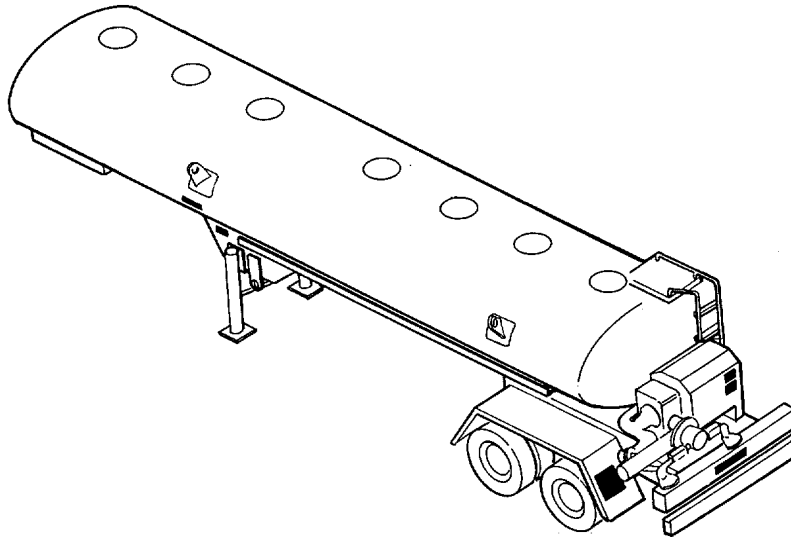


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TM 5-3825-229-14&P

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



**DISTRIBUTOR, WATER, SEMITRAILER MOUNTED,
6,000 GAL. CAPACITY
(NSN 3825-01-297-3357)
E.D. ETNYRE MODEL 60 PRS**

**Approved for public release: Distribution is Unlimited.
HEADQUARTERS, DEPARTMENT OF THE ARMY**

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30 SEPTEMBER 1991

WARNING

The discharge valve must always be closed before removing the cap or discharge hose, and whenever there is nothing connected to the output of the valve. This will prevent possible serious injury to personnel and damage to the equipment.

WARNING

The engine has a pressurized cooling system. Remove cap slowly and only when engine is cool or painful burns could result.

WARNING

A hot brake can cause serious burns. Be cautious when inspecting brakes after use. Slowly move hand toward brake drum. If drum is overheated, heat will be felt before actually touching drum.

WARNING

Wear protective goggles when opening drain cock and avoid air stream. Failure to do so could result in personal injury.

WARNING

Be sure all personnel stand clear of the towing vehicle and semitrailer during coupling operations.

WARNING

Extreme caution shall be exercised in all turns, curves, and highway cloverleaves, as well as under adverse weather conditions.

WARNING

Under no circumstances shall speeds exceed the following:

- Highway: 55 mph (88 km/h)
- Gravel/Dirt: 30 mph (48 km/h)
- Off-Road: 5 mph (8 km/h)

WARNING

Liquid tanks filled to their normal capacity handle essentially the same as a similar vehicle with a solid load. However, when driving with a partially filled tank, "sloshing" can be detected and must be taken into account in establishing safe driving practices. The driver of a partially loaded tank should learn the characteristics of the load and handle his braking efforts accordingly. It is recommended to keep the brakes on for a few moments after coming to a stop to avoid vehicle movement in the event that the braking sequence has developed a wave action in the tank.

WARNING

All personnel must wear hearing protection when the engine is operating, or permanent hearing loss may occur.

WARNING

Do not start the engine while either of the green SPRAY NOZZLE indicator lights is on. Be sure that the caps are securely fastened on all discharge outlets. Failure to heed this warning could result in serious personal injury.

WARNING

When moving the semitrailer into position near a water source be sure that the ground is stable enough to support the weight of the fully loaded tractor-trailer, and that the surrounding terrain is passable. When stopped, chock the wheels of both the truck-tractor and the semitrailer. Personnel working at the water loading site must avoid placing themselves in a position where equipment malfunction, or sudden equipment movement, would injure them. Failure to follow these warnings could result in severe personal injury, death and/or equipment damage.

WARNING

Be sure that all valves are in their proper positions before starting the engine, or severe personal injury could occur.

WARNING

Be sure no one is standing behind semitrailer when starting engine. Personal injury could occur if discharge valve or spray nozzles are accidentally left open.

WARNING

The hose is full of water and may require two persons to lift it from the water.

WARNING

When uncoupling the suction hose, do not stand in front of hose or piping. The force of water gushing out of the plumbing can knock you down.

WARNING

Be careful when climbing on rear of semitrailer. The surfaces may be wet or greasy, causing you to fall.

WARNING

Be sure the control box is in a position that will not interfere with or obstruct safe driving practices.

WARNING

Be certain that no one is standing behind the semitrailer before turning on the spray nozzles.

WARNING

Do not attempt to adjust the spray nozzle pattern while the engine is running. Personal injury may result.

WARNING

Do not start the engine while either of the green SPRAY NOZZLE indicator lights are on.

WARNING

Be certain the discharge nozzle is closed before starting the engine. Do not open the discharge valve unless someone is holding the discharge end of the hose securely, and that person is aware that you are about to open the valve.

WARNING

Open and close the discharge valve SLOWLY to prevent injuring the person at the end of the hose from sudden surges in pressure.

WARNING

One person must remain at the semitrailer at all times to control the flow of water when pumping out the discharge hose.

WARNING

Be certain that all persons understand the visual signals to be used to start and stop the flow of water to the discharge hose.

WARNING

Be certain that all persons understand how to operate the adjustable nozzle.

WARNING

Do not stand in the path of water when removing the protective cap from the suction line. Personal injury could occur from the force of water.

WARNING

To prevent injury to personnel, disconnect the electrical power source before performing any troubleshooting on wiring harness, connectors or lights.

WARNING

Never service or troubleshoot the pump with the engine running. Equipment damage or severe personal injury can result.

WARNING

Wear protective face shield when servicing the battery to protect the facial skin in case that the battery acid splashes and would come in contact with the skin and cause burns. Avoid contact with the eyes. If contact occurs, flush eyes with cold water and seek immediate medical attention. Wear rubber gloves and avoid acid contact with the skin. If contact occurs, wash immediately with cold water and seek medical attention as necessary.

WARNING

Disconnect all electric power before servicing the semitrailer.

WARNING

If NBC contamination is suspected, all the air filter media should be handled by personnel wearing protective equipment. Consult your NBC officer or NBC NCO for appropriate handling instructions.

WARNING

Wear protective goggles when using the cleaning solvent and avoid contact with the eyes. If contact occurs, flush eyes with cold water for 5 minutes and seek immediate medical attention. Dry cleaning solvent (PD-680) is both toxic and flammable. Avoid prolonged breathing of vapors. Avoid skin contact. Use only in a well-ventilated area. Keep away from open flame. Flash point of solvent is 138°F (59°C).

WARNING

Electrical shock hazard exists. Disconnect battery cables.

WARNING

Frame and axle must be firmly supported to prevent shifting of semitrailer. Shifting may cause serious injury to personnel and damage to equipment.

WARNING

Use care when removing feet from landing legs. Raise legs only high enough to remove foot.

WARNING

A hot engine can cause severe burns.

WARNING

Pressurized coolants have higher boiling point than water. NEVER open radiator filler cap when coolant temperature is above 212°F (100°C) or while engine is running.

WARNING

Improper use of cleaning solution can cause burns or other serious injury. Read all warning labels carefully before using.

WARNING

Contact with hot coolant can cause serious burns. Allow cooling system to cool before releasing pressure.

WARNING

Diesel fuel is highly combustible. To avoid injury or death, do not smoke or use open flame near fuel pump, tank or lines.

WARNING

Be sure exhaust system has cooled before starting work.

WARNING

The semitrailer must be supported adequately to prevent shifting. Shifting may cause serious personal injury and/or damage to the equipment.

WARNING

The axle assembly is heavy and awkward to handle. Use caution, adequate support and assistance during removal. Failure to follow this warning could result in serious injury to personnel.

WARNING

The axle assembly is heavy and awkward to handle. Use caution, adequate support and assistance during installation. Failure to follow this warning can result in serious injury to personnel.

WARNING

It is essential that torque values be maintained to insure proper operation of the suspension system. The torque values of the suspension bolts and nuts must be checked after an initial break-in period of 1,000 miles (1600 km) and every three months thereafter. Failure to do so may cause injury to personnel or damage to the equipment.

WARNING

Be sure cooling system has cooled completely before starting work.

WARNING

Do not allow pump to swing freely. To avoid injury, use two persons to guide pump by hand, while crane lifts unit off semitrailer.

WARNING

When testing or adjusting fuel injectors, do not place your hands or arms in front of injector nozzle. Nozzle discharge pressure can cause oil to penetrate the skin and cause blood poisoning or serious skin infection.

WARNING

Electrical shock hazard exists. Ensure battery cables are disconnected prior to servicing electrical or engine components.

CHANGE
NO. 1

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

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AND GENERAL SUPPORT MAINTENANCE MANUAL
(INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST)
DISTRIBUTOR, WATER, SEMITRAILER MOUNTED, 6,000 GAL. CAPACITY
(NSN 3825-01-297-3357)
E.D. ETNYRE MODEL 60 PRS**

Current as of 9 March 1993

TM 5-3825-229-14&P, dated 30 September 1991, is changed as follows:

1. Remove old pages and insert new pages.
2. New or changed material is indicated by an asterisk or by a vertical bar in the margin of the page.

Remove Pages

*vii and viii
C-1 through C-31(C-4 Blank)
D-1 and D-2
F-1 through Figure 3
4-1 and Figure 5
7-1 and Figure 8
9-1 and Figure 10
11-1 and Figure 12
14-1 through Figure 15
17-1 through Figure 20
21-1 through Figure 31
34-1 through Figure 36
38-1 through Figure 40
47-1 and Figure 48
51-1 and Figure 52
55-1 through Figure 61
66-1 through Figure 68
69-1 through 71-1
I-1 through I-49*

Insert Pages

*vii through ix(x Blank)
C-1 through C-3/(C-4 Blank)
D-1 and D-2
F-1 through Figure 3
4-1 and Figure 5
7-1 and Figure 8
9-1 and Figure 10
11-1 and Figure 12
14-1 through Figure 15
17-1 through Figure 20
21-1 through Figure 31
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38-1 through Figure 40
47-1 and Figure 48
51-1 and Figure 52
55-1 through Figure 61
66-1 through Figure 68
69-1 through Bulk-1
I-1 through I-49*

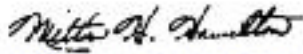
3. File this change sheet in front of the publication for reference purposes.

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General, United States Army
Chief of Staff

Official:


MILTON H. HAMILTON
Administrative Assistant to the
Secretary of the Army
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FOR

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E.D. ETNYRE MODEL 60 PRS**

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

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

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CHAPTER 1

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1-1. SCOPE

a. Type of Manual. Operator's, Organizational, Direct Support and General Support Maintenance Manual (Including Repair Parts and Special Tools Lists).

b. Model Number and Equipment Name. Distributor, Water, Semitrailer Mounted, 6,000 Gal. Capacity (E.D. Etnyre Model 60 PRS).

c. Purpose of Equipment. Primary intended use is for soil stabilization and soil compaction operations requiring distribution of water. The distributor can also be used for dust alleviation, fire fighting, and transport of water for emergency use. It is specifically not intended for transport or other handling of potable or drinking water.

d. Special Limitations on Equipment. Do not exceed the load and speed limitations of semitrailer. Semitrailer is designed to be towed with tank filled to its capacity of 6000 gallons (22,700 liters) over hardsurfaced roads, unimproved roads, or trails and open rolling terrain at the following maximum speeds:

- Highway: 55 mph (88 km/h)
- Gravel/Dirt: 30 mph (48 km/h)
- Off-Road: 5 mph (08 km/h)

The semitrailer should be operated only after being serviced and equipped for existing climatic conditions.

1-2. MAINTENANCE FORMS, RECORDS AND REPORTS

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

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

For destruction of Army materiel to prevent enemy use, refer to TM 750-244-6.

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

If your semitrailer mounted water distributor needs improvement, let us know. Send us an EIR. You, the user, are the only one that can tell us what you don't like about your equipment. Let us know why you don't like the design or performance. Put it on an SF 368 (Quality Deficiency Report). Mail it to: Commander, U.S. Army Tank-Automotive Command, ATTN: AMSTA-MB, Warren, MI 48937-5000. We'll send you a reply.

1-5. PREPARATION FOR STORAGE OR SHIPMENT

For information on preparing the Water Distributor Semitrailer for storage or shipment, refer to Chapter 4, Section XII.

1-6. WARRANTY

E.D. Etnyre and Company warrants to the original purchaser, its new product to be free from defects, in material and workmanship for a period of eighteen (18) months after the delivery date to the original purchaser. The month and year in which the warranty period began is identified on a "Warranty" data plate that is located near landing leg on road side of trailer.

Section II. EQUIPMENT DESCRIPTION

Paragraph Number	Title	Page Number
1-7	EQUIPMENT CAPABILITIES AND FEATURES	1-2
1-8	LOCATION AND DESCRIPTION OF MAJOR COMPONENTS	1-3
1-9	EQUIPMENT DATA	1-6

1-7. EQUIPMENT CAPABILITIES AND FEATURES

a. Capabilities.

- (1) Can be towed by M123A1C, M920, or M916 military truck tractors for either highway or off- road use.
- (2) Can transport up to 6000 gallons of water.
- (3) Can be gravity-filled through manhole in top of tank, or force-fed by pump from either a standing water supply (lake, stream or pond) or from a hydrant or other water source.
- (4) Two spray nozzles mounted at rear of semitrailer each produce a fan-like spray which spreads water over a width of approximately 35 feet or more, depending on pressure. The maximum combined area covered by both nozzles is approximately 70 feet wide.

1-7. EQUIPMENT CAPABILITIES AND FEATURES (cont)

b. Features.

(1) The engine and electrically controlled spray nozzle valves are operated from either of two control panels. One control panel is permanently mounted in a cabinet on right rear fender. The other panel is connected by a cable for remote control from cab of tractor. The remote control panel is stored in the cabinet when not in use. Both control panels are equipped to allow for starting and stopping engine, controlling engine speed (and thus water pressure and flow), and turning on or off the two sprinkler nozzles.

(2) Diesel engine driven, self-priming pump with four-inch suction and discharge ports.

(3) Four-inch suction hose for filling tank from standing water sources such as ponds or streams.

(4) Fifty-foot (1-1/2" diameter) fire hose with adjustable nozzle that can be adjusted for no flow, straight stream, or fog.

(5) The pump can discharge water from several different points:

- (a) Through one or both of a pair of spray nozzles located at rear of semitrailer.
- (b) Through a fifty-foot fire hose.
- (c) Through a three-inch line and valve to the tank (for filling tank).

1-8. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS

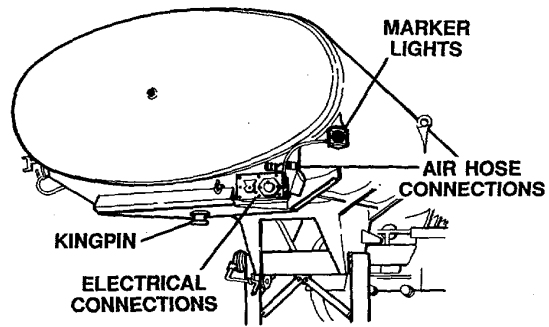
a. Front View.

(1) Kingpin - Connects semitrailer to fifth wheel of truck tractor.

(2) Air Hoses Connections - Service and emergency hoses connect to towing vehicle to provide air pressure for brake actuation and for primary operation of the electrically controlled spray nozzle valves.

(3) Electrical Connections - Connect to towing vehicle. Provide electrical power for brake and clearance lights.

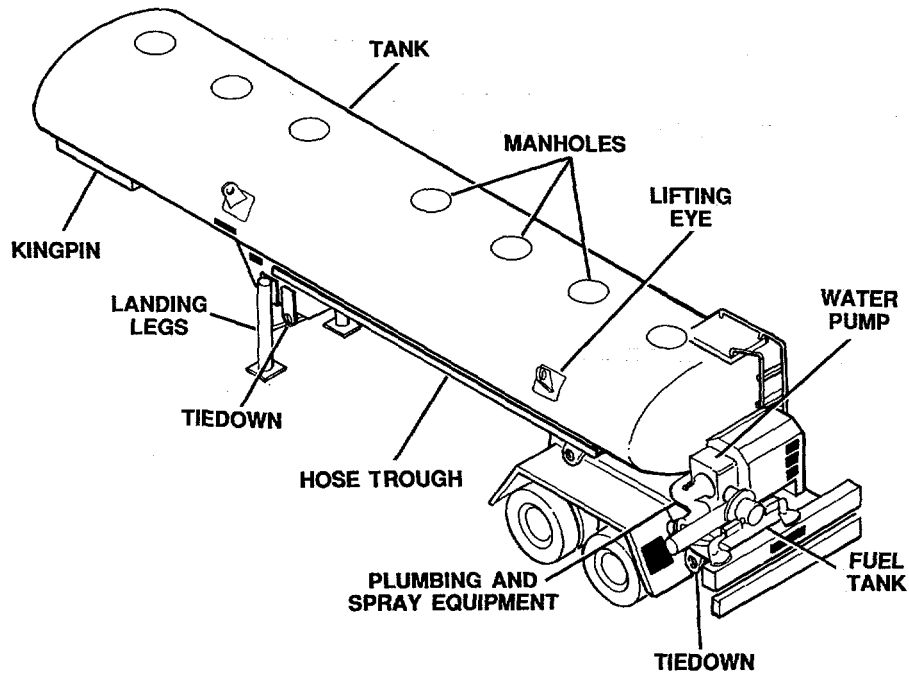
(4) Front Marker Lights - Mark front of semitrailer.



Front View

1-8. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (cont)

b. Roadside View.

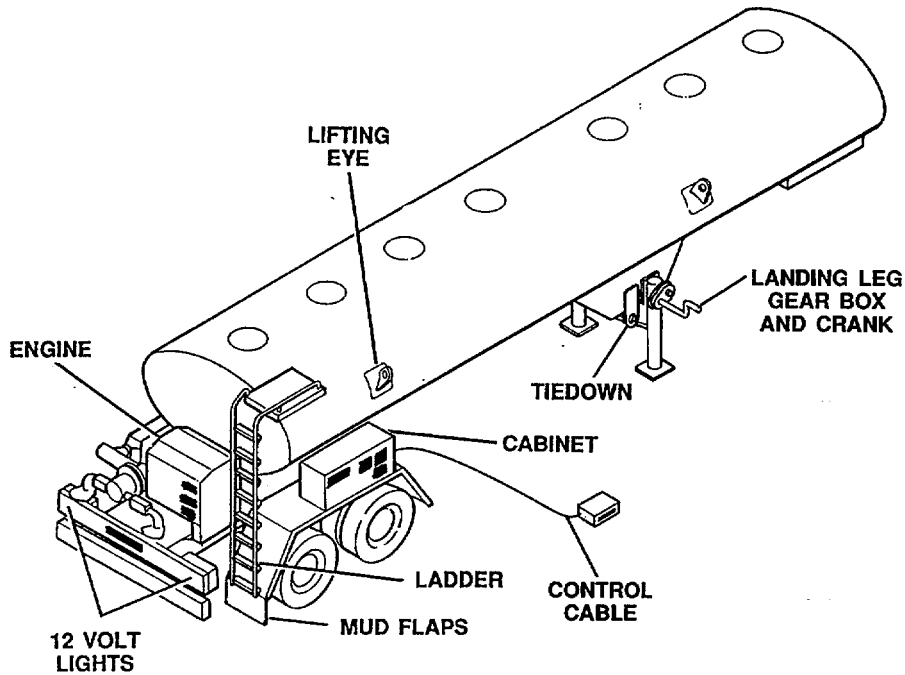


Roadside View

- (1) Tank - Fabricated steel tank with internal baffles. Includes manholes, access ladder, and lifting eyes.
- (2) Landing Legs - Support load of semitrailer (loaded or unloaded) when it is not coupled to a truck-tractor. Manually extended and retracted. Two-speed gear box for ease of handling.
- (3) Hose Trough - Storage area for suction hoses.
- (4) Lifting Eyes - Four lifting eyes evenly spaced around center of gravity of unit. Provide lifting points for empty unit. 12,880 lb (5855 kg) capacity (each eye).
- (5) Tiedowns - Six tiedown. One on each side of bogie frame behind rear axle, one on each side of the bogie frame ahead of the rear axle, and one on each side of landing legs. 16,000 lb (7273 kg) capacity.
- (6) Manholes - Provide access to inside of tank for cleaning or repair.
- (7) Pump - Self-priming, centrifugal-type pump with four-inch suction and discharge ports.
- (8) Plumbing and Spray Equipment - Includes all valves, piping, hoses and nozzles for suction and discharge of water.
- (9) Fuel Tank - 24-gallon tank supplies fuel for water distributor engine.

1-8. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (cont)

c. Curbside View



Curbside View

- (1) Cabinet - Contains permanently mounted control panel and tool box, and provides storage for remote control box and fire fighting hose when not in use.
- (2) 12-Volt Lights - Includes stop, turn signal, backup, and clearance lights. Also includes a 24-volt to 12-volt converter for connecting to truck tractors with 24-volt systems.
- (3) Engine - Liquid-cooled, four-cylinder, diesel engine direct-coupled to pump. Provides variable speed power for pump.
- (4) Mud Flaps - Keep mud and water from being splashed off rear tires during rainy weather. Mud flaps also prevent most rocks from being thrown off to the rear when traveling on unimproved roads.
- (5) Ladder - Provides access to top of tank.
- (6) Control Cable - 56 feet (17.08 m) long. Allows installing and positioning remote control box in prime mover.

1-9. EQUIPMENT DATA

a. Dimensions and Weights.

Overall height120 in. (304.8 cm)
Overall length450 in. (1143 cm)
Overall width96 in. (243.8 cm)
Upper fifth wheel plate height (empty) 62 in. (1 57.4 cm)
Wheelbase326 in. (828.0 cm)
Ground clearance (at brake chamber) 13 in. (33.0 cm)
Width across tires 95.5 in. (242.6 cm)
Tread width (per tire).....7 in. (17.8 cm)
Distance between axles (center to center) 49 in. (1 24.5 cm)
Overhang (bumper to center of rear axle) 68.5 in. (174 cm)
Fording depth 30 in. (76.2 cm)
Shipping weight15,000 lb (6818 kg)
Operating weight (including water, fuel, coolant, oil) 65,300 lb (29619 kg)

b. Electrical System.

Voltage 12 and 24 volts dc negative ground
Stop, turn, and taillights 12 volt
Clearance lights 12 volt

c. Axles.

Quantity 2
Manufacturer Rockwell Axle
Model No. TN4670-Q2027
Type 5" round
Capacity 22,500 lb (10,227 kg)

d. Hubs.

Manufacturer Gunite Hub
Model No. 5631 RH3 & 5631 LH3
Type 10 stud with inner and outer nuts
Capacity 25,000 lb (11,363 kg)

e. Brakes.

Actuation Air
Type S-Cam
Manufacturer Rockwell Axle
Model .. Q" Quick Change
Total braking surface area (per axle) 460 in. (1 168.4 cm)

Brake Chambers

Manufacturer Aeroquip
Model No KSD303OFC-00291
Type Self-adjusting

1-9. EQUIPMENT DATA (cont)

e. Brakes (cont).

Brake Linings
 Manufacturer Molded Material
 Model No..... E-1 45-A
 Type Non-asbestos

Brake Drums
 Manufacturer..... Gunito
 Model No..... 3483

f. Wheels.

Manufacturer Accuride
 Model No..... Disc #27404
 Size 2.5 X 8.25
 Rim type Drop center (demountable)

g. Tires.

Size 11 X 22.5
 Type Bias
 Ply rating 12,F
 Load rating 4760 lb @ 75 psi (2163.6 kg @ 517 kPa) (static)

h. Landing Leg.

Manufacturer Westran
 Model No LPR2-50-444
 Type 2-speed

i. Engine.

Type 4-cycle diesel, liquid cooled
 Manufacturer Cummins/Onan
 Model No L-423 D-P
 Number of cylinders 4
 Bore 3.50 in. (88.90 mm)
 Stroke 3.62 in. (91.95 mm)
 Total displacement 140 cu. in. (2294 cc)
 Governed speed 2800 rpm
 Maximum net horsepower 58 @ 3600 rpm
 Maximum net torque 98 @ 2000 rpm
 Alternator output 12 volts, 37 amps

j. Pump.

Type Centrifugal, self-priming
 Manufacturer ITT Marlow
 Model No 4C7
 Capacity 600 gpm @ 90 ft of head (2271 lpm @ 27.4 m of head) (maximum)

1-9. EQUIPMENT DATA (cont)

k. Spray Nozzle Control Valves.

Manufacturer CLA - VAL Co.
 Model No 7100 KH
 Size 2 in.
 Control system Fluid actuated diaphragm

Section III. TECHNICAL PRINCIPLES OF OPERATION

Paragraph Number	Title	Page Number
1-10	SEMITRAILER	1-8
1-11	WATER DISTRIBUTOR SYSTEM1 -9

1-10. SEMITRAILER

a. Electrical System. Includes 12-volt wiring for operating taillights and clearance lights. Power for semitrailer lights is supplied from towing vehicle via a cable that must be connected by operator when semitrailer is coupled to towing vehicle. The system is equipped with a 24-volt converter, providing capability for use with military or commercial systems.

b. Brake System. Semitrailer service and emergency brakes are air-actuated brakes that are controlled from towing vehicle. Air pressure for actuation is supplied by towing vehicle via two air hoses that must be connected by operator when semitrailer is coupled to towing vehicle. Components of brake system that operator/crew must inspect and maintain include the following:

(1) Gladhands. The gladhands are located at front of semitrailer. Gladhands are couplers that connect towing vehicle air system to semitrailer air brake system interconnecting hoses.

(2) Air Reservoir Tanks. Two air reservoirs located beneath semitrailer store and maintain air pressure for actuation of brakes. A drain cock is located in the bottom of each air reservoir. Purpose of drain cock is to drain condensation (water) from tanks. This prevents water from entering semitrailer air system. Water can affect operation of brakes and cause damage to components of air system. The drain cocks are opened by pulling on cables that extend through frame between roadside tires.

(3) Spring Brake Chambers. These are mechanical devices that apply semitrailer brakes when driver steps on brake pedal or pulls emergency brake lever in towing vehicle. Air pressure supplied by towing vehicle releases these mechanical brakes. The chambers are spring loaded to apply brakes.

c. Landing Legs. The landing legs support semitrailer when it is not coupled to a towing vehicle. They are operated by a hand crank. A two-speed gear box provides a low-speed gear for raising or lowering legs under a load, and a high-speed gear for ease and speed of raising and lowering legs when not under load.

1-11. WATER DISTRIBUTOR SYSTEM

The components of the water distribution system are described briefly below. Each of these will be described in greater detail in Chapter 2 - Operating Instructions.

- a. Engine. The engine which powers the pump is mounted on back of semitrailer. It receives its fuel from a fuel tank mounted between the frame members. Control of engine is by one of two control panels described below.
- b. Pump. The pump is coupled directly to the engine. The purpose of the pump is to pump water out of or into the tank.
- c. Valves. There are three manually operated valves and two solenoid-actuated valves that control the flow of water via the spray control valves for all operations.
- d. Control Panels. Two control panels are provided to control starting and stopping the engine, adjusting engine speed, and controlling the flow of water through the two spray nozzles. The rear control panel is permanently mounted in the cabinet on the right rear fender of the trailer. The remote control panel is connected by a long cable for controlling water distribution functions from the cab of the towing vehicle.

CHAPTER 2

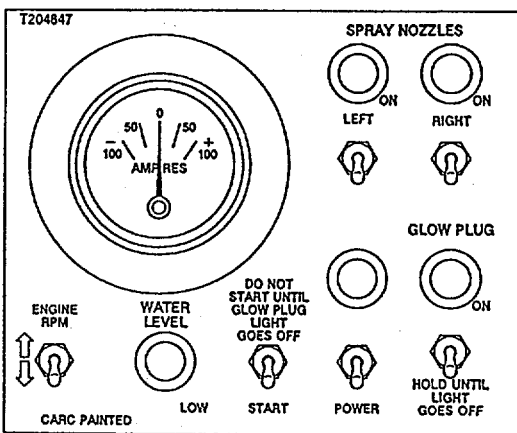
OPERATING INSTRUCTIONS

Section I. DESCRIPTION AND USE OF OPERATOR'S CONTROLS AND INDICATORS

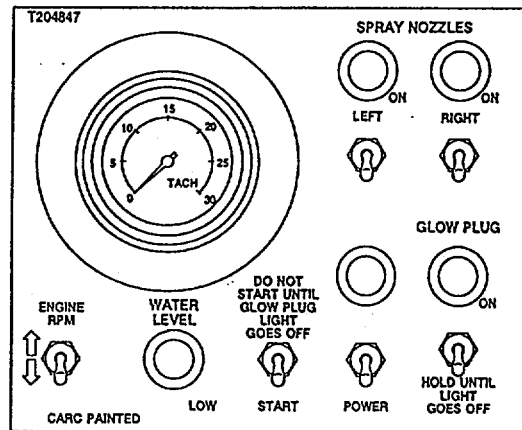
Paragraph Number	Title	Page Number
2-1	CONTROL PANELS	2-1
2-2	WATER DISTRIBUTOR VALVES	2-3

2-1. CONTROL PANELS

The water distributor contains two control panels: the rear control panel and the remote control panel. The rear control panel is permanently mounted in the cabinet on the right rear fender. The remote control panel is connected by a long cable, and is intended for control of spraying operations from the cab of the towing vehicle. The remote control panel is stored in the cabinet on the right rear fender when not in use. The two control panels are nearly identical. The visible difference is that the rear control panel contains an ammeter to indicate condition of the engine charging system, and the remote control panel contains a tachometer, for indication of engine speed, in place of the ammeter.



Rear Control Panel

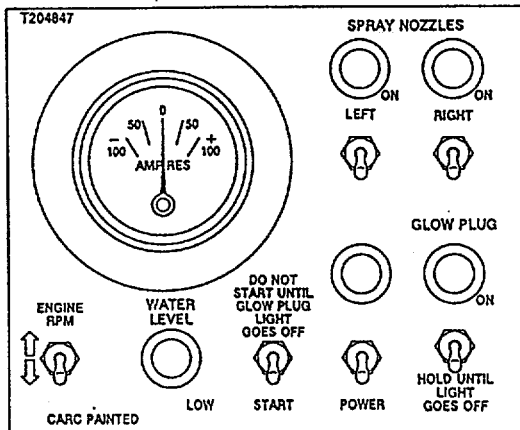


Remote Control Panel

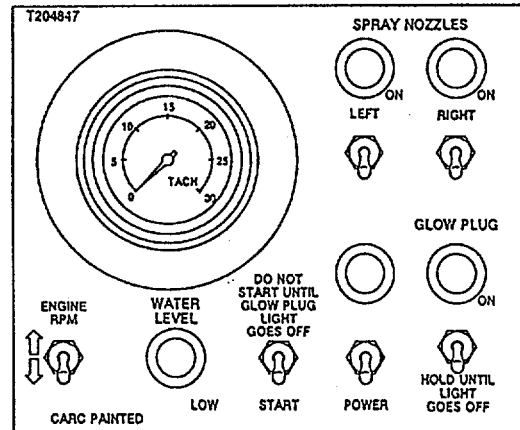
a. POWER Switch and Indicator Light. The POWER switch must be turned on for any other functions to operate. Because the power can be turned on or off at either control panel, the position of the POWER switch does not indicate whether the power is on or off. The red indicator light located directly above the power switch indicates the power is on when illuminated, whether it is turned on at the rear control panel or the remote control panel.

b. GLOW PLUG Switch and Indicator Light. The glow plug switch turns on the engine glow plugs and illuminates the green glow plug indicator lights on both the rear and remote control panels. This switch must be held in the ON position until the glow plug indicator goes out, showing that the engine is ready to start. The glow plugs must always be used before starting the engine.

2-1. CONTROL PANELS (cont)



Rear Control Panel



Remote Control Panel

c. START Switch. This switch is used to start the engine after the glow plugs have been preheated. Hold the switch down to start the engine, and release it as soon as the engine has started. The switch will return to its center position when released.

d. ENGINE RPM Switch. This switch is used to adjust engine speed. Hold the switch up to increase engine speed and down to decrease engine speed. Release the switch when the desired engine speed has been reached.

e. SPRAY NOZZLES Switches and Indicator Lights. These switches control water flow to the left and right spray nozzles. Push the switch up to turn water flow on, and down to turn water flow off. The green indicator lights will illuminate at both control panels when the valve to a spray nozzle is open.

NOTE

If a spray nozzle has been turned on, it must be turned off from the same control panel. It can be turned off from the opposite control panel only by turning off the power switch. However, this will turn off the power to all functions, including the engine.

f. WATER LEVEL LOW Indicator Light. When the water tank is nearly empty, the amber low-water indicator light will turn on. The engine should be shut down immediately when this light comes on.

CAUTION

Continued pumping with the amber LOW WATER LEVEL indicator light on will empty the tank and may damage the water pump shaft seals.

g. Ammeter (Rear Control Panel Only). The ammeter indicates the condition of the engine charging system when the power switch is in the on position.

h. Tachometer (Remote Control Panel Only). The tachometer indicates the speed of the water distributor engine in revolutions per minute (rpm).

2-2. WATER DISTRIBUTOR VALVES

The water distributor valves consist of three large, manually operated valves, a pair of solenoid actuated air control valves, and two pair of small manually operated air control valves. As a group, these valves control the flow of water for all operations of the water distributor system. Refer to valve operation plate (para. 2-11).

a. Suction Valve. The suction valve is located in the line between the tank and the pump intake. The valve is closed when the valve handle is pointing down, and open when the valve handle is pointing toward the front of the semitrailer. The words OPEN and SHUT are stamped on the indicator plate. The stampings may be wrong. You must squeeze the handle to adjust the position of the valve plate.

b. Fill Valve. The fill valve is located in the return line between the pump and the tank. The valve is closed when the valve handle is pointing down, and open when the valve handle is pointing toward the front of the semitrailer. The words OPEN and SHUT are stamped on the indicator plate. You must squeeze the handle to adjust the position of the valve plate.

c. Discharge Valve. The discharge valve is located directly above the fill valve. Open the valve by turning the handle fully counterclockwise. Close the valve by turning the handle fully clockwise. The discharge port of the valve is threaded to accept the 1-1/2" fire hose supplied with the semitrailer. A threaded cap is provided for

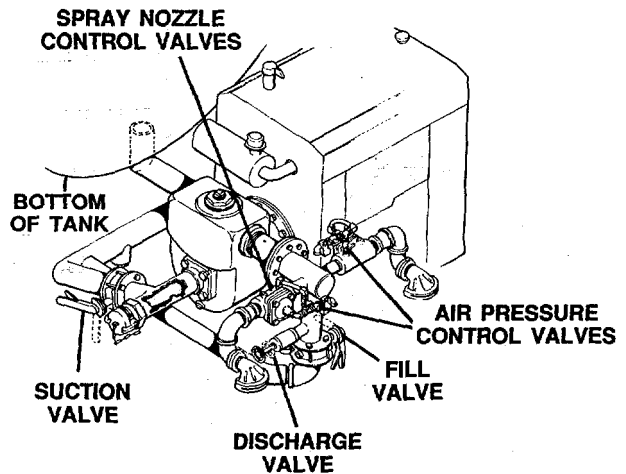
use when the fire hose is not connected. This cap should be kept on whenever the valve is not in use.

WARNING

The discharge valve must always be closed before removing the cap or discharge hose, and whenever there is nothing connected to the output of the valve. This will prevent possible serious injury to personnel and damage to the equipment.

d. Spray Nozzle Control Valves. These valves are held in their normally closed position by an internal spring. When the water distributor is coupled to a towing vehicle, air pressure taken from the brake system adds support to the spring in holding the spray nozzle control valves closed even when the water pump has pressurized the system. When a spray nozzle switch on either control panel is moved to the ON position, air pressure to the spray nozzle control valve is interrupted, allowing the system water pressure to overcome the spring inside the spray control nozzle valve which then opens to water flow.

e. Manually Operated Air Pressure Control Valves. There are two manually operated air pressure control valves for each spray nozzle valve. These valves are open when the handle of the valve is in line with the valve fittings, and closed when the handle is turned one-quarter turn (90°). When the semitrailer is connected to a truck-tractor, all valves should be configured for normal operation as shown. For emergency firefighting, or for any other situation where it is necessary to pump water without a truck-tractor connected to the water distributor, each of the four valves must be turned one-quarter turn (90°) as shown. This causes equal water pressure on both sides of the valve, allowing the spring to hold the spray nozzle valve closed in place of the air pressure that normally holds it closed.

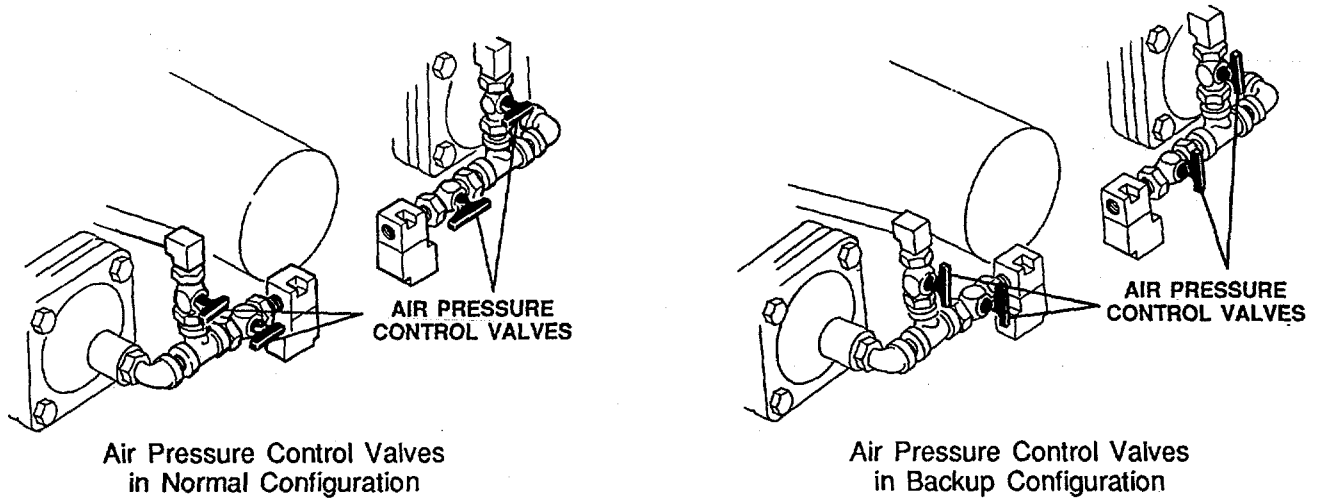


Water Distributor Valves

2-2. WATER DISTRIBUTOR VALVES (cont)

NOTE

For proper operation there must be air pressure available to the spray nozzle control valves and electrical power for the control panels.



Section II. OPERATOR/CREW PREVENTIVE MAINTENANCE CHECKS AND SERVICES

Paragraph Number	Title	Page Number
2-3	GENERAL	2-4
2-4	PMCS PROCEDURES	2-5
2-5	LEAKAGE	2-5

2-3. GENERAL

To ensure your water distributor is ready for operation at all times, it must be inspected within designated intervals (before operation, during operation, after operation, weekly and monthly). This will ensure that any defects will be discovered and corrected before they result in serious damage or failure.

Record all problems and shortcomings, and all corrective actions taken, on DA Form 2024 at your earliest possible opportunity.

- a. Before You Operate. Always keep in mind the CAUTIONS and WARNINGS. Perform the Before (B) PMCS prior to the equipment leaving its containment area or performing its intended mission.
- b. While You Operate. Always keep in mind the CAUTIONS and WARNINGS. Perform the During (D) PMCS when the equipment is being used in its intended mission.
- c. After Operation. Be sure to perform the After (A) PMCS after the equipment has been taken out of its mission mode or returned to its containment area.

2-3. GENERAL (cont)

NOTE

If your equipment fails to operate, troubleshoot with proper equipment. Report any problems using the proper forms. See DA PAM 738-750.

2-4. PMCS PROCEDURES

a. Purpose. Table 2-1 (Preventive Maintenance Checks and Services) provides you with all the necessary information for inspecting your water distributor at regular scheduled intervals.

b. Explanation of Columns.

(1) Item No. The item numbers in this column separate the items to be inspected. *They do not indicate sequence.*

(2) Intervals. This column shows when each check is to be done.

(3) Item To Be Inspected/Procedures. This column shows what checks and services you have to do and how to do them.

(4) Equipment Is Not Ready/Available If: This column shows/lists the conditions that make the equipment not ready/available for use.

2-5. LEAKAGE

Leakage definitions for operator/crew PMCS shall be defined as follows:

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

CAUTION

Equipment operation is allowable with minor leakages (Class I or II). Of course, you must consider the fluid capacity in the item/system being checked/inspected. When in doubt, notify your supervisor.

When operating with Class I or II leakages, continue to check fluid levels as required in the PMCS.

Class III leaks should be reported to your supervisor or organizational maintenance.

Table 2-1. Operator/Crew Preventive Maintenance Checks and Services

B = Before D = During A = After

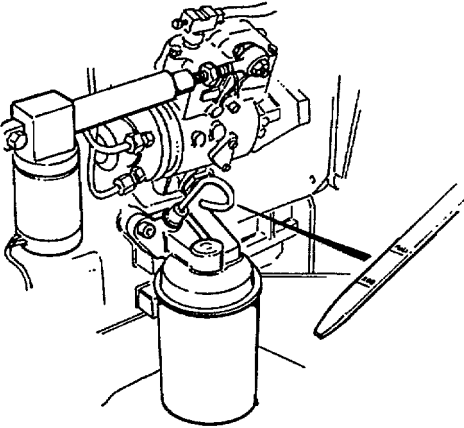
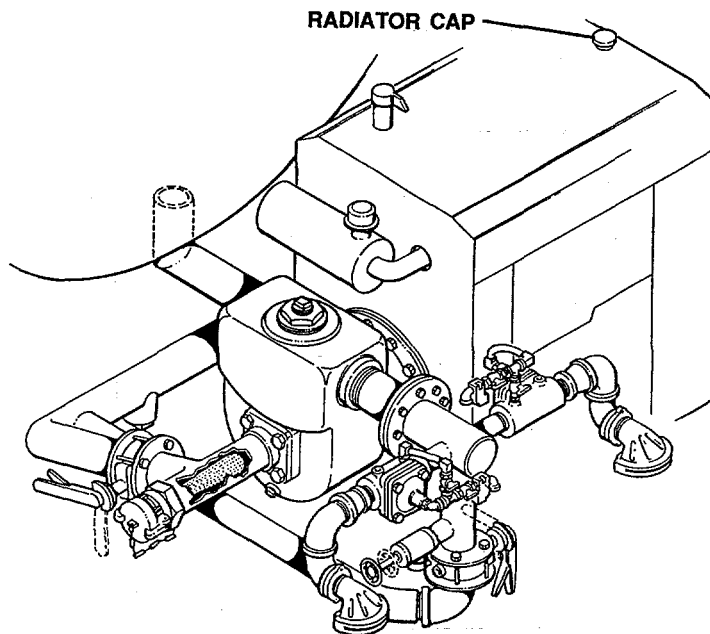
ITEM NO.	INTERVAL B D A	ITEM TO BE INSPECTED PROCEDURES: CHECK AND HAVE REPAIRED, FILLED, OR ADJUSTED AS NEEDED	EQUIPMENT IS NOT READY/AVAILABLE IF:
<p>NOTE</p> <p>Perform "Weekly" as well as "Before" operation PMCS if:</p> <p>a. You are the assigned operator and have not operated the equipment since the last weekly inspection.</p> <p>b. You are operating the equipment for the first time.</p>			
1	•	<p>ENGINE</p> <p>a. Check engine oil level with engine off. Maintain oil level between the add and full marks on the dipstick. Do not overfill.</p>	
 <p>Dipstick Location</p>			

Table 2-1. Operator/Crew Preventive Maintenance Checks and Services (cont)

B = Before D = During A = After

ITEM NO.	INTERVAL B D A	ITEM TO BE INSPECTED PROCEDURES: CHECK AND HAVE REPAIRED, FILLED, OR ADJUSTED AS NEEDED	EQUIPMENT IS NOT READY/AVAILABLE IF:
	<ul style="list-style-type: none"> • • 	<p style="text-align: center;"><u>WARNING</u></p> <p>The engine has a pressurized cooling system. Remove cap slowly and only when engine is cool or painful burns could result.</p> <p>b. Check engine coolant level. c. Check radiator hoses for dry rot</p> <p style="text-align: center;">NOTE</p> <p>Coolant level should be maintained at a level visible at the bottom of the filler neck. If coolant level is low, add a 50/50 mixture of antifreeze and water. Install radiator cap.</p>	<p>Hoses are not service-able.</p>

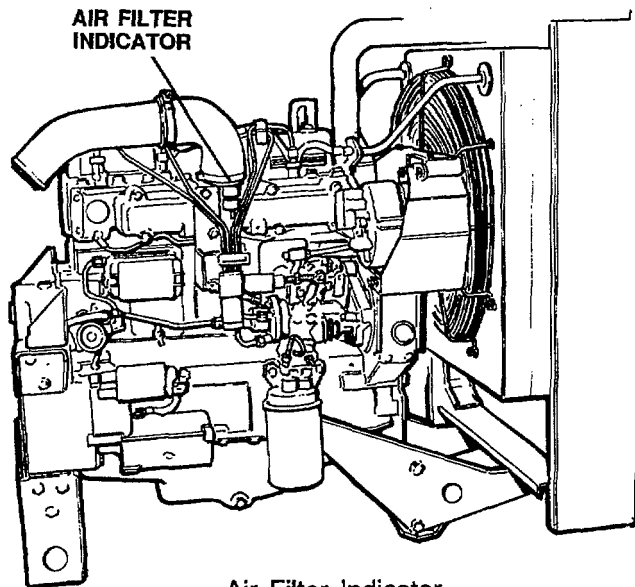


Radiator Cap

Table 2-1. Operator/Crew Preventive Maintenance Checks and Services (cont)

B = Before D = During A = After

ITEM NO.	INTERVAL B D A	ITEM TO BE INSPECTED PROCEDURES: CHECK AND HAVE REPAIRED, FILLED, OR ADJUSTED AS NEEDED	EQUIPMENT IS NOT READY/AVAILABLE IF:
	<ul style="list-style-type: none"> • • • 	<p>d. Inspect engine fan belt for presence and frayed or cracked condition</p> <p>e. Check all fuel lines and fittings for leakage</p> <p style="text-align: center;">CAUTION</p> <p>Before starting engine insure adequate water is in tank or that the water distributor pump is primed (para. 2-16).</p> <p>f. With the engine running, check the air filter indicator on the engine intake manifold. If it shows red the cleaner element is dirty. Replace element (para 3-7).</p>	<p>Fan belt is missing, and frayed or cracked condition</p> <p>Any fuel leakage is leakage evident.</p> <p>A clean air filter is not filter available or is missing</p>
	<ul style="list-style-type: none"> • 	<p>g. Check the exhaust system visually and audibly for signs of leakage.</p>	



Air Filter Indicator

Table 2-1. Operator/Crew Preventive Maintenance Checks and Services (cont)

B = Before D = During A = After

ITEM NO.	INTERVAL B D A			ITEM TO BE INSPECTED PROCEDURES: CHECK AND HAVE REPAIRED, FILLED, OR ADJUSTED AS NEEDED	EQUIPMENT IS NOT READY/AVAILABLE IF:
2.		•		<p>CONTROL PANEL GAUGES Inspect ammeter on rear control panel and tachometer on the remote control panel for operation or broken condition. Ammeter should indicate a charge condition with engine running. Tachometer will read maximum speed of 2800 RPM and 700 RPM at idle.</p>	Any gauge is broken inoperative.
3.	•			<p>STOP LIGHTS, TAIL LIGHTS, CLEARANCE LIGHTS</p> <p style="text-align: center;">NOTE</p> <p>Semitrailer must be connected to prime mover to check light operation. An assistant is required while checking lights (para. 2-6).</p> <p>a. If the tactical situation permits, connect intervehicular cable to towing vehicle. Operate the vehicle light switch through all settings and check all lights.</p>	
4.	•	•		<p>b. Depress brake pedal and check operation of brake lights.</p> <p>TIRES</p> <p>a. Check tire pressure (75 psi) when tires are cool. <i>Use 35 psi (241 kPa) for soft</i></p> <p>b. Inspect tires for cuts, foreign objects, from between tires. Check for obvious low pressure.</p>	Two tires on one axle are flat, missing, or unserviceable

Table 2-1. Operator/Crew Preventive Maintenance Checks and Services (cont)

B = Before D = During A = After

ITEM NO.	INTERVAL B D A			ITEM TO BE INSPECTED PROCEDURES: CHECK AND HAVE REPAIRED, FILLED, OR ADJUSTED AS NEEDED	EQUIPMENT IS NOT READY/AVAILABLE IF:
5.	•			<p>WHEELS</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>Turn nuts on left-side wheels counterclockwise to tighten, clockwise to loosen. Turn nuts on right-side wheels clockwise to tighten and counterclockwise to loosen. Failure to follow this system will result in damage to the equipment.</p> <p>Check wheels for obviously loose or missing wheel nuts.</p>	<p>Two or more wheel nuts are missing from any wheel.</p>
6.	• • •	•		<p>BRAKE SYSTEM</p> <p>a. Inspect brake hose couplings (gladhands) secure mounting and presence of packing.</p> <p>b. While an assistant actuates the service brakes, listen for air leaks at the gladhands, relay valve, multi-function valve and at the air reservoirs. Observe air chamber push rod movement.</p> <p>c. Be alert for any unusual difficulty that would indicate that the semitrailer brakes are malfunctioning..</p>	<p>Any coupling is missing or broken or packing is missing.</p> <p>Service brakes fail to operate.</p> <p>Air leaks are found. Service brakes do not operate.</p> <p>Malfunctions that would affect safe operation are evident</p>

Table 2-1. Operator/Crew Preventive Maintenance Checks and Services (cont)

B = Before D = During A = After

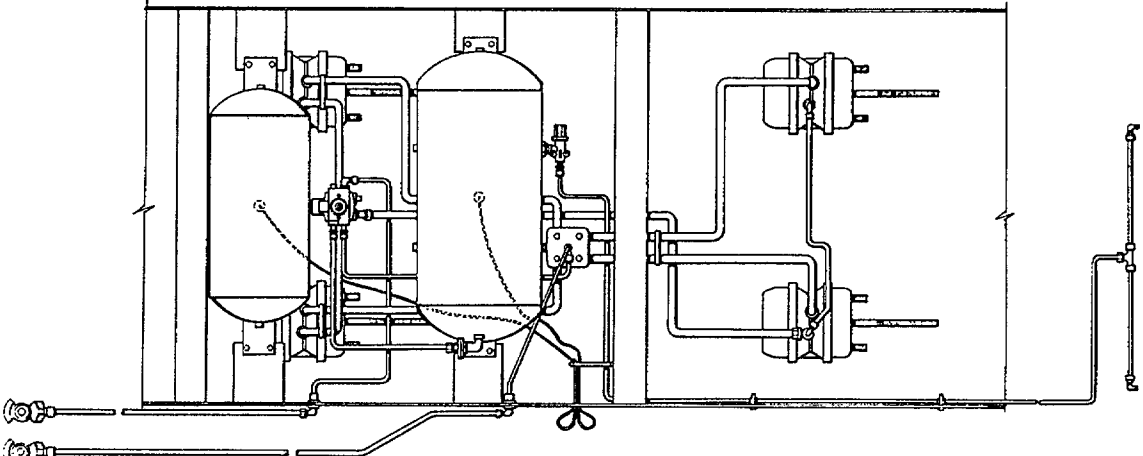
ITEM NO.	INTERVAL B D A	ITEM TO BE INSPECTED PROCEDURES: CHECK AND HAVE REPAIRED, FILLED, OR ADJUSTED AS NEEDED	EQUIPMENT IS NOT READY/AVAILABLE IF:
BRAKE SYSTEM (cont)			
			
Air System Schematic			
<u>WARNING</u>			
<p>A hot brake drum can cause serious burns. Be cautious when inspecting brakes after use. Slowly move hand toward brake drum. If drum is overheated, heat will be felt before actually touching brake drum.</p>			
		<ul style="list-style-type: none"> d. Cautiously feel brake drums for being abnormally hot or cold. An abnormally hot brake drum indicates a possibly dragging or grabbing brake, or improperly adjusted, dry, or defective wheel bearings. An abnormally cool drum indicates improper adjustment. 	<p>Drum is abnormally hot</p>

Table 2-1. Operator/Crew Preventive Maintenance Checks and Services (cont)

B = Before D = During A = After

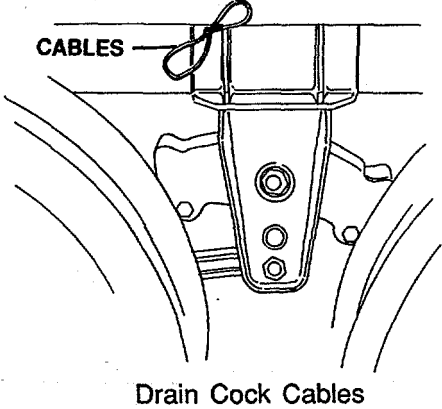
ITEM NO.	INTERVAL B D A			ITEM TO BE INSPECTED PROCEDURES: CHECK AND HAVE REPAIRED, FILLED, OR ADJUSTED AS NEEDED	EQUIPMENT IS NOT READY/AVAILABLE IF:
7.				<p>AIR RESERVOIRS</p> <p><u>WARNING</u></p> <p>Wear protective goggles when opening drain cock and avoid air stream. Failure to do so could result in personal injury.</p> <p>a. Inspect air reservoirs for evidence of damage or leakage.</p> <p>b. Drain condensation from air reservoirs. The drain cocks are opened by pulling on cables that extend through the frame between the roadside wheels.</p>	<p>Air reservoir(s) leaking or damaged.</p>
 <p>The diagram shows a top-down view of an air reservoir. A central vertical pipe has a drain cock at the bottom. Two cables extend from the drain cock area through the frame of the vehicle, one on each side. A label 'CABLES' with a line pointing to the cables is on the left. Below the diagram, the text 'Drain Cock Cables' is centered.</p>					

Table 2-1. Operator/Crew Preventive Maintenance Checks and Services (cont)

B = Before D = During A = After

ITEM NO.	INTERVAL B D A			ITEM TO BE INSPECTED PROCEDURES: CHECK AND HAVE REPAIRED, FILLED, OR ADJUSTED AS NEEDED	EQUIPMENT IS NOT READY/AVAILABLE IF:
8.	•			<p>LANDING GEAR</p> <p>a. When cranking landing legs, check that bind. Pull out handcrank and check for high-speed operation. Push in for low-speed operation. Make sure opposite side leg moves equally with side being cranked.</p> <p>b. Inspect handcrank, gear box, and landing leg foot for secure mounting. Check that handcrank holder stows handcrank securely.</p> <p>c. Inspect landing leg gear box for proper lubrication.</p>	Landing gear or legs are inoperative.
9.				<p>TANK Inspect tank for obvious damage or leakage.</p>	
10.	•			<p>SUCTION HOSE ASSEMBLY Inspect suction hoses for signs of scratches, fraying or wear. Inspect ends of hose connections for dents in the gasket sealing surface.</p>	
11.	•			<p>DISCHARGE HOSE ASSEMBLY Inspect the discharge hose for signs of chafing, fraying or wear.</p>	Any fuel leakage evident.
12.	•			<p>FUEL TANK Inspect the fuel tank and fuel lines for is damage or leaks. Remove any foreign material from the fuel tank inlet strainer.</p>	
13.	•			<p>ENGINE COWLING AND SHROUD Inspect engine cowling and shroud for obvious damage and loose or missing hardware.</p>	

Table 2-1. Operator/Crew Preventive Maintenance Checks and Services (cont)

B = Before D = During A = After

ITEM NO.	INTERVAL			ITEM TO BE INSPECTED PROCEDURES: CHECK AND HAVE REPAIRED, FILLED, OR ADJUSTED AS NEEDED	EQUIPMENT IS NOT READY/AVAILABLE IF:
	B	D	A		
14.	•			<p>PUMP</p> <p>a. Inspect pump intake filter by removing the suction port cap. Reach into the pump intake and pull the filter out. Replace after cleaning and install cap on port. Inspect pump for obvious damage, loose or missing mounting hardware, loose or damaged plumbing connections.</p>	Missing or damaged filter.
	•		•	<p>b. Inspect pump for secure mounting and. for leakage. Listen for unusual noises during operation.</p>	Pump fails to operate
	•		•	<p>c. Inspect spray nozzles for blocked openings.</p>	

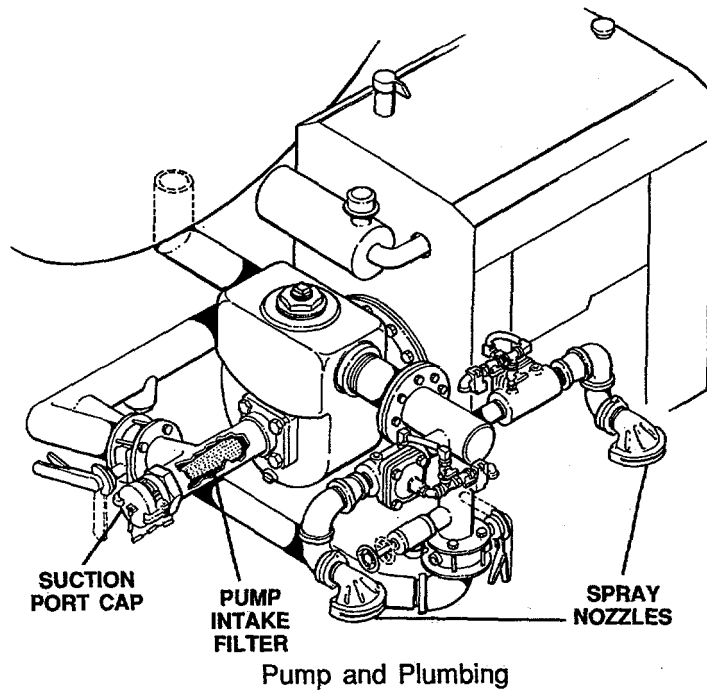


Table 2-1. Operator/Crew Preventive Maintenance Checks and Services (cont)

B = Before D = During A = After

ITEM NO.	INTERVAL			ITEM TO BE INSPECTED PROCEDURES: CHECK AND HAVE REPAIRED, FILLED, OR ADJUSTED AS NEEDED	EQUIPMENT IS NOT READY/AVAILABLE IF:
	B	D	A		
15.				<p>LINES AND FITTINGS</p> <p>a. Inspect lines and fittings for obvious damage, loose or missing mounting hardware, missing hardware, loose or damaged plumbing connections.</p>	<p>Obvious damage, missing hardware, damaged connections or any leakage.</p>

Section III. OPERATOR/CREW PREVENTIVE MAINTENANCE CHECKS AND SERVICES

Paragraph Number	Title	Page Number
2-6	COUPLING SEMITRAILER TO TOWING VEHICLE	2-15
2-7	OPERATING THE LANDING GEAR	2-17
2-8	TOWING THE WATER DISTRIBUTOR	2-18
2-9	INITIAL CHECKS.....	2-19
2-10	OPERATING PROCEDURES.....	2-20
2-11	OPERATING INSTRUCTIONS ON DECALS AND INSTRUCTION PLATES	2-20
2-12	STARTING THE ENGINE.....	2-22
2-13	ADJUSTING ENGINE SPEED.....	2-22
2-14	STOPPING THE ENGINE.....	2-23
2-15	PUMPING OPERATIONS	2-23
2-16	FILLING TANK FROM OUTSIDE SOURCE USING PUMP.....	2-23
2-17	SPRAYING.....	2-27
2-18	AIMING AND ADJUSTING WATER SPRAY NOZZLES	2-30
2-19	PUMPING OUT OF DISCHARGE VALVE.....	2-30
2-20	PUMPING FROM OUTSIDE SOURCE TO DISCHARGE HOSE.....	2-32
2-21	GRAVITY DRAINING OF TANK.....	2-37
2-22	PUMPING OUT DISCHARGE HOSE WITHOUT TRUCK-TRACTOR CONNECTED	2-37
2-23	DISCONNECTING WATER DISTRIBUTOR FROM TRUCK-TRACTOR.....	2-38

2-6. COUPLING SEMITRAILER TO TOWING VEHICLE

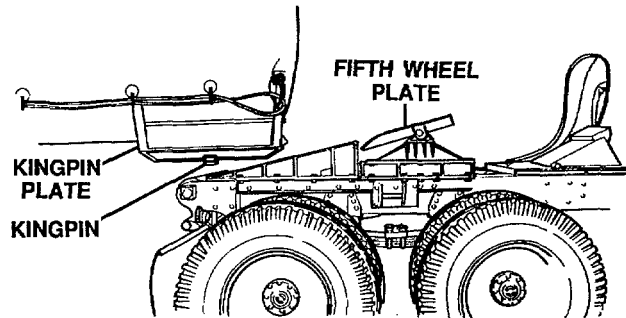
WARNING

Be sure all personnel stand clear of the towing vehicle and semitrailer during coupling operations.

- a. Align the towing vehicle with the semitrailer.

2-6. COUPLING SEMITRAILER TO TOWING VEHICLE (cont)

- b. Slowly back the towing vehicle into position. Be sure the kingpin is in line with the fifth wheel coupler jaws.
- c. Stop the towing vehicle just before the kingpin plate of the semitrailer starts to ride up the approach ramps of the towing vehicle.



Coupling Semitrailer to Towing Vehicle

- d. Check that kingpin plate is above the rear of the approach ramps before kingpin plate begins to ride up approach ramps. Adjust height as needed by using landing gear. Be sure that the towing vehicle fifth wheel coupler jaws are open.
- e. Slowly back the towing vehicle until coupler jaws engage the kingpin.

CAUTION

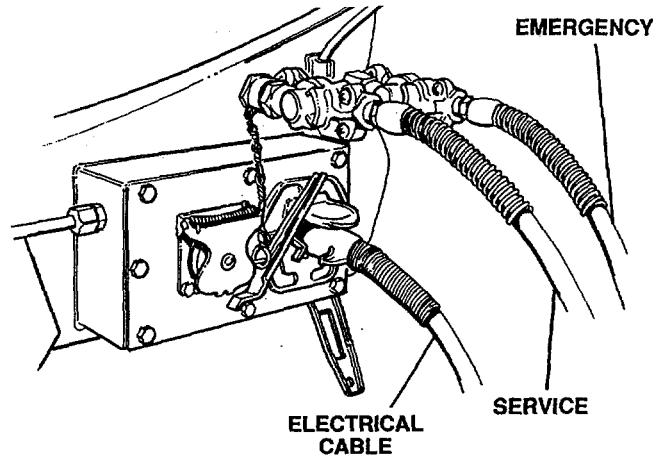
Visually check the coupling. You should not be able to see light between the fifth wheel and kingpin plate. If coupling is not complete and another attempt is to be made, move towing vehicle forward carefully. Do not exceed the limits of the air hoses and electrical cable.

- f. Make sure coupling is secure by inching towing vehicle forward. If coupling is not locked, rock towing vehicle back and forth slowly until kingpin is locked in fifth wheel.
- g. Connect the two air hoses marked SERVICE and EMERGENCY on the towing vehicle to the corresponding air hose couplings in the semitrailer.
- h. Open air line shutoff valves on towing vehicle.
- i. Set the trailer handbrake to lock the trailer wheels

NOTE

An additional safety measure is to chock the semitrailer wheels against movement or accidental trailer brake failure.

2-6. COUPLING SEMITRAILER TO TOWING VEHICLE (cont)



Connecting Intervehicular Hoses

j. Connect intervehicular electrical cable by opening the cover on the receptacle. Align slot on plug with alignment key in receptacle and push plug completely in; then release cover. Operate lights from inside of towing vehicle to make certain lights are in proper working order.

k. Check the air lines and electrical cable to be sure they are properly connected to the support arm and will not catch or rub.

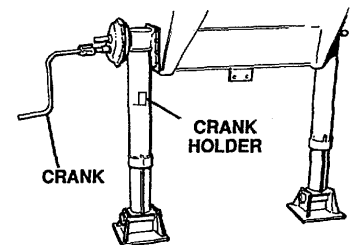
l. Remove wheel chocks if used.

m. Recheck the fifth wheel/kingpin locking by trying to move the towing vehicle and semitrailer forward together.

2-7. OPERATING THE LANDING GEAR

a. Raising the Landing Gear.

- (1) Unhook the crank from the crank holder.
- (2) Raise crank and push it in for high-speed operation.
- (3) Turn crank clockwise until legs have been retracted.
- (4) Lower crank and secure in crank holder.



Landing Gear

b. Lowering the Landing Gear

- (1) Unhook the crank and push the crank in to put it in high-speed mode.

2-7. OPERATING THE LANDING GEAR (cont)

- (2) Turn the crank counterclockwise and extend the legs until contact with the ground is made.
- (3) Pull the crank out to engage to low-speed gears and continue cranking counterclockwise until the semitrailer is raised to the desired height.

NOTE

To prevent landing legs from sinking in soft ground, place float pads (ground board assemblies) under landing shoes.

2-8. TOWING THE WATER DISTRIBUTOR**WARNING**

Extreme caution shall be exercised in all turns, curves, and highway cloverleaves, as well as under adverse weather conditions.

WARNING

Under no circumstances shall speeds exceed the following:

- Highway: 55 mph (88 km/h)
- Gravel/Dirt: 30 mph (48 km/h)
- Off-Road: 5 mph (8 km/h)

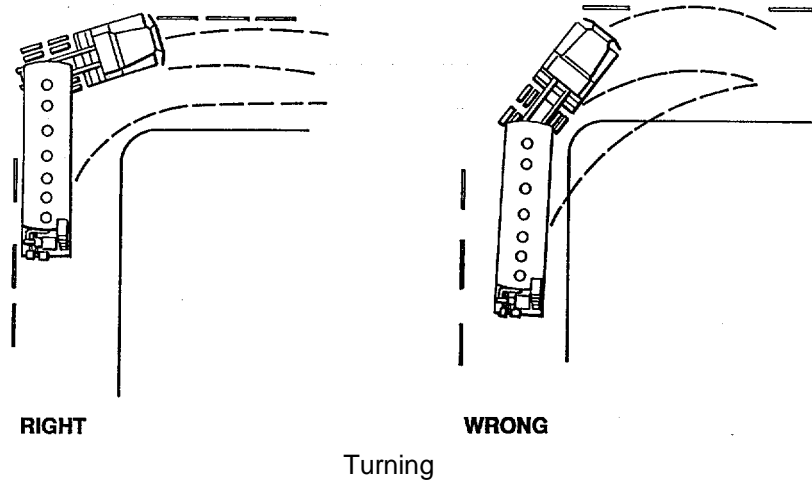
a. Driving. When driving the towing vehicle and semitrailer, the overall length of the unit must be kept in mind when passing other vehicles and when turning. Because the unit is hinged in the middle, backing is also affected. The semitrailer's payload will affect stopping and off-road maneuverability.

WARNING

Liquid tanks filled to their normal capacity handle essentially the same as a similar vehicle with a solid load. However, when driving with a partially filled tank, "sloshing" can be detected and must be taken into account in establishing safe driving practices. The driver of a partially loaded tank should learn the characteristics of the load and handle his braking efforts accordingly. It is recommended to keep the brakes on for a few moments after coming to a stop to avoid vehicle movement in the event that the braking sequence has developed a wave action in the tank.

b. Turning. When turning corners, allow for the semitrailer wheels turning inside the radius of the towing vehicle. Make a right turn by driving the towing vehicle about halfway into the intersection and then cutting sharply to the right. This will keep the semitrailer off of the curb.

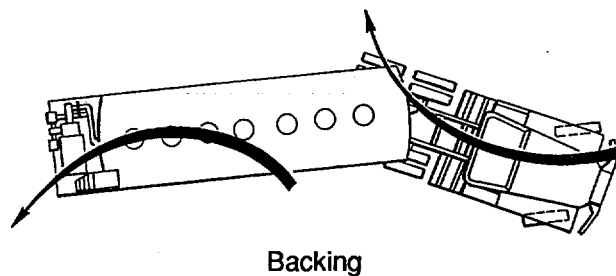
2-8. TOWING THE WATER DISTRIBUTOR (cont)



c. **Stopping.** The brakes of the towing vehicle and the semitrailer are applied at the same time in normal operation when the driver steps on the brake pedal. Brake pressure should be applied gradually and smoothly. The semitrailer brakes may be applied separately by using the semitrailer handbrake control lever on the steering column. On steep downgrades or slippery surfaces the semitrailer brakes should be slowly applied before the towing vehicle brakes. This will reduce the possibility of jack-knifing the semitrailer.

d. **Parking.** When the towing vehicle and semitrailer are to be parked and left unattended, set the parking brake on the towing vehicle and apply the brakes on the semitrailer. Turn off the engine of the towing vehicle before leaving the cab. Block the semitrailer wheels with chock blocks.

e. **Backing.** When backing, use an assistant as a ground guide to direct you. Adjust rear view mirrors before backing. When backing, the rear of the semitrailer will move in the opposite direction from the front towing vehicle wheels. If the wheels are turned to the right, the semitrailer will go left. If the wheels are turned to the left, the semitrailer will go right.



2-9. INITIAL CHECKS

Perform the "Before Operation" preventive maintenance checks and services found in Table 2-1 before performing the following procedures. These checks and services will determine that the water distributor is ready for use.

2-9. INITIAL CHECKS (cont)

NOTE

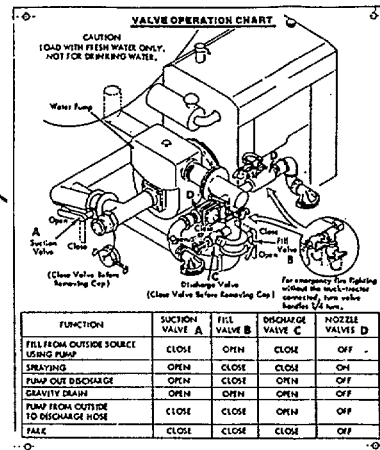
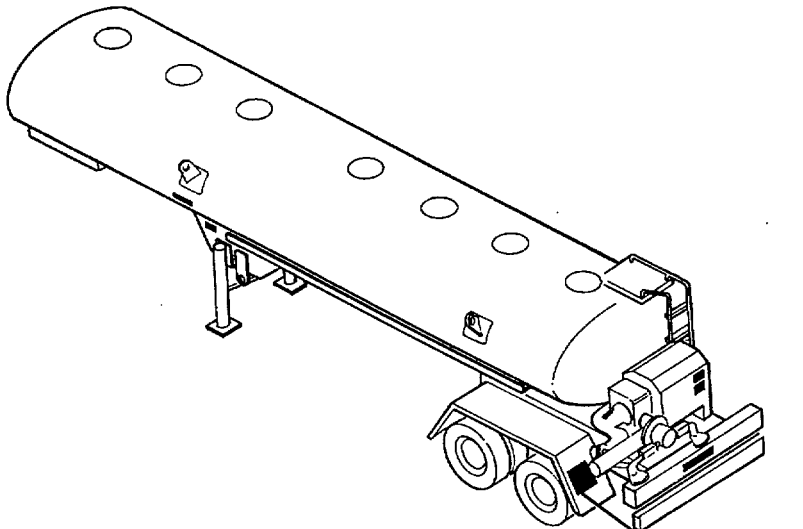
Perform the "Weekly" PMCS as well as the "Before Operation" PMCS if you are the assigned operator and have not operated the equipment since the last weekly inspection, or if you are operating the unit for the first time.

2-10. OPERATING PROCEDURES

Paragraphs 2-11 through 2-23 provide operating instructions for the semitrailer and water distributor. Read and understand all operating instructions before attempting to operate the equipment.

2-11. OPERATING INSTRUCTIONS ON DECALS AND INSTRUCTION PLATES

a. Valve Operation Plate. The valve operation plate is located on the left rear fender. This plate identifies each of the valves that control flow and distribution of the water. It provides instructions for which position (open or closed) each of the valves must be in to achieve the various functions of the water distributor.



Valve Operation Plate

2-11. OPERATING INSTRUCTIONS ON DECALS AND INSTRUCTION PLATES (cont)

b. Water Distribution Chart. The water distribution chart is attached to both of the control panels. These charts provide water usage rates based on various combinations of truck engine speed, truck transmission gear selection, water distributor engine speed, and one or both spray nozzles open. The card contains a chart for each of the three truck-tractors that may be used to tow the water distributor (M916, M920, and M123A1C).

M916 Tractor
Gallons per 100 feet of spray

		Truck Engine 1050 RPM		Truck Engine Full Throttle	
		1st Gear	2nd Gear	1st Gear	2nd Gear
Water Distributor Engine	1 Nozzle	77	64	39	32
	2000 RPM 2 Nozzles	158	131	79	66
Water Distributor Engine Full Throttle	1 Nozzle	107	88	53	44
	2 Nozzles	203	167	101	84

M920 Tractor
Gallons per 100 feet of spray

		Truck Engine 1050 RPM		Truck Engine Full Throttle	
		1st Gear	2nd Gear	1st Gear	2nd Gear
Water Distributor Engine	1 Nozzle	66	55	33	27
	2000 RPM 2 Nozzles	136	112	67	56
Water Distributor Engine Full Throttle	1 Nozzle	92	76	45	38
	2 Nozzles	174	144	88	72

M123A1C Tractor
Gallons per 100 feet of spray

		Truck Engine 1500 RPM		Truck Engine Full Throttle	
		1st Gear	2nd Gear	1st Gear	2nd Gear
Water Distributor Engine	1 Nozzle	75	43	37	21
	2000 RPM 2 Nozzles	153	88	76	44
Water Distributor Engine Full Throttle	1 Nozzle	103	59	51	30
	2 Nozzles	195	112	98	56

CAUTION

Unsafe operation of equipment may cause injury. Read, Understand and Follow the manuals when operating or performing maintenance.
Make certain everyone is clear of machine before starting engine or operation.
Load water distributor tank with FRESH WATER ONLY, not salt water.

T204883

Water Distribution Charts

- (1) Choose the chart for the appropriate truck-tractor.
- (2) Select the application rate (in gallons per 100 feet of travel) which most closely matches the desired application rate.
- (3) After the application rate has been selected, look at the top of the chart to determine the transmission gear and engine speed for the truck-tractor. Look to the left of the selected application rate to determine the proper water distributor engine speed and the number of nozzles to open.

2-12. STARTING THE ENGINE

WARNING

All personnel must wear hearing protection when the engine is operating, or permanent hearing loss may occur.

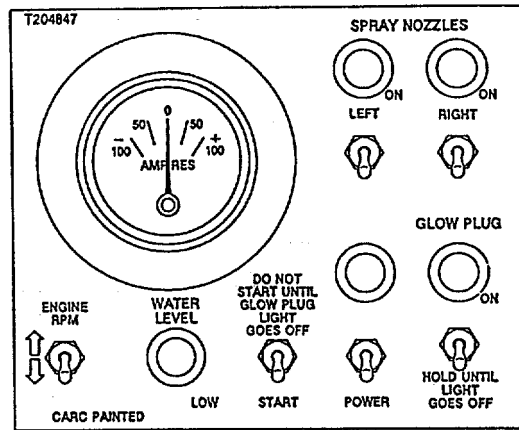
WARNING

Do not start the engine while either of the green SPRAY NOZZLE indicator lights is on. Be sure that the caps are securely fastened on all discharge outlets. Failure to heed this warning could result in serious personal injury.

CAUTION

Do not start the pump engine unless distributor pump is primed. Refer to para. 2-16 to prime pump.

- a. Refer to Valve Operation Plate on left rear fender and ensure that all water valves are closed.
- b. At either of the control boxes throw the POWER switch so that the red indicator light above it goes on.
- c. At either of the control boxes, turn the GLOW PLUG switch on and hold it on until the green indicator light goes off. The glow plugs must be heated every time the engine is started. Never start the engine until the glow plugs have finished heating.
- d. At either control panel, flip the START switch to the ON position until the engine starts.



Control Panel

CAUTION

Do not allow the starter to crank for more than 30 seconds. If the engine does not start, allow the starter to cool for 36 seconds before attempting to start the engine again.

- e. After the engine has started allow 3 minutes for the engine to warm up before performing any pumping operations.

2-13. ADJUSTING ENGINE SPEED

The engine speed can be adjusted from either of the control boxes by using the ENGINE RPM switch. Moving the switch up will cause engine speed to increase, while moving the switch down will cause engine speed to decrease. The engine has a nominal no load top speed of 2800 rpm. When the engine is pumping water, the top speed is approximately 2600 rpm.

NOTE

To make starting the engine easier, the throttle should be set for a speed of 2000 rpm before shutting down operation.

2-14. STOPPING THE ENGINE

Allow engine to cool down for 2 minutes before shutting down engine. To shut down the engine, flip POWER switch at either control panel. The red POWER indicator lamp should go out and the engine should stop.

NOTE

To make starting the engine easier, the throttle should be set for a speed of 2000 rpm before shutting down operation.

2-15. PUMPING OPERATIONS

The Valve Operation Plate located on the left rear fender provides information on valve positions for the following operations. Paragraphs 2-16 through 2-23 provide more detailed information on each of these operations.

2-16. FILLING TANK FROM OUTSIDE SOURCE USING PUMP

Read this section of the manual completely before proceeding with the actual filling of the tank. The normal method for filling the tank is to use the water distributor pump and suction hose assembly supplied with the semitrailer. The tank can also be filled through the manhole on top of the tank. If the tank is to be filled through the manhole, a source of water that can feed into the tank, either by gravity or under pressure, must be available, along with the means to direct the water into the tank. After the water tank is full, secure the access hatch before moving the semitrailer.

WARNING

When moving the semitrailer into position near a water source be sure that the ground is stable enough to support the weight of the fully loaded tractor-trailer, and that the surrounding terrain is passable. When stopped, chock the wheels of both the truck-tractor and the semitrailer. Personnel working at the water loading site must avoid placing themselves in a position where equipment malfunction, or sudden equipment movement, would injure them. Failure to follow these warnings could result in severe personal injury, death and/or equipment damage.

WARNING

The pump engine must NOT be running when the following steps are performed, or serious personal injury, death and/or equipment damage may occur.

WARNING

All personnel must wear hearing protection when the engine is operating, or permanent hearing loss may occur.

2-16. FILLING TANK FROM OUTSIDE SOURCE USING PUMP (cont)

NOTE

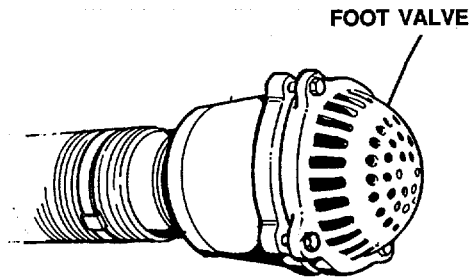
Before proceeding make sure that the left rear side of the semitrailer is within approximately 20 feet of the water source.

- a. Be sure the semitrailer air hoses (SERVICE and EMERGENCY) are connected to the towing vehicle.
- b. Refer to the Valve Operation Plate located on the left rear fender and close the suction valve (valve handle pointing toward the ground).
- c. Remove two suction hose sections from storage tray on left side of semitrailer.

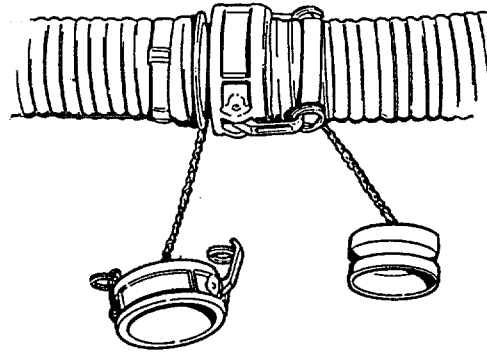
CAUTION

Be careful not to damage ends of hoses. Damage to threads or couplings of hoses will result in leaky connections or difficulty in assembling hoses.

- d. One of the two hoses is threaded on one end. Remove the foot valve from the tool box and screw it onto the threaded end of the suction hose.
- e. Remove protective caps from suction hoses and assemble two suction hose sections.



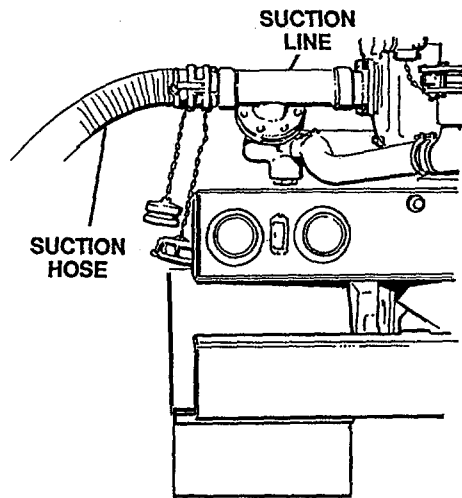
Installing Foot Valve on Suction Hose



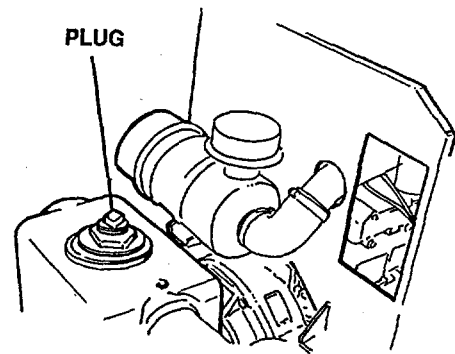
Assembling Suction Hose Sections

- f. Remove protective cap from suction line on trailer and connect free end of suction hose to suction line.
- g. Place foot valve assembly in water. The foot valve must be at least 18 inches under water and 2 feet from the water's edge.

2-16. FILLING TANK FROM OUTSIDE SOURCE USING PUMP (cont)



Connecting Suction Hose to Semitrailer



Priming Port on Pump

NOTE

If the water tank is empty, or if the pump is being used for the first time (either new, or after a repair), the pump must be manually primed as described in the following step. If the water tank or pump contains water from a previous pumping operation, the pump will be self-priming and the next step can be omitted.

- h. To prime the pump, remove plug from pump priming port on top of pump and pour water into this opening until pump chamber is full. Install plug.
- i. Using the Valve Operation Plate as a guide, open or close the valves as necessary for "Filling from Outside Source Using Pump."

WARNING

Be sure that all valves are in their proper positions before starting the engine, or severe personal injury could occur.

WARNING

Be sure no one is standing behind semitrailer when starting engine. Personal injury could occur if discharge valve or spray nozzles are accidentally left open.

- j. Start the engine (see para. 2-12). After the engine has warmed up, advance the throttle to full speed.

CAUTION

The actual flow of water may not begin for several minutes after engine has been started. If water is not flowing through suction hose within five minutes, shut down engine to prevent possible damage to the pump.

- k. Keep track of the elapsed time when water starts to fill the tank. After 15 minutes reduce engine speed to 2000 rpm (as shown on remote control panel tachometer).

2-16. FILLING TANK FROM OUTSIDE SOURCE USING PUMP (cont)

- l. When water starts to spill out of the overflow vent located at top center of tank, close fill valve.
- m. Allow engine to cool down for 2 minutes before shutting down engine. To shut down the engine, flip POWER switch at either control panel. The red POWER indicator lamp should go out and the engine should stop.

NOTE

To make starting the engine easier, the throttle should be set for a speed of 2000 rpm before shutting down operation.

- n. Close the suction valve.
- o. Pull the suction hose out of the water.

WARNING

The hose is full of water and may require two persons to lift it from the water.

- p. Using a long screwdriver, unseat the valve in foot valve and allow all water to drain from the hose, or pull hose from water and drain hose from upper end of hose.

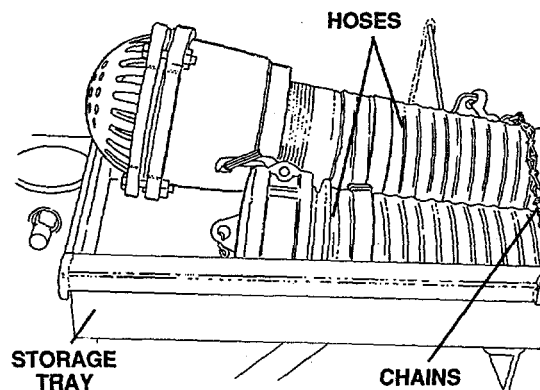
WARNING

When uncoupling the suction hose, do not stand in front of hose or piping. The force of water gushing out of the plumbing can knock you down.

- q. Leave the foot valve on the end of the suction hose and uncouple lower section of hose from upper section of hose and install protective caps on hose ends. Then disconnect suction hose from suction valve and install protective caps on hose and valve.
- r. Place suction hoses in storage tray on curb side of semitrailer and secure with chains.

CAUTION

Be sure all valves are closed before moving semitrailer.



Suction Hoses in Storage Tray

2-17. SPRAYING

- a. Fill water distributor tank (see para. 2-16) and close all valves.
- b. Refer to the Valve Operation Plate on the left rear fender and open or close the valves as necessary for spraying.

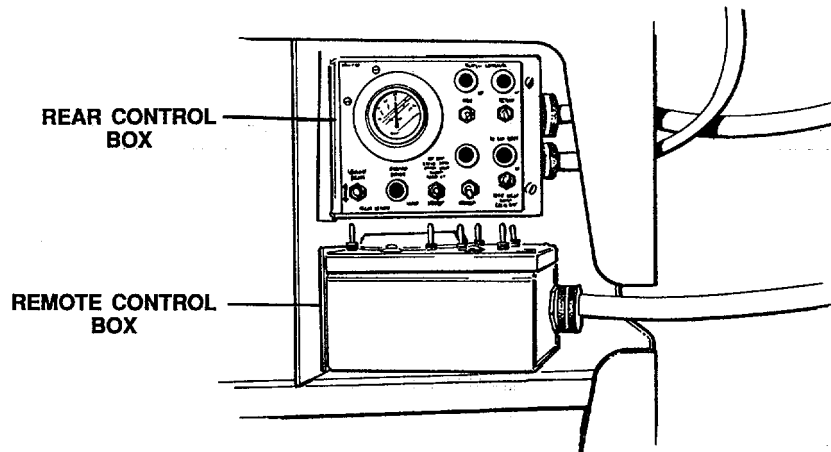
WARNING

Be careful when climbing on rear of semitrailer. The surfaces may be wet or greasy, causing you to fall.

WARNING

Be sure the control box is in a position that will not interfere with or obstruct safe driving practices.

- c. Remove the remote control box from the tool box and move it to the cab of the towing vehicle. Pass the control box through the rear window of the truck-tractor. Hang the cable on the air/electrical cable support on rear of truck-tractor.



Remote Control Box in Tool Box

2-17. SPRAYING (cont)

- d. Hang the cable on the hook on the front of the trailer near the electrical connection box.

CAUTION

Leave enough slack in the cable between the semitrailer and the truck-tractor to allow for full right- and left-hand turns, but be sure the cable will not touch the tires or be caught on anything when turning. Be sure the control box cable is hanging securely on the hooks on the side of the semitrailer.

- e. Refer to the Water Distribution Charts located in the tool box and determine the proper throttle and gear combinations for the desired coverage.

M916 Tractor					
Gallons per 100 feet of spray					
		Truck Engine 1050 RPM		Truck Engine Full Throttle	
		1st Gear	2nd Gear	1st Gear	2nd Gear
Water Distributor Engine 2000 RPM	1 Nozzle	77	64	39	32
	2 Nozzles	158	131	79	66
Water Distributor Engine Full Throttle	1 Nozzle	107	88	53	44
	2 Nozzles	203	167	101	84

M920 Tractor					
Gallons per 100 feet of spray					
		Truck Engine 1050 RPM		Truck Engine Full Throttle	
		1st Gear	2nd Gear	1st Gear	2nd Gear
Water Distributor Engine 2000 RPM	1 Nozzle	66	55	33	27
	2 Nozzles	136	112	67	56
Water Distributor Engine Full Throttle	1 Nozzle	92	76	45	38
	2 Nozzles	174	144	86	72

M123A1C Tractor					
Gallons per 100 feet of spray					
		Truck Engine 1500 RPM		Truck Engine Full Throttle	
		1st Gear	2nd Gear	1st Gear	2nd Gear
Water Distributor Engine 2000 RPM	1 Nozzle	75	43	37	21
	2 Nozzles	153	88	76	44
Water Distributor Engine Full Throttle	1 Nozzle	103	59	51	30
	2 Nozzles	195	112	98	56

CAUTION					
Unsafe operation of equipment may cause injury. Read, Understand and Follow the manuals when operating or performing maintenance.					
Make certain everyone is clear of machine before starting engine or operation.					
Load water distributor tank with FRESH WATER ONLY, not salt water.					

T204883

Water Distribution Charts

2-17. SPRAYING (cont)

- f. Position the distributor at the beginning of the area to be sprayed.

WARNING

All personnel must wear hearing protection when the engine is operating, or permanent hearing loss may occur.

WARNING

Do not start the engine while either of the green SPRAY NOZZLE indicator lights is on. Be sure that the caps are securely fastened on all discharge outlets. Failure to heed this warning could result in serious personal injury.

- g. Start the water distributor engine (see para. 2-12).

WARNING

Be certain that no one is standing behind the semitrailer before turning on the spray nozzles.

- h. Refer to Valve Operation Chart for valve positions. Refer to para. 2-1 1.
- i. Refer to paragraph 2-18 for nozzle aiming and adjustment procedures.
- j. Turn on the left and/or right spray nozzles by flipping the corresponding switches on the remote control panel in the cab. Drive truck at speed recommended by water distribution chart until spraying is complete or until tank must be refilled.

CAUTION

The water distributor engine must be shut down immediately if the LOW WATER LEVEL light on the control panel comes on at any time. This will prevent possible damage to the water pump.

- k. Turn off the spray nozzles when finished spraying.
- l. Allow engine to cool down for 2 minutes before shutting down engine. To shut down the engine, flip POWER switch at either control panel. The red POWER indicator lamp should go out and the engine should stop.

NOTE

To make starting the engine easier, the throttle should be set for a speed of 2000 rpm before shutting down operation.

2-18. AIMING AND ADJUSTING WATER SPRAY NOZZLES

WARNING

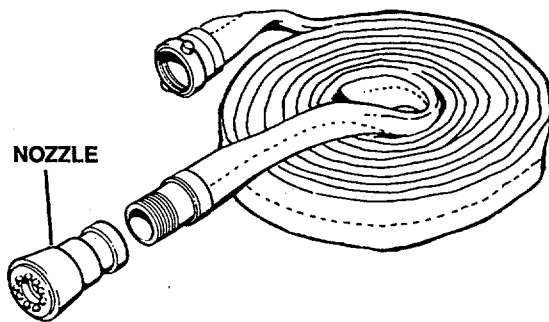
Do not attempt to adjust the spray nozzle pattern while the engine is running. Personal injury may result.

- The spray pattern of the water distributor is fully adjustable. The spray nozzle, and the two elbows that they are connected to can be turned in either direction to adjust the spray pattern as required.
- To adjust the spray pattern, loosen the two set screws in the locking ring and turn the nozzle or elbow as desired.
- When the desired spray pattern has been achieved, tighten the two setscrews on the locking ring securely. Do not overtighten.

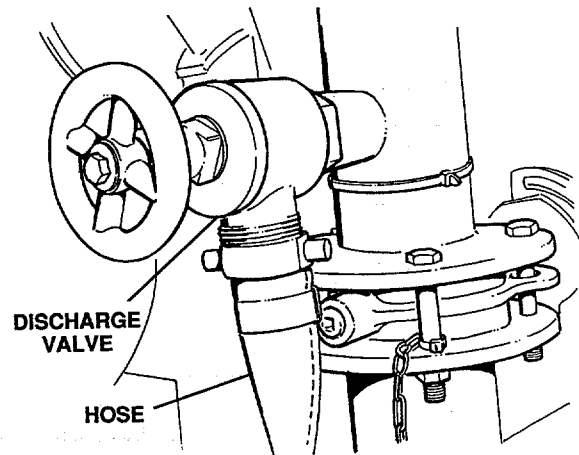
2-19. PUMPING OUT OF DISCHARGE VALVE

The discharge valve has a threaded connection to accept the fifty-foot hose that is supplied with the distributor and stored in the tool box. A nozzle is also supplied that is adjustable for discharging a straight stream or fog. This hose and nozzle can be used for firefighting.

- Fill the water distributor tank (see para. 2-16) and close all valves.
- Remove the fifty-foot hose from the tool box and connect the nozzle to the hose.
- Remove protective cap from discharge valve and connect fifty-foot hose to the discharge valve.



Fifty-Foot Hose and Nozzle



Fifty-Foot Hose
Connected to Discharge Valve

2-19. PUMPING OUT OF DISCHARGE VALVE (cont)

- d. Uncoil the hose completely.
- e. Refer to the Valve Operation Plate on the left rear fender. See column titled "Pump Out Discharge" and open or close the valves as necessary, except discharge valve which **MUST** remain **CLOSED** at the beginning of the operation.

WARNING

All personnel must wear hearing protection when the engine is operating, or permanent hearing loss may occur.

WARNING

Do not start the engine while either of the green **SPRAY NOZZLE** indicator lights is on.

WARNING

Be certain the discharge nozzle is closed before starting the engine. Do not open the discharge valve unless someone is holding the discharge end of the hose securely, and that person is aware that you are about to open the valve.

WARNING

Open and close the discharge valve **SLOWLY** to prevent injuring the person at the end of the hose from sudden surges in pressure.

WARNING

One person must remain at the semitrailer at all times to control the flow of water when pumping out the discharge hose.

WARNING

Be certain that all persons understand the visual signals to be used to start and stop the flow of water to the discharge hose.

WARNING

Be certain that all persons understand how to operate the adjustable nozzle.

- f. Start the water distributor engine (see para. 2-12).
- g. Open suction valve.
- h. **SLOWLY** open the discharge valve by turning the valve handle counterclockwise.

2-19. PUMPING OUT OF DISCHARGE VALVE (cont)

i. The hose nozzle may be used to stop the flow of water, and is also adjustable from a straight stream of water to fog. To adjust the nozzle, hold the portion of the red nozzle closest to you and turn the front portion of the nozzle. The words OPEN and CLOSE and directional arrows are printed on the front half of the nozzle directly behind the black rubber ring.

CAUTION

The water distributor engine must be shut down immediately if the LOW WATER LEVEL light on the control panel comes on at any time. This will prevent possible damage to the water pump.

- j. When the pumping operation is complete, close the discharge valve SLOWLY by turning the valve handle fully clockwise.
- k. Allow engine to cool down for 2 minutes before shutting down engine. To shut down the engine, flip POWER switch at either control panel. The red POWER indicator lamp should go out and the engine should stop.

NOTE

To make starting the engine easier, the throttle should be set for a speed of 2000 rpm before shutting down operation.

2-20. PUMPING FROM OUTSIDE SOURCE TO DISCHARGE HOSE**WARNING**

When moving the semitrailer into position near a water source be sure that the ground is stable enough to support the weight of the fully loaded tractor-trailer, and that the surrounding terrain is passable. When stopped, chock the wheels of both the truck-tractor and the semitrailer. Personnel working at the water-loading site must avoid placing themselves in a position where equipment malfunction, or sudden equipment movement, would injure them. Failure to follow these warnings could result in severe personal injury, death and/or equipment damage.

WARNING

The pump engine must NOT be running when the following steps are performed or serious personal injury, death and/or equipment damage may occur.

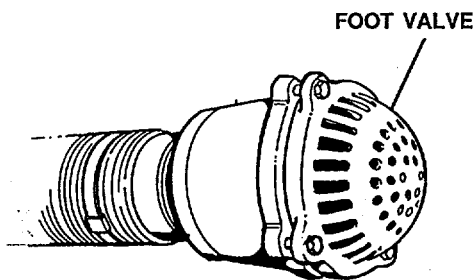
WARNING

All personnel must wear hearing protection when the engine is operating, or permanent hearing loss may occur.

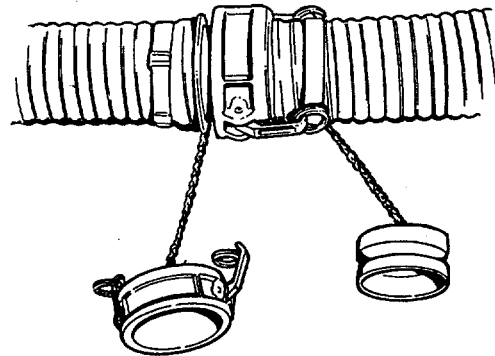
2-20. PUMPING FROM OUTSIDE SOURCE TO DISCHARGE HOSE (cont)**NOTE**

Before proceeding make sure that the left rear side of the semitrailer is within approximately 20 feet of the water source.

- a. Be sure the semitrailer air hoses are connected to the towing vehicle.
- b. Refer to the Valve Operation Plate located on the left rear fender of the semitrailer. Close the suction valve (valve handle pointing toward the ground). Close the fill valve (valve handle pointing toward front of semitrailer).
- c. Remove two suction hose sections from storage tray on left side of semitrailer and position them as shown.
- d. One of the two hoses is threaded on one end. Remove the foot valve from the tool box and screw it onto the threaded end of the suction hose.
- e. Remove protective caps from suction hoses and assemble two suction hose sections.



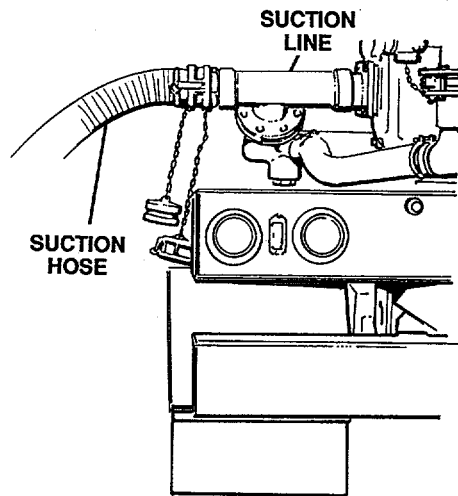
Installing Foot Valve on Suction Hose



Assembling Suction Hose Sections

2-20. PUMPING FROM OUTSIDE SOURCE TO DISCHARGE HOSE (cont)

- f. Remove protective cap from suction line on trailer and connect free end of suction hose to suction line.
- g. Place foot valve assembly in water. The foot valve must be at least 18 inches under water and 2 feet from the water's edge.

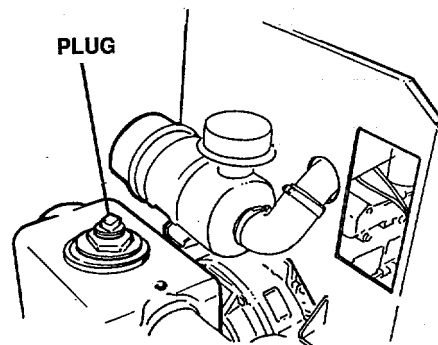


Connecting Suction Hose to Semitrailer

NOTE

If the water tank is empty, or if the pump is being used for the first time (either new or after a repair), the pump must be manually primed as described in the following step. If the water tank or pump contains water from a previous pumping operation, the pump will be self-priming and the next step can be omitted.

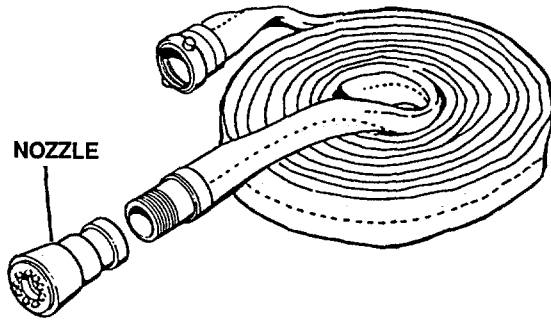
- h. To prime the pump, remove plug from pump priming port on top of pump and pour water into this opening until pump chamber is full. Install plug.
- i. Using the Valve Operation Plate as a guide, open or close the valves as necessary for "Pump from Outside to Discharge Hose."



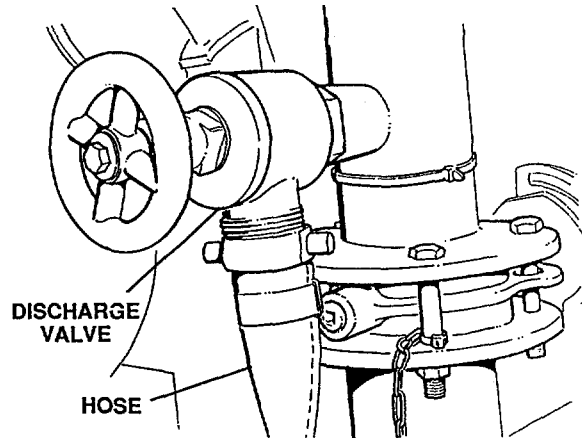
Priming Port on Pump

2-20. PUMPING FROM OUTSIDE SOURCE TO DISCHARGE HOSE (cont)

- j. Remove the fifty-foot hose from the tool box and connect the nozzle to the hose.
- k. Remove protective cap from discharge valve and connect fifty-foot hose to the discharge valve.



Fifty-Foot Hose and Nozzle



Fifty-Foot Hose
Connected to Discharge Valve

WARNING

All personnel must wear hearing protection when the engine is operating, or permanent hearing loss may occur.

WARNING

Do not start the engine while either of the green SPRAY NOZZLE indicator lights is on.

WARNING

Be certain the discharge nozzle is closed before starting the engine. Do not open the discharge valve unless someone is holding the discharge end of the hose securely, and that person is aware that you are about to open the valve.

WARNING

Open and close the discharge valve SLOWLY to prevent injuring the person at the end of the hose from sudden surges in pressure.

WARNING

One person must remain at the semitrailer at all times to control the flow of water when pumping out the discharge hose.

2-20. PUMPING FROM OUTSIDE SOURCE TO DISCHARGE HOSE (cont)**WARNING**

Be certain that all persons understand the visual signals to be used to start and stop the flow of water to the discharge hose.

WARNING

Be certain that all persons understand how to operate the adjustable nozzle.

- l. Refer to the Valve Operation Plate on left rear fender. Refer to column titled "Pump Out Discharge" and open or close the valves as necessary, except discharge valve which must remain closed at this time.
- m. Start the water distributor engine (see para. 2-12).

CAUTION

The actual flow of water may not begin for several minutes after engine has been started. If water is not flowing through suction hose within five minutes, shut down engine to prevent possible damage to the pump.

- n. SLOWLY open the discharge valve by turning the valve handle counterclockwise.

CAUTION

The water distributor engine must be shut down immediately if the LOW WATER LEVEL light on the control panel comes on at any time. This will prevent possible damage to the water pump.

- o. The hose nozzle may be used to stop the flow of water, and is also adjustable from a straight stream of water to fog. To adjust the nozzle, hold the portion of the red nozzle closest to you and turn the front portion of the nozzle. The words OPEN and CLOSE and directional arrows are printed on the front half of the nozzle directly behind the black rubber ring.
- p. When the pumping operation is complete, close the discharge valve SLOWLY by turning the valve handle fully clockwise.
- q. Allow engine to cool down for 2 minutes before shutting down engine. To shut down the engine, flip POWER switch at either control panel. The red POWER indicator lamp should go out and the engine should stop.

NOTE

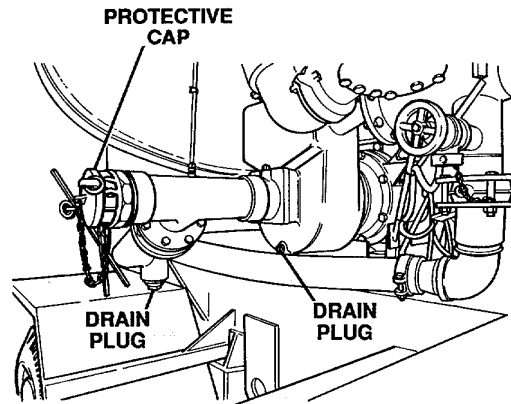
To make starting the engine easier, the throttle should be set for a speed of 2000 rpm before shutting down operation.

2-21. GRAVITY DRAINING OF TANK

WARNING

Do not stand in the path of water when removing the protective cap from the suction line. Personal injury could occur from the force of water.

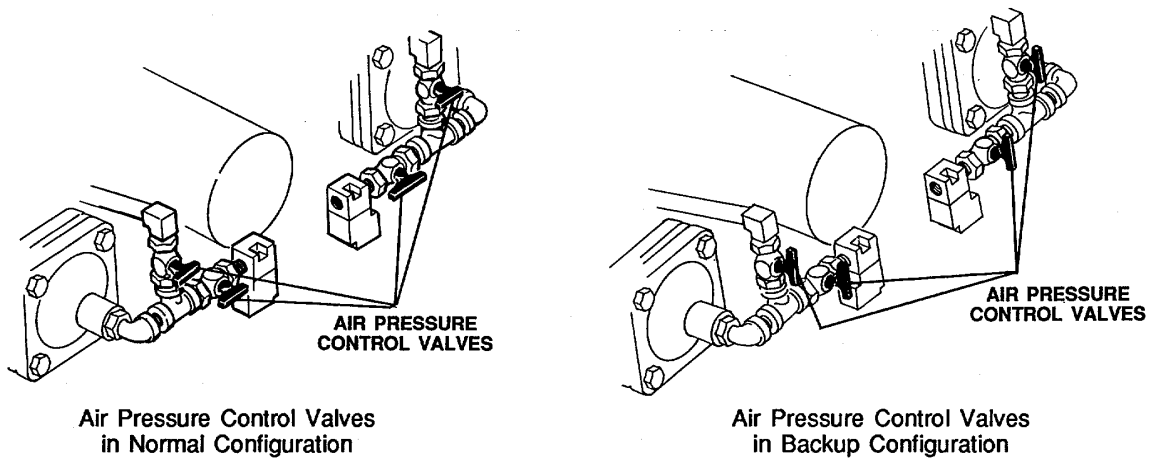
- a. To drain tank without using pump, remove drain plug from line between suction valve and tank.
- b. Remove drain plug from bottom of pump case.
- c. Install drain plug in line between suction valve and tank when all water has drained.
- d. Install drain plug in bottom of pump case.



Gravity Drain Points

2-22. PUMPING OUT DISCHARGE HOSE WITHOUT TRUCK-TRACTOR CONNECTED

The solenoid-actuated valves that control the flow of water to the spray nozzles rely on air pressure to keep the valves closed during pumping operations not involving the spray nozzles. This air pressure is obtained from the air brake system when a truck-tractor is connected to the semitrailer. It is also possible to operate the water distributor without a truck-tractor connected. If necessary to pump water out the discharge hose when a truck-tractor is not readily available (for emergency firefighting or other uses), the four small manual valves must all be turned 1/4 turn (90°) as shown.



Air Pressure Control Valves
in Normal Configuration

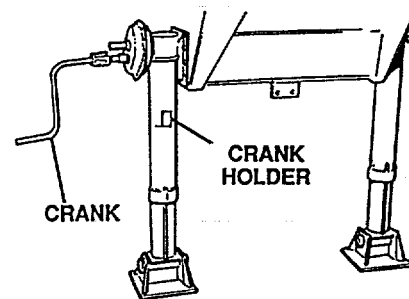
Air Pressure Control Valves
in Backup Configuration

2-23. DISCONNECTING WATER DISTRIBUTOR FROM TRUCK-TRACTOR**a. Lowering Landing Gear.**

- (1) Unhook crank and push crank in to put landing leg gear box in high-speed mode.
- (2) Turn crank counterclockwise and extend legs until contact with ground is made.
- (3) Pull the crank out to engage to low-speed gears and continue cranking counter-clockwise another 3-4 turns.

NOTE

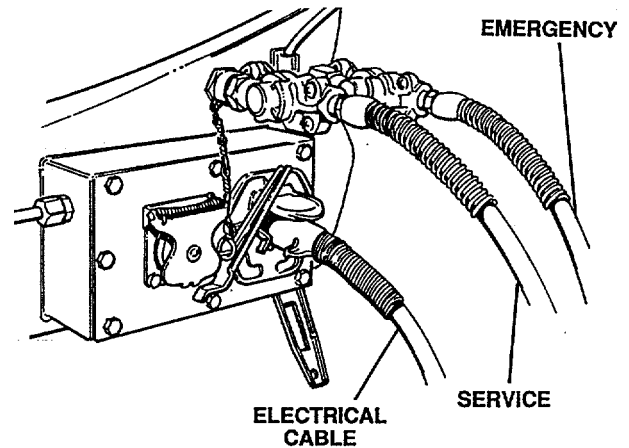
To prevent landing legs from sinking in soft ground, place float pads (ground board assemblies) under landing shoes.



Landing Legs

b. Disconnecting Air and Electrical Lines.

- (1) Close shutoff valves for the air lines on the towing vehicle.
- (2) Disconnect both the SERVICE and EMERGENCY air hoses at the glad-hand couplers on the semitrailer.
- (3) Disconnect electrical cable at semitrailer.
- (4) Be sure that the covers on the electrical connectors and glad-hands have been properly installed.
- (5) Remove remote control box from truck-tractor and store in tool box on curb side of semitrailer. Be sure control box cable is secured on hooks on side of semitrailer.



Air and Electric Lines

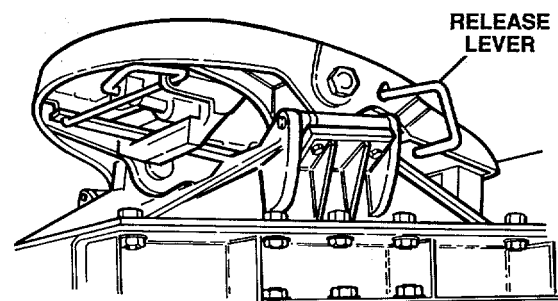
c. Disconnecting Semitrailer from Truck-Tractor.

- (1) Pull the fifth wheel kingpin release lever and be sure the jaws open.

NOTE

If the jaws on the fifth wheel do not open, try either raising or lowering the landing legs one turn of the crank and repeat step (1).

- (2) Slowly drive the truck-tractor forward until the kingpin plate has cleared the truck-tractor.



Fifth Wheel Kingpin Release Lever

2-23. DISCONNECTING WATER DISTRIBUTOR FROM TRUCK-TRACTOR (cont)

- (3) Chock wheels.
- (4) Drain air reservoir.

Section IV. OPERATION UNDER UNUSUAL CONDITIONS

Paragraph Number	Title	Page Number
2-24	OPERATION IN EXTREME COLD.....	2-39
2-25	OPERATION IN EXTREME HEAT	2-40
2-26	OPERATION IN RAINY OR HUMID CONDITIONS.....	2-40
2-27	OPERATION IN SALT WATER AREAS.....	2-40
2-28	OPERATION IN SNOW	2-40
2-29	OPERATION IN MUD	2-40
2-30	OPERATION IN DUSTY OR SANDY AREAS	2-40
2-31	FORDING OPERATIONS	2-41

2-24. OPERATION IN EXTREME COLD

a. Semitrailer.

- (1) Refer to FM 9-207 and FM 21-305 for special instructions on driving hazards in snow and ice that may be encountered during extremely cold weather conditions.
- (2) Tires may be frozen to the ground or have flat spots if they were under-inflated when the semitrailer was parked.
- (3) Brake shoes may become frozen to the brake drums and will require preheating with a torch to avoid damage.
- (4) For short shutdown periods, park in a sheltered spot out of the wind.
- (5) For long shutdown periods, if high dry ground is not available, prepare a footing of planks or brush.
- (6) Cover or shield the semitrailer with canvas covers if available. Keep ends of covers off the ground to keep them from freezing to the ground.
- (7) Be careful when placing the semitrailer in motion after shutdown. Low temperatures can cause lubricants to thicken or congeal. This can cause parts failure.
- (8) Apply brakes to assure they are working before driving at normal speed.

b. Water Distributor.

- (1) Freezing water can damage pipes, pump body and valve bodies. If water must be transported in temperatures below freezing, fill the tank, close the suction line valve, and drain all pump and discharge piping.
- (2) After use, be sure the tank and all piping are completely drained to prevent damage to equipment.

2-25. OPERATION IN EXTREME HEAT

- a. **Semitrailer.** Refer to TB 43-0239 for maintenance and operations under desert conditions.
- b. Water Distributor. The water distributor engine is equipped with a high-temperature shutdown switch. If engine temperature is too high, this switch will cause the engine to shut down. The engine must be allowed to cool down before restarting. Operation at a lower engine speed may be necessary to remain in operation at high ambient temperatures. For maximum cooling, keep the engine radiator clean and free of obstructions.

2-26. OPERATION IN RAINY OR HUMID CONDITIONS

Inspect, clean and lubricate inactive equipment frequently to prevent rust and/or fungus from accumulating.

2-27. OPERATION IN SALT WATER AREAS

Salt water will cause metal parts to rust and corrode. Clean, inspect and lubricate frequently.

2-28. OPERATION IN SNOW

Refer to FM 31-70 for special instructions on operation in snow.

2-29. OPERATION IN MUD**CAUTION**

Do not tow, pull, or push semitrailer by rear bumper. This may cause damage to the equipment.

- a. Reduce tire pressure to 35 psi (241 kPa) for operation in mud.
- b. Be sure to return tire pressure to 75 psi (517 kPa) after operation in mud.
- c. After operation in mud, clean, inspect and lubricate all equipment.

2-30. OPERATION IN DUSTY OR SANDY AREAS

- a. Reduce tire pressure to 35 psi (241 kPa) for operation in beach or desert sand.
- b. Be sure to return the pressure to 75 psi (517 kPa) after sand operation.
- c. After operation in sand, clean, inspect and lubricate all equipment.
- d. Clean, inspect and lubricate all equipment more frequently.
- e. In dusty conditions it may be necessary to clean the radiator and change the engine air filter more often than normal.

2-31. FORDING OPERATIONS**CAUTION**

Do not exceed fording depth of 30 inches (76 cm) or damage to the equipment may result.

a. Before Fording.

- (1) Before entering the water, check bottom surface conditions. If bottom is too soft, do not ford.
- (2) Cables and terminals must be protected by spraying with ignition insulation compound.

b. After Fording.

- (1) After coming out of the water, apply brakes a few times to help dry out brake linings. Make sure semitrailer brakes are working before driving at normal speeds.
- (2) Drain or dry all areas where water has collected.
- (3) Lubricate all unpainted surfaces.
- (4) Wheel bearings should be drained and relubricated with lubricant as specified in the Lubrication Chart after water fording operation. If wheel bearing lubricant has become contaminated it will be evident by foaming of the oil and a change in color to a light brown after towing the trailer 1 to 2 miles.
- (5) Dry all lubrication points and lubricate as specified in the Lubrication Chart.
- (6) Quarterly PMCS services must be completed within five days after fording operation. Refer to TM 9-238 for further guidance on fording requirements.

CHAPTER 3

OPERATOR'S MAINTENANCE

Section I. LUBRICATION INSTRUCTIONS

Paragraph Number	Title	Page Number
3-1	GENERAL	3-1
3-2	LUBRICATION INSTRUCTIONS	3-1

3-1. GENERAL

NOTE

LUBRICATION

THESE LUBRICATION INSTRUCTIONS ARE MANDATORY

- a. General. Keep all lubricants in closed containers and store in a clean dry place away from heat. Keep container covers clean, and allow no dust, dirt, or other foreign material to mix with lubricants. Keep all lubrication equipment clean and ready for use.
- b. Cleaning. Keep all external parts not requiring lubrication free of lubricants. Before lubricating equipment, wipe all lubrication points free of dirt or grease. Clean all lubrication points after servicing to prevent accumulation of foreign matter.
- c. Lubrication Points. Service lubrication points at the proper intervals as specified on the lubrication chart. The intervals specified are based on operating under normal conditions. Operation under unusual conditions may require modification of recommended intervals.

3-2. LUBRICATION INSTRUCTIONS

- a. Lubrication Under Normal Conditions. For lubrication under normal conditions, refer to the Lubrication Chart.
- b. Lubrication in Cold Weather. For instructions on lubrication in temperatures below 0°F (-180C), refer to FM 9-207, Operation and Maintenance of Ordnance Material in Cold Weather.
- c. Water Fording. For lubrication instructions before and after fording, refer to TM 9-238.
- d. Lubrication Under Unusual Conditions. After operating in mud, dust, sand, or other unusual conditions, clean and inspect all lubrication points. Lubricate semitrailer in accordance with the Lubrication Chart.

3-2. LUBRICATION INSTRUCTIONS (cont)

LUBRICATION CHART

DISTRIBUTOR, WATER, SEMITRAILER MOUNTED

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

WARNING

Wear protective goggles when using the cleaning solvent and avoid contact with the eyes. If contact occurs flush eyes with cold water for 5 minutes and seek immediate medical attention. Dry cleaning solvent (PD-680) is both toxic and flammable. Avoid prolonged breathing of vapors. Avoid skin contact. Use only in a well ventilated area. Keep away from open flame. Flash point of solvent is 138°F (59°C).

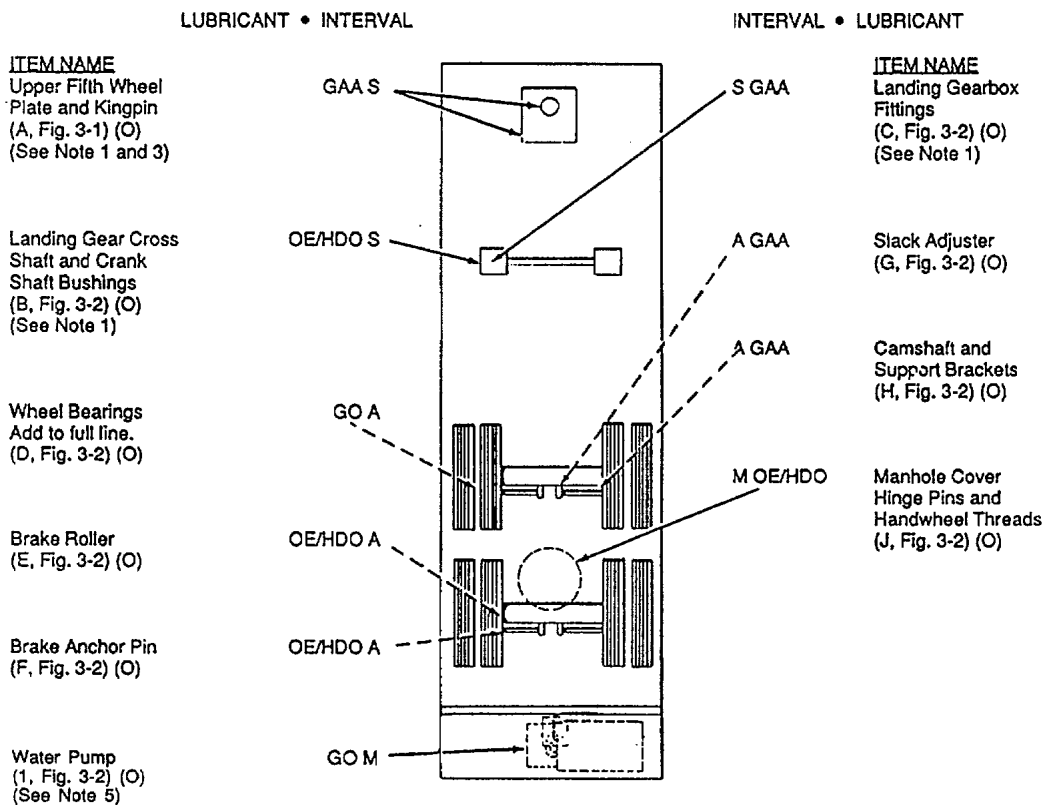


Figure 3-1. Lubrication Chart (Sheet 1 of 2)

3-2. LUBRICATION INSTRUCTIONS (cont)

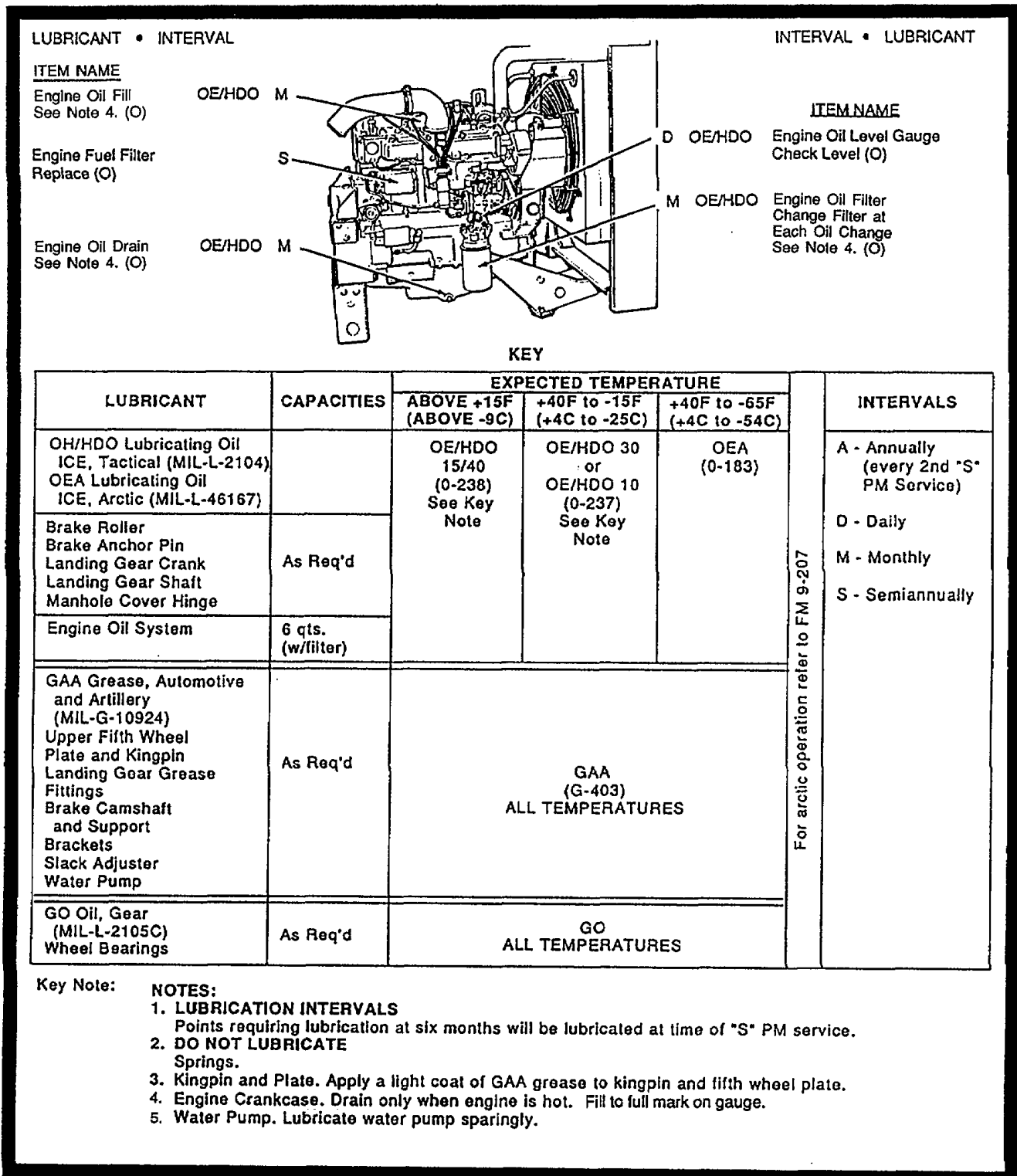


Figure 3-1. Lubrication Chart (Sheet 2 of 2)

3-2. LUBRICATION INSTRUCTIONS (cont)

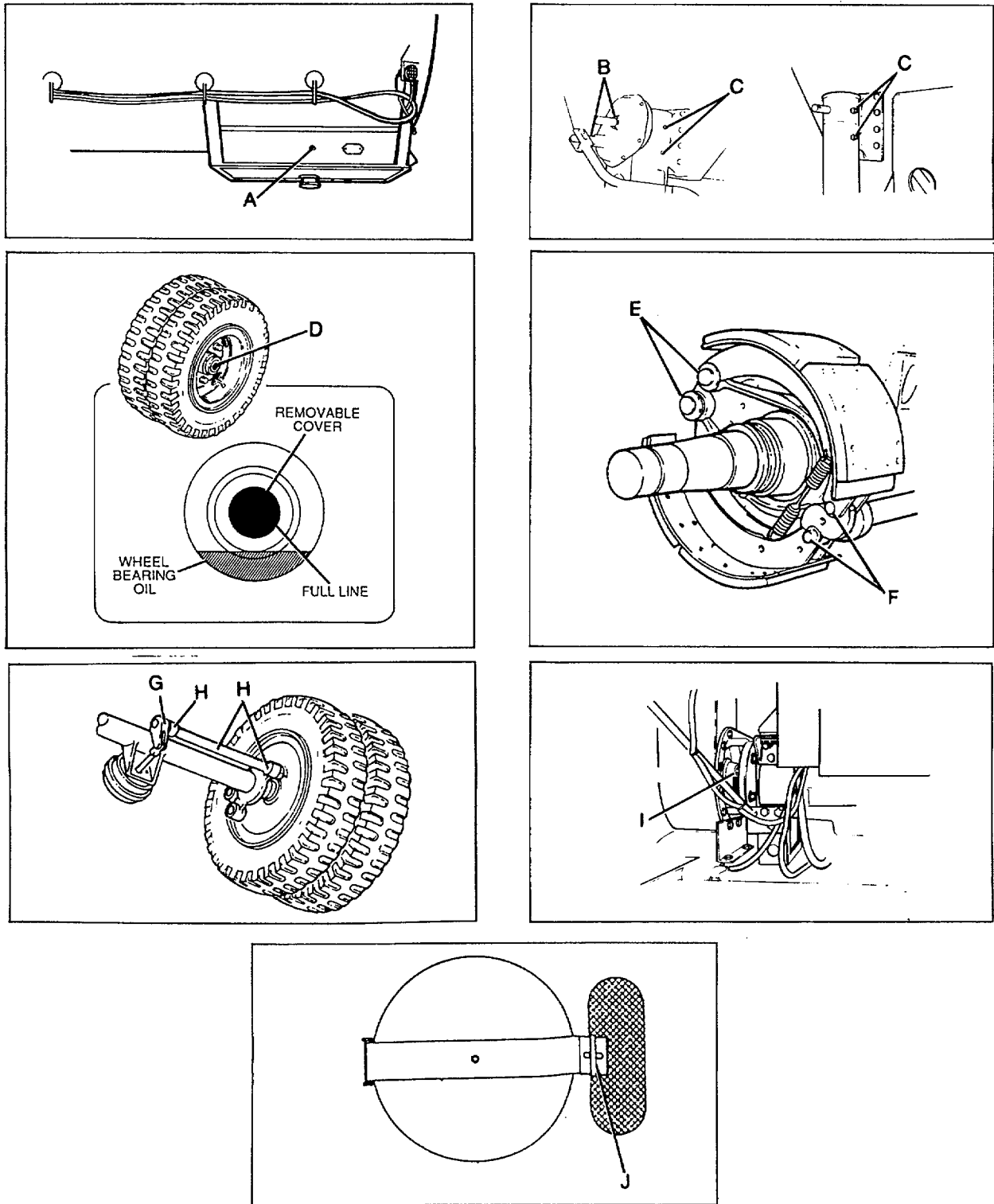


Figure 3-2. Localized Lubrication Points

Section II. OPERATOR TROUBLESHOOTING PROCEDURES

Paragraph Number	Title	Page Number
3-3	GENERAL	3-5
3-4	SYMPTOM INDEX	3-5

3-3. GENERAL

a. The troubleshooting table in this section lists the common malfunctions which you may find during normal operation of the semitrailer or its components. You should perform the tests or inspections and corrective maintenance in the order listed.

b. This manual cannot list all malfunctions that may occur, or all tests, inspections, and corrective actions. If a malfunction is not listed, or is not corrected by the listed corrective actions, notify Organizational Maintenance.

3-4. SYMPTOM INDEX

Subject	Page
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SEMITRAILER ELECTRICAL SYSTEM

All lights do not light	3-6
One or more lights do not light	3-7
Dim or flickering lights.....	3-8

BRAKES

Brake drums overheating	3-8
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Uneven braking	3-10

LANDING GEAR

Landing gear is difficult to raise or lower	3-10
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TIRES

Excessively worn, scuffed, or cupped tires	3-10
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WATER DISTRIBUTOR CONTROLS - REAR AND REMOTE

No electrical power.....	3-12
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3-4. SYMPTOM INDEX (cont)

PUMP

Pump will not prime3-12
 Pump will not hold prime3-13
 Poor performance - low pressure and/or low-volume output3-13
 Leakage around the pump shaft while pumping3-14
 Suddenly stops pumping3-14
 Stops pumping until engine is stopped and restarted3-14
 Spray nozzles do not spray when spray nozzle switches are turned on at control panel
 (and air supply is available from truck-tractor)3-15

ENGINE

Engine will not turn or crank3-16
 Engine will not start3-16
 Engine hard to start3-16
 Engine stops suddenly3-17
 Engine stops frequently3-17
 Engine shows loss of power3-17
 Engine runs unevenly and vibrates excessively3-18
 Engine emits black smoke from the exhaust3-18
 Engine emits bluish-white smoke from exhaust3-18
 Engine detonates or knocks3-18

Table 3-1. Operator Troubleshooting Table

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

SEMITRAILER ELECTRICAL SYSTEM

1. ALL LIGHTS DO NOT LIGHT

Step 1. Check lights on towing vehicle, including turn signals and stop lights.

- a. If towing vehicle lights come on, go to Step 2.
- b. If the towing vehicle lights do not light, notify Organizational Maintenance.

WARNING

To prevent injury to personnel, disconnect the electrical power source before performing any troubleshooting on wiring harness, connectors or lights.

Table 3-1. Operator Troubleshooting Table (cont)

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
-------------	--------------------	-------------------

SEMITRAILER ELECTRICAL SYSTEM (cont)

1. ALL LIGHTS DO NOT LIGHT (cont)

Step 2. Check electrical connection at intervehicular receptacle.

- a. If cable is not properly connected, reconnect cable and try the lights again.
- b. If cable is properly connected, go to Step 3.

Step 3. Check intervehicular connectors for dirty or corroded pins. Check for damaged pins.

- a. If pins are dirty or corroded, clean the pins.
- b. If pins are damaged, notify Organizational Maintenance.

2. ONE OR MORE LIGHTS DO NOT LIGHT

Step 1. Check for burned out or defective bulbs.

- a. If bulbs are not burned out or defective, go to Step 2.
- b. If bulbs are burned out or defective, notify Organizational Maintenance.

Step 2. Check for broken lead wires or loose connections.

- a. If connections are not loose or broken, go to Step 3.
- b. If lead wires are broken, notify Organizational Maintenance.

Step 3. Check light assembly for damage.

- a. If light assembly is not damaged, go to Step 4.
- b. If light assembly is damaged, notify Organizational Maintenance.

Step 4. Check for dirty or corroded connections on back of light.

- a. If connectors are dirty or corroded, clean connectors.
- b. If cleaning does not correct problem, notify Organizational Maintenance.
- c. If connector pins are dirty or corroded, clean pins.

Table 3-1. Operator Troubleshooting Table (cont)

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
-------------	--------------------	-------------------

SEMITRAILER ELECTRICAL SYSTEM (cont)

3. DIM OR FLICKERING LIGHTS

Step 1. Check electrical connectors at light for loose, dirty, or corroded pins.

- a. If connections are tight and clean, go to Step 2.
- b. If pins are loose, tighten.
- c. If connector pins are dirty or corroded, clean pins.

Step 2. Check for defective bulbs.

- a. If bulb(s) are not defective, notify Organizational Maintenance.
- b. If bulb(s) are defective, replace bulb(s).

BRAKES

4. BRAKE DRUMS OVERHEATING

Notify Organizational Maintenance.

5. BRAKES DO NOT RELEASE

Step 1. Check that air supply from towing vehicle to trailer is turned on.

- a. If air supply is turned on, go to Step 2.
- b. If air supply is shut off, turn on and try brakes again.
- c. If this fails to correct the problem, continue with troubleshooting.

Step 2. Check air pressure of towing vehicle.

- a. If air pressure is normal, go to Step 3.
- b. If air pressure is low, build up air pressure to normal level and try brakes again.
- c. If air pressure can't be built up to normal, notify Organizational Maintenance.

Step 3. Check air line connections at glad-hands.

- a. If air lines are properly connected, go to Step 4.

Table 3-1. Operator Troubleshooting Table (cont)

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
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BRAKES (cont)

5. BRAKES DO NOT RELEASE (cont)
- Step 3 (cont)
- b. If air lines are not properly connected (Emergency to Emergency and Service to Service), properly reconnect the air lines and try brakes again.
 - c. If this fails to correct the problem, continue with troubleshooting.
- Step 4. Check for dirty or damaged packing in gladhands.
- a. If coupling is clean and not damaged, go to Step 5.
 - b. If packing is dirty, clean packing and try brakes again.
 - c. If packing is leaking, notify Organizational Maintenance.
- Step 5. Inspect air line connections for leaks.
- a. If leaks are evident, notify Organizational Maintenance.
6. BRAKES GRAB
- Check for moisture in air reservoir by opening each drain cock as described in Operator's PMCS.
- a. If moisture is present, allow moisture to drain.
 - b. If this fails to correct the problem, notify Organizational Maintenance.
7. NO BRAKES OR WEAK BRAKES
- Step 1. Check that air supply from towing vehicle to trailer is turned on.
- a. If air supply is turned on, go to Step 2.
 - b. If air supply is shut off, turn on.
 - c. If this fails to correct the problem, notify Organizational Maintenance.

Table 3-1. Operator Troubleshooting Table (cont)

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<u>BRAKES (cont)</u>		
7.	NO BRAKES OR WEAK BRAKES (cont)	Step 2. Check air line connections at gladhands. <ul style="list-style-type: none"> a. If air lines are not properly connected (Emergency to Emergency and Service to Service), reconnect air lines. b. If this fails to correct the problem, notify Organizational Maintenance.
8.	UNEVEN BRAKING	Notify Organizational Maintenance.
<u>LANDING GEAR</u>		
9.	LANDING GEAR IS DIFFICULT TO RAISE OR LOWER	Step 1. Check for misaligned or broken crank handle. <ul style="list-style-type: none"> a. If handle is misaligned or broken, notify Organizational Maintenance. b. If handle is not misaligned or broken, go to Step 2. Step 2. Check for dirt on lower landing gear leg. <ul style="list-style-type: none"> a. If lower landing gear leg is dirty, clean. b. If lower landing gear leg is clean, go to Step 3. Step 3. Check for misaligned, damaged or bent landing gear legs. <ul style="list-style-type: none"> a. If landing gear legs are misaligned, damaged or bent, notify Organizational Maintenance.
10.	LANDING GEAR WILL NOT MOVE	Notify Organizational Maintenance.
<u>TIRES</u>		
11.	EXCESSIVELY WORN, SCUFFED OR CUPPED TIRES	Step 1. Check tire pressure.

Table 3-1. Operator Troubleshooting Table (cont)

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
11.	EXCESSIVELY WORN, SCUFFED OR CUPPED TIRES (cont)	<p>Step 1 (cont)</p> <p>a. Normal highway tire pressure is 75 psi (517 kPa). Measure cold tire pressure and inflate all tires to this level when needed.</p>
NOTE		
If the terrain is soft (sand/mud) operate the tires at 35 psi (241 kPa).		
b. If tire pressure is normal, 75 psi (517 kPa), go to Step 2.		
Step 2. Check for loose, cracked or broken wheels.		
a. If wheels are loose, tighten nuts. Torque nuts to 400-450 ft. lbs. (542-617 Nm).		
CAUTION		
Turn nuts on left wheel counterclockwise to tighten, clockwise to loosen. Nuts on right wheel are turned clockwise to tighten and counterclockwise to loosen. Failure to follow this system will result in damage to the equipment.		
b. If wheel is cracked or broken, notify Organizational Maintenance.		
c. If wheel is secure, and not cracked or broken, go to Step 3.		
Step 3. Check suspension system for damaged springs and loose or missing bolts or nuts.		
a. If suspension is damaged or has loose or missing bolts or nuts, notify Organizational Maintenance.		
b. If suspension system is not damaged, and all hardware is complete and tight, go to Step 4.		
Step 4. Check tracking for indication of axle misalignment.		
a. If the axle appears to be misaligned, notify Organizational Maintenance.		
b. If the above steps do not correct the malfunction, notify Organizational Maintenance.		

Table 3-1. Operator Troubleshooting Table (cont)

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<u>TIRES (cont)</u>		
12.	EXCESSIVE VIBRATION WHEN DRIVING	<ul style="list-style-type: none"> a. Check for foreign objects between tires or imbedded in the treads. b. If no objects are found, notify Organizational Maintenance.
<u>WATER DISTRIBUTOR CONTROLS - REAR AND REMOTE</u>		
13.	NO ELECTRICAL POWER	<p>Check battery</p> <ul style="list-style-type: none"> a. Tighten battery connections if they are loose. b. Check fluid level in the battery and, if low, refill. c. If this fails to correct the problem, notify Organizational Maintenance.
<u>PUMP</u>		
<u>WARNING</u>		
Never service or troubleshoot the pump with the engine running. Equipment damage or severe personal injury can result.		
14.	PUMP WILL NOT PRIME	<p>Step 1. Check to see if the pump is dry by removing the plug at the top of the casing.</p> <ul style="list-style-type: none"> a. If the pump is not dry, go to Step 2. b. If pump is dry, pour water into the pump casing until full. Replace plug and try to resume normal operations. c. If pump does not operate, go to Step 2. <p>Step 2. Inspect pump intake strainer for blockage. Remove suction port cap and visually inspect strainer with flashlight.</p> <ul style="list-style-type: none"> a. If pump intake strainer is not clogged, replace the suction port cap and go to Step 3. b. If the intake strainer is clogged, it must be removed and cleaned (para. 3-8).

Table 3-1. Operator Troubleshooting Table (cont)

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<u>PUMP (cont)</u>		
14.	PUMP WILL NOT PRIME (cont)	<p>Step 2. (cont)</p> <p>c. If the pump still will not operate, go to Step 3.</p> <p>Step 3. Check the pump intake suction line for air leaks.</p> <p>a. If there are no air leaks, proceed with troubleshooting the pump.</p> <p>b. If an air leak is found, notify Organizational Maintenance.</p>
15.	PUMP WILL NOT HOLD PRIME	Notify Organizational Maintenance.
16.	POOR PERFORMANCE - LOW PRESSURE AND/OR LOW-VOLUME OUTPUT	<p>Step 1. Check the pump intake suction line for air leaks.</p> <p>a. If there are no air leaks, proceed with troubleshooting the pump.</p> <p>b. If an air leak is found, notify Organizational Maintenance.</p> <p>Step 2. Inspect pump intake strainer for blockage. Remove suction port cap and visually inspect strainer with flashlight.</p> <p>a. If the pump intake strainer is not clogged, replace the suction port cap and go to Step 3.</p> <p>b. If the intake strainer is clogged, remove it by reaching into the suction port and pulling it out. After cleaning, replace strainer and the suction port cap and try to resume normal operations.</p> <p>c. If the pump still will not operate properly, go to Step 3.</p> <p>Step 3. Check to see that the suction hose intake at the foot valve is not clogged.</p> <p>a. If the foot valve is clogged, clean the assembly before replacing it into the water. The foot valve assembly can be unscrewed from the suction hose if required for proper cleaning.</p> <p>b. If the pump still will not operate properly, notify Organizational Maintenance.</p>

Table 3-1. Operator Troubleshooting Table (cont)

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<u>PUMP (cont)</u>		
17.	LEAKAGE AROUND THE PUMP SHAFT WHILE PUMPING	Notify Organizational Maintenance.
18.	SUDDENLY STOPS PUMPING	<p>Step 1. Check the pump intake suction line for air leaks.</p> <ul style="list-style-type: none"> a. If there are no air leaks, proceed with troubleshooting the pump. b. If an air leak is found, notify Organizational Maintenance. <p>Step 2. Inspect pump intake strainer for blockage. Remove suction port cap and visually inspect strainer with flashlight.</p> <ul style="list-style-type: none"> a. If the pump intake strainer is not clogged, replace the suction port cap and go to Step 3. b. If the intake strainer is clogged, remove it by reaching into the suction port and pulling on it. After cleaning, replace it and the suction port cap and try to resume normal operations. c. If the pump still will not operate properly go to Step 3. <p>Step 3. Check to see that the suction hose intake at the foot valve is not clogged.</p> <ul style="list-style-type: none"> a. If the foot valve is clogged, clean the assembly before replacing it into the water. The foot valve assembly can be unscrewed from the suction hose if required for proper cleaning. b. If the pump still will not operate properly, notify Organizational Maintenance.
19.	STOPS PUMPING UNTIL ENGINE IS STOPPED AND RESTARTED	<p>Step 1. Inspect pump intake strainer for blockage. Remove suction port cap and visually inspect strainer with flashlight.</p> <ul style="list-style-type: none"> a. If the pump intake strainer is not clogged, replace the suction port cap and go to Step 2. b. If the intake strainer is clogged, remove it by reaching into the suction port and pulling on it. After cleaning, replace it and the suction port cap and try to resume normal operations. c. If the pump still will not operate properly, go to Step 2.

Table 3-1. Operator Troubleshooting Table (cont)

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
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PUMP (cont)

- | | | |
|-----|--|--|
| 19. | STOPS PUMPING UNTIL ENGINE IS STOPPED AND RESTARTED (cont) | <p>Step 2. Check to see that the suction hose intake at the foot valve is not clogged.</p> <ul style="list-style-type: none"> a. If the foot valve is clogged, clean the assembly before replacing it into the water. The foot valve assembly can be unscrewed from the suction hose if required for proper cleaning. b. If the pump still will not operate properly, notify Organizational Maintenance. |
| 20. | SPRAY NOZZLES DO NOT SPRAY WHEN SPRAY NOZZLE SWITCHES ARE TURNED ON AT CONTROL PANEL (AND AIR SUPPLY IS AVAILABLE .FROM TRUCK-TRACTOR) | <p>Step 1. Air pressure control valves on water piping are in "backup" configuration.</p> <ul style="list-style-type: none"> a. Be sure all four valves are in their "normal" positions (see Valve Operation Chart on left rear fender of trailer). b. If spray nozzles still do not operate, go to Step 2. <p>Step 2. Insufficient air pressure in air reservoirs.</p> |

NOTE

The air pressure to operate the spray nozzle valves is obtained from the air reservoirs for the semi-trailer air brake system.

- a. Check air pressure in reservoirs by checking "Trailer Air Brake Pressure" gauge in truck-tractor. Air pressure must be 80 psi or more.
- b. If air pressure is below 80 psi, wait for air pressure to build up.
- c. If air pressure is over 80 psi, notify Organizational Maintenance.

Table 3-1. Operator Troubleshooting Table (cont)

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<u>ENGINE</u>		
21.	ENGINE WILL NOT TURN OR CRANK	Check battery. <ol style="list-style-type: none"> a. Tighten battery connections if they are loose. b. Check fluid level in the battery and refill if low. c. If the engine still will not crank, notify Organizational Maintenance.
22.	ENGINE WILL NOT START	Check fuel level in tank. <ol style="list-style-type: none"> a. If fuel level is low, add fuel. b. If fuel level is sufficient, and engine still will not start, notify Organizational Maintenance.
23.	ENGINE HARD TO START	Step 1. Check fuel level in tank. <ol style="list-style-type: none"> a. If fuel level is low, add fuel. b. If fuel level is okay, and engine is still hard to start, go to Step 2. Step 2. Inspect air filter. <ol style="list-style-type: none"> a. Check the air filter indicator on the engine intake manifold. If it shows red, the air cleaner element is dirty. Clean or replace air cleaner element (para. 3-7). b. If engine is still hard to start, go to Step 3. Step 3. Fuel may be contaminated. <ol style="list-style-type: none"> a. If fuel is found to be contaminated, have Organizational Maintenance install new fuel filter. b. Drain fuel from tank and add fuel known to be clean. c. If engine is still hard to start, notify Organizational Maintenance.

Table 3-1. Operator Troubleshooting Table (cont)

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<u>ENGINE (cont)</u>		
24.	ENGINE STOPS SUDDENLY	<p>Step 1. Check fuel level in tank.</p> <ul style="list-style-type: none"> <li>a. If fuel level is low, add fuel and try restarting the engine. <li>b. If fuel level is okay, or if engine is still hard to start, go to Step 2. <p>Step 2. Inspect radiator air passages.</p> <ul style="list-style-type: none"> <li>a. If radiator is clogged, clean any dirt and debris from radiator core. <li>b. If radiator is clean, notify Organizational Maintenance. <p>Step 3. Engine water temperature switch has shut down engine. Allow adequate cool-down time.</p>
25.	ENGINE STOPS FREQUENTLY	<p>Fuel may be contaminated.</p> <ul style="list-style-type: none"> <li>a. If fuel is found to be contaminated, have Organizational Maintenance install new fuel filter. <li>b. Drain fuel from tank and add fuel known to be clean. <li>c. If the engine still stops frequently, notify Organizational Maintenance.
26.	ENGINE SHOWS LOSS OF POWER	<p>Step 1. Inspect air filter.</p> <ul style="list-style-type: none"> <li>a. Check the air filter indicator on the engine intake manifold. If it shows red, the air cleaner element is dirty. Clean or replace element (para. 3-7). <li>b. If engine still shows a loss of power, go to Step 2. <p>Step 2. Fuel may be contaminated.</p> <ul style="list-style-type: none"> <li>a. If fuel is found to be contaminated, have Organizational Maintenance install new fuel filter. <li>b. Drain fuel from tank and add fuel known to be clean. <li>c. If engine still shows a loss of power, notify Organizational Maintenance.

Table 3-1. Operator Troubleshooting Table (cont)

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<u>ENGINE (cont)</u>		
27.	ENGINE RUNS UNEVENLY AND VIBRATES EXCESSIVELY	<p>Step 1. Inspect air filter.</p> <ul style="list-style-type: none"> a. Check the air filter indicator on the engine intake manifold. If it shows red, the air cleaner element is dirty. Clean or replace element (para. 3-7). b. If air filter is clean, go to Step 2. <p>Step 2. Fuel may be contaminated.</p> <ul style="list-style-type: none"> a. If fuel is found to be contaminated, have Organizational Maintenance install new fuel filter. b. Drain fuel from tank and add fuel known to be clean. c. If engine still runs unevenly and vibrates excessively, notify Organizational Maintenance.
28.	ENGINE EMITS BLACK SMOKE FROM THE EXHAUST	<p>Step 1. Inspect air filter.</p> <ul style="list-style-type: none"> a. Check the air filter indicator on the engine intake manifold. If it shows red, the air cleaner element is dirty. Clean or replace element (para. 3-7). b. If air filter is clean, go to Step 2. <p>Step 2. Fuel may be contaminated.</p> <ul style="list-style-type: none"> a. If fuel is found to be contaminated, have Organizational Maintenance install new fuel filter. b. Drain fuel from tank and add fuel known to be clean. c. If engine still emits black smoke from the exhaust, notify Organizational Maintenance.
29.	ENGINE EMITS BLUISH-WHITE SMOKE FROM EXHAUST	Notify Organizational Maintenance.
30.	ENGINE DETONATES OR KNOCKS	Notify Organizational Maintenance.

Section III. MAINTENANCE PROCEDURES

Paragraph Number	Title	Page Number
3-5	BATTERY	3-19
3-6	CABLES AND TERMINALS.....	3-20
3-7	AIR CLEANER.....	3-21
3-8	PUMP INTAKE STRAINER.....	3-23
3-9	CAGING AND UNCAGING SPRING BRAKE CHAMBERS.....	3-23

3-5. BATTERY

THIS TASK COVERS:

 Servicing

INITIAL SETUP:

Equipment/Materials Required:

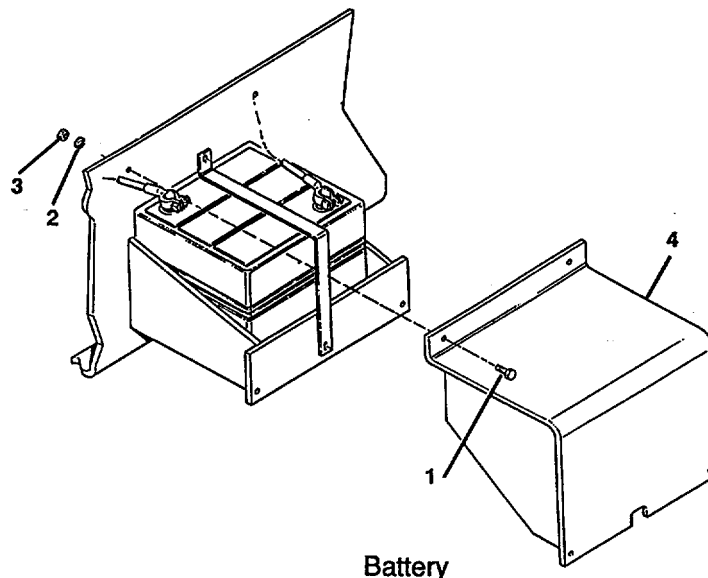
- Face shield (Item 20, Appendix E)
- Rubber gloves (Item 7, Appendix E)
- Protective goggles (Item 9, Appendix E)
- Rags (Item 6, Appendix E)

Equipment Conditions:

Engine shut down.

WARNING

Wear protective face shield when servicing the battery to protect the facial skin in case that the battery acid splashes and would come in contact with the skin and cause burns. Avoid contact with the eyes. If contact occurs, flush eyes with cold water and seek immediate medical attention. Wear rubber gloves and avoid acid contact with the skin. If contact occurs, wash immediately with cold water and seek medical attention as necessary.



3-5. BATTERY (cont)

- a. Remove four screws (1), lockwashers (2) and nuts (3). Remove battery cover (4).
- b. Clean the battery case with a clean dry cloth.
- c. Remove the caps from each battery cell and visually check the electrolyte level inside each battery cell, using a flashlight if necessary. If the tops of the plates in any of the cells are not covered by electrolyte, fill battery with distilled water.
- d. Replace the caps on the battery cells securely.
- e. Install battery cover and secure with four bolts (1), lockwashers (2) and nuts (3).

