

**TECHNICAL MANUAL
OPERATOR'S, UNIT,
DIRECT SUPPORT
AND GENERAL SUPPORT
MAINTENANCE MANUAL**

**FIREFIGHTING TRUCK,
100 FT AERIAL LADDER,
1000 GPM
(NSN 4210-01-290-8755)**

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WARNING

CARBON MONOXIDE (EXHAUST GAS) CAN CAUSE DEATH.

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

1. DO NOT operate personnel heater or engine of vehicle in a closed place without proper ventilation.
2. DO NOT drive any vehicle with inspection plates, cover plates, or engine compartment covers removed unless necessary for maintenance purposes.
3. BE ALERT at all times during vehicle operation for exhaust odors and exposure symptoms. If either are present, IMMEDIATELY VENTILATE personnel compartments. If symptoms persist, remove affected crew to fresh air and keep warm. DO NOT PERMIT PHYSICAL EXERCISE. If necessary, give artificial respiration and get immediate medical attention. For artificial respiration, refer to FM 21-11.
4. BE AWARE that the gas particulate filter unit or the field protection mask for nuclear-biological-chemical protection WILL NOT offer safety from carbon monoxide poisoning.

THE BEST DEFENSE AGAINST CARBON MONOXIDE POISONING IS GOOD VENTILATION.

WARNING

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

WARNING

Never use the parking brake for normal braking or wheels will lock up causing severe skid. Skidding vehicle could result in serious injury or death.

WARNING

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

WARNING

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

WARNING

The radiator is very hot and pressurized during vehicle operation. Let radiator cool before removing cap. Failure to do so can result in serious burns.

WARNING

The exhaust pipe and muffler can become very hot during vehicle operation. Be careful not to touch these parts with bare hands, or allow body to come in contact with pipe or muffler. Exhaust system parts can become hot enough to cause serious burns.

WARNING

Always use seatbelts when operating vehicle. Failure to use seatbelt can result in serious injury in case of accident.

WARNING

When working inside the vehicle with power off, be sure to ground every capacitor likely to hold a dangerous voltage potential.

WARNING

Be careful when working on or with electrical equipment. Do not be misled by the term "low-voltage". Voltages as low as 50 volts may cause death. For artificial respiration, refer to FM 21-11.

WARNING

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

WARNING

Starting fluid is toxic and flammable. Do not store in cab and do not breathe fumes. Do not puncture or burn containers. Dispose of container following manufacturer's recommendations on the container.

WARNING

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

WARNING

After Nuclear, Biological or Chemical (NBC) exposure of vehicle, all airfilters shall be handled with extreme caution. Unprotected personnel can experience injury or death if residual toxic agents or radioactive materials are present. If vehicle is exposed to chemical or biological agents, servicing personnel shall wear protective mask, hood, protective overgarments, and chemical protective gloves and boots in accordance with TM 10-277. All contaminated air filters shall be placed in double-lined plastic bags and moved swiftly to a segregation area away from the work site. The same procedure applies for radioactive dust contamination. The Company NBC team should measure the radiation prior to filter removal to determine the extent of safety procedures required per the NBC Annex to the unit Standard Operating Procedures (SOP). The segregation area in which the contaminated air filters are temporarily stored shall be marked with appropriate NBC placards. Final disposal of contaminated air filters shall be in accordance with local SOP. Decontamination operation shall be in accordance with TM 3-220 and local SOP.

TECHNICAL MANUAL
 NO. 5-4210-233-14&P-2

HEADQUARTERS
 DEPARTMENT OF THE ARMY
 WASHINGTON, D.C., 15 DECEMBER 1992

TECHNICAL MANUAL

Operator's, Unit, Direct Support and General Support Maintenance Manual

FIREFIGHTING TRUCK, 100 Fr AERIAL LADDER, 1000 GPM NSN 4210-01-290-8755

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

This manual is divided into two volumes:

Volume 1, TM 5-4210-233-1 4&P-1 consists of Chapters 1 through 5 and Index.

Volume 2, TM 5-4210-233-1 4&P-2 consists of Chapter 6, Appendixes A through J and Index

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 or DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual directly to: Commander, US Army Aviation and Troop Command, ATTN: AMSAT-I-MTS, 4300 Goodfellow Blvd., St. Louis, MO 63120-1798. A reply will be furnished directly to you.

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HOW TO USE THIS MANUAL

ARRANGEMENT. This manual is divided into six chapters. The purpose of each chapter is Listed below.

Chapter 1 - INTRODUCTION. Provides the user with information about standard data required in all manuals. It also familiarizes the user with the truck and related equipment.

Chapter 2 - OPERATING INSTRUCTIONS. Presents instructions needed by the operator and crew to effectively and efficiently operate the truck.

Chapter 3 - OPERATOR MAINTENANCE INSTRUCTIONS. Presents the necessary information for the operator to keep the truck and its components in good running condition.

Chapter 4 - UNIT MAINTENANCE. Presents the necessary procedures and instructions to perform maintenance tasks allocated to Unit Maintenance.

Chapter 5 - DIRECT SUPPORT MAINTENANCE. Presents the necessary procedures and instructions to perform maintenance tasks allocated to Direct Support Maintenance.

Chapter 6 - GENERAL SUPPORT MAINTENANCE. Presents the necessary procedures and instructions to perform maintenance tasks allocated to General Support Maintenance.

An alphabetical subject index has been included at the rear of this manual to improve reader access to the required information.

EXPLANATION OF NUMBERING SYSTEM.

Text. The information in this manual is numbered sequentially for easy access of data.

Example: 2-1.
 The first number indicates the chapter number.

 The second number (following the hyphen) indicates the paragraph number within that chapter.

Example: 2-1.1
 The third number (following the period) indicates the subordinate paragraph number within a particular paragraph

Page and Table Numbers. All pages and tables are numbered sequentially within each chapter.

LOCATION OF NUMBERS.

Text. Numbers appear above and to the left of the related text.

Pages. Page numbers appear at the bottom right-hand corner for odd-numbered pages or the bottom left-hand corner for even-numbered pages.

Tables. Table numbers appear directly above the related table.

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GENERAL SUPPORT MAINTENANCE

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

- a. Common Tools and Equipment. For authorized common tools and equipment, refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.
- b. Special Tools, TMDE and Support Equipment. Special Tools, TMDE and Support Equipment are listed in Appendix B.
- c. Repair Parts. Repair parts are listed and illustrated in Appendix F of this manual.

SECTION II. MAINTENANCE OF THE FIRE TRUCK

- d. The following paragraphs provide detailed General Support Maintenance Instructions.

6-2. CURB SIDE PUMP DISCHARGE MANIFOLD

This task covers:

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

TOOLS REQUIRED

Tool Kit, General Mechanics, Automotive
(Appendix B, Section III, Item 1)

