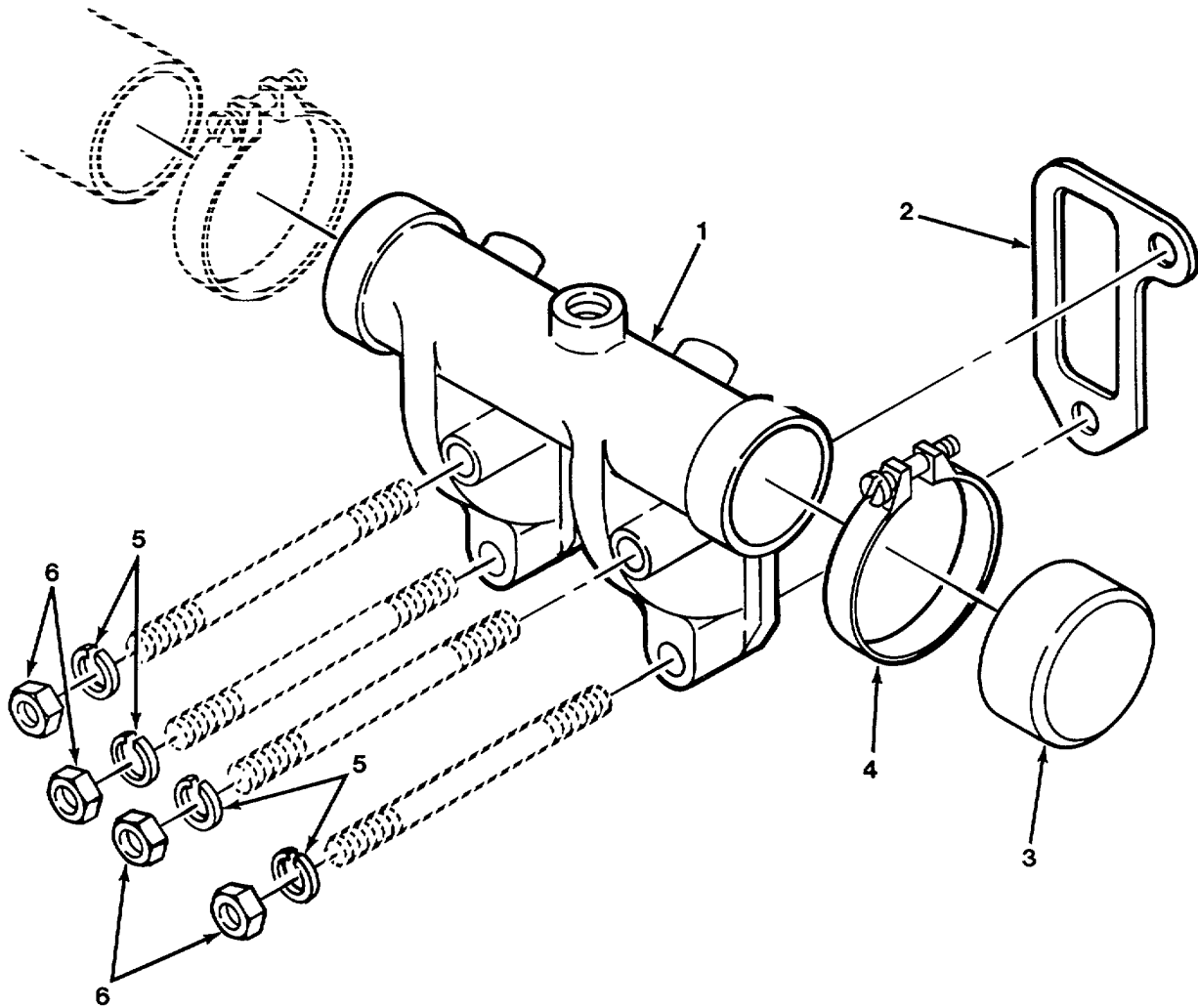


Figure 15. Intake Manifold Assembly

SECTION II

TM 5-3825-230-14&P

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
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GROUP 0108 MANIFOLDS

FIG,15. INTAKE MANIFOLD ASSEMBLY

1	PAOZZ	2X179	5600.2486.068	MANIFOLD, INTAKE	1
2	PAOZZ	2X179	560.4420.020	GASKET PART OF KIT P/N 395.8180.062.....	2
3	PFOZZ	2X179	560.2145.013	CAP, AIR CLEANER INT.....	1
4	PFOZZ	2X179	9.3630.023	CLAMP, LOOP	1
5	PFOZZ	2X179	9.7565.007	WASHER, FLAT M8.....	4
6	PFOZZ	2X179	9.3240.018	NUT, PLAIN, HEXAGON M8X1,25.....	4

END OF FIGURE

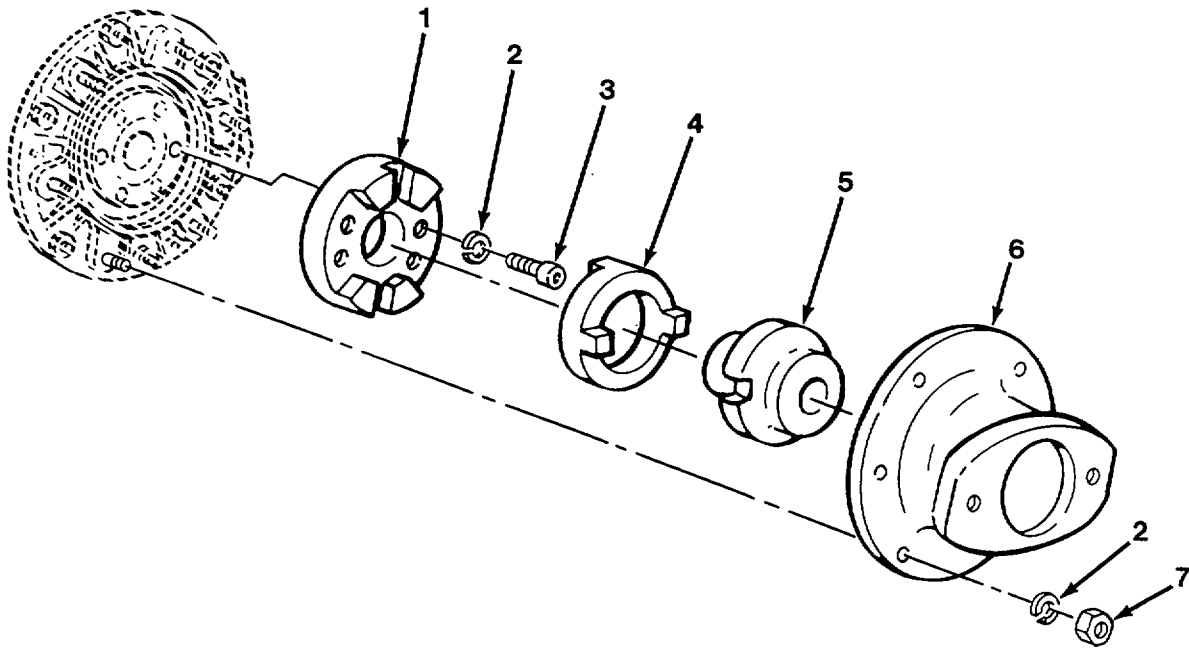


Figure 16. Hydraulic Pump Drive Assembly

SECTION II

TM 5-3825-230-14&PC02

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC) GROUP 0109 ACCESSORY DRIVING MECHANISMS	(6) QTY
FIG 16. HYDRAULIC PUMP DRIVE ASSEMBLY					
1	PAOZZ	2X179	3600.8061.096	COUPLING, HALF, SHAFT PART OF KIT P/N 3600.8888.529.....	1
2	PFOZZ	2X179	9.7565.007	WASHER, LOCK MB	10
3	PFOZZ	2X179	9.9730.100	SCREW, CAP, SOCKET HE M8X1, 25X25.....	4
4	PAOZZ	2X179	2760.4240.028	INSERT, FLEXIBLE COU PART OF KIT P/N 3600.8888.529.....	1
5	PAOZZ	2X179	2830.8061.372	COUPLING, SHAFT, FLEX PART OF KIT P/N..... 3600.8888.529.....	1
6	PAOZZ	2X179	3600.8836.084	HOUSING, MECHANICAL PART OF KIT P/N 3600, 8888.529.....	1
7	PFOZZ	2X179	3240.018	NUT, PLAIN, HEXAGON MBX125.....	6

END OF FIGURE

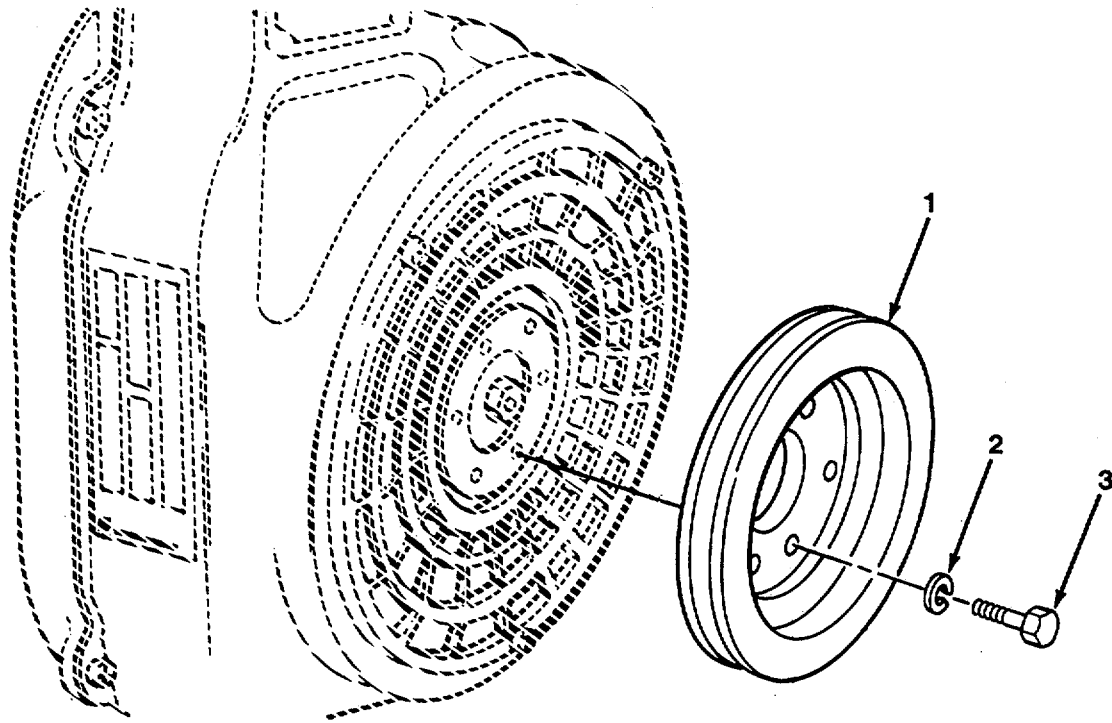


Figure 17. Alternator Drive Pulley

SECTION II

TM 5-3825-230-14&P

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC) GROUP 0109 ACCESSORY DRIVING MECHANISMS	(6) QTY
FIG.17. ALTERNATOR DRIVE PULLEY					
1	PAOZZ	2X179	7051-060	PULLEY, GROOVE.....	1
2	PFOZZ	2X179	9.7565.007	WASHER, FLAT M8.....	6
3	PFOZZ	2X179	9.1770.009	SCREW, CAP, HEXAGON H M8X1,25X35.....	6

END OF FIGURE

5
INCLUDES 6

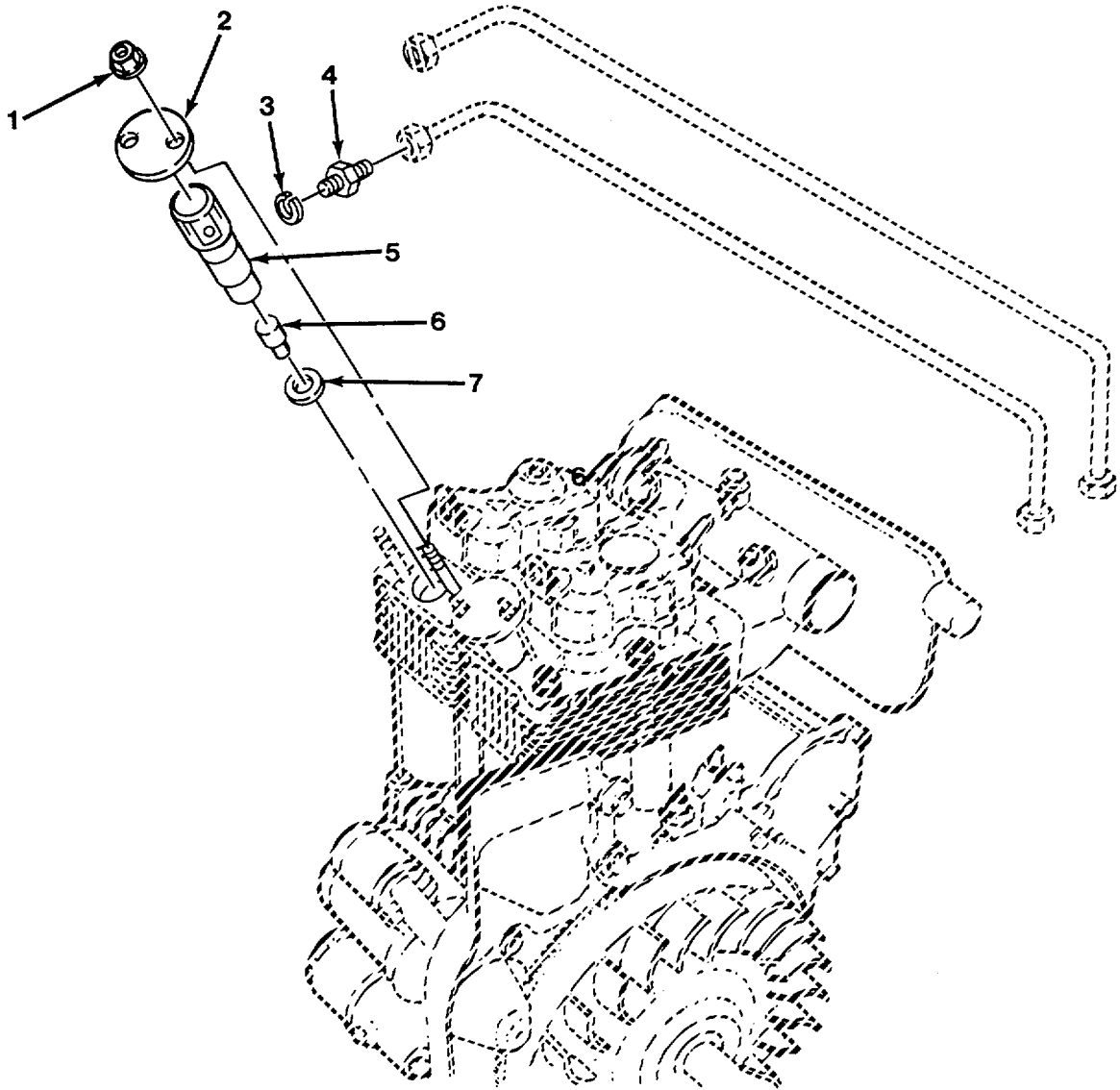


Figure 18. Injector Assembly

SECTION II

TM 5-3825-230-14&PC02

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
				GROUP 03 FUEL SYSTEM GROUP 0301 CARBURETOR, FUEL INJECTOR	
				FIG.18. INJECTOR ASSEMBLY	
1	PFFZZ	2X179	9.3240.008	NUT, PLAIN, HEXAGON	4
2	PAFZZ	2X179	500.3790.042	COVERT ACCESS.....	2
3	PFFZZ	2X179	260.4650.037	GASKET	2
4	PFFZZ	2X179	500.7301.006	REDUCER, TUBE	2
* 5	XBFZZ	2X179	395.6615.045	NOZZLE, FUEL INJECTI.....	2
6	PAFZZ	2X179	395.6531.104	.NOZZLE, INJECTION	1
7	PFFZZ	2X179	9.4670.064	GASKET 1,00.....	2
7	PFFZZ	2X179	9.4670.065	GASKET 1,50.....	2

END OF FIGURE

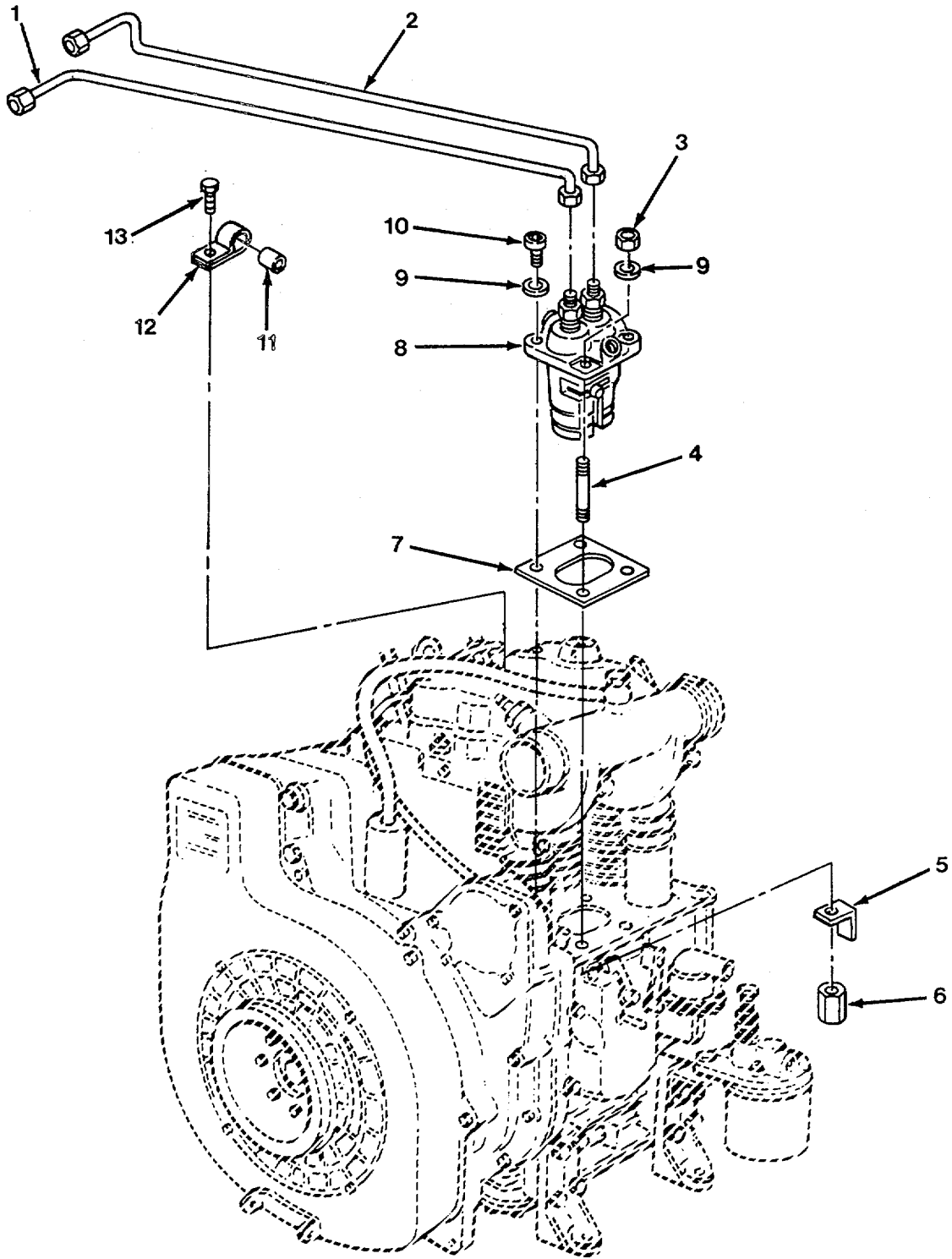


Figure 19. Injector Pump Assembly

SECTION II

TM 5-3825-230-14&PC02

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
GROUP 0302 FUEL PUMPS					
FIG.19. INJECTOR PUMP ASSEMBLY					
1	PAOZZ	2X179	435.9375.280	SPRAY TIP, NOZZLE, FU	1
2	PAOZZ	2X179	435.9375.279	ADAPTER, STRAIGHT, PI	1
* 3	PFFZZ	2X179	3240.018	NUT, PLAIN,HEXAGONN	1
4	PFFZZ	ZX179	9.6780.089	STUD PLAIN	1
5	PAFZZ	2X179	560.5168.041	STOP, ELECTRICAL SWI.....	1
6	PFFZZ	2X179	560.3240.131	NUT, PLAIN, HEXAGON.....	1
7	PAFZZ	2X179	276.4580.002	GASKET 0110 PART OF KIT P/N	1
				395.8180.062	
7	PAFZZ	2X179	276.4580.009	GASKET 0, 50 PART OF KIT P/N	1
				395 8180.062	
7	PAFZZ	2X179	672.4580.068	GASKET 0105 PART OF KIT P/N	1
				395.8180.062	
8	PAFZZ	2X179	435.6590.076	PUMP, FUEL, METERING	1
9	PFFZZ	2X179	9.7625.010	WASHER, FLAT.....	4
10	PFFZZ	2X179	9.9730.100	SCREW, CAP, SOCKET HE	3
11	PAOZZ	2X179	276.5400.046	GASKET	2
12	PFOZZ	2X179	276.3616.018	CLAMP, LOOP.....	2
13	PFOZZ	56161	10503657	SCREW, CAP, HEXAGON H M5X0, 8X12.....	2

END OF FIGURE

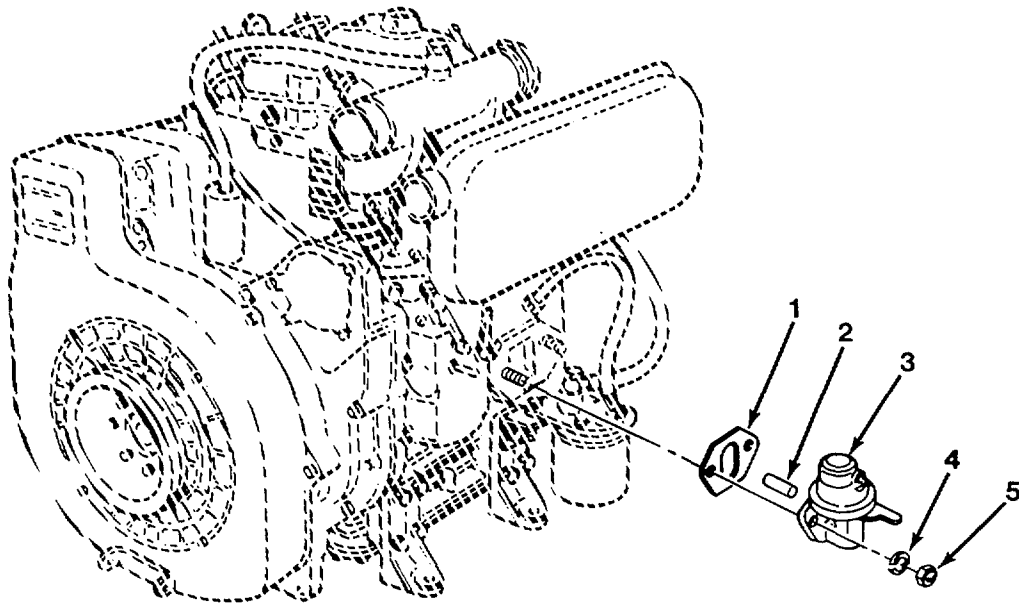


Figure 20. Fuel Pump Assembly

SECTION II

TM 5-3825-230-14&P

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE O N CODES (UOC)	(6) QTY
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GROUP 0302 FUEL PUMPS

FIG.20. FUEL PUMP ASSEMBLY

1	PAOZZ	2X179	560.4580.047	GASKET PART OF KIT P/N 395.8180.062.....	1
2	PFOZZ	2X179	560.7200.78	PIN,STRAIGHT, THREAD.....	1
3	PAOZZ	2X179	6585.030	PUMP, RECIPROCATING	1
4	PFOZZ	2X179	9.7565.007	WASHER, FLAT M8.....	2
5	PFOZZ	2X179	9.3203.047	NUT, PLAIN, HEXAGON M8X1, 25.....	2

END OF FIGURE

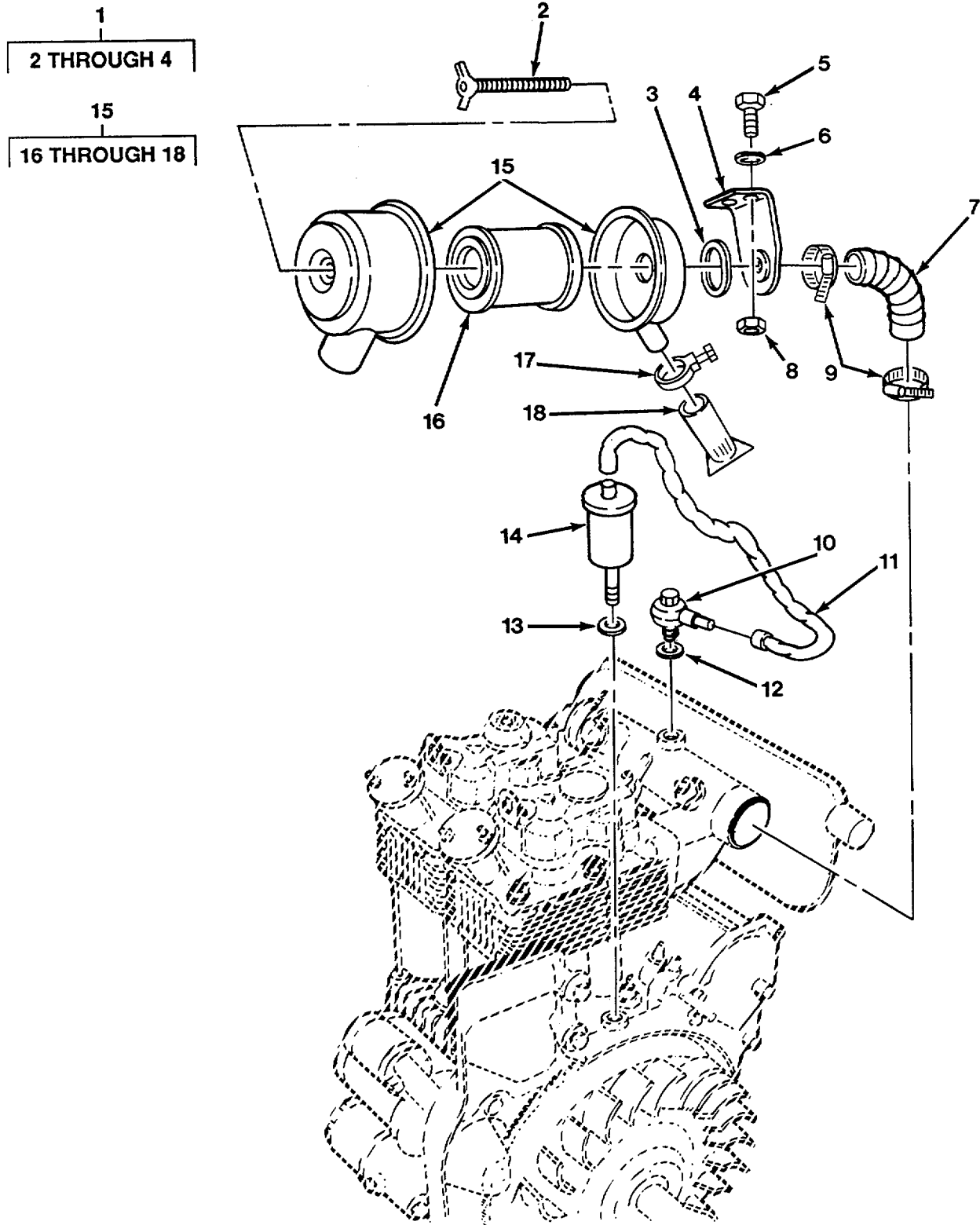


Figure 21. Air Cleaner and Vapor Separator Assembly

SECTION II

TM 5-3825-230-14&PC02

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY	
GROUP 0304 AIR CLEANER						
FIG.21. AIR CLEANER AND VAPOR SEPARATOR ASSEMBLY						
1	PFOZZ	78940	F221B6K01B	BRACKET, MOUNTING	1	
2	PFOZZ	78940	0629A84	.STUD, TAPPING, THREAD	1	
3	PFOZZ	78940	OA7419	.GASKET,	1	
4	PFOZZ	78940	F2218B4	.BRACKET, FILTER MOUT	1	
*	5	PFOZZ	80204	B1821BH038C100N	SCREW, CAP, HEXAGON H 3/8-16UNCX1.....	2
6	PFOZZ	96906	MS27183-13	WASHER, FLAT 3/8.....	2	
7	MOOZZ	66234	204-92008	HOSE MAKE FROM HOSE P/N CWC2INDIA	1	
8	PFOZZ	96906	MS51922-17	NUT, SELF-LOCKING, HE 3/8-16UNC.....	2	
9	PFOZZ	66295	28KS3	CLAMP, LOOP.	2	
10	PAOZZ	2X179	360.1901.039	BOLT, MACHINE	1	
11	PFOZZ	2X179	560.9400.054	TUBE, BENT METALLIC	1	
12	PFOZZ	2X179	9.4670.060	WASHER, FLAT	1	
13	PFOZZ	2X179	276.4670.014	WASHER, FLAT	1	
14	PAOZZ	2X179	560.9050.041	FILTER,FLUID	1	
15	PFOZZ	78940	E105BIK18B	AIR CLEANER, INTAKE.....	1	
16	PAOZZ	78940	250816A	.FILTER ELEMENT, INTA	1	
17	PFOZZ	78940	OA11861	.CLAMP, SPECIAL.....	1	
18	PFOZZ	78940	0638A1	.BOWL, SEDIMENT,	1	

END OF FIGURE

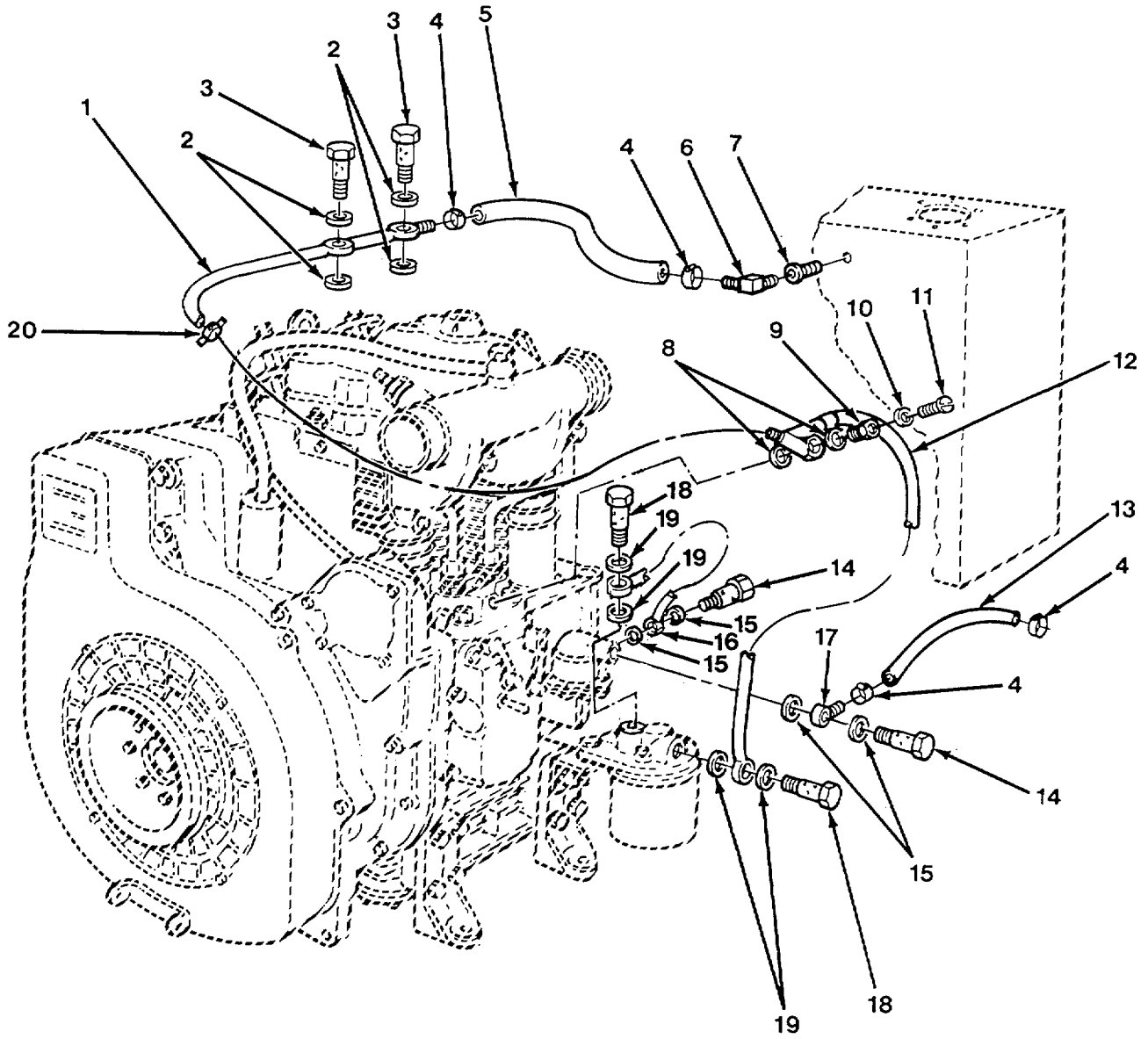


Figure 22. Fuel Lines and Fittings

SECTION II

TM 5-3825-230-14&P

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
GROUP 0306 TANKS, LINES, FITTINGS, HEADERS					
FIG. 22 FUEL LINES AND FITTINGS					
1	PFOZZ	2X179	560.9571.077	TUBE, BENT, METALLIC.....	1
2	PFOZZ	2X179	9.4670.058	WASHER, FLAT.....	4
3	PFOZZ	2X179	91901.029	BOLT, MACHINE.....	2
4	PAOZZ	70842	705-1171	CLAMP, HOSE.....	4
5	MOOZZ	79470	H05704	HOSE, NONMETALLIC MAKE FROM HOSE..... P/N H05704 (79470), 16 INCHES.....	1
6	PAOZZ	22031	4501-4	ELBOW, PIPE TO HOSE 1/4 HOSE X 1/4 PIPE.....	1
7	PFOZZ	72423	2071-059	BUSHING, PIPE 3/8X1/4.....	1
8	PFOZZ	2X179	9.4670.060	WASHER, FLAT.....	2
9	PFOZZ	2X179	9.1901.031	BOLT, MACHINE.....	1
10	PFOZZ	2X179	9.4775.196	WASHER, FLAT.....	1
11	PFOZZ	2X179	9.9080.037	PLUG, MACHINE THREAD.....	1
12	PAOZZ	2X179	560.9375.351	TUBE ASSEMBLY, METAL.....	1
13	MOOZZ	79470	H05704	HOSE, NONMETALLIC MAKE FROM HOSE..... P/N H05704(79470),10 INCHES.....	1
14	PFOZZ	2X179	9.1901.030	BOLT, MACHINE.....	1
15	PFOZZ	2X179	9.4670.059	WASHER, FLAT.....	4
16	PAOZZ	2X179	9375.022	TUBE ASSEMBLY, METAL.....	1
17	PAOZZ	2X179	7270.104	COUPLING, HOSE.....	1
18	PAOZZ	2X179	1901.032	BOLT, MACHINE,.....	2
19	PAOZZ	2X179	4670.016	WASHER, FLAT.....	4
20	PFOZZ	2X179	9.3630.050	CLAMP, LOOP.....	1

END OF FIGURE

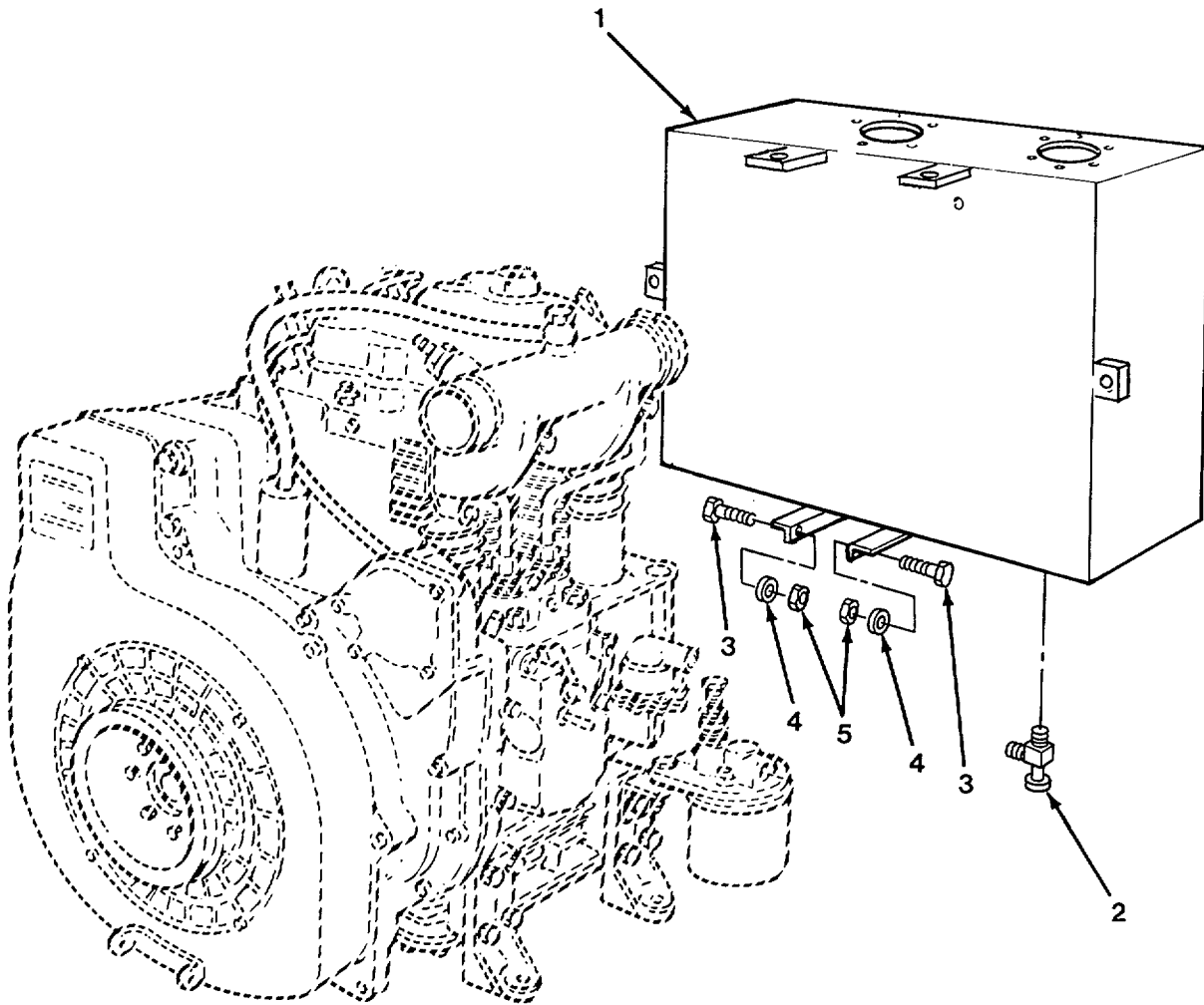


Figure 23. Fuel Tank Assembly

SECTION II

TM 5-3825-230-14&PC02

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
GROUP 0306 TANKS, LINES, FITTINGS, HEADERS					
FIG.23 FUEL TANK ASSEMBLY					
1	PAOZZ	66234	410-92713	TANK, FUEL, ENGINE	1
2	PBOZZ	57648	100-43	VALVE, REGULATING, FL.....	1
* 3	PFOZZ	80204	B1821BH038C125N	SCREW, CAP, HEXAGON H 3/8-16UNCX1.25 GR8.....	4
4	PFOZZ	96906	MS35338-46	WASHER, LOCK 3/8.....	4
5	PFOZZ	96906	MS51967-8	NUT, PLAIN HEXAGON, 3/8 - 16 UNC.....	4

END OF FIGURE

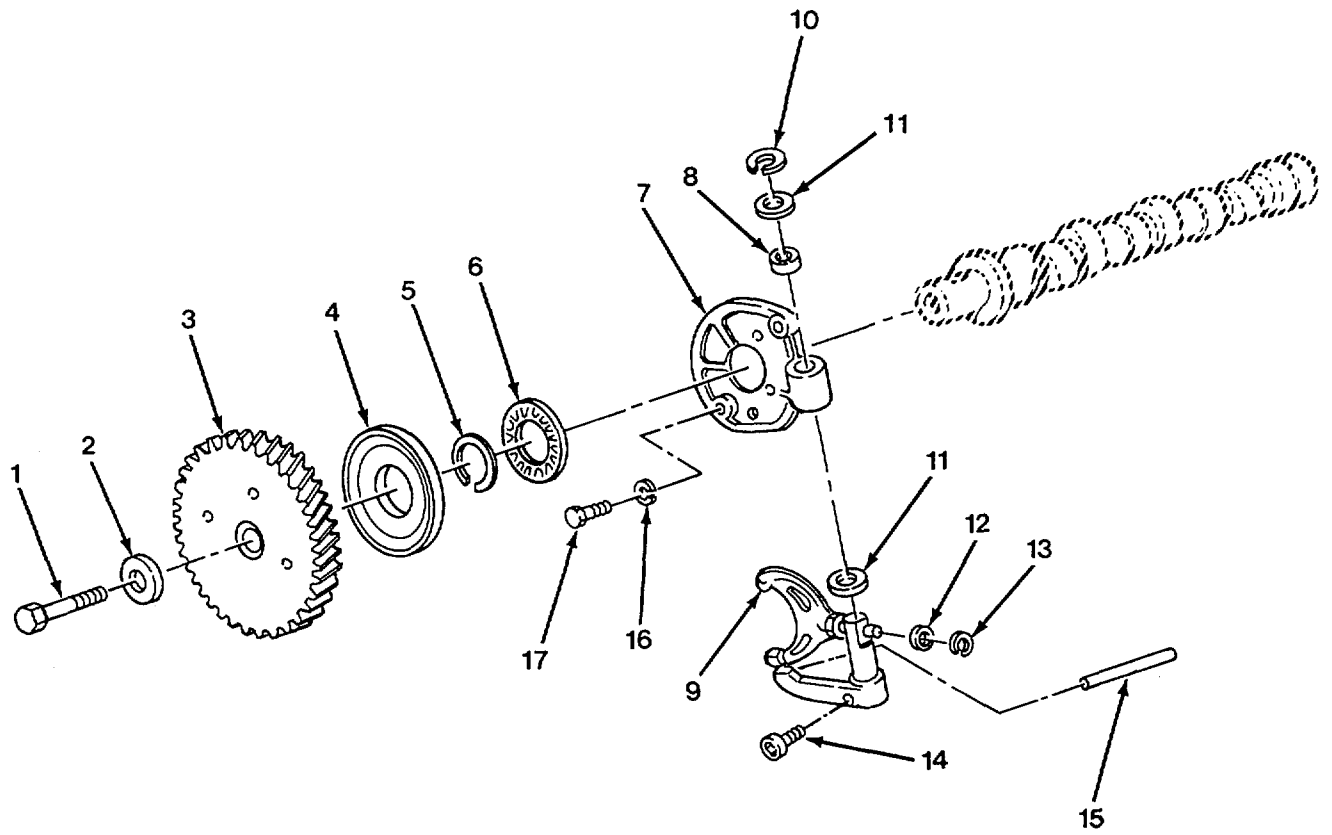
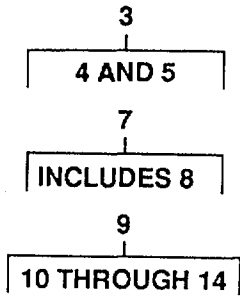


Figure 24. Governor and Governor Lever Assemblies

SECTION II

TM 5-3825-230-14&P

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
GROUP 0308 ENGINE SPEED GOVERNOR AND CONTROLS					
FIG. 24. GOVERNOR AND GOVERNOR LEVER ASSEMBLIES					
1	PFFZZ	15526	DIN933-M10X35-8 8-A4C	.SCREW, CAP, HEXAGON H M10X1, 5X35.....	1
2	PFFZZ	2X179	9.7626.038	WASHER, FLAT M10.....	1
3	PAFFF	2X179	435.7362.186	GOVERNOR, DIESEL ENG.,	1
4	PAFZZ	2X179	2086.034	.END BELL, ELECTRICAL	1
5	PAFZZ	2X179	560.1160.022	.RING, RETAINING	1
6	PAFZZ	2X179	9.3110.058	BEARING, ROLLER, THRU	1
7	PAFZZ	2X179	560.8785.069	BRACKET, MOUNTING	1
8	PAFZZ	2X179	9.1585.025	.BUSHING, SLEEVE	2
9	PAFFF	2X179	5200-300	LEVER ASSEMBLY, GOVE	1
10	PFFZZ	2X179	9.1240.005	.RING, RETAINING	1
11	PFFZZ	2X179	9.7626.040	.WASHER, FLAT.....	2
12	PFFZZ	2X179	9.7625.007	.WASHER, FLAT.....	1
13	PFFZZ	2X179	9.1240.077	.RING, RETAINING	1
14	PFFZZ	2X179	9.9730.107	.SCREW, CAP, SOCKET HE M6X1X14.....	1
15	PAFZZ	2X179	560.6080.022	PIN, STRAIGHT, HEADLE	1
16	PFFZZ	2X179	9.7565.007	WASHER, FLAT M8.....	2
17	PFFZZ	56161	10501759	SCREW, CAP, HEXAGON H M8X1, 25X25.....	2

END OF FIGURE

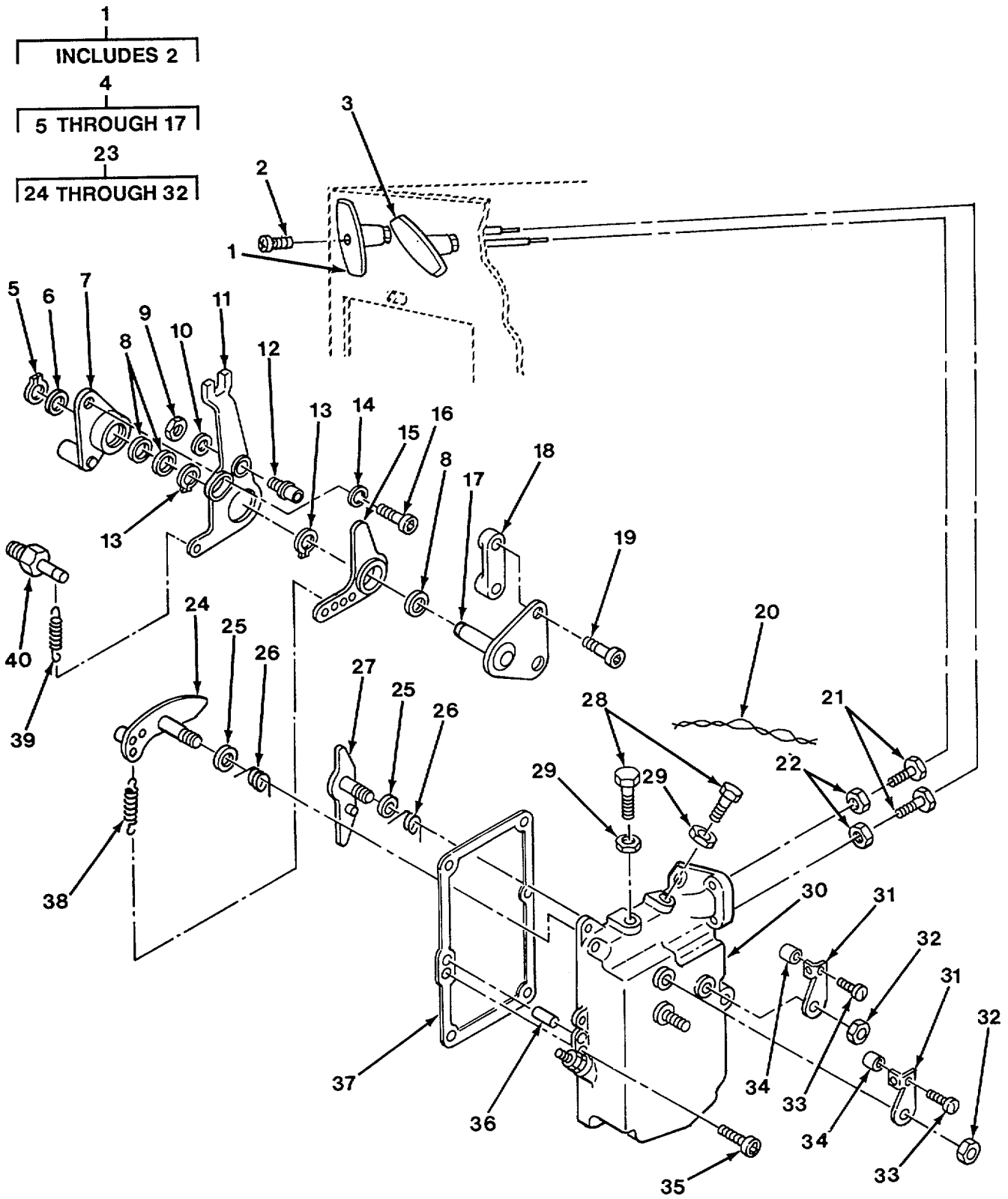


Figure 25. Throttle Control Lever Assembly

SECTION II

TM 5-3825-230-14&P

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
GROUP 0308 ENGINE SPEED GOVERNOR AND CONTROLS					
FIG. 25. THROTTLE CONTROL LEVER ASSEMBLY					
1	PAOZZ	66234	401-94733	CONTROL ASSEMBLY, PU.....	1
2	PFOZZ	96906	MS35207-263	.SCREW, MACHINE 10-32UNFX1/2.....	1
3	PAOZZ	66234	401-94732	CONTROL ASSEMBLY, PU.....	1
4	PFFFF	2X179	560.5200.265	LEVER, REMOTE CONTRO.....	1
5	PFFZZ	2X179	9.1240.001	.RING, RETAINING.....	1
6	PFFZZ	2X179	9.7625.103	.WASHER, FLAT 0, 50.....	1
6	PFFZZ	2X179	9.7625.104	.WASHER, FLAT 1, 00.....	1
7	PFFZZ	2X179	395.5200.250	.LEVER, REMOTE CONTROL.....	1
8	PAFZZ	2X179	9.3000.004	.BEARING, BALL, ANNULA.....	3
9	PFFZZ	2X179	9.3240.008	.NUT, PLAIN, HEXAGON.....	1
* 10	PFFZZ	2X179	7555.004	.WASHER.....	1
11	PFFZZ	2X179	560.5200.200	.LEVER, REMOTE CONTROL.....	1
12	PFFZZ	2X179	560.6140.100	.PIN, STRAIGHT, HEADED.....	1
13	PAFZZ	2X179	9.1241.009	.RING, RETAINING.....	2
* 14	XDFZZ	2C072	9.7625.012	.WASHER M8.....	1
15	PFFZZ	2X179	395.5200.271	.LEVER, REMOTE CONTROL.....	1
16	PFFZZ	2X179	9.9732.092	.SCREW, CAP, SOCKET HE M8X1, 25X18.....	1
17	PFFZZ	2X179	395.8785.070	.BRACKET, MOUNTING.....	1
18	PAFZZ	2X179	560.3521.038	SPACER, SLEEVE.....	1
19	PFFZZ	2X179	9.9732.063	SCREW, CAP, SOCKET HE M8X1, 25X35.....	2
20	MFOZZ	96906	MS20995C20	WIRE, NONELECTRICAL MAKE FROM WIRE P/N MS20995C20(96906), 12 INCHES.....	1
21	PFOZZ	2X179	2760.9180.042	BOLT, FLUID PASSAGE.....	2
22	PFOZZ	2X179	9.3240.019	NUT, PLAIN, HEXAGON.....	2
23	PAFFF	2X179	560.2516.061	CONTROL ASSEMBLY, RE.....	1
24	XAFZZ	2X179	560.5200.194	.LEVER.....	1
25	XAFZZ	2X179	9.1200.034	.SEAL, PLAIN.....	2
26	XAFZZ	2X179	560.5680.077	.SPRING.....	2
27	XAFZZ	2X179	560.5200.154	.LEVER.....	1
28	XAFZZ	2X179	9.1760.041	.SCREW, CAP, HEX HD M6X1X40.....	2
29	XAFZZ	2X179	9.3240.008	.NUT, PLAIN, HEXAGON M6X1.....	2
30	XAFZZ	2X179	560.2690.121	.COVER, REMOTE CONT.....	1
31	XAFZZ	2X179	560.5200.108	.LEVER.....	2
32	XAFZZ	2X179	9.3203.047	.NUT, PLAIN, HEXAGON.....	2
33	PFOZZ	2X179	9.9790.023	SCREW, CAP, SOCKET HE M5X0, 8X7.....	2
34	PFOZZ	2X179	9.6000.021	NUT, PLAIN, HEXAGON.....	2
35	PFFZZ	2X179	9.9732.078	SCREW, CAP, SOCKET HE.....	5
36	PFFZZ	2X179	276.8460.055	PIN, TAPERED, PLAIN.....	2
37	PAOZZ	2X179	560.4776.083	GASKET PART OF KIT P/N 395.8180.062.....	1
38	PAFZZ	2X179	560.5655.076	SPRING, HELICAL, EXTE.....	1
39	PFFZZ	2X179	560.5801.088	SPRING, HELICAL, EXTE.....	1
40	PAFZZ	2X179	560.6040.015	PIN, SPRING.....	1