3-6. CABLES AND TERMINALSTHIS TASK COVERS:

Servicing

INITIAL SETUP:**Equipment/Materials Required:**

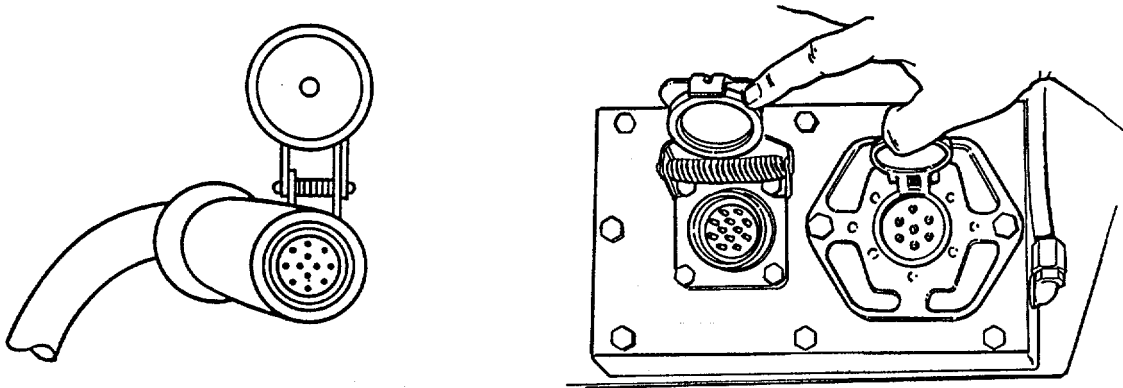
Rags (Item 6, Appendix E)

Brush, soft bristle (Item 2, Appendix E)

WARNING

Disconnect all electric power before servicing the semi-trailer.

Use a soft cloth or soft bristle brush to remove any build-up of grass and dirt from the electrical connectors.



Cables and Terminals

3-7. AIR CLEANERTHIS TASK COVERS:

Servicing

INITIAL SETUP:**Equipment/Materials Required:**

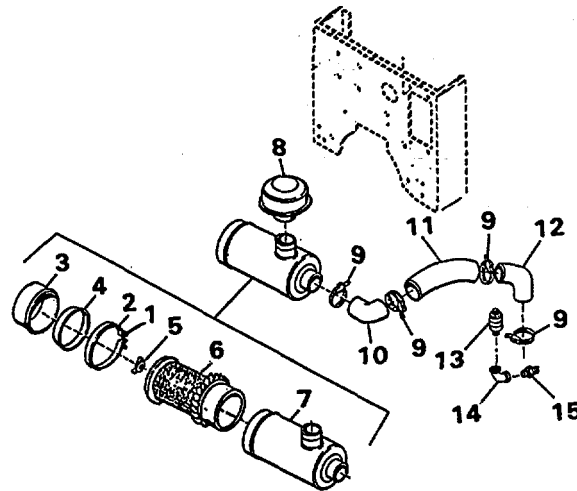
Rags (item 6, Appendix E)
 Cleaning solvent (Item 13, Appendix E)

Equipment Conditions:

Engine shut down.

WARNING

If NBC contamination is suspected, all the air filter media should be handled by personnel wearing protective equipment. Consult your NBC officer or NBC NCO for appropriate handling instructions.



Air Cleaner Service

- Loosen thumbscrew (1) until clamp (2) can be removed.
- Remove cup (3).
- Remove baffle (4) from cup (3).
- Remove wingnut (5) and remove element (6) from body (7). If unserviceable, replace element (6).
- Remove cap (8) from body.

3-7. AIR CLEANER (cont)

- f. Loosen clamps (9) and remove elbow (10), air inlet tube (11) and elbow (12).
- g. Remove indicator (13) from elbow (14) and remove elbow (14) and pipe nipple (15) from manifold.

WARNING

Wear protective goggles when using the cleaning solvent. Avoid contact with the eyes. If contact occurs, flush eyes with cold water for 5 minutes and seek immediate medical attention. Dry cleaning solvent (PD-680) is both toxic and flammable. Avoid prolonged breathing of vapors. Avoid skin contact. Use only in a well-ventilated area. Keep away from open flame. Flash point of solvent is 138°F (59°C).

- h. Clean inside of cup (3), body (7) and cap (8) with cleaning solvent (PD-680).
- i. Inspect elbows (10 and 12) and air inlet tube (11) for cracks and damage. Replace elbows and tube if unserviceable.
- j. Install pipe nipple (15) and elbow (14) in intake manifold. Install indicator (13) in elbow.
- k. Slide clamp (9) and elbow (12) on intake manifold.
- l. Slide air inlet tube (11) through rear of engine shroud and connect tube and clamp (9) to elbow (12).
- m. Connect elbow (10) to air inlet tube (11) and air cleaner body (7) with clamps (9).
- n. Install element (6) into body (7) and install wingnut (5). Tighten wingnut securely.
- o. Install baffle (4) in cup (3).
- p. Install cup (3) on body (7). Take note of arrows and the word TOP on end of cover for correct positioning.
- q. Install clamp (2) over mating flanges of cup and body. Tighten thumbscrew (1) securely.
- r. Install cap (8) on inlet of body (7).

3-8. PUMP INTAKE STRAINER

THIS TASK COVERS:

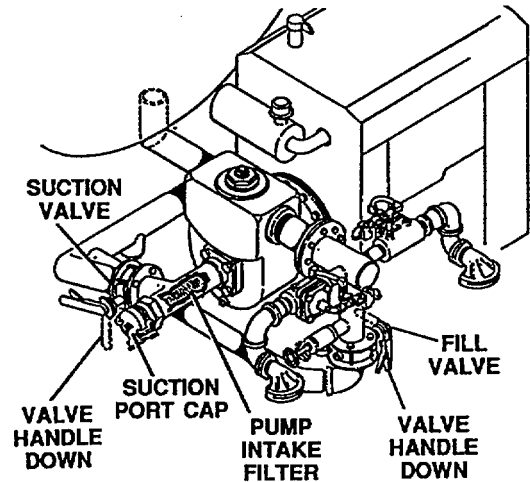
Servicing

INITIAL SETUP:

Equipment Conditions:

Engine shut down.
Suction and fill valves closed (valve handles pointing down).

- a. Remove suction port cap and pull intake strainer from suction pipe.
- b. Clean intake strainer and inspect for damage. If strainer is damaged it must be replaced.
- c. Insert intake strainer into suction pipe (pointed end first) and install suction port cap.



Pump Intake Strainer

3-9. CAGING AND UNCAGING SPRING BRAKE CHAMBERS

THIS TASK COVERS

- a. Inspection
- b. Caging
- c. Uncaging

INITIAL SETUP:

Tools Required:

Nomenclature:

General Mechanics Tool Kit
Spring Brake Tool

Equipment Conditions:

Intervehicular air lines disconnected. Refer to para. 2-23.

3-9. CAGING AND UNCAGING SPRING BRAKE CHAMBERS (Cont)

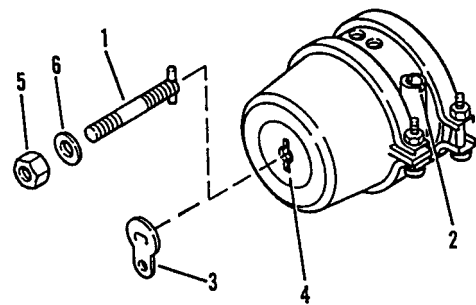
a. Inspection.

- (1) Inspect brake chamber clamp bands, castings and fasteners for external damage.
- (2) If damage is evident, do not attempt uncaging procedure.
- (3) Refer to para. 4-28 for removal procedures.

b. Caging Brake Chambers.

NOTE

This procedure will allow for moving the semi-trailer in the event of a brake system failure which has resulted in the brakes being locked.



Brake Chamber

- (1) Block wheels.
- (2) Remove plug (3) from brake chambers.
- (3) Remove nut (5) and washer (6). Remove tool (1) from mounting hole (2) on spring brake chamber (4).
- (4) Insert tool (1) through opening in spring brake chamber. Turn tool (1) 11/4 turn clockwise until it contacts mechanical stop.
- (5) Install washer (6) and nut (5) on tool (1) and tighten until it stops. Repeat above procedure for remaining brake chambers.

c. Uncaging Brake Chambers.

- (1) Slowly loosen nut (5) and washer (6) on spring brake tool (1). Remove nut (5) and washer (6).
- (2) Turn brake tool (1) 1/4 turn counterclockwise to unlock from manual release position. Remove spring brake tool (1).
- (3) Install plug (3) on spring brake chamber (4).
- (4) Insert spring brake tool (1) in mounting hole (2) on side of brake chamber (4). Secure tool (1) with washer (6) and nut (5).
- (5) Repeat steps (1) through (4) for remaining spring brake chambers.
- (6) Remove and stow chock blocks.

**CHAPTER 4
ORGANIZATIONAL MAINTENANCE INSTRUCTIONS**

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

Paragraph Number	Title	Page Number
4-1	COMMON TOOLS AND EQUIPMENT	4-1
4-2	SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT	4-1
4-3	REPAIR PARTS	4-1

4-1. COMMON TOOLS AND EQUIPMENT

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

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

No special tools, TMDE, or support equipment are required for maintenance of water distributor.

4-3. REPAIR PARTS

Repair parts are listed and illustrated in appendix F of this manual.

Section II. SERVICE UPON RECEIPT OF EQUIPMENT

Paragraph Number	Title	Page Number
4-4	UNPACKING AND CHECKING EQUIPMENT	4-1
4-5	SERVICING EQUIPMENT	4-2

4-4. UNPACKING AND CHECKING EQUIPMENT

- a. Remove any metal strapping, plywood, tape, seals, wrapping paper, or any other shipping and protective items.

WARNING

Wear protective goggles when using cleaning solvent. Avoid contact with the eyes. If contact occurs, flush eyes with cold water for 5 minutes and seek immediate medical attention. Dry-cleaning solvent (PD-680) is both toxic and flammable. Avoid prolonged breathing of vapors. Avoid skin contact. Use only in a well ventilated area. Keep away from open flame. Flash point of solvent is 138°F (59°C).

4-4. UNPACKING AND CHECKING EQUIPMENT (Cont)

- b. If any exterior parts are coated with rust preventive compound, remove it with cleaning solvent (PD-680).
- c. Read and follow all instructions contained in DD Form 2258, attached to conspicuous part of water distributor.
- d. Un-cage brakes and drain all preservative fluids from engine, fuel tank, and air reservoirs.
- e. Inspect equipment for damage incurred during shipping. If equipment has been damaged, report damage on DD Form 6, Packing Improvement Report.
- f. Check equipment against packing slip to see if shipment is complete. Report ail discrepancies in accordance with DA Pam 738-750.
- g. A decal has been developed that warns of NBC exposure. It is to be positioned in a noticeable place on or near the air filter housing. To order the decal, refer to Figure 30 in the RPSTL.

4-5. SERVICING EQUIPMENT

- a. Perform preventive maintenance checks and services contained in Tables 2-1 and 4-1.
- b. Lubricate all points as shown in Lubrication Chart (refer to para. 3-2), regardless of interval.
- c. Schedule next preventive maintenance checks and services on DD Form 314, Preventive Maintenance Schedule and Record.
- d. Report all deficiencies on DA Form 2407, if deficiencies appear to involve unsatisfactory design.
- e. Perform break-in road test of 25 miles (40 kilometers) at maximum speed of 50 mph (80 km/t).

Section III. ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES

Paragraph Number	Title	Page Number
4-6	GENERAL PMCS INFORMATION	4-2
4-7	ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES.....	4-3

4-6. GENERAL PMCS INFORMATION

To ensure that water distributor 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 4-1 contains a tabulated listing of preventive maintenance checks and services to be performed by organizational maintenance personnel. All deficiencies and shortcomings will be recorded, as well as corrective action taken, on DA Form 2404 at earliest possible opportunity.

4-7. ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES

- a. Item numbers in Table 4-1 indicate sequence of PMCS. Perform at following intervals:
 - (1) Quarterly (Q), once every three months.
 - (2) Semiannually (S), once every six months.
 - (3) Annually (A), once each year.
- b. If something does not work, troubleshoot it, using instructions in this manual, or notify your supervisor.
- c. Always do preventive maintenance in same order so it becomes habit.
- d. If anything looks wrong and you can't fix it, write it on DA Form 2024. If you find something seriously wrong, report it to Direct Support as soon as possible.

WARNING

Wear protective goggles when using the cleaning solvent. Avoid contact with the eyes. If contact occurs, flush eyes with cold water for 5 minutes and seek immediate medical attention. Dry cleaning solvent (PD-680) is both toxic and flammable. Avoid prolonged breathing of vapors. Avoid skin contact. Use only in a well-ventilated area. Keep away from open flame. Flash point of solvent is 138°F (59°C).

- e. Keep it clean. Dirt, grease, oil, and debris may hide serious problems. Clean as you work, as needed. Use dry cleaning solvent (PD-680) to clean metal surfaces. Use soap and water for cleaning rubber or plastic materials.
- f. Hardware. Check for loose, missing, bent, or broken bolts, nuts, and screws. Look for chipped paint, bare metal, or rust around bolt heads. Tighten any loose bolts or nuts.
- g. Welds. Look for loose or chipped paint, rust, or gaps where parts are welded together. Report bad welds to direct support.
- h. Electric wires and connectors. Look for cracked or broken insulation, bare wires, and loose or broken connectors. Tighten loose connections and make sure all wires are in good condition.

4-7. ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES (cont)

Table 4-1. Organizational Preventive Maintenance Checks and Services

ITEM NO.	INTERVAL			ITEM TO BE INSPECTED PROCEDURES
	Q	S	A	
1.	•			<p>BATTERY</p> <p>Test battery voltage and specific gravity (see para. 4-22). Refer to TM 9-6140-200-14.</p>
2.		•		<p>SUSPENSION</p> <p>Inspect semi-trailer suspension (rear axle assembly, springs, and torque rods) for leakage, cracks, or other damage. Report any damage to General and Direct Support Maintenance.</p>
3.		•		<p>BRAKE SHOES</p> <p>a. Inspect brake shoe linings for wear. If lining is worn to within 1/16 in. (1.58 mm) of rivet heads, replace brake shoe (see para. 4-25). b. Adjust brakes and length of travel of brake chamber pushrod (see para. 4-25).</p>
4.		•		<p>AIR BRAKE SYSTEM</p> <p>With air system fully charged, apply a soap solution to all couplings, air lines, fittings, valves, and reservoirs. Make note of any leaks, damage, or loose connections. Tighten loose connections or make repairs as necessary (see para. 4-28 through 4-35).</p>
5.		•		<p>WHEEL BEARINGS</p> <p>Adjust wheel bearings (see para. 4-36).</p>
6.	•			<p>HUBS</p> <p>Inspect hubs for proper level of oil and replenish as necessary (see para. 4-36).</p>
7.		•		<p>KINGPIN AND FIFTH WHEEL PLATE</p> <p>Clean kingpin and fifth wheel plate using rags and compressed air. Check kingpin for cracks, rust or other damage. If kingpin shows signs of damage, entire fifth wheel plate must be replaced. Notify Direct Support/General Support Maintenance.</p>

4-7. ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES (cont)

Table 4-1. Organizational Preventive Maintenance Checks and Services (cont)

ITEM NO.	INTERVAL			ITEM TO BE INSPECTED PROCEDURES
	Q	S	A	
8.	•			<p>MANHOLE ASSEMBLY</p> <p>Inspect manhole covers, cover gaskets, and latching assembly for damage. Replace damaged components as necessary.</p>
9.			•	<p>ENGINE COWLING AND SHROUD AND TOOL BOX</p> <p>Inspect all sheet metal for damage. If damage is found, notify your supervisor.</p>
10.	•			<p>ENGINE</p> <p>Inspect engine for obvious damage or leakage of fuel, oil, or coolant. If damage or leakage is found, notify your supervisor. Service engine (see paragraph 4-46).</p>
11.		•		<p>FUEL PUMP</p> <p>Test fuel pump for acceptable fuel pressure (see para. 4-52).</p>
12.		•		<p>THROTTLE CONTROL</p> <p>Adjust throttle control (see para. 4-54).</p>
13.		•		<p>FAN BELT</p> <p>Adjust fan belt.</p>
14.		•		<p>LANDING LEGS</p> <p>Inspect landing legs for wear and damage. Check for loose or damaged crank. Crank legs up and down. Check for binding between lower and upper leg assemblies. Make sure gears mesh smoothly in both speeds. Check to be sure there is no play in shaft as crank is turned.</p>
15.		•		<p>FRAME</p> <p>Inspect frame for cracks, bent condition and broken welds. If frame is damaged, immediately notify Direct Support Maintenance.</p>

Section IV. ORGANIZATIONAL TROUBLESHOOTING PROCEDURES

Paragraph Number	Title	Page Number
4-8	GENERAL TROUBLESHOOTING INFORMATION.....	4-6
4-9	SYMPTOM INDEX.....	4-6

4-8. GENERAL TROUBLESHOOTING INFORMATION

a. Table 4-2 in this section lists common malfunctions which may be found during normal operation or maintenance of water distributor or its components. Perform all tests, inspections, and corrective actions in listed order.

b. This manual can not list all malfunctions that may occur, nor all tests, inspections or corrective actions. If a malfunction is not listed, or is not corrected by listed corrective actions, notify your supervisor.

4-9. SYMPTOM INDEX

Engine will not turn or crank	4-6
Engine cranks but will not start	4-7
Engine hard to start	4-8
Engine stops suddenly	4-9
Engine stops frequently	4-10
Engine shows loss of power	4-10
Engine runs unevenly and vibrates excessively	4-10
Engine emits black smoke from exhaust	4-10
Engine emits bluish-white smoke from exhaust	4-11
Engine detonates or knocks	4-11
Spray system does not operate	4-11
Semi-trailer does not move	4-12

Table 4-2. Organizational Troubleshooting Table

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
--------------------	---------------------------	--------------------------

ENGINE

- | | | |
|----|-------------------------------|--|
| 1. | ENGINE WILL NOT TURN OR CRANK | <p>Step 1. Check battery.</p> <ul style="list-style-type: none"> a. Charge or replace battery if necessary. b. If battery is good, go to step 2. |
|----|-------------------------------|--|

Table 4-2. Organizational Troubleshooting Table (cont)

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<u>ENGINE (cont)</u>		
1.	ENGINE WILL NOT TURN OR CRANK (cont)	
	Step 2. Test for 12 volts DC at starter.	a. Replace starter if necessary (para. 4-59). b. If there is 12 volts DC through starter, go to step 3.
	Step 3. Test for 12 volts DC at starter solenoid.	a. Replace solenoid if necessary. b. If there is 12 volts DC through solenoid, go to step 4.
	Step 4. Test for 12 volts DC at starter relay.	a. Replace relay if necessary. b. If there is 12 volts DC through relay, go to step 5.
	Step 5. Test starter switch (para. 4-12).	a. If switch is faulty, replace switch (para. 4-12). b. If switch is good, go to step 6.
	Step 6. Test starter motor (para. 4-59).	a. If starter motor is faulty, replace (para. 4-59). b. If starter motor is good, notify Direct Support/General Support Maintenance.
2.	ENGINE CRANKS BUT WILL NOT START	
	Step 1. Check for fuel in tank.	
	Step 2. Check for 12 volts DC at fuel solenoid.	
	Step 3. Test battery. Refer to TM 9-6140-200-14.	a. Charge or replace battery if necessary (para. 4-22). b. If battery is good, go to step 4.

Table 4-2. Organizational Troubleshooting Table (cont)

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<u>ENGINE (cont)</u>		
2.	ENGINE CRANKS BUT WILL NOT START (cont)	
	Step 4. Check battery and starter cable connections.	<ul style="list-style-type: none"> a. If dirty and/or loose, clean or tighten as necessary. b. If cable connections are good, go to step 5.
	Step 5. Check glow plugs and wiring.	<ul style="list-style-type: none"> a. Replace glow pugs or wiring as necessary. b. If glow plugs and wiring are good, go to step 6.
	Step 6. Check fuel system for dirt or water contamination.	<ul style="list-style-type: none"> a. Clean or replace fuel system components. b. If no contamination is present, go to step 7.
	Step 7. Check valve clearance.	<ul style="list-style-type: none"> a. Adjust valves if necessary (para. 4-47). b. If valves do not require adjustment, notify Direct Support/General Support Maintenance.
3.	ENGINE HARD TO START	
	Step 1. Inspect fuel filter (para. 4-51).	<ul style="list-style-type: none"> a. Clean or replace filter as needed. b. If filter does not require cleaning, go to step 2.
	Step 2. Check for air leaks in fuel system.	<ul style="list-style-type: none"> a. Prime fuel system (para. 4-53). b. If engine is still hard to start, go to step 3.

Table 4-2. Organizational Troubleshooting Table (cont)

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<u>ENGINE (cont)</u>		
3.	ENGINE HARD TO START (cont)	
	Step 3. Test fuel transfer pump (para. 4-52).	<ul style="list-style-type: none"> a. If pump is defective, notify Direct Support/General Support Maintenance. b. If fuel transfer pump is good, go to step 4.
	Step 4. Check valve clearance	<ul style="list-style-type: none"> a. Adjust valves if needed (para. 4-47). b. If valves are adjusted properly, notify Direct Support/General Support Maintenance.
4.	ENGINE STOPS SUDDENLY	
	Step 1. Check fuel system components (filter, supply lines, return lines) and fuel, for blockage or restrictions.	<ul style="list-style-type: none"> a. Replace dirty fuel with clean fuel. b. Replace components if necessary. c. If fuel system is free of restrictions, go to step 2.
	Step 2. Check water temperature and water temperature switch. If water temperature switch is closed, go to Step 3.	
	Step 3. Check oil pressure and oil pressure switch. If oil pressure switch is closed, go to Step 4.	
	Step 4. Check fan belt tension. Refer to para. 4-57.	<ul style="list-style-type: none"> a. Adjust belt tension if necessary. b. If belt tension is correct, go to step 5.
	Step 5. Test thermostat. Refer to para. 4-46A.	<ul style="list-style-type: none"> a. Replace thermostat if necessary. b. If thermostat is good, go to step 5.
	Step 6. Replace engine water pump. If engine continues to stop suddenly, go to step 7.	

Table 4-2. Organizational Troubleshooting Table (cont)

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<u>ENGINE (cont)</u>		
4.	ENGINE STOPS SUDDENLY (cont)	Step 7. Replace engine oil pump. If engine continues to stop suddenly, notify Direct Support/General Support Maintenance.
5.	ENGINE STOPS FREQUENTLY	<p>Step 1. Check idle speed (para. 4-54).</p> <ul style="list-style-type: none"> a. Adjust idle speed if necessary. b. If idle speed is good, go to step 2. <p>Step 2. Check fuel system components (filter, supply lines, return lines) for blockage or restrictions.</p> <ul style="list-style-type: none"> a. Replace components as necessary. b. If fuel system is free of restrictions, notify Direct Support/General Support Maintenance.
6.	ENGINE SHOWS LOSS OF POWER	<p>Step 1. Check for air leaks in fuel system.</p> <ul style="list-style-type: none"> a. Prime fuel system (para. 4-53). b. If engine still shows loss of power, go to step 2. <p>Step 2. Check fuel system components (filter, supply lines, return lines) for blockage or restrictions.</p> <ul style="list-style-type: none"> a. Replace components as necessary. b. If engine still shows loss of power, go to step 3. <p>Step 3. Check valve clearance (para. 4-47).</p> <ul style="list-style-type: none"> a. Adjust valves as necessary. b. If valves do not require adjustment, notify Direct Support/General Support Maintenance.

Table 4-2. Organizational Troubleshooting Table (cont)

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<u>ENGINE (cont)</u>		
7.	ENGINE RUNS UNEVENLY AND VIBRATES EXCESSIVELY	<p>Step 1. Check idle speed.</p> <ul style="list-style-type: none"> a. Adjust idle speed as necessary (para. 4-54). b. If idle speed is good, go to step 2. <p>Step 2. Check for dirty fuel.</p> <ul style="list-style-type: none"> a. If fuel is dirty, replace it with clean fuel. b. If fuel is clean, go to step 3. <p>Step 3. Replace fuel filter (para. 4-51). If problem persists, notify Direct Support/General Support Maintenance.</p>
8.	ENGINE EMITS BLACK SMOKE FROM EXHAUST	Notify Direct Support/General Support Maintenance.
9.	ENGINE EMITS BLUISH-WHITE SMOKE FROM EXHAUST	<p>Test thermostat. Refer to para. 4-46A.</p> <ul style="list-style-type: none"> a. Replace thermostat if necessary. b. If problem persists, notify Direct Support/General Support Maintenance.
10.	ENGINE DETONATES OR KNOCKS	Notify Direct Support/General Support Maintenance.
11.	SPRAY SYSTEM DOES NOT OPERATE	<p>Test fuse. Refer to para. 4-1 5.</p> <ul style="list-style-type: none"> a. Replace fuse if necessary. b. If problem persists, notify Direct Support/General Support Maintenance.

Table 4-2. Organizational Troubleshooting Table (cont)

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<u>ENGINE (cont)</u>		
12.	SEMI-TRAILER DOES NOT MOVE	Trailer brakes locked. a. Test quick release valve. Refer to para. 4-32. b. Test relay valve. Refer to para. 4-33. c. Replace quick release valve and relay valve if necessary. If problem persists, notify Direct Support/General Support Maintenance.

Section V. MAINTENANCE OF ELECTRICAL SYSTEM

Paragraph Number	Title	Page Number
4-10	REAR AND REMOTE CONTROL BOX	4-13
4-11	CONTROL PANEL GAUGES	4-17
4-12	CONTROL PANEL SWITCHES AND RELAYS.....	4-21
4-13	CONTROL PANEL INDICATORS	4-29
4-14	CONTROL PANEL CABLES	4-30
4-15	FUSE	4-33
4-16	CLEARANCE/TURN AND STOP/TAIL LIGHTS.....	4-34
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4-20	12- AND 24-VOLT RECEPTACLES	4-39
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4-23	CABLES AND TERMINALS	4-48
4-24	LIQUID LEVEL TRANSMITTER	4-49
4-24	SPRAY SYSTEM SOLENOID VALVES	4-51

4-10. REAR AND REMOTE CONTROL BOX

THIS TASK COVERS:

- a. Removal
- b. Installation

Equipment/Materials Required:

Tags (Item 14, Appendix E)

INITIAL SETUP:

Tools Required:

Equipment Conditions:

Nomenclature:

<u>Ref</u>	<u>Conditions</u>
4-22	Battery cables disconnected

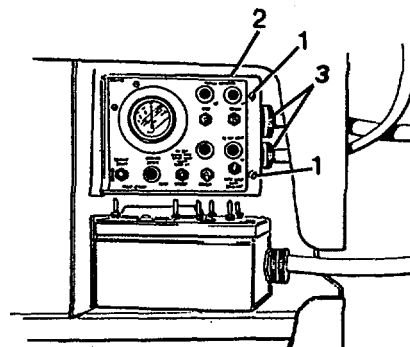
General Mechanics
Tool Kit

WARNING

Electrical shock hazard exists. Disconnect battery cables (para. 4-22).

a. Removal.

- (1) Remove two screws (1).
- (2) Remove control box cover (2) and control panel.



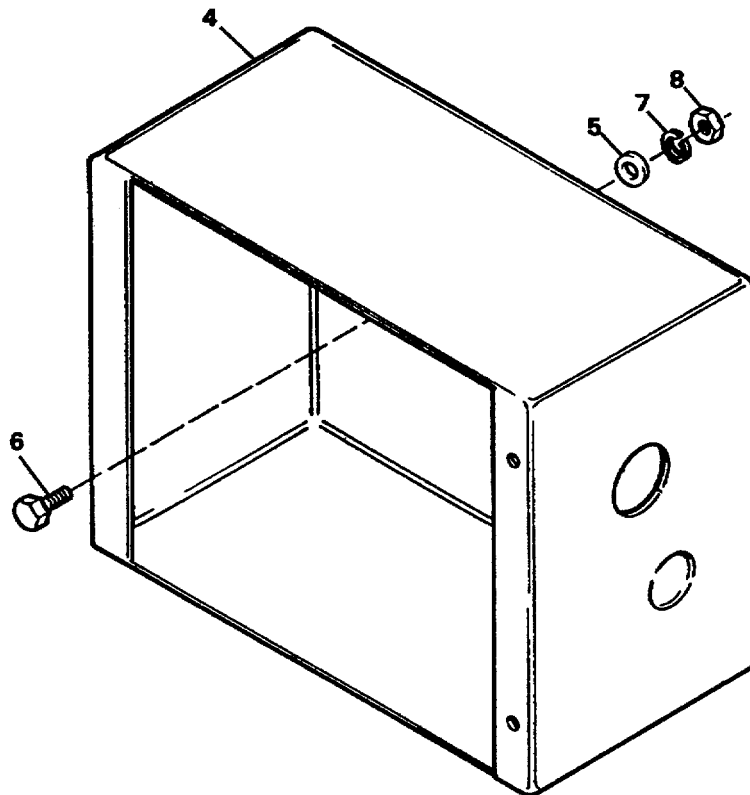
Remove Control Box Cover

4-10. REAR AND REMOTE CONTROL BOX (cont)**a. Removal (cont).**

- (3) Disconnect cables (3) from control box. Refer to control box wiring diagram and disconnect wiring harness from instruments, lights, switches and relays. Tag wires.
- (4) Remove lock nuts holding cable grips to control box and remove cable grips and wiring harness from control box.
- (5) Remove four locknuts (8) with four washers (7), four bushings (5) and four screws (6).
- (6) Remove control box (4) from tool box.

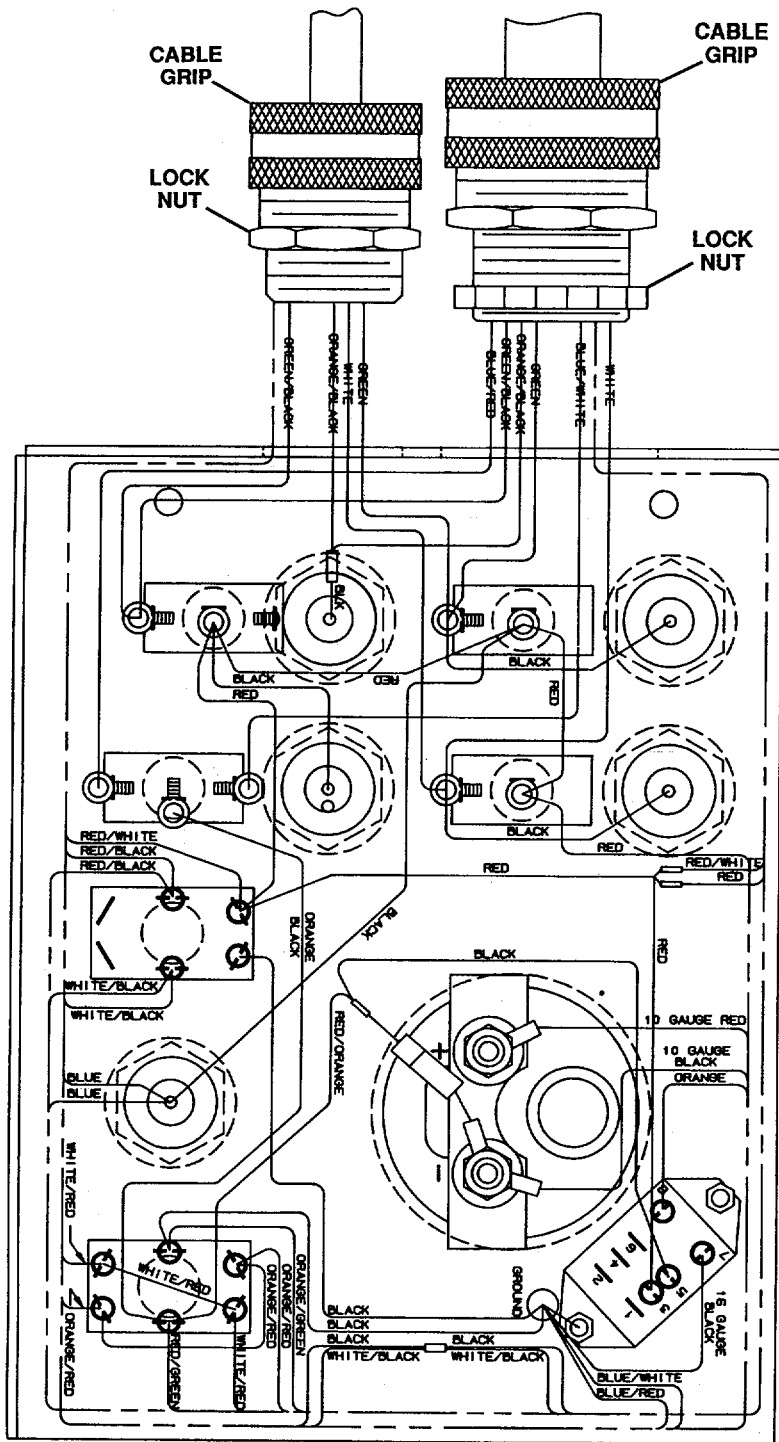
b. Installation

- (1) Install control box (4) in tool box and secure with four screws (6), bushings (5), washers (7) and locknuts (8).
- (2) Install harness and cable grips in control box. Slide lock nuts over wires of harness and secure cable grips to control box with lock nuts.
- (3) Refer to control box wiring and connect harness wires to instruments, lights, switches and relays.
- (4) Install cover (2) in position on control box and secure with two screws (1).



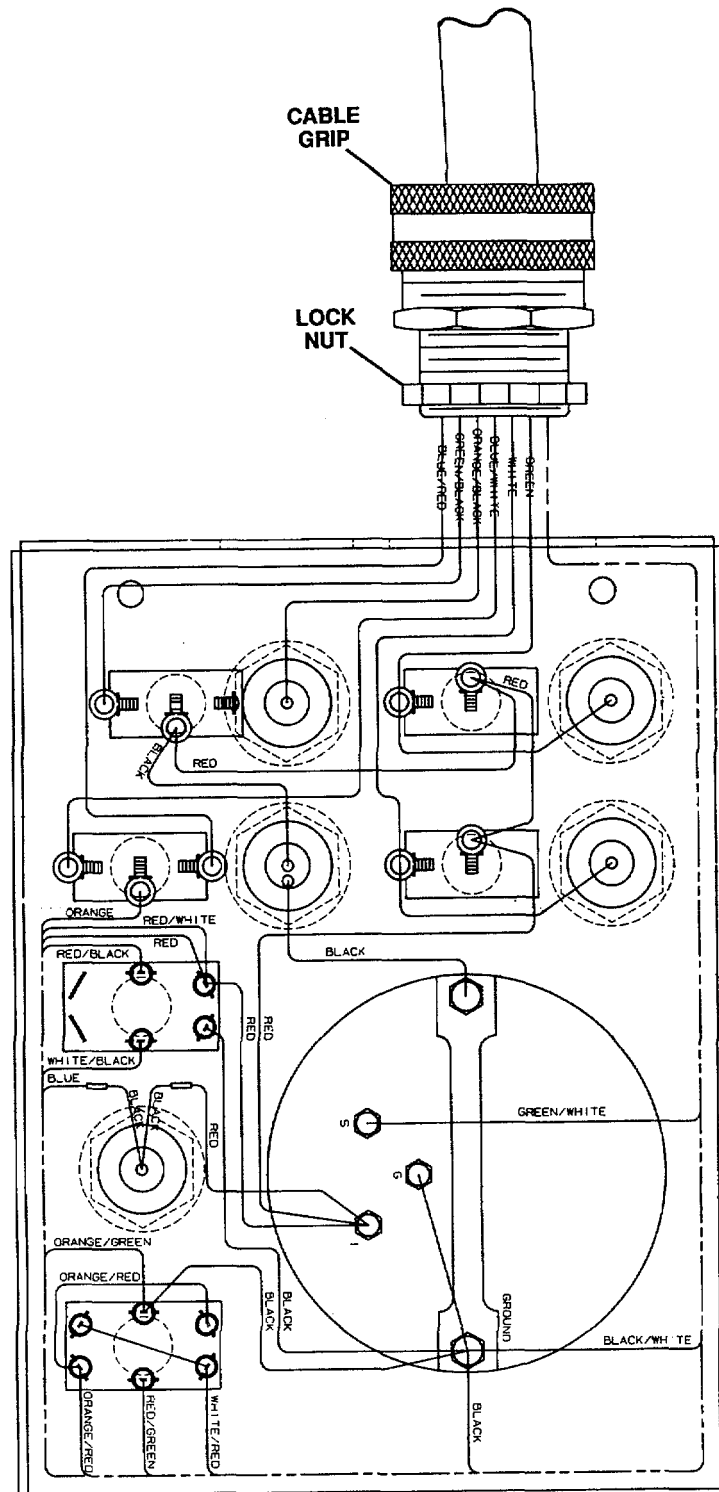
Removing Rear Control Box

4-10. REAR AND REMOTE CONTROL BOX (cont)



Rear Control Box Wiring

4-10. REAR AND REMOTE CONTROL BOX (cont)



Remote Control Box Wiring

4-11. CONTROL PANEL GAUGES

THIS TASK COVERS:

- | | |
|--------------------------|-------------------------------|
| a. Testing Tachometer | d. Removal of Ammeter |
| b. Testing Ammeter | e. Installation of Tachometer |
| c. Removal of Tachometer | f. Installation of Ammeter |

INITIAL SETUP:

Tools Required:

Nomenclature:

General Mechanics
Tool Kit

Equipment Materials Required:

Tags (Item 14, Appendix E)

Equipment Conditions:

<u>Ref</u>	<u>Conditions</u>
------------	-------------------

4-22	Battery cables disconnected
------	-----------------------------

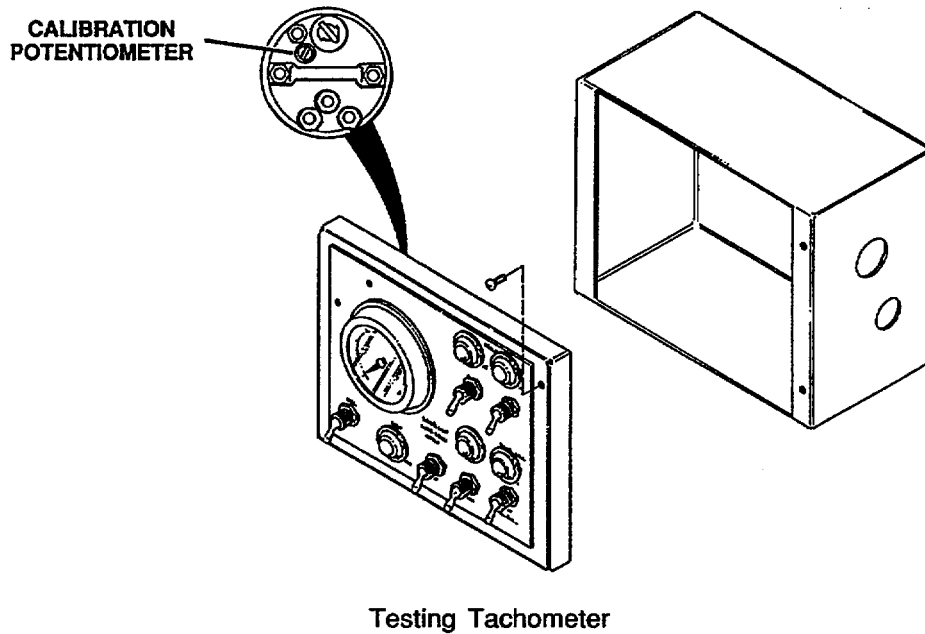
WARNING

Electrical shock hazard exists. Disconnect battery cables (para. 4-22).

a. Testing Tachometer.

- (1) Connect a calibrated 0-3000 RPM tachometer to the engine per the instructions supplied with the tachometer.
- (2) Place remote control box having tachometer next to reference tachometer for comparison.
- (3) Reconnect battery cables.
- (4) Run engine at idle speed, 1,000 RPM and 2,000 RPM. If control box tachometer and reference tachometer read identically at all three speeds, tachometer is good.
- (5) If control box tachometer reads different RPM than reference tachometer, the control box tachometer must be adjusted or replaced.
- (6) Unscrew two screws on right side of panel. Open panel.
- (7) Adjust calibration potentiometer on back of control box tachometer and test again. If several adjustments do not correct reading, replace control box tachometer.

4-11. CONTROL PANEL GAUGES (cont)

b. Testing Ammeter:

- (1) With engine running and tank water pump and all lights on, read amperage on rear control panel ammeter.
- (2) Stop engine.
- (3) Unscrew two screws (1) on right side of rear panel (2). Open panel (2).
- (4) Tag and remove wires (3) from ammeter terminals (4).
- (5) Connect wires (2) to calibrated, reference 100 - 0 - 100 AMP ammeter (3).

CAUTION

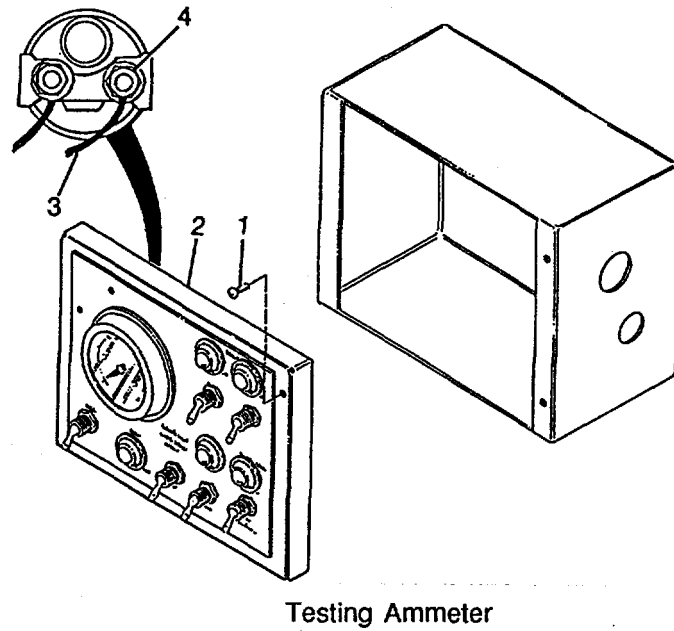
To avoid damage to equipment, do not let ammeter wires touch frame or other ground.

- (6) Start engine and turn on tank water pump and all lights. Read amperage on reference ammeter.
- (7) If control box ammeter reads significantly different amperage than reference ammeter, replace control box ammeter.

NOTE

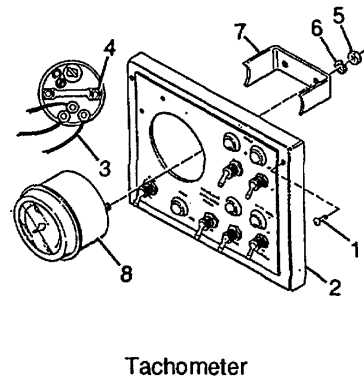
Do not use zero adjustment screw on front of meter to adjust for different amperage reading. Zero adjustment screw is used only to set pointer to zero.

4-11. CONTROL PANEL GAUGES (cont)



c. Removal of Tachometer.

- (1) Disconnect battery cables from battery.
- (2) Unscrew two screws (1) on right side of panel (2). Open panel (2).
- (3) Tag and remove wires (3) from tachometer terminals (4).
- (4) Remove nuts (5) and washers (6) from clamp (7) holding tachometer (8) to panel (2).
- (5) Remove clamp (7) and slide tachometer (8) out through hole in panel.



d. Removal of Ammeter.

- (1) Unscrew two screws (1) on right side of panel (2). Open panel (2).
- (2) Tag and remove wires (3) from ammeter terminals (4).

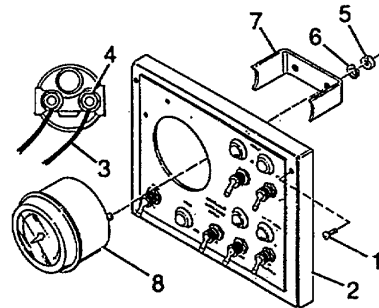
4-11. CONTROL PANEL GAUGES (cont)

d. Removal of Ammeter (cont).

- (3) Remove nuts (5) and washers (6) from clamp (7) holding ammeter (8) to panel (2).
- (4) Remove clamp (7) and slide ammeter (8) out through hole in panel.

e. Installation of Tachometer.

- (1) Insert tachometer (8) through hole in panel (2).
- (2) Install clamp (7) over bolts on back of tachometer (8). Secure with nuts (5) and washers (6).
- (3) Install wires (3) on tachometer terminals (4).
- (4) Close panel (2) and install two screws (1).
- (5) Test tachometer as described above.
- (6) Refer to para. 4-22 and connect battery cables.



Ammeter

f. Installation of Ammeter:

- (1) Insert ammeter (8) through hole in panel (2).
- (2) Install clamp (7) over bolts on back of ammeter (8). Secure with nuts (5) and washers (6).
- (3) Install wires (3) on ammeter terminals (4).
- (4) Close panel (2) and install two screws (1).
- (5) Test ammeter as described above.

4-12. CONTROL PANEL SWITCHES AND RELAYS

THIS TASK COVERS:

- | | |
|---|-----------------------|
| a. Preliminary Testing Information | e. Removal |
| b. Testing Spray Nozzle Switches | f. Installation |
| c. Testing Power Switch and Glow Plug Switch | g. Engine Relay Panel |
| d. Testing Start Switch and Engine RPM Switch | |

INITIAL SETUP:

Tools Required:

Nomenclature:

General Mechanics
Tool Kit

Multimeter 12-volt DC
power supply.

Equipment/Materials Required:

Tags (Item 14, Appendix E)

Equipment Conditions:

Ref Conditions

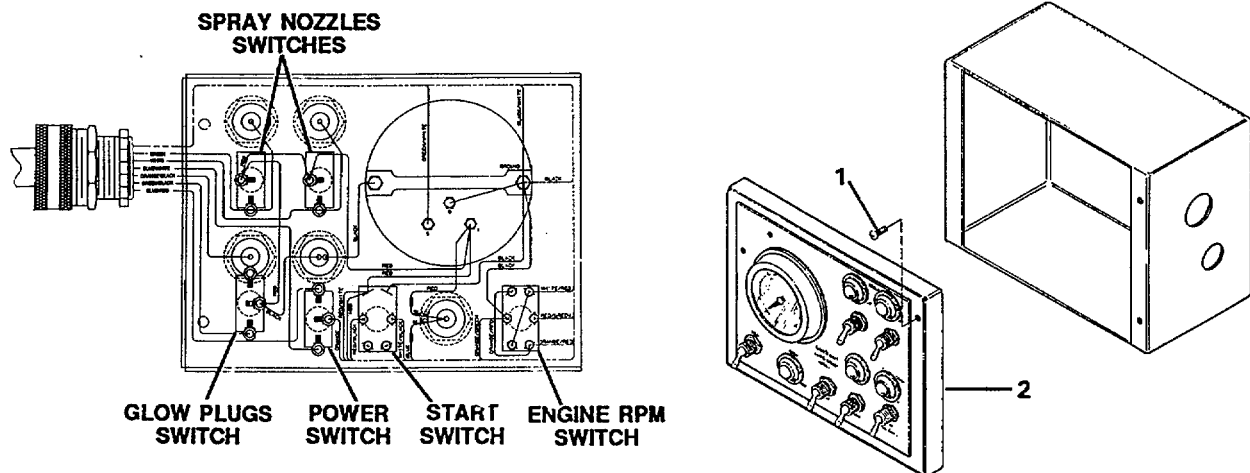
4-22 Battery cables disconnected

WARNING

Electric shock hazard exists. Disconnect battery cables (para. 4-22).

a. Preliminary Testing Information.

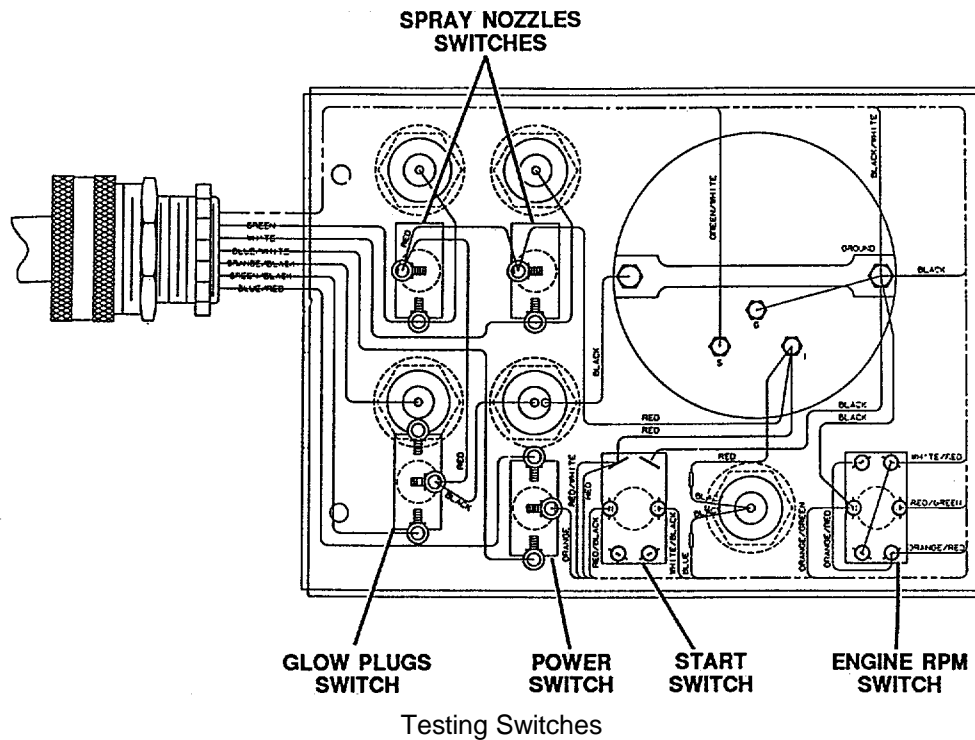
- (1) Unscrew two screws (1) on right side of panel (2). Open panel (2).
- (2) Tag and remove wires from switch(es) to be tested.
- (3) Prepare multimeter for ohms measurement per instructions supplied with multimeter.



Testing Switches

4-12. CONTROL PANEL SWITCHES AND RELAYS (cont)

b. Testing Spray Nozzle Switches.



- (1) Connect black test lead to center terminal of switch. Connect red test lead to end terminal.
- (2) Toggle switch to upper position. Multimeter display should go to zero ohms, indicating continuity.
- (3) Toggle switch back to center position. Meter display should return to infinity (∞), indicating no continuity.
- (4) If test results are not the same as described above, the switch must be replaced.

c. Testing Power Switch and Glow Plug Switch.

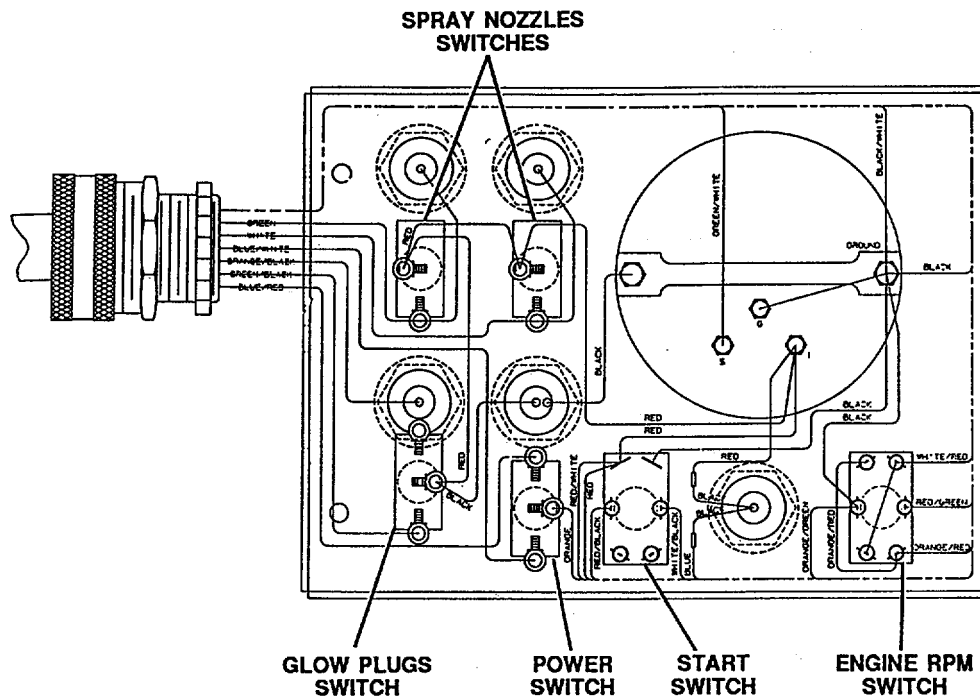
- (1) Prepare for switch testing as described in "Preliminary Testing Information" (para. "a" above).
- (2) Connect black test lead to center terminal of switch. Connect red test lead to upper terminal.
- (3) Toggle switch to upper position. Multimeter display should go to zero ohms, indicating continuity.
- (4) Toggle switch back to center position. Meter display should return to infinity (∞), indicating no continuity.

4-12. CONTROL PANEL SWITCHES AND RELAYS (cont)

c. Testing Power Switch and Glow Plug Switch (cont).

- (5) Connect red test lead to lower terminal.
- (6) Toggle switch to lower position. Multimeter display should go to zero ohms, indicating continuity.
- (7) Toggle switch back to center position. Meter display should return to infinity (cc), indicating no continuity.
- (8) If test results are not the same as described above, the switch must be replaced.

d. Testing Start Switch and Engine RPM Switch.



Testing Start Switch and Engine RPM Switch

- (1) Prepare for switch testing as described in "Preliminary Testing Information" (para. "a" above).
- (2) Connect black test lead to left center terminal of switch. Connect red test lead to left top terminal.
- (3) Toggle switch to upper position. Multimeter display should go to zero ohms, indicating continuity. Toggle switch back to center position. Meter display should return to infinity (oo), indicating no continuity.
- (4) Connect red test lead to left bottom terminal of switch.

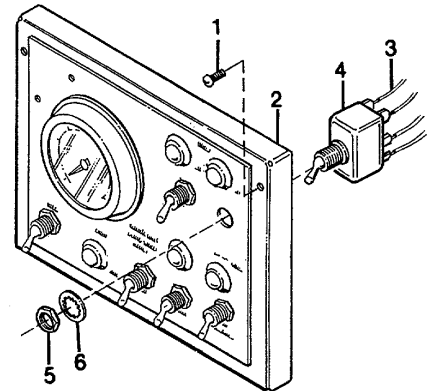
4-12. CONTROL PANEL SWITCHES AND RELAYS (cont)

d. Testing Start Switch and Engine RPM Switch (cont).

- (5) Toggle switch to bottom position. Multimeter display should go to zero ohms, indicating continuity. Toggle switch back to center position.
- (6) Connect black test lead to right center terminal of switch. Connect red test lead to right top terminal.
- (7) Toggle switch to upper position. Multimeter display should go to zero ohms, indicating continuity. Toggle switch back to center position. Meter display should return to infinity (∞), indicating no continuity.
- (8) Connect red test lead to right bottom terminal of switch.
- (9) Toggle switch to bottom position. Multimeter display should go to zero ohms, indicating continuity. Toggle switch back to center position.
- (10) If test results are not the same as described above, the switch must be replaced.

e. Removal.

- (1) Unscrew two screws (1) on right side of panel (2). Open panel (2).
- (2) Tag and remove all wires (3) from switch (4).
- (3) Remove nut (5) and washer (6) holding switch (4) to control box panel (2).
- (4) Remove switch (4).



Removal and Installation of Switches

f. Installation.

- (1) Install switch (4) through hole in control box panel (2). Secure with nut (5) and washer (6).
- (2) Connect wires (3) to proper switch terminals.
- (3) Close panel (2) and install two screws (1).

g. Engine Relay Panel

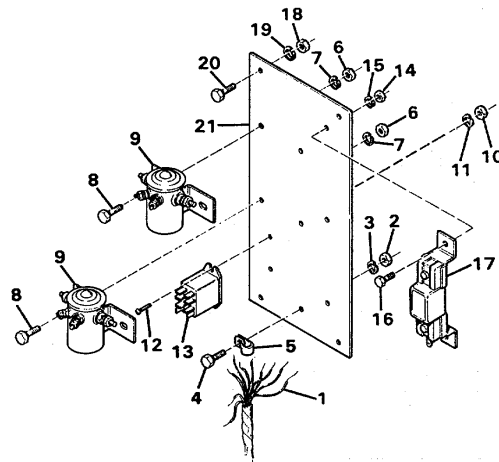
(1) Removal.

- (a) Disconnect harness wires (1) and engine wires from relays (9 and 13) and glow plug resistor (17).

4-12. CONTROL PANEL SWITCHES AND RELAYS (cont)

g. Engine Relay Panel (cont).

(1) Removal (cont).



Engine Relay Panel

- (b) Remove nut (2), washer (3), and screw (4). Remove clamp (5) and harness (1) from plate (21).
- (c) Remove four nuts (6), washers (7) and screws (8). Remove relays (9) from plate (21).
- (d) Remove two nuts (10), washers (11) and screws (12) and remove relays (13) from plate (21).
- (e) Remove two nuts (14), washers (15) and screws (16) and remove resistor (17) from plate (21).
- (f) Remove four nuts (18), washers (19) and screws (20) and remove plate (21) from engine housing.

(2) Testing.

(a) Testing Glow Plug Resistor.

- 1. Test resistor (17) as follows.
- 2. Prepare multimeter for ohms measurement per instructions supplied with multimeter.

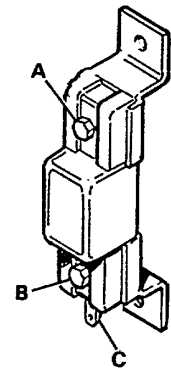
4-12. CONTROL PANEL SWITCHES AND RELAYS (cont)

g. Engine Relay Panel (cont).

(2) Testing (cont).

(a) Testing Glow Plug Resistor (cont).

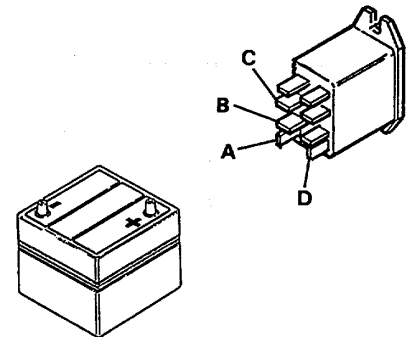
3. Connect one lead of the multimeter to terminal "A". Connect the other lead to terminal "B". The reading should show continuity or very little resistance.
4. Connect one lead of the multimeter to terminal "A" and the other lead to terminal "C". The reading should show continuity or very little resistance.
5. If there is no continuity and resistance is noted in either test, replace resistor.



Testing Resistor

(b) Testing Control Relay.

1. Connect terminal "A" to negative (or ground) of a 12-volt DC power supply or battery.
2. Connect terminal "B" to positive of a 12-volt DC power supply or battery.
3. Prepare multimeter to read DC voltage per instructions supplied with multimeter.
4. Check voltage at terminal "C" with multimeter. Voltage should be zero. If voltage is present, replace relay.
5. Connect terminal "D" to positive of a 12-volt DC power supply or battery.
6. Check voltage at terminal "C" with multimeter. Voltage should read 12 volts. If voltage is not 12 volts, replace relay.



Testing Control Relay

4-12. CONTROL PANEL SWITCHES AND RELAYS (cont)g. Engine Relay Panel (cont).(2) Testing (cont).(c) Testing Starter or Glow Plug Relay.**NOTE**

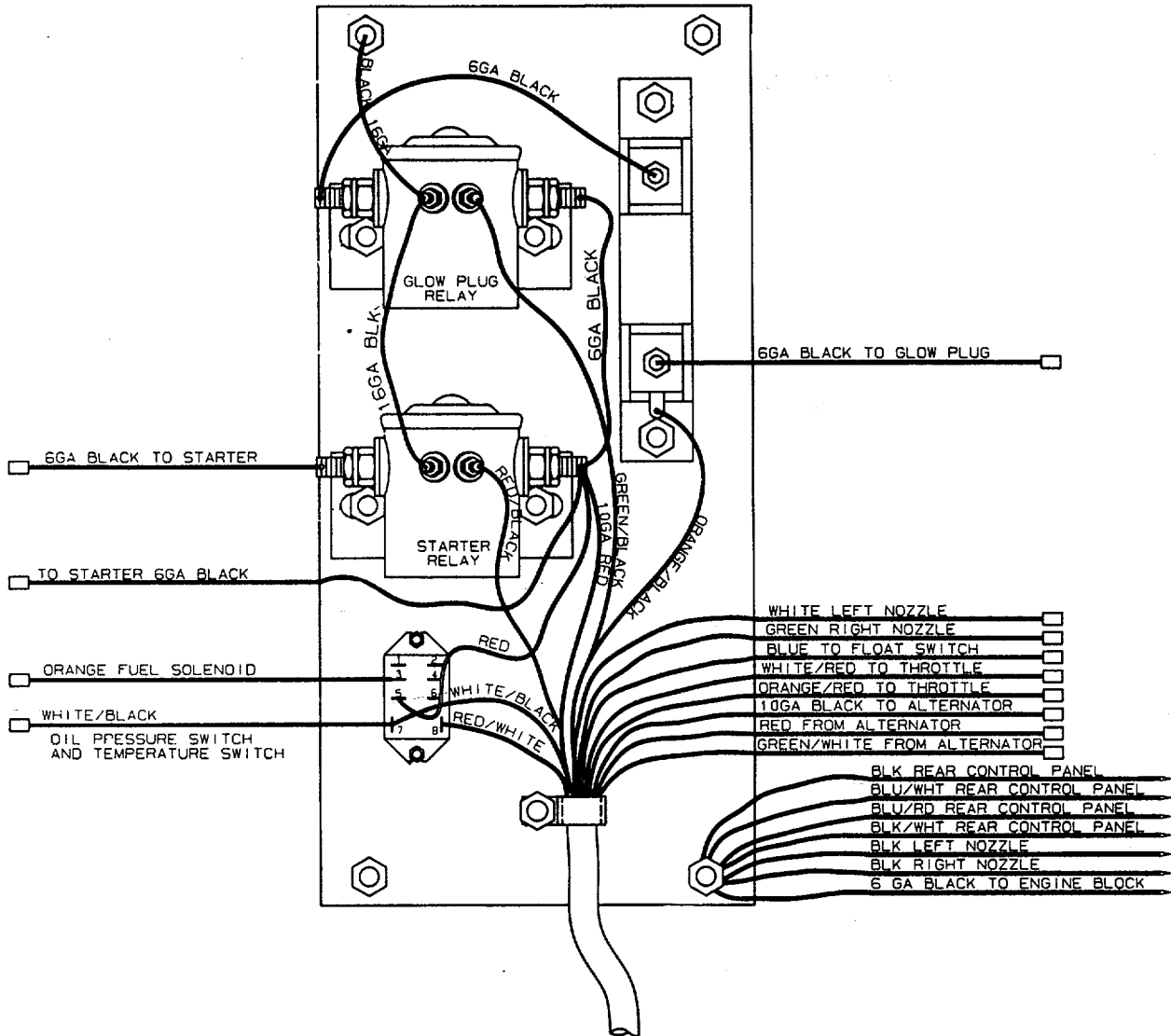
Testing is identical for either relay.

1. Connect terminal "D" to positive of 12-volt DC power supply or battery.
2. Prepare multimeter to read DC voltage per instructions supplied with multimeter.
3. Check voltage at terminal "A" with multimeter. Voltage should be zero. If voltage is present, replace relay.
4. Connect terminal "C" to positive of 12-volt DC power supply or battery
5. Check voltage at terminal "C" with multimeter. Voltage should read 12 volts DC. If voltage is not 12 volts, replace relay.

(3) Installation.

- (a) Install plate (21) on engine housing. Secure plate with four screws (20), washers (19) and nuts (18).
- (b) Install glow plug resistor (17) in position on plate and secure resistor with two screws (16), washers (15) and screws (14).
- (c) Place relay (13) on plate (21) and secure with two screws (12), washers (11) and nuts (10).
- (d) Install two relays (9) on plate (21) and secure with four screws (8), washers (7) and nuts (6).
- (e) Connect engine wires to relays and glow plug resistor. Connect harness wires (1) to relays (9 and 13) and glow plug resistor (17). Refer to next page for wiring diagram of relay panel.
- (f) Refer to para. 4-22 and connect cables to battery.

4-12. CONTROL PANEL SWITCHES AND RELAYS (cont)



Wiring Diagram, Engine Panel

4-13. CONTROL PANEL INDICATORS

THIS TASK COVERS:

- a. Testing
- b. Removal
- c. Installation

INITIAL SETUP:

Tools Required:

Nomenclature:
 General Mechanics
 Tool Kit

Equipment/Materials Required:

Tags (Item 14, Appendix E)

Equipment Conditions:

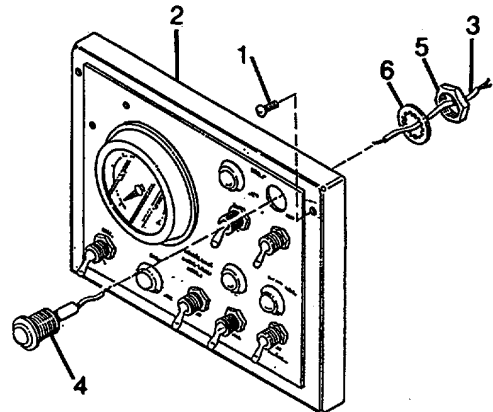
Ref Conditions
 4-22 Battery cables disconnected

WARNING

Electrical shock hazard exists. Disconnect battery cables (para. 4-22).

a. Testing.

- (1) Unscrew two screws (1) on right side of panel (2). Open panel (2).
- (2) Tag and remove wire(s) (3) from indicator light (4).
- (3) Connect battery jumper cables to positive and negative battery terminals.
- (4) Touch other end of jumper cables to terminals of indicator light (4). If light has two terminals, touch one jumper cable to one terminal and the other jumper to the other terminal. If light has only one terminal, touch one jumper cable to that terminal and the other jumper to ground. If indicator light is good, bulb should glow. If light does not glow, replace bulb.
- (5) Test remaining indicator lights.
- (6) Close panel (2) and install two screws (1).



Control Panel Indicators

4-13. CONTROL PANEL INDICATORS (cont)

b. Removal.

- (1) Unscrew two screws (1) on right side of panel (2). Open panel (2).
- (2) Tag and remove wire(s) (3) from indicator light (4).
- (3) Remove nut (5) and washer (6) holding indicator light (4) to panel (2).
- (.4) Remove indicator light (4).

c. Installation.

- (1) Install indicator light (4) in hole in panel (2).
- (2) Secure with nut (5) and washer (6).
- (3) Connect wire(s) (3) to light (4).
- (4) Close panel (2) and install two screws (1).
- (5) Refer to para. 4-22 and connect cables to battery.

4-14. CONTROL PANEL CABLES

THIS TASK COVERS:

- | | |
|------------|-----------------|
| a. Testing | |
| b. Removal | c. Installation |

INITIAL SETUP:

Tools Required:

Nomenclature:

General Mechanics
Tool Kit

Equipment Conditions:

Ref Conditions

4-22 Battery cables disconnected

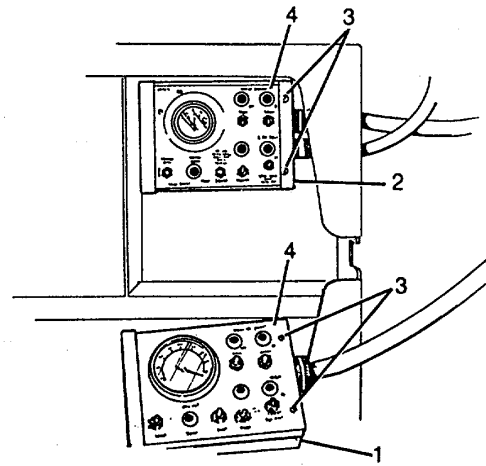
WARNING

Electrical shock hazard exists. Disconnect battery cables (para. 4-22).

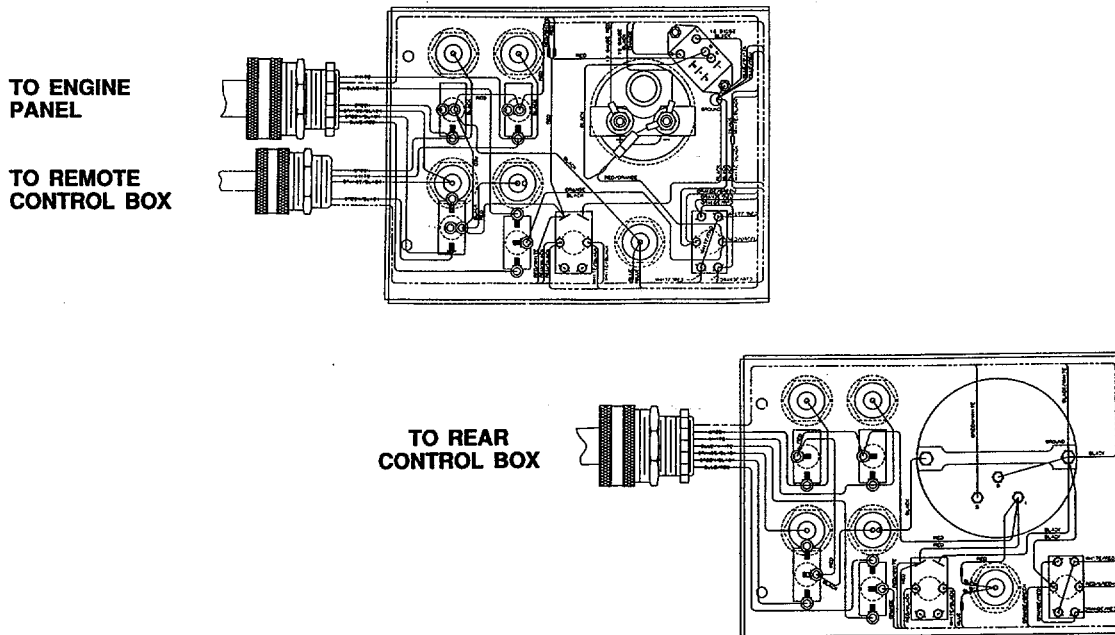
4-14. CONTROL PANEL CABLES (cont)

a. Testing.

- (1) Prepare multimeter for ohms (continuity) measurement per instructions supplied with multimeter.
- (2) Place remote (cab) control box (1) next to rear control box (2).
- (3) Unscrew two screws (3) on each panel (4) and open each panel.
- (4) Test for continuity of each wire in cable that connects both control boxes together as follows:
 - (a) Place one test probe on any cable wire connected to a terminal in remote control box. Note color of wire.
 - (b) Place remaining test probe on cable wire of same color in rear control box.



Opening Control Boxes



Testing Control Panel Cables

4-14. CONTROL PANEL CABLES (cont)

a. Testing (cont)

- (c) Meter should indicate zero ohms (continuity) if wire is good.
 - (d) Test each wire in connector cable for continuity. If meter indicates infinite ohms (broken wire) for any wire, replace cable.
- (5) Test for continuity of each wire in remaining cable that connects rear control box to engine and water distribution system.
- (a) Place one test probe on any cable wire connected to a terminal in rear control box. Note color of wire.
 - (b) Place remaining test probe on cable wire of same color at other end of cable.
 - (c) Meter should indicate zero ohms (continuity) if wire is good.
 - (d) Test each wire in connector cable for continuity. If meter indicates infinite ohms (broken wire) for any wire, replace cable.

b. Removal.

- (1) Refer to para. 4-10 and disconnect and remove cables from control box.
- (2) Disconnect and remove cable from control box as follows:
 - (a) Remove screws and remove control box cover from control box.
 - (b) Refer to wiring diagram and disconnect harness wires from tachometer or ammeter, switches and indicator lights.
 - (c) Remove lock nut from cable grip inside control box and remove cable grip, harness wires and harness from control box.

c. Installation.

- (1) Install harness wires and cable grip through hole in control box.
- (2) Install lock nut over wires. Secure cable grip to control box with lock nut.
- (3) Refer to wiring diagram and connect harness wires to tachometer or ammeter, switches and indicator lights.
- (4) Install control panel on control box. Secure with two screws.
- (5) Refer to paragraph 4-10 and connect and install cables on remote control box.
- (6) Refer to para. 4-22 and connect cables to battery.

4-15. FUSE**THIS TASK COVERS:**

- a. Removal
- b. Testing

- c. Installation

INITIAL SETUP:**Tools Required:****Equipment Conditions:**Nomenclature:Ref Conditions

General Mechanics
Tool Kit

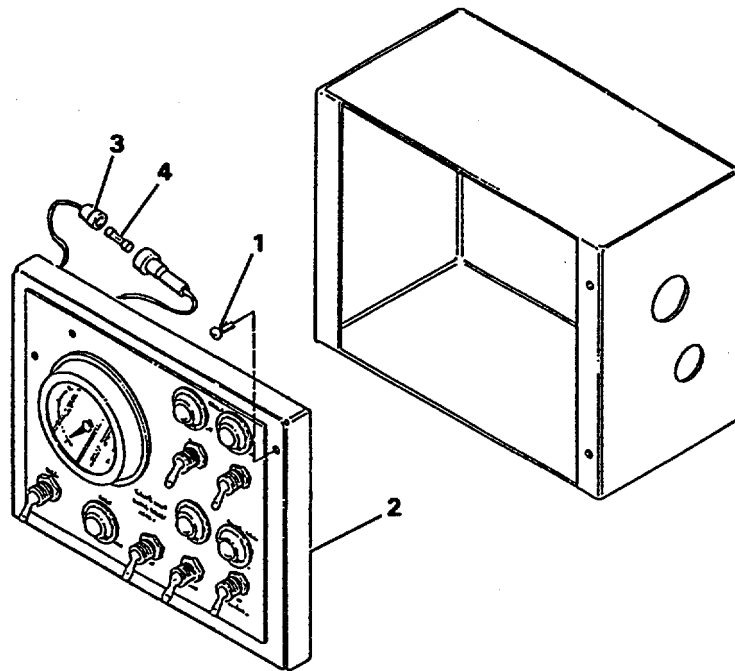
4-22 Battery cables disconnected.

WARNING

Electrical shock hazard exists. Disconnect battery cables (para. 4-22).

a. Removal.

- (1) On remote control box remove two screws (1) from right-hand side of panel (2). Gently pull panel (2) away from control box.
- (2) Twist fuse holder (3) apart and remove fuse (4).



Removing and Installing Fuse

4-15. FUSE (cont)

- b. Testing. Visually check fuse. If fuse element is open, fuse is bad and must be replaced.
- c. Installation.
 - (1) Place fuse (4) in fuse holder (3) and twist lock fuse holder together.
 - (2) Install instrument panel (2) on rear control box. Secure with two screws (1).
 - (3) Refer to para. 4-22 and connect cables to battery.

4-16. CLEARANCE/TURN AND STOP/TAIL LIGHTS

THIS TASK COVERS:

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

INITIAL SETUP:

Tools Required:

Nomenclature:

General Mechanics
Tool Kit

Equipment/Materials Required:

Conductor Splice (NSN 5940-01-079-1375)
(Item 21, Appendix E)

Equipment Conditions:

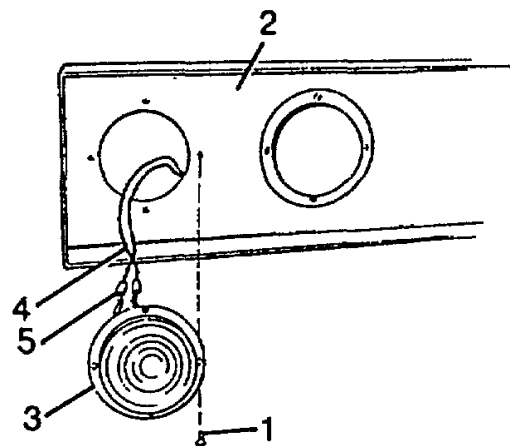
<u>Ref</u>	<u>Conditions</u>
2-23	Intervehicular cables disconnected.

a. Removal.

CAUTION

Lenses can break during removal.

- (1) Remove four screws (1) holding tail lights to frame (2).
- (2) Gently pull tail light assembly (3) and wires (4) out of hole in frame (2).
- (3) Cut wires (4) on both sides of crimped wire connector (5).
- (4) Remove tail light assembly (3). Remove gasket (11).



Tail Lights

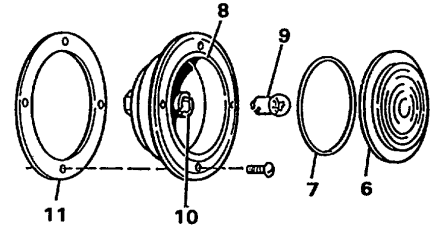
4-16. CLEARANCE/TURN AND STOP/TAIL LIGHTS (cont)

b. Disassembly.

- (1) To remove lens (6), insert screwdriver blade fully under lens flange. Pry carefully at several points if necessary. When removing lens, place one hand over lens face at pry point, to prevent flying shards if lens breaks.
- (2) Remove pre-formed packing (7) from groove (8).
- (3) Remove lamp (9) from socket (10).

c. Assembly.

- (1) Install lamp (9) in socket (10).
- (2) Install pre-formed packing (7) in groove (8).
- (3) Install lens (6).
- (4) Install gasket (11) on light.



Tail Lights

d. Installation.

- (1) Connect wires (4), using conductor splices.
- (2) Install light assembly (3) in hole in frame (2).
- (3) Secure with four screws (1).
- (4) Connect electrical power and test for proper operation.

4-17. CLEARANCE/MARKER LIGHTS

THIS TASK COVERS:

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

INITIAL SETUP:

Tools Required:

Nomenclature:

General Mechanics
Tool Kit

Equipment/Materials Required:

Conductor Splice (NSN 5940-01-079-1375)
(Item 21, Appendix E)

Equipment Conditions:

Ref Conditions

2-23 Intervehicular cable disconnected.

4-17. CLEARANCE/MARKER LIGHTS (cont)

a. Removal.

CAUTION

Lenses can break during removal.

- (1) Remove two screws (1) holding light assembly (2) to light guard (3).
- (2) Gently pull light assembly (2) and wires (4) out of guard.
- (3) Cut wires (4) on both sides of crimped wire connector.
- (4) Remove light assembly (2) and gasket (10).

b. Disassembly.

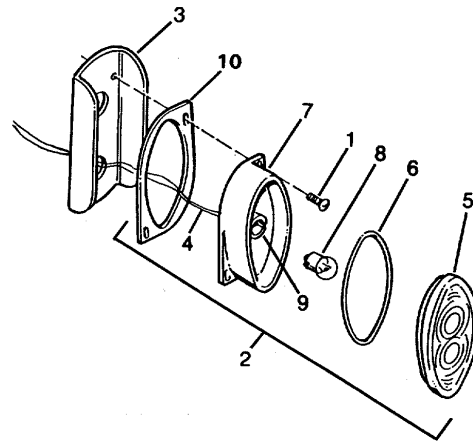
- (1) To remove lens (5), insert screwdriver blade fully under lens flange. Pry carefully at several points if necessary.
- (2) Remove pre-formed packing (6) from groove of housing (7).
- (3) Remove lamp (8) from socket (9)

c. Assembly.

- (1) Install lamp (8) in socket (9).
- (2) Install pre-formed packing (6) in groove of housing (7).
- (3) Install lens (5).

d. Installation.

- (1) Connect wires (4), using conductor splices.
- (2) Install light assembly (2) and gasket (10) on guard (3).
- (3) Secure light assembly (2) with two screws (1).
- (4) Connect electrical power and test for proper operation.



Clearance/Marker Light

4-18. LICENSE PLATE LIGHT

THIS TASK COVERS:

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

INITIAL SETUP:

Tools Required:

Nomenclature:

General Mechanics
Tool Kit

Equipment/Materials Required:

Conductor Splices (NSN 5940-01-079-1375)
(Item 21, Appendix E)

Equipment Conditions:

Ref Conditions

2-23 Intervehicular cable disconnected.

a. Removal.

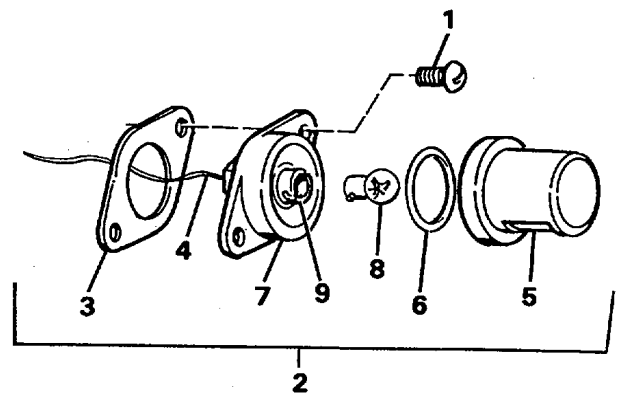
- (1) Remove two screws (1) holding light assembly (2) to rear fender.
- (2) Gently pull light assembly (2) and wires (4) away from fender.
- (3) Cut wires (4) on both sides of crimped wire connector and remove light assembly (2) and gasket (3).

b. Disassembly.

- (1) To remove lens (5), insert screwdriver blade fully under lens flange. Pry carefully at several points if necessary.
- (2) Remove pre-formed packing (6) from groove in housing (7).
- (3) Remove lamp (8) from socket (9).

c. Assembly.

- (1) Install lamp (8) in socket (9).
- (2) Install pre-formed packing (6) in groove in housing (7).
- (3) Install lens (5).



License Plate Light

4-18. LICENSE PLATE LIGHT (cont)

d. Installation.

- (1) Connect wires (4), using conductor splices.
- (2) Install light assembly (2) and gaskets (3) on bumper and secure with two screws (1).
- (3) Connect electrical power and test for proper operation.

4-19. IDENTIFICATION LIGHTS

THIS TASK COVERS:

a. Removal

b. Installation

INITIAL SETUP:

Tools Required:

Equipment/Materials Required:

Conductor Splices (NSN 5940-01-079-1375)
(Item 21, Appendix E)

Nomenclature:

General Mechanics
Tool Kit

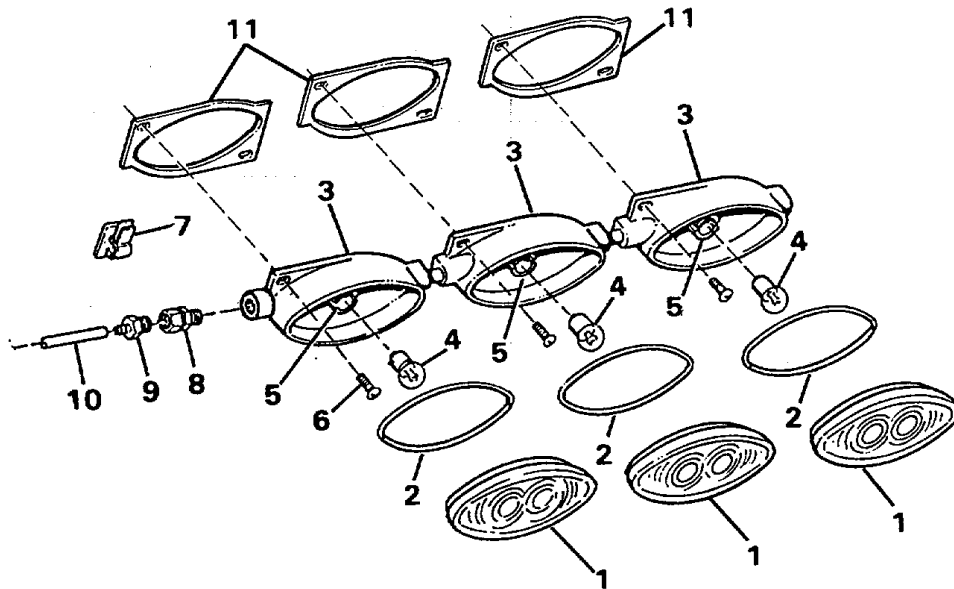
Equipment Conditions:

Ref Conditions

2-23 Intervehicular cable disconnected.

CAUTION

Lenses can break during removal.



Identification Lights

4-19. IDENTIFICATION LIGHTS (cont)

a. Removal.

- (1) Disconnect tube (10), connector (9) and adapter (8) from housing (3). Lift tube from clamp (7). Pull wires from housing and cut wires.
- (2) Remove six screws (6) and remove light assembly and gaskets (11) from bar at top of tank.
- (3) To remove lenses (1) insert screwdriver blade fully under lens flange. Pry carefully at separate points to remove lens if necessary.
- (4) Remove pre-formed packings (2) from grooves in housing (3).
- (5) Remove lamps (4) from sockets (5).

b. Installation.

- (1) Install lamps (4) in sockets (5).
- (2) Install pre-formed packings (2) in grooves in housing (3).
- (3) Install lenses (1).
- (4) Install gaskets (1 1) and light assembly on bar at top of tank and secure to bar with six screws (6).
- (5) Connect wires from harness to lamp wires with conductor splices.
- (6) Install adapter (8) in housing (3) and connect tube (10) and connector (9) to housing. Install tube in clamp (7).

4-20. 12- AND 24-VOLT RECEPTACLES

THIS TASK COVERS:

- a. Test
- b. Removal

- c. Installation
- d. Fuse Replacement

Equipment/Materials Required:

Tags (Item 14, Appendix E)

Tools Required:

Equipment Conditions:

Nomenclature:

Ref Conditions

General Mechanics
Tool Kit

2-23 Intervehicular cable disconnected.
4-22 Battery cables disconnected

WARNING

Electrical shock hazard exists. Disconnect battery cables (para. 4-22).

4-20. 12- AND 24-VOLT RECEPTACLES (cont)

a. Test. For testing procedures, refer to para. 4-21.

b. Removal.

(1) 12-Volt Receptacle.

- (a) Remove six screws (4) and washers (5) from nose box cover (6).
- (b) Gently pull nose box cover (6) away from nose box.
- (c) Tag wires (18) on 12-volt receptacle (12).
- (d) Remove seven screws (17) from receptacle (12).
- (e) Remove wires (18) from receptacle.
- (f) Remove nut (8), washer (7) and screw (2) holding receptacle to nose box cover.
- (g) Remove receptacle (12) and gasket (3) from cover.
- (h) Remove circuit breaker (13) from receptacle.

(2) 24-Volt Receptacle.

- (a) Disconnect wires from 24-volt receptacle (1).
- (b) Remove four nuts (1 1) washers (5) and screws (1 5) and remove cover (1 4) and receptacle (1) from cover.

(3) Converter.

- (a) Disconnect harness wires from converter (1 0).
- (b) Remove screws (1 6) and remove converter (1 0) from nose box.

c. Installation.

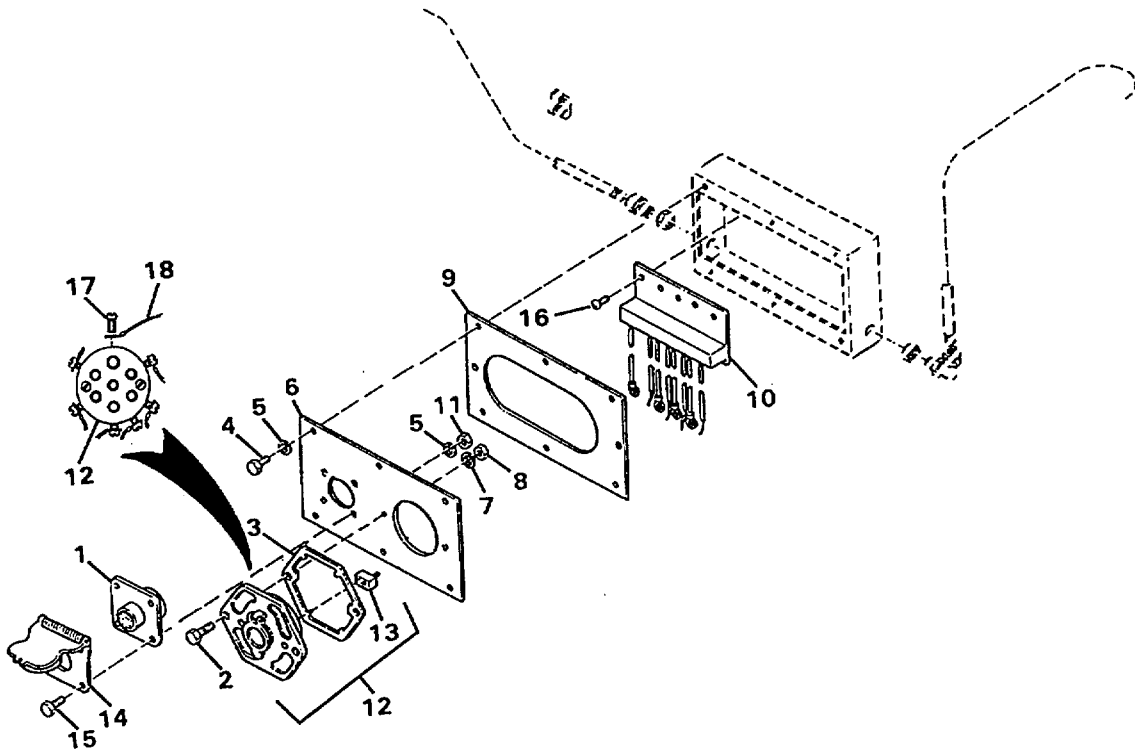
(1) Converter.

- (a) Install converter (1 0) in position in nose box.
- (b) Secure converter inside nose box with screws (1 6).

(2) 24-Volt Receptacle.

- (a) Install 24-volt receptacle (1) and cover (14) on cover (6) and secure to cover with screws (15).
- (b) Connect harness wires and converter wires to receptacle.

4-20. 12- AND 24-VOLT RECEPTACLES (cont)



12- and 24-Volt Receptacle

4-20. 12- AND 24-VOLT RECEPTACLES (cont)

c. Installation (cont).

- (3) 12-Volt Receptacle.
 - (a) Install circuit breaker (13) on receptacle.
 - (b) Connect harness and converter wires (18) to receptacle (12) and secure with seven screws (1 7).
 - (c) Install receptacle (12) and gasket (3) on cover (6). Secure receptacle to cover with two screws (2), washers (7) and nuts (8).
 - (d) Install assembled cover (6) on nose box and secure cover to box with six screws (4) and washers (5).

4-21. WIRING

THIS TASK COVERS:

- | | |
|------------|-----------------|
| a. Testing | c. Removal |
| b. Repair | d. Installation |

INITIAL SETUP:

Tools Required:

Nomenclature:

General Mechanics
Tool Kit

Equipment Conditions:

<u>Ref</u>	<u>Conditions</u>
2-23	Intervehicular cables disconnected.
4-22	Battery cable disconnected.

WARNING

Electrical shock hazard exists. Disconnect battery cables (para. 4-22).

a. Testing.

- (1) Connect power cable from towing vehicle, or other DC voltage source, to proper semitrailer nose box receptacle. Make sure that power is turned off.
- (2) Disconnect wire from defective light. Let wire hang so that it does not contact semitrailer frame or any other ground point.
- (3) Prepare multimeter for 12-volt DC measurement.
- (4) Turn on towing vehicle power or alternate DC power to semitrailer.

4-21. WIRING (cont)a. Testing (cont).

- (5) Connect positive test lead to bad wire. Connect negative test lead to trailer frame.
- (6) If meter indicates 12-volts DC, wire is good.
- (7) If meter indicates zero volts, check voltage at appropriate pin in nose box receptacle. If meter indicates 12-volts at nose box receptacle, replace wire. If meter does not indicate 12-volts at nose box receptacle, check towing vehicle power or alternate power source.

b. Repair.

Repair of wire is limited to-replacing terminal lugs. It is not necessary to remove wire to replace lugs.

c. Removal.

- (1) Disconnect suspected bad wire from 12-volt DC receptacle in-nose box.
- (2) Disconnect wire from dead marker, tail, turn or stop light. Refer to para. 4-16 or 4-17. Remove light assembly.
- (3) Tie 400 inch (34 feet) length of new wire to terminal of disconnected wire. Let wire hang outside of semitrailer.
- (4) Pull wire out from front of semitrailer through nose box.

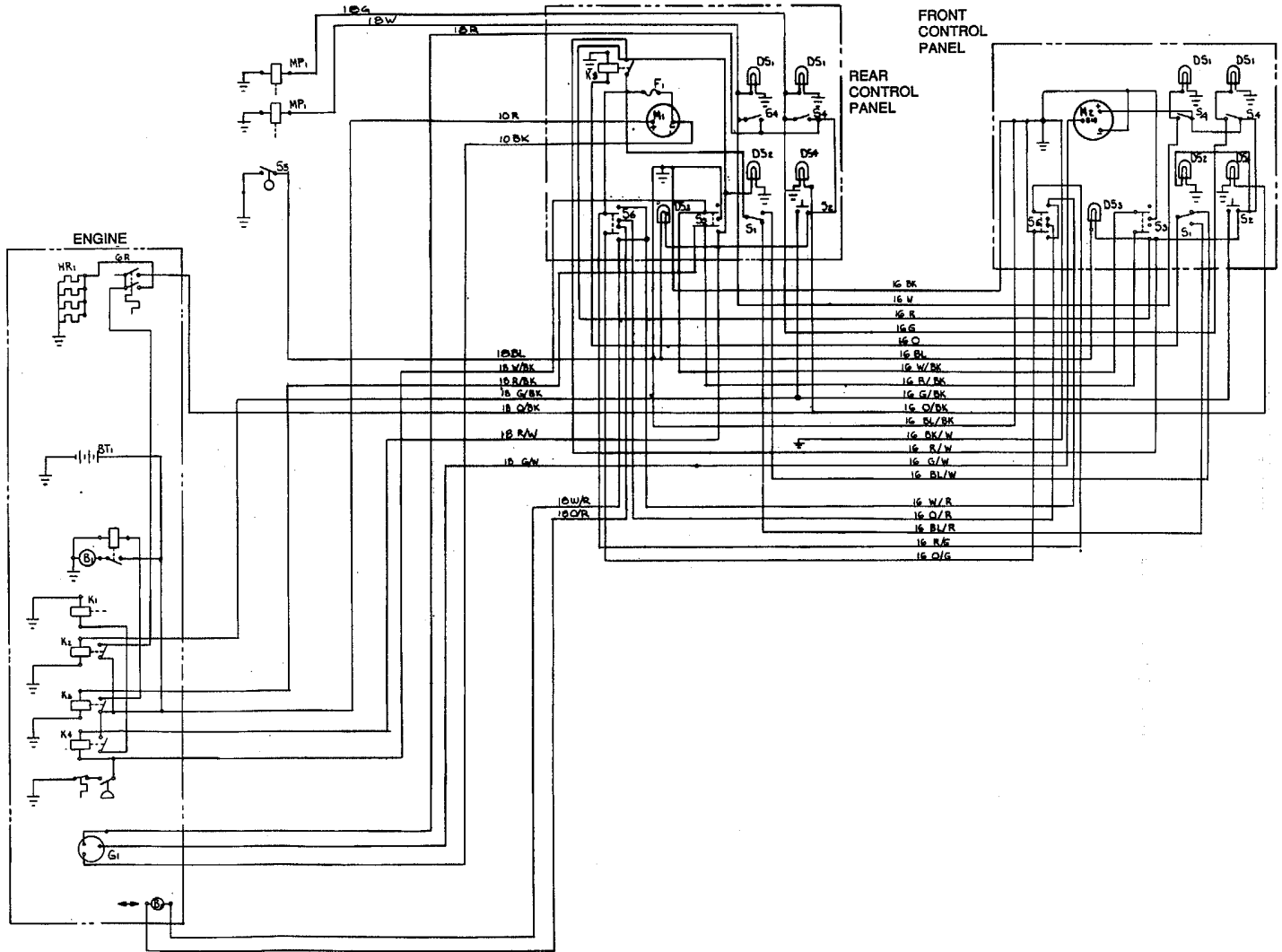
d. Installation.

- (1) Feed end of new wire through conduit pipe to conduit hole in box.
- (2) Feed wire into conduit hole in nose box while pulling wire out of empty light socket hole.
- (3) Connect wire to light assembly and install light assembly on semitrailer. Refer to para. 4-16 or 4-17.
- (4) Connect wire to proper terminal of 12-volt receptacle in nose box. Refer to para. 4-20.
- (5) Connect intervehicular cables. Refer to para. 4-23.
- (6) Connect battery cables. Refer to para. 4-22.

e. Wiring Diagrams.

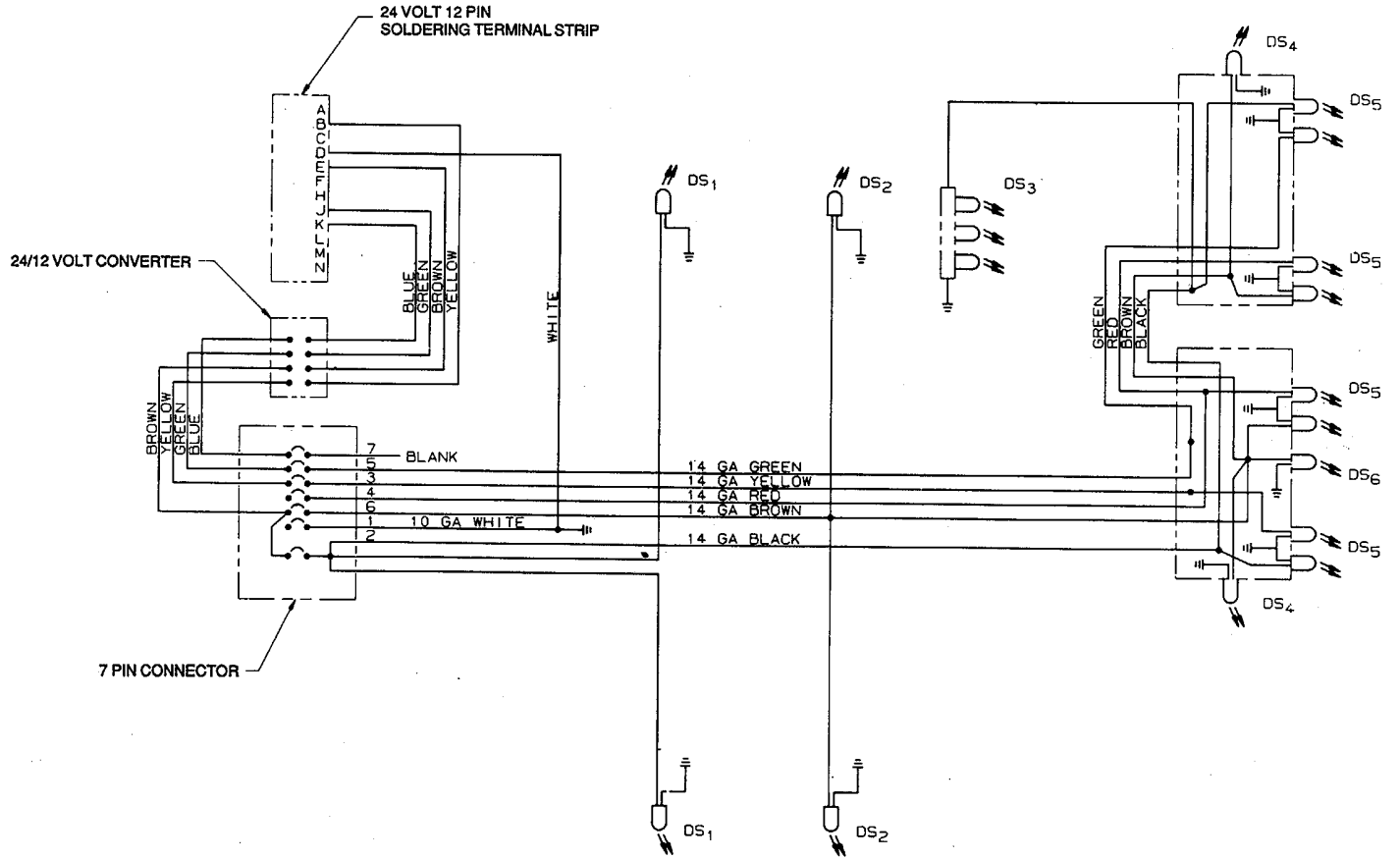
The electrical schematics and wiring diagrams are shown on the following pages.

4-21. WIRING (cont)



Electrical Schematic, Engine and Water Distributor Controls

4-21. WIRING (cont)



Electrical Schematic, 12-Volt Light

4-22. BATTERY

THIS TASK COVERS:

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

INITIAL SETUP:

Tools Required:

Nomenclature:

General Mechanics
Tool Kit

WARNING

Electrical shock hazard exists. Ensure battery cables are disconnected prior to servicing electrical or engine components.

WARNING

Wear protective face shield when servicing the battery to protect the facial skin in case that the battery acid splashes and would come in contact with the skin and cause burns. Avoid contact with the eyes. If contact occurs, flush eyes with cold water and seek immediate medical attention. Wear rubber gloves and avoid acid contact with the skin. If contact occurs, wash immediately with cold water and seek medical attention as necessary.

a. Removal.

- (1) Remove nuts (10), washers (11) and screws (12). Remove guard cover (13).
- (2) Loosen terminal clamp (4) holding battery cable (5) to negative battery terminal (6). Remove battery cable from negative battery terminal.
- (3) Loosen terminal clamp (1) holding battery cable (2) to positive battery terminal (3). Remove battery cable from positive battery terminal.
- (4) Remove screws (7), nuts (8) and holddown (9) securing battery in battery well on chassis.
- (5) Remove battery.

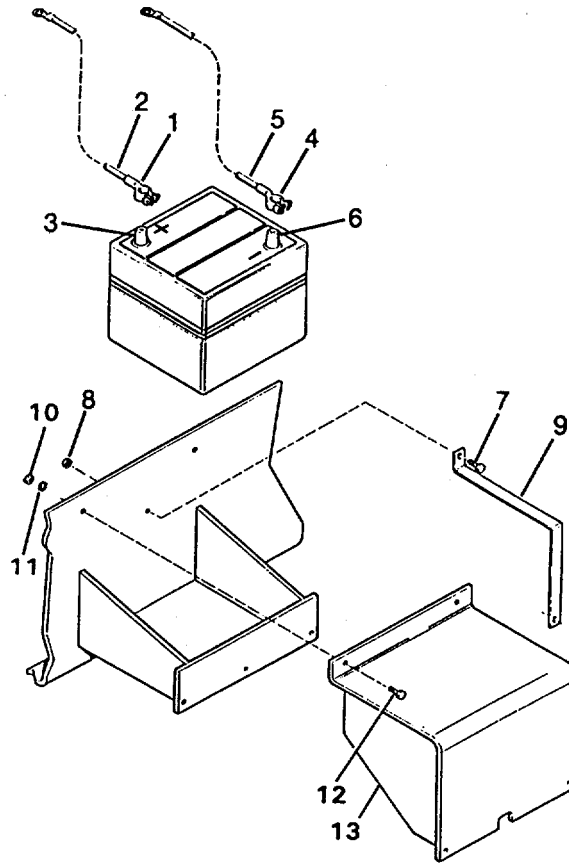
b. Repair.

For battery repair, refer to TM9-6140-20014, Operators', Unit, Direct Support and General Support Maintenance for Lead Acid Storage Batteries.

4-22. BATTERY (cont)

c. Installation.

- (1) Install battery in battery well and install holddown (9). Secure with screws (7) and nuts (8).
- (2) Install positive battery cable (2) on positive battery terminal (3). Tighten terminal clamp (1).
- (3) Install negative battery cable (5) on negative battery terminal (6). Tighten terminal clamp (4).
- (4) Install cover (13) over battery and secure with screws (12), washers (11) and nuts (10).



Removing and Installing Battery

4-23. CABLES AND TERMINALS**THIS TASK COVERS:**

- a. Removal
- b. Installation

INITIAL SETUP:**Tools Required:**Nomenclature:

General Mechanics
Tool Kit

Equipment/Materials Required:

Ignition Insulation Compound
(Item 8, Appendix E)

Equipment Conditions:Ref Conditions

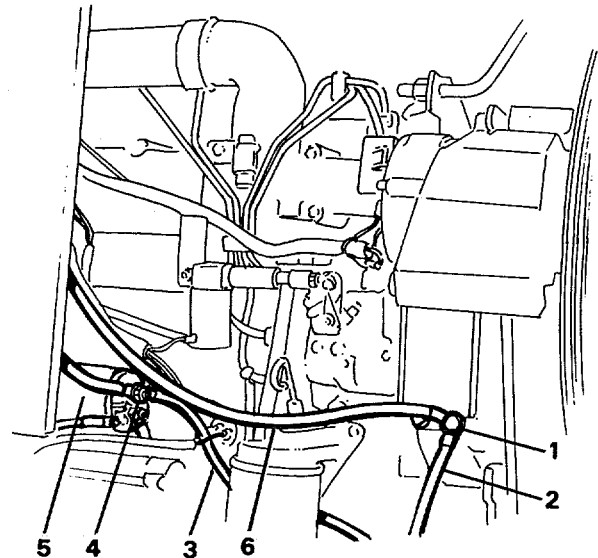
- 4-22 Battery cables disconnected.
- 4-56 Engine door removed.

WARNING

Wear protective face shield when servicing the battery to protect the facial skin in case that the battery acid splashes and would come in contact with the skin and cause burns. Avoid contact with the eyes. If contact occurs, flush eyes with cold water and seek immediate medical attention. Wear rubber gloves and avoid acid contact with the skin. If contact occurs, flush eyes with cold water and seek immediate medical attention.

A Removal.

- (1) Remove nut and washer (4) holding battery cable (3) on starter (5). Remove battery cable (3) from starter (5).
- (2) Remove screw and washers (1) and disconnect cables (2 and 6) from ground.



Removing and Installing Cables

4-23. CABLES AND TERMINALS (cont)

b. Installation.

- (1) Install battery cable (3) on starter (5). Secure with nut and washer (4).
- (2) Install battery cable (2) and cable (6) on engine. Secure with bolt and washer (1).
- (3) Refer to para. 4-22 and connect cables to battery.
- (4) Spray cable connections with ignition insulation compound.

4-24. LIQUID LEVEL TRANSMITTER

THIS TASK COVERS:

- a. Removal
- b. Installation

INITIAL SETUP:

Tools Required:

Nomenclature:

General Mechanics
Tool Kit

Equipment Conditions:

<u>Ref</u>	<u>Conditions</u>
------------	-------------------

4-22	Battery cables disconnected.
------	------------------------------

WARNING

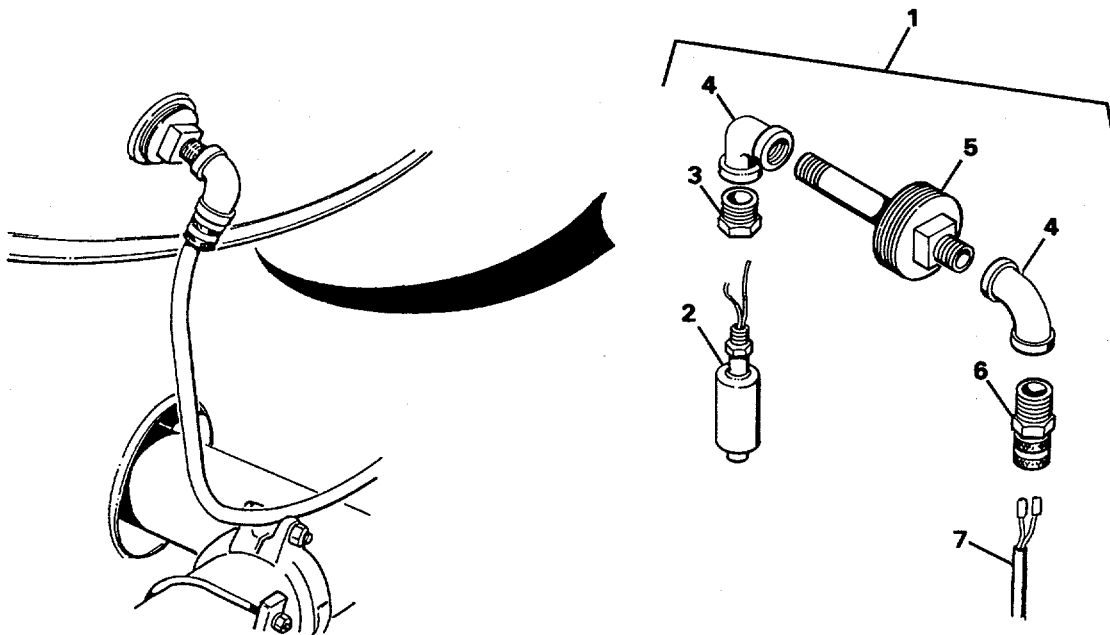
Electrical shock hazard exists. Disconnect battery cables (para. 4-22).

a. Removal.

- (1) At the rear of the tank remove cable grip (6) from elbow (4). Pull wires out through elbow and disconnect wires from indicator switch (2).
- (2) Turn indicator plug (5) counterclockwise and remove plug and indicator switch (2) from tank.
- (3) Remove indicator switch (2) from bushing (3). Remove elbows (4) and bushing (3) from plug (5).

4-24. LIQUID LEVEL TRANSMITTER (cont)b. Installation.

- (1) Install elbows (4) and bushing (3) on plug (5). Elbows must be at 90° and in line with plug.
- (2) Feed wires from indicator switch (2) through bushing, elbows and plug. Install indicator switch (2) in elbow (4).
- (3) Slide assembled indicator switch (2) into hole in rear of tank. Screw plug into tank. Tighten until outside elbow (4) is vertical with tank center line.
- (4) Install cable through grip (6) and connect harness wires (7) to indicator switch wires. Install grip (6) in elbow (4).
- (5) Connect battery cables. Refer to para. 4-22.



Liquid Level Transmitter

4-24A. SPRAY SYSTEM SOLENOID VALVES

THIS TASK COVERS:

- a. Testing
- b. Removal
- c. Installation

Equipment/Materials Required:

Tags (Item 14, Appendix E)
 Air Compressor or 125 PSI Air Supply
 12-Volt Battery

INITIAL SETUP:

Tools Required:

Equipment Conditions:

Nomenclature:

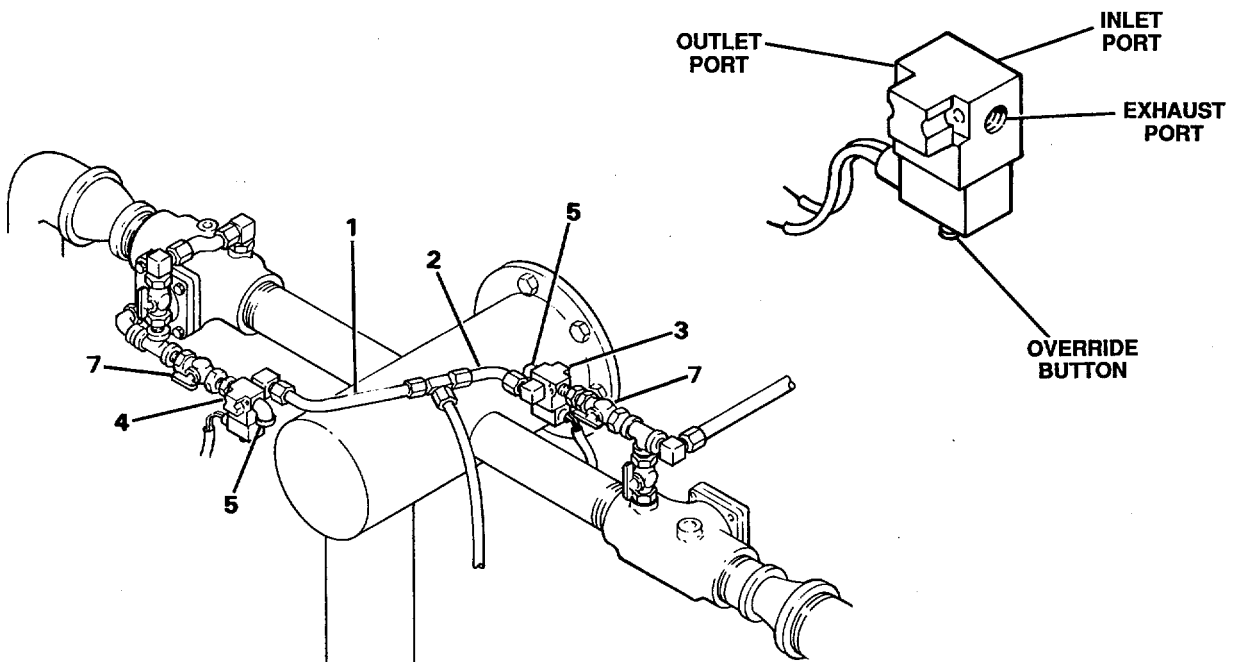
Ref Conditions

General Mechanics
 Tool Kit

2-6 Semitrailer coupled to prime mover.
 2-14 Engine shut off.

a. Testing.

- (1) Operate prime mover and pressurize semitrailer air system.
- (2) With air in systems, listen at the exhaust elbows (5). If air can be heard leaking from elbow, it could mean dirt is lodged in valve.
 - (a) Push in on override button, using a small screwdriver, and release.



Spray System Solenoid Valves

4-24A. SPRAY SYSTEM SOLENOID VALVES (cont)a. Testing (cont).

- (b) Repeat operation on override button two or three times. This may dislodge the dirt and stop the leak.
- (c) If air leakage continues, replace solenoid valve.
- (3) Refer to b. below and remove solenoid valve from spray system.
- (4) Connect the air compressor to the inlet port of the solenoid valve.
- (5) Turn on air pressure from compressor. Air should rush out of the outlet port. If air does not come out of the outlet port or exits from the exhaust port, push in on override button two or three times and release. If this does not correct problem, replace solenoid valve.
- (6) Connect the solenoid valve wires to the positive and negative terminals of the 12-volt DC battery. Either wire to a terminal is correct. Polarity does not matter.
- (7) With wires connected, air should stop exhausting from outlet port. If air does not stop exhausting, push in on override button two or three times and release. If air does not stop exhausting, replace solenoid valve.
- (8) Disconnect air supply from inlet port and connect it to the outlet port. With wires connected to the solenoid valve as above, air should flow out of exhaust port. This indicates valve is functioning properly.
- (9) If air does not flow out of exhaust port, push in on override button two or three times and release. If this does not correct problem, replace solenoid valve.
- (10) Disconnect air line and battery wires from solenoid valve.

b. Removal.**WARNING**

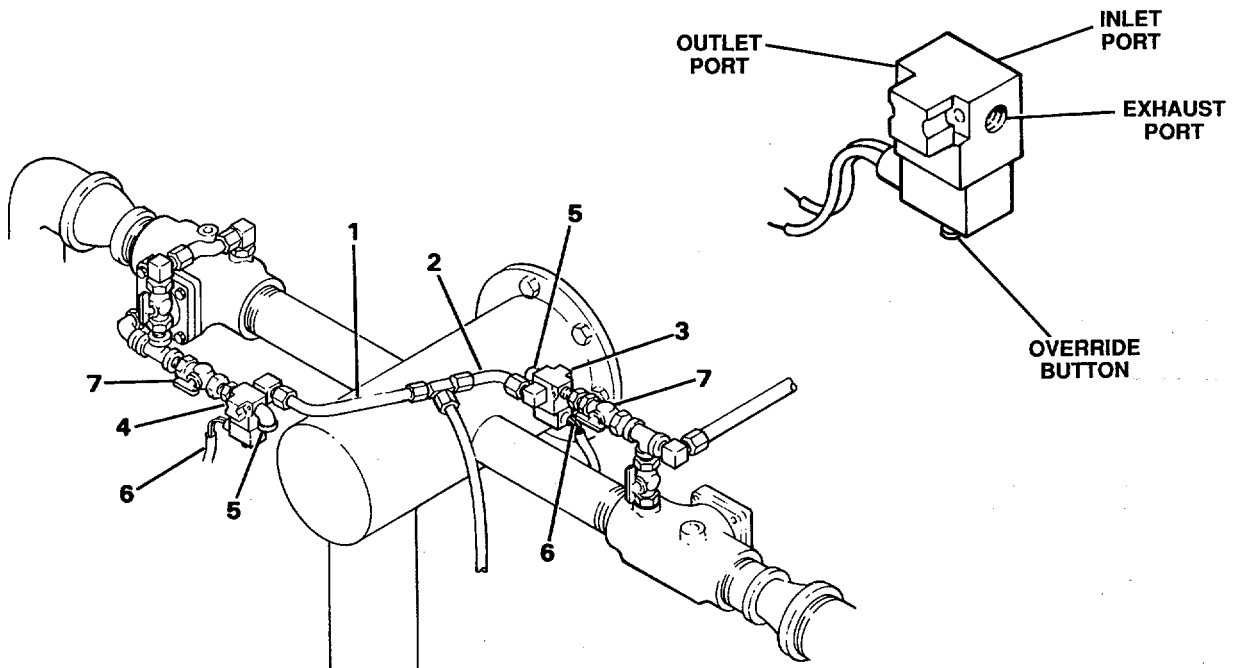
Electrical shock hazard exists. Disconnect battery cables (para. 4-22).

- (1) Refer to para. 4-22 and disconnect battery cables.
- (2) Drain air reservoirs (para. 1-10. b. (2)).
- (3) Tag and disconnect wires (6) from solenoid valves (3 and 4).
- (4) Disconnect air lines (1 and 2) from solenoid valves (3 and 4). Remove exhaust elbows (5) from solenoid valves.
- (5) Disconnect solenoid valves (3 and 4) from nipples connecting valves to air control valves (7). Remove solenoid valves.

4-24A. SPRAY SYSTEM SOLENOID VALVES (cont)

c. Installation.

- (1) Connect solenoid valves (3 and 4) to nipples at air control valves (7). Connect valves to allow valves to be in a vertical position.
- (2) Connect air lines (1 and 2) to solenoid valves (3 and 4). Install exhaust elbows (5) in solenoid valves.
- (3) Connect wires (6) to solenoid valves (3 and 4).
- (4) Refer to para. 4-22 and connect battery cables.



Spray System Solenoid Valves

Section VI. MAINTENANCE OF THE BRAKE SYSTEM

Paragraph Number	Title	Page Number
4-25	BRAKE SHOES	4-54
4-26	BRAKE CAMSHAFT	4-57
4-27	SLACK ADJUSTER.....	4-59
4-28	SPRING BRAKE CHAMBERS	4-63
4-29	GLADHANDS (AIR COUPLINGS)	4-64
4-30	DUMMY COUPLINGS.....	4-65
4-31	AIR LINES.....	4-66
4-32	QUICK RELEASE VALVE (SPRING BRAKE CONTROL VALVE)	4-67
4-33	RELAY VALVE.....	4-68
4-34	PRESSURE REGULATOR VALVE	4-70
4-35	AIR TANK AND RESERVOIR	4-71

4-25. BRAKE SHOES

THIS TASK COVERS:

- | | |
|---------------|-----------------|
| a. Inspection | c. Installation |
| b. Removal | d. Adjustment |

INITIAL SETUP:

Tools Required:

Nomenclature:

General Mechanics
Tool Kit

Personnel Required: 2

Equipment Conditions:

<u>Ref</u>	<u>Conditions</u>
------------	-------------------

Equipment/Materials Required:

Grease (Item 8, Appendix E)
Soft bristle brush (Item 2, Appendix E)
Goggles, protective (Item 9, Appendix E)

1-10. b. (2)	Air reservoirs drained.
2-7	Landing gear lowered.
4-27	Slack adjuster removed.
4-36	Brake drums removed.
4-37	Dual wheels and tires removed.

- a. Inspection.

WARNING

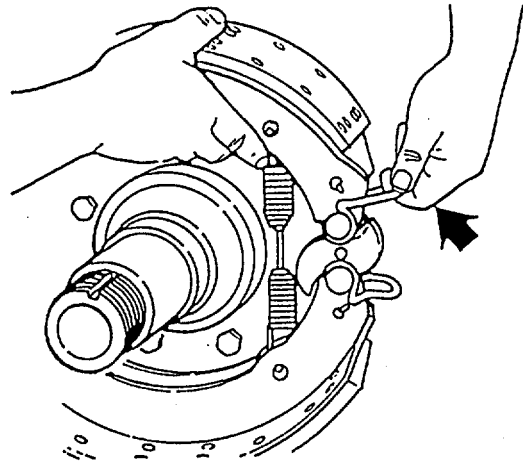
Frame and axle must be firmly supported to prevent shifting of semitrailer. Shifting may cause serious injury to personnel and damage to equipment.

- (1) Support axle and frame on each side.
- (2) Inspect brake linings for wear and corrosion. If lining surface area is worn down to within 1/16 in. (1.58 mm) of rivet heads, replace brake shoe.

4-25. BRAKE SHOES (cont)

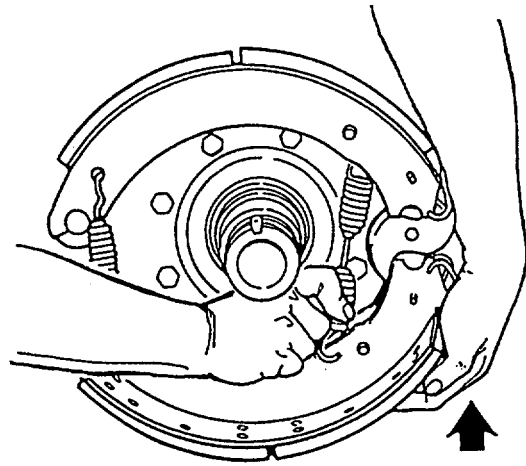
b. Removal.

- (1) Lift top brake shoe and pull on roller retainer to remove top cam roller.
- (2) Push on bottom brake shoe and pull on roller retainer to remove bottom cam roller.



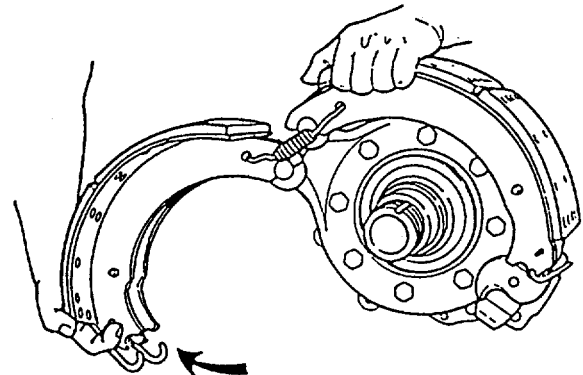
Removing Top Cam Roller

- (3) Lift lower shoe to release tension on spring and remove return spring.



Removing Brake Return Spring

- (4) Rotate lower shoe to release tension on two retaining springs. Remove springs and brake shoes.

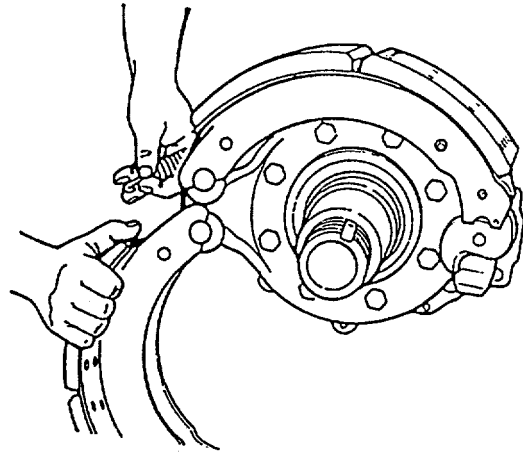


Remove Brake Retaining Springs

4-25. BRAKE SHOES (cont)

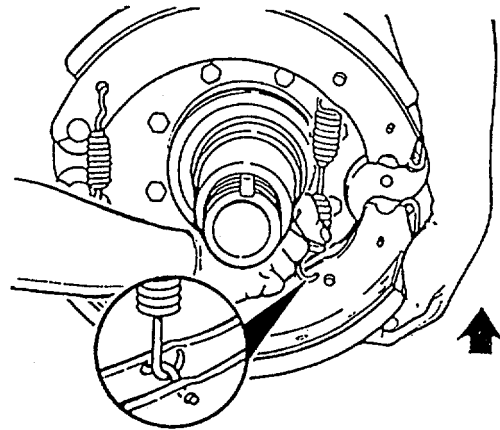
c. Installation.

- (1) Install upper brake shoe in position on top anchor pin. Hold lower brake shoe on bottom anchor pin and attach two new brake shoe retaining springs.



Installing Upper and Lower Brake Shoes

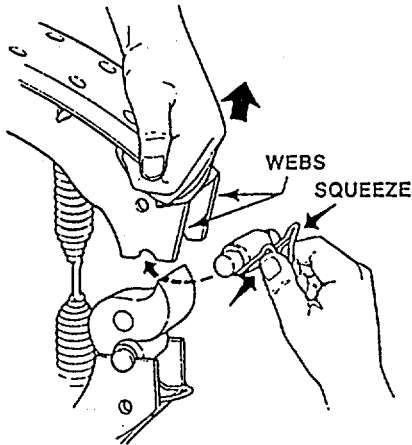
- (2) Rotate lower brake shoe forward and attach new brake shoe return spring.



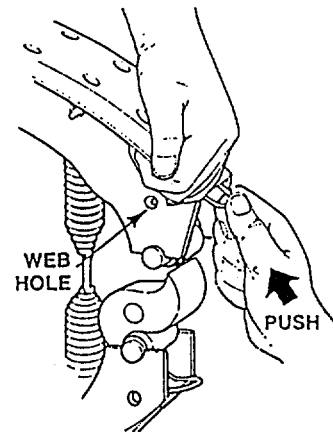
Installing Return Spring

4-25. BRAKES SHOES (cont)

c. Installation (cont).



Installing Rollers and Retainers



Locking Retainer Ears into Holes in Webs

- (3) Pull each brake shoe away from cam far enough to install cam rollers and retainers. Press ears of retainer together to permit retainer to fit between brake shoe webs.
- (4) Push retainers into brake shoes until ears lock in holes in shoe webs.
- (5) Install slack adjusters (para. 4-27).
- (6) Install brake drums (para. 4-36).
- (7) Install dual wheels and tires (para. 4-37).

d. Adjustment.

Refer to Adjusting Free Stroke, para. 4-27. c.

4-26. BRAKE CAMSHAFT

THIS TASK COVERS:

- a. Removal
- b. Installation

INITIAL SETUP:

Tools Required:

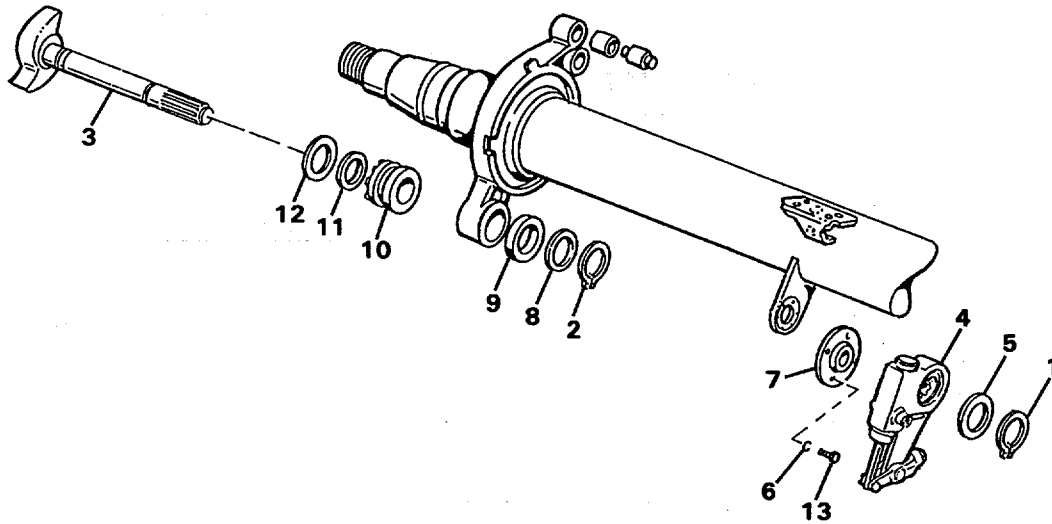
Nomenclature:

General Mechanics
Tool Kit

Equipment Conditions:

<u>Ref</u>	<u>Conditions</u>
1-10. b. (2)	Air reservoirs drained.
2-7	Landing gear lowered.
4-37	Wheels and tires removed.
4-27	Slack adjusters removed.
4-36	Brake drum and hub removed.
4-25	Brake shoes removed.

4-26. BRAKE CAMSHAFT (cont)

a. Removal.

Removal and Installation of Brake Camshaft

WARNING

Frame and axle must be firmly supported to prevent shifting of semitrailer. Shifting may cause serious injury to personnel and damage to equipment.

- (1) Support axle and frame on each side.
- (2) Remove lockrings (1 and 2) from camshaft (3). Remove washers (5) and disengage slack adjuster (4) from camshaft.
- (3) Slide camshaft (3) through spider and bracket.
- (4) While removing camshaft (3), remove washers (8 and 12) and seal (9).
- (5) Remove bushing (10) and preformed packing (11) from spider.
- (6) Remove four screws (13) and washers (6) holding bushing assembly (7) to bracket.

4-26. BRAKE CAMSHAFT (cont)

a. Installation.

- (1) Install bushing assembly (7) on bracket. Secure with screws (13) and washers (6).
- (2) Install bushing (10) and preformed packing (11) in spider.
- (3) Install washer (12) on camshaft (3) and insert camshaft through preformed packing (11) and bushing (10) in spider.
- (4) Install seal (9) and washer (8) on camshaft (3).
- (5) Insert camshaft (3) through bracket and bushing assembly (7). Move slack adjuster (4) into position and slide adjuster on splines of camshaft.
- (6) Install washer (5) and secure camshaft (3) with lockrings (1 and 2).
- (7) Install brake shoes (para. 4-25).
- (8) Install brake drum and hub (para. 4-36).
- (9) Install wheels and tires (para. 4-37).
- (10) Install slack adjuster (para. 4-26).

4-27. SLACK ADJUSTER

THIS TASK COVERS:

- | | |
|-----------------|--------------------------|
| a. Removal | c. Adjusting Free Stroke |
| b. Installation | |

INITIAL SETUP:

Tools Required:

Nomenclature:

General Mechanics
Tool Kit

Personnel Required: 2

Equipment Conditions:

<u>Ref</u>	<u>Conditions</u>
	Semitrailer wheels checked

a. Removal.

- (1) To release spring force from slack adjuster and camshaft, apply air to brake chambers. Do not apply brakes.
- (2) Remove pawl assembly (1) from slack adjuster (2).
- (3) Remove both cotter pin and clevis pins (3).

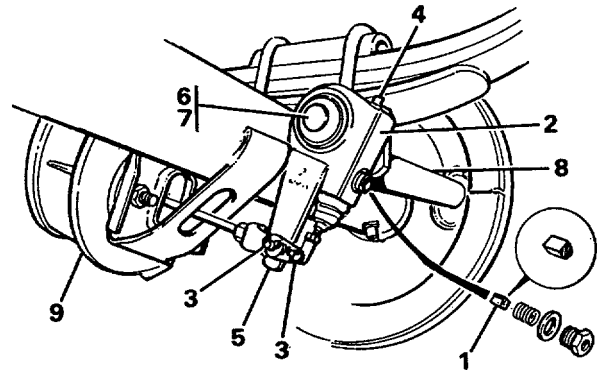
4-27. SLACK ADJUSTER (cont)

a. Removal (cont).

- (4) Use wrench to turn adjusting nut (4) clockwise. Move slack adjuster (2) away from clevis (5).
- (5) Remove lock ring (6) and washers (7) from camshaft (8). Remove slack adjuster (2) from camshaft (8).

b. Installation.

- (1) Grease splines on slack adjuster gear and brake camshaft.
- (2) Install slack adjuster on brake camshaft.
- (3) Install flat washers (7) and lock ring (6).
- (4) Remove pawl assembly (1) from slack adjuster (2), if necessary.



CAUTION

If pawl is not removed, turning adjusting nut will damage slack adjuster teeth.

- (5) Use wrench to turn adjusting nut (4) to align hole in arm of slack adjuster with hole in clevis (5).
- (6) Rotate slack adjuster (2) until there is 2-1/2 inch (63.5 mm) between threaded end of clevis (5) to bottom of brake chamber (9).
- (7) Install clevis pins (3) and cotter pins.
- (8) Install pawl assembly (1). Tighten screw to 15-20 lb-ft (20-27 Nm) (dry).
- (9) Adjust free stroke as follows:

c. Adjusting Free Stroke.

NOTE

Slack adjuster needs only one adjustment when brake shoes are replaced. It will remain in correct adjustment during life of brake lining.

- (1) To release spring forces from slack adjuster and camshaft, apply air to brake chambers. Do not apply brakes. Cage brake chambers. Refer to para. 3-9.
- (2) Jack up axle to be adjusted and chock wheels on opposite side. Wheels raised up by jack should rotate freely.

4-27. **SLACK ADJUSTER (cont)**

c. Adjusting Free Stroke (cont).

CAUTION

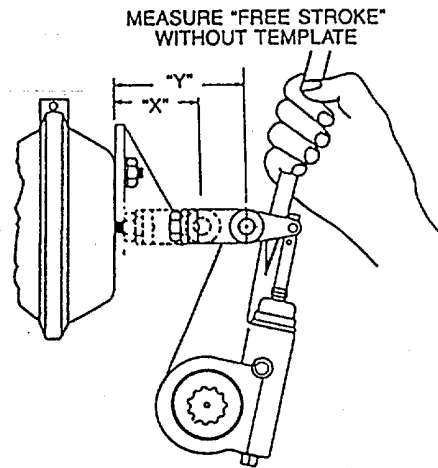
To avoid damaging slack adjuster teeth, remove pawl assembly before turning adjusting nut.

- (3) Set stroke to its approximate length and set approximate clearance between linings and drum as follows:
- (a) Turn manual adjusting nut on slack adjuster clockwise until brake linings touch drum.
 - (b) Turn adjusting nut 1/2 turn counterclockwise.
- (4) Measure free stroke as follows:
- (a) Measure distance from bottom of air chamber to center of large clevis pin while brake is released ("X").
 - (b) Use pry bar to move slack adjuster and apply brake. While brake is applied, measure same distance again ("Y").
 - (c) Difference between measurements is free stroke. Free stroke sets clearance between linings and

CAUTION

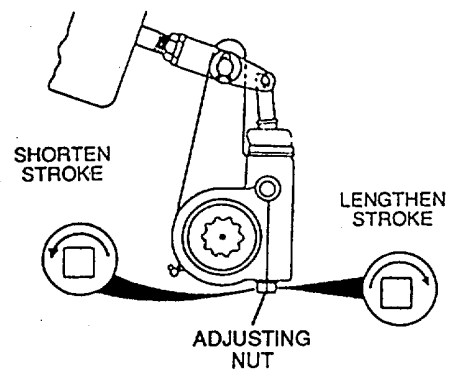
DO NOT set free stroke shorter than specified minimum. If free stroke is too short, linings can drag and damage brake and wear out shoes.

- (5) To lengthen stroke, turn adjusting nut 1/8 turn clockwise. To shorten stroke, turn adjusting nut 1/8 turn counter-clockwise. Check stroke again. Continue to measure and adjust stroke until it is adjusted correctly.
- (6) Double check for correct installation of slack adjuster and correct operation of brake as follows:



DRUM BRAKE: Y MINUS X MUST = 5/8"-3/4"
 IN SERVICE DISC BRAKE: Y MINUS X MUST = 3/4"-1"
 INITIAL DISC BRAKE: Y MINUS X MUST = 7/8"-1-1/8"

Measuring Free Stroke



Lengthening and Shortening Stroke

4-27. SLACK ADJUSTER (cont)

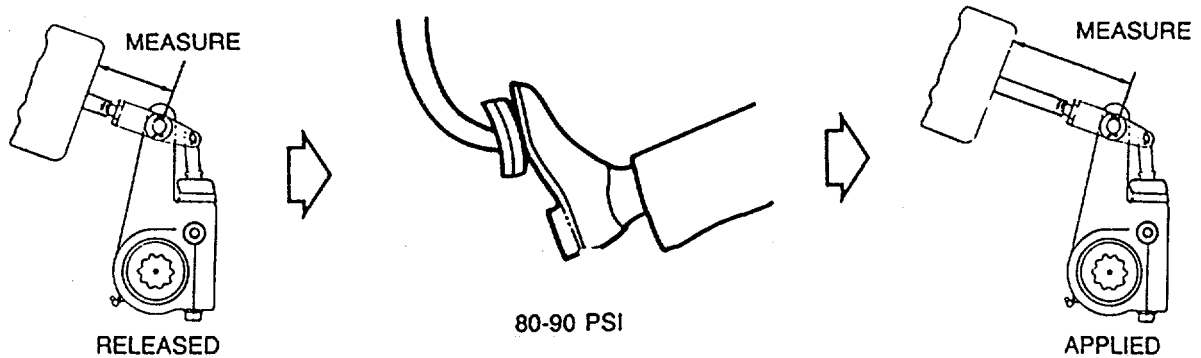
c. Adjusting Free Stroke (cont).

- (a) Measure distance from bottom of air chamber to center of large clevis pin.
- (b) Another person must apply brakes using 80-90 psi of air pressure.

NOTE

Build tank pressure to 100 psi and shut off engine. Then make and hold full brake application. This will give 80-90 psi in air chamber.

- (c) Measure distance from air chamber to center of large clevis pin while brakes are applied.
- (d) Difference between measurements is adjusted chamber stroke. Adjusted chamber stroke **MUST NOT** be greater than 2 inches.
- (e) If necessary, shorten adjusted chamber stroke. Refer to para. c. (3). Make adjusted chamber stroke as short as possible, but **NOT** so short that free stroke is less than distance specified in para. c. (4) (c). Refer to **CAUTION** before para. c. (3).



Measure Adjusted Chamber Stroke

- (7) Install pawl assembly. Tighten screw to torque of 15-20 lb-ft (20-27 Nm).
- (8) Lubricate slack adjuster through grease fitting until new grease flows from pressure relief valve in screw.
- (9) Repeat para. c. ((1) through (8)) for all slack adjusters.
- (10) Uncage spring brake chambers. Refer to para. 3-9.

4-28. SPRING BRAKE CHAMBERS

THIS TASK COVERS:

- a. Removal
- b. Installation

INITIAL SETUP:

Tools Required:

Nomenclature:

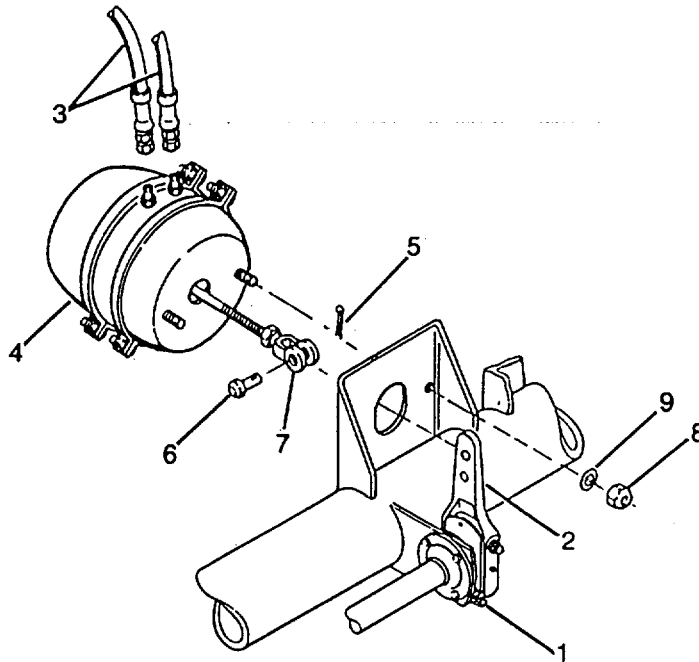
General Mechanics
Tool Kit

Equipment/Materials Required:

Tags (Item 14, Appendix E)

Equipment Conditions:

<u>Ref</u>	<u>Conditions</u>
3-9	Spring brakes caged
4-29	Air reservoirs drained



Removing and Installing Spring Brake Chamber

4-28. SPRING BRAKE CHAMBERS (cont)

a. Removal.

- (1) Turn adjusting nut (1) on slack adjuster (2) counterclockwise to release spring forces.
- (2) Tag and disconnect two air lines (3) from brake chamber (4).
- (3) Remove cotter pin (5) and clevis pin (6). Disconnect clevis (7) from slack adjuster (2).
- (4) Remove two nuts (8) and washers (9) holding brake chamber (4) to mounting bracket on axle.
- (5) Remove spring brake chamber (4).

b. Installation.

- (1) Install spring brake chamber (4) in position on mounting bracket with hose fittings towards top. Secure with nuts (8) and washers (9).
- (2) Position clevis (7) on slack adjuster (2). Secure with clevis pin (6) and cotter pin (5).
- (3) Connect air lines (3) to spring brake chamber (4).
- (4) Close drain valves on air reservoirs and pressurize air brake system.
- (5) Adjust slack adjuster. Refer to para. 4-27.
- (6) Uncage spring brake chambers. Refer to para. 3-9.

4-29. GLADHANDS (AIR COUPLINGS)

THIS TASK COVERS:

- a. Removal
- b. Installation

INITIAL SETUP:

Tools Required:

Nomenclature:

General Mechanics
Tool Kit

Equipment/Materials Required:

Soap Solution (Item 12, Appendix E)
Cleaning Solvent (Item 13, Appendix E)
Pipe Sealant (Item 11, Appendix E)

Equipment Conditions:

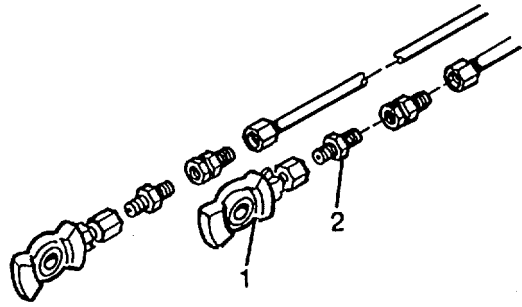
<u>Ref</u>	<u>Conditions</u>
2-23	Intervehicular air lines disconnected.

4-29. GLADHANDS (AIR COUPLINGS) (cont)a. Removal.

Unscrew gladhand (1) from clamping stud (2).

b. Installation

- (1) Apply pipe sealant to clamping stud.
- (2) Screw gladhand (1) on clamping stud (2).
- (3) Close drain valves on both air reservoirs.
- (4) Pressurize air system.
- (5) Check for leakage as follows:
 - (a) Coat gladhand and connection with soapsuds. No leakage is permitted.
 - (b) Replace any leaking gladhand or connection.



Removing and Installing Gladhands

4-30. DUMMY COUPLINGSTHIS TASK COVERS:

- a. Removal
- b. Installation

INITIAL SETUP:**Tools Required:**Nomenclature:

General Mechanics
Tool kit

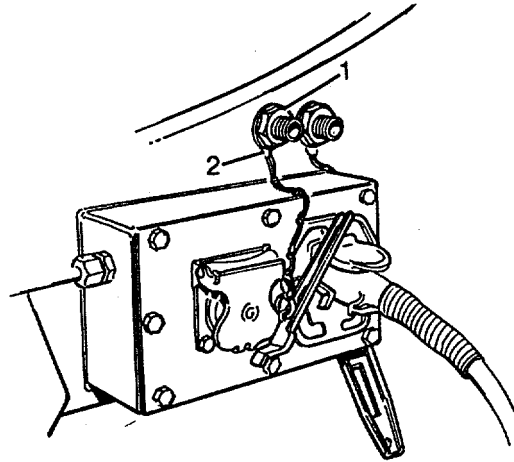
a. Removal.

Remove dummy coupling chain ring (2) from clamping stud (1).

4-30. DUMMY COUPLINGS (cont)

b. Installation.

Position dummy coupling chain ring (2) on clamping stud (1).



Removing and Installing Dummy Couplings

4-31. AIR LINES

THIS TASK COVERS:

- a. Removal
- b. Installation

INITIAL SETUP:

Tools Required:

Nomenclature:

General Mechanics
Tool Kit

Equipment/Materials Required:

Teflon tape (Item 15, Appendix E)
Soap solution (Item 12, Appendix E)

Equipment Conditions:

<u>Ref</u>	<u>Conditions</u>
1-10. b. (2)	Air reservoirs drained.

a. Removal.

- (1) To remove air lines, disconnect couplings at both ends of air line and remove line.
- (2) Refer to Figure 18 of Repair Parts and Special Tools List for location of air lines.

4-31. AIR LINES (cont)

b. Installation.

- (1) To install air lines, proceed as follows:
 - (a) Install air line in position in system. Refer to Figure 18 of Repair Parts and Special Tools List for location of air lines.
 - (b) Connect air line to correct components in system, using Teflon tape.
- (2) Close drain valves.
- (3) Pressurize air system.
- (4) Check for leakage as follows:
 - (a) Coat air line and connections with soapsuds. No leakage is permitted.
 - (b) Replace any leaking air line or connections.

4-32. QUICK RELEASE VALVE (SPRING BRAKE CONTROL VALVE)

THIS TASK COVERS:

- | | |
|-----------------|------------|
| a. Removal | c. Testing |
| b. Installation | |

INITIAL SETUP:

Tools Required:

Nomenclature:

General Mechanics
Tool Kit

Equipment/Materials Required:

Teflon Tape (Item 15, Appendix E)
Soap Solution (Item 12, Appendix E)
Tags (Item 14, Appendix E)

Equipment Conditions:

Ref Conditions

1-10. b. (2) Air reservoirs drained.

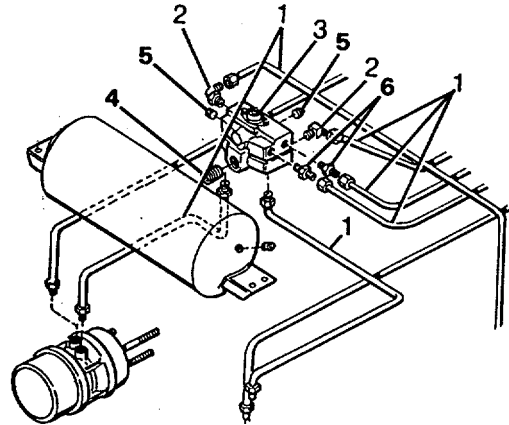
a. Removal.

- (1) Tag and disconnect air lines (1).
- (2) Remove elbows (2), adapters (6) and pipe plugs (5).
- (3) Remove quick release valve (3) from front reservoir nipple (4) by rotating entire valve counterclockwise.

4-32. QUICK RELEASE VALVE (SPRING BRAKE CONTROL VALVE) (cont)

b. Installation.

- (1) Install elbow (2) and adapters (6) on valve, using Teflon tape.
- (2) Install quick release valve (3) on air reservoir nipple (4) and secure by rotating entire valve clockwise.
- (3) Connect air lines (1), per tagged identification, using Teflon tape.
- (4) Install pipe plugs (5).
- (5) Close drain valves.
- (6) Pressurize brake system. Spring brake chambers should release. Test for leaks as follows.



Removing and Installing Quick Release Valve

c. Testing.

- (1) Coat quick release valve with soapy water.
- (2) Leakage at valve should not exceed a one-inch bubble in five seconds. If excess leakage is found, replace quick release valve.

4-33. RELAY VALVE

THIS TASK COVERS:

- | | |
|-----------------|------------|
| a. Removal | c. Testing |
| b. Installation | |

INITIAL SETUP:

Tools Required:

Nomenclature:

General Mechanics Tool Kit

Equipment/Materials Required:

Teflon Tape (Item 15, Appendix E)
 Soap Solution (Item 12, Appendix E)
 Tags (Item 14, Appendix E)

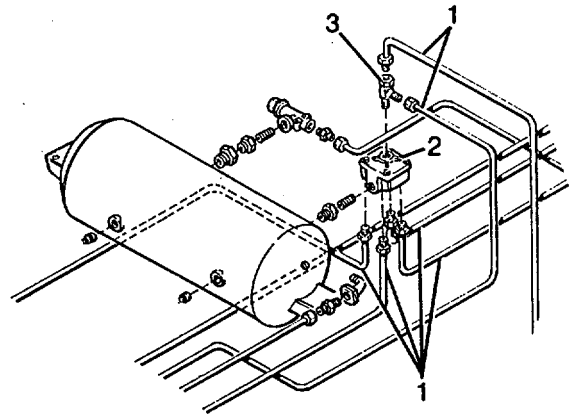
Equipment Conditions:

<u>Ref</u>	<u>Conditions</u>
1-10. b. (2)	Air reservoirs drained.

4-33. RELAY VALVE (cont)

a. Removal.

- (1) Tag and disconnect air lines (1) from relay valve (2).
- (2) Remove tee (3) from relay valve (2).
- (3) Remove relay valve (2) from rear air tank nipple (4) by turning entire valve counterclockwise.



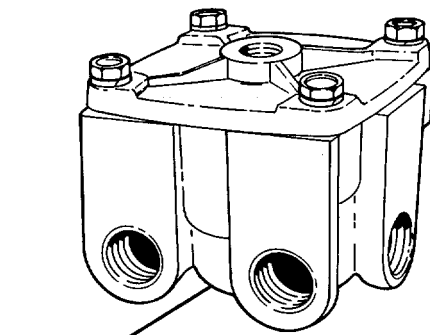
b. Installation.

- (1) Install tee (3) on relay valve (2), using Teflon tape.
- (2) Install relay valve (2) on air tank nipple (4) and secure by turning clockwise.
- (3) Connect air lines (1) to relay valve (2) and tee (3) per tagged identification.
- (4) Close drain valves.
- (5) Pressurize air system and test for leaks as follows.

Removing and Installing Relay Valve

c. Testing.

- (1) With brake system fully charged, close shutoff valve in emergency line on towing vehicle. Disconnect emergency air hose coupling. Make sure semitrailer brakes apply automatically. With relay valve in this emergency position, coat exhaust port with soapsuds.
- (2) Leakage tests must not exceed a one-inch bubble in three seconds. If excess leakage is found, replace relay valve.