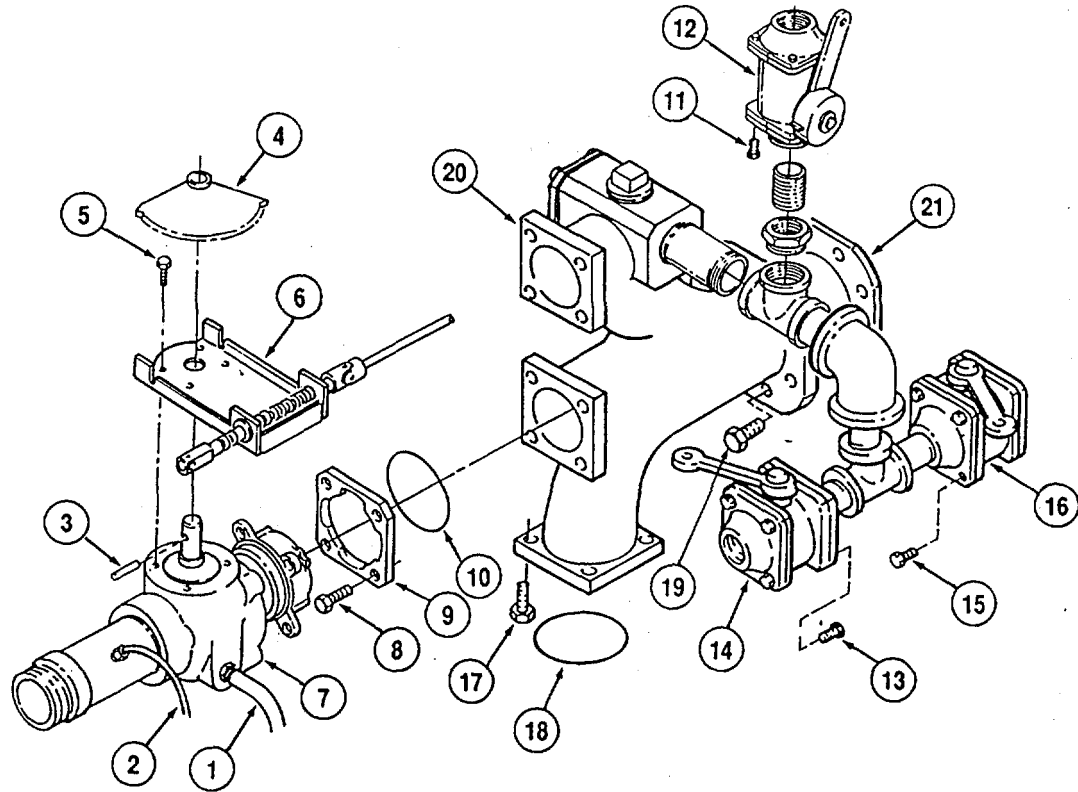
MATERIALS/PARTS REQUIRED

Tags, Identification (Item 32, Appendix E)
Gasket (Figure 31, Appendix F)
O-rings (Figure 14, Appendix F)
O-rings (Figure 12, Appendix F)
O-rings (Figure 22, Appendix F)

EQUIPMENT CONDITION

Main Engine Shutdown (see para 2-12.)
APU Shutdown (see para 2-16.)
Batteries Disconnected (see para 4-114.)
Curbside Operators Panel Removed
(see para 4-26.)

a. Removal



- (1) Tag and disconnect two drain valve hoses (1).
- (2) Tag and disconnect two pressure gauge hoses (2).
- (3) Remove two roll pins (3) to lift off two sector gears (4).

NOTE

Note position of sector gears to install them correctly during installation.

6-2. CURB SIDE PUMP DISCHARGE MANIFOLD - Continued

- (4) Remove eight bolts (5) to remove two valve control assemblies (6) from tops of discharge valves (7).

NOTE

Leave valve control assemblies connected to actuating linkage.

- (5) Remove four bolts (8) on each valve mounting flange (9). Remove two valves (7) with mounting flanges (9).
- (6) Turn each valve (7) counterclockwise 1/4 turn and remove them from valve mounting flanges (9). Remove and discard O-rings (10).
- (7) Remove bottom four bolts (11) from #1 crosslay valve (12).
- (8) Remove four bolts (13) from water valve (14).
- (9) Remove four bolts (15) from flush valve (16).
- (10) Remove four bolts (17) from relief valve connection. Remove and discard O-ring (18).
- (11) Remove eight bolts (19) securing discharge manifold (20) to pump body. Remove and discard gasket (21).

NOTE

Install piping and plugs on new manifold as needed.

b. Installation.

- (1) Using new gasket (21) attach discharge manifold (20) to pump body with eight bolts (19). Torque to 85 lb ft (115 N-m).
- (2) Using new O-ring (18), replace four bolts (17) to attach discharge manifold (20) to relief valve connection.
- (3) Using new O-ring, replace four bolts (15) to connect flush valve (16).
- (4) Using new O-ring, replace four bolts (13) to connect water valve (14).
- (5) Using new O-ring, replace four bottom bolts (11) to connect #1 crosslay valve (12).
- (6) Using new O-rings (10), replace two discharge valves (7) and valve mounting flanges (9) (turn valves 1/4 turn clockwise in valve mounting flanges).
- (7) Replace four bolts (8) in each valve mounting flange (9) to secure two discharge valves (7).
- (8) Replace two valve control assemblies (6) and attach them to discharge valves with eight bolts (5).
- (9) Replace two sector gears (4) in same positions they were in prior to removal and secure them with two roll pins (3).
- (10) Reconnect two pressure gauge hoses (2).

6-2. CURB SIDE PUMP DISCHARGE MANIFOLD - Continued

(11) Reconnect two drain valve hoses (1).

c. Follow-on Maintenance.

(1) Install curb side operator panel (see para 4-26).

(2) Connect batteries (see para 4-114).

6-3. STREET SIDE PUMP DISCHARGE MANIFOLD

This task covers:

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

TOOLS REQUIRED

Tool Kit, General Mechanics, Automotive (Appendix B, Section III, Item 1)

EQUIPMENT CONDITION

Main Engine Shutdown (see para 2-12.)
 APU Shutdown (see para 2-16.)
 Batteries Disconnected (see para 4-114.)

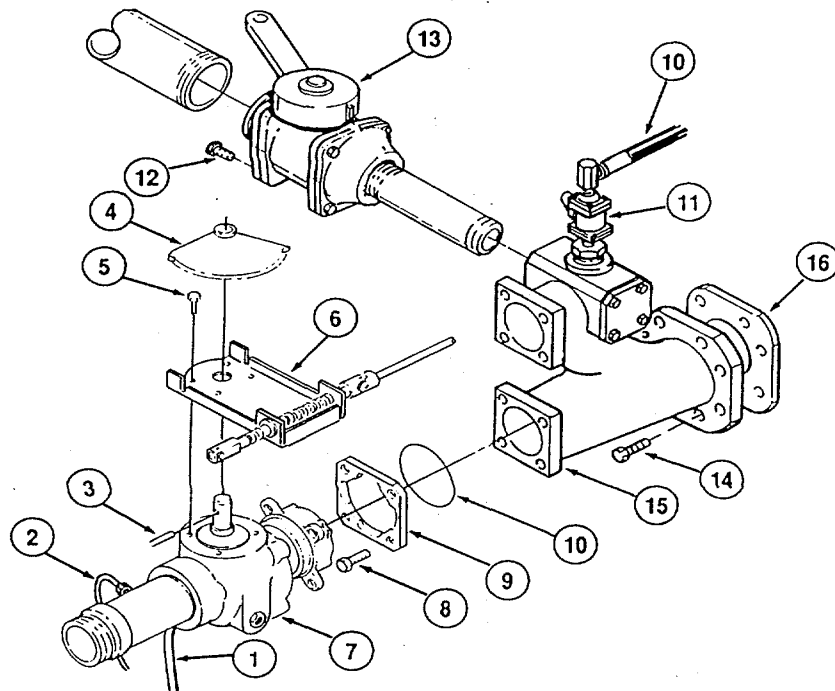
MATERIALS/PARTS REQUIRED

Tags, identification (Item 32, Appendix E)
 Gaskets (Figure 31, Appendix F)
 O-rings (Figure 15, Appendix F)

a. Removal.

NOTE

Access to street side pump discharge manifold can be made from beneath truck. If further disassembly of pump is required street side operator's panel should be removed (see para 4-25).



- (1) Tag and disconnect two drain valve hoses (1).
- (2) Tag and disconnect two pressure gauge hoses (2).
- (3) Remove two roll pins (3) to lift off two sector gears (4).

6-3. STREET SIDE PUMP DISCHARGE MANIFOLD - Continued**NOTE**

Note position of sector gears to install them correctly during installation.