END OF FIGURE

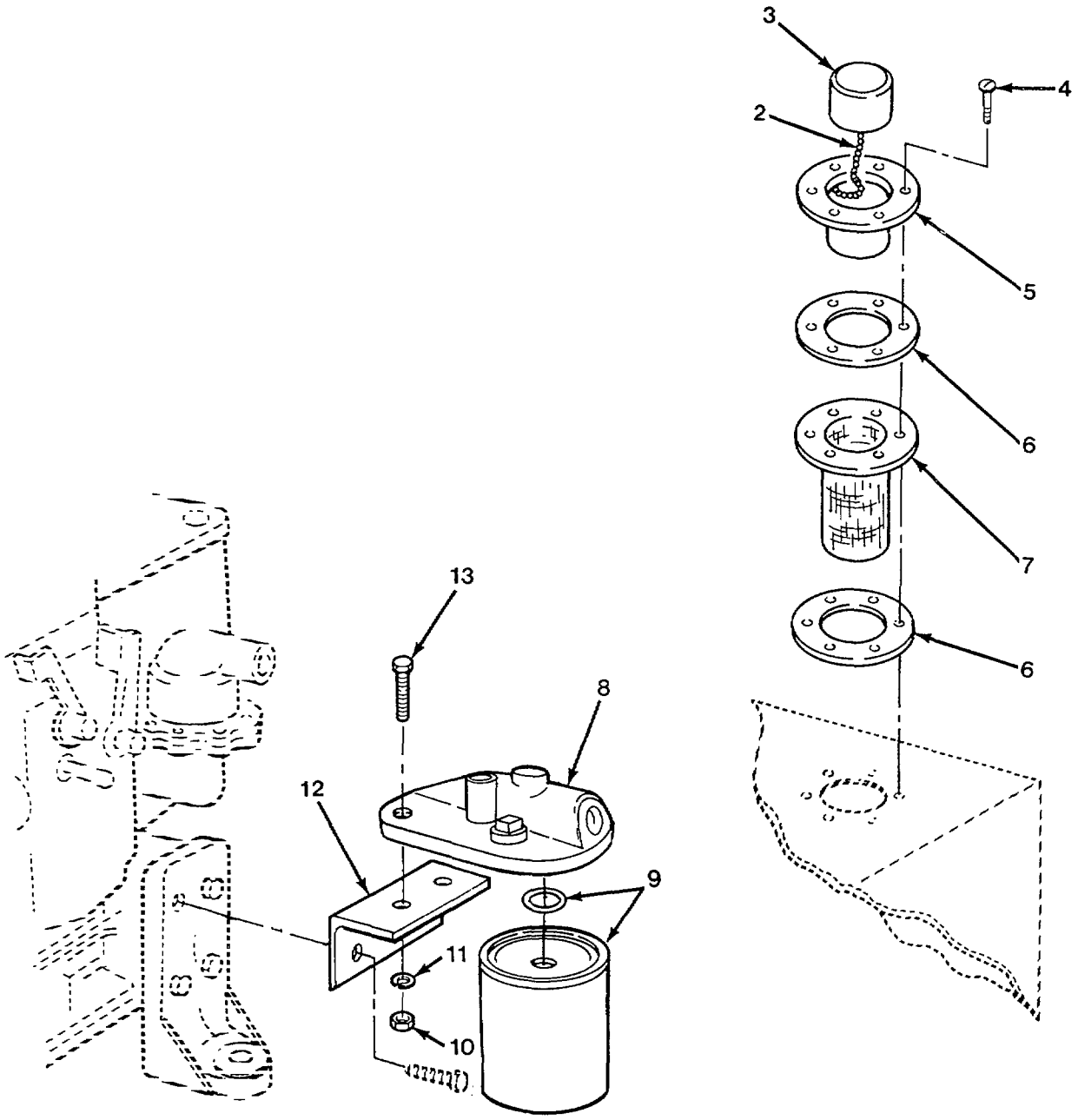
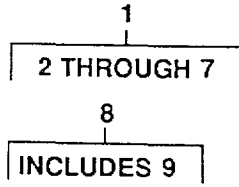


Figure 26. Fuel Filter Assembly

SECTION II

TM 5-3825-230-14&P

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
GROUP 0309 FUEL FILTERS					
FIG. 26. FUEL FILTER ASSEMBLY					
1	PAOZZ	55524	AB-1000-3	FILLER BREATHER FIL.....	1
2	PFOZZ	39428	3603T17	.CHAIN, WELDLESS.....	1
3	PFOZZ	55524	AB-CAP	.CAP, FILLER OPENING	1
4	PFOZZ	96906	MS35207-263	.SCREW, MACHINE 10-32UNFX1/2.....	1
5	PFOZZ	55524	AB-NECK	.FILLER NECK	1
6	PFOZZ	55524	AB-GASKET	.GASKET	2
7	PFOZZ	55524	AB-3INCHBASKET	.STRAINER ELEMENT, SE.....	1
8	PAOZZ	2X179	2830.3730.036	FILTER, FLUID	1
9	PAOZZ	2X179	2830.2175.045	.FILTER ELEMENT, FLUI	1
10	PAOZZ	2C072	9.3240.066	NUT, PLAIN, HEXAGON M10X1, 5.....	2
11	PFOZZ	2X179	9.7565.011	WASHER, LOCK M10.	2
12	PAOZZ	2X179	0000-J1G	BRACKET, MOUNTING	1
13	PFOZZ	5X475	9.1780.007	SCREW, CAP, HEXAGON H	2

END OF FIGURE

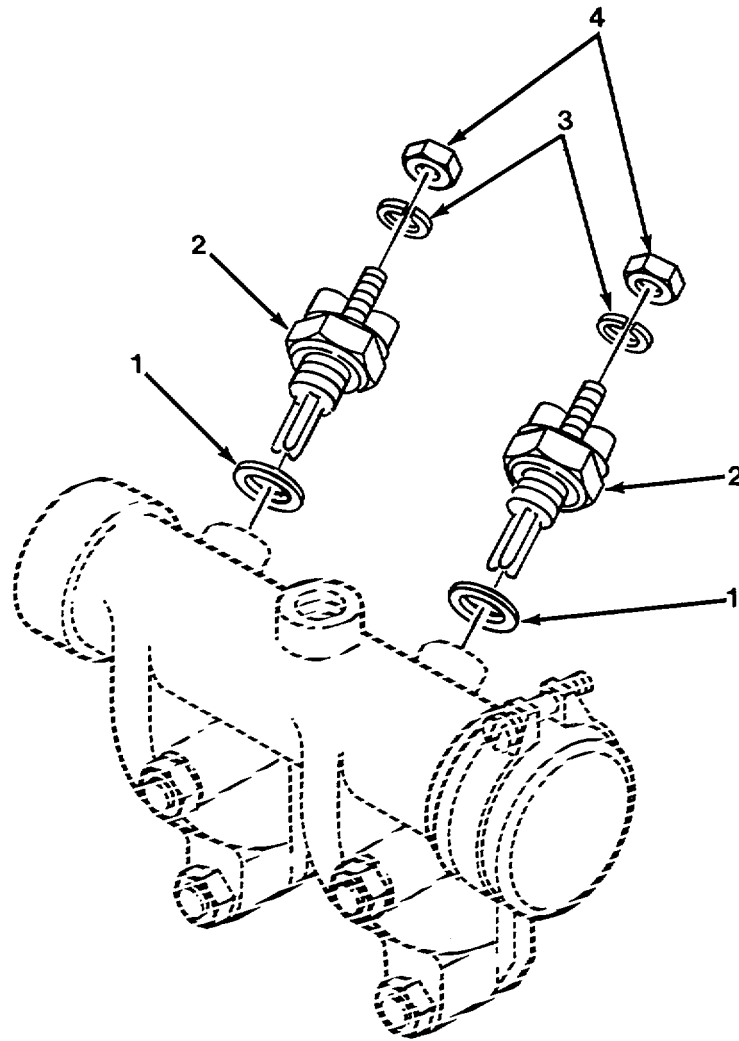


Figure 27. Glow Plug Assembly

SECTION II

TM 5-3825-230-14&P

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
GROUP 0311 ENGINE STARTING AIDS					
FIG. 27. GLOW PLUG ASSEMBLY					
1	PFOZZ	2X179	9.4670.026	WASHER, FLAT.....	2
2	PAOZZ	2X179	9040.2100.026	GLOW PLUG	2
3	PFOZZ	96906	MS35338-44	WASHER, LOCK 1/4.....	2
4	PFOZZ	24617	11505913	NUT, PLAIN, HEXAGON M5X0, 8.....	2

END OF FIGURE

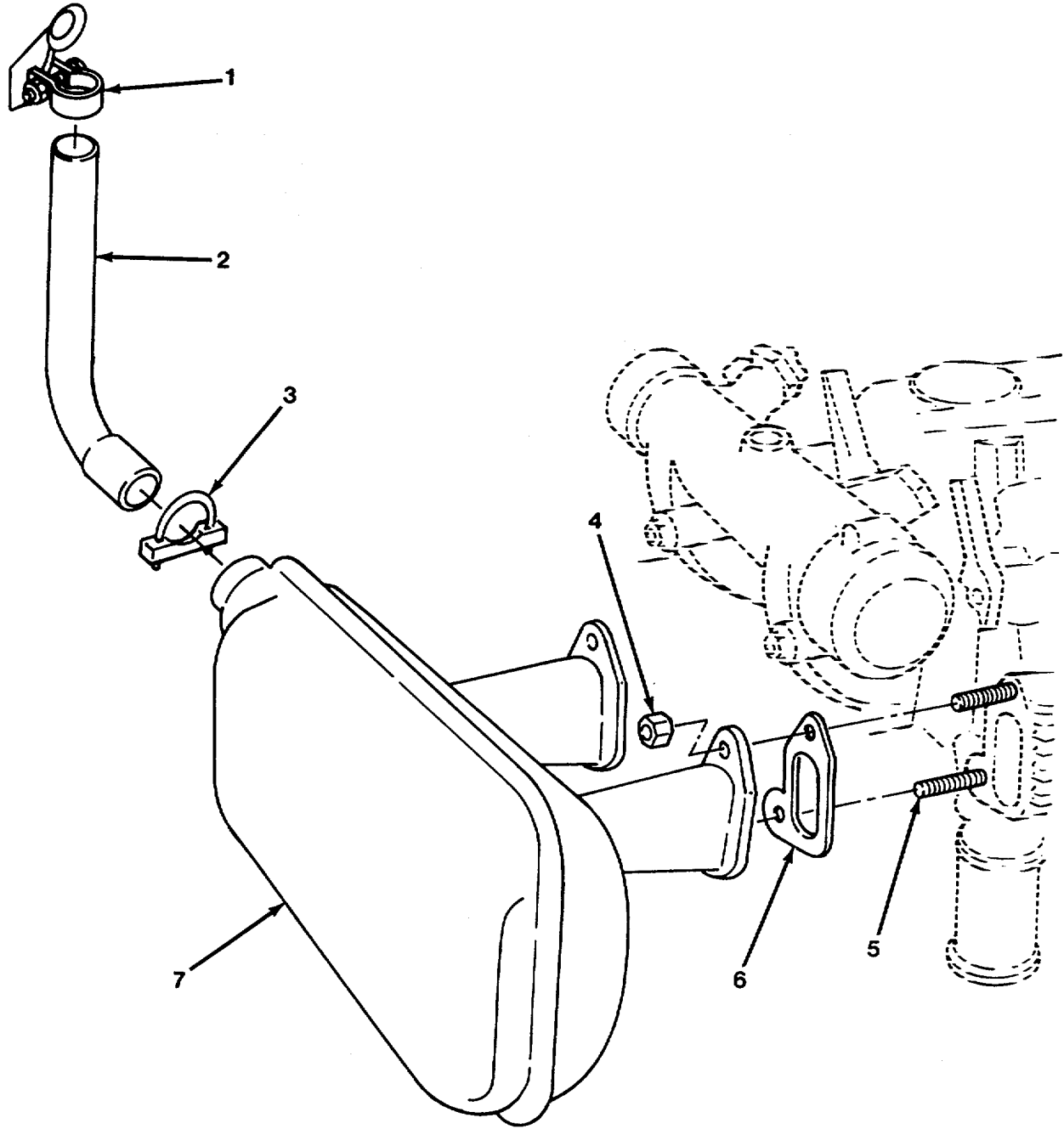


Figure 28. Muffler and Pipe Assembly

SECTION II

TM 5-3825-230-14&P

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
GROUP 04 EXHAUST SYSTEM					
GROUP 0401 MUFFLER AND PIPES					
FIG. 28. MUFFLER AND PIPE ASSEMBLY					
1	PFOZZ	70842	703-1500	CAP ASSEMBLY, PROTEC.....	1
2	PAOZZ	66234	209-92052	PIPE, EXHAUST	1
3	PAOZZ	70842	732-1026	CLAMP, LOOP.....	1
4	PFOZZ	2X179	9.3240.019	NUT, PLAIN, HEXAGON.....	4
5	PFOZZ	2X179	6780.085	STUD, PLAIN	4
6	PAOZZ	2X179	560.4420.019	GASKET PART OF KIT P/N 395.8180.062.....	2
7	PAOZZ	2X179	5460.256	MUFFLER, EXHAUST.....	1

END OF FIGURE

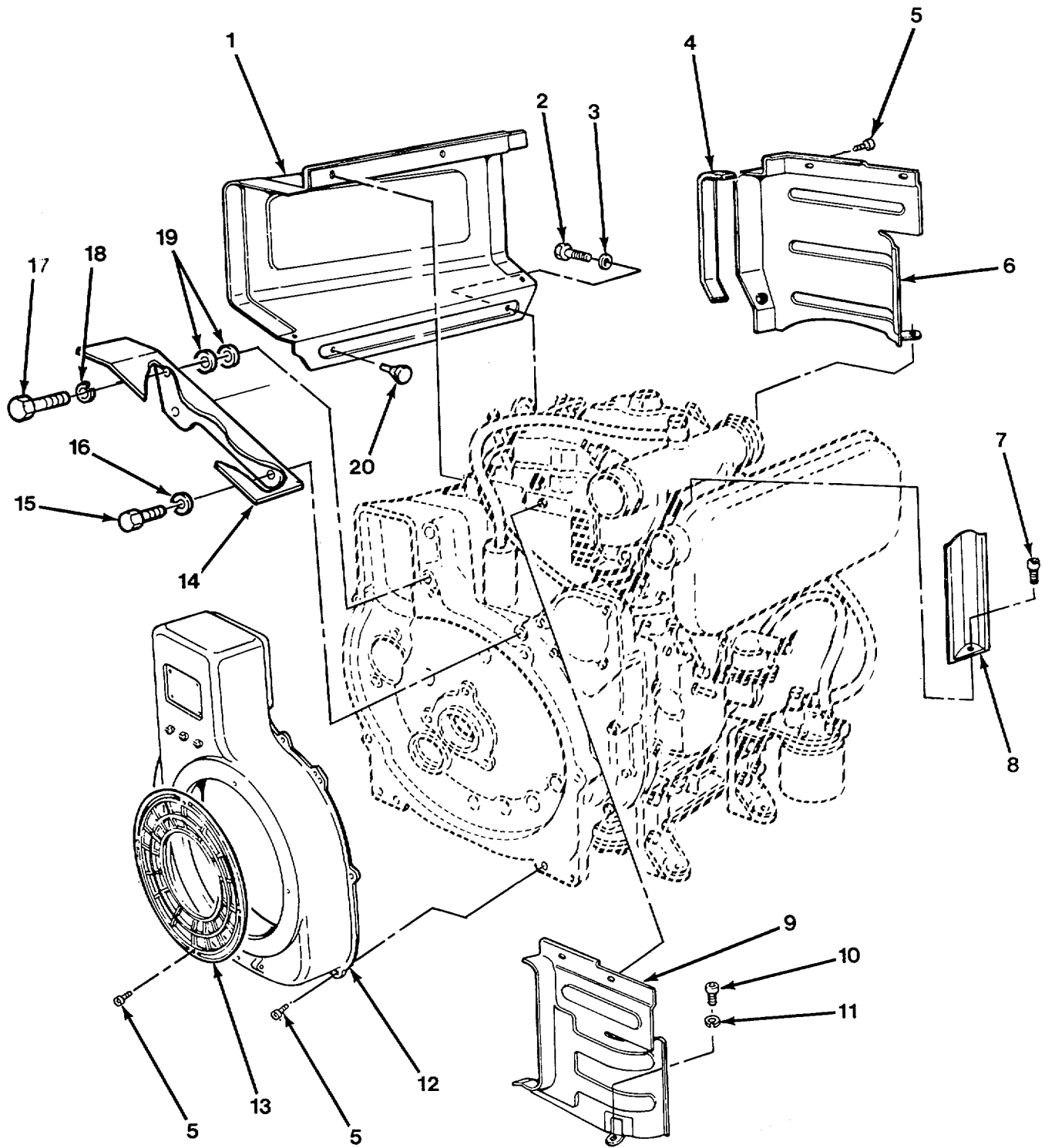


Figure 29. Shrouds and Guards

SECTION II

TM 5-3825-230-14&PCO2

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODE S (UOC)	(6) QTY
GROUP 05 COOLING SYSTEM					
GROUP 0502 COWLING, DEFLECTORS, AIR DUCTS, SHROUDS, ETC.					
FIG. 29. SHROUDS AND GUARDS					
1	PFOZZ	2X179	435.2920.104	COVER, ACCESS	1
2	PFOZZ	2X179	9.1770.002	SCREW, CAP, HEXAGON H M8X1, 25X16.....	1
3	PFOZZ	2X179	9.7565.007	WASHER, FLAT M8.....	1
4	PFOZZ	2X179	360.4776.090	GASKET	1
5	PFOZZ	2X179	9.9790.039	SCREW, CAP, SOCKET HE M6X1X12.....	18
6	PFOZZ	2X179	435.5066.070	PANEL, BODY, VEHICULA.....	1
7	PFOZZ	2X179	9.9731.092	SCREW, CAP, SOCKET HE MBX1, 25X14.....	1
8	PFOZZ	2X179	435.3350.094	DEFLECTOR, DIRT AND	1
9	PAOZZ	2X179	435.5066.074	SHROUD, FAN, RADIATOR	1
10	PFOZZ	2X179	9.1760.003	SCREW, CAP, HEXAGON H M6X1X12.....	2
* 11	PAOZZ	2X179	7555.004	WASHER M6	2
12	PFOZZ	2X179	435.2569.203	HOUSING, FLYWHEEL	1
13	PFOZZ	2X179	360.6927.056	GUARD, ENGINE.....	1
14	PAOZZ	66234	401-94506	SHROUD, FAN, RADIATOR	1
15	PFOZZ	24617	11500713	BOLT, MACHINE M8X1, 25X20	1
16	PFOZZ	96906	MS35338-45	WASHER, LOCK 5/16.....	1
17	PFOZZ	24617	11500723	SCREW, CAP, HEXAGON H M10X1, 50X20.....	2
18	PFOZZ	96906	MS35338-47	WASHER, LOCK 7/16.....	2
19	PFOZZ	96906	MS27183-15	WASHER, FLAT 7/16.....	4
20	PFOZZ	2X179	904.3527.018	SPACER, SLEEVE.....	1

END OF FIGURE

7
8 THROUGH 10

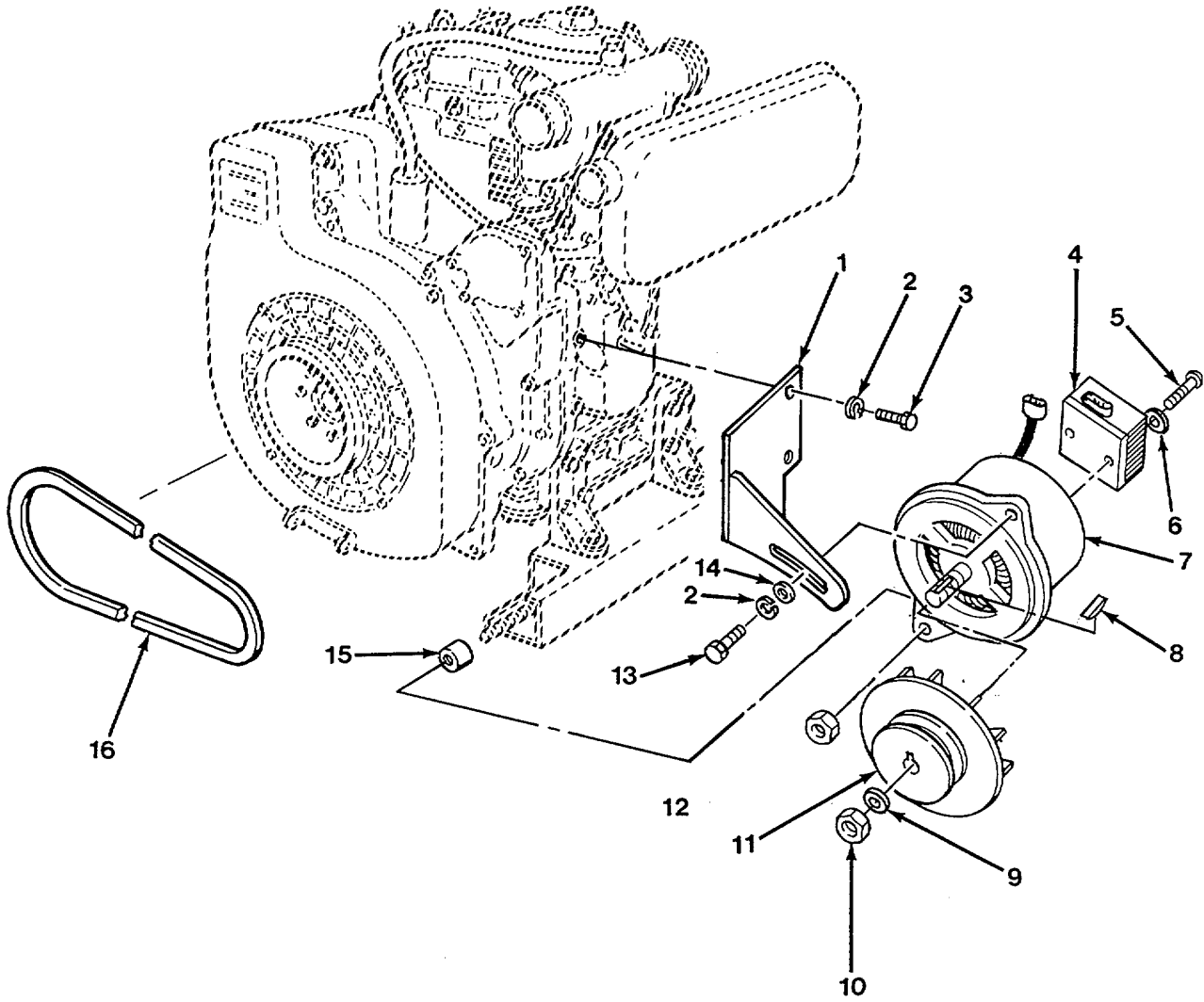


Figure 30. Alternator Installation

SECTION II

TM 5-3825-230-14&P

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
GROUP 06 ELECTRICAL SYSTEM					
GROUP 0601 GENERATOR, ALTERNATOR					
FIG. 30. ALTERNATOR INSTALLATION					
1	PFOZZ	66234	410-92705	BRACKET, MOUNTING	1
2	PFOZZ	96906	MS35338-45	WASHER, LOCK 5/16.....	3
3	PFOZZ	24617	11500713	BOLT, MACHINE M8X1, 25X20	2
4	PAOZZ	76761	A2-101	REGULATOR, VOLTAGE	1
5	PFOZZ	96906	MS35207-264	SCREW, MACHINE 10-32UNFX5/8.....	2
6	PFOZZ	96906	MS27183-7	WASHER, FLAT NO.10	2
7	PAOZZ	76761	A1-103	GENERATOR, ALTERNATI	1
8	PAOZZ	76761	A9-506	.KEY FAE NO. 6.....	1
9	PFOZZ	76761	A4-510	.WASHER, FLAT 1/2.....	1
10	PFOZZ	96906	MS21044-N8	.NUT, SELF-LOCKING, HE 1/2-20UNF.....	1
11	PAOZZ	76761	A3-300	PULLEY, GROOVE	1
12	PFOZZ	96906	MS51922-33	NUT, SELF-LOCKING, HE 1/2-13UNC.....	1
13	PFOZZ	96906	MS90725-34	BOLT, MACHINE 5/16-18UNCX1 GR5.....	1
14	PFOZZ	96906	MS27183-12	WASHER, FLAT 5/16.....	1
15	PAOZZ	66234	401-94419	SPACER, RING.....	1
16	PAOZZ	20796	15350LA	BELT, V.....	1

END OF FIGURE

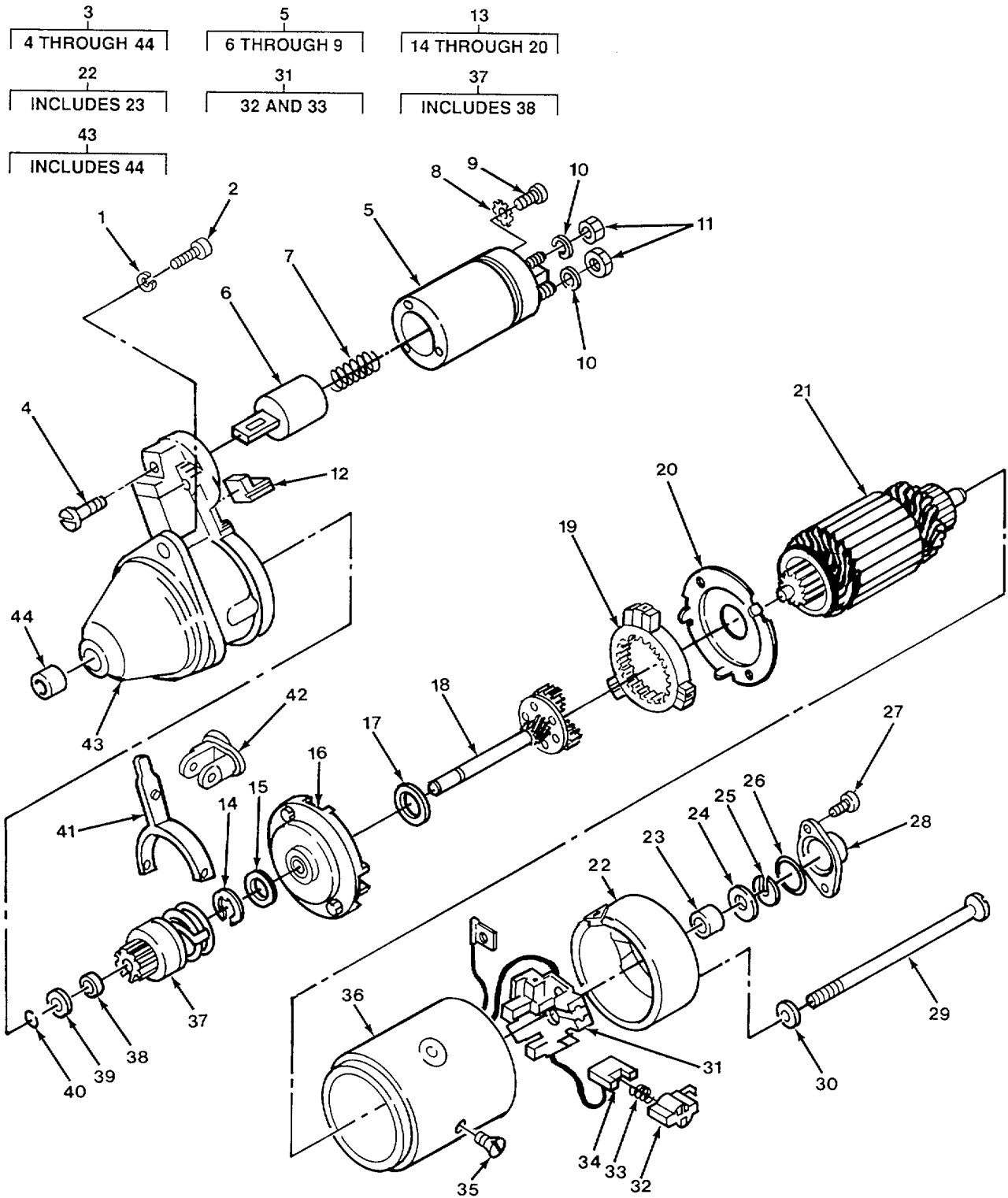


Figure 31. Starter Motor Assembly

SECTION II

TM 5-3825-230-14&PCO2

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY	
GROUP 0603 STARTING MOTOR						
FIG. 31. STARTER MOTOR ASSEMBLY						
1	PFOZZ	2X179	9.7565.011	WASHER, LOCK M10.....	2	
2	PFOZZ	2X179	9.9730.045	SCREW, CAP, SOCKET HE M10X1, 50X30.....	2	
3	PAOFF	53867	0 001 219 010	STARTER, MOTOR	1	
4	PFFZZ	53867	9 001 333 409	.SCREW, MACHINE	3	
5	PAFFF	55683	0 331 303 096	.SOLENOID, ELECTRICAL	1	
6	XAFZZ	66234	700-92010	..ACTUATOR, ELECTRIC-M	1	
7	XAFZZ	66234	700-92011	..SPRING, HELICAL, COMP	1	
8	PFFZZ	96906	MS35335-31	..WASHER, LOCK NO.8	1	
9	PFFZZ	24617	11502892	..SCREW, MACHINE M4X0, 7X6	1	
10	PFFZZ	53867	2 916 069 084	.WASHER, FLAT.....	2	
11	PFFZZ	53867	2 913 051 107	.NUT, PLAIN, HEXAGON.....	2	
12	KFFZZ	66234	700-92019	.SEAL, PLAIN PART OF KIT P/N 1 007	1	
010 040						
13	PAFFF	53867	9 001 337 056	.PARTS KIT, MOTOR, DIR	1	
14	XAFZZ	66234	700-92050	..RING, RETAINING	1	
15	XAFZZ	66234	700-92049	..WASHER, FLAT.....	1	
16	XAFZZ	66234	700-92048	..END BELL, ELECTRICAL	1	
17	XAFZZ	66234	700-92023	..WASHER, FLAT.....	1	
18	XAFZZ	66234	700-92024	..GEARSHAFT, MULTIPULE.....	1	
19	PAFZZ	53867	9 002 338 850	..WHEEL, GEARED, INTRNL.....	1	
20	XAFZZ	66234	700-92029	..COVER, ACCESS.....	1	
21	PAFZZ	S3465	4537769-643	.ARMATURE, MOTOR	1	
*	22	PAFFF	53867	9001 140 349	.PROTECTOR, THERMAL-0	1
*	23	PAFZZ	53867	100322005	..BEARING, SLEEVE	1
24	KFFZZ	66234	700-92034	.WASHER, FLAT PART OF KIT P/N 1 007	1	
010 040						
25	KFFZZ	66234	700-92035	.CLIP, RETAINING PART OF KIT P/N 1	1	
007 010 040						
26	KFFZZ	66234	700-92036	.PACKING, PREFORMED PART OF KIT P/N 1	1	
007 010 040						
27	PFFZZ	53867	9 001 333 411	.SCREW, MACHINE	2	
28	PAFZZ	53867	1 000 505 010	.CAP, ELECTRICAL.....	1	
29	PFFZZ	53867	9 001 333 417	.BOLT, MACHINE	2	
30	PFFZZ	96906	MS27183-5	.WASHER, FLAT NO.6	2	
*	31	PAFFF	53867	9 003 334 157	.WINDING, STARTER-GEN	1
32	PAFZZ	53867	9 001 140 383	..CLIP, ELECTRICAL	4	
33	PAFZZ	53867	1 004 615 001	..SPRING, HELICAL, COMP	4	
34	PAFZZ	53867	9 003 337 001	.BRUSH SET, ELECTRICA	1	
35	PFFZZ	53867	9 001 140 371	.SCREW, MACHINE	4	
36	XAFZZ	66234	700-92047	.HOUSING, ELECTRICAL.....	1	
*	37	PAFFF	66234	700-92051	.GEARSHAFT, SPUR.....	1
38	PAFZZ	53867	1 000 301 031	..BEARING, SLEEVE	1	
39	KFFZZ	66234	700-92053	.BUSHING, SLEEVE PART OF KIT P/N 1.....	1	
007 010 040						
40	KFFZZ	66234	700-92054	.SPACER, RING PART OF KIT P/N 1 007	1	
010 040						
41	PAFZZ	S3465	4537769-635	.SHIFTER FORK.....	1	
42	KFFZZ	66234	700-92020	.PIVOT, FORK PART OF KIT P/N 1 007	1	

SECTION II

TM 5-3825-230-14&PCO2

(1)	(2)	(3)	(4)	(5)	(6)
ITEM	SMR		PART		
NO	CODE	CAGEC	NUMBER	DESCRIPTION AND USABLE ON CODES (UOC)	QTY
				010 040	
* 43	PAFFF	66234	700-92009	.HOUSING, ELECTRICAL,.....	1
* 44	PAFZZ	53867	1000301031	..BEARING, SLEEVE	1

END OF FIGURE

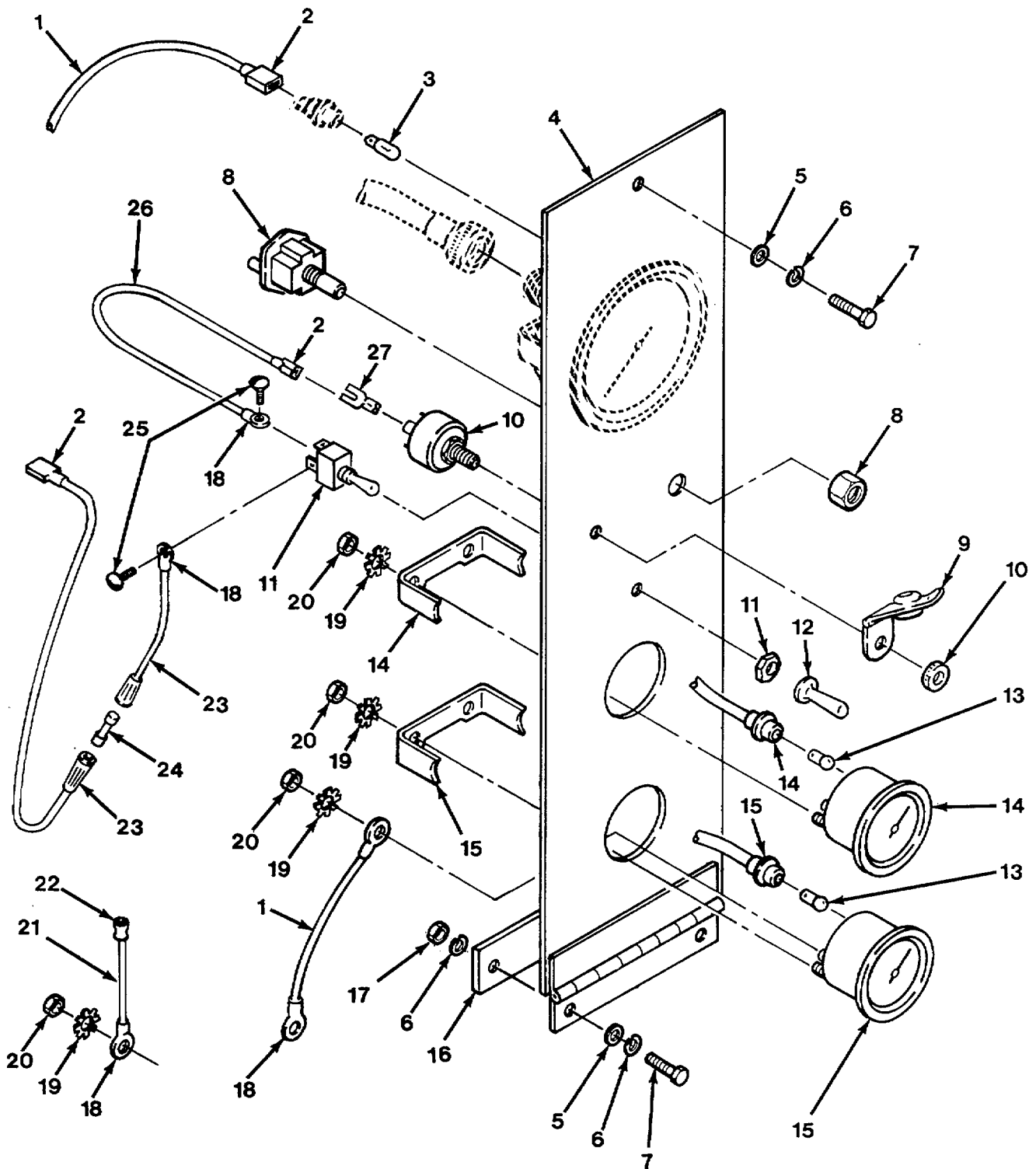


Figure 32. Instrument Panel Assembly

SECTION II

TM 5-3825-230-14&PCO2

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
GROUP 0607 INSTRUMENT OR ENGINE CONTROL PANEL					
FIG. 32. INSTRUMENT PANEL ASSEMBLY					
* 1	MOOZZ	58961	WG-16-0-6IN	WIRE, 16GA MAKE FROM WIRE P/N 950B (16764), 6 INCHES.....	2
2	PFOZZ	06383	DV14-250-C	TERMINAL, LUG 205X.032X16-14GA.....	3
3	PFOZZ	2X179	5175-119	LAMP, INCANDESCANT.	1
4	PAOZZ	66234	410-92916	PLATE, MOUNTING, FLAT	1
5	PFOZZ	96906	MS27183-10	WASHER, FLAT 1/4.....	3
6	PFOZZ	96906	MS35338-44	WASHER, LOCK 1/4.....	5
7	PFOZZ	96906	MS90725-6	SCREW, CAP, HEXAGON H 1/4-2 OUNCX3/4.....	3
8	PFOZZ	2X179	9040.7195.056	SWITCH, PUSH.....	1
9	PFOZZ	2X179	2760.2750.111	GUARD, SWITCH.....	1
10	PAOZZ	2X179	5041-020	KEY, SWITCH.....	1
11	PFOZZ	81640	7500K14	SWITCH, TOGGLE	1
* 12	PAOZZ	13445	81264	BOOT, DUST AND MOIST	1
13	PFOZZ	33955	1838575	LAMP, INCANDESCANT	2
14	PFOZZ	33955	6219371	RESISTOR, FIXED, WIRE	1
15	PFOZZ	33955	9154571	AMMETER	1
16	PAOZZ	66234	402-92008	SPACER, PLATE	1
17	PFOZZ	96906	MS51967-2	NUT, PLAIN, HEXAGON 1/4-20UNC.....	2
18	PFOZZ	96906	MS25036-108	TERMINAL, LUG 3/16X16-14GA.....	5
19	PFOZZ	96906	MS35335-87	WASHER, LOCK NO. 8	10
20	PFOZZ	96906	MS35649-286	NUT, PLAIN, HEXAGON 8-32UNC	10
* 21	MOOZZ	58961	WG-16-0-8IN	WIRE, 16GA MAKE FROM WIRE P/N 950B (16764), 8 INCHES.....	1
22	PFOZZ	06383	BSV10X-L	SPLICE, CONDUCTOR 12-10GA.....	1
23	PFOZZ	75915	155100	FUSEHOLDER, EXTRACTO.....	1
24	PFOZZ	71400	ACG-10	FUSE, CARTRIDGE.....	1
25	PFOZZ	96906	MS35206-226	SCREW, MACHINE 6-32UNCX1/4.....	2
* 26	MOOZZ	58961	WG-16-0-12IN	WIRE, 6GA MAKE FROM WIRE P/N 950B (16764), 12 INCHES.....	1
27	PAOZZ	06383	D-250A-C	ADAPTER, CONNECTOR.....	1

END OF FIGURE

5
6 THROUGH 11

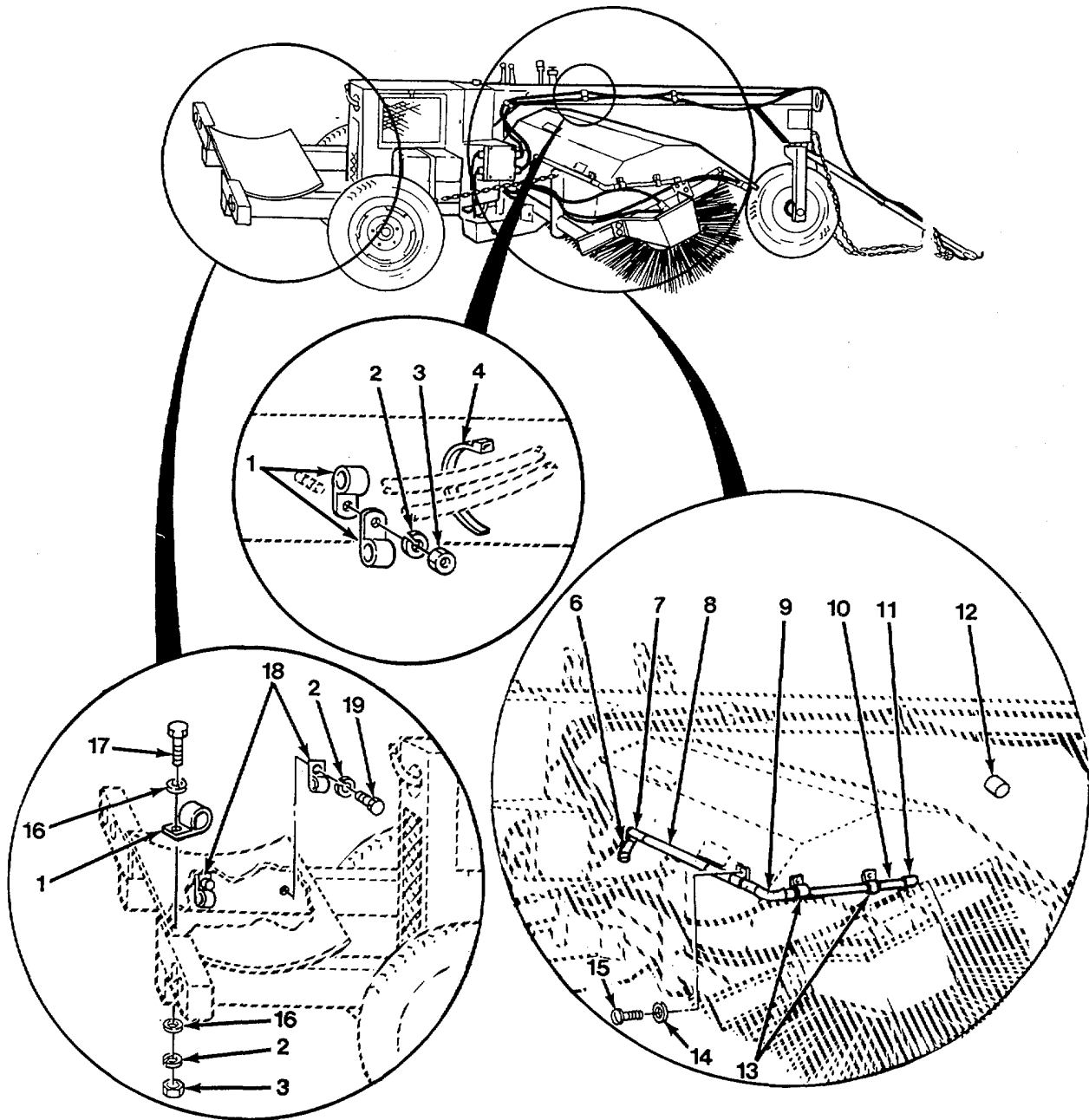


Figure 33. Wire Harness Mounting Parts

SECTION II

TM 5-3825-230-14&PCO2

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
GROUP 0608 MISCELLANEOUS ITEMS					
FIG. 33. WIRE HARNESS MOUNTING PARTS					
1	PFOZZ	96906	MS21333-105	CLAMP, LOOP 3/4.....	8
2	PFOZZ	96906	MS35338-44	WASHER, LOCK 1/4.....	20
3	PFOZZ	96906	MS51967-2	NUT, PLAIN, HEXAGON 1/4-20UNCO.....	7
4	PFOZZ	96906	MS3367-1-0	STRAP, TIEDOWN, ELECT.....	6
5	AOOOO	19207	CONDUIT ASSY	CONDUIT 1/2.....	1
6	MOOZZ	66234	402-92109	.PIPE, ELECTRICAL, PVC MAKE FROM PIPE P/N A52AE12 (23823), 12 INCHES.....	1
7	PFOZZ	14889	401-005	.TEE, PIPE 1/2 PVC.....	1
8	MOOZZ	66234	402-92111	.PIPE, ELECTRICAL, PVC MAKE FROM PIPE P/N A52AE12 (23823), 48.5 INCHES.....	2
9	PFOZZ	14007	406-005E	.ELBOW, PIPE 1/2 PVC.....	2
10	MOOZZ	66234	402-92110	.PIPE, ELECTRICAL, PVC MAKE FROM PIPE P/N A52AE12 (23823), 16 INCHES.....	2
11	PFOZZ	14889	447-005	.CAP, PIPE 1/2 PVC.....	3
12	PFOZZ	93908	E940D	COUPLING, ELECTRICAL 1/2 PVC.....	1
13	PFOZZ	96906	MS21333-73	CLAMP, LOOP 5/8.....	10
14	PFOZZ	96906	MS27183-8	WASHER, FLAT NO.10.....	10
15	PFOZZ	96906	MS35206-263	SCREW, MACHINE 10-24UNCX1/2.....	10
16	PFOZZ	96906	MS27183-10	WASHER, FLAT 1/4.....	8
* 17	PFOZZ	80204	B1821BH025C100N	SCREW, CAP, HEXAGON H 1/4-20UNCX1 GR8.....	4
18	PFOZZ	96906	MS21333-98	CLAMP, LOOP 1/4.....	14
19	PFOZZ	96906	MS90725-3	SCREW, CAP, HEXAGON H 1/4-20UNCX1/2 GR5.....	14

END OF FIGURE

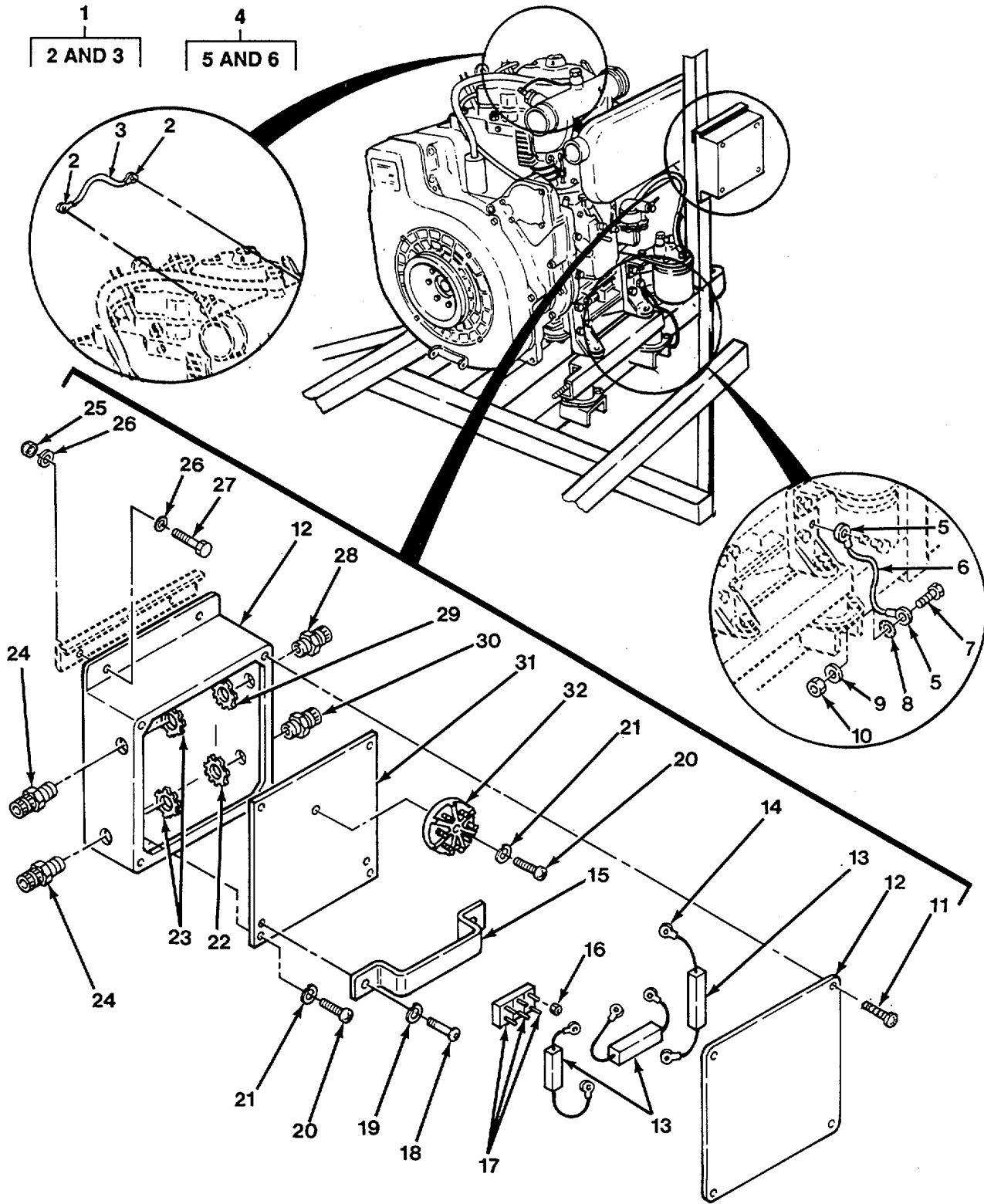


Figure 34. Junction Box and Jumper Wire Assemblies

SECTION II

TM 5-3825-230-14&PCO2

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
GROUP 0608 MISCELLANEOUS ITEMS					
FIG. 34. JUNCTION BOX AND JUMPER WIRE ASSEMBLIES					
1	AOOOO	66234	703-92133	WIRE ASSY, GP JUMPER.....	1
2	PFOZZ	96906	MS25036-157	.TERMINAL, LUG 1/4X12-O1GA.....	2
* 3	MOOZZ	66234	703-92132	.WIRE, 10GA MAKE FROM WIRE P/N 572DO (79550), 9 INCHES.....	1
4	AOOOO	66234	703-92097	WIRE ASSY, GND JMPR.....	1
5	PFOZZ	96906	MS25036-125	.TERMINAL, LUG 3/8X4GA.....	2
* 6	MOOZZ	66234	703-92096	.WIRE, 4GA MAKE FROM WIRE P/N 736102 (16428), 10 INCHES.....	1
* 7	PFOZZ	80204	B1821BH038C100N	SCREW, CAP, HEXAGON H 3/8-16UNCX1 GR5.....	1
8	PFOZZ	96906	MS35335-35	WASHER, LOCK 3/8.....	1
9	PFOZZ	96906	MS27183-13	WASHER, FLAT 3/8.....	1
10	PFOZZ	96906	MS51922-17	NUT, SELF-LOCKING, HE 3/8-16UNC.....	1
11	PFOZZ	96906	MS35207-265	SCREW, MACHINE 10-32UNCX3/4.....	4
12	PAOZZ	66234	401-94431	JUNCTION BOX.....	1
* 13	PAOZZ	12697	VK100NA-5	RESISTOR, ADJUSTABLE 6.8 OHM.....	3
14	PFOZZ	96906	MS25036-108	TERMINAL, LUG 3/16X16-14GA.....	6
15	PFOZZ	13445	30090-3	BASE, CIRCUIT BREAKER.....	1
16	PFOZZ	96906	MS35650-302	NUT, PLAIN, HEXAGON 10-32UNF.....	14
17	PAOZZ	13445	30055-20	CIRCUIT BREAKER 20 AMP.....	3
18	PFOZZ	96906	MS35206-280	SCREW, MACHINE 1/4-20UNCX5/8.....	2
19	PFOZZ	96906	MS35338-44	WASHER, LOCK 1/4.....	2
20	PFOZZ	96906	MS51957-65	SCREW, MACHINE 10-24UNCX3/4.....	5
21	PFOZZ	96906	MS35338-43	WASHER, LOCK NO. 1.....	19
22	PFOZZ	81992	003-22-003	LOCKNUT.....	1
* 23	PFOZZ	03743	BL50	LOCKNUT, ELECTRICAL.....	2
24	PFOZZ	74545	SHC-1025	BOX CONNECTOR, ELECT.....	2
25	PFOZZ	96906	MS51922-9	NUT, SELF-LOCKING, HE 5/16-18UNC.....	4
26	PFOZZ	96906	MS27183-12	WASHER, FLAT 5/16.....	8
27	PFOZZ	96906	MS90725-34	BOLT, MACHINE 5/16-18UNCX1 GR5.....	4
28	PFOZZ	81992	SHC-1037	BOX CONNECTOR, ELECT.....	1
29	PFOZZ	81992	003-22-002	NUT.....	1
30	PFOZZ	49367	08-1478	BOX CONNECTOR, ELECT.....	1
31	PFOZZ	66234	401-94499	PLATE, MOUNTING, FLAT.....	1
32	PFOZZ	13548	50820	TERMINAL BOARD.....	1