EXHAUST PORT

Relay Valve

4-34. PRESSURE REGULATOR VALVE

THIS TASK COVERS:

- a. Removal
- b. Installation

INITIAL SETUP:

Tools Required:

Nomenclature:

General Mechanics
Tool Kit

- c. Testing

Equipment/Materials Required:

Teflon Tape (Item 15, Appendix E)
Soap Solution (Item 12, Appendix E)

Equipment Conditions:

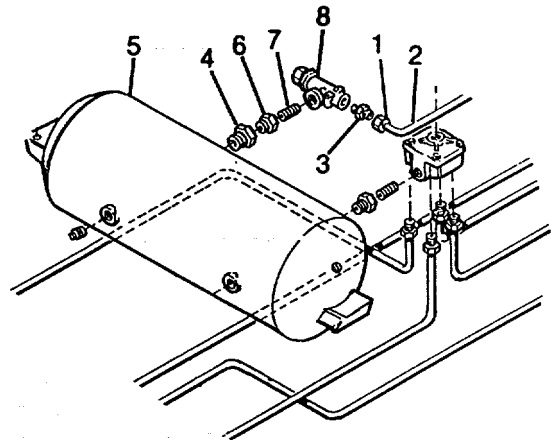
<u>Ref</u>	<u>Conditions</u>
1-10. b. (2)	Air reservoirs drained.

a. Removal.

- (1) Completely loosen hex nut (1) holding air line (2) to adapter (3). Remove air line (2).
- (2) Use wrench to hold bushing (4) in air reservoir (5) while turning bushing (6), nipple (7) and regulator valve (8) counterclockwise. Remove regulator valve (8), nipple (7) and bushing (6) from bushing (4).
- (3) Remove bushing (6) and nipple (7) and adapter (3) from valve (8).

b. Installation.

- (1) Install adapter (3) and nipple (7) on valve (8). Install bushing (6) on nipple (7), using Teflon tape.
- (2) Install valve (8), nipple (7) and bushing (6) on bushing (4) using Teflon tape.
- (3) Connect air line (2) to adapter (3).
- (4) Pressurize system and check for leaks as follows.



Removing and Installing Pressure Regulator Valve

4-34. PRESSURE REGULATOR VALVE (cont)

c. Testing.

With air brake system connected, apply soapy water to bushings, adapter, nipple, valve and air line connection. No leakage is permitted. Tighten couplings as required.

4-35. AIR TANK AND RESERVOIR

THIS TASK COVERS:

- | | |
|-----------------|------------|
| a. Removal | c. Testing |
| b. Installation | |

INITIAL SETUP:

Tools Required:

Nomenclature:

General Mechanics
Tool Kit

Equipment Conditions:

<u>Ref</u>	<u>Conditions</u>
1-10. b. (2)	Air reservoirs drained.
4-32	Quick release valve removed.
4-33	Relay valve removed.
4-34	Pressure regulator valve removed.

Equipment/Materials Required:

Teflon Tape (Item 15, Appendix E)
Soap solution (Item 12, Appendix E)

a. Removal.

- (1) Remove eight nuts (1), washers (2), and screws (3) from brackets (4) on air tank (5) and reservoir (8).
- (2) Remove air reservoir (8) and air tank (5).
- (3) Remove drain valve (6) and plugs (7) from air tank (5). Remove drain valves (6) and pipe plugs (7) from reservoir (8) and tank (5).
- (4) Remove check valve (9).

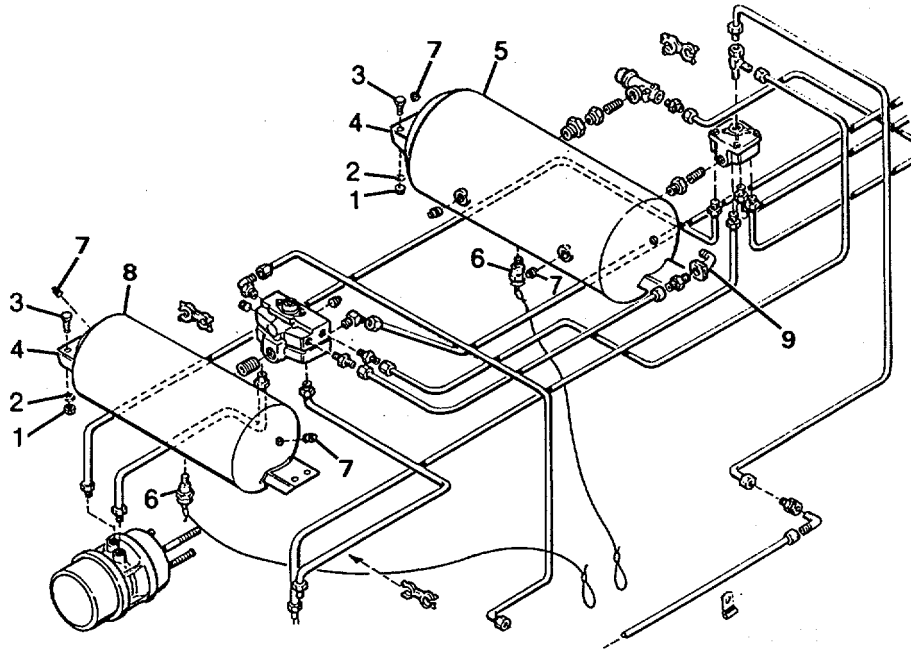
b. Installation.

- (1) Install drain valve (6) and plugs (7) on air tank (5) using Teflon tape. Install drain valve (6) and plug (7) on air reservoir (8) using Teflon tape.
- (2) Install air tank (5) and air reservoir (8) on frame. Secure to frame with screws (3), washers (2) and nuts (1).
- (3) Install check valve (9), using Teflon tape.

4-35. AIR TANK AND RESERVOIR (cont)

b. Installation (cont).

- (4) Install relay valve (para. 4-33), quick release valve (para. 4-32) and regulator valve (para. 4-34).
- (5) Pressurize air system and check for leaks as follows.



Removing and Installing Air Tank and Reservoir

c. Testing.

With air brake system connected to towing vehicle, coat drain valves, pipe plugs and connections with soapsuds. No leakage is permitted. Tighten any leaking connections. Inspect for damage or corrosion. Replace tank or reservoir if any damage or corrosion is found that would weaken tank or reservoir.

Section VII. MAINTENANCE OF WHEELS, HUBS AND DRUMS

Paragraph Number	Title	Page Number
4-36	BRAKE DRUM AND HUB ASSEMBLY	4-73
4-37	WHEELS	4-76
4-38	TIRES	4-78

4-36. BRAKE DRUM AND HUB ASSEMBLY

THIS TASK COVERS:

- a. Removal
- b. Installation

INITIAL SETUP:

Tools Required:

Nomenclature:

General Mechanics
Tool Kit

Lathe (brake drum)
Micrometer, inside

- c. Adjusting Wheel Bearings
- d. Repair of Brake Drum

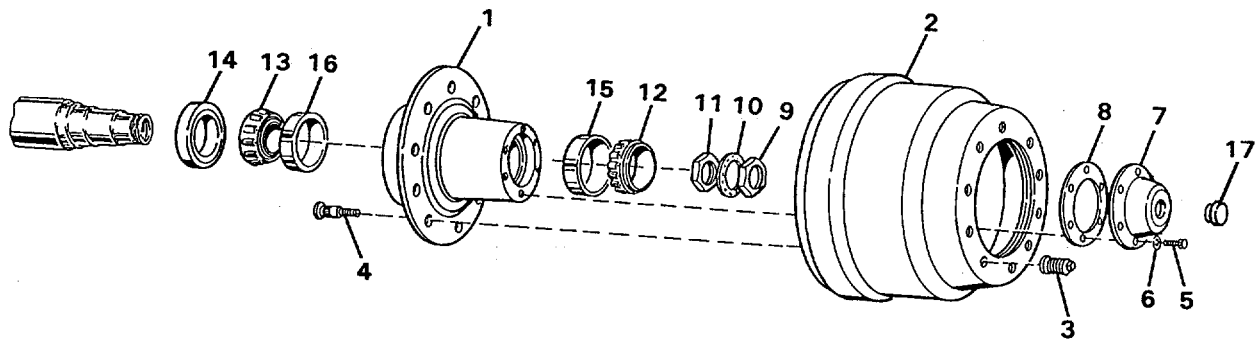
Equipment/Materials Required:

Solvent, Dry Cleaning (Item 13, Appendix E)
Oil (Item X, Appendix E)
Crocus Cloth (Item 5, Appendix E)

Equipment Conditions:

<u>Ref</u>	<u>Conditions</u>
3-9	Brake chambers caged (mechanical) or
4-27	Slack adjusters released (air)
4-37	Wheels and tires removed

a. Removal.



Brake Drum and Axle Hub

- (1) Remove ten cap nuts (3). Separate hub (1) and brake drum (2).
- (2) Remove brake drum (2).
- (3) Remove bolts (4) if damaged.
- (4) Place suitable container under hub cap (7) to catch oil during removal.
- (5) Remove six screws (5), lockwashers (6), hub cap (7) and gasket (8). Discard gasket.
- (6) Remove jam nut (9), lockwasher (10) and adjusting nut (11) from spindle.
- (7) Remove outer bearing cone (12) from hub.

4-36. BRAKE DRUM AND HUB ASSEMBLY (cont)a. Removal (cont).

- (8) Remove hub (1).
- (9) Remove inner bearing cone (13) and oil seal (14). Discard seal if damaged.
- (10) Remove inner bearing cup (16) and outer bearing cup (15) from hub (1).

b. Installation.

- (1) Install inner bearing cup (16) and bearing cone (13) in hub (1).
- (2) Install seal (14) in hub (1).
- (3) Install ten bolts (4) in hub (1).
- (4) Install assembled hub on axle.
- (5) Install outer bearing cup (15) and bearing cone (12) in hub (1).
- (6) Install adjusting nut (11).
- (7) Refer to para. c. below and adjust bearings.
- (8) Install lockwasher (10) and jam nut (9). Tighten nut to a torque of 250-300 lb-ft (339-407 Nm) (dry).
- (9) Install brake drum (2) on hub (1). Secure hub with ten cap nuts (3).
- (10) Install gasket (8) and hub cap (7) on hub (1). Secure hub cap (7) with six lockwashers (6) and screws (5).
- (11) Remove plug (17), fill hub cap with oil (GO) and replace plug.

c. Adjusting Wheel Bearings.

- (1) Install adjusting nut (11) and tighten to 100 lb-ft (135 Nm) (dry) torque while rotating wheel. Check that all bearing surfaces are in contact.
- (2) Loosen adjusting nut (11) completely. Tighten adjusting nut (11) to 50 Lb-ft (68 Nm) (dry) torque. Then, loosen adjusting nut 1/6 to 1/4 turn.
- (3) Install lockwasher (10) and jam nut (9). Torque jam nut to 250-300 Lb-ft (339-407 Nm).
- (4) Install brake drum (2) on hub and secure with ten cap nuts (3).
- (5) Install new gasket (8).
- (6) Install hub cap (7) and secure with six lockwashers (6) and screws (5).
- (7) Remove plug (17). Fill hub cap with oil. Replace plug (17).
- (8) Install tires and wheels on axle (para. 4-37).

4-36. BRAKE DRUM AND HUB ASSEMBLY (cont)

c. Adjusting Wheel Bearings (cont).

- (9) Uncage spring brake chambers (para. 3-9).
- (10) Adjust slack adjusters (para. 4-27).
- (11) Remove axle supports.

d. Repair of Brake Drum

- (1) Remove brake drum (refer to para. a above).

WARNING

Wear protective goggles when using the cleaning solvent. Avoid contact with the eyes. If contact occurs, flush eyes with cold water for 5 minutes and seek immediate medical attention. Dry cleaning solvent (PD-680) is both toxic and flammable. Avoid prolonged breathing of vapors. Avoid skin contact. Use only in a well-ventilated area. Keep away from open flame. Flash point of solvent is 138°F (59°C).

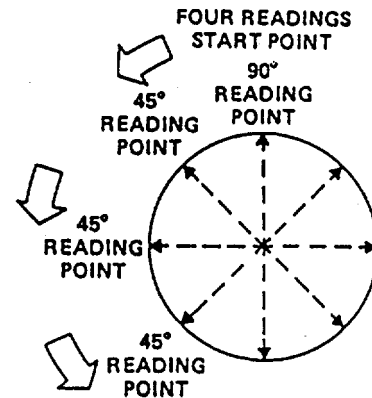
- (2) Clean brake drum with dry cleaning solvent (PD-680).
- (3) Check brake drum for wear, cracks or damage. Replace brake drum if damaged beyond repair.

NOTE

Slight scoring conditions can be corrected by polishing with crocus cloth. Heavy scoring and out-of-round condition require turning brake drum on a refinishing lathe.

Whenever the drum on one side of the axle is refinished, the other drum on the same axle must be turned to the same size.

- (4) Check inner brake surface of drum for heat checking, scoring or warpage.
- (5) Using micrometer, check inside of brake drum for out-of-round or tapered wear.
- (6) Record each reading. The maximum difference between the four readings cannot exceed 0.0006 inch (0.01524 mm). Drums with out-of-round exceed limits must be turned.



Checking Brake Drum for Out-of-Roundness

4-36. BRAKE DRUM AND HUB ASSEMBLY (cont)

d. Repair of Brake Drum (cont).

NOTE

If turning causes drum to exceed original inside diameter by more than 0.080 inch (2.032 mm), replace the drum. The drum on the opposite side of the same axle must also be replaced. Check drum diameter after each cut to make sure you have not cut too deeply.

- (7) To refinish inner braking surface, mount brake drum on refinishing lathe. Make several shallow cuts until scoring has been removed.
- (8) Refinish other drum on that axle to the same specifications.
- (9) Assemble hub and drum and install on axle (para. 4-36).
- (10) Install tire and wheel assemblies (para. 4-37).
- (11) Uncage brake chambers (para. 3-9).
- (12) Adjust slack adjusters (para. 4-27).
- (13) Remove axle supports.

4-37. WHEELS

THIS TASK COVERS:

- a. Removal
- b. Installation

INITIAL SETUP:

Tools Required:

Nomenclature:

General Mechanics
Tool Kit

Personnel Required: 2

Equipment/Materials Required:

Chock blocks

Equipment Conditions

Ref Conditions

Semitrailer brakes set.

Tires chocked, except those being replaced.

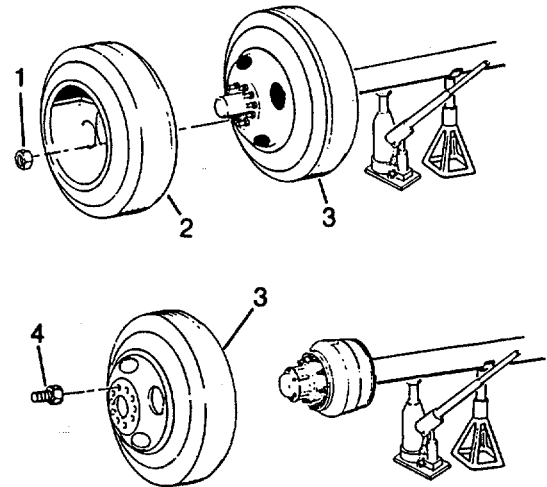
4-37. WHEELS (cont)

a. Removal.

CAUTION

Left wheel nuts must be turned counter-clockwise to tighten, clockwise to loosen. Right wheel nuts must be turned clockwise to tighten and counter-clockwise to loosen. Failure to follow these rules will result in damage to equipment.

- (1) Loosen, but do not remove ten outer lug nuts (1).
- (2) Jack axle up until wheels (2 and 3) are clear of ground.
- (3) Support semitrailer axle and frame with jack stands.
- (4) Remove ten nuts (1) and outer wheel (2).



Removing and Installing Wheels

NOTE

If only outer tire and wheel is being removed, omit step (5).

- (5) Remove ten lug nuts (4) and inner wheel (3)

b. Installation.

CAUTION

Valve stem must be in groove of drum to prevent damage.

- (1) Install inner wheel (3) and ten lug nuts (4). Torque nuts to 400-450 lb-ft (542-612 Nm) (dry).
- (2) Install outer wheel (2) and ten lug nuts (1). Valve stem must be 180 degrees from valve stem of inner tire. Torque lug nuts to 400-450 lb-ft (542-612 Nm) (dry).
- (3) Remove jack stands and lower semitrailer.
- (4) Remove and stow chock blocks.

4-38. TIRES

THIS TASK COVERS:

Tire Replacement and Repair

INITIAL SETUP:

Tools Required:

Nomenclature:

General Mechanics
Tool Kit

Equipment Conditions:

Ref Conditions

4-37 Wheels removed.

Refer to TM 9-2610-200-24 for tire removal, repair and installation.

Section VIII. MAINTENANCE OF FRAME

Paragraph Number	Title	Page Number
4-39	LANDING GEAR ATTACHMENTS.....	4-78
4-40	LANDING GEAR.....	4-80

4-39. LANDING GEAR ATTACHMENTS

THIS TASK COVERS:

- a. Landing Gear Crank
- b. Landing Gear Foot

INITIAL SETUP:

Tools Required

Nomenclature:

General Mechanics
Tool Kit

Personnel Required: 2

Equipment Conditions:

Ref Conditions

2-6 Semitrailer coupled to towing vehicle.

Equipment/Materials Required:

Rags (Item 6, Appendix E)
Grease (Item 8, Appendix E)

4-39. LANDING GEAR ATTACHMENTS (cont)

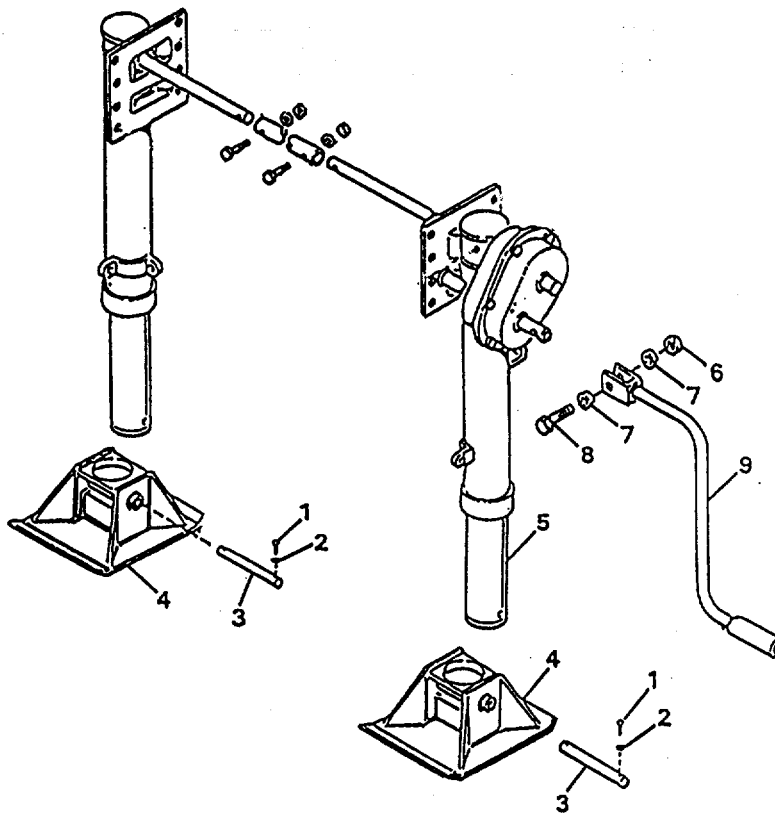
a. Landing Gear Crank.

(1) Removal.

- (a) Remove lock nut (6), washers (7) and screws (8).
- (b) Remove crank (9) from landing leg.

(2) Installation.

- (a) Install crank (9) on landing leg with holes in crank aligned with holes in shaft.
- (b) Install screw (8), washers (7) and nut (6) to secure crank (9).



Landing Leg Assembly

4-39. LANDING GEAR ATTACHMENTS (cont)

b. Landing Gear Foot.

(1) Removal.

WARNING

Use care when removing feet from landing legs. Raise legs only high enough to remove foot.

- (a) Raise landing legs only high enough for foot to clear landing leg when removed.
- (b) Remove screw (1) and nut (2).
- (c) Remove axle (3) and foot (4).

(2) Installation.

- (a) Slide foot (4) into position on landing leg. Raise foot to align holes in foot with holes in landing leg. Block foot in position.
- (b) Install axle (3) through shaft and leg and secure with nut (2) and screw (1).

4-40. LANDING GEAR

THIS TASK COVERS:

- a. Landing Gear Removal
- b. Landing Gear Installation

INITIAL SETUP:

Tools Required:

Nomenclature:

General Mechanics
Tool Kit

Equipment/Materials Required:

Brush, stiff bristle (Item 3, Appendix E)
Cleaning Solvent (Item 13, Appendix E)
Goggles (Item 20, Appendix E)

Personnel Required: 3

Equipment Conditions:

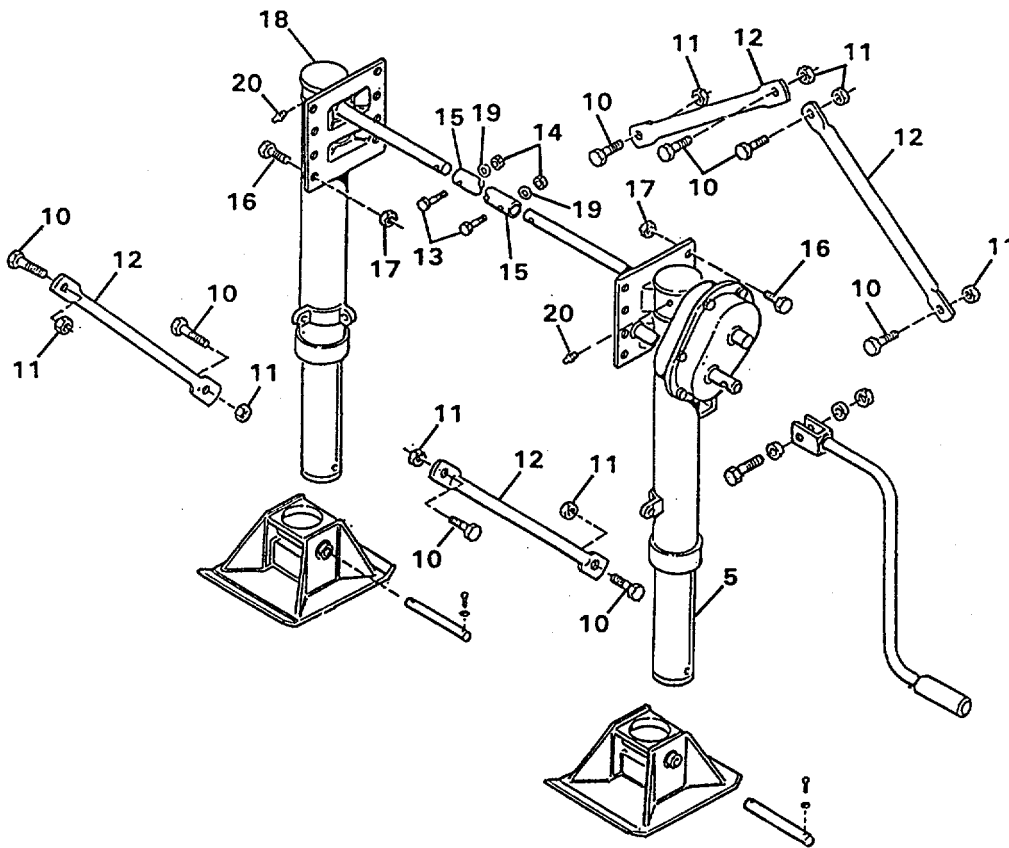
Ref Conditions

2-6 Semitrailer coupled to towing vehicle.
Wheels chocked.

4-40. LANDING GEAR (cont)a. Landing Gear Removal.**CAUTION**

If semitrailer is not coupled to towing vehicle, place blocking under semitrailer to support it while working on landing gear.

- (1) Lower landing legs so that legs touch ground.



Landing Leg Assembly

- (2) Remove nuts (14), lockwashers (19) and screws (13) to free center shaft (15).
- (3) Loosen lock nuts (11) attaching braces (12) at bottom of semitrailer. Do not remove nuts at this time.
- (4) Remove lock nuts (11) and screws (10) securing braces (12) to landing gear and disengage braces (12) from landing legs (5 and 18).

4-40. LANDING GEAR (cont)

a. Landing Gear Removal (cont).

- (5) Have personnel support landing leg to prevent leg from falling. Remove eight lock nuts (17) and screws (16). Carefully move right landing leg (5) away from semitrailer. Lower landing leg on to suitable blocking.
- (6) Remove center shaft (15) from landing legs. Remove remaining eight lock nuts (17) and screws (16) and carefully remove left landing leg (18).
- (7) Refer to para. 4-39 and remove feet (4) and crank (9) from legs, if necessary.

WARNING

Wear protective goggles when using the cleaning solvent. Avoid contact with the eyes. If contact occurs, flush eyes with cold water for 5 minutes and seek immediate medical attention. Dry cleaning solvent (PD-680) is both toxic and flammable. Avoid prolonged breathing of vapors. Avoid skin contact. Use only in a well-ventilated area. Keep away from open flame. Flash point of solvent is 138°F (59°C).

- (8) Remove rust and dirt with brush and cleaning solvent (PD-680).

b. Landing Gear Installation.

- (1) Refer to para. 4-39 and install feet (4) and crank (9) on landing legs.
- (2) Carefully lift left landing leg (18) into position beneath semitrailer. Secure leg to bracket on trailer with eight screws (16) and lock nuts (17).
- (3) Slide center shaft (15) on shaft of left leg.
- (4) Carefully lift right landing leg (5) into position beneath semitrailer. Slide shaft of right leg into center shaft (15). Secure leg to bracket on semitrailer with eight screws (16) and lock nuts (17).
- (5) Align holes in center shaft with holes in landing leg shafts. Secure shaft in position with screws (13), lockwashers (19) and nuts (14).
- (6) Move four brackets (12) in line with brackets on landing legs. Secure legs with screws (10) and lock nuts (11). Tighten nuts securing brackets to semitrailer securely.

Section IX. MAINTENANCE OF BODY

Paragraph Number	Title	Page Number
4-41	TOOL BOX	4-83
4-42	MANHOLE COVERS AND GASKETS	4-84

4-41. TOOL BOX

THIS TASK COVERS:

- a. Removal
- b. Installation

INITIAL SETUP:

Tools Required:

Nomenclature:

General Mechanics
Tool Kit

Equipment Conditions:

Ref Conditions

- 4-10 Rear control box removed.
 Remote control box removed.
- 4-22 Battery cables disconnected.

WARNING

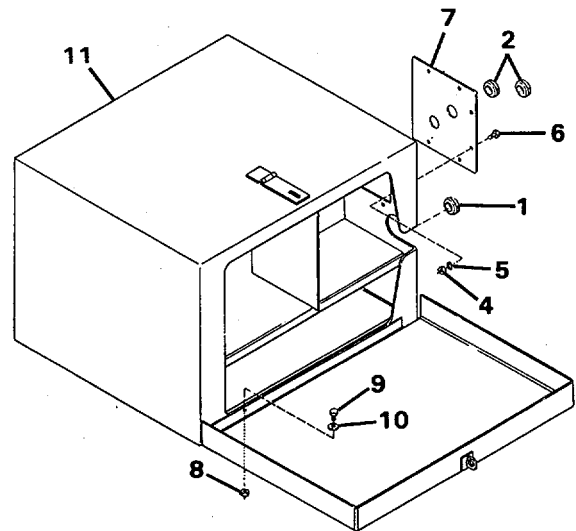
Electrical shock hazard exists. Disconnect battery cables (para. 4-22).

a. Removal.

- (1) Remove discharge hose from tool box (para. 2-19).
- (2) Remove grommets (1 and 2) from tool box (11) and plate (7).
- (3) Remove four nuts (4), lockwashers (5) and screws (6). Remove plate (7) from tool box (11).
- (4) Remove six lock nuts (8), screws (9) and flat washers (10).
- (5) Remove tool box (11).

b. Installation.

- (1) Install tool box (11) in position on semitrailer.
- (2) Secure tool box (11) with six flat washers (10), screws (9) and lock nuts (8).
- (3) Install plate (7) on side of tool box (4). Secure plate with screws (6), lockwashers (5) and nuts (4).
- (4) Install grommets (2) in openings in plate (7). Install grommet (1) in slot in tool box (11).
- (5) Install discharge hose in tool box.



Removing and Installing Tool Box.

4-42. MANHOLE COVERS AND GASKETS

THIS TASK COVERS:

- a. Removal
- b. Installation

INITIAL SETUP:

Tools Required:

Nomenclature:

General Mechanics
Tool Kit

Personnel Required: 2

Equipment Conditions:

Ref Conditions

2-18 Water tank drained

a. Removal.

(1) Rear Manhole Cover.

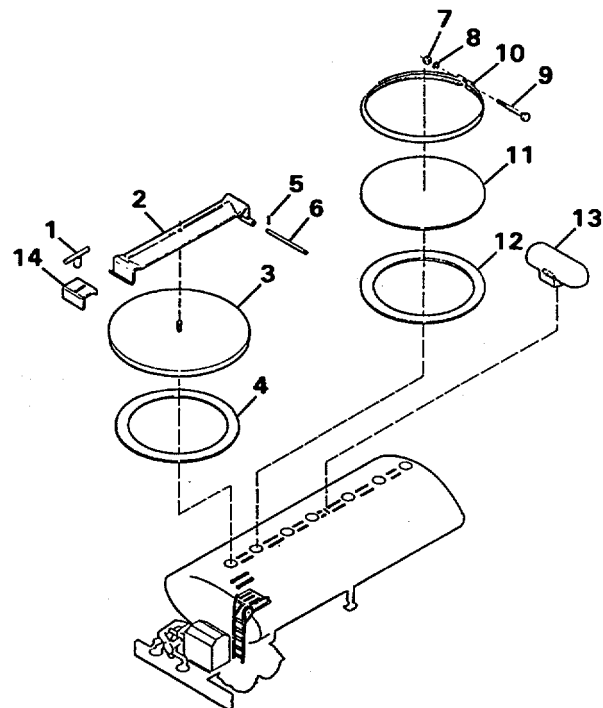
- (a) Remove handwheel (1) and clamp (14). Lift strong back (2) and remove lid (3).
- (b) Remove and discard gasket (4).
- (c) If necessary, remove cotter pin (5) and hinge pin (6). Remove strong back (2).

(2) Forward Manhole Covers.

- (a) Remove nut (7), washer (8) and screw (9). Remove clamp (10).
- (b) Remove cover (11). Remove and discard gasket (12).

(3) Tank Vent.

- (a) Remove tank vent (13) from top of tank.



Removing and Installing Manhole Covers

4-42. MANHOLE COVERS AND GASKETS (cont)

b. Installation.

(1) Forward Manhole Covers

- (a) Install new gasket (12) and cover (11).
- (b) Position clamp (10) around cover (11) and install screw (9), washer (8) and nut (7).
- (c) Tighten screw (9) securely.

(2) Rear Manhole Covers.

- (a) If necessary, install strong back (2). Install hinge pin (6) and secure with cotter pin (5).
- (b) Install new gasket (4) and install lid (3).
- (c) Lower strong back (2) into position and install handwheel (1) and clamp (14).
- (d) Lubricate hinge in accordance with Lubrication Chart (para. 3-2).

(3) Tank Vent.

- (a) Install vent (13) in threaded hole in top of tank.

Section X. MAINTENANCE OF BODY AND CHASSIS ACCESSORIES

Paragraph Number	Title	Page Number
4-43	FOOT VALVE	4-86
4-44	REFLECTORS	4-87
4-45	DATA PLATES.....	4-88

4-43. FOOT VALVE

THIS TASK COVERS:

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

INITIAL SETUP:

Tools Required:

Nomenclature:

General Mechanics
Tool Kit

Equipment/Materials Required:

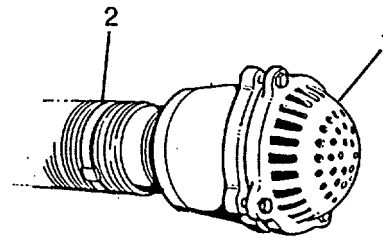
Cleaning solvent (Item 13, Appendix E)
Gloves, rubber (Item 7, Appendix E)
Goggles, protective (Item 9, Appendix E)
Rags (Item 6, Appendix E)
Wire brush (Item 4, Appendix E)

a. Removal.

- (1) Unscrew foot valve (1) counter-clockwise from suction hose (2).

b. Disassembly.

- (1) Remove four nuts (1) from screws (2).
- (2) Remove four screws (2) from foot valve.
- (3) Separate foot valve into four parts: strainer (4), spacer (5), valve assembly (6) and valve body (7).
- (4) Remove nut (8), leather washer (9) and screw (10) from center holes in discs (11 and 12) and leather valve flapper (13). Separate valve flapper (13) from discs (11 and 12).



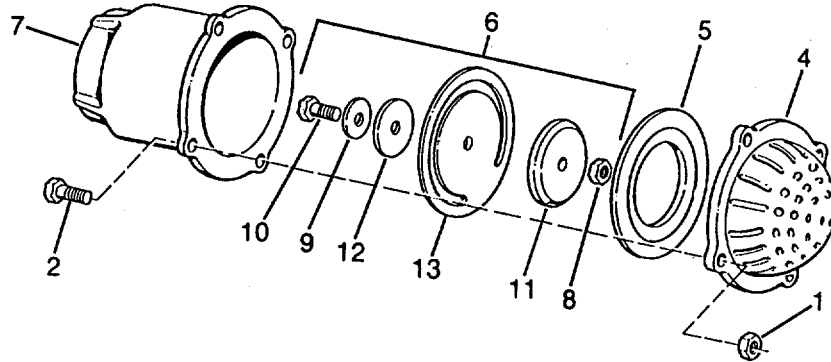
Removing and Installing Foot Valve

WARNING

Wear protective goggles when using the cleaning solvent. Avoid contact with the eyes. If contact occurs, flush eyes with cold water for 5 minutes and seek immediate medical attention. Dry cleaning solvent (PD-680) is both toxic and flammable. Avoid prolonged breathing of vapors. Avoid skin contact. Use only in a well-ventilated area. Keep away from open flame. Flash point of solvent is 138°F (59°C).

- (5) Clean metal parts with cleaning solvent (PD-680) and wire brush.

4-43. FOOT VALVE (cont)



Disassembly and Assembly of Foot Valve

c. Assembly.

- (1) Install discs (11 and 12) on each side of leather valve flapper (13). Secure with screw (10), leather washer (9) and nut (8) to form valve assembly (6).
- (2) Install valve assembly (6) on spacer (5) so that disc (11) fits inside hole of spacer (5).
- (3) Install spacer and valve assembly on valve body (7) so that assembly (6) rests on valve body flange and is held in place by spacer (5).
- (4) Install strainer (4) on spacer, valve assembly (6) and housing (7). Secure with four screws (2) and nuts (1).

d. Installation.

Screw foot valve onto suction hose as tightly as possible by hand.

4-44. REFLECTORS

THIS TASK COVERS:

- a. Removal
- b. Installation

INITIAL SETUP:

Tools Required:

Nomenclature:

General Mechanics
Tool Kit

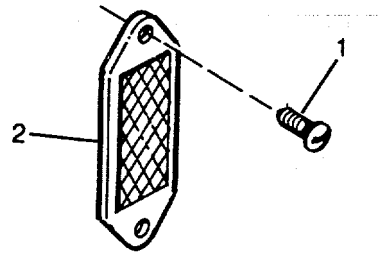
4-44. REFLECTORS (cont)

a. Removal.

Remove two screws (1) and remove reflector (2).

b. Installation.

Put reflector (2) in position and secure reflector with two screws (1)



Removing and Installing Reflectors

4-45. DATA PLATES

THIS TASK COVERS:

- a. Removal
- b. Installation

INITIAL SETUP:

Tools Required:

Nomenclature:

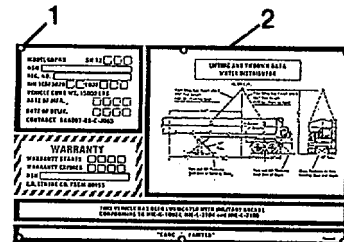
General Mechanics
Tool Kit

a. Removal.

Remove four rivets (1) by drilling rivets out from data plate (2) and remove data plate.

b. Installation.

Put data plate (2) in position and secure data plate with four rivets (1).



Removing and Installing Data Plates

Section XI. MAINTENANCE OF ENGINE ASSEMBLY

Paragraph Number	Title	Page Number
4-46	SERVICE ENGINE.....	4-89
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4-46. SERVICE ENGINE

THIS TASK COVERS:

- | | |
|---|---|
| <ul style="list-style-type: none"> a. Change Oil b. Check Oil Level c. Drain Antifreeze d. Clean Cooling System | <ul style="list-style-type: none"> e. Flush Engine f. Flush Radiator g. Fill Cooling system h. Check Wiring |
|---|---|

INITIAL SETUP:

Tools Required:

Nomenclature:

General Mechanics
Tool Kit

Equipment/Materials Required:

Oil (Item 10, Appendix E)
Antifreeze (Item 1, Appendix E)
Rags (Item 6, Appendix E)
Radiator Cleaning Solution (Item 19, Appendix E)

Equipment Conditions:

<u>Ref</u>	<u>Conditions</u>
2-22	Engine shut off

WARNING

A hot engine can cause severe burns.

4-46. SERVICE ENGINE (cont)

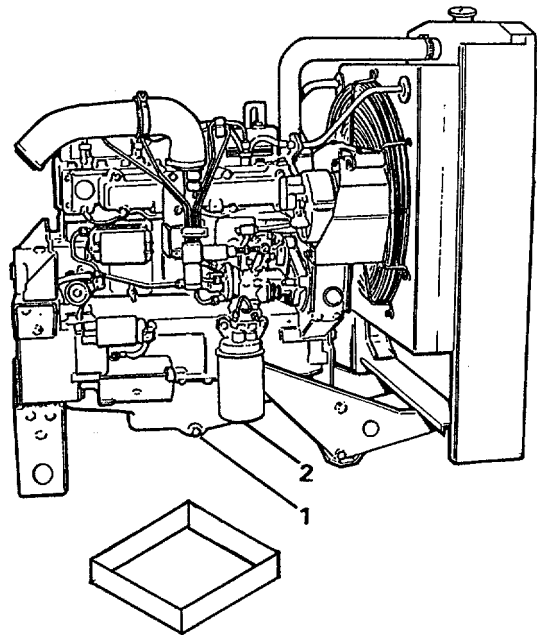
a. Change oil.

- (1) Place drain pan under drain plug.
- (2) Remove drain plug (1). Discard or recycle drained oil.
- (3) Install drain plug (1) and tighten securely. Do not overtighten.
- (4) Remove oil filter element (2) and install new element.
- (5) Fill crankcase with correct type of oil (see para 3-2).

CAUTION

Do not start pump engine unless distributor pump is primed. Refer to para. 4-16 to prime pump.

- (6) Run engine. Check for oil leaks around filter element and drain plug.
- (7) Stop engine so that oil can drain down. Check oil level: oil level should be at FULL mark.



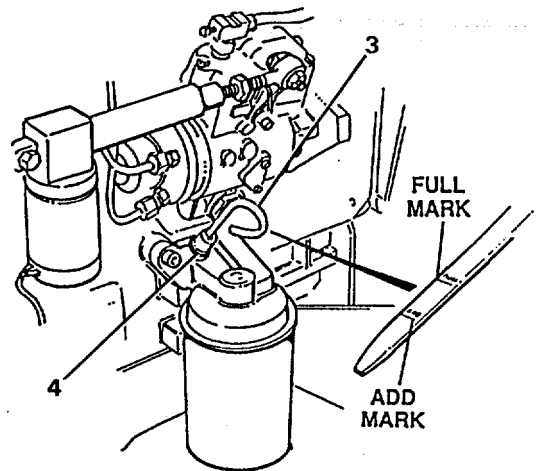
Changing Engine Oil

b. Check Oil Level.

- (1) Remove dipstick (3) from dipstick tube (4) and wipe oil from dipstick.
- (2) Insert dipstick and remove again.
- (3) Oil on dipstick should read between ADD and FULL marks. If oil is at or below ADD mark, add oil until dipstick reads FULL.
- (4) Insert dipstick back into engine.

c. Drain antifreeze.

- (1) Make sure engine is level to ensure complete draining.



Checking Oil Level

WARNING

Pressurized coolants have higher boiling point than water. **NEVER** open radiator filler cap when coolant temperature is above 212°F (100°C) or while engine is running.

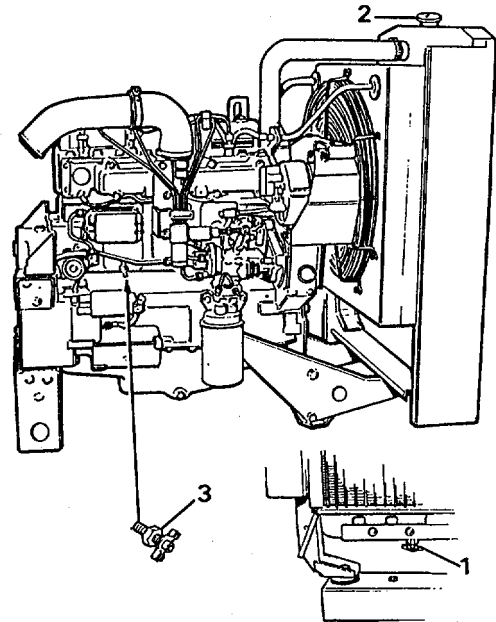
4-46. SERVICE ENGINE (cont)

c. Drain antifreeze (cont).

- (2) Position drain pan under radiator drain plug (1).
- (3) Remove radiator filler cap (2).
- (4) Open radiator drain plug (1). Drain all antifreeze from radiator. Close drain plug (1).
- (5) Position drain pan under engine block drain plug (3).
- (6) Open engine drain plug (3). Drain antifreeze from engine block. Close engine drain plug (3).

d. Clean Cooling System.

- (1) Drain cooling system as described above.
- (2) Fill with clean water and radiator cleaning solution. Follow instructions provided on solution container.



Draining Antifreeze

WARNING

Improper use of cleaning solution can cause burns or other serious injury. Read all warning labels carefully before using.

CAUTION

Do not start pump engine unless distributor pump is primed. Refer to para. 2-16 to prime pump.

- (3) Run engine to clean system.
- (4) When cleaning is complete, drain cleaning solution. After engine has cooled, flush system as described below.

CAUTION

NEVER pour cold water in hot engine. This can cause head or cylinder block to crack. **NEVER** operate engine without coolant under any circumstances.

e. Flushing Engine.

- (1) Drain cooling system (refer to para. c. above).
- (2) Remove thermostat (refer to para. 4-46A) thermostat cover (2).

4-46. SERVICE ENGINE (cont)

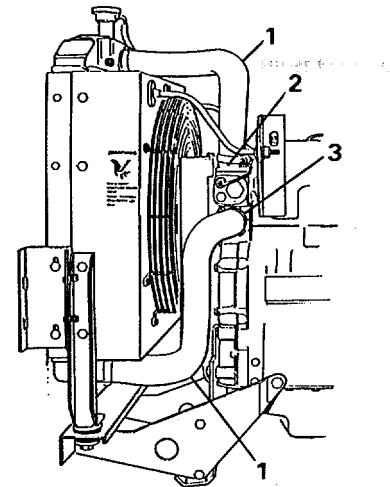
e. Flushing Engine (cont).

- (3) Disconnect hoses (1) at cover (2).
- (4) Close all drain plugs.

CAUTION

Do not exceed 50 kPa (7 psi) of air pressure. Excessive air pressure will damage cooling system.

- (5) Attach flushing gun to water outlet (2). Restrict engine coolant inlet (3) until system fills with water. Then apply 50 kPa (7 psi) air pressure gradually. Repeat process until water from cylinder block flow is clean.



Flushing Engine

f. Flushing Radiator.

- (1) Drain cooling system (Refer to para. c. above) and disconnect radiator hoses (1) at thermostat cover (2).
- (2) Secure flushing gun in lower radiator hose with hose clamp (3).
- (3) Fill radiator (4) with water. Be sure filler cap (5) is on tight. Direct upper hose away from engine to minimize collection of water around engine.

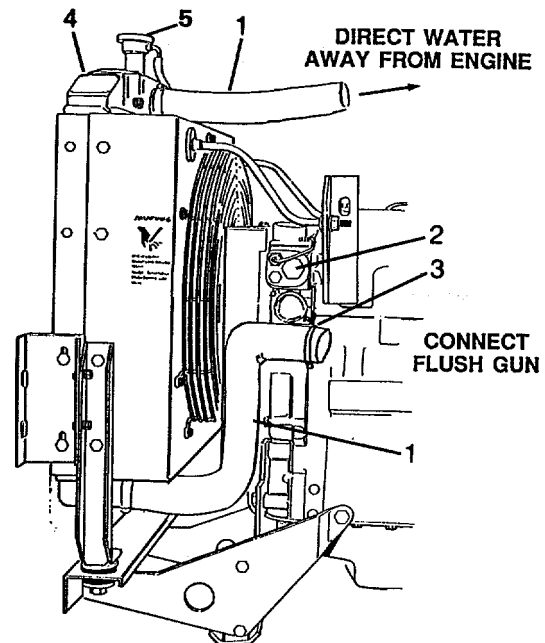
CAUTION

Do not exceed 50 kPa (7 psi) of air pressure. Excessive air pressure will damage cooling system.

- (4) Gradually apply 50 kPa (7 psi) air pressure.
- (5) Shut off air pressure. Fill radiator with water again and apply air pressure. Repeat until water comes out clean.

g. Fill Cooling System.

- (1) Close all drains. Install thermostat (para. 4-46A).
- (2) Loosen one water pump plug (2).



Flushing Radiator

4-46. SERVICE ENGINE (cont)g. Fill Cooling System (cont).

- (3) Fill system with clean antifreeze and water solution (50/50) until level is about one inch below filler neck.
- (4) When coolant appears at water pump plug (2), torque plug to 150 lb-in (17 Nm) (wet) and finish filling.

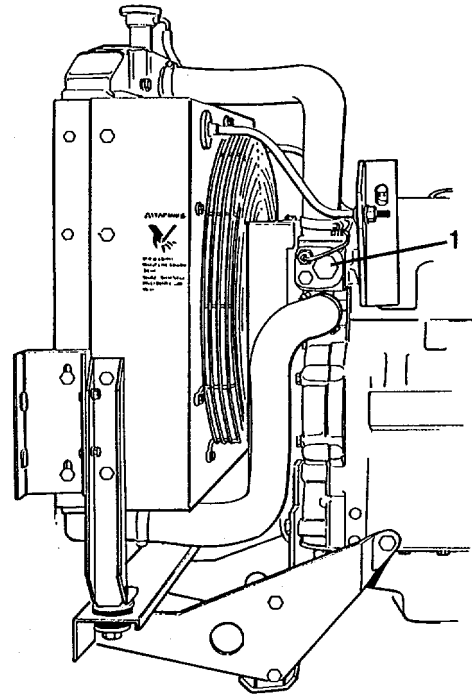
NOTE

In extremely low temperatures, -31°C (-25°F) or lower, increase percentage of antifreeze.

CAUTION

Do not start pump engine unless distributor pump is primed. Refer to para. 2-16 to prime pump.

- (5) Run engine for 10 minutes or until thermostat opens. As coolant circulates, air trapped in cylinder head will be released.



Filling Cooling System

WARNING

Contact with hot coolant can cause serious burns. Allow cooling system to cool before releasing pressure.

- (6) Fill with additional coolant as needed. Maintain level so it is visible at the bottom of the filler neck.
 - (7) Shut down unit and install filler cap.
- h. Check Wiring.
- (1) Check engine electrical wiring for breaks, damaged insulation and loose connections. Refer to para. 4-21 for repair of electrical wiring.

4-46A. THERMOSTAT AND COOLING LINES

THIS TASK COVERS:

- a. Removal
- b. Testing
- c. Installation
- d. Cooling Lines

INITIAL SETUP:

Tools Required:

Nomenclature:

General Mechanics
Tool Kit

Equipment/Materials Required:

Antifreeze (Item 1, Appendix E)

Equipment Conditions:

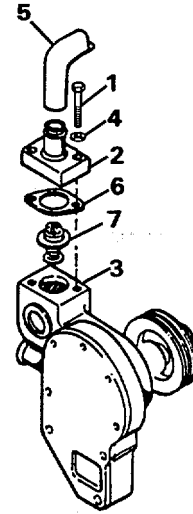
<u>Ref.</u>	<u>Conditions</u>
2-14	Engine shut off
4-56	Engine housing removed

a. Removal of Thermostat.

- (1) Drain cooling system (para. 4-46 above).
- (2) Remove two screws (1) and washers (4) securing thermostat cover (2) to water pump (3).
- (3) Lift thermostat cover with hose (5) attached and place to one side.
- (4) Remove gasket (6) and thermostat (7) from water pump.

b. Testing Thermostat.

- (1) Suspend thermostat in a pan of clean water. Thermostat must be immersed but not touching bottom of pan.

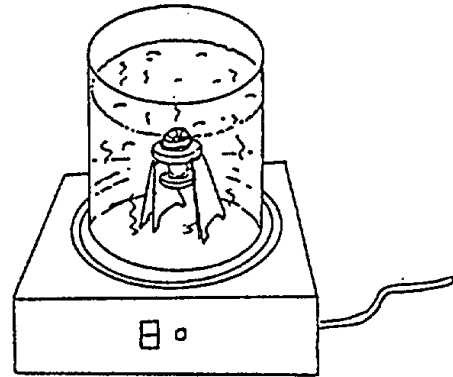


Removing and installing Thermostat

4-46A. THERMOSTAT AND COOLING LINES (cont)

b. Testing Thermostat (cont).

- (2) Heat water and stir gradually. Check water temperature with a reliable thermostat.
- (3) Observe thermostat as water temperature rises. Thermostat should begin to open when temperature is within $\pm 3^{\circ}\text{C}$ (5°F) of the nominal temperature (82°C , 180°F). Thermostat should be fully open at 12°C (22°F) above the nominal temperature.
- (4) Thermostat is not adjustable and must be replaced if it does not operate within the above limits.



Testing Thermostat

c. Installation of Thermostat.

- (1) Clean all old gasket material from cover (2) and mounting surface on water pump (3).
- (2) Install thermostat (7) in water pump (3) so that bypass plate is positioned above bypass opening.
- (3) Install new cover gasket (6) on water pump. Install cover (2), with attached hose (5), on water pump.
- (4) Secure cover with two screws (1) and washers (4). Tighten screws to a torque of 17 lb-ft (23 Nm) (wet).
- (5) Fill cooling system. Refer to para. 4-46. g.

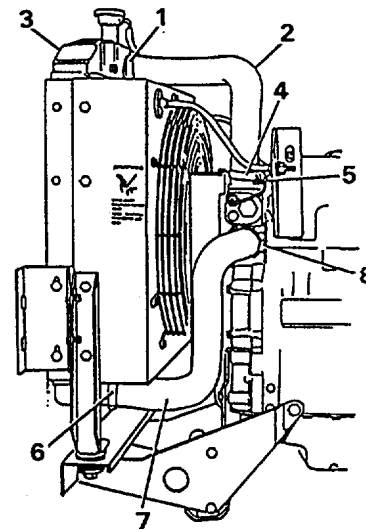
d. Cooling Lines.

(1) Removal.

- (a) Loosen clamps (1) and (4). Remove hose (2) from top of radiator (3) and from top of water pump (5).
- (b) Loosen clamps (6) and (8). Remove hose (7) from bottom of radiator (3) and from bottom of water pump (5).

(2) Installation.

- (a) Install hose (7) to bottom of water pump (5) and secure with clamp (8).
- (b) Install hose (7) to bottom of radiator (3) and secure with clamp (6).



Removing and installing Cooling Lines

4-46A. THERMOSTAT AND COOLING LINES (cont)

- d. Cooling Lines (cont).
 - (2) Installation (cont).
 - (c) Install hose (2) to top of water pump (5) and secure with clamp (4).
 - (d) Install hose (2) at top of radiator (3) and secure with clamp (1)
 - (e) Fill radiator with proper antifreeze. Refer to 4-46, Service Engine, for procedure.

4-46B. ENGINE SAFETY CONTROLS

THIS TASK COVERS:

- a. Water Temperature Switch
- b. Oil Pressure Switch

INITIAL SETUP:

Tools Required:

Equipment/Materials Required:

- Antifreeze (Item 1, Appendix E)
- Oil (Item 10, Appendix E)
- Teflon Tape (Item 15, Appendix E)

Equipment Conditions:

- 2-22 Engine shut off
- 4-22 Battery cables disconnected

WARNING

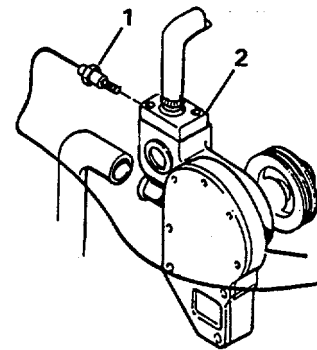
A hot engine can cause severe burns.

- a. Water Temperature Switch.

WARNING

Electrical shock hazard exists. Disconnect battery cables (para. 4-22).

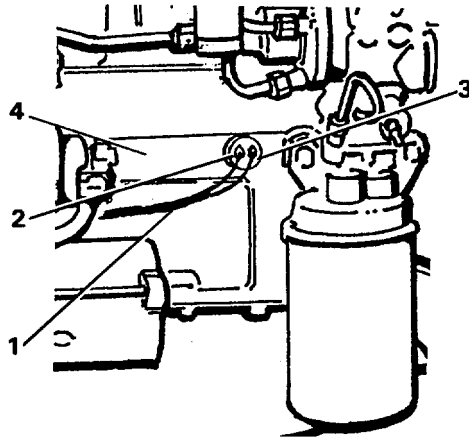
- (1) Removal.
 - (a) Drain cooling system (para. 4-46. c.).
 - (
 - b) Working on left side of engine disconnect wire from water temperature switch (1).
 - (c) Remove water temperature switch (1) from thermostat housing (2). Tape opening.



Water Temperature Switch

4-46B. ENGINE SAFETY CONTROLS (cont)a. Water Temperature Switch (cont).(2) Installation.

- (a) Remove tape and install water temperature switch (1) in thermostat housing (2).
 - (b) Connect wire to water temperature switch (1).
 - (c) Fill cooling system (para. 4-46. c.).
- b. Oil Pressure Switch.



Removing and Installing
Oil Pressure Switch

(1) Removal.

- (a) Drain crank case (para. 4-46. a.).
- (b) Tag and remove wires (1) from pressure switch terminals (2).
- (c) Remove oil pressure switch (3) from crankcase (4). Tape opening.

4-46B. ENGINE SAFETY CONTROLS (cont)

- b. Oil Pressure Switch (cont).
 - (2) Installation.
 - (a) Remove tape and install oil pressure switch (3) in crankcase (4).
 - (b) Connect wires (1) to terminals (2) on pressure switch (3).
 - (c) Fill engine crankcase (para. 4-46. a.).
 - (d) Connect battery cables (para. 4-22).

4-46C. ENGINE STARTING DEVICES

THIS TASK COVERS:

- a. Glow Plugs
- b. Crankcase Heater

INITIAL SETUP:

Tools Required:

Nomenclature:

General Mechanics
Tool Kit

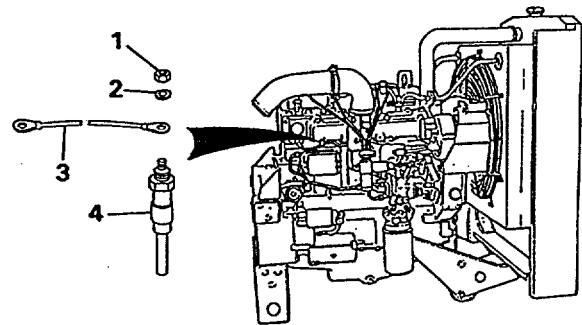
Equipment/Materials Required

Sealant (Item 11, Appendix E)

Equipment Conditions:

<u>Ref</u>	<u>Conditions</u>
4-22	Battery cables disconnected
4-56	Engine door removed

- a. Glow Plugs.
 - (1) Removal.
 - (a) Remove nut (1) and washer (2) on glow plug (4) at No. 4 cylinder rear of engine.
 - (b) Disconnect harness wire and wire (3) from glow plug. Remove nuts (1) and washers (2) and disconnect three wires (3) from between remaining glow plugs.
 - (c) Use a wrench and remove four glow plugs (4) from engine.



Glow Plugs

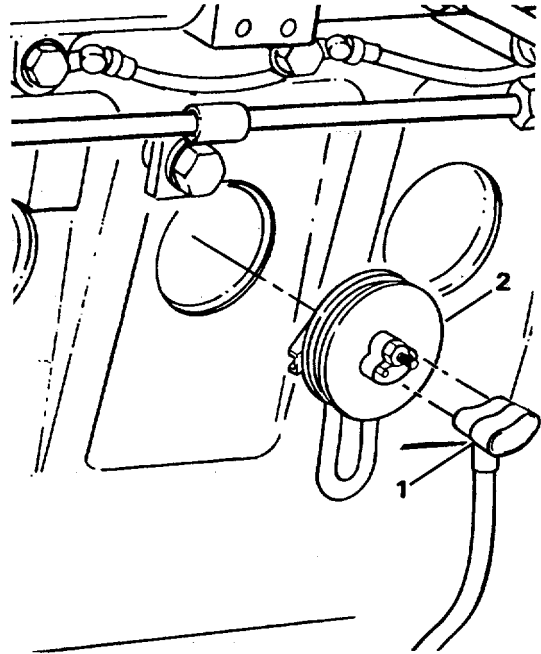
4-46C. ENGINE STARTING DEVICES (cont)a. Glow Plugs (cont).(2) Installation.

- (a) Install four glow plugs (4) in ports in engine. Tighten glow plugs to a torque of 14 lb-ft (19 Nm) (wet).
- (b) Connect three wires (3) to tops of glow plugs (4). On glow plug at No. 4 cylinder (rear of engine) connect harness wire to tops of plug.
- (c) Install four washers (2) and nuts (1) to secure wires to top of plugs.

b. Crankcase Heater.

(1) Removal.

- (a) Drain engine cooling system and engine block. Refer to para. 4-46.
- (b) Refer to para. 4-54 and remove throttle control actuator from the engine.
- (c) Disconnect wire (1) if it is connected to crankcase heater (2).
- (d) Use a sharp bladed instrument such as a screwdriver and pry crankcase heater (2) from engine crankcase. Discard heater.



Crankcase Heater

(2) Installation.

- (a) Clean surface of port in side of engine crankcase and wipe dry.
- (b) Apply a light bead of sealant to outside diameter of new crankcase heater (2) and to the inside diameter of the plug installation port.
- (c) Carefully seat new crankcase heater (2) in port in bore. Use a rubber or leather hammer to tap around circumference of heater. Continue driving heater into bore until it is fully seated.
- (d) Refer to para. 4-54 and install throttle control actuator on engine.
- (e) Refer to para. 4-46 and fill engine cooling system.
- (f) Refer to para. 4-22 and connect cables to battery.

4-47. VALVE ADJUSTMENT

THIS TASK COVERS:

Adjustment

INITIAL SETUP:

Tools Required:

Nomenclature:

General Mechanics
Tool Kit

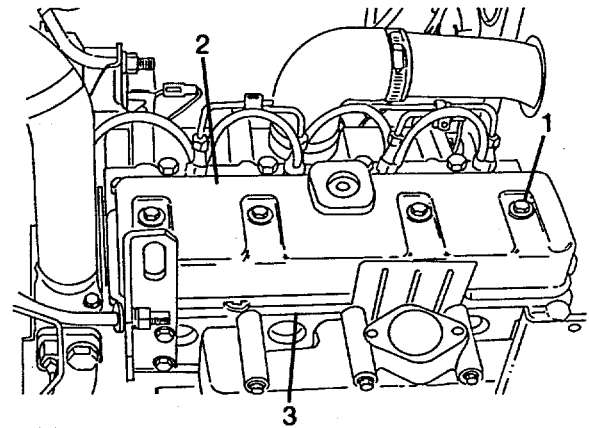
Equipment Condition:

<u>Ref</u>	<u>Conditions</u>
4-22	Battery disconnected
4-56	Engine housing removed

NOTE

Allow engine to cool before adjusting valves.

- a. Remove cap nuts and gaskets (1), rocker arm cover (2) and rocker arm cover gasket (3).
- b. Remove cap plug (4) from flywheel housing to expose timing pointer (5) and timing indicator (6).
- c. Hold START switch on remote control box in the start position momentarily to "jog" engine until number one (front) cylinder is on the compression stroke and the 0° TDC mark on the flywheel lines up with the timing indicator.



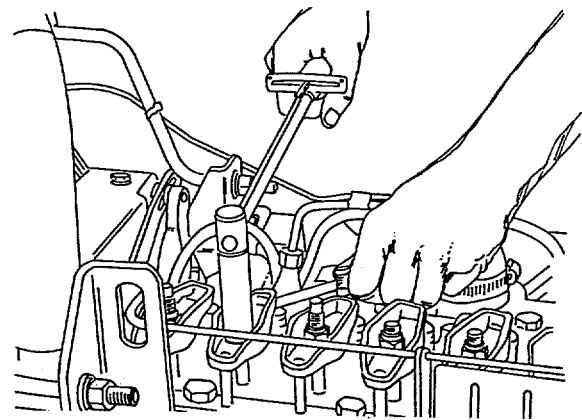
Removing and Installing Rocker Arm Cover

NOTE

With the number one piston at TDC (top dead center), the crankshaft can be turned 90° in either direction without the valves on number one cylinder opening. If the valves open during this test, the crankshaft must be turned one complete revolution (360°) counterclockwise as viewed from the flywheel.

CAUTION

Pulling down rocker arm locknuts tight will cause valves to hit pistons when making valve clearance adjustments, resulting in possible damage to components.



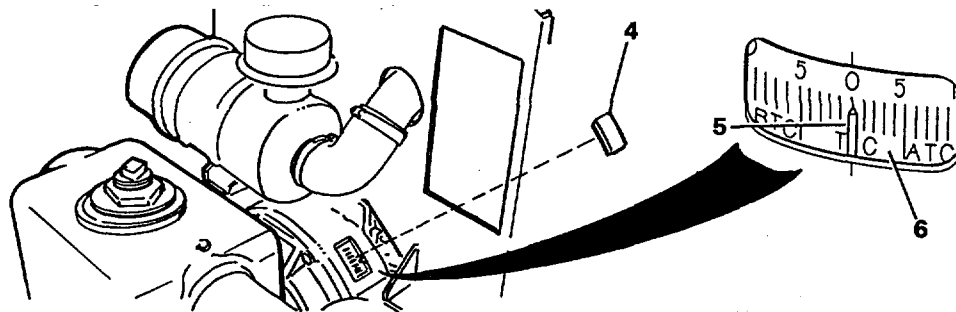
Adjusting Valve Lash

4-47. VALVE ADJUSTMENT (cont)

NOTE

Replace any rocker arm locknut that cannot hold a minimum wet torque of 30 lb-in (3.4 Nm) (wet). New, well-oiled rocker arm locknuts should have a minimum initial torque of 55 lb-in (6.2 Nm) (wet).

- d. With piston of number one cylinder at TDC, check and adjust the intake and exhaust valves marked with an "X" in Valve Lash Adjustment Table #1.
- e. To check valve lash, insert the correct size feeler gauge between the rocker arm and the valve stem. If the feeler gauge cannot be inserted, loosen rocker arm locknut slightly. Intake Valve Lash: 0.008 in. (0.2 mm) (cold). Exhaust Valve Lash: 0.012 in. (0.3 mm) (cold).
- f. Tighten rocker arm locknut until feeler gauge can be inserted and withdrawn with a slight drag.
- g. Turn engine 360° (one complete revolution) in a clockwise direction (as viewed from front of engine) and adjust the intake and exhaust valves marked with an "X" in Valve Lash Adjustment Table #2.
- h. After valve adjustment is complete, install rocker arm cover (2) with new gasket (3). Install cap nuts and gaskets (1) and torque to 13 lb-ft (18 Nm) (wet).
- i. Install cap plug (4) in flywheel housing.
- j. Install engine housing (para. 4-56).



Timing Marker on Flywheel

TABLE 1 VALVE TAPPET ADJUSTMENT		
Valve	Cylinder Number*	Four Cylinder
Intake	1	X
Exhaust	1	X
Intake	2	
Exhaust	2	X
Intake	3	X
Exhaust	3	
Intake	4	
Exhaust	4	

* - The cylinders are numbered from front to rear.

TABLE 2 VALVE TAPPET ADJUSTMENT		
Valve	Cylinder Number*	Four Cylinder
Intake	1	
Exhaust	1	
Intake	2	X
Exhaust	2	
Intake	3	
Exhaust	3	X
Intake	4	X
Exhaust	4	X

* - The cylinders are numbered from front to rear.

4-48. OIL FILTER

THIS TASK COVERS:

- a. Removal
- b. Installation

Equipment Conditions:

<u>Ref</u>	<u>Conditions</u>
4-46	Engine crankcase drained and drain plug installed

INITIAL SETUP:

Tools Required:

Nomenclature:

General Mechanical
Tool Kit

Equipment/Materials Required:

Oil (Item 10, Appendix E)
Rags (Item 6, Appendix E)

a. Removal.

- (1) Place drain pan under oil filter element (1).
- (2) Remove and discard oil filter element (1).
- (3) Clean off filter mounting surface (2) thoroughly.

b. Installation.

- (1) Make certain that gasket (3) is in filter element (1).
- (2) Apply thin film of clean oil to gasket (3).
- (3) Install filter element (1), spinning it down by hand until gasket just contacts mounting surface. Hand-tighten an additional 1/4 to 3/4 turn. Do not overtighten.
- (4) Fill crankcase with correct type of oil (see para. 3-2).

CAUTION

Do not start pump engine unless distributor pump is primed. Refer to para. 2-16 to prime pump.

- (5) Run engine. Check for oil leaks around filter element and drain plug.
- (6) Stop engine so that oil can drain down. Check oil level; oil level should be at FULL mark.

4-49. AIR CLEANERTHIS TASK COVERS:

- a. Removal
- b. Installation

INITIAL SETUP:**Tools Required:**Nomenclature:

General Mechanics
Tool Kit

Equipment/Materials Required:

Rags (Item 6, Appendix E)

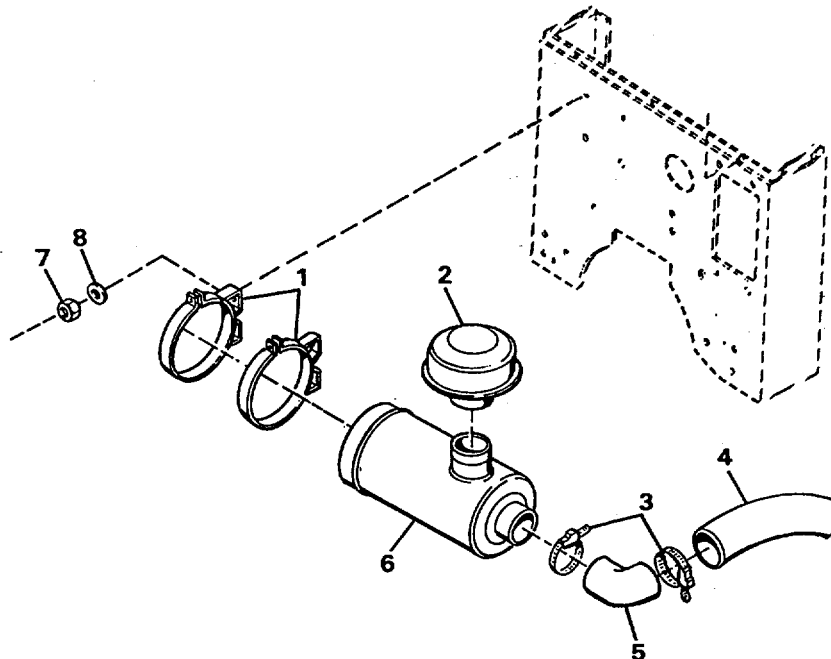
Equipment Conditions:

Ref Conditions

2-22 Engine shut off

a Removal.

- (1) Loosen clamp (3) and remove hose (5) from air cleaner (6).
- (2) Remove two nuts (7) and washers (8) mounting air cleaner (6) to engine. Remove air cleaner (6).
- (3) Remove cap (2) from air cleaner.
- (4) Loosen clamps (1) and remove clamps from air cleaner (6).
- (5) Clean housing (6) and cap (2) with rags to remove dirt.



Removing and Installing Air Cleaner

4-49. AIR CLEANER (cont)

b. Installation.

- (1) Install cap (2) on air cleaner.
- (2) Secure air cleaner (6) in clamps (1). Tighten clamps.
- (3) Install air cleaner (6) on engine housing and secure with two nuts (7) and washers (8).
- (4) Install hose (5) on air cleaner (6). Secure with clamp (3).

4-49A. AIR CLEANER INDICATOR

THIS TASK COVERS:

- a. Removal
- b. Installation

INITIAL SETUP:

Tools Required:

Nomenclature:

General Mechanics
Tool Kit

Equipment Conditions

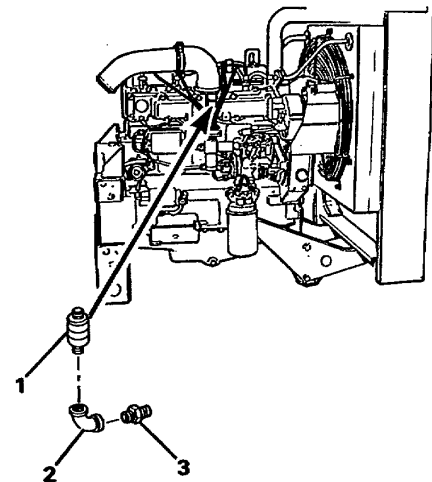
<u>Ref</u>	<u>Conditions</u>
4-56	Engine door removed.

a. Removal.

- (1) Remove air filter indicator (1) from elbow (2).
- (2) Remove elbow (2) and pipe nipple (3) from intake manifold.

b. Installation.

- (1) Install pipe nipple (3) in intake manifold. Connect elbow (2) to pipe nipple with elbow pointing upwards.
- (2) Install air cleaner indicator (1) in elbow (2).



Air Cleaner Indicator

4-50. FUEL TANK

THIS TASK COVERS:

- a. Removal
- b. Installation

Equipment/Materials Required:

Tags (Item 14, Appendix E)

INITIAL SETUP:

Tools Required:

Equipment Conditions:

Nomenclature:

<u>Ref</u>	<u>Conditions</u>
------------	-------------------

General Mechanics
Tool Kit

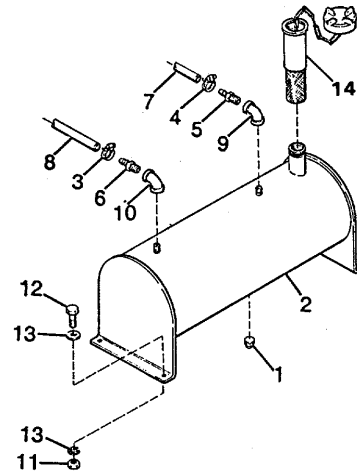
2-22	Engine shut off.
4-56	Engine housing removed.

WARNING

Diesel fuel is highly combustible. To avoid injury or death, do not smoke or use open flame near fuel pump, tank and lines.

a. Removal.

- (1) Place drain pan under fuel tank drain plug (1).
- (2) Remove drain plug (1) and drain fuel from tank (2).
- (3) Install drain plug. Do not overtighten.
- (4) Loosen hose clamps (3 and 4) on suction hose (8) and return hose (7). Tag and remove hose (7) and hose (8). Do not remove elbows (9 and 10) on hose ends (5) and (6) unless fuel tank is to be discarded. Save elbows for use on new tank.
- (5) Remove nuts (11), screws (12) and washers (13) holding tank (2) to frame. Remove tank.
- (6) Remove strainer (14) and cap from tank.



b. Installation.

- (1) Install strainer (14) and cap in tank.
- (2) Install tank (2) on frame. Secure with screws (12), washers (13) and nuts (11).

Removing and Installing Fuel Tank

4-50. FUEL TANK (cont)

b. Installation (cont).

- (3) If new tank replaces old tank, install elbows (9 and 10) on hose ends (5 and 6). Do not overtighten. Install drain plug (1).
- (4) Install intake hose (7) on hose end (5), and secure with clamp (4).
- (5) Install return hose (8) on hose end (6), and secure with clamp (3).
- (6) Fill tank with proper grade of diesel fuel.
- (7) Install engine housing (para. 4-56).

4-51. FUEL FILTER AND FUEL LINES

THIS TASK COVERS:

- a. Removal
- b. Installation
- c. Fuel Filter Lines
- d. Fuel Return Lines
- e. Fuel High Pressure Lines

INITIAL SETUP:

Tools Required:

Nomenclature:

General Mechanics
Tool Kit

Equipment/Materials Required:

Rags (Item 6, Appendix E)

Equipment Conditions:

<u>Ref</u>	<u>Conditions</u>
2-14	Engine shut off
4-22	Battery cables disconnected
4-56	Engine door removed

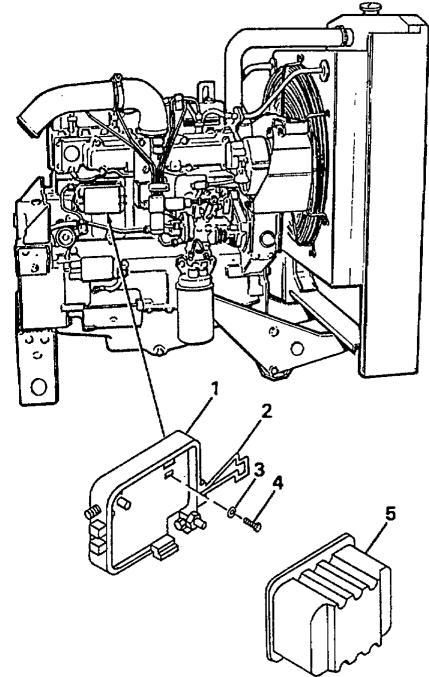
a. Removal.

- (1) Clean all dirt from filter (5) and base (1) of filter and surrounding area.
- (2) Pry fuel filter retaining clips (2) from filter.
- (3) Remove and discard old filter (5).
- (4) If filter housing (1) is damaged, remove two screws (3) and flat washers (4). Remove base. Remove retaining clips (2) from base (1).

4-51. FUEL FILTER AND FUEL LINES (cont)

b. Installation.

- (1) Install retaining clips (2) on base (1).
- (2) Install filter base (1) on engine and secure with two screws (4) and flat washers (3).
- (3) Install filter (5) on base and secure with retaining clips (2). Inlet and outlet ports are stamped on the reverse of the filter. Be sure ports are matched.
- (4) Prime fuel system (para. 4-53).



Removing and Installing Fuel Filter

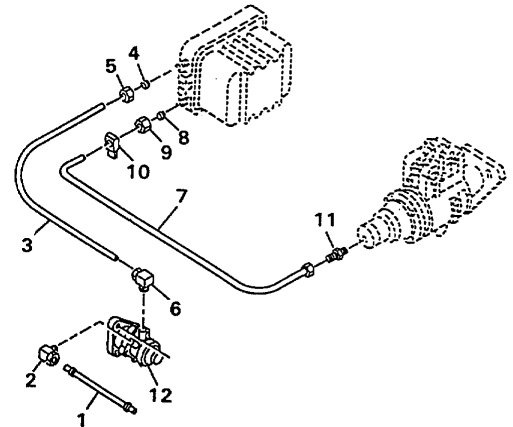
c. Fuel Filter Lines.

(1) Removal.

NOTE

Plug or cap all fuel line ports after disconnecting fuel lines. This is required to prevent dirt or foreign matter from entering fuel system.

- (a) Refer to para. 4-50 and disconnect fuel hose from tank and fuel line (1) at fuel transfer pump (12). Remove elbow (2) from fuel transfer pump. Cap or plug fuel transfer pump inlet.
- (b) Disconnect fuel line (3) from elbow (6) and from fuel filter. Remove sleeve (4) and nut (5). Remove elbow (6) from fuel transfer pump (12). Cap or plug transfer pump outlet and filter inlet.
- (c) Disconnect fuel line (7) from fuel injection pump and from fuel filter. Remove sleeve (8), nut (9) and grommet (10). Cap or plug fuel filter outlet.
- (d) Remove adapter (11) from fuel injection pump. Cap or plug injection pump inlet.



Fuel Filter and Fuel Lines

4-51. FUEL FILTER AND FUEL LINES (cont)c. Fuel Filter Lines (cont).(2) Installation.

- (a) Remove plug or cap from inlet port of fuel injection pump. Install adapter (11) in injection pump. Tighten fuel filter base. Connect line (7) to adapter (11). Loosen fuel filter base. Tighten nut on fuel line (7) to a torque of 18 lb-ft (24 Nm) (wet).
- (b) Remove plug or cap from filter outlet. Connect fuel line (7) to outlet of fuel filter with grommet (10), nut (9) and sleeve (8). Tighten nut to a torque of 18 lb-ft (24 Nm) (wet).
- (c) Remove plug or cap from fuel transfer pump outlet and fuel filter inlet. Install elbow (6) to fuel transfer pump (12). Connect fuel line (3) to elbow (6) and to fuel filter inlet port with sleeve (4) and nut (5). Tighten nut (5) and nut on elbow (6) to a torque of 18 lb-ft (24 Nm) (wet).
- (d) Remove plug from fuel transfer pump inlet. Install elbow (2) in fuel transfer pump inlet. Connect fuel hose (2) to elbow. Tighten nut on elbow to 18 lb-ft (24 Nm) (wet).
- (e) Refer to para. 4-50 and connect fuel line from fuel tank to fuel hose (1).
- (f) Prime fuel system. Refer to para. 4-52.

d. Fuel Return Lines.(1) Removal.**NOTE**

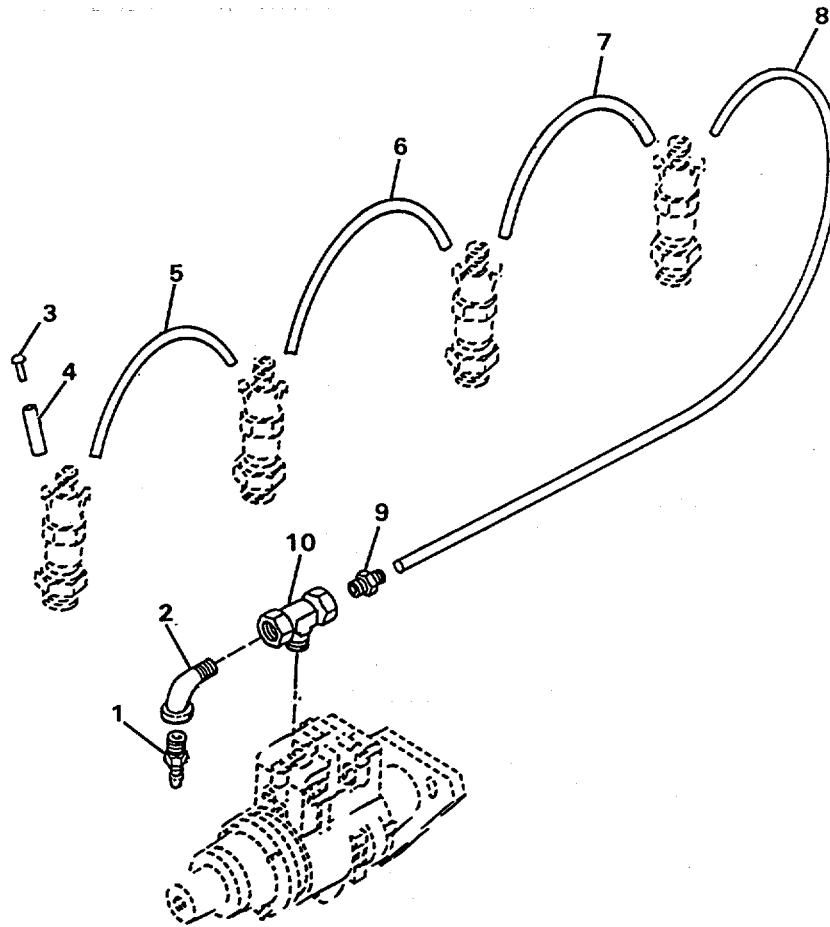
Plug or cap all fuel line ports after disconnecting fuel lines. This is required to prevent dirt or foreign matter from entering the fuel system.

- (a) Refer to para. 4-50 and disconnect fuel line to fuel tank from fuel injection pump tee (10). Remove hose end (1) and elbow (2) from tee (10).
- (b) Remove plug (3) and leak-off line (4) from No. 4 fuel injector. Remove leak-off lines (5, 6 and 7) from fuel injectors. Cap leak-off line connectors on fuel injectors.
- (c) Disconnect fuel leak-off line (8) from fuel injector and adapter (9). Cap fuel injector.
- (d) Remove adapter (9) and tee (10) from fuel injection pump. Plug inlet in injection pump.

4-51 FUEL FILTER AND FUEL LINES (cont)

d. Fuel Return Lines (cont).

(2) Installation.



Fuel Return Lines

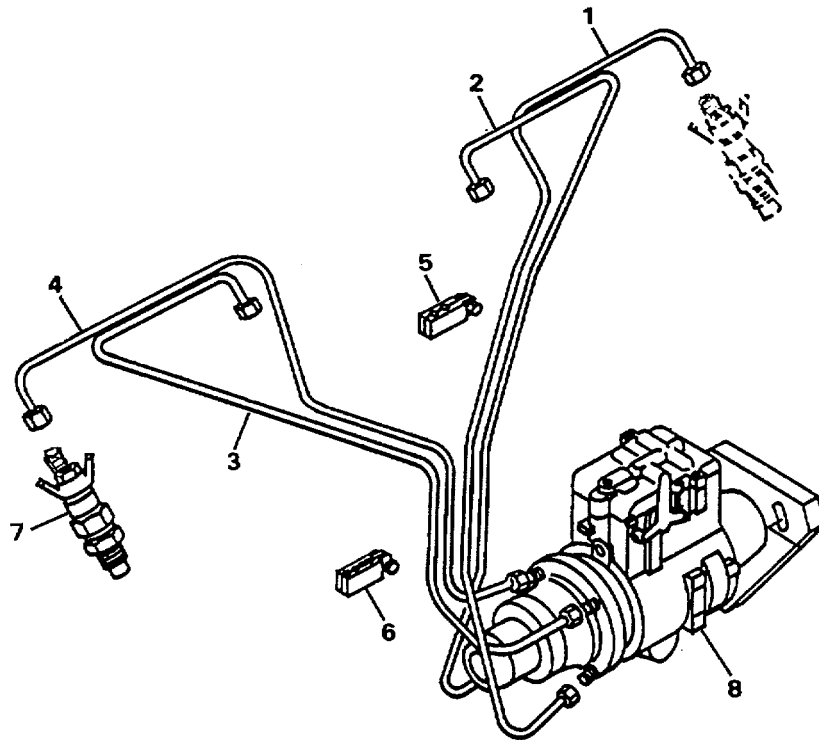
- (a) Remove plug from fuel injection pump inlet. Install tee (10) in inlet of injection pump. Install adapter (9) in tee (10).
- (b) Remove cap from No. 1 fuel injector. Connect fuel leak-off line (8) to adapter (9) and fuel injector.

4-51. FUEL FILTER AND FUEL LINES (cont)d. Fuel Return Lines (cont).(2) Installation (cont).

(c) Remove caps from fuel injector connections. Install fuel leak-off lines (5, 6 and 7) to fuel injectors. Install fuel leak-off line (4) and plug (3) on No. 4 injector.

(d) Install elbow (2) and hose end (1). Refer to para. 4-50 and connect fuel tank return hose to hose end.

(e) Prime fuel system. Refer to para. 4-52.

e. Fuel High Pressure Lines.

Fuel High Pressure Lines

(1) Removal.**NOTE**

Plug or cap all fuel line ports after disconnecting fuel lines. This is required to prevent dirt or foreign matter from entering the fuel system.

(a) Refer to para. 4-54 and remove throttle control from engine.

(b) Refer to para. 4-51. c. above and disconnect fuel inlet line from fuel injection pump.

4-51. FUEL FILTER AND FUEL LINES (cont)

e. Fuel High Pressure Lines (cont).

(1) Removal (cont).

(c) Tag fuel lines with cylinder numbers to aid in correct installation. Tag fuel lines as follows:

- Fuel Line (1) - No. 1 Cylinder
- Fuel Line (2) - No. 2 Cylinder
- Fuel Line (3) - No. 3 Cylinder
- Fuel Line (4) - No. 4 Cylinder

(d) Disconnect fuel lines (1, 2, 3 and 4) from fuel injectors (7) and fuel injection pump (8). Cap fuel injectors and fuel pump outlets.

(e) Remove fuel lines (1, 2, 3 and 4) as an assembly. Remove nuts and screws. Use care to prevent denting or bending fuel lines.

(2) Installation.

(a) Remove caps from fuel injectors (7) and fuel injection pump (8). Connect fuel lines (1, 2, 3 and 4) to fuel injection pump (8) and fuel injector (7). Tighten fuel line nuts to a torque of 18 lb-ft (24 Nm) (wet).

(b) Refer to para. 4-54 and install throttle control on engine.

(c) Refer to para. 4-22 and connect battery cables.

(d) Refer to para. 4-53 and prime fuel system.

4-52. FUEL TRANSFER PUMP

THIS TASK COVERS:

- a. Testing
- b. Removal
- c. Installation

Equipment Conditions:

<u>Ref</u>	<u>Conditions</u>
2-22	Engine shut off
4-56	Engine door removed

INITIAL SETUP:

Tools Required:

Nomenclature:

General Mechanics
Tool Kit

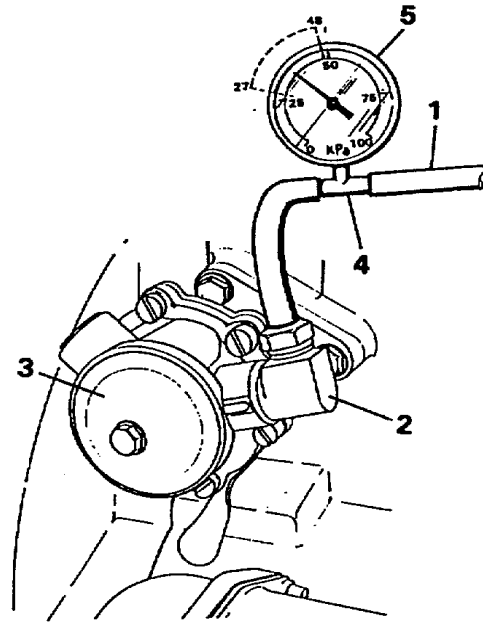
4-52. FUEL TRANSFER PUMP (cont)

a. Testing.

WARNING

Diesel fuel is highly combustible. To avoid injury or death, do not smoke or use open flame near fuel pump, tank or lines.

- (1) Disconnect fuel output line (1) from elbow (2) at pump (3).
- (2) Connect hose of tee connector (4) to elbow (2).
- (3) Connect fuel output line (1) to opposite end of tee connector (4).
- (4) Connect pressure gauge (5) to middle of tee connector(4).



Testing Fuel Transfer Pump

CAUTION

Do not start pump engine unless distributor pump is primed. Refer to para. 2-16 to prime pump.

- (5) Start engine and set throttle to idle speed.
- (6) Pump output pressure should be 27 to 48 kPa (4 to 7 psi). If pump output pressure is not acceptable, notify Direct Support Maintenance.

b. Removal.

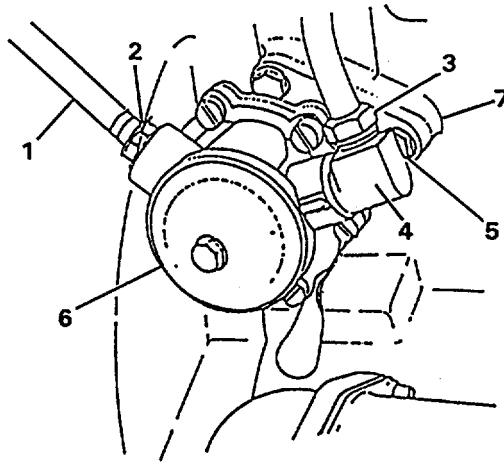
- (1) Disconnect fuel inlet line (1). Remove elbow (2).
- (2) Disconnect fuel outlet line (3) and remove elbow (4).
- (3) Remove three screws (5).
- (4) Remove fuel transfer pump (6) with fuel transfer pump gasket (7) and discard gasket. Remove pump rod from engine.

c. Installation.

- (1) Install pump rod in engine. Install new fuel transfer pump gasket (7) on engine. Install fuel transfer pump (6).

4-52. FUEL TRANSFER PUMP (cont)

c. Installation (cont).



Removal and Installation of Fuel Transfer Pump

- (2) Install three screws (5) through pump mounting holes and into engine block.
- (3) Torque three screws (5) to 18 ft-lb (11 Nm) (wet).
- (4) Install elbow (2) in pump and connect inlet line (1) to elbow.
- (5) Install elbow (4) in pump and connect outlet line (3) to elbow.
- (6) Refer to para. 4-53 and prime fuel system.
- (7) Refer to para. 4-56 and install engine door.

4-53. PRIMING FUEL SYSTEM

THIS TASK COVERS:

- a. Priming Low-Pressure Fuel System.
- b. Priming High-Pressure Fuel System.

INITIAL SETUP:

Equipment/ Materials Required :

Tools Required:

Rags (Item 6, Appendix E)

Nomenclature:

Equipment Conditions :

General Mechanics
Tool Kit

<u>Ref</u>	<u>Condition</u>
4-56	Engine cover removed

WARNING

Diesel fuel is highly combustible. To avoid injury or death, do not smoke or use open flame near fuel pump, tank or lines.

- a. Priming Low Pressure Fuel System.
 - (1) Check fuel tank level.
 - (2) Loosen low-pressure injection pump line (1) at injection pump fitting (2). Cap fitting.
 - (3) Actuate priming lever (3) on side of fuel transfer pump (4) until fuel flows from fitting (2).
 - (4) Tighten fuel line (1) at injection pump inlet (2). Tighten nut to a torque of 18 lb-ft (24 Nm) (wet).
- b. Priming High Pressure Fuel System.
 - (1) Loosen fuel injection line connecting nut (5) at each injector (6).

CAUTION

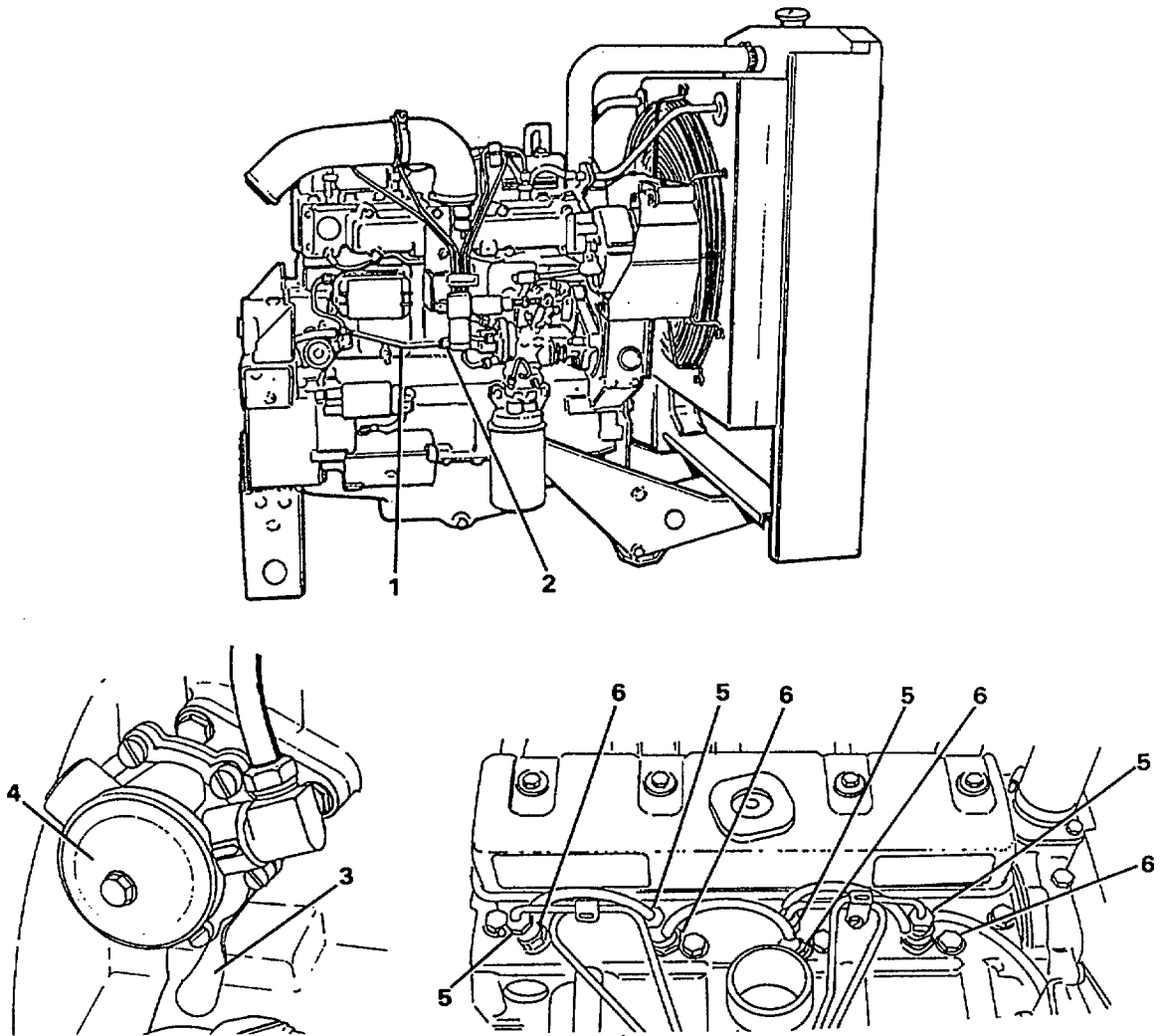
Do not start pump engine unless distributor pump is primed. Refer to para. 2-16 to prime pump.

NOTE

Do not operate starting motor for more than 30 seconds. Wait at least two minutes between each try to permit starter to cool down.

4-53. PRIMING FUEL SYSTEM (cont)

b. Priming High Pressure Fuel System (cont).



Priming Fuel System

- (2) Crank starting motor.
- (3) When fuel flows from ends of all high-pressure fuel lines, at injectors, stop starting motor and tighten connection nuts at injectors. Tighten nuts to a torque of 18 lb-ft (24 Nm) (wet).

4-54. THROTTLE CONTROL ACTUATOR

THIS TASK COVERS:

- a. Adjustment
- b. Removal
- c. Installation

INITIAL SETUP:

Tools Required:

Nomenclature:

General Mechanics
Tool Kit

Equipment/Materials Required:

Tags (Item 14, Appendix E)

Equipment Conditions:

<u>Ref</u>	<u>Conditions</u>
4-56	Engine door removed.
2-20	Engine running for throttle control adjustment.
2-22	Engine off for throttle control removal and installation.

a. Adjustment.

- (1) On control panel, press speed switch down and hold until engine runs at lowest speed.
- (2) To set idle speed, remove nut (1) and screw (2) from actuator shaft (3) and throttle lever (4).
- (3) Loosen locknut (5) on actuator shaft (3).
- (4) Turn actuator shaft (3) clockwise to reduce idle speed, counterclockwise to increase. Use half turns (1800) to assure that actuator shaft (3) always lines up with throttle lever (4).
- (5) Install and secure actuator shaft (3) to throttle lever (4) with screw (2) and nut (1).
- (6) Tighten locknut (5).

CAUTION

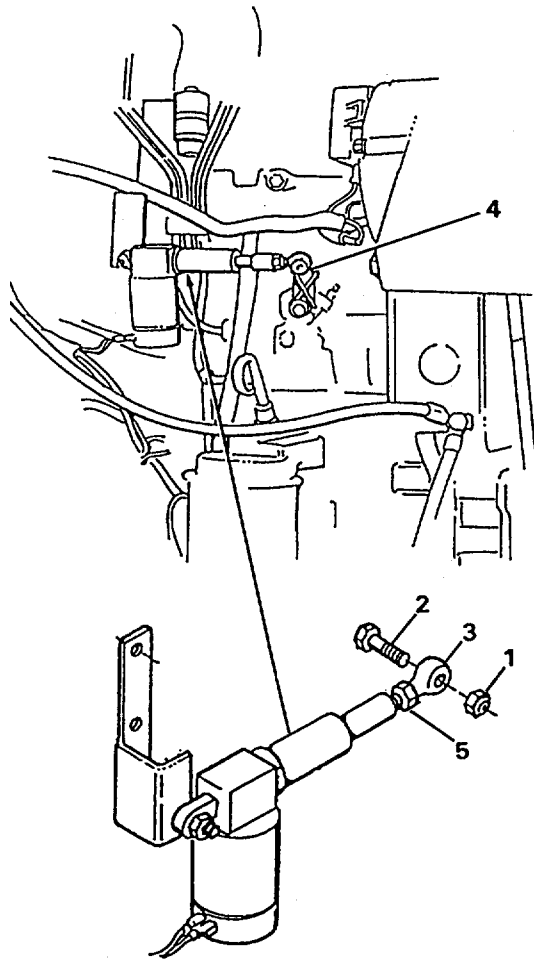
Do not start pump engine unless distributor pump is primed. Refer to para. 2-16 to prime pump.

- (7) Operate engine and check engine speed. Repeat steps 2 through 5 to obtain correct speed.

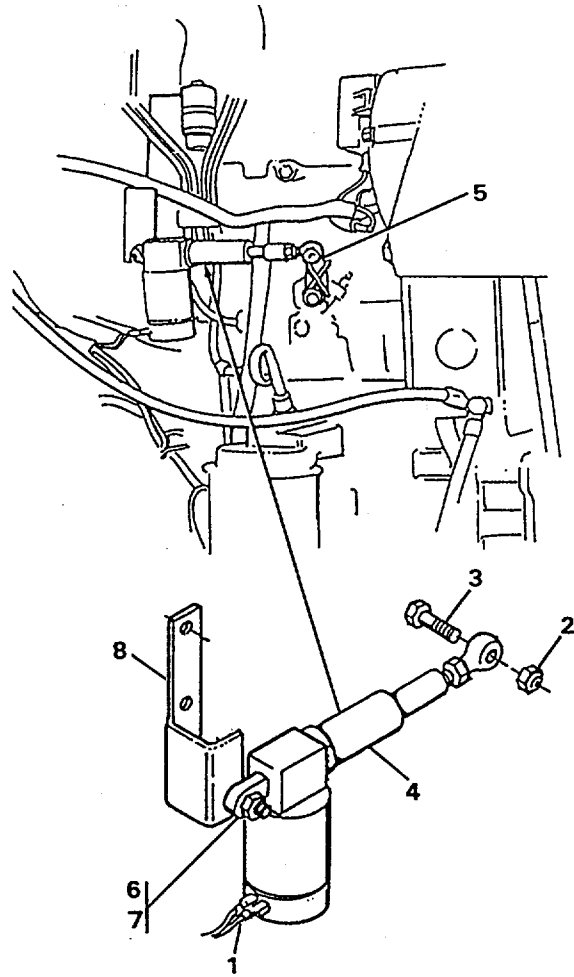
b. Removal.

- (1) Tag and remove wires (1) from actuator motor by sliding wire lugs off of motor tabs.
- (2) Remove nut (2) and screw (3) from actuator shaft and throttle lever (5).
- (3) Remove screw (6) and nut (7) holding throttle actuator (4) to bracket (8). Remove actuator assembly (4).

4-54. THROTTLE CONTROL ACTUATOR (cont)



Adjusting Throttle Control Actuator



Removing and Installing Throttle Control Actuator

c. Installation.

- (1) Install actuator assembly (4) on bracket (8), securing with screw (6) and nut (7).
- (2) Install screw (3) and lock nut (2) through actuator shaft and throttle lever (5).
- (3) Install wires (1) on motor tabs by sliding lugs over tabs. Be sure to observe correct polarity when installing wires.
- (4) Adjust throttle control actuator for idle speed as described in para. a. above.

4-55. MUFFLER

THIS TASK COVERS:

- a. Removal
- b. Installation

Tools Required:Nomenclature:

General Mechanics
Tool Kit

Equipment Conditions:Ref Conditions

2-22 Engine shut off
4-56 Engine housing removed

- a. Removal.

WARNING

Be sure exhaust system has cooled before starting work.

- (1) Remove cover (1) from muffler (2) before removing housing.
 - (2) Remove two screws (3), and flat washers (4) holding muffler (2) to side of exhaust manifold.
 - (3) Remove two screws (5) and lockwashers (6) holding muffler (2) to top of exhaust manifold. Remove gasket (7).
 - (4) Remove muffler (2) from manifold.
- b. Installation.
 - (1) Install muffler (2) and gasket (7) on exhaust manifold.
 - (2) Secure muffler (2) to flange on top of manifold with screws (5) and lockwashers (6).
 - (3) Secure muffler (2) to side of manifold with flat washers (4) and screws (5). Tighten screws (5) to a torque of 39 lb-ft (52 Nm) (wet).
 - (4) Secure deflector cover (1) to muffler (2) after installing engine housing.
 - (5) Refer to para. 4-56 and install engine housing.

4-56. ENGINE HOUSING, RADIATOR SHROUD AND RADIATOR

THIS TASK COVERS:

- a Engine Housing
 - (1) Removal
 - (2) Installation

- b. Radiator Shroud and Radiator
 - (1) Removal
 - (2) Installation

INITIAL SETUP:

Tools Required:

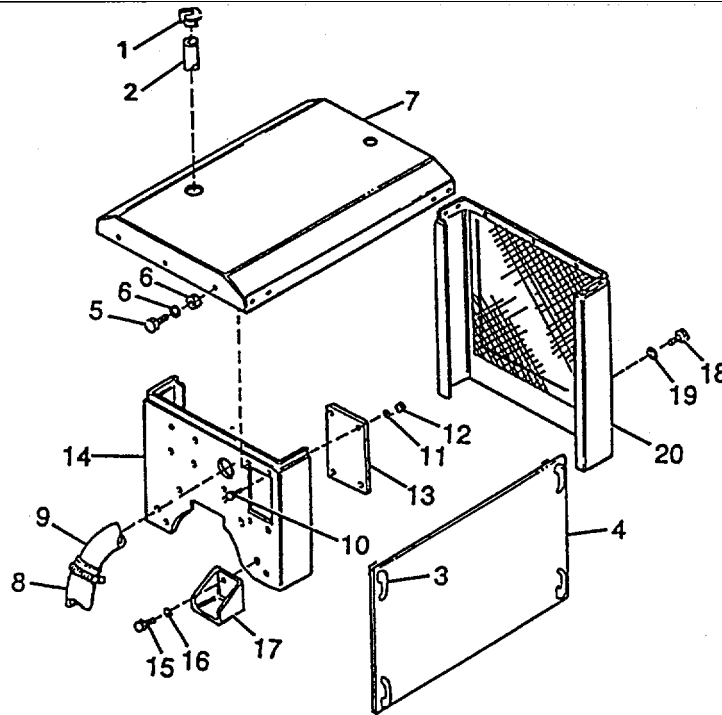
Nomenclature:

General Mechanics
Tool Kit

Equipment Conditions:

Ref Conditions

- 2-22 Engine shut off.
- 3-7 Air cleaner hoses removed.
- 4-22 Battery cables disconnected.
- 4-49 Air cleaner removed.
- 4-57 Fan and fan guard removed.



Removing and Installing Engine Housing

- a. Engine Housing.

WARNING

Be sure exhaust system has cooled before starting work.

4-56. ENGINE HOUSING, RADIATOR SHROUD AND RADIATOR (cont)a. Engine Housing (cont).(1) Removal.**WARNING**

Electrical shock hazard exists. Disconnect battery cables (para. 4-22).

- (a) Remove cover (1) from muffler exhaust pipe (2).
- (b) Release latches (3) on engine door (4).
- (c) Remove fourteen screws (5) and flat washers (6) from top and sides of engine roof (7).
- (d) Remove housing roof (7).
- (e) Remove four screws (10), lockwashers (11) and nuts (12) holding relay panel (13) to rear housing (14). Rest relay panel on engine base.
- (f) Remove hose (9) from intake manifold.
- (g) Remove four screws (15) and lockwashers (16) holding rear housing (14) to shock mount brackets (17). Remove rear housing.
- (h) Remove four screws (18) and lockwashers (19) holding radiator housing (20) to brackets. Remove radiator housing.

(2) Installation.

- (a) Install and secure radiator housing (20) to brackets with bolts (18) and lockwashers (19).
- (b) Secure rear housing (14) to shock mount brackets (17), using screws (15) and lockwashers (16).
- (c) Install hose (9) and connect to intake manifold.
- (d) Secure relay panel (13) to rear housing (14) with screws (10), lockwashers (11) and nuts (12).
- (e) Install engine housing roof (7). Secure roof to radiator housing (20) and rear housing (14), using screws (5) and flat washers (6).
- (f) Install engine door (4); secure with latches (3).
- (g) Install exhaust cover (1) on muffler exhaust pipe (2).

4-56. ENGINE HOUSING, RADIATOR SHROUD AND RADIATOR (cont)

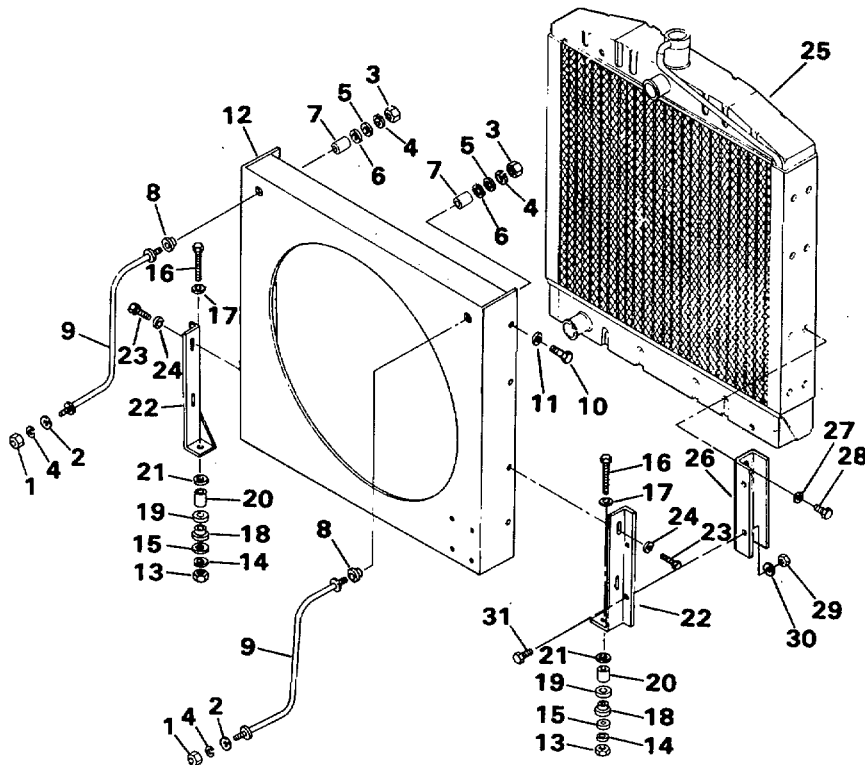
b. Radiator Shroud and Radiator.

CAUTION

Support or block radiator to prevent from falling.

(1) Removal.

- (a) Drain radiator. Refer to para. 4-46C.
- (b) Refer to para. 4-57 and remove fan guard. Refer to para. 4-46A and disconnect hoses from radiator (25).



Radiator and Radiator Shroud

- (c) Remove two nuts (1), flat washers (2) and lockwashers (4) attaching radiator rods (9) to brackets on engine.
- (d) Remove two nuts (3), lockwashers (4), flat washers (5), resilient mounts (6) and spacers (7). Remove radiator rods (9) and resilient mounts (8) from radiator shroud (12).
- (e) Remove four screws (10) and lockwashers (11) attaching shroud (12) to side of radiator.
- (f) Remove four nuts (29), lockwashers (30) and screws (31) securing brackets (22) to brackets (26).

4-56. ENGINE HOUSING, RADIATOR SHROUD AND RADIATOR (cont)b. Radiator Shroud and Radiator (cont).(1) Removal (cont).

- (g) Remove two nuts (13), lockwashers (14) and flat washers (15), screws (16) and lockwashers (17) securing shroud (12) and supports (22) to radiator (25) at bottom of shroud. Carefully lift radiator (25) from engine. Remove eight screws (28) and lockwashers (7) and remove brackets (26) from radiator.
- (h) Remove two resilient mounts (18 and 19), spacers (20), and resilient mounts (21).

(2) Installation.

- (a) Install brackets (26) on sides of radiator and secure with eight lockwashers (27) and screws (28).
- (b) Lift radiator (25) into position and support radiator. Install supports (22) on radiator shroud (12) and radiator (25) and secure with four lockwashers (24) and screws (23) and four screws (31), lockwashers (30) and nuts (29).
- (c) Carefully lift radiator (25) and radiator shroud (12), with supports (22) and brackets (26) attached, and lower into position at front of engine.
- (d) Install two screws (16) and lockwashers (17) through supports (22) and radiator bracket. Install two resilient mounts (21), spacers (20), mounts (19) and resilient mounts (18) on screws (16).
- (e) Install two lockwashers (14) and flat washers (15) on screws (16). Secure supports (22) to brackets with two nuts (13).
- (f) Secure radiator shroud (12) to radiator with four lockwashers (11) and screws (10).
- (g) Install two resilient mounts (8) in top of shroud (12). Install two radiator rods (9) through mounts (8) and shroud.
- (h) Slide two spacers (7), resilient mounts (6), lockwashers (4) and flat washers (5) on ends of rod (9). Secure rods with nuts (3).
- (i) Install ends of rods (9) through brackets on top of engine and secure with flat washers (2), lockwashers (4) and nuts (1).
- (j) Refer to para. 4-57 and install fan guard.
- (k) Refer to para. 3-7 and install air cleaner hoses.
- (l) Refer to para. 4-49 and install air cleaner.
- (m) Refer to para. 4-22 and connect battery cables.

4-57. FAN AND FAN BELT

THIS TASK COVERS:

- a. Removal of Fan
- b. Installation of Fan
- c. Adjustment of Fan Belt
- d. Removal of Fan Belt
- e. installation of Fan Belt

INITIAL SETUP:

Tools Required:

Nomenclature:

General Mechanics
Tool Kit

Equipment Conditions:

<u>Ref</u>	<u>Conditions</u>
2-14	Engine shut off.
4-22	Battery cables disconnected.
4-56	Engine housing removed.

a. Removal of Fan.

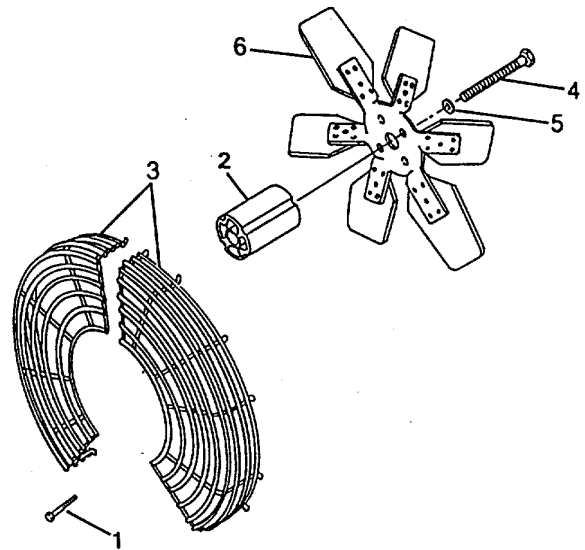
WARNING

Be sure cooling system has cooled completely before starting work.

- (1) Remove four screws (4) and lockwashers (5) securing fan (6) and fan spacer (2) to pulley hub.
- (2) Remove fan (6) and fan spacer (2).
- (3) Remove screws (1) and two halves of fan guard (3).

b. Installation of Fan.

- (1) Install fan guard (3). Secure with screws (1).
- (2) Install fan spacer (2) and fan (6), securing with screws (4) and lockwashers (5).
- (3) Install radiator housing and roof (para. 4-56).
 - (a) Slide fan belt (4) over crankshaft pulley (6), water pump pulley (5) and pulley on alternator (3).
 - (b) Refer to para. 4-57. c. and adjust fan belt tension.
 - (c) Tighten screws (4) to a torque of 17 lb-ft (23 Nm) (wet).
 - (d) Refer to para. 4-57. b. above and install fan, fan guard and fan spacer.



Removing and Installing Fan

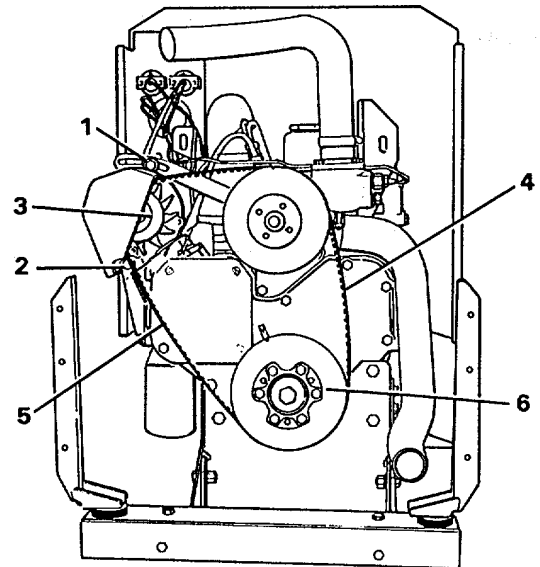
4-57. FAN AND FAN BELT (cont).

c. Adjustment of Fan Belt.

NOTE

Radiator is removed for clarity.

- (1) Depress fan belt at a point (5) midway between alternator pulley and crankshaft pulley (6).
- (2) Belt should deflect approximately 3/4 inch (19.05 mm). If adjustment is not correct, adjust as follows.
- (3) Loosen alternator mounting screws (1 and 2).
- (4) Move alternator (3) toward engine to loosen belt or use a pry bar or pull alternator away from engine to tighten belt.
- (5) With belt in correct adjustment, hold alternator in position and tighten screws (1 and 2). (Tighten screws (1) to a torque of 23 Nm (17 ft lb). Tighten nuts on screws (2) to a torque of 39 lb-ft (52 Nm) (wet).
- (6) Check belt deflection para. 4-57. c. (2) to see that deflection is correct.



Adjusting Fan Belt

d. Removal of Fan Belt.

- (1) Refer to para. 4-57. a. above and remove fan guard.
- (2) Refer to para. 4-58. a. and remove belt guard.
- (3) Loosen alternator mounting screws (1 and 2).

NOTE

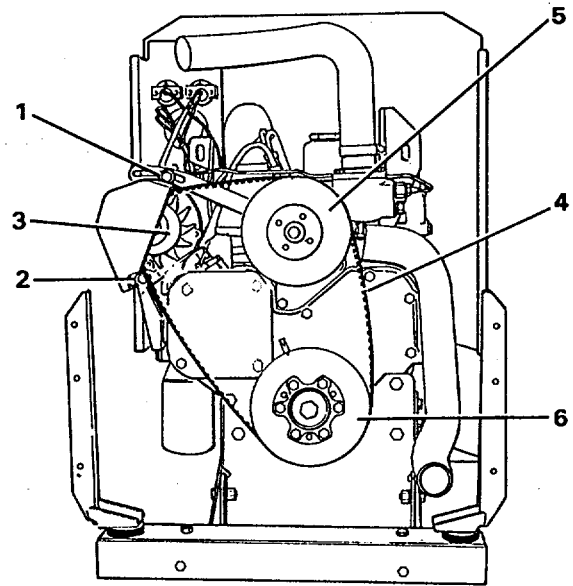
Radiator is removed for clarity.

- (4) Move alternator (3) towards engine to loosen belt as completely as possible.
- (5) Remove fan belt (4) from pulley on alternator (3). Slip fan belt (4) from grooves in water pump pulley (5) and crankshaft pulley (6).
- (6) Remove fan belt (4) from engine.

4-57. FAN AND FAN BELT (cont)

e. Installation of Fan Belt.

- (1) Install fan belt (4) over alternator pulley (3), water pump pulley (5) and crankshaft pulley (6).
- (2) Refer to para. 4-57. c. and adjust fan belt.
- (3) Refer to para. 4-58. b. and install belt guard
- (4) Refer to para. 4-57. a. and install fan guard.
- (5) Refer to para. 4-56 and install engine housing.
- (6) Refer to para. 4-22 and connect battery cables.



Removing and Installing Fan Belt

4-58. ALTERNATOR

THIS TASK COVERS:

- a. Testing
- b. Removal
- c. Installation

INITIAL SETUP:

Tools Required:

Nomenclature:

General Mechanics
Tool Kit

4-56 Engine door removed.

Multimeter

Equipment Conditions:

<u>Ref</u>	<u>Conditions</u>
2-14	Engine shut off.
4-22	Battery cables disconnected.

WARNING

Electrical shock hazard exists. Disconnect battery cables (para. 4-22).

4-58. ALTERNATOR (cont)a. Testing.

- (1) Prepare multimeter to measure DC voltage per instructions supplied with multimeter.
- (2) Connect negative lead of multimeter to a good ground on the alternator.
- (3) Connect positive lead of multimeter to positive terminal of alternator.

CAUTION

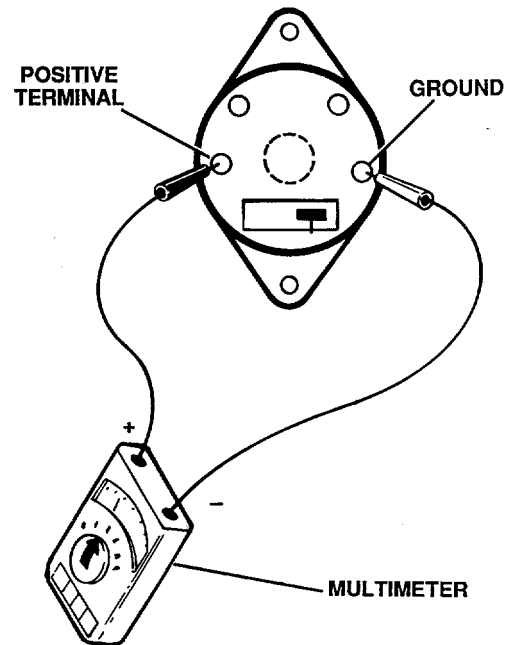
Do not start the pump engine unless distributor pump is primed. Refer to para. 2-16 to prime pump.

- (4) Start pump engine (para. 2-12). Run engine at fast idle of approximately 1000 RPM.
- (5) Voltage reading should be 13.8 to 14.8 volts. If voltage is not within limits, replace alternator.
- (6) Refer to para. 2-14 and stop engine.

b. Removal.**WARNING**

Electrical shock hazard exists. Disconnect battery cables (para. 4-22).

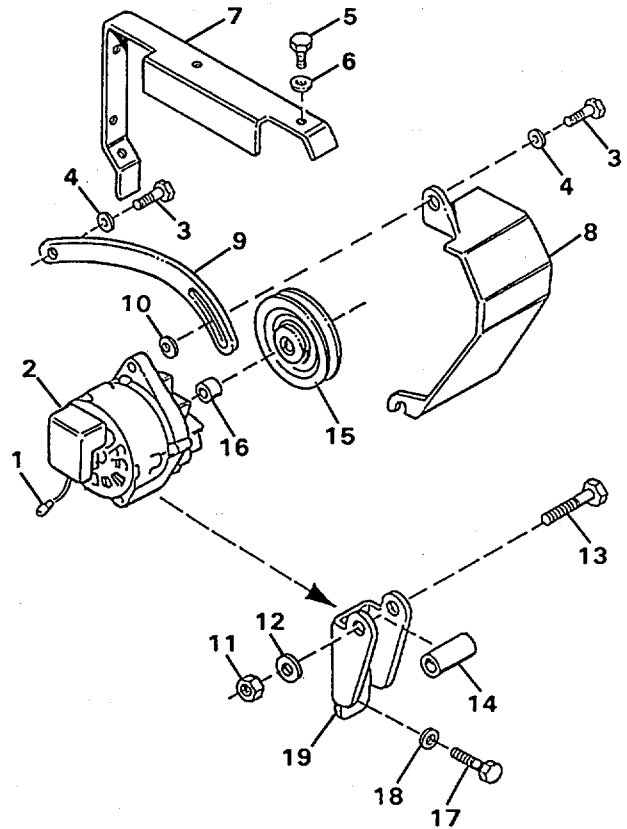
- (1) Disconnect harness wires (1) from alternator (2).
- (2) Refer to para. 4-57 and remove fan belt from alternator pulley.
- (3) Remove five screws (5) and flat washers (6) and remove belt guard (7).
- (4) Remove two screws (3) and flat washers (4) and remove adjusting strap (9) and guard (8). Remove spacer (10).
- (5) Support alternator (2) and remove nut (11), flat washer (12) and screw (13). Remove spacer (14) and remove alternator (2).
- (6) Use a suitable puller and remove pulley (15) and adapter (16) from alternator shaft.
- (7) Remove two screws (17) and flat washers (18) and remove bracket (19) from engine.



4-58. ALTERNATOR (cont)

c. Installation.

- (1) Install bracket (19) on engine and secure with two screws (17) and flat washers (18).
- (2) Install adapter (16) on shaft of alternator (2). Use a suitable press to drive pulley (15) on alternator shaft.
- (3) Install alternator (2) in position in bracket (19). Install spacer (14). Install screw (13), washer (12) and nut (11). Do not tighten nut at this time.
- (4) Install adjusting strap (9), with spacer (10) and guard (8) on engine and alternator. Install lower hook on guard over screw (13). Install washers (4) and screws (3). Do not tighten screws as this time.
- (5) Connect harness wires (1) to alternator (2).
- (6) Refer to para. 4-57 and install fan belt on pulley and adjust tension of fan belt.
- (7) Install belt guard (7) on engine and secure with five washers (6) and screws (5).
- (8) Refer to para. 4-56 and install engine cover.
- (9) Refer to para. 4-22 and connect battery cables.



Removing and Installing Alternator

4-59. STARTER MOTOR

THIS TASK COVERS:

- a. Removal
- b. Testing
- c. Installation

INITIAL SETUP:

Tools Required:

Nomenclature:

General Mechanics
Tool Kit

Equipment/Materials Required:

Tags (Item 14, Appendix E)

Equipment Conditions:

Ref Conditions

2-22 Engine shut off.

4-22 Battery cables disconnected.

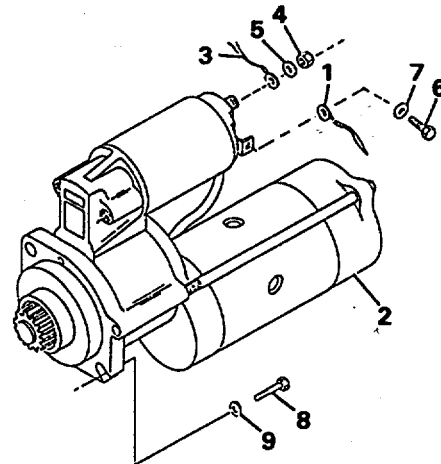
4-56 Engine door removed.

a. Removal.

CAUTION

Electrical shock hazards exists. Disconnect battery cable (para. 4-22).

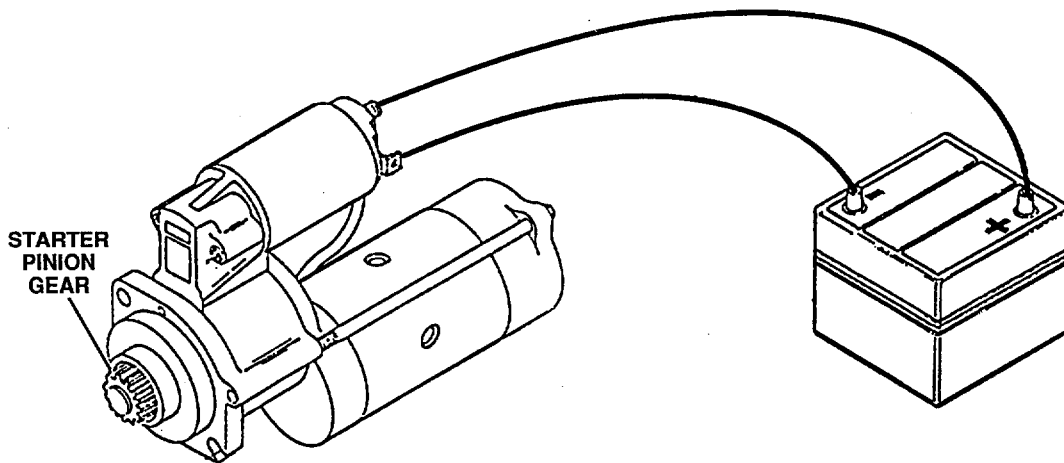
- (1) Tag cable (3). Remove nut (4) and washer (5). Remove battery cable (3) from tarter.
- (2) Remove screw (6) and lockwasher (7). remove wire (1) from starter (2).
- (3) Remove two screws (8) and flat washers (9) securing starter (2) to flywheel housing.
- (4) Remove starter. It may be necessary to rotate starter by hand to clear flywheel rousing.



Removing and Installing Starter Motor

4-59. STARTER MOTOR (cont)b. Testing.

- (1) Place starter on suitable bench or stand.

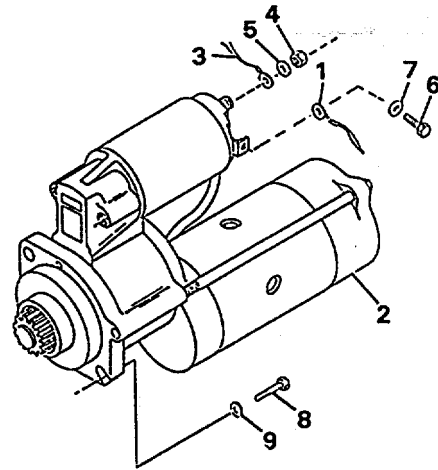
**Testing Starter**

- (2) Connect a 12-volt battery or 12-volt power supply positive terminal to battery solenoid as shown.
- (3) Momentarily connect the negative side of the power supply to battery solenoid as shown.
- (4) Observe starter pinion gear. Gear should extend out from housing and start to rotate.
- (5) Disengage negative terminal.
- (6) If starter pinion gear does not extend or rotate, replace starter.

4-59. STARTER MOTOR (cont)

c. Installation.

- (1) Install starter (2) on flywheel housing. Secure with two screws (8) and flat washers (9). Tighten screws to a torque of 62 lb-ft (84 Nm) (wet).
- (2) Connect battery cable (3) and lead wires (1) to starter (2). Secure cable and wires with washers (5 and 7), nut (4) and screw (6).
- (3) Connect positive cable (3) to battery (5) first. Then connect ground cable (1) to battery.



Removing and Installing Starter Motor

4-59A. ENGINE WIRING

THIS TASK COVERS:

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

Equipment/Materials Required:

Tags (Item 14, Appendix E)

INITIAL SETUP:

Equipment Conditions

Tools Required:

Nomenclature:

General Mechanics
Tool Kit

<u>Ref</u>	<u>Conditions</u>
2-14	Engine shut off
4-22	Battery cables disconnected
4-56	Engine door removed

4-59A. ENGINE WIRING (cont)a. Inspection.**WARNING**

Electrical shock hazard exists. Disconnect battery cables (para. 4-22).

- (1) Inspect all wiring for evidence of breaking, fraying insulation and deterioration.
- (2) Inspect ail connectors on end of wires for bent or damaged condition.
- (3) Check all wiring for solid and secure connections.
- (4) Replace or repair wiring if it is broken, has fraying insulation, or connectors are bent or damaged.

b. Removal.

- (1) Tag and disconnect electric lines leading from engine relay panel to engine and water spray system as follows:
 - (a) Disconnect wires from spray valve solenoid valves (para. 4-60).
 - (b) Disconnect wires from liquid level transmitter (para. 4-24).
 - (c) Disconnect cables from engine (para. 4-23).
 - (d) Disconnect wires from throttle actuator (para. 4-54).
 - (e) Disconnect wires from alternator (para. 4-58).
 - (f) Disconnect wires from oil pressure switch and water temperature switch (para. 4-46B).
 - (g) Disconnect wires from fuel injection pump.
 - (h) Disconnect two wires from starter (para. 4-59)
 - (i) Disconnect wire from glow plug (para. 4-46C).
 - (j) Remove engine relay panel (para. 4-12).

4-59A. ENGINE WIRING (cont)

c. Installation.

- (1) Install engine relay panel on engine rear housing (para. 4-12).
- (2) Connect wire to glow plug (para. 4-46C).
- (3) Connect two wires to starter (para. 4-59).
- (4) Connect wires to solenoid on fuel injection pump.
- (5) Connect wires to oil pressure switch and water temperature switch (para. 4-46B).
- (6) Connect wires to alternator (para. 4-58).
- (7) Connect wires to throttle actuator (para. 4-54).
- (8) Connect cables to engine(para. 4-23).
- (9) Connect wires to spray valve solenoid valves (para. 4-60).
- (10) Connect wires to liquid level transmitter (para. 4-24).
- (11) Connect battery cables (para. 4-22).
- (12) Install engine door (para. 4-56).

Section XII. MAINTENANCE OF WATER DISTRIBUTOR SYSTEM

Paragraph Number	Title	Page Number
4-60	LINES AND FITTINGS	4-133
4-61	SUCTION AND FILL BUTTERFLY VALVES.....	4-138
4-62	SPRAY VALVES	4-140
4-63	SPRAY NOZZLES	4-144
4-64	DISCHARGE VALVE	4-146

4-60. LINES AND FITTINGS

THIS TASK COVERS:

- a. Removal
- b. Installation

INITIAL SETUP:

Tools Required:

Personnel Required: 2

Nomenclature:

General Mechanics
Tool Kit

Equipment Materials Required:

Rags (Item 6, Appendix E)
Tags (Item 14, Appendix E)
Pipe Sealant (Item 11, Appendix E)

Equipment Conditions:

<u>Ref</u>	<u>Conditions</u>
2-14	Engine shut off
2-21	Water tank drained
4-22	Battery cables disconnected
4-29	Air reservoirs drained
4-63	Spray nozzles removed
4-64	Angle discharge valve removed

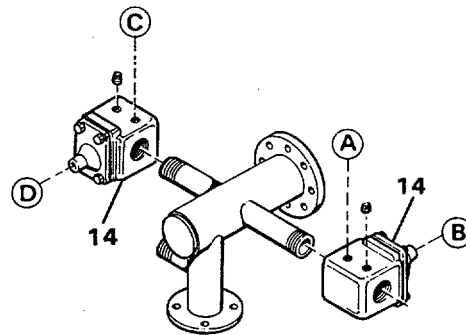
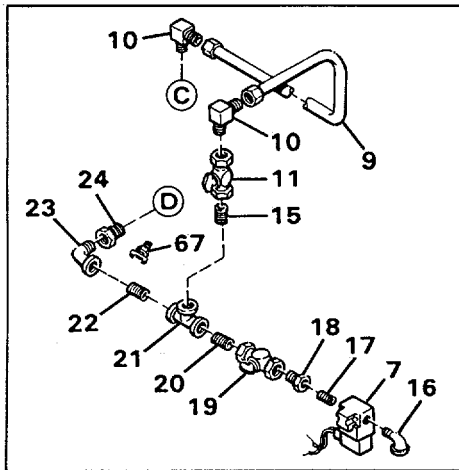
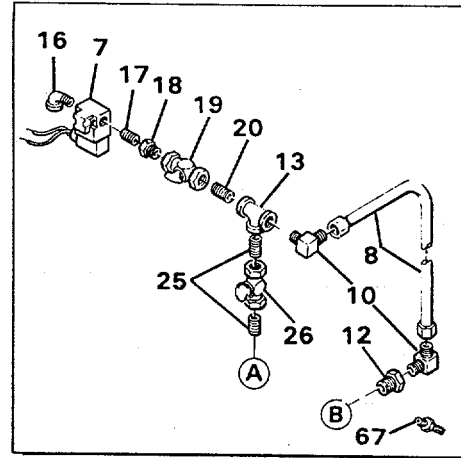
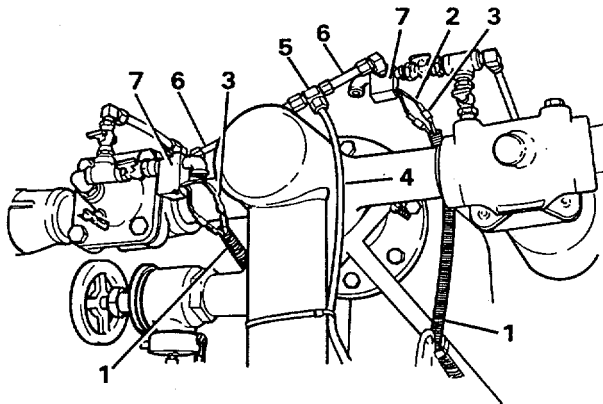
- a. Removal.

WARNING

Electric shock hazard exists. Disconnect battery cables (para. 4-22).

- (1) Pull back looms (1). Tag and disconnect solenoid valve wires (2) from spade lugs (3).
- (2) Disconnect air line (4) from tee (5). Remove air lines (6) from tee (5) and solenoid valves (7). Remove elbows (16) from solenoid valves (7).
- (3) Disconnect air lines (8 and 9) from elbows (10). Remove elbows (10) from valve (11), adapter (12) and tee (13).
- (4) Remove adapter (12) from spray valve (14). Remove remaining elbow (10) from second spray valve (14).
- (5) Remove valve (11) and nipple (15) from tee (21).

4-60. LINES AND FITTINGS (cont)



Removing Lines and Fittings (Sheet 1 of 2)

4-60 LINES AND FITTINGS (cont)

a. Removal (cont).

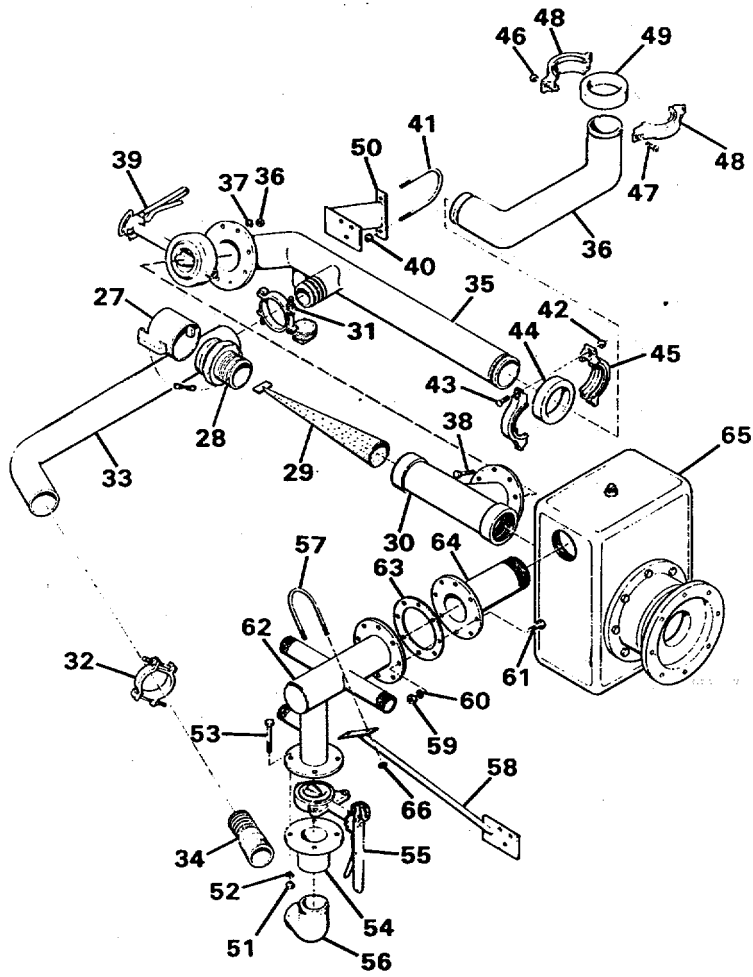
- (6) Remove two exhaust elbows (1 6). Remove solenoid valves (7). Remove nipples (1 7), bushings (18), valves (19) and nipples (20).
- (7) Remove tee (21), nipple (22), elbow (23) and bushing (24) from spray valve (14).
- (8) Remove valve (26) and nipples (25) from spray valve (14). Remove spray valves (14) from discharge header. Remove drain valves (67) from spray valves.
- (9) Remove cap (27) and adapter (28) to remove strainer (29) from suction tee (30).
- (10) Loosen hose clamps (31 and 32) and disconnect hose (33) from nipple (34) and suction line (35). Remove hose clamps and nipple (34).
- (11) Remove eight nuts (36), washers (37) and screws (38) and remove suction butterfly valve (39) from suction tee (30) and suction line (35). Remove suction tee (30) from pump (65).
- (12) Support suction line (35) with blocking and remove two nuts (40) and U-bolt (41) from brace (50).
- (13) Remove two nuts (42) and screws (43). Separate clamps (45) and disconnect suction line (35) from suction elbow (36). Remove gasket (44).
- (14) Remove two nuts (46) and screws (47). Separate clamps (48) and disconnect suction elbow (36) from outlet at bottom of tank. Remove gasket (49) and suction elbow.
- (15) Remove four nuts (51), washers (52) and screws (53) and remove pipe adapter (54) and fill butterfly valve (55). Remove elbow (56) from adapter.
- (16) Remove two nuts (66) and U-bolt (57) from brace (58).
- (17) Remove eight nuts (59), lockwashers (60) and screws (61). Remove discharge header (62) from discharge flange (64). Remove gasket (63). Remove discharge flange (64) from pump (65).

b. Installation.**NOTE**

Use pipe sealant (Item 1 1, Appendix E) on threads of all water pipes before installation.

- (1) Screw discharge flange (64) into outlet of pump (65).
- (2) Place new gasket (63) and discharge header (62) in position on discharge flange (64). Secure header to discharge flange with eight screws (61), lockwashers (60) and nuts (59).
- (3) Slide U-bolt (57) over discharge header (62) and through holes in brace (58). Secure U-bolt (57) with two nuts (66) to support discharge header.

4-60. LINES AND FITTINGS (cont)



Removing Lines and Fittings (Sheet 2 of 2)

4-60. LINES AND FITTINGS (cont)b. Installation (cont).

- (4) Install fill butterfly valve (55) and pipe adapter (54) in position at the outlet of discharge header (62). Secure adapter and valve to header with four screws (53), washers (52) and nuts (51). Install elbow (56) in pipe adapter (54).
- (5) Install new gasket (49) and elbow (36) in position at outlet at bottom to tank. Install clamps (48) around elbow and gasket. Secure clamps with two screws (47) and nuts (46).
- (6) Support elbow (36). Connect suction line (35) and new gasket (44) to elbow with clamps (45), screws (43) and nuts (42).
- (7) Place U-bolt (41) around suction line (35) and through brace (50). Secure U-bolt with two nuts (40).
- (8) Install suction tee (30) on pump (65). Place suction butterfly valve (39) in position between suction line (35) and suction tee (30). Secure butterfly valve (39) with eight screws (38), washers (37) and nuts (36).
- (9) Install nipple (34) in elbow (56). Install clamps (31 and 32) and hose (33) between nipple (34) and suction line (35). Tighten clamps (31 and 32) to secure hose (33).
- (10) Install strainer (29) in suction tee (30) on pump. Install adapter (28) and cap (27) on suction tee (30).
- (11) Install drain valves (67) on spray valves (1 4). Install spray valves (1 4) on discharge header. Install nipple (25) and valve (26) on spray valve (14). Operating handle on valve (26) must face to rear of semitrailer.
- (12) Install nipple (25) and tee (13) on valve (26). Connect nipple (20), valve (19), bushing (18) and nipple (17) to tee (13). Connect solenoid valve (7) to nipple (17) and install exhaust elbow (16) in solenoid.
- (13) Install bushing (24) in spray valve (14) and connect elbow (23), nipple (22), tee (21) to elbow (23). Connect nipple (20) valve (19), bushing (18) and nipple (17) to tee (21). Operating handle on valve (19) must face to rear of semitrailer.
- (14) Install solenoid (7) and exhaust elbow (16) on nipple (17).
- (15) Install nipple (15) in tee (21) and connect valve (1 1) to nipple (15). Operating handle on valve (15) must face rear of semitrailer.
- (16) Connect elbows (10) to valve (11) and spray valve (14). Connect air line (9) to elbows in valve (11) and spray valve (14).
- (17) Install adapter (12) and elbow (10) on spray valve (14). Connect elbow (10) to tee (13).
- (18) Connect air line (8) to elbows (10) at tee (13) and spray valves (14).
- (19) Connect air lines (6) to, tee (5) and elbows on solenoid valves (7). Connect air line (4) to bottom of tee (5).

4-60. LINES AND FITTINGS (cont)

b. Installation (cont).

(20) Connect solenoid valve wires (2) to spade lugs (3) on harness wires. Use looms (1) to cover wire connections.

CAUTION

Do not start pump unless distributor pump is primed. Refer to para. 2-16 to prime pump.

(21) Refer to para. 4-22 and connect battery cables.

(22) Refer to para. 2-20 and fill water tank.

(23) Refer to para. 2-6 and couple semitrailer to prime mover. Operate prime mover and pressurize air system.

(24) Refer to para. 4-63 and install spray nozzles.

(25) Refer to para. 4-64 and install angle discharge valve.

(26) Refer to para. 2-16 through 2-23. Operate spray system and check water piping and air lines for leaks.

4-61. SUCTION AND FILL BUTTERFLY VALVES

THIS TASK COVERS:

- a. Removal
- b. Disassembly

- c. Assembly
- d. Installation

INITIAL SETUP:

Tools Required:

Nomenclature:

General Mechanics
Tool Kit

Equipment Materials Required:

Pipe Sealant (Item 11, Appendix E)

Personnel Required: 2

Equipment Conditions:

<u>Ref</u>	<u>Conditions</u>
1-10. b.(2)	Air reservoirs drained
2-14	Engine shut off
2-21	Water tank drained

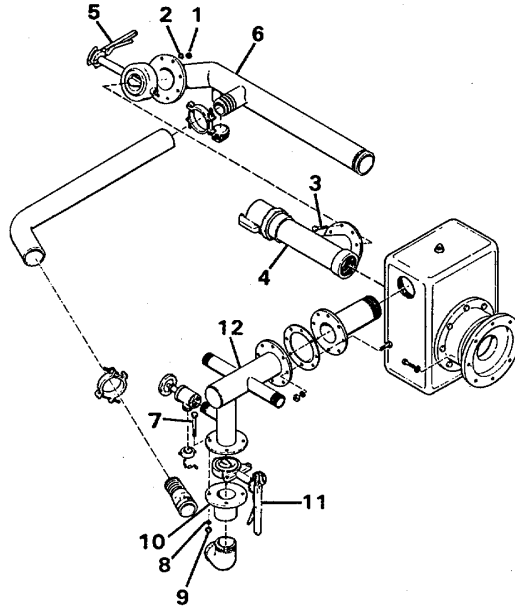
a. Removal.

(1) Remove eight nuts (1), washers (2) and screws (3) holding suction tee (4), suction butterfly valve (5) and suction line (6) together. Remove suction valve (5).

4-61. SUCTION AND FILL BUTTERFLY VALVES (cont)

a. Removal (cont).

- (2) Remove four screws (7), washers (8) and nuts (9) holding pipe adapter (10), fill butterfly valve (11) and header (12) together. Remove butterfly valve (11).



Removing and Installing Butterfly Valves

b. Disassembly.

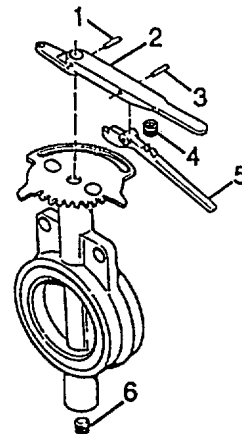
NOTE

Disassembly and assembly is identical for both butterfly valves.

- (1) Loosen handle stem pin (1) and remove handle (2).
- (2) Drive out pin (3) and remove spring (4) and lever (5) from handle (2).
- (3) Turn butterfly valve upside down and remove pipe plug (6) if necessary.

c. Assembly.

- (1) Install pipe plug (6) on bottom of valve.
- (2) Assemble lever (5) and spring (4) on handle (2) and install pin (3).



Disassembly and Assembly of Butterfly Valve

4-61. SUCTION AND FILL BUTTERFLY VALVES (cont)

- c. Assembly (cont).
 - (3) Install handle assembly on valve and install pin (1).
- d. Installation.

NOTE

When assembling plumbing, use pipe sealant (Item 11, Appendix E) on threads of all water pipes.

NOTE

Suction butterfly valve OPEN and CLOSED markings may be in the wrong position on plate. Suction valve is closed when handle is pointed down.

- (1) Position suction butterfly valve (5) between suction tee (4) and suction line (6). Secure with eight screws (3), washers (2) and nuts (1).
- (2) Position fill butterfly valve (1 1) between adapter (10) and header (12). Secure with four screws (7), washers (8) and nuts (9).

4-62. SPRAY VALVES

THIS TASK COVERS:

- a. Removal
- b. Disassembly
- c. Inspection and Repair
- d. Assembly
- e. Installation

Equipment/Materials Required:

INITIAL SETUP:

Pipe Sealant (Item 11, Appendix E)

Tools Required:

Equipment Conditions:

Nomenclature:

General Mechanics
Tool Kit

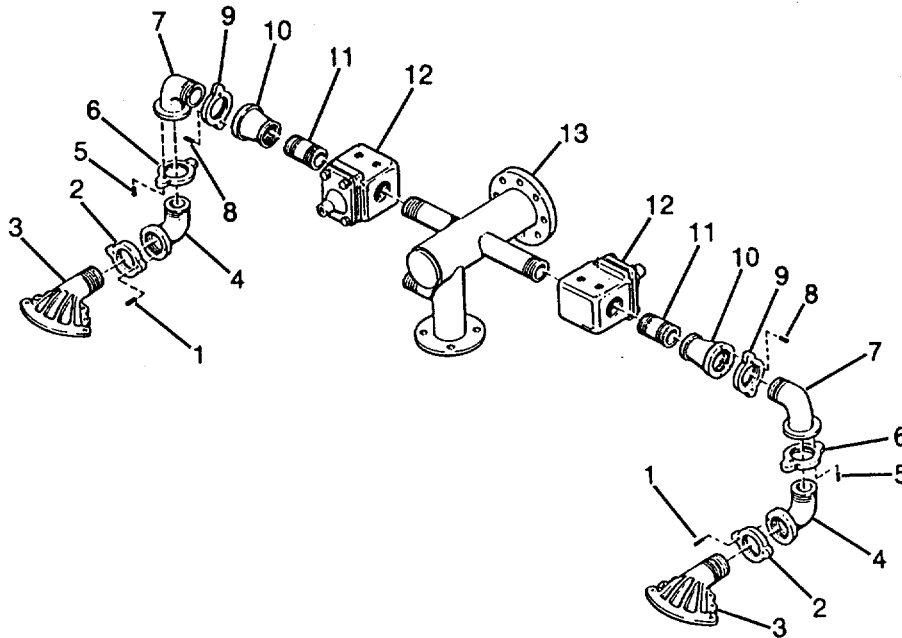
<u>Ref</u>	<u>Conditions</u>
1 -1 0.	b. (2) Air reservoirs drained
2-14	Engine shut off
2-21	Water tank drained
4-60	Valve air lines, wires and fittings removed

- a. Removal.
 - (1) Loosen two set screws (1) on ring (2). Loosen ring (2) by rotating counterclockwise one turn. Rotate nozzle (3) counterclockwise and remove nozzle (3) from elbow (4).
 - (2) Loosen two set screws (5) on ring (6). Loosen ring (6) by rotating ounterclockwise one turn. Rotate elbow (4) counterclockwise and remove elbow (4) from elbow (7).

4-62. SPRAY VALVES (cont)

a. Removal (cont).

- (3) Loosen set screws (8) on rings (9). Loosen ring (9) by rotating counter-clockwise one turn. Rotate elbows (7) counterclockwise and remove elbows (7) from couplings (10).
- (4) Unscrew and remove couplings (10) from nipples (11).
- (5) Unscrew and remove nipples (11) from spray valves (12).
- (6) Unscrew and remove spray valves (12) from header (13).



Removing and Installing Spray Valves

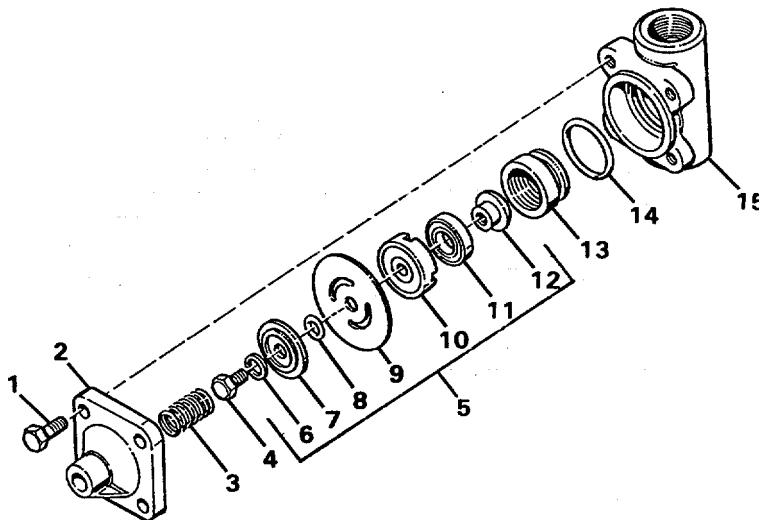
b. Disassembly.

- (1) Remove four screws (1) from cover (2) and remove cover (2).
- (2) Remove spring (3).
- (3) Remove stem bolt (4) and diaphragm assembly (5).
- (4) Disassemble diaphragm (5) assembly into component parts: Belleville washer (6), diaphragm washer (7), preformed packing (8), diaphragm (9), disc retainer (10), disc (11) and disc guide (12).
- (5) Remove seat (13) and preformed packing (14) from valve body (15).

4-62. SPRAY VALVES (cont)

c. Inspection and Repair.