- (4) Remove eight bolts (5) to remove two valve control assemblies (6) from tops of discharge valves (7).

NOTE

Leave valve control assemblies connected to actuating linkage.

- (5) Remove four bolts (8) on each valve mounting flange (9). Remove two valves (7) with mounting flanges (9).
- (6) Turn each valve (7) counterclockwise 1/4 turn and remove them from valve mounting flanges (9). Remove and discard O-rings (10).
- (7) Disconnect 1 inch hose (10) from tank fill/recirculation valve (11).
- (8) Remove four bolts (12) from #2 crosslay valve (13).
- (9) Remove eight bolts (14) securing discharge manifold (15) to pump body. Remove and discard gasket (16).

NOTE

Install piping and plugs on new manifold as needed.

b. Installation.

- (1) Using new gasket (16), attach discharge manifold (15) to pump body with eight bolts (14). Torque to 85 lb ft (115 N.m).
- (2) Using new O-ring, replace four bolts (1 2) to connect #2 crosslay valve (13).
- (3) Reconnect 1 inch hose (1 0) to tank fill/recirculation valve (11).
- (4) Using new O-rings (10), replace two discharge valves (7) and valve mounting flanges (9) (turn valves 1/4 turn clockwise in valve mounting flanges).
- (5) Tighten four bolts (8) in each valve mounting flange (9) to secure two discharge valves (7).
- (6) Replace two valve control assemblies (6) and attach them to discharge valves (7) with eight bolts (5).
- (7) Replace two sector gears (4) in same positions they were in prior to removal and secure them with two roll pins (3).
- (8) Reconnect two pressure gauge hoses (2).
- (9) Reconnect two drain valve hoses (1).

c. Follow-on Maintenance.

- (1) Connect batteries (see para 4-114).

6-4. STREET SIDE PUMP SUCTION MANIFOLD

This task covers:

- a. Removal
- b. Installation

c. Follow-on Maintenance

TOOLS REQUIRED

Tool Kit, General Mechanics, Automotive
(Appendix B, Section III, Item 1)

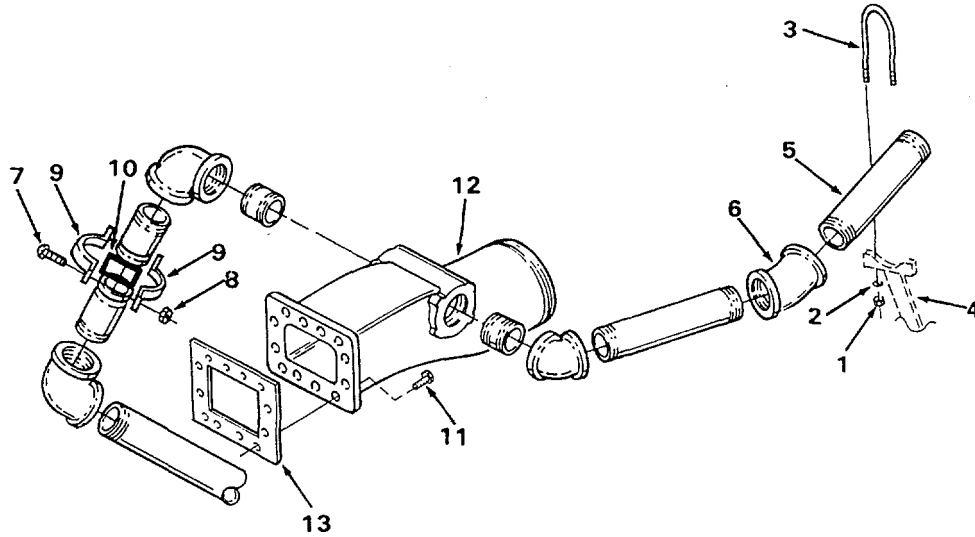
EQUIPMENT CONDITION

Main Engine Shutdown (see para 2-12.)
APU Shutdown (see para 2-16.)
Batteries Disconnected (see para 4-114.)

MATERIALS/PARTS REQUIRED

Tags, identification (Item 32, Appendix E)
Gasket (Figure 31, Appendix F)
Gasket (Figure 16, Appendix F)

a. Removal.



- (1) Remove two nuts (1) and washers (2), and U-bolt (3) from rear auxiliary suction clamp (4).
- (2) Use large pipe wrench to remove pipe (5) from elbow (6).

6-4. STREET SIDE PUMP SUCTION MANIFOLD - Continued

- (3) Remove two bolts (7) and nuts (8) to remove groove lock coupling (9) and gasket (10) from rear auxiliary suction plumbing. Discard gasket (10).
- (4) Remove twelve bolts (11) securing suction manifold (12) to pump.
- (5) Remove suction manifold (12) and gasket (13). Discard gasket (13).

NOTE

Install piping and plugs in new manifold as needed.

b. Installation.

- (1) Using new gasket (13), attach suction manifold (12) to pump body with twelve bolts (11). Torque to 85 lb ft (115 N.m).
- (2) Using new gasket (10), install groove lock coupling (9) with two bolts (7) and nuts (8) in rear auxiliary suction plumbing.
- (3) Use large pipe wrench to install pipe (5) in elbow (6).
- (4) Install U-bolt (3) with two washers (2) and nuts (1) in rear auxiliary suction clamp (4).

c. Follow-on Maintenance.

- (1) Connect batteries (see para 4-114).

6-5. CURB SIDE PUMP SUCTION MANIFOLD

This task covers:

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

TOOLS REQUIRED

Tool Kit, General Mechanics, Automotive (Appendix B, Section III, Item 1)

MATERIALS/PARTS REQUIRED

Tags, Identification (Item 32, Appendix E)
Gasket (Figure 31, Appendix F)

EQUIPMENT CONDITION

Main Engine Shutdown (see para 2-12.)
APU Shutdown (see para 2-16.)
Batteries Disconnected (see para 4-114.)
Curbside Operators Panel Removed (see para 4-26.)
Front Suction Elbow Removed (see para 5-9.)

a. Removal.

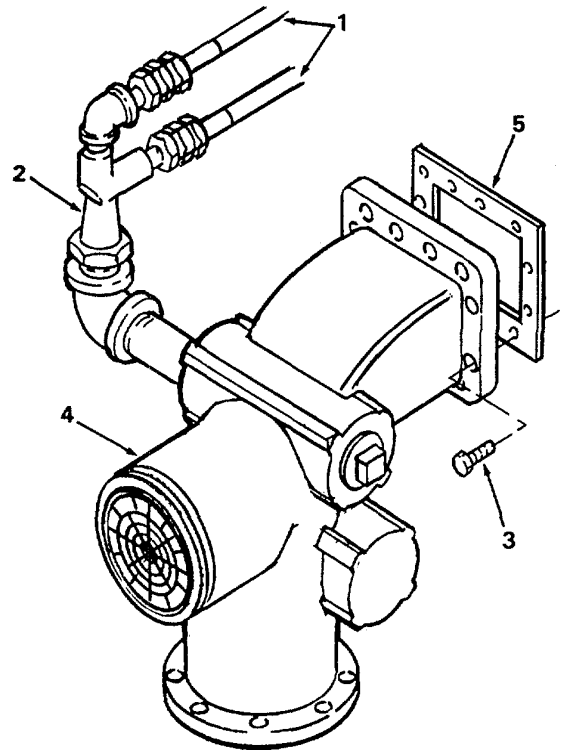
- (1) Tag and disconnect two hoses (1) from foam eductor (2).
- (2) Remove twelve manifold bolts (3).
- (3) Remove suction manifold (4).
- (4) Remove foam eductor (2) from piping in manifold (4).

b. Installation.