END OF FIGURE

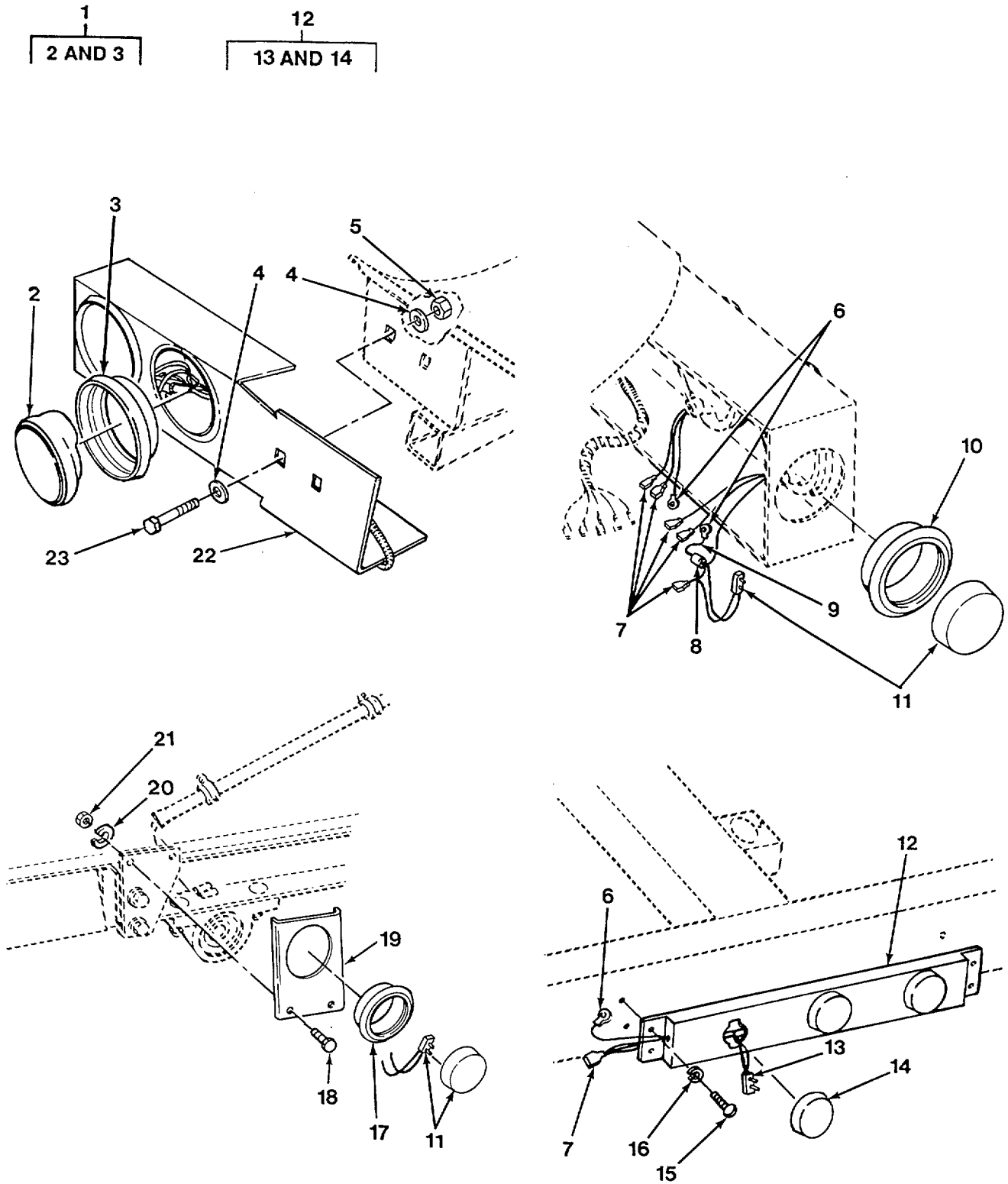


Figure 35. Lights and Light Mounts

SECTION II

TM 5-3825-230-14&PCO2

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
GROUP 0609 LIGHTS					
FIG. 35. LIGHTS AND LIGHT MOUNTS					
1	PFOZZ	66234	701-68471	LAMP UNIT, VEHICULAR	4
2	PAOZZ	70184	6-40301	.LAMP UNIT, VEHICULAR	1
3	PAOZZ	70184	88-40700	.GROMMET, NOMETALLIC	1
4	PFOZZ	96906	MS27183-18	WASHER, FLAT 1/2.....	4
5	PFOZZ	96906	MS51922-33	NUT, SELF-LOCKING, HE 1/2-13UNC.....	2
6	PFOZZ	96906	MS25036-108	TERMINAL, LUG 3/16X16-14GA.....	5
7	PFOZZ	06383	DNF18-250F1B-C	TERMINAL .250X.032X22-18GA.....	1
8	PFOZZ	06383	BSV10X-L	SPLICE, CONDUCTOR 12-10GA.....	2
* 9	MOOZZ	58961	WG-16-0-6IN	WIRE, 16GA MAKE FROM WIRE P/N 9505 (16764), 6 INCHES	2
10	PAOZZ	13548	10403	GROMMET, NONMETALLIC	2
11	PAOZZ	13548	10205R	LAMP UNIT, VEHICULAR	4
12	PFOZZ	13548	10744R	LAMP UNIT, VEHICULAR	1
13	PAOZZ	13548	93906	.LEAD ASSEMBLY, ELECT	1
14	PAOZZ	13548	10205R	.LAMP UNIT, VEHICULAR	3
15	PFOZZ	96906	MS35206-245	SCREW, MACHINE 8-32UNCX1/2.....	4
16	PFOZZ	96906	MS35338-42	WASHER, LOCK NO.8	4
17	PAOZZ	13548	10401	GROMMET, NONMETALLIC	2
* 18	PFOZZ	80204	B18218H038C125N	SCREW, CAP, HEXAGON H 3/8-16UNCX1.25 GR8.....	4
19	PFOZZ	66234	401-94117	BRACKET, MOUNTING	2
20	PFOZZ	96906	MS35338-46	WASHER, LOCK 3/8.....	4
21	PFOZZ	96906	MS51967-8	NUT, PLAIN, HEXAGON 3/8-16UNC.....	4
22	PFOZZ	66234	401-94438	BRACKET, MOUNTING RIGHT HAND	1
22	PFOZZ	66234	401-94439	BRACKET, LIGHT LEFT HAND	1
* 23	PFOZZ	80204	B1821BH050C150N	SCREW, CAP, HEXAGON H 1/2-13UNCX1.5 GR8.....	2

END OF FIGURE

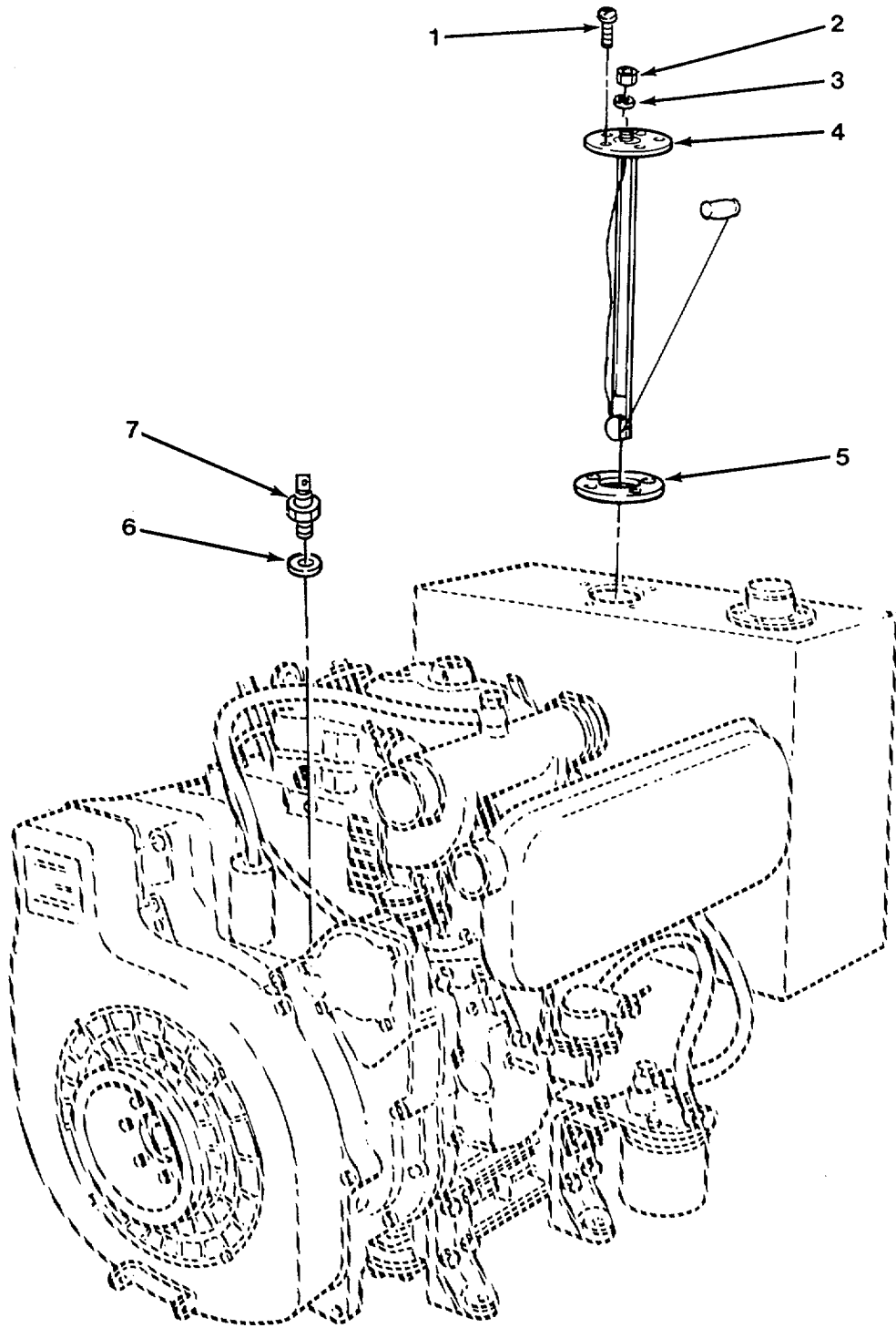


Figure 36. Sending Units and Warning Switches

SECTION II

TM 5-3825-230-14&PCO2

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
GROUP 0610 SENDING UNITS AND WARNING SWITCHES					
FIG. 36. SENDING UNITS AND WARNING SWITCHES					
1	PFOZZ	96906	MS35206-263	SCREW, MACHINE 10-24UNCX1/2.....	5
2	PFOZZ	96906	MS35650-302	NUT, PLAIN, HEXAGON 10-32UNF.....	1
3	PFOZZ	96906	MS35338-43	WASHER, LOCK NO. 10.....	1
4	PFOZZ	33955	1501775	INDICATOR, LIQUID.....	1
5	PFOZZ	33955	9610070	GASKET.....	1
6	PAOZZ	2X179	276.4670.014	WASHER, FLAT.....	1
* 7	XBOZZ	2X179	9040.6745.031	SWITCH, PRESSURE.....	1

END OF FIGURE

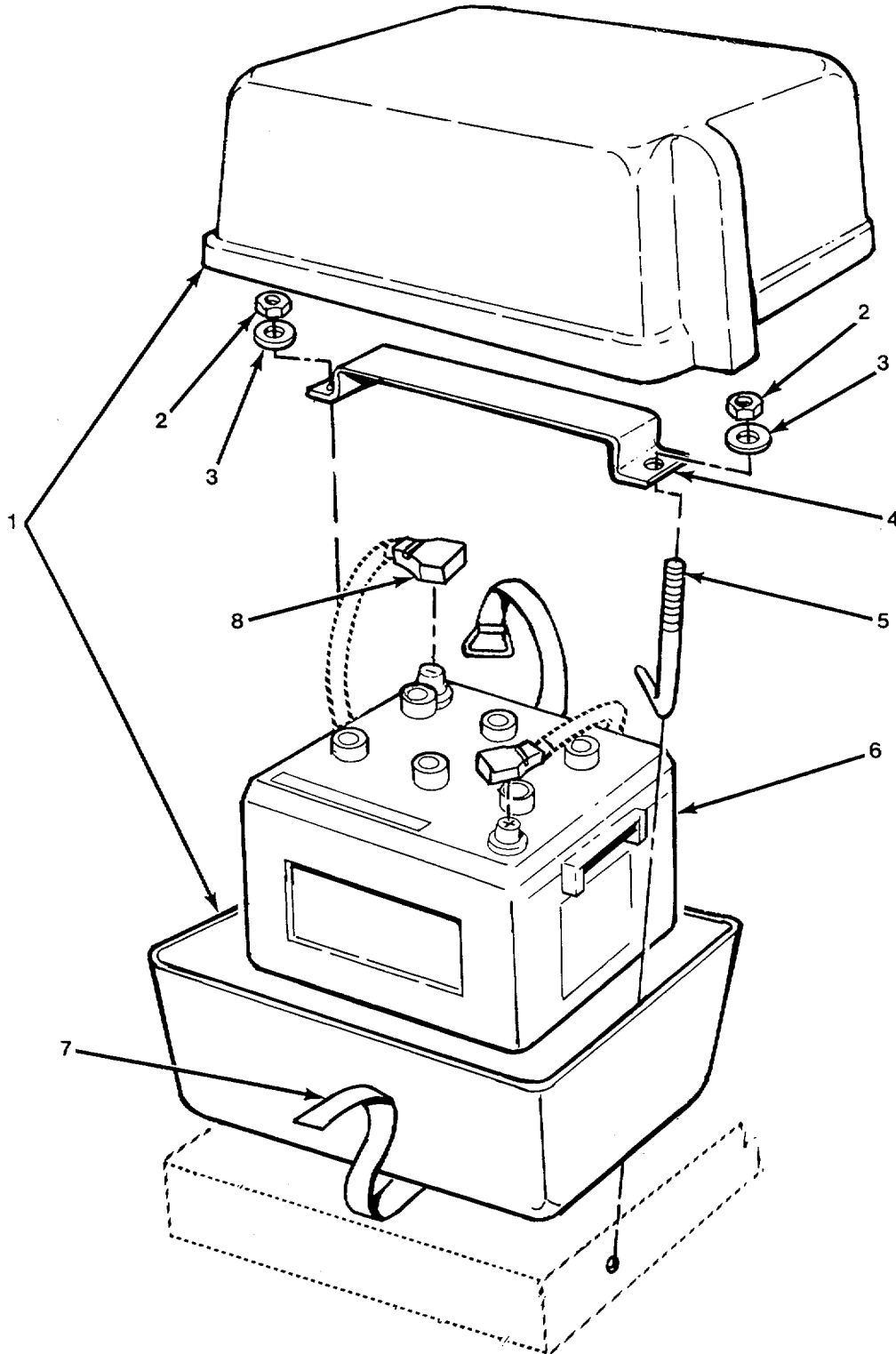


Figure 37. Battery Installation

SECTION II

TM 5-3825-230-14&P

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
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GROUP 0612 BATTERIES, STORAGE
(WET OR DRY)

FIG. 37. BATTERY INSTALLATION

1	PFOZZ	66234	401-94303	BATTERY BOX,	2
2	PFOZZ	96906	MS51922-1	NUT, SELF-LOCKING, HE 1/4-20UNC.....	4
3	PFOZZ	96906	MS27183-10	WASHER, FLAT 1/4.....	4
4	PAOZZ	66234	401-94773	COVER, BATTERY RETAI.....	2
5	PFOZZ	66234	401-94756	ROD END, THREADED	4
6	PAOFA	96906	MS52149-1	BATTERY, STORAGE	2
7	PFOZZ	39428	3705T101	STRAP, RETAINING	2
8	PAOZZ	70842	728197	CAP, PROTECTIVE, DUST.....	2

END OF FIGURE

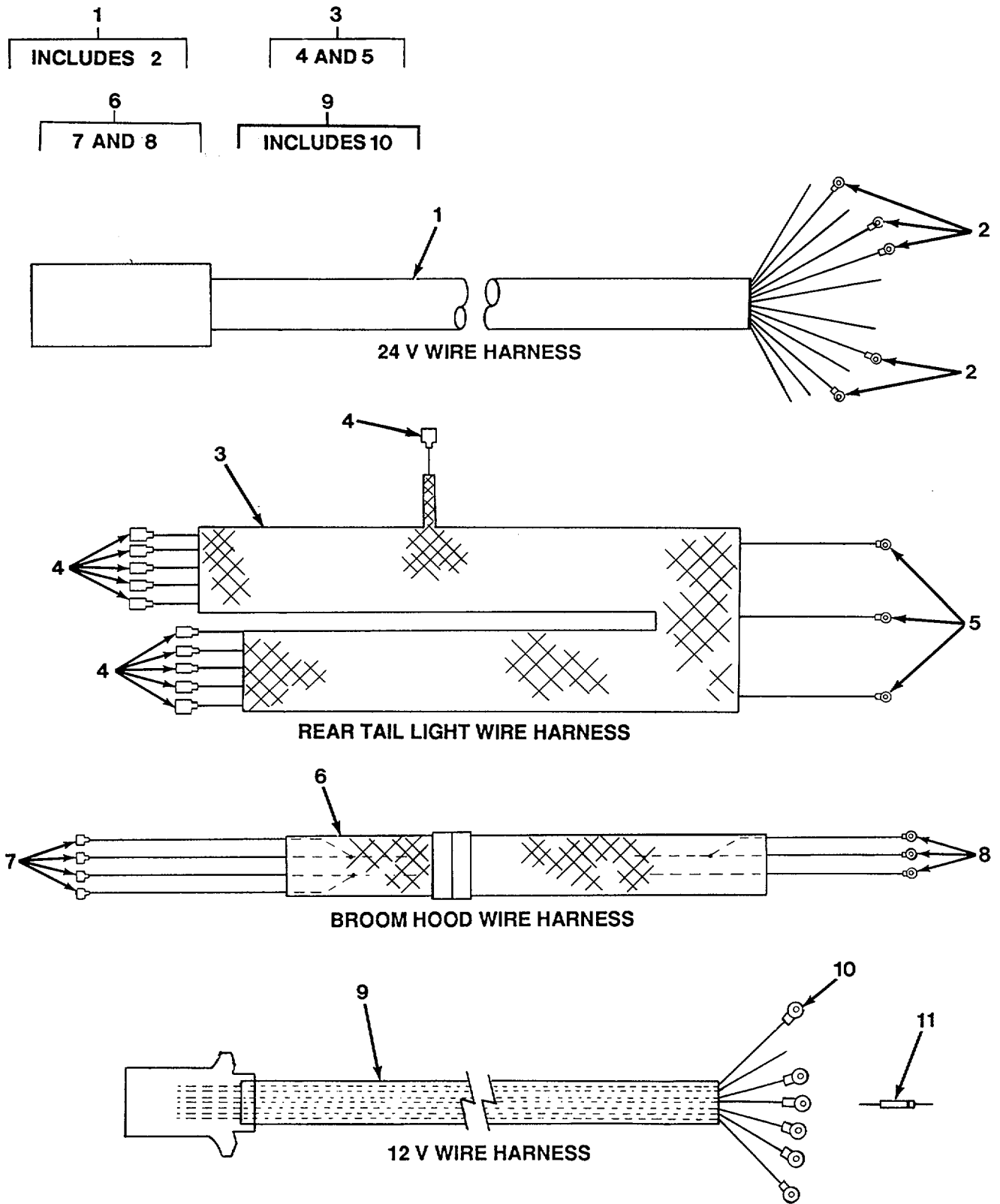


Figure 38. 12V, 24V, Rear Tail Light, and Broom Head Wire Harnesses

SECTION II

TM 5-3825-230-14&PC02

(1) ITEM NO	(2) SMR CODE	(3) CAGE C	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
GROUP 0613 HULL OR CHASSIS WIRING HARNESS					
FIG. 38. 12V, 24V, REAR TAIL LIGHT, AND BROOM HEAD WIRE HARNESSES					
1	XBOOO	66234	703-92065	WIRE HARNESS, 24V	1
2	PFOZZ	96906	MS25036-156	.TERMINAL, LUG 3/16 X 12-10GA.....	5
3	PAOOO	66234	703-92127	CABLE ASSEMBLY, SPEC.....	1
4	PFOZZ	06383	DNF18-250FIM-C	.TERMINAL, QUICK DISC 250 X . 032X22-18GA.....	11
5	PFOZZ	96906	MS25036-108	.TERMINAL, LUG 3/16 X 16-14 GA.....	3
6	PAOZZ	66234	703-92128	WIRING HARNESS, BRAN.....	1
7	PFOZZ	06383	BSV14X-C	.SPLICE, CONDUCTOR 16-14GA.....	4
8	PFOZZ	96906	MS25036-108	.TERMINAL PLUG 3/16 X 16-14GA.....	3
*9	XBOOO	66234	703-92152	WIRE HARNESS, 12V	1
10	PFOZZ	96906	MS25036-108	.TERMINAL, LUG 3/16X16-14GA.....	1
11	PAFZZ	81349	JAN1N3611	SEMICONDUCTOR DEVIC.....	2

END OF FIGURE

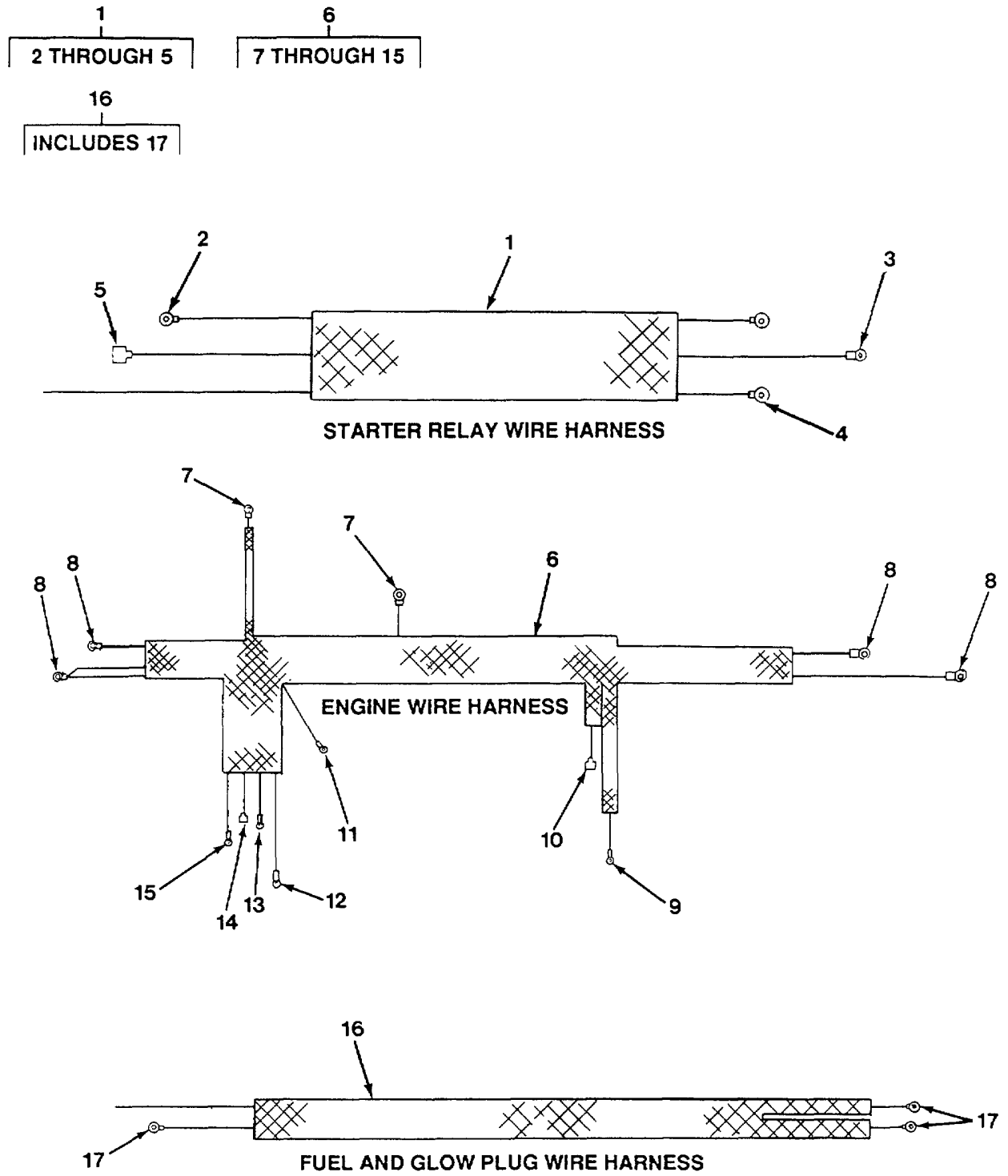


Figure 39. Starter Relay, Engine, and Fuel and Glow Plug Wire Harnesses

SECTION II

TM 5-3825-230-14&PC02

(1) ITEM NO	(2) SMR CODE	(3) CAGE C	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
GROUP 0613 HULL OR CHASSIS WIRING HARNESS					
FIG. 39. STARTER RELAY, ENGINE AND FUEL AND GLOW PLUG WIRE HARNESSSES					
1	PAOZZ	66234	703-92130	LEAD ASSEMBLY, ELECT	1
2	PFOZZ	96906	MS25036-115	.TERMINAL, LUG 3/8X8GA.....	2
3	PFOZZ	96906	MS25036-153	.TERMINAL, LUG 11/64X16-14GA.....	1
4	PFOZZ	96906	MS25036-112	.TERMINAL, LUG 3/16X10GA.....	1
5	PFOZZ	06383	DV14-250-C	.TERMINAL, LUG . 205X .032X16-14GA.....	1
6	PAOZZ	66234	703-92131	WIRING HARNESS, BRAN.....	1
7	PFOZZ	96906	MS25036-125	.TERMINAL, LUG 3/8X4GA.....	2
8	PAOZZ	79550	61	.TERMINAL, LUG.....	4
9	PFOZZ	96906	MS25036-116	.TERMINAL, LUG 1/4X8GA.....	1
10	PFOZZ	06383	DNF18-250M-C	.TERMINAL, LUG.....	1
11	PFOZZ	96906	MS25036-154	.TERMINAL, LUG 1/4X16-14GA.....	1
12	PFOZZ	96906	MS25036-115	.TERMINAL, LUG 3/16X8GA.....	1
13	PFOZZ	96906	MS25036-108	.TERMINAL, LUG 3/16X16-14GA.....	1
* 14	PFOZZ	00779	61198-1	.TERMINAL, QUICK DISC .250X .032X12-10GA.....	1
15	PFOZZ	96906	MS25036-112	.TERMINAL, LUG 3/16X12-10GA.....	1
16	PAOZZ	66234	703-92129	CABLE ASSEMBLY, SPEC.....	1
17	PFOZZ	96906	MS25036-108	.TERMINAL, LUG 3/16X16-14GA.....	3

END OF FIGURE

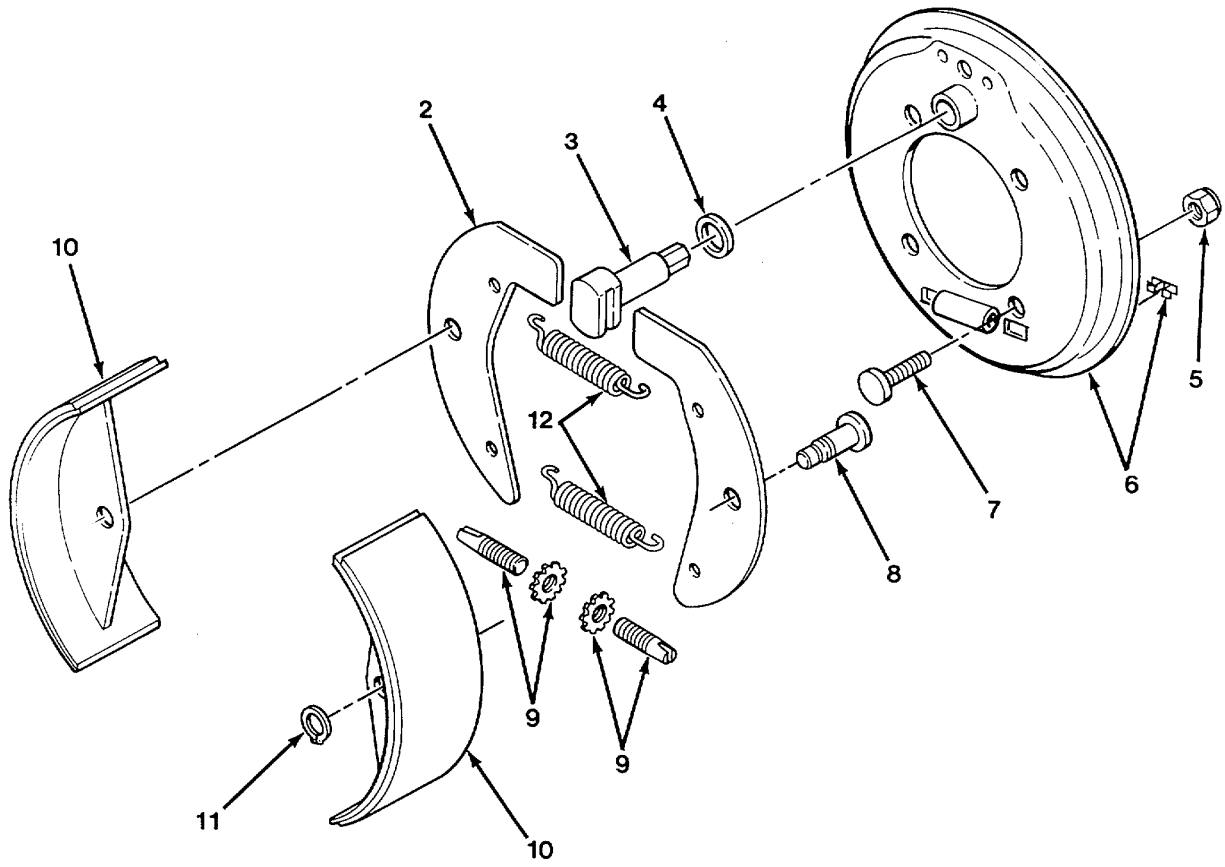
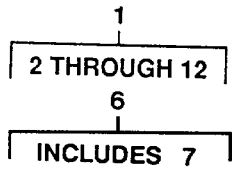


Figure 40. Hand Brake Assembly

SECTION II

TM 5-3825-230-14&P

(1) ITEM NO	(2) SMR CODE	(3) CAGE C	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
GROUP 12 BRAKES					
GROUP 1201 HAND BRAKES					
FIG. 40. HAND BRAKE ASSEMBLY					
1	PAOOO	94189	17122	BRAKE, SHOE TYPE.....	2
2	PAOZZ	94189	16691	.BRAKE, SHOE TYPE.....	1
3	PAOZZ	94189	16690	.CAMSHAFT, ACTUATING	1
4	PFOZZ	94189	7029	.SPACER, SLEEVE	1
5	PFOZZ	96906	MS51967-41	.NUT, PLAIN, HEXAGON 7/16-14UNC.....	4
6	PAOZZ	94189	0101668800	.HOUSING, BEARING UNI.....	1
7	PFOZZ	94189	8798	.BOLT, RIBBED SHOULDE.....	4
8	PAOZZ	94189	12560	.PIN, ANCHOR, MUNITION	2
9	PAOZZ	94189	23319	.ADJUSTING SCREW ASS.....	2
10	PAOZZ	94189	8780	.BRAKE SHOE.....	2
11	PAOZZ	96906	MS16624-1050	.RING, RETAINING	2
12	PAOZZ	94189	8785	.SPRING, HELICAL, EXTE.....	2

END OF FIGURE

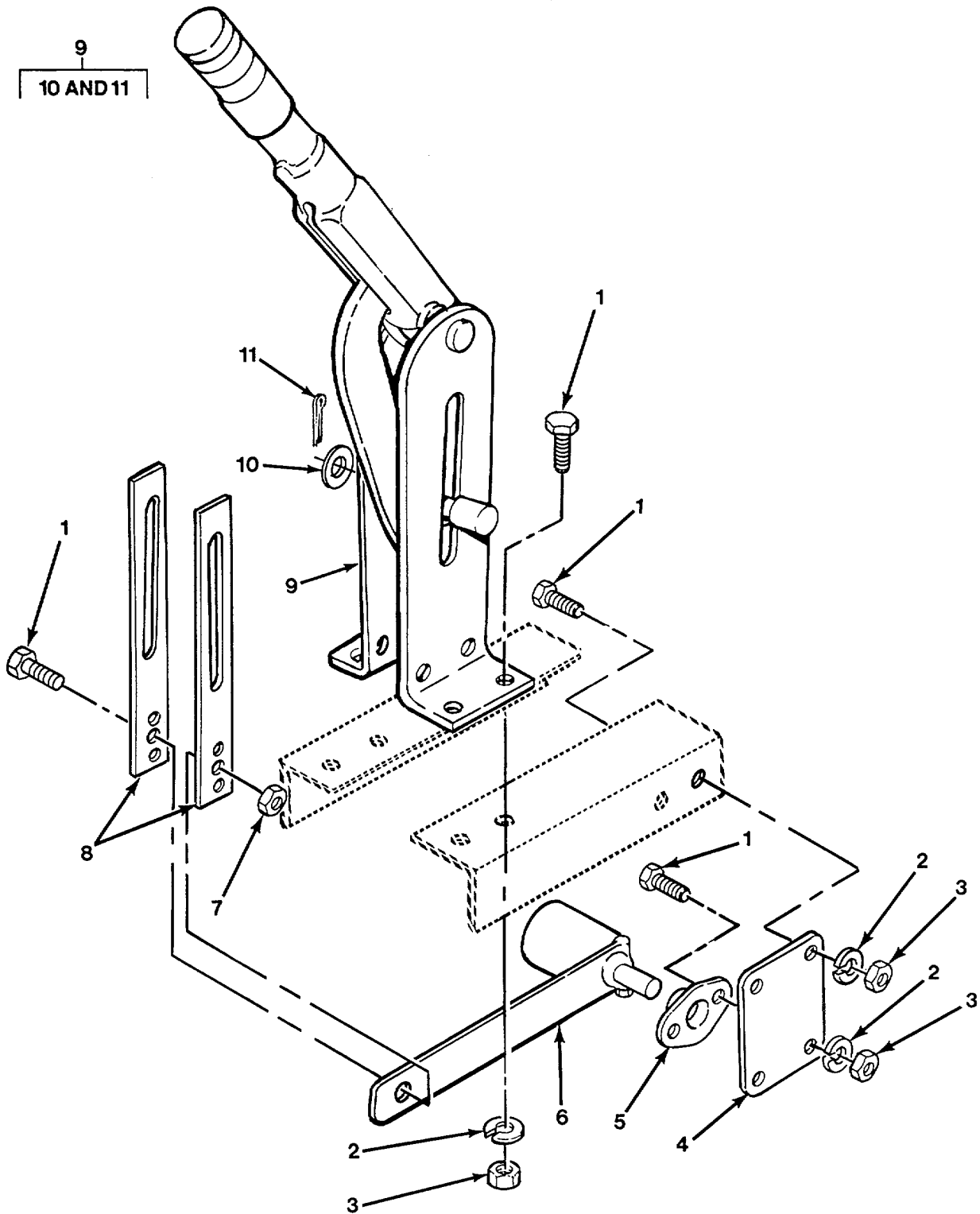


Figure 41. Hand Brake Lever Assembly

SECTION II

TM 5-3825-230-14&P

(1) ITEM NO	(2) SMR CODE	(3) CAGE C	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
GROUP 1201 HAND BRAKES					
FIG. 41. HAND BRAKE LEVER ASSEMBLY					
1	PFOZZ	96906	MS90725-34	BOLT, MACHINE 5/16-18UNCX1 GR5,.....	18
2	PFOZZ	96906	MS35338-45	WASHER, LOCK 5/16.....	16
3	PFOZZ	96906	MS51967-5	NUT, PLAIN, HEXAGON 5/16-18UNC.....	16
4	PAOZZ	66234	401-94816	PLATE, MOUNTING, FLAT	2
5	PAOZZ	4Y310	BCSM6700	BEARING, SLEEVE	2
6	PAOZZ	66234	410-92827	LEVER, MANUAL CONTRO RIGHT HAND.....	1
6	PAOZZ	66234	410-92834	LEVER, MANUAL CONTRO LEFT HAND.....	1
7	PFOZZ	96906	MS51922-9	NUT, SELF-LOCKING, HE 5/16-18UNC.....	2
8	PAOZZ	66234	401-94504	LEVER, MANUAL CONTRO.....	4
9	PAOZZ	92867	01215601	LEVER, MANUAL CONTRO.....	2
10	PFOZZ	96906	MS27183-12	.WASHER, FLAT 5/16.....	1
11	PFOZZ	96906	MS24665-283	.PIN, COTTER 3/32X3/4.....	1

END OF FIGURE

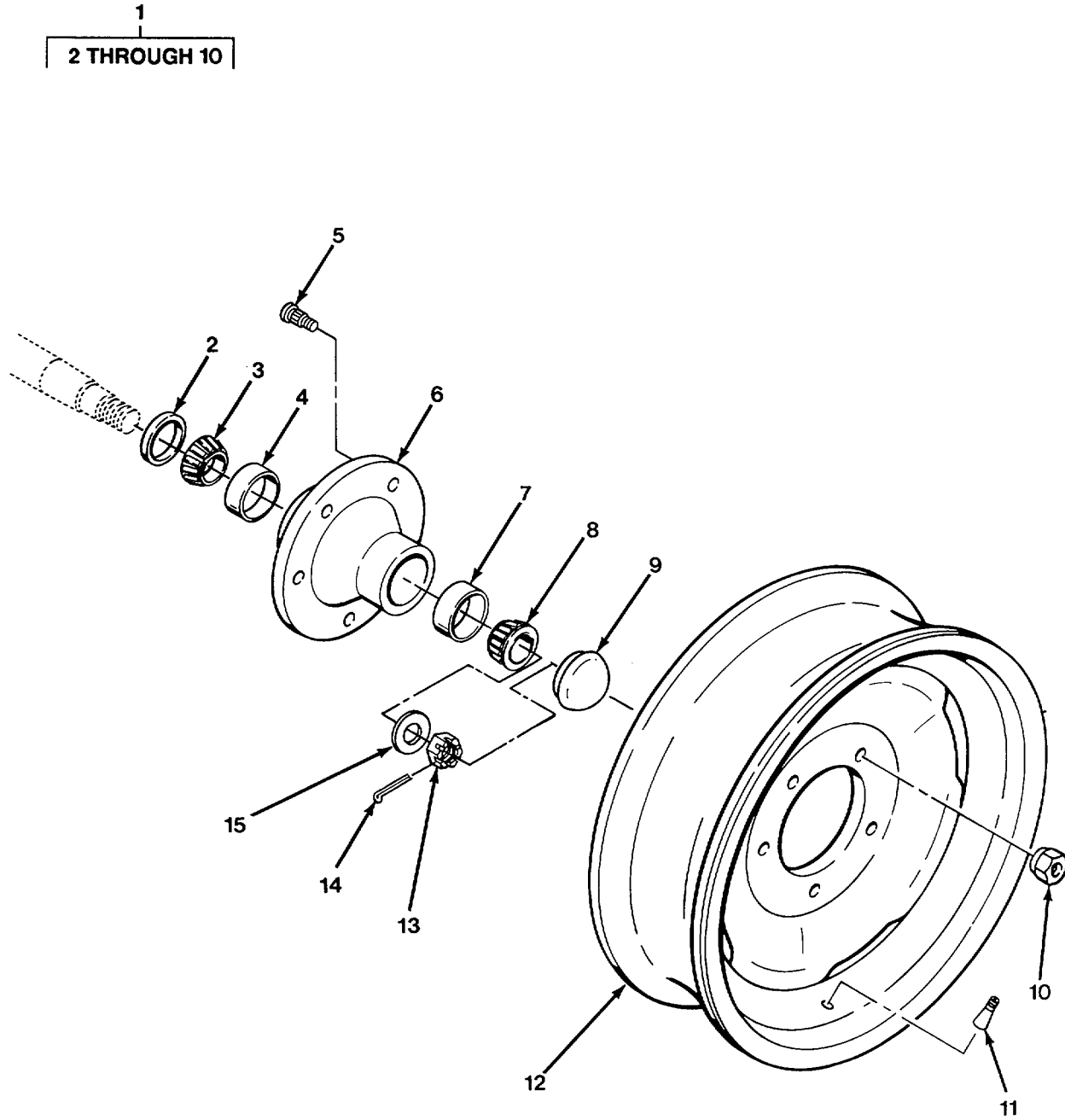


Figure 42. Wheel and Hub Assembly.

SECTION II

TM 5-3825-230-14&P

(1) ITEM NO	(2) SMR CODE	(3) CAGE C	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
GROUP 13 WHEELS AND TRACKS					
GROUP 1311 WHEEL ASSEMBLY					
FIG. 42. WHEEL AND HUB ASSEMBLY					
1	PAOOO	8H836	700-1	SPRING, HELICAL, EXTE.....	1
2	PAOZZ	8H836	806-1	.SEAL, PLAIN ENCASED	1
3	PAOZZ	60038	LM67048	.CONE AND ROLLERS, TA	1
4	PAOZZ	60038	LM67010	.CUP, TAPERED ROLLER	1
5	PAOZZ	8H836	263-2	.STUD, SELF-LOCKING	5
6	PAOZZ	8H836	009-1	.HUB, BODY	1
7	PAOZZ	60038	LM11910	.CUP, TAPERED ROLLER	1
8	PAOZZ	60038	LM11949	.CONE AND ROLLERS, TA	1
9	PAOZZ	8H836	114-1	.CAP, PROTECTIVE, DUST.....	1
10	PAOZZ	8H836	262-2	.NUT, PLAIN, CONE SEAT	5
11	PFOZZ	27783	TR415	VALVE, PNEUMATIC TIR	2
12	PFOZZ	8H836	902-1	WHEEL, PNEUMATIC TIR.....	2
13	PFOZZ	96906	MS9358-17	NUT, PLAIN, CASTELLAT 3/4-16UNF	1
14	PFOZZ	96906	MS24665-495	PIN, COTTER 3/16X1. 5.....	1
15	PFOZZ	96906	MS27183-23	WASHER, FLAT 3/4.....	1

END OF FIGURE

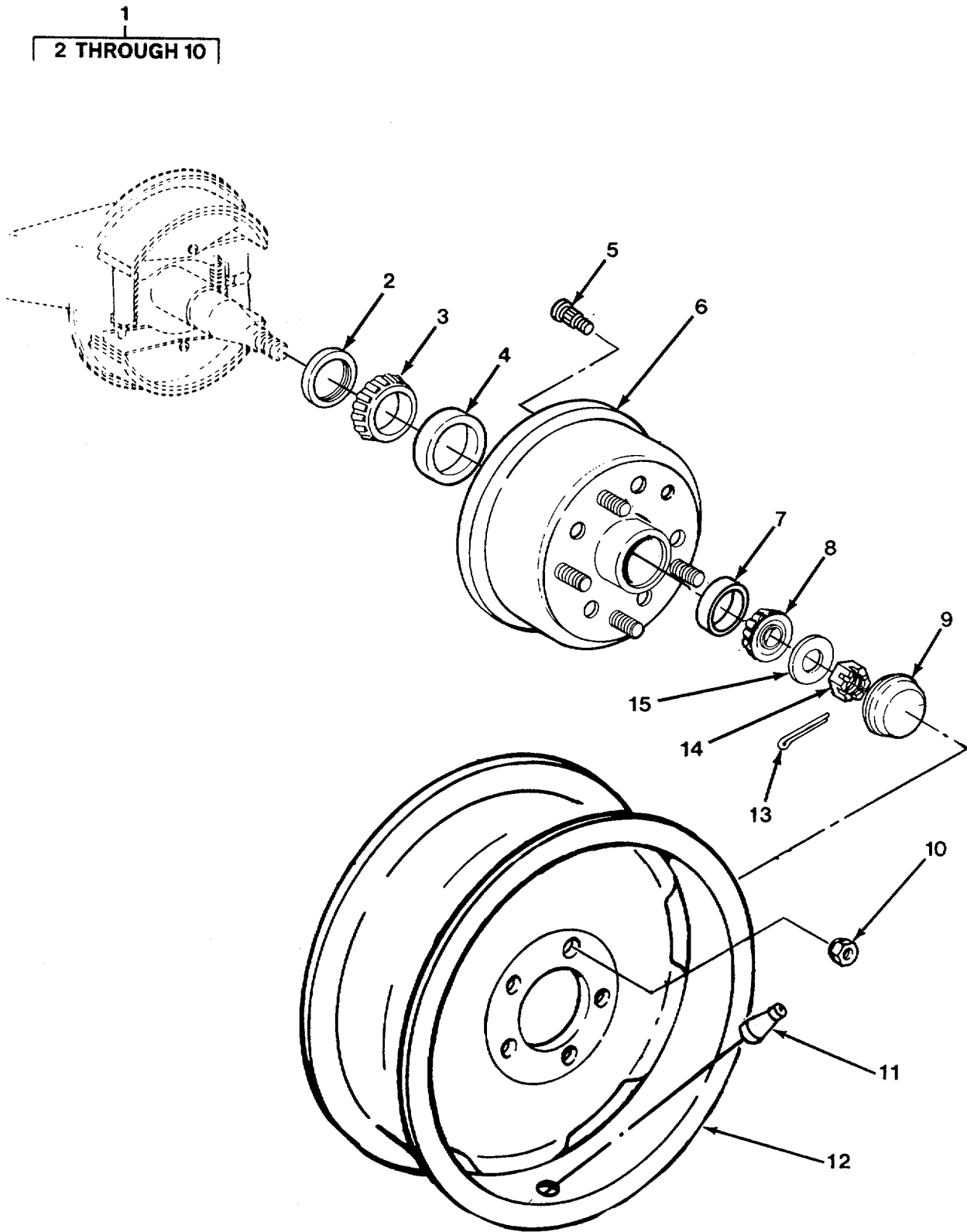


Figure 43. Wheel, Hub, and Drum Assembly

SECTION II

TM 5-3825-230-14&P

(1) ITEM NO	(2) SMR CODE	(3) CAGE C	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
GROUP 1311 WHEEL ASSEMBLY					
FIG. 43. WHEEL, HUB AND DRUM ASSEMBLY					
1	PAOZZ	94189	16622	HUB, WHEEL, VEHICULAR.....	2
2	PAOZZ	94189	15529	.SEAL, PLAIN ENCASED.....	1
3	PAOZZ	60038	L68149	.CONE AND ROLLERS, TA	1
4	PAOZZ	60038	L68111	.CUP, TAPERED ROLLER,.....	1
5	PFOZZ	94189	5081	.BOLT, RIBBED SHOULDE.....	5
6	PAOZZ	94189	16626	.BRAKE DRUM	1
7	PAOZZ	60038	L44649	.CONE AND ROLLERS, TA	1
8	PAOZZ	94189	8019	.CONE AND ROLLERS, TA	1
9	PFOZZ	94189	14286	.CAP, DUST	1
10	PFOZZ	94189	5082	.NUT, PLAIN, CONE SEAT	5
11	PAOZZ	17875	T-15R-50	VALVE, PNEUMATIC TIR	2
12	PAOZZ	8H836	902-1	WHEEL, PNEUMATIC TIR.....	2
13	PFOZZ	96906	MS24665-495	PIN, COTTER 3/16X1. 5.....	2
14	PFOZZ	96906	MS9358-17	NUT, PLAIN, CASTELLAT 3/4-16UNF	2
15	PFOZZ	96906	MS27183-23	WASHER, FLAT 3/4.....	2