- (1) Check valve body (15) and cover (2) for damage.
- (2) Check spring (3) for rust or breakage.
- (3) Check all components of diaphragm/disc assembly (5) for damage.
- (4) Check seat (13) for damage.
- (5) Replace damaged parts.



Disassembling and Assembling Spray Valve

d. Assembly.

- (1) Assemble diaphragm assembly (5) by installing disc (11) and retainer (10) on guide (12). Install diaphragm (9) on retainer. Install new preformed packing (8) and washer (7) on diaphragm. Secure assembly together with Belleville washer (6) and screw (4).
- (2) Install seat (13) and new preformed packing (14) in valve body (15).
- (3) Install diaphragm assembly (5) in seat (13).

4-62. SPRAY VALVES (cont)

d. Assembly (cont).

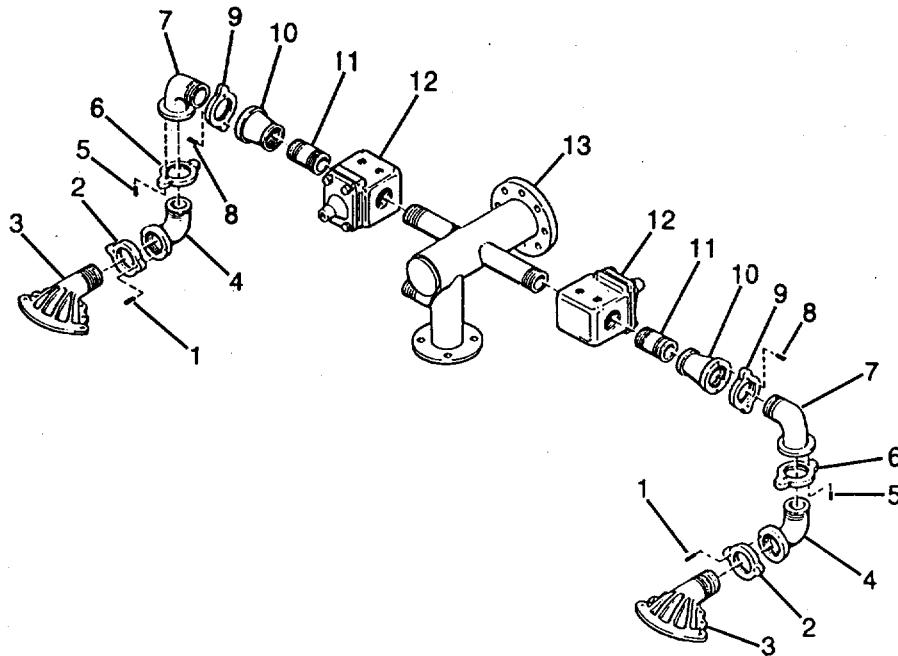
- (4) Install spring (3).
- (5) Install cover (2) and secure with screws (1).

e. Installation.

NOTE

When assembling plumbing, use pipe sealant (Item 11, Appendix E) on threads of all water pipes.

- (1) Install spray valves (12) on header (13).



Installing Spray Valves

- (2) Install nipples (11) on spray valves (12).
- (3) Install couplings (10) on nipples (11).
- (4) Screw rings (9) fully in on elbows (7).
- (5) Screw elbows (7) fully in couplings (10), then back off at least one turn so that elbows (7) face down.
- (6) Tighten rings (9) until they contact couplings (10) and secure with set screws (8).

4-62. SPRAY VALVES (cont)

e. Installation (cont).

- (7) Screw rings (6) fully in on elbows (7).
- (8) Screw elbows (4) fully in elbows (4), then back off at least one turn so that elbows (4) face away from semitrailer.
- (9) Tighten rings (6) until they contact elbows (7) and secure with set screws (5).
- (10) Screw rings (2) fully in on nozzles (3).
- (11) Screw nozzles (3) fully in elbows (4), then back off at least one turn so that nozzles (3) spray slit is parallel to ground.
- (12) Tighten rings (2) until they contact elbows (4) and secure with set screws (1).
- (13) Refer to para. 4-60 and install valve air lines, wiring and fittings.
- (14) Refer to para. 2-6 and couple semitrailer to prime mover. Operate prime mover and pressurize air system.
- (15) Refer to para. 2-20 and fill water tank.

4-63. SPRAY NOZZLES

THIS TASK COVERS:

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

INITIAL SETUP:

Tools Required:

Nomenclature:

General Mechanics
Tool Kit

Equipment Materials Required:

Cleaning Solvent (item 13, Appendix E)
Goggles (Item 9, Appendix E)

Equipment Conditions:

<u>Ref</u>	<u>Conditions</u>
1-10. b. (2)	Air reservoirs drained
2-14	Engine shut off
2-21	Water tank drained

4-63. SPRAY NOZZLES (cont)

a. Removal.

- (1) Loosen two set screws (1) on ring (2). Loosen ring (2) by rotating counterclockwise one turn.
- (2) Rotate nozzle (3) counterclockwise and remove nozzle (3) from elbow (4).

b. Disassembly.

- (1) Remove eight screws (1).
- (2) Separate lower plate (2), gasket (3) and upper plate (4).

c. Cleaning and Inspection

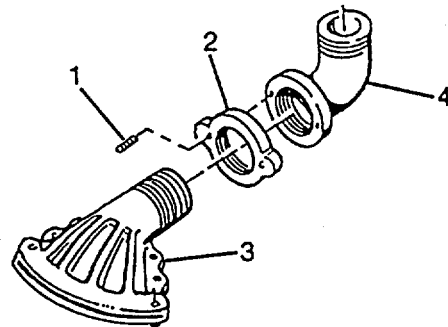
WARNING

Wear protective goggles when using the cleaning solvent. Avoid contact with the eyes. If contact occurs, flush eyes with cold water for 5 minutes and seek immediate medical attention. Dry cleaning solvent (PD-680) is both toxic and flammable. Avoid prolonged breathing of vapors. Avoid skin contact. Use only in a well-ventilated area. Keep away from open flame. Flash point of solvent is 138°F (59°C).

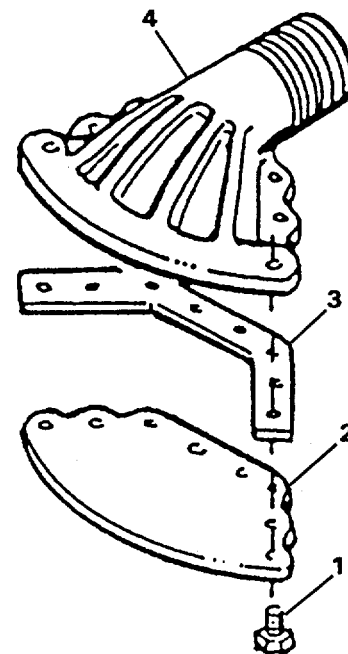
- (1) Clean off upper and lower plates (2 and 4) with PD-680 solvent (Item 13, Appendix E).
- (2) Inspect upper and lower plates (2 and 4) for damage.

d. Assembly.

- (1) Install new gasket (3) between upper plate (2) and lower plate (4).
- (2) Secure plates (2 and 4) and gasket (3) with screws (1).



Removing Spray Nozzles

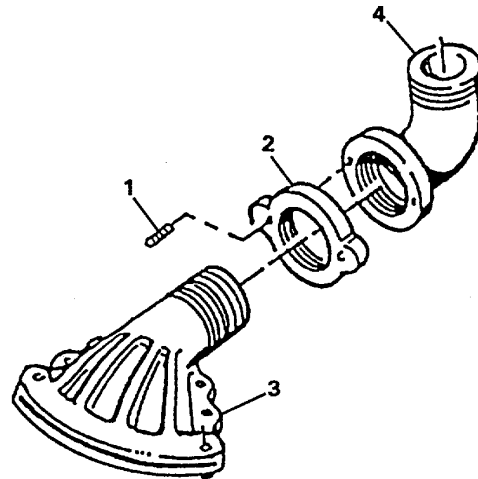


Disassembly and Assembly of Spray Nozzle

4-63. SPRAY NOZZLES (cont)

e. Installation.

- (1) Screw nozzle (3) fully in elbow (4), then back off at least one turn so that nozzle (3) spray slit is parallel to ground.
- (2) Unscrew ring (2) until it contacts elbow (4) and secure with set screws (1).
- (3) Refer to para. 2-6 and couple semitrailer to prime mover. Operate prime mover to pressurize air system.
- (4) Refer to para. 2-20 and fill water tank.



Installing Spray Nozzle

4-64. DISCHARGE VALVE

THIS TASK COVERS:

- a. Removal
- b. Installation

INITIAL SETUP:

Tools Required:

Nomenclature:

General Mechanics
Tool Kit

Equipment Materials Required:

Pipe Sealant (Item 11, Appendix E)

Equipment Conditions:

Ref	Conditions
1-10. b. (2)	Air reservoirs drained
2-14	Engine shut off
2-21	Water tank drained

a. Removal.

- (1) Close fill valve (1).
- (2) Remove cap (4) from discharge valve (2).
- (3) Use a 2-1/4 inch open-end wrench to unscrew discharge valve (2) from header (3). Remove discharge valve (2).

b. Installation.

- (1) Coat inside threads of discharge valve with pipe sealant (Item 11, Appendix E).
- (2) Install discharge valve (2) on header (3).

4-64. DISCHARGE VALVE (cont)

- b. Installation (cont).
 - (3) Install cap (4) on discharge valve (2).
 - (4) Refer to para. 2-6 and couple semitrailer to prime mover. Operate prime mover and pressurize air system.
 - (5) Refer to para. 2-20 and fill water tank.

Section XIII. PREPARATION FOR STORAGE AND SHIPMENT

Paragraph Number	Title	Page Number
4-65	GENERAL.....	4-147
4-66	ADMINISTRATIVE STORAGE INSTRUCTIONS	4-147
4-67	SHIPPING INSTRUCTIONS	4-147

4-65. GENERAL

Commanders are responsible for ensuring 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 water distributor 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.

4-66. ADMINISTRATIVE STORAGE INSTRUCTIONS

Refer to TM 740-90-1.

4-67. SHIPPING INSTRUCTIONS

Preservation and other protective measures taken in the preparation of material and accompanying tools and equipment for shipment must be sufficient to protect the material against deterioration and physical damage during shipment.

4-67. SHIPPING INSTRUCTIONS (cont)

WARNING

Wear protective goggles when using the cleaning solvent. Avoid contact with the eyes. If contact occurs, flush eyes with cold water for 5 minutes and seek immediate medical attention. Dry cleaning solvent (PD-680) is both toxic and flammable. Avoid prolonged breathing of vapors. Avoid skin contact. Use only in a well-ventilated area. Keep away from open flame. Flash point of solvent is 138°F (59°C).

- a. Cleaning. Use dry cleaning solvent (PD-680) to clean or wash grease or oil from all metal parts. All exposed machined surfaces must be cleaned to ensure removal of corrosion, soil, grease, residues, perspiration or other acid or alkali residues.
- b. Driving. After cleaning, use cold water to rinse all parts. Use a clean cloth to dry all parts thoroughly.
- c. Lubrication. Lubricate items specified on lubrication chart.
- d. Preservation.
 - (1) All critical unpainted metal surfaces must be protected during shipment. Oil or grease covered in the lubrication section may be used for this purpose but it is effective for only a few days. Equipment protected in this manner must be watched for signs of corrosion. Preservatives selection will be such that their application, use or removal will not damage the surface to which they are applied.
 - (2) Coat lower landing leg, chassis, frame, exterior hardware and suspension system with corrosion preventive compound.
 - (3) Spray data plates with a thin coating of ignition insulation compound. Control overspray to avoid coating adjacent surfaces.
 - (4) Cover all exterior reflectors and lights with tape.
- e. Marking. Refer to AR 746-1 for Packaging of Army Material for Storage and Shipment.

Section XIV. MAINTENANCE UNDER UNUSUAL CONDITIONS

Paragraph Number	Title	Page Number
4-68	EXTREME COLD WEATHER MAINTENANCE	4-149
4-69	EXTREME HOT WEATHER MAINTENANCE	4-149
4-70	MAINTENANCE AFTER FORDING	4-149
4-71	MAINTENANCE AFTER OPERATION ON UNUSUAL TERRAIN	4-150

4-68. EXTREME COLD WEATHER MAINTENANCE

CAUTION

It is very important that approved maintenance procedures be followed. FM 9-207 contains general information which is specifically applicable to this material as well as all other material. It must be considered an essential part of this technical manual, not merely an explanatory supplement to it.

a. The importance of maintenance must be impressed on all concerned. Maintenance of mechanical equipment in extreme cold is exceptionally difficult in the field. Even shop maintenance cannot be completed with normal speed because equipment must be allowed to thaw out and warm up before the mechanic can make satisfactory repairs. In the field, maintenance must be undertaken under the most difficult of conditions. Bare hands stick to cold metal. Fuel in contact with the hands results in super cooling due to evaporation, and hands can be painfully frozen in a matter of minutes. Engine oils, except subzero grade, cannot be poured at temperatures below -400F. Ordinary greases become as solid as cold butter.

b. These difficulties increase time required to perform maintenance. At temperatures below -400F, maintenance requires up to five times the normal amount of time. Complete winterization, diligent maintenance, and well-trained crews are the key to efficient Arctic winter operation.

c. Refer to FM 9-207 for general information on extreme cold weather maintenance procedures.

4-69. EXTREME HOT WEATHER MAINTENANCE

a. Refer to TB 43-0239 for specific desert maintenance instructions.

b. Corrosion. In hot, damp climates, corrosive action will occur on all parts of the material, and will be accelerated during rainy seasons. Evidence will appear in the form of rust, paint blisters, mildew, mold and fungus growth.

c. Protective Action. Remove the corrosion from exterior metal surfaces with abrasive paper or cloth and apply a protective coating of paint or touch up existing paint. Keep a film of preservative oil on unfinished exposed metal surfaces. Cables and terminals should be protected by spraying with ignition insulation compound.

4-70. MAINTENANCE AFTER FORDING

a. General. Although material unit housings are sealed to prevent the free flow of water into the housings, it must be realized that due to the necessary design of these assemblies, some water may enter, especially during submersion. The following services should be accomplished on all material which has been exposed to some depth of water or completely submerged, especially in salt water. Precautions should be taken as soon as practical to halt deterioration and avoid damage before the material is driven extensively in regular service.

b. Lubricate. Clean and lubricate all parts as specified on the lubrication chart. Remove wheels; clean and lubricate bearings. Make sure that lubricant is generously forced into each lubrication fitting to force out any water present.

c. Electrical Connections. Check all electrical connections for corrosion.

4-70. MAINTENANCE AFTER FORDING (cont)

d. Paint. Clean all exposed painted surfaces and touch up paint where necessary. Coat unpainted metal parts with preservative oil.

e. PMCS Services. Quarterly PMCS Services must be completed within five days after fording operation. Refer to TM 9-238 for further guidance on fording requirements.

4-71. MAINTENANCE AFTER OPERATION ON UNUSUAL TERRAIN

a. Mud. Thorough cleaning and lubrication of all parts affected must be accomplished as soon as possible after operation in mud, particularly when a sea of liquid mud has been traversed. Clean all suspension components and lubricate as specified on the lubrication chart. Lubricate wheel bearings, if necessary.

b. Sand or Dust. Touch up all painted surfaces damaged by sand. Lubricate completely to force out lubricants contaminated by sand or dust.

**CHAPTER 5
DIRECT SUPPORT MAINTENANCE INSTRUCTIONS**

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

Paragraph Number	Title	Page Number
5-1	COMMON TOOLS AND EQUIPMENT	5-1
5-2	SPECIAL TOOLS, TMDE AND SUPPORT EQUIPMENT.....	5-1
5-3	REPAIR PARTS.....	5-1

5-1. COMMON TOOLS AND EQUIPMENT

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

5-2. SPECIAL TOOLS, TMDE AND SUPPORT EQUIPMENT

No special tools, TMDE or equipment are required to maintain the water distributor or semitrailer.

5-3. REPAIR PARTS

Repair parts are listed and illustrated in Appendix F of this manual.

Section II. MAINTENANCE OF THE AXLE ASSEMBLY

Paragraph Number	Title	Page Number
5-4	AXLES.....	5-2
5-5	SPRINGS AND TORQUE ARMS	5-9

5-4. AXLES

THIS TASK COVERS:

- a. Removal
- b. Installation
- c. Alignment of Axles

INITIAL SETUP:

Personnel Required: 2

Tools Required:

Equipment Conditions:

Nomenclature:

Ref

Conditions

General Mechanics

Tool Kit

Jack Stands

2-7

2-21

2-23

Wheels chocked

Landing legs extended

Water tank drained

Semitrailer disconnected from tractor

- a. Removal.

WARNING

The semitrailer must be supported adequately to prevent shifting. Shifting may cause serious personal injury and/or damage to the equipment.

- (1) Raise rear of semitrailer with floor jacks under axle frame. Use jack stands or blocking to securely support axle frame and semitrailer.

NOTE

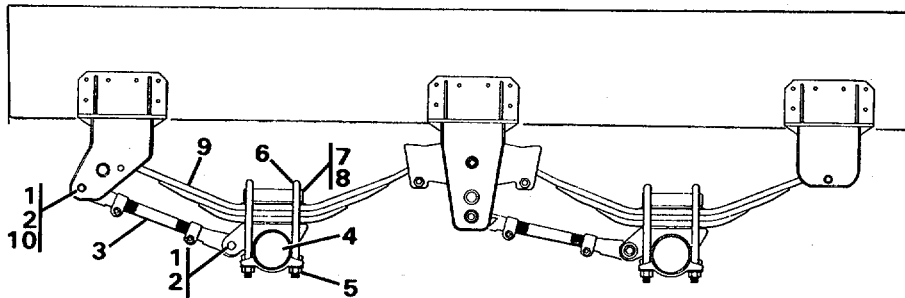
Front and rear axles are removed in the same manner.

- (2) Support ends of axle to be removed with jack stands or suitable blocking.
- (3) Refer to para. 4-37 and remove wheels from axle.
- (4) Disconnect air lines from both brake chambers attached to the axle to be removed. Refer to para. 4-28.

5-4 AXLES (cont)

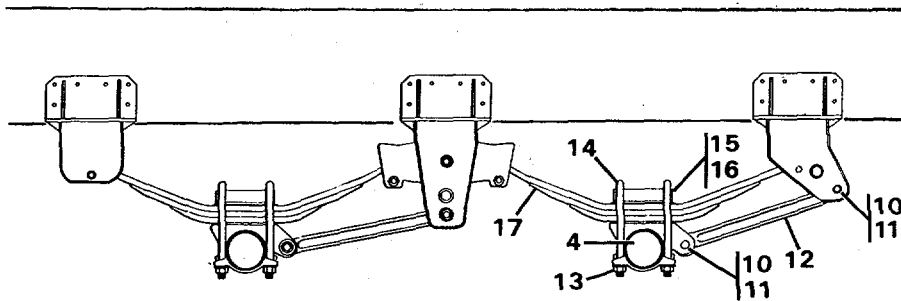
a. Removal (cont).

- (5) Remove two lock nuts (1), bolts (2) and spacer (10) securing adjustable torque arm (3) to axle assembly (4). Separate torque arm from axle.



Axle Assembly (Left Side View)

- (6) Remove four lock nuts (5) and two U-bolts (6) supporting front axle.
 (7) Remove top plate (7) and delrin liner (8) from top of spring (9).
 (8) Working on opposite side of semitrailer, remove two lock nuts (10) and bolts (11) and remove rigid torque arm (12) from axle.



Axle Assembly (Right Side View)

- (9) Remove four lock nuts (13) and U-bolts (14) supporting axle.
 (10) Remove top plate (15) and delrin liner (16) from top of spring (17).

5-4. AXLES (cont)a. Removal (cont).**WARNING**

The axle assembly is heavy and awkward to handle. Use caution, adequate support and assistance during removal. Failure to follow this warning could result in serious injury to personnel.

- (11) Carefully remove jack stands or blocking and remove front axle assembly (4) with attached brake chambers, from semitrailer.
- (12) Remove brake chambers from axle assembly. Refer to para. 4-28.
- (13) Remove brake camshafts and slack adjusters from axle assembly. Refer to para. 4-26.
- (14) Remove brake drums, hub assemblies, and seals and bearings from axle. Refer to para. 4-36.
- (15) Remove brake assemblies from axle. Refer to para. 4-25.

b. Installation.

- (1) Install brake assemblies on axle. Refer to para. 4-25.
- (2) Install bearings, seals, hub assembly and brake drums on axle. Refer to para. 4-36.
- (3) Install brake camshaft and slack adjuster on front axle. Refer to para. 4-26.
- (4) Install brake chambers on axle assembly. Refer to para. 4-28.

WARNING

The axle assembly is heavy and awkward to handle. Use caution, adequate support and assistance during installation. Failure to follow this warning can result in serious injury to personnel.

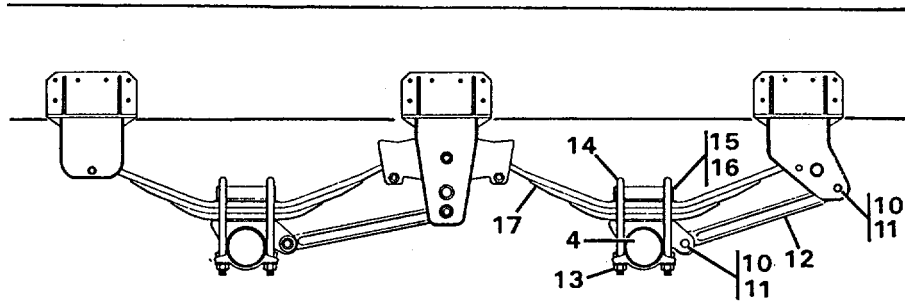
- (5) Carefully raise axle assembly (4) into position under springs (17). Install delrin liner (16) and top plate (15) in place on top of spring (17). Support axle with jack stands or blocking.
- (6) Install two U-bolts (14) over top plate (15) and through hanger welded to bottom of axle. Secure U-bolts (14) with lock nuts (13).

WARNING

It is essential that torque values be maintained to insure proper operation of the suspension system. The torque values of the suspension bolts and nuts must be checked after an initial break-in period of 1,000 miles (1600 km) and every three months thereafter. Failure to do so may cause injury to personnel or damage to the equipment.

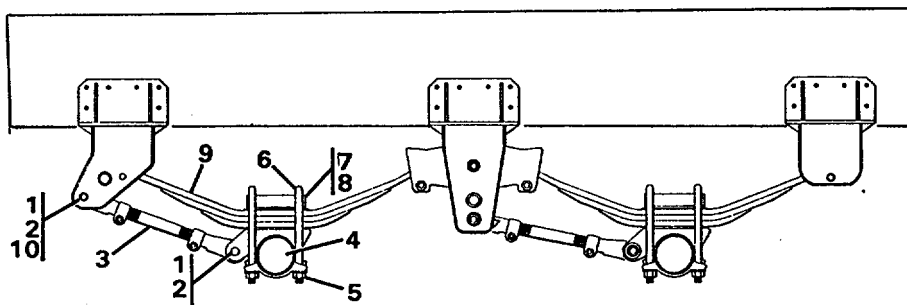
5-4. AXLES (cont)

b. Installation (cont).



Axle Assembly (Right Side View)

- (7) Torque lock nuts (13) to 300 lb-ft (407 Nm) (dry).
- (8) Support rigid torque arm (12) in position between axle and front hanger. Secure torque arm to axle and hanger with bolts (11) and lock nuts (10). Torque lock nuts to 250 lb-ft (330 Nm) (dry).
- (9) Working on opposite side of semitrailer install delrin liner (8) and top plate (7) in spring (9) above front axle (4).



Axle Assembly (Left Side View)

- (10) Install two U-bolts (6) over springs and through hanger welded to axle (4).
- (11) Secure U-bolts (6) to axle hanger with lock nuts (5). Tighten lock nuts (5) to a torque of 300 lb-ft (407 Nm) (dry).
- (12) Support adjustable torque arm (3) between front hanger and axle hanger. Secure torque arm with two bolts (2), spacer (10) and lock nuts (1). Tighten lock nuts (1) to a torque of 250 lb-ft (330 Nm) (dry).
- (13) Refer to para. 4-25 and install brake assemblies on axle assembly.
- (14) Refer to para. 4-36 and install seals and bearings, hub assembly and brake drums on axle assembly.

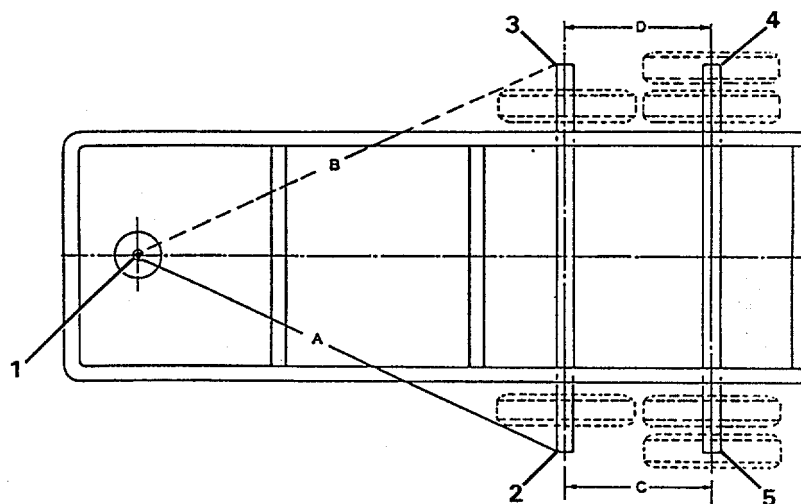
5-4. AXLES (cont)

b. Installation (cont).

- (15) Refer to para. 4-36 and install seals and bearings, hub assemblies and brake drums on axle assembly.
- (16) Refer to para. 4-26 and install slack adjusters and brake camshafts on axle assembly.
- (17) Refer to para. 4-28 and install brake chambers on axle assembly.
- (18) Raise rear of axle frame with floor jacks and remove jack stands or blocking. Lower semitrailer to rest on wheels. Remove floor jacks.
- (19) Refer to para. 4-28 and connect air lines to top of brake chambers.
- (20) Check axle alignment (para. c below).

c. Alignment of Axles.

- (1) Move the semitrailer forward and backward over a level surface two or three times with the last movement forward.



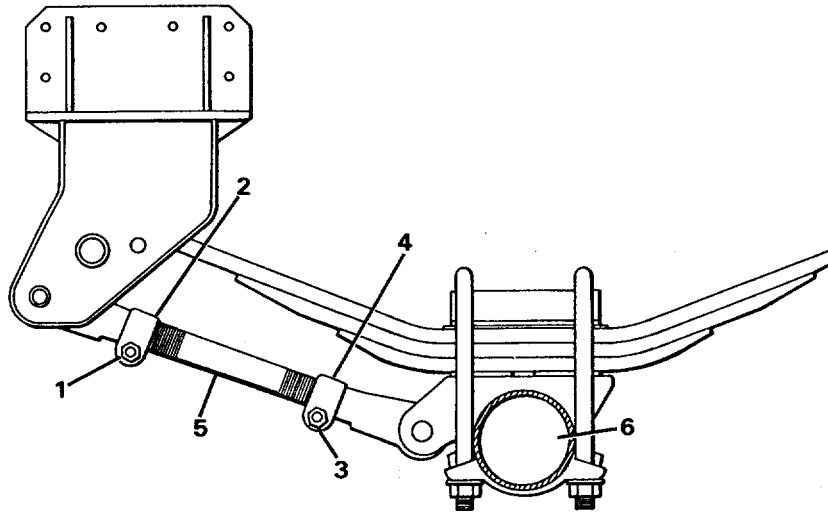
Axle Alignment

- (2) Moving the semitrailer permits the suspension to become correctly aligned to center the front and rear wheel tracks.
- (3) Disconnect the tractor from the semitrailer. Refer to para. 2-23. Refer to para. 3-9 and cage brake chambers.
- (4) Raise or lower the front of the semitrailer with the landing legs to bring the semitrailer to a level position.

5-4. AXLES (cont)

c. Alignment of Axles (cont).

- (5) Refer to para. 4-37 and remove outer wheels and tires from the front axle.
- (6) Use a steel tape and measure the distance (A) from kingpin (1) to the center point (2) of front axle spindle. Record this measurement. Measure distance (B) from kingpin (1) to the center point (3) of other front axle spindle. The distances must be within 1/8 in. (3.2 mm) of each other.
- (7) If front axle alignment does not meet the distance listed above, adjust as follows:

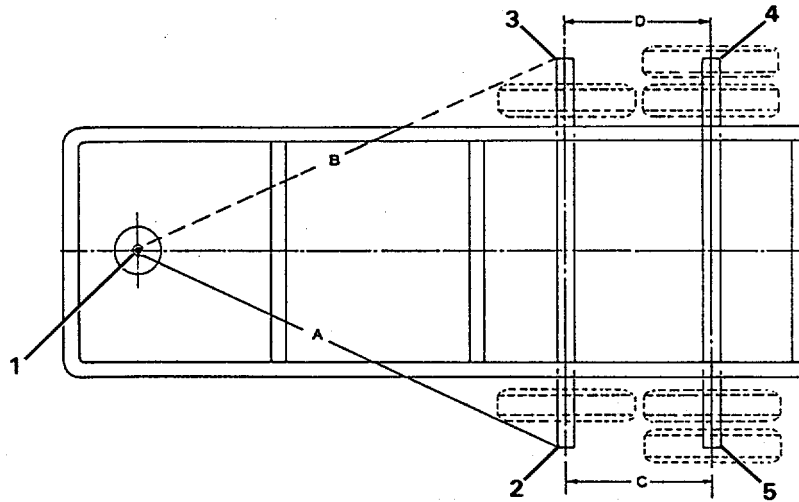


Front Axle Alignment

- (a) Loosen nuts (1 and 3) to disengage clamps (2 and 4) and free adjusting rod (5).
- (b) Turn adjusting rod (5) to lengthen or shorten torque rod as required. Tighten nuts (1 and 3) securely.
- (c) Recheck axle alignment. Refer to para. (6) above. If alignment is still incorrect, continue to make adjustments to adjustable torque rod until front axle is aligned. When alignment is correct, tighten nuts (1 and 3) to a torque of 150 lb-ft (202 Nm) (dry).
- (8) With the front axle aligned measure distance (C) between mid point of front axle (2) and mid point of rear axle (5). Record this measurement. Measure distance (D) between mid points on other end of axle at points (3) and (4). Distances must be within 1/16 in. (1.6 mm).
- (9) If distances are not within the requirement listed above, check axle suspension for wear and fasteners for proper torque. Adjust alignment as follows:
 - (a) Loosen nuts (1 and 3) to disengage clamps (2 and 4) and free adjusting rod (5).

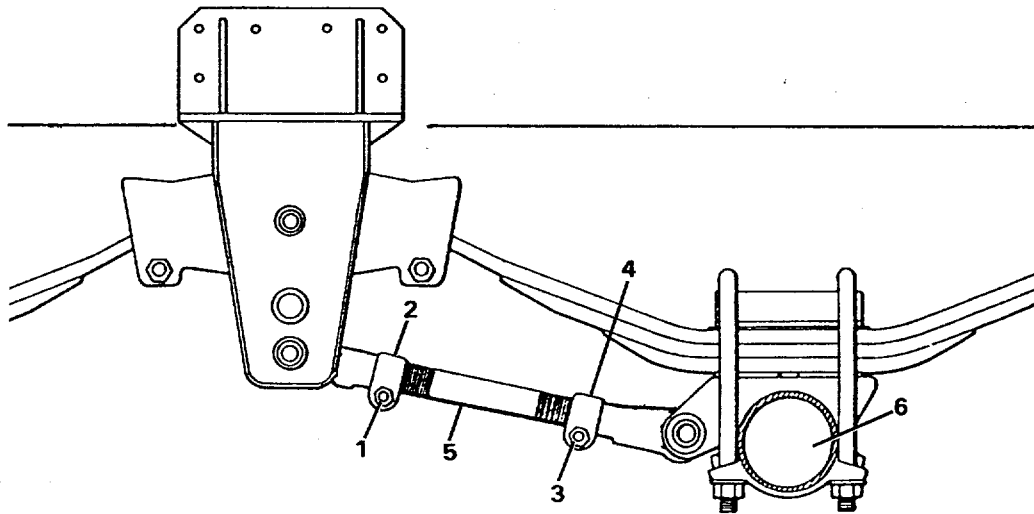
5-4. AXLES (cont)

c. Alignment of Axles (cont).



Axle Alignment

- (b) Turn adjusting rod (5) to lengthen or shorten torque rod as required. Tighten nuts (1 and 3) securely.



Rear Axle Alignment

- (c) Lower axle and remove jack stand. Recheck axle alignment. Refer to para. (8) above. If alignment is still incorrect, continue to make adjustments to adjustable torque rod until rear axle is aligned. When alignment is correct, tighten nuts (1 and 3) to a torque of 150 lb-ft (202 Nm).

5-4. AXLES (cont)

c. Alignment of Axles (cont).

(d) Refer to para. 3-9 and uncage brake chambers. Refer to para. 4-37 and install outer wheels and tires on front axle.

5-5. SPRINGS AND TORQUE ARMS

THIS TASK COVERS:

- a. Spring Removal
- b. Spring Installation

- c. Torque Arm Removal
- d. Torque Arm Installation

INITIAL SETUP:

Personnel Required: 2

Tools Required:

Equipment Conditions:

Nomenclature:

Ref

Conditions

General Mechanics
Tool Kit

2-7
3-9
4-37
5-4

Landing legs extended
Brake chambers caged
Wheels removed
Axles removed

- a. Spring Removal.

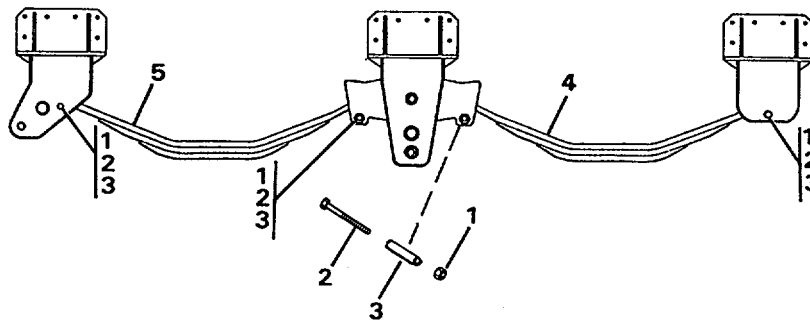
WARNING

The semitrailer must be supported adequately to prevent shifting. Shifting may cause serious personal injury and/or damage to equipment.

- (1) Support rear spring (4) and remove two lock nuts (1) and bolts (2). Remove two spring rollers (3) and remove rear spring (4).
- (2) Support front spring (5) and remove two remaining lock nuts (1) and bolts (2). Remove two spring rollers (3) and remove front spring (5).
- (3) Repeat operations (1) and (2) above and remove springs (4 and 5) from right side of axle frame.

5-5. SPRINGS AND TORQUE ARMS (cont)

a. Spring Removal (cont).

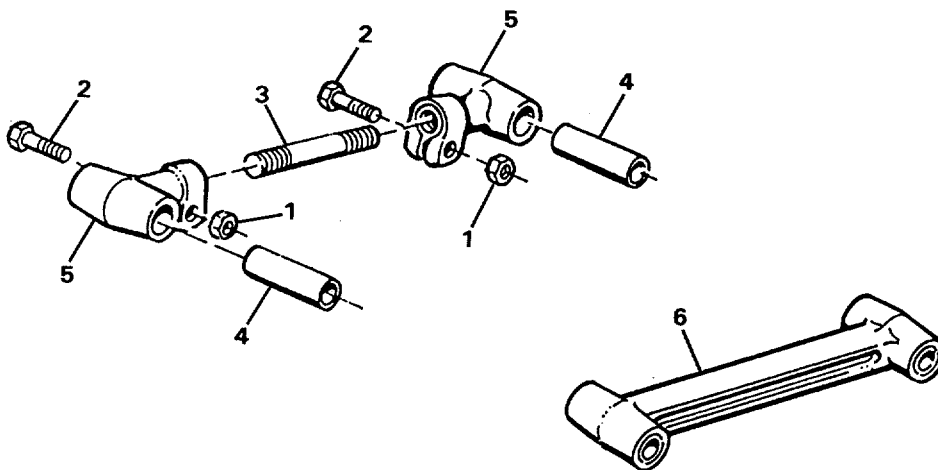


Axle Springs

b. Spring Installation.

- (1) Carefully lift front spring (5) into position between hangers.. Install two spring rollers (3) in position beneath curves in ends of spring leaf.
- (2) Install two bolts (2) and nuts (1) to secure rollers beneath spring. Tighten nuts securely, but do not over tighten. Spring rollers must be free to turn.
- (3) Repeat operations (1) and (2) to install the remaining three springs on the axle frame.
- (4) Refer to para. 5-4 and install axle assemblies.
- (5) Check axle alignment as described in para. 5-4. Adjust alignment if necessary.

c. Torque Arm Removal.



Torque Arms

5-5. SPRINGS AND TORQUE ARMS (cont)

c. Torque Arm Removal (cont).

- (1) Refer to para. 5-4 and remove adjustable and rigid torque arms from the axle assembly.
- (2) Remove two nuts (1) and screws (2). Remove adjusting rod (3) from torque rod.
- (3) Use a suitable brass drift or press and drive two bushings (4) from torque rod clevises (5).

d. Torque Arm Installation.

- (1) Press two new bushings (4) into torque rod clevises (5).
- (2) Install adjusting rod (3) in clevises. Install two bolts (2) through clamps and secure with nuts
- (1) Do not tighten completely until axle alignment is complete.
- (3) Refer to para. 5-4 to install adjustable torque arms and rigid torque arms, axle assemblies and align the axles.
- (4) Refer to para. 5-4 and install axles.
- (5) Refer to para. 4-37 and install wheels.
- (6) Refer to para. 3-9 and cage brake chambers.

Section III. MAINTENANCE OF ENGINE

Paragraph Number	Title	Page Number
5-6	ENGINE ASSEMBLY	5-12
5-7	CYLINDER HEAD	5-17
5-8	CRANKSHAFT PULLEY.....	5-22
5-9	FLYWHEEL AND RING GEAR	5-24
5-10	FLYWHEEL HOUSING	5-27
5-11	OIL PAN	5-29
5-12	OIL PUMP AND OIL PRESSURE REGULATING VALVE.....	5-32
5-13	EXHAUST MANIFOLD	5-37
5-14	INTAKE MANIFOLD	5-38
5-15	FUEL INJECTORS	5-40
5-16	FUEL INJECTION PUMP	5-42
5-17	FUEL TRANSFER PUMP	5-49
5-18	ENGINE WATER PUMP	5-50

5-6. ENGINE ASSEMBLY

THIS TASK COVERS:

- a. Removal
- b. Installation

INITIAL SETUP:

Tools Required:

Nomenclature:

General Mechanics
Tool Kit

Crane or lifting device

Equipment/Materials Required:

Tags (Item 14, Appendix E)

Personnel Required: 2

Equipment Conditions:

<u>Ref.</u>	<u>Conditions</u>
4-22	Battery cables disconnected
4-50	Fuel lines disconnected
4-55	Muffler removed
4-56	Engine housings removed

- a. Removal.

WARNING

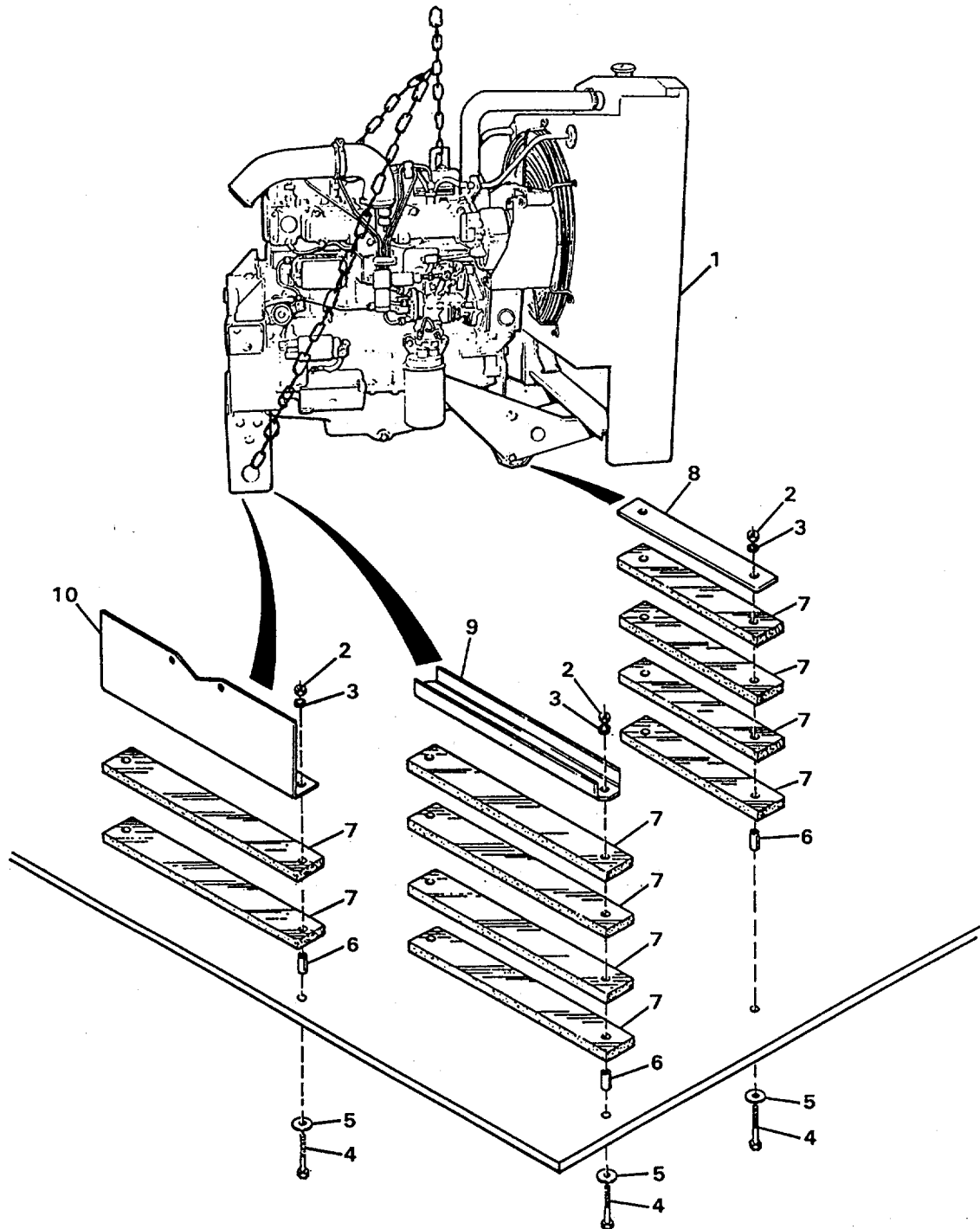
Electrical shock hazard exists. Disconnect battery cables (para. 4-22).

(1) Tag and disconnect electric lines leading from engine relay panel to engine and water spray system as follows:

- (a) Disconnect wires from spray valve solenoid valves (para. 4-60).
- (b) Disconnect wires from liquid level transmitter (para. 4-24).
- (c) Disconnect cables from engine (para. 4-23).
- (d) Disconnect wires from throttle actuator (para. 4-54).
- (e) Disconnect wires from alternator (para. 4-58).
- (f) Disconnect wires from oil pressure switch and water temperature switch (para. 4-46B).
- (g) Disconnect wire from fuel injection pump (para. 5-16).
- (h) Disconnect two wires from starter (para. 4-59).
- (i) Disconnect wire from glow plug (para. 4-46C).
- (j) Remove engine relay panel (para. 4-12).

5-6. ENGINE ASSEMBLY (cont)

a. Removal (cont).



Removal and Installation of Engine

5-6. ENGINE ASSEMBLY (cont)**a. Removal (cont).**

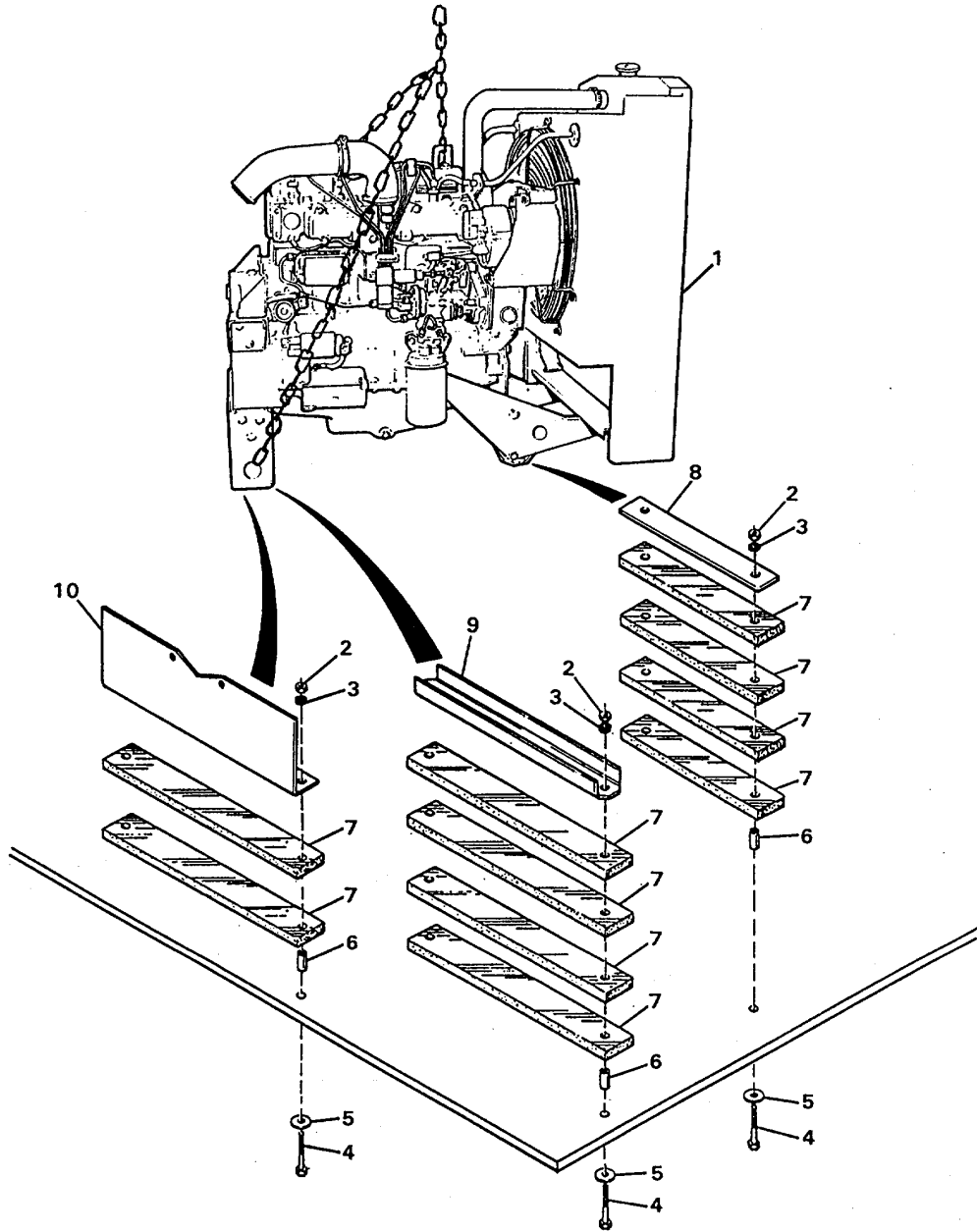
- (2) Disconnect brace supporting water piping from engine flywheel housing (para. 4-6).
- (3) Remove water distributor pump (para. 5-19).
- (4) Attach a suitable lifting device or chain to lifting eye at front of engine and to rear engine mounting bracket.
- (5) Remove four nuts (2), lockwashers (3), screws (4) and flat washers (5).
- (6) Carefully lift engine assembly (1) to clear plates (8 and 9). Remove four spacers (6), eight resilient mounts (7), and plates (8 and 9) from beneath engine.
- (7) Carefully lift engine from rear of semitrailer. Guide engine to prevent engine from swinging. Swing engine assembly away from semitrailer. Lower engine onto a suitable engine stand or supports.
- (8) Remove chains and lifting device from engine.
- (9) Remove two nuts (2), lockwashers (3), screws (4), four washers (5) and remove two spacers (6), pump bracket (10) and resilient mounts (7) from semitrailer.
- (10) Remove pump drive plate and pilot bearing from engine (para. 5-19).

b. Installation.

- (1) Place pump bracket (10) in position with two resilient mounts (7). Secure bracket with two spacers (6), four washers (5), two screws (4), lockwashers (3) and nuts (2).
- (2) Place eight resilient mounts (7) and plates (8 and 9) in position on semitrailer.
- (3) Attach chains to lifting bracket at front of engine and to rear engine mounting bracket.
- (4) Attach chains to crane or lifting device. Carefully lift engine up on rear platform of semitrailer. Lower engine assembly (1) into position on plates (8 and 9).
- (5) Install four spacers (6), eight washers (5) and four screws (4) from beneath frame through plates (8 and 9) and engine mounting brackets.
- (6) Secure engine assembly in position with four lockwashers (3) and nuts (2).
- (7) Attach water pump brace to engine flywheel housing (para. 4-60).

5-6. ENGINE ASSEMBLY (cont)

a. Installation (cont).



Removal and Installation of Engine

5-6. ENGINE ASSEMBLY (cont)

b. Installation (cont).

- (8) Install pilot bearing, drive plate and water distributor pump on engine flywheel and flywheel housing (para. 5-19).
- (9) Install engine housings (except roof) (para. 4-56).
- (10) Install engine relay panel on engine rear housing (para. 4-12).
- (11) Connect engine wiring (para. 4-59A).
- (12) Connect fuel lines (para. 4-50).
- (13) Install muffler (para. 4-55).
- (14) Install engine housings (para. 4-56).

5-7. CYLINDER HEAD

THIS TASK COVERS:

- a. Removal
- b. Installation

INITIAL SETUP:

Tools Required

Nomenclature:

General Mechanics
Tool Kit

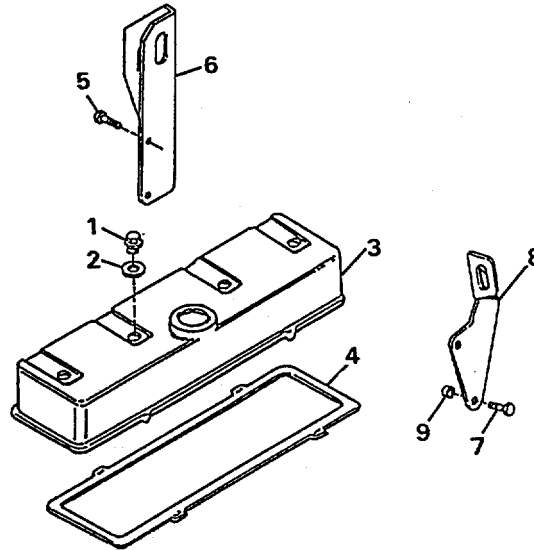
Equipment Conditions:

<u>Ref.</u>	<u>Conditions</u>
4-46C	Glow plugs removed
4-56	Engine housing, radiator shroud and radiator removed
4-57	Fan and fan belt removed
5-13	Exhaust manifold removed
5-14	Intake manifold removed
5-15	Fuel injectors removed

Personnel Required: 2

a. Removal.

- (1) Remove four rocker cover cap nuts (1).
- (2) Remove four rocker cover cap nut gaskets (2) and discard.

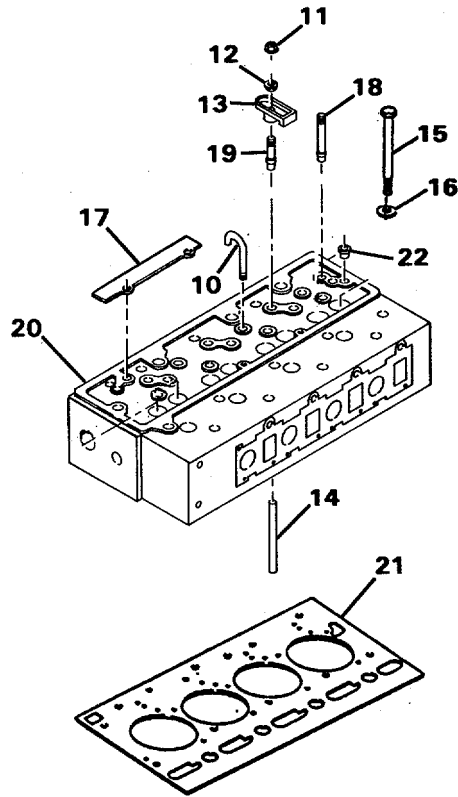


Rocker Cover and Supports

- (3) Remove rocker cover (3) with gasket (4).
- (4) Remove rocker cover gasket (4) and discard.
- (5) Remove two screws (5) and remove stabilizer support (6) from cylinder head. Remove two screws (7) and remove radiator support (8) and spacer (9) from cylinder head.

5-7. CYLINDER HEAD (cont)a. Removal (cont).

- (6) Remove two breather tubes (10).



Removal and Installation of Cylinder Head

CAUTION

Do not use an air wrench to remove or install rocker arm locknuts. This will destroy the selflocking feature of the locknut.

Keep rocker arms, rocker arm balls, flat washers, rocker arm locknuts, and push rods order, so they go back in the same valve train position.

- (7) Remove eight rocker arm locknuts (11), eight rocker arm balls (12), eight rocker arms (13), and eight push rods (14). Remove four studs (18) and four studs (19).
- (8) Remove eighteen screws (15).
- (9) Remove fourteen flat washers (16).
- (10) Remove two push rod guides (17).

5-7. CYLINDER HEAD (cont)

a. Removal (cont).

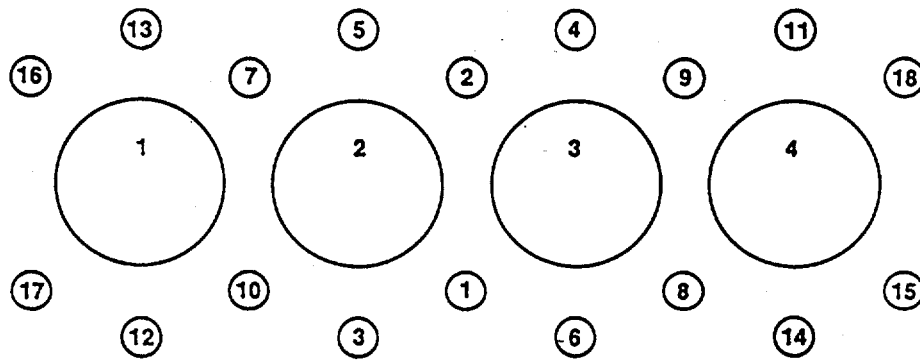
- (11) Remove cylinder head assembly (20) by lifting straight up. Remove pipe plug (22).
- (12) Set cylinder head (20) flat on wooden supports to protect machined surfaces.
- (13) Remove cylinder head gasket (21).

NOTE

Thoroughly clean all mating surfaces of head and block.

b. Installation.

- (1) Install new cylinder head gasket (21) on cylinder block assembly being sure that gasket mates properly with two cylinder head alignment pins.
- (2) Install cylinder head (20) on cylinder block assembly being sure that cylinder head mates properly with two cylinder head alignment pins. Install pipe plug (22).
- (3) Install eighteen screws (15) with fourteen flat washers (16) and two push rod guides (17) and torque first to 50 lb-ft (65 Nm) (wet) per the torque sequence illustration shown below. Tighten screws in the same sequence to a final torque of 95 lb-ft (129 Nm) (wet).



Cylinder Head Bolt Torque Sequence

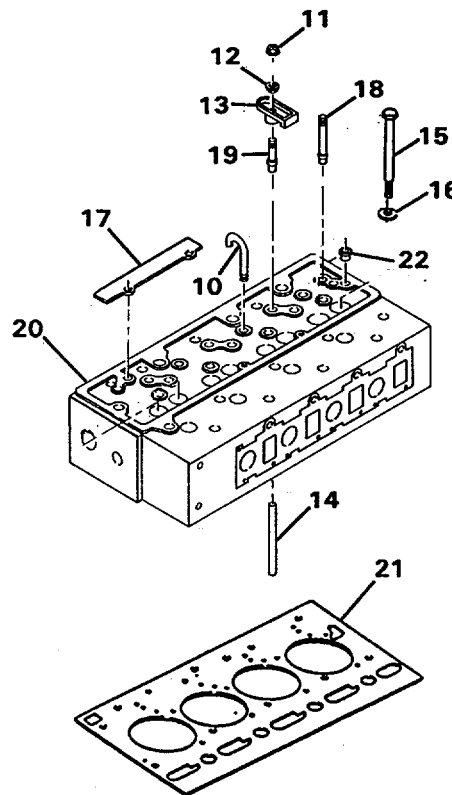
5-7. CYLINDER HEAD (cont)

b. Installation (cont).

CAUTION

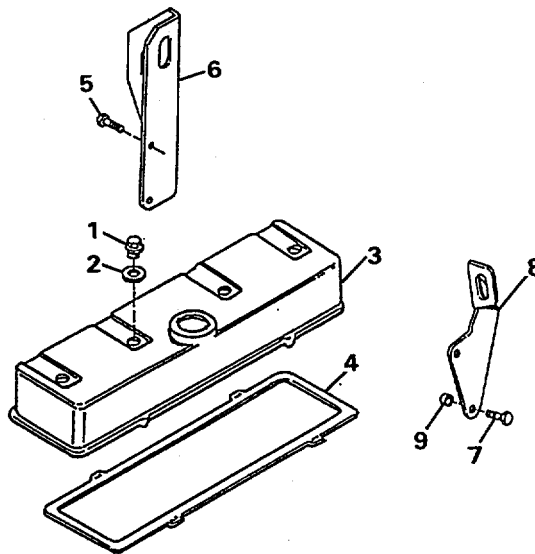
Push rods, rocker arms, rocker arm balls, flat washers and rocker arm lock nuts must be installed in the original positions they were removed from.

- (4) Install four studs (18) and four studs (19). Tighten studs to a torque of 39 lb-ft (52 Nm) (wet).
- (5) Install eight push rods (14), eight rocker arms (13), eight rocker arm balls (12), and eight rocker arm locknuts (11).
- (6) Adjust valve lash (para. 4-47).
- (7) Install two breathers (10).
- (8) Install supports (6 and 8) and spacer (9) on cylinder head (20). Secure supports with two screws (7) and two screws (5).
- (9) Install rocker cover gasket (4) inside rocker cover.



Removal and Installation of Cylinder head

5-7. CYLINDER HEAD (cont)

b. Installation (cont).

Rocker Cover and Supports

- (10) Install rocker cover (3).
- (11) Install rocker cover cap nut gaskets (2) on rocker cover cap nuts (1).
- (12) Install rocker cover cap nuts (1) and torque to 13 lb-ft (18 Nm) (wet).
- (13) Install fan and fan belt. Refer to para. 4-57.
- (14) Install radiator assembly. Refer to para. 4-56.
- (15) Install fuel injectors. Refer to para. 5-15.
- (16) Install intake manifold. Refer to para. 5-14.
- (17) Install exhaust manifold. Refer to para. 5-13.
- (18) Install glow plugs. Refer to para. 4-46C.
- (19) Install engine housing. Refer to para. 4-56.

5-8. CRANKSHAFT PULLEY

THIS TASK COVERS:

- | | |
|---------------|-----------------|
| a. Removal | c. Installation |
| b. Inspection | |

INITIAL SETUP:

Tools Required:

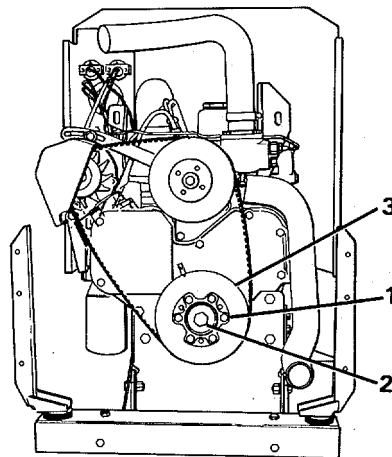
Nomenclature:

General Mechanics
 Tool Kit
 Pulley Puller

Equipment Conditions:

<u>Ref.</u>	<u>Conditions</u>
4-56	Radiator shroud and radiator removed
4-57	Fan and fan belt removed

- a. Removal.



Removal and Installation of Crankshaft Pulley

- (1) Remove three plastic plugs (1). Two of these plugs must be opposite each other.

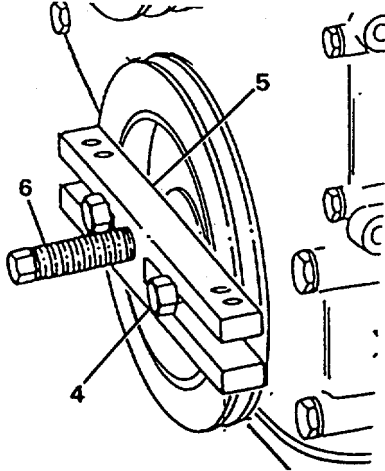
NOTE

Puller installs into two tapped holes opposite each other on pulley. Third hole is for 1/4" diameter metal rod used to lock crankshaft.

- (2) Insert 1/4" dia. metal rod into third hole and rotate engine counterclockwise until rod catches block and locks crank.
- (3) Loosen pulley retaining capscrew (2).

5-8. CRANKSHAFT PULLEY (cont)a. Removal (cont).

- (4) Turn pulley retaining capscrew (2) out approximately 1/2" (13 mm).



Removal of Crankshaft Pulley

- (5) Thread two capscrews (4) through puller (5) into tapped holes in pulley.
 (6) Tighten puller screw (6) to remove pulley.

NOTE

To assist in loosening pulley from crankshaft, strike puller screw with a soft-faced hammer.

- (7) With pulley loose on crankshaft, remove puller tools.
 (8) Remove crankshaft pulley retaining capscrew (2), washer and pulley (3).

B Inspection.

Inspect pulley for any burrs, nicks, or gouges in crankshaft mating area; remove if present.

C Installation.

- (1) Install pulley (3) and crankshaft pulley retaining capscrew (2) with washer, being sure that groove in pulley aligns with Woodruff key in crankshaft.
 (2) Torque crankshaft pulley retaining capscrew (2) to 98 lb-ft (133 Nm) (wet).
 (3) Install plastic plugs (1) in pulley.

5-8. CRANKSHAFT PULLEY (cont)

c. Installation (cont).

(4) Refer to para. 4-57 and install fan and fan belt.

(5) Refer to para. 4-56 and install radiator and shroud.

5-9. FLYWHEEL AND RING GEAR

THIS TASK COVERS:

- a. Removal
- b. Inspection
- c. Disassembly

- d. Replacement
- e. Installation

INITIAL SETUP:

Personnel Required: 2

Tools Required:

Equipment Conditions:

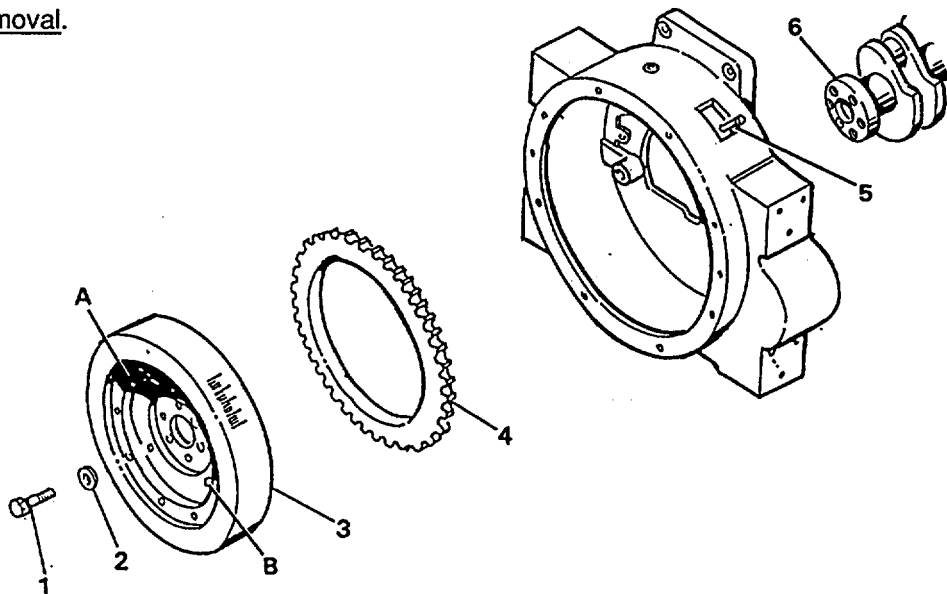
Nomenclature:

- General Mechanics
- Tool Kit
- Long capscrews, sling
- Threaded rods, crane or lifting device

<u>Ref.</u>	<u>Conditions</u>
5-6	Engine Removed
5-19	Pump Drive Plate Removed

a. Removal.

noval.



Removing Flywheel

5-9. FLYWHEEL AND RING GEAR (cont)

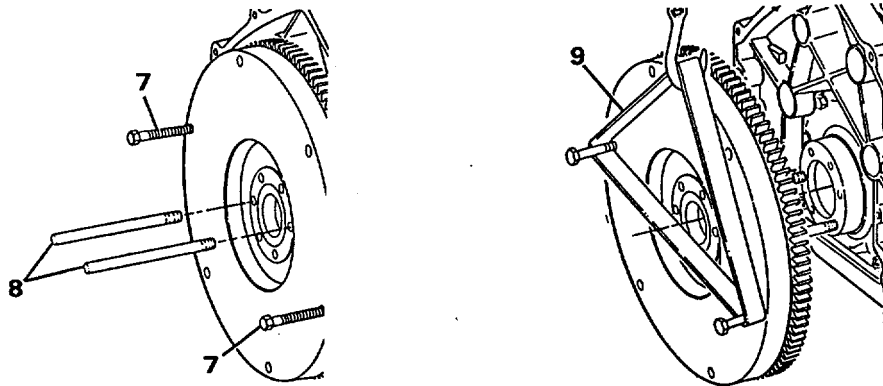
a Removal (cont).

- (1) Remove six capscrews (1) and six flat washers (2) that secure flywheel to crankshaft.
- (2) Install two long capscrews (7) in outer holes in flywheel face 180° apart (locations "A" and "B") to serve as handles.
- (3) Install two M10 x 1.75 threaded rods (8) into flywheel mounting holes. These rods will support the flywheel as it comes off the flywheel flange.
- (4) Install sling (9) on capscrews (7). Attach lifting device to sling.
- (5) Pull outward on two capscrews to remove flywheel (3).

NOTE

If flywheel cannot be removed with a direct pull and shaking of the handles, it may be necessary to remove the starter and tap the flywheel loose. Rotate flywheel and tap exposed area at intervals until flywheel comes loose.

- (6) Remove flywheel (3) with ring gear (4).
- (7) Remove sling (9). Remove rods (8) and capscrews (7) from flywheel and crankshaft.



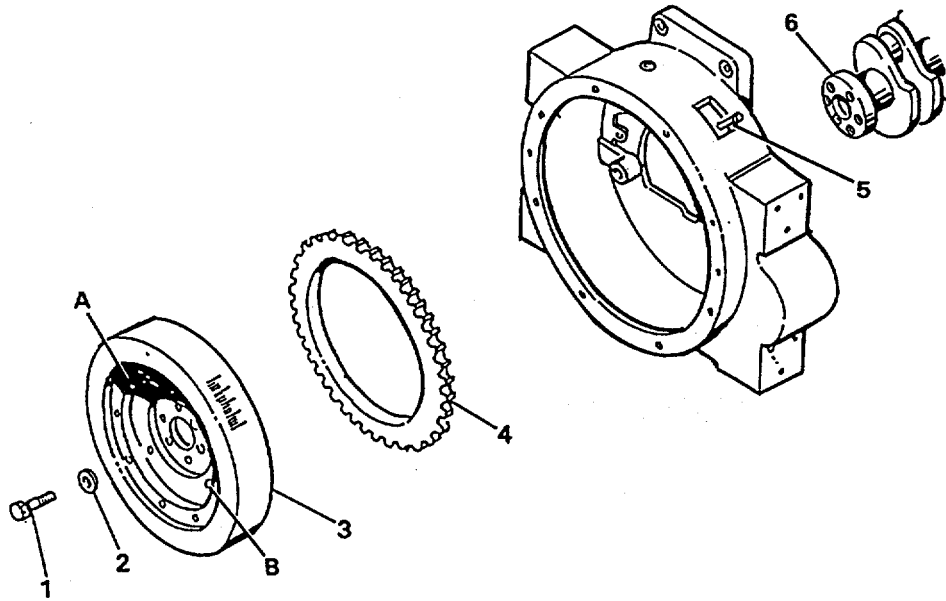
Removal and Installation of Flywheel

b Inspection.

- (1) Inspect flywheel surface where it mates to crankshaft flange, and remove any burrs or nicks.
- (2) Inspect ring gear for any cracked, chipped or broken teeth.

5-9. FLYWHEEL AND RING GEAR (cont)

- c. Disassembly.
- (1) Grind through ring gear (4) at base of one of the teeth until ring gear separates.
 - (2) Drive severed ring gear off flywheel, using a hammer and drift.
- d. Replacement.
- (1) Heat new ring gear to 365°-383°F (185°-195°C).
 - (2) Quickly drive heated ring gear onto flywheel down against shoulder.
- e. Installation.



Removal and Installation of Flywheel

- (1) Install threaded rods (8) in crankshaft. Install long capscrews (7) in flywheel face. Attach sling (9) and lifting device. Lift flywheel in position in flywheel housing.
- (2) Align alignment pin (5) and install flywheel (3) on crankshaft flange (6).
- (3) Install six capscrews (1) with six flat washers (2) in flywheel (3).
- (4) Torque six capscrews (1) to 50 lb.-ft (68 Nm) (wet) using a star pattern torque sequence.
- (5) Refer to para. 5-19 and install pump drive plate on flywheel. Refer to para. 5-6 and install engine.

5-10. FLYWHEEL HOUSING

THIS TASK COVERS:

- | | |
|---------------|-----------------|
| a. Removal | c. Installation |
| b. Inspection | |

INITIAL SETUP:

Personnel Required: 2

Tools Required:

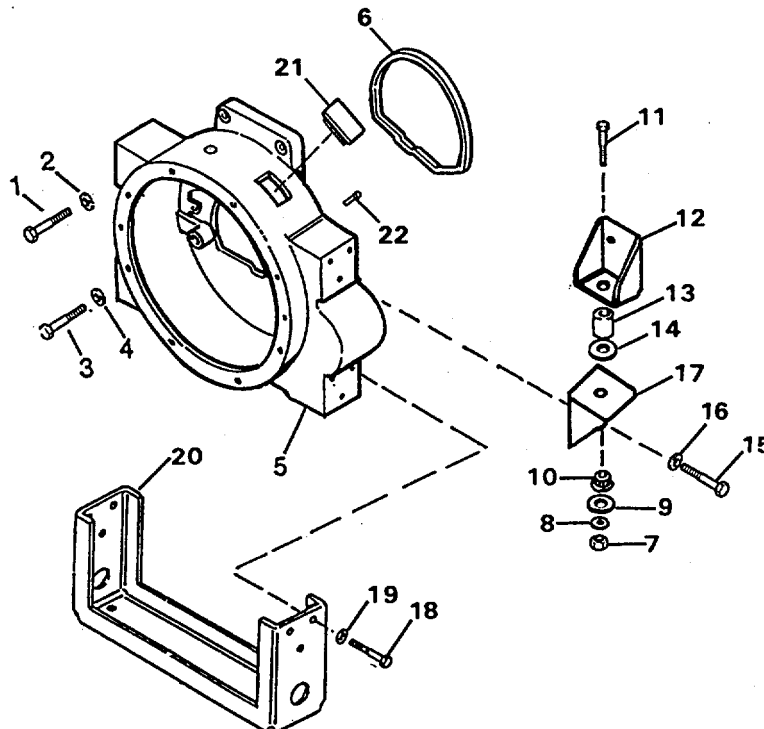
Equipment Conditions:

Nomenclature:

<u>Ref.</u>	<u>Conditions</u>
4-59	Starter motor removed
5-6	Engine removed
5-9	Flywheel and ring gear removed

a. Removal.

- (1) Attach a chain and hooks to the flywheel housing (5). Lift housing and rear of engine to clear floor. Place wooden blocking under oil pan and rear of engine forward of flywheel housing to prevent engine from tipping backwards when flywheel housing is removed.



Removal and Installation of Flywheel Housing

- (2) Remove two capscrews (1) with flat washers (2) from top of flywheel housing.

5-10. FLYWHEEL HOUSING (cont)

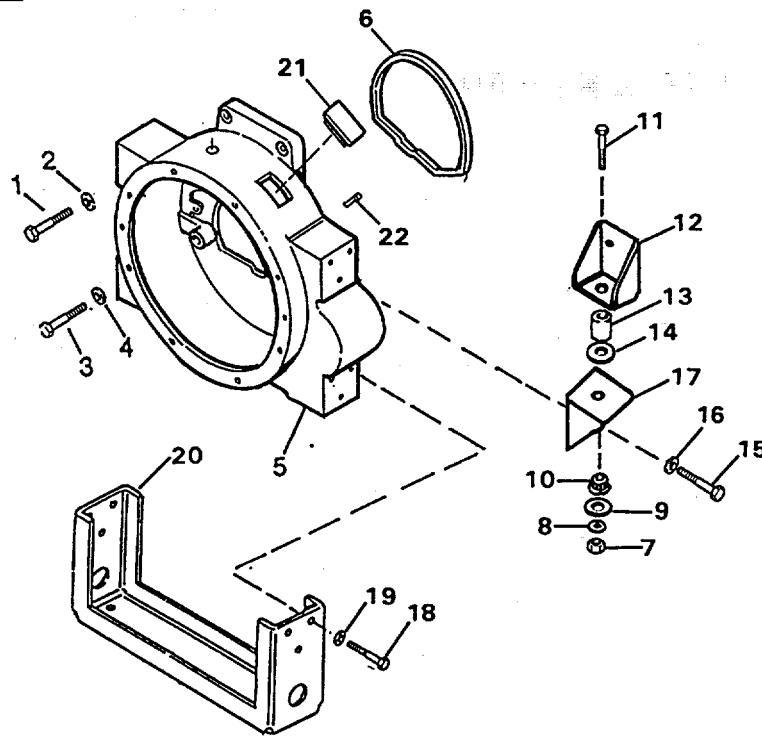
a. Removal (cont).

- (3) Remove four capscrews (3) with flat washers (4) from inside of flywheel housing.
- (4) Tap flywheel housing (5) with a soft-faced hammer to loosen.
- (5) Lift and move flywheel housing straight back until it clears the alignment dowels. Remove housing from engine.
- (6) Remove flywheel housing seal (6). Remove plug (21) and aligning pin (22).
- (7) Remove two nuts (7), lockwashers (8), flat washers (9) and resilient mounts (10). Remove two screws (11), rear brackets (12), spacers (13) and resilient mounts (14) from both sides of the flywheel housing (5).
- (8) Remove four screws (15) and flat washers (16) and remove right and left rear brackets (17) from flywheel housing.
- (9) Remove six screws (18) and lock washers (19) and remove rear engine bracket (20) from flywheel housing (5).

b. Inspection.

Inspect flywheel housing for cracks or other damage.

c. Installation.



Removing and Installing Flywheel Housing

5-10. FLYWHEEL HOUSING (cont)

c. Installation (cont).

- (1) Install rear engine bracket (20) on flywheel housing (5) and secure with six lockwashers (19) and screws (18). Install plug (21) and aligning pin (22) in housing (5).
- (2) Install new flywheel housing seal (6) in flywheel housing (5).
- (3) Attach chains and lifting device to flywheel housing (5). Install flywheel housing (5), being sure that the alignment dowels in engine crankcase properly mate with alignment holes in flywheel housing. Remove lifting device.
- (4) Install four capscrews (3) with flat washers (4) and torque to 62 lb-ft (84 Nm) (wet).
- (5) Install two capscrews (1) with flat washers (2) and torque to 62 lb-ft (84 Nm) (wet).
- (6) Install flywheel (para. 5-9) and starter motor (para. 4-59).
- (7) Install left rear bracket (17) and right rear bracket (17) on each side of flywheel housing (5). Secure brackets with four flat washers (16) and screws (15).
- (8) Install two resilient mounts (14) and spacers (13) on rear engine brackets (17). Install screws (11) through rear brackets (12). Install resilient mount (10) and secure brackets and mounts with flat washers (9), lock washer (8) and nuts (7).
- (9) Install engine (para. 5-6).

5-11. OIL PAN

THIS TASK COVERS:

- | | |
|---|------------------------|
| <p>a. Removal</p> <p>b. Cleaning and Inspection</p> | <p>c. Installation</p> |
|---|------------------------|

INITIAL SETUP:

Tools Required:

Nomenclature:

General Mechanics
Tool Kit

Equipment/Materials Required:

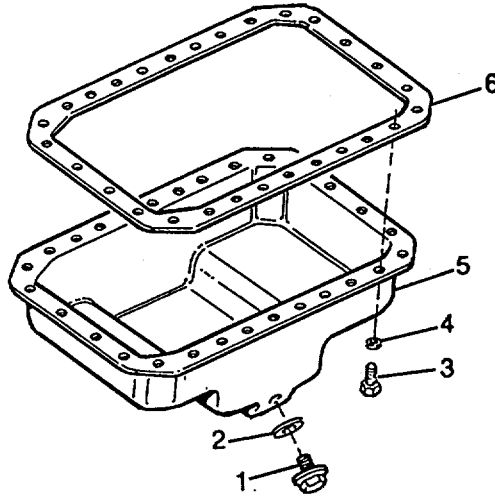
Rags (Item 6, Appendix E)
Cleaning Solvent (Item 13, Appendix E)
Goggles (Item 9, Appendix E)

Equipment Conditions:

<u>Ref.</u>	<u>Conditions</u>
2-14	Engine shut off
3-2	Engine oil drained
4-56	Engine door removed

5-11. OIL PAN (cont)a. Removal.

- (1) Remove twenty-eight screws (3) and Belleville washers (4) securing oil pan (5) to engine block.
- (2) Tap oil pan (5) loose with plastic or rubber mallet, and remove oil pan and gasket (6).

b. Cleaning and Inspection.

Removal and Installation of Oil Pan

WARNING

Wear protective goggles when using the cleaning solvent. Avoid contact with the eyes. If contact occurs, flush eyes with cold water for 5 minutes and seek immediate medical attention. Dry cleaning solvent (PD-680) is both toxic and flammable. Avoid prolonged breathing of vapors. Avoid skin contact. Use only in a well-ventilated area. Keep away from open flame. Flash point of solvent is 138°F (59°C).

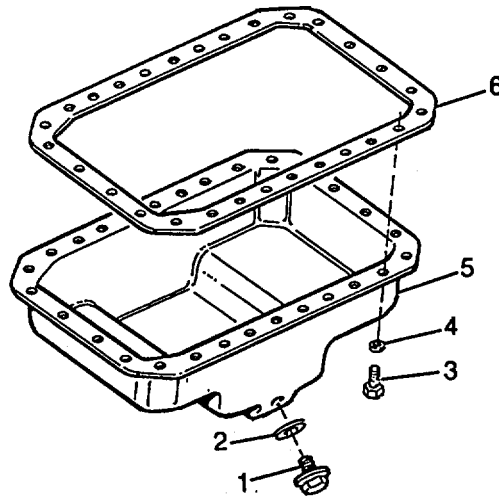
- (1) Wash oil pan in PD-680 cleaning solvent.
- (2) Scrape all old gasket material from oil pan and cylinder block.
- (3) Inspect oil pan for cracks and other damage. Inspect drain plug boss for oil leakage or damaged threads.

5-11. OIL PAN (cont)c Installation.

- (1) Install new gasket (6) on oil pan (5).
- (2) Install oil pan (5) on cylinder block, holding in position with a screw (3) and Belleville washer (4) in each corner.
- (3) Install remaining twenty-six screws (3) and washers (4), but do not tighten until all screws are started, so that oil pan can be shifted if necessary.

CAUTION

To avoid distorting oil pan and causing leaks, do not over-torque screws.



Removal and Installation of Oil Pan

- (4) Tighten all screws to a torque of 8 lb-ft (1.1 Nm) (wet), starting at center and working out to each end.
- (5) Install oil plug (1) with washer (2) in oil pan (5) and tighten securely.
- (6) Fill oil pan to proper level with specified engine oil. Refer to para. 3-2.
- (7) Install engine door. Refer to para. 4-56.

5-12. OIL PUMP AND OIL PRESSURE REGULATING VALVE

THIS TASK COVERS:

- | | |
|-------------------------------------|----------------------------------|
| a. Removal | c. Installation |
| b. Cleaning, Inspection, and Repair | d. Oil Pressure Regulating Valve |

INITIAL SETUP:

Tools Required:

Nomenclature:

General Mechanics
 Tool Kit
 Valve Spring Tester

Equipment/Materials Required:

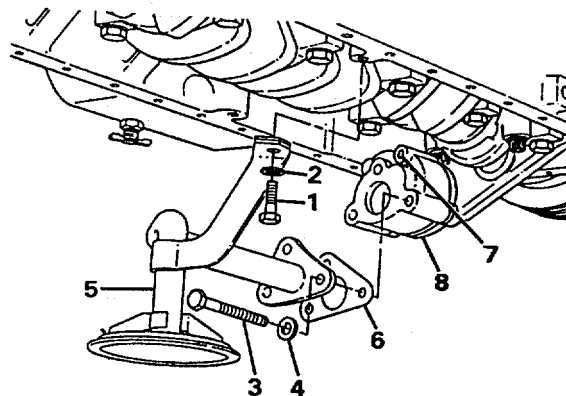
Cleaning Solvent (Item 13, Appendix E)
 Goggles (Item 9, Appendix E)

Equipment Conditions:

Ref.	Conditions
5-6	Engine assembly removed
5-11	Oil pan removed

a. Removal.

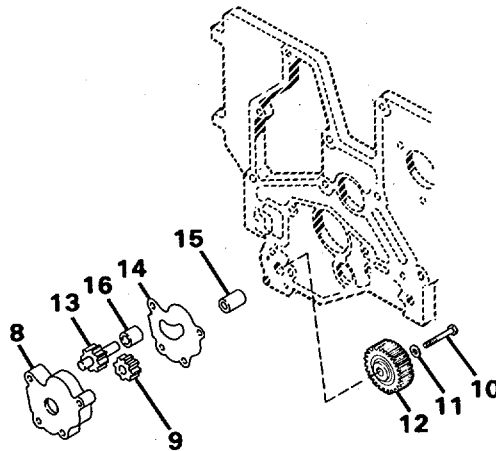
- (1) Remove screw (1) and washer (2) securing oil pump pickup tube (5) to crankcase.



Removing Oil Pump

- (2) Remove three screws (3) and washers (4) and remove oil pump pickup tube (5). Remove gasket (6).
- (3) Remove screw and washer (7) and remove oil pump assembly body (8) with gear (9) inside body.
- (4) Before removing pump gear (9) from body, mark face of gear with word TOP to aid in correct installation.

5-12. OIL PUMP AND OIL PRESSURE REGULATING VALVE (cont)

a. Removal (cont).

Oil Pump Assembly

- (5) Remove screw (10) and washer (11) and slide pump drive gear (12) from shaft (16). Remove oil pump gear and shaft (13) and plate (14).

b. Cleaning, Inspection and Repair.

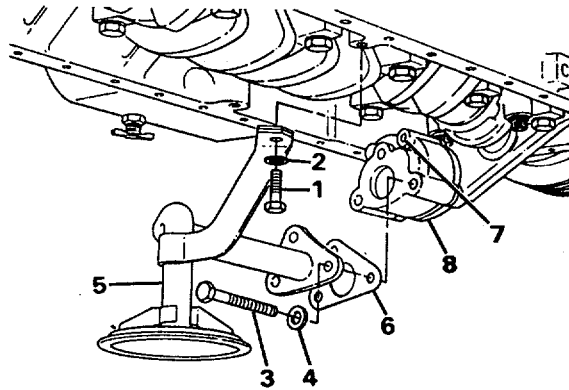
WARNING

Wear protective goggles when using the cleaning solvent. Avoid contact with the eyes. If contact occurs, flush eyes with cold water for 5 minutes and seek immediate medical attention. Dry cleaning solvent (PD-680) is both toxic and flammable. Avoid prolonged breathing of vapors. Avoid skin contact. Use only in a well-ventilated area. Keep away from open flame. Flash point of solvent is 138°F (59°C).

- (1) Clean all pump parts with cleaning solvent (PD-680) and dry thoroughly.
- (2) Inspect gears (9 and 13) for scoring and damaged teeth. Inspect shaft of gear (13) for wear.
- (3) Inspect drive shaft housing in pump body and bearing (15) in plate for wear and scoring.
- (4) Install gears (9 and 13) in pump body (8). Rotate gears back and forth and check backlash. Backlash should be within minimum of 0.003 inch (0.08 mm) and a maximum of 0.018 inch (0.45 mm).
- (5) Check clearance between ends of gear teeth and body. Clearance should be within a minimum of 0.004 inch (0.010 mm) and a maximum of 0.007 inch (0.18 mm).
- (6) Check clearance between face of gears (9 and 13) and face of body. Clearance should be within a minimum of 0.002 inch (0.06 mm) and a maximum of 0.006 inch (0.15 mm).

5-12. OIL PUMP AND OIL PRESSURE REGULATING VALVE (cont)**b. Cleaning, Inspection and Repair (cont).**

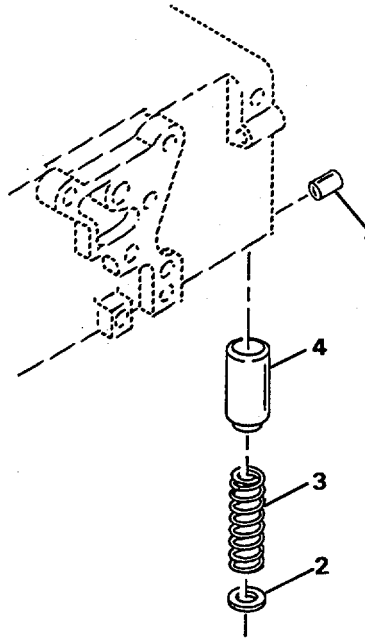
- (7) If oil pump parts inspected above are worn, scored or damaged or do not meet specifications, replace unserviceable parts.
- (8) Inspect screen on pump pickup tube (5) for damage. Clean screen.

c. Installation.

Installing Oil Pump

- (1) Install shaft and gear (13) through plate (14) and install shaft through gearcase backplate.
- (2) Install a 0.5096 inch (15 mm) packing over pump shaft to use as spacer. Place pump drive gear (12) in position on shaft and secure with washer (11) and screw (10).
- (3) Install gear (9) in pump body (8). Lubricate gears with lubricating oil (OE/HDO). Install body, with gears (9 and 13) meshed on gearcase backplate. Secure body to engine with screw and washer (7). Do not torque screws at this time.
- (4) Install a new gasket (6) on oil pump (8) and install oil pump pickup tube (5). Secure tube to crankcase with washer (2) and screw (1). Tighten screw to a torque of 17 lb-ft (23 Nm) (wet).
- (5) Secure pickup tube to oil pump (8) with three washers (4) and screws (3). Tighten screws (1, 3 and 7) to a torque of 17 lb-ft (23 Nm) (wet).
- (6) Install screw (10), washer (11) and gear (12) on gear shaft (16). Remove packing from shaft. Rotate shaft of gear (13) to be sure oil pump gears rotate freely.
- (7) Install drive gear (12) on shaft and secure with washer (1 1) and screw (10). Tighten screw to a torque of 17 lb-ft (23 Nm) (wet).
- (8) Refer to para. 5-11 and install oil pan.
- (9) Refer to para. 5-6 and install engine.

5-12. OIL PUMP AND OIL PRESSURE REGULATING VALVE (cont)

d. Oil Pressure Regulating Valve.(1) Removal.

Oil Pressure Regulating Valve

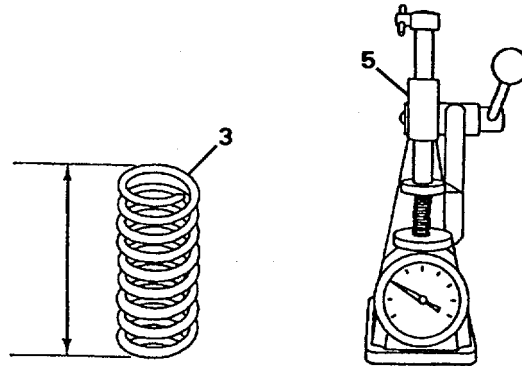
- (a) Refer to para. 5-11 and remove the oil pan.
- (b) The oil pressure regulating valve is mounted in a port in the bottom of the crankcase forward of the oil filter.
- (c) Use a flat bottom punch on drift pin and drive spring pin (1) from crankcase.
- (d) Remove washer (2), spring (3) and valve piston (4) from crankcase.

(2) Cleaning, Inspection and Repair.WARNING

Wear protective goggles when using the cleaning solvent. Avoid contact with the eyes. If contact occurs, flush eyes with cold water for 5 minutes and seek immediate medical attention. Dry cleaning solvent (PD-680) is both toxic and flammable. Avoid prolonged breathing of vapors. Avoid skin contact. Use only in a well-ventilated area. Keep away from open flame. Flash point of solvent is 138°F (59°C).

5-12. OIL PUMP AND OIL PRESSURE REGULATING VALVE (cont)d. Oil Pressure Regulating Valve (cont).(2) Cleaning, Inspection and Repair (cont).

- (a) Clean all regulating valve parts in cleaning solvent (PD-680) and dry thoroughly.
- (b) Inspect piston for nicks, scoring and wear. Replace piston if it shows indication of nicks, scoring or wear.
- (c) Check free length of spring. Minimum free length of spring is 3.37 inch (85.6 mm).
- (d) Use a valve spring tester (5) to test spring tension of spring (3). Compress the spring to a height of 2.08 inch (52.9 mm).



Testing Valve Spring Tension

- (e) Minimum spring tension at this height is 12 lb-ft (54 Nm). Maximum spring tension is 14 lb-ft (62 Nm).
- (f) Replace spring if spring is cracked or damaged and if it does not comply with free length and tension specifications listed above.

(3) Installation.

- (a) Apply a light coat of lubricant (OE/HDO) to piston (4), spring (3) and washer (2).
- (b) Install piston (4) in bore of crankcase. Piston should slide smoothly into crankcase bore.
- (c) Install spring (3) and washer (2) in bore. Use a suitable drift and compress spring to move washer above spring pin hole.
- (d) Drive the spring pin (1) into crankcase until pin is flush with surface of crankcase.
- (e) Refer to para. 5-11 and install oil pan.

5-13. EXHAUST MANIFOLDTHIS TASK COVERS:

- a. Removal
- b. Installation

INITIAL SETUP:**Tools Required:**Nomenclature:

General Mechanics
Tool Kit

Equipment Conditions:Ref.Conditions

4-55

Muffler removed

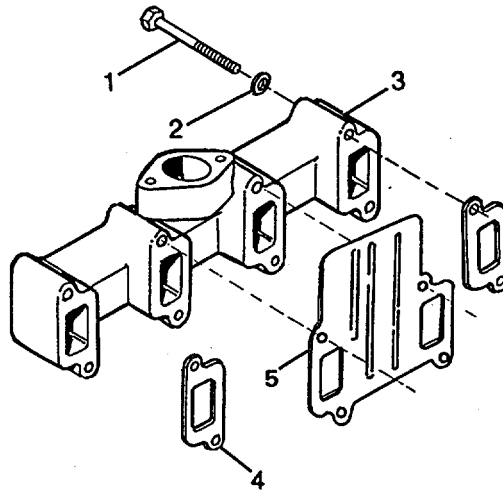
4-56

Engine door removed

- a. Removal.

WARNING

Be sure exhaust system has cooled before starting work.



Removing and Installing Exhaust Manifold

- (1) Remove eight screws (1) and flat washers (2) from exhaust manifold (3).
- (2) Remove manifold (3) and two gaskets (4) and gasket (5).

5-13. EXHAUST MANIFOLD (cont)

b. Installation.

- (1) Install eight screws (1) and flat washers (2) on manifold (3).
- (2) Place two gaskets (4) and gasket (5) over screws on manifold.
- (3) Secure manifold (3) with screws (1) and flat washers (2). Torque screws, in two even steps, to 21 lb-ft (28 Nm) (wet). Torque screws again after two hours of operation.
- (4) Install engine door. Refer to para. 4-56.
- (5) Install muffler. Refer to para. 4-55.

5-14. INTAKE MANIFOLD

THIS TASK COVERS:

- a. Removal
- b. Installation

INITIAL SETUP:

Tools Required:

Nomenclature:

General Mechanics
Tool Kit

Equipment Conditions:

Conditions

Ref.

2-14	Engine shut off
4-56	Engine door removed
4-49	Air hoses and indicator removed
4-51	High pressure fuel lines removed
4-54	Throttle control actuator removed

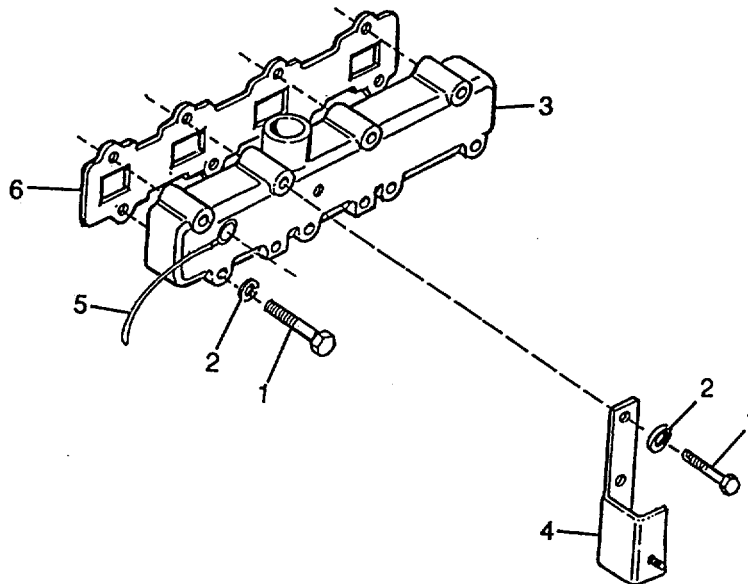
a. Removal.

- (1) Remove eight screws (1) and flat washers (2) that secure manifold (3), throttle guide bracket (4), starter relay ground wire (5) and gasket (6) to cylinder block.
- (2) Remove intake manifold (3) and gasket (6).

b. Installation.

- (1) Install throttle guide bracket (4), ground wire (5), screws (1) and flat washers (2) on manifold (3).
- (2) Place gasket (6) over screws on manifold.

5-14. INTAKE MANIFOLD (cont)

b. Installation (cont).

Removing and Installing Intake Manifold

- (3) Secure manifold (3), ground wire (5) and throttle guide bracket (4) to cylinder block with screws (1) and washers (2). Torque screws, in two even steps, to 17 lb-ft (23 Nm) (wet). Torque screws again after two hours of operation.
- (4) Install high pressure fuel lines (para. 4-51) and intake hose (para. 4-49) and indicator (para. 4-49).
- (5) Install throttle control actuator (para. 4-54).
- (6) Install engine door (para. 4-56).

5-15. FUEL INJECTORS

THIS TASK COVERS:

- a. Removal
- b. Installation

INITIAL SETUP:

Tools Required:

Nomenclature:

General Mechanics
Tool Kit

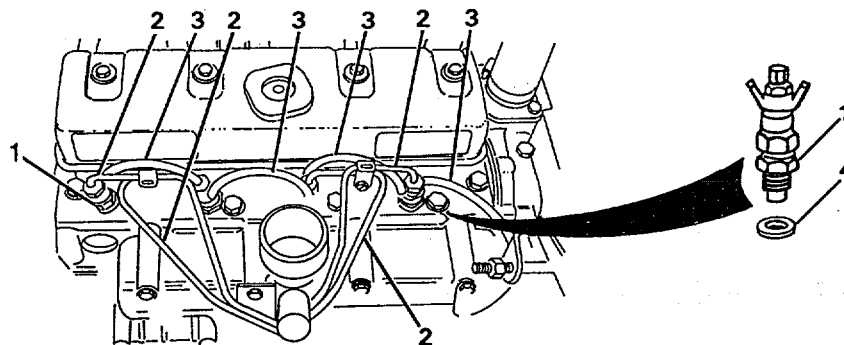
Equipment/Conditions:

<u>Ref.</u>	<u>Conditions</u>
4-56	Engine door removed
4-49	Air cleaner hose removed

Equipment/Materials Required:

Cleaning solvent (Item 13, Appendix E)
Rags (item 6, Appendix E)
Goggles (item 6, Appendix E)

a. Removal.



Removal and Installation of Fuel Injectors

WARNING

Wear protective goggles when using the cleaning solvent. Avoid contact with the eyes. If contact occurs, flush eyes with cold water for 5 minutes and seek immediate medical attention. Dry cleaning solvent (PD-680) is both toxic and flammable. Avoid prolonged breathing of vapors. Avoid skin contact. Use only in a well-ventilated area. Keep away from open flame. Flash point of solvent is 138°F (59°C).

- (1) Thoroughly clean injection nozzles (1), lines (2) and surrounding area with cleaning solvent (PD-680) and a stiff bristle brush.

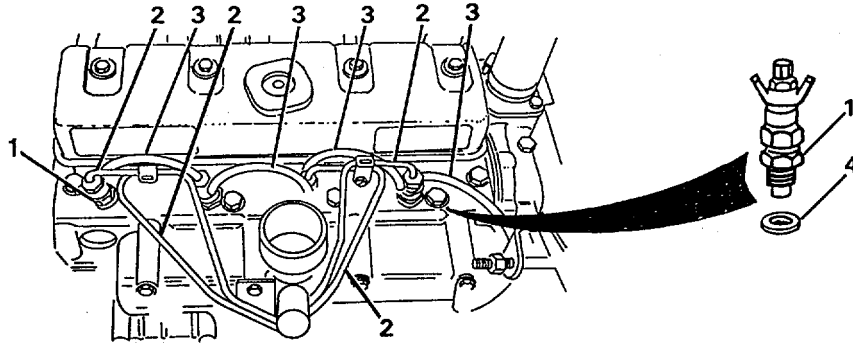
CAUTION

Failure to clean nozzles, lines and surrounding area will contaminate fuel causing engine failure.

5-15. FUEL INJECTORS (cont)a. Removal (cont).

- (2) Disconnect four high-pressure lines (2) from four injector nozzles (1).
- (3) Remove fuel return lines (3) from injector nozzles (1).
- (4) Cap all fuel lines (2) and return lines (3) to prevent contamination of fuel.
- (5) Remove injector nozzles (1) using a 27 mm deep socket.
- (6) Remove injector nozzle seals (4) from injector nozzle bore and discard.

b. Installation.

**Removal and Installation of Fuel Injectors**

- (1) Install new injector nozzle seals (4) in bore with concave side down.
- (2) Install injector nozzles (1) in cylinder head and torque to 51 lb-ft (69 Nm) (wet). Use a 27 mm deep socket to install fuel injectors.
- (3) Uncap pressure fuel lines (2) and connect to injectors (1).
- (4) Torque injector line nuts to 18 lb-ft (24 Nm) (wet).
- (5) Install fuel return lines (3) on injector nozzles (1).
- (6) Refer to para. 4-53 and prime fuel system.
- (7) Refer to para. 4-49 and install air cleaner and hose.
- (8) Refer to para. 4-56 and install engine door.

5-16. FUEL INJECTION PUMP

THIS TASK COVERS:

- a. Removal
- b. Installation and Timing

INITIAL SETUP:

Tools Required:

Nomenclature:

General Mechanics
Tool Kit

Gear Puller

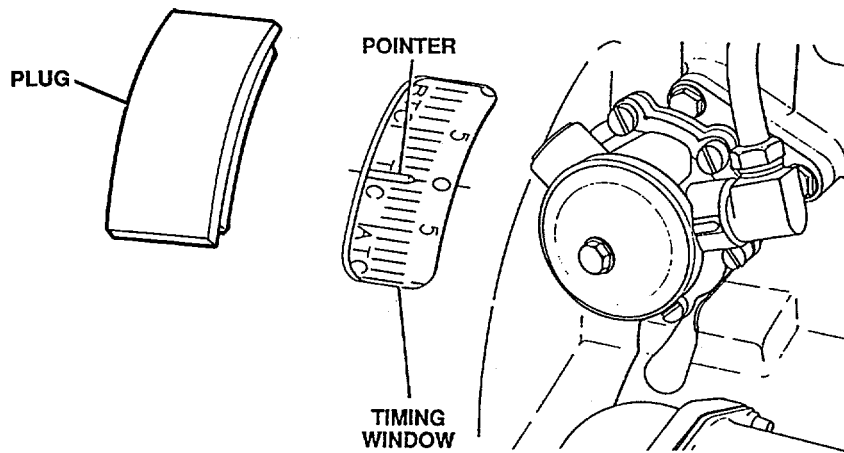
Three M8 x 30 mm Capscrews

Equipment/Materials Required:

Cleaning solvent (Item 13, Appendix E)
Rags (Item 6, Appendix E)
Goggles (Item 9, Appendix E)

Equipment Conditions:

<u>Ref.</u>	<u>Conditions</u>
4-51	Fuel filter removed
4-51	Fuel lines disconnected from pump
4-54	Throttle control actuator removed
4-56	Radiator shroud removed
4-57	Fan, fan belt and pulley removed



Timing Mark on Flywheel

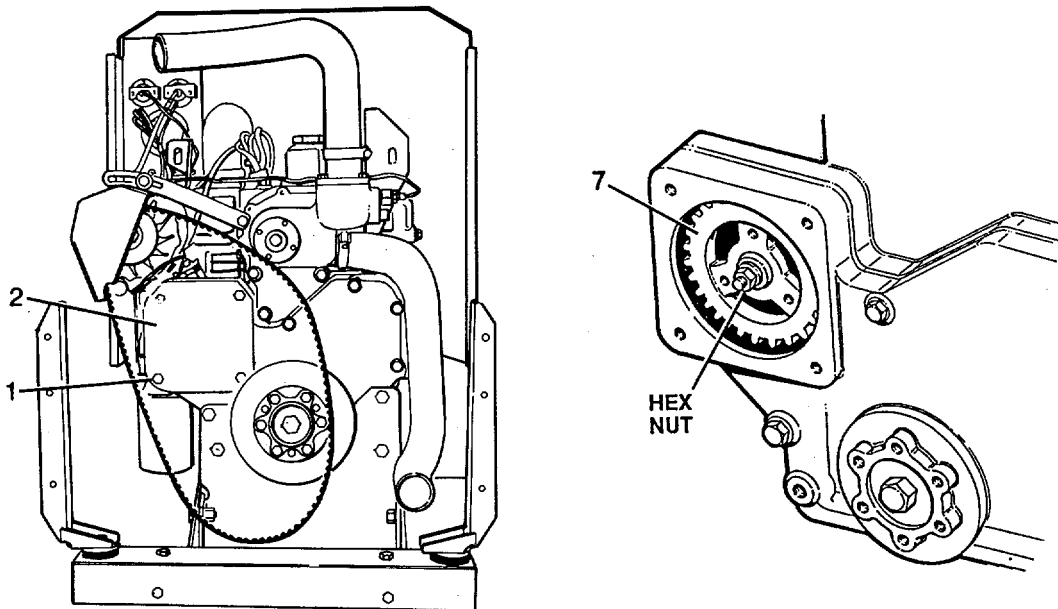
5-16. FUEL INJECTION PUMP (cont)a. Removal.

- (1) Remove plug from flywheel housing. Rotate engine clockwise until timing mark on flywheel lines up with timing pointer.

NOTE

Number one piston must be on the compression stroke to remove injection pump (see para.4-47 for this procedure).

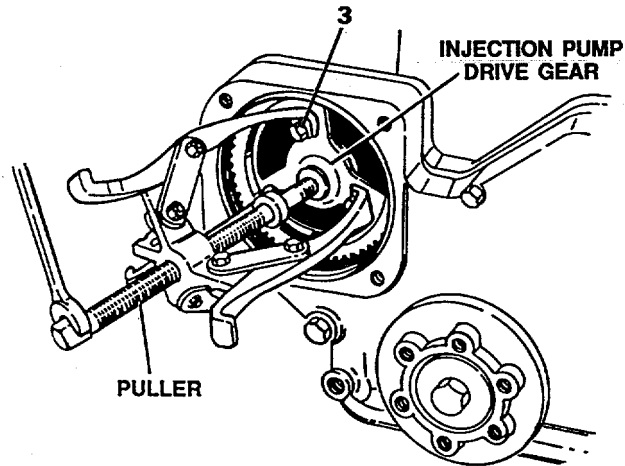
- (2) Loosen, but do not remove, four screws (1) from pump drive gear cover (2).
- (3) Remove two screws (1) with flat washers from left side of cover.
- (4) Remove pump drive gear cover (2) by sliding it to the left.
- (5) Remove packing from behind gear cover (2) and discard.
- (6) Remove hex nut from injection pump drive shaft.
- (7) Install three metric capscrews (3) through puller and into injection pump drive gear.



Removing and Installing Gear Cover

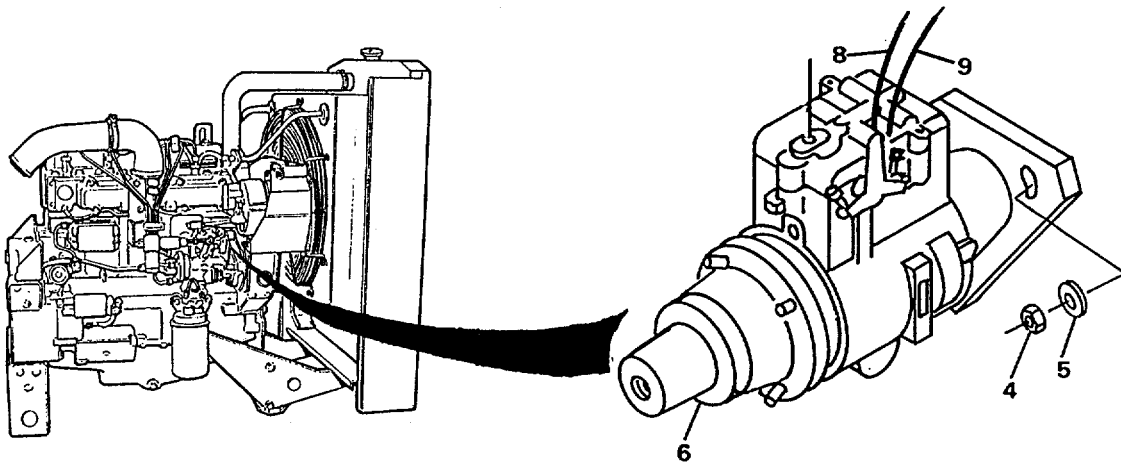
5-16. FUEL INJECTION PUMP (cont)

a. Removal (cont).

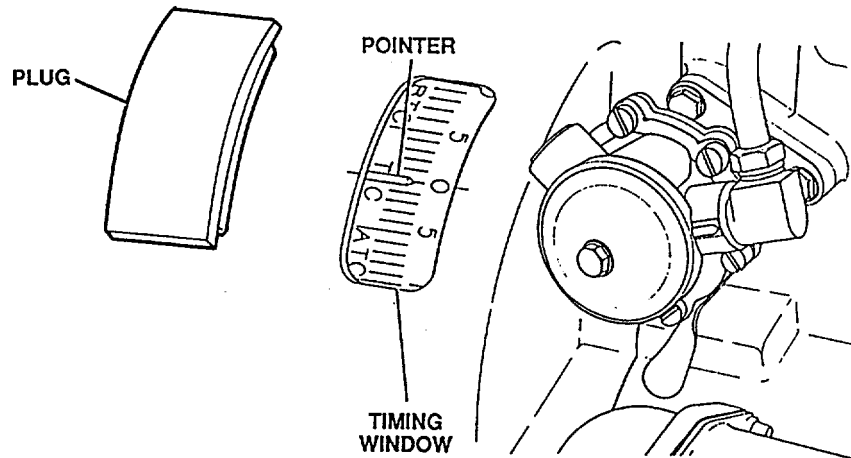


Removing Injection Pump Drive Gear

- (8) Tighten puller screw and remove injection pump drive gear (7).
- (9) Disconnect electrical leads (8 and 9) connected to top of injection pump.
- (10) Remove three hex nuts (4) with flat washers (5) from injection pump studs.
- (11) Remove injection pump (6) from engine.



Removing and Installing Fuel Injection Pump

5-16. FUEL INJECTION PUMP (cont)b. Installation and Timing.

Timing Mark on Flywheel

- (1) Remove plug. Rotate engine in a clockwise direction (viewed from front) until timing pointer on flywheel lines up with center of timing indicator.

NOTE

Number one piston must be on the compression stroke to time injection pump.

- (2) Install fuel injection pump onto engine with mounting studs located in centers of injection pump mounting slots.
- (3) Install three nuts (4) and three washers (5) and tighten. Do not torque nuts at this time.
- (4) Clean dirt and foreign material from around timing window cover on injection pump.
- (5) Remove two screws from timing window cover on fuel injection pump and remove timing window cover with gasket.

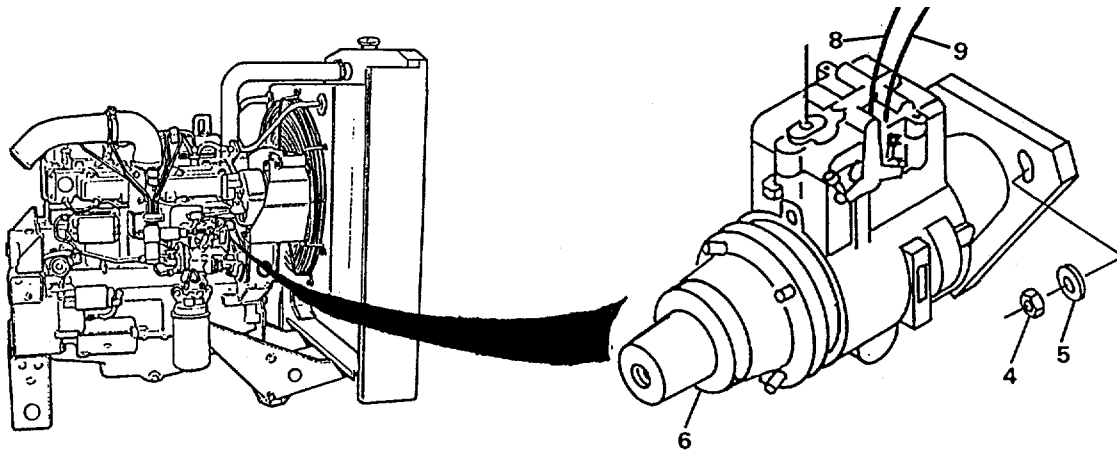
NOTE

Rotate the cam ring by rotating the injection pump shaft. Rotate the governor weight retainer with a clean awl or scribe through the timing window.

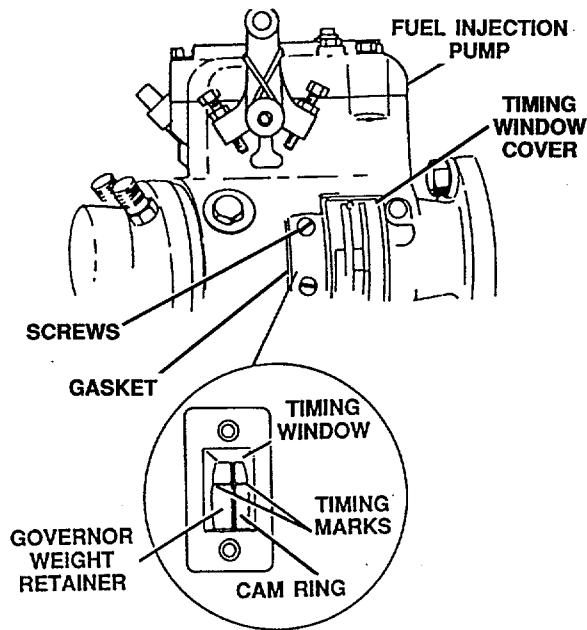
Governor weight retainer must be manually positioned in the counterclockwise direction (viewed from front).

5-16. FUEL INJECTION PUMP (cont)

b. Installation and Timing (Cont).



Removing and Installing Fuel Injection Pump



Injection Pump Timing Marks

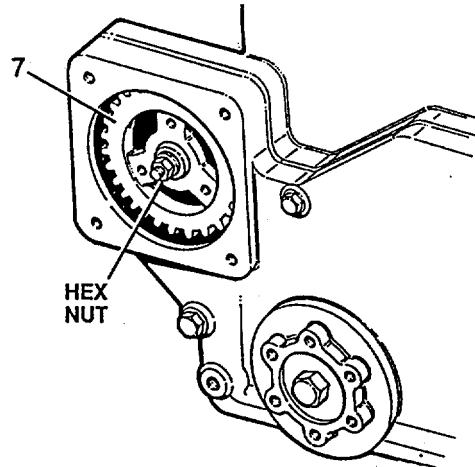
- (6) Align timing mark on governor weight retainer hub with timing mark on cam ring as viewed through timing window of fuel injection pump.

5-16. FUEL INJECTION PUMP (cont)b. Installation and Timing (Cont).

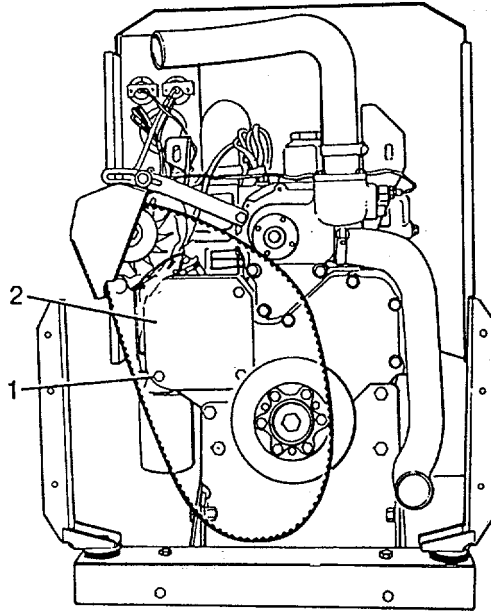
(7) Install injection pump drive gear (7).

NOTE

Injection pump drive shaft must not rotate while torquing hex nut.

**Installing Injection Pump Drive Gear**

- (8) Install hex nut on drive shaft and torque to 38 lb-ft (52 Nm) (wet).
- (9) Rotate flywheel in a clockwise direction one half revolution.
- (10) Rotate flywheel in a counterclockwise direction until flywheel timing indicator points to 15° BTDC.
- (11) Recheck correct alignment on injection pump timing marks. If timing marks are not correctly aligned, do the next step. If timing marks are correctly aligned, skip the next step.
- (12) Loosen three injection pump mounting nuts and rotate injection pump until timing marks are correctly aligned.
- (13) Tighten three hex nuts (4) to 17 lb-ft (23 Nm) (wet).
- (14) Install timing window cover with new gasket on injection pump and install two screws. Tighten screws securely.
- (15) Install a preformed packing on the pump drive gear cover (2).

5-16. FUEL INJECTION PUMP (cont)**b. Installation and Timing (Cont).**

Removing and Installing Gear Cover

- (16) Align pump drive gear cover (2) with mounting holes and install four capscrews (1) with flat washers and torque to 17 ft-lb (23 Nm).
- (17) Refer to para. 4-51 and connect fuel lines to injection pump and injectors.
- (18) Refer to para. 4-54 and install throttle actuator.
- (19) Refer to para. 4-56 and install radiator shroud.
- (20) Refer to para. 4-57 and install fan, fan belt and pulley.
- (21) Refer to para. 4-53 and prime fuel system.
- (22) Connect electrical leads (8 and 9) to top of injection pump.

5-17. FUEL TRANSFER PUMP

THIS TASK COVERS:

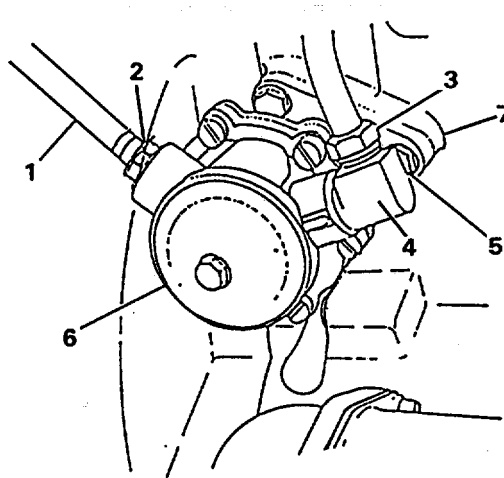
- a. Removal
- b. Installation

INITIAL SETUP:**Tools Required:**Nomenclature:

General Mechanics
Tool Kit

Equipment Conditions:Ref Conditions

4-56 Engine door removed

a. Removal.

Removal and Installation of Fuel Transfer Pump

- (1) Disconnect fuel inlet line (1). Remove elbow (2).
- (2) Disconnect fuel outlet line (3) and remove elbow (4).
- (3) Remove three screws (5).
- (4) Remove fuel transfer pump (6) with fuel transfer pump gasket (7) and discard gasket. Remove pump rod from engine.

5-17. FUEL TRANSFER PUMP (cont)

b. Installation.

- (1) Install pump rod in engine. Install new fuel transfer pump gasket (7) on engine. Install fuel transfer pump (6).
- (2) Install three screws (5) through pump mounting holes and into engine block.
- (3) Torque three screws (5) to 18 lb-ft (11 Nm) (wet).
- (4) Install elbow (2) in pump and connect inlet line (1) to elbow.
- (5) Install elbow (4) in pump and connect outlet line (3) to elbow.
- (6) Refer to para. 4-53 and prime fuel system.
- (7) Refer to para. 4-56 and install engine door.

5-18. ENGINE WATER PUMP

THIS TASK COVERS:

- a. Removal
- b. Installation

INITIAL SETUP:

Tools Required:

Nomenclature:

General Mechanics
Tool Kit

Equipment/Materials Required

Rags (Item 6, Appendix E)
Antifreeze (Item 1, Appendix E)
Grease (Item 8, Appendix E)

Equipment Conditions:

<u>Ref</u>	<u>Conditions</u>
2-14	Engine shut off
4-46	Drain cooling system
4-46A	Thermostat and cooling lines removed
4-56	Radiator removed
4-57	Fan, fan belt and spacer removed

WARNING

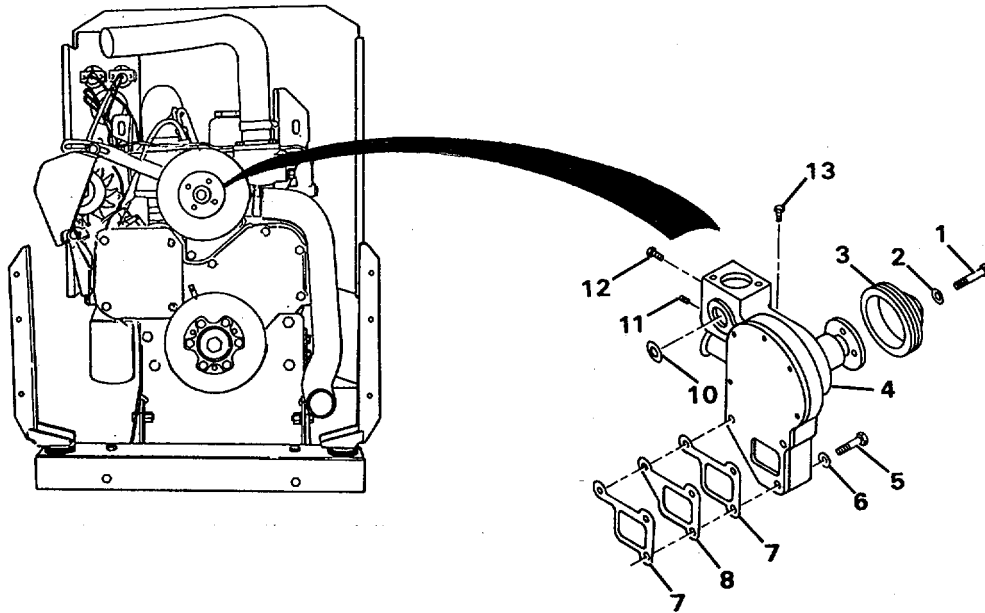
Be sure cooling system has cooled completely before starting work.

a. Removal.

- (1) Remove screw (1) and washer (2) and remove pulley (3) from water pump (4).
- (2) Remove three screws (5) and washers (6) and remove water pump (4) from engine.

5-18. ENGINE WATER PUMP (cont)**a. Removal (cont).**

- (3) Remove two gaskets (7) and spacer (8) from engine.
- (4) Remove preformed packing (10) and plugs (11, 12 and 13) from water pump.



Removing or Installing Water Pump

b. Installation.

- (1) Clean all old gasket material from cylinder head and water pump mounting surfaces.
- (2) Apply a small amount of grease (GAA) to packing (10) and install packing in groove in water pump adapter on cylinder head.
- (3) Install plugs (11, 12 and 13) in water pump (4). Tighten plugs to a torque of 12 ft-lb (17 Nm).
- (4) Place gaskets (7) with spacer (8) in position and install water pump (4) on engine. Secure water pump with three washers (6) and screws (5). Tighten screws to a torque of 17 ft-lb (23 Nm).
- (5) Install pulley (3) on shaft of water pump (4). Secure pulley to pump with washer (2) and screw (1). Tighten screw to a torque of 17 ft-lb (23 Nm).
- (6) Install fan and fan belt. Refer to para. 4-57.

5-18. ENGINE WATER PUMP (cont)

a. Installation (cont).

- (7) Install radiator. Refer to para. 4-56.
- (8) Install cooling lines and thermostat. Refer to para. 4-46A.
- (9) Fill cooling system. Refer to para. 4-46.
- (10) Install engine housings. Refer to para. 4-56.

Section IV. MAINTENANCE OF WATER DISTRIBUTION SYSTEM

Paragraph Number	Title	Page Number
5-19	WATER DISTRIBUTION PUMP.....	5-52

5-19. WATER DISTRIBUTION PUMP

THIS TASK COVERS:

- a. Removal
- b. Disassembly
- c. Cleaning, Inspection and Repair
- d. Assembly
- e. Installation

INITIAL SETUP:

Tools Required:

Nomenclature:

General Mechanics
Tool Kit

Bearing Puller

Personnel Required: 3

Equipment/Materials Required:

Cleaning solvent (Item 13, Appendix E)
Goggles (Item 9, Appendix E)
Pipe sealant (Item 11, Appendix E)
Discharge flange gasket

Equipment Conditions:

<u>Ref</u>	<u>Conditions</u>
2-18	Water tank drained
2-14	Engine shut off
4-29	Air reservoirs drained

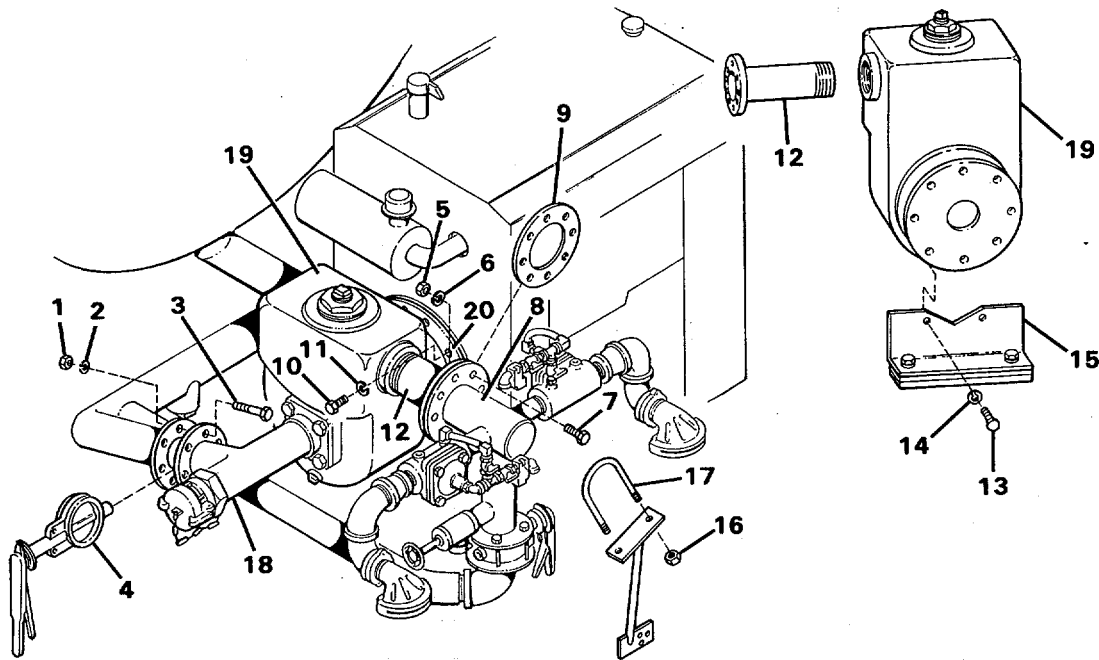
a. Removal.

- (1) Secure lifting straps or chains around intake pipe, discharge flange, and lantern ring (between pump and engine).

CAUTION

Be certain pump is supported by lifting device before removing attaching hardware.

5-19. WATER DISTRIBUTION PUMP (cont)

a. Removal (cont).

Remove and Install Water Distribution Pump

- (2) Remove eight nuts (1), lockwashers (2) and screws (3) holding butterfly suction valve (4) in pipes. Remove valve.
- (3) Remove eight nuts (5), lockwashers (6) and screws (7) holding discharge header (8) to discharge flange.
- (4) Remove eight screws (10) and lockwashers (11) securing adapter (20) to engine flywheel housing.
- (5) Remove two nuts (16) and remove U-bolt (17) from discharge header (8).
- (6) Remove two bolts (13) and lockwashers (14) securing pump support bracket (15) to bottom of pump.

WARNING

Do not allow pump to swing freely. To avoid injury, use two persons to guide pump by hand, while crane lifts unit off semitrailer.

5-19. WATER DISTRIBUTION PUMP (cont)

a. Removal (cont).

(7) Carefully pull pump (19) away from engine until pump shaft disengages from engine flywheel. Remove pump.

(8) Remove suction tee (18) and discharge flange (12) from pump. Remove discharge flange gasket (9).

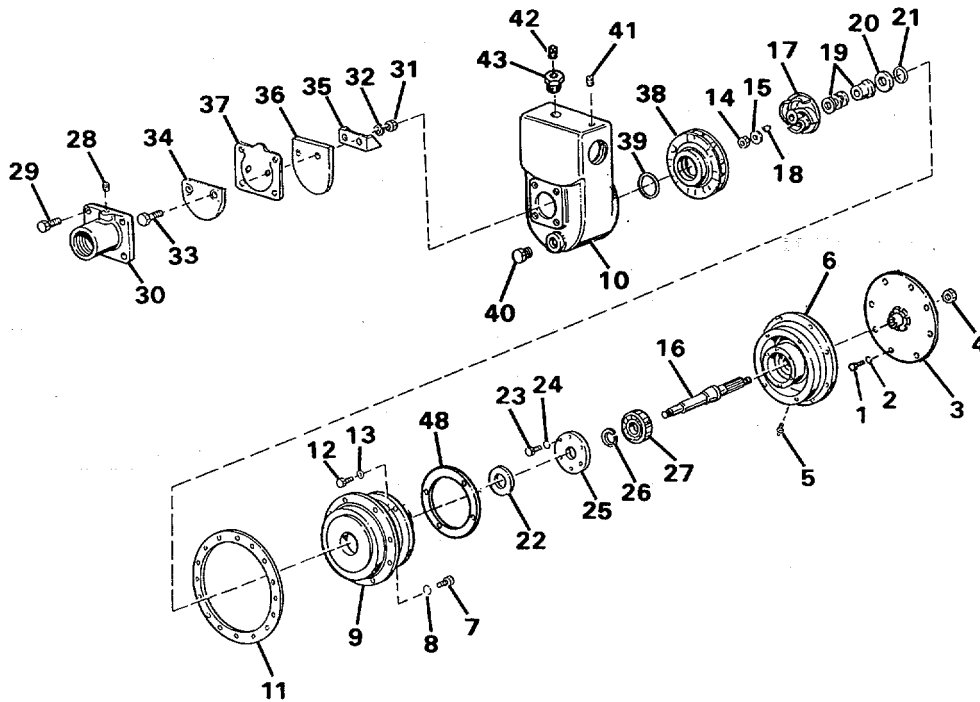
b. Disassembly.

(1) Remove eight screws (1) and washers (2) and remove drive plate (3) from engine flywheel. Remove flywheel pilot (4).

(2) Remove relief fitting (5) from adapter (6).

NOTE

Match mark adapter lantern (9) and pump tank (10) to aid in proper assembly of pump.



Water Distribution Pump

(3) Remove twelve screws (7) and washers (8) and separate lantern (9), with attached adapter (6) from pump tank (10). Remove gasket (11) and shim (48).

5-19. WATER DISTRIBUTION PUMP (cont)b. Disassembly (cont).**NOTE**

Separation of lantern (9) and adapter (6) may require two personnel.

- (4) Secure shaft (16) in a vise with brass jaws. Remove nut (14) and flat washer (15) from shaft. Use a suitable puller and remove impeller (17) and key (18) from shaft.
- (5) Remove four screws (12) and washers (13) and separate lantern (9) from adapter (6).
- (6) Remove seal assembly (19), ceramic seat (20) and packing (21) from shaft.
- (7) Remove slinger (22) from shaft (16). Remove six screws (23) and washers (24) and remove bearing cap (25) from adapter.
- (8) Remove retainer ring (26) and pull bearing (27) from shaft (16).
- (9) Remove pipe plug (28) from pump inlet (30). Remove four screws (29) and separate pump inlet (30) from tank (10).
- (10) Remove two nuts (31), lockwashers (32) and screws (33) and separate lower weight (34) and stop plate (35) from upper weight (36) and check valve (37).
- (11) Remove diffuser (38) and gasket (39).
- (12) Remove pipe plugs (40, 41 and 42) and bushing (43) from pump tank (10).

c. Cleaning, Inspection and Repair.**WARNING**

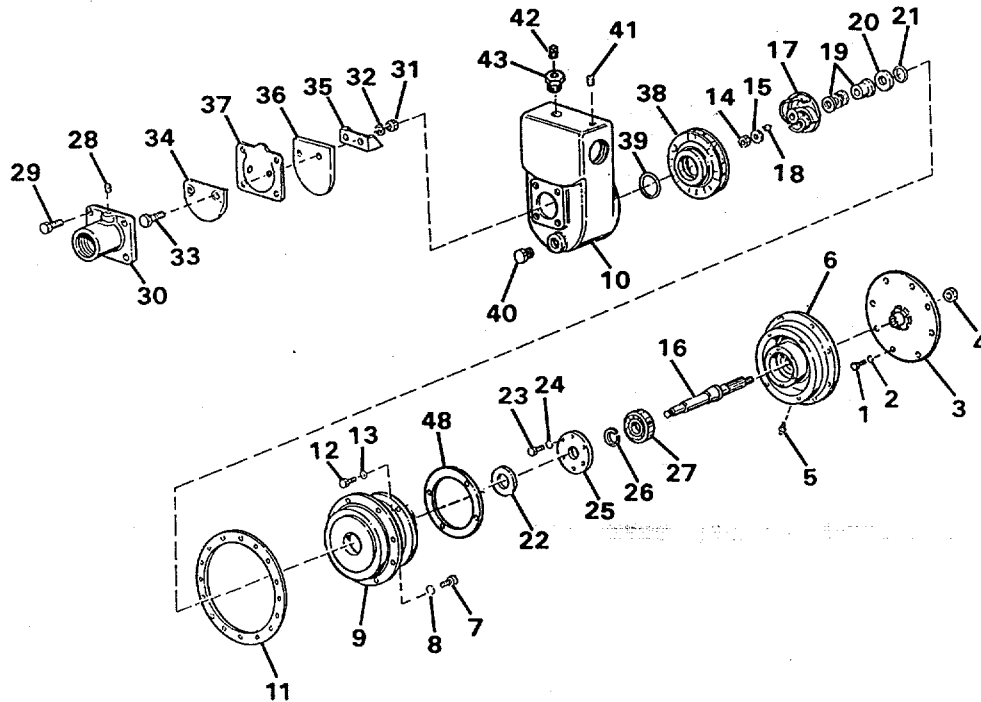
Wear protective goggles when using the cleaning solvent. Avoid contact with the eyes. If contact occurs, flush eyes with cold water for 5 minutes and seek immediate medical attention. Dry cleaning solvent (PD-680) is both toxic and flammable. Avoid prolonged breathing of vapors. Avoid skin contact. Use only in a well-ventilated area. Keep away from open flame. Flash point of solvent is 138°F (590C).

- (1) Clean all metal parts of pump with cleaning solvent (PD-680) and dry thoroughly.
- (2) Inspect seal assembly, ceramic seat and impeller for cracks, wear and damage.
- (3) Inspect ball bearing for freedom of rotation and damage.
- (4) Check splines on shaft for wear and damage.
- (5) Inspect check valve for evidence of cracking. Flapper valve must be pliable and free to move.
- (6) Check diffuser for cracked or damage veins.
- (7) Replace all cracked, worn or damaged parts.

5-19. WATER DISTRIBUTION PUMP (cont)

d. assembly.

- (1) Install new gasket (39) and diffuser (38) in pump.
- (2) Align lower weight (34), check valve (37) and upper weight (36). Install stop plate (35) on weights and secure with two screws (33), lockwashers (32) and nuts (31).
- (3) Install weights and pump inlet (30) on pump tank and secure with four screws (29). Install pipe plug (28) in pump inlet.



Water Distribution Pump

- (4) Press bearing (27) on shaft (16) and secure with retaining ring (26). Slide shaft and bearing in position on flywheel housing adapter (6).
- (5) Install bearing cap (25) on adapter and secure with six washers (24) and screws (23).
- (6) Install slinger (22) on shaft and install assembled adapter (6) and shim (48) on lantern (9). Secure adapter to lantern with four lockwashers (13) and screws (12).
- (7) Install new packing (21), ceramic seat (20) and seal assembly (19) on shaft. Slide key (18) in slot in shaft and install impeller (17). Secure impeller with flat washer (15) and nut (14).
- (8) Install new gasket (11) and assembled lantern (9) and adapter (6) on pump tank (10) and secure with twelve lockwashers (8) and screws (7).

5-19. WATER DISTRIBUTION PUMP (cont)d. Assembly (cont).

- (9) Install bushing (43) and plugs (40, 41 and 42) in pump tank (10). Install relief fitting (5) in adapter (6).
- (10) Install flywheel pilot (4) in flywheel and place drive plate (3) in position on flywheel. Secure drive plate to flywheel with eight lockwashers (2) and screws (1).

e. Installation.**NOTE**

When assembling plumbing, coat all pipe threads with pipe sealant (Item 11, Appendix E).

- (1) Install suction tee (18) and discharge flange (12) on pump (19).
- (2) Using a hoist and lifting slings, lift the pump onto the semitrailer.
- (3) Carefully move the pump towards the engine until the pump shaft is fully engaged with the engine flywheel and the adapter is contacting the engine flywheel housing.

NOTE

Do not tighten any mounting hardware until all hardware has been installed, and the positioning of all plumbing has been adjusted.

- (4) Install two screws (13) and lockwashers (14) to secure the pump support bracket (15) to the bottom of the pump (19).
- (5) Install eight screws (10) and lockwashers (11) to secure adapter to engine flywheel housing.
- (6) Install a new discharge flange gasket (9) and secure discharge header (8) to discharge flange (12) with eight screws (7) lockwashers (6) and nuts (5).

NOTE

To install the butterfly suction valve correctly, the valve handle must point toward the front of the trailer when the valve is closed. The valve handle must point toward the ground when the valve is open.

- (7) Install butterfly suction valve (4) in position. Install eight screws (3), lockwashers (2) and nuts (1) to secure valve between suction tee (18) and suction line.
- (8) Install U-bolt (17) over discharge header (8) and secure with two nuts (16).

CHAPTER 6

GENERAL SUPPORT MAINTENANCE INSTRUCTIONS

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

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6-3	REPAIR PARTS.....	6-1

6-1. COMMON TOOLS AND EQUIPMENT

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

6-2. SPECIAL TOOLS, TMDE AND SUPPORT EQUIPMENT

No special tools, TMDE or equipment are required to maintain the water distributor or semitrailer.

6-3. REPAIR PARTS

Repair parts are listed and illustrated in Appendix F of this manual.

Section II. MAINTENANCE OF THE ENGINE

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6-4. CYLINDER HEAD AND VALVES

THIS TASK COVERS:

- a. Removal
- b. Cleaning and Inspection

- c. Installation

INITIAL SETUP:

Tools Required:

Nomenclature

General Mechanics
Tool Kit

18" - 24" Heavy Straightedge

Valve Guide Removal Tool

Equipment/Materials Required:

Rags (Item 6, Appendix E)
Lubricating Oil (Item 10, Appendix E)
Cleaning Solvent (Item 13, Appendix E)
Goggles (Item 9, Appendix E)

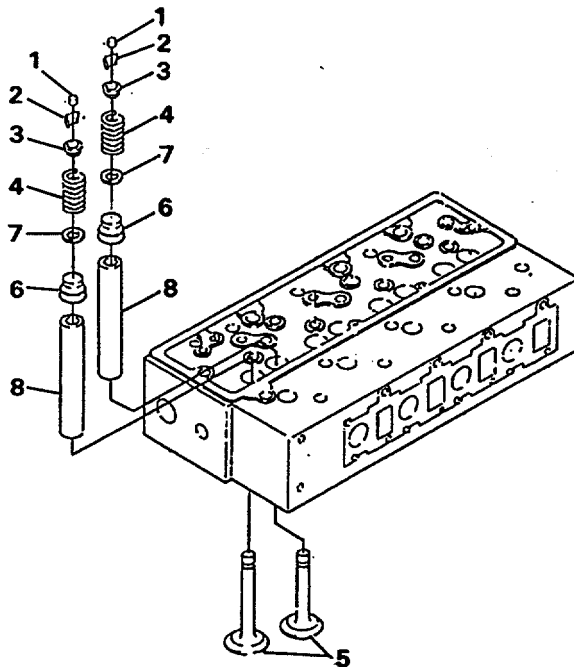
Equipment Conditions:

Ref Conditions

5-7 Cylinder head and rocker arms removed

Personnel Required: 1

a. Removal.



Removing and Installing Valves

6-4. CYLINDER HEAD AND VALVES (cont)a. Removal (cont).

- (1) Place cylinder head on bench with exhaust side down.

NOTE

Place valves, springs, retainers and wear plates in a rack as they are removed from cylinder head so they can be identified and reinstalled in their original locations.

- (2) Using a valve spring compressor, compress valve springs (4). Remove valve spring retainer locks (2) and valve stem caps (1).
- (3) Release valve spring compressor tool and remove valve spring retainers (3), valve springs (4) and valves (5).
- (4) Remove valve spring wear plates (7) and valve stem seals (6). Discard valve stem seals (6).
- (5) Remove valve guides (8) by pressing them out through bottom of cylinder head using a valve guide removal tool and hydraulic press.

b. Cleaning and Inspection.

- (1) Clean carbon from valves, valve seats, valve guides and cylinder head ports. Remove all oil and crankcase deposits from rocker arm assemblies and push rods.
- (2) Inspect valve stem caps for cracks and wear. Replace valve stem cap if cracked or worn.
- (3) Replace valves if they are cracked, bent, burned or warped, or if stems are worn.
- (4) Check rocker arms for cracks, galling, scoring or wear. Replace rocker arm and ball if excessively worn.
- (5) Inspect rocker arm locknut threads for wear.
 - (a) Measure the rocker arm locknut breakaway torque from operating position using a torque wrench.
 - (b) Use the torque wrench to remove rocker arm locknut and observe any increase in torque.
 - (c) If the removal torque increases more than 20 in-lb (2.3 Nm), replace rocker arm stud.
 - (d) To replace a worn or damaged rocker arm stud, unscrew the stud using the lower nut. Coat lower threads of new stud with oil and install. Rocker arm studs are installed, starting with a long stud on each end, then a short, long, short, etc., ending with two short studs in center of head.
- (6) Inspect rocker arm balls for cracks and wear. Replace rocker arm ball and arm if it is cracked, worn or damaged.

6-4. CYLINDER HEAD AND VALVES (cont)

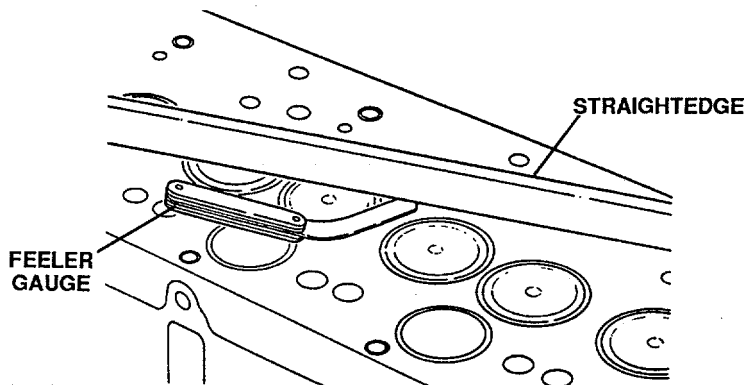
b. Cleaning and Inspection (cont).

- (7) Check valve springs for cracks, worn ends, distortion and tension. If spring ends are worn, check lower valve spring wear plate and valve spring retainer for wear. Check for spring distortion by placing spring on a flat surface next to a square. Measure height of spring and rotate it against square edge to measure distortion. If distortion exceeds 0.0787 in. (2 mm), replace spring. Check spring tension at the installed height for both the valve open and closed position using an accurate valve spring tester. Replace any valve spring that is weak, cracked, worn or distorted.

WARNING

Wear protective goggles when using the cleaning solvent. Avoid contact with the eyes. If contact occurs, flush eyes with cold water for 5 minutes and seek immediate medical attention. Dry cleaning solvent (PD-680) is both toxic and flammable. Avoid prolonged breathing of vapors. Avoid skin contact. Use only in a well-ventilated area. Keep away from open flame. Flash point of solvent is 138°F (59°C).

- (8) Clean all push rods in a solvent (PD-680). On push rods with an oil passage, blow out the passage with compressed air. Check push rod ends for wear of damage. Check push rod for bends by rolling it on a flat surface. If push rods are bent, twisted or damaged, replace them.
- (9) Check cylinder head for flatness and distortion. Use a straightedge and feeler gauge. Total incremental flatness must be within 0.0016 in. (0.04 mm) within any 5.91 in. (150 mm) diameter area. The surface flatness should be within 0.004 in. (0.10 mm).

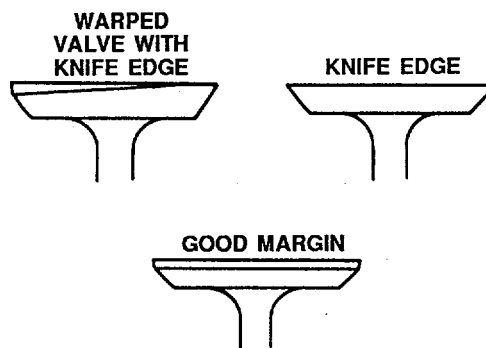


Checking Cylinder Head

6-4. CYLINDER HEAD AND VALVES (cont)

b. Cleaning and Inspection (cont).

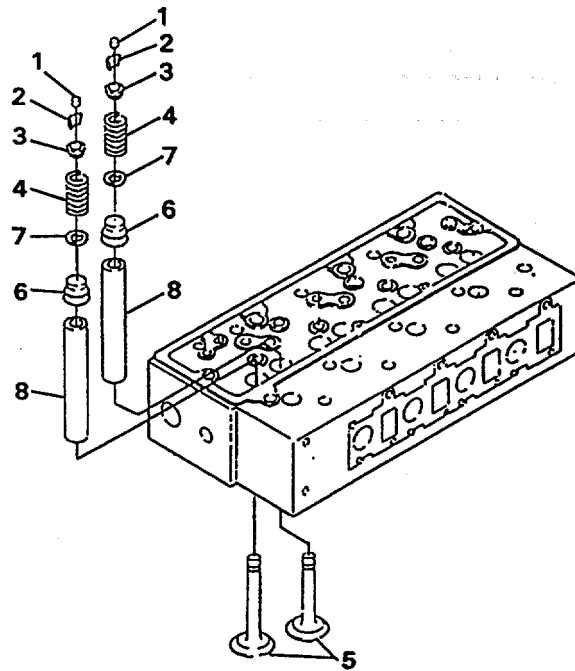
- (10) Inspect valve seats in cylinder head. Check angle of valve seats. Valve seat angle for exhaust valves is 44°. Intake valve seat angle should be 29°. If seat angles in head are not correct, grind seats and valves as follows:
- (a) Remove carbon from valve seat area. Using a valve grinding stone, grind intake valve seat to a 30° angle with a uniform seat on the surface.
 - (b) Finish grind intake valve seat to a 29° angle with a fine stone and clean seat.
 - (c) Check intake valve face. Seat on valve must be 29° and have a uniform face.
 - (d) Refinish valve faces on a valve refacing machine to 29° angle.
 - (e) Check valve head depth in cylinder head with a depth gauge. Depth should be 0.0189 in. (0.48 mm). If depth is not correct, regrind to correct depth.
 - (f) Use a dial indicator to check valve runout of valve seat in cylinder head. Runout must not exceed 0.0019 in. (0.050 mm). If runout is excessive, regrind valve seat to meet specifications.
 - (g) Grind exhaust valve seats and valve faces in the same manner to a seat angle of 45°.
 - (h) Exhaust valve head depth should be 0.264 in. (0.67 mm).
 - (i) Runout of exhaust valve seats must be 0.0019 in. (0.050 mm).



Checking Valve Head Seats

6-4. CYLINDER HEAD AND VALVES (cont)

b. Installation



Removing and Installing Valves

- (1) Press valve guides (8) in position from top of cylinder head with valve guide installation tool and hydraulic press. Install replacement valve guides with grooved end up.

NOTE

The exhaust valve guide is 0.2362 in. (6 mm) longer than the intake valve guide. Guides must be installed in the correct guide bore.

The bore of a replacement valve guide is 0.3004-0.3047 in. (7.63-7.74 mm). The interference fit of a guide in cylinder head is 0.0009-0.0026 in. (0.025-0.065 mm). The valve guide bore will close some when installed. Use a valve guide reamer to resize valve guides after installation to the correct inside diameter. Do not ream or hone guides already installed in service replacement cylinder heads. Valve seats must be refinished after installing new valve guides.

- (2) Lubricate stem of each valve (5) with engine oil (OE/HDO) and insert in guide (8) from which it was removed.
- (3) Install valve spring wear plate (7) over valve guides in recess of the head.

6-4. CYLINDER HEAD AND VALVES (cont)

b. Installation (cont).

NOTE

Do not reuse valve stem seals. Each time the valves are removed from cylinder head, a new seal must be used when the valve is installed.

- (4) Coat inside of valve stem seal (6) with oil (OE/HDO). Push valve stem seal over valve stem and all the way down onto valve guide flange.

CAUTION

Do not remove valve after seal is installed. Valve can be withdrawn only as far as the groove in valve stem. Do not allow valve stem seal to come in contact with groove or seal damage may occur.

- (5) Using a valve spring compressor, compress each valve spring (4) and retainer (3).
- (6) Insert valve spring retainer locks (2). Remove valve spring compressor tool. Install valve stem cap (1).
- (7) Install cylinder head with new gasket (para. 5-7).

6-5. TAPPETS

THIS TASK COVERS:

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

INITIAL SETUP:

Tools Required:

Nomenclature

General Mechanics
Tool Kit

Micrometers

Equipment/Materials Required:

Lubricating Oil (Item 10, Appendix E)

Equipment Conditions:

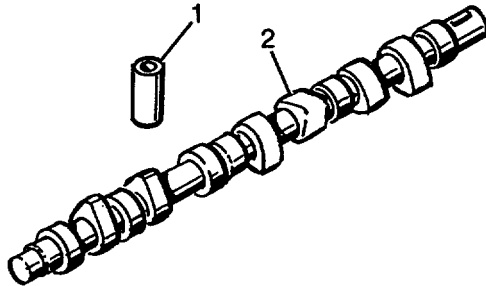
<u>Ref</u>	<u>Conditions</u>
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5-7	Cylinder head removed
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Personnel Required: 1

6-5. TAPPETS (cont)**a. Removal.**

- (1) Tappets (1) are positioned in the crankcase above the camshaft (2). The top of each tappet is machined to accept a push rod. Tappets ride on intake and exhaust camshaft lobes.



Removal and Installation of Tappets

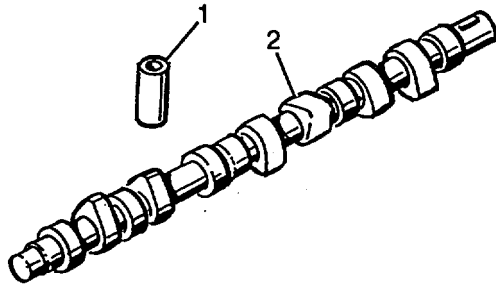
- (2) Remove tappets (1) and identify them as to location in crankcase.

b. Inspection.

- (1) Inspect tappet faces that contact camshaft lobes for roughness, scuffing or concave wear. Replace any worn tappets. If tappets are worn, replace camshaft.
- (2) If the clearance between tappet and bore in crankcase exceeds 0.0022-0.0039 in. (0.055-0.100 mm), replace tappet.
- (3) Measure outside diameter of tappets with a micrometer. Minimum diameter of tappet should be 1.0236 to 1.0242 in. (26.00-26.015 mm).
- (4) Measure valve tappet bore in crankcase. Valve tappet bore diameter should be 1.0263 to 1.0276 in. (26.070-26.100 mm). Tappet clearance in bore should be 0.022 to 0.039 in. (0.055-0.100 mm).