- (1) Install foam eductor (2) in piping in manifold (4).
- (2) Using new gasket (5), attach suction manifold (4) to pump body with twelve bolts (3). Torque to 85 lb ft (115 N.m).
- (3) Reconnect two hoses (1) to foam eductor (2).

c. Follow-on Maintenance.

- (1) Install front suction elbow (see para 5-9).
- (2) Install curbside operators panel (see para 4-26).
- (3) Connect batteries (see para 4-114).



6-6. FIRE PUMP

This task covers:

- | | |
|----------------------------------|-----------------------------------|
| a. Removal of Transmission | g. Disassembly of Pump Body |
| b. Disassembly of Transmission | h. Inspection of Pump Body |
| c. Inspection of Transmission | i. Assembly of Pump Body |
| d. Assembly of Transmission | j. Installation of Pump |
| e. Installation of Transmission | k. Packing Adjustment/Replacement |
| f. Removal of Complete Pump Body | l. Follow-on Maintenance |
| | m. Testing |

TOOLS REQUIRED

Tool Kit, General Mechanics, Automotive (Appendix B, Section III, Item 1)

MATERIALS/PARTS REQUIRED

Flexible Graphite (Grafoil) (Figure 38, Appendix F)
 Tags, Identification (Item 32, Appendix E)
 Lubricating Oil (Item 20, Appendix E)
 Lint Free Cloth (Item 42, Appendix E)
 Oil Dexron II (Item 12, Appendix E)
 Grease, Silicone (Item 11, Appendix E)
 Adhesive Sealant (Item 35, Appendix E)
 O-rings (Figure 31, Appendix E)
 O-rings (Figure 32, Appendix F)
 Oil Seals (Figure 32, Appendix F)
 Gaskets (Figure 38, Appendix F)
 Packing (Figure 38, Appendix F)
 Gasket (Figure 32, Appendix F)

MATERIALS/PARTS REQUIRED- Continued

Shims (Figure 32, Appendix F)
 Cotter Pins (Figure 32, Appendix F)

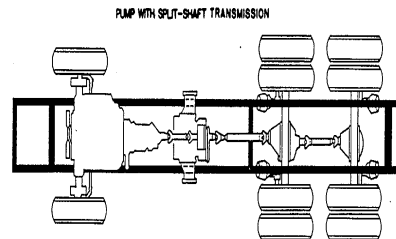
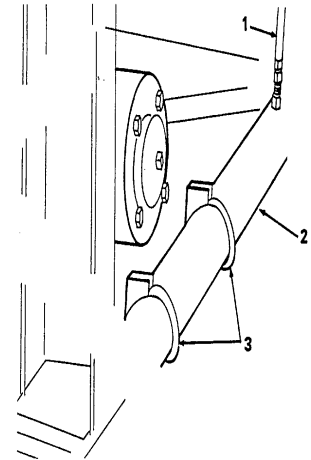
PERSONNEL REQUIRED: 2

EQUIPMENT CONDITION

Main Engine Shutdown (see para 2-12.)
 APU Shutdown (see para 2-16.)
 Batteries Disconnected (see para 4-114.)
 Curb Side Operators Panel Removed (see para 4-26.)
 Street Side Operators Panel Removed (see para 4-25.)
 Discharge Manifolds Removed (see paras 6-2., 6-3.)
 Suction Manifolds Removed (see paras 6-4., 6-5.)
 Drive Shafts Removed (see para 5-7.)

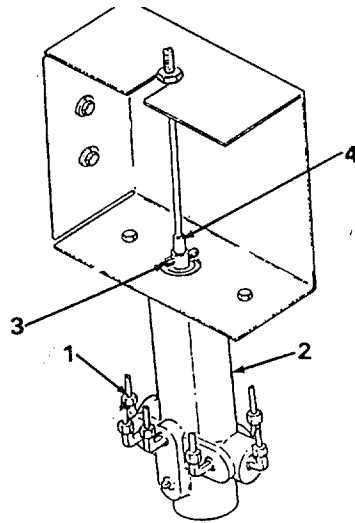
a. Removal of Transmission.

- (1) Remove cotter pins (82 and 83), hex nuts (84 and 85), and flatwashers (86 and 87) to remove drive shaft end yokes. (See illustration on page 6-15.)
- (2) Remove coppertube (1) from auxiliary cooler (2).
- (3) Remove two clamps (3) from auxiliary cooler. Move cooler aside to allow for pump removal.

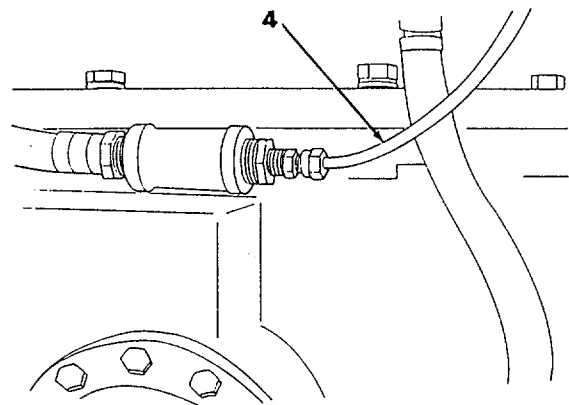
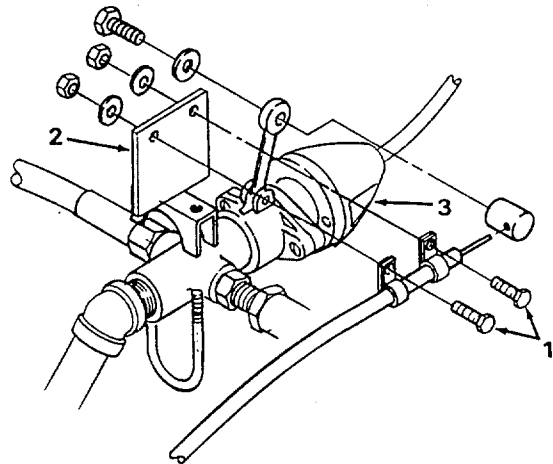


6-6. FIRE PUMP - Continued

- (4) Tag and remove seven copper lines (1), from manifold drain valve (2).
- (5) Remove roll pin (3) from universal joint (4) and remove drain valve.
- (6) Remove two bolts (1) securing bracket (2) to primer valve (3).
- (7) Tag and disconnect wires from priming pump motor.
- (8) Remove priming tank hose and priming valve hose.
- (9) Remove five bolts securing priming pump/motor (see para 4-57).

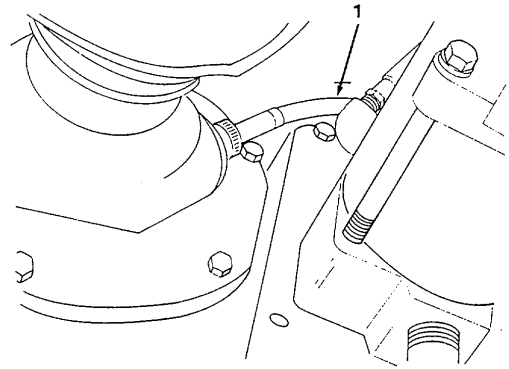


- (10) Remove priming pump/motor.
- (11) Remove manual pump shift rod, manual pump shift disengagement cable, and bracket.
- (12) Remove pump oil pressure gauge line (4).