END OF FIGURE

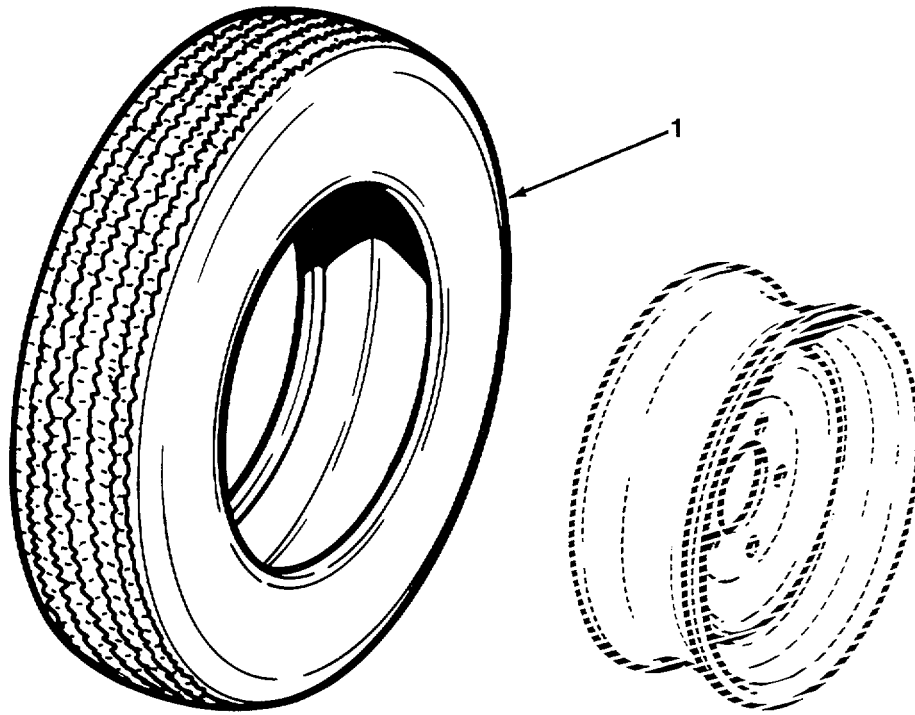


Figure 44. Tires

SECTION II

TM 5-3825-230-14&P

(1) ITEM NO	(2) SMR CODE	(3) CAGE C	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
1	PAOFH	73842	ST225/75R15	TIRE, PNEUMATIC	3

END OF FIGURE

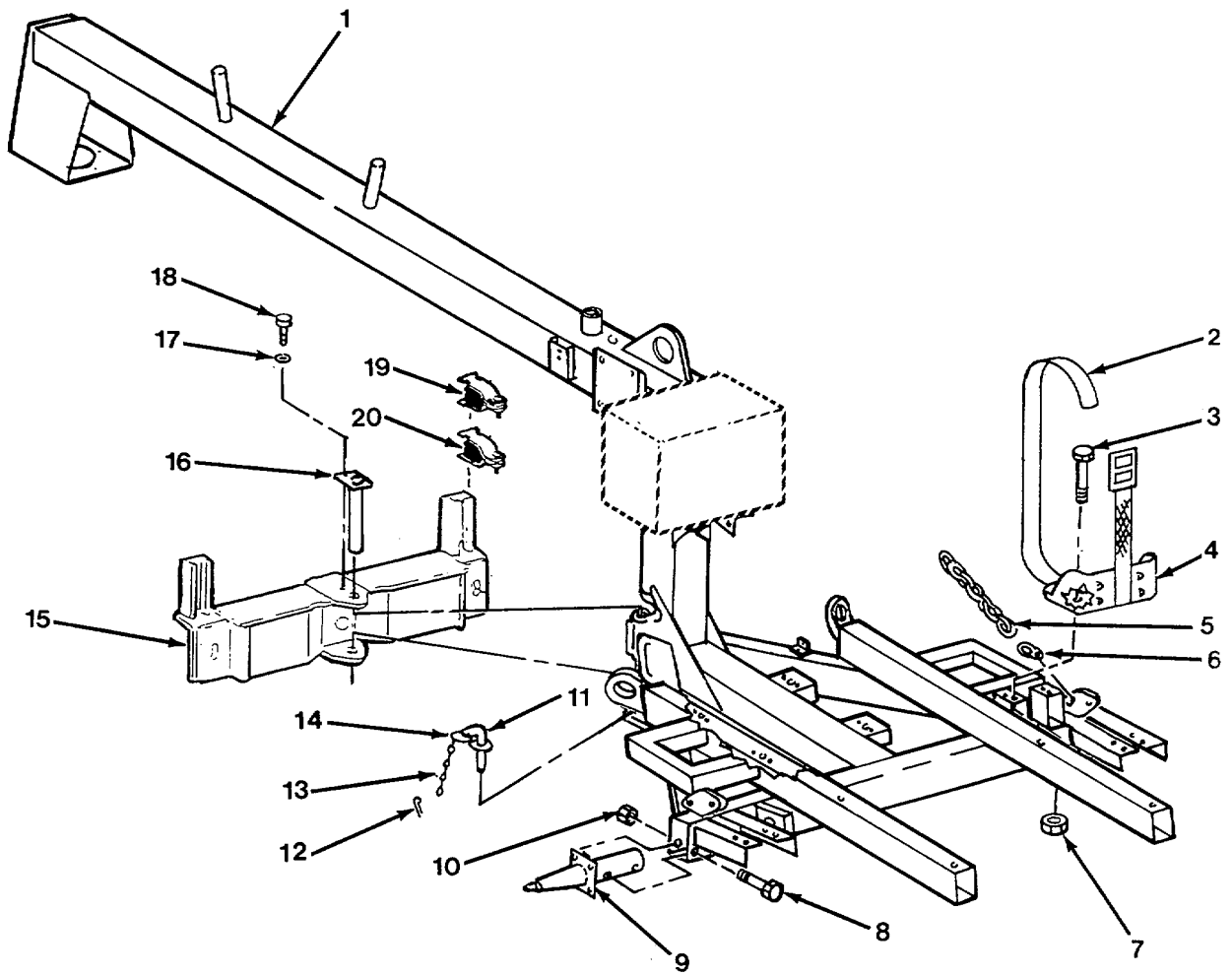


Figure 45. Main Frame Assembly

SECTION II

TM 5-3825-230-14&PC02

(1) ITEM NO	(2) SMR CODE	(3) CAGE C	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
GROUP 15 FRAME, TOWING ATTACHMENTS AND DRAWBARS					
GROUP 1501 FRAME ASSEMBLY					
FIG. 45. MAIN FRAME ASSEMBLY					
1	PBOFH	66234	410-92613	FRAME SECTION, STRUC.....	1
2	PAOZZ	19207	8690528	STRAP, WEBBING	1
3	PFOZZ	96906	MS90725-68	SCREW, CAP, HEXAGON H 3/8-16UNCX2.5 GR5.....	4
4	PAOZZ	07860	C21452	BRACKET ASSEMBLY, LI	1
5	MOOZZ	66234	509-90329	CHAIN MAKE FROM CHAIN P/N 671442 (12128), 32 LINKS.....	2
6	PFOZZ	12128	M647	SWIVEL, EYE AND JAW	4
7	PFOZZ	96906	MS51922-17	NUT, SELF-LOCKING, HE 3/8-16UNC.....	4
8	PFOZZ	96906	MS90725-168	SCREW, CAP, HEXAGON H 3/8-16UNCX3 GR5.....	4
9	PAOZZ	66234	410-92672	SHAFT, SHOULDERED.....	2
10	PFOZZ	96906	MS51922-49	NUT, SELF-LOCKING, HE 5/8-11UNC.....	4
11	PAOZZ	66234	400-65650	PIN, STRAIGHT, HEADED.....	1
12	PFOZZ	96906	MS24665-495	PIN, COTTER 3/16X1. 5.....	1
13	MFOZZ	66234	509-92004	CHAIN, STUD LINK MAKE FROM P/N 3607T21 (39428) 21 LINKS.....	1
14	PFOZZ	96652	29-10	RING, RETAINING	1
15	PAOZZ	66234	410-92669	FRAME SECTION, STRUC.....	1
16	PAOZZ	66234	410-92668	PIN, STRAIGHT, HEADED.....	1
17	PFOZZ	96906	MS35338-45	WASHER, LOCK 5/16.....	1
* 18	PFOZZ	80204	B1821BH031C075N	BOLT, MACHINE 5/16-18UNCX3/4.....	1
19	PFOZZ	55017	100100	BRACKET, PIPE 1. 00	1
20	PFOZZ	55017	100112	CLAMP, PIPE, ANCHORA 1. 05	1

END OF FIGURE

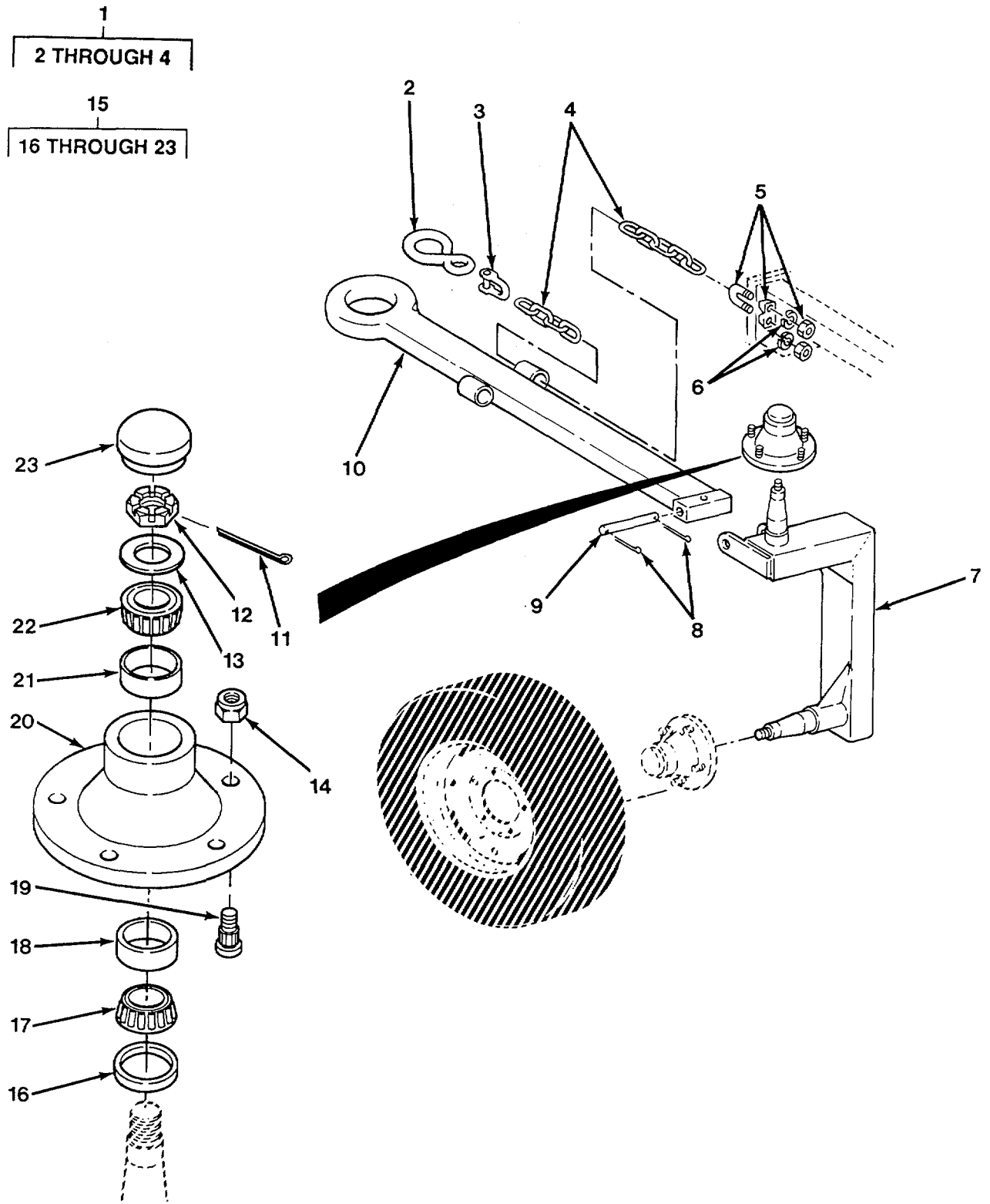


Figure 46. Tow Pole and Strut Assembly

SECTION II

TM 5-3825-230-14&P

(1) ITEM NO	(2) SMR CODE	(3) CAGE C	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
GROUP 1503 PINTLES AND TOWING ATTACHMENTS					
FIG. 46. TOW POLE AND STRUT ASSEMBLY					
1	AOOOO	66234	509-92013	CHAIN ASSEMBLY	2
2	PFOZZ	10001	1784995	.HOOK, HOIST	1
3	PAOZZ	80205	NAS1042-18	.SHACKLE	1
4	PFOZZ	82918	F310190-437	.LINK, CHAIN, COLD SHU	1
5	PFOZZ	66234	387-91668	CLAMP, LOOP	2
6	PFOZZ	96906	MS35338-46	WASHER, LOCK 3/8.....	4
7	PFOZZ	66234	410-92667	HOUSING, STEERING CO	1
8	PAOZZ	96906	MS24665-495	PIN, COTTER 3/16X15.....	2
9	PFOZZ	66234	383-72815	PIN, STRAIGHT, HEADLE	1
10	PFOZZ	66234	410-92666	TOW, BAR	1
11	PFOZZ	96906	MS24665-495	PIN, COTTER 3/16X15.....	1
12	PFOZZ	96906	MS9358-17	NUT, PLAIN, CASTELLAT 3/4-16UNF	1
13	PFOZZ	96906	MS27183-23	WASHER, FLAT 3/4.....	1
14	PAOZZ	96906	MS21044-N8	NUT, SELF-LOCKING, HE 1/2-20UNF.....	5
15	PAOOO	8H836	700-1	SPRING, HELICAL, EXTE.....	1
16	PAOZZ	8H836	806-1	.SEAL, PLAIN ENCASED.....	1
17	PAOZZ	60038	LM67048	.CONE AND ROLLERS, TA	1
18	PAOZZ	60038	LM67010	.CUP, TAPERED ROLLER.....	1
19	PAOZZ	8H836	263-2	.STUD, SELF-LOCKING	1
20	PAOZZ	8H836	009-1	.HUB, BODY	1
21	PAOZZ	60038	LM11910	.CUP, TAPERED ROLLER	1
22	PAOZZ	60038	LM11949	.CONE AND ROLLERS, TA	1
23	PAOZZ	8H836	114-1	.CAP, PROTECTIVE, DUST.....	1

END OF FIGURE

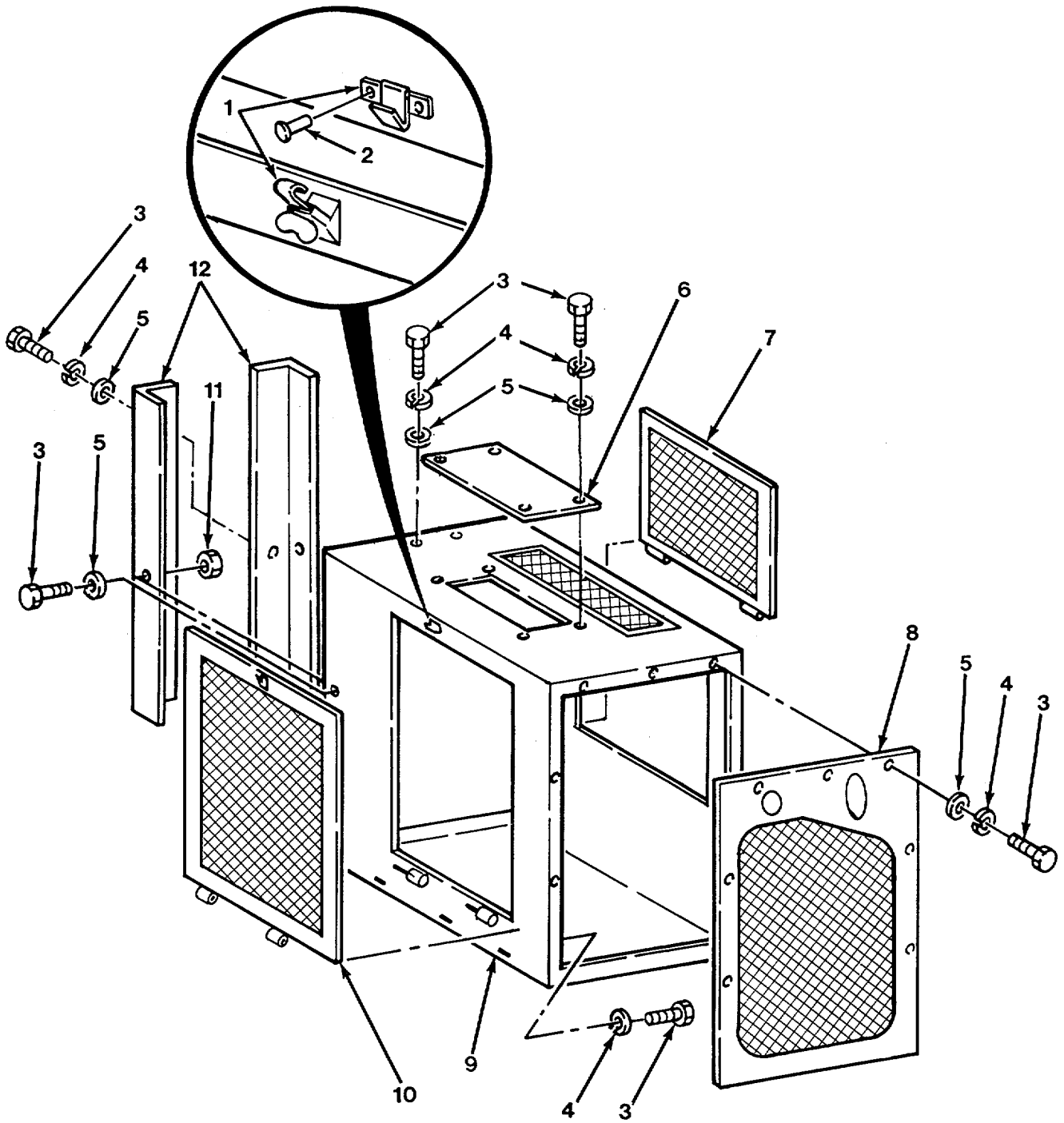


Figure 47. Engine Enclosure

SECTION II

TM 5-3825-230-14&P

(1) ITEM NO	(2) SMR CODE	(3) CAGE C	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
GROUP 18 BODY,CAB,HOOD AND HULL					
GROUP 1801 BODY, CAB, HOOD AND HULL ASSEMBLIES					
FIG. 47. ENGINE ENCLOSURE					
1	PAOZZ	66234	387-92022	LEVER, LOCK-RELEASE	2
2	PFOZZ	96906	MS20604B5W8	RIVET, BLIND	8
3	PFOZZ	96906	MS90725-6	SCREW, CAP, HEXAGON H 1/4-20UNCX3/4 GR5.....	25
4	PFOZZ	96906	MS35338-44	WASHER, LOCK 1/4.....	23
5	PFOZZ	96906	MS27183-10	WASHER, FLAT 1/4.....	17
6	PFOZZ	66234	402-92006	COVER, ACCESS.....	1
7	PAOZZ	66234	410-93039	COVER, ACCESS.....	1
8	PAOZZ	66234	410-92727	PANEL, BODY, VEHICULA.....	1
9	PFOZZ	66234	410-92718	COVER, ACCESS.....	1
10	PAOZZ	66234	410-93040	COVER, ACCESS.....	1
11	PFOZZ	96906	MS51922-1	NUT, SELF-LOCKING, HE 1/4-20UNC.....	2
12	PAOZZ	66234	402-92326	GUARD, ENGINE.....	2

END OF FIGURE

SECTION II

TM 5-3825-230-14&PC02

(1) ITEM NO	(2) SMR CODE	(3) CAGE C	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
GROUP 22 BODY, CHASSIS, OR HULL AND ACCESSORY ITEMS					
GROUP 2210 DATA PLATES AND INSTRUCTION HOLDERS					
FIG. 48. DECALS					
1	PFOZZ	66234	390-92042	PLATE, INSTRUCTION.....	1
2	PFOZZ	66234	390-65617	MARKER, IDENTIFICATI	1
3	PFOZZ	66234	390-92026	MARKER, IDENTIFICATI	2
4	PFOZZ	66234	390-92043	PLATE, INSTRUCTION.....	1
5	PFOZZ	66234	390-76001	PLATE, INSTRUCTION	1
6	PFOZZ	66234	390-92044	PLATE, IDENTIFICATIO	1
7	PFOZZ	96906	MS35206-245	SCREW, MACHINE 8-32UNCX3/8.....	12
8	PFOZZ	96906	MS35333-38	WASHER, LOCK NO. 8	12
9	PFOZZ	66234	390-72016	MARKER, IDENTIFICATI	2
10	PFOZZ	66234	390-65608	MARKER, IDENTIFICATI	1
11	PFOZZ	66234	390-65607	MARKER, IDENTIFICATI	1
* 12	PAOZZ	66234	390-92041	PLATE, INSTRUCTION.....	1
13	PFOZZ	66234	390-92045	PLATE, INSTRUCTION.....	1
14	PFOZZ	66234	390-65643	MARKER, IDENTIFICATI	1

END OF FIGURE

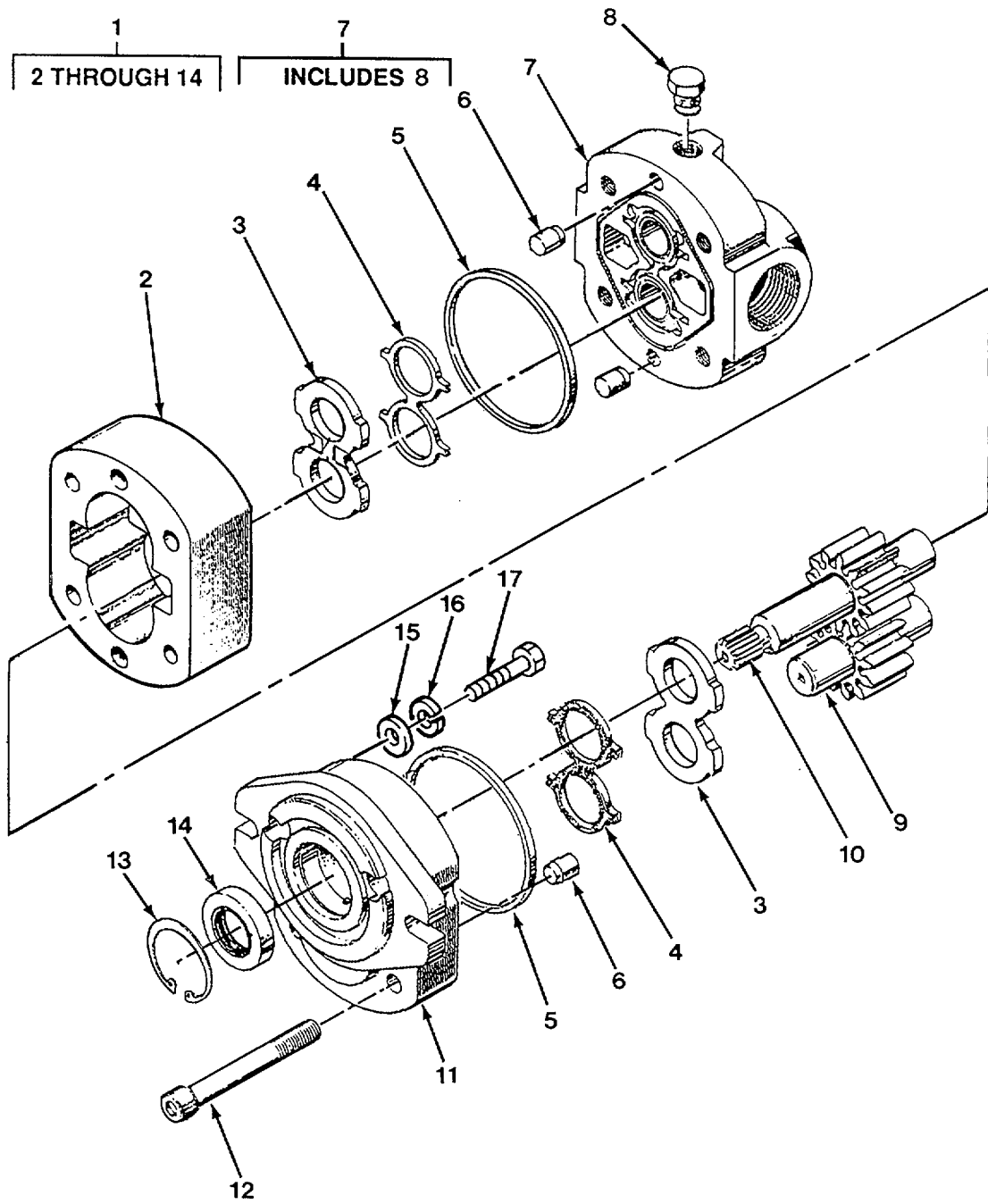


Figure 49. Hydraulic Pump Assembly

SECTION II

TM 5-3825-230-14&P

(1) ITEM NO	(2) SMR CODE	(3) CAGE C	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
GROUP 24 HYDRAULIC LIFT COMPONENTS					
GROUP 2401 HYDRAULIC PUMP					
FIG. 49. HYDRAULIC PUMP ASSEMBLY					
1	PAOFF	11341	40007RAASA	PUMP UNIT, ROTARY	1
2	PAFZZ	11341	4P0004-002	.HOUSING, LIQUID PUMP	1
3	PAFZZ	11341	4P0013-001	.PLATE, THRUST, ROTARY	2
4	KFFZZ	11341	5A0078	.SEAL, LOADING PART OF KIT P/N 4P0017--001	2
5	KFFZZ	11341	5A0048	.SEAL, STATIC PART OF KIT P/N 4P0017--001.....	2
6	PAFZZ	11341	2A0310-604	.PIN, STRAIGHT, HEADLE	4
7	PAFZZ	11341	4P0007-007	.HOUSING, OIL PUMP	1
8	PAFZZ	88044	AN933-3	..PLUG, PIPE 3/8	1
9	PAFZZ	11341	4P0012-008	.GEARSHAFT, SPUR.....	1
10	PAFZZ	11341	4P0011-008	.GEARSHAFT, SPUR.....	1
11	PAFZZ	11341	4P0003-002	.COVER, HYDRAULIC, PUM	1
12	PAFZZ	11341	2A0079-634	.SCREW, CAP, SOCKET HE	4
13	PAFZZ	11341	2A0466-150	.RING, RETAINING	1
14	KFFZZ	11341	5A0050	.SEAL, SHAFT PART OF KIT P/N 4P0017--001.....	1
15	PFOZZ	96906	MS27183-18	WASHER, FLAT 1/2.....	2
16	PFOZZ	96906	MS35338-48	WASHER, LOCK 1/2.....	2
17	PFOZZ	96906	MS90725-109	SCREW, CAP, HEXAGON H 1/2-13UNCX1 GR5.....	2

END OF FIGURE

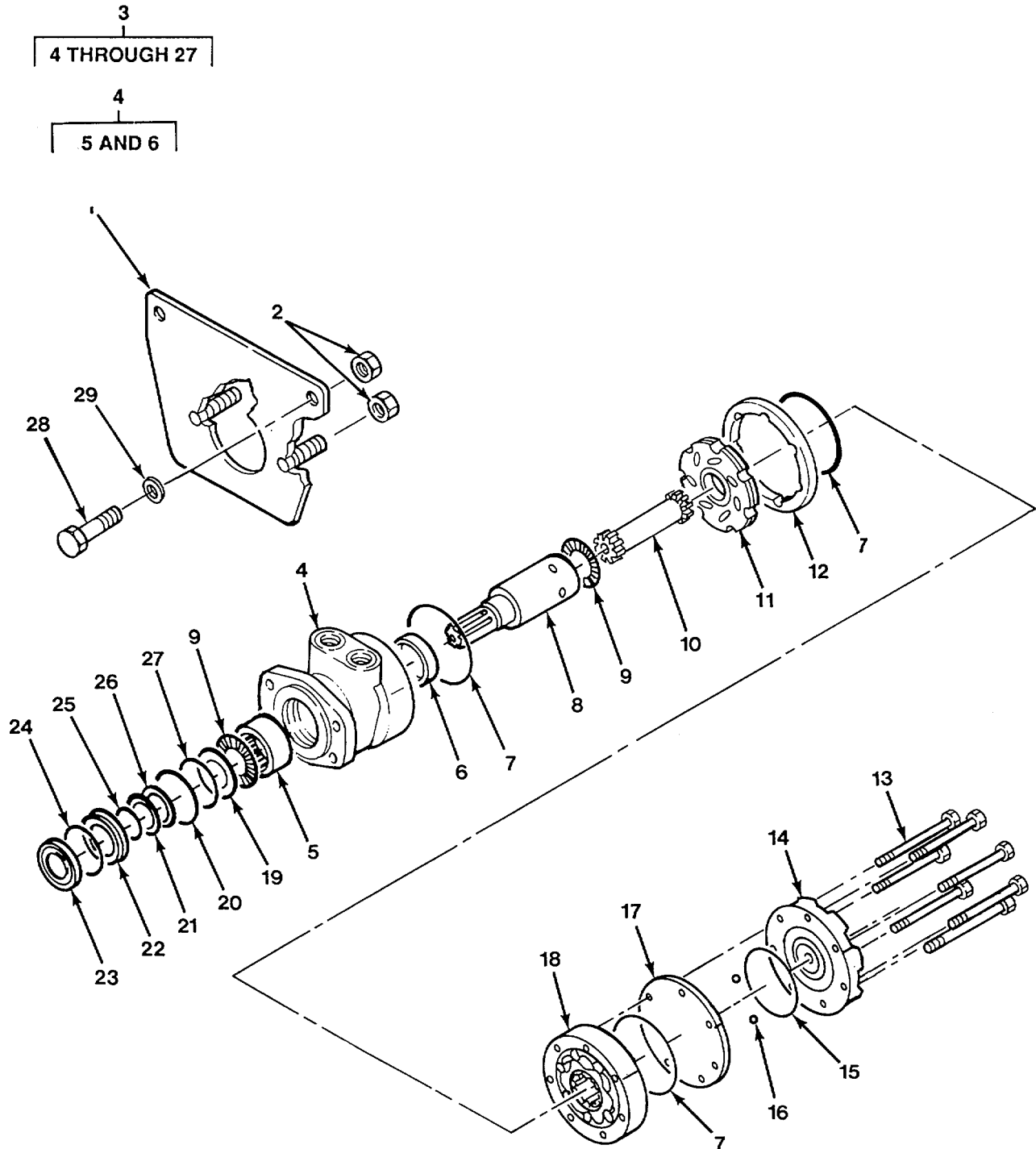


Figure 50. Hydraulic Motor Assembly

SECTION II

TM 5-3825-230-14&PC02

(1) ITEM NO	(2) SMR CODE	(3) CAGE C	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
GROUP 2401 HYDRAULIC PUMP					
FIG. 50. HYDRAULIC MOTOR ASSEMBLY					
1	PAOZZ	66234	410-92658	BRACKET, MOUNTING	1
2	PFOZZ	96906	MS51922-33	NUT, SELF-LOCKING, HE 1/2-13UNC.....	4
3	PAOFF	63050	RE-1808020	MOTOR, HYDRAULIC	1
4	PFFFF	63050	PE130823	.HOUSING, BEARING UNI.....	1
5	PAFZZ	63050	PE018003	..BEARING, ROLLER, CYLI	1
6	PAFZZ	63050	PE018002	..BEARING, ROLLER CYLI	1
7	KFFZZ	63050	RE018030	..SEAL PART OF KIT P/N PE444002.....	3
8	PAFZZ	63050	PE011600	..SHAFT, SHOULDERED.....	1
9	PAFZZ	63050	PE018059	..BEARING, WASHER, THRU.....	2
10	PAFZZ	63050	PE014007	..CONNECTING LINK, RIG	1
11	PAFZZ	63050	PE015006	..PLATE, MOUNTING FLAT	1
12	PAFZZ	63050	PE018041	..BOOT, DUST AND MOIST	1
13	PAFZZ	63050	PE013019	..SCREW, CAP, HEXAGON H	7
14	PAFZZ	63050	PE016001	..COVER, ACCESS.....	1
15	KFFZZ	63050	RS018013	..SEAL, SQUARE CUT PART OF KIT P/N PE444002.....	1
16	KFFZZ	63050	RE018048	..BALL, 3/16 DIAMETER PART OF KIT P/N PE012001.....	4
17	KFFZZ	63050	RE012001	..PLATE, PRESSURE PART OF KIT P/N PE012001.....	1
18	PAFZZ	63050	PE247005	..ROTOR ASSEMBLY	1
19	KFFZZ	63050	RE018170	..WASHER, THRUST PART OF KIT P/N PE444003.....	1
20	KFFZZ	63050	RE018001	..SPACER PART OF KIT P/N PE444002.....	1
21	KFFZZ	63050	RE018163	..RING, BACKUP, TEFLON PART OF KIT P/N PE444002.....	1
22	KFFZZ	63050	RE018977	..CARRIER, SEAL PART OF KIT P/N PE444003	1
23	KFFZZ	63050	RE018006	..SEAL, DUST PART OF KIT P/N PE444002	1
24	KFFZZ	63050	RE018005	..RING, RETAINING PART OF KIT P/N PE444002	1
25	KFFZZ	63050	RE018138	..RING, BACKUP PART OF KIT P/N PE444002.....	1
26	KFFZZ	63050	RE018153	..SEAL, SHAFT PART OF KIT P/N PE444002	1
27	KFFZZ	63050	RE018187	..SEAL, SQUARE CUT PART OF KIT P/N PE444002.....	1
* 28	PFOZZ	80204	B1821BH050C150N	SCREW, CAP, HEXAGON H 1/2-13UNCX1.5 GR8.....	2
29	PFOZZ	96906	MS27183-18	WASHER, FLAT 1/2.....	2

END OF FIGURE

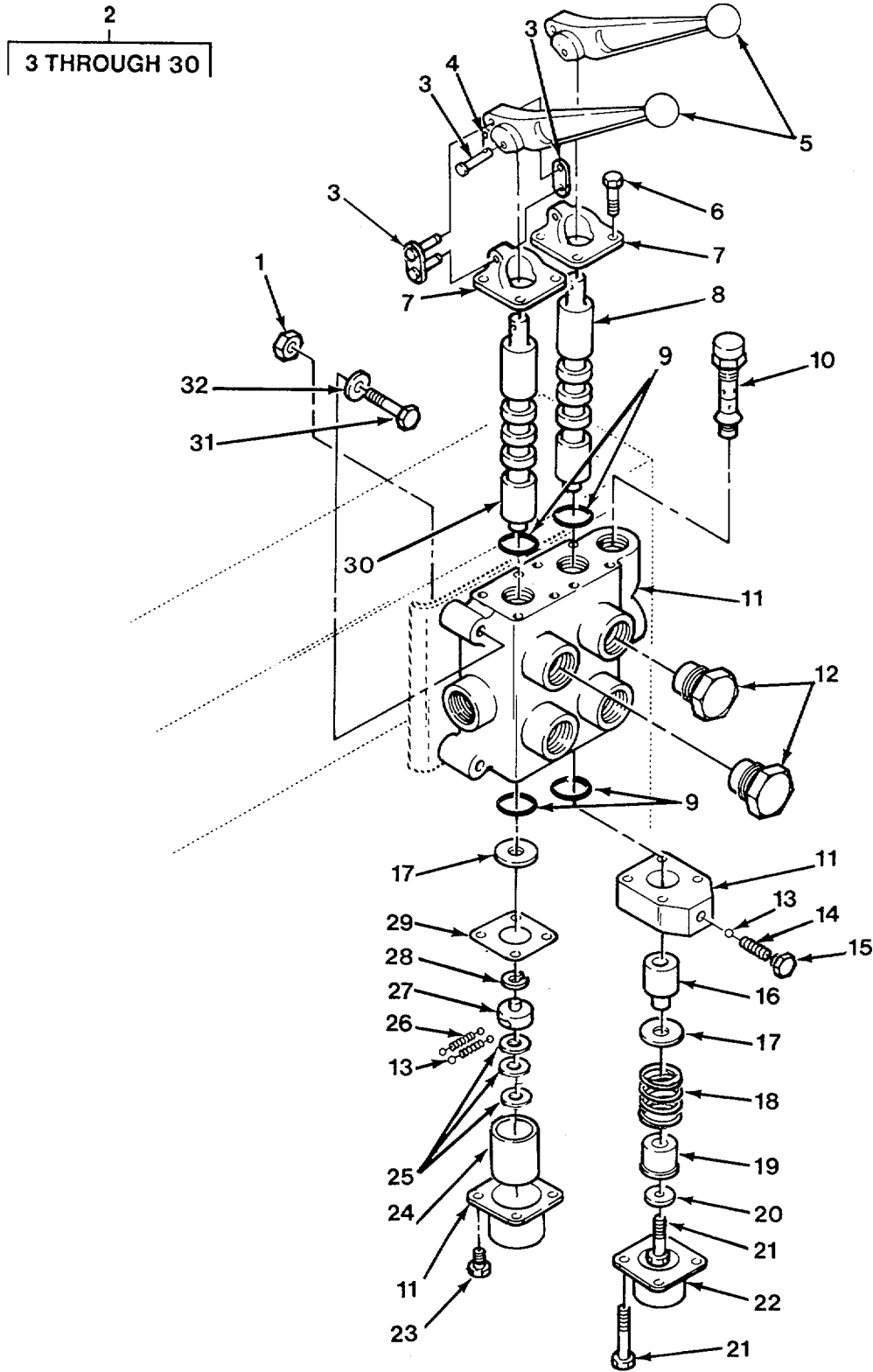


Figure 51. Hydraulic Control Valve Assembly

SECTION II

TM 5-3825-230-14&P

(1) ITEM NO	(2) SMR CODE	(3) CAGE C	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
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GROUP 2402 HYDRAULIC CONTROL VALVE

FIG. 51. HYDRAULIC CONTROL VALVE ASSEMBLY

1	PFOZZ	96906	MS51922-17	NUT, SELF-LOCKING, HE 3/8-16UNC.....	3
2	PAOFF	11341	CA237NBEE0	VALVE, LINEAR, DIRECT.....	1
3	PAFZZ	11341	V1702	.SET, STRAIGHT, HEADED.....	2
4	PFFZZ	24617	103374	.PIN, COTTER 3/32X1	1
5	PAFZZ	11341	1V1703	.LEVER, MANUAL CONTRO.	2
6	PAFZZ	80205	NAS1352-4LE8P	.SCREW, SELF-LOCKING 1/4-20UNCX1/2.....	8
7	PAFZZ	11341	4Z4306	.BRACKET, EYE, ROTATIN.....	2
8	PAFZZ	11341	1V0006	.VALVE, LINEAR, DIRECT.	1
9	PAFZZ	11341	2A0283-7214	.SEAL.....	4
10	PAFZZ	11341	1R0037	.PLUG, RELIEF, PRESSUR.....	1
11	PAFZZ	11341	1V1426	.BODY, VALVE	1
12	PAFZZ	11341	2A0354-112	.PLUG, MACHINE THREAD.....	2
13	PAFZZ	11341	2A0017-8	.BALL, BEARING	5
14	PAFZZ	11341	1A0610	.SPRING, HELICAL, COMP	1
15	PAFZZ	11341	1V0217	.PLUG, MACHINE THREAD.	1
16	PAFZZ	11341	1V0070	.RETAINER, HELICAL CO	1
17	PAFZZ	11341	1A0291	.WASHER, FLAT.....	2
18	PAFZZ	11341	1A0332	.SPRING, HELICAL, COMP	1
19	PAFZZ	11341	1A0292	.RETAINER, HELICAL CO	1
20	PAFZZ	11341	1A0290	.WASHER, FLAT.....	1
21	PAFZZ	11341	2A0079-414	.SCREW, CAP, SOCKET HE	5
22	PAFZZ	11341	1A0294	.PLATE, RETAINING, BEA	2
23	PFFZZ	96906	MS16998-42	SCREW, CAP, SOCKET HE 1/4-28UNCX5/8.....	4
24	PAFZZ	11341	1V0269	.BEARING, SLEEVE	1
25	PAFZZ	96906	MS27183-17	.WASHER, FLAT 1/2.....	3
26	PAFZZ	11341	1A0739	.SPRING, HELICAL, COMP	2
27	PAFZZ	11341	1V0272	.RETAINER SLEEVE, SEA	1
28	PAFZZ	11341	2A0736-104P	.WASHER, LOCK.....	1
29	PAFZZ	11341	1A0710	.RETAINER, DISC, VALVE	1
30	PAFZZ	11341	1V0046	.VALVE, LINEAR, DIRECT.....	1
31	PFOZZ	96906	MS-90728-66	SCREW, CAP, HEXAGON H 3/8-16UNCX2 GR8.....	3
32	PFOZZ	96906	MS27183-13	WASHER, FLAT 3/8.....	3

END OF FIGURE

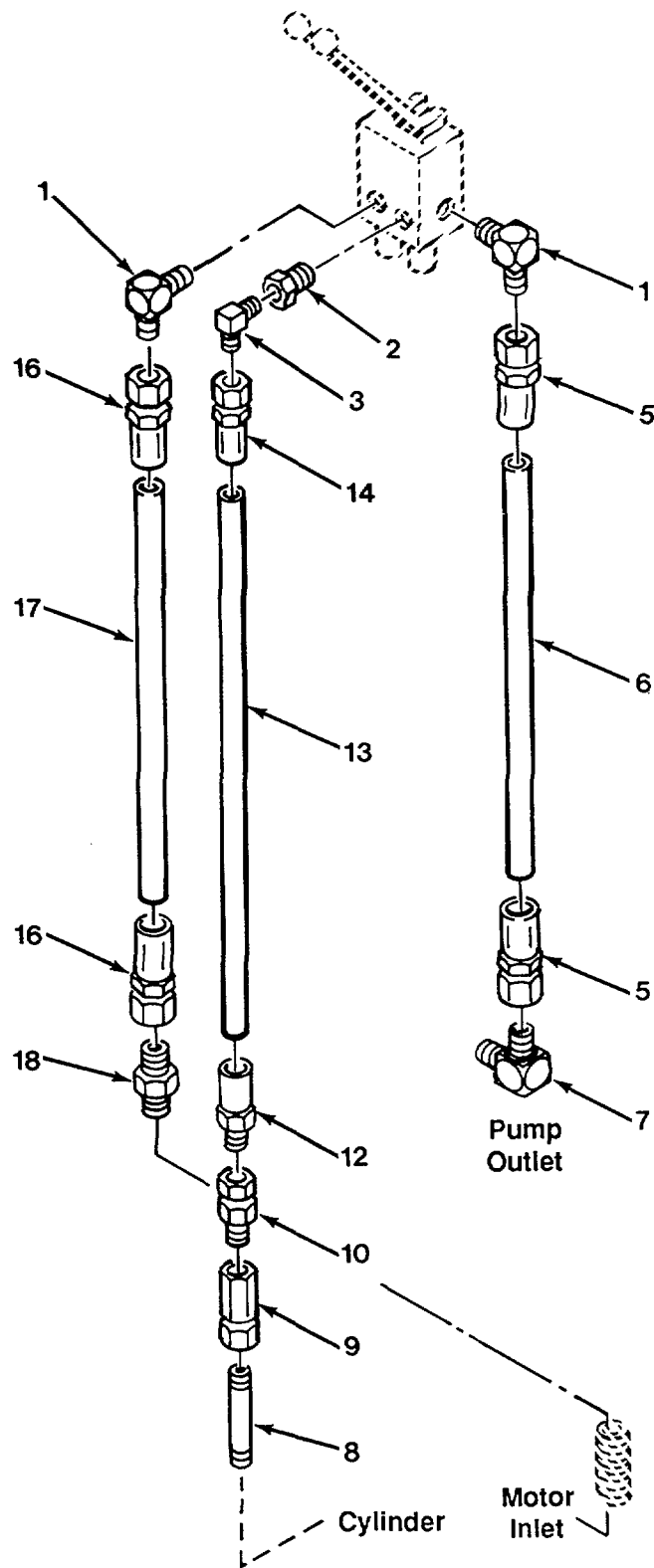
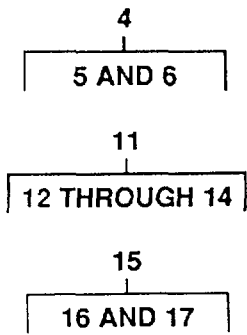


Figure 52. Hydraulic Pressure Lines and Fittings

SECTION II

TM 5-3825-230-14&P

(1) ITEM NO	(2) SMR CODE	(3) CAGE C	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
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GROUP 2406 HYDRAULIC LINES AND FITTINGS

FIG. 52. HYDRAULIC PRESSURE LINES AND FITTINGS

1	PFOZZ	96906	MS51527A12	ELBOW, TUBE TO BOSS.....	2
2	PFOZZ	66234	400-72806	PLUG, MACHINE THREAD.....	1
3	PFOZZ	22031	2501-4	ELBOW, PIPE TO TUBE.....	1
4	AFOFF	66234	213-91779	HOSE ASSEMBLY.....	1
5	PAFZZ	30327	HL12-12NJ	.ADAPTER, STRAIGHT, TU.....	2
6	MFFZZ	66234	204-85451	.HOSE MAKE FROM HOSE P/N J412 (30327) 51 INCHES.....	1
7	PFOZZ	96906	MS51527A12	ELBOW, TUBE TO BOSS.....	1
8	PFOZZ	96906	MS51953-365	NIPPLE, PIPE 1/4X4.....	1
9	PFOZZ	01276	2046-4-4S	COUPLING, PIPE	1
10	PAOZZ	66234	206-34005	ADAPTER, STRAIGHT, TU.....	1
11	AFOFF	66234	213-91901	HOSE ASSEMBLY,.....	1
12	PAFZZ	30327	HA04-04MB	.ADAPTER, STRAIGHT, PI	1
13	MFFZZ	66234	204-85041	.HOSE MAKE FROM HOSE P/N SAE100R1..... TYAT SZ4(81343), 41 INCHES	1
14	PAFZZ	30327	HG04-04NJ	.ADAPTER, STRAIGHT, TU,.....	1
15	AFOFF	66234	213-91767	HOSE ASSEMBLY.....	1
16	PAFZZ	61424	10655-12-12	.ADAPTER, STRAIGHT, TU.....	2
17	MFFZZ	66234	204-85493	.HOSE MAKE FROM HOSE P/N J412(09505), 93 INCHES.....	1
18	PFOZZ	96906	MS39324-12-10	ADAPTER, STRAIGHT, TU.....	1

END OF FIGURE

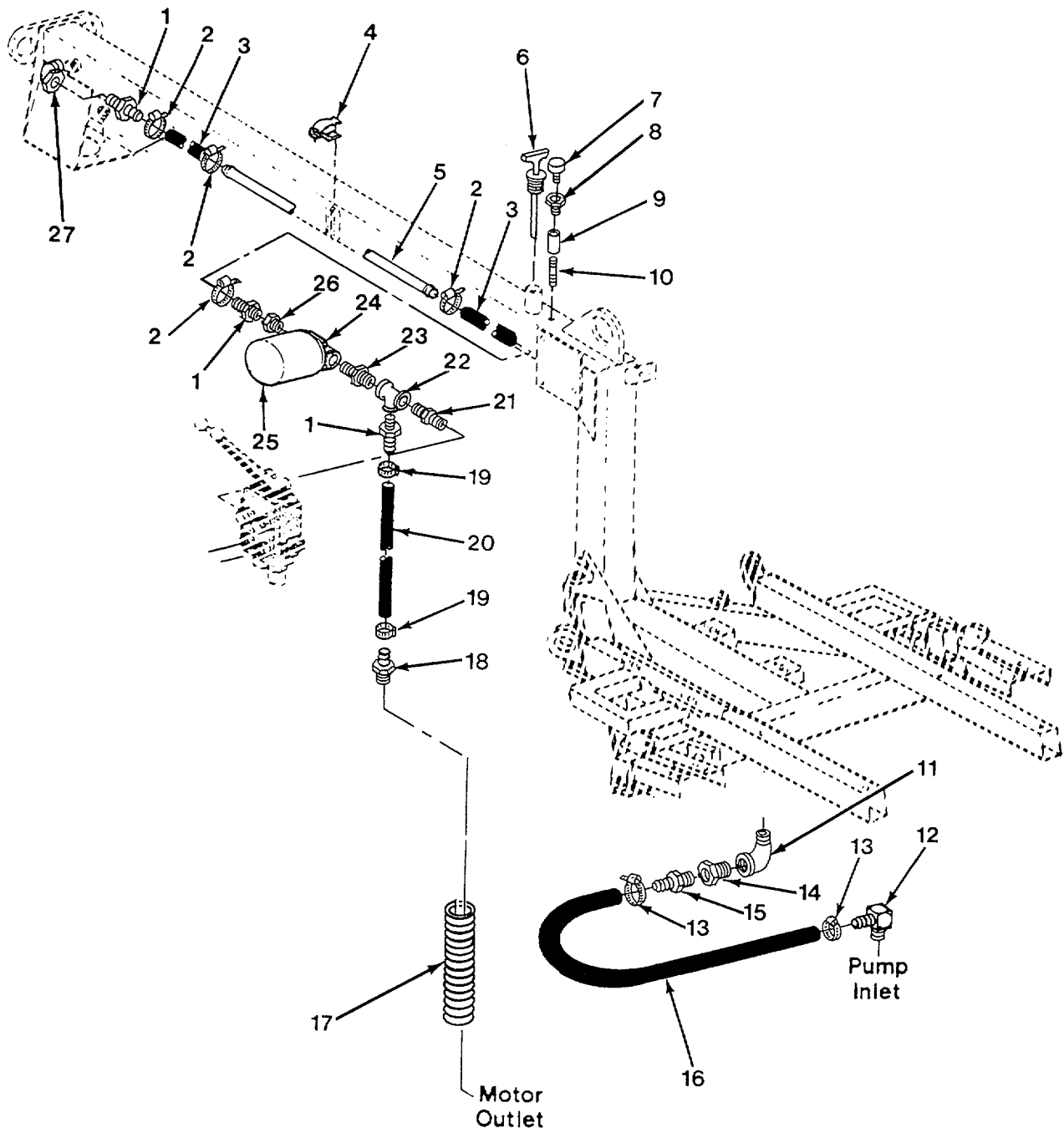


Figure 53. Hydraulic Return Lines and Fittings

SECTION II

TM 5-3825-230-14&PC02

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
GROUP 2406 HYDRAULIC LINES AND FITTINGS					
FIG. 53. HYDRAULIC RETURN LINES AND FITTINGS					
1	PFOZZ	98441	0188-12-12	ADAPTER, STRAIGHT, PI	3
2	PFOZZ	96906	MS35842-11	CLAMP, HOSE,.....	4
3	MOOZZ	66234	204-85611	HOSE MAKE FROM HOSE P/N 2556-12 (01276), 11 INCHES.....	2
4	PFOZZ	55017	100075	CLAMP ASSEMBLY 0.75.....	2
5	PAOZZ	66234	205-74425	TUBE, METALLIC	1
6	PFOZZ	76280	208-72630	GAGE ROD, LIQUID, LEV	1
7	PFOZZ	90005	569020-02	BREATHER,.....	1
8	PFOZZ	72423	2071-039	BUSHING, PIPE 1/4X1/8.....	1
9	PFOZZ	88044	AN910-2	COUPLING, PIPE 1/4.....	1
10	PFOZZ	96906	MS51953-36	NIPPLE, PIPE 1/4X4.....	1
11	PFOZZ	72423	1003-250	ELBOW, PIPE 1.25.....	1
12	PFOZZ	22031	4601-16-NWO	ELBOW, HOSE TO BOSS	1
13	PFOZZ	66295	20H	CLAMP, HOSE.....	2
14	PFOZZ	72423	2071-249	BUSHING, PIPE 1.25X1.00.....	1
* 15	XBOZZ	22031	4404-16	ADAPTER, STRAIGHT, PI	1
16	MOOZZ	66234	204-85730	HOSE, NONMATALLIC MAKE FROM HOSE P/N U216-6 (30327),30 INCHES.....	1
17	MOOZZ	66234	212-91159	GUARD, HOSE MAKE FROM PLASTIC COIL P/N 1722-95 (09505),12 INCHES.....	1
18	PFOZZ	99103	OM-1012	ADAPTER, STRAIGHT, TU.....	1
19	PFOZZ	96906	MS35842-11	CLAMP, HOSE	2
20	MOOZZ	66234	204-85690	HOSE MAKE FROM HOSE P/N 2556-12 (01276) 990 INCHES.....	1
21	PFOZZ	22031	6401-12-0	ADAPTER, STRAIGHT, PI	1
22	PFOZZ	72423	1021-150	TEE, PIPE 3/4.....	1
23	PFOZZ	22031	5404-16-12	REDUCER, PIPE 1X3/4	1
24	PAOZZ	60827	AF-10-25-0	FILTER ELEMENT, FLUI	1
25	PAOZZ	60827	AE-10	FILTER ELEMENT, FLUI,,	1
26	PFOZZ	72423	2071-199	BUSHING, PIPE 1X3/4.....	1
27	PFOZZ	72423	1001-199	ELBOW, PIPE 1X3/4.....	1