6-5. TAPPETS (cont)

c. Installation.



Removal and Installation of Tappets

- (1) Lubricate each cam lobe on camshaft (2) with lubricating oil (OE/HDO).
- (2) Lubricate bottom of each tappet (1) with lubricating oil (OE/HDO).
- (3) Install tappets (1) in their original location in crankcase.
- (4) Install cylinder head and rocker arm assemblies (para. 5-7).

6-6. HOT PLUGS

THIS TASK COVERS:

- a. Removal
- b. Inspection

- c. Installation

INITIAL SETUP:

Equipment/Materials Required:

Tools Required:

Pipe Sealant (item 11, Appendix E)

Nomenclature

Equipment Conditions:

General Mechanics
Tool Kit

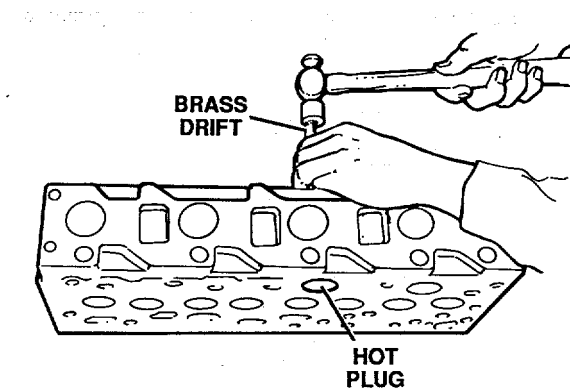
Ref Conditions

5-7 Cylinder head removed

Personnel Required: 1

6-5. TAPPETS (cont)**c. Removal.**

- (1) Place cylinder head (1) on exhaust port side.



Removal of Hot Plugs

- (2) Place a brass drift into injection nozzle bore and drive out hot plug.

b. Inspection.

- (1) Clean all carbon deposits from hot plugs.
- (2) Inspect hot plugs for visible damage or erosion. If damaged or eroded, replace hot plug.

NOTE

Hot plugs will develop hairline cracks after running. This is normal and acceptable.

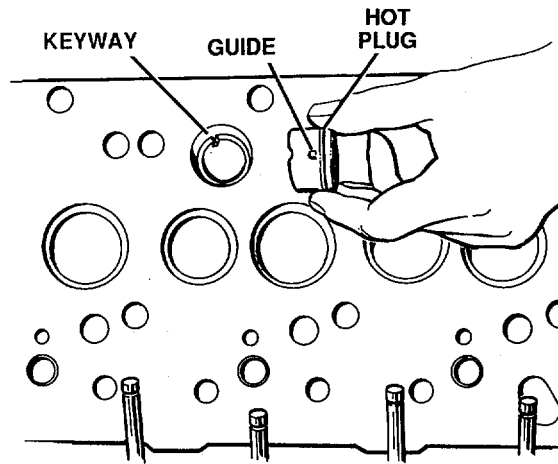
- (3) Inspect hot plugs for hairline cracks that intersect. If cracks intersect, replace hot plug.
- (4) Inspect hot plug for damage to guide. If guide is damaged, replace hot plug.

c. Installation.

- (1) Align guide on hot plug with keyway in hot plug bore.
- (2) Drive hot plug into bore with a soft-faced hammer.

6-5. TAPPETS (cont)

c. Installation (Cont).



Installation of Hot Plugs

NOTE

Hot plug face may not protrude more than 0.0026 in. (0.065 mm) from cylinder head. If this occurs, remove hot plug and grind face of hot plug as necessary.

Hot plug face may not recede more than 0.001 in. (0.025 mm) from cylinder head. If this occurs, remove and replace hot plug.

Hot plugs must be tight in hot plug bore. If they are not, remove hot plug and coat with pipe sealant and install plug.

6-7. GEARCASE COVER

THIS TASK COVERS:

- a. Removal
- b. Installation

INITIAL SETUP:

Tools Required:

Nomenclature

General Mechanics
Tool Kit

Personnel Required: 2

Equipment/Materials Required:

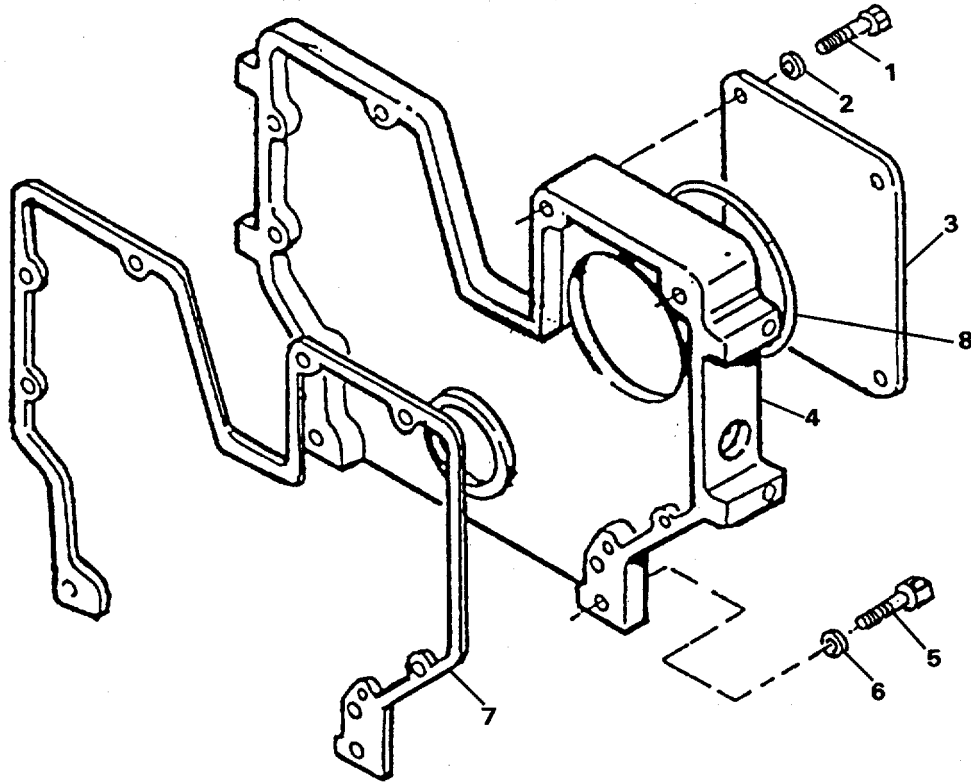
Lubricating Oil (Item 10, Appendix E)

Equipment Conditions:

<u>Ref</u>	<u>Conditions</u>
4-58	Alternator removed
5-6	Engine removed
5-8	Crankshaft pulley removed
5-11	Screws and washers securing oil pan to gear case cover removed

6-7. GEARCASE COVER (cont)

a. Removal.



Removing and Installing Gearcase Cover

- (1) Loosen oil pan capscrews enough to lower front end of oil pan.
- (2) Remove screws (1), washers (2) and fuel injection pump gear cover plate (3) from gearcase cover (4). Remove packing (8).
- (3) Remove screws (5) and washers (6) from gearcase cover (4).
- (4) Tap cover loose with a soft-faced hammer. Remove gearcase cover (4) and gasket (7) from engine. If oil pan gasket is damaged during removal, oil pan must be removed and gasket replaced.

6-7. GEARCASE COVER (cont)

b. Installation.

- (1) Remove any burrs from crankshaft sealing surface.
- (2) Coat crankshaft lightly with lubricating oil (OE/HDO).
- (3) Install new gasket (7) on backplate.
- (4) Install gearcase cover (4) on backplate and secure with screws (5) and washers (6). Torque screws to 17 lb-ft (23 Nm) (wet).
- (5) Install packing (8) and pump gear cover plate (3) on gear case cover and secure with washers (2) and screws (1). Tighten screws to a torque of 17 lb-ft (23 Nm) (wet).
- (6) Tighten oil pan screws (para. 5-11).
- (7) Install crankshaft pulley (para. 5-8).
- (8) Install alternator and alternator bracket (para. 4-58).

6-8. GEAR TRAIN AND BACKPLATE

THIS TASK COVERS:

- a. Removal
- b. Inspection

c. Installation

INITIAL SETUP:

Equipment/Materials Required:

Tools Required:

Lubricating Oil (Item 10, Appendix E)

Nomenclature

Equipment Conditions:

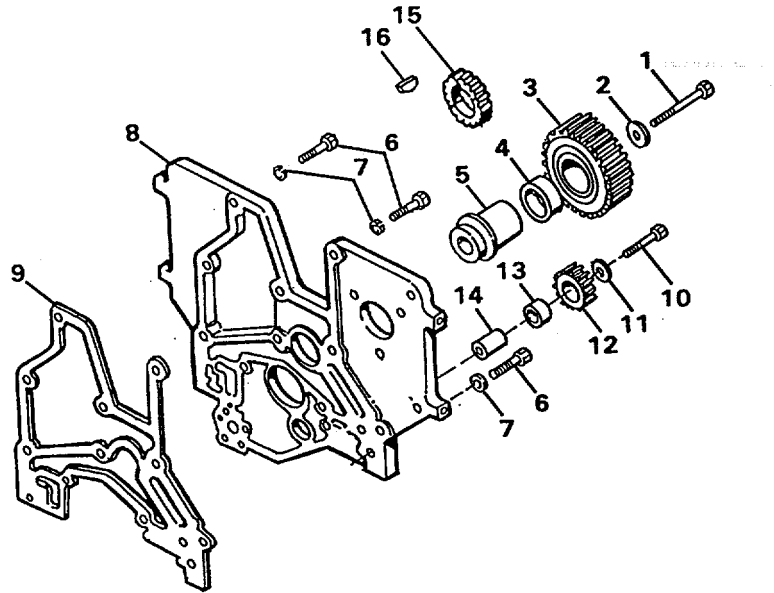
General Mechanics
Tool Kit

Ref Conditions

Gear Puller

- 5-12 Oil pump and gear removed
- 5-11 Oil pan and oil pickup tube removed
- 5-7 Cylinder head removed
- 5-16 Fuel injection pump and drive gear removed
- 5-17 Fuel transfer pump removed
- 6-7 Gearcase cover removed
- 6-13 Camshaft and camshaft gear removed

Personnel Required: 1

6-8. GEAR TRAIN AND BACKPLATE (cont)**a. Removal****Removing or Installing Gear Train and Backplate**

- (1) Remove screw (1) and flat washer (2) from idler gear (3).
- (2) Remove idler gear (3) from shaft (5).
- (3) Remove bearing (4) from idler gear (3) if damaged.
- (4) Install a 14 mm adapter in end of shaft (5).
- (5) Install slide hammer in adapter and pull shaft (5) from cylinder block.
- (6) Remove screw (10) and flat washer (11) and remove oil pump idler gear (12).
- (7) Use a suitable puller and remove crankshaft gear (15) from crankshaft. Remove key (16) from crankshaft.
- (8) Remove screws (6) (three capscrews and two socket head screws) and flat washers (7) from backplate (8).
- (9) Remove backplate (8) and gasket (9) from alignment pins. Discard gasket (9).

b. Inspection.

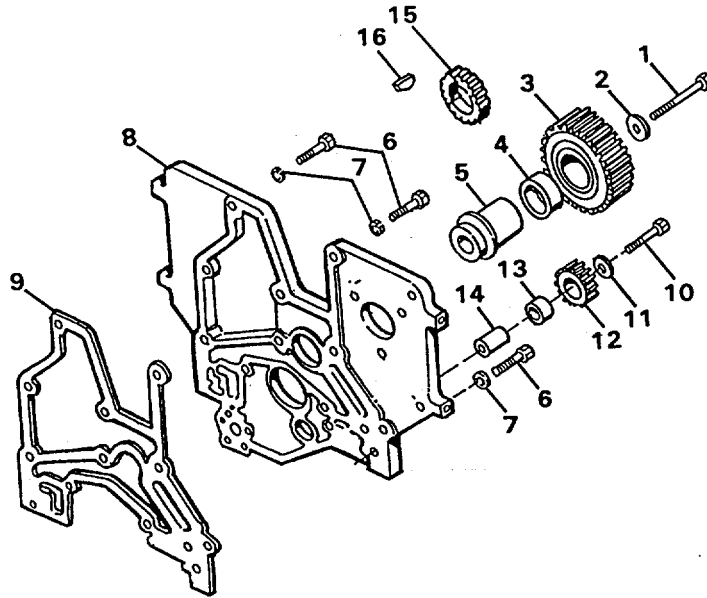
- (1) Inspect idler gears (3 and 12) and crankshaft gear (15) for nicked, worn or broken teeth. Replace if necessary.

6-8. GEAR TRAIN AND BACKPLATE (cont)

b. Inspection (cont).

- (2) Inspect inside diameter of idler gear bearings (4 and 13). Replace bearings if it is nicked, scored or worn. Press shaft (14) from backplate.
- (3) Inspect backplate for cracks, damage or wear. Replace if necessary.

c. Installation.

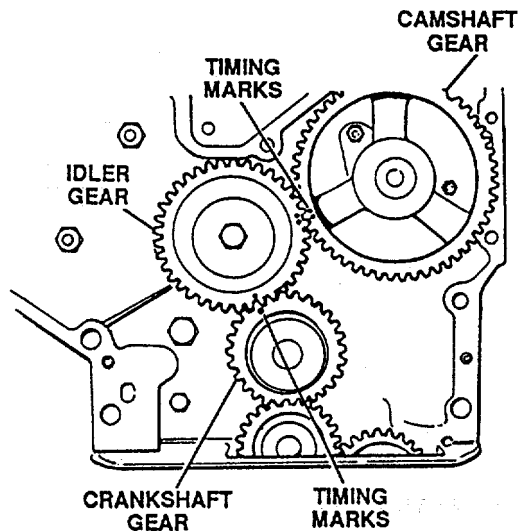


Removing or Installing Gear Train and Backplate

- (1) Install new gasket (9) and backplate (8) on alignment pins.
- (2) Install washers (7) and screws (6) (three capscrews and two socket head screws) on backplate (8). Tighten screws to 17 lb-ft (23 Nm) (wet).
- (3) Position idler gear shaft (5) in bore of cylinder block. Install washer (2) and screw (1) in idler shaft (5). Tighten screw until shaft bottoms in cylinder block bore. Remove screw (1) and washer (2).
- (4) Press bearing (4) in idler gear (3). Ream to 1.5760-1.5770 in. (40.030-40.054 mm).
- (5) Apply a light coat of oil (OE/HDO) to idler gear shaft (5). Install idler gear (3) on shaft (5). Be sure to align timing marks.
- (6) Install washer (2) and screw (1). Tighten screw to a torque of 39 lb-ft (52 Nm) (wet).

6-8. GEAR TRAIN AND BACKPLATE (cont)c. Installation (cont).

- (7) Install shaft (14) and press in place in backplate.
- (8) Press bearing (13) into bore of idler gear (12).
- (9) Install oil pump idler gear (12) on shaft (14) and secure with screw (10) and flat washer (11). Tighten screw to a torque of 17 lb-ft (23 Nm) (wet).



Timing Marks on Timing Gears

- (10) Install key (16) in groove in crankshaft and press crankshaft gear (15) on crankshaft. Align timing marks.
- (11) Install camshaft (para. 6-13).
- (12) Install fuel injection pump and drive gear (para. 5-16).
- (13) Install gearcase cover (para. 6-7).
- (14) Install cylinder head (para. 5-7).
- (15) Install oil pump and gear (para. 5-12).
- (16) Install oil pan and oil pickup tube (para. 5-11).

6-9. CRANKSHAFT FRONT OIL SEAL

THIS TASK COVERS:

- a. Removal
- b. Installation

Equipment/Materials Required:

Pipe Sealant (Item 11, Appendix E)

INITIAL SETUP:

Tools Required:

Nomenclature

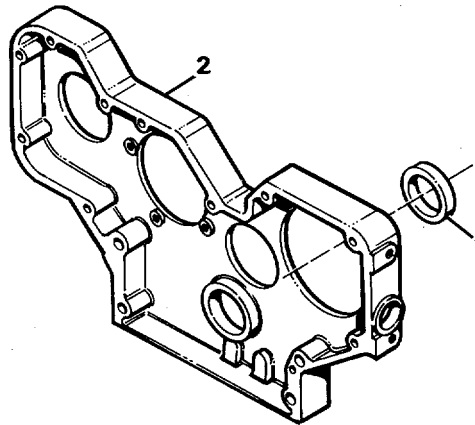
General Mechanics
Tool Kit

Equipment Conditions:

<u>Ref</u>	<u>Conditions</u>
6-7	Gearcase cover removed
6-8	Crankshaft gear removed

Personnel Required: 1

a. Removal.



Crankshaft Front Oil Seal and Wear Sleeve

- (1) Support gearcase cover (2) and drive or press oil seal (1) out from back side of cover.

CAUTION

Do not nick or gouge crankshaft with chisel. If crankshaft is damaged it must be removed and repaired or replaced.

- (2) Inspect oil seal for damage and evidence of leakage.

b. Installation.

- (1) Apply pipe sealant to crankshaft and inside of new wear seal (1) before installing.
- (2) Place gearcase cover (2) on solid surface so back of seal bore is supported.

6-9. CRANKSHAFT FRONT OIL SEAL (cont)

b. Installation (cont).

- (3) Position seal (1) in cover (2) with open side of seal facing inside of cover and positioned squarely in bore of cover.

CAUTION

A new seal must be installed. The seal should not be positioned in a wear groove on the crankshaft. Positioning a seal on a worn, dirty, rough or grooved crankshaft surface will cause the seal to leak.

Be sure the seal seats squarely on shoulder in cover bore. A seal that is cocked in bore will leak.

- (4) Drive or press seal (1) in cover bore until it bottoms on shoulder, using the front wear sleeve oil seal installing tool and arbor press.
- (5) Install gearcase cover (para. 6-7).

6-10. CRANKSHAFT REAR OIL SEAL AND WEAR SLEEVE

THIS TASK COVERS:

- a. Removal
- b. Installation

INITIAL SETUP:

Tools Required:

Nomenclature

General Mechanics
Tool Kit

Seal Removal Tool

Sleeve Installation Tool

Dial Indicator

Equipment/Materials Required:

Lubricating Oil (Item 10, Appendix E)
Pipe Sealant (Item 11, Appendix E)

Equipment Conditions:

<u>Ref</u>	<u>Conditions</u>
5-6	Engine removed
5-10	Flywheel and flywheel housing removed

Personnel Required: 1

a. Removal.

- (1) Remove eight capscrews (1) and flat washers (2) from front seal plate (3).
- (2) Remove four capscrews (4) and lockwashers (5) on back end of oil pan. Loosen capscrews (4) on each side of oil pan.

6-10. CRANKSHAFT REAR OIL SEAL AND WEAR SLEEVE (cont)

a. Removal (cont).

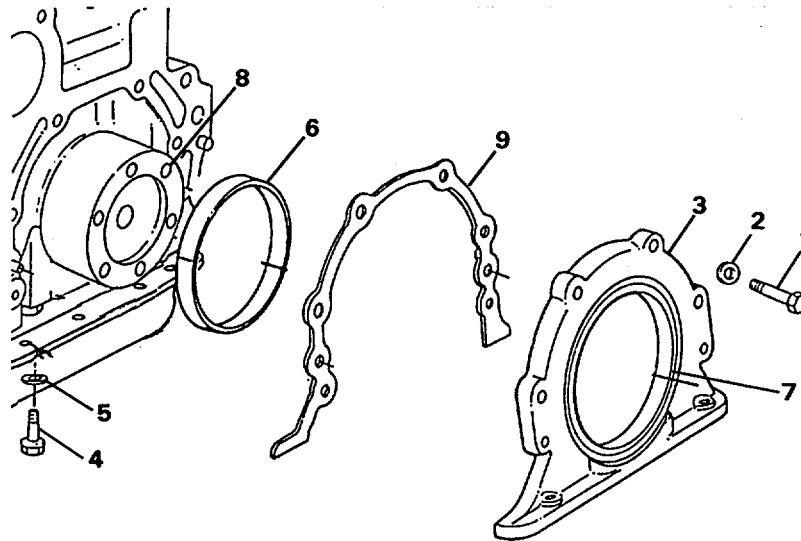
- (3) Slide seal plate (3) off crankshaft flange. Remove and discard seal plate gasket (9) from flange. Be careful not to damage oil pan gasket.
- (4) Support seal plate (3) in a press. Use a seal removal tool and press oil seal (7) from plate.

CAUTION

Do not nick or gouge crankshaft with chisel. If crankshaft is damaged, it must be removed and replaced.

- (5) If replacement of the wear sleeve (6) is required, use a hammer and chisel that is only as wide as wear sleeve. Make one or two chisel marks across wear sleeve and remove from crankshaft.

b. Installation.



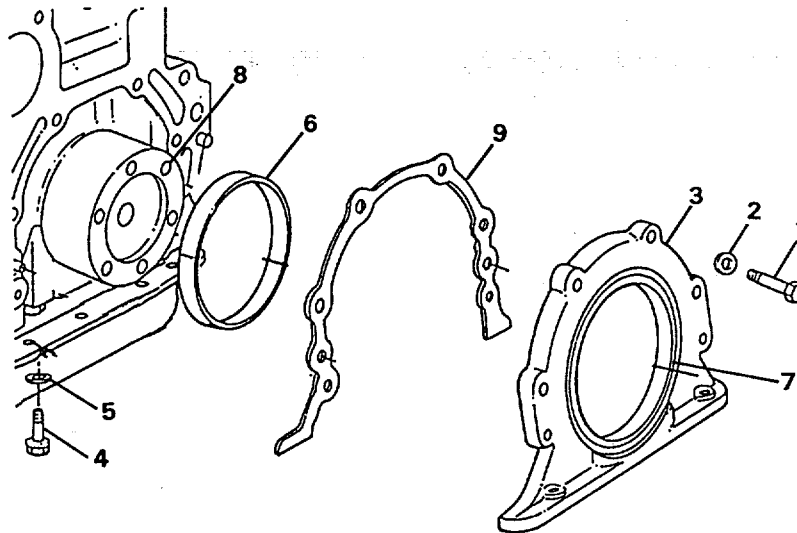
Removing or Installing Rear Oil Seal Plate

- (1) Apply pipe sealant to crankshaft (8) and inside of new wear sleeve (6). Position wear sleeve on crankshaft flange with outside chamfer toward back of engine.
- (2) Using rear wear sleeve installation tool, press wear sleeve (6) on crankshaft flange. Alternately tighten the bolts until tool bottoms on crankshaft flange. Clean any surplus pipe sealant off wear sleeve and crankshaft flange.
- (3) Lubricate new oil seal with oil (OE/HDO) to ensure sufficient lubrication until crankcase oil enters seal.

6-10. CRANKSHAFT REAR OIL SEAL AND WEAR SLEEVE (cont)b. Installation (cont).**CAUTION**

A new seal must be installed with a new wear sleeve. The seal should not be positioned in a wear groove on wear sleeve. Positioning a seal on a worn, dirty, rough or grooved crankshaft surface will cause seal to leak.

- (4) Using oil seal driver, install seal (7) with rubber lip facing outward. Drive seal in flush with machined surface of seal plate (3).
- (5) Be sure wear sleeve (6) on which seal (7) rides is free of dirt, nicks, burrs and wear grooves.
- (6) Lubricate crankshaft flange with clean engine oil (OE/HDO). Apply a bead of sealant to the junction of cylinder block, seal plate (3) and oil pan.
- (7) Install seal plate gasket (9) and seal plate (3) on crankcase. Use extreme care when installing seal plate so the oil pan gasket is not damaged. If oil pan gasket is damaged, remove oil pan and replace gasket.
- (8) Install washers (2) and capscrews (1) to secure seal plate (3). Torque capscrews to 17 lb-ft (23 Nm) (wet). Tighten oil pan screws (4) to a torque of 8.3 lb-ft (11 Nm) (wet).
- (9) Check crankshaft-to-seal runout as follows:



Removing or Installing Rear Oil Seal Plate

- (a) Load crankshaft so that all end play is taken up.
- (b) Mount a dial indicator on face of crankshaft flywheel mounting flange.

6-10. CRANKSHAFT REAR OIL SEAL AND WEAR SLEEVE (cont)

b. Installation (cont).

(c) Rotate crankshaft one complete revolution. Note maximum runout

(d) If runout exceeds 0.0098 in. (0.25 mm), remove seal plate assembly and reposition seal in plate.

(10) Install flywheel housing and flywheel (para. 5-10).

6-11. PISTONS AND CONNECTING RODS

THIS TASK COVERS:

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

INITIAL SETUP:

Tools Required:

Nomenclature

General Mechanics
Tool Kit

Cylinder Ridge Reamer
Plastic Tubing
Feeler Gauge
Micrometers
Oil Ring Expander
Piston Ring Compressor

Equipment/Materials Required:

Lubricating Oil (Item 10, Appendix E)
Cleaning Solvent (Item 13, Appendix E)
Goggles (Item 9, Appendix E)

Equipment Conditions:

<u>Ref</u>	<u>Conditions</u>
5-7	Cylinder head removed
5-11	Oil pan removed
5-12	Oil pump removed

Personnel Required: 1

a. Removal.

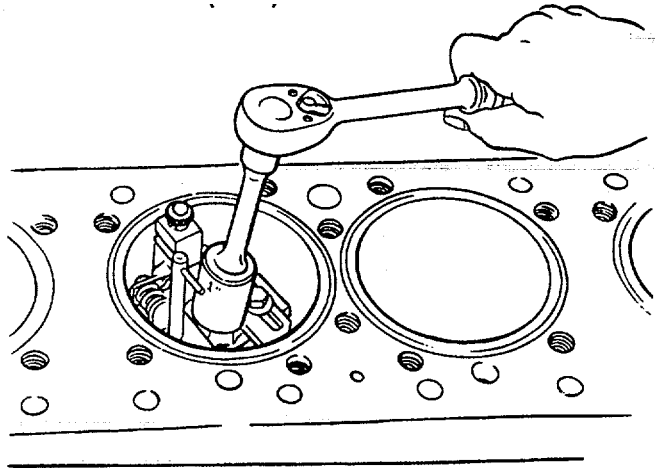
CAUTION

Removing carbon without a ridge reamer may cause damage to cylinder bore.

(1) Remove carbon from top of cylinder bore and check for a ridge. Remove ridge with a ridge reamer before removing piston.

6-11. PISTONS AND CONNECTING RODS (cont)

a. Removal (cont).

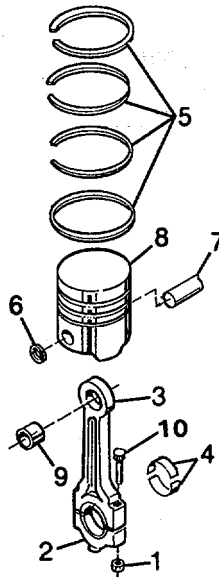


Ridge-Reaming Cylinder Bore

CAUTION

Forcing piston from cylinder before cleaning carbon or removing ridge may cause damage to piston.

(2) Mark the cylinder number on each connecting rod bearing cap and top of each piston.



Removal and Installation of Pistons

6-11. PISTONS AND CONNECTING RODS (cont)

a. Removal (cont).

- (3) Turn crankshaft until piston is at bottom of its stroke. Remove connecting rod nuts (1). Remove bearing caps (2) and free lower end of connecting rods (3) from crankshaft. Remove bearings (4) from bearing caps (2) and connecting rods (3). Remove bolts (10).

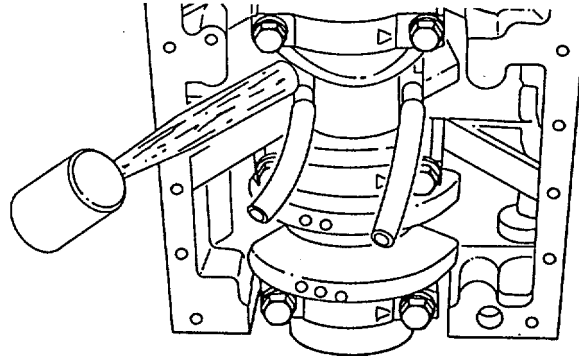
CAUTION

Avoid scratching crankpin and cylinder wall when removing piston and rod. Protect crankshaft rod journals by placing a piece of plastic tubing over rod bolts during removal.

- (4) Push rod and piston assembly out through top of cylinder using a hammer handle. Protect crankshaft rod journals by placing a piece of plastic tubing over rod bolts during removal.

b. Disassembly.

- (1) Remove piston rings (5) with a piston ring spreader.
 (2) Remove two retaining rings (6) with snap ring pliers. Push piston pin (7) out of piston (8).



Pushing Piston Assembly from Crankcase

- (3) Remove connecting rod bushing (9) if visibly damaged. Press bushing from piston rod.

c. Cleaning and Inspection.

CAUTION

Do not use a caustic cleaning solvent or wire brush for cleaning pistons. These materials will cause piston damage.

WARNING

Wear protective goggles when using the cleaning solvent. Avoid contact with the eyes. If contact occurs, flush eyes with cold water for 5 minutes and seek immediate medical attention. Dry cleaning solvent (PD-680) is both toxic and flammable. Avoid prolonged breathing of vapors. Avoid skin contact. Use only in a well-ventilated area. Keep away from open flame. Flash point of solvent is 138°F (59°C).

6-11. PISTONS AND CONNECTING RODS (cont)

c. Cleaning and Inspection (cont)

(1) Remove dirt and deposits from piston surfaces with a cleaning solvent (PD-680). Clean piston ring grooves with a groove cleaner. Do not remove metal from the ring groove sides.

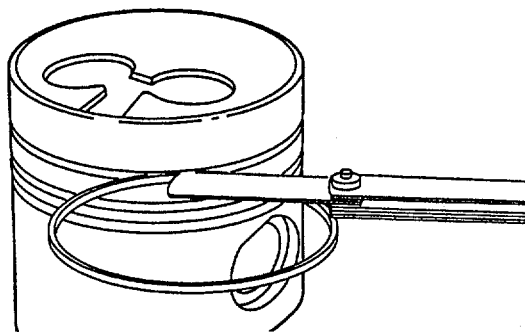
(2) Check piston for scoring, damaged ring grooves and signs of overheating. Inspect pistons for cracks and bent or broken ring lands. Replace any piston that is badly scored or burred, cracked, has badly worn ring grooves or is not in good condition.

(3) Check piston ring clearance.

(a) Check ring end gap by inserting each ring into cylinder in the location it is to be used. Use a piston to push ring squarely down in cylinder bore far enough to be in the ring travel area. Check ring end gap with a feeler gauge. Ring gaps must be as shown below:

<u>Ring</u>	<u>Gap</u>
Top Ring	MIN: 0.014 inch (0.35 mm) MAX: 0.024 inch (0.60 mm)
Intermediate Ring	MIN: 0.010 inch (0.25 mm) MAX: 0.024 inch (0.60 mm)
Oil Control Ring	MIN: 0.010 inch (0.25 mm) MAX: 0.020 inch (0.50 mm)

(b) If ring end gap does not meet specifications, check for the correct set of rings and correct bore size. A cylinder bore that is 0.0012 in. (0.03 mm) undersize will reduce the end gap 0.0031 in. (0.08 mm).



Checking Piston Ring Groove Side Clearance

6-11. PISTONS AND CONNECTING RODS (cont)

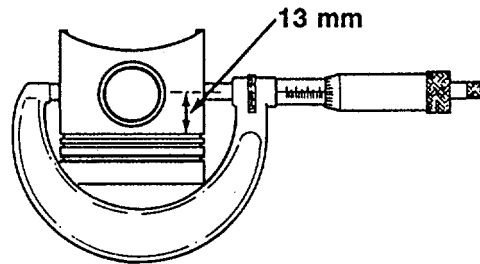
c. Cleaning and Inspection (cont).

(4) Check piston ring groove side clearance. Clearance must be as shown below:

<u>Ring</u>	<u>Groove Side Clearance (MAXIMUM)</u>
Top Rings	0.0098 inch (0.25 mm)
Intermediate Rings	0.010 inch (0.25 mm)
Oil Control Rings	0.006 inch (0.15 mm)

(5) Calculate piston to cylinder wall clearance.

(a) Measurements of the pistons, cylinder bores, and clearances between pistons and cylinder bores should be taken at 70°F (21°C). Pistons must be fitted to their respective cylinder bores before the rings are installed to provide a specific clearance.



Measuring Piston Skirt Diameter

(b) Measure outside diameter of piston skirt 0.05 in. (13 mm) below oil ring at a right angle to the piston pin using an outside micrometer. Diameter must be as shown below.

(c) Nominal diameter limit minimum must be 3.4971 in. (88.827 mm). Worn diameter limit minimum must be 3.4946 in. (88.762 mm).

(d) Cylinder bore honed diameter should be 3.5034 to 3.5044 in. (88.987 to 89.013 mm). Allowable wear limit is 3.5064 in. (89.063 mm).

(e) The difference between the two readings is the piston-to-cylinder clearance. If clearance exceeds wear limit, cylinder bore should be resized to the smallest standard oversize diameter at which it will clean up. Clearance should be 0.0057 to 0.0079 in. (0.145-0.201 mm). Maximum allowable wear limit clearance is 0.0107 in. (0.273 mm).

(6) Clean oil and crankcase deposits from connecting rod and cap. Be sure funnel oil hole is clean and open.

(7) Check connecting rods for nicks, cracks and damaged bolt threads. Replace as necessary.

6-11. PISTONS AND CONNECTING RODS (cont)

c. Cleaning and Inspection (cont).

- (8) Measure the outside diameter of piston pin and the inside diameter of connecting rod bushing. Replace connecting rod bushing if clearance is greater than 0.0020 in. (0.05 mm). Pin outside diameter should be 1.2596 to 1.2598 in. (31.995-32.00 mm). Bushing bore inside diameter should be 1.2599 to 1.2601 in. (32.003-32.009 mm).
- (9) Inspect connecting rod bearings for scoring, chipping, cracking or signs of overheating. Replace bearings if damaged. Replace bearing shells if any bright spots are found.
- (10) Measure thickness of connecting rod bearings. Thickness should be a minimum of 0.0738 in. (1.875 NM). Maximum thickness should be 0.0752 in. (1.910 Nm).
- (11) If any components or the piston assembly do not meet the above specifications replace the component or assembly.

d. Assembly.

NOTE

Each connecting rod and bearing cap should have been numbered during disassembly for identification and must be installed in the cylinder from which it was removed. Install piston assembly in engine with connecting rod identification numbers facing camshaft side of engine and the piston swirl chamber toward intake side.

- (1) Press connecting rod bushing (9) in connecting rod. Be sure oil hole lines up with the connecting rod (3) oil hole. The connecting rod bushing must be reamed to obtain the correct inside diameter.

NOTE

A new piston pin installed in a new bushing at 70°F (21°C) should be a thumb-push fit.

- (2) Install one retaining ring (6) in the piston pin hole with sharp edge of retainer facing outward.
- (3) Insert upper end of connecting rod (3) into piston, with swirl chamber of piston (8) positioned opposite connecting rod identification numbers.
- (4) Lubricate piston pin (7) with oil (OE/HDO) and push it into piston (8) and connecting rod (3).
- (5) Install other retaining ring (6) with sharp edge facing outward.

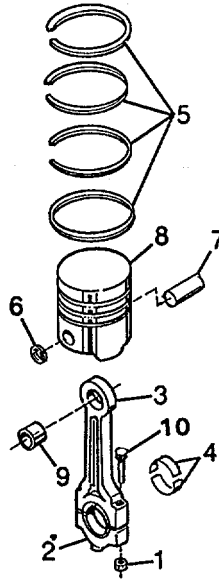
CAUTION

Be careful not to nick the bottom of piston skirt when a connecting rod assembly is secured in a vise. Use protective jaws, wooden blocks or a cloth to protect rod and piston from nicks that could lead to piston or connecting rod failure.

6-11. PISTONS AND CONNECTING RODS (cont)

d. Assembly (cont).

- (6) Lubricate piston (8) and rings (5) with engine oil (OE/HDO). Install rings on piston using a piston ring installer.
 - (a) Install oil control ring spring in bottom groove of piston with the guide pin inserted inside spring.
 - (b) Install chrome oil control ring in bottom groove over spring with end gap opposite (180 degrees) the guide pin in spring.



Removing and Installing Pistons

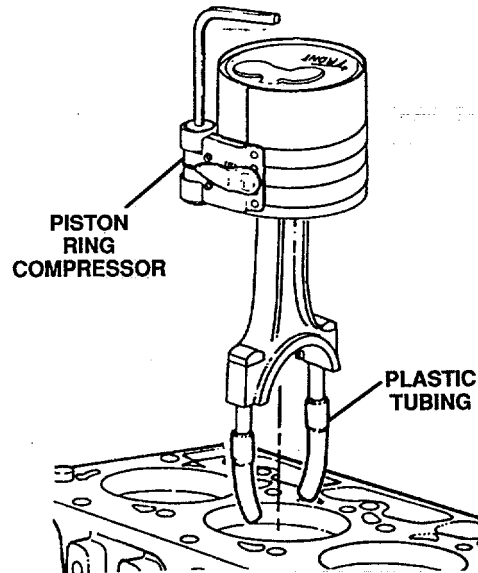
- (c) Install second compression ring in second groove of piston with side stamped "Up 2nd" or with a dot towards top of piston.
- (d) Install top chrome compression ring in top groove of piston with side stamped "Up Top" or with a dot toward top of piston.
- (7) Install bolts (10) in piston rod (3).

e. Installation.

- (1) Stagger piston ring gaps evenly around piston (8). Apply lubricant (OE/HDO) to piston (8) and rings (5).
- (2) Turn crankshaft to position number one rod bearing journal at the bottom of its stroke.

6-11. PISTONS AND CONNECTING RODS (cont)

e. Installation (cont)



Installing Piston and Connecting Rod in Cylinder

- (3) Position upper bearing (4) in connecting rod (3) with tang of bearing in the recess of connecting rod. Lubricate bearing and crankshaft journal with oil (OE/HDO). Protect crankshaft rod journals by placing a piece of plastic tubing over rod bolts during installation.
- (4) Compress rings (5) with a ring compressor and install piston assembly in cylinder bore by tapping on top of piston with a wooden hammer handle.

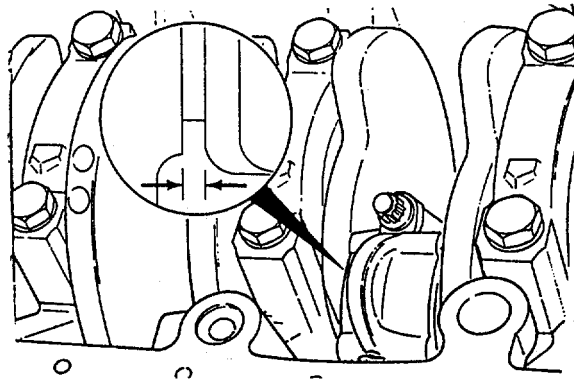
NOTE

If any difficulty is experienced in installing piston assembly, the ring compressor must be removed and the ring set inspected for correct installation in piston ring grooves. Align lower end of connecting rod with crankshaft journal before inserting piston assembly into cylinder bore.

- (5) Install lower bearing (4) in connecting rod bearing cap (2) with tang of bearing in recess of bearing cap and lubricate.
- (6) Install bearing cap (2) and bearing (4) on crankshaft journal. Be sure identification numbers stamped in bearing cap are located on same side as corresponding numbers stamped in connecting rod.
- (7) Tighten nuts (1) to specified torque as follows:
 - (a) Step 1. Tighten to a torque of 22 lb-ft (30 Nm) (wet).
 - (b) Step 2. Tighten to a torque of 40 lb-ft (55 Nm) (wet).
 - (c) Step 3. Final tighten to a torque of 63 lb-ft (85 Nm) (wet).

6-11. PISTONS AND CONNECTING RODS (cont)

- e. Installation (cont).
- (8) Install remaining piston assemblies in the same manner. Turn engine over by hand after each piston assembly is installed to be sure that all bearings are free.
- (9) Check the side clearance between the connecting rod and crankshaft. Clearance should be a minimum of 0.002 in. (0.05 mm) and a maximum of 0.018 in. (0.45 mm).
- (10) Refer to para. 5-12 and install the oil pump.



Checking Connecting Rod Side Clearance

- (11) Refer to para. 5-11 and install the oil pan.
- (12) Refer to para. 5-7 and install the cylinder head.

6-12. CRANKSHAFT AND MAIN BEARINGS

THIS TASK COVERS:

- a. Removal
- b. Inspection

- c. Installation

INITIAL SETUP:

Equipment/Materials Required: 2

Tools Required:

Lubricating Oil (Item 10, Appendix E)

Nomenclature

Equipment Conditions:

General Mechanics
Tool Kit

Ref Conditions

Inside Micrometer

5-7 Cylinder head removed

5-8 Crankshaft pulley removed

5-9 Flywheel removed

5-10 Flywheel housing removed

5-11 Oil pan removed

5-12 Oil pump removed

Dial Indicator

6-7 Gear case cover removed

6-8 Gear and backplate removed

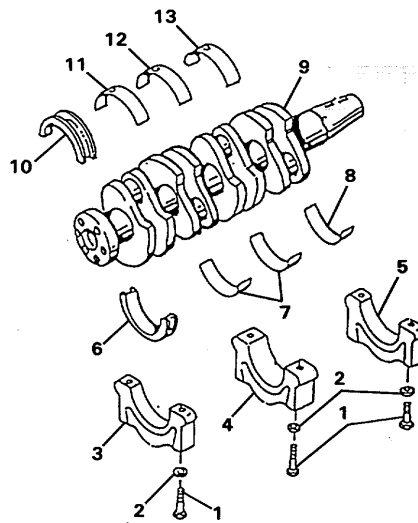
6-9 Crankshaft front oil seal removed

6-10 Crankshaft rear oil seal removed

6-11 Pistons and connecting rods removed

Personnel Required: 1

a. Removal.



Removing or Installing Crankshaft and Bearings

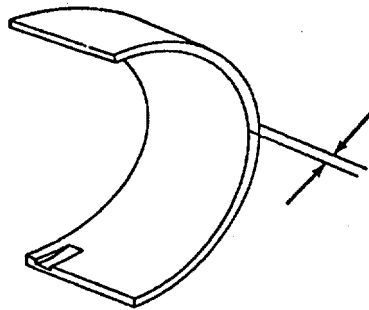
6-12. CRANKSHAFT AND MAIN BEARINGS (cont)**a. Removal (cont).**

Mark bearing caps (3, 4 and 5) to aid in assembly.

- (1) Remove ten screws (1) and flat washers (2).
- (2) Remove one rear bearing cap (3), three intermediate bearing caps (4) and one front bearing cap (5).
- (3) Remove one rear lower bearing (6), three intermediate lower bearings (7) and one front lower bearing (8) from crankshaft journals. Mark bearings with the number of the journal from where they were removed.
- (4) Carefully lift crankshaft (9) from upper bearings in crankcase.
- (5) Remove one upper rear bearing (10), two intermediate bearings (11), one intermediate upper bearing (12) and one front upper bearing (13). Mark bearings with the number of the journal from which they were removed.

b. Inspection.

- (1) Clean crankshaft and bearings and dry thoroughly.
- (2) Inspect journals for chipping, cracking and signs of overheating. Replace crankshaft if any of these conditions exist.



Measuring Bearing Thickness

- (3) Clean bearing caps and bearings to remove all grease and dirt.
- (4) Inspect bearing caps for cracks, nicks and damage. Replace any damaged bearing caps.
- (5) Inspect bearings for nicks, scratches and wear.
- (6) Measure thickness of bearings with a micrometer. Thickness of bearing should be a minimum of 0.0943 in. (2.374 mm). Maximum thickness should be 0.0953 in. (2.421 mm).

6-12. CRANKSHAFT AND MAIN BEARINGS (cont)**b. Inspection (cont).**

- (7) Replace bearings if nicked, scratched, worn or less than minimum thickness.
- (8) Measure diameter of main bearing journals and connecting rod journals on crankshaft with a micrometer. Measure journals at several places on journal.
- (9) Main bearing journals should have a diameter between 2.9917 and 2.9925 in. (75.99-76.01 mm).
- (10) Connecting rod journals should have a diameter between 2.2043 and 2.2051 in. (55.99-56.01 mm).
- (11) Check out-of-round of main bearing journals. Out-of-round should be between 0.0003 in. (0.007 mm). Maximum allowable wear limit out-of-round is 0.0004 in. (0.010 mm).
- (12) Check out-of-round of connecting rod journals. Out-of-round should be between 0.002 in. (0.005 mm). Maximum allowable wear limit out-of-round is 0.0003 in. (0.007 mm).
- (13) Check taper of main bearing journals. Taper should be between 0.002 in. (0.005 mm). Maximum allowable wear limit is 0.0003 in. (0.007 mm).
- (14) Check taper of connecting rod journals. Taper should be between 0.0002 in. (0.005 mm). Maximum allowable wear limit is 0.0003 in. (0.007 mm).
- (15) Install main bearings (c. below) and bearing caps. Tighten screws to a torque of 90 lb-ft (123 Nm).
- (16) Use an inside micrometer and check inside diameter of bearing faces.
- (17) Inside diameter should be 2.9937 to 2.9957 in. (76.040-76.090 mm). Check diameters of main bearing journals measured in (8) above. Subtract this dimension from inside diameters of main bearings. The difference is the bearing clearance. The specified clearance between main bearings and crankshaft journal is 0.0012 to 0.0039 in. (0.03-0.10 mm). If clearance is not as specified, replace crankshaft.
- (18) Remove bearing caps and main bearings (a. above).
- (19) Replace crankshaft or bearings if measurements of bearing journals are not within specifications.

c. Installation.**NOTE**

The upper main bearings are marked as to location. Bearing (13) is marked FRONT UPPER, bearing (12) is marked UPPER INTER. Bearings (11) are marked UPPER CTR and bearing (10) is marked UPPER REAR.

- (1) Install bearings (10, 11, 12, and 13) in position in crankcase. Tang on bearing must be in slot in bearing seat.

6-12. CRANKSHAFT AND MAIN BEARINGS (cont)

c. Installation (cont).

- (2) Lubricate all bearing journals on crankshaft (9) with oil (OEHDO) and carefully lower crankshaft into position in crankcase. It may be necessary to rotate crankshaft to clear the casting bosses in the crankcase.

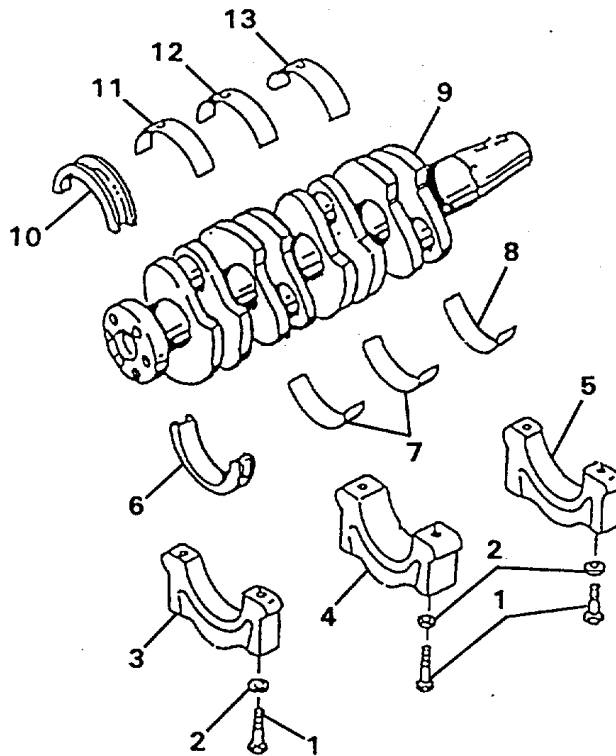
NOTE

The lower main bearings are marked as to location. Bearing (6) is marked LOWER REAR. Bearings (7) are marked LOWER INTR. and LOWER CTR. Bearing (8) is marked LOWER FRONT.

- (3) Install lower bearings (6, 7 and 8) in position in bearing caps (3, 4 and 5). Tang on bearing must engage slot in cap.

NOTE

Bearing cap (5) is marked F for front. Bearing cap (3) is marked R for rear. Bearing caps (4) are marked for their respective position. Bearing caps are also marked with numbers (1 through 5) to aid in installation.



Removing or Installing Crankshaft and Bearings

6-12. CRANKSHAFT AND MAIN BEARINGS (cont)

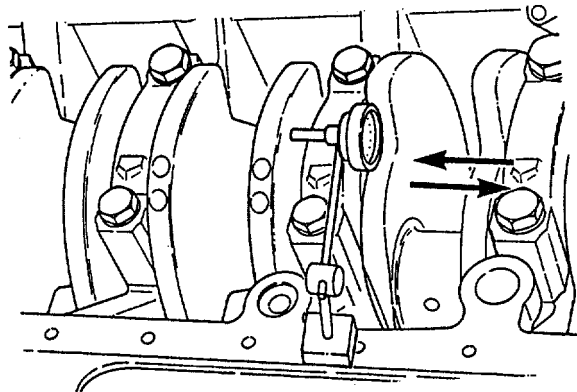
c. Installation (cont).

- (4) Install bearing caps in position over respective journals. Caps must be installed with numbers on caps toward camshaft side of crankcase. If necessary, push crankshaft toward front of engine to bring rear bearing surfaces in alignment.
- (5) Install washers (2) and screws (1) to secure bearing caps to crankcase.

CAUTION

Do not over torque bearing screws. Overtightening of the screws may distort the bearing caps and draw the bearings too tight against the crankshaft journals. This can result in premature bearing failure.

- (6) Tighten screws (1) to a torque of 90 lb-ft (123 Nm) (wet).
- (7) Attach a dial indicator to crankcase. Push the crankshaft in one direction to take up end play. Set dial indicator to zero and pull crankshaft in the opposite direction. End play should be a minimum of 0.004 in. (0.100 mm). Maximum end play should be 0.015 in. (0.38 mm).
- (8) If end play does not conform to specifications replace flanged rear bearings (6 and 10).
- (9) Install pistons and connecting rods. (para. 6-1 1).



Checking Crankshaft End Play

- (10) Install crankshaft front and rear oil seals (paras. 6-9 and 6-10).
- (11) Install gear train and backplate (para. 6-8).
- (12) Install oil pump and oil pan (paras. 5-11 and 5-12).
- (13) Install flywheel and flywheel housing (paras. 5-9 and 5-10).
- (14) install crankshaft pulley (para. 5-8).
- (15) Install cylinder head (para. 5-7).

6-13. CAMSHAFT

THIS TASK COVERS:

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

INITIAL SETUP:

Tools Required:

Nomenclature

General Mechanics
Tool Kit

Dial Indicator

Micrometers

Personnel Required: 1

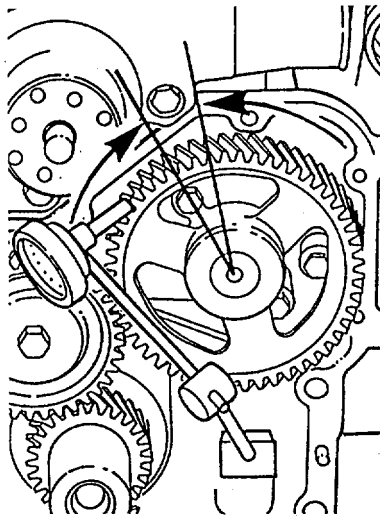
Equipment/Materials Required:

Crocus Cloth (Item 5, Appendix E)
Lubricating Oil (Item 10, Appendix E)

Equipment Conditions:

<u>Ref</u>	<u>Conditions</u>
5-7	Cylinder head removed
5-12	Oil pump and gear removed
5-17	Fuel transfer pump removed
6-5	Tappets removed
6-7	Gear cover removed

a. Removal.



Checking Camshaft Gear Backlash

- (1) Check camshaft to idler gear backlash before removing camshaft assembly.
 - a. Install a dial indicator on crankcase in contact with camshaft gear.
 - b. Backlash should be 0.0017 to 0.0104 in. (0.045-0.264 mm).

6-13. CAMSHAFT (cont)

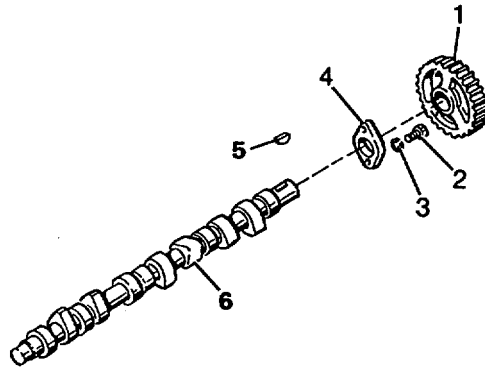
a. Removal (cont).

- (2) Rotate camshaft gear (1) so camshaft retaining plate screws (2) are accessible through camshaft gear. Remove two screws (2) and washers (3) to loosen retainer (4).
- (3) Rotate camshaft gear (1) to align timing marks with timing marks on idler gear. Refer to para. 6-8.

CAUTION

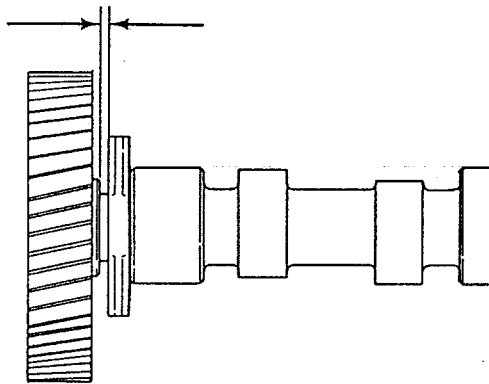
Use care so as not to scratch or mar camshaft bearings with cam lobes as camshaft is withdrawn from crankcase.

- (4) Carefully remove camshaft (6), with camshaft gear (1) attached, from crankcase.



Removing or Installing Camshaft

- (5) Check clearance between camshaft gear (1) and retainer (4) with a feeler gauge. Clearance should be 0.004 to 0.020 in. (0.10-0.50 mm). If clearance is excessive, replace retainer.



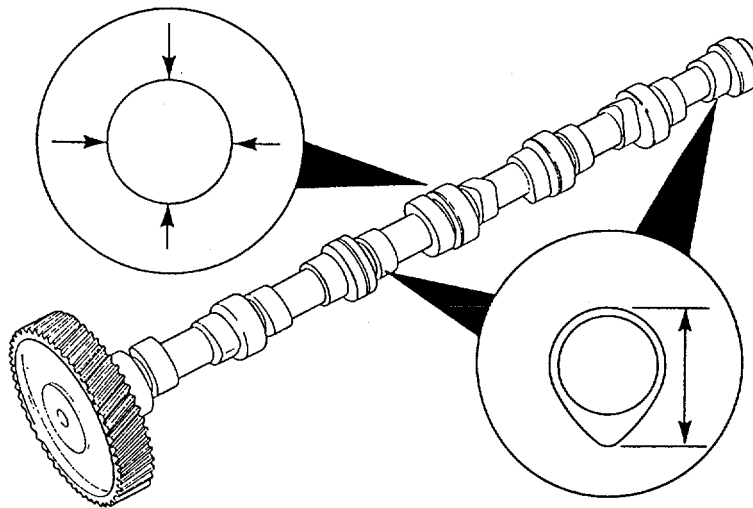
Checking Clearance Between Gear and Retainer

6-13. CAMSHAFT (cont)a. Removal (cont).

- (6) Place camshaft and camshaft gear in a press. Press camshaft (6) out of gear (1). Remove retainer (4). Remove key (5) from camshaft (6).

b. Inspection.

- (1) Clean camshaft, retainer and gear.
- (2) Visually inspect camshaft lobes and bearing journals for roughness, scoring or wear. Check lobes and bearings for wear with a micrometer.

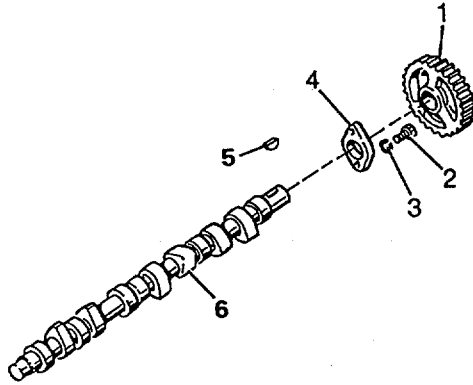


Checking Camshaft Lobes and Bearing Journals

- (a) Diameter of bearing journals should be 1.9678 in. (49.982 mm).
- (b) Intake and exhaust valve lobes should have a distance of 1.673 in. (42.50 mm) from base to nose.
- (c) Fuel transfer pump lobe should have a distance of 1.604 in. (40.73 mm).
- (d) Replace a camshaft if lobes or bearings are worn beyond specifications.
- (3) Inspect the camshaft gear for cracks, chips and broken teeth. Inspect bore of gear for burrs and damage. Remove burrs with fine crocus cloth, if possible. Replace gear if cracked or damaged.
- (4) Measure the camshaft retainer thickness. Retainer should be 0.465 to 0.472 (11.80-12.00 mm) thick. If worn beyond these limits, replace retainer.

6-13. CAMSHAFT (cont)c. Installation.

- (1) Install key (5) in slot in camshaft (6). Drive key into slot with a leather hammer.

**Removing or Installing Camshaft**

- (2) Lubricate retainer (4) with oil (OE/HDO) and slide retainer on camshaft (6).
 (3) Lubricate gear mounting surface on end of camshaft with oil (OE/HDO).

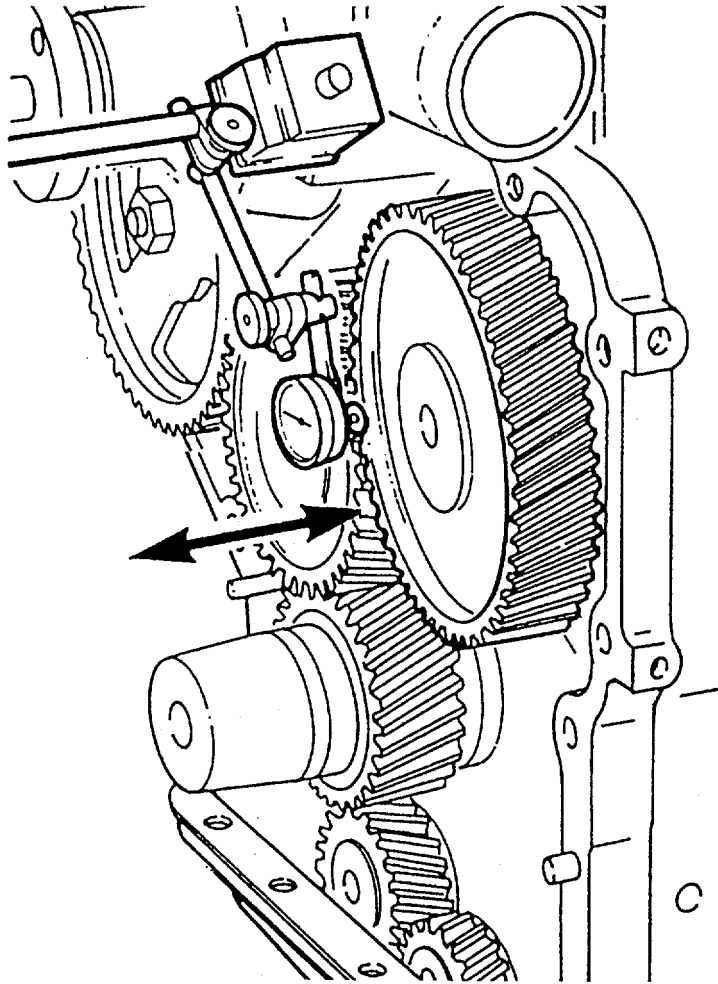
NOTE

Timing marks on camshaft gear (1) must face out (away from camshaft) when installing gear on camshaft.

- (4) Install the camshaft (6) and camshaft gear (1) in a press. Support the camshaft on the No. 1 bearing journal and press camshaft gear on camshaft until gear contacts shoulder on camshaft.
 (5) Recheck clearance between retainer (4) and gear (1). Refer to 6-13. b. (4) above.
 (6) Install camshaft (6), with attached gear (1), in crankcase. Check to make sure timing marks on camshaft gear align with timing marks on idler gear. Refer to para. 6-8.
 (7) Install two washers (3) and screws (2). Tighten screws to a torque of 17 lb-ft (23 Nm) (wet).
 (8) Check and verify gear backlash. Refer to 6-13. a. (1) above.
 (9) Check end play of crankshaft gear. Attach a dial indicator to the crankcase with indicator contacting gear. Pull camshaft gear and shift in and out of crankcase. End play should be 0.004 to 0.020 in. (0.10-0.50 mm). If end play is excess replace retainer (4).

6-13. CAMSHAFT (cont)

c. Installation (cont).



Checking End Play of Camshaft and Gear

- (10) Install gear cover (para. 6-7).
- (11) Install tappets (para. 6-5).
- (12) Install fuel transfer pump (para. 5-17).
- (13) Install cylinder head (para. 5-7).
- (14) Install oil pump and gear (para. 5-12).

6-14. FUEL INJECTORS

THIS TASK COVERS:

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

INITIAL SETUP:

Tools Required:

Nomenclature

General Mechanics
Tool Kit

Injection Nozzle Tester

Equipment/Materials Required:

Cleaning Solvent (Item 13, Appendix E)
Goggles (Item 9, Appendix E)
Stiff Bristle Brush

Equipment Conditions:

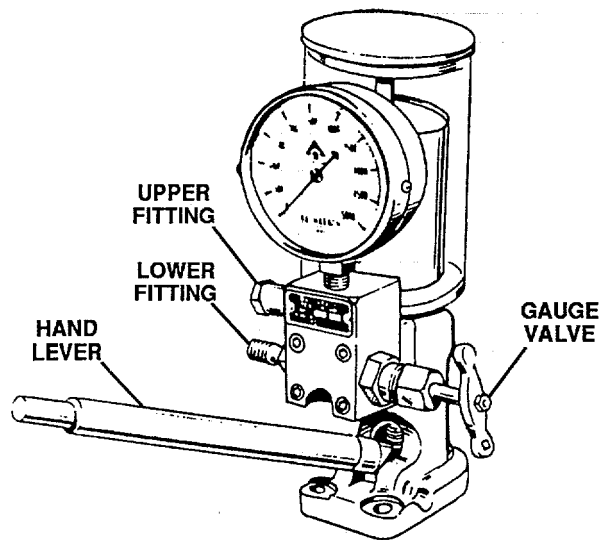
Ref	Conditions
5-15	Fuel injectors removed

- a. Removal. Refer to para. 5-15 and remove fuel injectors from the cylinder head.
- b. Testing.

CAUTION

Strict cleanliness of all equipment and parts is required when working on the fuel injectors.

- (1) Before disassembling the fuel injectors, test all injectors in a nozzle tester.



Fuel Injection Nozzle Tester

6-14. FUEL INJECTORS (cont)

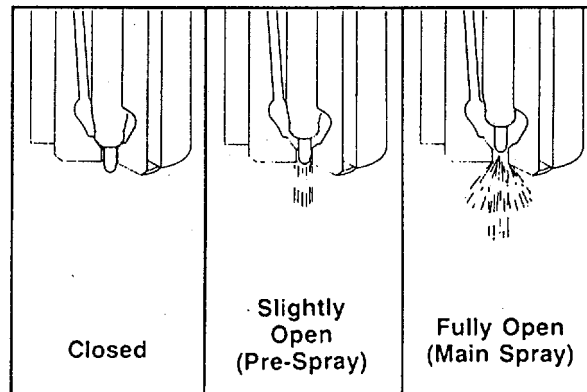
b. Testing (cont).

- (2) Connect the fuel injector to the upper fitting on the nozzle tester.
- (3) Fill tester supply tank with correct diesel fuel.

WARNING

When testing or adjusting fuel injectors, do not place your hands or arms in front of injector nozzle. Nozzle discharge pressure can cause oil to penetrate the skin and cause blood poisoning or serious skin infection.

- (4) Check nozzle opening pressure as follows:
 - (a) Suspend injector nozzle in a glass jar to contain oil spray and allow for observation of injector operation.
 - (b) Close the pressure gauge valve. Flush injector by operating hand lever rapidly five to ten strokes.
 - (c) Open the pressure gauge valve. Pump hand lever slowly to raise pressure until the injector valve opens and spray ejects from nozzle.
 - (d) When injector valve opens the pressure will fall rapidly. Check pressure reading at which injector valve opens.
 - (e) The nozzle should open at 1890 to 2000 psi (13,000-13,000 kPa).
 - (f) If opening pressure does not meet specifications, clean, inspect and repair injector.
- (5) Check nozzle spray pattern as follows:
 - (a) With pressure gauge valve open, raise pressure as in (4) above.

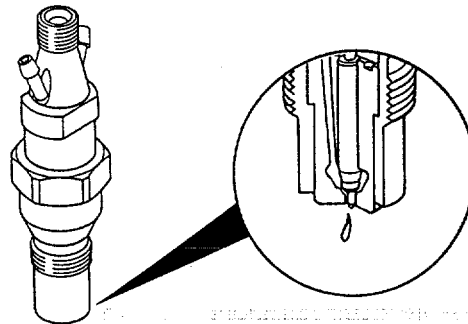


Fuel Spray Patterns

6-14. FUEL INJECTORS (cont)

b. Testing (cont).

- (b) Check spray pattern as diesel fuel is forced from the nozzle.
 - (c) As the needle lifts off the seat a small amount of fuel-enters the combustion chamber as "prespray." As the fuel pressure continues to rise, the needle fully opens and the main spray of fuel is injected into combustion chamber.
 - (d) If spray patterns are not as shown, repair fuel injector.
- (6) Check nozzle for leakage.
- (a) With pressure valve still open, depress hand lever until the pressure is 150 psi (1,034 kPa).
 - (b) If the pressure drops within 10 seconds, the nozzle is leaking. Check to see if diesel fuel is falling in drops from injector.



Checking Nozzle Leakage

- (c) If drop forms the nozzle is leaking and must be cleaned and repaired.

c. Disassembly.

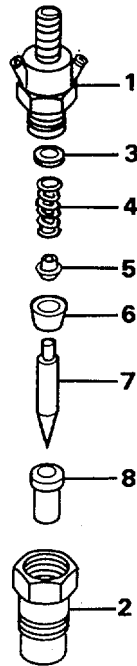
WARNING

Wear protective goggles when using the cleaning solvent. Avoid contact with the eyes. If contact occurs, flush eyes with cold water for 5 minutes and seek immediate medical attention. Dry cleaning solvent (PD-680) is both toxic and flammable. Avoid prolonged breathing of vapors. Avoid skin contact. Use only in a well-ventilated area. Keep away from open flame. Flash point of solvent is 138°F (59°C).

- (1) Clean outside of injector assembly with cleaning solvent (PD-680) and dry thoroughly.
- (2) Clean carbon residue from the nozzle tip and nozzle tip nut with a stiff wire brush.
- (3) Clamp upper nozzle body (1) in a vise with copper jaw covers.
- (4) Loosen the nozzle tip nut (2) from upper body.

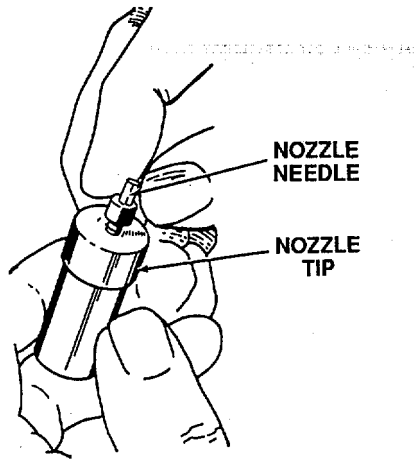
6-14. FUEL INJECTORS (cont)c. Disassembly (cont).

- (5) Remove injector assembly from the vise.
- (6) Remove nozzle tip nut (2) completely.
- (7) Remove shims (3). Record number of shims.



Fuel Injector Assembly

- (8) Remove spring (4), thrust pin (5) and disc (6). Remove needle (7) and injector tip (8) as an assembly.
- (9) Slide the needle (7) from the tip (8). Hold needle only by stem at top of needle. Place needle and tip on clean, absorbent cloth or paper. Avoid holding needle by needle body. Perspiration and body oils can corrode the finely lapped surfaces of the needle.
- (10) After cleaning, dip the needle (7) and tip (8) in clean diesel oil.
- (11) Slide needle (7) into bore of tip (8). Needle must fit freely into bore of tip. Lift needle about one third of its length out of tip. Needle should slide down to the seat under its own weight when tip is held at a 45 degree angle.

6-14. FUEL INJECTORS (cont)**c. Disassembly (cont).****Nozzle Needle Slide Test**

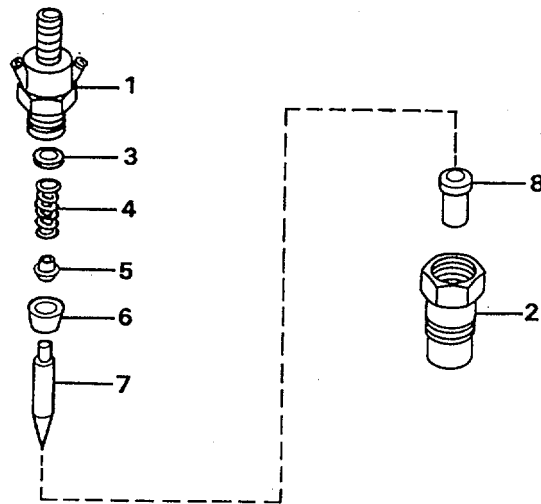
- (12) If nozzle needle fails test, clean the nozzle again and retest it. Any nozzle needle and tip failing the slide test must be replaced. Replace tip and needle as an assembly.
- (13) Inspect spring (4) for kinks, bends and damage. Inspect disc (6) and thrust pin (5) for wear and damage.
- (14) Replace all worn or damaged parts.

d. Assembly.

- (1) Thoroughly rinse all parts of the fuel injector assembly in clean diesel fuel.
- (2) Slide nozzle tip (8) and nozzle needle (7) into tip nut (2). Install disc (6) in tip nut (2) with smooth, flat face against needle and tip.
- (3) Place thrust pin (5) into bore of disc (6). Install shims (3) (same amount as removed in c. above) and spring (4) in upper nozzle body (1).
- (4) Thread upper body (1) into tip nut (2) just enough to hold parts in place.
- (5) Mount the upper body (1) in a vise with copper jaws and tighten tip nut to a torque of 30 to 35 lb-ft (41-48 Nm) (wet).

6-14. FUEL INJECTORS (cont)

d. Assembly (cont).



Fuel Injector Assembly

(6) Refer to b. above and test injector for opening pressure, spray pattern and leakage.

(7) If opening pressure is not correct, replace shims. A thicker shim will result in higher pressure.

(a) The shims are available in thicknesses of 0.0315 in. (0.080 mm) to 0.77 inch (1.96 mm).

(b) The shims are graduated in thickness by 0.0015 in. (0.04 mm).

(c) A change in shim thickness of 0.0015 in. (0.04 mm) will increase pressure by 72 psi (490 kPa).

(d) Add or delete shims as necessary to obtain correct opening pressure.

e. Installation.

Refer to para. 5-15 and install fuel injectors in cylinder head.

6-15. ENGINE CRANKCASE (BLOCK)

THIS TASK COVERS:

- a. Cleaning
- b. Inspection
- c. Repair Detergent

Equipment/Material Required:

- Lubricating oil (Item 10, Appendix E)
- Cleaning Solvent (Item 13, Appendix E)

INITIAL SETUP:

Personnel Required: 2

Tools Required:

Nomenclature
Shop Equipment,
Auto Maintenance
and Repair, Field
Maintenance

Equipment Conditions:

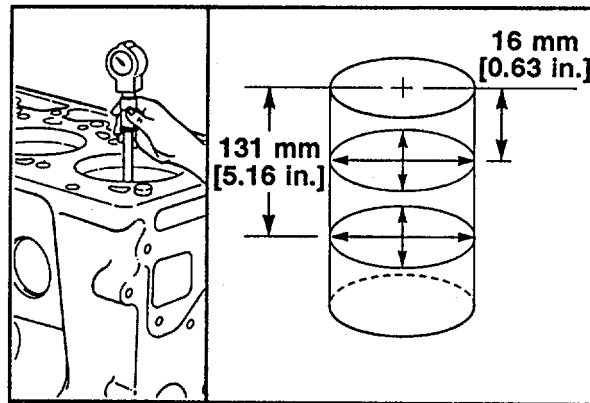
<u>Ref</u>	<u>Conditions</u>
5-6	Engine removed
5-10	Flywheel housing removed
5-12	Oil pump removed
5-13	Exhaust manifold removed
5-14	Intake manifold removed
6-4	Cylinder head and valves removed
6-5	Tappets removed
6-8	Idler gears and backplate removed
6-11	Pistons and connecting rods removed
6-12	Crankshaft removed
6-13	Camshaft removed

- a. Cleaning.

WARNING

Wear protective goggles when using the cleaning solvent. Avoid contact with the eyes. If contact occurs, flush eyes with cold water for 5 minutes and seek immediate medical attention. Dry cleaning solvent (PD-680) is both toxic and flammable. Avoid prolonged breathing of vapors. Avoid skin contact. Use only in a well-ventilated area. Keep away from open flame. Flash point of solvent is 138°F (59°C).

- (1) Clean the crankcase with cleaning solvent (PD-680) and dry thoroughly.
- (2) Scrape all old gasket material from crankcase surfaces.
- (3) Use warm water and a detergent and flush the crankcase. Use rags and air pressure to dry crankcase.

6-15. ENGINE CRANKCASE (BLOCK) (cont)b. Inspection.

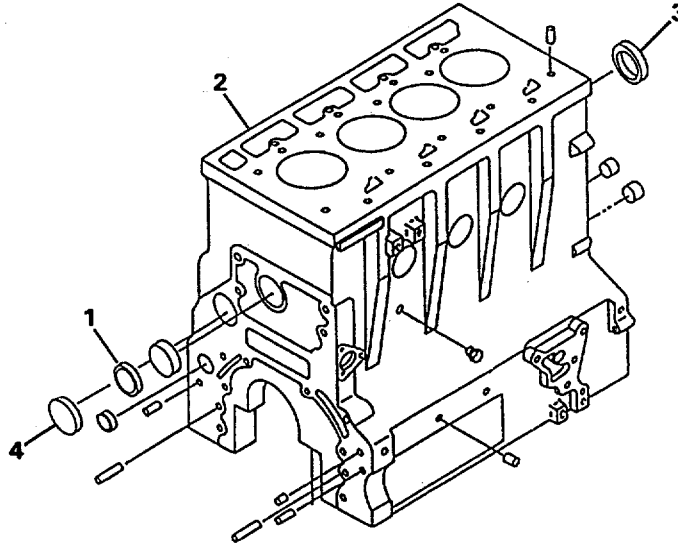
Measuring Cylinder Bore

- (1) Inspect crankcase for cracks, dents and damage. Replace crankcase if cracked or damaged.
- (2) Measure the cylinder bore diameter with an inside micrometer at two places within bore. Measure at 0.63 in. (16 mm) from top of cylinder and at 5.16 in. (131 mm) from top. Check cylinder from out-of-round and taper of bore.
- (3) The measurements should be as follows:
 - (a) Bore inside diameter - 3.5034 to 3.5044 in. (88.987-89.013 mm). Maximum allowable wear limit is 3.5064 in. (89.063 mm).
 - (b) Cylinder bore out-of-round - 0.002 in. (0.04 mm).
 - (c) Bore taper - 0.003 in. (0.08 mm).
 - (d) If cylinder bores are worn beyond the above specifications, replace crankcase.

6-15. ENGINE CRANKCASE (BLOCK) (cont)

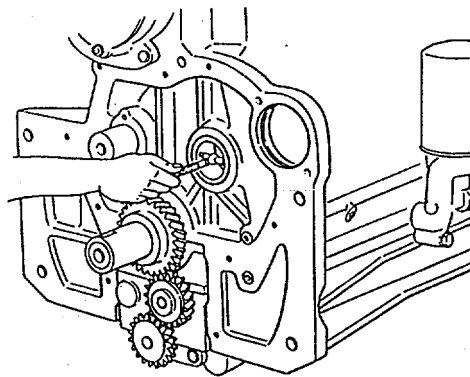
b. Inspection (cont).

- (e) Place a straightedge on top of crankcase (2) and check flatness of surface. Warpage of crankcase surface must not exceed 0.002 in. (0.05 mm). If measurement exceeds the specification, replace crankcase.



Crankcase Assembly

- (4) Five camshaft bearings installed in the crankcase support the camshaft. Four are intermediate bearings (1) and one front bearing (3).



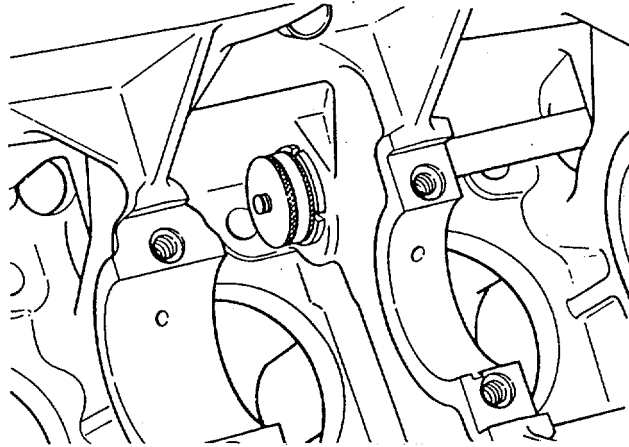
Measuring Inside Diameter of Front Camshaft Bearing

6-15. ENGINE CRANKCASE (BLOCK) (cont)

b. Inspection (cont).

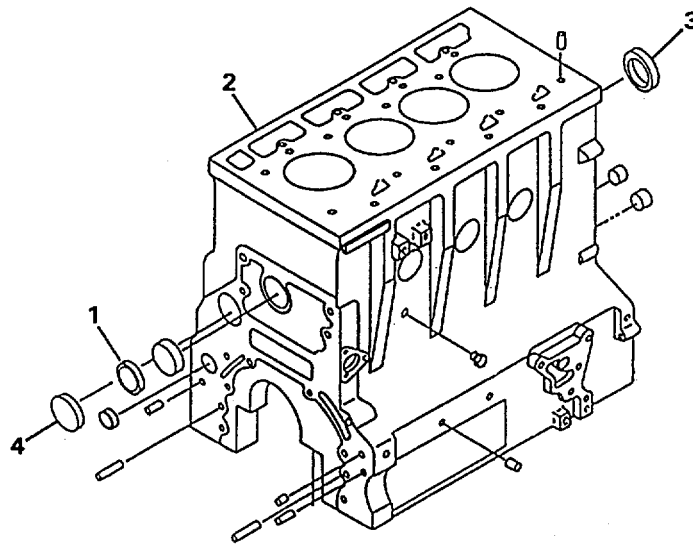
- (5) Measure inside diameter of all camshaft bearings. Inside diameter should be 1.9702 to 1.9730 in. (50.044-50.116 mm). Measure the bearing at two positions. The second measurement should be 90 degrees from the first. Use an inside micrometer. Replace bearings that exceed the measurement.

c. Repair.



Camshaft Bearing Puller Installed

- (1) Use a long shaft and drive rear expansion plug (4) from crankcase.
- (2) Install camshaft bearing puller into camshaft bore from rear and place in position with the shoulder of puller contacting bearing to be removed.



Crankcase Assembly

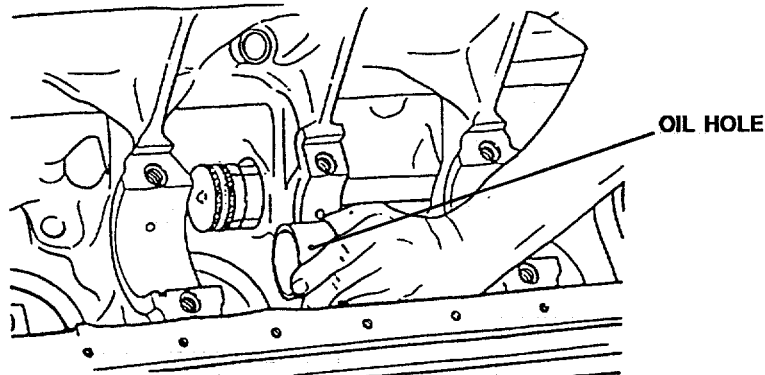
6-15. ENGINE CRANKCASE (BLOCK) (cont)

c. Repair (cont).

- (3) Gradually tighten puller nut until bearing (1) is removed from crankcase bore.
- (4) Remove the extracted bearing from the puller. Install puller on remaining bearings (1), except rearmost bearing, and remove intermediate bearings and front bearings (3).
- (5) Remove the rear bearing (1) by reversing the position of the puller so rear bearing is removed toward front of crankcase.

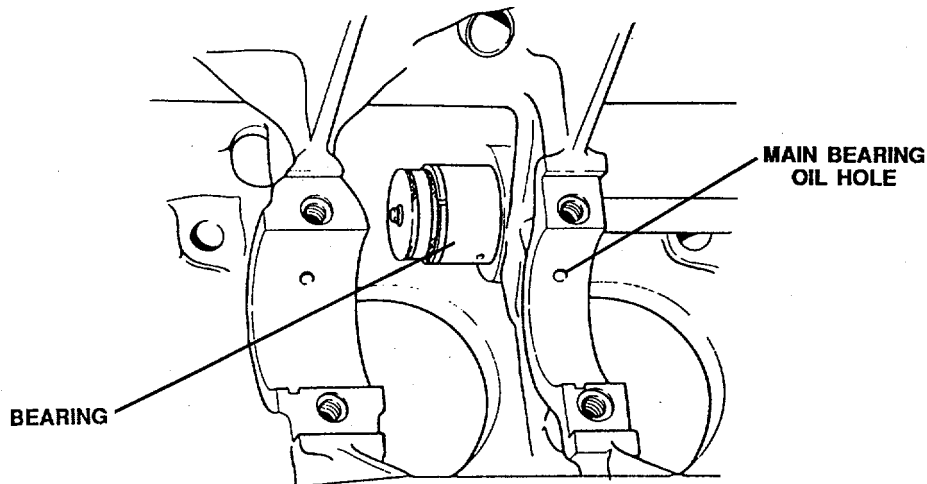
CAUTION

The camshaft bearings must be properly positioned in crankcase. Oil hole in bearing must line up with oil passage in crankcase.



Aligning Oil Hole in Bearing

- (6) Install the bearing on the puller. Align oil hole in bearing with oil hole in block for main bearing.



Bearing Installed on Puller

6-15. ENGINE CRANKCASE (BLOCK) (cont)c. Repair (cont).**NOTE**

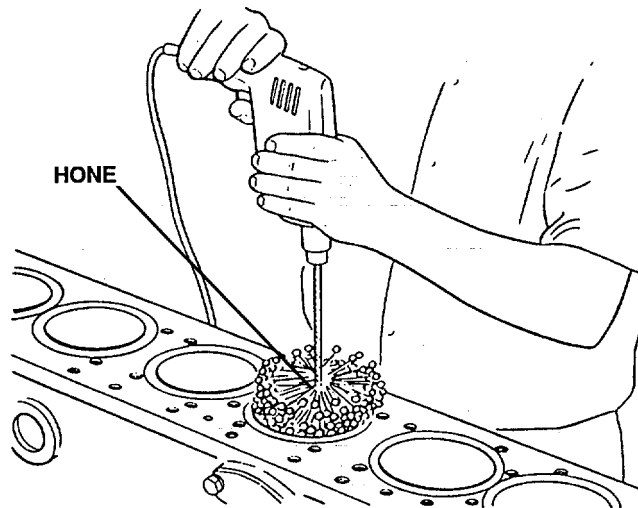
The front bearing (3) is wider and has two oil holes.

- (7) Gradually tighten puller nut and pull bearing into crankcase bore. Pull bearing until face of bearing is flush with edge of crankcase bore. Install all bearings except rear bearing (1). Install rear bearing last.
- (8) Install the front bearing (3) in the same manner. Align one oil hole in bearing with main bearing oil hole. Align other oil hole with oil passage to rocker arm oiling system.
- (9) Reverse puller and install rear bearing (1) with oil holes aligned, in the same manner. Install rear expansion plug (4) in crankcase.

CAUTION

When reversing puller, use care when inserting puller. Do not damage installed camshaft bearings when passing puller through to rear bearing.

- (10) The camshaft bearings do not require machining or reaming after installation.



Deglazing Cylinder Bores

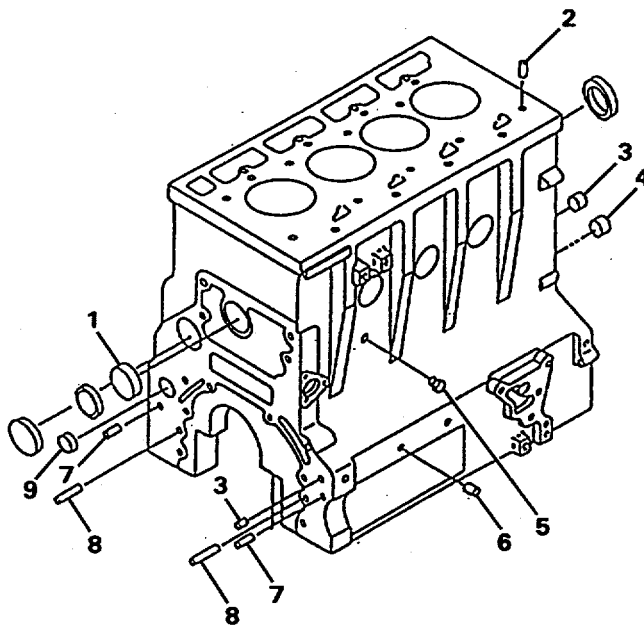
- (11) Cylinder bores must be deglazed and honed.
 - (a) Use a hone of the appropriate size. Size required is a hone whose diameter can be adjusted from 3.50 in. (88.9 mm) to 4.00 in. (101.6 mm).
 - (b) Attach hone to a 3/8 in. (9.84 mm) or 1/2 in. (12.7 mm) drill. Drill speed must be

6-15. ENGINE CRANKCASE (BLOCK) (cont)

c. Repair (cont).**WARNING**

Wear protective goggles when using the cleaning solvent. Avoid contact with the eyes. If contact occurs, flush eyes with cold water for 5 minutes and seek immediate medical attention. Dry cleaning solvent (PD-680) is both toxic and flammable. Avoid prolonged breathing of vapors. Avoid skin contact. Use only in a well-ventilated area. Keep away from open flame. Flash point of solvent is 138°F (590C).

- (c) Mix a solution of one part SAE 30W engine oil (OE/HDO) and one part cleaning solvent.
- (d) Soak the hone brush in the solution to provide lubrication and aid in the honing process.
- (e) Operate the drill and hone to provide the drill speed of 300 to 400 RPM. Slide hone up and down complete length of cylinder bore.
- (f) Complete strokes should be about one stroke per second. Stop honing action to check deglazing process. A fast, even cross hatch pattern on the cylinder walls should be obtained in 20 to 30 seconds.
- (g) Mix a strong solution of hot water and detergent. Clean the bores with the solution. Use clean water to rinse solution from crankcase after cleaning. Use compressed air to blow the surface dry after rinsing. Wipe all surfaces of cylinder dry with clean rags.



Crankcase Assembly

6-15. ENGINE CRANKCASE (BLOCK) (cont)

c. Repair (cont).

- (12) Replace any damaged or worn expansion plugs (1 and 3). Check aligning pins (2, 4, 6, 7, 8 and 9) for nicks, cracks and damage.
- (13) Check drain valve (5) and replace if damaged.
- (14) Replace all cracked or damaged plugs and aligning pins.
- (15) Refer to the following to assemble the engine.
 - (a) Refer to para. 6-13 and install the camshaft.
 - (b) Refer to para. 6-12 and install the main bearings.
 - (c) Refer to para. 6-12 and install the crankshaft.
 - (d) Refer to para. 6-11 and install pistons and connecting rods.
 - (e) Refer to para. 6-8 and install backplate and idler gears.
 - (f) Refer to para. 6-5 and install tappets.
 - (g) Refer to para. 6-4 and install cylinder head and valves.
 - (h) Refer to para. 5-14 and install intake manifold.
 - (i) Refer to para. 5-12 and install oil pump.
 - (j) Refer to para. 5-10 and install flywheel housing

SECTION III. MAINTENANCE OF THE FRAME

Paragraph Number	Title	Page Number
6-16	UPPER KING PIN PLATE	6-54

6-16. UPPER KING PIN PLATE

THIS TASK COVERS:

- a. Removal
- b. Installation

INITIAL SETUP:

Tools Required:

Nomenclature

General Mechanics
Tool Kit

Shop Equipment
Welding

Equipment Conditions:

<u>Ref</u>	<u>Conditions</u>
4-20	12- and 24-volt receptacles removed
4-21	Electrical wiring removed
4-29	Gladhands removed
4-31	Air lines removed

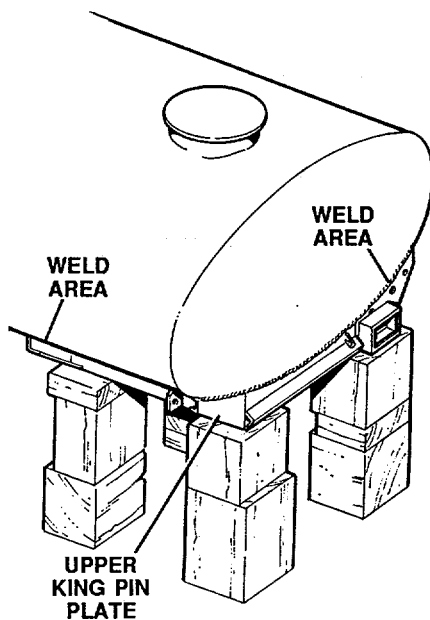
Personnel Required: Welder qualified for overhead welding

- a. Removal.

CAUTION

Water distributor tank must be filled with water before attempting to remove the upper king pin plate. This will prevent damage or warpage to the tank during the removal process.

- (1) Fill tank with water (para. 2-16).

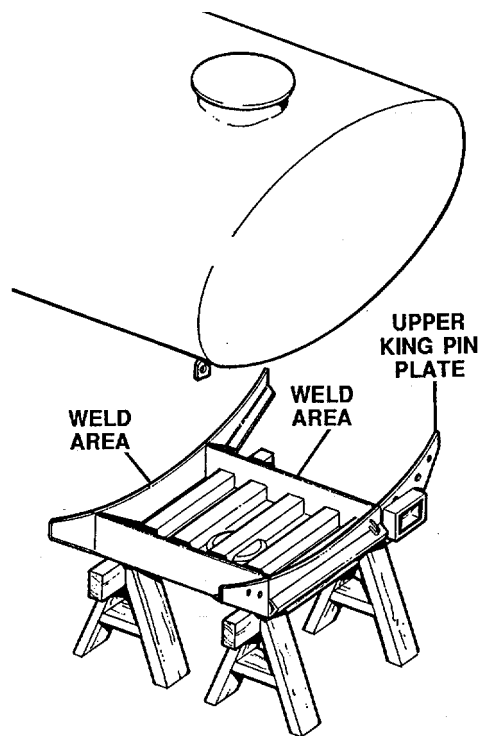


Removing and Installing Upper King Pin Plate

6-16. UPPER KING PIN PLATE (cont)a. Removal (cont).**CAUTION**

Weight of upper king pin plate is 550 lb. (1210 kg). Be sure adequate blocking or jack stands are used to support the plate.

- (2) Position jack stands or blocking to support the upper king pin plate as shown.
- (3) Refer to TM 43-0139 and remove CARC paint from weld areas where upper king pin plate is welded to tank.



Removing and Installing Upper King Pin Plate

CAUTION

When cutting the welds to free the plate, avoid damage to the pads on the tank.

NOTE

The welder performing the task to remove and install the upper king pin plate must be certified in overhead welding.

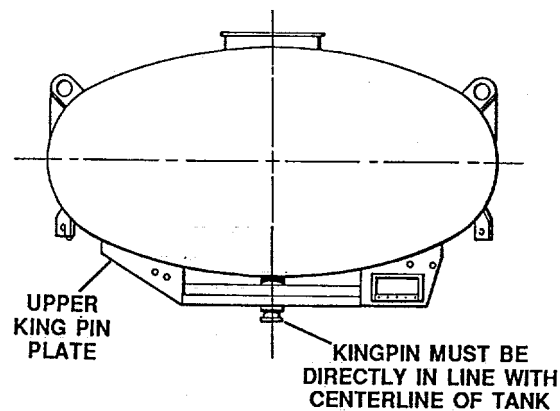
- (4) Use a cutting torch and cut the welds attaching the bolsters and side plates as close as possible to the tank. Leave the tank pads intact.

6-16. UPPER KING PIN PLATE (cont)a. Removal (cont).

(5) Remove upper king pin plate from beneath tank.

b. Installation.

- (1) Be sure that water distributor tank is level. Adjust level of tank with landing legs if necessary.
- (2) Use a forklift truck or jackstands to position the new upper king pin plate into position beneath tank.
- (3) Raise upper king pin plate up to tank. Position plate to be sure that king pin is directly in line with centerline of tank.
- (4) When properly positioned, center of king pin must be 22 inches (559 mm) from front seam of tank.
- (5) After king pin plate is properly positioned in relation to tank, check to be sure that tank and king pin plate are level.
- (6) Using standard steel welding rod, weld the upper king pin plate to the tank shelf and tank pads.



Removing and Installing Upper King Pin Plate

- (7) Refer to TM 43-0139 and clean the repaired area. Prime paint the area with CARC paint (MIL-C-461 68).
- (8) Drain water from tank (para. 2-21).

6-16. UPPER KING PIN PLATE (cont)

b. Installation (cont).

- (9) Inspect coating on inside of tank in two front compartments.
- (10) If necessary, clean and re-coat the tank with Bitumastic coating (DoD-P-23236A, SH, Type 1, Class 2).
- (11) Check rear axle alignment with new king pin and realign if necessary. Refer to para. 5-4.

APPENDIX A

REFERENCES

A-1. SCOPE

This appendix lists forms, field manuals, technical manuals, and other publications referenced in this manual and which apply to operation, unit maintenance, and intermediate direct support and general support maintenance of the 6,000 gallon water distributor.

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

A4. FIELD MANUALS

NBC Contamination Avoidance FM 3-3
 NBC Protection FM 3-4
 NBC Decontamination FM 3-5
 Field Behavior of NBC Agents (Including Smoke and Incendiaries) FM 3-6
 Camouflage FM 5-20
 Ammunition Handbook FM 9-13
 Operation and Maintenance of Ordnance Materiel in Cold
 Weather (O Deg. to Minus 65 Deg. F) FM 9-207
 Vehicle Recovery Operations FM 20-22
 First Aid for Soldiers FM 21-11
 Manual for the Wheeled Vehicle Driver..... FM 21-305
 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
 Mountain Operations (How to Fight) FM 90-6
 Operational Symbols..... FM101-5-1

A-5. SUPPLY BULLETIN

Storage Serviceability Standard - Tracked Vehicles,
 Wheeled Vehicles, and Component Parts.....SB 740-98-1

A-6. TECHNICAL BULLETINS

Tactical Wheeled Vehicles: Repair of Frames TB 9-2300-247-40
 Warranty Program for Distributor, Water, Semitrailer Mounted,
 6,000 Gallon Capacity (NSN 3825-01-297-3357)..... TB 5-3825-229-14
 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
 Safeguards for Handling Air Filters in Nuclear, Biological and
 Chemical (NBC) Conditions TB 43-0219

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
 Operator's, Unit, Direct Support and General Support
 Maintenance for Lead Acid Storage Batteries..... TM 9-6140-200-214
 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 Medical Department Expendable/Durable Items..... CTA 8-100
 Expendable/Durable Items (Except Medical, Class V,
 Repair Parts, and Heraldic Items)CTA 50-970
 Packaging of Army Material for Storage and Shipment AR 746-1

APPENDIX B**MAINTENANCE ALLOCATION CHART****Section I. INTRODUCTION****B-1. GENERAL**

- a. This section provides a general explanation of all maintenance and repair functions authorized at various maintenance categories.
- 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 categories.
- c. Section II lists the tools and test equipment (both special tools and common tool sets) required for each maintenance function as referenced from Section II.
- d. Section IV contains supplemental instructions and explanatory notes for a particular maintenance function.

B-2. MAINTENANCE FUNCTIONS

Maintenance functions 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. Align. To adjust specified variable elements of an item to bring about optimum or desired performance.
- f. Calibrate. To determine and cause corrections to be made or to be adjusted on instruments or test measuring, and diagnostic equipment 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 3d 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.
- j. Overhaul. That maintenance effort (service/action) prescribed to restore an item to a completely serviceable/operational condition as required by maintenance standards in appropriate technical publications (i.e., DMWR). Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like new condition.
- k. Rebuild. Consists of those services/actions necessary for the restoration of unserviceable equipment to a like new condition in accordance with original manufacturing standards. Rebuild is the highest degree of materiel maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurements (hours/miles, etc.) considered in classifying Army equipment/components.

B-3. EXPLANATION OF COLUMNS IN THE MAC, SECTION II

- a. Column 1, Group Number. Column 1 lists functional group code numbers, the purpose of which is to identify maintenance significant components, assemblies, subassemblies, and modules with the next higher assembly. End item group number shall be "00".
- 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. (For detailed explanation of these functions, see paragraph B-2.)
- d. Column 4, Maintenance Level. Column 4 specifies by the listing of a work time figure in the appropriate subcolumn(s), the category 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 category of maintenance. If the number or complexity of the tasks within the listed maintenance function vary at different maintenance categories, appropriate work time figures will be shown for each category. 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 item 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 to the maintenance functions authorized in the maintenance allocation chart. The symbol designations for the various maintenance categories are as follows:

C	Operator or Crew
O	Organizational Maintenance
F	Direct Support Maintenance
H	General Support Maintenance
D	Depot Maintenance

- e. Column 5, Tools and Equipment. Column 5 specifies by code, those common tool sets (not individual tools) and special tools, 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 REQUIREMENTS, SECTION III

a. Column 1, Reference Code. The tool and test equipment reference code correlates with a code used in the MAC, Section II, Column 5.

b. Column 2, Level Maintenance. The lowest category of maintenance authorized to use the tool or test equipment.

c. Column 3, Nomenclature. Name or identification of the tool or test equipment.

d. Column 4, National Stock Number. The National Stock Number of the tool or test equipment.

e. Column 5, Tool Number. The manufacturer's part number.

B-5. EXPLANATION OF COLUMNS IN REMARKS, SECTION IV

a. Column 1, Reference Code. The code recorded in Column 6, Section II.

b. Column 2, Remarks. This column lists information pertinent to the maintenance function being performed as indicated in the MAC, Section II.

Section II. MAINTENANCE ALLOCATION CHART

(1) GROUP NUMBER	(2) COMPONENT ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQUIP	(6) REMARKS
			C	O	F	H	D		
06	ELECTRICAL SYSTEM								
0606	Engine Safety Controls	Inspect Replace	0.1	0.4				1 1	
0607	Control Panel	Test		0.4				1	
	Gages	Replace		1.0				1	
	Engine Relay	Test		0.5				1,2	
	Panel	Replace		1.0				1,2	
	Control Panel	Test		0.5				1	
	Switches	Replace		0.5				1	
	Control Panel	Test		0.5				1	
	Indicator Lights	Replace		0.5				1	
	Control Panel	Test		0.5				1	
	Cables	Replace		1.0				1	
	Fuses	Test		0.2				1	
	Replace			0.2				1	
0609	Light, Stop & Tail	Inspect Replace	0.1 0.5					1 1	
	Light, Clearance	Inspect Replace	0.1	0.5				1 1	
0610	Liquid Level Transmitter	Replace		0.5				1	
0612	Battery	Service Replace	0.2	0.3				1 1,2	
	Cables & Terminals	Service	0.2					1	
	Replace			0.4				1	
0613	Wiring	Inspect Test Replace Repair	0.5 0.5	1.0 0.5				1 1 1 1,2	

Section II. MAINTENANCE ALLOCATION CHART

(1) GROUP NUMBER	(2) COMPONENT ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQUIP	(6) REMARKS
			C	O	F	H	D		
	Receptacles, 12 and 24 Volt	Test Replace		0.5 1.0				1 1,2	
	Remote Harness Engine Harness	Replace Replace		1.0 1.0				1 1	
11	REAR AXLE								
1100	Rear Axle Assembly	Inspect Replace		0.2	5.0			1 1	
12	BRAKES								
1202	Brake Shoes	Inspect Adjust Replace		1.0 1.0 3.0				1 1 1	
1206	Mechanical Brake System Brake, Camshaft	Inspect Adjust Replace		0.1 0.2 1.0				1 1,2 1,2	
	Slack Adjuster	Adjust Replace		0.1 0.5				1 1	
1208	Air Brake System								
	Brake Chambers	Replace		1.0				1	
	Air Lines Quick Release Valve	Replace Test Replace		1.0 0.1 1.0				1 1 1	
	Relay Valve	Test Replace		0.2 1.0				1 1	
	Reservoir	Service Replace	0.1	0.5					
	Gladhands	Replace		0.5				1	
	Brake Protection Valve	Replace		0.4				1	

Section II. MAINTENANCE ALLOCATION CHART

(1) GROUP NUMBER	(2) COMPONENT ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQUIP	(6) REMARKS
			C	O	F	H	D		
13	WHEELS, HUBS & DRUMS								
1311	Wheel Seals	Inspect Replace		0.1 1.0				1 1	
	Wheel Bearings	Inspect Adjust Replace		0.5 1.0 1.0				1 1 1	
	Brake Drums	Inspect Replace Repair		0.5 0.7 1.5				1 1	
	Hubs	Service Replace		0.5 1.0				1 1	
1313	Tires	Inspect Service Replace Repair	0.1 0.1	1.5 1.5				1 1 1 1	
15	FRAME								
1501	Frame Assembly	Inspect Repair		0.2	2.0			1 1	
1506	Kingpin & Fifth Wheel Plate	Inspect Service Replace		0.2 0.2		4.0		1 1,5,6	
1507	Landing Gear	Inspect Replace		0.2 4.0				1 1	
	Gearbox	Service	0.1					1	
16	SPRINGS								
1601	Springs	Inspect Replace		0.2	4.0			1 1,2	
	Torque Rods	Replace			1.5			1	

Section II. MAINTENANCE ALLOCATION CHART

(1) GROUP NUMBER	(2) COMPONENT ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQUIP	(6) REMARKS
			C	O	F	H	D		
18	BODY								
1808	Tool Box	Inspect Replace		1.0 2.0				1,2	
1811	Tank Body & Manhole Assembly	Inspect Repair		0.4	6.0			1 1,2	
	Cover, Manhole	Service Replace	0.1	0.5				1 1	
	Gasket	Replace		0.2					
22	BODY & CHASSIS ACCESSORY ITEMS								
2202	Foot Valve	Inspect Replace Repair		0.5 0.5 0.5				1 1 1	
	Suction Hose Assembly	Inspect Replace	0.1	0.5				1 1	
	Fire Hose Assembly	Inspect Replace	0.1	0.5				1 1	
	Reflectors	Inspect Replace	0.1	0.3				1 1	
2210	Data Plates	Replace		0.2				1	
29	ENGINE ASSEMBLY								
2910	Engine	Service Replace Repair	1.0		3.0	6.0		1,2 1,2 1,2,4	
2911	Cylinder Block & Cylinder Head	Inspect Replace Repair			1.0 4.0	6.0		1,2 1,2,6,7	
2912	Crankshaft	Replace				4.0		1,2,3, 6,7	
	Bearings	Replace				3.0		1,2,4	
	Seals	Replace				2.0		1,2,4	

Section II. MAINTENANCE ALLOCATION CHART

(1) GROUP NUMBER	(2) COMPONENT ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQUIP	(6) REMARKS
			C	O	F	H	D		
2913	Flywheel & Ring Gear	Inspect Replace			1.0 3.0			1,2 1,2,4	
2914	Pistons & Connecting Rods	Inspect Replace			1.0	5.0		1,2,4 1,2,4, 6,7	
2915	Valves, Camshafts & Timing Gears Repair	Inspect Adjust Replace		2.0	4.0 4.0	1.0		1,2,4 1,2,4 1,2,4, 6,7	
2916	Lubrication System								
	Oil Filter	Replace		0.5				1	
	Oil Pump	Replace Repair			1.0 2.0			1,2,3 1,2,3	
	Pressure Regulating Valve	Replace			1.0			1	
2917	Special Starting Devices								
	Glow Plugs	Replace		0.5				1	
	Crankcase Heater	Replace		0.5				1	
2918	Manifold, Exhaust	Replace Repair			1.0 1.0			1,2 1,2	
	Manifold, Intake	Replace Repair			1.0 1.0			1,2 1,2	
2932	Fuel Injectors	Test Replace Repair			1.0	2.0	1.0	1,2,4 1,2,4, 6,7	
	Injection Pump	Replace Repair			1.0		4.0	1,2,4 A	
2933	Air Cleaner	Service Replace	0.2	0.3				1,2 1,2	

Section II. MAINTENANCE ALLOCATION CHART

(1) GROUP NUMBER	(2) COMPONENT ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQUIP	(6) REMARKS
			C	O	F	H	D		
2935	Fuel Tank	Inspect Replace	0.1	1.0				1 1,2	
2937	Fuel Filter	Replace		0.5				1,2	
2938	Engine Primary System, Fuel Pump and Lines:								
	Fuel Transfer Pump	Test Replace		0.5 0.5				1,2 1,2	
	Fuel Lines	Replace		1.0				1,2	
2939	Throttle Control	Adjust Replace		0.2 0.5				1,2 1,2	
2941	Exhaust System Muffler	Inspect Replace		0.5 1.0				1,2	
2951	Radiator	Service Replace	0.2	1.0				1,2 1,2	
2952	Engine Cowling and Shroud	Inspect Replace	0.2	2.0				1 1	
2953	Cooling System Lines	Inspect Replace	0.2	1.0				1	
	Thermostat	Test Replace		0.5 0.5				1 1	
2954	Water Pump	Replace			1.0			1,2	
2955	Fan Fan Belt	Replace Adjust Replace		1.0 0.5 1.5				1,2 1,2 1,2	
2961	Generator (Alternator)	Test Replace		1.0	0.5			1,2	

Section II. MAINTENANCE ALLOCATION CHART

(1) GROUP NUMBER	(2) COMPONENT ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQUIP	(6) REMARKS
			C	O	F	H	D		
2963	Starter	Test Replace		0.5 0.5				1,2	
72	DISPENSING AND SERVICING COM PONENTS								
7202	Pump	Service Inspect Replace Repair	0.1 0.1		1.5	3.0		1,2 1,2 1,2	
7203	Lines and Fittings	Inspect Replace	0.1	1.0				1,2 1,2	
	Butterfly Valves	Replace Repair		1.0 1.0				1,2 1,2	
	Spray Valves	Replace		1.0				1,2	
	Discharge Valve	Replace Repair		0.5 1.0				1,2 1,2	
95	GENERAL USE STANDARDIZED PARTS								
9501	Bulk Material								
	Hoses	Replace Repair		0.5 0.5				1,2 1,2	
	Wires	Replace Repair		0.5 0.5				1,2 1,2	

SECTION III TOOL AND TEST EQUIPMENT REQUIREMENTS

(1) TOOL OR TEST EQUIPMENT REF CODE	(2) MAINTENANCE LEVEL	(3) NOMENCLATURE	(4) NATIONAL/NATO STOCK NUMBER	(5) TOOL NUMBER
1	O	Tool Kit, General Mechanics, Automotive	5180-00-177-7033	
2	O	Shop Equipment, Automotive Maintenance and Repair, Unit Maintenance, Common No. 1	4910-00-754-0654	
3	O	Shop Equipment, Automotive Maintenance and Repair, Unit Maintenance, Common No. 1, Less Power	4910-00-754-0653	
4	O	Shop Equipment, Automotive Maintenance and Repair. Unit Maintenance, Common No. 2, Less Power	4910-00-754-0650	
5	O	Tool Kit, Welders	5810-00-754-0681	
6	F,H	Shop Equipment, Automotive Maintenance and Repair, Field Maintenance	491 0-00-754- 0705	
7	F,H	Shop Equipment, Automotive Maintenance and Repair, Field Maintenance, Supplement	4910-00-754-0706	

Section IV. REMARKS

Reference Code	Remarks
A	Return to Depot Maintenance for disposition.

APPENDIX C
COMPONENTS OF END ITEM AND BASIC ISSUE ITEMS LISTS

Section I. INTRODUCTION

C-1. SCOPE.

This appendix lists Components of End Item and Basic Issue Items for the water distributor to help you inventory items required for safe and efficient operation.

C-2. GENERAL.

The Components of End Item and Basic Issue Items Lists are divided into the following sections:

a. *Section II. Components of End Item (COEI).* This listing is for informational purposes only and is not authority to requisition replacements. These items are part of the end item, but are removed and separately packaged for transportation or shipment. As part of the end item, these items must be with the end item whenever it is issued or transferred between property accounts. Illustrations are furnished to assist you in identifying the items.

b. *Section II. Basic Issue Items (BII).* These are the minimum essential items required to place the water distributor in operation, to operate it, and to perform emergency repairs. Although shipped separately packaged, BII must be with the water distributor during operation and whenever it is transferred between property accounts. The illustrations will assist you with hard-to-identify items. This manual is your authority to request/ requisition replacement BII, based on TOE/MTOE authorization of the end item.

C-3. EXPLANATION OF COLUMNS

Below is an explanation of columns found in the tabular listings:

a. *Column (1) - Illustration Number (Illus. Number).* This column indicates the number of the illustration that shows the item.

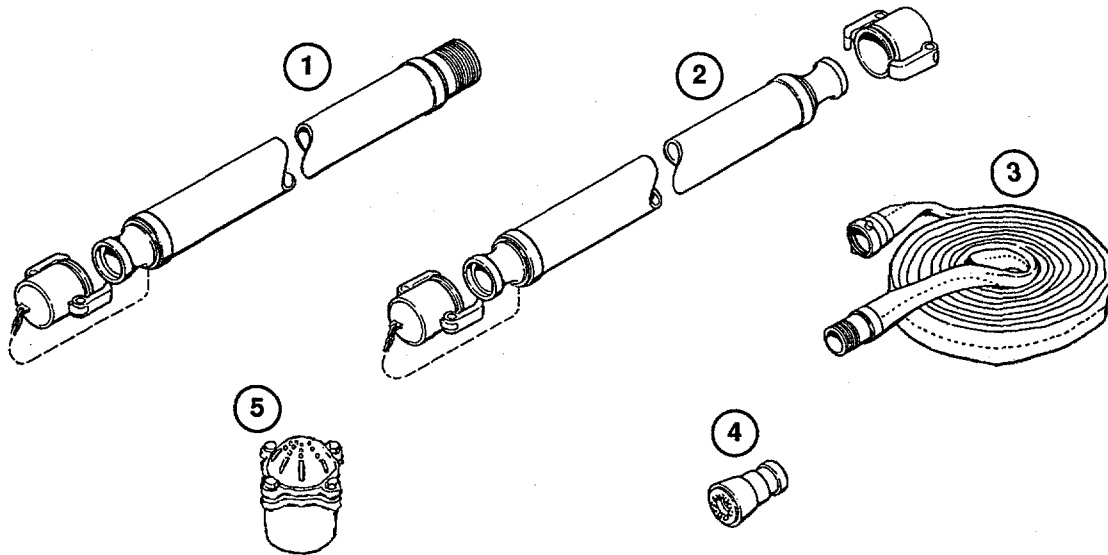
b. *Column (2) - National Stock Number.*
Indicates the National Stock Number (NSN) assigned to the item and will be used for requisitioning purposes.

c. *Column (3) - Description.* Indicates the Federal item name and, if required, a minimum description to identify and locate the item. The last line for each item indicates the Commercial and Government Entity (CAGE) Code in parentheses followed by the part number.

d. *Column (4) - Unit of Measure (U/M).*
Indicates the measure used in performing the actual operational/maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in., pr).

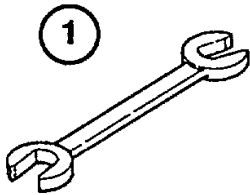
e. *Column (5) - Quantity Required (Qty Rqr).* Indicates the quantity of the item authorized to be used with the equipment.

SECTION II. COMPONENTS OF END ITEM



(1) Illus Number	(2) National Stock Number	(3) Description CAGEC and Part Number	Usable On Code	(4) UI	(5) Qty Rqr
1	4720-01-323-0272	HOSE, SUCTION (80195) T204826	6KG	EA	1
2	4720-01-323-0273	HOSE, SUCTION (80195) T204825	6KG	EA	1
3	4720-00-729-5390	HOSE, DISCHARGE (80195) T204827	6KG	EA	1
4	4730-01-322-9878	NOZZLE, DISCHARGE HOSE (96046) HN4-L	6KG	EA	1
5	4820-01-336-9067	VALVE ASSEMBLY, FOOT (70277) DFBS40	6KG	EA	1

SECTION III. BASIC ISSUE ITEMS



(1) Illus Number	(2) National Stock Number	(3) Description CAGEC and Part Number	(4) Usable On Code U/I	(5) Qty Rqr
1	5120-00-277-2311	WRENCH, OPEN END ¼ X 5/16 INCH (93389) 3018	6KG EA	1

APPENDIX D

ADDITIONAL AUTHORIZATION LIST

SECTION I. INTRODUCTION

D-1. SCOPE

This appendix lists additional items you are authorized for the support of the water distributor.

D-2. GENERAL

This list identifies items that do not have to accompany the water distributor and that do not have to be turned in with it. These items are all authorized to you by CTA, MTOE, TDA, or JTA.

D-3. EXPLANATION OF LISTING

National stock numbers, descriptions, and quantities are provided to help you identify and request the additional items you require to support this equipment. The items are listed in alphabetical sequence by item name under the type document (i.e., CTA, MTOE, TDA or JTA) with authorizes the item(s) to you. If item required differs for different models of this equipment, the model is shown under the "Usable On" heading in the description column.

SECTION II. ADDITIONAL AUTHORIZATION ITEMS

(1) NATIONAL STOCK NUMBER	(2) DESCRIPTION FSCM&PART NUMBER USABLE ON CODE	(3) U/M	(4) QTY AUTH
<u>MTOE AUTHORIZED ITEMS</u>			
2530-01-089-4992	BOOT, BATTERY TERMINAL (2W733) 728197	EA	2
5340-00-664-1324	PADLOCK	EA	1
	PROTECTOR, EAR (3R117) 1000	EA	1

APPENDIX E**EXPENDABLE SUPPLIES AND MATERIALS LIST****E-1. SCOPE**

This listing is for informational purposes only and is not authority to requisition the listed items. These items are authorized to you by CTA 50-970, Expendable/Durable Items (Except Medical, Class V, Repair Parts, and Heraldic Items), or CTA-8-100, Army Medical Department Expendable/Durable Items.

E-2. EXPLANATION OF COLUMNS

- a. Column (1) - Item Number. This number is assigned to the entry in the listing and is referenced in the initial setup narrative instructions to identify the material.
- b. Column (2) - Level. This column identifies the lowest level of maintenance that requires the listed item.

C - Operator/Crew
O - Organizational
F - Direct Support
H - General Support

- 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 Federal Supply Code for Manufacturer (FSCM) 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.

(1) ITEM NO.	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) U/M
1	C,O	6850-00-664-1403	ANTIFREEZE	GA
2	C,O,F	7920-00-282-2470	BRUSH, SOFT BRISTLE	EA
3	C,O,F	7920-00-269-1259	BRUSH, STIFF BRISTLE	EA
4	C,O,F	7920-00-291-5815	BRUSH, WIRE: Scratch, S-Wire, curved handle wire lg outside, 1-1/8 to 1-1/4 outside block, 4 rows wide, 18 rows long.	EA
5	O,F	5350-00-192-5052	CLOTH CROCUS: Ferric oxide and quartz jean-cloth backing, exposed coat, 9 x 1 1 Sht, 50 Sht sheave (81349) P-C-458A, 42-C-20420-50	EA
6	C,O	7920-00-205-1711	RAGS, COTTON: Wiping	BL
7	C,O		GLOVES,RUBBER	PR
8	C,O		GREASE, AUTOMOTIVE AND ARTILLERY: (GAA) (81349) MIL-G-10924	
		9150-00-935-1017	14 oz. cartridge	OZ
		9150-00-190-0904	1-3/4 pound can	LB
		9150-00-190-0905	6-1/2 pound can	LB
9	C,O	4240-00-816-8319	GOGGLES, PROTECTIVE:	PR
10	C,O		LUBRICATING OIL: OE/HDO 30 (81349) MIL-L-2104	
		9150-00-186-6681	1 quart can	QT
		9150-00-188-9858	5 - 1# only, gallon can	GAL
		9150-00-189-6729	55 gallon drum	GAL
11	0		SEALANT, PIPE: (81349) MIL-C-21567	
12	0	7930-00-282-9699	DETERGENT: GP Liq, WS, A	GAL

(1) ITEM NO.	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) U/M
13	C,O,F		SOLVENT, DRY CLEANING: Type 11, (81348) PD-680	
		6850-00-664-5685	1 Quart can	QT
		6850-00-281-1985	1 Gallon can	GAL
		6850-00-285-8011	55 Gallon drum	GAL
14	O	9905-00-537-8954	TAGS, MARKER: MIL-T-12755, (81349) Box of 50EA	
15	O,F	8030-00-839-3545	TAPE, ANTISEIZING (TEFLON): (81349) MIL-T-27730 1/4 inch wide x 260 inches long	IN
16	F,H		PAINT: (81349) MIL-C-46168	GAL
17	F,H		COATING: DoD-P-23236A (SH, Type 1, Class 2)	
18	O,F	8030-00-433-9032	INSULATION COMPOUND, IGNITION	QT
19	O,F		CLEANING SOLUTION, RADIATOR: (81349) MIL-C-10597	KIT
20	C,O	4240-00-542-2048	SHIELD, FACE	EA
21	O	5940-01-079-1375	SPLICE, CONDUCTOR: (81349) M7928/5-4	EA

APPENDIX F

ORGANIZATIONAL, DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE

REPAIR PARTS AND SPECIAL TOOLS LISTS

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 organizational, direct support, and general support maintenance of the water distributor. 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 1, *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 in item name sequence. Repair parts kits are listed separately in their own functional group within Section II. Repair parts for repairable special tools are also listed in this section. Items listed are shown on the associated illustration(s)/figure(s).

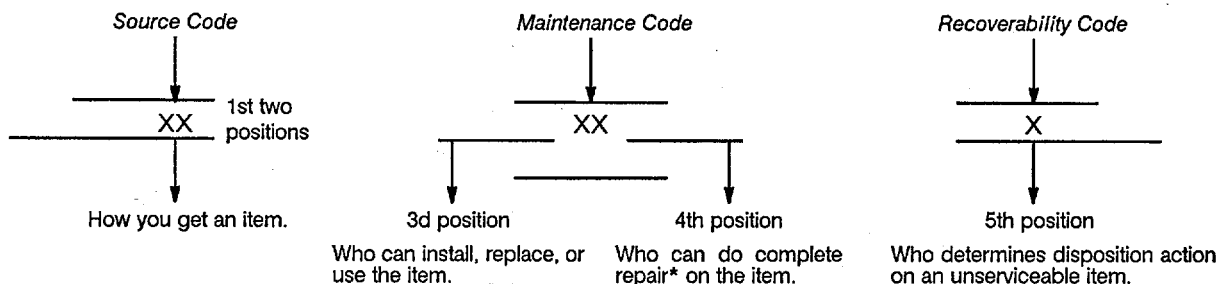
b. Section III. Special Tools List. A list of special tools, special TMDE, and other special support equipment authorized by this RPSTL [as indicated by Basis of Issue (BOI) information in the *DESCRIPTION AND USABLE ON CODE* column] for the performance of maintenance.

c. Section IV. Cross-reference Indexes. A list, in National Item Identification Number (NIIN) sequence, of all National stock numbered items appearing in the listing, 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, CAGE, 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 of the "Repair" function in a use/user environment in order to restore serviceability to a failed item.

F-3 EXPLANATION OF COLUMNS (SECTIONS II AND III (Con't)).

(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 follow:

<u>Code</u>	<u>Application/Explanation</u>
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 3d position of the SMR code. <p style="text-align: center;">* * Items coded PC are subject to deterioration.</p>
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 3d position of the SMR code. The complete kit must be requisitioned and applied.
MO - Made at UM/AVUM Level MF - Made at DS/AVUM Level MH - Made at GS Level 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 materiel which is identified by the part number in the <i>DESCRIPTION AND USABLE ON CODE (UOC)</i> column and listed in the bulk materiel group of the repair parts list in this RPSTL. If the item is authorized to you by the 3d 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.
AO - Assembled by UM/AVUM Level AF - Assembled by DS/AVUM Level AH - Assembled by GS Level AL - Assembled by SRA AD - Assembled at 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 3d position code of the SMR code authorizes you to replace the item, but the source code indicates that the item is assembled at a higher level, order the item from the higher level of maintenance.

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.'

- XA - DO NOT requisition an 'XA'-coded item. Order its next higher assembly.
- XB - If an "XB" item is not available from salvage, order it using the CAGE and part number given.

F-3 EXPLANATION OF COLUMNS (SECTIONS II AND III) (Con't).

- 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 CAGE and part number given, if no NSN is available.

(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.

<u>Code</u>	<u>Application/Explanation</u>
C	- Crew or operator maintenance done within unit maintenance or aviation unit maintenance.
O	- Unit maintenance or aviation unit can remove, replace, and use the item.
F	- Direct support or aviation intermediate 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.

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.

- (b) The maintenance code entered in the fourth position tells whether or not the item is to be repaired and identifies the lowest maintenance level with the capability to do complete repair (i.e., perform all authorized "Repair" functions). This position will contain one of the following maintenance codes:

<u>Code</u>	<u>Application/Explanation</u>
O	- Unit maintenance or aviation unit is the lowest level that can do complete repair of the item.
F	- Direct support or aviation intermediate is the lowest level than 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, lubricating, etc., at the user level.

F-3 EXPLANATION OF COLUMNS (SECTIONS II AND III) (Con't).

(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:

<u>Code</u>	<u>Application/Explanation</u>
Z	- Nonreparable item. When unserviceable, condemn and dispose of the item at the level of maintenance shown in the 3d position of the SMR code.
O	- Reparable item. When uneconomically reparable, condemn and dispose of the item at unit maintenance or aviation unit level.
F	- Reparable item. When uneconomically reparable, condemn and dispose of the item at the direct support or aviation intermediate 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 of item 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 (CAGE) Code (C) is a 5-digit alphanumeric code which is used to identify the manufacturer, distributor, or Government agency, etc., that supplies the item.

NOTE

When you use an NSN to requisition an item, the item you receive may have a different part number from the part ordered.

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.

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) Physical security classification. Not Applicable.
- (3) Items that are included in kits and sets are listed below the name of the kit or set on Figure KIT.
- (4) Spare/repair parts that make up an assembled item are listed immediately following the assembled item line entry.
- (5) Part numbers for bulk materials are referenced in this column in the line item entry for the item to be manufactured/fabricated.

F-3 EXPLANATION OF COLUMNS (SECTIONS II AND III) (Con't).

(6) When the item is not used with all serial numbers of the same model, the effective serial numbers are shown on the last line(s) of the description (before UOC). Not Applicable.

(7) The usable on code, when applicable (see paragraph F-5, Special Information).

(8) 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 Basis of Issue, the total authorization is increased proportionately.

(9) 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., NSN
5305-01-674-1467).
NIIN

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 (CAGE) Code (C) is a 5-digit alphanumeric 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 standards 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 CAGE columns to the left.

(4) FIG. column. This column lists the number of the figure where the item is identified/located in Section II and Section III.

(5) ITEM column. The item number is that number assigned to the item as it appears in the figure referenced in the adjacent figure number column.

F-4. EXPLANATION OF COLUMNS (SECTION IV) (Con't).c. Figure and Item Number Index.

(1) FIG. column. This column lists the number of the figure where the item is identified/located in Sections II and III.

(2) ITEM column. The 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 (CAGE) Code (C) is a 5-digit alphanumeric 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. Not Applicable.

b. Fabrication Instructions. Bulk materiel required to manufacture items are listed in the Bulk Materiel Functional Group of this RPSTL. Part numbers for bulk materiel are also referenced in the DESCRIPTION column of the line item entry for the item to be manufactured/fabricated. Detailed fabrication instructions for items source coded to be manufactured or fabricated are found in *Appendix G* of this manual.

c. Assembly Instructions. Detailed assembly instructions for items source coded to be assembled from component spare/repair parts are found in *Chapters 4, 5, and 6*. Items that make up the assembly are listed immediately following the assembly item entry or reference is made to an applicable figure.

d. Kits. Line item entries for repair parts kits appear in group 9401 in Section II. Not Applicable.

e. Index Numbers. Items which have the word BULK in the FIG. column will have an index number shown in the item column. This index number is a cross-reference between the National Stock Number/Part Number Index and the bulk materiel list in Section II.

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 use the Figure and Item Number Index to find the NSN.

b. When National Stock Number or Part Number is Known:

(1) First. Using the National Stock Number or Part Number Index, find the pertinent National Stock Number or Part Number. The NSN Index is in National Item Identification Number (NIIN) sequence [see paragraph F-4.a(1)]. The part numbers in the Part Number Index are listed in ascending alphanumeric sequence (see paragraph F-4.b). Both indexes cross-reference you to the illustration/figure and item number of the item you are looking for.

F-6. HOW TO LOCATE REPAIR PARTS (Con't).

(2) Second. Turn to the figure and item number, verify that the item is the one you're looking for, then locate the item number in the repair parts list for the figure.

F-7. ABBREVIATIONS.

For standard abbreviations see MIL-STD-12D, *Military Standard Abbreviations for Use on Drawings, Specifications, Standards, and in Technical Documents.*

<u>Abbreviations</u>	<u>Explanation</u>
NIIN	National Item Identification Number (consists of the last 9 digits of the NSN)
RPSTL	Repair Parts and Special Tools Lists

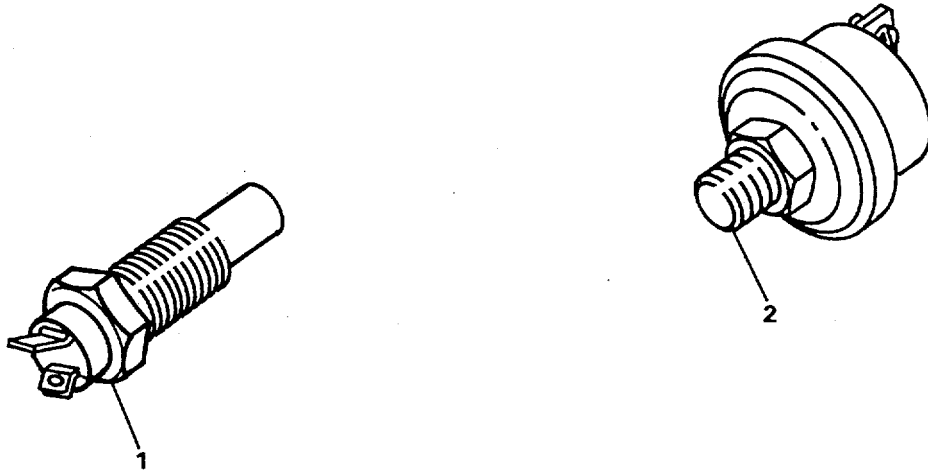


Figure 1. Engine Safety Controls

SECTION II

TM 5-3825-229-14&P

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
GROUP 0606 ELECTRICAL SYSTEM FIGURE 1. ENGINE SAFETY CONTROLS					
1	PAOZZ	28340	CLASS 5100	.SWITCH, THERMOSTATIC	1
2	PAOZZ	74400	M-4008	.SWITCH, PRESSURE.....	1

END OF FIGURE

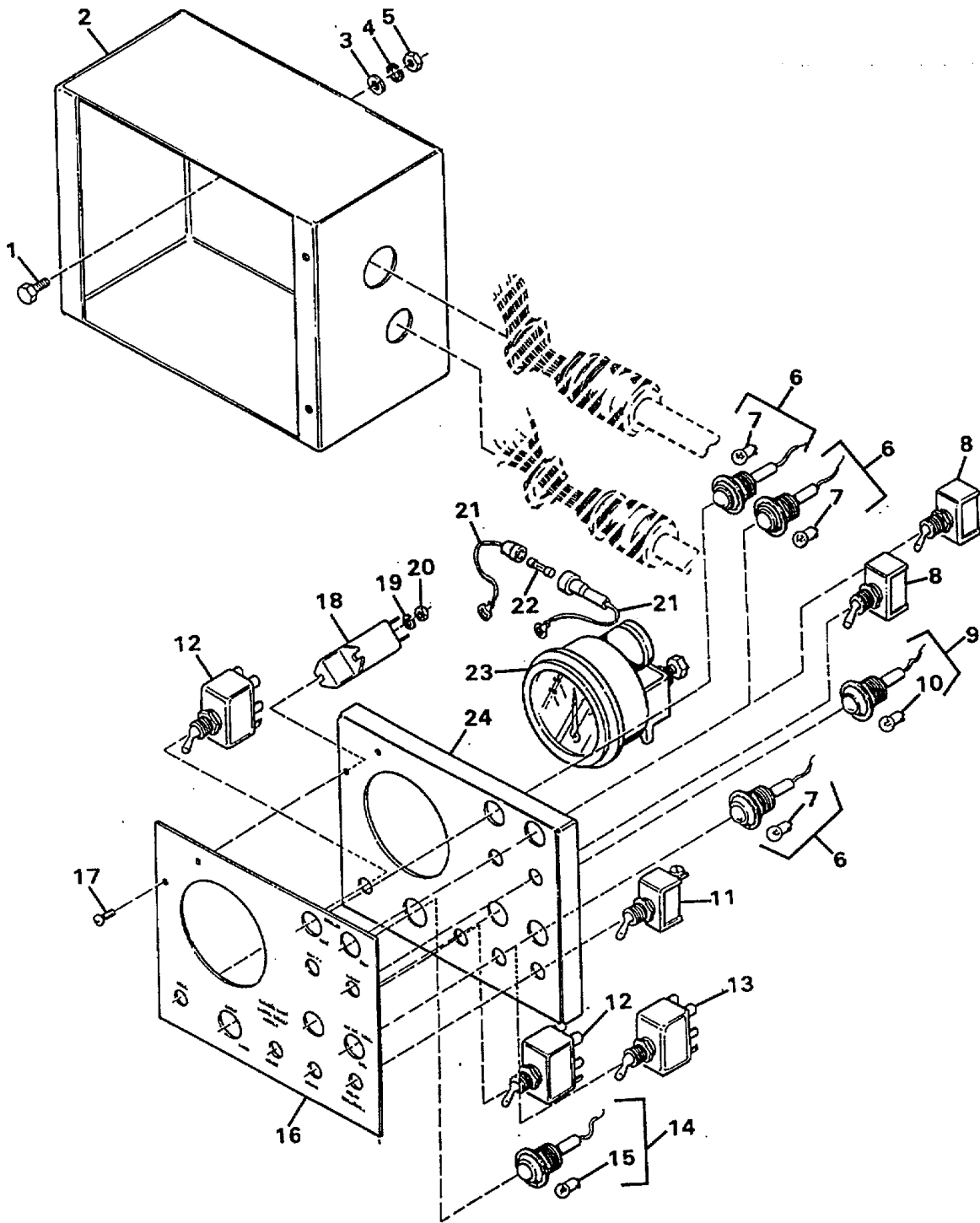


Figure 2. Rear Control Box

SECTION II

TM 5-3825-229-14&P

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
GROUP 0607 ELECTRICAL SYSTEM FIGURE 2. REAR CONTROL BOX					
1	PFOZZ	96906	MS90725-14	.SCREW, CAP, HEXAGON H.....	4
2	PBOZZ	00843	A-8R64	BOX CONTROL	1
3	PFOZZ	80195	6000455	.BUSHING, RUBBER	4
4	PFOZZ	96906	MS27183-9	.WASHER, FLAT.....	4
5	PFOZZ	96906	MS17829-4C	.NUT, SELF-LOCKING,HE	4
6	PAOZZ	13445	PL-19-GC	.LIGHT, INDICATOR	3
7	PAOZZ	08108	53	..LAMP, INCANDESCENT.....	1
8	PAOZZ	80195	6700255	.SWITCH, TOGGLE	1
9	PAOZZ	13445	PL-20-RC	.LIGHT, INDICATOR	1
10	PAOZZ	13445	PL-20-RC	.LIGHT, INDICATOR.	1
11	PAOZZ	80195	6700161	.SWITCH, PUSH	1
12	PAOZZ	73559	6GM5M	.SWITCH, TOGGLE	1
13	PAOZZ	96906	MS35058-23	.SWITCH, TOGGLE	1
14	PAOZZ	13445	PL-20-AC	.LIGHT, INDICATOR	1
15	PAOZZ	08108	53	..LAMP, INCANDESCENT.....	1
17	PFOZZ	96906	MS35207-214	.SCREW, MACHINE.....	2
*18	PAOZZ	61964	LY2F-DC12	.RELAY, ELECTROMAGNET	1
19	PFOZZ	96906	MS35335-29	.WASHER, LOCK.	2
20	PFOZZ	96906	MS35649-242	.NUT, PLAIN, HEXAGON.	2
21	PAOZZ	13445	3031-20	.FUSEHOLDER, EXTRACTO.....	1
22	PAOZZ	81349	F02A32V20A	.FUSE, CARTRIDGE	1
23	PAOZZ	80195	3160100	.AMMETER	1
24	PBOZZ	80195	T2048EE	.PANEL, VEHICULAR OP.	1

END OF FIGURE

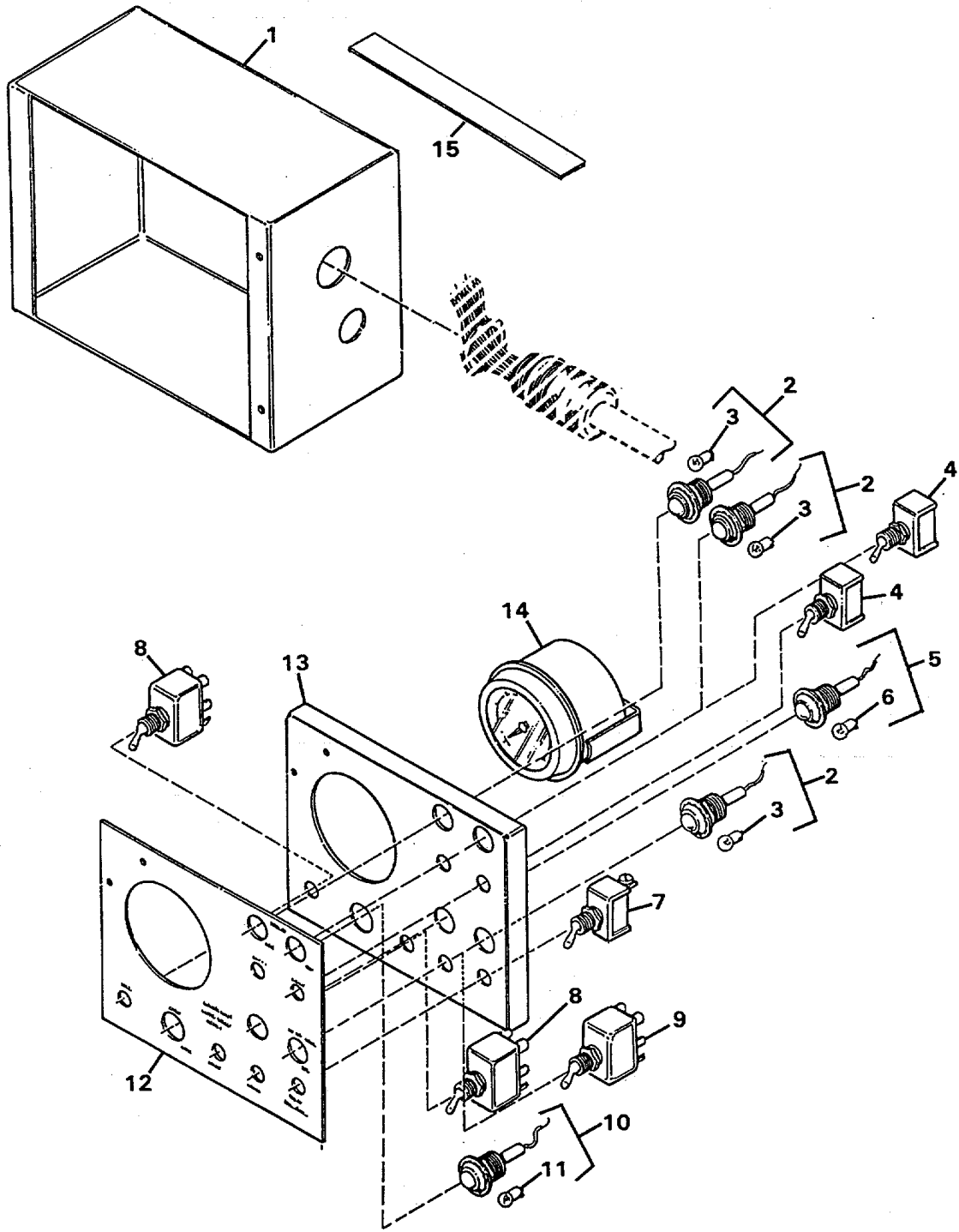


Figure 3. Remote Control Box

SECTION II

TM 5-3825-229-14&P

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
GROUP 0607 ELECTRICAL					
FIGURE 3. REMOTE CONTROL BOX					
1	PBOZZ	00843	A-8R64	.BOX CONTROL	1
2	PAOZZ	13445	PL-19-GC	.LIGHT, INDICATOR	3
3	PAHZZ	15434	C0101076200	..BEARING, SLEEVE.....	1
4	PAOZZ	80195	6700255	.SWITCH, TOGGLE	1
5	PAOZZ	13445	PL-20-RC	.LIGHT, INDICATOR	1
6	PAOZZ	08108	53	..LAMP, INCANDESCENT	1
7	PAOZZ	80195	6700161	.SWITCH, PUSH*	1
8	PAOZZ	73559	6GM5M	.SWITCH, TOGGLE	1
9	PAOZZ	96906	MS35058-23	.SWITCH, TOGGLE	1
10	PAOZZ	13445	PL-20-AC	.LIGHT, INDICATOR	1
11	PAOZZ	08108	53	..LAMP, INCANDESCENT	1
12	PAOZZ	80195	T234847	.PLATE, INSTRUCTION	1
13	PBOZZ	80195	T2048ED	.COVER, ACCESS	1
14	PAOZZ	16476	7163 1-00	.TACHOMETER	1
15	PBOZZ	80195	T2048EG	.MAGNET, PERMANENT	2

END OF FIGURE

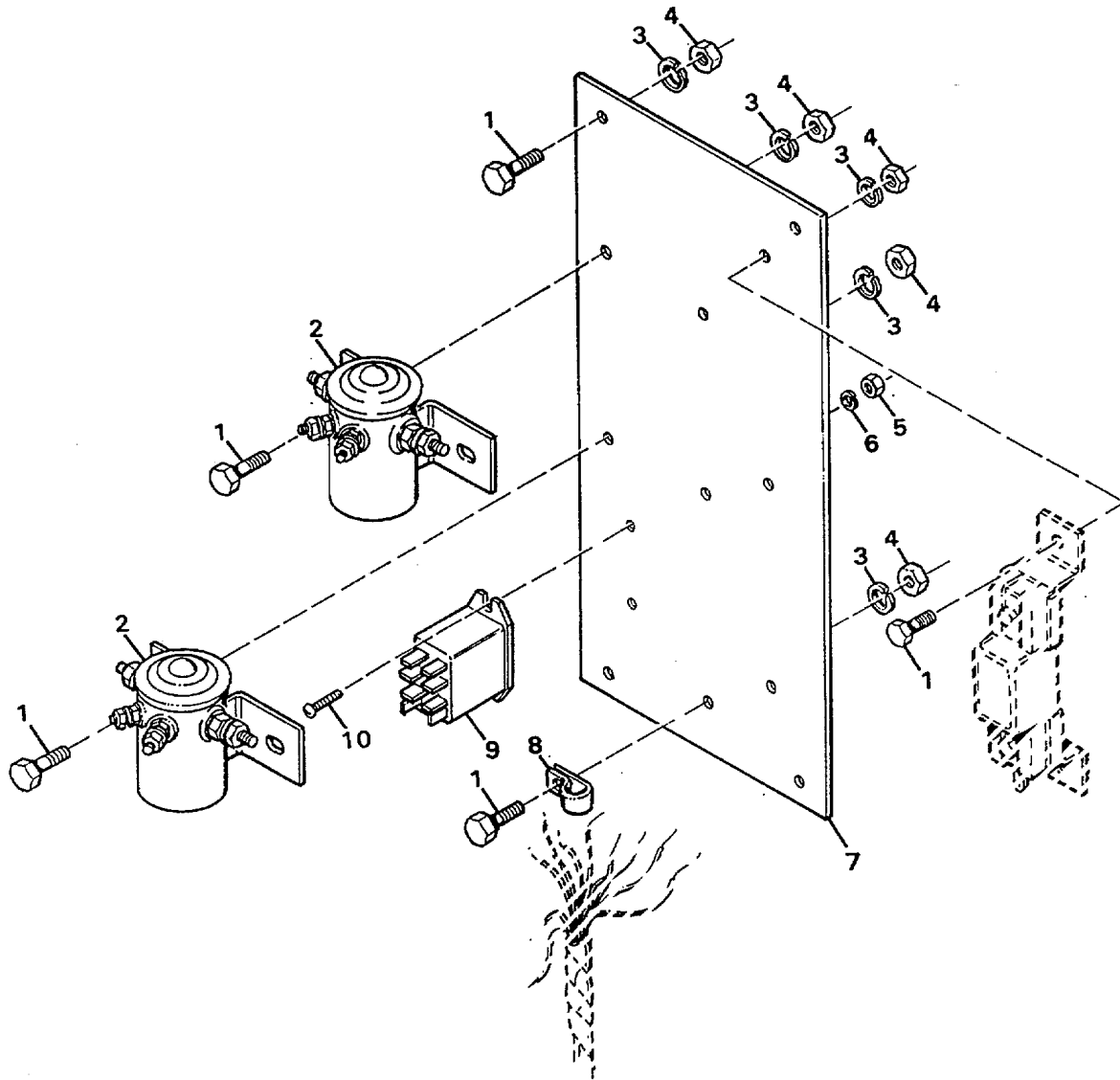


Figure 4. Engine Relay Panel

SECTION II

TM 5-3825-229-14&P

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
GROUP 0607 ELECTRICAL SYSTEM					
FIGURE 4. ENGINE RELAY PANEL					
1	PAOZZ	96906	MS90725-6	.SCREW, CAP, HEXAGON H	11
2	PAOZZ	13445	24059	.SOLENOID, ELECTRICAL	2
3	PAOZZ	96906	MS35338-44	.WASHER, LOCK.....	11
4	PAOZZ	96906	MS51967-2	.NUT, PLAIN, HEXAGON	11
* 5	PAOZZ	96906	MS35649-242	.NUT, PLAIN, HEXAGON	2
6	PFOZZ	96906	MS35335-29	.WASHER, LOCK.....	2
7	PFOZZ	80195	T2048EC	.PLATE, MOUNTING	1
8	PAOZZ	98343	1511-5	.CLAMP, LOOP	1
* 9	PAOZZ	61964	LY2F-DC12	-RELAY, ELECTROMAGNET	1
10	PFOZZ	96906	MS35207-214	.SCREW, MACHINE.....	2

END OF FIGURE

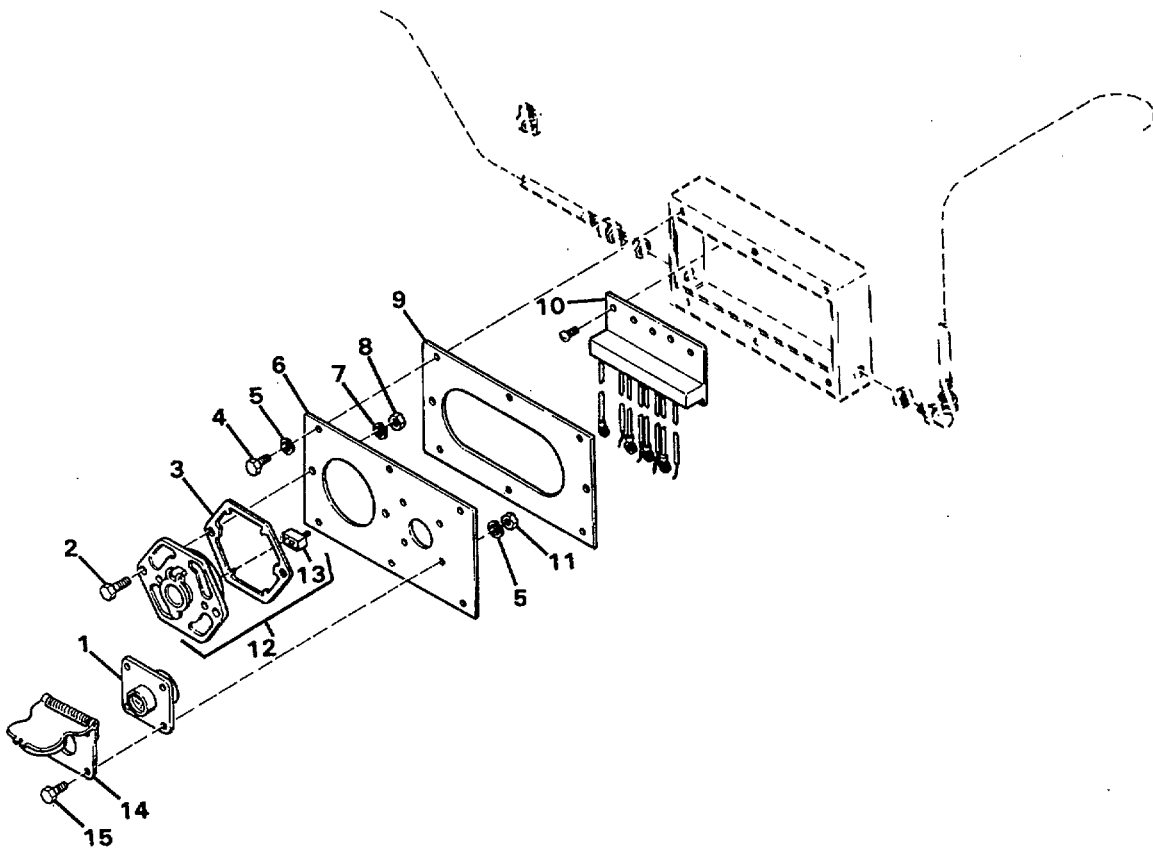


Figure 5. Electrical Receptacle Box

SECTION II

TM 5-3825-229-14&P

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
GROUP 0608 ELECTRICAL					
FIGURE 5. ELECTRICAL RECEPTACLE BOX					
1	PAOZZ	96906	MS75021-1	.CONNECTOR, RECEPTACLE	1
2	PFOZZ	96906	MS90725-34	.BOLT, MACHINE.....	2
3	PFOZZ	06721	78593	.GASKET.....	1
4	PFOZZ	96906	M590725-3	.SCREW, CAP, HEXAGON H.....	6
5	PAOZZ	96906	MS35338-44	.WASHER, LOCK.....	6
6	PFOZZ	80195	T2048EJ	.COVER, JUNCTION BOX	1
7	PAOZZ	96906	MS35338-45	.WASHER, LOCK.....	2
8	PFOZZ	96906	MS51967-5	.NUT, PLAIN, HEXAGON	2
9	PFOZZ	80195	T2048EK	.GASKET.....	1
10	PAOZZ	80195	T204874	.RECTIFIER, SEMICONDU	1
11	PAOZZ	96906	MS51967-2	.NUT, PLAIN, HEXAGON.	4
12	PFOZZ	06721	78515	.CONNECTOR, RECEPTACL	1
13	PAOZZ	13445	30056-15	..CIRCUIT BREAKER	6
14	PAOZZ	16528	7731428	.COVER, JUNCTION BOX	1
15	PAOZZ	96906	MS90725-6	.SCREW, CAP, HEXAGON H	4

END OF FIGURE

1 — 2
THRU
5

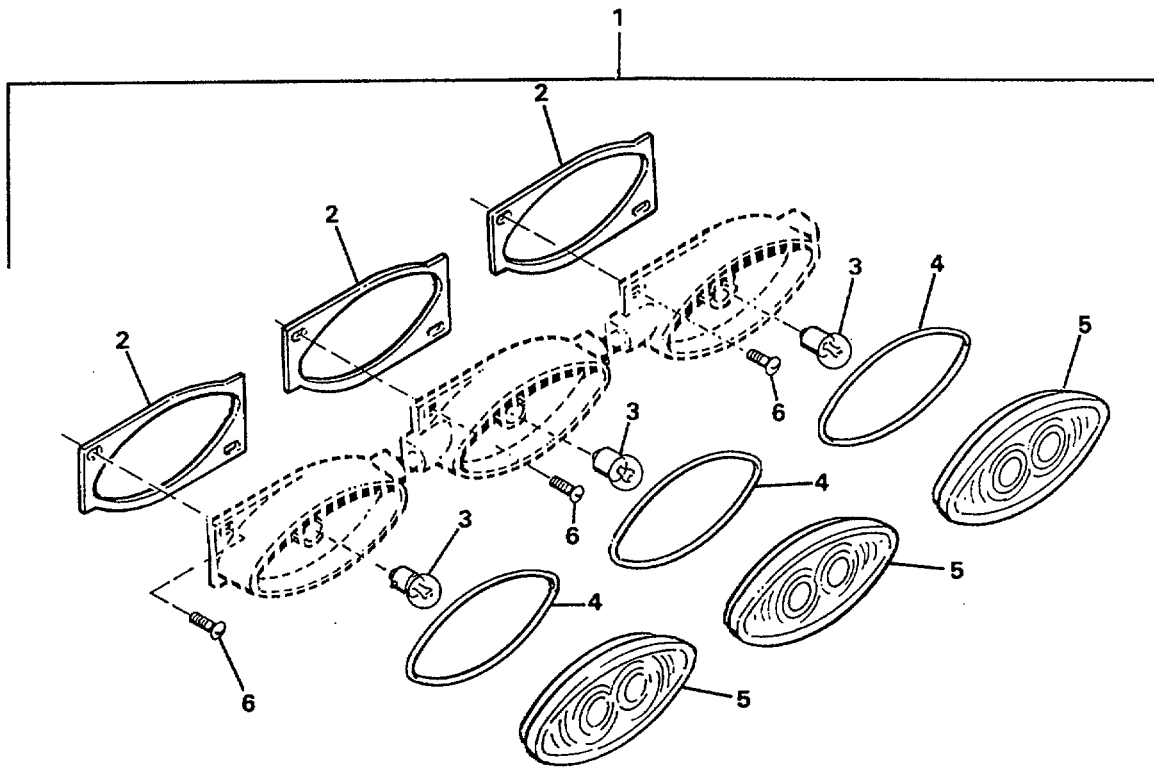


Figure 6. Identification Light

SECTION II

TM 5-3825-229-14&P

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
GROUP 0609 ELECTRICAL SYSTEM					
FIGURE 6. IDENTIFICATION LIGHT					
1	PBOZZ	13226	200- 9122	.LIGHT ASSEMBLY, CLEA.....	1
2	PFOZZ	13226	209	..GASKET.....	3
3	PFOZZ	08108	67	..LAMP, INCANDESCENT	3
4	PFOZZ	13226	202	..PACKING, PREFORMED.....	3
5	PFOZZ	13226	201R	..LENS, LIGHT	3
6	PFOZZ	24617	447839	..SCREW, TAPPING, THREA	6