6-6. FIRE PUMP - Continued

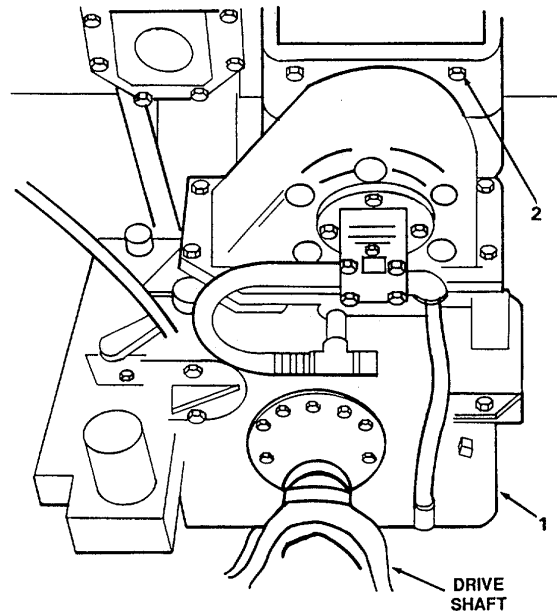
- (13) Disconnect tachometer cable (1).
- (14) Remove drain plug, drain lubricant, install drain plug.



WARNING

Serious injury could occur if heavy equipment is moved/lifted without sufficient personnel to do the job. Use proper physical lifting procedures or use a suitable lifting device or dolly. Wear safety shoes, gloves and other suitable protective clothing. Area should be clear of other personnel. Serious injury or death can result from falling objects.

- (15) Support transmission (1) with suitable jack.
- (16) Remove eight bolts (2) securing transmission to pump.
- (17) Remove transmission.

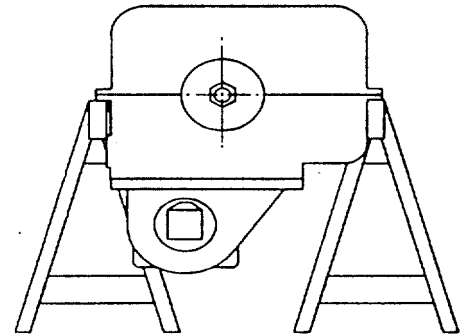


6-6. FIRE PUMP - Continued

b. Disassembly of Transmission.

NOTE

Out of chassis overhaul will require supporting the transmission initially in an upside down position, possibly attaching it direct to an engine overhaul stand at the face of the cap that bolts to the pump, or making up an adapter to allow this connection to an overhaul stand. Another consideration would be to support it on suitable supports on the underside of the flange of the mid-section, first removing the flange bolts at the support areas.



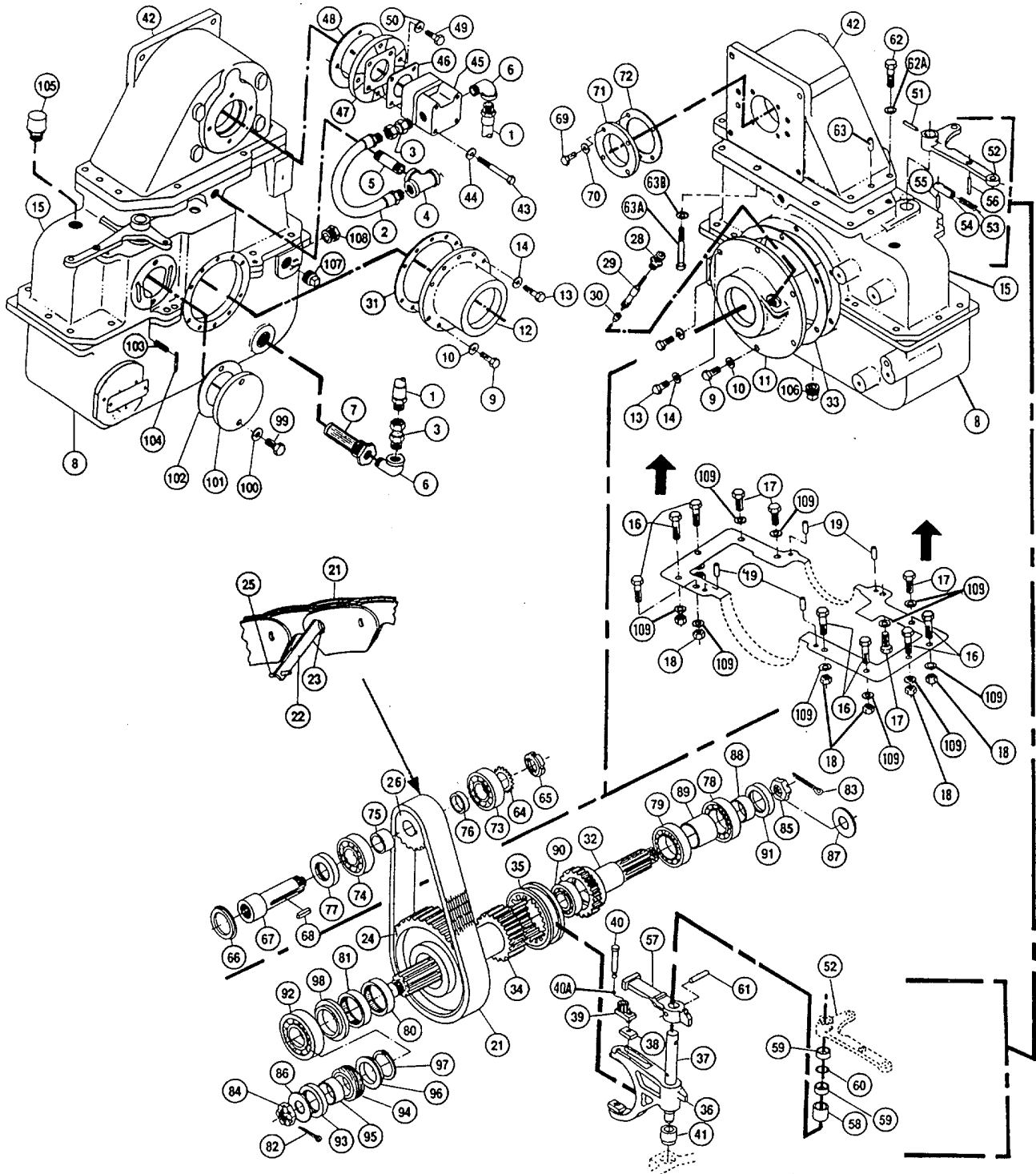
- (1) Remove lube system hoses by disconnecting hoses (1 and 2) at swivel fittings (3), tee (4), nipple (5) and elbows (6). Remove sump oil strainer (7) from bottom section of case (8).
- (2) Remove self-locking cap screws (9) and lockwashers (10) attaching drive and coupling shaft housings (11 and 12) to bottom section (8). Loosen cap screws (13) and washers (14) attaching housings to mid-section (15).
- (3) Remove cap screws (16), bolts (17), nuts (18), and lockwashers (109), attaching bottom section (8) to mid-section (15). Drive dowels (19) out of bottom section flange. Remove bottom section (8).
- (4) Rotate drive line chain (21) until removable long connecting pin (22) and short connecting pin (23) on the chain is visible at the drive sprocket (24). The removable connecting pin (22) has a spiral pin (25) in each end holding it in place.
- (5) Remove one spiral pin (25), tap both the long (22) and short (23) connecting pins out of the chain links. Disengage chain (21) from the sprocket drive and driven sprockets (24 and 26) and remove from case.
- (6) Remove tachometer driven gear sleeve (28) and driven gear (29), and bushing (30) from drive shaft housing (11).
- (7) Remove the remaining cap screws (13) and lockwashers (14) attaching the coupling shaft housing (12) to the mid-section (15).
- (8) Remove coupling shaft housing (12) and shims (31). Note number and thickness of shims for assembly.

NOTE

Coupling shaft (32) and its associated parts may come with the housing (31).

- (9) Remove the coupling shaft assembly (32) if it did not come out when removing housing (31).