END OF FIGURE

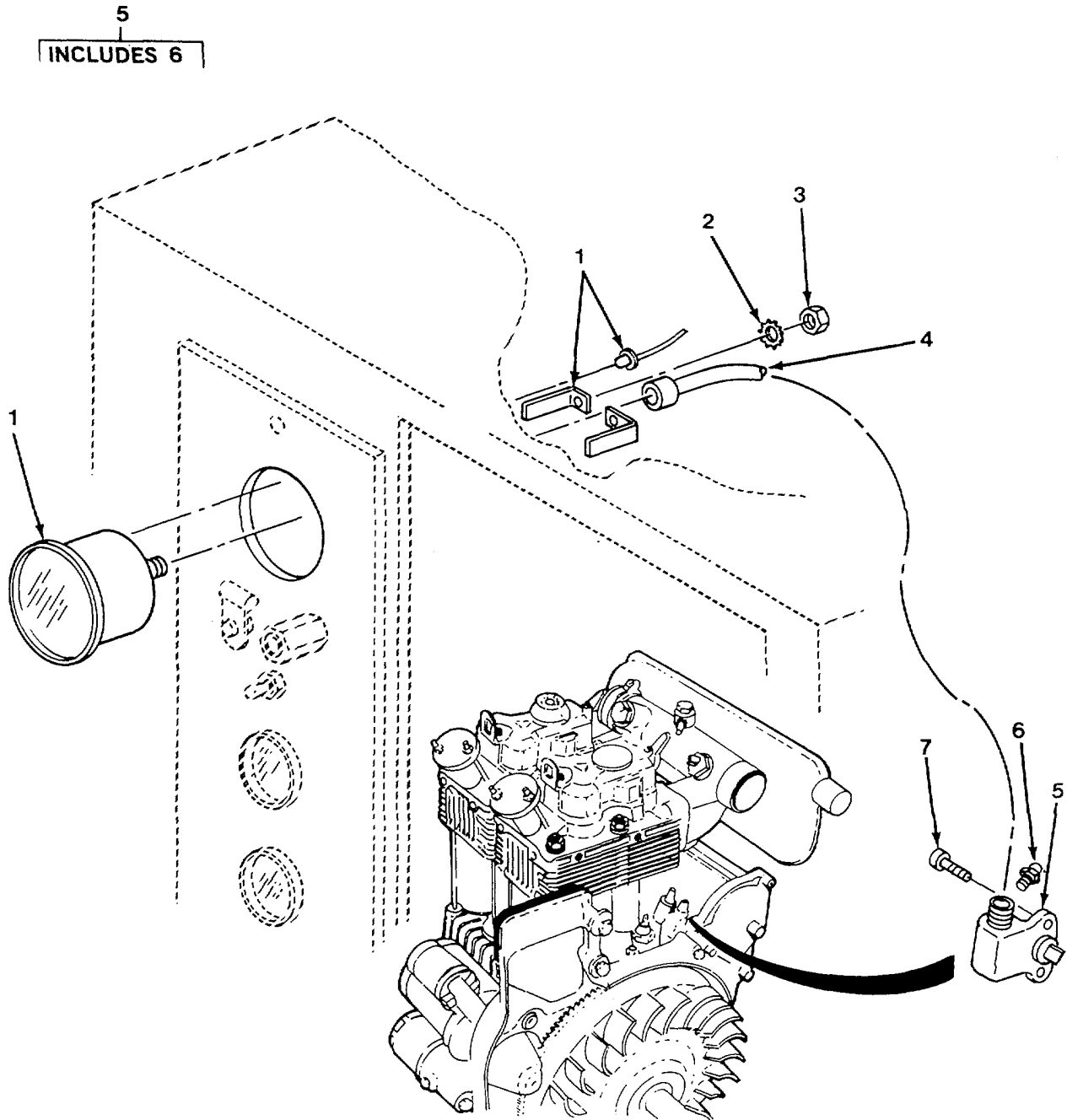


Figure 54. Tachometer and Tachometer Drive

SECTION II

TM 5-3825-230-14&P

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
				GROUP 47 GAGES (NON-ELECTRICAL) WEIGHING AND MEASURING DEVICES	
				GROUP 4701 INSTRUMENTS (SPEED AND DISTANCE)	
				FIG. 154. TACHOMETER AND TACHOMETER DRIVE	
1	PAOZZ	2X179	2529.007	TACHOMETER, MECHANIC.....	1
2	PFOZZ	96906	MS35335-33	WASHER, LOCK 1/4.....	2
3	PFOZZ	24617	11505913	NUT, PLAIN, HEXAGON M5X0,8.....	2
4	PAOZZ	2X179	9282.003	CONTROL ASSEMBLY, PU.....	1
5	PAOZZ	2X179	7475018	.GEAR ASSEMBLY, SPEED.....	1
6	PFOZZ	96906	MS15003-1	.FITTING, LUBRICATION	1
7	PFOZZ	2X179	9730.004	SCREW, CAP, SOCKET HE.....	1

END OF FIGURE

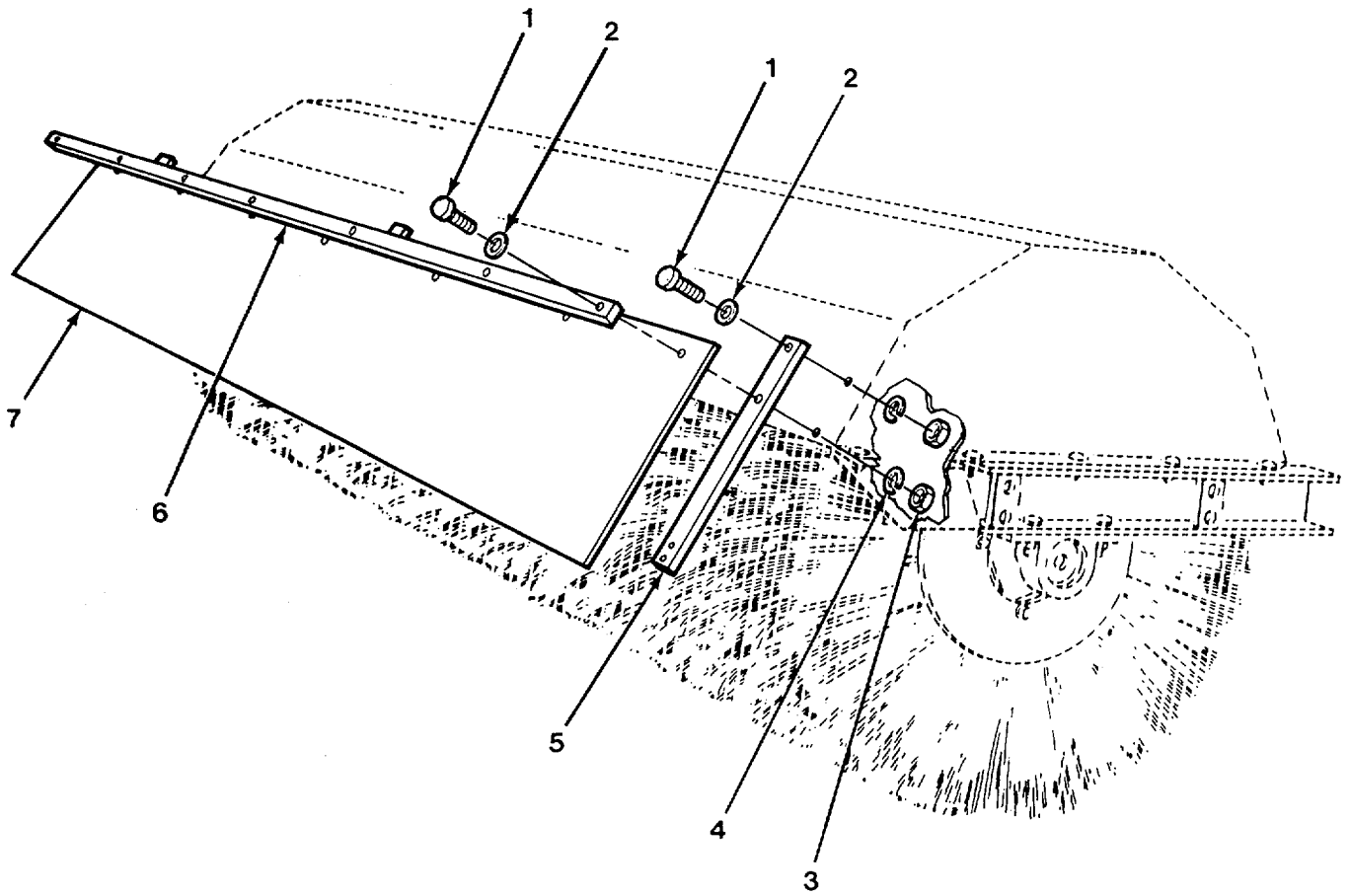


Figure 55. Dirt Deflector Assembly

SECTION II

TM 5-3825-230-14&P

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
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GROUP 71 SWEEPING EQUIPMENT
COMPONENTS

GROUP 7111 CUTTER AND/OR BOOM
ASSEMBLY

FIG. 55. DIRT DEFLECTOR ASSEMBLY

1	PFOZZ	96906	MS90725-34	BOLT, MACHINE 5/16-18UNCX1 GR5.....	10
2	PFOZZ	96906	MS27183-11	WASHER, FLAT 5/16.....	10
3	PFOZZ	96906	MS51967-5	NUT, PLAIN, HEXAGON 5/16-18UNC.....	10
4	PFOZZ	96906	MS35338-45	WASHER, LOCK 5/16.....	10
5	PFOZZ	66234	401-94242	BRACKET, MOUNTING	3
6	PAOZZ	66234	401-94292	STRAP, RETAINING	1
7	PAOZZ	66234	101-75791	GUARD, SPLASH, VEHICU	1

END OF FIGURE

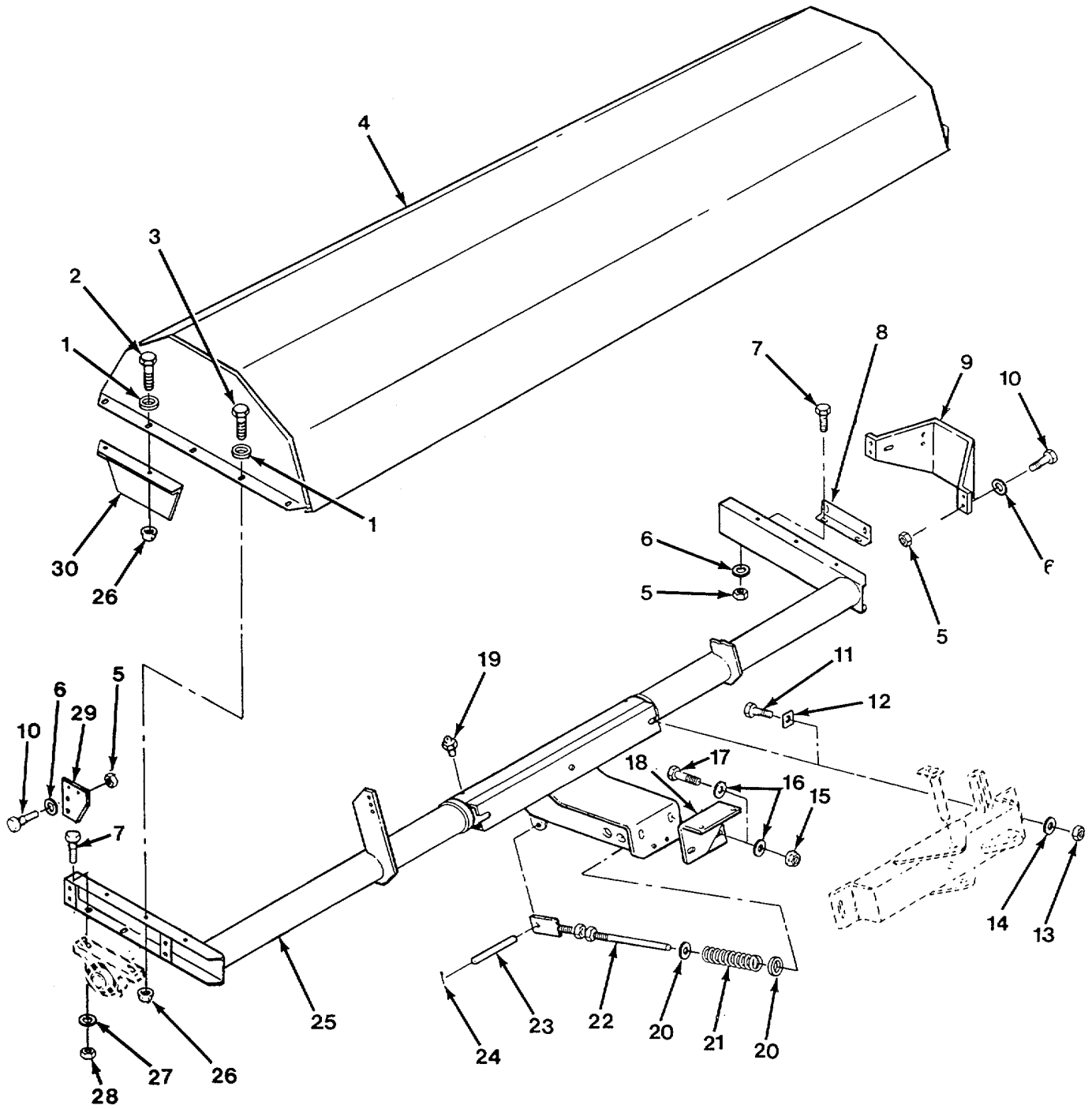


Figure 56. Brush Frame Assembly

SECTION II

TM 5-3825-230-14&PC02

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
GROUP 7111 CUTTER AND/OR BOOM ASSEMBLY					
FIG. 56. BRUSH FRAME ASSEMBLY					
1	PFOZZ	96906	MS27183-9	WASHER, FLAT 1/4.....	16
*	2	PFOZZ	80204	B1821BH025C125N SCREW, CAP, HEXAGON H 1/4-20UNCX3/4 GR8.....	4
3	PFOZZ	96906	MS90725-6	SCREW, CAP, HEXAGON H 1/4-20UNCX1 GR5.....	6
4	PAOZZ	66234	410-92663	COVER, ACCESS.....	1
5	PFOZZ	96906	MS51922-33	NUT, SELF-LOCKING, HE 1/2-13UNC.....	8
6	PFOZZ	96906	MS27183-18	WASHER, FLAT 1/2.....	8
7	PFOZZ	96906	MS35751-130	BOLT, SQUARE NECK 1/2-13UNCX2.75 GR5.....	4
8	PFOZZ	66236	401-94280	BRACKET, ANGLE	1
9	PFOZZ	66234	401-94240	GUARD, MECHANICAL	1
*	10	PFOZZ	80204	B1821BH050C150N SCREW, CAP, HEXAGON H 1/2-13UNCX1.5 GR8.....	12
11	PFOZZ	96906	MS35751-183	BOLT, SQUARE NECK 3/4-10UNCX2.5 GR5.....	2
12	PFOZZ	66234	401-94233	WASHER, FLAT.....	2
13	PFOZZ	96906	MS51922-57	NUT, SELF-LOCKING, HE 3/4-01UNC.....	2
14	PFOZZ	96906	MS27183-23	WASHER, FLAT 3/4.....	2
15	PFOZZ	96906	MS51922-17	NUT, SELF-LOCKING, HE 3/8-16UNC.....	2
16	PFOZZ	96906	MS27183-13	WASHER, FLAT 3/8.....	4
17	PFOZZ	96906	MS90725-64	SCREW, CAP, HEXAGON H 3/8-16UNCX1.5 GR5.....	2
18	PAOZZ	66234	410-92657	BRACKET, ANGLE	1
19	PFOZZ	96906	MS15002-1	FITTING, LUBRICATION	5
20	PFOZZ	66234	372-92034	WASHER, CONVEX	2
21	PFOZZ	56988	D97	SPRING, HELICOPTER.....	2
22	PFOZZ	66234	410-92655	ROD END, THREADED	2
23	PFOZZ	66234	383-92046	PIN, STRAIGHT, HEADLE	1
24	PFOZZ	96906	MS24665-357	PIN, COTTER 1/8X15	2
25	PAOZZ	66234	410-92664	FRAME SECTION, STRUC	1
26	PFOZZ	96906	MS51922-1	NUT, SELF-LOCKING, HE 1/4-20UNC.....	10
27	PFOZZ	96906	MS35338-48	WASHER, LOCK 1/2.....	2
28	PFOZZ	96906	MS51967-14	NUT, PLAIN, HEXAGON 1/2-13UNC.....	2
29	PFOZZ	66234	401-94118	PLATE, MOUNTING	2
30	PFOZZ	66234	401-94230	DEFLECTOR, DIRT AND LEFT HAND.....	1
30	PFOZZ	66234	401-94231	DEFLECTOR, DIRT AND RIGHT HAND.....	1

END OF FIGURE

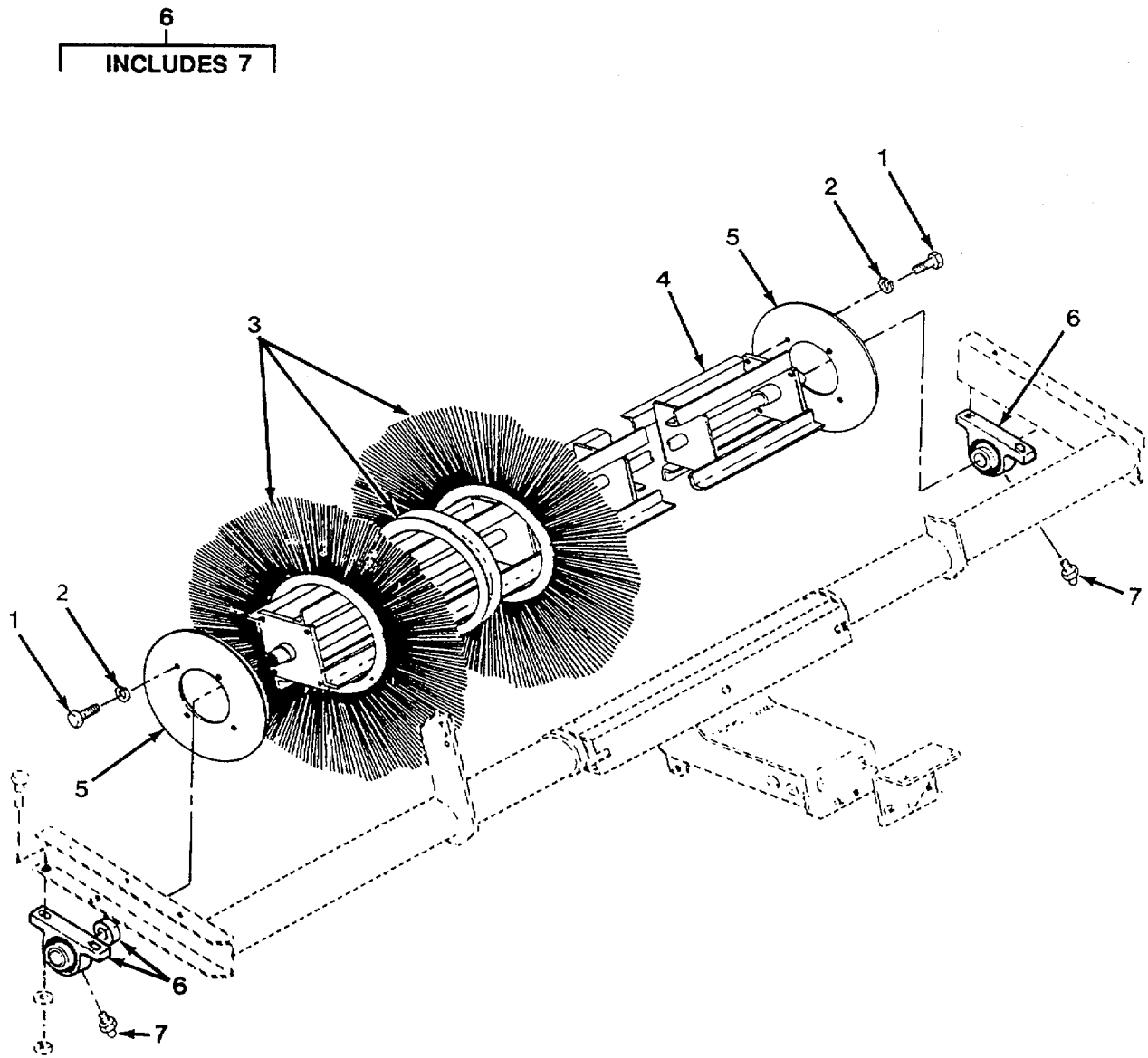


Figure 57. Hydraulic Core and Brush Kit Assembly

SECTION II

TM 5-3825-230-14&PC02

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
GROUP 7111 CUTTER AND/OR BOOM ASSEMBLY					
FIG. 57. HYDRAULIC CORE AND BRUSH KIT ASSEMBLY					
* 1	PFOZZ	80204	B18218H031C075N	BOLT, MACHINE 5/16-18UNCX3/4 GR8.....	8
2	PFOZZ	96906	MS35338-45	WASHER, LOCK 5/16.....	8
3	PAOZZ	66234	907-46665	BRUSH, FIBER, ROTARY.....	1
4	PAOOO	66234	410-92662	CORE, HYDRAULIC, SWEE	1
5	PFOZZ	66234	401-94232	SHIM.....	2
6	PFOZZ	21335	VAS 1 7/16	BEARING UNIT, BALL	2
7	PFOZZ	96906	MS15003-1	.FITTING, LUBRICATION	1

END OF FIGURE

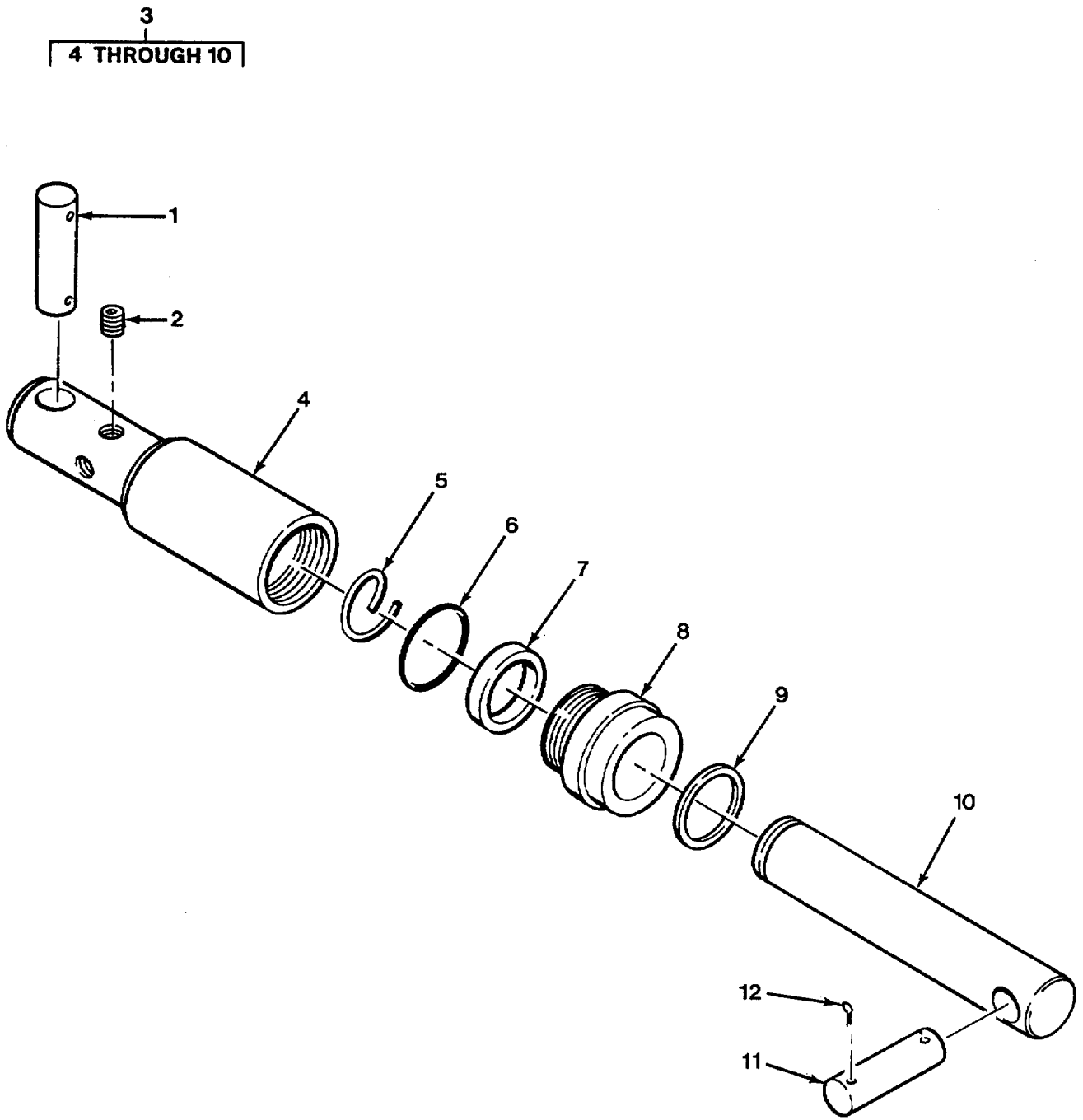


Figure 58. Hydraulic Cylinder Assembly

SECTION II

TM 5-3825-230-14&PC02

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
GROUP 7113 LIFTING AND TILTING DEVICES					
FIG. 58. HYDRAULIC CYLINDER ASSEMBLY					
1	PFOZZ	66234	383-92045	PIN, STRAIGHT, HEADLE	1
2	PFOZZ	93334	444654	PLUG, PIPE	1
3	PAOFF	67029	72276	CYLINDER ASSEMBLY, A.....	1
4	PAFZZ	67029	DHA1-216	.CYLINDER, ACTUATING	1
5	KFFZZ	67089	RST-150	.RING, RETAINING PART OF KIT P/N DH24-82	1
6	KFFZZ	67029	2-221	.PACKING, PREFORMED PART OF KIT P/N DH24-82	1
7	KFFZZ	67029	DH5-116	.SEAL, PISTON ROD PART OF KIT P/N DH24-82	1
* 8	PAFZZ	67089	DH3-145	.PACKING, PREFORMED.....	1
9	KFFZZ	67029	DH14-65	.SEAL, DIRT PART OF KIT P/N DH24-82	1
10	PAFZZ	67029	DH2-218	.PISTON, LINEAR ACTUA	1
11	PFOZZ	66234	383-92044	PIN, STRAIGHT, HEADLE	1
12	PFOZZ	96906	MS24665-360	PINT, COTTER 1/8X2	4

END OF FIGURE

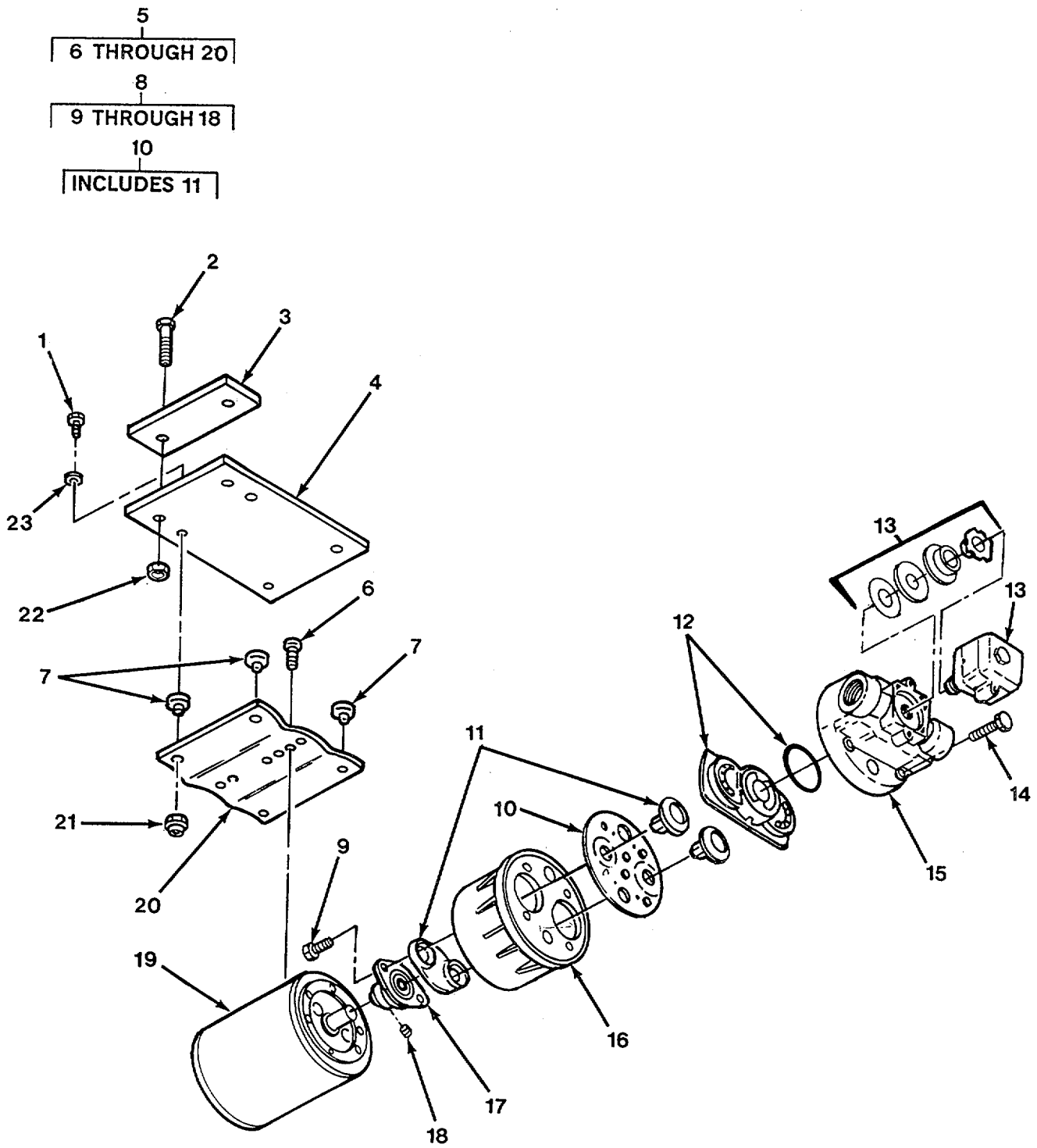


Figure 59. Spray Pump Assembly

SECTION II

TM 5-3825-230-14&PC02

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
GROUP 7114 SPRAY SYSTEM					
FIG. 59. SPRAY PUMP ASSEMBLY					
* 1	PAOZZ	80204	B18218H025C100N	SCREW, CAP, HEXAGON H 1/4-20UNCX1 GR8.....	4
* 2	PAOZZ	80204	B1821BH050C150N	SCREW, CAP, HEXAGON H 1/2-13UNCX15 GR8.....	2
3	PFOZZ	66234	402-92239	SPACER, PLATE	1
4	PAOZZ	66234	401-94254	BRACKET, MOUNTING	1
5	PAOFF	0FDH7	2100-332	PUMP, RECIPROCATING	1
6	PFFZZ	0FDH7	20131-002	..SCREW, CAP, HEXAGON.	2
7	PFFZZ	0FDH7	20132-000	..GROMMET, NONMETALLIC	4
8	PAFZZ	0FDH7	20050-132	..HOUSING, LIQUID PUMP	1
9	PFFZZ	0FDH7	21131-000	..SCREW, CAP, HEXAGON.....	4
10	PAFFF	0FDH7	21195-003	..PARTS KIT, RECIPROCA.....	1
11	PFFZZ	0FDH7	21041-001	..PARTS KIT, RECIPROCA.....	2
12	PFFZZ	0FDH7	20028-008	..VALVE, CHECK.....	1
13	PFFZZ	0FDH7	02095-100	..SWITCH, PRESSURE	1
14	PFFZZ	0FDH7	20131-001	..SCREW, CAP, SOCKET HE	1
15	PFFZZ	0FDH7	20500-507	..HOUSING, LIQUID PUMP.....	1
16	PFFZZ	0FDH7	20428-000	..CONNECTOR, FLUID, PUM	1
17	PFFZZ	0FDH7	21033-002	..CAM, CONTROL.....	1
18	PFFZZ	0FDH7	91008-000	..SET SCREW	1
19	PAFZZ	0FDH7	02019-001	..MOTOR, DIRECT CURREN.....	1
20	PFFZZ	0FDH7	11028-101	..BASE, MOTOR	1
21	PFOZZ	96906	MS51922-1	NUT, SELF-LOCKING, HE 1/4-20UNC.....	4
22	PFOZZ	96906	MS51922-33	NUT, SELF-LOCKING, HE 1/2-13UNC.....	2
23	PFOZZ	96906	MS27183-10	WASHER,FLAT 1/4.....	4

END OF FIGURE

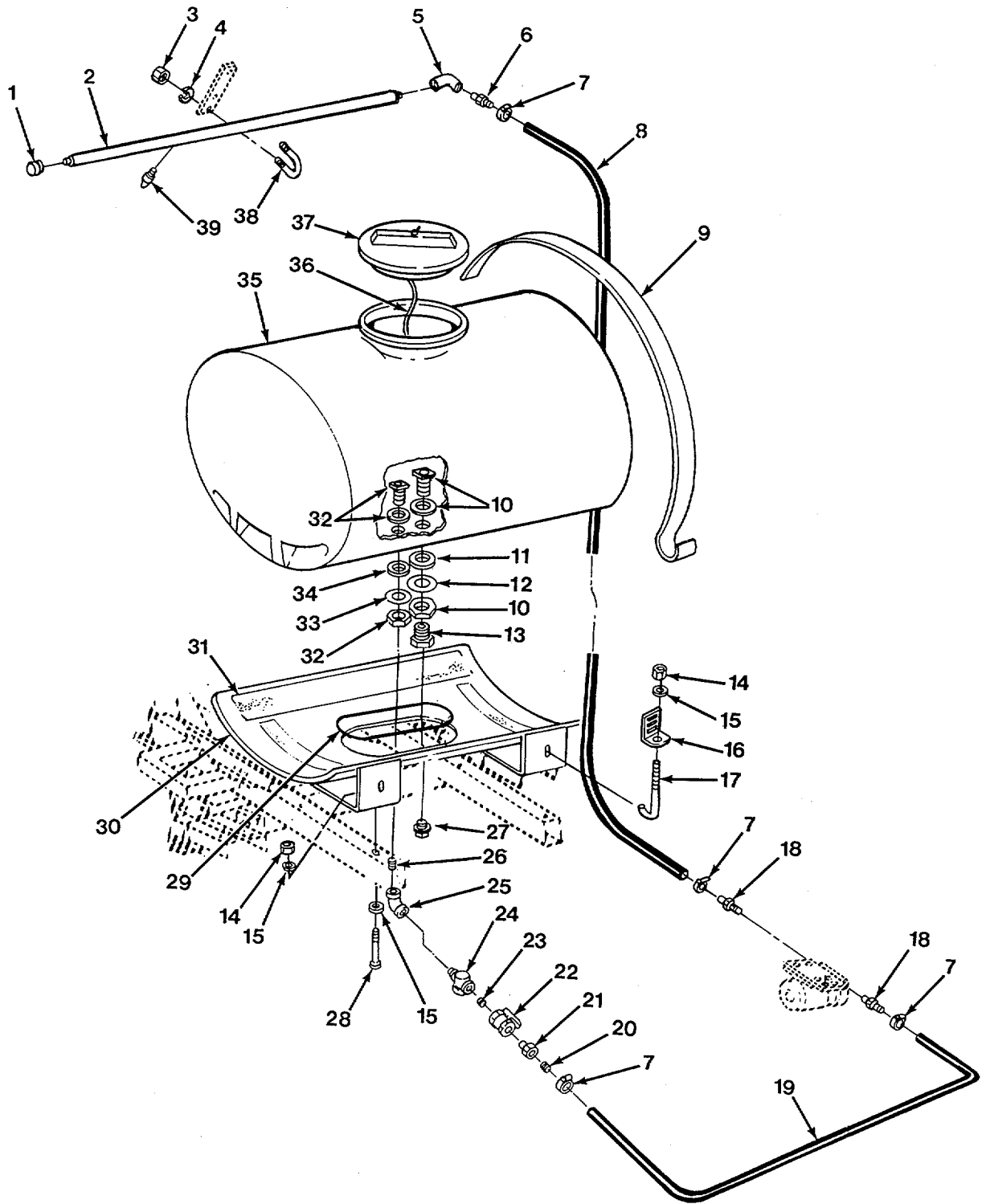


Figure 60. Spray System Installation

SECTION II

TM 5-3825-230-14&PCO2

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
GROUP 7114 SPRAY SYSTEM					
FIG. 60. SPRAY SYSTEM INSTALLATION					
1	PFOZZ	72423	1145-150	CAP, PIPE 3/4.....	1
2	PAOZZ	66234	401-94241	PIPE, METALLIC 3/4.....	1
3	PAOZZ	96906	MS51967-2	NUT, PLAIN, HEXAGON 1/4-20UNC.....	6
4	PAOZZ	96906	MS35338-44	WASHER, LOCK 1/4.....	6
5	PFOZZ	72423	1101-150	ELBOW, PIPE 3/4.....	1
6	PFOZZ	61424	P8MCB-12	ADAPTER, STRAIGHT, PI 1/2HOSE X 3/4 PIPE	1
7	PAOZZ	96906	MS35842-11	CLAMP, HOSE.....	4
8	MOOZZ	66234	204-85299	HOSE MAKE FROM HOSE P/N 3708 (82271),99INCHES.....	1
9	PFOZZ	66234	401-94253	STRAP, WEBBING,,,,,	2
10	PAOZZ	73124	BF10125SXT	ADAPTER BUSHING 1 1/4	1
11	PFOZZ	73124	BF0150PP	GASKET 1-1/4	1
* 12	XBOZZ	7R531	RT56125	SPACER, RING 1 1/4.....	1
13	PFOZZ	72423	2171-249	BUSHING, PIPE 1-1/4X1.....	1
14	PAOZZ	96906	MS51922-33	NUT, SELF-LOCKING, HE 1/2-13UNC.....	8
15	PFOZZ	96906	MS27183-18	WASHER,FLAT 1/2.....	12
16	PFOZZ	66234	401-94252	BRACKET, MOUNTING	4
17	PFOZZ	66234	401-94251	BOLT, HOOK	4
18	PAOZZ	05779	P8MCB-6	ADAPTER, STRAIGHT, PI 1/2HOSE X 3/8 PIPE	2
19	MOOZZ	66234	204-85227	HOSE MAKE FROM HOSE P/N B708(82271), 27 INCHES.....	1
20	PFOZZ	96906	MS51953-29	NIPPLE, PIPE ¼ CLOSE	1
21	PFOZZ	72423	2071-098	BUSHING, PIPE 1/2X1/4.....	1
22	PAOZZ	39428	4887K33	VALVE, BALL 1/2.....	1
23	PFOZZ	72423	2071-099	BUSHING, PIPE 1/2X3/8.....	1
24	PFOZZ	8K002	2P130	STRAINER, SEDIMENT	1
25	PFOZZ	72423	1101-148	ELBOWIPIPE3/4X3/8 90 DEG	1
26	PAOZZ	96906	MS51953-97	NIPPLE,PIPE3/4 CLOSE.....	1
27	PFOZZ	72423	2173-200	PLUG, PIPE 1.00	1
* 28	PAOZZ	80204	B1821BH050C450N	SCREW, CAP, HEXAGON H1/2-13UNCX4.5 GR8.....	4
29	MOOZZ	66234	488-49720	TRIM, EDGE, BLACK MAKE FROM MOLDING P/N 75000317(82654),76 INCHES.....	1
30	PAOZZ	66234	410-92661	BRACKET, MOUNTING	1
31	MOOZZ	66234	488-72394	TAPE, FOAM MAKE FROM TAPE P/N N-200 (57364),94 INCHES,.....	1
32	PFOZZ	73124	BF10075SXT	BUSHING, SLEEVE 3/4	1
* 33	XBOZZ	7R531	RT5675	RING, RETAINING 3/4	1
34	PFOZZ	73124	BF0075PP	GASKET 3/4.....	1
35	PAOZZ	66234	221-92018	TANK, LIQUID STORAGE,,	1
* 36	MOOZZ	66234	221-92023	STRING MAKE FROM ROPE P/N 3-16WHITE (84093), 18 INCHES.....	1
37	PAOZZ	66234	221-92022	CAP, FILLER OPENING	1
* 38	PAOZZ	7J925	370-74138-05	BOLT, U.....	3
39	PAOZZ	82247	H1/4VVL-8002	NOZZLE, SPRAY, FLUID 1/4	8

END OF FIGURE

SECTION II

TM 5-3825-230-14&P

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
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GROUP 26 TOOLS AND TEST EQUIPMENT

GROUP 2604 SPECIAL TOOLS

FIG. 61. ENGINE SPECIAL TOOLS

1	PEFZZ	2X179	7535.1460.009	SPRING COMPRESSOR	
				BOI:1 PER BN HQ WHEN BN HAS SVC CO	

END OF FIGURE

SECTION II

TM 5-3825-230-14&P

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
GROUP 94 REPAIR KITS					
GROUP 9401 REPAIR KITS					
PAFZZ	67089		DH24-82	PARTS KIT, LINEAR AC	1
				PACKING PREFORMED (1) 58-6	
				RING, RETAINING (1) 58-5	
				SEAL, DIRT (1) 58-9	
				SEAL, PISTON ROD (1) 58-7	
PAOZZ	63050		PE012001	SPACER, PLATE	1
				BALL 3/16 DIAMETER (4) 50-16	
				PLATE, PRESSURE (1) 50-17	
PAFZZ	63050		PE444002	SEAL ASSEMBLY, SHAFT	1
				RING, BACKUP (1) 50-25	
				RING, BACKUP, TEFLON (1) 50-21	
				RING, RETAINING (1) 50-24	
				SEAL (3) 50-7	
				SEAL, DUST (1) 50-23	
				SEAL, SHAFT (1) 50-26	
				SEAL, SQUARE CUT (1) 50-27	
				SEAL, SQUARE CUT (1) 50-15	
				SPACER (1) 50-20	
PAFZZ	63050		PE444003	PARTS KIT, SEAL REPL	1
				CARRIER, SEAL (1) 50-22	
				WASHER, THRUST (1) 50-19	
PAOZZ	2X179		3600.8888.529	CONNECTOR, FLUID, PUM	1
				COUPLING, SHAFT, FLEX (1) 16-5	
				COUPLING, HALF, SHAFT (1) 16-1	
				HOUSING, MECHANICAL (1) 16-6	
				INSERT, FLEXIBLE COU (1) 16-4	
PAFZZ	2X179		395.8180.062	GASKET SET.....	1
				GASKET (2) 8-14	
				GASKET (1) 5-5	
				GASKET (1) 12-4	
				GASKET (1) 19-7	
				GASKET (1) 19-7	
				GASKET (1) 19-7	
				GASKET (1) 2-23	
				GASKET (1) 14-1	
				GASKET (1) 20-1	
				GASKET (1) 25-37	
				GASKET (2) 28-6	
				GASKET (2) 15-2	
				GASKET, CSHAFT SPRT (1) 5-5	
				GASKET, CRANKCASE (1) 2-2	
				GASKET, HEAD(0,50) (2) 2-3	
				GASKET, HEAD(0,55) (2) 2-3	
				GASKET, HEAD(0,60) (2) 2-3	
				GASKET, HEAD(0,65) (2) 2-3	
				GASKET, HEAD(0,70) (2) 2-3	
				GASKET, HEAD(0,75) (2) 2-3	
				GASKET, HEAD(0,80) (2) 2-3	

KITS-1

SECTION II

TM 5-3825-230-14&P

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
				GASKET HEAD (0,85)	(2) 2-3
				GASKET, HEAD (0,90)	(2) 2-3
				GASKET, HEAD (0,95)	(2) 2-3
PAFZZ	11341		4P0017-001	PARTS KIT, SEAL REPL	1
				SEAL, LOADING	(2) 49-4
				SEAL, SHAFT	(1) 49-14
				SEAL, STATIC	(2) 49-5
PAFZZ	2X179		435.8150.017	PARTS KIT, LINEAR AC	1
				CAP, PROTECTIVE, DUST	(2) 9-11
				GASKET	(2) 2-9
				GASKET, GUARD TUBE	(2) 2-5
				SEAL, PLAIN	(1) 4-9
PAFZZ	53867		1 007 010 040	SHIM SET	1
				BUSHING, SLEEVE	(1) 31-39
				CLIP, RETAINING	(1) 31-25
				PACKING, PREFORMED	(1) 31-26
				PIVOT, FORK	(1) 31-42
				SEAL, PLAIN	(1) 31-12
				SPACER, RING	(1) B1-40
				WASHER, FLAT	(1) 31-24

END OF FIGURE

KITS-2

SECTION II

TM 5-3825-230-14&PC02

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
GROUP 95 GENERAL USE STANDARDIZED PARTS					
GROUP 9501 HARDWARE SUPPLIES AND BULK MATERIAL, COMMON					
1	PAOZZ	12128	671442	CHAIN, WELDLESS.....	V
2	PAOZZ	23823	A52AE12	CONDUIT, NONMETALLIC	V
3	PAOZZ	81519	CWC2INDIA	HOSE, AIR DUCT	V
4	PAOZZ	30327	J412	HOSE, NONMETALLIC.....	V
5	PAOZZ	01276	2556-12	HOSE-NONMETALLIC.....	V
6	PAOZZ	30327	U216-6	HOSE, NONMETALLIC.....	V
7	PAOZZ	81343	SAE100R1 TYAT SZ.....	HOSE, NONMETALLIC	V
V			4		
8	PAOZZ	82271	B708	HOSE, NONMETALLIC.....	V
9	PAOZZ	79470	H05704	HOSE, NONMETALLIC,.....	V
10	PAOZZ	82654	75000317	MOLDING, QUICKEDGE	V
* 11	XBOZZ	84093	3-16WHITE	ROPE, FIBROUS	V
12	PAOZZ	39428	3559T47	SHACKLE	V
* 13	XDOZZ	57364	N-200AWHITE188X 4X400	TAPE, PRESSURE SENSI.,.....	V
14	PAOZZ	09505	1722-95	TUBING, PLASTIC, SPIR.....	V
* 15	PAOZZ	16764	950B	WIRE, ELECTRICAL.....	V
* 16	PAOZZ	16428	736102	WIRE, ELECTRICAL.....	V
* 17	PAOZZ	79550	572D0	WIRE ELECTRICAL,,	V
18	PAFZZ	96906	MS20995C20	WIRE, NONELECTRICAL,	V

END OF FIGURE

BULK-1

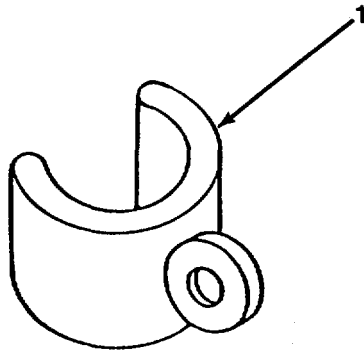


Figure 61. Engine Special Tools

CROSS- REFERENCE-INDEXES

NATIONAL STOCK NUMBER INDEX					
STOCK NUMBER	FIG.	ITEM	STOCK NUMBER	FIG.	ITEM
5305-00-044-4153	49	17	5940-00-143-4774	39	3
5310-00-045-3296	1	11	5940-00-143-4775	38	2
	34	21	5940-00-143-4777	34	2
	36	3	5940-00-143-4780	32	18
5310-00-045-3299	35	16		34	14
4730-00-050-4208	54	6		35	6
	57	7		38	5
5305-00-050-9231	34	20		38	8
4720-00-054-6358	BULK	4		38	10
5340-00-057-2906	33	13		39	13
4730-00-058-3353	52	14		39	17
5310-00-067-6356	56	13	5940-00-143-4794	39	4
5305-00-068-0500	33	19		39	15
5305-00-068-0502	32	7	5940-00-143-5284	39	2
	47	3		39	12
	56	3	5975-00-152-1075	34	23
5305-00-068-0509	56	2	4730-00-172-0010	56	19
5305-00-068-0510	21	5	5340-00-186-5085	45	2
	34	7	4730-00-196-1468	60	26
5305-00-068-0511	23	3	4730-00-196-1502	60	20
	35	18	4730-00-196-1539	53	10
5305-00-071-2069	35	23	5310-00-209-0786	54	2
	50	28	5310-00-209-0965	29	18
	56	10	9505-00-221-2650	BULK	18
	59	2	4730-00-223-9255	53	9
5305-00-071-2081	60	28	5305-00-225-3843	33	17
5310-00-081-4219	30	14		59	1
	34	26	5310-00-225-6993	30	12
	41	10		35	5
5310-00-087-4652	1	15		50	2
	21	8		56	5
	34	10		59	22
	45	7		60	14
	51	1	5306-00-225-84699	30	13
	56	15		34	27
5310-00-087-7493	1	13		41	1
	21	6		55	1
	34	9	5306-00-226-4825	45	18
	51	32		57	1
	56	16	5940-00-230-0515	39	11
5310-00-088-1251	37	2	5315-00-234-1664	42	14
	47	11		43	13
	56	26		45	12
	59	21		46	8
5310-00-088-6897	42	13		46	11
	43	14	4730-00-239-2803	53	23
	46	12	4030-00-243-4439	46	5
5940-00-114-1305	39	9	5340-00-253-1910	43	9
5310-00-119-2090	43	10	5305-00-269-3218	1	14
5305-00-121-2420	51	6		45	3

CROSS- REFERENCE-INDEXES

NATIONAL STOCK NUMBER INDEX					
STOCK NUMBER	FIG.	ITEM	STOCK NUMBER	FIG.	ITEM
5310-00-269-4040	1	8	3110-00-606-1842	42	7
	45	10		46	21
4730-00-277-9997	52	8	5310-00-627-6128	34	8
4730-00-278-2523	53	13	5310-00-637-9541	23	4
4030-00-282-4885	45	6		35	20
5975-00-295-9696	34	30		46	6
5315-00-298-1481	56	24	4030-00-684-6346	46	2
5315-00-298-1499	58	12	5306-00-702-4483	56	7
5930-00-359-5500	32	11	4730-00-702-5694	49	8
5310-00-407-9566	29	16	5305-00-724-5914	45	8
	30	2	5305-00-724-7247	1	6
	41	2	4720-00-730-0116	BULK	3
	45	17	5310-00-732-0558	23	5
	55	4		35	21
	57	2	2940-00-755-6584	53	25
4730-00-414-5962	58	2	5310-00-761-6882	32	17
5940-00-432-2660	39	14		33	3
5940-00-434-6062	39	8		60	3
4720-00-460-3915	BULK	7	5310-00-762-6223	40	5
6145-00-468-1261	BULK	17	3110-00-763-0259	43	3
6145-00-471-0428	BULK	15	5310-00-768-0318	56	28
2590-00-473-6331	45	4	3110-00-769-1426	43	4
4730-00-476-5865	33	7	5305-00-782-9489	51	31
4730-00-476-7135	33	9	5365-00-803-7301	40	11
4010-00-494-2326	46	4	5340-00-809-1490	33	18
4720-00-541-8859	BULK	5	5340-00-809-1494	33	1
4030-00-542-3184	46	3	5310-00-809-3078	55	2
5315-00-550-7397	40	8	5310-00-809-4058	32	5
5360-00-553-2039	40	12		33	16
2640-00-555-2841	42	11		37	3
	43	11		47	5
5940-00-557-4338	34	5		59	23
	39	7	5310-00-809-4061	29	19
5310-00-559-0070	48	8	5310-00-809-5997	51	25
3040-00-570-6161	58	3	5310-00-809-5993	35	4
5310-00-582-5965	27	3		49	15
	32	6		50	29
	33	2		56	6
	34	19		60	15
	47	4	5310-00-809-8533	42	15
	60	4		43	15
5310-00-584-5272	49	16		46	13
	56	27		56	14
5310-00-596-7693	31	8	5310-00-809-8544	30	6
3110-00-606-1839	42	8	5310-00-809-8546	33	14
	46	22	5315-00-816-1794	51	4
3110-00-606-1840	42	4	5310-00-823-8804	56	1
	46	18	5315-00-842-3044	41	11
3110-00-606-1841	42	3	4730-00-871-6729	22	4
	46	17	5310-00-877-5795	30	10