END OF FIGURE

2 — 3
THRU
6

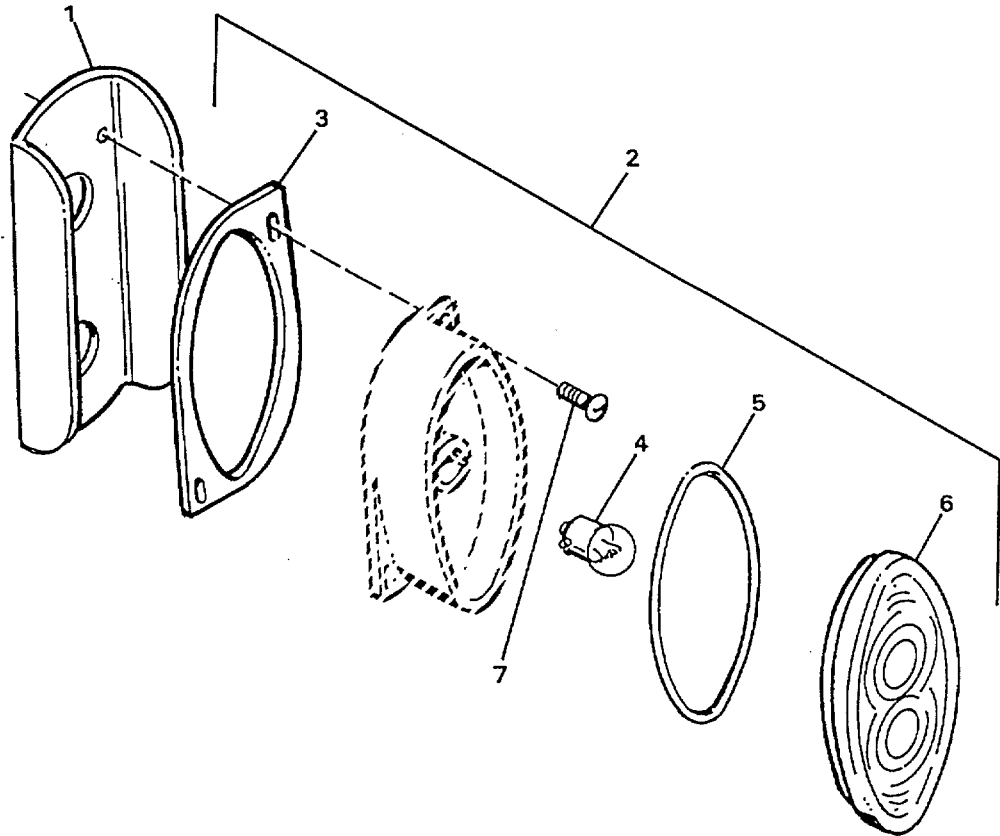


Figure 7. Red Clearance Light

SECTION II

TM 5-3825-229-14&P

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
GROUP 0609 ELECTRICAL SYSTEM					
FIGURE 7. RED CLEARANCE LIGHT					
* 1	PFOZZ	13226	17938-MS	.GUARD LIGHT.....	3
* 2	PBOZZ	13226	211-05122	.LIGHT, MARKER, CLEARA.....	3
3	PFOZZ	13226	209	..GASKET.....	3
4	PFOZZ	08108	67	..LAMP, INCANDESCENT	3
5	PFOZZ	13226	202	..PACKING, PREFORMED	3
6	PFOZZ	13226	201R	..LENS, LIGHT	3
7	PFOZZ	24617	447839	..SCREW, TAPPING, THREAD.....	6

END OF FIGURE-

2 — 3
THRU
6

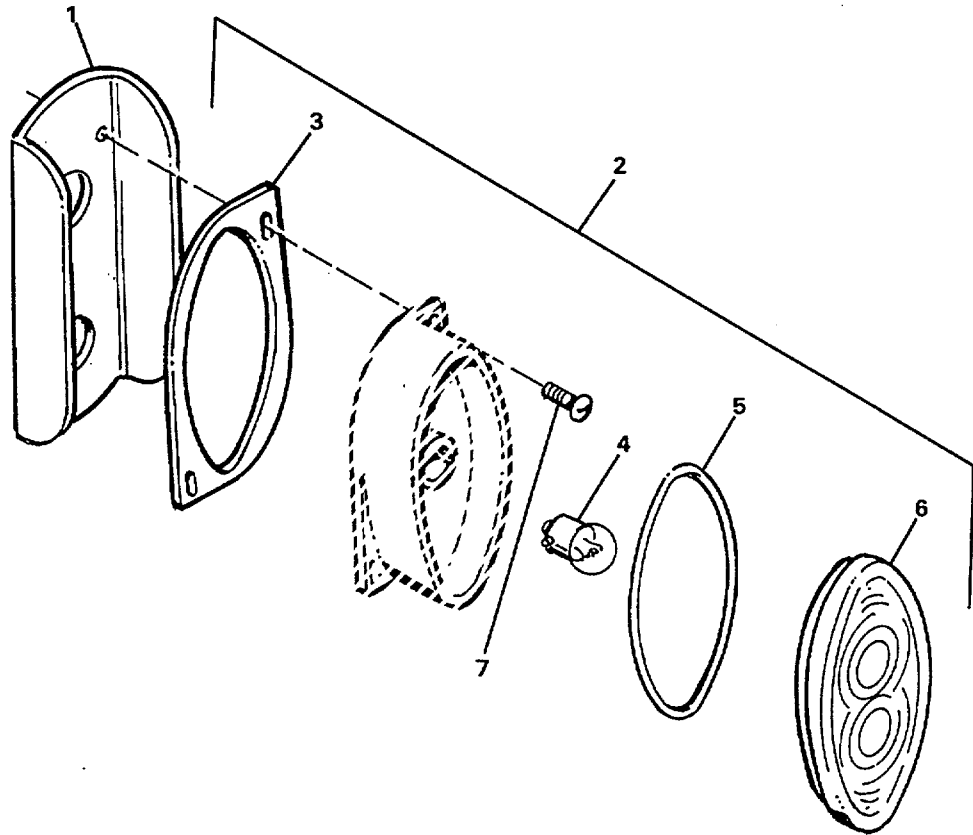


Figure 8. Amber Clearance Light

SECTION II

TM 5-3825-229-14&P

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
GROUP 0609 ELECTRICAL SYSTEM FIGURE 8. AMBER CLEARANCE LIGHT					
1	PFOZZ	13226	17938-MS	.GUARD LIGHT	2
2	PBOZZ	13226	211-05132	.LAMP UNIT, VEHICULAR	2
3	PFOZZ	13226	209	..GASKET	2
4	PFOZZ	08108	67	..LAMP, INCANDESCENT	2
5	PFOZZ	13226	202	..PACKING, PREFORMED	2
6	PFOZZ	13226	201-A	..LENS, LIGHT	2
7	PFOZZ	24617	447839	..SCREW, TAPPING, THREAD	4

END OF FIGURE

2 — 3
THRU
6

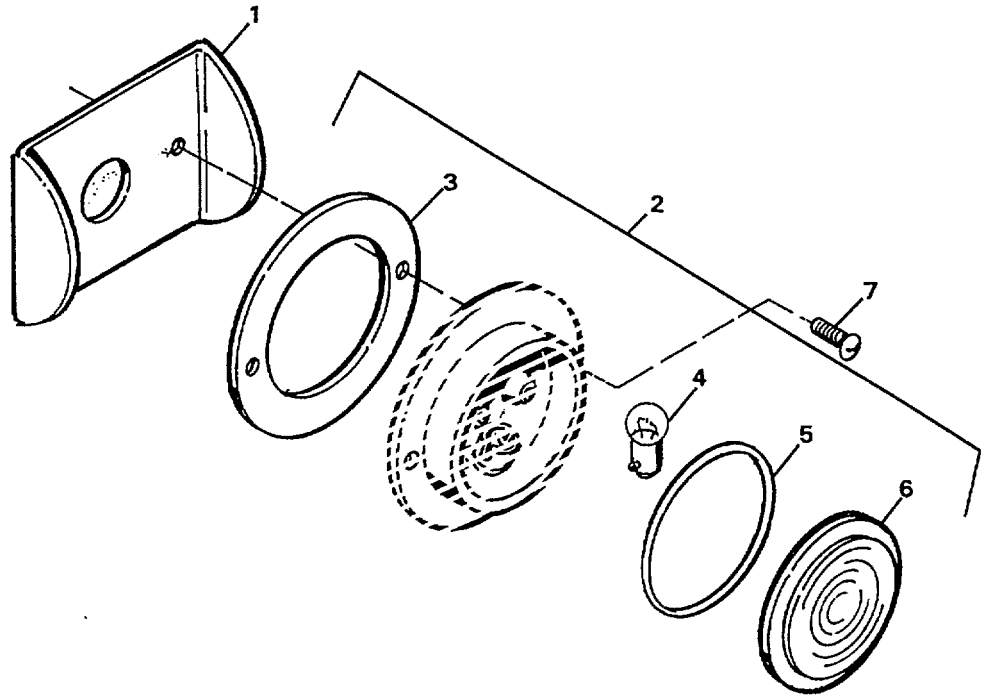


Figure 9. Front Clearance Light

SECTION II

TM 5-3825-229-14&P

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
GROUP 0609 ELECTRICAL SYSTEM FIGURE 9. FRONT CLEARANCE LIGHT					
* 1	XBOZZ	80195	T2048EH	.COVER, LAMP	2
2	PBOZZ	13226	50-05132	.LIGHT ASSEMBLY, CLEA	2
3	PFOZZ	13226	59	.GASKET	1
4	PFOZZ	08108	67	..LAMP, INCANDESCENT	1
5	PFOZZ	13226	52	..PACKING, PREFORMED	1
* 6	PFOZZ	13226	51A	..LENS, LIGHT	1
7	PFOZZ	24617	447839	.SCREW, TAPPING, THREA	4

END OF FIGURE

1 — 2
THRU
5

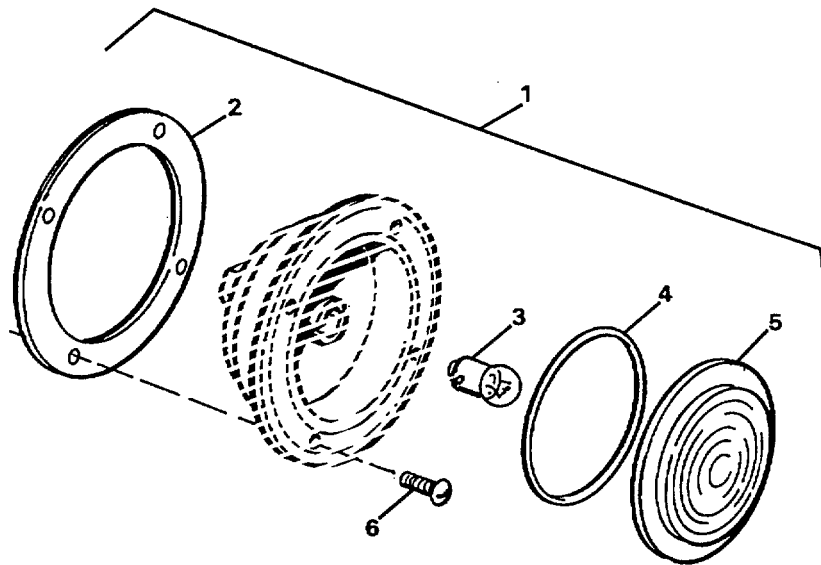


Figure 10. Stop and Signal Light

SECTION II

TM 5-3825-229-14&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 0609 ELECTRICAL SYSTEM
 FIGURE 10. STOP AND SIGNAL LIGHT

1	PAOZZ	13226	70-02122	.LIGHT ASSEMBLY, INDI.....	4
2	PFOZZ	13226	79	..GASKET.....	1
3	PAOZZ	08108	1157	..LAMP, INCANDESCENT.....	1
4	PAOZZ	13226	72	..PACKING, PREFORMED.....	1
5	PAOZZ	13226	71R	..LENS, LIGHT.....	1
6	PFOZZ	24617	447839	..SCREW, TAPPING, THREA..	8

END OF: FIGURE

2 — 3
THRU
6

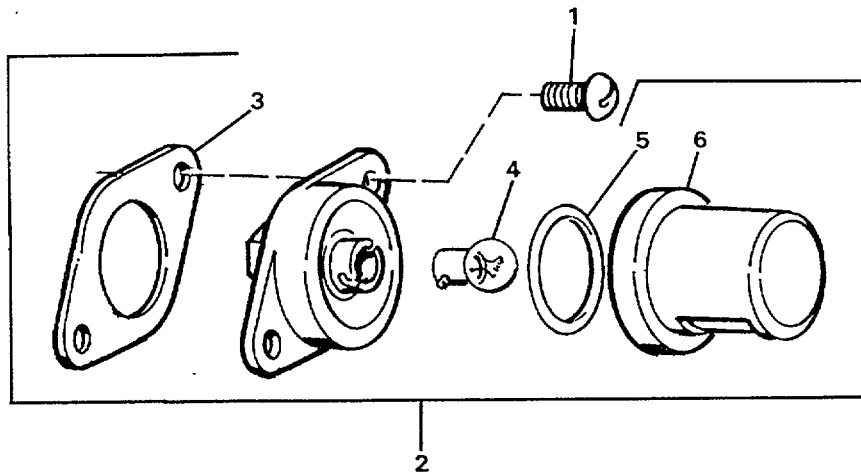


Figure 11. License Light

SECTION II

TM 5-3825-229-14&P

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
GROUP 0609 ELECTRICAL SYSTEM					
FIGURE 11. LICENSE LIGHT					
1	PFOZZ	24617	447839	.SCREW, TAPPING, THREA	2
* 2	PFOZZ	77327	20-03212	.LIGHT, INDICATOR	1
3	PFOZZ	13226	29	..GASKET.....	1
4	PFOZZ	08108	67	..LAMP, INCANDESCENT	1
5	PFOZZ	13226	22	..PACKING, PREFORMED.....	1
6	PFOZZ	13226	21L	..LENS, LIGHT	1

END OF FIGURE

1 — 2
THRU
6

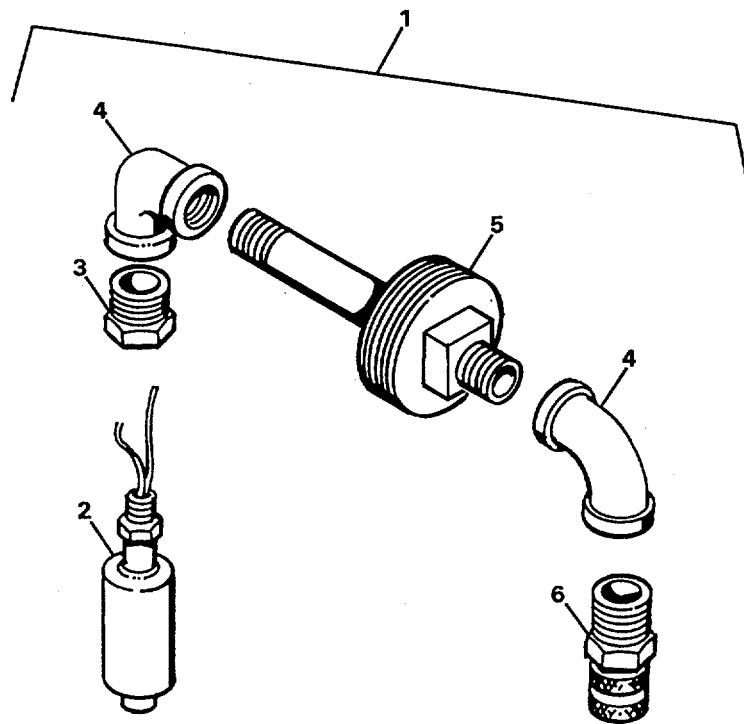


Figure 12. Liquid Level Transmitter

SECTION II

TM 5-3825-229-14&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 0610 ELECTRICAL SYSTEM
 FIGURE 12. LIQUID LEVEL INDICATOR

1	PFOZZ	80195	T2048CA	..TRANSMITTER LIQ LEV	1
2	PAOZZ	61397	LCS-S200-BB	..SWITCH, LIQUID LEVEL	1
3	PFOZZ	81348	WW-P-471B8QBCDA	..BUSHING, PIPE	1
4	PFOZZ	90598	10517-5	..ELBOW, PIPE	2
5	PFOZZ	80195	T2048CB	..PLUG INDICATOR.....	1
6	PFOZZ	80195	6700858	..GRIP, CABLE, JAW	1

END OF FIGURE

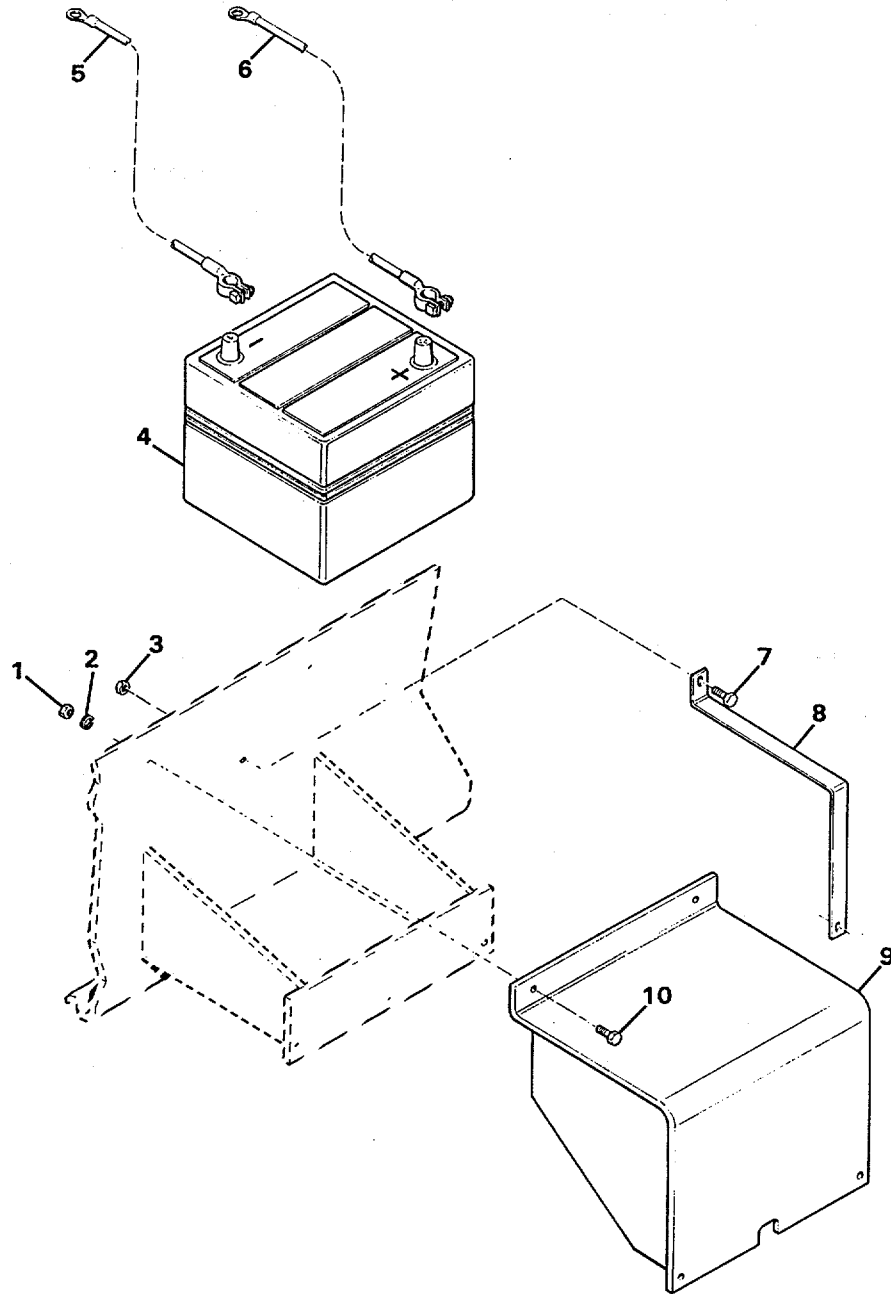


Figure 13. Battery Installation

SECTION II

TM 5-3825-229-14&P

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
FIGURE 13. BATTERY INSTALLATION					
1	PAOZZ	96906	MS51967-2	.NUT, PLAIN , HEXAGON	4
2	PAOZZ	96906	MS35338-44	.WASHER, LOCK.....	4
3	PFOZZ	21450	131245	.NUT, SELF-LOCKING, HE	2
4	PAOFA	96906	MS52149-1	.BATTERY, STORAGE.....	1
5	PAOZZ	80195	T2048ER	.LEAD, STORAGE BATTER.....	1
6	PAOZZ	80195	T2048ET	.LEAD, STORAGE BATTER.....	1
7	PAOZZ	96906	MS90725-6	.SCREW, CAP, HEXAGON	6
8	PBOZZ	80195	T2048EP	.RETAINER, BATTERY.	1
9	PBOZZ	80195	T2048CC	.COVER, BATTERY RETAI	1

END OF FIGURE

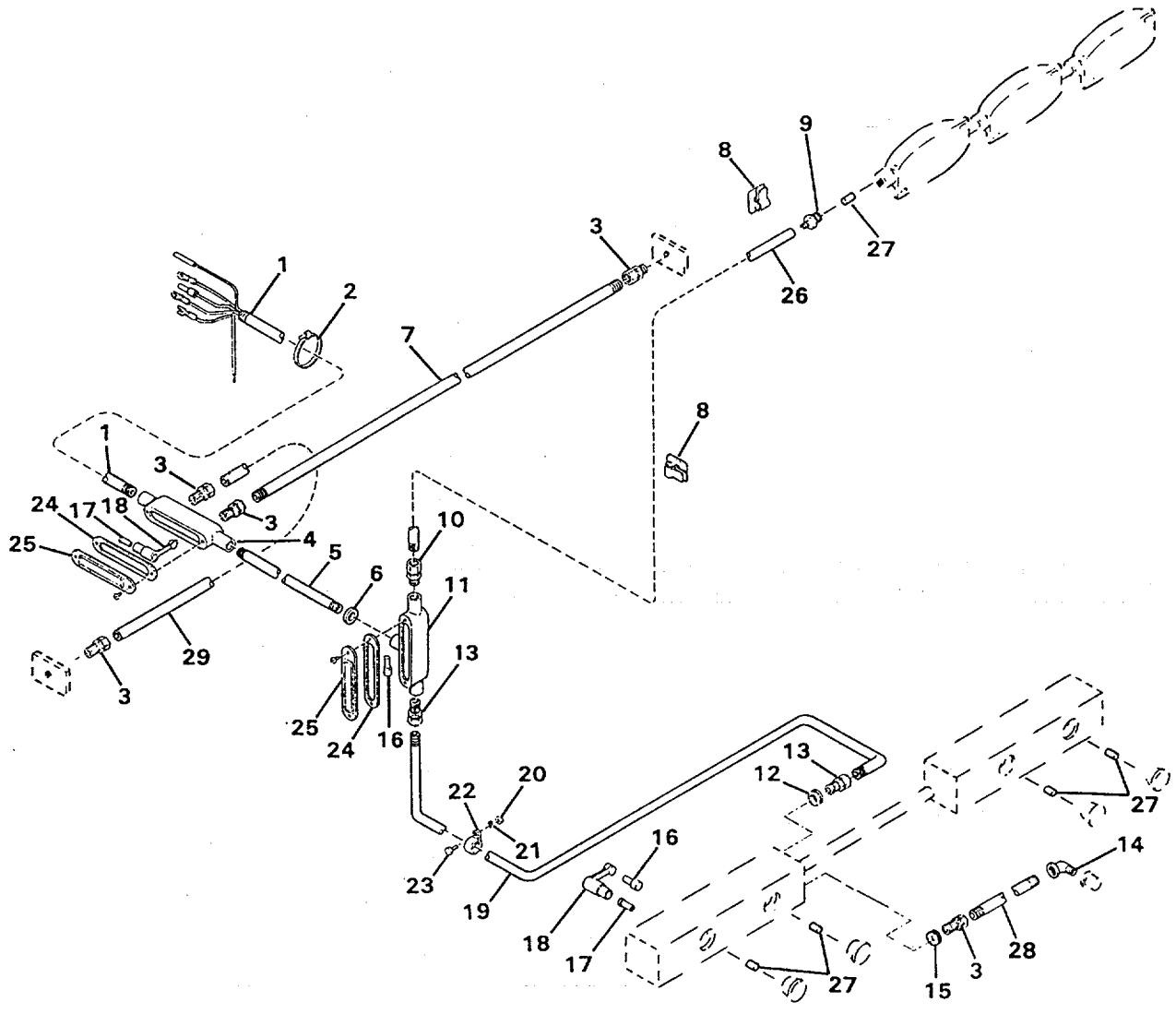


Figure 14. Wiring Installation (Sheet 1 of 3)

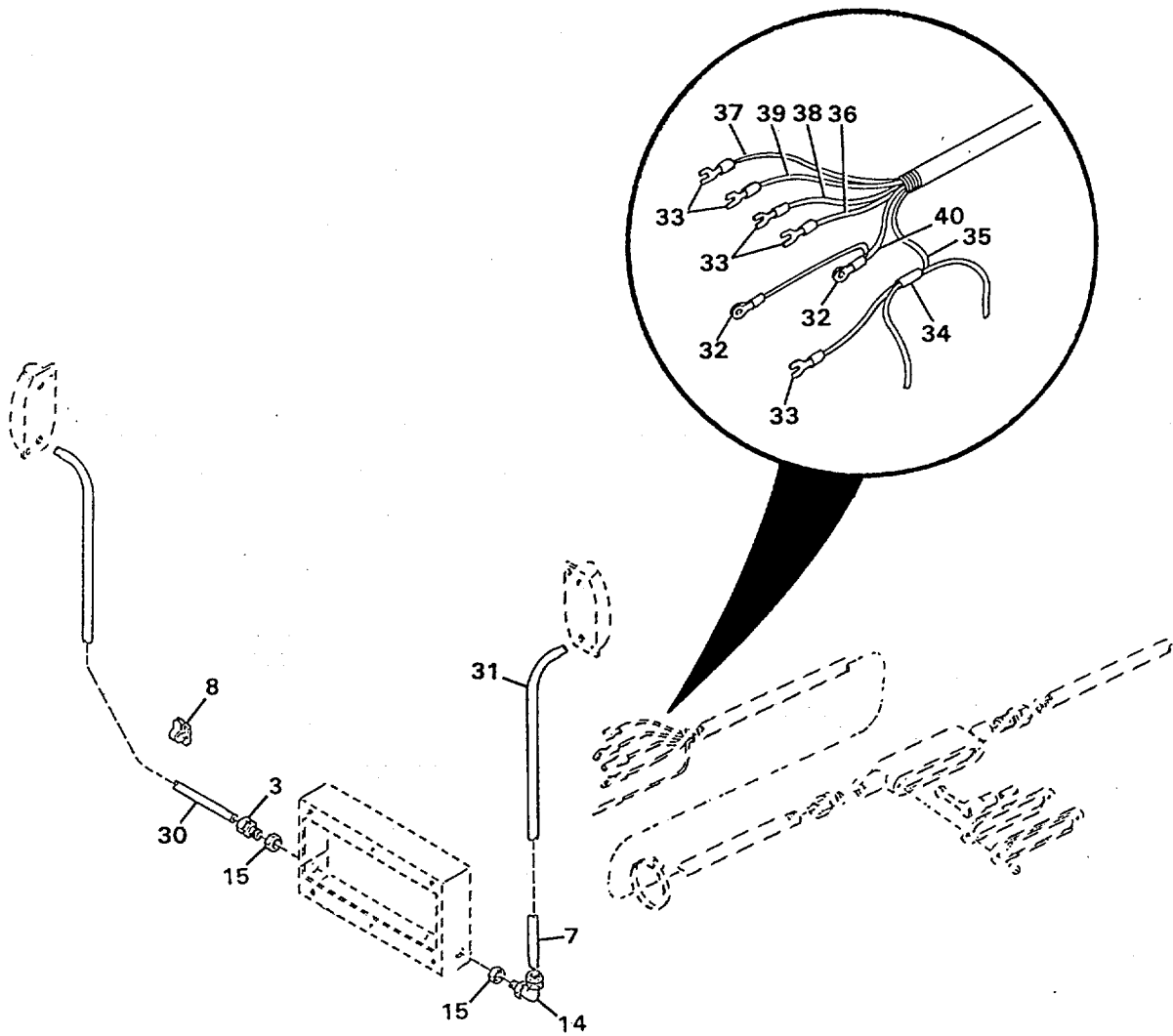


Figure 14. Wiring Installation (Sheet 2 of 3)

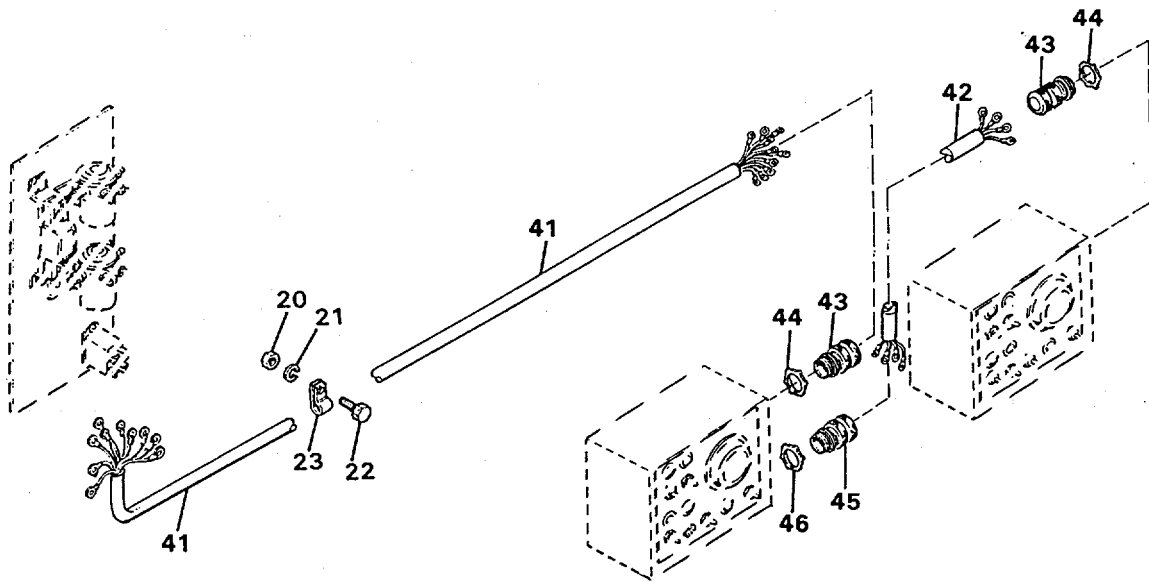


Figure 14. Wiring Installation (Sheet 3 of 3)

SECTION II

TM5-3825-229-14&PCO1

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY	
GROUP 0613 ELECTRICAL SYSTEM FIGURE 14. WIRING INSTALLATION						
1	PFOZZ	80195	T2048EM	.CONDUIT REAR 13 FT	1	
2	PAOZZ	96906	MS3367-1-9	.STRAP, TIEDOWN, ELECT	21	
3	PFOZZ	93061	P6MC4	.ADAPTER, STRAIGHT, P	4	
4	PFOZZ	80195	T2048EL	.CONNECTOR, TUBING	1	
*	5	PFOZZ	80195	T2048EN	.CONDUIT REAR 13 FT	1
*	6	PAOZZ	96906	MS35489-80	.GROMMET, NONMETALLIC	8
7	MOOZZ	93061	PFT-68-48	.TUBING NYLON 48 IN MAKE FROM TUBE P/N PT-240-6B	1	
8	PAOZZ	06721	11137	.CLAMP, LOOP	17	
9	PFOZZ	93061	28-6-2	.ADAPTER, STRAIGHT, PI	1	
11	PFOZZ	15235	T17AND17OF	.CONDUIT OUTLET.....	1	
*	12	PFOZZ	59730	141SL	.LOCKNUT, ELECTRICAL.....	2
13	PFOZZ	59730	5332	.BOX CONNECTOR, ELECT	2	
14	PFOZZ	93061	P6ME4	.ELBOW, PIPE TO TUBE	3	
15	PFDZZ	24617	144575	.LOCKNUT, PIPE	3	
16	PFOZZ	00779	35653	.SPLICE, CONDUCTOR	4	
17	PFOZZ	3Y572	30-415	.INSULATOR ASSEMBLY	10	
18	PFOZZ	30119	30-411	.SPLICE, CONDUCTOR.....	10	
19	MOOZZ	80195	6700710-60	.CONDUIT, BENT MAKE FROM P/N 6700710	1	
20	PAOZZ	96906	MS51967-2	.NUT, PLAIN, HEXAGON	3	
21	PAOZZ	96906	MS35338-44	.WASHER, LOCK.....	3	
22	PAOZZ	96906	MS90725-6	.SCREW, CAP, HEXAGON H.....	3	
23	PFOZZ	28606	1511-7	.CLAMP, LOOP	3	
24	PFOZZ	03743	GK50-N	.GASKET.....	2	
25	PFOZZ	03743	K50	.COVER, CONDUIT OUTLE	2	
26	PAOZZ	96906	MS25036-112	TERMINAL, LUG.....	1	
27	PFOZZ	81349	M7928/5-4	.SPLICE, CONDUCTOR.....	5	
28	MOOZZ	93061	PFT-6B-54	.TUBING, NYLON, 54 IN MAKE FROM P/N PFT-6B.....	1	
29	MOOZZ	93061	PFT-6B-6	.TUBING, NYLON, 6 IN MAKE FROM P/N PFT-6B.....	1	
*	30	MOOZZ	93061	PT-240-6B-23	.TUBING NYLON 23 IN MAKE FROM TUBING P/N PT-240-6B.....	1
*	31	MOOZZ	93061	PT-240-6B-76	.TUBING NYLON 76 IN MAKE FROM TUBING P/N PT-240-6B.....	1
32	PPBOZZ	96906	MS25036-157	.TERMINAL, LUG,	2	
33	PFOZZ	00779	32060	.TERMINAL, LUG	11	
34	PAOZZ	81349	M7928/5-5	.SPLICE, CONDUCTOR.....	7	
*	35	MOOZZ	64488	81143S-XX	.WIRE, ELECTRICAL 14 GA, BLACK, MAKE WIRE P/N 81143S.....	6
*	36	MOOZZ	64488	81146S-XX	.WIRE, ELECTRICAL 14 GA, BROWN, MAKE WIRE P/N 81146S5.....	1
*	37	MOOZZ	77060	952G-XX	.WIRE, ELECTRICAL 14 GA, GREEN, MAKE FROM WIRE P/N 952G.....	1
*	38	MOOZZ	80195	570D-2-XX	.WIRE, ELECTRICAL 14 GA, RED, MAKE FROM WIRE P/N 570D-2	1
*	39	MOOZZ	64488	81142S-XX	.WIRE, ELECTRICAL 14 GA, YELLOW, MAKE FROM WIRE P/N 81142S.....	1
*	40	MOOZZ	79550	72D9-XX	.WIRE, ELECTRICAL 14 GA, WHITE,	1

SECTION II

TM5-3825-229-14&PCO1

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				MAKE FROM WIRE P/N 572D9	
41	PAFZZ	80195	T2048EW	.WIRING, BRAN	1
42	PAOZZ	80195	T2048EV	.WIRING HARNESS, BRAN	1
43	PAOZZ	03743	CG87100	.BOX CONNECTOR.....	2
44	PAOZZ	03743	BL100	.LOCKNUT , ELECTRICAL.....	2
45	PFOZZ	03743	CG-6275	.BOX CONNECTOR, ELECT.....	1
46	PAOZZ	59730	141	.LOCKNUT, ELECTRICAL.....	1

END OF FIGURE

1 — 2
THRU
20

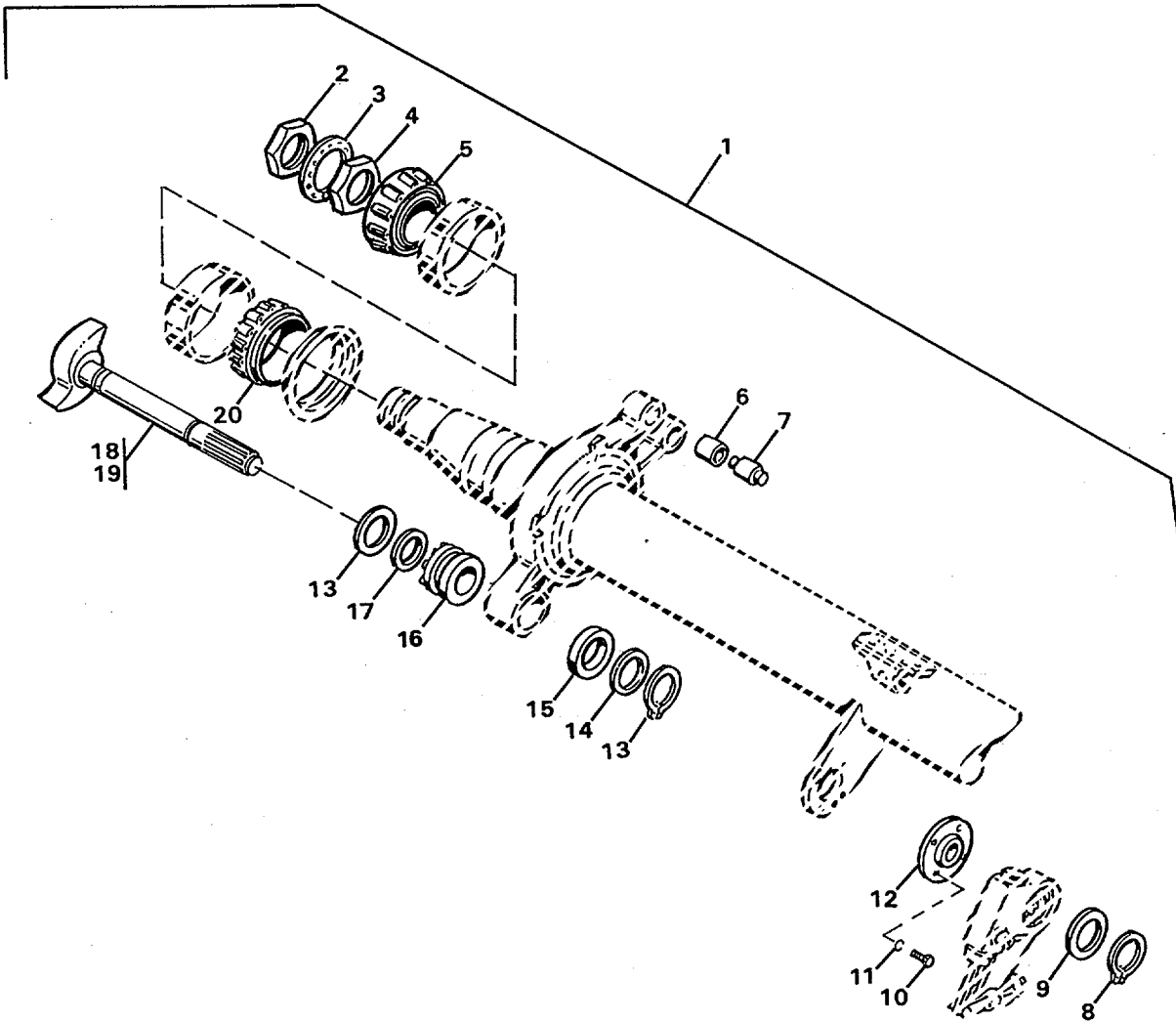


Figure 15. Rear Axle Assembly

SECTION II

TM5-3825-229-14&P

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
GROUP 1100 REAR AXLE					
FIGURE 15. AXLE ASSEMBLY					
1	PBFFF	80195	T2048SU	..AXLE ASSEMBLY, AUTOM.....	2
2	PAOZZ	78500	1227-8-756	..NUT, PLAIN, HEXAGON.....	2
3	PAOZZ	78500	A-1229-W-2545	..WASHER, LOCK.....	2
4	PAOZZ	78500	1227C549	..NUT INNER WHEEL BEA	2
5	PAOZZ	52676	HM212049	..CONE AND ROLLERS, TA.....	2
6	PAOZZ	78500	1225-N-976	..BUSHING, SLEEVE.....	4
7	PAOZZ	78500	1259-N-274	..PIN, SHOULDER, HEADLE.....	4
8	PAOZZ	19207	11662296-9	..RING, RETAINING.....	2
9	PAOZZ	78500	1229-B-1848	..WASHER, FLAT	2
10	PAFZZ	78500	S-266-P	..SCREW	8
11	PAOZZ	78500	1229-K-15972	..WASHER, FLAT.....	8
12	PAOZZ	82304	19083	...RETAINER ASSEMBLY.....	2
13	PAOZZ	78500	1229-A-1119	..RING, RETAINING	2
14	PAOZZ	785U0	1229-F-25J2	..WASHER, FLAT.....	2
15	PAOZZ	78500	1205-U-1451	..SEAL.....	2
16	PAFZZ	7850U	1225-B-834	..SPIDER, BRAKE	2
17	PAOZZ	78500	12J5-V-1452	..PACKING, PREFORMED).....	2
18	PBFZZ	78500	2210-L-4328	..CAM CONTROL.....	1
19	PAOZZ	785u0	2210-M-4329	..CAM CONTROL	1
20	PAOZZ	7850u	HM-218248	..CONE AND ROLLERS, TA.....	2

END OF FIGURE

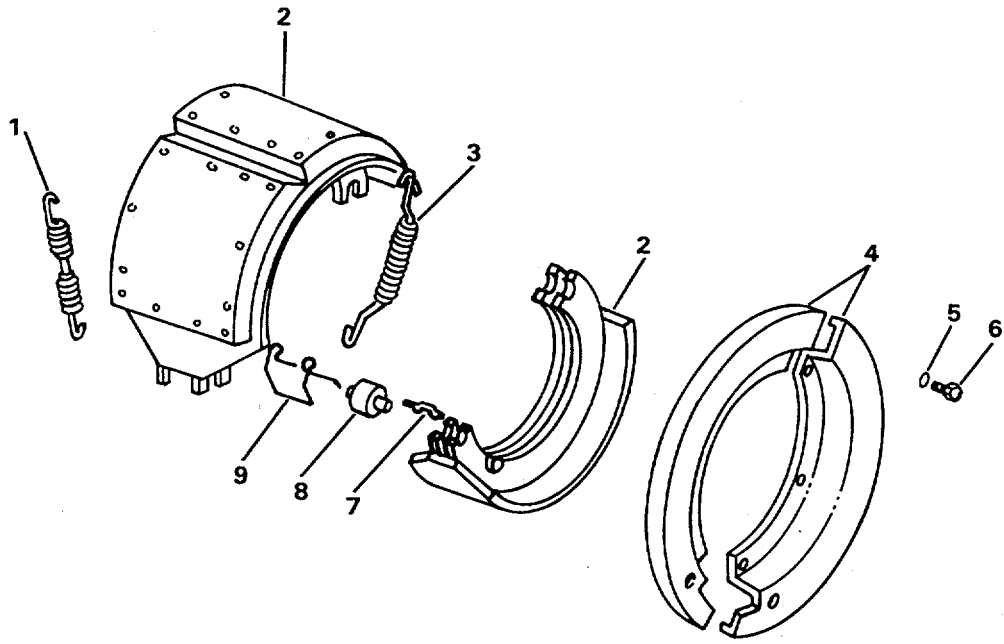


Figure 16. Brake Assembly

SECTION II

TM5-3825-229-14&P

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
GROUP 1202 BRAKES					
FIGURE 16. BRAKE ASSEMBLY					
1	PAOZZ	78500	2258-U-619	.SPRING	4
2	PAOZZ	78500	A2-3222-Z-1612	.BRAKE, SHOE TYPE.....	8
3	PAOZZ	78500	2258-Q-615	.SPRING, HELICAL, EXTEL.....	8
4	PBOLZ	78500	AI-3236-A-1249	.CAP, PROTECTIVE, DUST.....	4
5	PAOZZ	78500	WA-15-C	.WASHER, LOCK	12
6	PAOZZ	78500	S-254	.SCREW, TAPPING, THREA	12
7	PAOZZ	78500	1218-G-85	.PIN, RETURN SPRING	8
8	PAOZZ	78500	1779-R-18	.ROLLER, , LINEAR-ROTAR	6
9	PAOZZ	78500	3105-R-200	.CLIP, RETAINING	8

END OF FIGURE

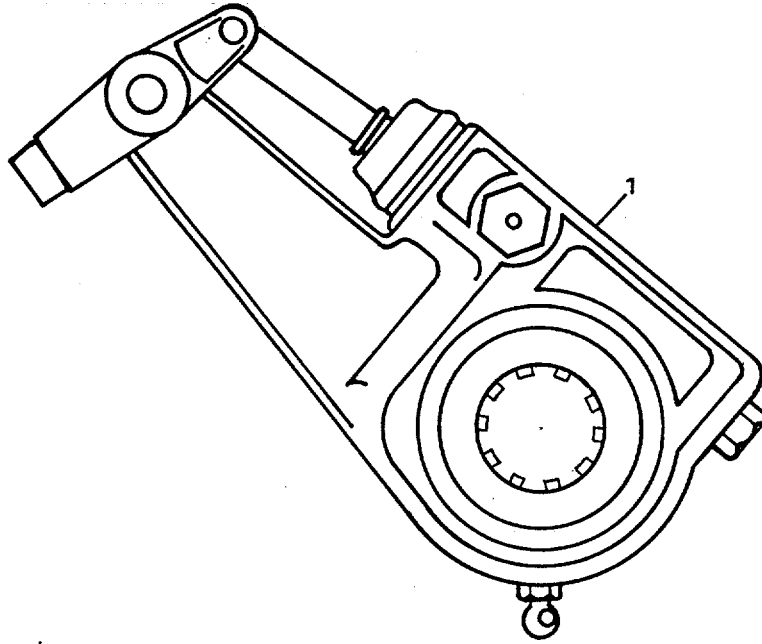


Figure 17. Slack Adjuster

SECTION II

TM5-3825-229-14&P

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
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GROUP 1206 BRAKES
FIGURE 17. SLACKS ADJUSTER

1	PAOZZ	78500	A-15-3275N-716	.SLACK ADJUST ASSY.....	4
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END OF FIGURE

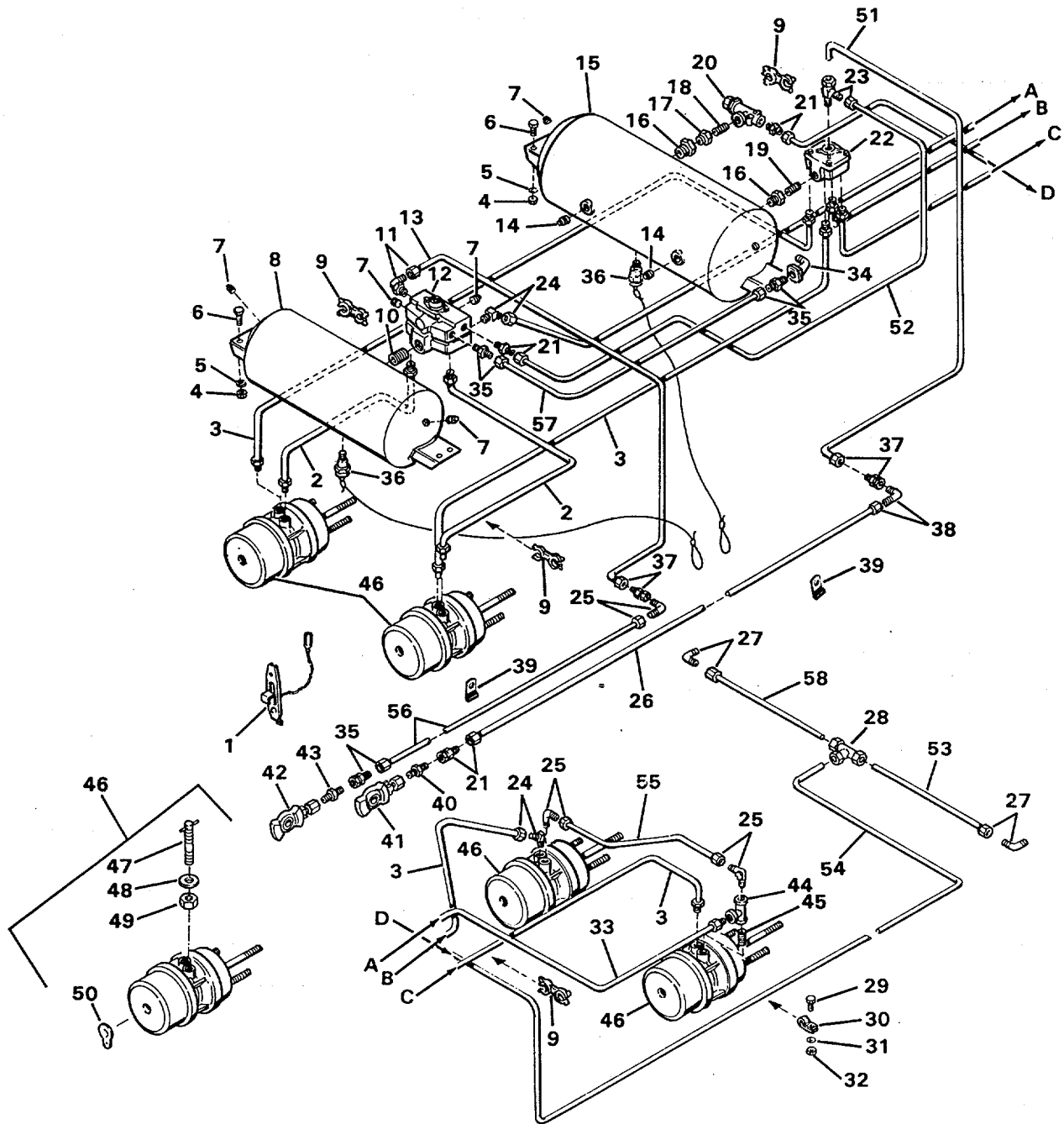


Figure 18. Air Installation

SECTION II

TM5-3825-229-14&PCO1

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
GROUP 1208 BRAKES FIGURE 18. AIR INSTALLATION					
1	PAOZZ	14892	220635	.DUMMY COUPLING, AUTO	2
2	PAOZZ	01276	FL5507GHGO320	.HOSE ASSEMBLY, NONME	2
3	PAOZZ	06721	62X7440BO	.HOSE ASSEMBLY, NONME	4
4	PFOZZ	24617	274993	.NUT, SELF-LOCKING, HE	8
5	PFOZZ	24617	274517	.WASHER, FLAT	8
* 6	PAOZZ	80204	B1821BHO38100N	.SCREW, CAP, HEXAGON H.....	8
7	PAOZZ	72582	444867	.PLUG, PIPE	5
8	PAOZZ	62173	9501	.ACCUMULATOR, PNEUMAT	1
9	PAOZZ	06721	100469D	.CLAMP, HOSE	3
10	PFOZZ	80195	6200530	.NIPPLE, PIPE	1
11	PAOZZ	79146	H0169-6X4	.ELBOW, PIPE TO TUBE	1
12	PAOZZ	06721	TD-3155900	.VALVE, LINEAR, DIRECT	1
13	MOOZZ	93061	PFT-68-28	.TUBING NYLON 28IN MAKE FROM TUBING P/N PFT-6B-6B	1
14	PFOZZ	02892	8485984	.PLUG, PIPE	2
15	PAOZZ	62173	120	.TANK, PRESSURE	1
16	PFOZZ	24617	14042	.BUSHING, PIPE	2
17	PFOZZ	24617	144215	.BUSHING, PIPE.	2
18	PFOZZ	80195	6200292	.NIPPLE, PIPE	1
19	PFOZZ	80195	6200601	.NIPPLE, PIPE	1
20	PAOOO	06853	277147	.VALVE, REGULATING, FL.....	1
21	PAOZZ	79470	1468X6	.ADAPTER, STRAIGHT, PI	3
22	PAOZZ	06853	102276	.VALVE, RELAY, AIR PRE	1
23	PAOZZ	93061	271NTA-6-4	.TEE, PIPE TO TUBE	1
24	PAOZZ	79470	3350X6	.ELBOW, PIPE	2
25	PAOZZ	93061	269NTA-8-6	.ELBOW, PIPE TO	3
26	MOOZZ	9306	PFT-8B-29	.TUBING NYLON, 29 IN MANUFACTURE .FROM P/ PFT-8B	33
27	PAOZZ	79470	1469X6X2	.ELBOW, PIPE TO TUBE	2
28	PFOZZ	81343	6-6-6 100401BA	.TEE, TUBE	1
29	PAOZZ	96906	MS90725-6	.SCREW, CAP, HEXAGON H.....	5
30	PFOZZ	98343	1511-3	.CLAMP, LOOP	5
31	PAOZZ	96906	MS35338-44	.WASHER, LOCK.....	5
32	PAOZZ	96906	MS51967-2	.NUT, PLAIN, HEXAGON.....	5
33	PAOZZ	01276	FL5507GHG0540	.HOSE ASSEMBLY, NONME	1
34	PAOZZ	0N972	401015	.VALVE, CHECK	1
35	PAOZZ	93061	68NTA-8-6	.ADAPTER, STRAIGHT.....	3
36	PAOZZ	0N972	401047	.COCK, POPPET DRAIN	2
37	PAOZZ	80195	T204853	.ADAPTER, STRAIGHT, FL	2
38	PAOZZ	81343	6-6 120202BA	.ELBOW, PIPE TO TUBE	1
39	PFOZZ	06721	11137	.CLAMP, LOOP	2
*40	PAOZZ	06853	205498	.REDUCER, PIPE	1
41	PAOZZ	98343	10451EF	.COUPLING HALF, QUICK	1
42	PAOZZ	06721	10452SF	.COUPLING HALF, QUICK	1
43	PAOZZ	40342	1031520	.REDUCER, PIPE.....	1
44	PFOZZ	54578	1105-1-1/4	.TEE, PIPE	1
45	PFOZZ	96906	MS51953-49	.NIPPLE, PIPE	1
46	PAOZZ	26622	KSD303OFC-00291	.CHAMBER, AIR BRAKE.....	4
* 47	XBOZZ	26622	KSD4940022	..TOOL CAGING	4

SECTION II

TM5-3825-229-14&PCO1

(1)	(2)	(3)	(4)	(5)	(6)
ITEM NO	SMR CODE	FSCM	PART NUMBER	DESCRIPTION AND USABLE ON CODES(UOC)	QTY
* 48	PFOZZ	26622	KSD4940257	..WASHER FLAT.....	4
* 49	PFOZZ	26622	KSD4940024	..NUT, PLAIN, HEXAGON	4
* 50	PAOZZ	26622	KSD4940283	..PLUG, PROTECTIVE, D.....	4
51	MOOZZ	93061	PFT-6B-20	.TUBING NYLON 20 IN MAKE FROM .TUBING P/N PFT-6B.....	1
52	MOOZZ	93061	PFT-6B-20	.TUBING NYLON 20 IN MAKE FROM .TUBING P/N PFT-6B-6B	1
53	MOOZZ	93061	PFT-6B-7	.TUBING NYLON 7 1N MAKE FROM .TUBING P/N PFT-6B.....	1
54	MOOZZ	93061	PFT-6B-13	.TUBING NYLON 13 IN MAKE FROM .TUBING P/N PFT-6B.....	1
55	MOOZZ	93061	PFT-BB-28	.TUBING NYLON 28 IN MAKE FROM .TUBING P/N PFT-8B.....	1
56	MOOZZ	93061	PFT-6B-29	.TUBING NYLON 29 1N MAKE FROM .TUBING P/N PFT-6B.....	1
57	MOOZZ	93061	PFT-8B-19	.TUBING NYLON 19 IN MAKE FROM .TUBING P/N PFT-8B.....	1
58	MOOZZ	93061	PFT-6B-3	.TUBING NYLON 3 IN MAKE FROM .TUBING P/N PFT-6B.....	1

END OF FIGURE

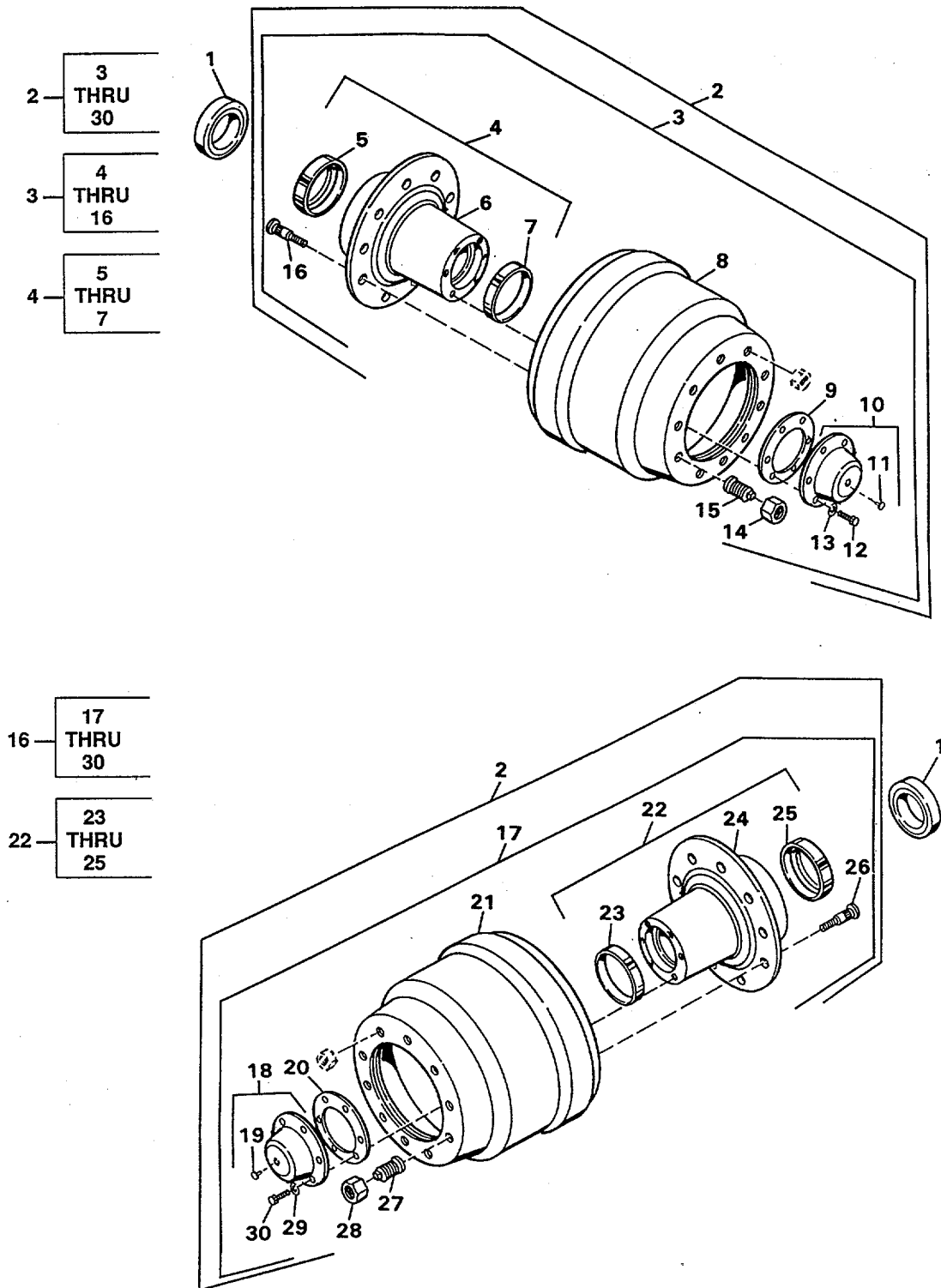


Figure 19. Hub and Drive Assembly

SECTION II

TM5-3825-229-14&PCO1

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY	
GROUP 1311 WHEELS AND TRACKS FIGURE 19. HUB AND DRUM ASSEMBLY						
1	PAOZZ	80201	46304	..SEAL, PLAIN, ENCASED.....	2	
2	XCOFF	80195	6450531	..HUB, WHEEL, VEHICULAR.....	4	
3	PAOOO	73972	5631-RH3	..HUB, WHEEL, VEHICULAR.....	1	
*	4	PAOZZ	73972	HT-518-K	..HUB, WHEEL, VEHICULAR.....	1
5	PAOZZ	60038	HMZ12011	...CUP, TAPERED ROLLER.....	1	
*	6	PAOZZ	73972	HT-518	...HUB, WHEEL, VEHICULAR.....	1
7	PAOZZ	60038	HM218210	...CUP, TAPERED ROLLER.....	1	
8	PAOZZ	73972	3483	..BRAKE DRUM.....	1	
9	PAOZZ	11583	N676	..GASKET.....	1	
10	PAOZZ	80201	1743	..HUB CAP, WHEEL.....	1	
*	11	PAOZZ	80201	450434	..PLUG, PROTECTIVE, DUS.....	1
12	PAOZZ	73972	WP-5	..SCREW, CAP, HEXAGON H.....	6	
13	PAOZZ	96906	MS35333-41	..WASHER, LOCK.....	6	
14	PAOZZ	96906	MS51983-8	..NUT, PLAIN, SINGLE BA.....	10	
15	PAOZZ	73972	W-1038-R	..NUT, CAP, DUAL WHEEL.....	10	
16	PAOZZ	73972	W-980-R	..BOLT, RIBBED SHOULDE.....	10	
17	PAOOO	73972	5631-LH3	...HUB, WHEEL, VEHICULAR.....	1	
18	PAOZZ	80201	1743	...HUB CAP, WHEEL.....	1	
*	19	PAOZZ	80201	450434PLUG, PROTECTIVE, DUS.....	1
20	PAOZZ	11583	N676	...GASKET.....	1	
21	PAOZZ	73972	3483	...BRAKE DRUM.....	1	
*22	PAOZZ	73972	HT-518-K	...HUB, WHEEL, VEHICULAR.....	1	
23	PAOZZ	60038	HM218210	...CUP, TAPERED ROLLER.....	1	
*	24	PAOZZ	73972	HT-518	...HUB, WHEEL, VEHICULAR.....	1
25	PAOZZ	60038	HM212011	...CUP, TAPERED ROLLER.....	1	
26	PAOZZ	73972	W-980-L	...BOLT, RIBBED SHOULDE.....	10	
27	PAOZZ	73972	W-1038-L	...NUT, CAP, DUAL WHEE.....	10	
28	PAOZZ	96906	MS51983-7	...NUT, PLAIN, SINGLE BA.....	10	
29	PAOZZ	96906	MS35333-41	..WASHER, LOCK.....	6	
30	PAOZZ	73972	WP-5	..SCREW, CAP, HEXAGON H.....	6	

END OF FIGURE

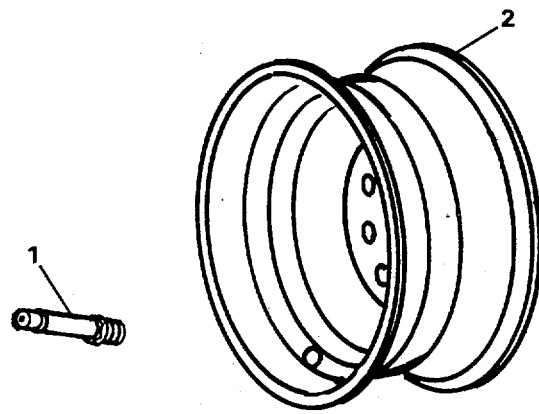


Figure 20. Wheel Assembly

SECTION II

TM5-3825-229-14&P

(1)	(2)	(3)	(4)	(5)	(6)
ITEM	SMR	FSCM	PART		
NO	CODE		NUMBER	DESCRIPTION AND USABLE ON CODES(UOC)	QTY

GROUP 1311 WHEEL AND TRACKS
 FIGURE 20. WHEEL ASSEMBLY

1	PAOZZ	27783	573	.VALVE, PNEUMATIC TIR	8
2	PAOZZ	73195	27404N	.WHEEL DISC.....	8

END OF FIGURE

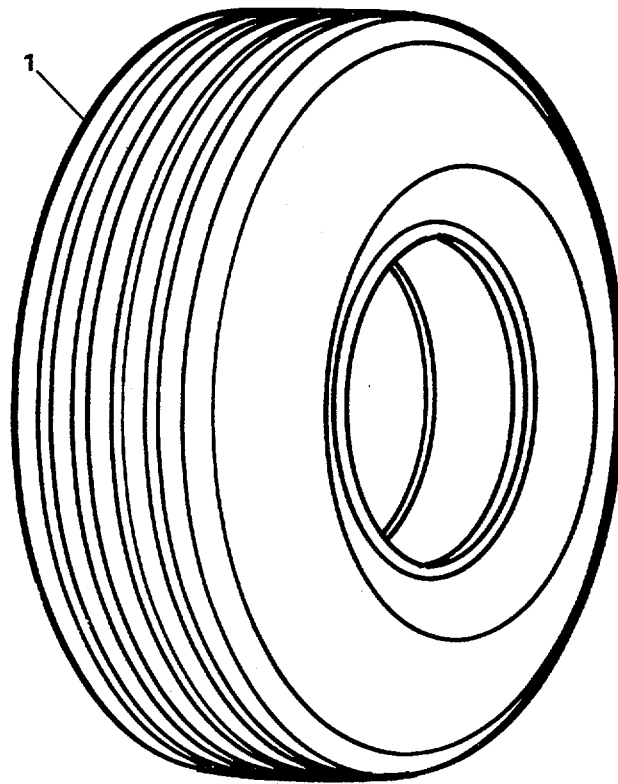


Figure 21. Tires

SECTION II TM5-3825-229-14&PCO1

(1)	(2)	(3)	(4)	(5)	(6)
ITEM	SMR	FSCM	PART		
NO	CODE		NUMBER	DESCRIPTION AND USABLE ON CODES(UOC)	QTY

GROUP 1313 WHEELS AND TRACKS
FIGURE 21. TIRES

*	1	PAOFH	81348	GP3STYLXTYBACLR/ T/11.00-22850/F/	.TIRE, PNEUMATIC	8
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END OF FIGURE

7 — 8
THRU
14

16 — 17
THRU
24

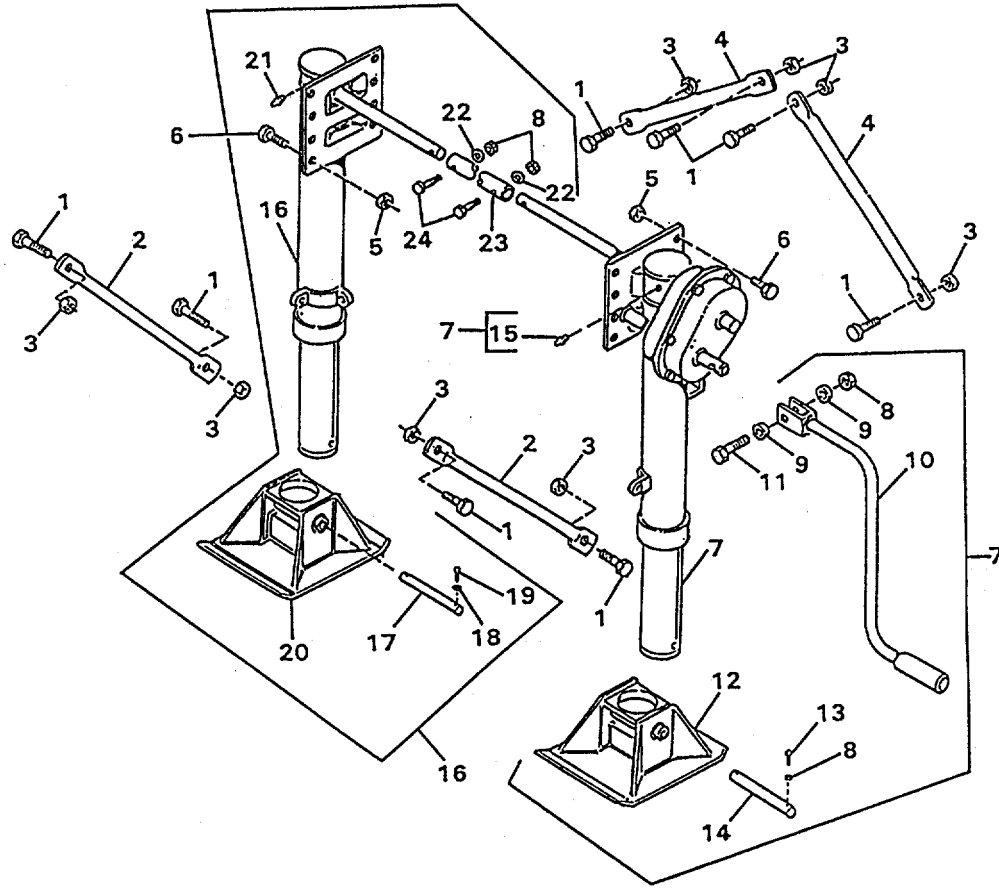


Figure 22. Landing Leg Assembly

SECTION II

TM5-3825-229-14&PCO1

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
GROUP 1507 FRAME, TOWING ATTACHMENTS AND DRAWBARS FIGURE 22. LANDING LEGS ASSEMBLY					
*	1	PAOZZ	80204 B1821BH063C175N	..SCREW, CAP, HEXAGON	8
	2	PBOZZ	80195 T2048LC	..BRACE SIDE.....	2
	3	PAOZZ	94135 12Z2007-440	..NUT, SELF-LOCKING, HE	8
	4	PBOZZ	80195 T2048LD	..BRACKET, MOUNTING.	2
	5	PAOZZ	96906 MS17829-8C	..NUT, SELF-LOCKING, HE	16
*	6	PAOZZ	80204 B1821BH044C150N	..SCREW, CAP, HEXAGON H.....	16
	7	PAOFF	24234 740192	..LEG, SEMITRAILER RET.....	1
	8	PAOZZ	96906 MS51967-8	..NUT, PLAIN, HEXAGON	2
	9	PAOZZ	96906 MS27183-14	..WASHER, FLAT.....	2
	10	PAOZZ	24234 730113	..CRANK, HAND	1
	11	PAOZZ	25567 B-0611	...SCREW, CAP, HEXAGON H.....	1
	12	PBOZZ	24234 730143	...SHOE, JACK-SUPPORT	1
*	13	PAOZZ	96906 M518154-67	..SCREW, CAP, HEXAGON H.....	1
	14	PBOZZ	24234 750005	..AXLE, STRAIGHT	1
	15	PAOZZ	80837 1351-A7	..FITTING, LUBRICATION.....	2
	16	PAOFF	24234 740214	..STAND ASSEMBLY, LIFT	1
	17	PBOZZ	24234 750005	..AXLE, STRAIGHT	1
	18	XAFZZ	24234 203514	..NUT LOCK.....	1
	19	PAOZZ	03502 8954942P64	..STUD, PLAIN	1
	20	PBOZZ	24234 730143	..SHOE, JACK-.....	1
				..SUPPORT	1
	21	PAOZZ	80837 1351-A7	..FITTING, LUBRICATION	2
*	22	PFOZZ	96906 MS27183-15	..WASHER, FLAT.....	2
*	23	XDOZZ	24234 6884-35.1	..SHAFT	1
*	24	PAOZZ	96906 MS18154-67	..SCREW, CAP, HEXAGON H.....	2

END OF FIGURE

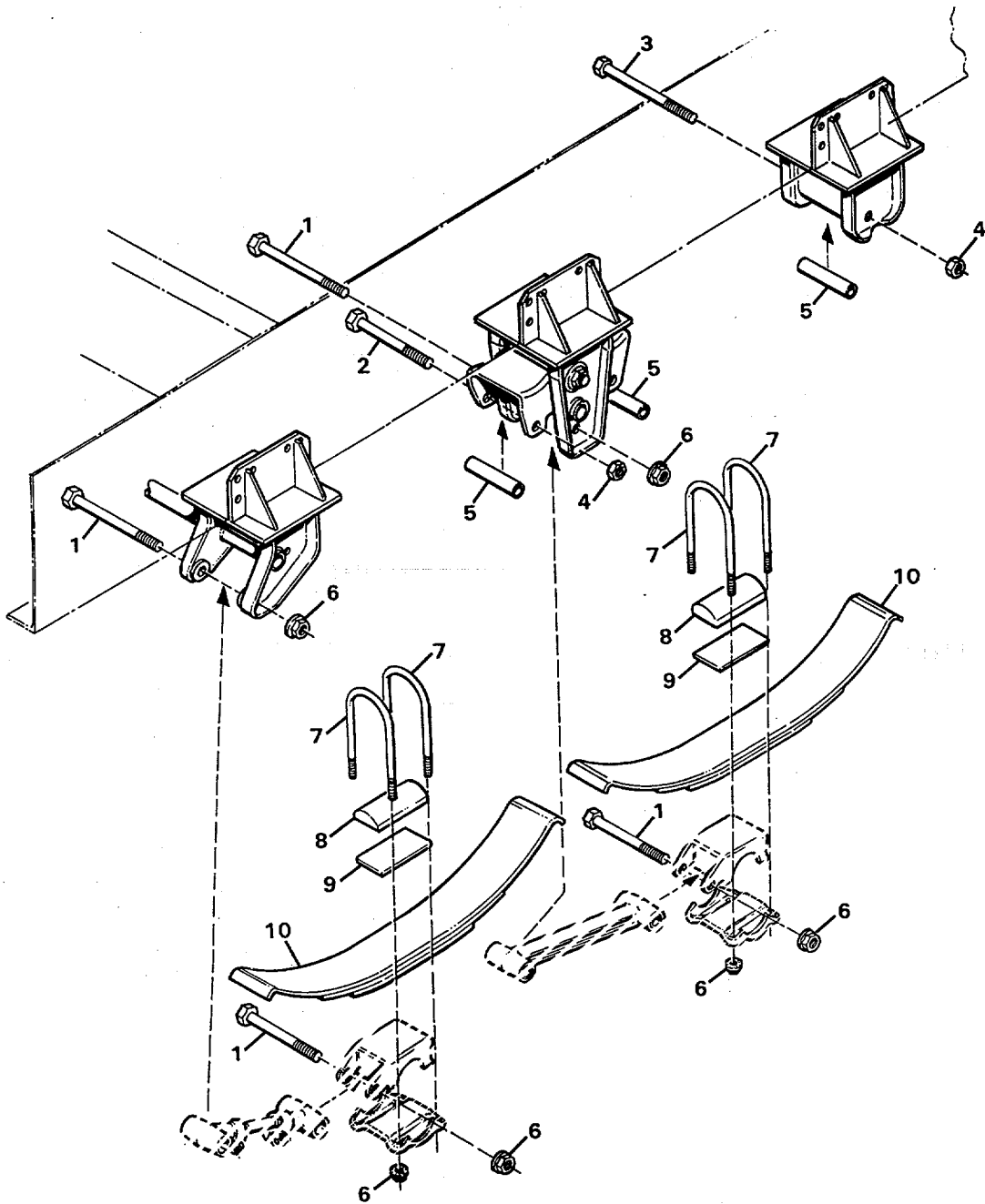


Figure 23. Suspension System

SECTION II

TM5-3825-229-14&PCO1

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
GROUP 1601 SPRINGS AND SHOCK ABSORBERS FIGURE 23. SUSPENSION SYSTEM					
1	PAFZZ	99062	0001-08	.BOLT, MACHINE.....	8
2	PAFZZ	99062	0001-04	.BOLT, MACHINE.....	4
3	PAFZZ	99062	0001-02	.BOLT, MACHINE.....	2
*	4	PAFZZ	82465 31WLF5818	.NUT, PLAIN, EXTENDED.....	6
	5	PAFZZ	99062 0741-01	.SPACER, SLEEVE.....	8
*	6	PAFZZ	82465 31WLF7814	.NUT, SELF-LOCKING, EX	24
	7	PAFZZ	99062 0078-11	.BOLT U	8
	8	PBFZZ	99062 0077-00 .	.PLATE TOP.....	4
	9	PAFZZ	99062 0375-00	.LINER DELRIN.....	4
	10	PAFZZ	99062 0079-01	.SPRING ASSEMBLY, LEA	4

END OF FIGURE

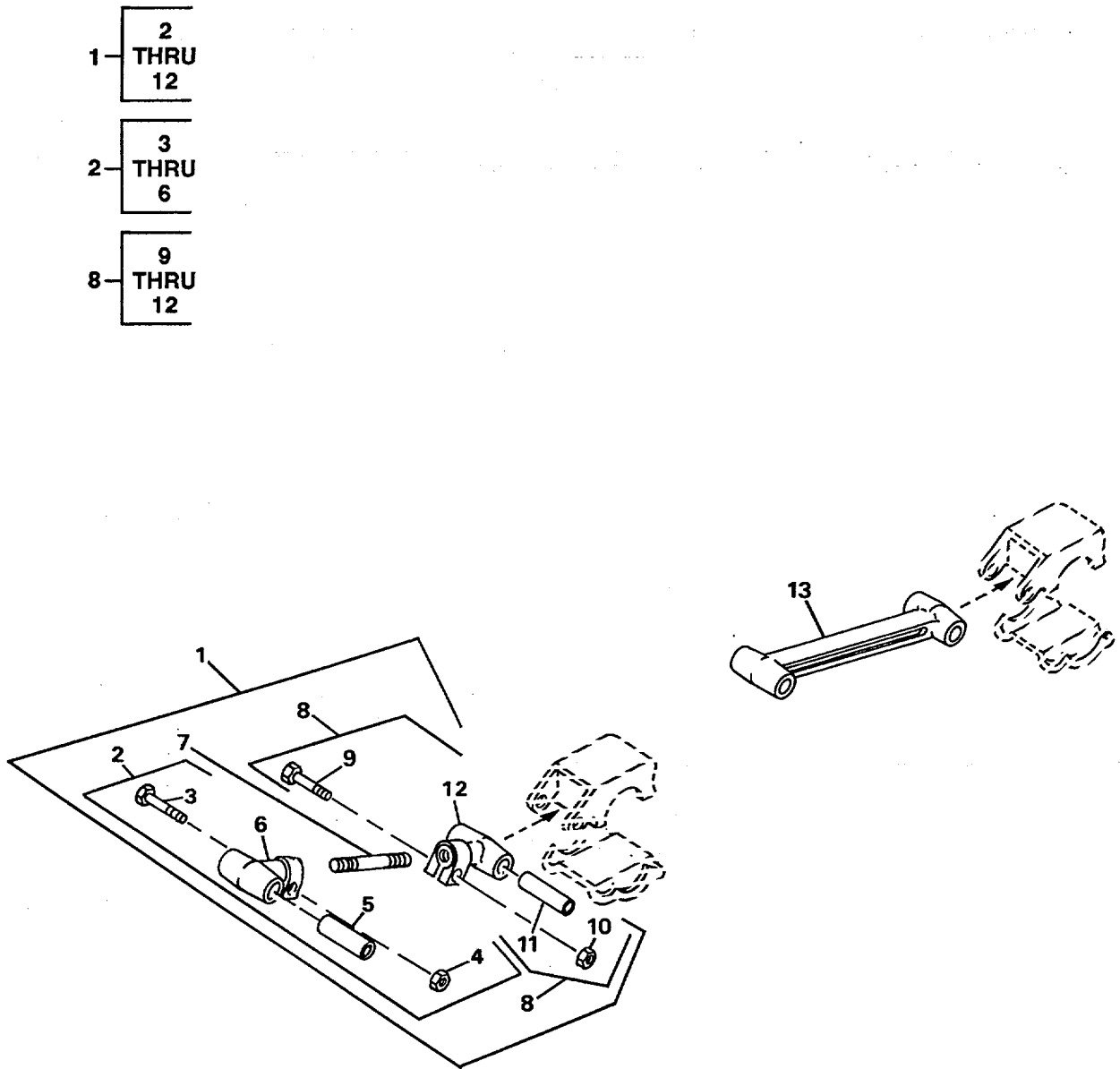


Figure 24. Torque Arms and Stab Rods

TA706611

SECTION II

TM5-3825-229-14&PCO1

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY	
GROUP 1605 SPRINGS SND SHOCK ABSORBERS FIGURE 24. TORQUE ARMS AND STAB BARS						
1	PAFZZ	99062	1035-20	.ARM TORQUE ADJ.....	2	
2	PAFZZ	99062	1035-12	..CLEVIS, ROD END	1	
3	PAFZZ	99062	0001-13	..BOLT, CLEVIS	1	
4	PAFZZ	99062	0002-13	...NUT, PLAIN, CONE SEAT	1	
5	PAFZZ	99062	0022-00	..BUSHING, SLEEVE	1	
*	6	XAFZZ	99062	1035-20XL	...CLEVIS	1
*	7	PAFZZ	99062	0029-23	..TORSION BAR, HINGE.....	1
*	8	PAFZZ	99062	1035-11	..CLEVIS, ROD END	1
*	9	PAFZZ	99062	0001-13	...BOLT, CLEVIS	1
*	10	PAFZZ	99062	0002-13	...NUT, PLAIN, CONE SEAT	1
*	11	PAFZZ	99062	0022-00	...BUSHING, SLEEVE	1
*	12	XAFZZ	99062	1035-20XR	...CLEVIS	1
*	13	PAFZZ	99062	0075-20	.TORSION BAR, SUSPENS.....	1

END OF FIGURE

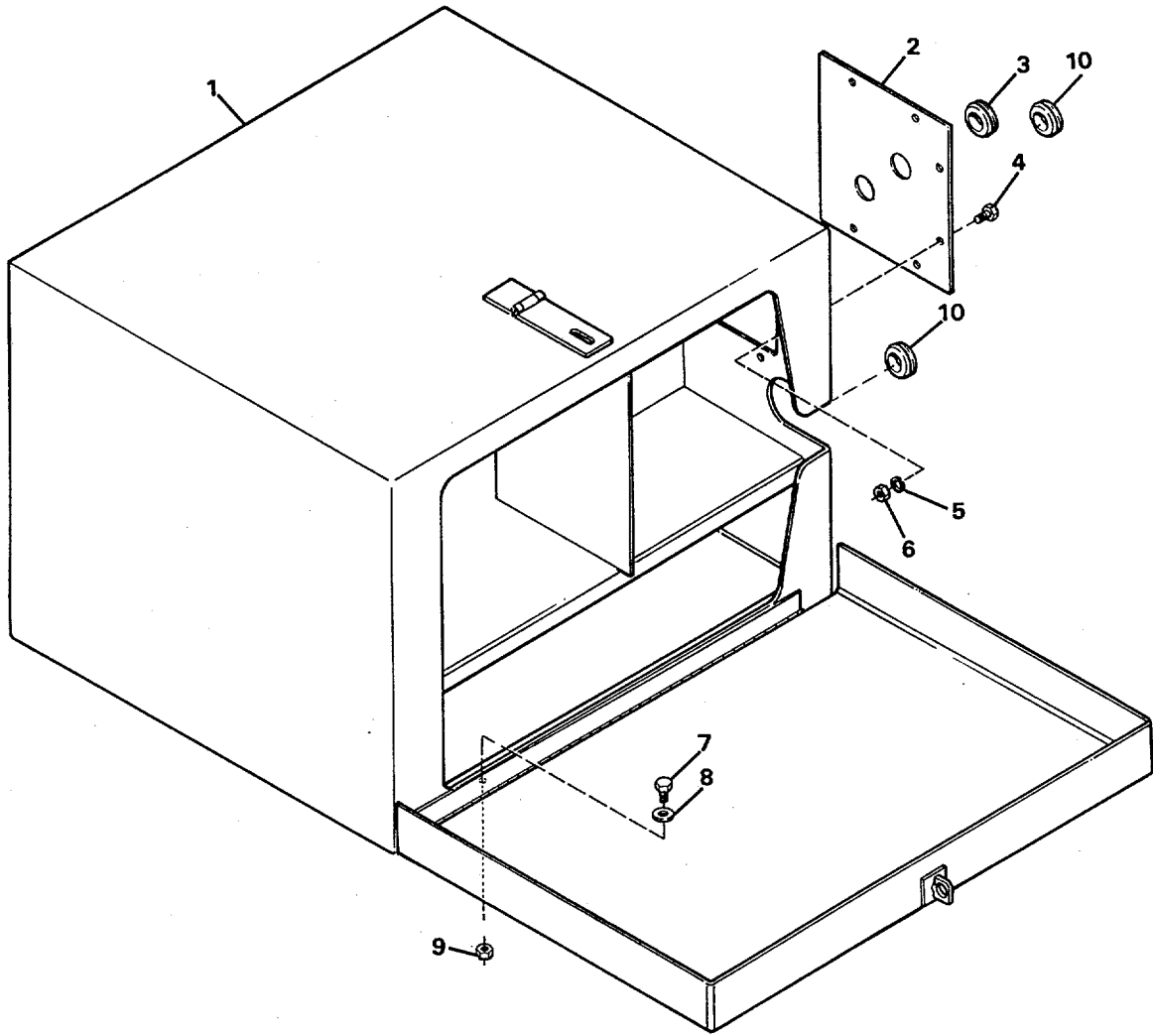


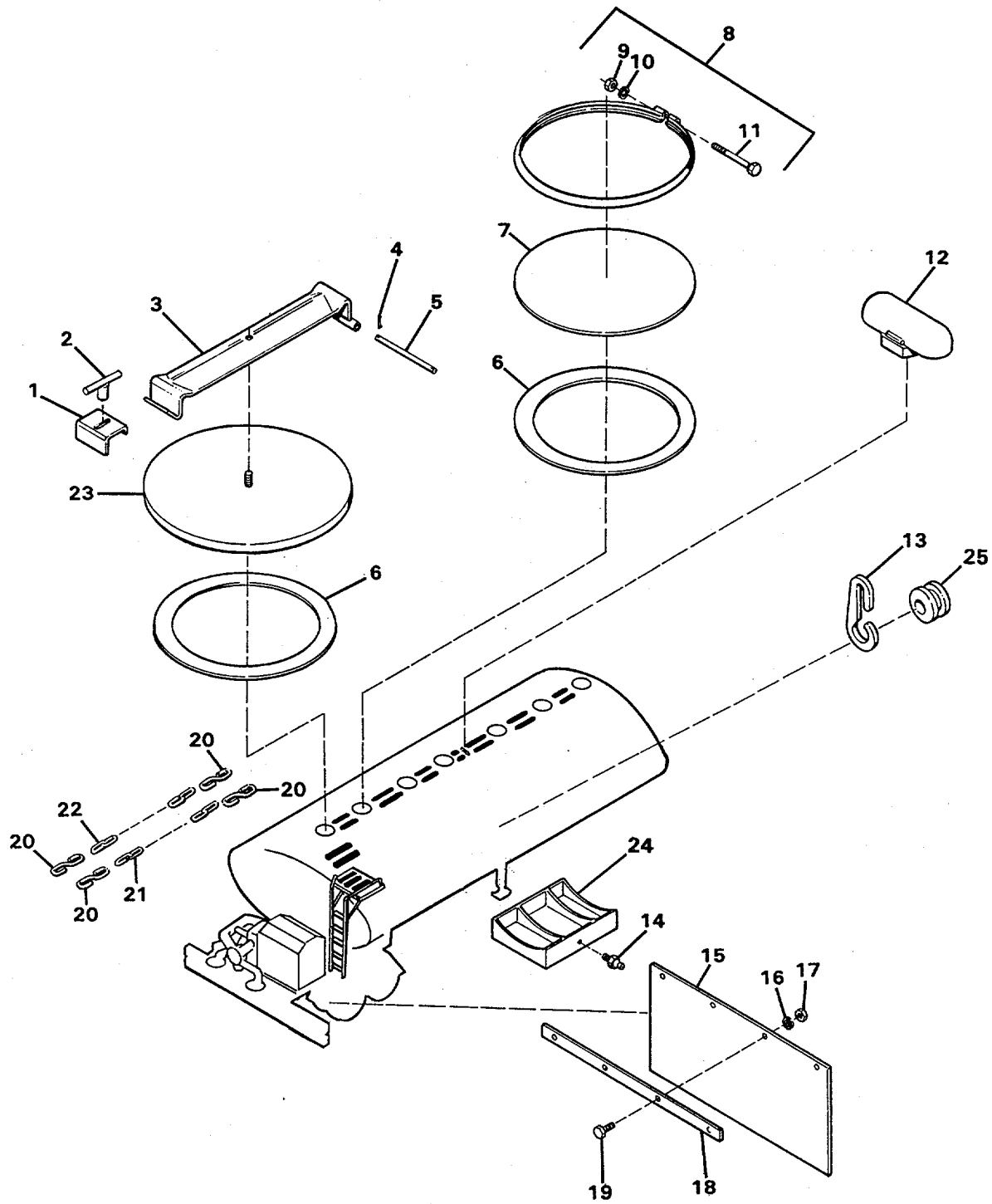
Figure 25. Tool Box

SECTION II

TM5-3825-229-14&PCO1

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
FIGURE 25. TOOL BOX INSTALLATION					
1	PFOZZ	80195	T2048FD	.BOX, ACCESSORIES STO	1
2	PBOZZ	80195	T2048FE	.COVER, ACCESS.	1
3	PAOZZ	96906	MS35489-80	.GROMMETINONM ETALLIC	1
4	PFOZZ	96906	MS90725-3	.SCREWICAP, HEXAGON H	4
5	PAOZZ	96906	MS35338-44	.WASHER, LOCK.....	4
6	PAOZZ	96906	MS51967-2	.NUT, PLAIN, HEXAGON.	4
* 7	PAOZZ	80204	B1821BHO38C100N	.SCREW, CAP, HEXAGON	6
8	PFOZZ	24617	274517	.WASHER, FLAT.....	6
9	PFOZZ	24617	274993	.NUT, SELF- LOCKING, HE	6
10	PFOZZ	76385	Z-3065	.GROMMET, NONMETALLIC	2

END OF FIGURE



TA706612

Figure 26. Tank Body

SECTION II

TM5-3825-229-14&PCO1

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY	
GROUP 1811 BODY, CAB AND HULL FIGURE 26. TANK BODY						
1	PFOZZ	80195	T2048TU	.BRACKET, DOUBLE ANGL.....	1	
2	PFOZZ	80195	T2048TV	.HANDWHEEL	1	
3	PFOZZ	80195	T2048TN	.BAIL, RETAINING	1	
4	PFOZZ	24617	103374	.PIN, COTTER	2	
5	PFOZZ	80195	T2048TT	.PIN, STRAIGHT, HEADLE	1	
6	PAOZZ	80195	TZ048TL	.GASKET.....	8	
7	PFOZZ	80195	T2048TJ	.COVER, MANHOLE	6	
8	PAOZZ	80195	T2048TK	.CLAMP, LOOP.....	6	
9	PAOZZ	96906	MS51967-8	..NUT, PLAIN, HEXAGON.....	1	
10	PFOZZ	24617	274517	..WASHER, FLAT.....	1	
*	11	PFOZZ	80204	B1821BH038C475N	..SCREW, CAP, HEXAGON H.....	1
	12	PBOZZ	12718	300-006	.BREATHER.....	1
*	13	PFOZZ	80195	T2048EF	.HOOK, HOIST	1
	14	PAOZZ	96906	MS15003-1	.FITTING, LUBRICATION	2
*	15	PFOZZ	05333	042412	.GUARD, SPLASH, VEHICU	2
	16	PAOZZ	96906	MS35338-44	WASHER, LOCK.....	8
	17	PAOZZ	96906	MS51967-2	.NUT, PLAIN, HEXAGON	8
	18	PFOZZ	80195	2710001	.STRAP FLAP	2
	19	PAOZZ	96906	MS90725-6	.SCREW, CAP, HEXAGON H.....	8
	20	XAOZZ	70277	C7010-28-24	HOOKS	4
	21	PFOZZ	39428	3913T16	.SNAP HOOK	3
	22	PFOZZ	16003	C43974	.CHAIN, WELDLESS.....	2
	23	PBDZZ	80195	T2048TP	.COVER, ACCESS	1
	24	PFHZZ	80195	T2048KA	..FIFTH WHEEL ASSEMBL.....	1
	25	PFOZZ	96906	MS35849-52	..GROMMET.....	1

END OF FIGURE

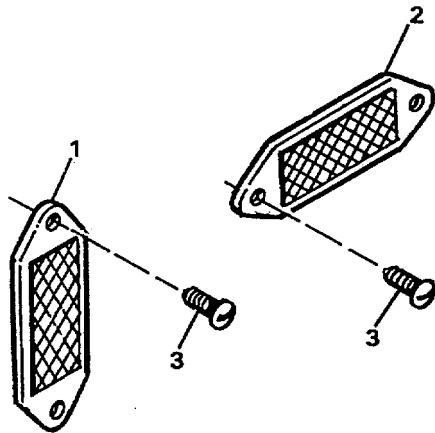


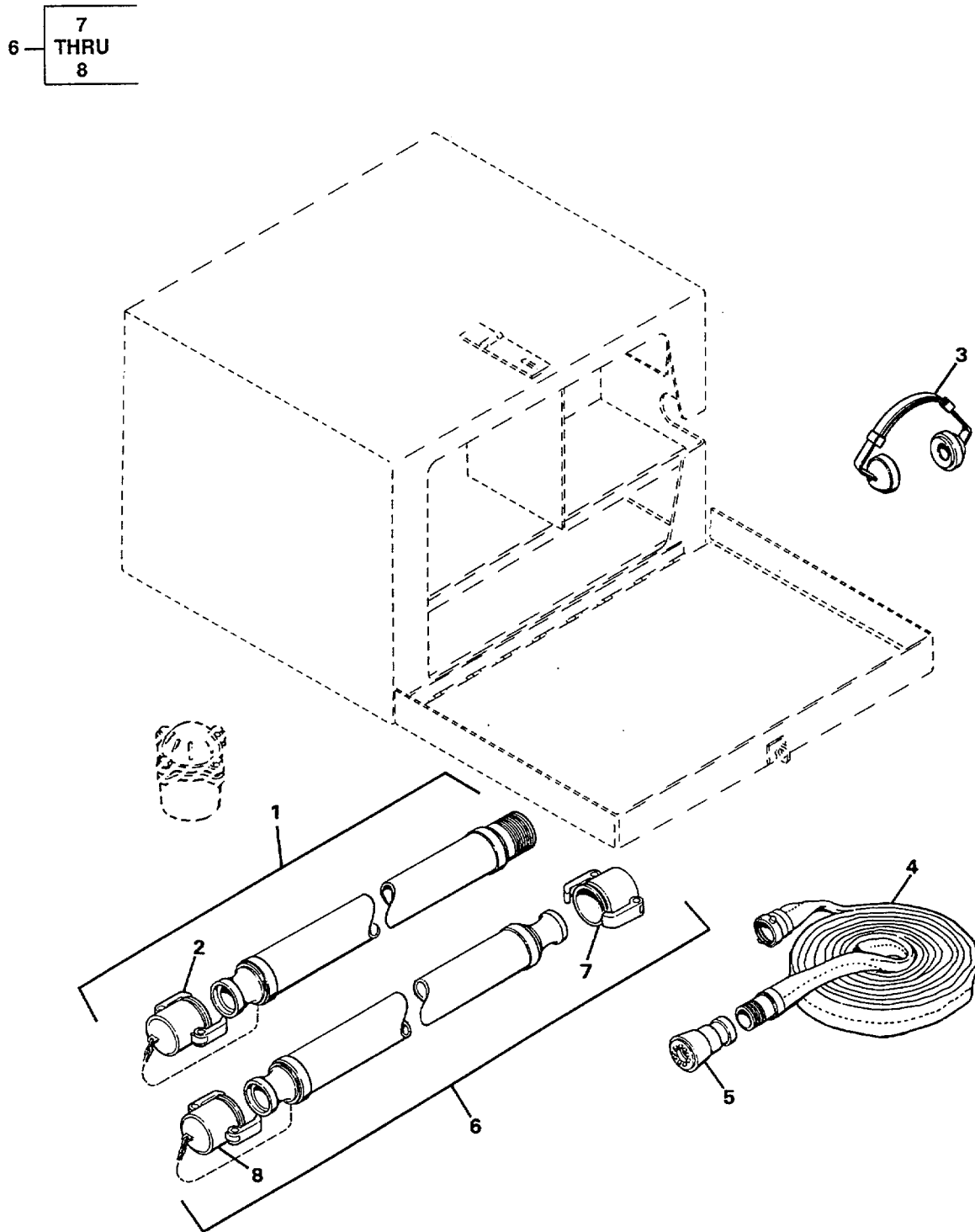
Figure 27. Reflectors

SECTION II

TM5-3825-229-14&PCO1

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
GROUP 2202 BODY, CAB AND HULL ACCESSORY ITEMS FIGURE 27. REFLECTORS					
1	PAOZZ	13548	RL-2	.REFLECTOR, INJECTION AMBER	6
2	PADZZ	13548	98001R	.REFLECTOR, INDICATION RED	4
3	PAOZZ	24617	447839	.SCREW, TAPPING	20

END OF FIGURE



TA706613

Figure 28. Accessory Items

SECTION II

TM5-3825-229-14&PCO1

(1)	(2)	(3)	(4)	(5)	(6)
ITEM	SMR	FSCM	PART		
NO	CODE		NUMBER	DESCRIPTION AND USABLE ON CODES(UOC)	QTY
				GROUP 2202 BODY, CAB AND HULL	
				ACCESSORY ITEMS	
				FIGURE 28. ACCESSORY ITEMS	
*	1	PFOZZ	80195 T204826	.HOSE ASSEMBLY, METAL	1
	2	PFOZZ	73848 400ADC	..CAP, PROTECTIVE, DUST.....	1
	3	PAOZZ	1M331 1000	.PROTECTOR, HEARING	1
	4	PFOZZ	80195 T204827	.HOSE ASSEMBLY, NO	1
	5	PFOZZ	96046 HN4-L	.NOZZLE, SPRAY, FLUID-	1
	6	PFOZZ	80195 T204825	.HOSE ASSEMBLY, METAL	1
	7	PFOZZ	73848 400ADP	..ADAPTER, STRAIGHT, HO	1
	8	PFOZZ	73848 400ADC	..CAP, PROTECTIVE, DUST.....	1

END OF FIGURE

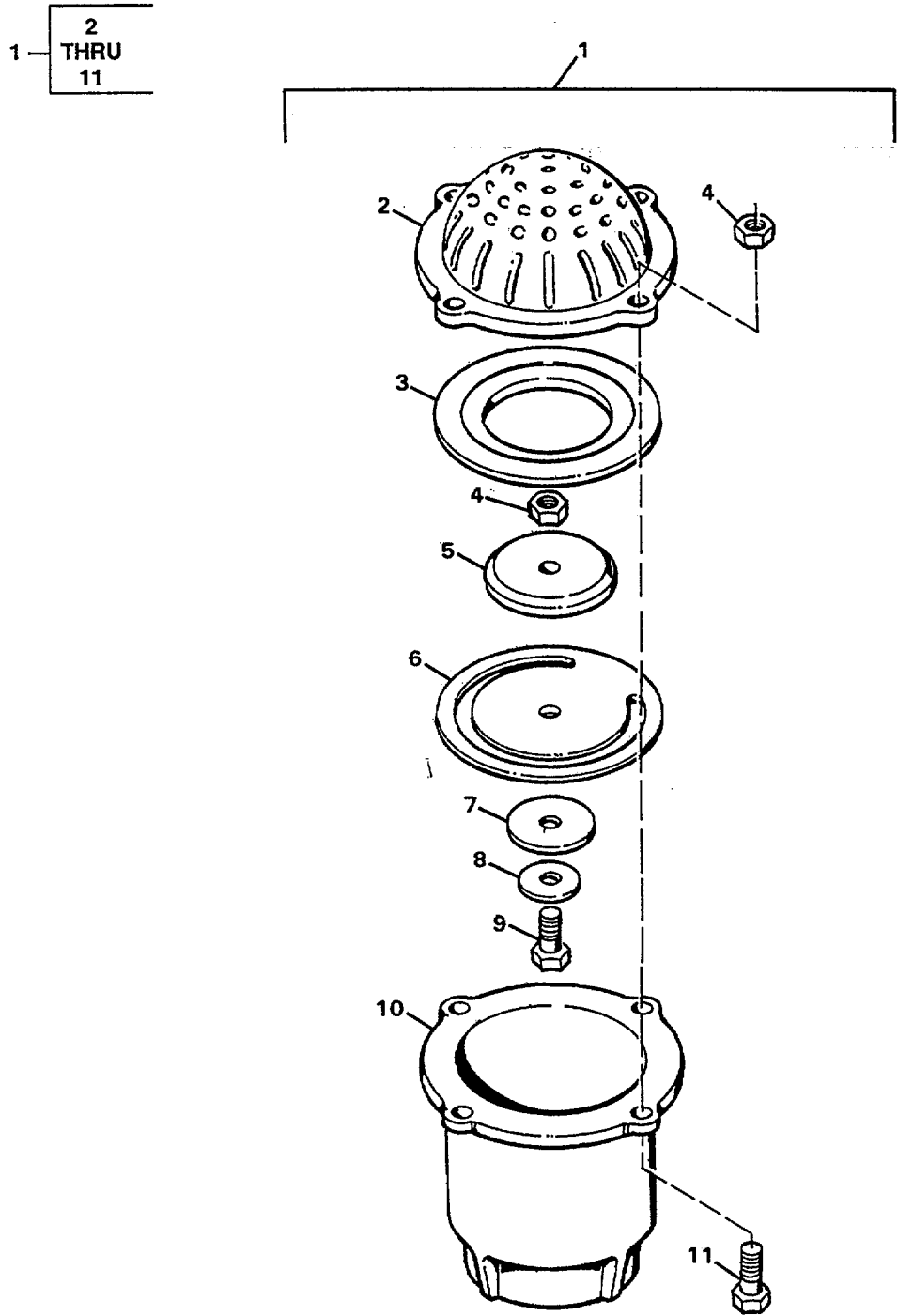


Figure 29. Foot Valve Assembly

SECTION II

TM5-3825-229-14&PCO1

(1)	(2)	(3)	(4)	(5)	(6)
ITEM NO	SMR CODE	FSCM	PART NUMBER	DESCRIPTION AND USABLE ON CODES(UOC)	QTY
GROUP 2202 BODY, CAB AND HULL					
ACCESSORY ITEMS					
FIGURE 29. FOOT VALVE ASSEMBLY					
* 1	PFOOO	ONG12	DFVS40	.VALVE, FOOT.....	1
2	PAOZZ	ONG12	FVS40	..STRAINER, SEDIMENT	1
3	PFOZZ	ONG12	FVFA40	..FLAPPER VALVE, PUMP.....	1
4	PAOZZ	96906	MS51967-8	..NUT, PLAIN, HEXAGON	5
5	PFOZZ	ONG12	811-4-5	..DISK LARGE.....	1
6	PFOZZ	ONG12	FVFA40	..FLAPPER VALVE, PUMP	1
7	PFOZZ	ONG12	FVSP40)	..SEAT, VALVE	1
3	PAOZZ	ONG12	811-4-7	..WASHER FLAPPER	1
9	PAOZZ	ONG12	9422016	..SCREW CAP HEX	1
10	XAFZZ	ONG12	811-4-1	..BODY VALVE	1
11	PAOZZ	ONG12	9422876	..SCREW CAP HEX.....	4

END OF FIGURE

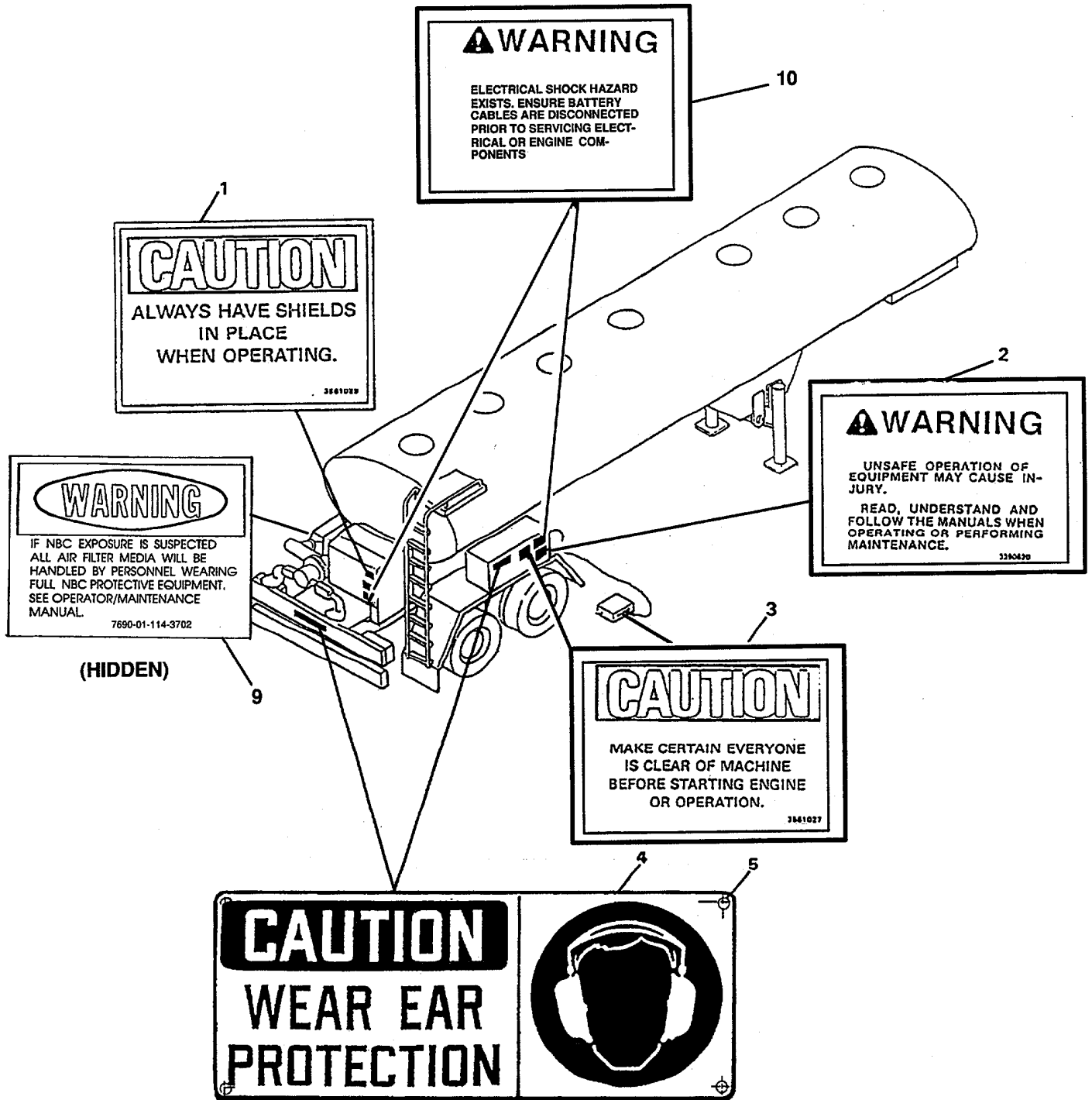


Figure 30. Data Plates (Sheet 1 of 2)

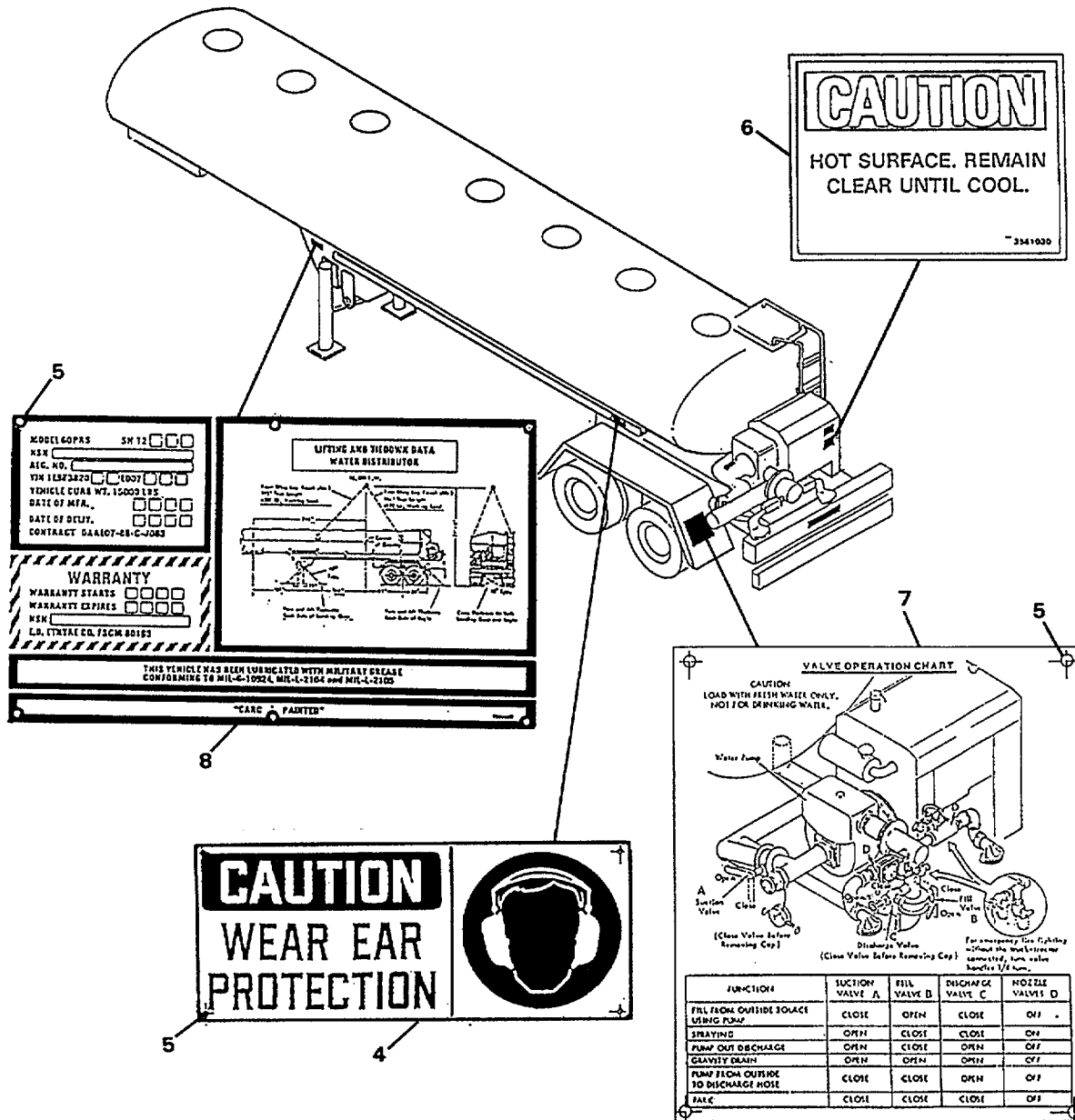


Figure 30. Data Plates (Sheet 2 of 2)

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
GROUP 2210 BODY, CAB AND HULL ACCESSORY ITEMS FIGURE 30. DATA PLATES					
1	PBOZZ	80195	3561029	.PLATE, INSTRUCTION	1
2	PBOZZ	80195	3390620	.PLATE, INSTRUCTION	1
3	PBOZZ	80195	3561027	.PLATE, INSTRUCTION	2
4	PFOZZ	80195	T204882	.PLATE, INSTRUCTION	3
5	PFOZZ	11815	SSP-4-3	.RIVET, TUBULAR	20
* 6	PBOZZ	34623	MA242A-21090	.PLATE, INSTRUCTION	1
7	PBOZZ	80195	T204880	.PLATE, INSTRUCTION	1
8	PFOZZ	80195	T204881	.PLATE, IDENTIFICATIO	1
* 9	PAOZZ	19207	12296626	.DECAL NBC AIR CLEANER.....	1
*10	PFOZZ	80195	T2048993	.PLATE, IDENTIFICATI ELEC HAZARD.....	1

END OF FIGURE

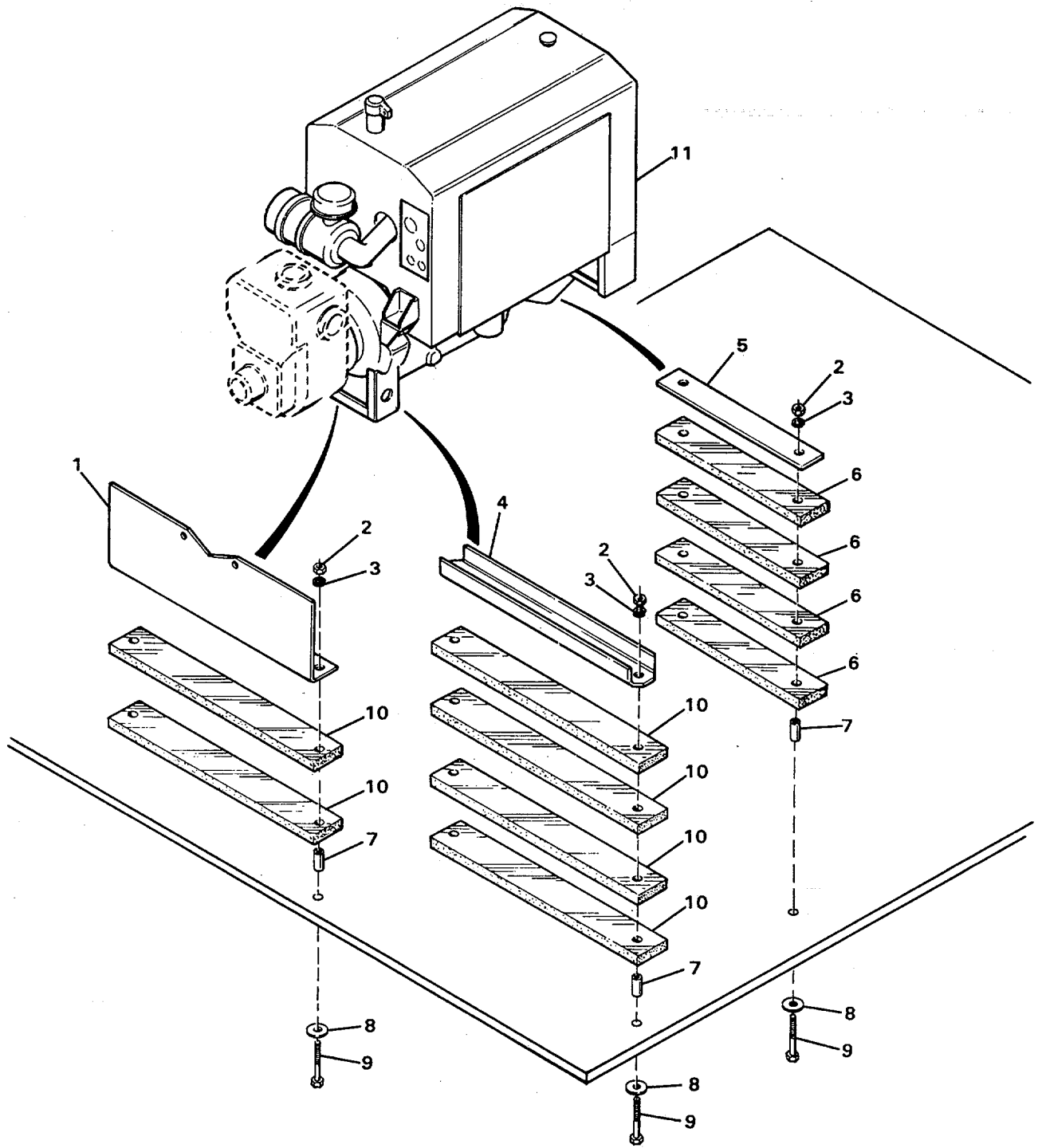


Figure 31. Engine Mounting

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
GROUP 2910 ENGINE FIGURE 31. ENGINE MOUNTING					
1	PBOZZ	80195	T2048PN	.BRACKET, MOUNTING	1
2	PAOZZ	96906	MS51967-8	.NUT, PLAIN, HEXAGON	6
3	PAOZZ	96906	MS35338-46	.WASHER, LOCK.....	6
4	PFOZZ	15434	C0403204300	.BRACKET, DOUBLE ANGL.	1
5	PBOZZ	15434	C0403204400	.BRACKET, MOUNTING	1
6	PAOZZ	15434	C0402053900	.HUNT, RESILIENT	4
7	PFOZZ	15434	C0403204200	.SPACER, SLEEVE.....	6
8	PFOZZ	11862	9417793	.WASHER, FLAT	6
9	PAOZZ	96906	MS90725-67 .	.SCREW, CAP, HEXAGON	6
10	PAOZZ	15434	C0402051800	.MOUNT, RESILIENT	6
11	PAOHH	15434	L423D-P/10929E	.ENGINE, DIESEL	1

END OF FIGURE

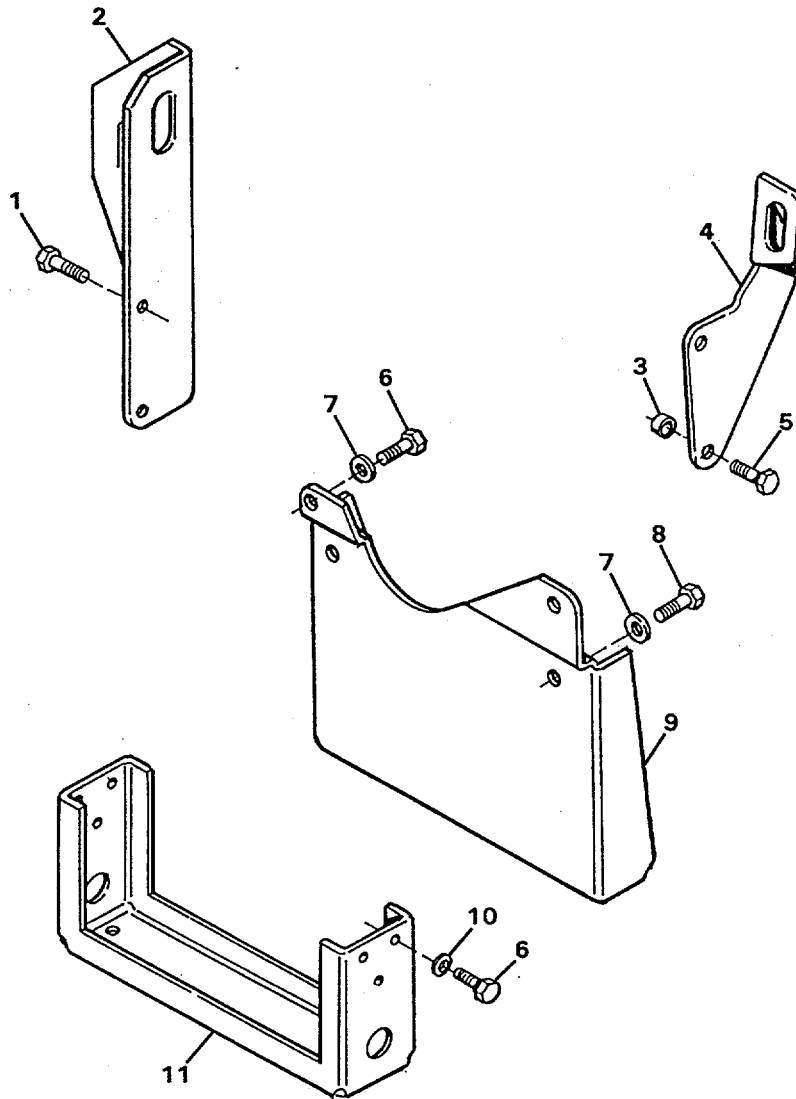


Figure 32. Engine Brackets

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
GROUP 2910 ENGINE FIGURE 32. ENGINE BRACKETS					
1	PAOZZ	15434	C0718105400	.SCREW, CAP, HEXAGON H.....	2
2	PBOZZ	15434	C0130233800	.SUPPORT.....	1
3	PBOZZ	15434	C0191132200	.SPACER, SLEEVE.....	2
4	PBOZZ	15434	C0130283800	.SUPPORT, RADIATOR.....	1
5	PAOZZ	15434	C0718180700	.SCREW CAP HEX	2
6	PAOZZ	15434	C0718107300	.SCREW, CAP, HEXAGON	8
7	PAOZZ	15434	C0740101000	.WASHER, FLAT.....	6
8	PAOZZ	15434	C0718107300	.SCREW, CAP, HEXAGON H.....	2
9	PBFZZ	15434	C0403203300	.BRACKET, ENGINE.....	1
10	PAOZZ	15434	C0850201200	.WASHER, LOCK.....	6
11	PAOZZ	15434	C0403195200	.BRACKET, ENGINE REAR.....	1

END OF FIGURE

1 — 2
THRU
16

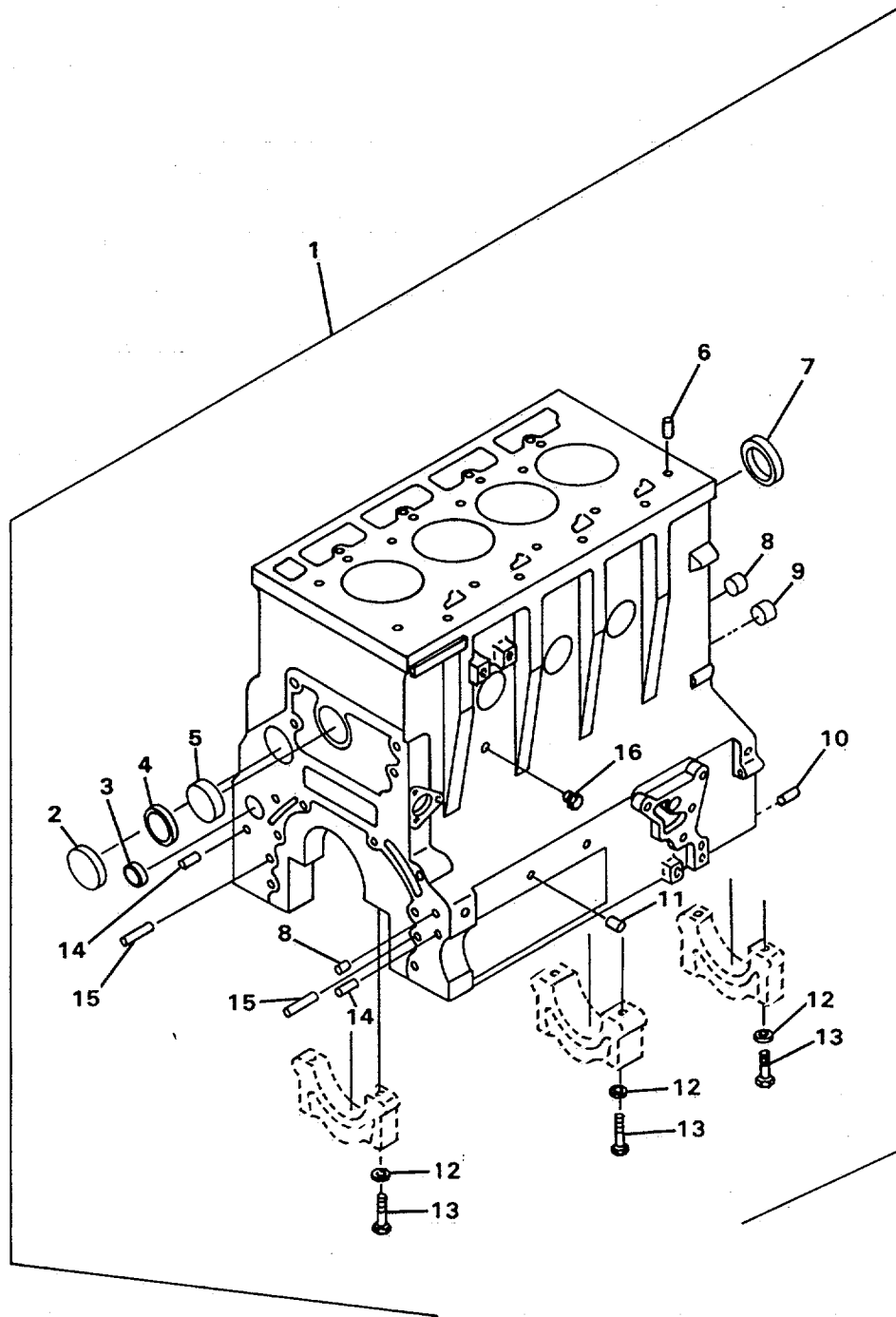


Figure 33. Engine Crankcase

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
GROUPP 2911 ENGINE FIGURE 33. ENGINE CRANKCASE					
1	PAHZZ	15434	C0110344903	..ENGINE BLOCK ASSEM	1
2	PBHZZ	15434	C0517014000	..PLUG	1
3	PBHZZ	15434	C0517014600	..PLUG	5
4	PAHZZ	15434	C0101076200	..BEARING, SLEEVE	4
5	PBHZZ	15434	C0517014100	..PLUG	4
6	PFHZZ	15434	C0110349900	..PIN ALIGNING	2
7	PAHZZ	15434	C0101051100	..BEARING, SLEEVE	1
8	PBHZZ	15434	C0517014400	..PLUG	2
9	PBHZZ	15434	C0775007400	..PIN	2
10	PBHZZ	15434	C0516210200	..PIN	1
11	PFHZZ	15434	C0505027400	..PLUG, FITTING.....	1
12	PFHZZ	15434	C0740180100	..WASHER, FLAT.....	10
13	PAHZZ	15434	C0720180100	..SCREW, CAP	10
14	PBHZZ	15434	C0775007800	..PIN	2
15	PBHZZ	15434	C0775008900	..PIN	2
16	PAOZZ	79470	230	..COCK, DRAIN.....	
1					

END OF FIGURE

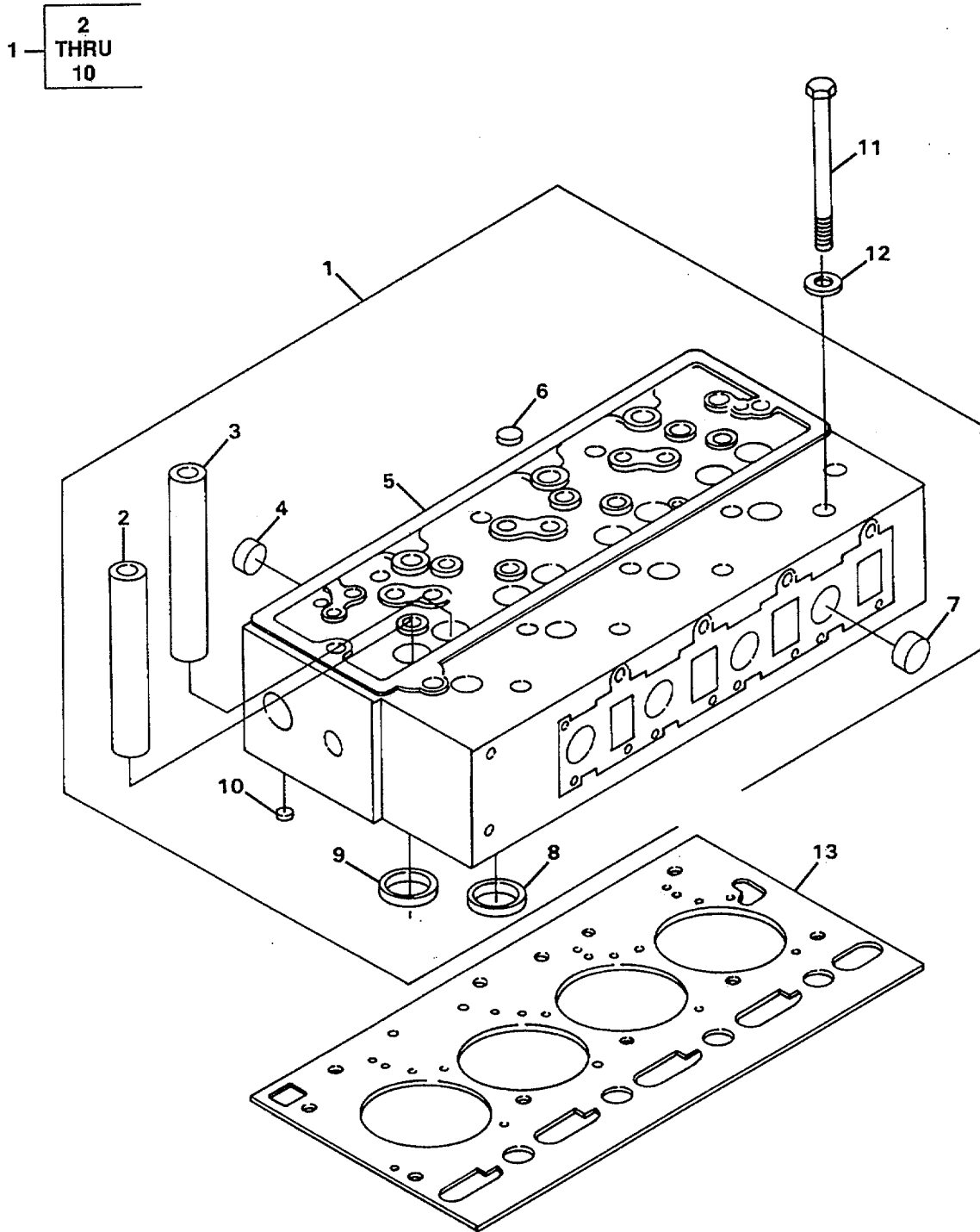


Figure 34. Engine Cylinder Head

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
GROUP 2911 ENGINE FIGURE 34. ENGINE CYLINDER HEAD					
1	PAFHH	15434	C0110344201	.CYLINDER HEAD, DIESE.....	1
2	PAHZZ	15434	C0110284700	..GUIDE, VALVE STEM.....	4
3	PAHZZ	15434	C0110284600	..GUIDE, ENGINE POPPET	4
4	PBHZZ	15434	C0517014600	..PLUG	4
* 5	PAFHH	15434	C0110344201	..CYLINDER HEAD, DIESE	1
6	PBHZZ	15434	C0517016200	..PLUG	4
7	PBHZZ	15434	C0517014200	..PLUG	7
8	PAHZZ	15434	C0110278101	..SEAT, VALVE	4
9	PAHZZ	15434	C0110322601	..INSERT, ENGINE VALVE	4
10	PBHZZ	15434	C0517016700	..PLUG	1
11	PFFZZ	15434	C0720180200	..SCREW.....	18
12	PFFZZ	15434	C0740180100	..WASHER, FLAT.....	14
13	PAFZZ	15434	C0110301200	..GASKET.....	1

END OF FIGURE

3 — 4
THRU
5

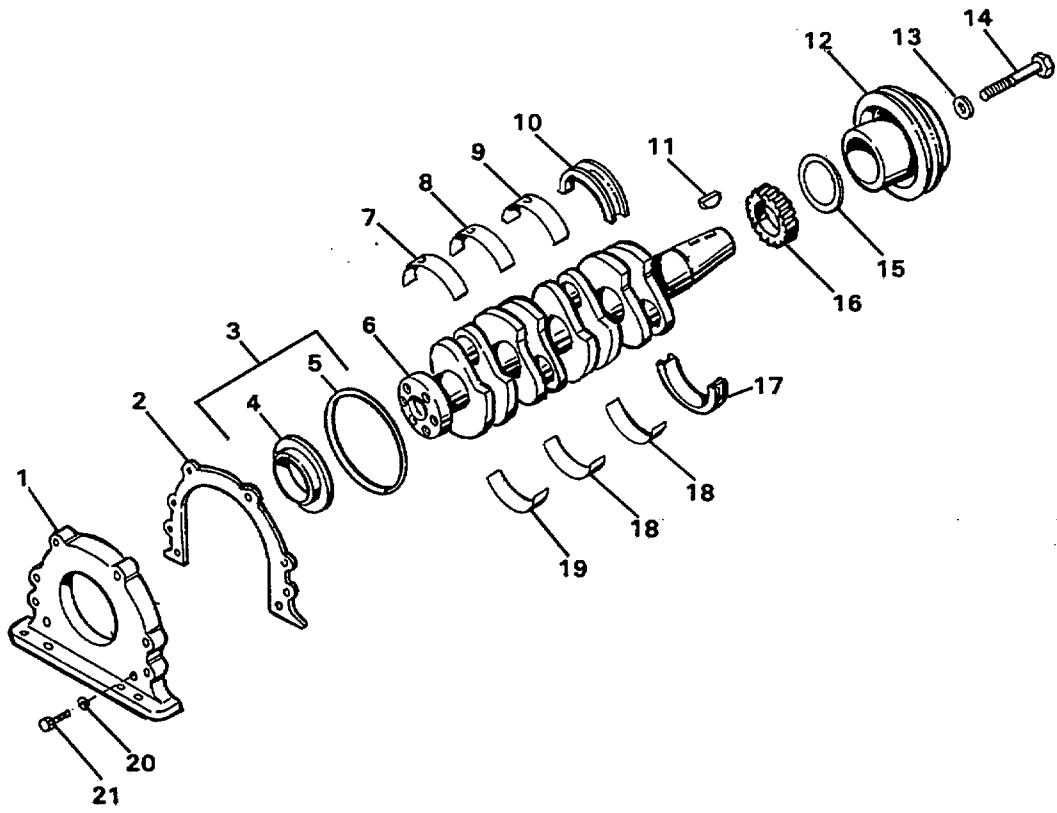


Figure 35. Crankshaft

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
GROUP 2912 ENGINE FIGURE 35. CRANKSHAFT					
1	PBHZZ	15434	C0101058400	.RETAINER, OIL SEAL.....	1
2	PAHZZ	15434	C0101077600	.GASKET.....	1
3	PAHZZ	15434	C0509020300	.GASKET.....	1
* 4	PAHZZ	80201	543229-65	.SEAL, PLAIN..	1
* 5	PBHZZ	15434	C0509020300	.GASKET.....	1
6	PAHZZ	15434	C0104144801	.CRANKSHAFT, ENGINE.....	1
7	PAHZZ	15434	C0101049300	.BEARING HALF, SLEEVE.....	1
8	PAHZZ	15434-	C0101049100	.BEARING HALF, SLEEVE.....	2
9	PAHZZ	15434	C0101049200	.BEARING HALF, SLEEVE.....	1
10	XAHZZ	15434	C0101049000	.BEARING FRT UPP.....	1
11	PFHZZ	15434	C0515024500	.KEY, WOODRUFF.....	2
12	PAFZZ	15434	C0104147000	.PULLEY, GROOVE.....	1
13	PFFZZ	15434	C0526028300	.WASHER, FLAT.....	1
14	PFFZZ	15434	C0720112300	.SCREW, CAP, HEXAGON.....	1
15	PAHZZ	80201	543202	.SEAL, PLAIN ENCASED.....	1
16	PAHZZ	15434	C0104113800	.GEAR, SPUR.....	12
17	PAHZZ	15434	C0101061700	.BEARING HALF, SLEEVE.....	1
18	PAHZZ	15434	C0101049500	.BEARING HALF, SLEEVE.....	3
19	PAHZZ	15434	C0101061600	.BEARING HALF, SLEEVE.....	1
20	PAHZZ	15434	C0740100600	.WASHER, FLAT.....	8
21	PAHZZ	15434	C0718103700	.BOLT, MACHINE.....	8

END OF FIGURE

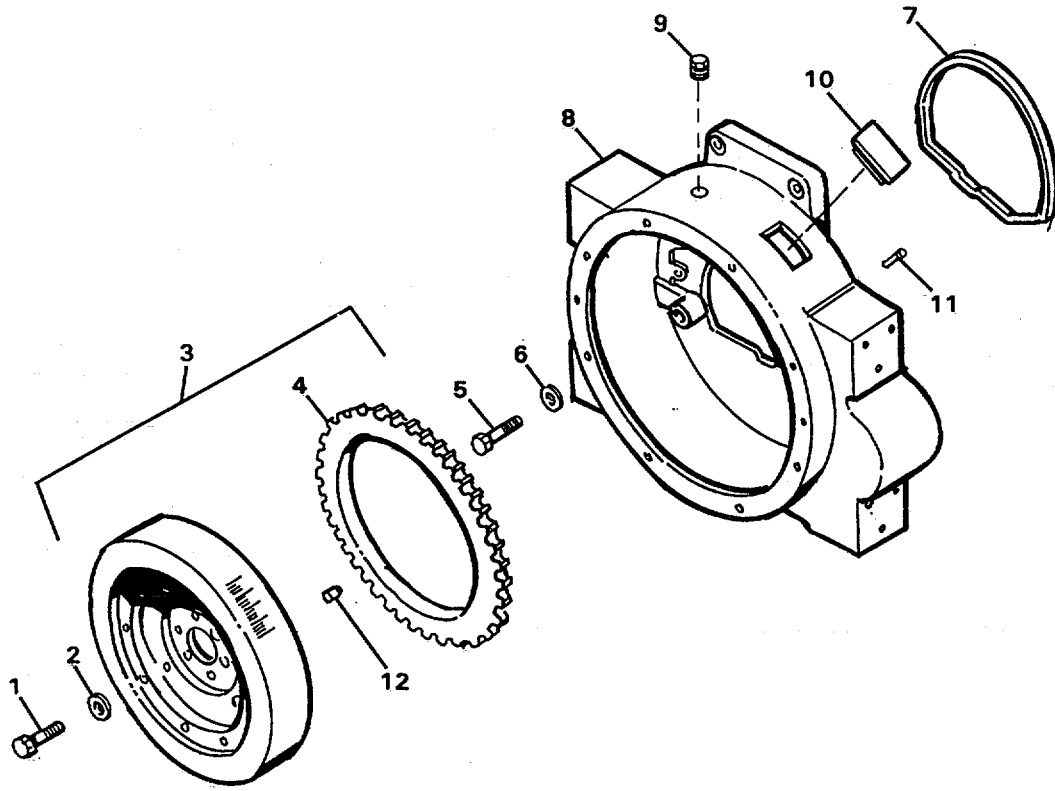


Figure 36. Flywheel Assembly

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
GROUP 2913 ENGINE FIGURE 36. FLYWHEEL ASSEMBLY					
1	PAFZZ	15434	C0720180400	.SCREW.....	6
2	PAFZZ	15434	C0740100800	.WASHER, FLAT.....	6
3	PBFZZ	15434	C0104126400	.FLYWHEEL, ENGINE	1
4	PAFZZ	15434	C0104167800	..GEAR, BEVEL-	1
5	PAFZZ	15434	C0718L07800	.SCREW.....	6
6	PAFZZ	15434	C0740180100	.WASHER, FLAT	6
7	PAFZZ	15434	C0101063000	.SEAL, HOUSING.....	1
8	PAFZZ	15434	C0101062501	.HOUSING, FLYWHEEL	1
9	PFFZZ	15434	C0517062500	.PLUG, MACHINE THREAD	1
10	PAOZZ	15434	C0101059200	.PLUG, TIMING	1
11	PAOZZ	15434	C0160129200	.INDICATOR	1
12	PAFZZ	15434	C0104169000	.PIN, STRAIGHT, HEADLE.	1

END OF FIGURE

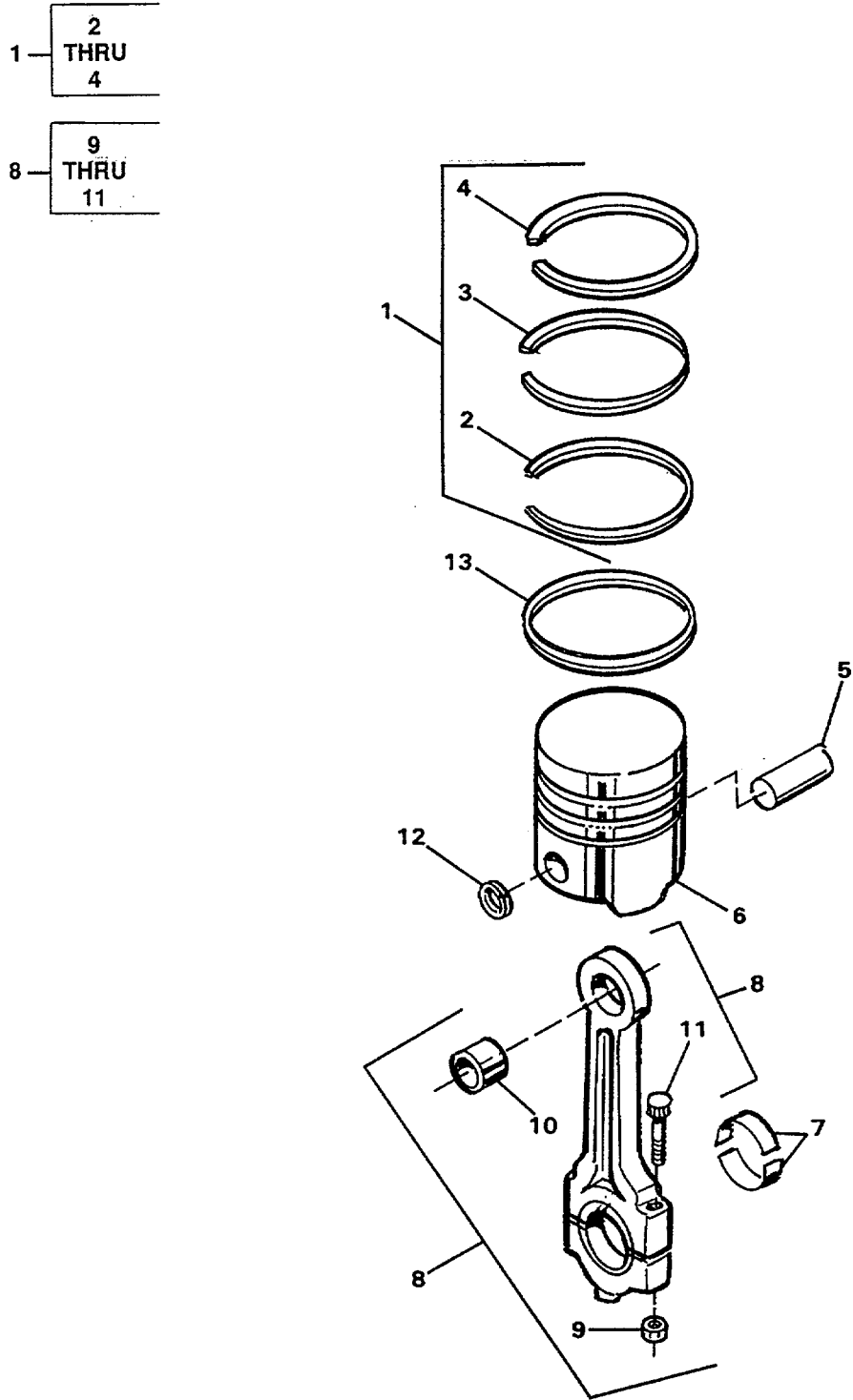


Figure 37. Piston and Connecting Rods

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
GRUUP 2914 ENGLNE FIGURE 31. PISTON AND CCNNECTING ROD					
1	PAHZZ	15434	C0113027801	.RING SET, PISTON	4
2	PAHZZ	15434	C0113027501	..RING, PISTON.....	4
3	PAHZZ	15434	C0113027301	..RING, PISTON	1
4	PAHZZ	15434	C0113027501	..RING, PISTON	1
5	PAHZZ	15434	C0112016500	.PIN, PISTON..	4
6	PAHZZ	15434	C0112018901	.PISTON, INTERNALCOM	4
7	PAHZZ	15434	C0114031900	.BEARING, SLEEVE	8
8	PAHZZ	15434	C0114031300	.CONNECTING ROD POST	4
9	PBHZZ	15434	C0114031800	..NUT.....	2
10	PAHZZ	15434	C0114031600	..BUSHING, SLEEVE	1
11	PBHZZ	15434	C0114031500	..BOLT.....	2
12	PFHZZ	96906	MS16625-1125	.RING, RETAINING	8
13	PAHZZ	15434	C0113027201	.SPRING, SPIRAL, TORSI	4

END OF FIGURE

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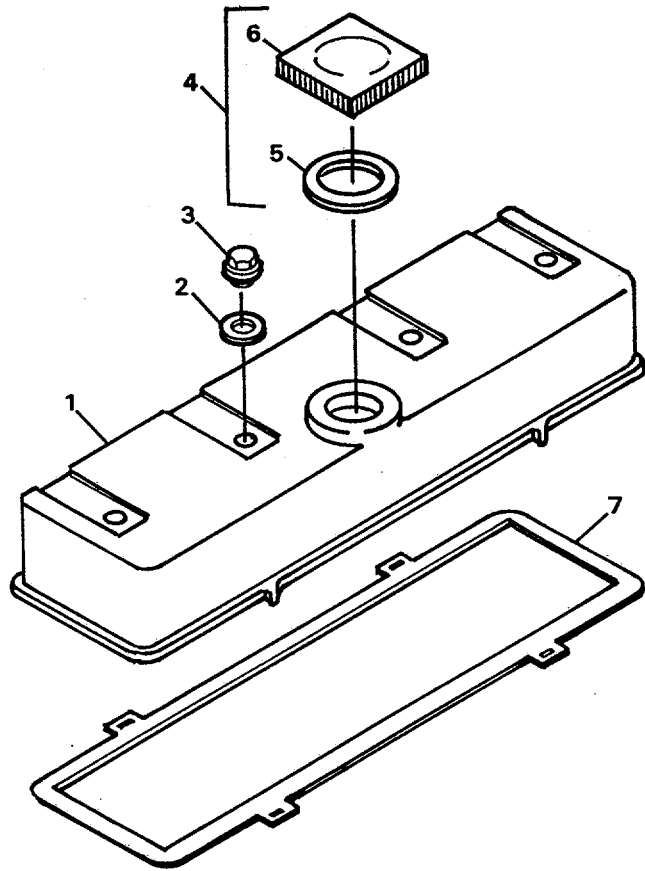


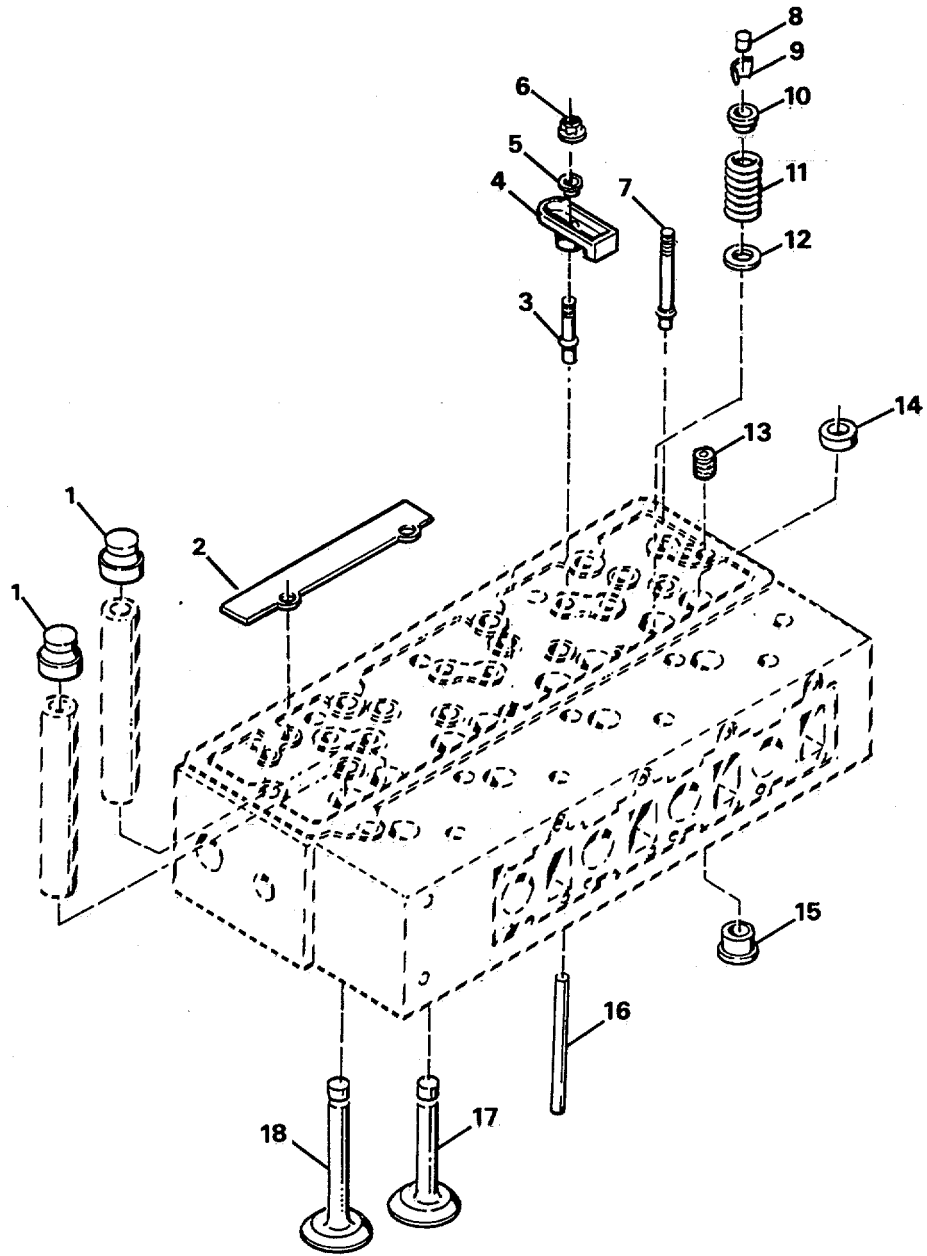
Figure 38. Valve Cover

SECTION II

TM5-3825-229-14&P

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
GROUP 2915 ENGINE					
FIGURE 38. RECKER COVER					
1	PAOZZ	15434	C0115027200	.COVER, ENGINE POPPET.....	1
2	PAOZZ	15434	C0115023200	.GASKET.....	4
3	PAOZZ	15434	C0115032000	.NUT.....	4
4	PAOZZ	15434	C0123160500	.CAPPFILLER OPENING	1
5	PAOZZ	15434	C0123151800	..GASKET.....	1
6	XADZZ	15434	C0123160400	..CAP, FILLER OPENING.....	1
7	PAOZZ	15434	C0115025400	.GASKET.....	1