6-6. FIRE PUMP - Continued

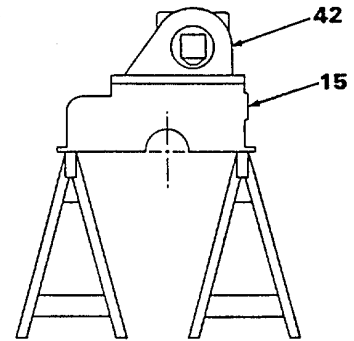


6-6. FIRE PUMP - Continued

- (10) Remove the remaining cap screws (13) and washers (14) attaching the drive shaft housing (11) to the mid-section (15). The housing (11), gasket (33) and the drive shaft (34), drive sprocket (24), shift collar (35) and associated parts can now be removed as a unit from the mid-section (15). The shift fork (36) will slip off the shift shaft (37) when the drive shaft (34) assembly is lifted out. Remove shifter shoe (38) from locking arm (39). Discard gasket.
- (11) Slip locking arm (39) off pivot pin (40).

NOTE

The pivot pin (40) and shift shaft bushing (41) need only be removed if bent or otherwise damaged. If pivot pin (40) is removed replace O-ring (40A).



- (12) Reposition mid (15) and cap (42) section assembly on the supports so that the cap (42) portion is on top as shown, or set the assembly on a bench.
- (13) Remove four screws (43) and washers (44) that fasten oil pump (45) to pump support housing and remove oil pump (45) and gasket (46). Do not remove two small screws that fasten the pump together. Remove oil pump adapter (47) and shims (48) by removing screws (49) and washers (50). Discard gaskets (46). Note number of thickness of shims for assembly.
- (14) Remove pin attaching shift arm (52) to shift shaft (37). Remove shift arm (52), spring (53), sleeve (54), and pins (55 and 56). Remove shift shaft (37) and attached sector gear (57) from inside of the mid-section (15). Spacer (58) will fall free as shift shaft (37) is removed.
- (15) Press out bushings (59) from mid-section. O-ring (60) between bushings (59) will come out when the bushings are removed. Discard O-ring.
- (16) Remove pin (61) that attaches the sector gear (57) to the shift shaft (37) and remove the sector gear (57).
- (17) Remove cap screws (62) and lockwashers (62A) that attach the cap (42) to the top of the mid-section (15).
- (18) Remove cap (42) and its driven sprocket (26) from the top of the mid-section. Rapping the cap (42) with a soft hammer will break adhesion with the mid-section (15) and free the dowels (63A) between the cap (42) and mid-section (15).

CAUTION

Do not drive the dowels (63A) through the flange of the cap (42) deeper into the mid-section (15).

- (19) Remove 4 cap screws (63A) and lockwashers (63B) that fasten housing (15) to cap (42) and remove housing.

6-6. FIRE PUMP - Continued**WARNING**

Serious injury could occur if heavy equipment is moved/lifted without sufficient personnel to do the job. Use proper physical lifting procedures or use a suitable lifting device or dolly. Wear safety shoes, gloves and other suitable protective clothing. Area should be clear of other personnel. Serious injury or death can result from falling objects.

- (20) Straighten tab of lock washer (64) from slot in locknut (65) and then remove the locknut (65).
- (21) Remove flinger ring (66) and its driving grommet from the end of the driven shaft (67) with key (68).
- (22) Remove four cap screws (69) and washers (70) that fasten housing (71) and gasket (72) to cap (42) but do not remove the housing (71).

WARNING

Serious injury could occur if heavy equipment is moved/lifted without sufficient personnel to do the job. Use proper physical lifting procedures or use a suitable lifting device or dolly. Wear safety shoes, gloves and other suitable protective clothing. Area should be clear of other personnel. Serious injury or death can result from falling objects.

- (23) Under a press, support the assembly on the face of housing (71) and apply a press load to the slot end of the driven shaft (67) and press shaft out of bearings (73 and 74), spacers (75 and 76), and sprocket (26). Remove spacers (75 and 76) and sprocket (26).
- (24) Remove housing (71) and bearings (73 and 74) from cap (42). Remove and discard oil seal (77) from housing (71).
- (25) Slide housing (12) off of bearings (78 and 79).
- (26) If not previously removed, remove cotter pins (82 and 83), lock nuts (84 and 85) and washers (86 and 87).
- (27) Pull outer bearing (78) from shaft (32); oil seal sleeve (88) will come off with the bearing. Remove spacer (89), pull inner bearing (79) from shaft. Due to closeness of this bearing to hub end of shaft (32), a split plate type puller may be necessary.
- (28) Tap out pilot bearing (90) if still in coupling shaft (32) by using a punch through the two access holes in the coupling shaft for this purpose. Remove and discard oil seal (91).
- (29) Slide shift collar (35) from teeth on drive shaft (34).
- (30) Slide housing (11) from bearing (92) and press oil seal (93) from housing (11). Discard oil seal (93).
- (31) With suitable puller, remove tachometer gear (94) and sleeve (95).
- (32) Remove spacer (95) and snap ring (97).