CROSS- REFERENCE-INDEXES

NATIONAL STOCK NUMBER INDEX					
STOCK NUMBER	FIG.	ITEM	STOCK NUMBER	FIG.	ITEM
5310-00-877-5795	46	14	5905-01-082-0849	34	13
5310-00-880-7744	41	3	4310-01-094-0791	53	7
	55	3	5995-01-096-0733	35	13
5310-00-905-5159	32	19	4730-01-096-9138	52	18
4730-00-908-3194	53	2	4730-01-099-7329	60	6
	53	19	4730-01-102-6544	22	6
	60	7	5310-01-113-5659	34	29
3110-00-926-1379	43	7	5975-01-123-8811	BULK	2
	43	8	4720-01-125-4474	BULK	9
5310-00-934-9751	34	16	5940-01-134-1722	32	22
	36	2		35	8
5310-00-934-9758	1	12	6110-01-134-9981	30	4
5310-00-934-9762	32	20	5340-01-135-1030	21	9
4730-00-938-7849	33	11	5940-01-135-2403	38	7
5306-00-952-0964	56	11	5315-01-136-8328	30	8
5320-00-957-2493	47	2	5310-01-141-8704	34	22
5961-00-957-6865	38	11	5975-01-145-7210	33	12
4730-00-965-6538	53	1	4030-01-146-6160	BULK	12
5305-00-983-6659	51	23	5340-01-153-9240	51	19
5310-00-983-8483	31	30	5310-01-154-0712	51	17
5310-00-984-3806	34	25	5310-01-154-0713	51	20
	41	7	5365-01-154-8557	45	14
5305-00-984-4983	32	25	4820-01-155-0302	51	10
5305-00-984-6193	35	15	5920-01-156-6878	32	23
	48	7	5305-01-158-0826	19	13
5305-00-984-6210	33	15	5305-01-159-0065	24	17
	36	1	3110-01-160-2471	51	22
5305-00-984-6214	1	9	3040-01-170-9751	51	7
5975-00-984-6582	33	4	2510-01-176-1177	BULK	10
5305-00-988-1724	34	18	4730-01-178-9654	53	12
5305-00-989-7434	25	2	6220-01-183-4557	35	11
	26	4		35	14
5305-00-989-7435	30	5	1450-01-204-7742	35	7
5305-00-993-1848	34	11	5975-01-207-0229	34	28
4730-01-007-7158	52	9	6140-01-210-1964	37	6
4730-01-011-7736	52	1	3040-01-211-2255	51	5
	52	7	5330-01-217-8918	51	9
3020-01-045-2627	30	11	5340-01-220-6352	45	19
4730-01-049-3251	52	12	5925-01-222-0059	34	15
5330-01-055-3870	43	2	5925-01-222-3650	34	17
5306-01-055-6876	43	5	6145-01-229-3621	BULK	16
2530-01-061-1351	32	12	5330-01-236-0495	20	1
2530-01-069-4213	40	10	5330-01-247-2403	8	8
5340-01-069-5306	53	4	5330-01-247-2409	12	8
2530-01-069-9174	40	3	5310-01-247-2425	25	10
5365-01-070-2350	40	4		29	11
3130-01-070-5629	40	6	5310-01-247-2452	26	10
5306-01-071-1309	40	7	2530-01-250-1624	40	9
4730-01-075-1920	52	16	5975-01-256-0876	34	24
4130-01-075-5547	26	1	3120-01-265-2462	50	9

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STOCK NUMBER	FIG.	ITEM	STOCK NUMBER	FIG.	ITEM
5360-01-268-2610	42	1	2520-01-323-5941	56	30
	46	15	2815-01-323-5942	29	8
4720-01-272-4672	BULK	8	3040-01-323-5943	KITS	
5305-01-274-1264	24	1	2930-01-323-5959	29	9
4720-01-288-3893	BULK	6	2510-01-323-5966	29	6
5306-01-289-9197	29	15	2815-01-323-5968	29	13
	30	3	2815-01-323-5992	5	16
5330-01-290-2621	36	5	2815-01-323-5993	3	4
5905-01-291-4426	32	14	3040-01-323-5994	4	11
4730-01-292-4698	52	3	2815-01-323-5995	9	1
6625-01-297-2005	32	15	3020-01-323-5998	56	9
6220-01-301-5411	35	12	3020-01-323-6006	13	7
2920-01-302-6304	31	21	4320-01-323-6028	50	3
3010-01-302-6310	31	41	2990-01-323-6030	28	7
5310-01-303-2728	31	10	2815-01-323-6038	7	1
5365-01-303-2965	KITS		2815-01-323-6039	9	12
5945-01-303-3353	31	5	2815-01-323-6043	10	3
6680-01-309-6450	53	6	2815-01-323-6044	9	8
4320-01-317-8940	20	3	2540-01-323-6045	46	10
2530-01-322-0673	40	2	2530-01-323-6048	42	12
5330-01-323-1574	KITS			43	12
5330-01-323-2757	29	4	2540-01-323-6051	55	7
5330-01-323-2758	4	1	2910-01-323-7057	19	1
3120-01-323-2785	7	5	4730-01-323-7313	60	39
5330-01-323-2834	5	7	2510-01-323-7322	29	1
3130-01-323-2885	5	1	4320-01-323-7364	49	7
3130-01-323-2886	5	6	4320-01-323-7481	59	16
3130-01-323-2887	5	4	2815-01-323-7633	1	1
3130-01-323-2888	5	4	4710-01-323-8541	60	2
2805-01-323-4357	13	9	4710-01-323-8545	22	1
4730-01-323-5042	25	21	4710-01-323-8546	9	9
4810-01-323-5044	3	8	4730-01-323-8614	19	2
4730-01-323-5079	60	5	2510-01-323-8677	1	7
4730-01-323-5080	60	25	5306-01-323-8814	22	3
4730-01-323-5107	60	1	5315-31-323-8823	5	17
4320-01-323-5114	59	11	5315-31-323-8821	8	11
4320-01-323-5123	49	3		8	24
4320-01-323-5149	49	2	5315-01-323-8822	8	12
4320-01-323-5157	49	11		8	25
5330-01-323-5455	11	2	5315-01-323-8824	9	7
5305-01-323-5473	59	6	5360-01-323-8830	8	6
5305-01-323-5474	59	9		8	19
5305-01-323-5477	59	18	5360-01-323-8831	9	17
3120-01-323-5480	7	5	5360-01-323-8844	25	38
3120-01-323-5481	5	4	5305-01-323-8924	49	12
3130-01-323-5516	5	1	5305-01-323-8925	5	3
3130-01-323-5517	5	1		8	1
5306-01-323-5539	60	17	5305-01-323-8926	8	13
3040-01-323-5936	5	2		8	26
2520-01-323-5940	56	30	5305-01-323-8927	29	7

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STOCK NUMBER	FIG.	ITEM	STOCK NUMBER	FIG.	ITEM
5305-01-323-8928	29	5	2815-01-324-5084	7	4
5305-01-323-8929	31	2	4320-01-324-5113	49	1
5305-01-323-8930	12	10	2815-01-324-5147	10	4
5305-01-323-8931	25	35	2815-01-324-5148	2	4
5305-01-323-8932	25	33	2815-01-324-5149	6	3
2990-01-323-9508	25	23	2940-01-324-5153	12	1
5315-01-324-0422	49	6	2530-01-324-5178	40	1
5315-01-324-0423	8	9	2315-01-324-5192	7	6
	8	22	4730-01-324-6492	60	27
2815-01-324-0765	9	15	4710-01-324-6528	1	16
5340-01-324-0904	8	5	4710-01-324-6529	13	1
	8	18	4710-01-324-6530	21	11
5307-01-324-0945	28	5	4730-01-324-6572	60	18
5305-01-324-0949	5	15	4730-01-324-6595	60	24
5305-01-324-0950	29	2	5340-01-324-6754	56	8
5305-01-324-0951	13	4	5315-01-324-6779	45	11
	17	3	5340-01-324-6783	60	30
5340-01-324-0961	8	16	5340-01-324-6784	56	22
5340-01-324-0962	8	3	5340-01-324-6794	60	9
5340-01-324-0963	18	2	5340-01-324-6798	56	29
2815-01-324-1147	7	4	5340-01-324-6799	59	4
2815-01-324-1151	7	2	2910-01-324-6897	21	14
	7	2	2910-01-324-6898	26	8
	7	2	2910-01-324-6899	26	9
2805-01-324-1211	29	12	2815-01-324-6906	10	2
2510-01-324-1216	45	1	5975-01-324-7837	34	12
2510-01-324-1217	45	15	4320-01-324-7898	59	15
2510-01-324-1218	56	25	5310-01-324-8237	9	2
3040-01-324-1228	59	17	5310-01-324-8238	18	1
3040-01-324-1275	49	9		25	9
3040-01-324-1276	49	10	5310-01-324-8239	5	8
2910-01-324-1304	23	1		20	5
2815-01-324-1332	7	1	5310-01-324-8240	13	5
5315-01-324-1748	45	16	5310-01-324-8242	25	22
5315-01-324-1750	58	1		28	4
2815-01-324-2149	KITS		5310-01-324-8243	25	34
5365-01-324-2562	7	3	5310-01-324-8245	3	3
	7	3	5310-01-324-8246	15	6
	7	3		16	7
3825-01-324-2743	57	4		19	3
5365-01-324-3425	19	11	5360-01-324-8264	2	7
5315-01-324-3993	13	8	5330-01-324-8286	18	3
5340-01-324-4260	56	18	3120-01-324-8319	7	8
5340-01-324-4262	60	16	3120-01-324-8320	24	8
5340-01-324-4496	50	1	5310-01-324-8325	2	13
5365-01-324-4872	25	18		8	4
5365-01-324-4919	9	6		8	17
5306-01-324-4962	60	38		21	13
4820-01-324-5045	59	12		36	6
4730-01-324-5074	53	18	5310-01-324-8326	3	2

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STOCK NUMBER	FIG.	ITEM	STOCK NUMBER	FIG.	ITEM
5310-01-324-8327	14	4	5340-01-325-5892	42	9
5310-01-324-8331	24	2		46	23
5310-01-324-8332	24	11	5340-01-325-5916	22	20
5310-01-324-8333	24	12	5305-01-325-5918	7	7
5310-01-324-8334	5	13	5340-01-325-5943	2	28
	14	10	5340-01-325-5955	4	8
	19	9	6680-01-325-6281	36	4
5310-01-324-8335	27	1	5310-01-325-7141	3	1
5310-01-324-8336	2	6	5365-01-325-7217	49	13
5310-01-324-8343	1	4	5365-01-325-7219	24	10
	13	6	5365-01-325-7220	24	13
	26	11	5305-01-325-8387	56	17
	31	1	5340-01-326-0035	35	19
5305-01-324-8352	4	7	5315-01-326-0083	46	9
5305-01-324-8354	4	6	5310-01-326-1053	56	12
5305-01-324-8355	4	5	5365-01-326-1152	57	5
5305-01-324-8356	59	14	5340-01-326-1256	45	20
5305-01-324-8388	2	20	5340-01-326-2078	11	1
5305-01-324-8389	14	9	7690-01-326-5393	48	11
5340-01-324-8392	1	10	7690-01-326-5394	48	10
5330-01-324-8399	KITS		3110-01-326-5461	24	6
5307-01-324-8407	42	5	5306-01-326-5519	22	9
	46	19	5340-01-326-5620	5	9
5340-01-324-8414	47	9	5305-01-326-5632	5	10
5340-01-324-8427	30	1	5365-01-326-5660	30	15
5360-01-324-8510	56	21	2815-01-326-5977	5	11
2920-01-324-8512	27	2	3020-01-326-6014	24	3
3040-01-324-8554	42	6	5340-01-326-8059	35	22
	46	20	4730-01-326-8076	12	5
2815-01-324-8556	9	18	4810-01-326-9021	3	7
3130-01-324-8895	57	6	2815-01-326-9076	9	14
5930-01-324-8927	59	13	4710-01-326-9210	22	12
5930-01-324-8933	32	8	3120-01-326-9402	7	5
5930-01-324-8942	32	9	2815-01-327-0117	9	13
4710-01-325-0258	2	8	3040-01-327-0187	5	11
4730-01-325-0445	18	4	3040-01-327-0188	5	11
2990-01-325-0716	24	9	3020-01-327-0209	5	12
5305-01-325-2646	24	14	3825-01-327-0530	57	3
5340-01-325-2827	35	22	5330-01-327-2630	18	7
3020-01-325-3038	17	1	5330-01-327-2631	18	7
5330-01-325-5151	42	2	5310-01-327-3340	42	10
	46	16	5365-01-327-3353	22	11
5315-01-325-5456	56	23	5365-01-327-3393	24	5
3110-01-325-5757	8	7	5310-01-327-3418	22	10
	8	20	5310-01-327-3419	21	12
5315-01-325-5779	10	1		22	8
5315-01-325-5782	24	15	5307-01-327-3437	3	9
5315-01-325-5786	2	1	5307-01-327-3438	3	5
	25	36	5307-01-327-3439	3	6
5365-01-325-5876	29	20	5340-01-327-3444	19	12

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STOCK NUMBER	FIG.	ITEM	STOCK NUMBER	FIG.	ITEM
5305-01-327-3448	6	2	5340-01-335-9944	2	18
5340-01-327-3492	59	20	5940-01-336-5780	34	32
5340-01-327-3590	56	4	6680-01-336-7050	13	2
5340-01-327-5561	4	2	2610-01-336-8828	44	1
5310-01-327-8913	6	1	5330-01-339-0180	KITS	
6150-01-327-9402	24	4	3130-01-339-0849	50	4
5340-01-328-2257	55	5	5340-01-339-0873	50	11
7690-01-331-8267	48	9	6105-01-339-1220	50	18
7690-01-331-9013	48	2	3040-01-339-1580	50	8
7690-01-332-1839	48	14	5340-01-339-2129	50	14
5310-01-332-8236	12	3	2940-01-339-3846	53	24
	22	2	4730-01-339-4496	52	10
7690-01-332-8948	48	3	4730-01-339-4524	53	14
5306-01-333-2649	4	3	2520-01-339-6520	50	12
	14	3	4730-01-339-6733	53	22
2815-01-333-2944	14	2	5305-01-339-6960	50	13
2940-01-333-2952	14	5	9330-01-339-8081	BULK	14
5365-01-333-3765	25	13	4710-01-339-8103	22	16
5365-01-333-3823	9	4	4730-01-339-8108	60	21
5340-01-333-3856	25	17	2815-01-339-8323	12	9
5306-01-333-5094	22	14	4820-01-339-8402	12	6
5315-01-333-5119	2	11	2815-01-339-8409	15	1
5340-01-333-5127	2	16	2510-01-339-8413	46	7
5365-01-333-5128	14	7	4710-01-339-8435	53	5
5365-01-333-5129	2	12	4730-01-339-8515	53	27
5360-01-333-5157	25	39	4730-01-339-8517	52	5
5305-01-333-5260	2	14	2530-01-339-8589	51	11
5365-01-333-5286	25	5	3040-01-339-8603	41	6
5305-01-333-5380	29	10	2940-01-339-8611	21	16
5305-01-333-5381	1	5	5430-01-339-8677	60	35
	26	13	3110-01-339-8793	50	6
5340-01-333-5385	1	3	3110-01-339-8794	51	13
5315-01-333-5735	58	11	5315-01-339-8804	51	3
4320-01-333-5914	59	10	5360-01-339-8825	51	14
2990-01-333-6069	25	4	5360-01-339-8826	51	18
2815-01-333-8251	2	10	5360-01-339-8827	51	26
2910-01-333-8271	19	8	5360-01-339-8828	12	7
5310-01-334-0415	25	6	3120-01-339-8891	41	5
5310-01-334-0416	25	6	5340-01-339-8910	37	8
6220-01-334-0613	35	1	5330-01-339-8916	51	27
3040-01-334-2288	25	7	5305-01-339-8924	51	21
3040-01-334-2289	25	15	5340-01-339-8929	15	4
3040-01-334-2290	25	11	5340-01-339-8940	37	7
5306-01-334-2758	2	19	5340-01-339-8956	51	16
5307-01-334-2759	2	15	5340-01-339-8960	47	7
5305-01-334-2761	14	8	5340-01-339-8961	47	10
5305-01-334-2762	25	16	5325-01-339-8989	59	7
5330-01-334-2770	9	10	5340-01-339-9000	26	12
5310-01-334-3502	14	6	5340-01-339-9006	34	31
	22	19	5340-01-339-9007	32	4

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5340-01-339-9010	41	8	5310-01-340-8352	24	16
5340-01-339-9011	41	6		29	3
5340-01-339-9012	47	1	5310-01-340-8371	51	28
3030-01-340-0183	30	16	4730-01-340-8701	53	21
2805-01-340-0201	9	12	6680-01-340-8840	54	.1
4820-01-340-0285	60	22	4730-01-340-8883	53	26
4730-01-340-0303	53	11	4730-01-340-8885	22	7
5340-01-340-0329	28	3	3010-01-341-2459	54	5
3040-01-340-0358	50	10	5305-01-341-2906	4	4
4810-01-340-0375	51	29		25	19
2940-01-340-0444	15	3	5307-01-341-2950	2	17
5340-01-340-0481	41	4	5315-01-341-2956	20	2
4820-01-340-1074	51	8	5305-01-341-2968	12	2
2930-01-340-1450	29	14	5325-01-341-3023	35	17
2815-01-340-1458	47	12	5325-01-341-3024	35	10
2940-01-340-1582	21	15	5340-01-341-3049	41	9
2590-01-340-1606	54	4	5305-01-341-3087	29	17
2590-01-340-1607	25	1	5940-01-341-4709	32	27
2805-01-340-1629	9	16	4320-01-341-5051	KITS	
4730-01-340-1680	60	23	2990-01-341-5119	28	2
5306-01-340-2012	21	10	5940-01-341-5267	32	2
5306-01-340-2013	22	18		39	5
5315-01-340-2021	25	40	4010-01-341-5442	25	3
5365-01-340-2025	51	12	2910-01-341-6173	18	6
5365-01-340-2026	51	15	5365-01-341-8842	KITS	
3120-01-340-2063	2	25	5340-01-341-8869	21	1
5307-01-340-2073	19	4	5306-01-341-8905	37	5
5305-01-340-2076	54	7	5305-01-341-8919	9	3
5365-01-340-2091	59	3		16	3
5365-01-340-2092	32	16		19	10
5340-01-340-2093	2	26	5340-01-342-0233	19	5
5340-01-340-2094	2	21	2990-01-342-0645	28	1
2920-01-340-2367	31	28	5940-01-342-1641	39	10
4010-01-340-4736	BULK	1	5940-01-342-1642	38	4
5330-01-340-4776	KITS		3110-01-342-3049	25	8
3020-01-340-4809	2	27	4820-01-342-3185	51	2
4730-01-340-5597	22	17	5310-01-342-4964	56	20
3110-01-340-8032	50	5	9905-01-342-5306	48	1
5310-01-340-8085	19	6	9905-01-342-5307	48	4
5365-01-340-8121	52	2	9905-01-342-8191	48	13
5330-01-340-8158	4	10	3040-01-342-8732	58	10
5365-01-340-8313	2	24	9905-01-343-1207	48	6
3120-01-340-8324	51	24	6160-01-343-1320	37	4
5310-01-340-8352	5	14	4730-01-343-8719	53	8
	9	5	3040-01-346-6383	58	4
	13	3	6150-01-346-8206	38	3
	15	5	6150-01-347-2512	39	16
	16	2	4330-01-347-2849	21	4
	17	2	4730-01-347-2853	26	7
	20	4	4730-01-347-4139	21	17

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STOCK NUMBER	FIG.	ITEM	STOCK NUMBER	FIG.	ITEM
2920-01-347-6069	30	7	3120-01-357-8019	31	44
2520-01-347-6388	21	18	3120-01-357-8020	31	23
2590-01-347-7451	26	5	5330-01-358-1288	19	7
4320-01-347-8626	59	8	6110-01-358-3505	31	22
5307-01-348-3416	21	2	5330-01-358-3541	8	14
5340-01-348-6116	60	37	5330-01-358-3542	5	5
5340-01-348-6222	47	6	5330-01-358-3543	12	4
5330-01-348-6928	26	6	5330-01-358-3544	19	7
5330-01-348-6929	21	3	5330-01-358-3545	2	23
5340-01-348-7050	26	3	5330-01-358-3546	14	1
5325-01-348-7059	35	3	2530-01-358-7719	43	6
7690-01-349-3926	48	5	2815-01-358-8549	7	4
6150-01-349-5316	39	1	4320-01-358-8565	59	5
6240-01-349-5507	32	3	3040-01-358-8598	45	9
6240-01-349-8489	32	13	5310-01-359-1523	30	9
2815-01-350-1664	8	2	5305-01-360-1959	31	35
2815-01-350-1665	8	15	6105-01-360-5571	59	19
3040-01-350-6348	16	6	6160-01-360-6492	37	1
6220-01-350-7889	35	2	6150-01-361-4810	31	43
5310-01-350-8553	27	4	5305-01-361-7506	31	9
	54	3	5120-01-361-9773	61	1
3010-01-350-9152	16	4	2920-01-362-1812	31	31
3010-01-350-9155	16	5	5999-01-362-3373	31	32
5330-01-351-7597	8	21	6105-01-362-4207	31	13
5330-01-351-7675	28	6	5305-01-363-8836	31	27
5330-01-351-7676	15	2	5305-01-363-9102	31	4
5310-01-351-7802	22	15	5340-01-364-1516	24	7
2510-01-352-2334	47	8	4820-01-364-3406	51	30
2530-01-352-9090	43	1	2815-01-364-3417	9	16
5340-01-353-2677	1	2	5305-01-364-4775	31	29
6150-01-354-4400	38	6	5930-01-364-5374	32	10
6150-01-354-4401	39	6	5920-01-364-9164	32	24
4820-01-354-5223	23	2	6110-01-365-8948	31	3
5340-01-355-0276	55	6	9905-01-366-4743	48	12
5315-01-355-3636	25	2	5977-01-367-1508	31	34
5330-01-355-5154	25	37	5330-01-367-6594	58	8
5340-01-355-5188	9	11			
5330-01-355-6725	4	9			
5330-01-355-6732	2	9			
5330-01-356-7144	60	11			
5330-01-356-7145	60	34			
4730-01-356-8760	60	10			
4730-01-356-8761	60	13			
3040-01-356-9853	16	1			
3040-01-357-3557	31	37			
5330-01-357-3791	2	22			
5310-01-357-4595	31	11			
5340-01-357-6222	60	32			
5330-01-357-6929	19	7			
3120-01-357-8019	31	38			

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		NATIONAL STOCK NUMBER INDEX				
STOCK NUMBER		FIG.	ITEM	STOCK NUMBER	FIG.	ITEM
55524	AB-CAP			5340-01-348-7050	26	3
55524	AB-GASKET			5330-01-348-6928	26	6
55524	AB-NECK			2590-01-347-7451	26	5
55524	AB-1000-3			4130-01-075-5547	26	1
55524	AB-3INCHBASKET			4730-01-347-2853	26	7
71400	ACG-10			5920-01-364-9164	32	24
60827	AE-10			2940-00-755-6584	53	25
60827	AF-10-25-0			2940-01-339-3846	53	24
88044	AN910-2			4730-00-223-9255	53	9
88044	AN933-3			4730-00-702-5694	49	8
76761	A1-103			2920-01-347-6069	30	7
76761	A2-101			6110-01-134-9981	30	4
76761	A3-300			3020-01-045-2627	30	11
76761	A4-510			5310-01-359-1523	30	9
23823	A52AE12			5975-01-123-8811	BULK	2
76761	A9-506			5315-01-136-8328	30	8
4Y310	BCSM6700			3120-01-339-8891	41	5
73124	BF0075PP			5330-01-356-7145	60	34
73124	3F0150PP			5330-01-356-7144	60	11
73124	BF10075SXT			5340-01-357-6222	60	32
73124	BF10125SXT			4730-01-356-8760	60	10
03743	BL50			5975-00-152-1075	34	23
06383	BSV10X-L			5940-01-134-1722	32	22
					35	8
06383	BSV14X-C			5940-01-135-2403	38	7
80204	B1821BH025C100N			5305-00-225-3843	33	17
					59	1
80204	B1821BH025C125N			5305-00-068-0509	56	2
80204	B1821BH031C075N			5306-00-226-4825	45	18
					57	1
80204	B18213H038C100NN			5305-00-068-0513	21	5
					34	7
80204	B1821BH038C125N			5305-00-068-0511	23	3
					35	18
80204	B1821BH050C150N			5305-00-071-2069	35	23
					50	28
					56	10
					59	2
80204	B1821BH050C450N			5305-00-071-2081	60	23
80204	B1821BH063C350N			5305-00-724-7247	1	6
82271	B703			4720-01-272-4672	BULK	3
11341	CA237NBEE0			4820-01-342-3185	51	2
19207	CONDUIT ASSY				33	5
81518	CWC2INDIA			4720-00-730-0116	BULK	3
07860	C21452			2590-00-473-6331	45	4
06383	D-250A-C			5940-01-341-4709	32	27
49367	DB-1478			5975-00-295-9696	34	30
67029	DHA1-216			3040-01-346-6383	58	4
67029	DH14-65				53	9
67029	DH2-218			3040-01-342-8732	58	10
67089	DH24-82			3040-01-323-5943	KITS	

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CAGEC	PART NUMBER	PART NUMBER INDEX		FIG.	ITEM
			STOCK NUMBER		
67089	DH3-145		5330-01-367-6594	58	8
67029	DH5-116			58	7
15526	DIN933-M10X35-8. 8-A4C		5305-01-274-1264	24	1
06383	DNF18-250F1M-C		5940-01-342-1642	38	4
06383	DNF18-250F1B-C		1450-01-204-7742	35	7
06383	DNF18-250M-C		5940-01-342-1641	39	10
06383	DV14-250-C		5940-01-341-5267	32	2
				39	5
56988	097		5360-01-324-8510	56	21
78940	E105B1K01B		2940-01-340-1582	21	15
93908	E9400D		5975-01-145-7210	33	12
78940	F22134		4330-01-347-2849	21	4
78940	F22186K01B		5340-01-341-8869	21	1
82918	F310190-437		4010-00-494-2326	46	4
30327	HA04-04MB		4730-01-049-3251	52	12
30327	HG04-04NJ		4730-00-058-3353	52	14
30327	HL12-12NJ		4730-01-339-8517	52	5
79470	H05704			22	5
				22	13
			4720-01-125-4474	BULK	9
82247	H1/4VVL-8002		4730-01-323-7313	60	39
81349	JAN1N3611		5961-00-957-6865	38	11
30327	J412		4720-00-054-6358	BULK	4
2X179	LEVER			8	10
				8	23
60038	LM11910		3110-00-606-1842	42	7
				46	21
60038	LM11949		3110-00-606-1839	42	8
				46	22
60038	LM67010		3110-00-606-1840	42	4
				46	18
60038	LM67048		3110-00-636-1841	42	3
				46	17
60038	L44649		3110-00-926-1379	43	7
60038	L68111		3110-00-769-1426	43	4
60038	L68149		3110-00-763-0259	43	3
96906	MS-90728-66		5305-00-782-9489	51	31
96906	MS15002-1		4730-00-172-0010	56	19
96906	MS15003-1		4730-00-050-4208	54	6
				57	7
96906	MS16624-1050		5365-00-833-7301	40	11
96906	MS16998-42		5305-00-983-6659	51	23
96906	MS20604B5W8		5320-00-957-2493	47	2
96906	MS20995C20			25	20
			9505-00-221-2650	BULK	18
96906	MS21044-N8		5310-00-877-5795	30	10
				46	14
96906	MS21333-105		5340-00-809-1494	33	1
96906	MS21333-73		5340-00-057-2906	33	13
96906	MS21333-98		5340-00-809-1490	33	18

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CAGEC	PART NUMBER	PART NUMBER INDEX		FIG.	ITEM
			STOCK NUMBER		
96906	MS24665-283		5315-00-842-3044	41	11
96906	MS24665-357		5315-00-298-1481	56	24
96906	MS24665-360		5315-00-298-1499	58	12
96906	MS24665-495		5315-00-234-1664	42	14
				43	13
				45	12
				46	8
				46	11
96906	MS25036-108		5940-00-143-4780	32	18
				34	14
				35	6
				38	5
				38	8
				38	10
				39	13
				39	17
96906	MS25036-112		5940-00-143-4794	39	4
				39	15
96906	MS25036-115		5940-00-143-5284	39	2
				39	12
96906	MS25036-116		5940-00-114-1305	39	9
96906	MS25036-125		5940-00-557-4333	34	5
				39	7
96906	MS25036-153		5940-00-143-4774	39	3
96906	MS25036-154		5940-00-230-0515	39	11
96906	MS25036-156		5940-00-143-4775	38	2
96906	MS25036-157		5940-00-143-4777	34	2
96906	MS27133-10		5310-00-809-4058	32	5
				33	16
				37	3
				47	5
				59	23
96906	MS27183-11		5310-00-809-3078	55	2
96906	MS27183-12		5310-00-081-4219	30	14
				34	26
				41	10
96906	MS27183-13		5310-00-087-749	1	13
				21	6
				34	9
				51	32
				56	16
96906	MS27183-15		5310-00-809-4061	29	19
96906	MS27183-17		5310-00-809-5997	51	25
96906	MS27183-18		5310-00-809-5998	35	4
				49	15
				50	29
				56	6
				60	15
96906	MS27133-23		5310-00-809-8533	42	15
				43	15
				46	13

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CAGEC	PART NUMBER	PART NUMBER INDEX		FIG.	ITEM
			STOCK NUMBER		
96906	MS27133-23		5310-00-809-8533	56	14
96906	MS27183-5		5310-00-983-8483	31	30
96906	MS27183-7		5310-00-809-8544	30	6
96906	MS27183-8		5310-00-809-8546	33	14
96906	MS27183-9		5310-00-823-8804	56	1
96906	MS3367-1-0		5975-00-984-6582	33	4
96906	MS35206-226		5305-00-984-4983	32	25
96906	MS35206-245		5305-00-984-6193	35	15
				48	7
96906	MS35206-263		5305-00-984-6210	33	15
				36	1
96906	MS35206-267		5305-00-984-6214	1	9
96906	MS35206-280		5305-00-988-1724	34	18
96906	MS35207-263		5305-00-989-7434	25	2
				26	4
96906	MS35207-264		5305-00-989-7435	30	5
96906	MS35207-265		5305-00-993-1848	34	11
96906	MS35333-38		5310-00-559-0070	48	8
96906	MS35335-31		5310-00-596-7693	31	8
96906	MS35335-33		5310-30-209-0786	54	2
96906	MS35335-35		5310-30-627-6128	34	8
96906	MS35335-87		5310-00-905-5159	32	19
96906	MS35338-42		5310-00-045-3299	35	16
96906	MS35338-43		5310-00-045-3296	1	11
				34	21
				36	3
96906	MS35338-44		5310-00-582-5965	27	3
				32	6
				33	2
				34	19
				47	4
				60	4
96906	MS35338-45		5310-00-407-9566	29	16
				30	2
				41	2
				45	17
				55	4
				57	2
96906	MS35338-46		5310-00-637-9541	23	4
				35	20
				46	6
96906	MS35338-47		5310-00-209-0965	29	18
96906	MS35338-48		5310-00-584-5272	49	16
				56	27
96906	MS35649-202		5310-00-934-9758	1	12
96906	MS35649-286		5310-00-934-9762	32	20
96906	MS35650-302		5310-00-934-9751	34	16
				36	2
96906	MS35751-130		5306-00-702-4483	56	7
96906	MS35751-183		5306-00-952-0964	56	11
96906	MS35842-11		4730-00-908-3194	53	2

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CAGEC	PART NUMBER	PART NUMBER INDEX		FIG.	ITEM
			STOCK NUMBER		
96906	MS35842-11		4730-00-908-3194	53	19
				60	7
96906	MS39324-12-10		4730-01-096-9138	52	18
96906	MS51527A12		4730-01-011-7736	52	1
96906	MS51922-1		5310-00-088-1251	52	7
				37	2
				47	11
				56	26
				59	21
96906	MS51922-17		5310-00-087-4652	1	15
				21	8
				34	10
				45	7
				51	1
				56	15
96906	MS51922-33		5310-00-225-6993	30	12
				35	5
				50	2
				56	5
				59	22
				60	14
96906	MS51922-49		5310-00-269-4040	1	8
				45	10
96906	MS519Z2-57		5310-00-067-6356	56	13
96906	MS51922-9		5310-00-984-3806	34	25
96906	MS51953-29		4730-00-196-1502	41	7
				60	20
				53	10
				52	8
				60	26
				34	20
				56	28
				32	17
				33	3
				60	3
				40	5
				41	3
				55	3
96906	MS51967-41		5310-00-762-6223	23	5
				35	21
96906	MS51967-5		5310-00-880-7744	37	6
96906	MS51967-8		5310-00-732-0558	49	17
				45	8
				33	19
				30	13
				34	27
				41	1
				55	1
				32	7
				47	3
				56	3
96906	MS52149-1		6140-01-210-1964		
96906	MS90725-109		5305-00-044-4153		
96906	MS90725-168		5305-00-724-5914		
96906	MS90725-3		5305-00-068-0500		
96906	MS90725-34		5306-00-225-8499		
96906	MS90725-6		5305-00-068-0502		

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CAGEC	PART NUMBER	PART NUMBER INDEX		FIG.	ITEM
			STOCK NUMBER		
96906	MS90725-64		5305-01-325-8387	56	17
96906	MS90725-68		5305-00-269-3218	1	14
				45	3
96906	MS9358-17		5310-00-088-6897	42	13
				43	14
				46	12
12128	M647		4030-00-282-4885	45	6
57364	N-200AWHITE.188X 4X400			BULK	13
80205	NAS1042-18		4030-00-542-3184	46	3
80205	NAS1352-4LEBP		5305-00-121-2420	51	6
63050	PE011600		3040-01-339-1580	50	8
63050	PE012001		5365-01-341-8842	KITS	
63050	PE014007		3040-01-340-0353	50	10
63050	PE015006		5340-01-339-0873	50	11
63050	PE016001		5340-01-339-2129	50	14
63050	PE018002		3110-01-339-8793	50	6
63050	PE018003		3110-01-340-8032	50	5
63050	PE018019		5305-01-339-6960	50	13
63050	PE018041		2520-01-339-6520	50	12
63050	PE018059		3120-01-265-2462	50	9
63050	PE130823		3130-01-339-0849	50	4
63050	PE247005		6105-01-339-1220	50	18
63050	PE444002		5330-01-339-0180	KITS	
63050	PE444003		5330-01-340-4776	KITS	
61424	P8MCB-12		4730-01-099-7329	60	6
05779	P8MCB-6		4730-01-324-6572	60	18
63050	RE-1808020		4320-01-323-6028	50	3
63050	RE012001			50	17
63050	RE018001			50	20
63050	RE018005			50	24
63050	RE018006			50	23
63050	RE018030			50	7
63050	RE018048			50	16
63050	RE018138			50	25
63050	RE018153			50	26
63050	RE018163			50	21
63050	RE018170			50	19
63050	RE018187			50	27
63050	RE018977			50	22
67089	RST-150			58	5
63050	RS018013			50	15
7R531	RT56125			60	12
7R531	RT5675			60	33
81343	SAE100R1 TYAT SZ 4		4720-00-460-3915	BULK	7
74545	SHC-1025		5975-01-256-0376	34	24
81992	SHC-1037		5975-01-207-0229	34	28
73842	ST225/75R15		2610-01-336-8828	44	1
17875	T-15R-50		2640-00-555-2841	43	11
27783	TR415		2640-00-555-2841	42	11

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CAGEC	PART NUMBER	PART NUMBER INDEX		FIG.	ITEM
			STOCK NUMBER		
30327	U216-6		4720-01-288-3893	BULK	6
21335	VAS 1 7/16		3130-01-324-8895	57	6
12697	VK100NA-5		5905-01-082-0849	34	13
58961	WG-16-0-12IN			32	26
58961	WG-16-0-6IN			32	1
				35	9
58961	WG-16-0-81N			32	21
53867	0 001 219 010	6110-01-365-8948		31	3
55683	0 331 303 096	5945-01-303-3353		31	5
78940	0A11861	4730-01-347-4139		21	17
78940	0A7419	5330-01-348-6929		21	3
99103	0M-1012	4730-01-324-5074		53	18
2X179	0000-J1G	5340-01-339-9000		26	12
81992	003-22-002	5310-01-113-5659		34	29
81992	003-22-003	5310-01-141-8704		34	22
8H836	009-1	3040-01-324-8554		42	6
				46	20
94189	0101668800	3130-01-070-5629		40	6
92867	01215601	5340-01-341-3049		41	9
98441	0188-12-12	4730-00-965-6538		53	1
0FDH7	02019-001	6105-01-360-5571		59	19
0FDH7	02095-100	5930-01-324-8927		59	13
78940	0629A84	5307-01-348-3416		21	2
78940	0638A1	2520-01-347-6388		21	18
53867	1 000 301 031	3120-01-357-8019		31	38
53867	1 000 505 010	2920-01-340-2367		31	28
53867	1 004 615 001			31	33
53867	1 007 010 040	5365-01-303-2965		KITS	
11341	1A0290	5310-01-154-0713		51	20
11341	1A0291	5310-01-154-0712		51	17
11341	1A0292	5340-01-153-9240		51	19
11341	1A0294	3110-01-160-2471		51	22
11341	1A0332	5360-01-339-8826		51	18
11341	1A0610	5360-01-339-8825		51	14
11341	1A0710	4810-01-340-0375		51	29
11341	1A0739	5360-01-339-8827		51	26
11341	1R0037	4820-01-155-0302		51	10
11341	1V0006	4820-01-340-1074		51	8
11341	1V0046	4820-01-364-3406		51	30
11341	1V0070	5340-01-339-8956		51	16
11341	1V0217	5365-01-340-2026		51	15
11341	1V0269	3120-01-340-8324		51	24
11341	1V0272	5330-01-339-8916		51	27
11341	1V1426	2530-01-339-8589		51	11
11341	1V1702	5315-01-339-8804		51	3
11341	1V1703	3040-01-211-2255		51	5
57648	100-43	4820-01-354-5223		23	2
53867	1000301031	3120-01-357-8019		31	44
55017	100075	5340-01-069-5306		53	4
72423	1001-199	4730-01-339-8515		53	27
55017	100100	5340-01-220-6352		45	19

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CAGEC	PART NUMBER	PART NUMBER INDEX		FIG.	ITEM
			STOCK NUMBER		
55017	100112		5340-01-326-1256	45	20
72423	1003-250		4730-01-340-0303	53	11
53867	100322005		3120-01-357-8020	31	23
66234	101-75791		2540-01-323-6051	55	7
13548	10205R		6220-01-183-4557	35	11
				35	14
72423	1021-150		4730-01-339-6733	53	22
24617	103374		5315-00-816-1794	51	4
13548	10401		5325-01-341-3023	35	17
13548	10403		5325-01-341-3024	35	10
56161	10501759		5305-01-159-0065	24	17
56161	10503657		5305-01-158-0826	19	13
61424	10655-12-12		4730-01-075-1920	52	16
13548	10744R		6220-01-301-5411	35	12
72423	1101-148		4730-01-323-5080	60	25
72423	1101-150		4730-01-323-5079	60	5
0FDH7	11028-101		5340-01-327-3492	59	20
8H836	114-1		5340-01-325-5892	42	9
				46	23
72423	1145-150		4730-01-323-5107	60	1
24617	11500713		5306-01-289-9197	29	15
				30	3
24617	11500723		5305-01-341-3087	29	17
24617	11502892		5305-01-361-7506	31	9
24617	11505913		5310-01-350-8553	27	4
				54	3
2X179	1213.173		5330-01-357-3791	2	22
2X179	1240.016		5365-01-340-8313	2	24
94189	12560		5315-00-550-7397	40	8
2X179	1300.101		3120-01-340-2063	2	25
2X179	1400-077		6680-01-336-7050	13	2
94189	14286		5340-00-253-1910	43	9
33955	1501775		6680-01-325-6281	36	4
20796	15350LA		3030-01-340-0183	30	16
75915	155100		5920-01-156-6878	32	23
94189	15529		5330-01-055-3870	43	2
94189	16622		2530-01-352-9090	43	1
94189	16626		2530-01-358-7719	43	6
94189	16690		2530-01-069-9174	40	3
94189	16691		2530-01-322-0673	40	2
94189	17122		2530-01-324-5178	40	1
09505	1722-95		9330-01-339-8081	BULK	14
10001	1784995		4030-00-684-6346	46	2
33955	1838575		6240-01-349-8489	32	13
2X179	1901.032		5306-01-340-2013	22	18
53867	2 913 051 107		5310-01-357-4595	31	11
53867	2 916 069 084		5310-01-303-2723	31	10
67029	2-221			58	6
11341	2A0017-8		3110-01-339-8794	51	13
11341	2A0379-414		5305-01-339-8924	51	21
11341	2A0079-634		5305-01-323-8924	49	12

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CAGEC	PART NUMBER	PART NUMBER INDEX		FIG.	ITEM
			STOCK NUMBER		
11341	2A0283-7214		5330-01-217-8918	51	9
11341	2A0310-604		5315-01-324-0422	49	6
11341	2A0354-112		5365-01-340-2025	51	12
11341	2A0466-150		5365-01-325-7217	49	13
11341	2A0736-104P		5310-01-340-8371	51	28
8K002	2P130		4730-01-324-6595	60	24
66295	20H		4730-00-278-2523	53	13
76005	200XPD-60		5340-01-324-8392	1	10
0FDH7	20028-008		4820-01-324-5045	59	12
0FDH7	20050-132		4320-01-347-8626	59	8
0FDH7	20131-001		5305-01-324-8356	59	14
0FDH7	20131-002		5305-01-323-5473	59	6
0FDH7	20132-000		5325-01-339-8989	59	7
66234	204-85041			52	13
66234	204-85227			60	19
66234	204-85299			60	8
66234	204-85451			52	6
66234	204-85493			52	17
66234	204-85611			53	3
66234	204-85690			53	20
66234	204-85730			53	16
66234	204-92008			21	7
0FDH7	20428-000	4320-01-323-7481		59	16
01276	2046-4-4S	4730-01-007-7158		52	9
66234	205-74425	4710-01-339-8435		53	5
0FDH7	20500-507	4320-01-324-7898		59	15
66234	206-34005	4730-01-339-4496		52	10
72423	2371-039	4730-01-343-8719		53	8
72423	2071-059	4730-01-340-8885		22	7
72423	2071-098	4730-01-339-8108		60	21
72423	2071-099	4730-01-340-1680		60	23
72423	2071-199	4730-01-340-8883		53	26
72423	2071-249	4730-01-339-4524		53	14
76280	208-72630	6680-01-309-6450		53	6
2X179	2086.084	6150-01-327-9402		24	4
66234	209-92052	2990-01-341-5119		28	2
0FDH7	2100-332	4320-01-358-8565		59	5
0FDH7	21033-002	3040-01-324-1228		59	17
0FDH7	21041-001	4320-01-323-5114		59	11
0FDH7	21131-000	5305-01-323-5474		59	9
0FDH7	21195-003	4320-01-333-5914		59	10
66234	212-91159			53	17
66234	213-91767			52	15
66234	213-91779			52	4
66234	213-91901			52	11
72423	2171-249	4730-01-356-8761		60	13
72423	2173-200	4730-01-324-6492		60	27
66234	221-92018	5430-01-339-8677		60	35
66234	221-92022	5340-01-348-6116		60	37
66234	221-92023			60	36
94189	23319	2530-01-250-1624		40	9

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CAGEC	PART NUMBER	PART NUMBER INDEX		FIG.	ITEM
			STOCK NUMBER		
78940	250B16A		2940-01-339-8611	21	16
22031	2501-4		4730-01-292-4698	52	3
2X179	2529.007		6680-01-340-8840	54	1
01276	2556-12		4720-00-541-8859	BULK	5
2X179	260.4650.037		5330-01-324-8286	18	3
2X179	260.6410.018		2815-01-324-8556	9	18
8H836	262-2		5310-01-327-3340	42	10
8H836	263-2		5307-01-324-8407	42	5
				46	19
2X179	270.9850.002		2815-01-323-6044	9	8
2X179	276.3616.018		5340-01-327-3444	19	12
2X179	276.4580.002		5330-01-358-1288	19	7
2X179	276.4580.009		5330-01-358-3544	19	7
2X179	276.4670.014		5310-01-324-8325	2	13
				8	4
				8	17
				21	13
				36	6
2X179	276.5400.046		5365-01-324-3425	19	11
2X179	276.8335.084		5365-01-333-3323	9	4
2X179	276.8460.055		5315-01-325-5786	2	1
				25	36
2X179	276.9032.019		5340-01-326-2078	11	1
2X179	2760.2750.111		5930-01-324-8942	32	9
2X179	2760.4240.028		3010-01-350-9152	16	4
2X179	2760.9180.042		4730-01-323-5042	25	21
66295	28KS3		5340-01-135-1030	21	9
2X179	2830.2175.045		2910-01-324-6899	26	9
2X179	2830.3730.036		2910-01-324-6898	26	8
2X179	2830.8061.372		3010-01-350-9155	16	5
96652	29-10		5365-01-154-8557	45	14
84093	3-16WHITE			BULK	11
13445	30055-20		5925-01-222-3650	34	17
13445	30090-3		5925-01-222-0059	34	15
2X179	3240.018		5310-01-324-8246	15	6
				16	7
				19	3
39428	3559T47		4030-01-146-6160	BULK	12
2X179	360.1901.039		5306-01-340-2012	21	10
2X179	360.4601.042		5330-01-358-3546	14	1
2X179	360.4701.041			2	2
2X179	360.4701.058		5330-01-358-3542	5	5
2X179	360.4701.059			5	5
2X179	360.4776.089		5330-01-323-2758	4	1
2X179	360.4776.090		5330-01-323-2757	29	4
2X179	360.4936.035		3020-01-327-0209	5	12
2X179	360.5055.026		5340-01-327-5561	4	2
2X179	360.6927.056		2815-01-323-5968	29	13
2X179	360.7626.033		5310-01-327-3913	6	1
2X179	360.8676.055		3040-01-323-5936	5	2
2X179	360.9000.072		5340-01-333-5127	2	16

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CAGEC	PART NUMBER	PART NUMBER INDEX		FIG.	ITEM
			STOCK NUMBER		
2X179	3600.6645.113		2815-01-333-2944	14	2
2X179	3600.3061.096		3040-01-356-9853	16	1
2X179	3600.8836.084		3040-01-350-6348	16	6
2X179	3600.8888.529		4320-01-341-5051	KITS	
39428	3603T17			26	2
7J925	370-74138-05		5306-01-324-4962	60	38
39428	3705T101		5340-01-339-8940	37	7
66234	372-92034		5310-01-342-4964	56	20
66234	383-72815		5315-01-326-0083	46	9
66234	383-92044		5315-01-333-5735	58	11
66234	393-92045		5315-01-324-1750	58	1
66234	383-92046		5315-01-325-5456	56	23
66234	337-91668		4030-00-243-4439	46	5
66234	387-92022		5340-01-339-9012	47	1
66234	390-65607		7690-01-326-5393	43	11
66234	390-65608		7690-01-326-5394	48	10
66234	390-65617		7690-01-331-9013	48	2
66234	390-65643		7690-01-332-1839	48	14
66234	390-72016		7690-01-331-8267	48	9
66234	390-76001		7690-01-349-3926	48	5
66234	390-92026		7690-01-332-8948	48	3
66234	390-92041		9905-01-366-4743	48	12
66234	390-92042		9905-01-342-5306	48	1
66234	390-92043		9905-01-342-5307	48	4
66234	390-92044		9905-01-343-1207	48	6
66234	390-92045		9905-01-342-8191	48	13
2X179	395.4730.089			2	3
2X179	395.4730.090			2	3
2X179	395.4730.091			2	3
2X179	395.4730.092			2	3
2X179	395.4730.185			2	3
2X179	395.4730.186			2	3
2X179	395.4730.187			2	3
2X179	395.4730.188			2	3
2X179	395.4730.189			2	3
2X179	395.4730.190			2	3
2X179	395.5200.250		3040-01-334-2288	25	7
2Xi79	395.5200o271		3040-01-334-2289	25	15
2X179	395.5755.065		5360-01-323-8831	9	17
ZX179	395.6531.104		2910-01-341-6173	18	6
2X179	395.6615.045			13	5
2X179	395.8180.062		5330-01-324-8399	KITS	
2X179	395.8211.071		2915-01-324-1147	7	4
2X179	395.8211.073		2815-01-324-5084	7	4
2X179	395.8676.090		3130-01-323-2886	5	6
2X179	395.8785.070		5340-01-333-3856	25	17
11341	4P0003-002		4320-01-323-5157	49	11
11341	4P0004-002		4320-01-323-5149	49	2
11341	4P0007-007		4320-01-323-7364	49	7
11341	4P0011-008		3040-01-324-1276	49	10
11341	4P0012-008		3040-01-324-1275	49	9

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CAGEC	PART NUMBER	PART NUMBER INDEX		FIG.	ITEM
			STOCK NUMBER		
11341	4P0013-001		4320-01-323-5128	49	3
11341	4P0017-001		5330-01-323-1574	KITS	
11341	4Z4306		3040-01-170-9751	51	7
11341	40P007RAASA		4320-01-324-5113	49	1
66234	400-65650		5315-01-324-6779	45	11
66234	400-72806		5365-01-340-8121	52	2
14889	401-005		4730-00-476-5865	33	7
66234	401-94117		5340-01-326-0035	35	19
66234	401-94118		5340-01-324-6798	56	29
66234	401-94230		2520-01-323-5940	56	30
66234	401-94231		2520-01-323-5941	56	30
66234	401-94232		5365-01-326-1152	57	5
66234	401-94233		5310-01-326-1053	56	12
66234	401-94240		3020-01-323-5998	56	9
66234	401-94241		4710-01-323-8541	60	2
66234	401-94242		5340-01-328-2257	55	5
66234	401-94251		5306-01-323-5539	60	17
66234	401-94252		5340-01-324-4262	60	16
66234	401-94253		5340-01-324-6794	60	9
66234	401-94254		5340-01-324-6799	59	4
66234	401-94280		5340-01-324-6754	56	8
66234	401-94292		5340-01-355-0276	55	6
66234	401-94303		6160-01-360-6492	37	1
66234	401-94419		5365-01-326-5660	30	15
66234	401-94420		4710-01-324-6528	1	16
66234	401-94431		5975-01-324-7837	34	12
66234	401-94438		5340-01-326-8059	35	22
66234	401-94439		5340-01-325-2827	35	22
66234	401-94499		5340-01-339-9006	34	31
66234	401-94504		5340-01-339-9010	41	8
66234	401-94506		2930-01-340-1450	29	14
66234	401-94732		4010-01-341-5442	25	3
66234	401-94733		2590-01-340-1607	25	1
66234	401-94756		5306-01-341-8905	37	5
66234	401-94773		6160-01-343-1320	37	4
66234	401-94816		5340-01-340-0481	41	4
66234	402-92006		5340-01-348-6222	47	6
66234	402-92008		5365-01-340-2092	32	16
66234	402-92109			33	6
66234	402-92110			33	10
66234	402-92111			33	8
66234	402-92239		5365-01-340-2091	59	3
66234	402-92326		2815-01-340-1458	47	12
14007	406-005E		4730-00-476-7135	33	9
66234	410-92613		2510-01-324-1216	45	1
66234	410-92655		5340-01-324-6784	56	22
66234	410-92657		5340-01-324-4260	56	18
66234	410-92658		5340-01-324-4496	50	1
66234	410-92661		5340-01-324-6783	60	30
66234	410-92662		3825-01-324-2743	57	4
66234	410-92663		5340-01-327-3590	56	4