END OF FIGURE



TA706614

Figure 39. Valves and Rocker Arms

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
GROUP 2915 ENGINE					
FIGURE 39. VALVES AND ROCKER ARMS					
1	PAHZZ	15434	C0110302500	.SEAL, PLAIN..	8
2	PAHZZ	15434	C0115031300	.GUIDE, PUSHROD	2
* 3	PAHZZ	15434	C0115020400	.STUD, ROCKER ARM	4
* 4	PAHZZ	15434	C0115031600	.ROCKER ARM, ENGINE P	8
* 5	PAHZZ	15434	C0115020200	.BALL, ROCKER	8
* 6	PAHZZ	15434	C0115031500	.NUT.....	8
* 7	PAHZZ	15434	C0115027000	.STUD, ROCKER ARM.....	4
* 8	PAHZZ	15434	C0110324500	.VALVE, CAP	8
* 9	PAHZZ	15434	C0110275200	.LOCK, VALVE SPRING R.....	8
*10	PAHZZ	15434	C0110351900	.RETAINER, HELICAL CO	8
*11	PAHZZ	15434	C0110330000	.SPRING	16
*12	PAHZZ	15434	C0110299100	.RETAINER, HELICAL CO	4
*13	PAHZZ	15434	C0502002800	.PLUG, MACHINE THREAD.....	1
*14	PBHZZ	15434	C0110343200	.SPACER, PLATE	4
*15	PAHZZ	15434	C0110303902	.PLUG, EXPANSION.....	4
*16	PAHZZ	15434	C0115025300	.PUSH ROD, ENGINE POP.....	8
*17	PAHZZ	15434	C0110284000	.VALVE, POPPET, ENGINE EXHAUST	4
*18	PAHZZ	15434	C03803813	.VALVE, POPPET, ENGINE INTAKE	4

END OF FIGURE

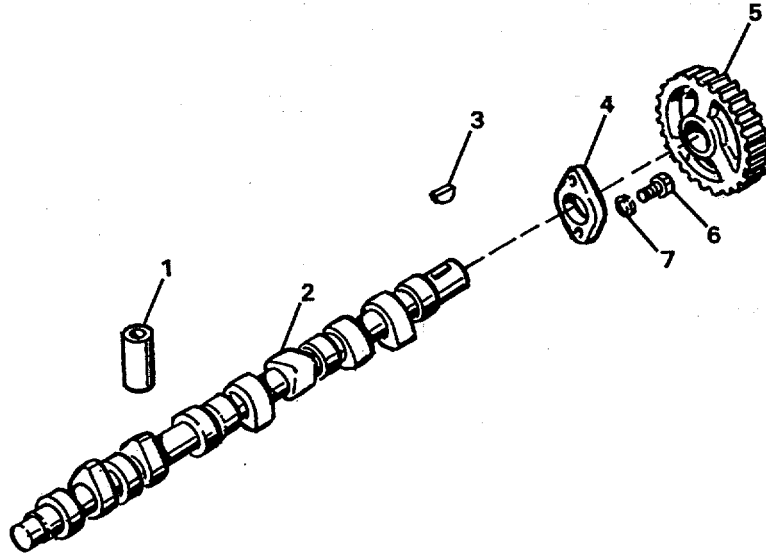


Figure 40. Camshaft

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
GRUUP 2915 ENGINE					
FIGURE 40. CAMSHAFT					
1	PAHZZ	15434	C0115027500	.TAPPET, ENGINE POPPE	8
2	PAHZZ	15434	C0105051700	.CAMSHAFT, ENGINE	1
3	PFHZZ	15434	C0515024500	.KEY, WOODRUFF	1
4	PBHZZ	15434	C0105053400	.RETAINER, CAMSHAFT	1
5	PAHZZ	15434	C0105051500	.GEAR CAMSHAFT	1
6	PFHZZ	15434	C0718104400	.SCREW	2
7	PFHZZ	15434	C0740100600	.WASHER, FLAT	2

END OF FIGURE

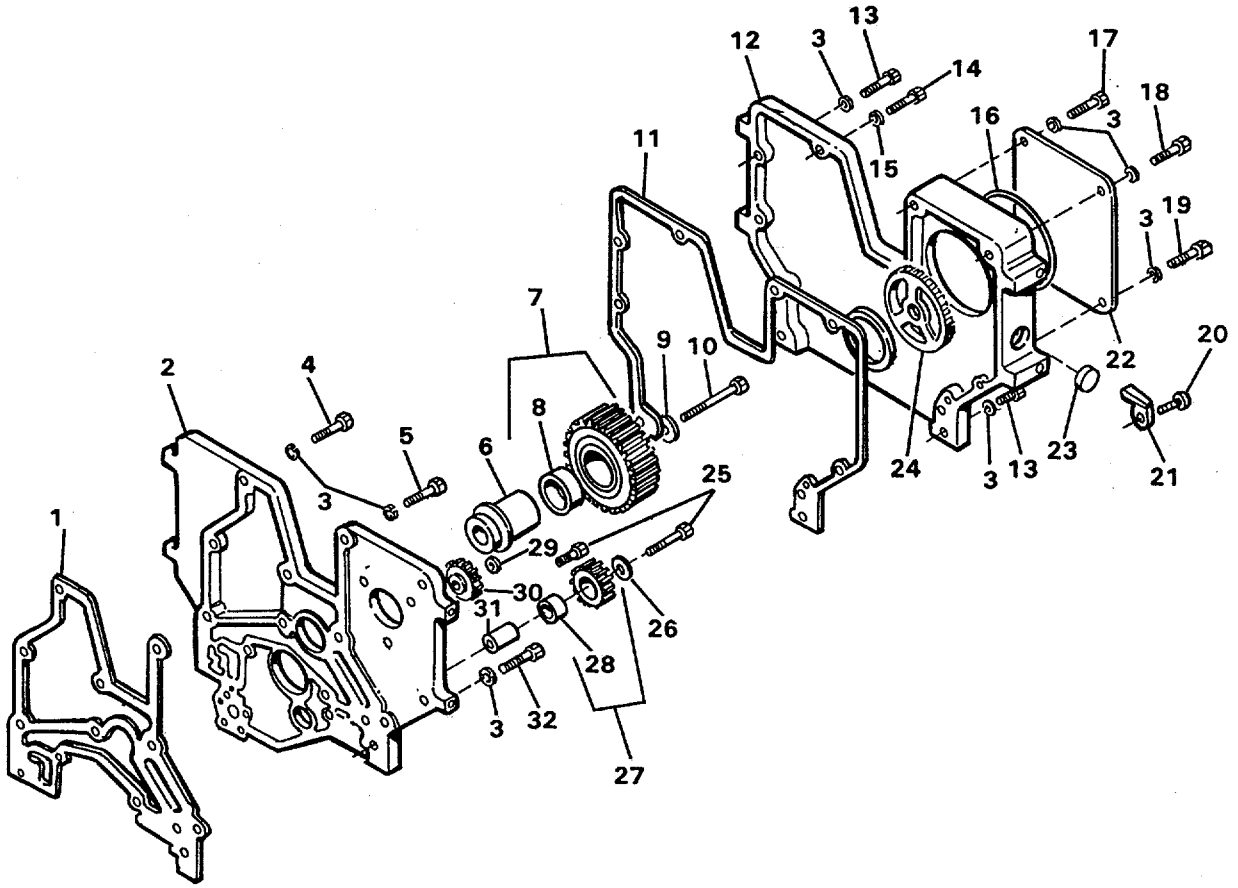


Figure 41. Gear Case and Timing Gears

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
GROUP 2915 ENGINE FIGURE 41. CRANKCASE					
1	PAHZZ	15434	C0103073300	.GASKET.....	1
2	PBHZZ	15434	C0103071600	.COVER, MECHANICAL, TR.....	1
3	PAFZZ	15434	C0740100600	.WASHER, FLAT.....	11
4	PAFZZ	15434	C0718180100	.SCREW.....	2
5	PAHZZ	15434	C0718103700	.BOLT, MACHINE.....	1
6	PBHZZ	15434	C0105050800	.SHAFT, SHOULDERED.....	1
7	PAHZZ	15434	C0105051300	.GEAR, SPUR.....	1
8	PBHZZ	15434	C0105051900	..BEARING, SLEEVE.....	1
9	PAHZZ	15434	C0526212700	.WASHER, FLAT.....	1
10	PAHZZ	15434	C0718106400	.SCREW.....	1
11	PBHZZ	15434	C0103073100	.GASKET.....	1
12	PAHZZ	15434	C0103071900	.HOUSING, FLYWHEEL.....	1
13	PAHZZ	15434	C0718104600	.SCREW.....	2
14	PAHZZ	15434	C0718108500	.SCREW.....	5
15	PAHZZ	15434	C0740101000	.WASHER, FLAT.....	4
16	PAHZZ	15434	C0509026300	.PACKING, PREFORMED.....	1
17	PAHZZ	15434	C0718104800	.BOLT, MACHINE.....	1
18	PAHZZ	15434	C0718104400	.SCREW.....	2
19	PAOZZ	15434	C0718103600	.SCREW.....	1
20	PAHZZ	15434	C0815057800	.SCREW.....	2
21	PBFZZ	15434	C0103075000	.CAM, CONTROL.....	1
22	PBHZZ	15434	C0103073500	.COVER, ACCESS.....	1
23	PAHZZ	15434	C0517018800	.PLUGTEXPANSILN.....	1
24	PAHZZ	15434	C0147042700	.GEAR*SPUR.....	1
25	PAFZZ	15434	C0718103500	.SCREW, CAP, HEXAGON.....	2
26	PAHZZ	15434	C0526210700	.WASHER, FLAT.....	1
27	PAHZZ	15434	C0120106300	.GEARPSPUR.....	1
28	PBHZZ	15434	C0120104100	.BEARING, SLEEVE.....	1
29	PAHZZ	15434	C0526210600	.W ASHER, FLAT.....	1
30	PAHZZ	15434	C0105088500	.GEAR, SPUR.....	1
31	PAHZZ	15434	C0120098300	.SHAFT, SHOULDERED.....	1
32	PAHZZ	15434	C0718103900	.SCREW, CAP, HEXAGON.....	1

END OF FIGURE

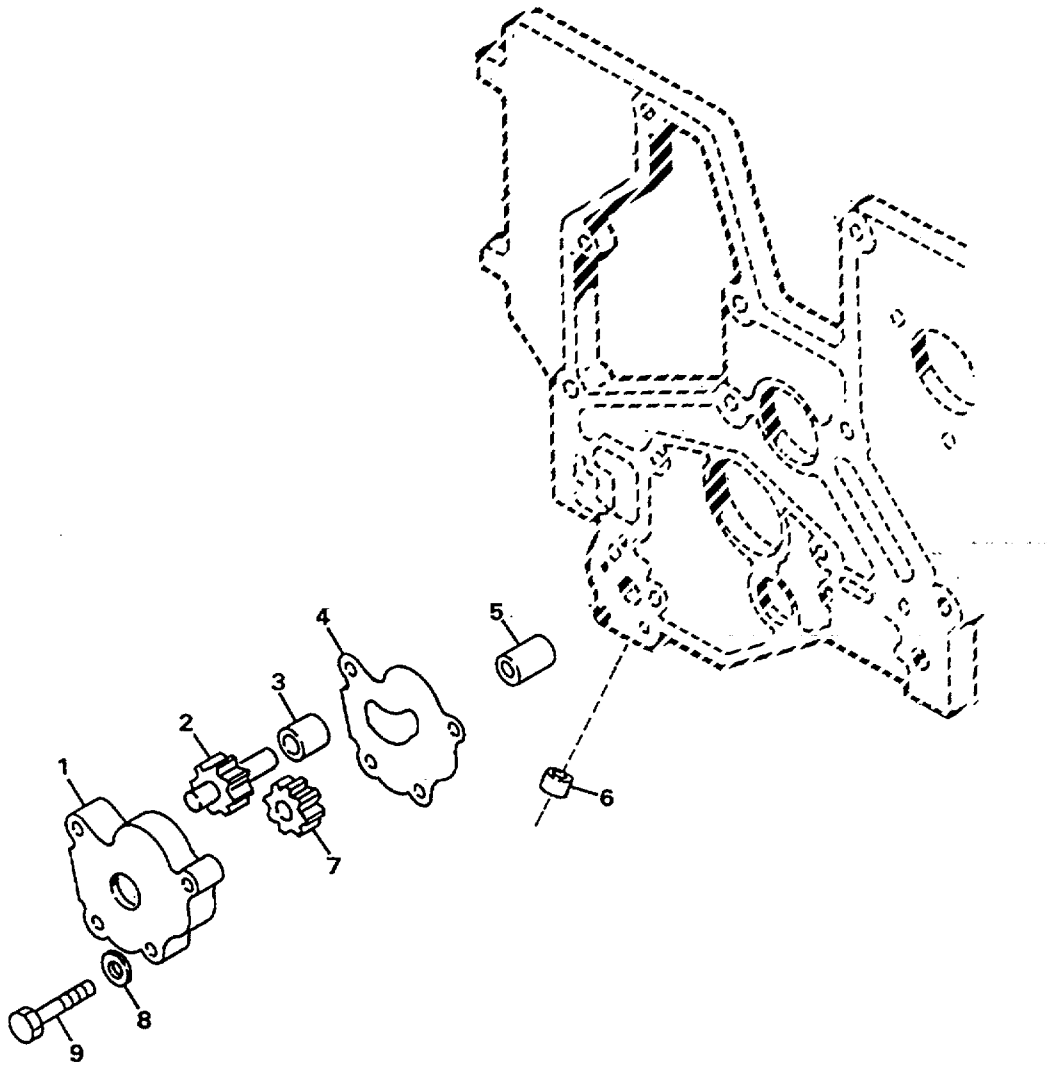


Figure 42. Oil Pump

SECTION II

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(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
GROUP 2916 ENGINE FIGURE 42. OIL PUMP					
1	PBFZZ	15434	C0120101100	.HOUSING, OIL PUMP AS	1
2	PAFZZ	15434	C0120120501	.GEARSHAFT, SPUR.....	1
3	PAFZZ	15434	C0120101100	.SHAFT, STRAIGHT.....	1
4	PBFZZ	15434	C0120104200	.PLATE, MOUNTING.....	1
5	PAFZZ	15434	C0120097900	.BEARING, SLEEVE	1
6	PAFZZ	15434	C0725180200	.SCREW, SOCKET	1
7	PAFZZ	15434	C0120113401	.GEAR, SPUR.	1
8	PAFZZ	15434	C0740100600	.WASHER, FLAT.....	2
9	PAFZZ	15434	C0718104100	.SCREW, CAP, HEXAGON	2

END OF FIGURE

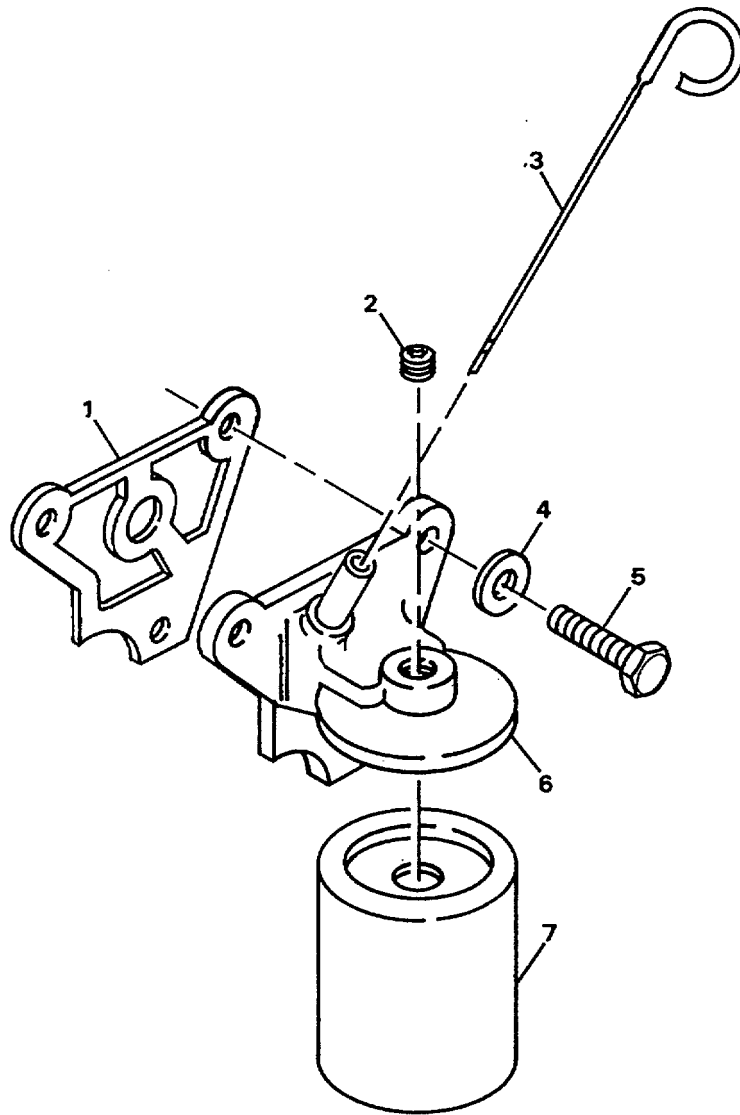


Figure 43. Oil Filter

(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 2916 ENGINE
FIGURE 43. OIL FILTER

1	PAOZZ	15434	C0122074000	.GASKET ADAPTER.....	1
2	PFOZZ	15434	C0505027400	.PLUG, FITTING	1
3	PAOZZ	15434	C0123171101	.GAGE ROD, LIQUID LEV.....	1
4	PFOZZ	15434	C0526210800	.WASHER, FLAT.....	3
5	PFOZZ	15434	C0725105100	.BOLT, MACHINE	3
6	PAOZZ	15434	C0122059200	.ADAPTER FILTER	1
7	PAOZZ	73370	PH3616	.FILTER ELEMENT, FLUI.....	1

END OF FIGURE

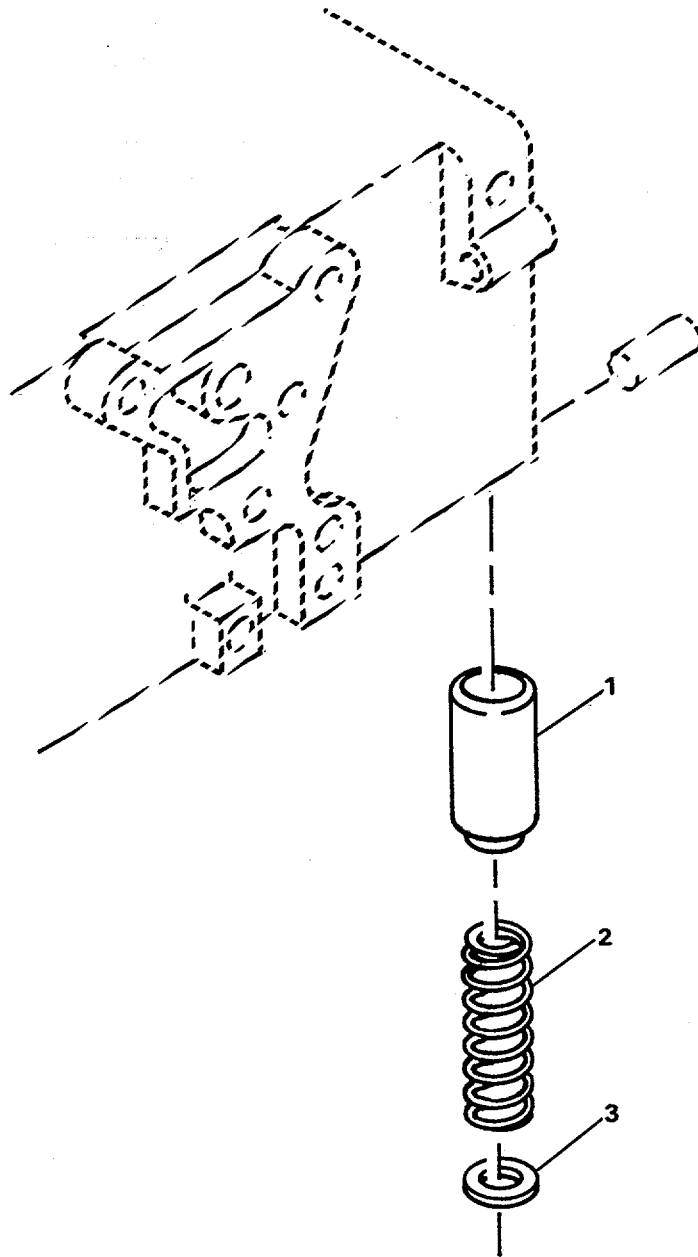


Figure 44. Oil Pressure Regulating Valve

SECTION II

TM5-3825-229-14&P

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
GROUP 2916 ENGINE					
FIGURE 44.OIL PRESS REGULATING VALVE					
1	PAHZZ	15434	C0123151400	.VALVE, RELIEF, PRESSU.....	1
2	PAHZZ	15434	C0123151100	.SPRING	1
3	PAHZZ	15434	C0740100400	.WASHER, FLAT	1

END OF FIGURE

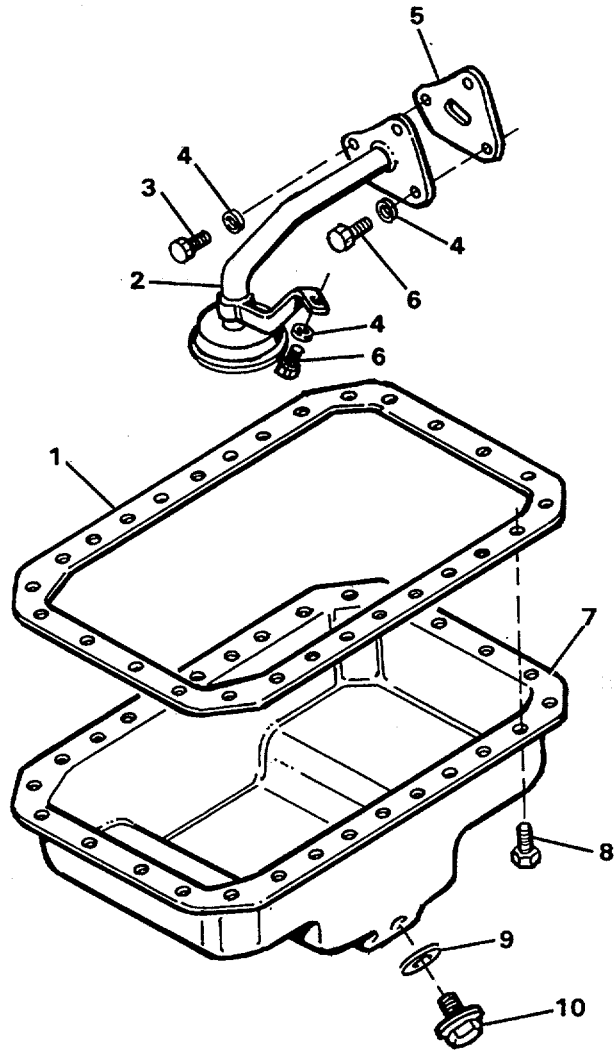


Figure 45. Oil Pan

SECTION II

TM5-3825-229-14&P

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
GROUP 2916 ENGINE FIGURE 45. OIL PAN					
1	PAFZZ	15434	C0102098100	.GASKET.....	1
2	PAFZZ	15434	C0120103400	.PICKUP ASSEMBLY, OIL	1
3	PAHZZ	15434	C0718104400	.SCREW.....	2
4	PFFZZ	15434	C0740100600	.WASHER, FLAT.....	4
5	PAFZZ	15434	C0120122200	.GASKET.....	1
6	PFFZZ	15434	C0718103600	.SCREW.....	2
7	PAFZZ	15434	C0102113900	.OILPAN.....	1
8	PAFZZ	15434	C0815072200	.SCREW, ASSEMBLED WAS.....	28
9	PAOZZ	15434	C0102114700	.GASKET	1
10	PAOZZ	15434	C0102114600	.PLUG	1

END OF FIGURE

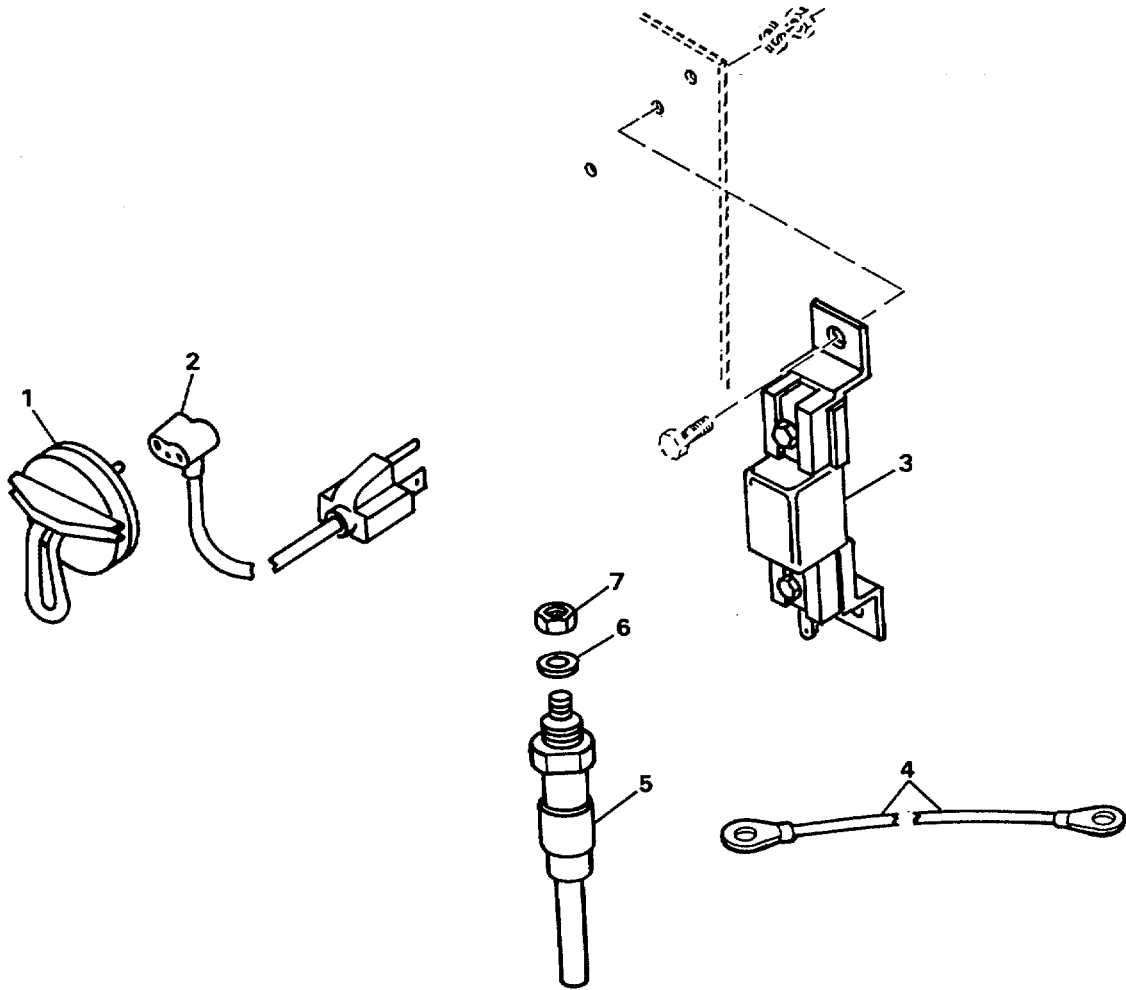


Figure 46. Special Starting Devices

SECTION II

TM 5-3825-229-14&P

(1)	(2)	(3)	(4)	(5)	(6)
ITEM	SMR		PART		
NO	CODE	CAGEC	NUMBER	DESCRIPTION AND USABLE ON CODES(UOC)	QTY

GROUP 2917 ENGINE
 FIGURE 46. SPECIAL STARTING DEVICES

1	PFOZZ	6Y402	88t0891	.HEATER, COOLANT, ENGI.....	1
2	PFOZZ	6Y402	8890412	.CORD ASSEMBLY, ELECT.....	1
3	PAOZZ	01843	0-251-103-307	.RESISTOR, TERMINAL	1
4	PAOZZ	15434	C0336413100	.LEAD, GLOW PLUG	3
5	PAOZZ	U1843	0-250-250-200	.GLOW PLUG	4
6	PAOZZ	15434	C0850200500	.WASHER, LOCK.....	4
7	PAOZZ	15434	C0750100200	.NUT, PLAIN, HEXAGON	4

END OF FIGURE

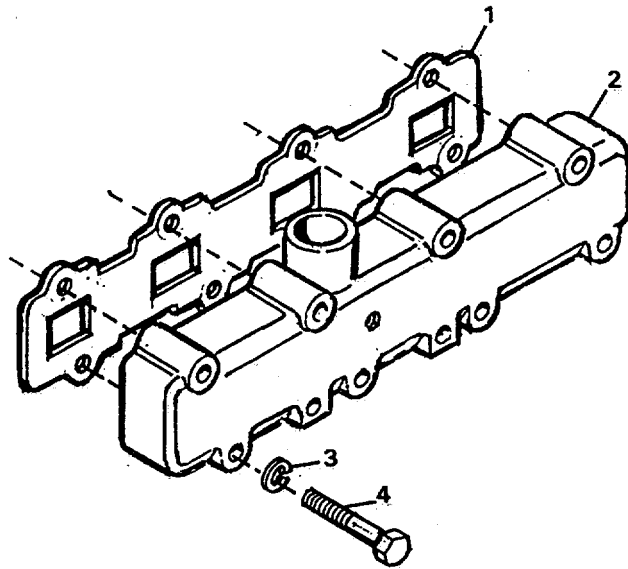


Figure 47. Intake Manifold

SECTION II

TM 5-3825-229-14&PCO1

(1)	(2)	(3)	(4)	(5)	(6)
ITEM	SMR	CAGEC	PART		
NO	CODE		NUMBER	DESCRIPTION AND USABLE ON CODES(UOC)	QTY

GROUP 2918 ENGINE
 FIGURE 47. INTAKE MANIFOLD

1	PAFZZ	15434	C0154275800	.GASKET.....	1
2	PAFFF	15434	C0154244800	.MANIFOLD, INTAKE	1
3	PAFZZ	15434	C0740100600	.WASHER, FLAT.....	8
4	PAFZZ	15434	C0718180100	.SCREW.....	8

END OF FIGURE

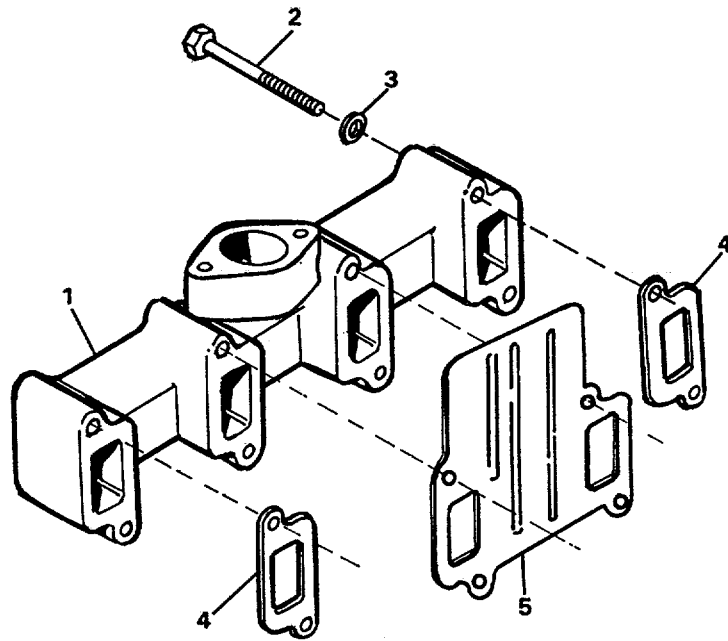


Figure 48. Exhaust Manifold

SECTION II

TM 5-3825-229-14&P

(1)	(2)	(3)	(4)	(5)	(6)
ITEM	SMR	CAGEC	PART	DESCRIPTION AND USABLE ON CODES(UOC)	QTY
NO	CODE		NUMBER		

GROUP 2918 ENGINE
EXHAUST MANIFOLD

1	PAFFF	15434	C0154229600	.MANIFOLD, EXHAUST ..1.....	1
2	PFFZZ	15434	C0800252400	.BOLT, MACHINE.....	8
3	PFFZZ	15434	C0740100600	.WASHER, FLAT.....	8
4	PAFZZ	15434	C0154232500	.GASKET.....	2
5	PAFZZ	15434	C0154216200	.GASKET.....	1

END OF FIGURE

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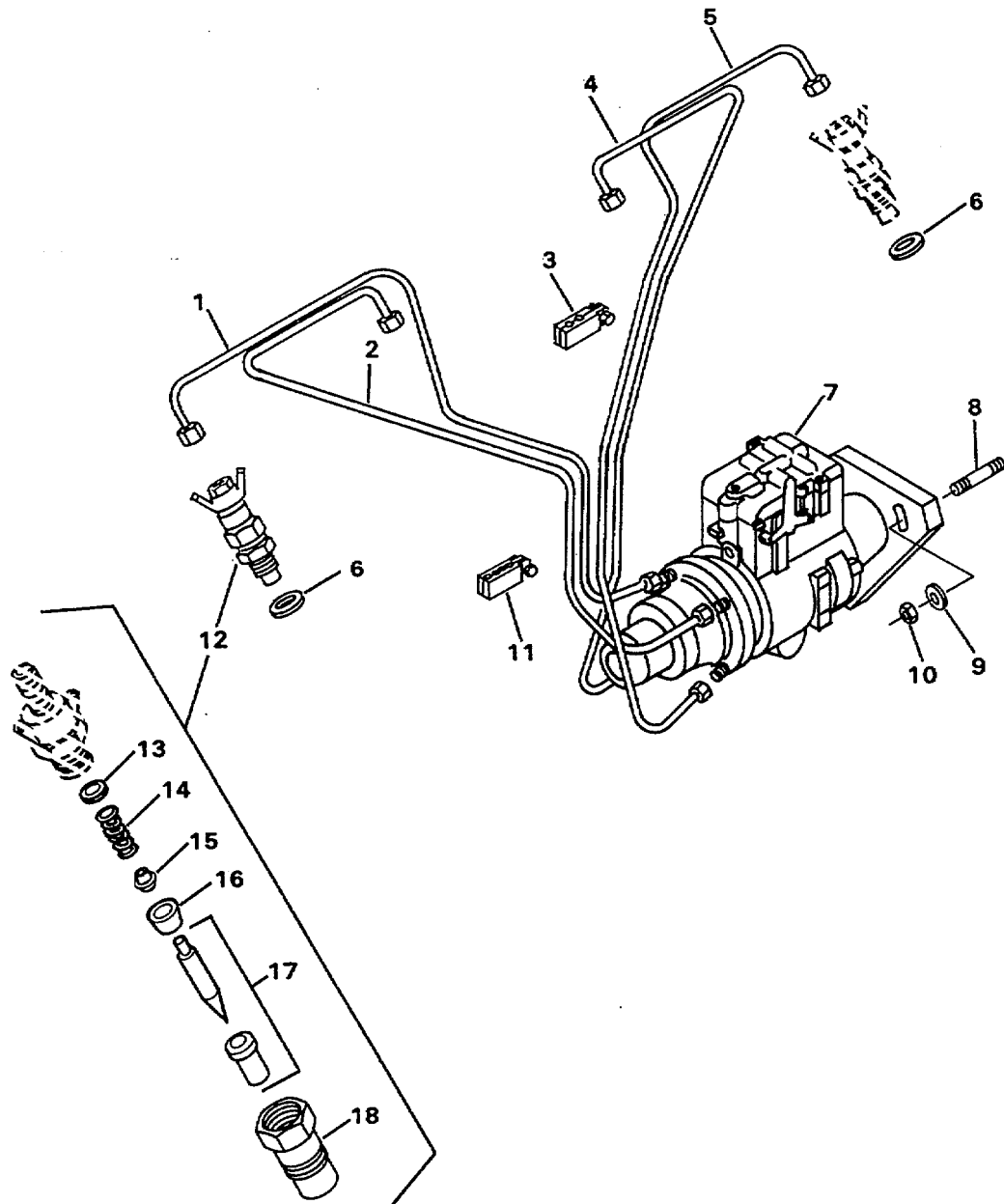


Figure 49. Fuel Injection Pump, Fuel Injectors and Fuel Lines

SECTION II

TM 5-3825-229-14&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 2932 ENGINE
FIGURE 49. FUEL INJECTION PUMP
INJECTORS AND FUEL LINES

1	PAFZZ	15434	C0147067801	.TUBE, BENT, METALLIC	1
2	PAFZZ	15434	C0147061770	.TUBE, BENT, METALLIC	1
3	PBFZZ	15434	C0147068000	.CLAMP, LOOP	2
4	PAFZZ	15434	C0147067600	.TUBE, BENT, METALLIC	1
5	PAFZZ	15434	C0147067500	.TUBE, BENT, METALLIC	1
6	PAHZZ	53867	1 410 501 072	.SEAL ,PLAIN,.....	4
7	PAFDD	15434	C0147046203	.PUMP, FUEL, METERING	1
8	PAFZZ	15434	C0520240300	.STUD	3
9	PFFZZ	15434	C0526210640	.WASHER, FLAT.....	3
10	PFFZZ	15434	C0750100600	.NUT, PLAIN, HEXAGON	3
11	PBFZZ	15434	C0147067900	.CLAMP, LOOP	1
12	PAFHH	53867	0 432 217 0191	.INJECTOR, ASSEMBLY, F	4
13	PAHZZ	53867	2 430 100 525	..SHIM 0.8 MM THK	1
13	PAHZZ	53867	2 430 100 527	..SHIM 0.84 MM THK.....	1
13	PAHZZ	53867	2 430 100 530	..SHIM 0.90 MM THK.....	1
13	PAHZZ	53867	2 430 100 532	..SHIM 0.94 MM THK.....	1
13	PAHZZ	53867	2 430 100 534	..SHIM 0.98, MM THK.....	1
13	PAHZZ	53867	2 430 100 535	..SHIM 1.00 MM THK.....	1
13	PAHZZ	53867	2 430 100 539	..SHIM 1.08 THK	1
13	PAHZZ	53867	2 430 100 540	..SHIM 1.10 MM THK.....	1
13	PAHZZ	53867	2 430 100 542	..SHIM 1.14 MM THK.....	1
13	PAHZZ	53867	2 430 100 544	..SHIM 1.18 MM THK.....	1
13	PAHZZ	53867	2 430 100 545	..SHIM 1.20 MM THK.....	1
13	PAHZZ	53867	2 430 100 547	..SHIM 1.24 MM THK.....	1
13	PAHZZ	53867	2 430 100 549	..SHIM 1.28 MM THK.....	1
13	PAHZZ	53867	2 430 100 550	..SHIM 1.30 MM THK.....	1
13	PAHZZ	53867	2 430 100 552	..SHIM 1.34 MM THK.....	1
13	PAHZZ	53867	2 430 100 554	..SHIM 1.38 MM THK.....	1
13	PAHZZ	53867	2 430 100 555	..SHIM 1.40 MM THK.....	1
13	PAHZZ	53867	2 430 100 557	..SHIM 1.44 MM THK.....	1
13	PAHZZ	53867	2 430 100 559	..SHIM 1.48 MM THK.....	1
13	PAHZZ	53867	2 430 100 560	..WASHER, FLAT 1.50 MM THK	1
13	PAHZZ	53667	2 430 100 562	..WASHER, FLAT 1.54 MM THK	1
13	PAHZZ	53867	2 430 100 564	..WASHER, FLAT 1.58 MM THK	1
13	PAHZZ	53867	2 430 100 565	..SHIM 1.60 MM THK.....	1
13	PAHZZ	53867	2 430 100 567	..SHIM 1.64 MM THK.....	1
13	PAHZZ	53867	2 430 100 569	..WASHER, FLAT 1.68 MM THK	1
13	PAHZZ	53867	2 430 100 570	..WASHER, FLAT 1.70 MM THK	1
13	PAHZZ	53867	2 430 100 572	..SHIM 1.74 MM THK.....	1
13	PAHZZ	53867	2 430 100 574	..SHIM 1.78 MM THK.....	1
13	PAHZZ	53867	2 430 100 575	..WASHER, FLAT 1.80 MM THK	1
13	PAHZZ	53867	2 430 100 577	..SHIM 1.84 MM THK.....	1
13	PAHZZ	53867	2 430 100 579	..SHIM 1.88 MM THK.....	1
13	PAHZZ	53867	2 430 100 580	..SHIM 1.90 MM THK.....	1
13	PAHZZ	53867	2 430 100 582	..SHIM 1.94 MM THK.....	1
13	PAHZZ	53867	2 430 100 584	..SHIM 1.98 MM THK.....	1
13	PAHZZ	53867	2 430 100 529	..SHIM 0.88 MM THK.....	1
14	PAHZZ	53867	2 434 614 010	..SPRING, HELICAL, COMP	1

SECTION II

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(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
15	PBHZZ	53867	2 433 124 161	..PIN, GROOVED, HEALED,	1
16	PBHZZ	53867	2 430 136 145	..BUSHING, SLEEVE	1
17	PAHZZ	53867	0 434 250 999	..NOZZLE, FUEL INJECTI.	1
18	PBHZZ	53867	2 433 458 123	..NUT, SLEEVE	1

END OF FIGURE

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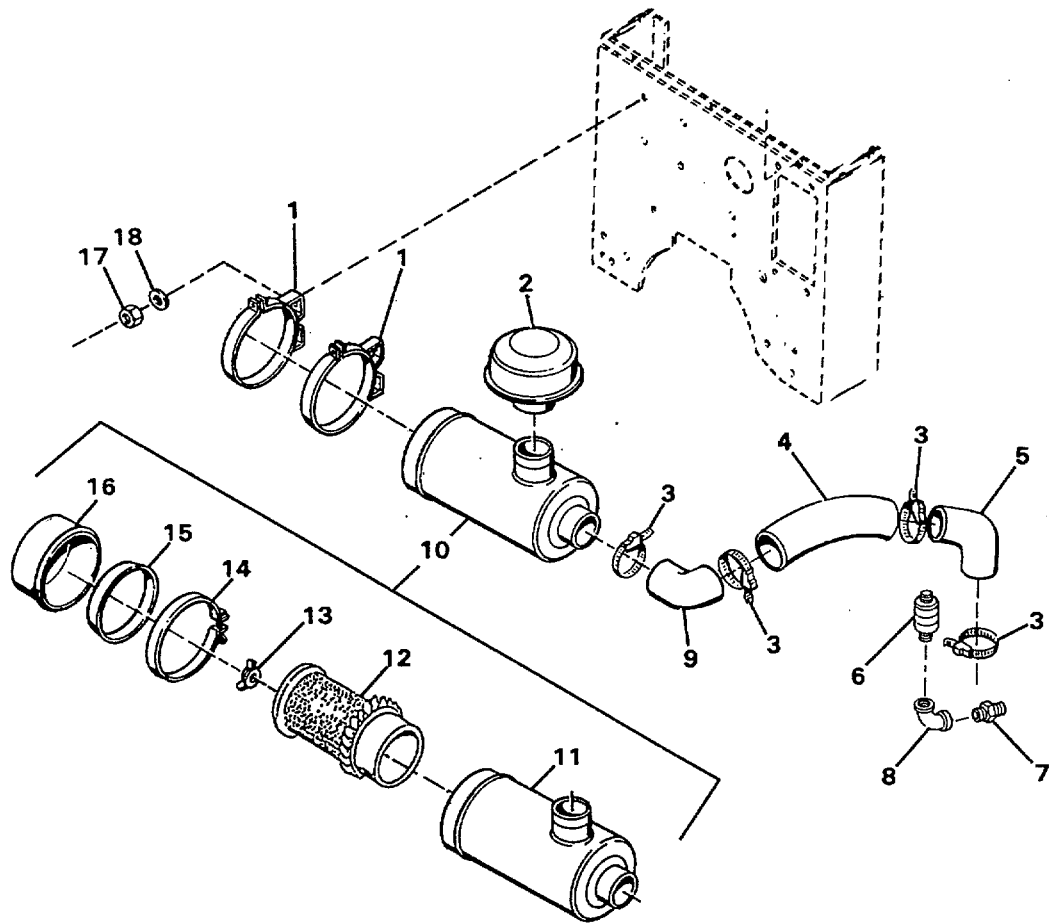


Figure 50. Air Cleaner

SECTION II

TM 5-3825-229-14&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 2933 ENGINE
FIGURE 50. AIR CLEANER

1	PFOZZ	18265	P-7191	.CLAMP, LOOP	2
2	PFOZZ	18265	GAXOO-1966	.CAP, AIR CLEANER INT	1
3	PFOZZ	66295	44H	.CLAMP, HOSE	4
4	PFOZZ	15434	C0140199102	.ADAPTER	1
5	PFOZZ	15434	C0503122200	.ELBOW, HOSE	1
6	PFOZZ	18265	ABXOO-2250	.INDICATOR, FILTER WA	1
7	PFOZZ	81343	2-2 130137B	.NIPPLE, PIPE	1
8	PFOZZ	79470	3400X2	.ELBOW, PIPE	1
9	PFOZZ	15434	C0503140600	.ELBOW, HOSE	1
10	PBOZZ	18265	FWG06-5304	.AIR CLEANER, INTAKE	1
11	PBOZZ	18265	P15-2790	.AIR CLEANER, INTAKE	1
12	PAOZZ	18265	SMP18-1052	.FILTER ELEMENT, INTA	1
13	PFOZZ	18265	P10-1270	.NUT, ASSEMBLY, RETAIN.	1
14	PFOZZ	18265	P00-2940	.CLAMP, LOOP	1
15	PFOZZ	18265	P10-2510	.BAFFLE	1
16	PFOZZ	18265	P10-2805	.CUP	1
17	PAOZZ	15434	C0860200800	.NUT. PLAIN, HEXAGON	4
18	PAOZZ	15434	C0526210300	.WASHER, FLAT	4

END OF FIGURE

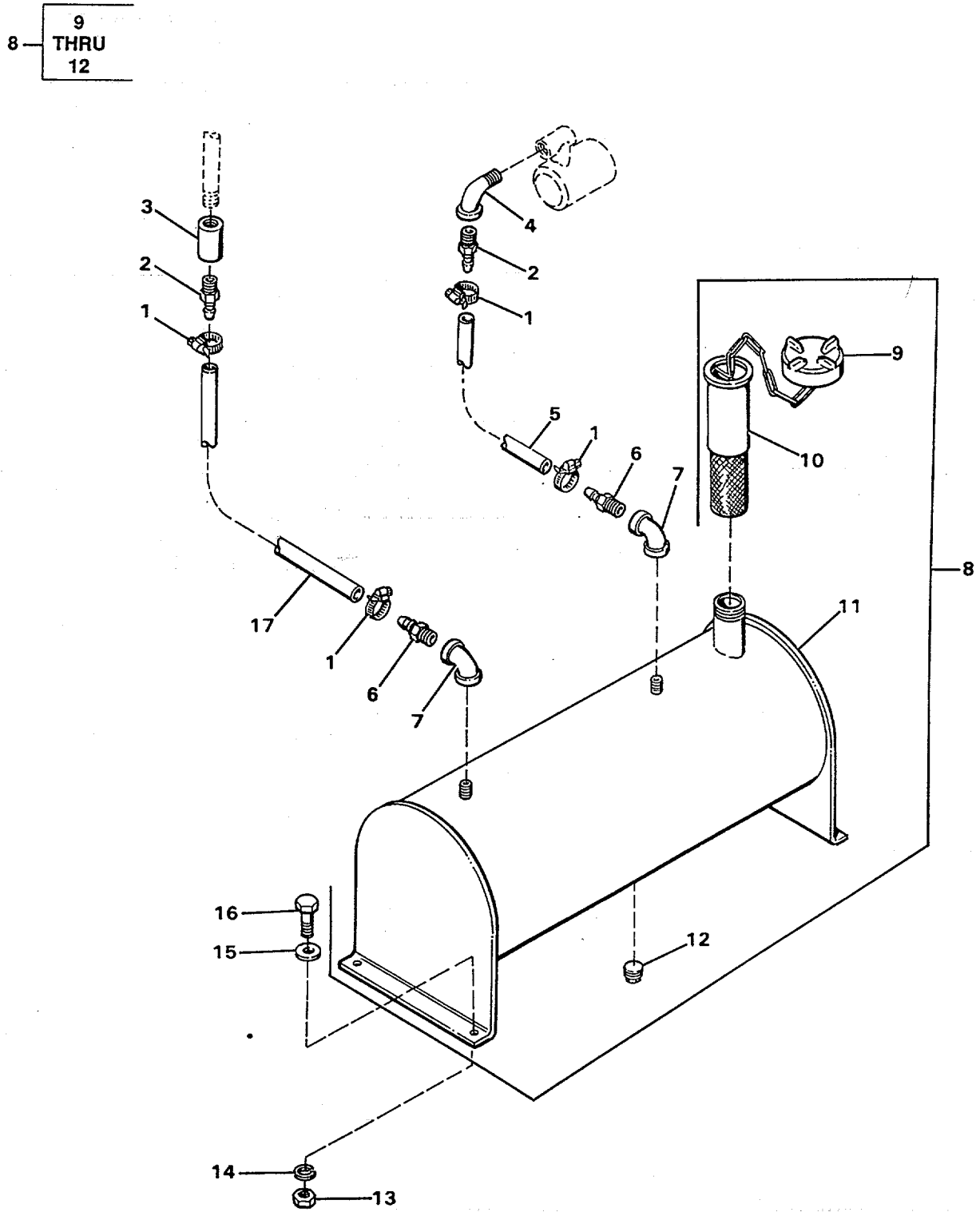


Figure 51. Fuel Tank Installation

SECTION II

TM 5-3825-229-14&PCO1

(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 2935 ENGINE
FIGURE 51. FUEL TANK INSTALLATION

1	PFOZZ	66295	M5	.CLAMP, HOSE	4
2	PFOZZ	93061	125HBL-4-2	.ADAPTER, STRAIGHT, PI	2
3	PFOZZ	96906	MS39233-1	.COUPLING, PIPE.....	1
4	PFOZZ	24617	105422	.ELBOW, PIPE	1
*	5	MOOZZ	24161	70030-32 .HOSE, FUEL 32 IN MAKE FROM HOSE P/ N 70030.....	1
6	PFOZZ	93061	125HBL-4-4	.ADAPTER, STRAIGHT, PI	2
7	PFOZZ	93236	PL12M	.ELBOW, PIPE	2
8	PBOZZ	80195	T2048UU	.TANK, FUEL, ENGINE	1
*	9	PAOZZ	78225	ACO-4032 ..CAP, FILLER OPENING.....	1
10	PAOZZ	80195	T2048UJ	..STRAINER ASSEMBLY	1
11	XAOZZ	80195	T2048UT	..TANK FUEL.....	1
12	PFOZZ	24617	444626	..PLUG, PIPE	1
13	PFOZZ	96906	MS51967-8	.NUT, PLAIN, HEXAGON	4
14	PAOZZ	96906	MS35338-46	.WASHER, LOCK.....	4
15	PFOZZ	24617	274517	.WASHER, FLAT.....	4
*16	PAOZZ	96906	MS90725-60	.SCREW, CAP, HEXAGON H.....	4
*17	MOOZZ	24161	70030-24	.HOSE, FUEL, 24 IN MAKE FROM HOSE P/ N 70030	1

END OF FIGURE

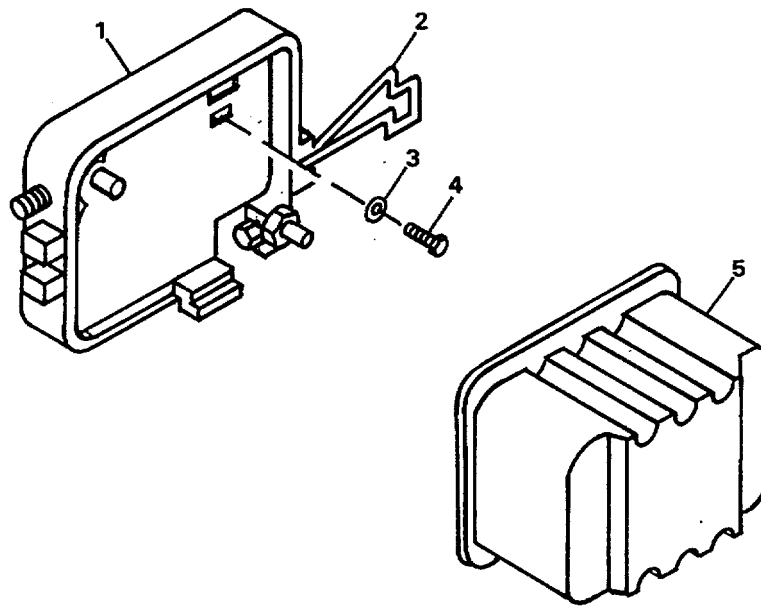


Figure 52. Fuel Filter

SECTION II

TM 5-3825-229-14&P

(1)	(2)	(3)	(4)	(5)	(6)
ITEM	SMR	CAGEC	PART		
NO	CODE		NUMBER	DESCRIPTION AND USABLE ON CODES(UOC)	QTY

GROUP 2937 ENGINE
 FIGURE 52. FUEL FILTER

1	PBOZZ	84760	23187	.HEAD, FLUID FILTER	1
2	PAOZZ	84760	23243	.CLIP, SPRING TENSION	1
3	PAOZZ	15434	C0740100800	.WASHER, FLAT	2
4	PAOZZ	15434	C0725107400	.SCREW, CAP, HEXAGON H.....	2
5	PAOZZ	84760	23775	.FILTER ELEMENT, FLUI.....	1

END OF FIGURE

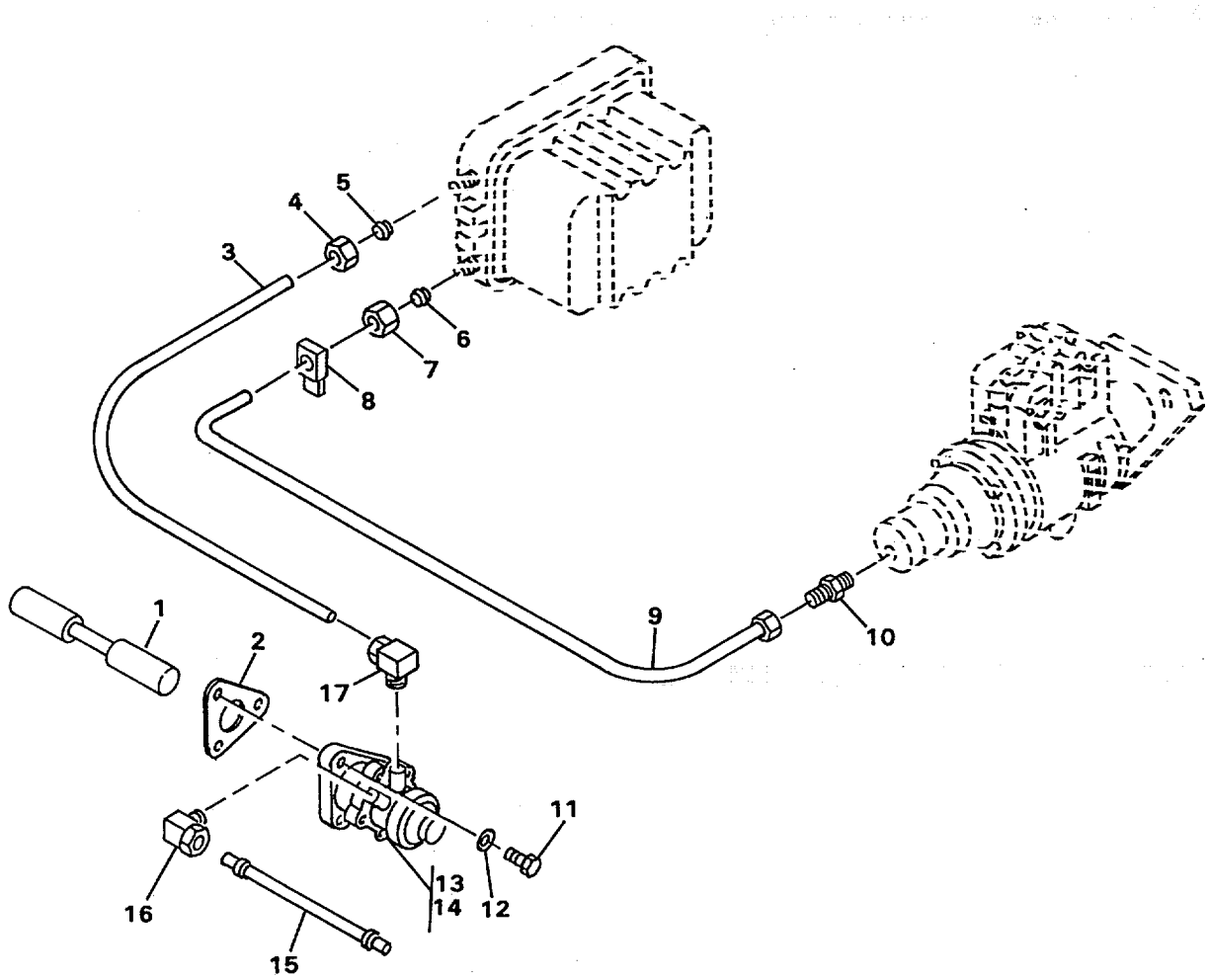


Figure 53. Fuel Transfer Pump and Fuel Lines

SECTION II

TM 5-3825-229-14&P

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
GROUP 2938 ENGINE					
FIGURE 53. FUEL TRANSFER PUMP AND LINES					
1	PAOZZ	15434	C0149173200	.PUSHROD, PUMP	1
2	PAOZZ	15434	C0149220700	.GASKET.....	1
3	PAOZZ	15434	C0149177200	.HOSE METALLIC.....	1
4	PFOZZ	96936	MS39176-4	*NUT, TUBE COUPLING.....	1
5	PFOZZ	79470	60X5	.SLEEVE, COMPRESSION,	1
6	PFOZZ	79470	C5165X5	.SLEEVE, FLARED, TUBE	1
7	PAOZZ	79470	C5105X5	.NUT, TUBE COUPLING	1
8	PAOZZ	84760	23448	.GROMMET, NONMETALLIC.....	1
9	PAOZZ	15434	C0149179300	.HOSE, METALLIC.....	1
10	PFOZZ	15434	C0502073300	.CONNECTOR	1
11	PAOZZ	15434	C0718102100	.SCREW.....	3
12	PAOZZ	15434	C0740100400	.WASHER, FLAT.....	3
13	PAOFF	7W442	7-21323-0	.PUMP, FUEL CAM ACTUA	1
14	PAOZZ	15434	C014921420	.PARTS KIT, ENGINE FU.....	1
15	PAOZZ	15434	C0501000200	.HOSE ASSEMBLY NONME	1
16	PFOZZ	79470	434X4	.ELBOW, PIPE TO TUBE	1
17	PFOZZ	79470	69X5	.ELBOW, PIPE TO TUBE	1

END OF FIGURE

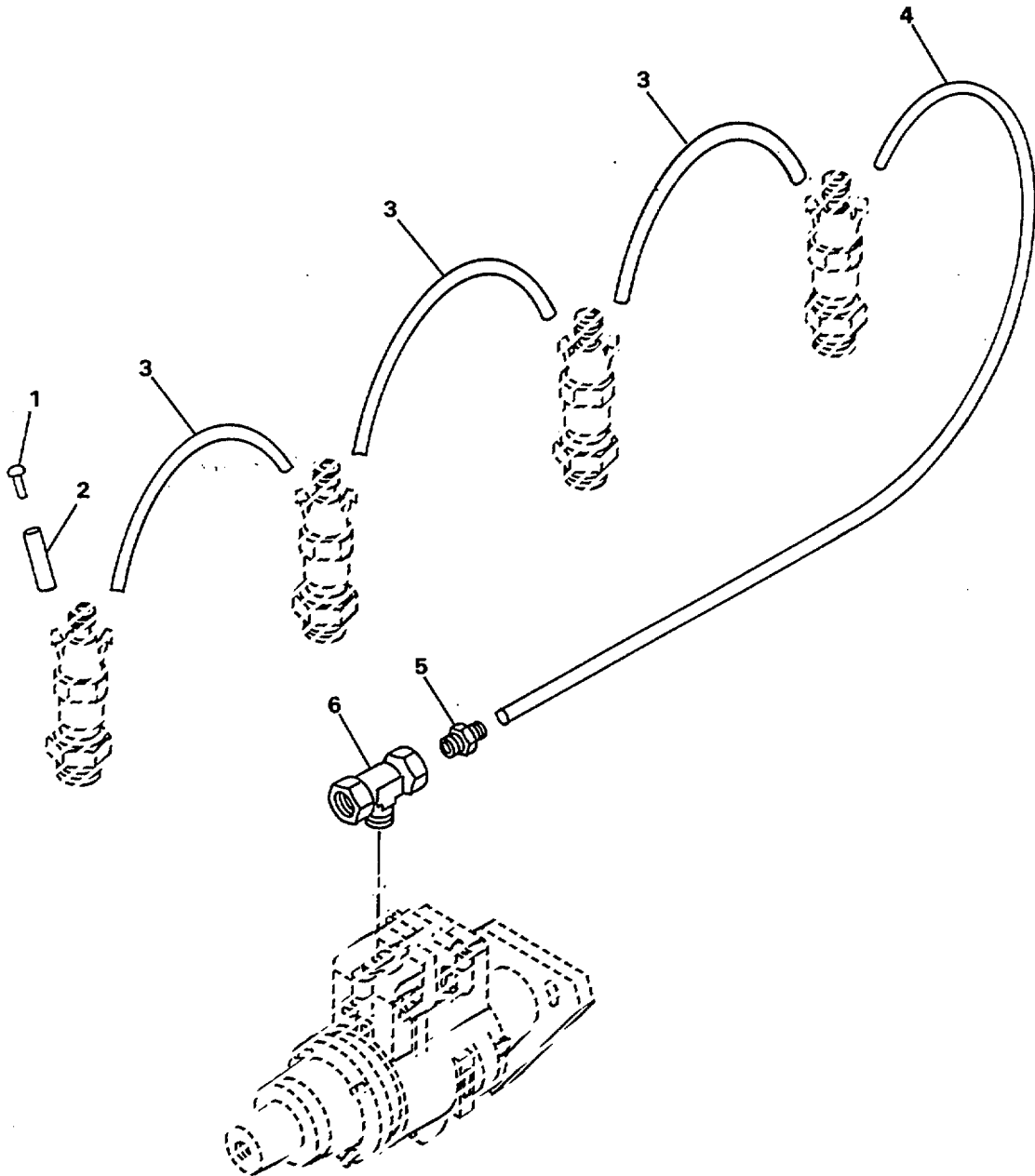


Figure 54. Fuel Return Lines

SECTION II

TM 5-3825-229-14&P

(1)	(2)	(3)	(4)	(5)	(6)
ITEM	SMR	CAGEC	PART	DESCRIPTION AND USABLE ON CODES(UOC)	QTY
NO	CODE		NUMBER		

GROUP 2938 ENGINE
 FIGURE 54. FUEL RETURN LINES

1	PFOZZ	79470	1073X4	.CAP. TUBE	1
2	PAOZZ	15434	C0503105400	.HOSE, NONMETALLIC, NONMETALLIC	1
3	PAOZZ	15434	C0503105300	.TUBE ASSEMBLY, METAL	3
4	PAOZZ	15434	C0503105500	.HOSE, NONMETALLIC	1
5	PFOZZ	79470	11068X4	.ADAPTER, STRAIGHT, PIPE.....	1
6	PFOZZ	15434	C050205700	.TEE, PIPE	1

END OF FIGURE

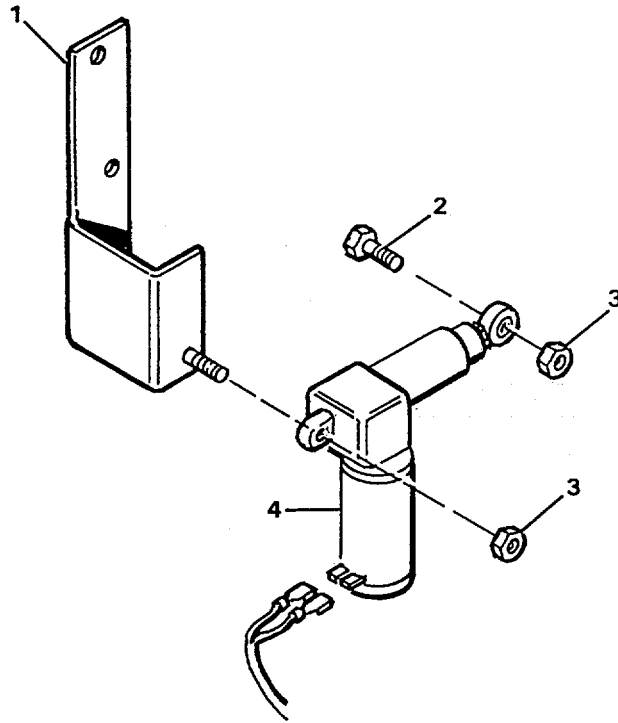


Figure 55. Throttle Actuator

SECTION II

TM 5-3825-229-14&PCO1

(1)	(2)	(3)	(4)	(5)	(6)
ITEM	SMR	CAGEC	PART	DESCRIPTION AND USABLE ON CODES(UOC)	QTY
NO	CODE		NUMBER		

GROUP 2939 ENGINE
 FIGURE 55. THROTTLE ACTUATOR

1	PBOZZ	80195	T2048PB	.BRACKET, MOUNTING	1	
*	2	PAOZZ	80204	B1821BH025C100N	.SCREW, CAP, HEXAGON H.....	1
	3	PAOZZ	21450	131245	.NUT, SELF-LOCKING, HE	2
	4	PAOZZ	58791	T204833	.ACTUATOR, ELECTRO-ME.....	1

END OF FIGURE

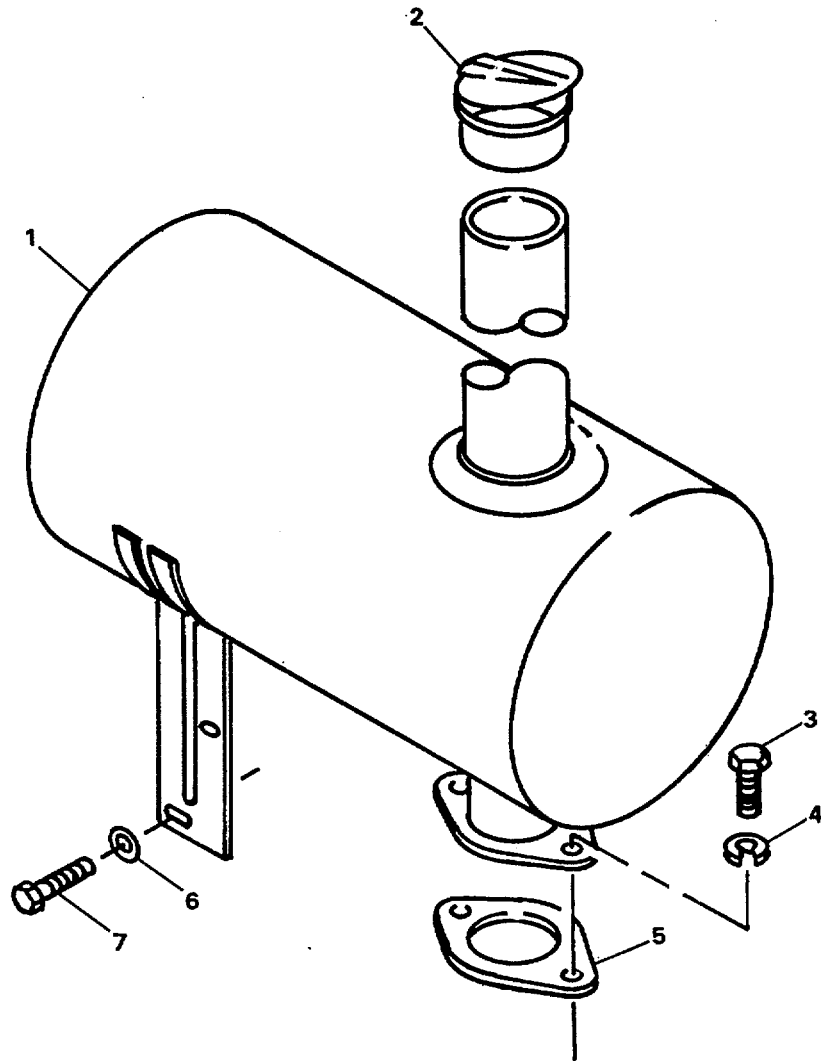


Figure 56. Engine Muffler

SECTION II

TM5-3825-229-14&PC01

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
GROUP 2941 ENGINE					
FIGURE 56. ENGINE MUFFLER					
*	1	PAOZZ	15434 C0155196700	.MUFFLER, EXHAUST	1
*	2	PFOZZ	15434 C0155206201	.CAP ASSEMBLY, PROTEC	1
	3	PAOZZ	15434 C0718105400	.SCREW, CAP, HEXAGON H.....	2
	4	PAOZZ	15434 C0740100800	.WASHER, FLAT	2
	5	PAOZZ	15434 C0155192000	.GASKET.....	1
	6	PAOZZ	15434 C0850200800	.WASHER, LOCK.....	2
	7	PAOZZ	15434 C0718180700	.SCREW, CAP, HEXAGON H.....	2

END OF FIGURE

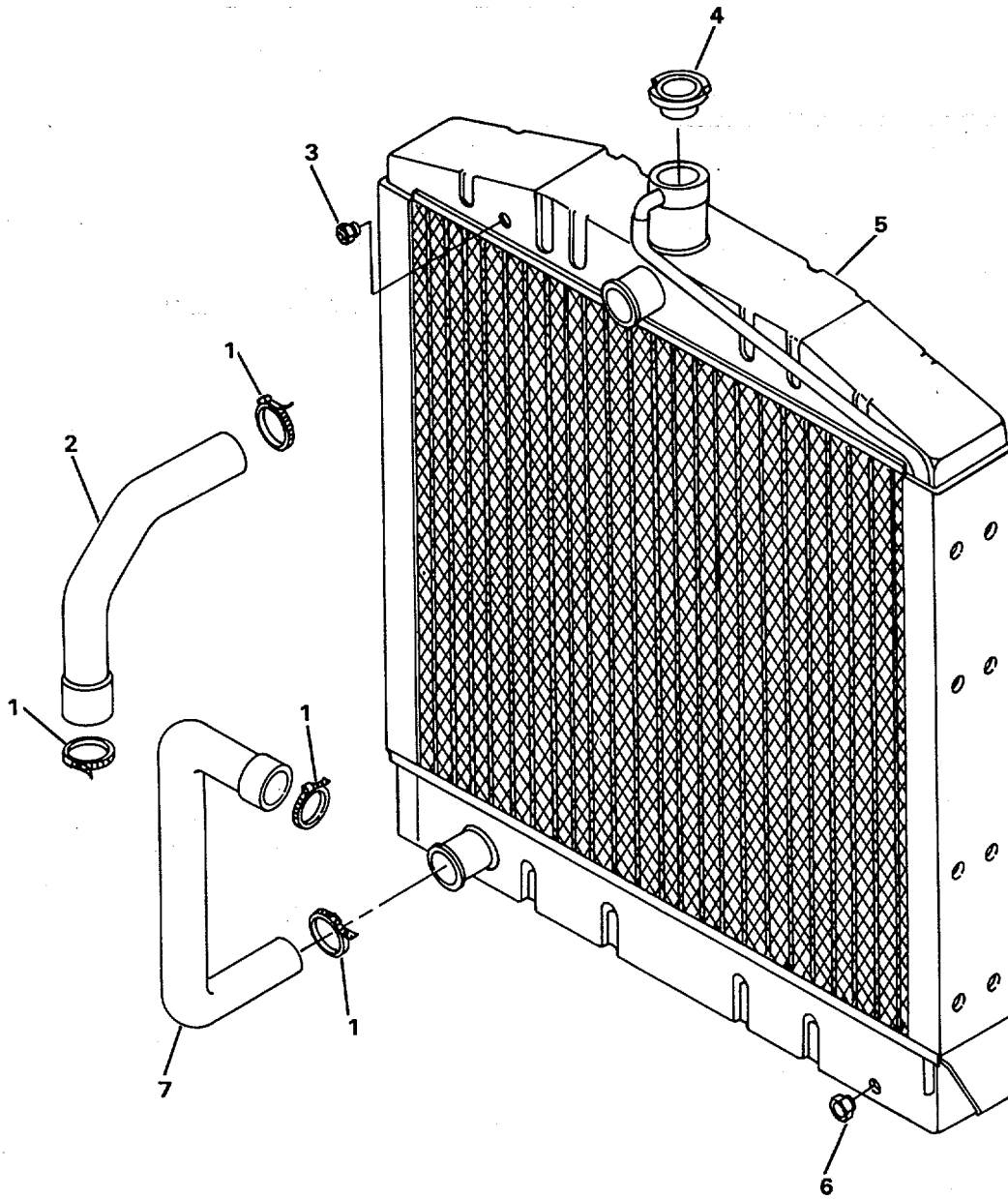


Figure 57. Engine Radiator

SECTION II

TM5-3825-229-14&PC01

(1)	(2)	(3)	(4)	(5)	(6)
ITEM	SMR		PART		
NO	CODE	CAGEC	NUMBER	DESCRIPTION AND USABLE ON CODES(UOC)	QTY

GROUP 2951 ENGINE
 FIGURE 57. ENGINE RADIATOR

	1	PAOZZ	66295	C32P	.CLAMP, HOSE	4
*	2	PAOZZ	15434	C0503136700	.HOSE, PREFORMED.....	1
	3	PAOZZ	79470	3152X4	.PLUG, PIPE	1
*	4	PAOZZ	44940	130-2003	.CAP, FILLER, OPENING.....	1
	5	PAOZZ	41197	1A11363D	.RADIATOR, ENGINE	1
	6	PAOZZ	79470	145	.COCK, DRAIN.....	1
	7	PAOZZ	15434	C0503136600	.HOSE, PREFORMED.....	1

END OF FIGURE

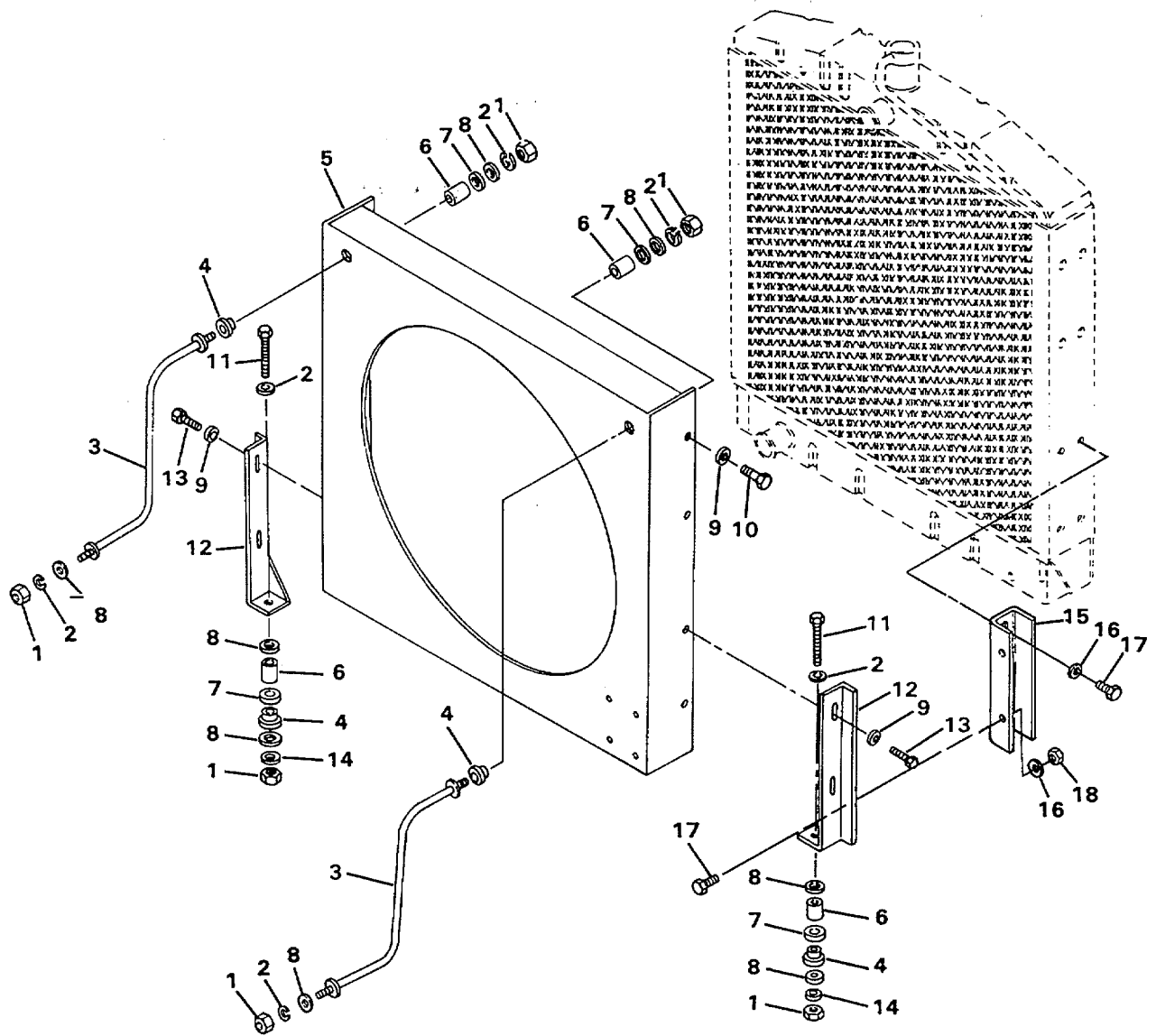


Figure 58. Radiator Shroud

SECTION II

TM5-3825-229-14&PC01

(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 2951 ENGINE
FIGURE 58. RADIATOR SHROUD

1	PFOZZ	15434	C0860201000	.NUT, PLAIN, HEXAGON H.....	6
2	PFOZZ	15434	C0526214800	.WASHER, LOCK.....	6
3	XAOZZ	15434	C0130245200	.ROD RADIATOR.....	2
4	PFOZZ	81860	W94-030	.MOUNT, RESILIENT.....	4
5	PFOZZ	15434	C0130245600	.SHROUD, FAN, RADIATOR.....	1
6	PFOZZ	15434	C0130245800	.SPACER, PLATE.....	4
7	PFOZZ	81860	W84-030	.MOUNT, RESILIENT.....	4
8	PFOZZ	15434	C0526032200	.WASHER, FLAT.....	6
* 9	PFOZZ	15434	C0850200800	.WASHER, LOCK.....	8
10	PFOZZ	15434	C0800205000	.SCREW, CAP, HEXAGON.....	4
11	PFOZZ	15434	C0800205400	.SCREW, CAP, HEXAGON H.....	4
12	PBOZZ	15434	C0130276800	.BRACKET, MOUNTING.....	2
*13	PFOZZ	56161	10504048	.SCREW, CAP, HEXAGON H.....	2
14	PAOZZ	15434	C0850201200	.WASHER, LOCK.....	2
*15	PFOZZ	15434	C0405376800	.BRACKET, RADIATOR.....	2
16	PFOZZ	15434	C0526210300	.WASHER, FLAT.....	12
17	PFOZZ	15434	C0800205000	.SCREW, CAP, HEXAGON.....	12
*18	PFOZZ	15434	C0860200800	*NUT, PLAIN, HEXAGON.....	8

END OF FIGURE

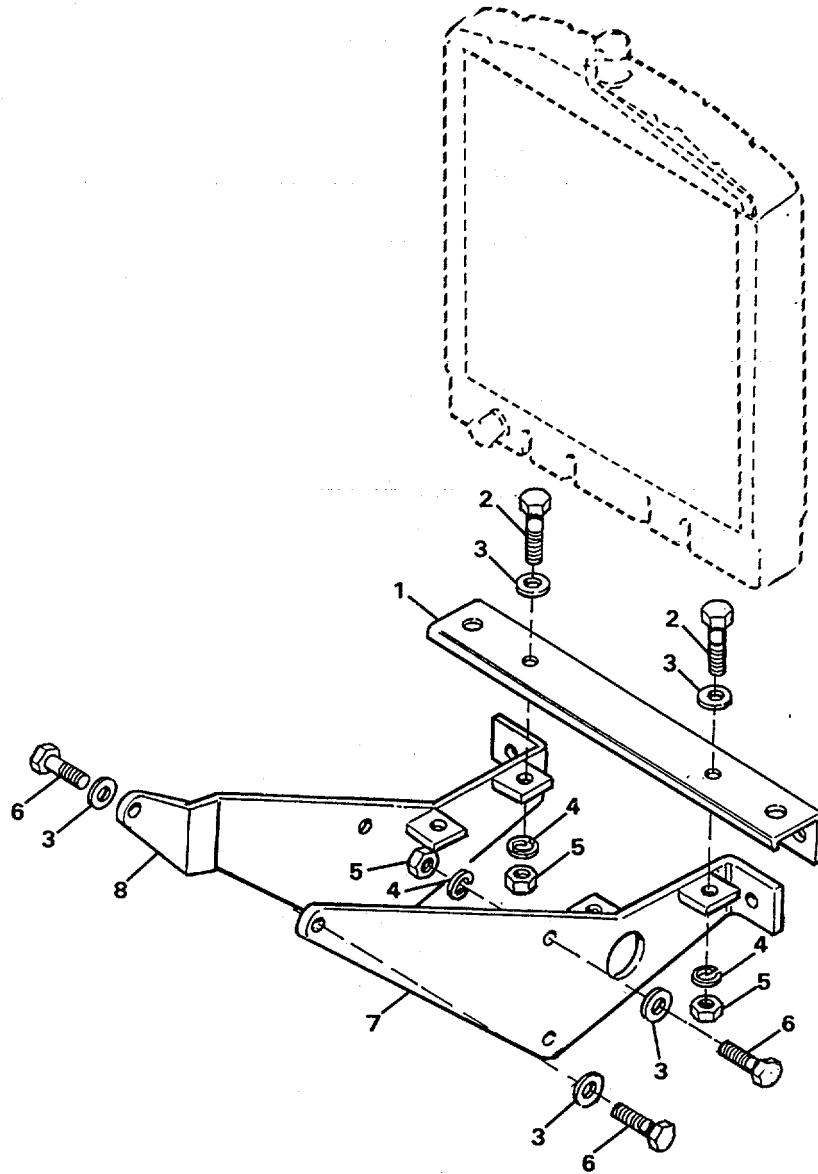


Figure 59. Radiator Brackets

SECTION II

TM5-3825-229-14&PC01

(1)	(2)	(3)	(4)	(5)	(6)
ITEM	SMR		PART		
NO	CODE	CAGEC	NUMBER	DESCRIPTION AND USABLE ON CODES(UOC)	QTY

GROUP 2951 ENGINE
 FIGURE 59. RADIATOR BRACKET

* 1	PBOZZ	15434	C0130293500	.BRACKET, VEHICULAR C.....	1
2	PAOZZ	15434	C0800210000	.SCREW, CAP, HEXAGON H.....	4
3	PAOZZ	15434	C0526214800	.WASHER, FLAT.....	6
4	PAOZZ	15434	C0850201200	.WASHER, LOCK.....	4
5	PAOZZ	15434	C0860200800	.NUT, PLAIN, HEXAGON.....	6
6	PAOZZ	15434	C0800211200	.SCREW, CAP, HEXAGON H.....	4
7	PBOZZ	15434	C0130293400	.BRACKET, VEHICULAR	1
8	PBOZZ	15434	C0130293300	.BRACKET, VEHICULAR	1

END OF FIGURE

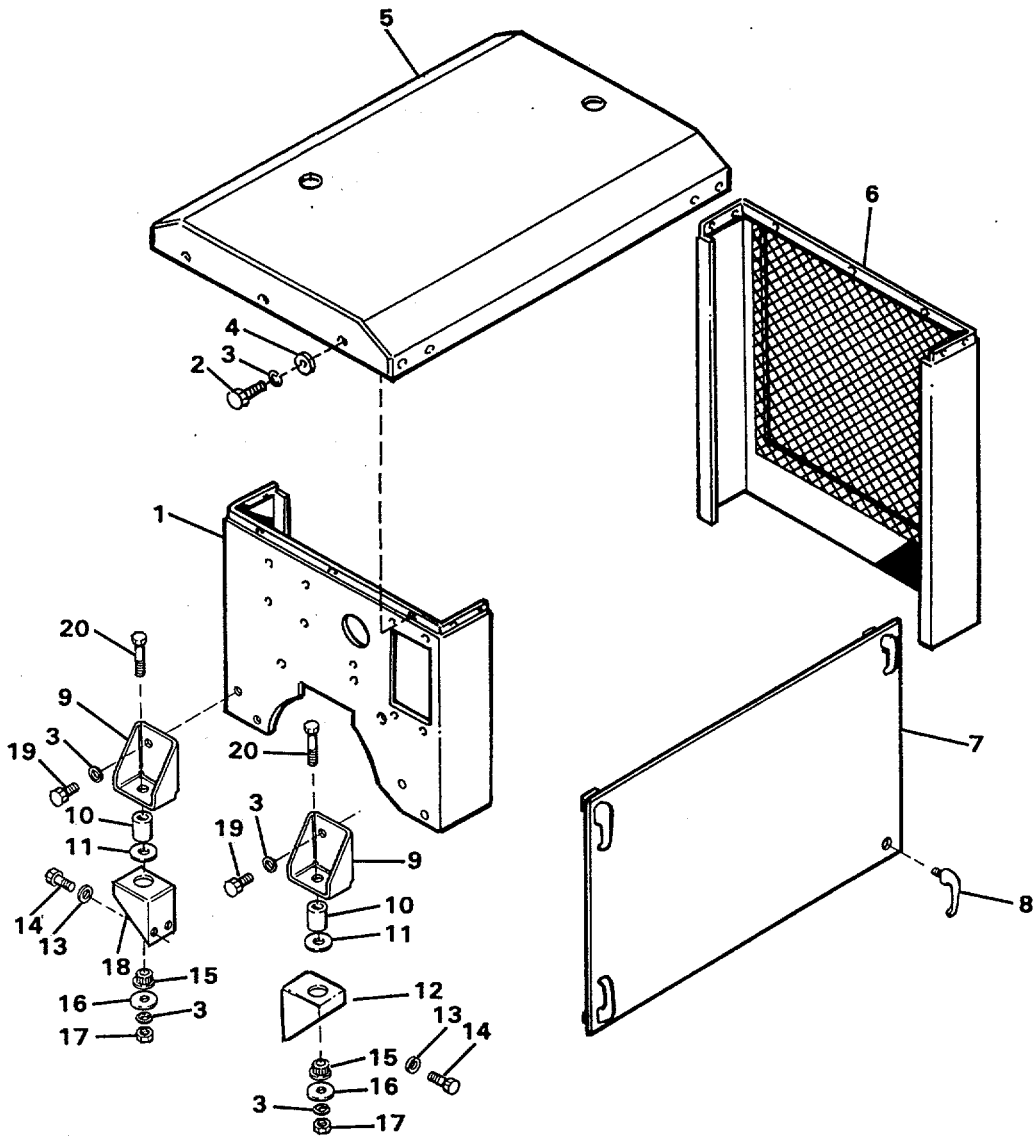


Figure 60. Engine Cowling

SECTION II

TM5-3825-229-14&PC01

(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 2952 ENGINE
FIGURE 60. ENGINE COWLING

1	PFOZZ	15434	C0405357100	.HOUSING, ENGINE	1
2	PAOZZ	56161	10503517	.SCREW, CAP, HEXAGON	14
3	PAOZZ	15434	C0850200800	.WASHER LOCK.....	22
4	PAOZZ	15434	C0526210300	.WASHER, FLAT.....	14
5	PFOZZ	15434	C0405351100	.HOOD, ENGINE COMPART	1
6	PFOZZ	15434	C0405377500	.SHROUD, FAN, RADIATOR.....	1
7	PAOZZ	80195	T2048PC	.COVER, ACCESS.....	1
8	PAOZZ	94222	19-10-091-10	.HANDLE ASSEMBLY.....	4
9	PFOZZ	15434	C0405302800	.BRACKET, VEHICULAR	2
10	PFOZZ	15434	C0405303100	.SPACER, PLATE	2
11	PAOZZ	81860	W84-030	.MOUNT, RESILIENT	2
12	PFOZZ	15434	C0405302900	.BRACKET, VEHICULAR	1
13	PAOZZ	15434	C0526214800	.WASHER, FLAT.....	4
14	PAOZZ	56161	10501759	.SCREW, CAP, HEXAGON H.....	4
15	PAOZZ	81860	W94-030	.MOUNT, RESILIENT	2
16	PAOZZ	15434	C0526032100	.WASHER, FLAT.....	2
17	PAOZZ	15434	C0860200800	.NUT, PLAIN, HEXAGON	2
18	PFOZZ	15434	C0405303000	.BRACKET, VEHICULAR	1
*19	PAOZZ	15434	C0718103600	.SCREW.....	4
20	PFOZZ	15434	C08002062000	.SCREW, CAP, HEXAGON H.....	2

END OF FIGURE

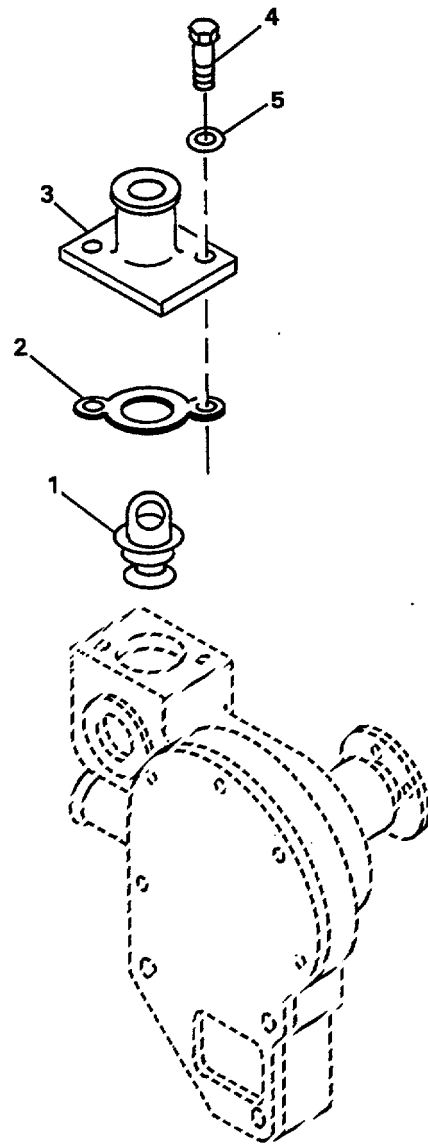


Figure 61. Thermostat and Housing

SECTION II

TM 5-3825-229-14&P

(1)	(2)	(3)	(4)	(5)	(6)
ITEM	SMR	FSCM	PART		
NO	CODE		NUMBER	DESCRIPTION AND USABLE ON CODES(UOC)	QTY

GROUP 2953 ENGINE
 FIGURE 61. THERMOSTAT AND HOUSING

1	PAOZZ	78493	4S139-0745631	.THERMOSTAT,	1
2	PAOZZ	15434	C0309058530	.GASKET.....	1
3	PAOZZ	15434	C030904L200	.WATER,OUTLET,ENGINE	1
4	PAOZZ	15434	C0718103700	.BOLT,MACHINE	2
5	PAOZZ	15434	C0740100600	.WASHER,FLAT	2

END OF FIGURE

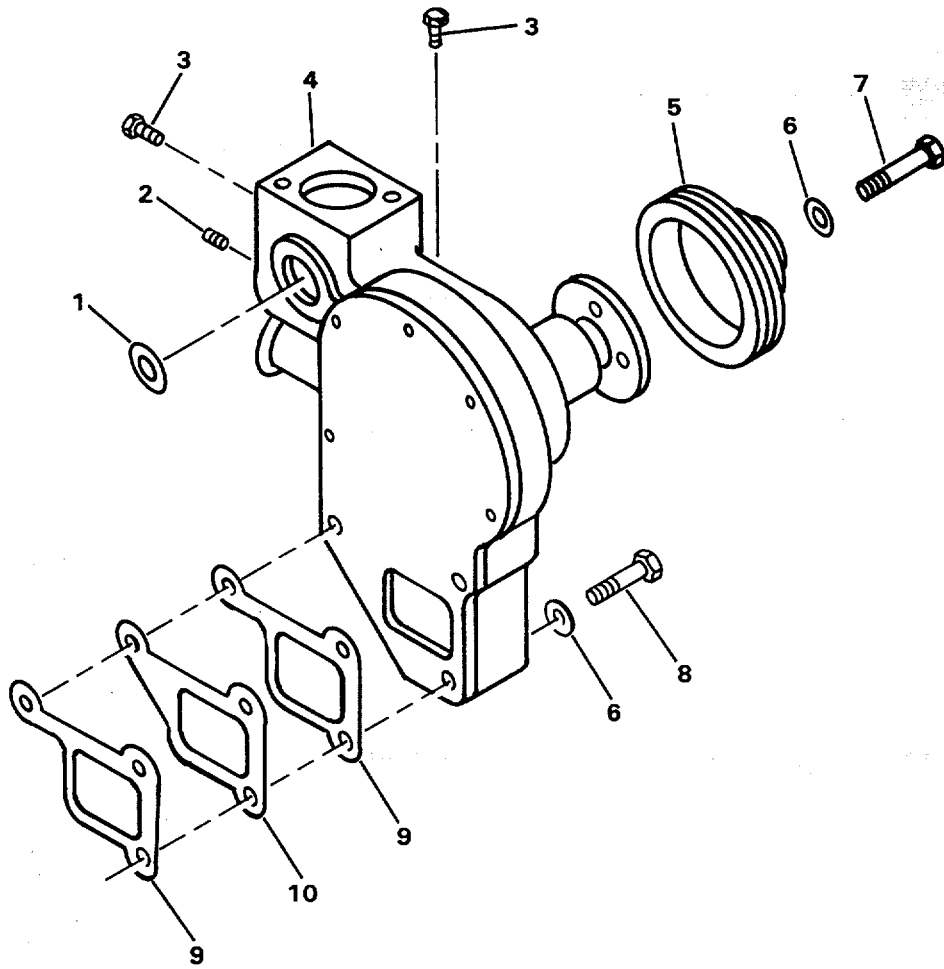


Figure 62. Water Pump Assembly

SECTION II

TM 5-3825-229-14&P

(1)	(2)	(3)	(4)	(5)	(6)
ITEM	SMR	FSCM	PART		
NO	CODE		NUMBER	DESCRIPTION AND USABLE ON CODES(UOC)	QTY

GROUP 2953 ENGINE
 FIGURE 62. WATER PUMP ASSEMBLY

1	PAFZZ	15434	C0509026400	.PACKING,PREFORMED	1
2	PFOZZ	15434	C0502031700	.PLUG,PIPE	1
3	PFOZZ	15434	C05020177500	.PLUG,PIPE	3
4	PAFZZ	15434	C013L039800	.PUMP,COOLING,SYSTEM	1
5	PAFZZ	15434	C0131034400	.PULLEYE,GROOVE.	1
6	PAOZZ	15434	C0740100600	.WASHER,FLAT	9
7	PAFZZ	15434	C0718103500	.SCREW,CAP,HEXAGON H.....	4
8	PFFZZ	15434	C0720104400	.SCREW,CAP,HEXAGON H.....	3
9	PAFZZ	15434	C01310)45800	.GASKET.....	2
10	PAFZZ	15434	C0131032400	.SPACER	1

END OF FIGURE

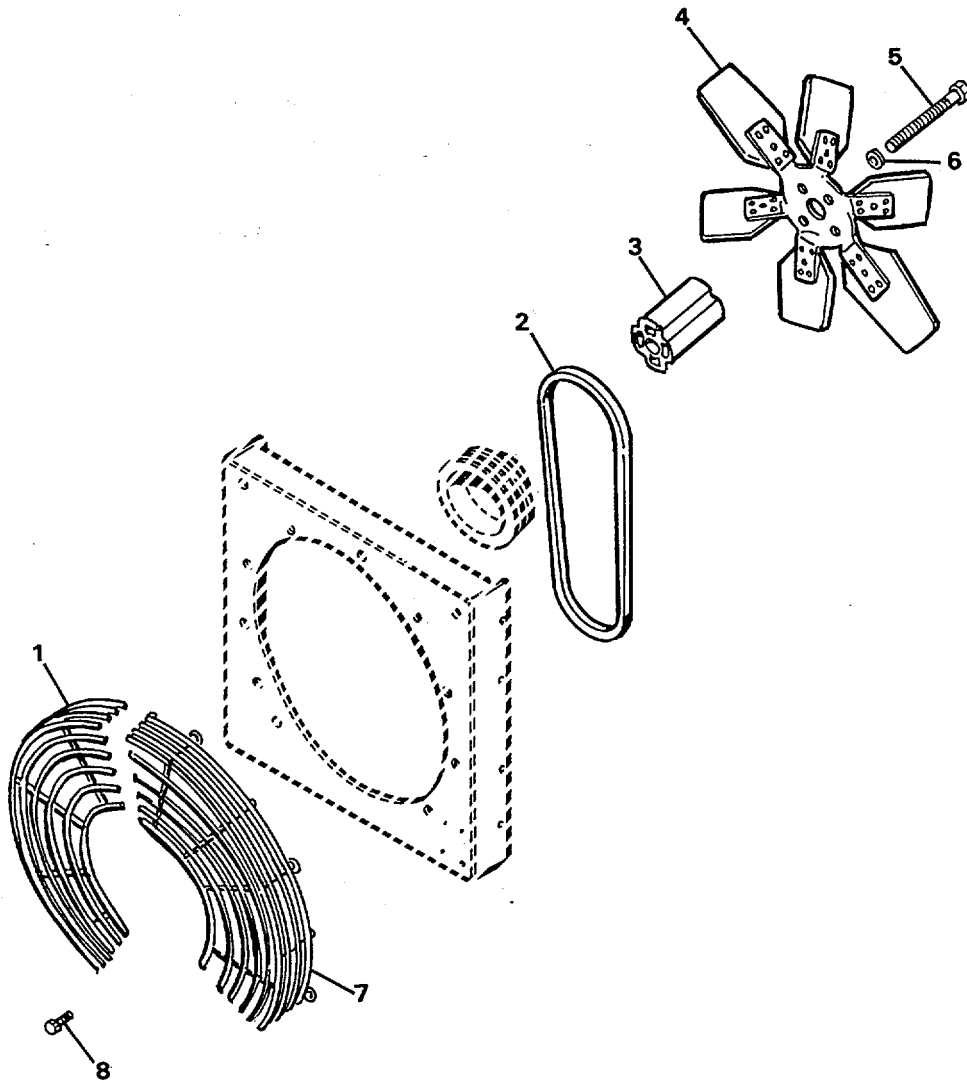


Figure 63. Pan and Fan Belt

SECTION II

TM 5-3825-229-14&P

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
GROUP 2955 ENGINE					
FIGURE 63. FAN AND FAN BELT					
1	PBOZZ	15434	C0130244200	GUARD ENGINE	1
2	PAOZZ	24161	HC-38	.BELT,	1
3	PFOZZ	15434	C0130187300	SPACER,STRAIGHT	1
4	PFOZZ	22038	460756	.IMPELLER,FAN,AXIAL.....	1
5	PFOZZ	15434	C0718104700	.SCREW,CAP,HEXAGON H.....	4
6	PAOZZ	15434	C0850200800	.WASHER,LOCK.....	4
7	PBOZZ	15434	C0130244300	.GUARD,ENGINE	1
8	PAOZZ	15434	C0821203300	.SCREW,ASSEMBLY,PANE.....	8

END OF FIGURE

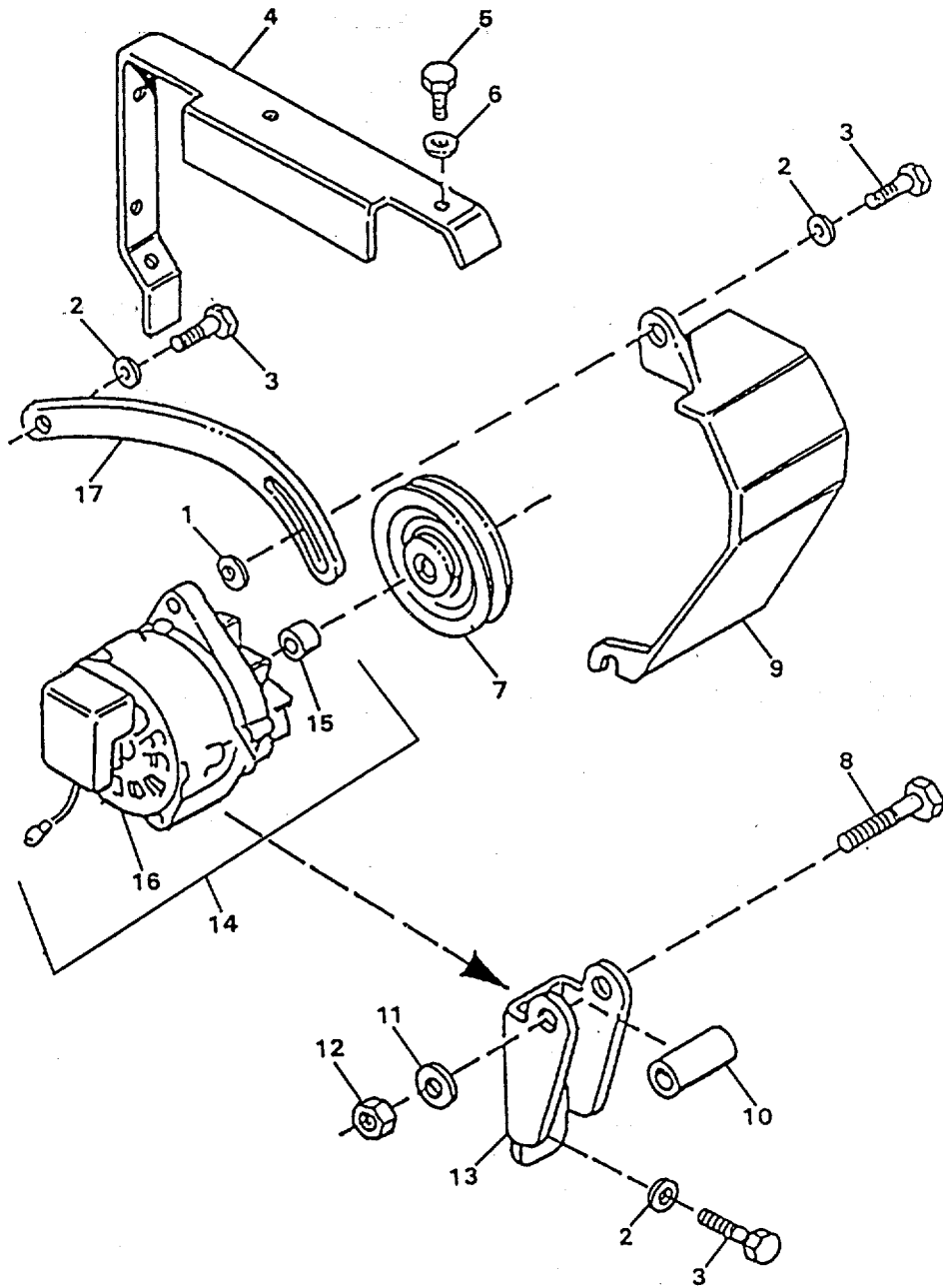


Figure 64. Alternator Assembly and Brackets

SECTION II

TM 5-3825-229-14&P

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
GROUP 2961 ENGINE					
FIGURE 64. ALTERNATOR AND BRACKETS					
1	PBOZZ	15434	C0191132200	.SPACER SLEEVE	1
2	PAOZZ	15434	C0740100600	.WASHER,FLAT	9
3	PAOZZ	15434	C0718103600	.SCREW.....	1
4	PBOZZ	15434	C0130306000	.GUARD,ENGINE	1
5	PAOZZ	15434	C0800205200	SCREW,CAP,HEXAGON.....	5
6	PAOZZ	15434	C0526210300	.WASHER,FLAT	5
7	PAOZZ	15434	C0191133930	.PULLEY,GROOVE.....	1
8	PAOZZ	15434	C0800210000	.SCREW,CAP,HEXAGON.....	1
9	PBOZZ	15434	C0191174100	.GUARD,ENGALTERNATO.....	1
10	PBOZZ	15434	C0191132200	.SPACER,SLEEVE	1
11	PAOZZ	15434	C0526212300	.WASHER,FLAT	2
12	PAOZZ	15434	C0860200900	.NUT,PLAIN,HEXAGON.	1
13	PAOZZ	15434	C0191133100	.BRACKET,ENGINE ACCE.....	1
14	PBOZZ	15434	C0191190900	..GENERATOR,ALTERNATI.....	1
15	PBOZZ	15434	C0191187100	..ADAPTER,GENERATOR	1
16	PBOZZ	0EADY1	18EA2021FA	..GENERATOR,ENGINE AC	1
17	PAOZZ	15434	C0191136500	..ARM,ADJUSTING,BELT	1

END OF FIGURE

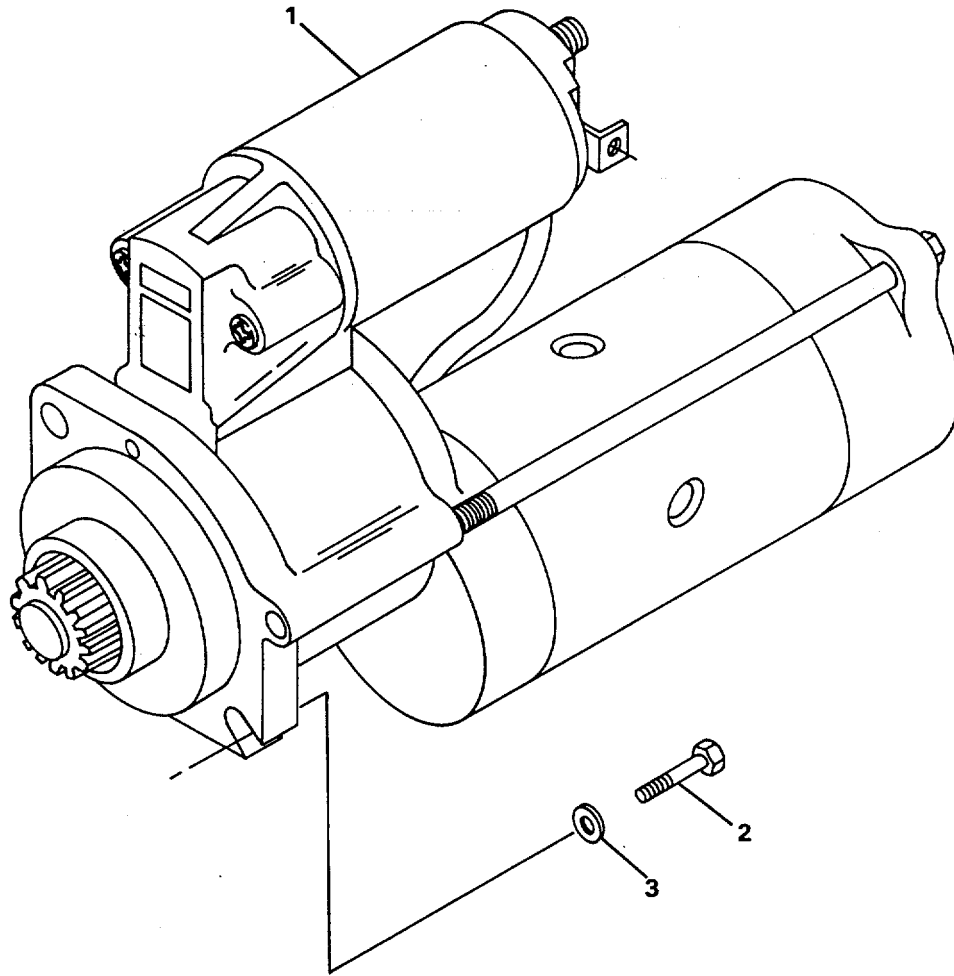


Figure 65. Starter

SECTION II

TM 5-3825-229-14&P

(1)	(2)	(3)	(4)	(5)	(6)
ITEM	SMR	FSCM	PART		
NO	CODE		NUMBER	DESCRIPTION AND USABLE ON CODES(UOC)	QTY

GROUP 2963 ENGINE
 FIGURE 65. STARTER ASSEMBLY

1	PAOZZ	3N649	M002T56072	.STARTER,ENGINE,ELEC	1
2	PAOZZ	15434	C0720180630	.SCREW.....	2
3	PAOZZ	15434	C074010100	.WASHER,FLAT	2

END OF FIGURE

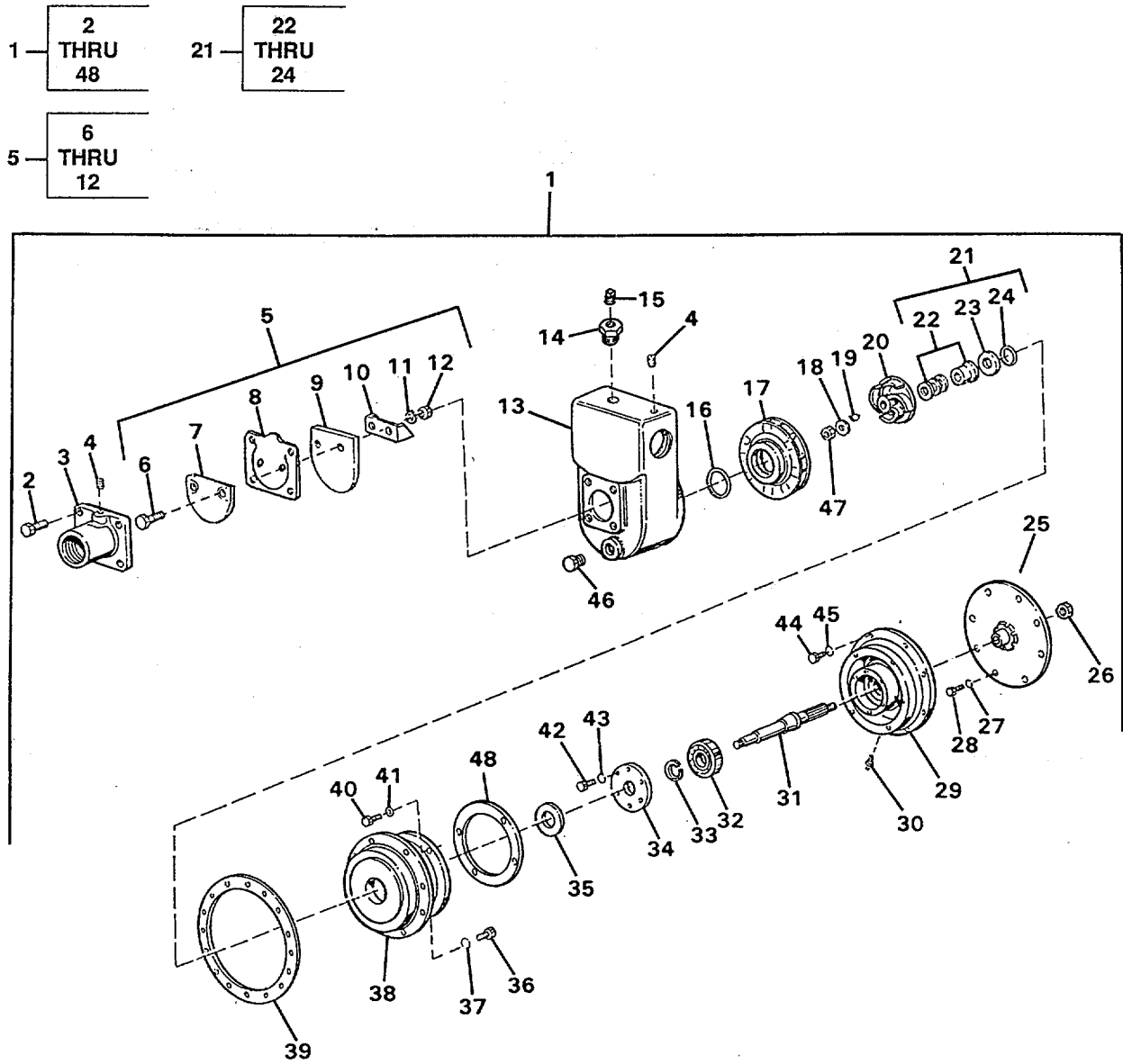


Figure 66. Pump Assembly

SECTION II

TM 5-3825-229-14&PCO1

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
GROUP 7202 DISPENSING AND SERVICING COMPONENTS					
FIGURE 66. PUMP ASSEMBLY					
1	PAFFF	38455	4C7-QA052AA	..PUMP,CENTRIFUGAL	1
*2	PAFZZ	80204	B1821BH050C125N	..SCREW,CAP,HEXAGON H.....	4
3	PFFZZ	38455	22471-02	..INLET,PUMP	1
4	PFOZZ	38455	16433-00	...PLUG,PIPE	2
*5	PAFFF	38455	27186-00	..DISK, VALVE	1
6	PFFZZ	38455	1643300	...PLUG,PIPE	2
7	PAFZZ	38455	15128-02	... VALVE,PUMP.....	1
8	PAFZZ	38455	15636-00	... VALVE,CHECK.....	1
9	PAFZZ	38455	15127-02	... VALVE,PUMP.....	1
10	PFFZZ	38455	27185-00	...PLATE,STOP.....	1
11	PAFZZ	38455	5062600	..WASHER,LOCK.....	2
12	PAFZZ	96906	MS51967-14	..NUT,PLAIN,HEXAGON.....	2
*13	PBFZZ	38455	21569-AD-QA052AA	..HOUSING,WATER,PUMP	1
14	PAOZZ	38455	45686-00	..BUSHING,PIPE	1
15	PFOZZ	38455	16543-00	..PLUG,PIPE	1
16	PAFZZ	38455	21316-00	..GASKET.....	1
17	PBFZZ	38455	21578-02	..VACUUM,PUMP,DIFFUSI.....	1
18	PAFZZ	38455	30586-00	..WASHER,IMPELLER	1
19	PAFZZ	38455	22967-00	..KEY,WOODRUFF.....	1
20	PAFZZ	38455	36442-02	..IMPELLE,IVACCUM PUMP.....	1
21	PAFZZ	38455	25356-20	..SEAL ASSEMBLY,SHAFT	1
22	XAFZZ	38455	2548100	..SEAL,W/SPRING	1
23	XAFZZ	38455	2493200	..SEAT CERAMIC.....	1
24	XAFZZ	38455	25475-00	..PACKING PRFMD	1
25	PFFZZ	38455	41219-00	..PLATE DRIVE.....	1
26	PFFZZ	38455	26104-00	...PILOT,FLYWHEEL.....	1
27	PFFZZ	38455	5158100	..WASHER,LOCK.....	8
*28	PFFZZ	61080	50051800	..SCREW,CAP,SOCKET HE	8
29	PFFZZ	38455	28744-AA	..ADAPTER,FLYWHEEL HO.....	1
30	PAOZZ	38455	25924-00	..FITTING,LUBRICANT P	1
31	PFFZZ	38455	42524-00 00	..SHAFT,STRAIGHT	1
32	PFFZZ	15175	A51655-14	..BEARING,BALL,ANNULA	1
33	PFFZZ	38455	25817-0	..RING,RETAINING.....	1
34	PFFZZ	38455	28745-02	..CAP,PILLOWBLOCK	1
*35	PAFZZ	38455	20831-00	..SLINGER.....	1
36	PAFZZ	06032	2070-6453-003	..SCREW,CAP,HEXAGON H.....	12
37	PAFZZ	38455	5062300	..WASHER,LOCK.....	12
38	PFFZZ	38455	21579-02	..LANTERN,PUMP.....	1
39	PAFZZ	38455	21437	..PAPER,GASKET	1
*40	PAFZZ	80204	B1821BH044C150N 9	..SCREW,CAP,HEXAGON H.....	4
41	PAFZZ	96906	MS35338-47	..WASHER,LOCK.....	4
42	PAFZZ	58501	100-ED39	..BOLT,MACHINE	6
43	PAFZZ	96906	MS35338-45	..WASHER,LOCK.....	6
44	PAFZZ	64678	000933010202	..BOLT,MACHINE	8
45	PAFZZ	15526	DIN1273-M10-A4C	..WASHER,LOCK.....	8
46	PAOZZ	38455	16455-00	..PLUG,PIPE	1
*47	PAFZZ	72962	41NTE164	..NUT,SELF-LOCKING,HE.....	1
*48	XBFZZ	38455	20068-00	..SHIM	1

END OF FIGURE

11 — 12
THRU
15

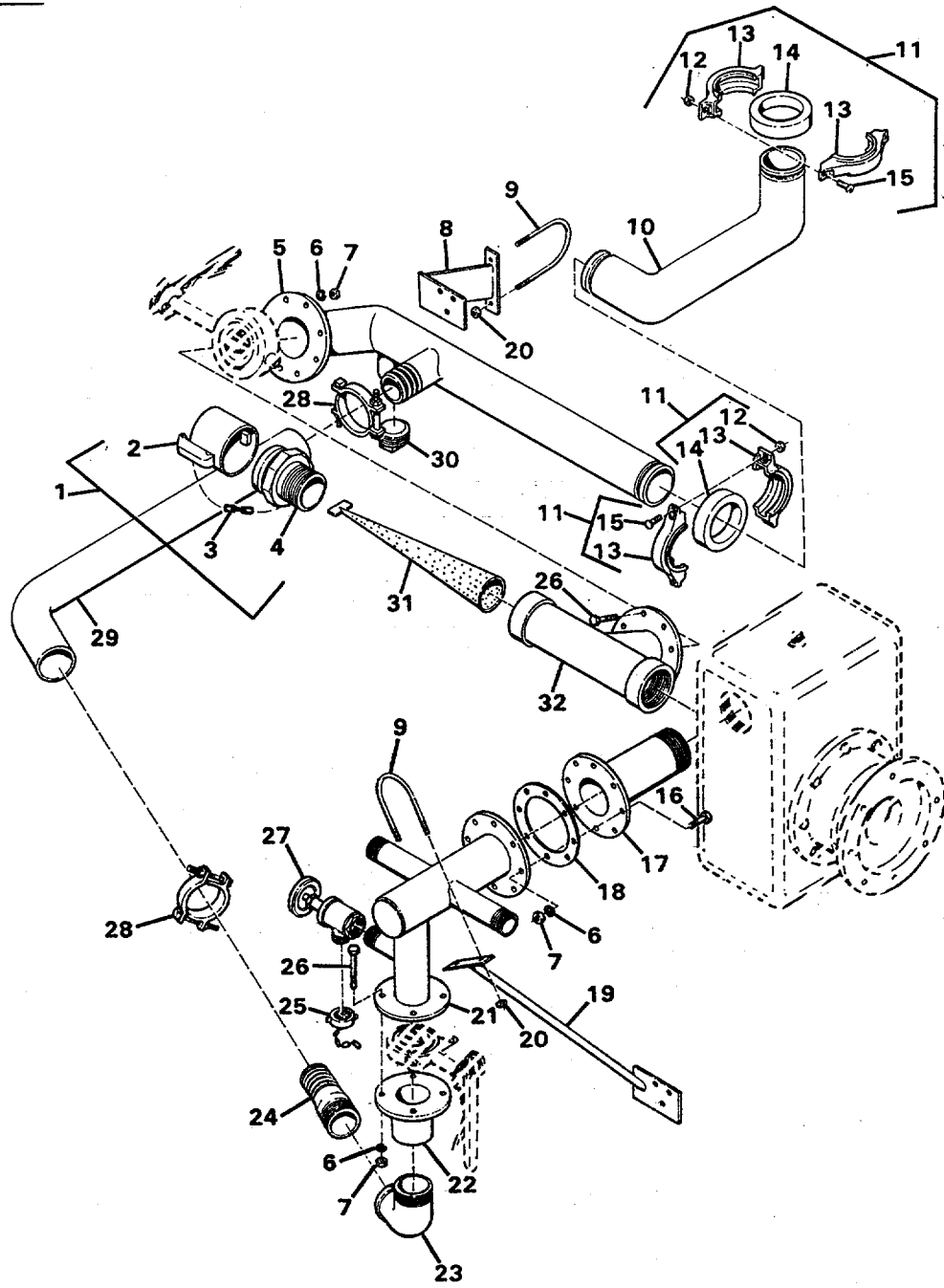


Figure 67. Water Distributing System (Sheet 1 of 2)

33 — 34
THRU
37

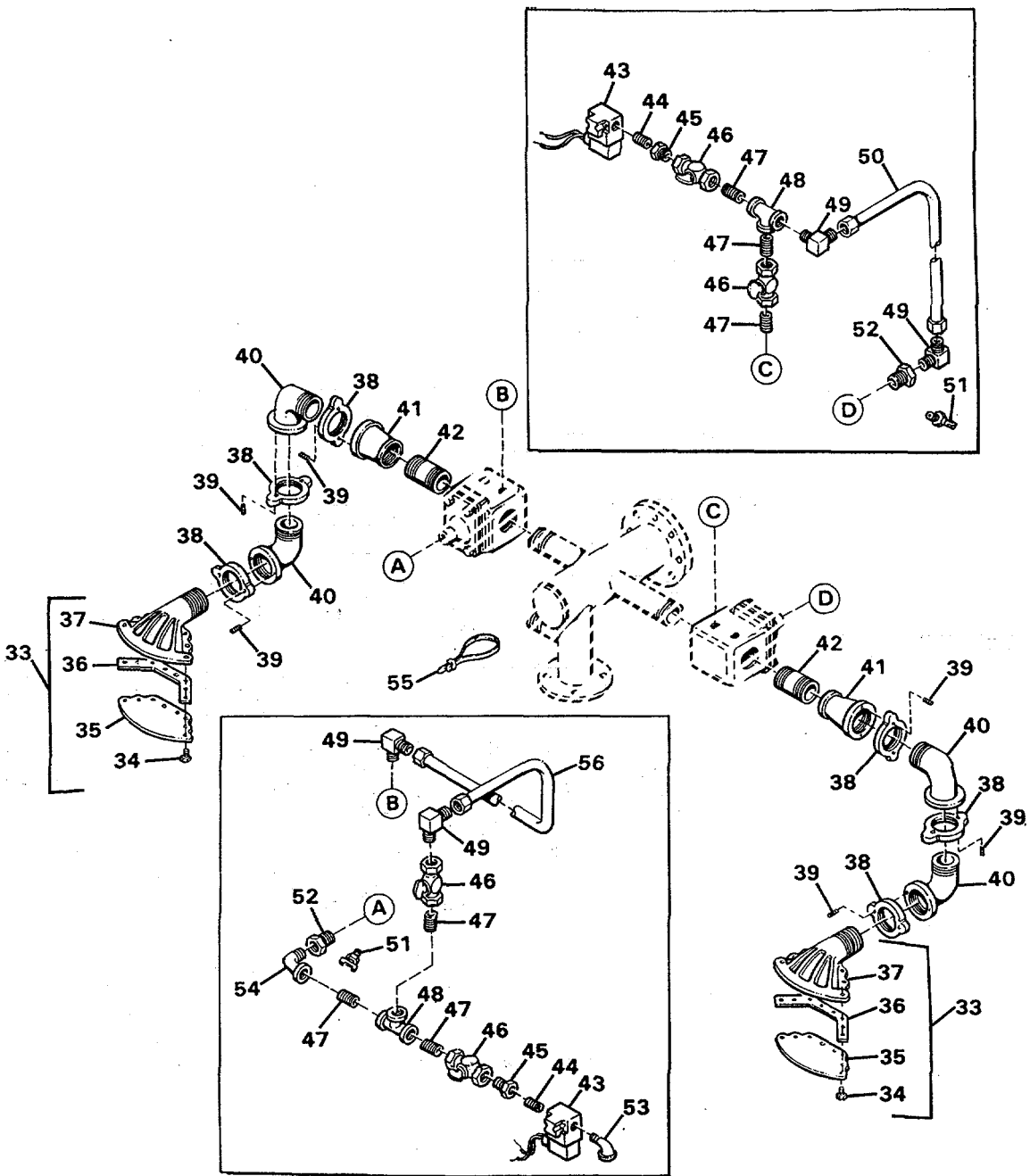


Figure 67. Water Distributing System (Sheet 2 of 2)

SECTION II

TM 5-3825-229-14&P

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
GROUP 7203 DISPENSING AND SERVICING COMPONENTS					
FIGURE 67. WATER DISTRIBUTION SYSTEM					
*1	XDOZZ	80691	40FAL	ADAPTER,STRAIGHT,PI	1
2	PFOZZ	80691	400CAL	.CAP,QUICK,DISCONNEC.....	1
3	PFOZZ	80691	60CHBR	CHAIN,BRASS	1
* 4	XDOZZ	80691	40FAL	.ADAPTERT,QUICK,CONNE.....	1
5	PAOZZ	80195	T2048PL	TUBE,ASSEMBLY,METAL.....	1
6	PAOZZ	96906	MS35338-48	WASHER,LOCK.....	20
7	PAOZZ	24617	120378	NUT,PLAIN,HEXAGON	20
8	PBOZZ	80195	T2048PT	BRACKET,MOUNTING	1
9	PBOZZ	80195	2990003	.BOLT,	2
10	PBOZZ	80195	T2048PG	.ELBOW TUBE	1
* 11	PFOZZ	79154	C-040-075-P-TO	.COUPLING,CLAMP,PIPE.....	2
12	PAOZZ	24617	120378	..NUT,PLAIN,HEXAGON	2
13	XAOZZ	79154	75D-4	COUPLING HALF.....	2
14	PFOZZ	79154	75D-4-G-T	..GASKET.....	1
* 15	PAOZZ	80204	B1821BH05OC275N	.SCREW,CAP,HEXAGON H.....	2
* 16	PAOZZ	80204	B1821BH044C150N	SCREW,CAP,HEXAGON H.....	8
17	PAOZZ	80195	T2048PK	.FLANGE,PIPE	1
18	PAOZZ	80195	2940053	.GASKET.....	1
19	PBOZZ	80195	T2048PR	.BRACE PIPING.....	1
20	PAOZZ	96906	MS51967-8	NUT,PLAIN,HEXAGON	4
21	PAOZZ	80195	T2048PM	HEADER,DISCHARGE.....	1
22	PFOZZ	80195	T2048PP	.ADPATER,STRAIGHT,FL	1
23	PFOZZ	80195	T204830	.ELBOW,PIPE	1
24	PFOZZ	80195	6200575	.ADAPTER,STRAIGHT,PI	1
25	PAOZZ	ONG12	618R	.CAP,VALVE.	1
* 26	PAOZZ	80204	B1821BH050C350N	.SCREW,CAP,HEXAGON H.....	12
27	PFOZZ	ONG12	4065	.VALVE,ANGLE	1
28	PAOZZ	85653	K-39	CLAMP,HOSE.....	2
* 29	MOOZZ	80195	T2048PV	HOSE,RUBBER 37 IN MAKE FROM	7
				TUBING PIN P-1196-3	
30	PAOZZ	80195	6200153	.PLUG,PIPE	1
31	PFOZZ	80195	T2048TM	.STRAINER,SUCTION.....	1
32	PAOZZ	80195	T2048PJ	TEE SUCTION	1
33	PAOZZ	80195	2940006	.NOZZLE,DISTRIBUTION.....	2
34	PAOZZ	96906	MS35307-305	..SCREW,CAP,HEXAGON H.....	38
35	PBOZZ	80195	2940008	..PLATE BOTTOM.....	1
36	PAOZZ	80195	2940009	..GASKET.....	1
37	PBOZZ	80195	2940007	.PLATE,MOUNTING	1
38	PFOZZ	80195	2940005	.RING, LOCKING	6
39	PFOZZ	24617	127796	SET SCREW	12
40	PFOZZ	96906	MS39230-10	.ELBOW,PIPE	4
41	PAOZZ	80195	6200063	.COUPLING,PIPE.....	2
42	PFOZZ	91340	D9485-42-22	.NIPPLE,PIPE	2
43	PAOZZ	97999	35A-AAA-DDBA-1BA	.VALVE,SOLENOID.....	2
* 44	PFOZZ	96906	MS51953-1B	.NIPPLE,PIPE	2
* 45	PFOZZ	81348	WWP471	.BUSHING,PIPE	2
46	PFOZZ	72219	41-560-01	.COCK,PLUG	4
47	PFOZZ	96906	MS51873-25	NIPPLE,PIPE.....	6

SECTION II

TM 5-3825-229-14&P

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
48	PFOZZ	24611	144083.	TEE,PIPE.....	2
49	PFOZZ	79470	1469X6.	ELBOW,PIPE TO TUBE.....	4
50	MOOZZ	79470	PFT-6B-1J	.TUBING,NYLON 1 IN MAKE FROM P/N..... PFT-68	1
51	PFOZZ	96906	MS35782-5	.COCK,DRAIN	2
52	PFOZZ	96906	MS14304-ITC804	.BUSHING,PIPE.....	2
53	PFOZZ	24617	144112	.ELBOW,PIPE	1
54	PFOZZ	24617	105422	.ELBOW,PIPE.....	2
55	PAOZZ	59730	TY409	.STAP,TIEDOWN.....	3
56	MOOZZ	7947U	PFT-6B-5	.TUBINGPNYLCN 5 IN MAKE FROM P/N..... PFT-6B	1

END OF FIGURE

2
THRU
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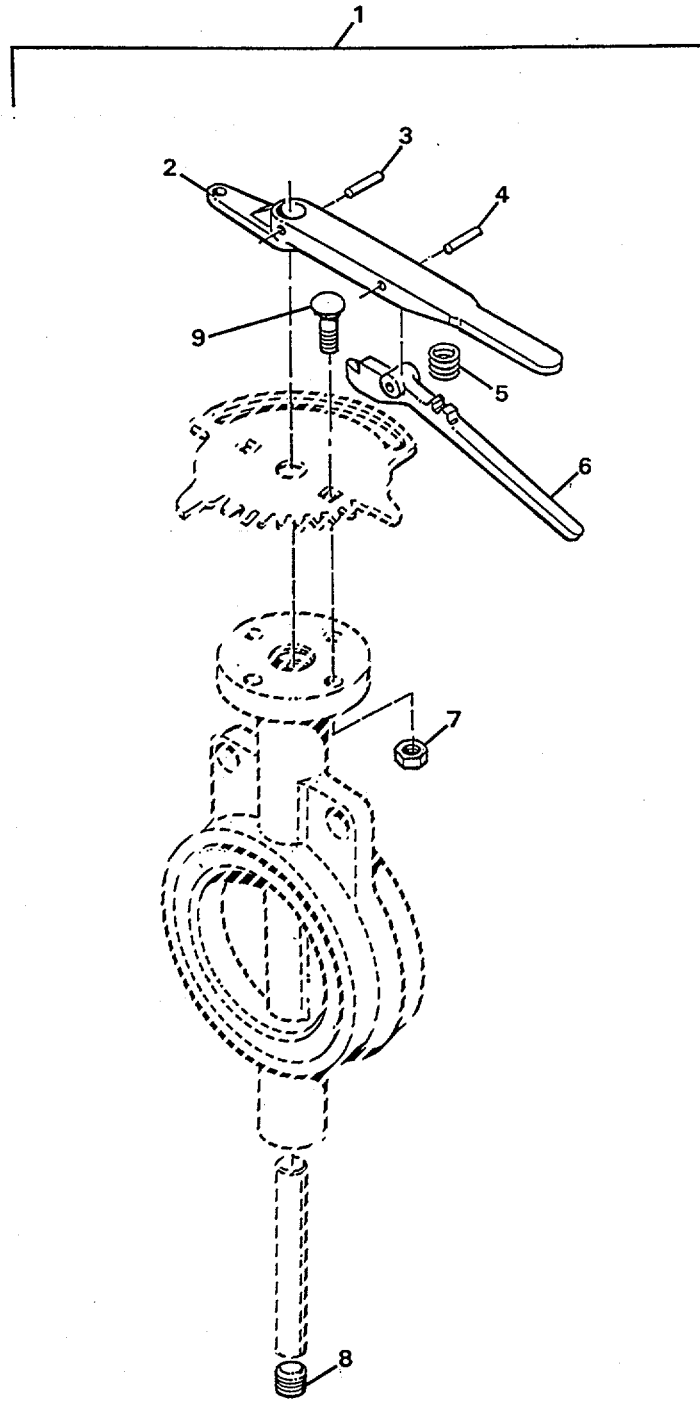


Figure 68. Large Butterfly Valve

SECTION II

TM 5-3825-229-14&P

(1)	(2)	(3)	(4)	(5)	(6)
ITEM	SMR	FSCM	PART		
NO	CODE		NUMBER	DESCRIPTION AND USABLE ON CODES(UOC)	QTY

GROUP 7203 DISPENSING AND SERVICING COMPONENTS

FIGURE 68. LARGE BUTTERFLY VALVE

I	PAOOO	83195	204837	VALVE,BUTTERFLY	1
2	PAOZZ	82666	DS3-E-4-J5	.HANDLE,MANUAL.....	20
3	PAOZZ	82666	DS3-E-4-18	..PINSTRAIGHT,HEADLE.....	1
4	PAOZZ	82666	DS3-E-4-09	..PIN,STRAIGHT HEADLE.....	1
5	PAOZZ	82666	DS3-E-4-08	..SPRING,HELICAL,COMP	1
6	PAOZZ	82666	OS3-E-4-07	..LEVER,LOCK-RELEASE.	1
7	PAOZZ	82666	DS3-t-4-03	..WASHER,FLAT	2
8	PFOZZ	82666	DS3-E-4-11	..PLUG;PIPE.	1
9	PFOZZ	82666	DS3-E-4-U2	..SCREW,MACHINE	2

END OF FIGURE

1 — 2
THRU
9

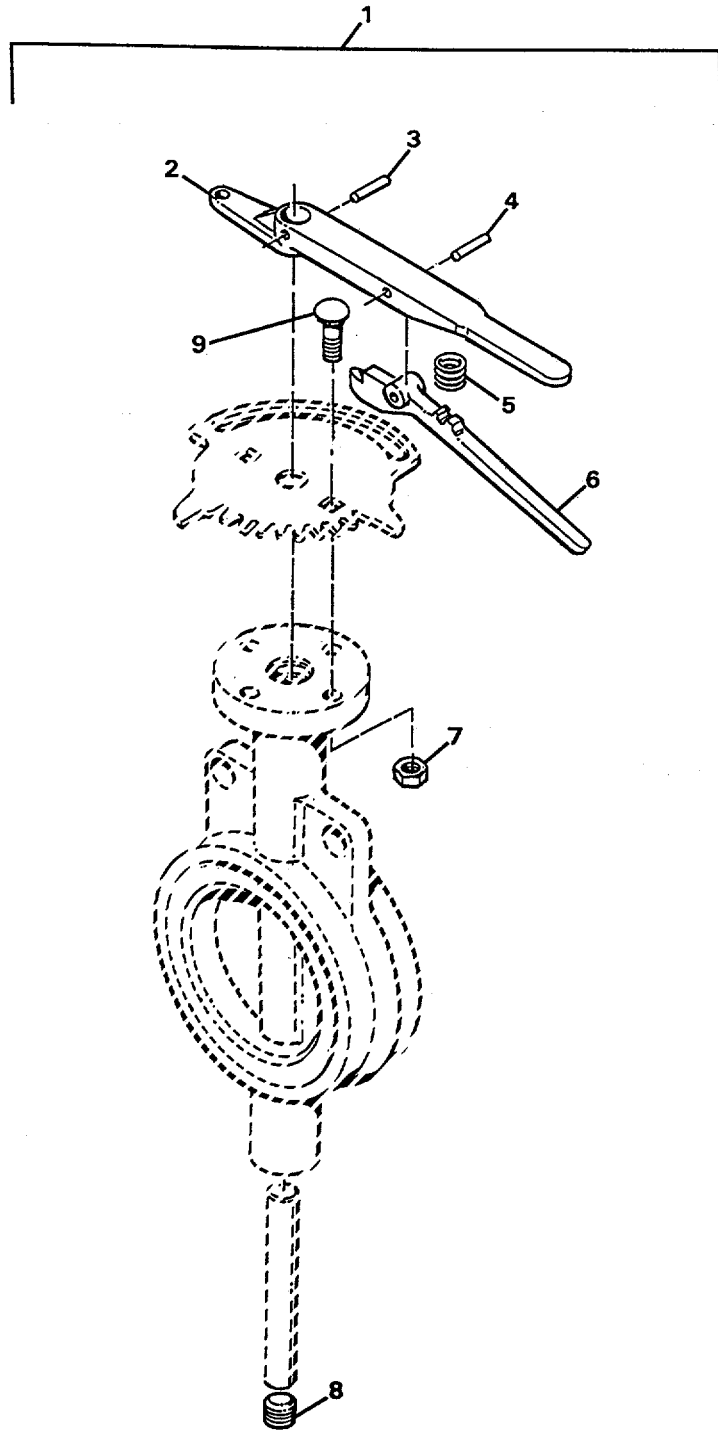


Figure 69. Small Butterfly Valve

SECTION II

TM 5-3825-229-14&P

(1)	(2)	(3)	(4)	(5)	(6)
ITEM	SMR	FSCM	PART		
NO	CODE		NUMBER	DESCRIPTION AND USABLE ON CODES(UOC)	QTY

GROUP 7203 DISPENSING AND SERVICING COMPONENTS

FIGURE 69. SMALL BUTTERFLY VALVE

1	PAOOO	82666	LG-512-DS3-E-3	. VALVE,BUTTERFLY	1
2	PAOZZ	82666	LV341-3	..HANDLE,MANUAL,CON.....	1
3	PAOZZ	82666	DS3-E-3-18	..PIN,STRAIGHT,HEADLE.....	1
4	PAOZZ	82666	DS3-E-3-09	..PINISTRAIGHT,HEADLE.....	1
5	XBOZZ	82666	DS3-E-3-08	..SPRING,HELICALICOMP	1
6	PAOZZ	82666	DS3-E-3-07	..LEVER,LOCK-RELEASE	1
7	PAOZZ	82666	DS3-E-3-03	..WASHER,FLAT	2
8	PFOZZ	82666	DS3-E-3-11	..PLUG,PIPE	1
9	PFOZZ	82666	DS3-E-3-02	..SCREW,MACHINE	2

END OF FIGURE

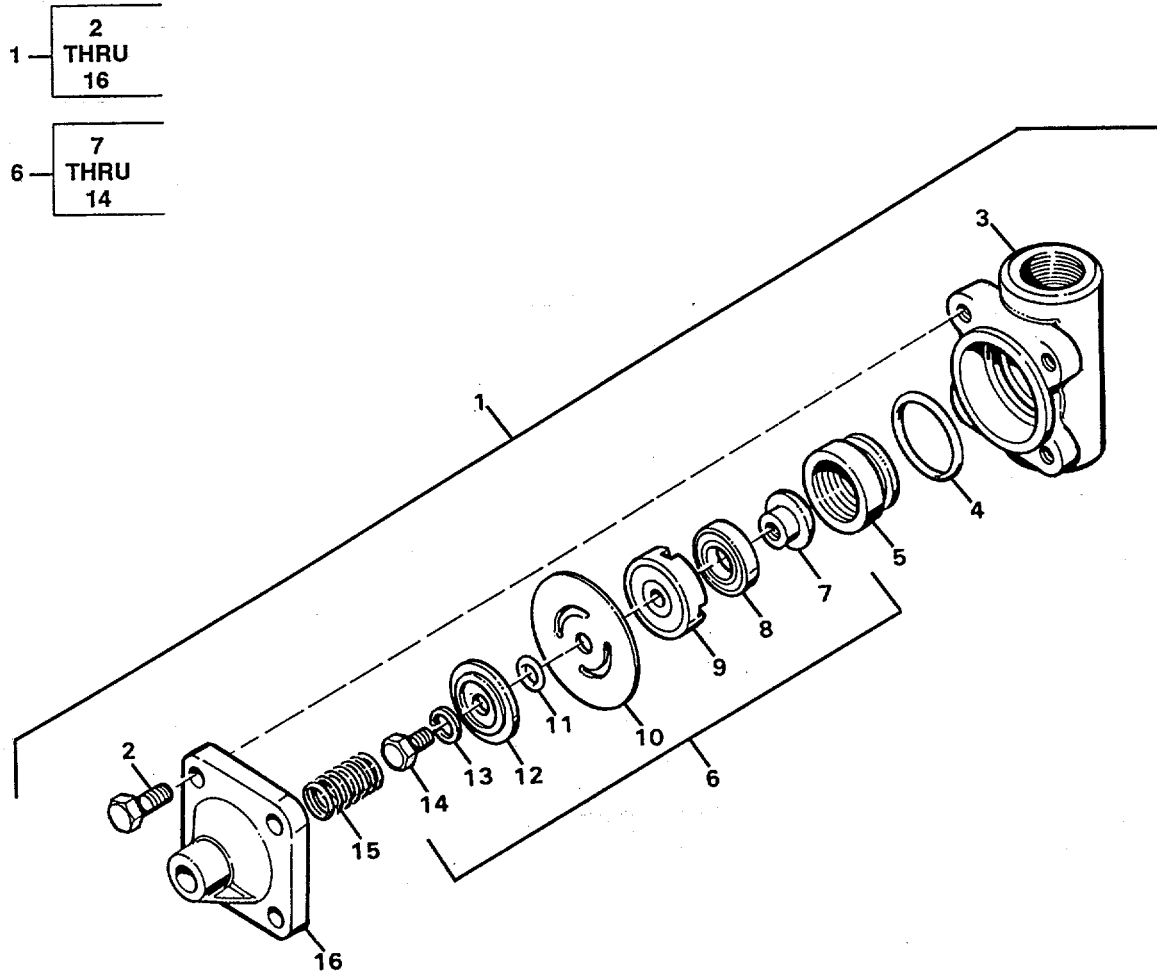


Figure 70. Spray Valve Assembly

SECTION II

TM 5-3825-229-14&P

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
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GROUP 7203 DISPENSING AND SERVICING COMPONENTS

FIGURE 70. SPRAY VALVE ASSEMBLY

1	PAOOO	86184	85682D	SPRAY VALVE ASSY	2
2	PFOZZ	86184	6760750H	..SCREW,CAP,HEXAGON H.....	4
3	P8OZZ	DEG96	33876	..BODY VALVE	1
4	PAOZZ	DEG96	00775H	..PACKING,PREFORMED	1
5	PAOZZ	86184	33879	..SEAT,VALVE	1
6	PAOZZ	DEG96	82557-03	..DIAPHRAGM ASSEMBLY	1
7	XAO LZ	DEG96	74821	...GUIDE DISC	1
8	XAOZZ	DEG96	81858	..DISC.	1
9	XAOZZ	DEG96	74816	...RETAINER.....	1
10	XAOZZ	DEG96	33877	..DIAPHRAGM.....	1
11	XAOZZ	DEG96	00714	...PACKING STEM.....	1
12	XAOZZ	DEG96	74825	...WASHER DIAPHRAGM	1
13	XAOZZ	DEG96	70550-02	...WASHER BELLEVILLE	1
14	XAOZZ	DEG96	74830	...BOLT STEM.....	1
15	PAOZL	DEG96	C-3152	..SPRING,HELICAL,COIMP	1
16	P8OZZ	DEG96	83320-01	..RETAINER,PACKING	1

END OF FIGURE

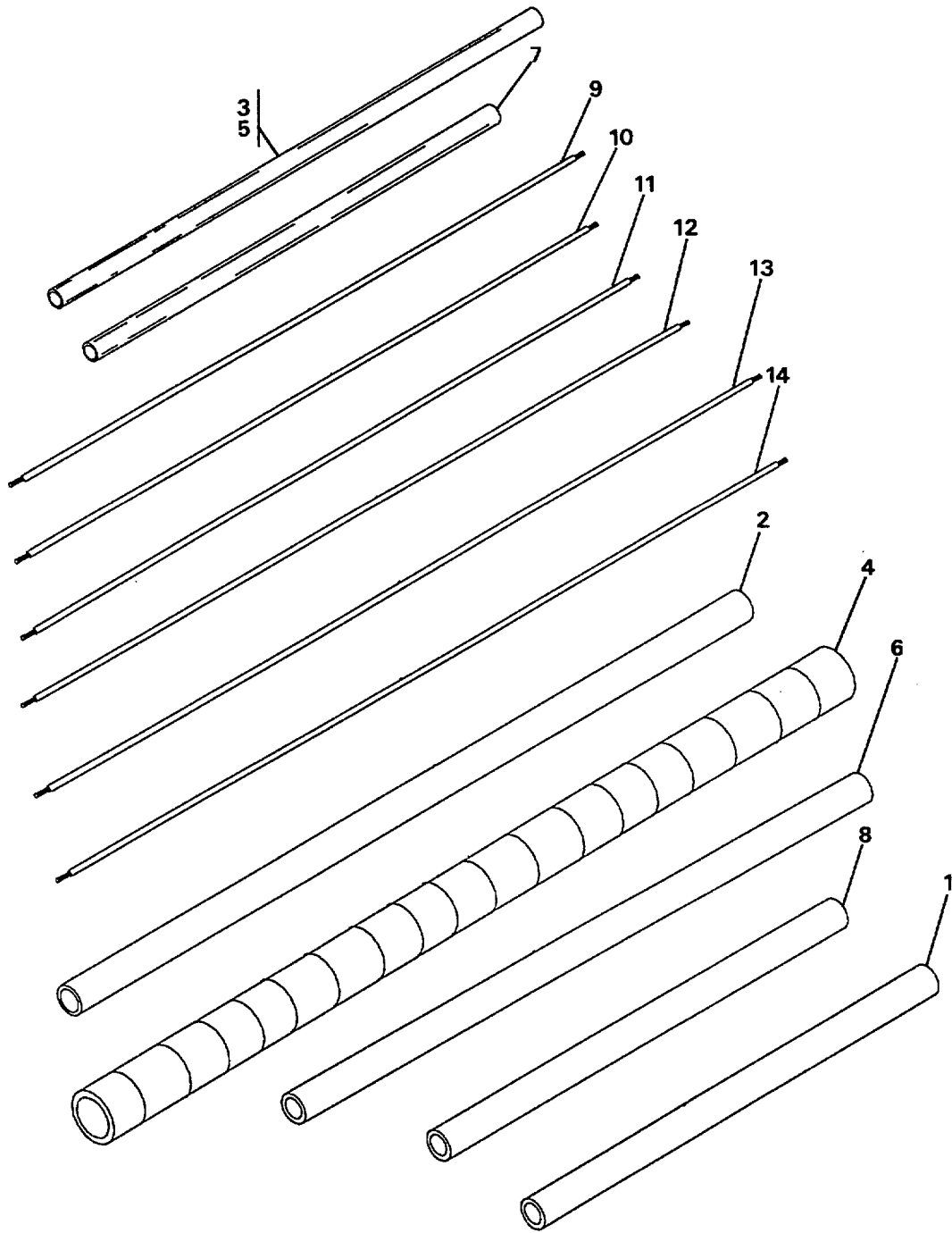


Figure Bulk.