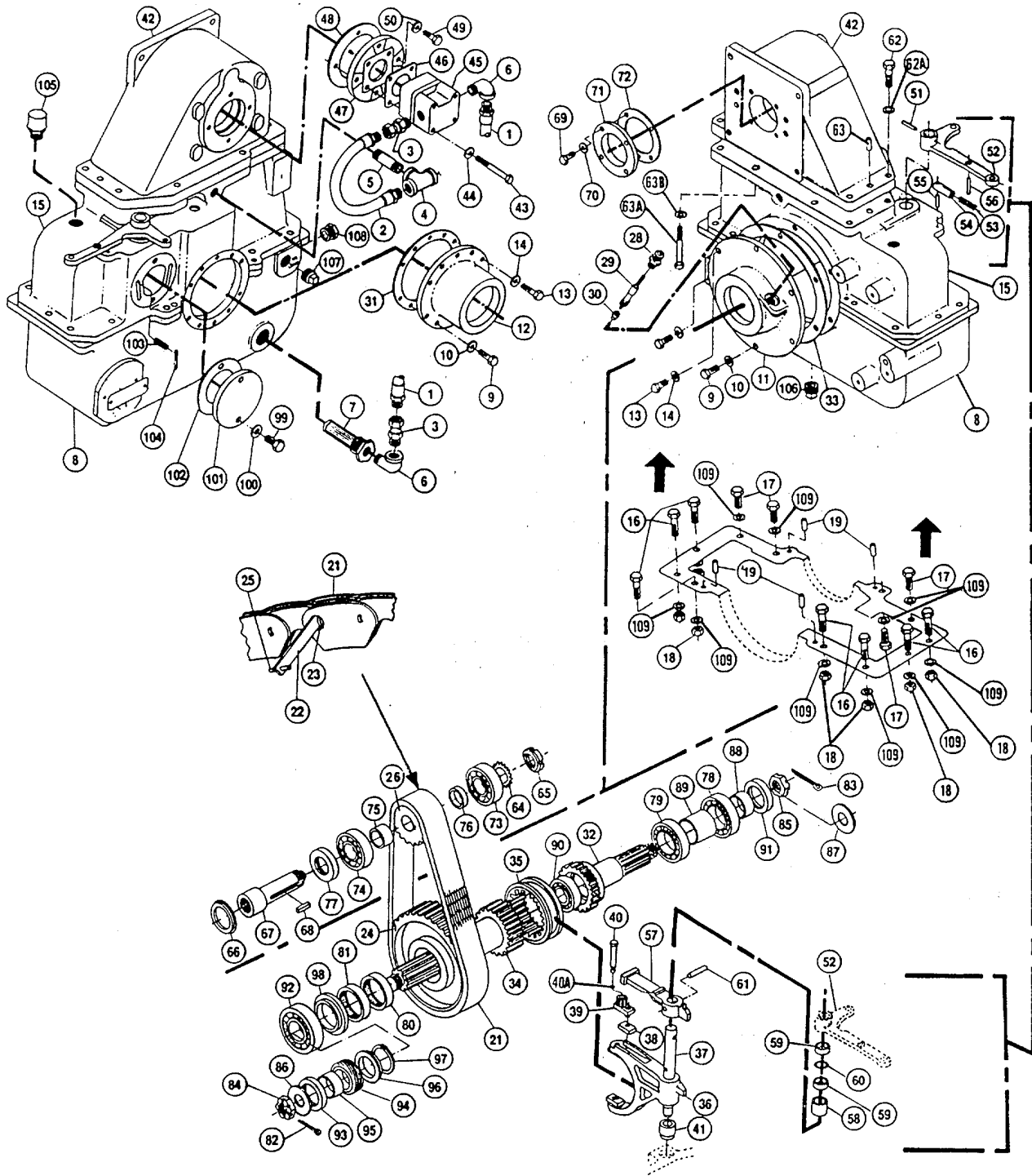
6-6. FIRE PUMP - Continued

- (33) Place shaft and sprocket assembly in an arbor press in a vertical position with the spline end up and supported on the bottom face of sprocket (24). Press shaft out of bearing (92). Catch shaft to avoid damage.
- (34) Remove needle bearings (80 and 81) from sprocket (24).
- (35) Remove two screws (99) and washers (100) securing coverplate (101) and gasket (102) to midsection (15). Discard gasket.
- (36) Remove adjusting screw (103) and screw retainer (104) from midsection (15).
- (37) Remove breather (105), magnetic drain plug (106), sight plug (107) and pipe plug (108).

c. Inspection of Transmission.

- (1) Refer to general instructions concerning inspection of bearings and their cleaning; in addition, check for the following:
 - (1) Bent shift shaft (37).
 - (2) Worn shifter shoes (38).
 - (3) Loose shifter pivot pins (40).
 - (4) Damaged locking arm assembly (52), sector gear (57), or bent pivot pin (61).
 - (5) Condition of oil hoses.
 - (6) Damaged splines on drive (34) and coupling (32) shafts.
 - (7) Worn or damaged drive slot in end of driven shaft (67).
 - (8) Oil seals, if not discarded.,
 - (9) Worn oil pump (45).
 - (10) Worn sprocket teeth (24 and 26).
 - (11) Worn flanks on inner chain (21) links.
 - (12) Outside guide links of chain (21) not retained by "riveted over" pins.
 - (13) Wear on inner faces of outside guide links of chain (21).
 - (14) Badly worn pointing on teeth of shift collar (35), and similar wear on teeth of drive shaft (34) and coupling shaft (32).
 - (15) Worn or damaged oil seal sleeves (88 and 95).
 - (16) Damaged or dirty sump oil strainer (7).
 - (17) If oil pump (45) does not operate properly or shows signs of damage, it must be replaced. Check to make sure pump turns freely and drive tang is not damaged. If in doubt, contact factory for instructions.
- (2) Before assembly, make sure all reusable parts have been cleaned and are kept free of dirt during reassembly.

6-6. FIRE PUMP - Continued



6-6. FIRE PUMP - Continuedd. Assembly of Transmission.

- (1) Keep reusable bearings covered and new bearings wrapped until they are to be installed. Before pressing a ball bearing on a shaft, coat bearing bore with Dexron II oil (Item 12, Appendix E). Apply Dexron II oil (Item 12, Appendix E) to the outside of needle bearings. Always apply force to the inner race of a ball bearing when pressing it on a shaft, and to the outer race if pressing into a bore. Press on evenly with a piece of pipe or tube which just clears the shaft. Apply force to the cup of a needle bearing when pressing it into the bore with a pipe or tube which just clears the bore. Be sure shafts, bores, and pipe or tube used for pressing out bearings are clean before installing bearings.
- (2) Before installing an oil seal in its housing, coat seal OD evenly with silicone grease (Item 11, Appendix E). Be sure that seal, shaft, and housing are clean. Always install a seal with the seal lip facing in. Apply force to the outer edge of a seal, and press in evenly.
- (3) If a gasket is awkward to hold in place while assembling a component, coat one of the mating flanges with silicone grease (Item 11, Appendix E) and press the gasket into position against the flange. The grease will hold the gasket in place during reassembly.
- (4) Press new oil seal (77) into oil seal housing (71).
- (5) Press inner bearing (74) up against shoulder on driven shaft (67). Slide spacer (75) on the shaft up against the bearing (74).
- (6) Install key (68) in the keyway in the shaft up against the spacer (75).
- (7) With the cap (42) resting on its base, position the driven sprocket (26) inside of the cap (42) and at the same time take the driven shaft (67), bearing (74), spacer (75) and key (68) assembled previously and from the face of the cap (42) that fastens to the pump body, slide the driven shaft through the bore in the cap (42) into the bore in the driven sprocket (26) lining up the key (68) in the shaft with the keyway in the sprocket. Tap bearing (74) into the bore in the cap (42). If the key (68) moves axially in its keyway, tap the key back into full engagement with the driven sprocket (26). Install spacer (76) on the driven shaft (67) up against the sprocket (26).
- (8) Place cap (42) and driven shaft assembly (67) under a press with the face of the cap supported on blocking allowing the internal spline end of the driven shaft (67) to contact and rest on the table of the press. Position outer bearing (73) on shaft and press the bearing (73) on the shaft tight up against spacer (76).
- (9) Remove cap (42) and driven shaft assembly (67) from the press and install the bearing lockwasher (64) and locknut (65). Make sure the tang of the washer is in the keyway in the shaft. Tighten nut (65) and bend one of the locking tangs on the washer (64) into one of the slots in the locknut (65).
- (10) Position new gasket (72) on housing (71) and install housing (71) on cap (42). Fasten in place with cap screws (69) and lockwashers (70).

6-6. FIRE PUMP - Continued

- (11) The driven shaft (67) assembly was factory shimmed to limit the axial float. If any of the parts have been changed, it may be necessary to change the total thickness of shims (48) between the cap (42) and oil pump support housing (47). The correct thickness of shims can be determined as follows:
- a. Apply axial force to end of the driven shaft (67) so it is moved forward against housing (71) as far as it can go. Install oil pump support housing (47), less shims (48), until the nose end of the housing (47) contacts the outer driven shaft bearing (73). Measure clearance between oil pump support housing (47) and the face of the cap (42) and add to this measurement .005 to .010 in. (.127-.254 mm) and this total is the thickness of shims to install between oil pump support housing (47) and cap (42). Remove the housing (50) and install the shims (48) and fasten the housing (47) to the cap (42) with cap screws (49) and lockwashers (44).

NOTE

Shims are color coded for thickness as follows: .005" (.127 mm) blue, .010" (.254 mm) brown.

- (12) Place this assembly aside for later installation.
- (13) Press needle bearings (80 and 81) into each end of bore of drive sprocket (24) (see note below), setting them back from each face 1/8 in. (3.2 mm). Slide sprocket (24), coupling teeth end first, onto drive shaft (34).

NOTE

One end of the O. D. of the cup of the needle bearings (80 and 81) has a shiny surface and the remaining surface has a dull appearance. These bearings should be installed in the bore of the drive sprocket (24) shiny end first.

- (14) Press spacer (98) and bearing (92) on shaft against shoulder of drive sprocket (24). (Drive sprocket (24) should rotate freely on shaft after installation of the bearing.)
- (15) Install snap ring (97) and spacer (96).
- (16) Press tachometer gear (94) and sleeve (95) on shaft against shoulder spacer (96). Press pilot bearing (90) on other end of shaft.
- (17) Press new oil seal (93) into drive shaft housing (11). Make sure tachometer drive bushing (30) is in place in the housing (11).
- (18) Apply a light coat of sealant (Item 35, Appendix E) to face of drive shaft housing (11). Position new gasket (33) in place on the housing (11).
- (19) Install the drive shaft housing (11) on the bearing (92) on the drive shaft assembly.
- (20) Place this assembly aside for later installation.