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CAGEC	PART NUMBER	PART NUMBER INDEX		FIG.	ITEM
			STOCK NUMBER		
66234	410-92664		2510-01-324-1218	56	25
66234	410-92666		2540-01-323-6045	46	10
66234	410-92667		2510-01-339-8413	46	7
66234	410-92668		5315-01-324-1748	45	16
66234	410-92669		2510-01-324-1217	45	15
66234	410-92672		3040-01-358-8598	45	9
66234	410-92704		2510-01-323-8677	1	7
66234	410-92705		5340-01-324-8427	30	1
66234	410-92713		2910-01-324-1304	23	1
66234	410-92718		5340-01-324-8414	47	9
66234	410-92727		2510-01-352-2334	47	8
66234	410-92827		3040-01-339-8603	41	6
66234	410-92834		5340-01-339-9011	41	6
66234	410-92916		5340-01-339-9007	32	4
66234	410-93039		5340-01-339-8960	47	7
66234	410-93040		5340-01-339-8961	47	10
2X179	435.1011.110		2815-01-324-5147	10	4
2X179	435.1050.284		2815-01-323-5992	5	16
2X179	435.1410.088		2815-01-323-6043	10	3
2X179	435.1510.222		2815-01-333-8251	2	10
2X179	435.1526.098		2815-01-324-5192	7	6
2X179	435.1630.018		3120-01-324-8319	7	8
2X179	435.1640.082		3120-01-326-9402	7	5
2X179	435.1640.083		3120-01-323-2785	7	5
2X179	435.1640.084		3120-01-323-5480	7	5
2X179	435.2330.214		2815-01-324-5148	2	4
2X179	435.2569.203		2805-01-324-1211	29	12
2X179	435.2615.075		5340-01-325-5955	4	8
2X179	435.2816.052			6	4
2X179	435.2920.104		2510-01-323-7322	29	1
2X179	435.3350.094		2815-01-323-5942	29	8
2X179	435.5066.070		2510-01-323-5966	29	6
2X179	435.5066.074		2930-01-323-5959	29	9
2X179	435.6500.315			7	1
2X179	435.6500.316		2815-01-323-6038	7	1
2X179	435.6500.317		2815-01-324-1332	7	1
2X179	435.6590.076		2910-01-333-8271	19	8
2X179	435.6850.124		5306-01-334-2758	2	19
2X179	435.7362.186		3020-01-326-6014	24	3
2X179	435.8150.017		2815-01-324-2149	KITS	
2X179	435.8211.089		2815-31-358-8549	7	4
2X179	435.8480.050		2815-01-324-1151	7	2
				7	2
				7	2
2X179	435.8900.291		3040-01-323-5994	4	11
2X179	435.9200.243		2815-01-323-5993	3	4
2X179	435.9375.279		4730-01-323-8614	19	2
2X179	435.9375.280		2910-01-323-7057	19	1
2X179	435.9455.074		4710-01-324-6529	13	1
2X179	435.9520.055		4710-01-325-0258	2	8
2X179	435.9652.061		2815-01-326-9076	9	14

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CAGEC	PART NUMBER	PART NUMBER INDEX		FIG.	ITEM
			STOCK NUMBER		
2X179	435.9685.067		2815-01-327-0117	9	13
2X179	435.9880.639		2815-01-324-5149	6	3
22031	4404-16			53	15
93334	444654		4730-00-414-5962	58	2
14889	447-005		4730-00-938-7849	33	11
22031	4501-4		4730-01-102-6544	22	6
S3465	4537769-635		3010-01-302-6310	31	41
S3465	4537769-643		2920-01-302-6304	31	21
22031	4601-16-NWO		4730-01-178-9654	53	12
2X179	4670.016		5310-01-334-3502	14	6
				22	19
2X179	4845-181		2805-01-340-1629	9	16
66234	488-49720			60	29
66234	488-72394			60	31
39428	4887K33		4820-01-340-0285	60	22
2X179	4936.077		3020-01-340-4809	2	27
11341	5A0048			49	5
11341	5A0050			49	14
11341	5A0078			49	4
2X179	500.2135.072		5340-01-355-5188	9	11
2X179	500.3790.042		5340-01-324-0963	18	2
2X179	500.5755.049		5360-01-339-8828	12	7
2X179	500.7301.006		4730-01-325-0445	18	4
2X179	500.9070.012		2815-01-339-8323	12	9
66234	500-92018		2815-01-323-7633	1	1
2X179	5041-020		5930-01-364-5374	32	10
94189	5081		5306-01-055-6876	43	5
94189	5082		5310-00-119-2090	43	10
13548	50820		5940-01-336-5780	34	32
66234	509-90329			45	5
66234	509-92004			45	13
66234	509-92013			46	1
2X179	5175-119		6240-01-349-5507	32	3
2X179	5200-300		2990-01-325-0716	24	9
22031	5404-16-12		4730-00-239-2803	53	23
2X179	5460.256		2990-01-323-6030	28	7
2X179	560.1160.022		5365-01-327-3393	24	5
2X179	560.1350.011		5330-01-334-2770	9	10
2X179	560.1611.053		3130-01-323-2888	5	4
2X179	560.1611.054		3130-01-323-2887	5	4
2X179	560.1611.055		3120-01-323-5481	5	4
2X179	560.1862.057		5305-01-326-5632	5	10
2X179	560.2125.093		5340-01-324-0962	8	3
2X179	560.2125.094		5340-01-324-0961	8	16
2X179	560.2125.100		2815-01-350-1664	8	2
2X179	560.2125.101		2815-01-350-1665	8	15
2X179	560.2145.013		2940-01-340-0444	15	3
2X179	560.2516.061		2990-01-323-9508	25	23
2X179	560.2690.121			25	30
2X179	560.3240.131		5310-01-340-8085	19	6
2X179	560.3300.100		5310-01-324-8245	3	3

CROSS-REFERENCE INDEXES

CAGEC	PART NUMBER	PART NUMBER INDEX		FIG.	ITEM
			STOCK NUMBER		
2X179	560.3521.038		5365-01-324-4872	25	18
2X179	560.4330.037		2815-01-323-5995	9	1
2X179	560.4400.022		5330-01-358-3541	8	14
2X179	560.4420.019		5330-01-351-7675	28	6
2X179	560.4420.020		5330-01-351-7676	15	2
2X179	560.4501.022		5330-01-358-3543	12	4
2X179	560.4580.047		5330-01-236-0495	20	1
2X179	560.4776.083		5330-01-355-5154	25	37
2X179	560.4776.087		5330-01-358-3545	2	23
2X179	560.4845.182		2815-01-364-3417	9	16
2X179	560.4936.009		3020-01-323-6006	13	7
2X179	560.5090.010		2940-01-333-2952	14	5
2X179	560.5111.069		5340-01-326-5620	5	9
2X179	560.5168.041		5340-01-342-0233	19	5
2X179	560.5200.108			25	31
2X179	560.5200.154			25	27
2X179	560.5200.194			25	24
2X179	560.5200.200		3040-01-334-2290	25	11
2X179	560.5200.265		2990-01-333-6069	25	4
2X179	560.5655.076		5360-01-323-8844	25	38
2X179	560.5680.077			25	26
2X179	560.5801.088		5360-01-333-5157	25	39
2X179	560.6040.015		5315-01-340-2021	25	40
2X179	560.6045.040		5315-01-323-8824	9	7
2X179	560.6080.022		5315-01-325-5782	24	15
2X179	560.6095.010		5315-01-324-0423	8	9
				8	22
2X179	560.6140.100		5315-01-355-3636	25	12
2X179	560.6372.098		5365-01-324-4919	9	6
2X179	560.6429.033		5340-01-333-5385	1	3
2X179	560.6605.037		2805-31-323-4357	13	9
2X179	560.7200.078		5315-01-341-2956	20	2
2X179	560.8000.065		4810-01-323-5044	3	8
2X179	560.8000.066		4810-01-326-9021	3	7
2X179	560.8676.061		3040-01-327-0187	5	11
2X179	560.8676.070		3040-01-327-0188	5	11
2X179	560.8676.071		2815-01-326-5977	5	11
2X179	560.8785.069		5340-01-364-1516	24	7
2X179	560.9050.041		2910-01-324-6897	21	14
2X179	560.9375.351		4710-01-326-9210	22	12
2X179	560.9400.054		4710-01-324-6530	21	11
2X179	560.9455.053		4710-01-323-8546	9	9
2X179	560.9571.077		4710-01-323-8545	22	1
2X179	560.9680.013		4820-01-339-8402	12	6
2X179	560.9320.085		5305-01-323-8926	8	13
				8	26
2X179	5600.2486.068		2815-01-339-8409	15	1
2X179	5600.3902.052		4730-01-326-8076	12	5
90005	569020-02		4310-01-094-0791	53	7
79550	57200		6145-00-468-1261	BULK	17
70184	6-40301		6220-01-350-7889	35	2

CROSS-REFERENCE INDEXES

CAGEC	PART NUMBER	PART NUMBER INDEX		FIG.	ITEM
			STOCK NUMBER		
79550	61		5940-00-434-6062	39	8
00779	61198-1		5940-00-432-2660	39	14
33955	6219371		5905-01-291-4426	32	14
2X179	625.4740.029			2	5
			5330-01-355-6732	2	9
2X179	625.5801.153		5360-01-324-8264	2	7
2X179	625.7625.108		5310-01-324-8336	2	6
2X179	62914845.184		2815-01-323-6039	9	12
2X179	629.4845.185		2805-01-340-0201	9	12
22031	6401-12-0		4730-01-340-8701	53	21
2X179	6585.030		4320-01-317-8940	20	3
12128	671442		4010-01-340-4736	BULK	1
2X179	672.4580.068		5330-01-357-6929	19	7
2X179	6780.085		5307-01-324-0945	28	5
8H836	700-1		5360-01-268-2610	42	1
				46	15
66234	700-92009		6150-01-361-4810	31	43
66234	700-92010			31	6
66234	700-92011			31	7
66234	700-92019			31	12
66234	700-92020			31	42
66234	700-92023			31	17
66234	700-92024			31	18
66234	700-92029			31	20
66234	700-92034			31	24
66234	700-92035			31	25
66234	700-92036			31	26
66234	700-92047			31	36
66234	700-92048			31	16
66234	700-92049			31	15
66234	700-92050			31	14
66234	700-92051		3040-01-357-3557	31	37
66234	700-92053			31	39
66234	700-92054			31	40
66234	701-68471		6220-01-334-0613	35	1
94189	7029		5365-01-070-2350	40	4
70842	703-1500		2990-01-342-0645	28	1
66234	703-92065			38	1
66234	703-92096			34	6
66234	703-92097			34	4
66234	703-92127		6150-01-346-8206	38	3
66234	703-92128		6150-01-354-4400	38	6
66234	703-92129		6150-01-347-2512	39	16
66234	703-92130		6150-01-349-5316	39	1
66234	703-92131		6150-01-354-4401	39	6
66234	703-92132			34	3
66234	703-92133			34	1
66234	703-92152			38	9
70842	705-1171		4730-00-871-6729	22	4
2X179	7051-060		3020-01-325-3038	17	1
2X179	710.3430.067		2815-01-324-0765	9	15

CROSS-REFERENCE INDEXES

CAGEC	PART NUMBER	PART NUMBER INDEX		FIG.	ITEM
			STOCK NUMBER		
67029	72276		3040-00-570-6161	58	3
2X179	7270.104		4730-01-340-5597	22	17
70842	728197		5340-01-339-8910	37	8
70842	732-1026		5340-01-340-0329	28	3
16428	736102		6145-01-229-3621	BULK	16
2X179	7475018		3010-01-341-2459	54	5
81640	7500K14		5930-00-359-5500	32	11
82654	75000317		2510-01-176-1177	BULK	10
2X179	7535.1460.009		5120-01-361-9773	61	1
2X179	7555.004		5310-01-247-2425	25	10
				29	11
2X179	7565.004		5310-01-324-8327	14	4
94189	8019		3110-00-926-1379	43	8
8H836	806-1		5330-01-325-5151	42	2
				46	16
13445	81264		2530-01-061-1351	32	12
19207	8690528		5340-00-186-5085	45	2
94189	8780		2530-01-069-4213	40	10
2X179	8780.015		5340-01-340-2093	2	26
94189	8785		5360-00-553-2039	40	12
94189	8798		5306-01-071-1309	40	7
70184	88-40700		5325-01-348-7059	35	3
2X179	8903.050		5340-01-340-2094	2	21
53867	9 001 140 371		5305-01-360-1959	31	35
53867	9 001 140 383		5999-01-362-3373	31	32
53867	9 001 333 409		5305-01-363-9102	31	4
53867	9 001 333 411		5305-01-363-8836	31	27
53867	9 001 333 417		5305-01-364-4775	31	29
53867	9 001 337 056		6105-01-362-4207	31	13
53867	9 002 338 850			31	19
53867	9 003 334 157		2920-01-362-1812	31	31
53867	9 003 337 001		5977-01-367-1508	31	34
2X179	9.1200.015		5330-01-323-5455	11	2
20072	9.1200.034		5330-01-247-2403	8	8
			5330-01-351-7597	8	21
				25	25
2X179	9.1200.174		5330-01-355-6725	4	9
2X179	9.1210.079		5330-01-323-2834	5	7
2X179	9.1212.006		5330-01-340-8158	4	10
2X179	9.1240.001		5365-01-333-5286	25	5
2X179	9.1240.005		5365-01-325-7219	24	10
2X179	9.1240.017		5365-01-324-2562	7	3
				7	3
				7	3
2X179	9.1240.077		5365-01-325-7220	24	13
2X179	9.1241.009		5365-01-333-3765	25	13
2X179	9.1585.025		3120-01-324-8320	24	8
2X179	9.1760.001		5306-01-333-2649	4	3
				14	3
2X179	9.1760.003		5305-01-333-5380	29	10
2X179	9.1760.041			25	28

CROSS-REFERENCE INDEXES

CAGEC	PART NUMBER	PART NUMBER INDEX		FIG.	ITEM
			STOCK NUMBER		
2X179	9.1770.002		5305-01-324-0950	29	2
2X179	9.1770.005		5305-01-324-0949	5	15
2X179	9.1770.009		5305-01-324-0951	13	4
				17	3
2X179	9.1770.039		5305-01-324-8389	14	9
2X179	9.1770.042		5305-01-341-2968	12	2
2X179	9.1770.101		5305-01-325-5918	7	7
2X179	9.1780.007		5305-01-333-5381	1	5
				26	13
2X179	9.1305.025		5305-01-327-3448	6	2
2X179	9.1901.029		5306-01-323-8814	22	3
2X179	9.1901.030		5306-01-333-5094	22	14
2X179	9.1901.031		5306-01-326-5519	22	9
2X179	9.2200.001		5315-01-324-3993	13	8
2X179	9.2280.047		5315-01-325-5779	10	1
2X179	9.2280.056		5315-01-323-8820	5	17
2X179	9.3000.004		3110-01-342-3049	25	8
2X179	9.3110.058		3110-01-326-5461	24	6
2X179	9.3203.047		5310-01-324-8239	5	8
				20	5
				25	32
2X179	9.3240.008		5310-01-324-8238	18	1
				25	9
				25	29
2X179	9.3240.010		5310-01-324-8237	9	2
2X179	9.3240.019		5310-01-324-8242	25	22
				28	4
2X179	9.3240.032		5310-01-325-7141	3	1
2X179	9.3240.036		5310-01-324-8240	13	5
2C072	9.3240.066		5310-01-247-2452	26	10
2X179	9.3630.023		5340-01-339-8929	15	4
2X179	9.3630.050		5340-01-325-5916	22	20
2C072	9.4670.021		5330-01-247-2409	12	8
2X179	9.4670.026		5310-01-324-8335	27	1
2X179	9.4670.058		5310-01-332-8236	12	3
				22	2
2X179	9.4670.059		5310-01-351-7802	22	15
2X179	9.4670.060		5310-01-327-3419	21	12
				22	8
2X179	9.4670.064		5330-01-327-2630	18	7
2X179	9.4670.065		5330-01-327-2631	18	7
2X179	9.4775.196		5310-01-327-3418	22	10
2X179	9.6000.021		5310-01-324-8243	25	34
2X179	9.6760.045		5307-01-327-3437	3	9
2X179	9.6780.005		5307-01-334-2759	2	15
2X179	9.6780.008		5307-01-341-2950	2	17
2X179	9.6780.030		5307-01-327-3438	3	5
2X179	9.6780.084		5307-01-327-3439	3	6
2X179	9.6780.089		5307-01-340-2073	19	4
2X179	9.7565.007		5310-01-340-8352	5	14
				9	5

CROSS-REFERENCE INDEXES

CAGEC	PART NUMBER	PART NUMBER INDEX		FIG.	ITEM
			STOCK NUMBER		
2X179	9.7565.007		5310-01-340-8352	13	3
				15	5
				16	2
				17	2
				20	4
				24	16
				29	3
2X179	9.7565.011		5310-01-324-834	31	4
				13	6
				26	11
				31	1
2X179	9.7625.007		5310-01-324-8333	24	12
2X179	9.7625.010		5310-01-324-8334	5	13
				14	10
				19	9
2C072	9.7625.012			25	14
2X179	9.7625.067		5310-01-324-8326	3	2
2X179	9.7625.103		5310-01-334-0415	25	6
2X179	9.7625.104		5310-01-334-0416	25	6
2X179	9.7626.038		5310-01-324-8331	24	2
2X179	9.7626.040		5310-01-324-8332	24	11
2X179	9.8245.005		3110-01-325-5757	8	7
				8	20
2X179	9.8400.048		5315-01-333-5119	2	11
2X179	9.8430.004		5315-01-323-8822	8	12
				8	25
2X179	9.8430.005		5315-01-323-8821	8	11
				8	24
2X179	9.8430.065		5340-01-325-5943	2	28
2X179	9.8965.003		5365-01-333-5129	2	12
2X179	9.8965.005		5365-01-333-5128	14	7
2X179	9.9000.064		5340-01-324-0904	8	5
				8	18
2X179	9.9080.037		5365-01-327-3353	22	11
2X179	9.9080.083		5340-01-335-9944	2	18
2X179	9.9730.012		5305-01-323-8930	12	10
2X179	9.9730.032		5305-01-324-8388	2	20
2X179	9.9730.034		5305-01-324-8354	4	6
2X179	9.9730.035		5305-01-324-8352	4	7
2X179	9.9730.045		5305-01-323-8929	31	2
2X179	9.9730.100		5305-01-341-8919	9	3
				16	3
				19	10
2X179	9.9730.107		5305-01-325-2646	24	14
2X179	9.9731.092		5305-01-323-8927	29	7
2X179	9.9732.063		5305-01-341-2906	4	4
				25	19
2X179	9.9732.074		5305-01-324-8355	4	5
2X179	9.9732.075		5305-01-323-8925	5	3
				8	1
2X179	9.9732.078		5305-01-323-8931	25	35

CROSS-REFERENCE INDEXES

CAGEC	PART NUMBER	PART NUMBER INDEX		FIG.	ITEM
			STOCK NUMBER		
2X179	9.9732.092		5305-01-334-2762	25	16
2X179	9.9765.108		5305-01-334-2761	14	8
2X179	9.9765.111		5305-01-333-5260	2	14
2X179	9.9790.023		5305-01-323-8932	25	33
2X179	9.9790.039		5305-01-323-8928	29	5
53867	9001 140 349		6110-01-358-3505	31	22
8H836	902-1		2530-01-323-6048	42	12
				43	12
2X179	904.1610.082		3130-01-323-2885	5	1
2X179	904.1610.098		3130-01-323-5516	5	1
2X179	904.1610.099		3130-01-323-5517	5	1
2X179	904.2175.040		2940-01-324-5153	12	1
2X179	904.3527.018		5365-01-325-5876	29	20
2X179	904.7215.043		2815-01-324-6906	10	2
2X179	904.8506.003		5340-01-353-2677	1	2
2X179	9040.2100.026		2920-01-324-8512	27	2
2X179	9040.5780.011		5360-01-323-8830	8	6
				8	19
2X179	9040.6745.031			36	7
2X179	9040.7195.056		5930-01-324-8933	32	8
66234	907-46665		3825-01-327-0530	57	3
0FDH7	91008-000		5305-01-323-5477	59	18
33955	9154571		6625-01-297-2005	32	15
2X179	9282.003		2590-01-340-1606	54	4
2X179	9375.022		4710-01-339-8103	22	16
13548	93906		5995-01-096-0733	35	13
16764	9508		6145-00-471-0428	BULK	15
33955	9610070		5330-01-290-2621	36	5
2X179	9730.004		5305-01-340-2076	54	7

CROSS REFERENCE INDEXES

FIG.	ITEM	FIGURE AND ITEM NUMBER INDEX STOCK NUMBER	CAGEC	PART NUMBER
BULK	1	4010-01-340-4736	12128	671442
BULK	2	5975-01-123-8811	23823	A52AE12
BULK	3	4720-00-730-0116	81518	CWC2INDIA
BULK	4	4720-00-054-6358	30327	J412
BULK	5	4720-00-541-8859	01276	2556-12
BULK	6	4720-01-288-3893	30327	U216-6
BULK	7	4720-00-460-3915	81343	SAE100R1 TYAT SZ 4
BULK	8	4720-01-272-4672	82271	8708
BULK	9	4720-01-125-4474	79470	H05704
BULK	10	2510-01-176-1177	82654	75000317
BULK	11		84093	3-16WHITE
BULK	12	4030-01-146-6160	39428	3559T47
BULK	13		57364	N-200AWHITE.188X 4X400
BULK	14	9330-01-339-8081	09505	1722-95
BULK	15	6145-00-471-0428	16764	9508
BULK	16	6145-01-229-3621	16428	736132
BULK	17	6145-00-468-1261	79550	57200
BULK	18	9505-00-221-2650	96906	MS20995C20
KITS		2815-01-324-2149	2X179	435.8150.017
KITS		3040-01-323-5943	67089	DH24-82
KITS		4320-01-341-5051	2X179	3600.8888.529
KITS		5330-01-323-1574	11341	4P0017-001
KITS		5330-01-324-8399	2X179	395.8180.062
KITS		5330-01-339-0180	63050	PE444002
KITS		5330-01-340-4776	63050	PE444003
KITS		5365-01-303-2965	53867	1 007 010 040
KITS		5365-01-341-8842	63050	PE012001
1	1	2815-01-323-7633	66234	500-92018
1	2	5340-01-353-2677	2X179	904.8506.003
1	3	5340-01-333-5385	2X179	560.6429.033
1	4	5310-01-324-8343	2X179	9.7565.011
1	5	5305-01-333-5381	2X179	9.1780.007
1	6	5305-00-724-7247	80204	818218H063C350N
1	7	2510-01-323-8677	66234	410-92704
1	8	5310-00-269-4040	96906	MS51922-49
1	9	5305-00-984-6214	96906	MS35206-267
1	10	5340-01-324-8392	76005	Z00XP0-60
1	11	5310-00-045-3296	96906	MS35338-43
1	12	5310-00-934-9758	96906	MS35649-202
1	13	5310-00-087-7493	96906	MS27183-13
1	14	5305-00-269-3218	96906	MS90725-68
1	15	5310-00-087-4652	96906	MS51922-17
1	16	4710-01-324-6523	66234	401-94420
2	1	5315-01-325-5786	2X179	276.8460.055
2	2		2X179	36304701.041
2	3		2X179	395.4730.089
2	3		2X179	395.4730.090
2	3		2X179	395.4730.091
2	3		2X179	395.4730.092

CROSS REFERENCE INDEXES

FIG.	ITEM	FIGURE AND ITEM NUMBER INDEX STOCK NUMBER	CAGEC	PART NUMBER
2	3		2X179	395.4730.185
2	3		2X179	395.4730.186
2	3		2X179	395.4730.187
2	3		2X179	395.4730.188
2	3		2X179	395.4730.189
2	3		2X179	395.4730.190
2	4	2815-01-324-5143	2X179	435.2380.214
2	5		2X179	625.4740.029
2	6	5310-01-324-8336	2X179	625.7625.108
2	7	5360-01-324-8264	2X179	625.5801.153
2	8	4710-01-325-0258	2X179	435.9520.055
2	9	5330-01-355-6732	2X179	625.4740.029
2	10	2815-01-333-8251	2X179	435.1510.222
2	11	5315-01-333-5119	2X179	9.8400.048
2	12	5365-01-333-5129	2X179	9.8965.003
2	13	5310-01-324-8325	2X179	276.4670.014
2	14	5305-01-333-5260	2X179	9.9765.111
2	15	5307-01-334-2759	2X179	9.6780.005
2	16	5340-01-333-5127	2X179	360.9000.072
2	17	5307-01-341-2950	2X179	9.6780.008
2	18	5340-01-335-9944	2X179	9.9080o083
2	19	5306-01-334-2758	2X179	435.6850.124
2	20	5305-01-324-8388	2X179	9.9730.032
2	21	5340-01-340-2094	2X179	8903.050
2	22	5330-01-357-3791	2X179	1213.173
2	23	5330-01-358-3545	2X179	560.4776.087
2	24	5365-01-340-8313	2X179	1240.016
2	25	3120-01-340-2063	2X179	1300.101
2	26	5340-01-340-2093	2X179	8780.015
2	27	3020-01-340-4809	2X179	4936.077
2	28	5340-01-325-5943	2X179	9.8430.065
3	1	5310-01-325-7141	2X179	9.3240.032
3	2	5310-01-324-8326	2X179	9.7625.067
3	3	5310-01-324-8245	2X179	560.3300.100
3	4	2815-01-323-5993	2X179	435.9200.243
3	5	5307-01-327-3438	2X179	9.6780.030
3	6	5307-01-327-3439	2X179	9.6780.084
3	7	4810-01-326-9021	2X179	560.8000.066
3	8	4810-01-323-5044	2X179	560.8000.065
3	9	5307-01-327-3437	2X179	9.6760.045
4	1	5330-01-323-2758	2X179	360.4776.089
4	2	5340-01-327-5561	2X179	360.5055.026
4	3	5306-01-333-2649	2X179	9.1760.001
4	4	5305-01-341-2906	2X179	9.9732.063
4	5	5305-01-324-8355	2X179	9.9732.074
4	6	5305-01-324-8354	2X179	9.9730.034
4	7	5305-01-324-8352	2X179	9.9730.035
4	8	5340-01-325-5955	2X179	435.2615.075
4	9	5330-01-355-6725	2X179	9.1200.174
4	10	5330-01-340-8158	2X179	9.1212.006
4	11	3040-01-323-5994	2X179	435.8900.291

CROSS REFERENCE INDEXES

FIG.	ITEM	FIGURE AND ITEM NUMBER INDEX STOCK NUMBER	CAGEC	PART NUMBER
5	1	3130-01-323-2885	2X179	904.1610.082
5	1	3130-01-323-5516	2X179	904.1610.098
5	1	3130-01-323-5517	2X179	904.1610.099
5	2	3040-01-323-5936	2X179	360.8676.055
5	3	5305-01-323-8925	2X179	9.9732.075
5	4	3120-01-323-5481	2X179	560.1611.055
5	4	3130-01-323-2887	2X179	560.1611.054
5	4	3130-01-323-2883	2X179	560.1611.053
5	5		2X179	360.4701.059
5	5	5330-01-358-3542	2X179	360.4701.058
5	6	3130-01-323-2886	2X179	395.8676.090
5	7	5330-01-323-2834	2X179	9.1210.079
5	8	5310-01-324-8239	2X179	9.3203.047
5	9	5340-01-326-5620	2X179	560.5111.069
5	10	5305-01-326-5632	2X179	560.1862.057
5	11	2815-01-326-5977	2X179	560.8676.071
5	11	3040-01-327-0187	2X179	560.8676.061
5	11	3040-01-327-0188	2X179	560.8676.070
5	12	3020-01-327-0209	2X179	360.4936.035
5	13	5310-01-324-8334	2X179	9.7625.010
5	14	5310-01-340-8352	2X179	9.7565.007
5	15	5305-01-324-0949	2X179	9.1770.005
5	16	2815-01-323-5992	2X179	435.1050.284
5	17	5315-01-323-8320	2X179	9.2280.056
6	1	5310-01-327-8913	2X179	360.7626.033
6	2	5305-01-327-3448	2X179	9.1805.025
6	3	2815-01-324-5149	2X179	435.9880.639
6	4		2X179	435.2816.052
7	1		2X179	435.6500.315
7	1	2815-01-323-6038	2X179	435.6500.316
7	1	2815-01-324-1332	2X179	435.6500.317
7	2	2815-01-324-1151	2X179	435.8480.050
7	2	2815-01-324-1151	2X179	435.8480.050
7	2	2815-01-324-1151	2X179	435.8480.050
7	3	5365-01-324-2562	2X179	9.1240.017
7	3	5365-01-324-2562	2X179	9.1240.017
7	3	5365-01-324-2562	2X179	9.1240.017
7	4	2815-01-324-1147	2X179	395.8211.071
7	4	2815-01-324-5084	2X179	395.8211.073
7	4	2815-01-358-8549	2X179	435.8211.089
7	5	3120-01-323-2785	2X179	435.1640.083
7	5	3120-01-323-5480	2X179	435.1640.084
7	5	3120-01-326-9402	2X179	435.1640.082
7	6	2815-01-324-5192	2X179	435.1526.098
7	7	5305-01-325-5918	2X179	9.1770.101
7	8	3120-01-324-8319	2X179	435.1630.018
8	1	5305-01-323-8925	2X179	9.9732.075
8	2	2815-01-350-1664	2X179	560.2125.100
8	3	5340-01-324-0962	2X179	560.2125.093
8	4	5310-01-324-8325	2X179	276.4670.014
8	5	5340-01-324-0904	2X179	9.9000.064

CROSS REFERENCE INDEXES

FIG.	ITEM	FIGURE AND ITEM NUMBER INDEX STOCK NUMBER	CAGEC	PART NUMBER
8	6	5360-01-323-8830	2X179	9040.5780011
8	7	3110-01-325-5757	2X179	9.8245.005
8	8	5330-01-247-2403	2C072	9.1200.034
B	9	5315-01-324-0423	2X179	560.6095.010
8	10		2X179	LEVER
8	11	5315-01-323-8821	2X179	9.8430.005
8	12	5315-01-323-8822	2X179	9.8430.004
8	13	5305-01-323-8926	2X179	560.9820.085
8	14	5330-01-358-3541	2X179	560.4400.022
8	15	2815-01-350-1665	2X179	560.2125.101
8	16	5340-01-324-0961	2X179	560.2125.094
8	17	5310-01-324-8325	2X179	276.4670.014
8	18	5340-01-324-0904	2X179	9.9000.064
8	19	5360-01-323-8830	2X179	9040.5780.011
8	20	3110-01-325-5757	2X179	9.8245.005
8	21	5330-01-351-7597	2X179	9.1200.034
8	22	5315-01-324-0423	2X179	560.6095.010
8	23		2X179	LEVER
8	24	5315-01-323-8821	2X179	9.8430.005
8	25	5315-01-323-8822	2X179	9.8430.004
8	26	5305-01-323-8926	2X179	560.9820.085
9	1	2815-01-323-5995	2X179	560.4330.037
9	2	5310-01-324-8237	2X179	9.3240.010
9	3	5305-01-341-8919	2X179	9.9730.100
9	4	5365-01-333-3823	2X179	276.8335.084
9	5	5310-01-340-8352	2X179	9.7565.007
9	6	5365-01-324-4919	2X179	560.6372.098
9	7	5315-01-323-8824	2X179	560.6045.040
9	8	2815-01-323-6044	2X179	270.9850.002
9	9	4710-01-323-8546	2X179	560.9455.053
9	10	5330-01-334-2770	2X179	560.1350.011
9	11	5340-01-355-5188	2X179	500.2135.072
9	12	2805-01-340-0201	2X179	629.4845.185
9	12	2815-01-323-6039	2X179	629.4845.184
9	13	2815-01-327-0117	2X179	435.9685.067
9	14	2815-01-326-9076	2X179	435.9652.061
9	15	2815-01-324-0765	2X179	710.3430.067
9	16	2805-01-340-1629	2X179	4845-181
9	16	2815-01-364-3417	2X179	560.4845.182
9	17	5360-01-323-8831	2X179	395.5755.065
9	18	2315-01-324-8556	2X179	260.6410.018
10	1	5315-01-325-5779	2X179	9.2280.047
10	2	2815-01-324-6906	2X179	904T7215.043
13	3	2815-01-323-6043	2X179	435.1410.088
10	4	2815-01-324-5147	2X179	435.1011.110
11	1	5340-01-326-2078	2X179	276.9032.019
11	2	5330-01-323-5455	2X179	9.1200.015
12	1	2940-01-324-5153	2X179	904.2175.040
12	2	5305-01-341-2968	2X179	9.1770.042
12	3	5310-01-332-8236	2X179	9.4570.058
12	4	5330-31-358-3543	2X179	560.4501.022

CROSS REFERENCE INDEXES

FIG.	ITEM	FIGURE AND ITEM NUMBER INDEX STOCK NUMBER	CAGEC	PART NUMBER
12	5	4730-01-326-8076	2X179	5600.3902.052
12	6	4820-01-339-8402	2X179	560.9680.013
12	7	5360-01-339-8828	2X179	500.5755.049
12	8	5330-01-247-2409	2C072	9.4670.021
12	9	2815-01-339-8323	2X179	500.9070.012
12	10	5305-01-323-8930	2X179	9.9730.012
13	1	4710-01-324-6529	2X179	435.9455.074
13	2	6680-01-336-7050	2X179	1400-077
13	3	5310-01-340-8352	2X179	9.7565.007
13	4	5305-01-324-0951	2X179	9.1770.009
13	5	5310-01-324-8240	2X179	9.3240.036
13	6	5310-01-324-8343	2X179	9.7565.011
13	7	3020-01-323-6006	2X179	560.4936.009
13	8	5315-01-324-3993	2X179	9.2200.001
13	9	2805-01-323-4357	2X179	560.6605.037
14	1	5330-01-358-3546	2X179	360.4601.042
14	2	2815-01-333-2944	2X179	3603.6645.113
14	3	5306-01-333-2649	2X179	9.1760.001
14	4	5310-01-324-8327	2X179	7565.004
14	5	2940-01-333-2952	2X179	560.5090.010
14	6	5310-01-334-3502	2X179	4670.016
14	7	5365-01-333-5128	2X179	9.8965.005
14	8	5305-01-334-2761	2X179	9.9765.108
14	9	5305-01-324-8389	2X179	9.1770.039
14	10	5310-01-324-8334	2X179	9.7625.010
15	1	2815-01-339-8409	2X179	5600.2486.068
15	2	5330-01-351-7676	2X179	560.4420.020
15	3	2940-01-340-0444	2X179	560.2145.013
15	4	5340-01-339-8929	2X179	9.3630.023
15	5	5310-01-340-8352	2X179	9.7565.007
15	6	5310-01-324-8246	2X179	3240.018
16	1	3040-01-356-9353	2X179	3600.8061.096
16	2	5310-01-340-8352	2X179	9.7565.007
16	3	5305-01-341-8919	2X179	9.9730.100
16	4	3010-01-350-9152	2X179	2760.4240.028
16	5	3010-01-350-9155	2X179	2830.8061.372
16	6	3040-01-350-6348	2X179	3600.8836.084
16	7	5310-01-324-8246	2X179	3240.018
17	1	3020-01-325-3038	2X179	7051-060
17	2	5310-01-340-8352	2X179	9.7565.007
17	3	5305-01-324-0951	2X179	9.1770.009
18	1	5310-01-324-8238	2X179	9.3240.008
18	2	5340-01-324-0963	2X179	500.3790.042
18	3	5330-01-324-8286	2X179	260.4650.037
18	4	4730-01-325-0445	2X179	500.7301.006
18	5		2X179	395.6615.045
18	6	2910-01-341-6173	2X179	395.6531.104
18	7	5330-01-327-2630	2X179	9.4670.064
18	7	5330-01-327-2631	2X179	9.4670.065
19	1	2910-01-323-7057	2X179	435.9375.280
19	2	4730-01-323-8614	2X179	435.9375.279

CROSS REFERENCE INDEXES

FIG.	ITEM	FIGURE AND ITEM NUMBER INDEX STOCK NUMBER	CAGEC	PART NUMBER
19	3	5310-01-324-8246	2X179	3240.018
19	4	5307-01-340-2073	2X179	9.6780.089
19	5	5340-01-342-0233	2X179	560.5168.041
19	6	5310-01-340-8085	2X179	560.3240.131
19	7	5330-01-357-6929	2X179	672.4580.068
19	7	5330-01-358-1288	2X179	276.4580.002
19	7	5330-01-358-3544	2X179	276.4580.009
19	8	2910-01-333-8271	2X179	435.6590.076
19	9	5310-01-324-8334	2X179	9.7625.010
19	10	5305-01-341-8919	2X179	9.9730.100
19	11	5365-01-324-3425	2X179	276.5400.046
19	12	5340-01-327-3444	2X179	276.3616.018
19	13	5305-01-158-0826	56161	10503657
20	1	5330-01-236-0495	2X179	560.4580.047
20	2	5315-01-341-2956	2X179	560.7200.078
20	3	4320-01-317-8940	2X179	6585.030
20	4	5310-01-340-8352	2X179	9.7565.007
20	5	5310-01-324-8239	2X179	9.3203.047
21	1	5340-01-341-8869	78940	F22136K01B
21	2	5307-01-348-3416	78940	0629A84
21	3	5330-01-348-6929	78940	0A7419
21	4	4330-01-347-2849	78940	F221B4
21	5	5305-00-068-0510	80204	B1821BH038C100N
21	6	5310-00-087-7493	96906	MS27183-13
21	7		66234	204-92008
21	8	5310-00-087-4652	96906	MS51922-17
21	9	5340-01-135-1030	66295	28KS3
21	10	5306-01-340-2012	2X179	360.901.039
21	11	4710-01-324-6530	2X179	560.9400.054
21	12	5310-01-327-3419	2X179	9.4670.060
21	13	5310-01-324-8325	2X179	276.4670.014
21	14	2910-01-324-6897	2X179	560.9050.041
21	15	2940-01-340-1582	78940	E105BIK018
21	16	2940-01-339-8611	78940	250816A
21	17	4730-01-347-4139	78940	0A11861
21	18	2520-01-347-6388	78940	0638A1
22	1	4710-01-323-8545	2X179	560.9571.077
22	2	5310-01-332-8236	2X179	9.4670.058
22	3	5306-01-323-8814	2X179	9.1901.029
22	4	4730-00-871-6729	70842	705-1171
22	5		79470	H05704
22	6	4730-01-102-6544	22031	4501-4
22	7	4730-01-340-8885	72423	2071-059
22	8	5310-01-327-3419	2X179	9.4670.060
22	9	5306-01-326-5519	2X179	9.1901.031
22	10	5310-01-327-3418	2X179	9.4775.196
22	11	5365-01-327-3353	2X179	9.9080.037
22	12	4710-01-326-9210	2X179	560.9375.351
22	13		79470	H05704
22	14	5306-01-333-5094	2X179	9.1901.030
22	15	5310-01-351-7802	2X179	9.4670.059

CROSS REFERENCE INDEXES

FIG.	ITEM	FIGURE AND ITEM NUMBER INDEX STOCK NUMBER	CAGEC	PART NUMBER
22	16	4710-01-339-8103	2X179	9375.022
22	17	4730-01-340-5597	2X179	7270.104
22	18	5306-01-340-2013	2X179	1901.032
22	19	5310-01-334-3502	2X179	4670016-
22	20	5340-01-325-5916	2X179	9.3630.050
23	1	2910-01-324-1304	66234	410-92713
23	2	4820-01-354-5223	57648	100-43
23	3	5305-00-068-0511	80204	B1821BH038C125N
23	4	5310-00-637-9541	96906	MS35338-46
23	5	5310-00-732-0558	96906	MS51967-8
24	1	5305-01-274-1264	15526	DIN933-M10X35-8. 8-A4C
24	2	5310-01-324-8331	2X179	9.7626.038
24	3	3020-01-326-6014	2X179	435.7362.186
24	4	6150-01-327-9402	2X179	2086.084
24	5	5365-01-327-3393	2X179	560.1160.022
24	6	3110-01-326-5461	2X179	9.3110.058
24	7	5340-01-364-1516	2X179	560.8785.069
24	8	3120-01-324-8320	2X179	9.1585.025
24	9	2990-01-325-0716	2X179	5200-300
24	10	5365-01-325-7219	2X179	9.1240.005
24	11	5310-01-324-8332	2X179	9.7626.040
24	12	5310-01-324-8333	2X179	9.7625.007
24	13	5365-01-325-7220	2X179	9.1240.077
24	14	5305-01-325-2646	2X179	9.9730.107
24	15	5315-01-325-5782	2X179	560.6080.022
24	16	5310-01-340-8352	2X179	9.7565.007
24	17	5305-01-159-0065	56161	10501759
25	1	2590-01-340-1607	66234	401-94733
25	2	5305-00-989-7434	96906	MS35207-263
25	3	4010-01-341-5442	66234	401-94732
25	4	2990-01-333-6069	2X179	560.5200.265
25	5	5365-01-333-5286	2X179	9.1240.001
25	6	5310-01-334-0415	2X179	9.7625.103
25	6	5310-01-334-0416	2X179	9.7625.104
25	7	3040-01-334-2288	2X179	395.5200.250
25	8	3110-01-342-3049	2X179	9.3000.004
25	9	5310-01-324-8238	2X179	9.3240.008
25	10	5310-01-247-2425	2X179	7555.004
25	11	3040-01-334-2290	2X179	560.5200.200
25	12	5315-01-355-3636	2X179	560.6140.100
25	13	5365-01-333-3765	2X179	9.1241.009
25	14		2C072	9.7625.012
25	15	3040-01-334-2289	2X179	395.5200.271
25	16	5305-01-334-2762	2X179	9.9732.092
25	17	5340-01-333-3856	2X179	395.8785.070
25	18	5365-01-324-4872	2X179	560.3521.038
25	19	5305-01-341-2906	2X179	9.9732.063
25	20		96906	MS20995C20
25	21	4730-01-323-5042	2X179	2760.9180.042
25	22	5310-01-324-8242	2X179	9.3240.019

CROSS REFERENCE INDEXES

FIG.	ITEM	FIGURE AND ITEM NUMBER INDEX STOCK NUMBER	CAGEC	PART NUMBER
25	23	2990-01-323-9508	2X179	560.2516.061
25	24		2X179	560.5200.194
25	25		2X179	9.1200.034
25	26		2X179	560.5680.077
25	27		2X179	560.5200.154
25	28		2X179	9.1760.041
25	29		2X179	9.3240.008
25	30		2X179	560.2690.121
25	31		2X179	560.5200.108
25	32		2X179	9.3203.047
25	33	5305-01-323-8932	2X179	9.9790.023
25	34	5310-01-324-8243	2X179	9.6000.021
25	35	5305-01-323-8931	2X179	9.9732.078
25	36	5315-01-325-5786	2X179	276.8460.055
25	37	5330-01-355-5154	2X179	560.4776.083
25	38	5360-01-323-8844	2X179	560.5655.076
25	39	5360-01-333-5157	2X179	560.5801.088
25	40	5315-01-340-2021	2X179	560.6040.015
26	1	4130-01-075-5547	55524	AB-1000-3
26	2		39428	3603T17
26	3	5340-01-348-7050	55524	AB-CAP
26	4	5305-00-989-7434	96906	MS35207-263
26	5	2590-01-347-7451	55524	AB-NECK
26	6	5330-01-348-6928	55524	AB-GASKET
26	7	4730-01-347-2853	55524	AB-3INCHBASKET
26	8	2910-01-324-6898	2X179	2830.3730.036
26	9	2910-01-324-6899	2X179	2830.2175.045
26	10	5310-01-247-2452	2C072	9.3240.066
26	11	5310-01-324-8343	2X179	9.7565.011
26	12	5340-01-339-9000	2X179	0000-J1G
26	13	5305-01-333-5381	5X475	9.1780.007
27	1	5310-01-324-8335	2X179	9.4670.026
27	2	2920-01-324-8512	2X179	9040.2100.026
27	3	5310-00-582-5965	96906	MS35338-44
27	4	5310-01-350-8553	24617	11505913
28	1	2990-01-342-0645	70842	703-1500
28	2	2990-01-341-5119	66234	209-92052
28	3	5340-01-340-0329	70842	732-1026
28	4	5310-01-324-8242	2X179	9.3240.019
28	5	5307-01-324-0945	2X179	6780.085
28	6	5330-01-351-7675	2X179	560.4420.019
28	7	2990-01-323-6030	2X179	5460.256
29	1	2510-01-323-7322	2X179	435.2920.104
29	2	5305-01-324-0950	2X179	9.1770.002
29	3	5310-01-340-8352	2X179	9.7565.007
29	4	5330-01-323-2757	2X179	360.4776.090
29	5	5305-01-323-8928	2X179	9.9790.039
29	6	2510-01-323-5966	2X179	435.5066.070
29	7	5305-01-323-8927	2X179	9.9731.092
29	8	2815-01-323-5942	2X179	435.3350.094
29	9	2930-01-323-5959	2X179	435.5066.074

CROSS REFERENCE INDEXES

FIG.	ITEM	FIGURE AND ITEM NUMBER INDEX STOCK NUMBER	CAGEC	PART NUMBER
29	10	5305-01-333-5380	2X179	9.1760.003
29	11	5310-01-247-2425	2X179	7555.004
29	12	2805-01-324-1211	2X179	435.2569.203
29	13	2815-01-323-5968	2X179	360.6927.056
29	14	2930-01-340-1450	66234	401-94506
29	15	5306-01-289-9197	24617	11500713
29	16	5310-00-407-9566	96906	MS35338-45
29	17	5305-01-341-3087	24617	11500723
29	18	5310-00-209-0965	96906	MS35338-47
29	19	5310-00-809-4061	96906	MS27183-15
29	20	5365-01-325-5876	2X179	904.3527.018
30	1	5340-01-324-8427	66234	410-92705
30	2	5310-00-407-9566	96906	MS35338-45
30	3	5306-01-289-9197	24617	11500713
30	4	6110-01-134-9981	76761	A2-101
30	5	5305-00-989-7435	96906	MS35207-264
30	6	5310-00-809-8544	96906	MS27183-7
30	7	2920-01-347-6069	76761	A1-103
30	8	5315-01-136-8328	76761	A9-506
30	9	5310-01-359-1523	76761	A4-510
30	10	5310-00-877-5795	96906	MS21044-N8
30	11	3020-01-045-2627	76761	A3-300
30	12	5310-00-225-6993	96906	MS51922-33
30	13	5306-00-225-8499	96906	MS90725-34
30	14	5310-00-081-4219	96906	MS27183-12
30	15	5365-01-326-5660	66234	401-94419
30	16	3030-01-340-0183	20796	15350LA
31	1	5310-01-324-8343	2X179	9.7565.011
31	2	5305-01-323-8929	2X179	9.9730.045
31	3	6113-01-365-8948	53867	0 001 219 010
31	4	5305-01-363-9102	53867	9 001 333 409
31	5	5945-01-303-3353	55653	0 331 303 096
31	6		66234	700-92010
31	7		66234	700-92011
31	3	5310-00-596-7693	96906	MS35335-31
31	9	5305-01-361-7506	24617	11502892
31	10	5310-01-303-2728	53867	2 916 069 084
31	11	5310-01-357-4595	53867	2 913 051 107
31	12		66234	700-92019
31	13	6105-01-362-4207	53867	9 001 337 056
31	14		66234	700-92050
31	15		66234	700-92049
31	16		66234	700-92048
31	17		66234	700-92323
31	18		66234	700-92024
31	19		53867	9 002 338 850
31	20		66234	700-92029
31	21	2920-01-302-6304	S3465	4537769-643
31	22	6110-01-358-3505	53867	9001 140 349
31	23	3120-01-357-8020	53857	100322005
31	24		66234	700-92034

CROSS REFERENCE INDEXES

FIG.	ITEM	FIGURE AND ITEM NUMBER INDEX STOCK NUMBER	CAGEC	PART NUMBER
31	25		66234	700-92035
31	26		66234	700-92036
31	27	5305-01-363-8836	53867	9 001 333 411
31	28	2920-01-340-2367	53867	1 000 505 010
31	29	5305-01-364-4775	53867	9 001 333 417
31	30	5310-00-983-8483	96906	MS27183-5
31	31	2920-01-362-1812	53867	9 003 334 157
31	32	5999-01-362-3373	53867	9 001 140 383
31	33		53837	1 004 615 001
31	34	5977-01-367-1508	53867	9 003 337 001
31	35	5305-01-360-1959	53867	9 001 140 371
31	36		66234	700-92047
31	37	3040-01-357-3557	66234	700-92051
31	38	3120-01-357-8019	53867	1 000 301 031
31	39		66234	700-92053
31	40		66234	700-92054
31	41	3010-01-302-6310	S3465	4537769-635
31	42		66234	700-92020
31	43	6150-01-361-4810	66234	700-92009
31	44	3120-01-357-8019	53867	1000301031
32	1		58961	WG-16-0-6IN
32	2	5940-01-341-5267	06383	DV14-250-C
32	3	6240-01-349-5507	2X179	5175-119
32	4	5340-01-339-9007	66234	410-92916
32	5	5310-00-809-4058	96906	MS27183-10
32	6	5310-00-582-5965	96906	MS35338-44
32	7	5305-00-068-0502	96906	MS90725-6
32	8	5933-01-324-8933	2X179	9040.7195.056
32	9	5930-01-324-8942	2X179	2760.2750.111
32	10	5930-01-364-5374	2X179	5041-020
32	11	5930-00-359-5500	81640	7500K14
32	12	2530-01-061-1351	13445	81264
32	13	6240-01-349-8489	33955	1838575
32	14	5905-01-291-4426	33955	6219371
32	15	6625-01-297-2005	33955	9154571
32	16	5365-01-340-2092	66234	402-92008
32	17	5310-00-761-6882	96906	MS51967-2
32	18	5940-00-143-4780	96906	MS25036-108
32	19	5310-00-905-5159	96906	MS35335-87
32	20	5310-00-934-9762	96906	MS35649-286
32	21		58961	WG-16-0-8IN
32	22	5940-01-134-1722	06383	BSV10X-L
32	23	5920-01-156-6878	75915	155100
32	24	5920-01-364-9164	71400	ACG-10
32	25	5305-00-984-4983	96906	MS35206-226
32	26		58961	WG-16-0-121N
32	27	5940-01-341-4709	06383	D-250A-C
33	1	5340-00-809-1494	96906	MS21333-105
33	2	5310-00-582-5965	96906	MS35338-44
33	3	5310-00-761-6882	96906	MS51967-2
33	4	5975-00-984-6582	96906	MS3367-1-0