SECTION II

TM 5-3825-229-14&PCO1

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
GROUP 95 GENERAL USE STANDARDIZED PARTS					
GROUP 9501 BULK MATERIEL					
1	PFOZZ	80195	6700710	.CONDUIT,BENT.....	1
2	PFOZZ	70510	LD/EF-1/2	.CONDUIT,METAL,FLEXI.....	1
3	PFOZZ	30327	C608	.HOSE,NONMETALLIC	1
4	PFOZZ	61463	P-1196-3	.HOSE,NONMETALLIC	1
5	XDOZZ	93061	PFT-8B	.HOSE,NONMETALLIC	1
6	PFOZZ	24161	70030	.HOSE,NONMETALLIC	1
7	PFOZZ	79470	PT-240-6B	.TUBING,NONMETALLIC.....	1
8	PFOZZ	61424	PFT-6B	.TUBING,NYLON	1
9	PAOZZ	64488	81142S	.WIRE,ELECTRICAL 14GA, YELLOW.....	1
10	PAOZZ	79550	570D-2	WIRE,ELECTRICAL 14GA, RED.....	1
11	PAOZZ	77060	952G	WIRE,ELECTRICAL 14GA, GREEN.....	1
12	PAOZZ	64488	81146S	.WIRE,ELECTRICAL 14GA, BROWN.....	1
13	PAOZZ	64488	81143S	.WIRE,ELECTRICAL 14GA, BLACK.....	1
14	PAOZZ	79550	572D9	.WIRE,ELECTRICAL 14GA, WHITE	1

END OF FIGURE

SECTION IV

TM5-3825-229-14&PC01

CROSS-REFERENCE INDEXES
NATIONAL STOCK NUMBER INDEX

STOCK NUMBER	FIG.	ITEM	STOCK NUMBER	FIG.	ITEM
2530-00-007-2271	15	12	6240-00-155-8717	11	4
5340-00-009-5294	50	14	5975-00-159-0969	14	25
4730-00-012-7951	57	3	5310-00-167-0721	19	13
5310-00-013-1245	13	3		19	29
	55	3	4820-00-174-0339	33	16
6240-00-013-1282	2	7	9905-00-181-1080	27	1
	2	15	5330-00-184-2761	66	16
	3	6	4310-00-190-0983	50	2
	3	11	2940-00-192-9182	50	12
4730-00-019-2067	18	45	4730-00-196-0888	18	16
4320-00-019-2991	50	15	4730-00-196-1465	67	47
1040-00-019-2992	50	16	4730-00-196-2054	67	44
5305-00-021-3616	67	34	4730-00-196-2075	67	42
4730-00-050-4208	26	14	4730-00-200-0531	51	6
5310-00-064-8521	22	3	4730-00-202-6693	12	3
5305-00-068-0500	5	4	4720-00-203-6526	53	15
	25	4	4730-00-204-3491	57	1
5305-00-068-0502	4	1	5365-00-204-5061	15	8
	5	15	5310-00-209-0965	66	41
	13	7	4930-00-216-6195	66	21
	14	22	5305-00-225-3843	55	2
	18	29	5306-00-225-8499	5	2
	26	19	4730-00-231-5605	51	4
5305-00-068-0510	18	6		67	54
	2	57	5330-00-245-5503	19	9
4730-00-069-1187	18	11		19	20
	67	49	4730-00-246-9200	67	53
5305-00-071-2055	22	6	4730-00-249-3915	51	7
	66	40	4730-00-253-4420	67	40
	67	16	4730-00-257-2117	67	48
5305-00-071-2067	66	2	4730-00-257-2122	18	44
5305-00-071-2074	67	15	5305-00-269-3211	51	16
5305-00-071-2077	67	26	5305-00-269-3217	31	9
5305-00-071-2237	2	1	5305-00-269-3219	22	11
5975-00-074-2072	14	2	4730-00-277-6199	50	3
5310-00-080-6004	22	9	4730-00-277-8257	18	24
6210-00-122-1200	2	6	4730-00-277-8643	53	16
	3	2	4730-00-278-3721	50	7
5920-00-131-9915	2	22	4730-00-278-4740	53	17
5920-00-133-8663	2	21	4730-00-278-4773	12	4
2530-00-137-9235	18	1	4730-00-278-8829	53	4
5940-00-143-4777	14	32	4730-00-287-0276	53	7
5940-00-143-4794	14	26	4730-00-289-0155	18	38
5975-00-152-1075	14	46	4730-00-289-2830	67	45
5305-00-152-6326	22	13	3110-00-293-8997	19	5
	22	24		19	25
6240-00-155-8717	6	3	3110-00-293-8998	15	5
	7	4	6145-00-310-2590	BULK	10
	8	4	6145-00-310-2598	BULK	13
	9	4	3120-00-322-6430	16	8

SECTION IV

TM5-3825-229-14&PC01

CROSS-REFERENCE INDEXES
NATIONAL STOCK NUMBER INDEX

STOCK NUMBER	FIG.	ITEM	STOCK NUMBER	FIG.	ITEM
4730-00-359-3872	18	14	3110-00-618-0Z49	19	23
5310-00-402-5857	16	5	5940-00-636-5535	14	16
5365-00-406-3791	66	33	5310-00-637-9541	31	3
5310-00-407-9566	5	7		51	14
	66	43	4730-00-639-9730	50	8
5310-00-411-9121	66	18	5930-00-655-1515	2	13
5315-00-411-9127	66	19		3	9
5330-00-412-9924	66	35	4730-00-684-4659	18	40
4320-00-428-2749	66	9	5975-00-714-8031	14	44
4320-00-428-2750	66	7	5305-00-724-7221	22	1
5330-00-432-4218	6	2	4210-00-729-5590	28	4
	7	3	5310-00-732-0558	22	8
				26	9
5330-00-432-4219	10	2		29	4
5975-00-433-5339	67	55		31	2
5975-00-456-0627	14	45		51	13
5930-00-458-7220	1	2		67	20
4730-00-463-3618	51	2	5310-00-761-6882	4	4
5330-00-464-7329	6	4		5	11
	7	5		13	1
	8	5		14	20
6145-00-468-1260	BULK	14		18	32
4820-00-472-4049	67	46		25	6
5310-00-483-8792	2	5		26	17
5310-00-498-2381	24	4	5310-00-768-0318	66	12
	24	10	5305-00-781-3930	26	11
3030-00-528-4238	63	2	5315-00-784-0637	16	7
2610-00-528-9536	21	1	4730-00-802-2237	67	52
5940-00-552-2019	14	33	5365-00-804-2786	37	12
3110-00-554-3079	66	32	5310-00-809-4061	22	22
2640-00-555-2824	20	1	5315-00-816-1794	26	4
5330-00-561-8750	66	39	5310-00-823-8804	2	4
5325-00-579-6134	14	6	4730-00-833-7976	33	11
	25	3		43	2
5310-00-582-5965	4	3	4820-00-836-1598	18	20
	5	5	5975-00-839-5320	14	11
	13	2	4730-00-842-7841	51	12
	14	21	6220-00-844-6471	6	5
	18	31		7	6
	25	5	5935-00-846-3883	5	1
	26	16	2910-00-847-2807	51	9
5310-00-584-5272	67	6	4820-00-849-1220	67	51
4010-00-585-2108	26	22	5945-00-853-6024	4	2
4730-00-595-0251	54	6	4730-00-855-4916	67	11
5310-00-595-7421	22	5	5310-00-880-7744	5	8
5310-00-616-3554	2	19	4820-00-884-5620	66	5
	4	6	2530-00-886-1103	15	4
5340-00-617-7909	50	1	6240-00-889-1799	10	3
3110-00-618-0248	15	20	6220-00-897-5856	9	6
3110-00-618-0249	19	7	5330-00-897-5857	10	4

SECTION IV

TM5-3825-229-14&PCO1

CROSS-REFERENCE INDEXES
NATIONAL STOCK NUMBER INDEX

STOCK NUMBER	FIG.	ITEM	STOCK NUMBER	FIG.	ITEM
5330-00-897-5859	9	5	4820-01-115-0614	66	8
6220-00-897-5860	10	5	2590-01-115-0650	22	12
5925-00-900-1903	5	13		22	20
5310-00-934-9739	2	20	4730-01-115-8269	22	15
	4	5		22	21
5310-00-935-9088	66	47	6220-01-116-1267	11	6
4730-00-947-7498	51	3	4730-01-116-3729	66	30
6145-00-950-4922	BULK	11	5305-01-116-4700	15	10
5305-00-958-0655	2	17	5310-01-116-4762	15	11
	4	10	5310-01-116-4765	15	3
5975-00-959-6187	14	43	5310-01-117-2404	15	2
5340-00-978-3439	18	30	4730-01-118-2594	18	7
5975-00-983-5239	BULK	2	5330-01-121-5360	11	5
5975-00-983-9229	14	13	5305-01-122-2058	66	36
4720-01-003-6706	BULK	3	5315-01-129-6898	15	7
5307-01-007-4931	22	19	5310-01-133-5373	15	9
6220-01-011-8989	8	6	4730-01-134-1278	18	27
4720-01-014-4915	BULK	7	4730-01-134-3571	18	28
9905-01-023-2714	27	2	4730-01-134-7760	18	23
5330-01-023-5229	15	15	5340-01-142-6389	26	21
5330-01-024-2294	15	17	5305-01-149-0867	58	11
4730-01-062-2570	18	21	5306-01-151-9330	19	26
6210-01-069-0434	2	9	5306-01-151-9331	19	16
	2	10	5305-01-155-5440	32	6
	3	5		32	8
4820-01-076-9493	18	34	2530-01-155-5731	18	22
5325-01-078-5180	25	10	5305-01-158-0827	32	1
5940-01-079-1375	14	27		56	3
5940-01-079-1936	14	34	5305-01-158-0831	42	9
5305-01-080-1713	66	28		60	20
5330-01-082-3189	9	3	5360-01-158-1974	16	3
6210-01-083-6258	2	14	5305-01-158-3207	60	2
	3	10		64	5
5930-01-084-2289	2	11	5305-01-159-0065	60	14
	3	7	5305-01-165-0583	35	14
5936-01-084-2371	2	8	5305-01-165-1284	41	32
	3	4	6145-01-165-5632	BULK	9
9905-01-088-2441	30	3	2510-01-165-6140	23	10
9905-01-090-7679	30	1	5365-01-166-0789	23	5
9905-01-090-7680	30	6	4730-01-167-7064	51	1
4730-01-091-8032	18	35	4720-01-169-9891	BULK	8
4730-01-095-7717	18	25	6625-01-175-9998	2	23
4730-01-098-4335	18	41	3120-01-179-4120	15	6
5310-01-101-2029	18	4	2530-01-179-7532	15	16
	25	9	4730-01-185-5348	54	5
5360-01-107-9716	16	1	2530-01-189-6688	19	10
5340-01-113-9708	22	10		19	18
7690-01-114-3702	30	9	5330-01-202-7608	14	24
2590-01-115-0427	22	14	6140-01-210-1964	13	4
	22	17	2940-01-210-9683	43	7

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STOCK NUMBER	FIG.	ITEM	STOCK NUMBER	FIG.	ITEM
		1	3020-01-217-9689	41	30
5310-01-211-3811	31	8	4730-01-218-0395	18	17
4730-01-211-5223	62	3	3020-01-218-2120	40	5
4730-01-211-5224	62	2	3020-01-218-3954	35	16
5340-01-211-6171	32	2	5340-01-223-8667	41	22
2590-01-211-6719	38	.4	3040-01-223-8757	41	21
4730-01-211-8385	53	10	2815-01-223-8798	34	2
2920-01-211-8589	64	13	2815-01-224-0228	40	1
2920-01-211-8618	64	17	2815-01-224-1844	37	5
4720-01-212-2604	54	4	2815-01-224-1940	34	3
5305-01-212-3220	41	19	2915-01-224-2046	12	2
	45	6	3040-01-224-3076	41	6
	60	19	2815-01-224-6181	34	9
	64	3	365-01-225-0720	45	10
5305-01-212-3221	53	11	3020-01-225-6989	41	27
5305-01-212-3227	65	2	5305-01-226-6622	36	1
5310-01-212-3338	49	10	5305-01-226-6623	41	20
5330-01-212-3355	48	5	5305-01-226-6624	41	13
5330-01-212-3356	48	4	5305-01-226-6625	41	14
5330-01-212-3358	38	2	5305-01-226-6626	41	10
5330-01-212-3361	45	9	5305-01-226-6627	42	6
5330-01-212-3363	45	5	5305-01-226-6628	40	6
5310-01-212-3385	58	8		41	18
5310-01-212-3389	32	10		45	3
	58	14	5305-01-226-6629	34	11
	59	4	5305-01-226-6631	33	13
4710-01-212-3407	54	3	3120-01-226-6700	41	8
2815-01-212-4009	36	10	2815-01-227-0517	39	17
5330-01-212-6042	62	1	5330-01-227-3196	36	7
5305-01-213-5015	36	5	5315-01-227-3199	33	10
5305-01-213-5019	41	4	5330-01-227-3341	41	11
	47	4	5330-01-227-3342	41	1
5307-01-213-5020	49	8	5310-01-227-6099	39	6
4320-01-213-6179	66	38	3120-01-227-8646	37	7
3040-01-215-3539	41	31	5310-01-227-8658	41	9
2815-01-215-3569	39	2	5360-01-228-0380	39	11
2815-01-215-3571	39	3	3120-01-228-0462	37	10
2815-01-215-3572	39	7	3020-01-228-3818	41	7
2815-01-215-3573	39	8	5365-01-228-4013	67	38
2815-01-215-3583	39	5	5355-01-228-6054	36	11
2815-01-215-3661	39	4	5340-01-228-6055	34	10
5310-01-215-9458	38	3	5340-01-228-6056	34	7
5330-01-215-9642	41	16	5340-01-228-6057	33	3
3020-01-216-6930	41	24		34	4
2815-01-217-1345	32	11	5340-01-228-6058	34	6
3040-01-217-1347	40	4	5306-01-228-7458	37	11
2815-01-217-1351	39	9	5330-01-229-1985	67	8
5365-01-217-1887	62	10	5930-01-229-2718	1	1
5310-01-217-3368	46	7	5310-01-229-8029	19	14
2920-01-217-6489	46	4	5330-01-229-8942	35	3

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STOCK NUMBER	FIG.	ITEM	STOCK NUMBER	FIG.	ITEM
5330-01-229-8942	35	5	5306-01-276-9191	66	42
6145-01-230-1863	BULK	12	6220-01-283-8703	6	1
5360-01-230-4566	44	2	6220-01-283-8706	7	2
5340-01-230-9790	33	8	5340-01-288-1244	19	11
5340-01-230-9791	33	2		19	19
5315-01-230-9792	33	9	5365-01-289-7520	15	13
5315-01-230-9793	33	15	5310-01-290-2215	15	14
5315-01-230-9794	33	14	4720-01-290-2513	18	33
3120-01-231-0559	33	7	4720-01-290-9208	18	2
3120-01-231-0560	3	3	5330-01-291-5071	19	1
	33	4	4820-01-311-4266	34	8
5340-01-233-1282	33	5	5315-01-311-5863	35	11
3120-01-233-7812	41	28		40	3
3120-01-233-7813	42	5	5365-01-311-6149	39	14
4720-01-238-0193	54	2	5340-01-311-6947	39	15
2815-01-239-2223	37	8	5340-01-311-7098	39	12
5310-01-240-1472	37	9	2815-01-313-4524	39	16
5306-01-240-5171	66	44	2530-01-316-9165	17	1
4730-01-242-4507	18	43	2590-01-318-4232	70	1
5360-01-247-8508	49	14	2910-01-318-4235	53	13
5305-01-260-8929	59	2		53	14
	64	8	2815-01-318-4236	34	1
4820-01-263-6410	57	6		34	5
5310-01-264-9410	66	45	2910-01-318-4237	49	7
5310-01-270-5463	19	28	4910-01-318-7469	22	16
5305-01-273-6251	41	25	4820-01-320-0292	68	1
	62	7	4730-01-320-5318	18	19
4730-01-274-8401	14	9	4730-01-320-5362	66	6
5306-01-275-3242	41	17	2815-01-320-7298	45	2
5310-01-275-3318	44	3	4730-01-320-7353	66	14
	53	12	4710-01-320-8072	53	3
5310-01-275-3323	36	2	4710-01-320-8073	53	9
	52	3	4820-01-320-8852	44	1
	56	4	2815-01-320-8892	33	1
5306-01-275-5001	35	21	2930-01-320-8900	61	3
	41	5	2815-01-320-8920	38	1
	61	4	2815-01-320-8934	48	1
5310-01-276-1660	35	20	2530-01-320-8937	16	2
	40	7	3120-01-320-9634	35	8
	41	3	3120-01-320-9635	35	9
	42	8	3120-01-320-9636	35	19
	45	4	3120-01-320-9637	35	17
	47	3	5330-01-321-0455	47	1
	48	3	5330-01-321-0456	35	2
	61	5	5330-01-321-0510	35	1
	62	6	3120-01-321-0511	35	7
	64	2	3120-01-321-0512	35	18
5310-01-276-8608	32	7	5306-01-321-1994	48	2
	41	15	5330-01-321-2052	61	2
	65	3	5305-01-321-2121	59	6

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STOCK NUMBER	FIG.	ITEM	STOCK NUMBER	FIG.	ITEM
5360-01-321-2357	37	13	4710-01-321-6373	49	2
5975-01-321-3291	14	1	4710-01-321-6374	49	1
5975-01-321-3292	5	6	2815-01-321-6466	40	2
6220-01-321-3295	11	2	3020-01-321-6494	36	4
6220-01-321-3297	8	2	2530-01-321-6510	18	46
5340-01-321-3395	41	23	5310-01-321-6578	58	1
5310-01-321-3476	33	12	5330-01-321-6582	39	1
	34	12	5330-01-321-6595	34	13
	36	6	5330-01-321-6596	11	3
5310-01-321-3478	46	6	3120-01-321-6609	24	5
5310-01-321-4081	43	4		24	11
5310-01-321-4082	41	29	5365-01-321-6610	32	3
	49	9		64	1
5310-01-321-4083	41	26		64	10
5310-01-321-4084	60	16	5365-01-321-6611	63	3
5310-01-321-4088	56	6	5310-01-321-6612	35	13
	58	9	5310-01-321-6613	64	11
	60	3	5310-01-321-6614	50	18
	63	6		58	16
5310-01-321-4932	66	27		60	4
5935-01-321-4951	5	12		64	6
5930-01-321-4987	2	12	5310-01-321-6615	68	7
	3	8	5310-01-321-6616	69	7
5905-01-321-5000	46	3	3130-01-321-6631	66	34
2930-01-321-5471	60	6	5305-01-321-6676	32	5
2815-01-321-5477	41	12		56	7
2815-01-321-5480	64	4	5305-01-321-6684	16	6
2815-01-321-5481	64	9	5310-01-321-6922	50	13
2930-01-321-5486	32	4	5975-01-321-7175	14	5
2815-01-321-5491	36	3	5945-01-321-7211	2	18
2815-01-321-5505	47	2		4	9
2815-01-321-5523	37	6	5975-01-321-7294	2	2
6680-01-321-5883	43	3		3	1
5310-01-321-5930	50	17	5975-01-321-7295	5	14
	58	18	2590-01-321-8094	59	7
	59	5	2590-01-321-8095	59	1
	60	17	2590-01-321-8096	60	9
	64	12	2590-01-321-8097	60	12
5310-01-321-6020	58	2	4820-01-321-8109	69	1
	59	3	5965-01-321-8147	28	3
	60	13	2930-01-321-8283	63	4
5310-01-321-6029	66	11	2815-01-321-8290	42	1
5310-01-321-6030	66	37		42	3
5340-01-321-6066	52	2	2920-01-321-8325	65	1
5365-01-321-6076	58	6	2815-01-321-8346	45	7
5365-01-321-6077	60	10	2930-01-321-8350	62	4
4730-01-321-6284	50	5	2815-01-321-8352	36	8
4730-01-321-6287	50	4	2990-01-321-8360	66	29
4730-01-321-6288	18	10	2815-01-321-8361	63	7
2815-01-321-6309	37	3	2815-01-321-8362	63	1

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STOCK NUMBER	FIG.	ITEM	STOCK NUMBER	FIG.	ITEM
2990-01-321-8491	56	1	5330-01-322-0848	26	6
2940-01-321-8492	50	11	4320-01-322-0921	66	17
2910-01-321-8558	52	1	3040-01-322-0965	66	31
5305-01-321-8572	67	39	4320-01-322-0995	66	25
5310-01-321-8610	18	5	2990-01-322-1038	46	1
	25	8	5340-01-322-1058	28	2
	26	10		28	8
	51	15	5306-01-322-1384	23	1
5340-01-321-8665	14	8	5306-01-322-1420	23	7
	18	39	5330-01-322-1616	5	3
5306-01-321-8721	67	9	3825-01-322-2244	23	9
6220-01-321-9062	10	1	3825-01-322-2245	23	8
6220-01-321-9147	7	1	4320-01-322-2246	66	3
	8	1	2815-01-322-2339	60	1
5315-01-321-9628	68	3	5306-01-322-2392	23	2
5315-01-321-9629	69	3	5306-01-322-2393	23	3
5340-01-321-9631	24	2	4730-01-322-2407	50	9
5340-01-321-9632	24	8	5330-01-322-2434	53	2
5330-01-321-9649	67	14	5305-01-322-2449	68	9
5305-01-321-9664	19	12	5305-01-322-2450	69	9
	19	30	5306-01-322-2452	24	3
5340-01-321-9679	16	4		24	9
5340-01-321-9687	49	11	2590-01-322-2525	60	18
5340-01-321-9688	49	3	4710-01-322-2566	49	5
5305-01-321-9689	62	8	4710-01-322-2567	49	4
5340-01-321-9695	68	6	5365-01-322-2623	31	7
5340-01-321-9696	69	6	5340-01-322-2632	3	13
5340-01-321-9702	68	2	4730-01-322-2687	68	8
5325-01-321-9706	53	8	4730-01-322-2688	69	8
5340-01-321-9718	58	12	2910-01-322-2705	52	5
5305-01-321-9733	63	5	6140-01-322-2781	13	6
4730-01-321-9833	66	4	6680-01-322-2798	12	1
4730-01-321-9834	66	15	6680-01-322-2807	3	14
2590-01-321-9883	32	9	4010-01-322-2824	67	3
2590-0L-321-9884	59	8	5330-01-322-2833	35	4
4730-01-321-9963	66	46	5330-01-322-2848	62	9
2930-01-321-9985	58	5	5340-01-322-2943	22	2
3040-01-321-9993	15	18	5340-01-322-2944	26	8
3040-01-321-9994	15	19	5340-01-322-2950	3	15
2815-01-321-9995	35	6	5340-01-322-2951	4	7
3040-01-321-9997	42	2	5340-01-322-2952	31	6
2510-01-321-9999	60	5	4320-01-322-3489	66	10
3020-01-322-0014	42	7	3825-01-322-3490	66	26
2930-01-322-0062	57	5	5340-01-322-3591	26	23
3040-01-322-0076	24	1	5340-01-322-3611	26	3
2510-01-322-0093	24	13	6150-01-322-4542	46	2
3020-01-322-0096	35	12	5340-01-322-4814	67	19
3020-01-322-0097	62	5	5340-01-322-4815	67	8
3020-01-322-0098	64	7	4730-01-322-4965	14	4
4720-01-322-0116	57	2	4730-01-322-4993	67	31

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STOCK NUMBER	FIG.	ITEM	STOCK NUMBER	FIG.	ITEM
5340-01-322-5097	31	4	5330-01-322-7340	5	9
5365-01-322-5147	2	3	4730-01-322-7637	67	17
4810-01-322-5711	67	43	4330-01-322-7651	51	10
4820-01-322-5716	18	36	4730-01-322-7652	67	21
2540-01-322-5718	25	1	4320-01-322-7775	66	20
2530-01-322-5721	18	12	5970-01-322-8529	14	17
5430-01-322-5727	26	12	4730-01-322-9024	18	42
2530-01-322-5770	19	3	4730-01-322-9112	67	23
4820-01-322-5776	12	5	4730-01-322-9113	67	10
2530-01-322-5780	19	27	4730-01-322-9118	18	37
2530-01-322-5781	19	15	4730-01-322-9119	67	24
2530-01-322-5806	18	15	4730-01-322-9122	18	18
2910-01-322-5807	51	8	4730-01-322-9125	67	41
2510-01-322-5818	2	24	4730-01-322-9129	14	3
2530-01-322-5819	19	8	4730-01-322-9131	14	14
	19	21	4730-01-322-9135	67	22
2510-01-322-5825	26	7	4720-01-322-9144	BULK	6
2520-01-322-5830	15	1	4730-01-322-9171	67	30
4710-01-322-5845	67	5	2920-01-322-9238	55	4
5365-01-322-5978	36	9	5315-01-322-9675	26	5
5330-01-322-6056	67	36	4720-01-322-9785	BULK	4
5340-01-322-6095	26	18	4730-01-322-9878	28	5
6220-01-322-6375	9	2	4720-01-323-0104	57	7
5975-01-322-6434	14	12	3825-1-323-0121	67	35
5310-01-322-6526	49	13	4720-01-323-0272	28	1
5310-01-322-6527	49	13	4720-01-323-0273	28	6
5310-01-322-6528	49	13	2910-01-323-0311	49	12
5310-01-322-6529	49	13	4730-01-323-0970	67	28
5310-01-322-6530	49	13	4730-01-323-1025	18	9
5310-01-322-6531	49	13	5315-01-323-1070	36	12
5310-01-322-6532	49	13	5315-01-323-1071	33	6
5310-01-322-6533	49	13	5315-01-323-1072	68	4
5310-01-322-6534	49	13	5315-01-323-1073	69	4
5340-01-322-6598	31	1	5360-01-323-1078	68	5
5340-01-322-6610	25	2	5340-01-323-1789	22	4
4730-01-322-6642	67	2	4730-01-323-2075	67	32
4730-01-322-6697	67	33	5306-01-323-2680	43	5
5310-01-322-6936	49	13	5330-01-323-2754	45	1
5310-01-322-6937	49	13	5365-01-323-2795	49	13
5310-01-322-6938	49	13	5365-01-323-2796	49	13
5310-01-322-6939	49	13	5365-01-323-2797	49	13
5340-01-322-7104	4	8	5365-01-323-2798	49	13
5305-01-322-7301	45	8	5365-01-323-2799	49	13
5305-01-322-7321	6	6	5365-01-323-2800	49	13
	7	7	5365-01-323-2801	49	13
	8	7	5365-01-323-2802	49	13
	9	7	5365-01-323-2803	49	13
	10	6	5365-01-323-2804	49	13
	11	1	5365-01-323-2805	49	13
	27	3	5365-01-323-2828	49	13

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STOCK NUMBER	FIG.	ITEM	STOCK NUMBER	FIG.	ITEM
5365-01-323-2829	49	13	2530-01-329-7522	19	24
5330-01-323-2923	49	6	2530-01-329-7523	20	2
4730-01-323-3216	14	15	2540-01-329-7524	26	15
4720-01-323-3236	18	3	2590-01-329-7554	22	7
4730-01-323-3317	53	5	5365-01-330-8453	49	13
6140-01-323-3388	13	5	5365-01-330-8454	49	13
5310-01-323-3738	49	13	5365-01-330-8455	49	13
5310-01-323-3739	49	13	5365-01-330-8456	49	13
5340-01-323-3912	31	10	5365-01-330-8457	49	13
5315-01-323-4925	49	15	6160-01-332-8845	13	8
2510-01-323-5313	26	24	5310-01-333-6434	23	6
5340-01-323-5613	26	1	2920-01-334-4326	46	5
5340-01-323-5638	31	5	5305-01-334-9998	70	2
5340-01-323-5697	28	7	2940-01-335-3265	50	10
2910-01-323-7359	49	17	2920-01-335-3463	64	16
5310-01-323-7955	67	7	2815-01-336-3139	31	11
	67	12	6160-01-336-6653	13	9
5340-01-323-8064	55	1	5310-01-336-6855	23	4
5340-01-323-8435	58	4		35	15
	60	15	4820-01-336-9067	29	1
2520-01-323-8681	41	2	4730-01-337-3741	54	1
5340-01-324-0176	60	7	2940-01-337-4186	50	6
5340-01-324-0955	24	7	2815-01-338-7476	37	2
2910-01-324-1235	49	16		37	4
4730-01-324-2078	49	18	2815-01-338-9553	37	1
5940-01-324-4550	14	18	5365-01-339-0675	39	13
5340-01-324-5105	14	23	5305-01-339-0818	52	4
5340-01-324-5156	26	2	9905-01-339-1825	30	8
5330-01-324-7024	38	7	9905-01-339-1826	3	12
5330-01-324-7025	56	5	9905-01-339-1827	30	7
6150-01-325-2988	14	41	9905-01-339-1828	30	4
4030-01-325-5165	26	13	9905-01-339-1829	30	2
5365-01-325-5171	49	13	4820-01-340-0282	67	27
5340-01-325-5927	58	7	4820-01-340-5877	29	7
	60	11	4730-01-340-5981	29	2
5340-01-325-5948	39	10	4820-01-340-6093	29	3
5340-01-325-5958	16	9		29	6
6115-01-325-6215	64	15	2910-01-341-2222	66	13
6115-01-325-6228	64	14	4730-01-346-4594	53	6
4820-01-325-6350	70	5	5340-01-346-7930	69	2
4320-01-325-6373	66	1	5340-01-346-9436	18	50
6130-01-325-6732	5	10	5120-01-347-9554	12	6
6620-01-325-6749	61	1	5310-01-348-6982	18	48
5365-01-325-7318	49	13	2990-01-350-1669	56	2
6150-01-326-2443	14	42	2910-01-350-5050	43	6
5305-01-326-4892	63	8	5310-01-351-7544	18	49
4730-01-328-5539	67	37	5330-01-351-7674	43	1
2530-01-329-7521	19	4	9905-01-351-8919	30	10
	19	22			
2530-01-329-7522	19	6			

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CAGEC	PART NUMBER	PART NUMBER INDEX STOCK NUMBER	FIG.	ITEM
78500	A-1229-W-2545	5310-01-116-4765	15	3
78500	A-15-3275N-716	2530-01-316-9165	17	1
00843	A-8R64	5975-01-321-7294	2	2
			3	1
18265	ABXOO-2250	2940-01-337-4186	50	6
78225	AC04032	2910-00-847-2807	51	9
78500	A1-3236-A-1249	5340-01-321-9679	16	4
78500	A2-3222-Z-1612	2530-01-320-8937	16	2
15175	A51655-14	3110-00-554-3079	66	32
25567	B-0611	5305-00-269-3219	22	11
03743	BL100	5975-00-714-8031	14	44
80204	B1821BH025C100N	5305-00-225-3843	55	2
80204	B1821BH638CI00N	5305-00-068-0510	18	6
			25	7
80204	B1821BH038C475N	5305-00-781-3930	26	11
80204	B1821BH044C150N	5305-00-071-2055	22	6
			66	40
			67	16
80204	B1821BH050C125N	5305-00-071-2067	66	2
80204	B1821BH050C275N	5305-00-071-2074	67	15
80204	B1821BH050C354N	5305-00-071-2077	67	26
80204	B1821BH063C175N	5305-00-724-7221	22	1
79154	C-040-075-P-TO	4730-00-855-4916	67	11
OEG96	C-3152		70	15
03743	CG-6275	5975-00-456-0627	14	45
03743	CG87100	5975-00-959-6187	14	43
15434	C0101049000		35	10
15434	C0101049100	3120-01-320-9634	35	8
15434	C0101049200	3120-01-320-9635	35	9
15434	C0101049300	3120-01-321-0511	35	7
15434	C0101049500	3120-01-321-0512	35	18
15434	C0101051100	3120-01-231-0559	33	7
15434	C0101058400	5330-01-321-0510	35	1
15434	C0101059200	2815-01-212-4009	36	10
15434	C0101061600	3120-01-320-9636	35	19
15434	C0101061700	3120-01-320-9637	35	17
15434	C0101062501	2815-01-321-8352	36	8
15434	C0101063000	5330-01-227-3196	36	7
15434	C0101076200	3120-01-231-0560	3	3
			33	4
15434	C0101077600	5330-01-321-0456	35	2
15434	C0102098100	5330-01-323-2754	45	1
15434	C0102113900	2815-01-321-8346	45	7
15434	C0102114600	5365-01-225-0720	45	10
15434	C0102114700	5330-01-212-3361	45	9
15434	C0103071600	2520-01-323-8681	41	2
15434	C0103071900	2815-01-321-5477	41	12
15434	C0103073100	5330-01-227-3341	41	11
15434	C0103073300	5330-01-227-3342	41	1
15434	C0103073500	5340-01-223-8667	41	22
15434	C0103075000	3040-01-223-8757	41	21

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CAGEC	PART NUMBER	PART NUMBER INDEX STOCK NUMBER	FIG.	ITEM
15434	C0104113800	3020-01-218-3954	35	16
15434	C0104126400	2815-01-321-5491	36	3
15434	C0104144801	2815-01-321-9995	35	6
15434	C0104147000	3020-01-322-0096	35	12
15434	C0104167800	3020-01-321-6494	36	4
15434	C0104169000	5315-01-323-1070	36	12
15434	C0105050800	3040-01-224-3076	41	6
15434	C0105051300	3020-01-228-3818	41	7
15434	C0105051500	3020-01-218-2120	40	5
15434	C0105051700	2815-01-321-6466	40	2
15434	C0105051900	3120-01-226-6700	41	8
15434	C0105053400	3040-01-217-1347	40	4
15434	C0105088500	3020-01-217-9689	41	30
15434	C0110275200	2815-01-217-1351	39	9
15434	C0110278101	4820-01-311-4266	34	8
15434	C0110284000	2815-01-227-0517	39	17
15434	C0110284600	2815-01-224-1940	34	3
15434	C0110284700	2815-01-223-8798	34	2
15434	C0110299100	5340-01-311-7098	39	12
15434	C0110301200	5330-01-321-6595	34	13
15434	C0110302500	5330-01-321-6582	39	1
15434	C0110303902	5340-01-311-6947	39	15
15434	C0110322601	2815-01-224-6181	34	9
15434	C0110324500	2815-01-215-3573	39	8
15434	C0110330000	5360-01-228-0380	39	11
15434	C0110343200	5365-01-311-6149	39	14
15434	C0110344201	2815-01-318-4236	34	1
			34	5
15434	C0110344903	2815-01-320-8892	33	1
15434	C0110349900	5315-01-323-1071	33	6
15434	C0110351900	5340-01-325-5948	39	10
15434	C0112016500	2815-01-224-1844	37	5
15434	C0112018901	2815-01-321-5523	37	6
15434	C0113027201	5360-01-321-2357	37	13
15434	C0113027301	2815-01-321-6309	37	3
15434	C0113027501	2815-01-338-7476	37	2
			37	4
15434	C0113027801	2815-01-338-9553	37	1
15434	C0114031300	2815-01-239-2223	37	8
15434	C0114031500	5306-01-228-7458	37	11
15434	C0114031600	3120-01-228-0462	37	10
15434	C0114031800	5310-01-240-1472	37	9
15434	C0114031900	3120-01-227-8646	37	7
15434	C0115020200	2815-01-215-3583	39	5
15434	C0115020400	2815-01-215-3571	39	3
15434	C0115023200	5330-01-212-3358	38	2
15434	C0115025300	2815-01-313-4524	39	16
15434	C0115025400	5330-01-324-7024	38	7
15434	C0115027000	2815-01-215-3572	39	7
15434	C0115027200	2815-01-320-8920	38	1
15434	C0115027500	2815-01-224-0228	40	1

CROSS-REFERENCE INDEXES

CAGEC	PART NUMBER	PART NUMBER INDEX STOCK NUMBER	FIG.	ITEM
15434	C0115031300	2815-01-215-3569	39	2
15434	C0115031500	5310-01-227-6099	39	6
15434	C0115031600	2815-01-215-3661	39	4
15434	C0115032000	5310-01-215-9458	38	3
15434	C0120097900	3120-01-233-7813	42	5
15434	C0120098300	3040-01-215-3539	41	31
15434	C0120101100	2815-01-321-8290	42	1
			42	3
15434	C0120103400	2815-01-320-7298	45	2
15434	C0120104100	3120-01-233-7812	41	28
15434	C0120104200		42	4
15434	C0120106300	3020-01-225-6989	41	27
15434	C0120113401	3020-01-322-0014	42	7
15434	C0120120501	3040-01-321-9997	42	2
15434	C0120122200	5330-01-212-3363	45	5
15434	C0122059200	2910-01-350-5050	43	6
15434	C0122074000	5330-01-351-7674	43	1
15434	C0123151100	5360-01-230-4566	44	2
15434	C0123151400	4820-01-320-8852	44	1
15434	C0123151800		38	5
15434	C0123160400		38	6
15434	C0123160500	2590-01-211-6719	38	4
15434	C0123171101	6680-01-321-5883	43	3
15434	C0130187300	5365-01-321-6611	63	3
15434	C0130233800	5340-01-211-6171	32	2
15434	C0130244200	2815-01-321-8362	63	1
15434	C0130244300	2815-01-321-8361	63	7
15434	C0130245200		58	3
15434	C0130245600	2930-01-321-9985	58	5
15434	C0130245800	5365-01-321-6076	58	6
15434	C0130276800	5340-01-321-9718	58	12
15434	C0130283800	2930-01-321-5486	32	4
15434	C0130293300	2590-01-321-9884	59	8
15434	C0130293400	2590-01-321-8094	59	7
15434	C0130293500	2590-01-321-8095	59	1
15434	C0130306000	2815-01-321-5480	64	4
15434	C0131032400	5365-01-217-1887	62	10
15434	C01310344Q0	3020-01-322-0097	62	5
15434	C0131039800	2930-01-321-8350	62	4
15434	C0131045800	5330-01-322-2848	62	9
15434	C0140199102	4730-01-321-6287	50	4
15434	C0147042700	3020-01-216-6930	41	24
15434	C0147046203	2910-01-318-4237	49	7
15434	C0147067500	4710-01-322-2566	49	5
15434	C0147067600	4710-01-322-2567	49	4
15434	C0147067700	4710-01-321-6373	49	2
15434	C0147067800	4710-01-321-6374	49	1
15434	C0147067900	5340-01-321-9687	49	11
15434	C0147068000	5340-01-321-9688	49	3
15434	C0149173200	2805-01-211-2199	53	1
15434	C0149177200	4710-01-320-8072	53	3

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CAGEC	PART NUMBER	PART NUMBER INDEX STOCK NUMBER	FIG.	ITEM
15434	C0149179300	4710-01-320-8073	53	9
15434	C0149214200	2910-01-318-4235	53	14
15434	C0149220700	5330-01-322-2434	53	2
15434	C0154216200	5330-01-212-3355	48	5
15434	C0154229600	2815-01-320-8934	48	1
15434	C0154232500	5330-01-212-3356	48	4
15434	C0154244800	2815-01-321-5505	47	2
15434	C0154275800	5330-01-321-0455	47	1
15434	C0155192000	5330-01-324-7025	56	5
15434	C0155196700	2990-01-321-8491	56	1
15434	C0155206201	2990-01-350-1669	56	2
15434	C0160129200	5355-01-228-6054	36	11
15434	C0191132200	5365-01-321-6610	32	3
			64	1
			64	10
15434	C0191133100	2920-01-211-8589	64	13
15434	C0191133900	3020-01-322-0098	64	7
15434	C0191136500	2920-01-211-8618	64	17
15434	C0191174100	2815-01-321-5481	64	9
15434	C0191187100	6115-01-325-6215	64	15
15434	C0191190900	6115-01-325-6228	64	14
15434	C0309041200	2930-01-320-8900	61	3
15434	C0309048200	5930-01-229-2718	1	1
15434	C0309058500	5330-01-321-2052	61	2
15434	C0336413100	2920-01-217-6489	46	4
15434	C03803813		39	18
15434	C0402051800	5340-01-323-3912	31	10
15434	C0402053900	5340-01-322-2952	31	6
15434	C0403195200	2815-01-217-1345	32	11
15434	C0403203300	2590-01-321-9883	32	9
15434	C0403204200	5365-01-322-2623	31	7
15434	C0403204300	5340-01-322-5097	31	4
15434	C0403204400	5340-01-323-5638	31	5
15434	C0405302800	2590-01-321-8096	60	9
15434	C0405302900	2590-01-321-8097	60	12
15434	C0405303000	2590-01-322-2525	60	18
15434	C0405303100	5365-01-321-6077	60	10
15434	C0405351100	2510-01-321-9999	60	5
15434	C0405357100	2815-01-322-2339	60	1
15434	C0405376800		58	15
15434	C0405377500	2930-01-321-5471	60	6
15434	C0501000200	4720-00-203-6526	53	15
15434	C0502002800	5365-01-339-0675	39	13
15434	C0502005700	4730-00-595-0251	54	6
15434	C0502031700	4730-01-211-5224	62	2
15434	C0502073300	4730-01-211-8385	53	10
15434	C0502077500	4730-01-211-5223	62	3
15434	C0503105300	4710-01-212-3407	54	3
15434	C0503105400	4720-01-238-0193	54	2
15434	C0503105500	4720-01-212-2604	54	4
15434	C0503122200	4730-01-321-6284	50	5

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CAGEC	PART NUMBER	PART NUMBER INDEX STOCK NUMBER	FIG.	ITEM
15434	C0503136600	4720-01-323-0104	57	7
15434	C0503136700	4720-01-322-0116	57	2
15434	C0503140600	4730-01-322-2407	50	9
15434	C0505027400	4730-00-833-7976	33	11
			43	2
15434	C0509020300	5330-01-229-8942	35	3
			35	5
15434	C0509026300	5330-01-215-9642	41	16
15434	C0509026400	5330-01-212-6042	62	1
15434	C0515024500	5315-01-311-5863	35	11
			40	3
15434	C0516210200	5315-01-227-3199	33	10
15434	C0517014000	5340-01-230-9791	33	Z
15434	C0517014100	5340-01-233-1282	33	5
15434	C0517014200	5340-01-228-6056	34	7
15434	C0517014400	5340-01-230-9790	33	8
15434	C0517014600	5340-01-228-6057	33	3
			34	4
15434	C0517016200	5340-01-228-6058	34	6
15434	C0517016700	5340-01-228-6055	34	10
15434	C0517018800	5340-01-321-3395	41	23
15434	C0517062500	5365-01-322-5978	36	9
15434	C0520240300	5307-01-213-5020	49	8
15434	C0526028300	5310-01-321-6612	35	13
15434	C0526032100	5310-01-321-4084	60	16
15434	C0526032200	5310-01-212-3385	58	8
15434	C0526210300	5310-01-321-6614	50	18
			58	16
			60	4
			64	6
15434	C0526210600	5310-01-321-4082	41	29
			49	9
15434	C0526210700	5310-01-321-4083	41	26
15434	C0526210800	5310-01-321-4081	43	4
15434	C0526212300	5310-01-321-6613	64	11
15434	C0526212700	5310-01-227-8658	41	9
15434	C0526214800	5310-01-321-6020	58	2
			59	3
			60	13
15434	C0718102100	5305-01-212-3221	53	11
15434	C0718103500	5305-01-273-6251	41	25
			62	7
15434	C0718103600	5305-01-212-3220	41	19
			45	6
			60	19
			64	3
15434	C0718103700	5306-01-275-5001	35	21
			41	5
			61	4
15434	C0718103900	5305-01-165-1284	41	32
15434	C0718104100	5305-01-158-0831	42	9

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CAGEC	PART NUMBER	PART NUMBER INDEX STOCK NUMBER	FIG.	ITEM
15434	C0718104400	5305-01-226-6628	40	6
			41	18
			45	3
15434	C0718104600	5305-01-226-6624	41	13
15434	C0718104700	5305-01-321-9733	63	5
15434	C0718104800	5306-01-275-3242	41	17
15434	C0718105400	5305-01-158-0827	32	1
			56	3
15434	C0718106400	5305-01-226-6626	41	10
15434	C0718107300	5305-01-155-5440	32	6
			32	8
15434	C0718107800	5305-01-213-5015	36	5
15434	C0718108500	5305-01-226-6625	41	14
15434	C0718180100	5305-01-213-5019	41	4
			47	4
15434	C0718180700	5305-01-321-6676	32	5
			56	7
15434	C0720104400	5305-01-321-9689	62	8
15434	C0720112300	5305-01-165-0583	35	14
15434	C0720180100	5305-01-226-6631	33	13
15434	C0720180200	5305-01-226-6629	34	11
15434	C0720180400	5305-01-226-6622	36	1
15434	C0720180600	5305-01-212-3227	65	2
15434	C0725105100	5306-01-323-2680	43	5
15434	C0725107400	5305-01-339-0818	52	4
15434	C0725180200	5305-01-226-6627	42	6
15434	C0740100400	5310-01-275-3318	44	3
			53	12
15434	C0740100600	5310-01-276-1660	35	20
			40	7
			41	3
			42	8
			45	4
			47	3
			48	3
			61	5
			62	6
			64	2
15434	C0740100800	5310-01-275-3323	36	2
			52	3
			56	4
15434	C0740101000	5310-01-276-8608	32	7
			41	15
			65	3
15434	C0740180100	5310-01-321-3476	33	12
			34	12
			36	6
15434	C0750100200	5310-01-217-3368	46	7
15434	C0750100600	5310-01-212-3338	49	10
15434	C0775007400	5315-01-230-9792	33	9
15434	C0775007800	5315-01-230-9794	33	14

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CAGEC	PART NUMBER	PART NUMBER INDEX STOCK NUMBER	FIG.	ITEM
15434	C0775008900	5315-01-230-9793	33	15
15434	C0800205000		58	10
			58	17
15434	C0800205200	5305-01-158-3207	64	5
15434	C0800205400	5305-01-149-0867	58	11
15434	C08002062000	5305-01-158-0831	60	20
15434	C0800210000	5305-01-260-8929	59	2
			64	8
15434	C0800211200	5305-01-321-2121	59	6
15434	C0800252400	5306-01-321-1994	48	2
15434	C0815057800	5305-01-226-6623	41	20
15434	C0815072200	5305-01-322-7301	45	8
15434	C0821203300	5305-01-326-4892	63	8
15434	C0850200500	5310-01-321-3478	46	6
15434	C0850200800	5310-01-321-4088	56	6
			58	9
			60	3
			63	6
15434	C0850201200	5310-01-212-3389	32	10
			58	14
			59	4
15434	C0860200800	5310-01-321-5930	50	17
			58	18
			59	5
			60	17
15434	C0860200900	5310-01-321-5930	64	12
15434	C0860201000	5310-01-321-6578	58	1
66295	C32P	4730-00-204-3491	57	1
16003	C43974	4010-00-585-2108	26	22
79470	C5105X5	4730-00-287-0276	53	7
79470	C5165X5	4730-01-346-4594	53	6
30327	C608	4720-01-003-6706	BULK	3
70277	C7010-28-24		26	20
ONG12	DFVS40	4820-01-336-9067	29	1
15526	DIN127B-M10-A4C	5310-01-264-9410	66	45
82666	DS3-E-3-02	5305-01-322-2450	69	9
82666	DS3-E-3-03	5310-01-321-6616	69	7
82666	DS3-E-3-07	5340-01-321-9696	69	6
82666	DS3-E-3-08		69	5
82666	DS3-E-3-09	5315-01-323-1073	69	4
82666	DS3-E-3-11	4730-01-322-2688	69	8
82666	DS3-E-3-18	5315-01-321-9629	69	3
82666	DS3-E-4-02	5305-01-322-2449	68	9
82666	DS3-E-4-03	5310-01-3Z1-6615	68	7
82666	DS3-E-4-05	5340-01-321-9702	68	2
82666	DS3-E-4-07	5340-01-321-9695	68	6
82666	DS3-E-4-08	5360-01-323-1078	68	5
82666	DS3-E-4-09	5315-01-323-1072	68	4
82666	DS3-E-4-11	4730-01-322-2687	68	8
82666	DS3-E-4-18	5315-01-321-9628	68	3
91340	D9485-42-22	4730-00-196-2075	67	42

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CAGEC	PART NUMBER	PART NUMBER INDEX STOCK NUMBER	FIG.	ITEM
01276	FL5507GHG0320	4720-01-290-9208	18	2
01276	FL5507GHG0540	4720-01-290-2513	18	33
0NG12	FVFA40	4820-01-340-6093	29	3
			29	6
0NG12	FVSP40	4820-01-340-5877	29	7
0NG12	FVS40	4730-01-340-5981	29	2
18265	FWG06-5304	2940-01-335-3265	50	10
81349	F02A32V20A	5920-00-131-9915	2	22
18265	GAX00-1966	4310-00-190-0983	50	2
03743	GK50-N	5330-01-202-7608	14	24
81348	GP3STYLXTYBACL/ T/11.00-22.50/F/	2610-00-528-9536	21	1
24161	HC-38	3030-00-528-4238	63	2
78500	HM-218248	3110-00-618-0248	15	20
60038	HM212011	3110-00-293-8997	19	5
			19	25
52676	HM212049	3110-00-293-8998	15	5
60038	HM218210	3110-00-618-0249	19	7
			19	23
96046	HN4-L	4730-01-322-9878	28	5
73972	HT-518	2530-01-329-7522	19	6
			19	24
73972	T-518-K	530-01-329-7521	19	4
			19	22
79146	H0169-6X4	4730-00-069-1187	18	11
85653	K-39	4730-01-323-0970	67	28
26622	KSD3030FC-00291	2530-01-321-6510	18	46
26622	KSD4940022		18	47
26622	KSD4940024	5310-01-351-7544	18	49
26622	KSD4940257	5310-01-348-6982	18	48
26622	KSD4940283	5340-01-346-9436	18	50
03743	K50	5975-00-159-0969	14	25
61397	LCS-S200-BB	2915-01-224-2046	12	2
70510	LD/EF-1/2	5975-00-983-5239	BULK	2
82666	LG-512-DS3-E-3	4820-01-321-8109	69	1
82666	LV341-3	5340-01-346-7930	69	2
61964	LY2F-DC12	5945-01-321-7211	2	18
			4	9
15434	L423D-P/10929E	2815-01-336-3139	31	11
34623	MA242A-21090	9905-01-090-7680	30	6
96906	MS14304-IT0804	4730-00-802-2237	67	52
96906	MS15003-1	4730-00-050-4208	26	14
96906	MS16625-1125	5365-00-804-2786	37	12
96906	MS17829-4C	5310-00-483-8792	2	5
96906	MS17829-8C	5310-00-595-7421	22	5
96906	MS18154-67	5305-00-152-6326	22	13
			22	24
96906	MS25036-112	5940-00-143-4794	14	26
96906	MS25036-157	5940-00-143-4777	14	32
96906	MS27183-14	5310-00-080-6004	22	9
96906	MS27183-15	5310-00-809-4061	22	22

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CAGEC	PART NUMBER	PART NUMBER INDEX STOCK NUMBER	FIG.	ITEM
96906	MS27183-9	5310-00-823-8804	2	4
96906	MS3367-1-9	5975-00-074-2072	14	2
96906	MS35058-23	5930-00-655-1515	2	13
			3	9
96906	MS35207-214	5305-00-958-0655	2	17
			4	10
96906	MS35307-305	5305-00-021-3616	67	34
96906	MS35333-41	5310-00-167-0721	19	13
			19	29
96906	MS35335-29	5310-00-616-3554	2	19
			4	6
96906	MS35338-44	5310-00-582-5965	4	3
			5	5
			13	2
			14	21
			18	31
			25	5
			26	16
96906	MS35338-45	5310-00-407-9566	5	7
			66	43
96906	MS35338-46	5310-00-637-9541	31	3
			51	14
96906	MS35338-47	5310-00-209-0965	66	41
96906	MS35338-48	5310-00-584-5272	67	6
96906	MS35489-80	5325-00-579-6134	14	6
			25	3
96906	MS35649-242	5310-00-934-9739	2	20
			4	5
96906	MS35782-5	4820-00-849-1220	67	51
96906	MS35849-52		26	25
96906	MS39176-4	4730-00-278-8829	53	4
96906	MS39230-10	4730-00-253-4420	67	40
96906	MS39233-1	4730-00-947-7498	51	3
96906	MS51873-25	4730-00-196-1465	67	47
96906	MS51953-1B	4730-00-196-2054	67	44
96906	MS51953-49	4730-00-019-2067	18	45
96906	MS51967-14	5310-00-768-0318	66	12
96906	MS51967-2	5310-00-761-6882	4	4
			5	11
			13	1
			14	20
			18	32
			25	6
			26	17
96906	MS51967-5	5310-00-880-7744	5	8
96906	MS51967-8	5310-00-732-0558	22	8
			26	9
			29	4
			31	2
			51	13
			67	20

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CAGEC	PART NUMBER	PART NUMBER INDEX STOCK NUMBER	FIG.	ITEM
96906	MS51983-7	5310-01-270-5463	19	28
96906	MS51983-8	5310-01-229-8029	19	14
96906	MS52149-1	6140-01-210-1964	13	4
96906	MS75021-1	5935-00-846-3883	5	1
96906	MS90725-14	5305-00-071-2237	2	1
96906	MS90725-3	5305-00-068-0500	5	4
			25	4
96906	MS90725-34	5306-00-225-8499	5	2
96906	MS90725-6	5305-00-068-0502	4	1
			5	15
			13	7
			14	22
			18	29
			26	19
96906	MS90725-60	5305-00-269-3211	51	16
96906	MS90725-67	5305-00-269-3217	31	9
3N649	M002T56072	2920-01-321-8325	65	1
66295	M5	4730-01-167-7064	51	1
81349	M7928/5-4	5940-01-079-1375	14	27
81349	M7928/5-5	5940-01-079-1936	14	34
11583	N676	5330-00-245-5503	19	9
			19	20
61463	P-1196-3	4720-01-322-9785	BULK	4
18265	P-7191	5340-00-617-7909	50	1
61424	PFT-6B	4720-01-169-9891	BULK	8
79470	PFT-6B-10		67	50
93061	PFT-6B-13		18	54
93061	PFT-6B-20		18	51
			18	52
93061	PFT-6B-28		13	13
93061	PFT-6B-29		18	56
93061	PFT-6B-3		18	58
93061	PFT-6B-48		14	7
79470	PFT-6B-5		67	56
93061	PFT-6B-54		14	28
93061	PFT-6B-6		14	29
93061	PFT-6B-7		18	53
93061	PFT-8B		BULK	5
93061	PFT-8B-19		18	57
93061	PFT-8B-28		18	55
93061	PFT-8B-29		18	26
73370	PH3616	2940-01-210-9683	43	7
13445	PL-19-GC	6210-00-122-1200	2	6
			3	2
13445	PL-20-AC	6210-01-083-6258	2	14
			3	10
13445	PL-20-RC	6210-01-069-0434	2	9
			2	10
			3	5
93236	PL12M	4730-00-249-3915	51	7
79470	PT-240-6B	4720-01-014-4915	BULK	7

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CAGEC	PART NUMBER	PART NUMBER INDEX STOCK NUMBER	FIG.	ITEM
93061	PT-240-6B-23		14	30
93061	PT-240-6B-76		14	31
18265	P00-2940	5340-00-009-5294	50	14
18265	P10-1270	5310-01-321-6922	50	13
18265	P10-2510	4320-00-019-2991	50	15
18265	P10-2805	1040-00-019-2992	50	16
18265	P15-2790	2940-01-321-8492	50	11
93061	P6MC4	4730-01-322-9129	14	3
93061	P6ME4	4730-01-322-9131	14	14
13548	R1-2	9905-00-181-1080	27	1
78500	S-254	5305-01-321-6684	16	6
78500	S-266-P	5305-01-116-4700	15	10
18265	SMP18-1052	2940-00-192-9182	50	12
11815	SSP-4-3		30	5
06721	T0-3155900	2530-01-322-5721	18	12
59730	TY409	5975-00-433-5339	67	55
15235	T17AND170F	5975-00-839-5320	14	11
80195	T2048BU	2520-01-3Z2-5830	15	1
80195	T2048CA	6680-01-322-2798	12	1
80195	T2048CB	4820-01-322-5776	12	5
80195	T2048CC	6160-01-336-6653	13	9
80195	T2048EC	5340-01-322-2951	4	7
80195	T2048ED	5340-01-322-2632	3	13
80195	T2048EE	2510-01-322-5818	2	24
80195	T2048EF	4030-01-325-5165	26	13
80195	T2048EG	5340-01-322-2950	3	15
80195	T2048EH		9	1
80195	T2048EJ	5975-01-321-3292	5	6
80195	T2048EK	5330-01-322-7340	5	9
80195	T2048EL	4730-01-322-4965	14	4
80195	T2048EM	5975-01-321-3291	14	1
80195	T2048EN	5975-01-321-7175	14	5
80195	T204BEP	6160-01-332-8845	13	8
80195	T2048ER	6140-01-323-3388	13	5
80195	T2048ET	6140-01-322-2781	13	6
80195	T2048EV	6150-01-326-2443	14	42
80195	T2048EW	6150-01-325-2988	14	41
80195	T2048FD	2540-01-322-5718	25	1
80195	T2048FE	5340-01-322-6610	25	2
80195	T2048KA	2510-01-323-5313	26	24
80195	T2048LC	5340-01-322-2943	22	2
80195	T2048LD	5340-01-323-1789	22	4
80195	T204BPB	5340-01-323-8064	55	1
80195	T2048PC	5340-01-324-0176	60	7
80195	T2048PG	4730-01-322-9113	67	10
80195	T204BPJ	4730-01-323-2075	67	32
80195	T2048PK	4730-01-322-7637	67	17
80195	T2048PL	4710-01-322-5845	67	5
80195	T2048PM	4730-01-322-7652	67	21
80195	T2048PN	5340-01-322-6598	31	1
80195	T2048PP	4730-01-322-9135	67	22

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CAGEC	PART NUMBER	PART NUMBER INDEX STOCK NUMBER	FIG.	ITEM
80195	T2048PR	5340-01-322-4814	67	19
80195	T2048PT	5340-01-322-4815	67	8
80195	T2048PV		67	29
80195	T2048TJ	2510-01-322-5825	26	7
80195	T204BTK	5340-01-322-2944	26	8
80195	T2048TL	5330-01-322-0848	26	6
80195	T2048TM	4730-01-322-4993	67	31
80195	T2048TN	5340-01-322-3611	26	3
80195	T2048TP	5340-01-322-3591	26	23
80195	T2048TT	5315-01-322-9675	26	5
80195	T2048TU	5340-01-323-5613	26	1
80195	T2048TV	5340-01-324-5156	26	2
80195	T2048UJ	4330-01-322-7651	51	10
80195	T2048UT		51	11
80195	T2048UU	2910-01-322-5807	51	8
80195	T204825	4720-01-323-0273	28	6
80195	T204826	4720-01-323-0272	28	1
80195	T204827	4210-00-729-5590	28	4
80195	T204830	4730-01-322-9112	67	23
58791	T204833	2920-01-322-9238	55	4
80195	T204837	4820-01-320-0292	68	1
80195	T204847	9905-01-339-1826	3	12
80195	T204853	4730-01-322-9118	18	37
80195	T204874	6130-01-325-6732	5	10
80195	T204880	9905-01-339-1827	30	7
80195	T204881	9905-01-339-1825	30	8
80195	T204882	9905-01-339-1828	30	4
80195	T2048993	9905-01-351-8919	30	10
73972	W-1038-L	2530-01-322-5780	19	27
73972	W-1038-R	2530-01-322-5781	19	15
73972	W-980-L	5306-01-151-9330	19	26
73972	W-980-R	5306-01-151-9331	19	16
78500	WA-15-C	5310-00-402-5857	16	5
73972	WP-5	5305-01-321-9664	19	12
			19	30
81348	WW-P-471BDQBCDA	4730-00-202-6693	12	3
81348	WWP471	4730-00-289-2830	67	45
81860	W94-030	5340-01-325-5927	58	7
			60	11
81860	W94-030	340-01-323-8435	58	4
			60	15
76385	Z-3065	5325-01-078-5180	25	10
53867	0 432 217 0191	2910-01-323-0311	49	12
53867	0 434 250 999	2910-01-323-7359	49	17
01843	0-250-250-200	2920-01-334-4326	46	5
01843	0-251-103-307	5905-01-321-5000	46	3
99062	0001-02	5306-01-322-2393	23	3
99062	0001-04	5306-01-322-2392	23	2
99062	0001-08	5306-01-322-1384	23	1
99062	0001-13	5306-01-322-2452	24	3
			24	9

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CAGEC	PART NUMBER	PART NUMBER INDEX STOCK NUMBER	FIG.	ITEM
99062	0002-13	5310-00-498-2381	24	4
			24	10
64678	000933010202	5306-01-240-5171	66	44
99062	0022-00	3120-01-321-6609	24	5
			24	11
99062	0029-23	5340-01-324-0955	24	7
0EG96	00714		70	11
99062	0075-20	2510-01-322-0093	24	13
99062	0077-00	3825-01-322-2245	23	8
0EG96	00775H		70	4
99062	0078-11	5306-01-322-1420	23	7
99062	0079-01	2510-01-165-6140	23	10
99062	0375-00	3825-01-322-2244	23	9
05333	042412	2540-01-329-7524	26	15
99062	0741-01	5365-01-166-0789	23	5
53867	1 410 501 072	5330-01-323-2923	49	6
41197	1A11363D	2930-01-322-0062	57	5
58501	100-ED39	5306-01-276-9191	66	42
1M331	1000	5965-01-321-8147	28	3
06721	100469D	4730-01-323-1025	18	9
06853	102276	2530-01-155-5731	18	22
40342	1031520	4730-01-242-4507	18	43
24617	103374	5315-00-816-1794	26	4
99062	1035-11	5340-01-321-9632	24	8
99062	1035-12	5340-01-321-9631	24	2
99062	1035-20	3040-01-322-0076	24	1
99062	1035-20XL		24	6
99062	1035-20XR		24	12
98343	10451EF	4730-01-098-4335	18	41
06721	10452SF	4730-01-322-9024	18	42
56161	10501759	5305-01-159-0065	60	14
56161	10503517	5305-01-158-3207	60	2
56161	10504048		58	13
90598	10517-5	4730-00-278-4773	12	4
24617	105422	4730-00-231-5605	51	4
			67	54
79470	1068X4	4730-01-185-5348	54	5
79470	1073X4	4730-01-337-3741	54	1
54578	1105-1-1/4	4730-00-257-2122	18	44
06721	11137	5340-01-321-8665	14	8
			18	39
08108	1157	6240-00-889-1799	10	3
19207	11662296-9	5365-00-204-5061	15	a
94135	12Z2007-440	5310-00-064-8521	2Z	3
62173	1203	2530-01-322-5806	18	15
24617	120378	5310-01-323-7955	67	7
			67	12
78500	1205-U-1451	5330-01-023-5229	15	15
78500	1205-V-1452	5330-01-024-2294	15	17
78500	1218-G-85	5315-00-784-0637	16	7
78500	1225-B-834	2530-01-179-7532	15	16

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CAGEC	PART NUMBER	PART NUMBER INDEX STOCK NUMBER	FIG.	ITEM
78500	1225-N-976	3120-01-179-4120	15	6
78500	1227-B-756	5310-01-117-2404	15	2
78500	1227C549	2530-00-886-1103	15	4
78500	1229-A-1119	5365-01-289-7520	15	13
78500	1229-8-1848	5310-01-133-5373	15	9
78500	1229-F-2502	5310-01-290-2215	15	14
78500	1229-K-1597Z	5310-01-116-4762	15	11
19207	12296626	7690-01-114-3702	30	9
93061	125HBL-4-2	4730-00-463-3618	51	2
93061	125HBL-4-4	4730-00-200-0531	51	6
78500	1259-N-274	5315-01-129-6898	15	7
24617	127796	5305-01-321-8572	67	39
44940	130-2003		57	4
21450	131245	5310-00-013-1245	13	3
			55	3
80837	1351-A7	4730-01-115-8269	22	15
			22	21
24617	14042	4730-00-196-0888	18	16
59730	141	5975-00-152-1075	14	46
59730	141SL	5975-01-322-6434	14	12
24617	144083	4730-00-257-2117	67	48
24617	144112	4730-00-246-9200	67	53
24617	144215	4730-01-218-0395	18	17
24617	144575	4730-01-323-3216	14	15
79470	145	4820-01-263-6410	57	6
79470	1468X6	4730-01-062-2570	18	21
79470	1469X6	4730-00-069-1187	67	49
79470	1469X6X2	4730-01-134-1278	18	27
98343	1511-3	5340-00-978-3439	18	30
98343	1511-5	5340-01-322-7104	4	8
28606	1511-7	5340-01-324-5105	14	23
38455	151Z7-02	4320-00-428-2749	66	9
38455	15128-02	4320-00-428-2750	66	7
38455	15636-00	4820-01-115-0614	66	8
38455	16433-00	4730-01-321-9833	66	4
38455	1643300	4730-01-320-5362	66	6
38455	16455-00	4730-01-321-9963	66	46
38455	16543-00	4730-01-321-9834	66	15
80201	1743	2530-01-189-6688	19	10
			19	18
78500	1779-R-18	3120-00-322-6430	16	8
13226	17938-MS	6220-01-321-9147	7	1
			8	1
94222	19-10-091-10		60	8
82304	19083	2530-00-007-2271	15	12
53867	2 430 I100 525	5365-01-323-2795	49	13
53867	2 430 100 527	5365-01-323-2796	49	13
53867	2 430 100 529	5365-01-323-2829	49	13
53867	2 430 100 530	5365-01-323-2797	49	13
53867	2 430 100 532	5365-01-323-2798	49	13
53867	2 430 100 534	5365-01-323-2799	49	13

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CAGEC	PART NUMBER	PART NUMBER INDEX STOCK NUMBER	FIG.	ITEM
53867	2 430 100 535	5310-01-322-6526	49	13
53867	2 430 100 539	5310-01-322-6527	49	13
53867	2 430 100 540	5365-01-325-7318	49	13
53867	2 430 100 542	5310-01-323-3738	49	13
53867	2 430 100 544	5365-01-323-2800	49	13
53867	2 430 100 545	5365-01-323-2801	49	13
53867	2 430 100 547	5365-01-323-2828	49	13
53867	2 430 100 549	5365-01-323-2802	49	13
53867	2 430 100 550	5310-01-322-6528	49	13
53867	2 430 100 552	5310-01-322-6529	49	13
53867	2 430 100 554	5310-01-322-6530	49	13
53867	2 430 100 555	5310-01-322-6531	49	13
53867	2 430 100 557	5310-01-322-6532	49	13
53867	2 430 100 559	5310-01-322-6936	49	13
53867	2 430 100 560	5310-01-322-6533	49	13
53867	2 430 100 562	5310-01-322-6937	49	13
53867	2 430 100 564	5310-01-322-6938	49	13
53867	2 430 100 565	5365-01-323-2803	49	13
53867	2 430 100 567	5365-01-325-5171	49	13
53867	2 430 100 569	5310-01-322-6534	49	13
53867	2 430 100 570	5310-01-323-3739	49	13
53867	2 430 100 572	5365-01-330-8453	49	13
53867	2 430 100 574	5365-01-330-8454	49	13
53867	2 430 100 575	5310-01-322-6939	49	13
53867	2 430 100 577	5365-01-330-8455	49	13
53867	2 430 100 579	5365-01-323-2804	49	13
53867	2 430 100 580	5365-01-323-2805	49	13
53867	2 430 100 582	5365-01-330-8456	49	13
53867	2 430 100 584	5365-01-330-8457	49	13
53867	2 430 136 145	2910-01-324-1235	49	16
53867	2 433 124 161	5315-01-323-4925	49	15
53867	2 433 458 123	4730-01-324-2078	49	18
53867	2 434 614 010	5360-01-247-8508	49	14
81343	2-2 130137B	4730-00-278-3721	50	7
77327	20-03212	6220-01-321-3295	11	2
13226	200-09122	6220-01-283-8703	6	1
38455	20068-00		66	48
13226	201-A	6220-01-011-8989	8	6
13226	201R	6220-00-844-6471	6	5
			7	6
13226	202	5330-00-464-7329	6	4
			7	5
			8	5
24234	203514		22	18
06853	205498	4730-00-684-4659	18	40
06032	2070-6453-003	5305-01-122-2058	66	36
38455	20831-00	5330-00-412-9924	66	35
13226	209	5330-00-432-4218	6	2
			7	3
			8	3
13226	21L	6220-01-116-1267	11	6

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CAGEC	PART NUMBER	PART NUMBER INDEX STOCK NUMBER	FIG.	ITEM
13226	211-05122	6220-01-283-8706	7	2
13226	211-05132	6220-01-321-3297	8	2
38455	21316-00	5330-00-184-2761	66	16
38455	21437	5330-00-561-8750	66	39
38455	21569-AD-QA052AA	2910-01-341-2222	66	13
38455	21578-02	4320-01-322-0921	66	17
38455	21579-02	4320-01-213-6179	66	38
13226	22	5330-01-121-5360	11	5
14892	220635	2530-00-137-9235	18	1
78500	2210-L-4328	3040-01-321-9993	15	18
78500	2210-M-4329	3040-01-321-9994	15	19
38455	22471-02	4320-01-322-2246	66	3
78500	2258-Q-615	5360-01-158-1974	16	3
78500	2258-U-619	5360-01-107-9716	16	1
38455	22967-00	5315-00-411-9127	66	19
79470	230	4820-00-174-0339	33	16
84760	23187	2910-01-321-8558	52	1
84760	23243	5340-01-321-6066	52	2
84760	23448	5325-01-321-9706	53	8
84760	23775	2910-01-322-2705	52	5
13445	24059	5945-00-853-6024	4	2
38455	2493200		66	23
38455	25356-20	4930-00-216-6195	66	21
38455	25475-00		66	24
38455	2548100		66	22
38455	25817-00	5365-00-406-3791	66	33
38455	25924-00	4730-01-116-3729	66	30
38455	26104-00	3825-01-322-3490	66	26
93061	269NTA-8-6	4730-01-095-7717	18	25
93061	271NTA-6-4	4730-01-134-7760	18	23
80195	2710001	5340-01-322-6095	26	18
38455	27185-00	4320-01-322-3489	66	10
38455	27186-00	4820-00-884-5620	66	5
73195	27404N	2530-01-329-7523	20	2
24617	274517	5310-01-321-8610	8	5
			25	8
			26	10
			51	15
24617	274993	5310-01-101-2029	18	4
			25	9
06853	277147	4820-00-836-1598	18	20
93061	28-6-2	4730-01-274-8401	14	9
38455	28744-AA	2990-01-321-8360	66	29
38455	28745-02	3130-01-321-6631	66	34
13226	29	5330-01-321-6596	11	3
80195	2940005	5365-01-228-4013	67	38
80195	2940006	4730-01-322-6697	67	33
80195	2940007	4730-01-328-5539	67	37
80195	2940008	3825-01-323-0121	67	35
80195	2940009	5330-01-322-6056	67	36
80195	2940053	5330-01-229-1985	67	18

CROSS-REFERENCE INDEXES

CAGEC	PART NUMBER	PART NUMBER INDEX STOCK NUMBER	FIG.	ITEM
80195	2990003	5306-01-321-8721	67	9
30119	30-411	5940-01-324-4550	14	18
3Y572	30-415	5970-01-322-8529	14	17
12718	300-006	5430-01-322-5727	26	12
13445	30056-15	5925-00-900-1903	5	13
13445	3031-20	5920-00-133-8663	2	21
38455	30586-00	5310-00-411-9121	66	18
82465	31WLF5818	5310-01-336-6855	23	4
82465	31WLF7814	5310-01-333-6434	23	6
78500	3105-R-200	5340-01-325-5958	16	9
79470	3152X4	4730-00-012-7951	57	3
80195	3160100	6625-01-175-9998	2	23
00779	32060	5940-00-552-2019	14	33
79470	3350X6	4730-00-277-8257	18	24
0EG96	33876		70	3
0EG96	33877		70	10
86184	33879	4820-01-325-6350	70	5
80195	3390620	9905-01-339-1829	30	2
79470	3400X2	4730-00-639-9730	50	8
73972	3483	2530-01-322-5819	19	8
			19	21
97999	35A-AAA-DDBA-1BA	4810-01-322-5711	67	43
80195	3561027	9905-01-088-2441	30	3
80195	3561029	9905-01-090-7679	30	1
00779	35653	5940-00-636-5535	14	16
38455	36442-02	4320-01-322-7775	66	20
39428	3913T16	5340-01-142-6389	26	21
38455	4C7-QA052AA	4320-01-325-6373	66	1
78493	4S139-0745631	6620-01-325-6749	61	1
80691	40DCAL	4730-01-322-6642	67	2
80691	40FAL		67	1
			67	4
73848	400ADC	5340-01-322-1058	28	2
			28	8
73848	400ADP	5340-01-323-5697	28	7
0N972	401015	4820-01-076-9493	18	34
0N972	401047	4820-01-322-5716	18	36
0NG12	4065	4820-01-340-0282	67	27
72219	41-560-01	4820-00-472-4049	67	46
72962	41NTE164	5310-00-935-9088	66	47
38455	41219-00	4320-01-322-0995	66	25
38455	42524-00	3040-01-322-0965	66	31
79470	434X4	4730-00-277-8643	53	16
66295	44H	4730-00-277-6199	50	3
24617	444626	4730-00-842-7841	51	12
72582	444867	4730-01-118-2594	18	7
24617	447839	5305-01-322-7321	6	6
			7	7
			8	7
			9	7
			10	6

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CAGEC	PART NUMBER	PART NUMBER INDEX STOCK NUMBER	FIG.	ITEM
24617	447839	53050-01-32Z-7321	11	1
			27	3
80201	450434	5340-01-288-1244	19	11
			19	19
38455	45686-00	4730-01-320-7353	66	14
22038	460756	2930-01-321-8283	63	4
80201	46304	5330-01-291-5071	19	1
13226	50-05132	6220-01-322-6375	9	2
61080	50051800	5305-01-080-1713	66	28
38455	5062300	5310-01-321-6030	66	37
38455	5062600	5310-01-321-6029	66	11
13226	51A	6220-00-897-5856	9	6
38455	5158100	5310-01-321-4932	66	27
13226	52	5330-00-897-5859	9	5
08108	53	6240-00-013-1282	2	7
			2	15
			3	6
			3	11
59730	5332	5975-00-983-9229	14	13
80201	543202	5310-01-336-6855	35	15
80201	543229-65	5330-01-322-2833	35	4
73972	5631-LH3		19	17
73972	5631-RH3	2530-01-322-5770	19	3
79550	570D-2	6145-00-310-2590	BULK	10
80195	570D-2-XX		14	38
79550	572D9	6145-00-468-1260	BULK	14
79550	572D9-XX		14	40
27783	573	2640-00-555-2824	20	1
13226	59	5330-01-082-3189	9	3
81343	6-6 120202BA	4730-00-289-0155	18	38
81343	6-6-6 100401BA	4730-01-134-3571	18	28
73559	6GM5M	5930-01-321-4987	2	12
			3	8
80691	60CHBR	4010-01-322-2824	67	3
79470	60X5	4730-01-323-3317	53	5
80195	6000455	5365-01-322-5147	2	3
ONG12	618R		67	25
06721	62X744080	4720-01-323-3236	18	3
80195	6200063	4730-01-322-9125	67	41
80195	6200153	4730-01-322-9171	67	30
80195	6200292	4730-01-322-9122	18	18
80195	6200530	4730-01-321-6288	18	10
80195	6200575	4730-01-322-9119	67	24
80195	6200601	4730-01-320-5318	18	19
80195	6450531		19	2
08108	67	6240-00-155-8717	6	3
			7	4
			8	4
			9	4
			11	4
80195	6700161	5930-01-084-2289	2	11

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CAGEC	PART NUMBER	PART NUMBER INDEX STOCK NUMBER	FIG.	ITEM
80195	6700161	5930-01-084-2289	3	7
80195	6700255	5930-01-084-2371	2	8
			3	4
80195	6700710		BULK	1
80195	6700710-60		14	19
80195	6700858	5120-01-347-9554	12	6
86184	6760750H	5305-01-334-9998	70	2
93061	68NTA-8-6	4730-01-091-8032	18	35
24234	6884-35.1		22	23
79470	69X5	4730-00-278-4740	53	17
7W442	7-21323-00	2910-01-318-4235	53	13
13226	70-02122	6220-01-321-9062	10	1
24161	70030	4720-01-322-9144	BULK	6
24161	70030-24		51	17
24161	70030-32		51	5
0EG96	70550-02		70	13
132Z6	71R	6220-00-897-5860	10	5
16476	71631-00	6680-01-322-2807	3	14
13226	72	5330-00-897-5857	10	4
24234	730113	5340-01-113-9708	22	10
24234	730143	2590-01-115-0650	22	12
			22	20
24234	740192	2590-01-329-7554	22	7
24234	740214	4910-01-318-7469	22	16
0NG96	74816		70	9
0EG96	74821		70	7
0EG96	74825		70	12
0EG96	74830		70	14
79154	750-4		67	13
79154	750-4-G-T	5330-01-321-9649	67	14
24234	750005	2590-01-115-0427	22	14
			22	17
74400	76052-15	5930-00-458-7220	1	2
16528	7731428	5975-01-321-7295	5	14
06721	78515	5935-01-321-4951	5	12
06721	78593	5330-01-322-1616	5	3
13226	79	5330-00-432-4219	10	2
0EDY1	8EA2021FA	2920-01-335-3463	64	16
0NG12	811-4-1		29	10
0NG12	811-4-5		29	5
0NG12	811-4-7		29	8
64488	81142S	6145-01-165-5632	BULK	9
64488	81142S-XX		14	39
64488	81143S	6145-00-310-2598	BULK	13
64488	81143S-XX		14	35
64488	81146S	6145-01-230-1863	BULK	12
64488	81146S-XX		14	36
0NG96	81858		70	8
0NG96	82557-03		70	6
0EG96	83320-01		70	16
02892	8485984	4730-00-359-3872	18	14

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CAGEC	PART NUMBER	PART NUMBER INDEX STOCK NUMBER	FIG.	ITEM
86184	85682D	2590-01-318-4232	70	1
6Y402	8880891	2990-01-322-1038	46	1
6Y402	8890412	6150-01-322-4542	46	2
03502	8954942P64	5307-01-007-4931	22	19
11862	9417793	5310-01-211-3811	31	8
0NG12	9422016		29	9
0NG12	9422876		29	11
62173	9501		18	8
77060	952G	6145-00-950-4922	BULK	11
77060	952G-XX		14	37
13548	98001R	9905-01-023-2714	27	2

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FIG	ITEM	FIGURE AND ITEM NUMBER INDEX		PART NUMBER
		STOCK NUMBER	CAGEC	
BULK	1		80195	6700710
BULK	2	5975-00-983-5239	70510	LD/EF-1/2
BULK	3	4720-01-003-6706	30327	C608
BULK	4	4720-01-322-9785	61463	P-1196-3
BULK	5		93061	PFT-8B
BULK	6	4720-01-322-9144	24161	70030
BULK	7	4720-01-014-4915	79470	PT-240-6B
BULK	8	4720-01-169-9891	61424	PFT-6B
BULK	9	6145-01-165-5632	64488	81142S
BULK	10	6145-00-310-2590	79550	570D-2
BULK	11	6145-00-950-4922	77060	952G
BULK	12	6145-01-230-1863	64488	81146S
BULK	13	6145-00-310-2598	64488	81143S
BULK	14	6145-00-468-1260	79550	57209
1	1	5930-01-229-2718	15434	C0309048200
1	2	5930-00-458-7220	74400	76052-15
2	1	5305-00-071-2Z37	96906	MS90725-14
2	2	5975-01-321-7294	00843	A-8R64
2	3	5365-01-322-5147	80195	6000455
2	4	5310-00-823-8804	96906	MSZ7183-9
2	5	5310-00-483-8792	96906	MS17829-4C
2	6	6210-00-122-1200	13445	PL-19-GC
2	7	6240-00-013-1282	08108	53
2	8	5930-01-084-2371	80195	6700255
2	9	6210-01-069-0434	13445	PL-20-RC
2	10	6210-01-069-0434	13445	PL-20-RC
2	11	5930-01-084-2289	80195	6700161
2	12	5930-01-321-4987	73559	6GM5M
2	13	5930-00-655-1515	96906	MS35058-23
2	14	6210-01-083-6258	13445	PL-20-AC
2	15	6240-00-013-1282	08108	53
2	17	5305-00-958-0655	96906	MS35207-214
2	18	5945-01-321-7211	61964	LY2F-DC12
2	19	5310-00-616-3554	96906	MS35335-29
2	20	5310-00-934-9739	96906	MS35649-242
2	21	5920-00-133-8663	13445	3031-20
2	22	5920-00-131-9915	81349	F02A32VZ0A
2	23	6625-01-175-9998	80195	3160100
2	24	2510-01-322-5818	80195	T2048EE
3	1	5975-01-321-7294	00843	A-8R64
3	2	6210-00-122-1200	13445	PL-19-GC
3	3	3120-01-231-0560	15434	C0101076200
3	4	5930-01-084-2371	80195	6700255
3	5	6210-01-069-0434	13445	PL-20-RC
3	6	6240-00-013-1282	08108	53
3	7	5930-01-084-2289	80195	6700161
3	8	5930-01-321-4987	73559	6GM5M
3	9	5930-00-655-1515	96906	MS35058-23
3	10	6210-01-083-6258	13445	PL-20-AC
3	11	6240-00-013-1282	08108	53
3	12	9905-01-339-1826	80195	T204847

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FIG	ITEM	FIGURE AND ITEM NUMBER INDEX		PART NUMBER
		STOCK NUMBER	CAGEC	
3	13	5340-01-322-2632	80195	T2048ED
3	14	6680-01-322-2807	16476	71631-00
3	15	5340-01-322-2950	80195	T2048EG
4	1	5305-00-068-0502	96906	MS90725-6
4	2	5945-00-853-6024	13445	24059
4	3	5310-00-582-5965	96906	MS35338-44
4	4	5310-00-761-6882	96906	MS51967-2
4	5	5310-00-934-9739	96906	MS35649-242
4	6	5310-00-616-3554	96906	MS35335-29
4	7	5340-01-322-2951	80195	T2048EC
4	8	5340-01-322-7104	98343	1511-5
4	9	5945-01-321-7211	61964	LY2F-DC12
4	10	5305-00-958-0655	96906	MS35207-214
5	1	5935-00-846-3883	96906	MS75021-1
5	2	5306-00-225-8499	96906	MS90725-34
5	3	5330-01-322-1616	06721	78593
5	4	5305-00-068-0500	96906	MS90725-3
5	5	5310-00-582-5965	96906	MS35338-44
5	6	5975-01-321-3292	80195	T2048EJ
5	7	5310-00-407-9566	96906	MS35338-45
5	8	5310-00-880-7744	96906	MS51967-5
5	9	5330-01-322-7340	80195	T2048EK
5	10	6130-01-325-6732	80195	T204874
5	11	5310-00-761-6882	96906	MS51967-2
5	12	5935-01-321-4951	06721	78515
5	13	5925-00-900-1903	13445	30056-15
5	14	5975-01-321-7295	16528	7731428
5	15	5305-00-068-0502	96906	MS90725-6
6	1	6220-01-283-8703	13226	200-09122
6	2	5330-00-432-4218	13226	209
6	3	6240-00-155-8717	08108	67
6	4	5330-00-464-7329	13226	202
6	5	6220-30-844-6471	13226	201R
6	6	5305-01-322-7321	24617	447839
7	1	6220-01-321-9147	13226	17938-MS
7	2	6220-01-283-8706	13226	211-05122
7	3	5330-00-432-4218	13226	209
7	4	6240-00-155-8717	08108	67
7	5	5330-00-464-7329	13226	202
7	6	6220-00-844-6471	13226	201R
7	7	5305-01-322-7321	24617	447839
8	1	6220-01-321-9147	13226	17938-MS
8	2	6220-01-321-3297	13226	211-05132
8	3	5330-00-432-4218	13226	209
8	4	6240-00-155-8717	08108	67
8	5	5330-00-464-7329	13226	202
8	6	6220-01-011-8989	13226	201-A
8	7	5305-01-322-7321	24617	447839
9	1		80195	T2048EH
9	2	6220-01-322-6375	13226	50-05132
9	3	5330-01-082-3189	13226	59

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FIG	ITEM	FIGURE AND ITEM NUMBER INDEX		PART NUMBER
		STOCK NUMBER	CAGEC	
9	4	6240-00-155-8717	08108	67
9	5	5330-00-897-5859	13226	52
9	6	6220-00-897-5856	13226	51A
9	7	5305-01-322-7321	24617	447839
10	1	6220-01-321-9062	13226	70-02122
10	2	5330-00-432-4219	13226	79
10	3	6240-00-889-1799	08108	1157
10	4	5330-00-897-5857	13226	72
10	5	6220-00-897-5860	13226	71R
10	6	5305-01-322-7321	24617	447839
11	1	5305-01-322-7321	24617	447839
11	Z	6220-01-321-3295	77327	20-03212
11	3	5330-01-321-6596	13226	29
11	4	6240-00-155-8717	08108	67
11	5	5330-01-121-5360	13226	22
11	6	6220-01-116-1267	13226	21L
12	1	6680-01-322-2798	80195	T2048CA
12	2	2915-01-224-2046	61397	LCS-S200-BB
12	3	4730-00-202-6693	81348	WW-P-471BDQBCDA
12	4	4730-00-278-4773	90598	10517-5
12	5	4820-01-322-5776	80195	T2048CB
12	6	5120-01-347-9554	80195	6700858
13	1	5310-00-761-6882	96906	MS51967-2
13	2	5310-00-582-5965	96906	MS35338-44
13	3	5310-00-013-245	21450	131245
13	4	6140-01-210-1964	96906	MS52149-1
13	5	6140-01-323-3388	80195	T2048ER
13	6	6140-01-322-2781	80195	T2048ET
13	7	5305-00-068-0502	96906	MS90725-6
13	8	6160-01-332-8845	80195	T2048EP
13	9	6160-01-336-6653	80195	T2048CC
14	1	5975-01-321-3291	80195	T2048EM
14	2	5975-00-074-2072	96906	MS3367-1-9
14	3	4730-01-322-9129	93061	P6MC4
14	4	4730-01-322-4965	80195	T2048EL
14	5	5975-01-321-7175	80195	T2048EN
14	6	5325-00-579-6134	96906	MS35489-80
14	7		93061	PFT-6B-48
14	8	5340-01-321-8665	06721	11137
14	9	4730-01-274-8401	93061	28-6-2
14	11	5975-00-839-5320	15235	T17AND170F
14	12	5975-01-322-6434	59730	141SL
14	13	5975-00-983-9229	59730	5332
14	14	4730-01-322-9131	93061	P6ME4
14	15	4730-01-323-3216	24617	144575
14	16	5940-00-636-5535	00779	35653
14	17	5970-01-322-8529	3Y572	30-415
14	18	5940-01-324-4550	30119	30-411
14	19		80195	6700710-60
14	20	5310-00-761-6882	96906	MS51967-2
14	21	5310-00-582-5965	96906	MS35338-44

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FIG	ITEM	FIGURE AND ITEM NUMBER INDEX		PART NUMBER
		STOCK NUMBER	CAGEC	
14	22	5305-00-068-0502	96906	MS90725-6
14	23	5340-01-324-5105	28606	1511-7
14	24	5330-01-202-7608	03743	GK50-N
14	25	5975-00-159-0969	03743	K50
14	26	5940-00-143-4794	96906	MS25036-112
14	27	5940-01-079-1375	81349	M7928/5-4
14	28		93061	PFT-6B-54
14	29		93061	PFT-6B-6
14	30		93061	PT-240-6B-23
14	31		93061	PT-240-6B-76
14	32	5940-00-143-4777	96906	MS25036-157
14	33	5940-00-552-2019	00779	32060
14	34	5940-01-079-1936	81349	M7928/5-5
14	35		64488	81143S-XX
14	36		64488	81146S-XX
14	37		77060	952G-XX
14	38		80195	570D-2-XX
14	39		64488	81142S-XX
14	40		79550	572D9-XX
14	41	6150-01-325-2988	80195	T2048EW
14	42	6150-01-326-2443	80195	T2048EV
14	43	5975-00-959-6187	03743	CG87100
14	44	5915-00-714-8031	03743	BL100
14	45	5975-00-456-0627	03743	CG-6275
14	46	5975-00-152-1075	59730	141
15	1	2520-01-322-5830	80195	T2048BU
15	2	5310-01-117-2404	78500	1227-B-756
15	3	5310-01-116-4765	78500	A-1229-W-2545
15	4	2530-00-886-1103	78500	1227C549
15	5	3110-00-293-8998	52676	HM212049
15	6	3120-01-179-4120	78500	1225-N-976
15	7	5315-01-129-6898	78500	1259-N-274
15	8	5365-00-204-5061	19207	11662296-9
15	9	5310-01-133-5373	78500	1229-B-1848
15	10	5305-01-116-4700	78500	S-266-P
15	11	5310-01-116-4762	78500	1229-K-1597Z
15	12	2530-00-007-2271	82304	19083
15	13	5365-01-289-7520	78500	1229-A-1119
15	14	5310-01-290-2215	78500	1229-F-2502
15	15	5330-01-023-5229	78500	1205-U-1451
15	16	2530-01-179-7532	78500	1225-B-834
15	17	5330-01-024-2294	78500	1205-V-1452
15	18	3040-01-321-9993	78500	2210-L-4328
15	19	3040-01-321-9994	78500	2210-M-4329
15	20	3110-00-618-0248	78500	HM-218248
-16	1	5360-01-107-9716	78500	2258-U-619
16	2	2530-01-320-8937	78500	A2-3222-Z-1612
16	3	5360-01-158-1974	78500	2258-Q-615
16	4	5340-01-321-9679	78500	A1-3236-A-1249
16	5	5310-00-402-5857	78500	WA-15-C
16	6	5305-01-321-6684	78500	S-254

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FIG	ITEM	FIGURE AND ITEM NUMBER INDEX		PART NUMBER
		STOCK NUMBER	CAGEC	
16	7	5315-00-784-0637	78500	1218-G-85
16	8	3120-00-322-6430	78500	1779-R-18
16	9	5340-01-325-5958	78500	3105-R-200
17	1	2530-01-316-9165	78500	A-15-3275N-716
18	1	2530-00-137-9235	14892	220635
18	2	4720-01-290-9208	01276	FL5507GHG0320
18	3	4720-01-323-3236	06721	62X7440BO
18	4	5310-01-101-2029	24617	274993
18	5	5310-01-321-8610	24617	274517
18	6	5305-00-068-0510	80204	B1821BHO38CIOON
18	7	4730-01-118-2594	72582	444867
18	8		62173	9501
18	9	4730-01-323-1025	06721	100469D
18	10	4730-01-321-6288	80195	6200530
18	11	4730-00-069-1187	79146	H0169-6X4
18	12	2530-01-322-5721	06721	TO-3155900
18	13		93061	PFT-6B-28
18	14	4730-00-359-3872	02892	8485984
18	15	2530-01-322-5806	62173	1203
18	16	4730-00-196-0888	24617	14042
18	17	4730-01-218-0395	24617	144215
1B	18	4730-01-322-9122	80195	6200292
18	19	4730-01-320-5318	80195	6200601
18	20	4820-00-836-1598	06853	277147
18	21	4730-01-062-2570	79470	1468X6
18	22	2530-01-155-5731	06853	102276
18	23	4730-01-134-7760	93061	271NTA-6-4
18	24	4730-00-277-8257	79470	3350X6
18	25	4730-01-095-7717	93061	269NTA-8-6
18	26		93061	PFT-88-29
18	27	4730-01-134-1278	79470	1469X6XZ
18	28	4730-01-134-3571	81343	6-6-6 100401BA
18	29	5305-00-068-0502	96906	MS90725-6
18	30	5340-00-978-3439	98343	1511-3
18	31	5310-00-582-5965	96906	MS35338-44
18	32	5310-00-761-6882	96906	MS51967-2
18	33	4720-01-290-2513	01276	FL5507GHGO540
18	34	4820-01-076-9493	ON972	401015
18	35	4730-01-091-8032	93061	68NTA-8-6
18	36	4820-01-322-5716	ON972	401047
18	37	4730-01-322-9118	80195	T204853
18	38	4730-00-289-0155	81343	6-6 120202BA
18	39	5340-01-321-8665	06721	11137
18	40	4730-00-684-4659	06853	205498
13	41	4730-01-098-4335	98343	10451EF
18	42	4730-01-322-9024	06721	10452.SF
18	43	4730-01-242-4507	40342	1031520
18	44	4730-00-257-2122	54578	1105-1-1/4
18	45	4730-00-019-2067	96906	MS51953-49
18	46	2530-01-321-6510	26622	KSD303OFC-00291
18	47		26622	KSD4940022

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FIG	ITEM	FIGURE AND ITEM NUMBER INDEX		PART NUMBER
		STOCK NUMBER	CAGEC	
18	48	5310-01-348-6982	26622	KSD4940257
18	49	5310-01-351-7544	26622	KSD4940024
18	50	5340-01-346-9436	26622	KSD4940283
18	51		93061	PFT-6B-20
18	52		93061	PFT-6B-20
18	53		93061	PFT-6B-7
18	54		93061	PFT-6B-13
18	55		93061	PFT-8B-28
18	56		93061	PFT-6B-29
18	57		93061	PFT-88-19
18	58		93061	PFT-6B-3
19	1	5330-01-291-5071	80201	46304
19	2		80195	6450531
19	3	2530-01-322-5770	73972	5631-RH3
19	4	2530-01-329-7521	73972	HT-518-K
19	5	3110-00-293-8997	60038	HM212011
19	6	2530-01-329-7522	73972	HT-518
19	7	3110-00-618-0249	60038	HM218210
19	8	2530-01-322-5819	73972	3483
19	9	5330-00-245-5503	11583	N676
19	10	2530-01-189-6688	80201	1743
19	11	5340-01-288-1244	80201	450434
19	12	5305-01-321-9664	73972	WP-5
19	13	5310-00-167-0721	96906	MS35333-41
19	14	5310-01-229-8029	96906	MS51983-8
19	15	2530-01-322-5781	73972	W-1038-R
19	16	5306-01-151-9331	73972	W-980-R
19	17		73972	5631-LH3
19	18	2530-01-189-6688	80201	1743
19	19	5340-01-288-1244	80201	450434
19	20	5330-00-245-5503	11583	N676
19	21	2530-01-322-5819	73972	3483
19	22	2530-01-329-7521	73972	HT-518-K
19	23	3110-00-618-0249	60038	HM218210
19	24	2530-01-329-7522	73972	HT-518
19	25	3110-00-293-8997	60038	HM212011
19	26	5306-01-151-9330	73972	W-980-L
19	27	2530-01-322-5780	73972	W-1038-L
19	28	5310-01-270-5463	96906	MS51983-7
19	29	5310-00-167-0721	96906	MS35333-41
19	30	5305-01-321-9664	73972	WP-5
20	1	2640-00-555-2824	27783	573
20	2	2530-01-329-7523	73195	27404N
21	1	2610-00-528-9536	81348	GP3STYLXTYBACL/ T/11.00-22.501F/
22	1	5305-00-724-7221	80204	B1821BH063C175N
22	2	5340-01-322-2943	80195	T2048LC
22	3	5310-00-064-8521	94135	12Z2007-440
22	4	5340-01-323-1789	80195	T2048LD
22	5	5310-00-595-7421	96906	MS17829-8C
22	6	5305-00-071-2055	80204	B1821BH044C150N

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FIG	ITEM	FIGURE AND ITEM NUMBER INDEX		PART NUMBER
		STOCK NUMBER	CAGEC	
22	7	2590-01-329-7554	24234	740192
22	8	5310-00-732-0558	96906	MS51967-8
22	9	5310-00-080-6004	96906	MS27183-14
22	10	5340-01-113-9708	24234	730113
Z2	11	5305-00-269-3219	25567	8-0611
22	12	2590-01-115-0650	24234	730143
22	13	5305-00-152-6326	96906	MS18154-67
22	14	2590-01-115-0427	24234	750005
22	15	4730-01-115-8269	80837	1351-A7
22	16	4910-01-318-7469	24234	740214
22	17	2590-01-115-0427	24234	750005
2Z	18		24234	203514
2Z	19	5307-01-007-4931	03502	8954942P64
22	20	2590-01-115-0650	24234	730143
22	21	4730-01-115-8269	80837	1351-AT
22	22	5310-00-809-4061	96906	MS27183-15
22	23		24234	6884-35.1
22,	24	5305-00-152-6326	96906	MS18154-67
23	1	5306-01-322-1384	99062	0001-08
23	2	5306-01-322-2392	99062	0001-04
23	3	5306-01-322-2393	99062	0001-02
23	4	5310-01-336-6855	82465	31WLF5818
23	5	5365-01-166-0789	99062	0741-01
23	6	5310-01-333-6434	82465	31WLF7814
23	7	5306-01-322-1420	99062	0078-11
23	8	3825-01-322-2245	99062	0077-00
23	9	3825-01-322-2244	99062	0375-00
23	10	2510-01-165-6140	99062	0079-01
24	1	3040-01-322-0076	99062	1035-20
24	2	5340-01-321-9631	99062	1035-12
Z4	3	5306-01-322-2452	99062	0001-13
24	4	5310-00-498-2381	99062	0002-13
24	5	3120-01-321-6609	99062	0022-00
24	6		99062	1035-20XL
24	7	5340-01-324-0955	99062	0029-23
24	8	5340-01-321-9632	99062	1035-11
24	9	5306-01-322-2452	99062	0001-13
24	10	5310-00-498-2381	99062	0002-13
24	11	3120-01-321-6609	99062	0022-00
24	12		99062	1035-20XR
24	13	2510-01-322-0093	99062	0075-20
25	1	2540-01-322-5718	80195	T2048FD
25	2	5340-01-322-6610	80195	T2048FE
25	3	5325-00-579-6134	96906	MS35489-80
25	4	5305-00-068-0500	96906	MS90725-3
25	5	5310-00-582-5965	96906	MS35338-44
25	6	5310-00-761-6882	96906	MS51967-2
25	7	5305-00-068-0510	80204	B182IBH038C100N
25	8	5310-01-321-8610	24617	274517
25	9	5310-01-101-2029	24617	274993
25	10	5325-01-078-5180	76385	Z-3065

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FIG	ITEM	FIGURE AND ITEM NUMBER INDEX		PART NUMBER
		STOCK NUMBER	CAGEC	
26	1	5340-01-323-5613	80195	T2048TU
26	2	5340-01-324-5156	80195	T2048TV
26	3	5340-01-322-3611	80195	T2048TN
26	4	5315-00-816-1794	24617	103374
26	5	5315-01-322-9675	80195	T2048TT
26	6	5330-01-322-0848	80195	T2048TL
26	7	2510-01-322-5825	80195	T2048TJ
26	8	5340-01-322-2944	80195	T2048TK
26	9	5310-00-732-0558	96906	MS51967-8
26	10	5310-01-321-8610	24617	274517
26	11	5305-00-781-3930	80204	B1821BH038C475N
26	12	5430-01-322-5727	12718	300-006
26	13	4030-01-325-5165	80195	T2048EF
26	14	4730-00-050-4208	96906	MS15003-1
26	15	2540-01-329-7524	05333	042412
26	16	5310-00-582-5965	96906	MS35338-44
26	17	5310-00-761-6882	96906	MS51967-2
26	18	5340-01-322-6095	80195	2710001
26	19	5305-00-068-0502	96906	MS90725-6
26	20		70277	C7010-28-24
26	21	5340-01-142-6389	39428	3913T16
26	22	4010-00-585-2108	16003	C43974
26	23	5340-01-322-3591	80195	T2048TP
26	24	2510-01-323-5313	80195	T2048KA
26	25		96906	MS35849-52
27	1	9905-00-181-1080	13548	R1-2
27	2	9905-01-023-2714	13548	98001R
27	3	5305-01-322-7321	24617	447839
28	1	4720-01-323-0272	80195	T204826
28	2	5340-01-322-1058	73848	400ADC
28	3	5965-01-321-8147	IM331	1000
28	4	4210-00-729-5590	80195	T204827
28	5	4730-01-322-9878	96046	HN4-L
28	6	4720-01-323-0273	80195	T204825
28	7	5340-01-323-5697	73848	400ADP
28	8	5340-01-322-1058	73848	400ADC
29	1	4820-01-336-9067	0NG12	DFVS40
29	2	4730-01-340-5981	0NG12	FVS40
29	3	4820-01-340-6093	0NG12	FVFA40
29	4	5310-00-732-0558	96906	MS51967-8
29	5		0NG12	811-4-5
29	6	4820-01-340-6093	0NG12	FVFA40
29	7	4820-01-340-5877	0NG12	FVSP40
29	8		0NG12	811-4-7
29	9		0NG12	9422016
29	10		0NG12	811-4-1
29	11		0NG12	9422876
30	1	9905-01-090-7679	80195	3561029
30	2	9905-01-339-1829	80195	3390620
30	3	9905-01-088-2441	80195	3561027
30	4	9905-01-339-1828	80195	T204882

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FIG	ITEM	FIGURE AND ITEM NUMBER INDEX		PART NUMBER
		STOCK NUMBER	CAGEC	
30	5		11815	SSP-4-3
30	6	9905-01-090-7680	34623	MA242A-21090
30	7	9905-01-339-1827	80195	T204880
30	8	9905-01-339-1825	80195	T204881
30	9	7690-01-114-3702	19207	12296626
30	10	9905-01-351-8919	80195	T2048993
31	1	5340-01-322-6598	80195	T2048PN
31	2	5310-00-732-0558	96906	MS51967-8
31	3	5310-00-637-9541	96906	MS35338-46
31	4	5340-01-322-5097	15434	C0403204300
31	5	5340-01-323-5638	15434	C0403204400
31	6	5340-01-322-2952	15434	C0402053900
31	7	5365-01-322-2623	15434	C0403204200
31	8	5310-01-211-3811	11862	9417793
31	9	5305-00-269-3217	96906	MS90725-67
31	10	5340-01-323-3912	15434	C0402051800
31	11	2815-01-336-3139	15434	L423D-P/10929E
32	1	5305-01-158-0827	15434	C0718105400
32	2	5340-01-211-6171	15434	C0130233800
32	3	5365-01-321-6610	15434	C0191132200
32	4	2930-01-321-5486	15434	C0130283800
32	5	5305-01-321-6676	15434	C0718180700
32	6	5305-01-155-5440	15434	C0718107300
32	7	5310-01-276-8608	15434	C0740101000
32	8	5305-01-155-5440	15434	C07181073006
32	9	2590-01-321-9883	15434	C0403203300
32	10	5310-01-212-3389	15434	C0850201200
32	11	2815-01-217-1345	15434	C0403195200
33	1	2815-01-320-8892	15434	C0110344903
33	2	5340-01-230-9791	15434	C0517014000
33	3	5340-01-228-6057	15434	C0517014600
33	4	3120-01-231-0560	15434	C0101076200
33	5	5340-01-233-1282	15434	C0517014100
33	6	5315-01-323-1071	15434	C0110349900
33	7	3120-01-231-0559	15434	C0101051100
33	8	5340-01-230-9790	15434	C0517014400
33	9	5315-01-230-9792	15434	C0775007400
33	10	5315-01-227-3199	15434	C0516210200
33	11	4730-00-833-7976	15434	C0505027400
33	12	5310-01-321-3476	15434	C0740180100
33	13	5305-01-226-6631	15434	C0720180100
33	14	5315-01-230-9794	15434	C0775007800
33	15	5315-01-230-9793	15434	C0775008900
33	16	4820-00-174-0339	79470	230
34	1	2815-01-318-4236	15434	C0110344201
34	2	2815-01-223-8798	15434	C0110284700
34	3	2815-01-224-1940	15434	C0110284600
34	4	5340-01-228-6057	15434	C0517014600
34	5	2815-01-318-4236	15434	C0110344201
34	6	5340-01-228-6058	15434	C0517016200
34	7	5340-01-228-6056	15434	C0517014200

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FIG.	ITEM	FIGURE AND ITEM NUMBER INDEX		PART NUMBER
		STOCK NUMBER	CAGEC	
34	8	4820-01-311-4266	15434	C0110278101
34	9	2815-01-224-6181	15434	C0110322601
34	10	5340-01-228-6055	15434	C0517016700
34	11	5305-01-226-6629	15434	C0720180200
34	12	5310-01-321-3476.	15434	C0740180100
34	13	5330-01-321-6595	15434	C0110301200
35	1	5330-01-321-0510	15434	C0101058400
35	2	5330-01-321-0456	15434	C0101077600
35	3	5330-01-229-8942	15434	C0509020300
35	4	5330-01-322-2833	80201	543229-65
35	5	5330-01-229-8942	15434	C0509020300
35	6	2815-01-321-9995	15434	C0104144801
35	7	3120-01-321-0511	15434	C0101049300
35	8	3120-01-320-9634	15434	C0101049100
35	9	3120-01-320-9635	15434	C0101049200
35	10		15434	C0101049000
35	11	5315-01-311-5863	15434	C0515024500
35	12	3020-01-322-0096	15434	C0104147000
35	13	5310-01-321-6612	15434	C0526028300
35	14	5305-01-165-0583	15434	C0720112300
35	15	5310-01-336-6855	80201	543202
35	16	3020-01-218-3954	15434	C0104113800
35	17	3120-01-320-9637	15434	C0101061700
35	18	3120-01-321-0512	15434	C0101049500
35	19	3120-01-320-9636	15434	C0101061600
35	20	5310-01-276-1660	15434	C0740100600
35	21	5306-01-275-5001	15434	C0718103700
36	1	5305-01-226-6622	15434	C0720180400
36	2	5310-01-275-3323	15434	C0740100800
36	3	2815-01-321-5491	15434	C0104126400
36	4	3020-01-321-6494	15434	C0104167800
36	5	5305-01-213-5015	15434	C0718107800
36	6	5310-01-321-3476	15434	C0740180100
36	7	5330-01-227-3196	15434	C0101063000
36	8	2815-01-321-8352	15434	C0101062501
36	9	5365-01-3Z2-5978	15434	C0517062500
36	10	2815-01-212-4009	15434	C0101059200
36	11	5355-01-228-6054	15434	C0160129200
36	12	5315-01-323-1070	15434	C0104169000
37	1	2815-01-338-9553	15434	C0113027801
37	2	2815-01-338-7476	15434	C0113027501
37	3	2815-01-321-6309	15434	C0113027301
37	4	2815-01-338-7476	15434	C0113027501
37	5	2815-01-224-1844	15434	C0112016500
37	6	2815-01-321-5523	15434	C0112018901
37	7	3120-01-227-8646	15434	C0114031900
37	8	2815-01-239-2223	15434	C0114031300
37	9	5310-01-240-1472	15434	C0114031800
37	10	3120-01-228-0462	15434	C0114031600
37	11	5306-01-228-7458	15434	C0114031500
37	12	5365-00-804-2786	96906	MS16625-1125

SECTION IV

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CROSS-REFERENCE INDEXES

FIGURE AND ITEM NUMBER INDEX				
FIG.	ITEM	STOCK NUMBER	CAGEC	PART NUMBER
37	13	5360-01-321-2357	15434	C0113027201
38	1	2815-01-320-8920	15434	C0115027200
38	2	5330-01-212-3358	15434	C0115023200
38	3	5310-01-215-9458	15434	C0115032000
38	4	2590-01-211-6719	15434	C0123160500
38	5		15434	C0123151800
38	6		15434	C0123160400
38	7	5330-01-324-7024	15434	C0115025400
39	1	5330-01-321-6582	15434	C0110302500
39	2	2815-01-215-3569	15434	C0115031300
39	3	2815-01-215-3571	15434	C0115020400
39	4	2815-01-215-3661	15434	C0115031600
39	5	2815-01-215-3583	15434	C0115020200
39	6	5310-01-Z27-6099	15434	C0115031500
39	7	2815-01-215-3572	15434	C0115027000
39	8	2815-01-215-3573	15434	C0110324500
39	9	2815-01-217-1351	15434	C0110275200
39	10	5340-01-325-5948	15434	C0110351900
39	11	5360-01-228-0380	15434	C0110330000
39	12	5340-01-311-7098	15434	C0110299100
39	13	5365-01-339-0675	15434	C0502002800
39	14	5365-01-311-6149	15434	C0110343200
39	15	5340-01-311-6947	15434	C0110303902
39	16	2815-01-313-4524	15434	C0115025300
39	17	2815-01-227-0517	15434	C0110284000
39	18		15434	C03803813
40	1	2815-01-224-0228	15434	C0115027500
40	2	2815-01-321-6466	15434	C0105051700
40	3	5315-01-311-5863	15434	C0515024500
40	4	3040-01-217-1347	15434	C0105053400
40	5	3020-01-218-2120	15434	C0105051500
40	6	5305-01-226-6628	15434	C0718104400
40	7	5310-01-276-1660	15434	C0740100600
41	1	5330-01-227-3342	15434	C0103073300
41	2	2520-01-323-8681	15434	C0103071600
41	3	5310-01-276-1660	15434	C0740100600
41	4	5305-01-213-5019	15434	C0718180100
41	5	5306-01-275-5001	15434	C0718103700
41	6	3040-01-224-3076	15434	C0105050800
41	7	3020-01-228-3818	15434	C0105051300
41	8	3120-01-226-6700	15434	C0105051900
41	9	5310-01-227-8658	15434	C0526212700
41	10	5305-01-226-6626	15434	C0718106400
41	11	5330-01-227-3341	15434	C0103073100
41	12	2815-01-321-5477	15434	C0103071900
41	13	5305-01-226-6624	15434	C0718104600
41	14	5305-01-226-6625	15434	C0718108500
41	15	5310-01-276-8608	15434	C0740101000
41	16	5330-01-215-9642	15434	C0509026300
41	17	5306-01-275-3242	15434	C0718104800
41	18	5305-01-226-6628	15434	C0718104400

CROSS-REFERENCE INDEXES

FIG.	ITEM	FIGURE AND ITEM NUMBER INDEX		PART NUMBER
		STOCK NUMBER	CAGEC	
41	19	5305-01-212-3220	15434	C0718103600
41	20	5305-01-226-6623	15434	C0815057800
41	21	3040-01-223-8757	15434	C0103075000
41	22	5340-01-223-8667	15434	C0103073500
41	23	5340-01-321-3395	15434	C0517018800
41	24	3020-01-216-6930	15434	C0147042700
41	25	5305-01-273-6251	15434	C0718103500
41	26	5310-01-321-4083	15434	C0526210700
41	27	3020-01-225-6989	15434	C0120106300
41	28	3120-01-233-7812	15434	C0120104100
41	29	5310-01-321-4082	15434	C0526210600
41	30	3020-01-217-9689	15434	C0105088500
41	31	3040-01-215-3539	15434	C0120098300
41	32	5305-01-165-1284	15434	C0718103900
42	1	2815-01-321-8290	15434	C0120101100
42	2	3040-01-321-9997	15434	C0120120501
42	3	2815-01-321-8290	15434	C0120101100
42	4		15434	C0120104200
42	5	3120-01-233-7813	15434	C0120097900
42	6	5305-01-226-6627	15434	C0725180200
42	7	3020-01-322-0014	15434	C0120113401
42	8	5310-01-276-1660	15434	C0740100600
42	9	5305-01-158-0831	15434	C0718104100
43	1	5330-01-351-7674	15434	C0122074000
43	2	4730-00-833-7976	15434	C0505027400
43	3	6680-01-321-5883	15434	C0123171101
43	4	5310-01-321-4081	15434	C0526210800
43	5	5306-01-323-2680	15434	C0725105100
43	6	2910-01-350-5050	15434	C0122059200
43	7	2940-01-210-9683	73370	PH3616
44	1	4820-01-320-8852	15434	C0123151400
44	2	5360-01-230-4566	15434	C0123151100
44	3	5310-01-275-3318	15434	C0740100400
45	1	5330-01-323-2754	15434	C0102098100
45	2	2815-01-320-7298	15434	C0120103400
45	3	5305-01-226-6628	15434	C0718104400
45	4	5310-01-276-1660	15434	C0740100600
45	5	5330-01-212-3363-	15434	C0120122200
45	6	5305-01-212-3220	15434	C0718103600
45	7	2815-01-321-8346	15434	C0012113900
45	8	5305-01-322-7301	15434	C0815072200
45	9	5330-01-212-3361	15434	C0102114700
45	10	5365-01-225-0720	15434	C0102114600
46	1	2990-01-322-1038	6Y402	8880891
46	2	6150-01-322-4542	6Y402	8890412
46	3	5905-01-321-5000	01843	0-251-103-307
46	4	2920-01-217-6489	15434	C0336413100
46	5	2920-01-334-4326	01843	0-250-250-200
46	6	5310-01-321-3478	15434	C0850200500
46	7	5310-01-217-3368	15434	C0750100200
47	1	5330-01-321-0455	15434	C0154275800

CROSS-REFERENCE INDEXES

FIG.	ITEM	FIGURE AND ITEM NUMBER INDEX		PART NUMBER
		STOCK NUMBER	CAGEC	
47	2	2815-01-321-5505	15434	C0154244800
47	3	5310-01-276-1660	15434	C0740100600
47	4	5305-01-213-5019	15434	C0718180100
48	1	2815-01-320-8934	15434	C0154229600
48	2	5306-01-321-1994	15434	C0800252400
48	3	5310-01-276-1660	15434	C0740100600
48	4	5330-01-212-3356	15434	C0154232500
48	5	5330-01-212-3355	15434	C0154216200
49	1	4710-01-321-6374	15434	C0147067800
49	2	4710-01-321-6373	15434	C0147067700
49	3	5340-01-321-9688	15434	C0147068000
49	4	4710-01-322-2567	15434	C0147067600
49	5	4710-01-322-2566	15434	C0147067500
49	6	5330-01-323-2923	53867	1 410 501 072
49	7	2910-01-318-4237	15434	C0147046203
49	8	5307-01-213-5020	15434	C0520240300
49	9	5310-01-321-4082	15434	C0526210600
49	10	5310-01-212-3338	15434	C0750100600
49	11	5340-01-321-9687	15434	C0147067900
49	12	2910-01-323-0311	53867	0 432 217 0191
49	13	5310-01-322-6526	53867	2 430 100 535
49	13	5310-01-322-6527	53867	2 430 100 539
49	13	5310-01-322-6528	53867	2 430 100 550
49	13	5310-01-322-6529	53867	2 430 100 552
49	13	5310-01-322-6530	53867	2 430 100 554
49	13	5310-01-322-6531	53867	2 430 100 555
49	13	5310-01-322-6532	53867	2 430 100 557
49	i3	5310-01-322-6533	53867	Z 430 100 560
49	13	5310-01-322-6534	53867	2 430 100 569
49	13	5310-01-322-6936	53867	2 430 100 559
49	13	5310-01-322-6937	53867	2 430 100 562
49	13	5310-01-322-6938	53867	2 430 100 564
49	13	5310-01-322-6939	53867	2 430 100 575
49	13	5310-01-323-3738	53867	2 430 100 542
49	13	5310-01-323-3739	53867	2 430 100 570
49	13	5365-01-323-2795	53867	2 430 100 525
49	13	5365-01-323-2796	53867	2 430 100 527
49	13	5365-01-323-2797	53867	2 430 100 530
49	13	5365-01-323-2798	53867	2 430 100 532
49	13	5365-01-323-2799	53867	2 430 100 534
49	13	5365-01-323-2800	53867	2 430 100 544
49	13	5365-01-323-2801	53867	2 430 100 545
49	13	5365-01-323-2802	53867	2 430 100 549
49	13	5365-01-323-2803	53867	Z 430 100 565
49	13	5365-01-323-2804	53867	2 430 100 579
49	13	5365-01-323-2805	53867	2 430 100 580
49	13	5365-01-323-2828	53867	2 430 100 547
49	13	5365-01-323-2829	53867	2 430 100 529
49	13	5365-01-325-5171	53867	2 430 100 567
49	13	5365-01-325-7318	53867	2 430 100 540
49	13	5365-01-330-8453	53867	2 430 100 572

SECTION IV

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CROSS-REFERENCE INDEXES

FIGURE AND ITEM NUMBER INDEX				
FIG.	ITEM	STOCK NUMBER	CAGEC	PART NUMBER
49	13	5365-01-330-8454	53867	2 430 100 574
49	13	5365-01-330-8455	53867	2 430 100 577
49	13	5365-01-330-8456	53867	2 430 100 582
49	13	5365-01-330-8457	53867	2 430 100 584
49	14	5360-01-247-8508	53867	2 434 614 010
49	15	5315-01-323-4925	53867	2 433 124 161
49	16	2910-01-324-1235	53867	2 430 136 145
49	17	2910-01-323-7359	53867	0 434 250 999
49	18	4730-01-324-2078	53867	2 433 458 123
50	1	5340-00-617-7909	18265	P-7191
50	2	4310-00-190-0983	18265	GAX00-1966
50	3	4730-00-277-6199	66295	44H
50	4	4730-01-321-6287	15434	C0140199102
5Q	5	4730-01-321-6284	15434	C0503122200
50	6	2940-01-337-4186	18265	ABX-2250
50	7	4730-00-278-3721	81343	2-2 130137B
50	8	4730-00-639-9730	79470	3400X2
50	9	4730-01-322-2407	15434	C0503140600
50	10	2940-01-335-3265	18265	FWG06-5304
50	11	2940-01-321-8492	18265	P15-2790
50	12	2940-00-192-9182	18265	SMP18-1052
50	13	5310-01-321-6922	18265	P10-1270
50	14	5340-00-009-5294	18265	P00-2940
50	15	4320-00-019-2991	18265	P10-2510
50	16	1040-00-019-2992	18265	P10-2805
50	17	5310-01-321-5930	15434	C0860200800
50	18	5310-01-321-6614	15434	C0526210300
51	1	4730-01-167-7064	66295	M5
51	2	4730-00-463-3618	93061	125HBL-4-2
51	3	4730-00-947-7498	96906	MS39233-1
51	4	4730-00-231-5605	24617	105422
51	5		24161	70030-32
51	6	4730-00-200-0531	93061	125HBL-4-4
51	7	4730-00-249-3915	93236	PL12M
51	8	2910-01-322-5807	80195	T2048UU
51	9	2910-00-847-2807	78225	AC0-4032
51	10	4330-01-322-7651	80195	T2048UJ
51	11		80195	T2048UT
51	12	4730-00-842-7841	24617	444626
51	13	5310-00-732-0558	96906	MS51967-8
51	14	5310-00-637-9541	96906	MS35338-46
51	15	5310-01-321-8610	24617	274517
51	16	5305-00-269-3211	96906	MS90725-60
51	17		24161	70030-24
52	1	2910-01-321-8558	84760	23187
52	2	5340-01-321-6066	84760	23243
52	3	5310-01-275-3323	15434	C0740100800
52	4	5305-01-339-0818	15434	C0725107400
52	5	2910-01-322-2705	84760	23775
53	1	2805-01-211-2199	15434	C0149173200
53	2	5330-01-322-2434	15434	C0149220700

CROSS-REFERENCE INDEXES

FIGURE AND ITEM NUMBER INDEX				
FIG.	ITEM	STOCK NUMBER	CAGEC	PART NUMBER
53	3	4710-01-320-8072	15434	C0149177200
53	4	4730-00-278-8829	96906	MS39176-4
53	5	4i30-01-323-3317	79470-	60-X5
53	6	4730-01-346-4594	79470	C5165X5
53	7	4730-00-287-0276	79470	C5105X5
53	8	5325-01-321-9706	84760	23448
53	9	4710-01-320-8073	15434	C0149179300
53	10	4730-01-211-8385	15434	C0502073300
53	11	5305-01-212-3221	15434	C0718102100
53	12	5310-01-275-3318	15434	C0740100400
53	13	2910-01-318-4235	7W442	7-21323-00
53	14	2910-01-318-4235	15434	C0149214200
53	15	4720-00-203-6526	15434	C0501000200
53	16	4730-00-277-8643	79470	434X4
53	17	4730-00-278-4740	79470	69X5
54	1	4730-01-337-3741	79470	1073X4
54	2	4720-01-238-0193	15434	C0503105400
54	3	4710-01-212-3407	15434	C0503105300
54	4	4720-01-212-2604	15434	C0503105500
54	5	4730-01-185-5348	79470	1068X4
54	6	4730-00-595-0251	15434	C0502005700
55	1	5340-01-323-8064	80195	T2048PB
55	2	5305-00-225-3843	80204	81821BH025C100N
55	3	5310-00-013-1245	21450	131245
55	4	2920-01-322-9238	58791	T204833
56	1	2990-01-321-8491	15434	C0155196700
56	2	2990-01-350-1669	15434	C0155206201
56	3	5305-01-158-0827	15434	C0718105400
56	4	5310-01-275-3323	15434	C0740100800
56	5	5330-01-324-7025	15434	C0155192000
56	6	5310-01-321-4088	15434	C0850200800
56	7	5305-01-321-6676	15434	C0718180700
57	1	4730-00-204-3491	66295	C32P
57	2	4720-01-322-0116	15434	C0503136700
57	3	4730-00-012-7951	79470	3152X4
57	4		44940	130-2003
57	5	2930-01-322-0062	41197	1A11363D
57	6	4820-01-263-6410	79470	145
57	7	4720-01-323-0104	15434	C0503136600
58	1	5310-01-321-6578	15434	C0860201000
58	2	5310-01-321-6020	15434	C0526214800
58	3		15434	C0130245200
58	4	5340-01-323-8435	81860	W94-030
58	5	2930-01-321-9985	15434	C0130245600
58	6	5365-01-321-6076	15434	C0130245800
58	7	5340-01-325-5927	81860	W84-030
58	8	5310-01-212-3385	15434	C0526032200
58	9	5310-01-321-4088	15434	C0850200800
58	10		15434	C0800205000
58	11	5305-01-149-0867	15434	C0800205400
58	12	5340-01-321-9718	15434	C0130276800

CROSS-REFERENCE INDEXES

FIGURE AND ITEM NUMBER INDEX				
FIG.	ITEM	STOCK NUMBER	CAGEC	PART NUMBER
58	13		56161	10504048
58	14	5310-01-212-3389	15434	C0850201200
58	15		15434	C0405376800
58	16	5310-01-321-6614	15434	C0526210300
58	17		15434	C0800205000
58	18	5310-01-321-5930	15434	C0860200800
59	1	2590-01-321-8095	15434	C0130293500
59	2	5305-01-260-8929	15434	C0800210000
59	3	5310-01-321-6020	15434	C0526214800
59	4	5310-01-212-3389	15434	C0850201200
59	5	5310-01-321-5930	15434	C0860200800
59	6	5305-01-321-2121	15434	C0800211200
59	7	2590-01-321-8094	15434	C0130293400
59	8	2590-01-321-9884	15434	C0130293300
60	1	2815-01-322-2339	15434	C0405357100
60	2	5305-01-158-3207	56161	10503517
60	3	5310-01-321-4088	15434	C0850200800
60	4	5310-01-321-6614	15434	C0526210300
60	5	2510-01-321-9999	15434	C0405351100
60	6	2930-01-321-5471	15434	C0405377500
60	7	5340-01-324-0176	80195	T2048PC
60	8		94222	19-10-091-10
60	9	2590-01-321-8096	15434	C0405302800
60	10	5365-01-321-6077	15434	C0405303100
60	11	5340-01-325-5927	81860	W84-030
60	12	2590-01-321-8097	15434	C0405302900
60	13	5310-01-321-6020	15434	C0526214800
60	14	5305-01-159-0065	56161	10501759
60	15	5340-01-323-8435	81860	W94-030
60	16	5310-01-321-4084	15434	C0526032100
60	17	5310-01-321-5930	15434	C0860200800
60	18	2590-01-322-2525	15434	C0405303000
60	19	5305-01-212-3220	15434	C0718103600
60	20	5305-01-158-0831	15434	C08002062000
61	1	6620-01-325-6749	78493	4S139-0745631
61	2	5330-01-321-2052	15434	C0309058500
61	3	2930-01-320-8900	15434	C0309041200
61	4	5306-01-275-5001	15434	C0718103700
61	5	5310-01-276-1660	15434	C0740100600
62	1	5330-01-212-6042	15434	C0509026400
62	2	4730-01-211-5224	15434	C0502031700
62	3	4730-01-211-5223	15434	C0502077500
62	4	2930-01-321-8350	15434	C0131039800
62	5	3020-01-322-0097	15434	C0131034400
62	6	5310-01-276-1660	15434	C0740100600
62	7	5305-01-273-6251	15434	C0718103500
62	8	5305-01-321-9689	15434	C0720104400
62	9	5330-01-322-2848	15434	C0131045800
62	10	5365-01-217-1887	15434	C0131032400
63	1	2815-01-321-8362	15434	C0130244200
63	2	3030-00-528-4238	24161	HC-38

CROSS-REFERENCE INDEXES

FIG.	ITEM	FIGURE AND ITEM NUMBER INDEX		PART NUMBER
		STOCK NUMBER	CAGEC	
63	3	5365-01-321-6611	15434	C0130187300
63	4	2930-01-321-8283	22038	460756
63	5	5305-01-321-9733	15434	C0718104700
63	6	5310-01-321-4088	15434	C0850200800
63	7	2815-01-321-8361	15434	C0130244300
63	8	5305-01-326-4892	15434	C0821203300
64	1	5365-01-321-6610	15434	C0191132200
64	2	5310-01-276-1660	15434	C0740100600
64	3	5305-01-212-3220	15434	C0718103600
64	4	2815-01-321-5480	15434	C0130306000
64	5	5305-01-158-3207	15434	C0800205200
64	6	5310-01-321-6614	15434	C0526210300
64	7	3020-01-322-0098	15434	C0191133900
64	8	5305-01-260-8929	15434	C0800210000
64	9	2815-01-321-5481	15434	C0191174100
64	10	5365-01-321-6610	15434	C0191132200
64	11	5310-01-321-6613	15434	C0526212300
64	12	5310-01-321-5930	15434	C0860200900
64	13	2920-01-211-8589	15434	C0191133100
64	14	6115-01-325-6228	15434	C0191190900
64	t5	6115-01-325-6215	15434	C0191187100
64	16	2920-01-335-3463	0EDY1	8EA2021FA
64	17	2920-01-211-8618	15434	C0191136500
65	1	2920-01-321-8325	3N649	M002T56072
65	2	5305-01-212-3227	15434	C0720180600
65	3	5310-01-276-8608	15434	C0740101000
66	1	4320-01-325-6373	38455	4C7-QA052AA
66	Z	5305-00-071-2067	80204	B1821BH050C125N
66	3	4320-01-322-2246	38455	22471-02
66	4	4730-01-321-9833	38455	16433-00
66	5	4820-00-884-5620	38455	27186-00
66	6	4730-01-320-5362	38455	1643300
66	7	4320-00-428-2750	38455	15128-02
66	8	4820-01-115-0614	38455	15636-00
66	9	4320-00-428-2749	38455	15127-02
66	10	4320-01-322-3489	38455	27185-00
66	11	5310-01-321-6029	38455	5062600
66	12	5310-00-768-0318	96906	MS51967-14
66	13	2910-01-341-2222	38455	21569-AD-QA052AA
66	14	4730-01-320-7353	38455	45686-00
66	15	4730-01-321-9834	38455	16543-00
66	16	5330-00-184-2761	38455	21316-00
66	17	4320-01-322-0921	38455	21578-02
66	18	5310-00-411-9121	38455	30586-00
66	19	5315-00-411-9127	38455	22967-00
66	20	4320-01-322-7775	38455	36442-02
66	21	4930-00-216-6195	38455	25356-20
66	22		38455	2548100
66	23		38455	2493200
66	24		38455	25475-00
66	25	4320-01-322-0995	38455	41219-00

CROSS-REFERENCE INDEXES

FIGURE AND ITEM NUMBER INDEX				
FIG.	ITEM	STOCK NUMBER	CAGEC	PART NUMBER
66	26	3825-01-322-3490	38455	26104-00
66	27	5310-01-321-4932	38455	5158100
66	28	5305-01-080-1713	61080	50051800
66	29	2990-01-321-8360	38455	28744-AA
66	30	4730-01-116-3729	38455	25924-00
66	31	3040-01-322-0965	38455	42524-00
66	32	3110-00-554-3079	15175	A51655-14
66	33	5365-00-406-3791	38455	25817-00
66	34	3130-01-321-6631	38455	28745-02
66	35	5330-00-412-9924	38455	20831-00
66	36	5305-01-122-2058	06032	2070-6453-003
66	37	5310-01-321-6030	38455	5062300
66	38	4320-01-213-6179	38455	21579-02
66	39	5330-00-561-8750	38455	21437
66	40	5305-00-071-2055	80204	B1821BH044C150N
66	41	5310-00-209-0965	96906	MS35338-47
66	42	5306-01-276-9191	58501	100-ED39
66	43	5310-00-407-9566	96906	MS35338-45
66	44	5306-01-240-5171	64678	000933010202
66	45	5310-01-264-9410	15526	D1N127B-M10-A4C
66	46	4730-01-321-9963	38455	16455-00
66	47	5310-00-935-9088	72962	41NTE164
66	48		38455	20068-00
67	1		80691	40FAL
67	2	4730-01-322-6642	80691	40DCAL
67	3	4010-01-322-2824	80691	60CHBR
67	4		80691	40FAL
67	5	4710-01-322-5845	80195	T2048PL
67	6	5310-00-584-5272	96906	MS35338-48
67	7	5310-01-323-7955	24617	120378
67	8	5340-01-322-4815	80195	T2048PT
67	9	5306-01-321-8721	80195	2990003
67	10	4730-01-322-9113	80195	T2048PG
67	11	4730-00-855-4916	79154	C-040-075-P-T0
67	12	5310-01-323-7955	24617	120378
67	13		79154	75D-4
67	14	5330-01-321-9649	79154	75D-4-G-T
67	15	5305-00-071-2074	80204	B1821BH050C275N
67	16	5305-00-071-2055	80204	81821BH044C150N
67	17	4730-01-322-7637	80195	T2048PK
67	18	5330-01-229-1985	80195	2940053
67	19	5340-01-322-4814	80195	T2048PR
67	20	5310-00-732-0558	96906	MS51967-8
67	21	4730-01-322-7652	80195	T2048PM
67	22	4730-01-322-9135	80195	T2048PP
67	23	4730-01-322-9112	80195	T204830
67	24	4730-01-322-9119	80195	6200575
67	25		ONG12	618R
67	26	5305-00-071-2077	80204	B1821BH050C350N
67	27	4820-01-340-0282	ONG12	4065
67	28	4730-01-323-0970	85653	K-39

CROSS-REFERENCE INDEXES

FIGURE AND ITEM NUMBER INDEX				
FIG.	ITEM	STOCK NUMBER	CAGEC	PART NUMBER
67	29		80195	T2048PV
67	30	4730-01-322-9171	80195	6200153
67	31	4730-01-322-4993	80195	T2048TM
67	32	4730-01-323-2075	80195	T2048PJ
67	33	4730-01-322-6697	80195	2940006
67	34	5305-00-021-3616	96906	MS35307-305
67	35	3825-01-323-0121	80195	2940008
67	36	5330-01-322-6056	80195	2940009
67	37	4730-01-328-5539	80195	2940007
67	38	5365-01-228-4013	80195	2940005
67	39	5305-01-321-8572	24617	127796
67	40	4730-00-253-4420	96906	MS39230-10
67	41	4730-01-322-9125	80195	6200063
67	42	4730-00-196-2075	91340	D9485-42-22
67	43	4810-01-322-5711	97999	35A-AAA-D0BA-1BA
67	44	4730-00-196-2054	96906	MS51953-1B
67	45	4730-00-289-2830	81348	WWP471
67	46	4820-00-472-4049	72219	41-560-01
67	47	4730-00-196-1465	96906	MS51873-25
67	48	4730-00-257-2117	24617	144083
67	49	4730-00-069-1187	79470	1469X6
67	50		79470	PFT-6B-10
67	51	4820-00-849-1220	96906	MS35782-5
67	52	4730-00-802-2237	96906	MS14304-1T0804
67	53	4730-00-246-9200	24617	144112
67	54	4730-00-231-5605	24617	105422
67	55	5975-00-433-5339	59730	TY409
67	56		79470	PFT-6B-5
68	1	4820-01-320-0292	80195	T204837
68	2	5340-01-321-9702	82666	DS3-E-4-05
68	3	5315-01-321-9628	82666	DS3-E-4-18
68	4	5315-01-323-1072	82666	DS3-E-4-09
68	5	5360-01-323-1078	82666	DS3-E-4-08
68	6	5340-01-321-9695	82666	DS3-E-4-07
68	7	5310-01-321-6615	82666	DS3-E-4-03
68	8	4730-01-322-2687	82666	DS3-E-4-11
68	9	5305-01-322-2449	82666	DS3-E-4-02
69	1	4820-01-321-8109	82666	LG-512-DS3-E-3
69	2	5340-01-346-7930	82666	LV341-3
69	3	5315-01-321-9629	82666	DS3-E-3-18
69	4	5315-01-323-1073	82666	DS3-E-3-09
69	5		82666	DS3-E-3-08
69	6	5340-01-321-9696	82666	DS3-E-3-07
69	7	5310-01-321-6616	82666	DS3-E-3-03
69	8	4730-01-322-2688	82666	DS3-E-3-11
69	9	5305-01-322-2450	82666	DS3-E-3-02
70	1	2590-01-318-4232	86184	85682D
70	2	5305-01-334-9998	86184	6760750H
70	3		0EG96	33876
70	4		0EG96	00775H
70	5	4820-01-325-6350	86184	33879

SECTION IV

TM5-3825-229-14&PC01

CROSS-REFERENCE INDEXES

FIGURE AND ITEM NUMBER INDEX

FIG.	ITEM	STOCK NUMBER	CAGEC	PART NUMBER
70	6		0NG96	82557-03
70	7		0EG96	74821
70	8		0NG96	81858
70	9		0NG96	74816
70	10		0EG96	33877
70	11		0EG96	00714
70	12		0EG96	74825
70	13		0EG96	70550-02
70	14		0EG96	74830
70	15		0EG96	C-3152
70	16		0EG96	83320-01

APPENDIX G

ILLUSTRATED LIST OF MANUFACTURED ITEMS

This appendix includes instructions for making items to be manufactured or fabricated at organizational, direct and general support maintenance level.

A part number index in alphanumeric order is provided for cross-referencing the part number of the item to the figure which covers the fabrication criteria.

All parts and bulk materials needed for manufacture of the items are listed by part number or specification number in a tabular list on the illustration.



MATERIAL:

Tubing, Nylon
 Outside Diameter - 0.38 In.
 Wall Thickness - 0.062 In.

Manufacture the Following
 Parts from the Tubing-
 Cut to Length

PART NO. PFT-6B	PART NO.	LENGTH
	T2048AC	28 In.
	T2048AD	20 In.
	T2048AE	38 In.
	T2048AF	3 In.
	T2048AG	17 In.
	T2048AH	13 In.
	T2048AJ	29 In.
	T2048AK	5 In.
	T2048AL	10 In.

Figure G-1. Tubing, Nylon, 0.38 In. O.D.



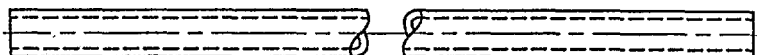
MATERIAL:

Tubing, Nylon
 Outside Diameter - 0.50 In.
 Wall Thickness - 0.062 In

Manufacture the Following
 Parts from the Tubing -
 Cut to Length

PART NO. PFT-8B	PART NO.	LENGTH
	T2048AA	29 In.
	T2048AB	19 In.
	T2048AM	28 In.

Figure G-2. Tubing, Nylon, 0.50 In. O.D.



MATERIAL:

Tubing, Polyethylene
 Outside Diameter - 0.38 In.
 Wall Thickness - 0.062 In.

Manufacture the Following
 PART NO. PT-240-6B
 Parts from the Tubing -
 Cut to Length

PART NO.	LENGTH
T2048CD	48 In.
T2048CE	14 In.
T2048CF	6 In.
T2048CG	54 In.
T2048CH	76 In.
T2048CJ	23 In.
T2048CK	60 In.

Figure G-3. Tubing, Polyethylene, 0.50 In. O.D.



MATERIAL:

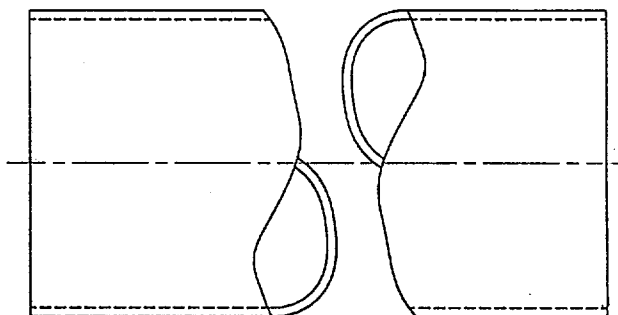
Hose, Fiber Braid w/Rubber
 Inside Diameter - 0.25 In.

Manufacture the Following
 Parts from the Hose -
 Cut to Length

PART NO. 70030

PART NO.	LENGTH
T2048UW	24 In.
T2048UY	32 In.

Figure G-4. Fuel Hose. Fiber Braid with Rubber, 0.25 In. I.D.



MATERIAL:

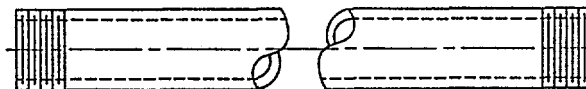
Hose, Wire Reinforced Polyester
 Inside Diameter - 3.0 In.

Manufacture the Following
 Part from the Hose -
 Cut to Length

PART NO. P-1196-3

PART NO.	LENGTH
T2048PV	37 In.

Figure G-5. Hose, Wire Reinforced, Polyester, 3.0 In. I.D.



MATERIAL:

Conduit, Pipe, Steel
 Outside Diameter - 0.50 In.
 Conforms to ASTM A-53

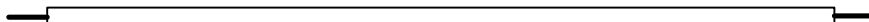
Manufacture the Following
 Parts from the Conduit -
 Cut to Length

PART NO. 6303355

PART NO.	LENGTH
T2048EM	227 In.
T2048EN	154 In.

Form 1/2 NPT Threads on
 Each End of Conduits

Figure G-6. Conduit, Pipe, Steel, 0.50 In. O.D.



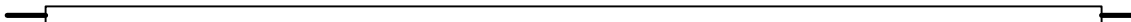
MATERIAL:

Wire, 10 GA, Type GPT
 PCV Insulation
 Copper Conductor
 Color - White

Manufacture the Following
 Part from the Wire -
 Cut to Length

PART NO. 6700303-2

PART NO.	LENGTH
6700303	2 In.



MATERIAL:

Wire, 14 GA, Type GPT
 PCV Insulation
 Copper Conductor
 Color - Black

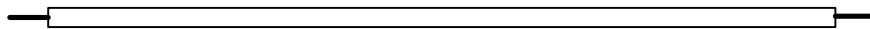
Manufacture the Following
 Part from the Wire -
 Cut to Length

PART NO. 6700115-60

PART NO.	LENGTH
6700115	60 In.

Figure G-7. Wire, 10 and 14 GA, PCV Insulation (Sheet 1 of 2)

MATERIAL:



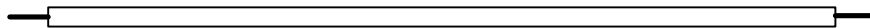
Wire, 14 GA, Type GPT
 PCV Insulation
 Copper Conductor
 Color - Brown,

Manufacture the Following
 Part from the Wire -
 Cut to Length

PART NO. 6700116-60

PART NO.	LENGTH
6700116	60 In.

MATERIAL:



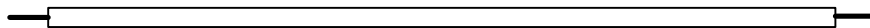
Wire, 14 GA, Type GPT
 PCV Insulation
 Copper Conductor
 Color - Green

Manufacture the Following
 Part from the Wire -
 Cut to Length

PART NO. 6700117-55

PART NO.	LENGTH
6700117	53 In.

MATERIAL:



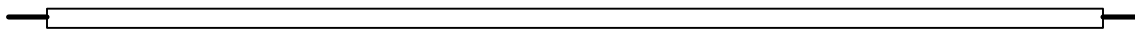
Wire, 14 GA, Type GPT
 PCV Insulation
 Copper Conductor
 Color - Red

Manufacture the Following
 Part from the Wire -
 Cut to Length

PART NO. 6700119-55

PART NO.	LENGTH
6700119	55 In.

MATERIAL :



Wire, 14 GA, Type GPT
 PCV Insulation
 Copper Conductor
 Color - Yellow

Manufacture the Following
 Part from the Wire -
 Cut to Length

PART NO. 6700121

PART NO.	LENGTH
6700121	45 In.

Figure G-7. Wire, 10 and 14 GA, PCV insulation (Sheet 2 of 2)



MATERIAL:

Conduit, PCV Jacket, Galvanized Steel
 Outside Diameter - 0.82 In.
 Inside Diameter - 0.62 In.

Manufacture the Following
 Part from the Conduit -
 Cut to Length

PART NO. LT-1 1

PART NO.
 6700710

LENGTH
 84 In

Figure G-8. Conduit, PCV Jacket, Galvanized Steel, 0.82 In. O.D.

Index

PART NO.	FIG. NO.	PART NO.	FIG. NO.
LT-11	G-8	T2048CH	G-3
PFT-6B	G-1	T2048CJ	G-3
PFT-8B	G-2	T2048CK	G-6
PT-240-6B	G-3	T2048EM	G-6
P-1196-3	G-4	T2048EN	G-6
T2048AA	G-2	T2048PV	G-5
T2048AB	G-2	T2048UW	G-4
T2048AC	G-1	T2048UY	G-4
T2048AD	G-1	6303355	G-6
T2048AE	G-1	6300303	G-7
T2048AF	G-1	6300303-2	G-7
T2048AG	G-1	6700115	G-7
T2048AH	G-1	6700115-60	G-7
T2048AJ	G-1	6700116	G-7
T2048AK	G-1	6700116-60	G-7
T2048AL	G-1	6700117	G-7
T2048AM	G-2	6700117-55	G-7
T2048CD	G-3	6700119	G-7
T2048CE	G-3	6700119-55	G-7
T2048CF	G-3	6700121	G-7
T2048CG	G-3	6700710	G-8

APPENDIX H

TORQUE LIMITS

H-1. GENERAL

This section provides general torque limits for fasteners. Special torque values are indicated in the maintenance procedures for applicable components. The general torque values given in this appendix shall be used when specific torque values are not indicated in the maintenance procedures.

H-2. TORQUE LIMITS

Torque limits are listed in table H-1 for dry fasteners and in table H-2 for wet fasteners. Dry fasteners are defined as fasteners on which no lubricants are applied to the threads; wet fasteners are defined as fasteners on which special graphited or poly-disulphide greases or other extreme pressure lubricants are applied to the threads. Torque limits listed in Table H-3 are for specialized torques for dry fasteners. Table H-4 lists torques applicable to the semitrailer engine and are for wet fasteners.

Table H-1. Torque Limits for Dry Fasteners

SIZE		TORQUE					
		SAE GRADE NO. 2		SAE GRADE NO. 5		SAE GRADE NO. 8	
INCHES	MILLIMETERS	POUNDS FOOT	NEWTON METERS	POUNDS FOOT	NEWTON METERS	POUNDS FOOT	NEWTON METERS
1/4	6.35	5-6	6.8-8.13	9-11	12.2-14.9	12-15	16.3-20.3
5/16	7.94	10-12	13.6-16.3	17-20.5	23.1-27.8	24-29	32.5-39.3
3/8	9.53	20-23	27.1-31.2	35-42	47.5-57.0	45-54	61.0-73.2
7/16	11.11	30-35	40.7-47.4	54-64	73.2-86.8	70-84	94.9-113.9
1/2	12.70	45-52	61.0-70.5	80-96	108.5-130.2	110-132	149.2-179.0
9/16	14.29	65-75	88.1-101.6	110-132	149.2-179.0	160-192	217.0-260.4
5/8	15.88	95-105	128.7-142.3	150-180	203.4-244.1	220-264	298.3-358.0
3/4	19.05	150-185	203.3-250.7	270-324	366.1-439.3	380-456	515.3-518.3
7/8	22.23	160-200	216.8-271.0	400-480	542.4-650.9	600-720	813.6-976.3
1	25.40	250-300	338.8-406.5	580-696	786.5-943.8	900-1080	1220.4-1464.5
1-1/8	25.58	-	-	800-880	1084.8-1193.3	1280-1440	1735.7-1952.8
1-1/4	31.75	-	-	1120-1240	1518.7-1681.4	1820-2000	2467.9-2712.0
1-3/8	34.93	-	-	1460-1680	1979.8-2278.1	2380-2720	3227.3-3688.3
1-1/2	38.10	-	-	1940-2200	2630.6-2983.2	3160-3560	4285.0-4827.4

Table H-2. Torque Limits for Wet Fasteners

SIZE		TORQUE					
		SAE GRADE NO. 2		SAE GRADE NO. 5		SAE GRADE NO. 8	
INCHES	MILLIMETERS	POUNDS FOOT	NEWTON METERS	POUNDS FOOT	NEWTON METERS	POUNDS FOOT	NEWTON METERS
1/4	6.35	4.5-5.5	6.1-7.5	8-10	10.8-13.6	11-13.5	14.9-18.3
5/16	7.94	9-11	12.2-14.9	15-18.5	20.4-25.1	21.5-26	29.2-35.3
3/8	9.53	18-20.5	24.4-27.8	31.5-38	42.8-51.6	40.5-48.5	55-65.9
7/16	11.11	27-31.5	36.7-42.8	48.5-57.5	65.9-78.2	63-75.5	85.6-102.6
1/2	12.70	40.5-47	55-63.9	72-86.5	97.9-117.6	99-119	134.6-161.8
9/16	14.29	58.5-67.5	79.5-91.8	99-119.0	134.6-161.8	144-173	195.8-235.2
5/8	15.88	85.5-94.5	116.2-128.5	135-162	183.6-220.3	198-237.5	269.2-323
3/4	19.05	135-166.5	183.6-226.4	243-291.5	330.4-396.4	342-410	465.1-557.6
7/8	22.23	144-180	195.8-224.8	360-432	489.6-587.5	540-648	734.4-881.2
1	25.40	225-270	306-367.2	522-626	709.9-851.3	810-972	1101.6-1321.9
1-1/8	25.58	-	-	720-792	979.2-1077.1	1152-1296	1566.7-1762.5
1-1/4	31.75	-	-	1008-1116	1370.8-1517.7	1638-1800	2227.6-2448
1-3/8	34.93	-	-	1314-1512	1787-2056.3	2142-2448	2430.3-3329.2
1-1/2	38.10	-	-	1746-1980	2374.5-2692.8	2844-3204	3867.8-4357.4

Table H-3. Torque Limits for Specialized Dry Fasteners

SIZE		MANUAL LOCATION (PAGE)	TORQUE	
INCHES	MILLIMETERS		POUNDS FOOT	NEWTON METERS
9/16	14.29	4-60	15-20	20-27
	NUT	4-74	250-300	339-407
	NUT	4-74	50	68
3/4	19.05	4-77	400-450	542-612
7/8	22.23	5-5	300	407
7/8	22.23	5-5	250	330
3/4	19.05	5-7	150	202

Table H-4. Torque Limits for Engine Wet Fasteners

SIZE		MANUAL LOCATION (PAGE)	TORQUE	
INCHES	MILLIMETERS		POUNDS FOOT	NEWTON METERS
	M8	4-95	17	23
	M12	4-99	14	19
	M10	4-101	13	18
	M12	4-108	18	24
	M12	4-111	18	24
	M12	4-114	18	24
	M12	4-115	18	24
	M10	4-118	39	52
	M8	4-123	17	23
	M10	4-124	39	52
	M12	4-130	62	84
	M12	5-19	50	65
	M12	5-19	95	129
	M10	5-20	39	52
	M10	5-21	13	18
	M16	5-23	98	133
	M10	5-26	50	68
	M12	5-29	62	84
	M8	5-31	8	11
	M8	5-34	17	23
	M8	5-38	21	28
	M8	5-39	17	23
	NOZZLE	5-41	51	69
	M12	5-41	18	24
	M8	5-47	38	52
	M8	5-47	17	23
	M8	5-47	17	23
	M8	5-50	12	17

Table H-4. Torque Limits for Engine Wet Fasteners

SIZE		MANUAL LOCATION (PAGE)	TORQUE	
INCHES	MILLIMETERS		POUNDS FOOT	NEWTON METERS
	M8	6-13	17	23
	M8	6-15	17	23
	M10	6-15	39	15
	M8	6-16	17	23
	M8	6-20	8	11
	M12	6-28	63	85
	M12	6-34	90	123
	M12	6-34	90	123
	M8	6-38	17	23
	TIP NUT	6-44	30-35	41-48
			POUNDS INCH	NEWTON METERS
	PLUG	4-93	150	17
	M15	4-114	17	2

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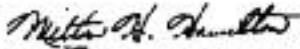
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By Order of the Secretary of the Army:

GORDON R. SULLIVAN
General, United States Army
Chief of Staff

Official: 
MILTON H. HAMILTON
Administrative Assistant to the
Secretary of the Army
01718

Distribution:

To be distributed in accordance with DA Form 12-25-E (Block 3577), Operator, Unit, Direct and General Support requirements for Distributor, Water, Semitrailer, Mounted, 6,000 Gallon Capacity, TM 5-3825-229-14&P.

RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL PUBLICATIONS



*THEN...JOT DOWN THE
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PAGE NO.	PARA-GRAPH	FIGURE NO.	TABLE NO.

IN THIS SPACE, TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT.

PRINTED NAME, GRADE OR TITLE AND TELEPHONE NUMBER

SIGN HERE

THE METRIC SYSTEM AND EQUIVALENT

LINEAR MEASURE

1 Centimeter - 10 Millimeters - 0.01 Meters = 0.3937 Inches
 1 Meter - 100 Centimeters - 1000 Millimeters = 39.37 Inches
 1 Kilometer - 1000 Meters - 0.621 Miles

SQUARE MEASURE

1 Sq Centimeter - 100 Sq Millimeters - 0.155 Sq Inches
 1 Sq Meter - 10,000 Sq Centimeters - 10.76 Sq Feet
 1 Sq Kilometer - 1,000,000 Sq Meters - 0.386 Sq Miles

WEIGHTS

1 Gram - 0.001 Kilograms - 1000 Milligrams - 0.035 Ounces
 1 Kilogram = 0.001 Grams = 2.2 Lb
 Feet
 1 Metric Ton - 1000 Kilograms - 1 Megogram = 1.1 Short Tons

CUBIC MEASURE

1 Cu centimeter = 1000 Cu Millimeters = 0.06 Cu Inches
 1 Cu Meter = 1,000,000 Cu Centimeters = 35.31 Cu

LIQUID MEASURE

1 Milliliter = 0.001 liters = 0.0338 Fluid Ounces
 1 Liter = 1000 Milliliters = 33.82 Fluid Ounces

TEMPERATURE

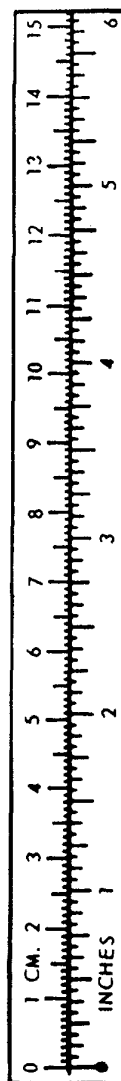
$5/9 (^{\circ}F - 32) = ^{\circ}C$
 212 $^{\circ}$ Fahrenheit is equivalent to 100 $^{\circ}$ Celsius
 90 $^{\circ}$ Fahrenheit is equivalent to 32.2 $^{\circ}$ Celsius
 32 $^{\circ}$ Fahrenheit is equivalent to 0 $^{\circ}$ Celsius
 $9/5 C^{\circ} + 32 = F^{\circ}$

APPROXIMATE CONVERSION FACTORS

APPROXIMATE CONVERSION FACTORS

<u>TO CHANGE</u>	<u>TO</u>	<u>MULTIPLY BY</u>
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

<u>TO CHANGE</u>	<u>TO</u>	<u>MULTIPLY BY</u>
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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