CROSS REFERENCE INDEXES

FIG.	ITEM	FIGURE AND ITEM NUMBER INDEX STOCK NUMBER	CAGEC	PART NUMBER
33	5		19207	CONDUIT ASSY
33	6		62234	402-92109
33	7	4730-00-476-5865	14889	401-005
33	8		66234	402-92111
33	9	4730-00-476-7135	14007	406-005E
33	10		66234	402-92110
33	11	4730-00-938-7849	14889	447-005
33	12	5975-01-145-7210	93908	E940D
33	13	5340-00-057-2906	96906	MS21333-73
33	14	5310-00-809-8546	96906	MS27183-8
33	15	5305-00-984-6210	96906	MS35206-263
33	16	5310-00-809-4058	96906	MS27183-10
33	17	5305-00-225-3843	80204	B1821BH025C100N
33	18	5340-00-809-1490	95936	MS21333-98
33	19	5305-00-068-0500	96906	MS90725-3
34	1		66234	703-92133
34	2	5940-00-143-4777	96906	MS25035-157
34	3		66234	703-92132
34	4		66234	703-92097
34	5	5940-00-557-4338	96906	MS25036-125
34	6		66234	703-92096
34	7	5305-00-068-0510	80204	B1821BH038C100N
34	8	5310-00-627-6128	96906	MS35335-35
34	9	5310-00-087-7493	96906	MS27183-13
34	10	5310-00-087-4652	96906	MS51922-17
34	11	5305-00-993-1848	96906	MS35207-265
34	12	5975-01-324-7837	66234	401-94431
34	13	5905-01-082-0849	12697	VK100NA-5
34	14	5940-00-143-4780	95906	MS25036-108
34	15	5925-01-222-0059	13445	30090-3
34	16	5310-00-934-9751	96906	MS35650-302
34	17	5925-01-222-3650	13445	30055-20
34	18	5305-00-988-1724	96906	MS35206-280
34	19	5310-00-582-5965	96906	MS35338-44
34	20	5305-00-050-9231	96906	MS51957-65
34	21	5310-00-045-3296	96906	MS35338-43
34	22	5310-01-141-8704	81992	003-22-003
34	23	5975-00-152-1075	03743	BL50
34	24	5975-01-256-0876	74545	SHC-1025
34	25	5310-00-984-3806	96906	MS51922-9
34	26	5310-30-081-4219	96906	MS27183-12
34	27	5306-00-225-8499	96906	MS90725-34
34	28	5975-01-207-0229	81992	SHC-1037
34	29	5310-01-113-5659	81992	003-22-002
34	33	5975-00-295-9696	49367	DB-1478
34	31	5340-01-339-9006	66234	401-94499
34	32	5940-01-336-5783	13546	50820
35	1	6220-01-334-0613	66234	701-68471
35	2	6220-01-350-7889	70184	6-40301
35	3	5325-31-348-7059	70184	38-40700
35	4	5310-00-809-5998	96906	MS27183-18

CROSS REFERENCE INDEXES

FIG.	ITEM	FIGURE AND ITEM NUMBER INDEX STOCK NUMBER	CAGEC	PART NUMBER
35	5	5310-00-225-6993	96906	MS51922-33
35	6	5940-00-143-4780	96906	MS25036-108
35	7	1450-01-204-7742	06383	DNF18-250F1B-C
35	8	5940-01-134-1722	06383	BSV10X-L
35	9		58961	WG-16-0-6IN
35	10	5325-01-341-3024	13548	10403
35	11	6220-01-183-4557	13548	10205R
35	12	6220-01-301-5411	13548	10744R
35	13	5995-01-096-0733	13548	93906
35	14	6220-01-183-4557	13548	10205R
35	15	5305-00-984-6193	96906	MS35205-245
35	16	5310-00-045-3299	96906	MS35338-42
35	17	5325-01-341-3023	13548	10401
35	18	5305-00-068-0511	80204	B1821BH03BC125N
35	19	5340-01-326-0035	66234	401-94117
35	20	5310-00-637-9541	96906	MS35333-46
35	21	5310-00-732-0558	96906	MS51967-8
35	22	5340-01-325-2827	66234	401-94439
35	22	5340-01-326-8059	66234	401-94438
35	23	5305-00-071-2069	80204	B1821BH050C150N
36	1	5305-00-984-6210	96906	MS35206-263
36	2	5310-00-934-9751	96906	MS35650-302
36	3	5310-00-045-3296	96906	MS35338-43
36	4	6680-01-325-6281	33955	1501775
36	5	5330-01-290-2621	33955	9610070
36	6	5310-01-324-8325	2X179	276.4670, 014
36	7		2X179	9040. 6745.031
37	1	6160-01-360-6492	66234	401-94303
37	2	5310-00-088-1251	96906	MS51922-1
37	3	5310-00-809-4058	96936	MS27183-10
37	4	6160-01-343-1320	66234	401-94773
37	5	5306-01-341-8905	66234	401-94756
37	6	6140-01-210-1964	96906	MS52149-1
37	7	5340-01-339-8940	39428	3705T101
37	8	5340-01-339-8910	70842	728197
38	1		66234	703-92065
38	2	5940-00-143-4775	96906	MS25036-156
38	3	6150-01-346-8206	66234	703-92127
38	4	5940-01-342-1642	06383	DNF18-250F1M-C
38	5	5940-00-143-4780	96936	MS25036-108
38	6	6150-01-354-4400	66234	703-92128
38	7	5943-01-135-2403	05383	BSV14X-C
38	8	5940-00-143-4780	96906	MS25036-108
38	9		66234	703-92152
38	10	5940-00-143-4780	96906	MS25036-108
38	11	5961-00-957-6865	81349	JAN1N3611
39	1	6150-01-349-5316	66234	703-92130
39	2	5940-00-143-5284	96906	MS25036-115
39	3	5940-00-143-4774	96906	MS25036-153
39	4	5940-00-143-4794	96906	MS25036-112
39	5	5940-01-341-5267	06383	DV14-250-C

CROSS REFERENCE INDEXES

FIG.	ITEM	FIGURE AND ITEM NUMBER INDEX STOCK NUMBER	CAGEC	PART NUMBER
39	6	6150-01-354-4401	66234	703-92131
39	7	5940-00-557-4338	96906	MS25036-125
39	8	5940-00-434-6062	79550	61
39	9	5940-00-114-1305	96906	MS25036-116
39	10	5940-01-342-1641	06383	DNF18-250M-C
39	11	5940-00-230-0515	96906	MS25036-154
39	12	5940-00-143-5284	96906	MS25036-115
39	13	5940-00-143-4780	96906	MS25036-108
39	14	5940-00-432-2660	00779	61198-1
39	15	5940-00-143-4794	96906	MS25036-112
39	16	6150-01-347-2512	66234	703-92129
39	17	5940-00-143-4780	96906	MS25036-108
40	1	2530-01-324-5178	94189	17122
40	2	2530-01-322-0673	94189	16691
40	3	2530-01-069-9174	94189	16690
40	4	5365-01-070-2350	94189	7029
40	5	5310-00-762-6223	96906	MS51967-41
40	6	3130-01-070-5629	94189	0101663800
40	7	5306-01-071-1309	94189	8798
40	8	5315-00-550-7397	94189	12560
40	9	2530-01-250-1624	94189	23319
40	10	2530-01-069-4213	94189	8780
40	11	5365-00-803-7301	96906	MS16624-1050
40	12	5360-00-553-2039	94189	8785
41	1	5306-00-225-8499	96906	MS90725-34
41	2	5310-00-407-9566	96906	MS35333-45
41	3	5310-00-880-7744	96906	MS51967-5
41	4	5340-01-340-0481	66234	401-94816
41	5	3120-01-339-8891	4Y310	BCSM6700
41	6	3040-01-339-8603	66234	410-92827
41	6	5340-01-339-9011	66234	410-92834
41	7	5310-00-984-3806	96906	MS51922-9
41	8	5340-01-339-9010	66234	401-94504
41	9	5340-01-341-3049	92867	01215601
41	10	5310-00-081-4219	96906	MS27183-12
41	11	5315-00-842-3044	96906	MS24665-283
42	1	5360-01-268-2610	8H836	700-1
42	2	5330-01-325-5151	8H836	806-1
42	3	3110-00-606-1841	60038	LM67048
42	4	3110-00-606-1840	60038	LM67010
42	5	5307-01-324-8407	8H836	263-2
42	6	3040-01-324-8554	8H836	OC9-1
42	7	3110-00-606-1842	60038	LM11910
42	8	3110-00-606-1839	60038	LM11949
42	9	5340-01-325-5892	8H836	114-1
42	10	5310-01-327-3340	8H836	262-2
42	11	2640-00-555-2841	27783	TR415
42	12	2530-01-323-6048	8H836	902-1
42	13	5310-00-088-6897	96906	MS9358-17
42	14	5315-00-234-1664	96906	MS24665-495
42	15	5310-00-809-8533	96936	MS27163-23

CROSS REFERENCE INDEXES

FIG.	ITEM	FIGURE AND ITEM NUMBER INDEX STOCK NUMBER	CAGEC	PART NUMBER
43	1	2530-01-352-9090	94189	16622
43	2	5330-01-055-3870	94189	15529
43	3	3110-00-763-0259	60038	L68149
43	4	3110-00-769-1426	60038	L68111
43	5	5306-01-055-6876	94189	5081
43	6	2530-01-358-7719	94189	16626
43	7	3110-00-926-1379	60038	L44649
43	8	3110-00-926-1379	94189	8019
43	9	5340-00-253-1910	94189	14286
43	10	5310-00-119-2090	94189	5082
43	11	2640-00-555-2841	17875	T-15R-50
43	12	2530-01-323-6048	8H836	902-1
43	13	5315-00-234-1664	96906	MS24665-495
43	14	5310-00-088-6897	96906	MS9358-17
43	15	5310-00-809-8533	96906	MS27183-23
44	1	2610-01-336-8828	73842	ST225/75R15
45	1	2510-01-324-1216	66234	410-92613
45	2	5340-00-186-5085	19207	8690523
45	3	5305-00-269-3218	96906	MS90725-68
45	4	2590-00-473-6331	07860	C21452
45	5		66234	509-90329
45	6	4030-00-282-4885	12128	M647
45	7	5310-00-087-4652	96906	MS51922-17
45	8	5305-00-724-5914	96906	MS90725-168
45	9	3040-01-358-8598	66234	410-92672
45	10	5310-00-269-4340	96906	MS51922-49
45	11	5315-01-324-6779	66234	400-65650
45	12	5315-00-234-1664	96936	MS24665-495
45	13		66234	509-92004
45	14	5365-01-154-8557	96652	29-10
45	15	2510-01-324-1217	66234	410-92669
45	16	5315-01-324-1748	66234	410-92668
45	17	5310-00-407-9566	96906	MS35338-45
45	18	5306-00-226-4825	80204	B18213H031C075N
45	19	5340-01-220-6352	55017	100100
45	20	5340-01-326-1256	55017	100112
46	1		66234	509-92013
46	2	4030-00-684-6346	10001	1784995
46	3	4033-00-542-3184	80205	NAS1042-18
46	4	4010-00-494-2326	82918	F310190-437
46	5	4030-00-243-4439	66234	387-91668
46	6	5310-00-637-9541	96906	MS35333-46
46	7	2510-01-339-8413	66234	410-92667
46	8	5315-00-234-1664	96906	MS24665-495
46	9	5315-01-326-0083	66234	383-72815
46	10	2540-01-323-6045	66234	410-92666
46	11	5315-00-234-1664	96906	MS24665-495
46	12	5310-00-088-6897	96906	MS9358-17
46	13	5310-00-809-8533	96906	MS27183-23
46	14	5310-00-877-5795	96906	MS21044-N8
46	15	5360-01-268-2610	8H836	700-1

CROSS REFERENCE INDEXES

FIG.	ITEM	FIGURE AND ITEM NUMBER INDEX STOCK NUMBER	CAGEC	PART NUMBER
46	16	5330-01-325-5151	8H836	806-1
46	17	3110-00-606-1841	60038	LM67048
46	18	3110-00-606-1840	60038	LM67010
46	19	5307-01-324-8407	8H836	263-2
46	20	3040-01-324-8554	8H836	009-1
46	21	3110-00-606-1842	60038	LM11910
46	22	3110-00-606-1839	60038	LM11949
46	23	5340-01-325-5892	8H836	114-1
47	1	5340-01-339-9012	66234	387-92022
47	2	5320-00-957-2493	96906	MS20604B5W8
47	3	5305-00-068-0502	96906	MS90725-6
47	4	5310-00-582-5965	96906	MS35338-44
47	5	5310-00-809-4058	96906	MS27183-10
47	6	5340-01-348-6222	66234	402-92006
47	7	5340-01-339-8960	66234	410-93039
47	8	2510-01-352-2334	66234	410-92727
47	9	5340-01-324-8414	66234	410-92718
47	10	5340-01-339-8961	66234	410-93040
47	11	5310-00-088-1251	96906	MS51922-1
47	12	2815-01-340-1453	66234	402-92326
48	1	9905-01-342-5306	66234	390-92042
48	2	7690-01-331-9013	66234	390-65617
48	3	7690-01-332-8948	66234	390-92026
48	4	9905-01-342-5307	66234	390-92043
48	5	7690-01-349-3926	66234	390-76001
48	6	9905-01-343-1207	66234	390-92044
48	7	5305-00-984-6193	96906	MS35206-245
48	8	5310-00-559-0070	96906	MS35333-38
48	9	7690-01-331-8267	66234	390-72016
48	10	7690-01-326-5394	66234	390-65608
48	11	7690-01-326-5393	66234	390-65607
48	12	9905-01-366-4743	66234	390-92041
48	13	9905-01-342-8191	66234	390-92045
48	14	7690-01-332-1839	66234	390-65643
49	1	4320-01-324-5113	11341	40P007RAASA
49	2	4320-01-323-5149	11341	4P0004-002
49	3	4320-01-323-5128	11341	4P0013-001
49	4		11341	5A0078
49	5		11341	5A0048
49	6	5315-01-324-0422	11341	2A0310-604
49	7	4320-01-323-7364	11341	4P0007-007
49	8	4730-00-702-5694	88044	AN933-3
49	9	3040-01-324-1275	11341	4P0012-008
49	10	3040-01-324-1276	11341	4P0011-008
49	11	4320-01-323-5157	11341	4P0003-002
49	12	5305-01-323-8924	11341	2A0079-634
49	13	5365-01-325-7217	11341	2A0466-150
49	14		11341	5A0050
49	15	5310-00-809-5998	96906	MS27183-18
49	16	5310-00-584-5272	96906	MS35338-48
49	17	5305-00-044-4153	96906	MS90725-109

CROSS REFERENCE INDEXES

FIG.	ITEM	FIGURE AND ITEM NUMBER INDEX STOCK NUMBER	CAGEC	PART NUMBER
50	1	5340-01-324-4496	66234	410-92658
50	2	5310-00-225-6993	96906	MS51922-33
50	3	4320-01-323-6028	63050	RE-1808020
50	4	3130-01-339-0849	63050	PE130823
50	5	3110-01-340-8032	63050	PE018003
50	6	3110-01-339-8793	63050	PE018002
50	7		63050	RE018030
50	8	3040-01-339-1580	63050	PE011600
50	9	3120-01-265-2462	63050	PE018059
50	13	3040-01-340-0353	63050	PE014007
50	11	5340-01-339-0873	63050	PE015006
50	12	2520-01-339-6520	63050	PE018041
50	13	5305-01-339-6960	63050	PE018019
50	14	5340-01-339-2129	63050	PE016001
50	15		63050	RS018013
50	16		63050	RE018048
50	17		63050	RE012001
50	18	6105-01-339-1220	63050	PE247005
50	19		63050	RE018170
50	20		63050	RE018001
50	21		63050	RE018163
50	22		63050	RE018977
50	23		63050	RE018006
50	24		63050	RE018005
50	25		63050	RE018138
50	26		63050	RE018153
50	27		63050	RE018187
50	28	5305-00-071-2069	80204	B18213H050C150N
50	29	5310-00-809-5998	96906	MS27183-18
51	1	5310-00-087-4652	96906	MS51922-17
51	2	4820-01-342-3185	11341	CA237NBEE0
51	3	5315-01-339-8804	11341	1V1702
51	4	5315-00-816-1794	24617	103374
51	5	3040-01-211-2255	11341	1V1703
51	6	5305-00-121-2420	80205	NAS1352-4LE8P
51	7	3040-01-170-9751	11341	4Z4306
51	8	4820-01-340-1074	11341	1V0006
51	9	5330-01-217-8918	11341	2A0283-7214
51	10	4820-01-155-0302	11341	1R0037
51	11	2530-01-339-8589	11341	1V1426
51	12	5365-01-340-2025	11341	2A0354-112
51	13	3110-01-339-8794	11341	2A0017-8
51	14	5360-01-339-8825	11341	1A0610
51	15	5365-01-340-2026	11341	1V0217
51	16	5340-01-339-8956	11341	1V0370
51	17	5310-01-154-0712	11341	1A0291
51	18	5360-01-339-8826	11341	1A0332
51	19	5340-01-153-9240	11341	1A0292
51	20	5310-01-154-0713	11341	1A0290
51	21	5305-01-339-8924	11341	2A0079-414
51	22	3110-01-160-2471	11341	1A0294

CROSS REFERENCE INDEXES

FIG.	ITEM	FIGURE AND ITEM NUMBER INDEX STOCK NUMBER	CAGEC	PART NUMBER
51	23	5305-00-983-6659	96906	MS16998-42
51	24	3120-01-340-8324	11341	1V0269
51	25	5310-00-809-5997	96906	MS27183-17
51	26	5360-01-339-3827	11341	1A0739
51	27	5330-01-339-8916	11341	1V0272
51	28	5310-01-340-8371	11341	2A0736-104P
51	29	4810-01-340-0375	11341	1A0710
51	30	4820-01-364-3406	11341	1V0046
51	31	5305-00-782-9489	96906	MS-90728-66
51	32	5310-00-087-7493	96906	MS27183-13
52	1	4730-01-011-7736	96906	MS51527A12
52	2	5365-01-340-3121	66234	400-72806
52	3	4730-01-292-4698	22031	2501-4
52	4		66234	213-91779
52	5	4730-01-339-8517	30327	HL12-12NJ
52	6		66234	204-85451
52	7	4730-01-011-7736	96906	MS51527A12
52	8	4730-00-277-9997	96936	MS51953-36B
52	9	4730-01-007-7158	01276	2046-4-4S
52	10	4730-01-339-4496	66234	206-34005
52	11		66234	213-91901
52	12	4730-01-049-3251	30327	HA04-04MB
52	13		66234	204-85041
52	14	4730-00-058-3353	31327	HG04-04NJ
52	15		65234	213-91767
52	16	4730-01-075-1920	61424	10655-12-12
52	17		66234	204-35493
52	18	4730-01-096-9138	96906	MS39324-12-10
53	1	4730-00-965-6538	98441	0188-12-12
53	2	4730-00-908-3194	96906	MS35842-11
53	3		66234	204-85611
53	4	5340-01-069-5306	55017	100075
53	5	4710-01-339-8435	66234	205-74425
53	6	6680-01-309-6450	76280	208-72630
53	7	4310-01-094-0791	90005	569020-02
53	8	4730-01-343-8719	72423	2071-039
53	9	4730-00-223-9255	88044	AN910-2
53	10	4730-00-196-1539	96906	MS51953-36
53	11	4730-01-340-0303	72423	1003-253
53	12	4730-01-178-9654	22031	4601-16-NWO
53	13	4730-00-278-2523	66295	20H
53	14	4730-01-339-4524	72423	2071-249
53	15		22031	4404-16
53	16		66234	204-85730
53	17		66234	212-91159
53	18	4730-01-324-5074	99103	0M-1012
53	19	4730-00-908-3194	96906	MS35842-11
53	20		66234	204-85693
53	21	4730-01-340-8701	22031	6401-12-0
53	22	4730-01-339-6733	72423	1021-150
53	23	4730-00-239-2803	22031	5404-16-12

CROSS REFERENCE INDEXES

FIG.	ITEM	FIGURE AND ITEM NUMBER INDEX STOCK NUMBER	CAGEC	PART NUMBER
53	24	2940-01-339-3846	60827	AF-10-25-0
53	25	2940-00-755-6584	60827	AE-10
53	26	4730-01-340-8883	72423	2071-199
53	27	4730-01-339-8515	72423	1001-199
54	1	6680-01-340-8840	2X179	2529.007
54	2	5310-00-209-0786	96906	MS35335-33
54	3	5310-01-350-8553	24617	11505913
54	4	2590-01-340-1606	2X179	9282.003
54	5	3010-01-341-2459	2X179	7475018
54	6	4730-00-050-4208	96906	MS15003-1
54	7	5305-01-340-2076	2X179	9730.004
55	1	5306-00-225-8499	96906	MS90725-34
55	2	5310-00-809-3078	96906	MS27183-11
55	3	5310-00-880-7744	96906	MS51967-5
55	4	5310-00-407-9566	96906	MS35338-45
55	5	5340-01-328-2257	66234	401-94242
55	6	5340-01-355-0276	66234	401-94292
55	7	2540-01-323-6051	66234	101-75791
56	1	5310-00-823-8804	96906	MS27183-9
56	2	5305-00-068-0509	83204	B1821BH025C125N
56	3	5305-00-068-0502	96906	MS90725-6
56	4	5340-01-327-3590	66234	410-92663
56	5	5310-00-225-6993	96906	MS51922-33
56	6	5310-00-809-5993	96906	MS27183-18
56	7	5306-00-702-4483	96906	MS35751-130
56	8	5340-01-324-6754	66234	401-94280
56	9	3020-01-323-5998	66234	401-94240
56	10	5305-00-071-2069	80204	B1821BH050C150N
56	11	5306-00-952-0964	96906	MS35751-183
56	12	5310-01-326-1053	66234	401-94233
56	13	5310-00-067-6356	96906	MS51922-57
56	14	5310-00-809-8533	96906	MS27183-23
56	15	5310-00-087-4652	96906	MS51922-17
56	16	5310-00-087-7493	96996	MS27183-13
56	17	5305-01-325-8387	96906	MS90725-64
56	18	5340-01-324-4260	66234	410-92657
56	19	4730-00-172-0010	96906	MS15002-1
56	20	5310-01-342-4964	66234	372-92034
56	21	5360-01-324-8510	56988	D97
56	22	5340-01-324-6784	66234	410-92655
56	23	5315-01-325-5456	66234	383-92046
56	24	5315-00-298-1481	96906	MS24665-357
56	25	2510-01-324-1218	66234	410-92664
56	26	5310-30-088-1251	96906	MS51922-1
56	27	5310-00-584-5272	96906	MS35338-48
56	28	5310-00-768-0318	96906	MS51967-14
56	29	5340-01-324-6798	66234	401-94118
56	30	2520-01-323-5940	66234	401-94230
56	30	2520-01-323-5941	66234	401-94231
57	1	5306-00-226-4825	80204	B1821BH031C075N
57	2	5310-00-407-9566	96906	MS35338-45

CROSS REFERENCE INDEXES

FIG.	ITEM	FIGURE AND ITEM NUMBER INDEX STOCK NUMBER	CAGEC	PART NUMBER
57	3	3825-01-327-0530	66234	907-46665
57	4	3825-01-324-2743	66234	410-92662
57	5	5365-01-326-1152	66234	401-94232
57	6	3130-01-324-8895	21335	VAS 1 7/16
57	7	4730-00-050-4208	96906	MS15003-1
58	1	5315-01-324-1750	66234	383-92045
58	2	4730-00-414-5962	93334	444654
58	3	3040-00-570-6161	67029	72276
58	4	3040-01-346-6383	67029	DHA1-216
58	5		67089	RST-150
58	6		67029	2-221
58	7		67029	DH5-116
58	8	5330-01-367-6594	67089	DH3-145
58	9		67029	DH14-65
58	10	3040-01-342-8732	67029	DH2-218
58	11	5315-01-333-5735	66234	383-92044
58	12	5315-00-298-1499	96906	MS24665-360
59	1	5305-00-225-3843	80204	B1821BH025C100N
59	2	5305-00-071-2069	80204	B1821BH050C150N
59	3	5365-01-340-2091	66234	402-92239
59	4	5340-01-324-6799	66234	401-94254
59	5	4320-01-358-8565	OFDH7	2100-332
59	6	5305-01-323-5473	OFDH7	20131-002
59	7	5325-01-339-8969	OFDH7	20132-00
59	8	4320-01-347-8626	OFDH7	20050-132
59	9	5305-01-323-5474	OFDH7	21131-000
59	10	4320-01-333-5914	OFDH7	21195-003
59	11	4320-01-323-5114	OFDH7	21041-001
59	12	4820-01-324-5045	OFDH7	20028-008
59	13	5930-01-324-8927	OFDH7	02095-100
59	14	5305-01-324-8356	OFDH7	20131-001
59	15	4320-01-324-7898	OFDH7	20500-507
59	16	4320-01-323-7481	OFDH7	20428-000
59	17	3040-01-324-1223	OFDH7	21033-002
59	18	5305-01-323-5477	OFDH7	91003-000
59	19	6105-01-360-5571	OFDH7	02019-001
59	20	5340-01-327-3492	OFDH7	11028-101
59	21	5310-00-088-1251	96906	MS51922-1
59	22	5310-00-225-6993	96906	MS51922-33
59	23	5310-00-809-4058	96906	MS27183-10
60	1	4730-01-323-5107	72423	1145-150
60	2	4710-01-323-8541	66234	401-94241
60	3	5310-00-761-6882	96906	MS51967-2
60	4	5310-00-582-5965	96906	MS35333-44
60	5	4730-01-323-5079	72423	1101-150
60	6	4730-31-099-7329	61424	P8MCB-12
60	7	4730-00-908-3194	96906	MS35842-11
60	8		66234	204-85299
60	9	5340-01-324-6794	66234	401-94253
60	10	4730-01-356-8760	73124	BF10125SXT
60	11	5330-01-356-7144	73124	BF0150PP

CROSS REFERENCE INDEXES

FIG.	ITEM	FIGURE AND ITEM NUMBER INDEX STOCK NUMBER	CAGEC	PART NUMBER
60	12		7R531	RT56125
60	13	4730-01-356-8761	72423	2171-249
60	14	5310-00-225-6993	96906	MS51922-33
60	15	5310-00-809-5998	96906	MS27183-18
60	16	5340-01-324-4262	66234	401-94252
60	17	5306-01-323-5539	66234	401-94251
60	18	4730-01-324-6572	05779	P8MCB-6
60	19		66234	204-85227
60	20	4730-00-196-1502	96906	MS51953-29
60	21	4730-01-339-8103	72423	2071-098
60	22	4820-01-340-0285	39428	4887K33
60	23	4730-01-340-1680	72423	2071-099
60	24	4730-01-324-6595	8K002	2P130
60	25	4730-01-323-5080	72423	1101-148
60	26	4730-00-196-1468	96906	MS51953-97
60	27	4730-01-324-6492	72423	2173-200
60	28	5305-00-071-2081	50204	B1821BH050C450N
60	29		66234	483-49720
60	30	5340-01-324-6783	66234	410-92661
60	31		66234	488-72394
60	32	5340-01-357-6222	73124	BF10075SXT
60	33		7R531	RT5675
60	34	5330-01-356-7145	73124	BF0075PP
60	35	5430-01-339-8677	65234	221-92018
60	36		66234	221-92023
60	37	5343-01-348-6116	66234	221-92322
60	33	5306-01-324-4962	7J925	370-74138-05
60	39	4730-01-323-7313	82247	H1/4VVL-8002
61	1	5120-01-361-9773	2X179	7535.14603.009

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APPENDIX G

ILLUSTRATED LIST OF MANUFACTURED ITEMS

G-1. INTRODUCTION.

This appendix includes complete instructions for manufacturing or fabricating authorized items locally. All bulk materials needed to manufacture an item are listed by part number or specification number in a tabular list with an illustration, as needed.

Section I. UNIT MAINTENANCE MANUFACTURED ITEMS

G-2. AIR DUCT HOSE FABRICATION.

The air duct hose for the air cleaning assembly is fabricated from bulk hose stock, P/N CWC2INDIA. It is fabricated by cutting a 12 in. (305 mm) length of bulk hose with a fine-toothed hacksaw or suitable cutting device. Refer to paragraph 4-37 for installation instructions.

G-3. FUEL HOSE FABRICATION.

There are two fabricated fuel hoses in the fuel system, one is a supply line and one is a return line. Locations and installation instructions are found in paragraph 4-42 and paragraph 4-46. Table G-1 lists the two hoses.

Table G-1. Fuel System Hoses

Item	Hose Assy Part Number	Bulk Hose Part Number	Cutoff Length Inches (mm)	Fitting A	Fitting B
Supply	204-92148	H05704	10 (254)	100-43	7270.104
Return	204-92149	H05704	16 (406)	4501-4-4	560.9571.077

G-4. ELECTRICAL GROUND AND JUMPER WIRES FABRICATION.

There are six ground and jumper wires in the electrical system. Locations are shown in the RPSTL, figures 32, 34, and 35. Refer to paragraph 4-83 for terminal or connector installation.

Table G-2. Ground and Jumper Wires

Wire Part Number	Bulk Wire Part Number	Cutoff Length Inches (mm)	Wire Gauge
WG-16-0-6IN	WG-16-0-1000	6 (152)	16 ga
WG-16-0-8IN	WG-16-0-1000	8 (203)	16 ga
WG-16-0-12IN	WG-16-0-1000	12 (305)	16 ga
703-92132	WG-10-0-1000	9 (228)	10 ga
703-92096	WB-4-0-500	10 (254)	4 ga
WG-16-0-6IN	WG-16-0-1000	6 (152)	16 ga

G-5. CONDUIT FABRICATION.

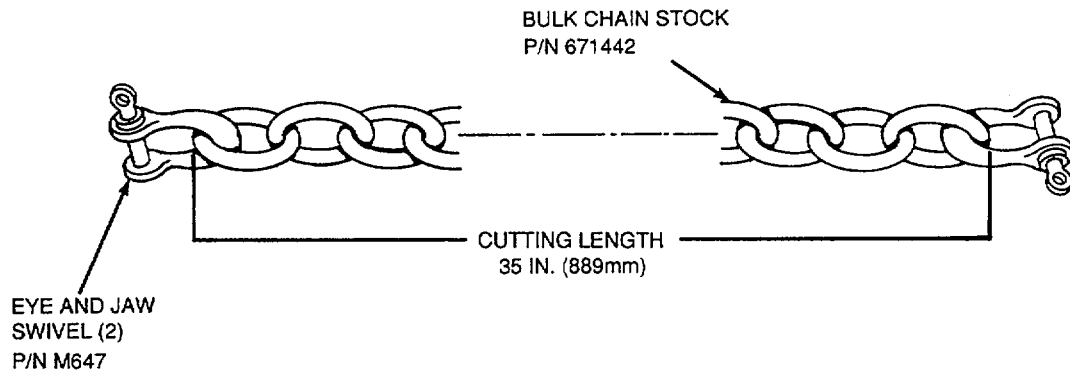
Conduit for the broom hood wiring harness is fabricated from bulk PVC pipe stock, P/N A52AE12. Cut conduit using a fine-toothed hacksaw or suitable cutting device. Drill endcaps with a drill and 1/2" drill bit. Coupling, P/N E940D can be used for repair of damaged conduit. Refer to paragraph 4-78 for installation instructions.

Table G-3. Conduit Fabrication

PVC Part Number	Bulk PVC Part Number	Cutoff Length Inches (mm)	Quantity	Fitting A	Fitting B
402-92109	A52AE12	2 (51)	1	401-005	N/A
402-92111	A52AE12	48.5 (1221)	2	401-005	406-005E
402-92110	A52AE12	16 (406)	2	406-005E	447-005

G-6. TRANSPORT CHAIN FABRICATION.

The transport chain is used in two places. The length is the same for each application.



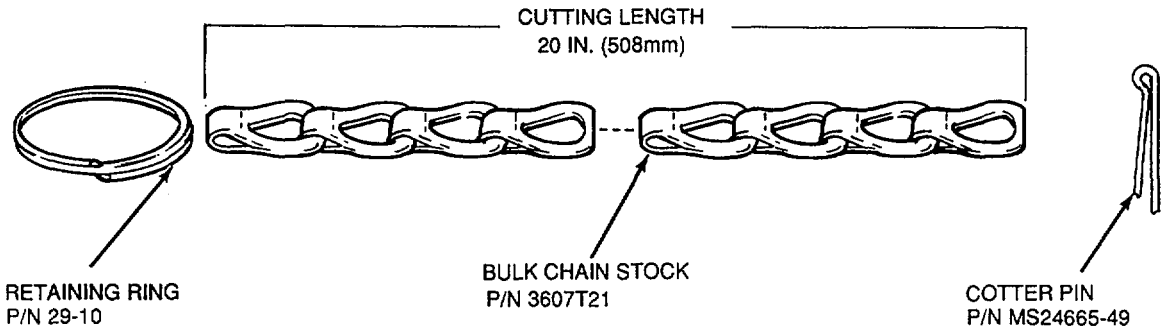
NOTES:

1. Obtain enough bulk chain, P/N 671442, to fabricate transport chain to desired length.
2. Use a fine-toothed hacksaw or suitable cutting device and cut chain.
3. Install two eye and jaw swivels, P/N M647, on chain.

Figure G-1. Transport Chain

G-7. STUD LINK CHAIN FABRICATION.

One stud link chain is located on the main frame assembly.



NOTES:

1. Obtain enough bulk chain, P/N 3607T21, to fabricate stud link chain to desired length.
2. Use a fine-toothed hacksaw or suitable cutting device and cut chain.
3. Install retaining ring, P/N 29-10, and cotter pin, P/N MS24665-495, on chain.

Figure G-2. Stud Link Chain

G-8. HYDRAULIC HOSE FABRICATION.

The following hydraulic hoses are cut from bulk hose using a fine-toothed hacksaw or suitable cutting device, and are clamped on to the hydraulic fittings. Refer to paragraph 4-105 for installation instructions.

Table G-4. Hydraulic Hoses

Hose Assembly Part Number	Bulk Hose Part Number	Cutoff Length Inches (mm)
204-85611	2556-12	11(279)
204-85730	U216-6	30 (762)
204-85690	2556-12	90 (2286)

G-9. HOSE GUARD FABRICATION.

Plastic hose guard for the hydraulic motor hoses is fabricated from bulk hose guard stock, P/N 1722-95. It is fabricated by cutting 12 in. (305 mm) length of the bulk hose guard using tin snips. Wrap hose guard around hydraulic hoses.

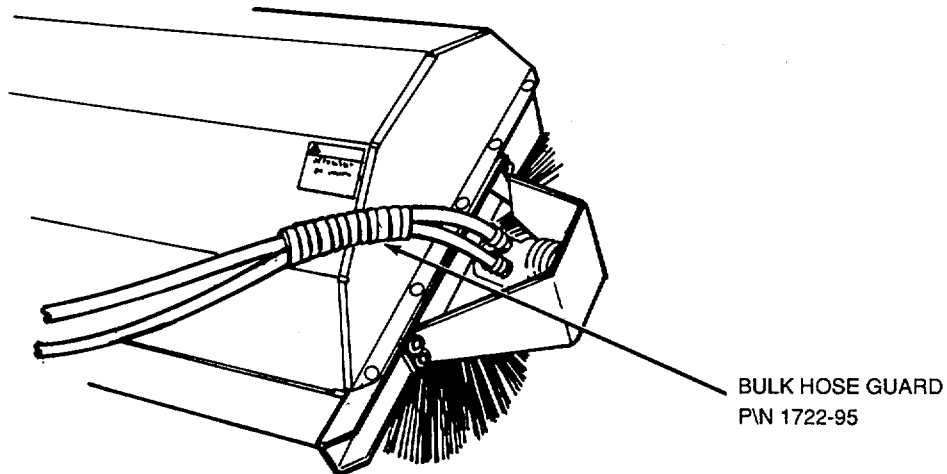


Figure G-3. Hose Guard

G-10. WATER LINES FABRICATION.

The two water lines are fabricated from bulk hose stock, P/N B708. Locations and installation instructions are found in paragraph 4-123. Cut bulk hose to desired length using a fine-toothed hacksaw or suitable cutting device. Table G-5 lists the hoses.

Table G-5. Water Hoses

Hose Assembly Part Number	Bulk Hose Part Number	Cutoff Length Inches (mm)
204-85299	B708	99 (2515)
204-85227	B708	27 (686)

G-11. WATER TANK LID STRING FABRICATION.

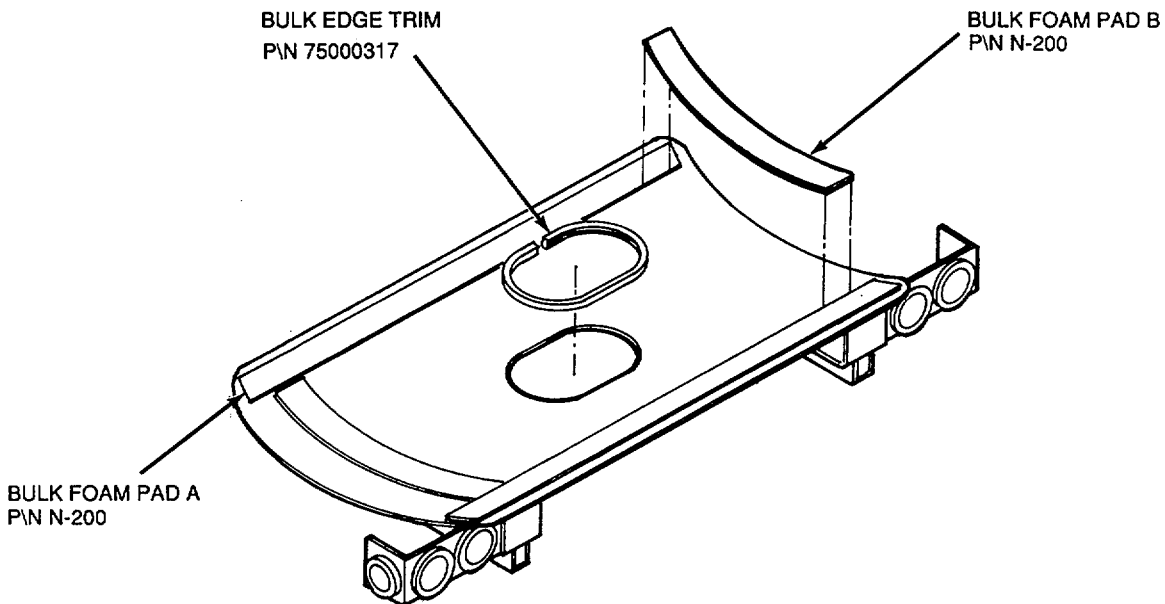
The water tank lid string is fabrication from bulk string stock, P/N 3852T36. It is fabricated by cutting an 18 in. (457 mm) length of bulk string using scissors or a suitable cutting device. Refer to paragraph 4-121 for installation instructions.

G-12. WATER TANK SADDLE TRIM AND PAD FABRICATION.

Edge trim for the water tank saddle is fabricated from bulk trim stock, P/N 75000317. Foam pad is fabricated from bulk pad stock, P/N N-200. Table G-6 lists bulk items and lengths; all widths are 4 inches.

Table G-6. Saddle Trim and Pads

Item	Item Assembly Part Number	Bulk Part Number	Cutoff Length Inches (mm)
Trim	488-49720	75000317	76 (1930)
Pad A	488-72394	N-200	41(1041)
Pad B	488-72394	N-200	16 (406)



WARNING

Dry cleaning solvent P-D-680 is toxic and flammable. Wear protective goggles, face mask, and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapor. Do not use near open flame or excessive heat. The flashpoint for type I dry cleaning solvent is 100°F (38°C) and for type II is 140°F (60 °C). If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, flush eyes with water and get medical aid immediately.

NOTES:

1. Scrape old foam pads from saddle with scraper and clean affected areas with dry cleaning solvent P-D-680.
2. Remove edge trim from the saddle and clean affected area with dry cleaning solvent P-D-680.
3. Cut foam pads A and B and/or edge trim to lengths specified in table G-6.
4. Install foam pads A and B and/or edge trim to saddle with self-adhesive side facing down.

Figure G-4. Saddle Trim and Pads

Section II. DIRECT SUPPORT MAINTENANCE MANUFACTURED ITEMS

G-13. THROTTLE CONTROL LOCKWIRE FABRICATION.

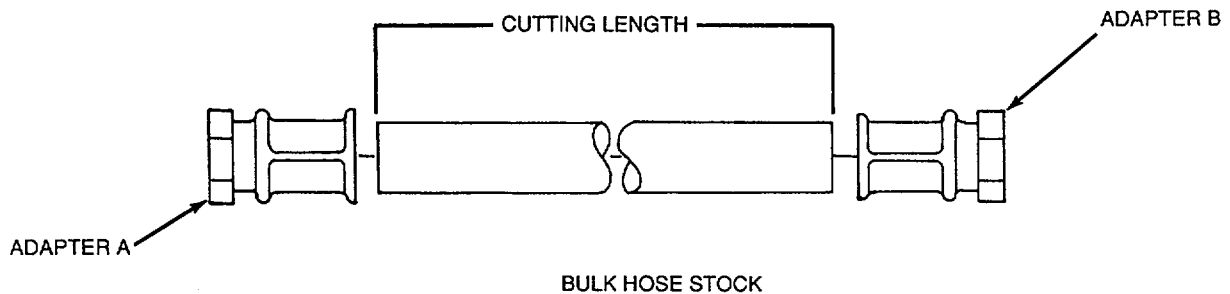
Lockwire for the throttle control lever assembly is fabricated from bulk wire stock, P/N MS20995C20. It is fabricated by cutting a 12 in. (305 mm) length of the bulk wire with wire cutters. Refer to paragraph 5-28 for installation instructions.

G-14. HYDRAULIC HOSE FABRICATION.

The following hydraulic hoses are cut from bulk stock. Refer to paragraph 4-105 for installation instructions. Table G-7 lists the hoses and adapters.

Table G-7. Hydraulic Hose Assembly Components

Hose Assembly Part Number	Bulk Hose Part Number	Cutoff Length Inches (mm)	Adapter A	Adapter B
204-85451	J412	51(1295)	HL12-12NJ	HL12-12NJ
204-85041	SAE100R1TY-ATSZ4	41(1041)	HA04-04MB	HG04-04NJ
204-85493	J412	93(2362)	10655-12-12	10655-12-12



NOTES:

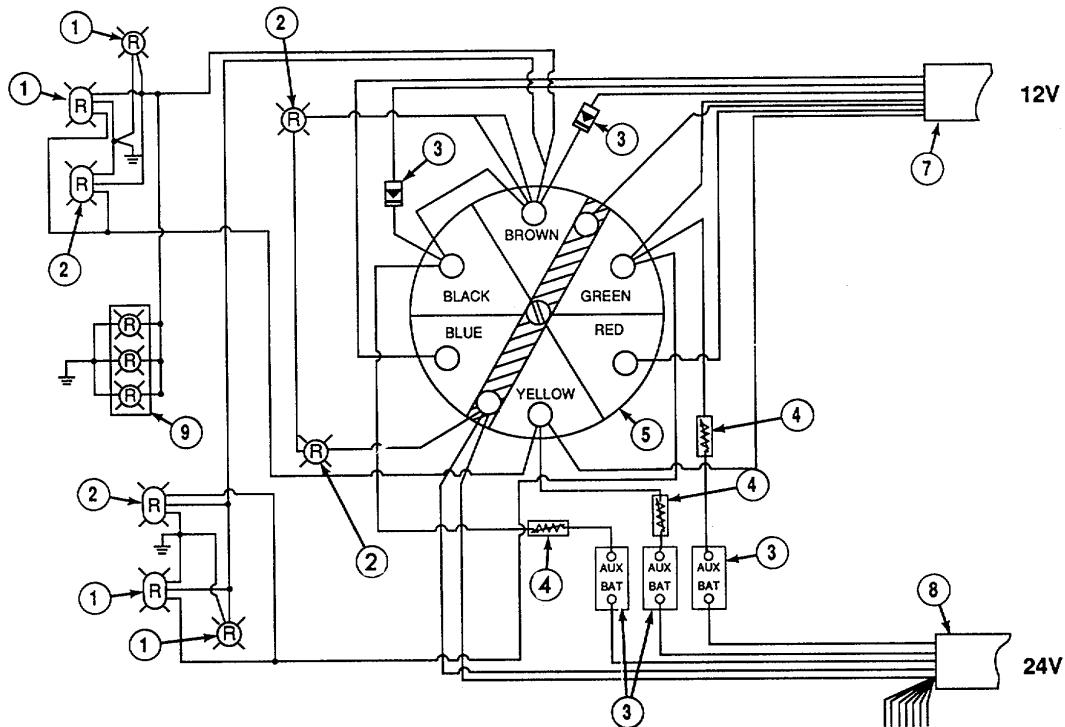
1. Obtain all components required to fabricate desired hose assembly (table G-7).
2. Use a fine-toothed hacksaw or suitable cutting device and cut hose to desired length.
3. Slide adapter A on hose and crimp as necessary.
4. Slide adapter B on hose and crimp as necessary.
5. Prior to installation, test hose and adapter assembly to 2, 000 psi (13, 800 kPa) using methods found in TM 9-4940-468-14, Tool Outfit Hydraulic System Test and Repair.

Figure G-5. Hydraulic Hose Assembly Components

APPENDIX H

SCHEMATICS

ELECTRICAL LIGHTING DIAGRAM

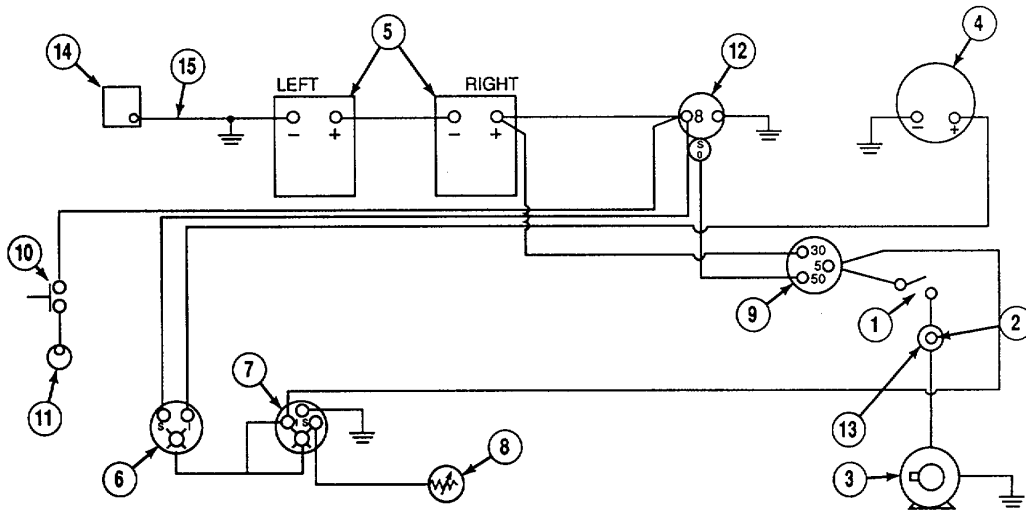


12V AND 24V WIRING HARNESSSES

LEGEND

No.	Qty	Description
1	4	LAMP, TURN SIGNAL
2	4	LAMP, RED SIDE LAMP
3	2	DIODE
4	3	RESISTOR
5	1	TERMINAL BLOCK
6	3	CIRCUIT BREAKER
7	1	WIRE HARNESS
8	1	WIRE HARNESS
9	1	I.D. LIGHT BAR

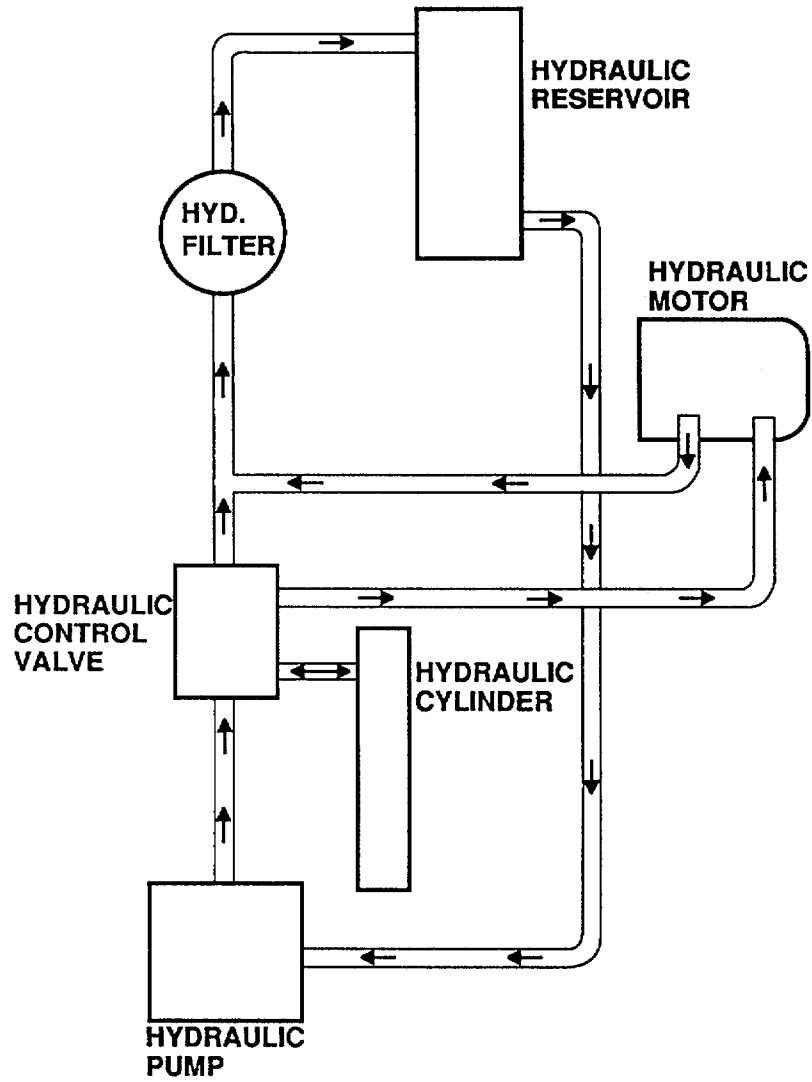
ENGINE AND BATTERY WIRING HARNESS



LEGEND

No.	Qty	Description
1	1	SWITCH, TOGGLE
2	1	FUSE
3	1	PUMP
4	1	ALTERNATOR
5	2	BATTERY
6	1	AMMETER
7	1	FUEL GAGE
8	1	FUEL SENDING UNIT
9	1	SWITCH, IGNITION
10	1	SWITCH, PUSH BUTTON
11	1	GLOW PLUG
12	1	STARTER RELAY
13	1	FUSE HOLDER
14	1	ENGINE
15	1	WIRE ASSY, GROUND

HYDRAULIC SCHEMATIC



H-3/(H-4 blank)

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By Order of the Secretary of the Army:

GORDON R. SULLIVAN
General, United States Army
Chief of Staff

Official:


MILTON H. HAMILTON
Administrative Assistant to the
Secretary of the Army
04223

Distribution:

To be distributed in accordance with DA Form 12-25-E, Block 5262, requirements for TRS-3625-230-14 & P.

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 = 1Megagram = 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

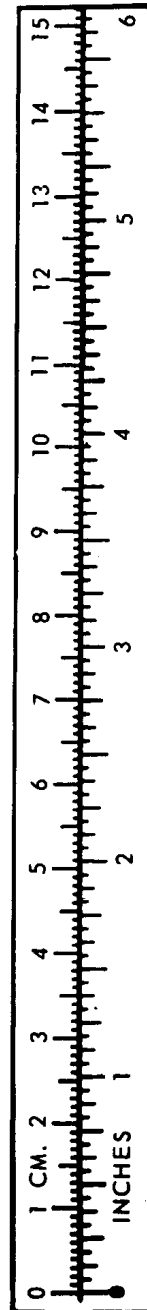
1 Cu. Centimeter = 1000 Cu. Millimeters = 0.06 Cu. Inches
 1 Cu. Meter = 1,000,000 Cu. Centimeters = 35.31 Cu. Feet

TEMPERATURE

$5/9 (^{\circ}\text{F} - 32) = ^{\circ}\text{C}$
 212° Fahrenheit is equivalent to 100° Celsius
 90° Fahrenheit is equivalent to 32.2° Celsius
 32° Fahrenheit is equivalent to 0° Celsius
 $9/5 (^{\circ}\text{C} + 32) = \text{F}^{\circ}$

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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