6-6. FIRE PUMP - Continued

- (21) Stand coupling shaft (32) on press table with spline end up.
- (22) Press on inner bearing (79) tight against shoulder on coupling shaft (32).
- (23) Slip spacer (89) over shaft (32) and seat it against bearing (79).
- (24) Press on outer bearing (78) tight against spacer (89).
- (25) Press on oil seal sleeve (88) tight against bearing (78) inner race.
- (26) Press new oil seal (91) into the coupling shaft housing (12).
- (27) Install the coupling shaft housing (12) onto bearings (78 and 79) on the coupling shaft (32) assembly.
- (28) Place this assembly aside for later installation.
- (29) Press bushings (59) into the mid-section shift shaft hole with top of outer bushing (59) flush with pad on the mid-section (15) and with 1/8" (3.2 mm) space between the bushings (59). Lubricate with silicone grease (Item 11, Appendix E), and install new O-ring (60) in the space between the bushings (59).
- (30) Install pins (55 and 56) in shift arm (52) and in the case mid-section (15).
- (31) Slide sector gear (57) on the shift shaft (37).

NOTE

The hub end of the sector gear (57) is towards the shouldered end of the shaft. Line up the hole in the hub of the sector gear (57) with the hole mid-length in the shift shaft (37) and install pin (61).

- (32) Slide spacer (58) on the shift shaft (37) up against the sector gear (57).
- (33) Position spring sleeve (54) on pin (55) in the case mid-section (15).
- (34) Install the previously assembled shift shaft (37) and sector gear (57) from the inside through the shift shaft hole in the mid-section.
- (35) Insert spring (53) in spring sleeve (54). Position the shift arm (52) on the shift shaft (37). Slide down until holes in the shift arm (52) and shift shaft (37) line up and at the same time compress spring (53) in its sleeve (54) to allow pin (56) in the shift arm (52) to slide through the slot in the sleeve (54). Install pin (51) that fastens shift arm (52) to shaft (37). Support mid-section (15) with shift shaft (37) in place in inverted position on work bench or other supports.
- (36) Lubricate with silicone grease (Item 11, Appendix E), and install new O-ring (40A) in groove on pivot pin (40).

6-6. FIRE PUMP - Continued**NOTE**

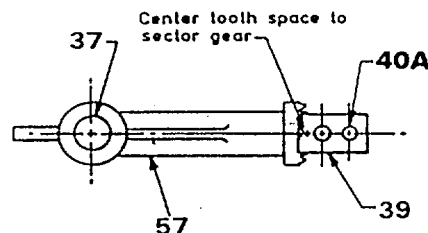
This O-ring (40A) serves only to hold the locking arm (39) on the pivot pin if the assembly is in a right side up position.

- (37) Install the locking arm (39) on pivot pin (40) and mesh with teeth on the sector gear (57). Proper meshing of these is when the pin end of the locking arm (39) is in line with the sector gear (57) and the center tooth space in the sector gear (57) is centered with the pivot pin (40).
- (38) Install shifter shoe on the pin on the locking arm (39).

NOTE

Shifter shoe (39) can be installed with face with counterbore at hole either up or down.

- (39) Install adjusting screws (103) in the mid-section and adjust these screws to that locking arm (39) is rotatable slightly less than 90° each direction from a center position with the sector gear (57).



- (40) Slide the shift collar (35) into engagement with the shoes on the shift fork (36). The 3/16" (4.8 mm)x 45° (chamfered) pointed (tapered) end of the collar to face towards the drive shaft end of the case.
- (41) Take the drive shaft (34) and housing assembly (11) and install it into the half bore in the mid-section (15) of case. Make sure tachometer drive outlet is correctly orientated. Engage the teeth at the end of the drive sprocket (24) with those in the shift collar (35). Line up holes in housing (11) with holes in the case and install cap screws (13) and lockwashers (14) and tighten finger tight only.
- (42) Support the mid-section (15) and drive shaft (34) assembly on suitable blockings so the flange that cap (42) will bolt to is up.
- (43) Make sure face of flanges that meet on the mid-section (15) and cap (42) are clean and free of nicks and burrs.
- (44) Install dowels (63) in top flange of the mid-section (15).
- (45) Apply light coat of sealant (Item 35, Appendix E) to face of top flange of the mid-section (15).
- (46) Position previously assembled cap (42) and driven shaft (67) on dowels (63) in the top flange of the mid-section (15) and tap down into contact with mid-section (15).
- (47) Install screws (62 and 63A) with lockwashers (62A and 63B) and tighten evenly.

6-6. FIRE PUMP - Continued

- (48) Install lower shift shaft bushing (41) into lower portion (8) of case assembly.
- (49) Install four dowels (19) in flange of the mid-section (15) portion of the case.

WARNING

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- (50) Coat flange of the mid-section (15) portion of the case with a light coat of sealant (Item 35, Appendix E).
- (51) Position lower portion of the case (8) to the mid-section (15) of the case and align with dowels (19) and tap into position until flanges of the mid-section and lower section meet. Install cap screws (16), bolts (17), lockwashers (109) and nuts (18) and tighten securely.
- (52) Install cap screws (9) with nylock insert and lockwashers (10) in drive shaft housing (11) and tighten these fasteners and those previously installed (13 and 14) in the drive shaft housing (11) securely.

NOTE

The drive line assembly was factory shimmed to limit the axial float of the drive line. If any of the drive line parts have been changed, it may be necessary to change the total thickness of shims (31) between the coupling shaft housing (12) and the transmission case. Shims are color coded for thickness as follows: .005" (.127 mm) blue, .007" (.178 mm) natural, .010" (.254 mm) brown. The correct thickness of shims can be determined as follows:

- (53) Install coupling shaft (32) and housing (12) assembly with no shims between the housing and case. Tighten cap screws (9 and 13) evenly and tap the end of the coupling shaft (32) with a soft mallet to force drive line all the way forward. Do not overtighten causing bending or breakage of the flange of the coupling shaft housing (12).
- (54) Measure gaps between housing (12) and case in several places to assure a uniform gap, and add 0.005 in. (.127 mm). This will be the total thickness of shims needed to provide the recommended axial float of 0.005 in. (.127 mm).
- (55) Remove coupling shaft housing (12) from case after measuring gap.

NOTE

Field conditions may make it difficult to determine the correct amount of shims. If in doubt, add another 0.005 in. (.127 mm) shims. No harm will result from a small amount of additional axial float but bearing life will be shortened if bearings are excessively preloaded.

6-6. FIRE PUMP - Continued

- (56) Support the mid-section (15) and cap assembly (42) in an upside down position on suitable supports.
- (57) Lower one end of the chain (21) into the case until it touches the inside of the cap (42). Reach down into the case and grasp the lower end of the chain (21) and pull it up and engage it with the teeth on the driven sprocket (26) and drive sprocket (24). Mesh the chain ends together around the drive sprocket (24).
- (58) Tap the short connecting pin (23) partway through holes in end links. Tap a spring pin (25) in one hole of the long connecting pin (22), and start the long pin (22) in the side link alongside the short pin (23). Make sure the long pin (22) is installed nearest the end of the connecting guide link.
- (59) Tap both connecting pins (22 and 23) through the chain end links, aligning the links as the pins go through. Tap the other spring pin (25) in the other hole of the long connecting pin (22). Make sure the spring pins overlap the short connecting pin (23) on each end.
- (60) Install correct amount of shims (31) on the coupling shaft housing (12), or if all original parts are being reused, reinstall original shims (31) (if not reusable, replace with new shims) on coupling shaft housing (12) applying a light coat of sealant (Item 35, Appendix E) between shims (31) and on both faces of first and last shim. Install the housing (12) over the bearings (78 or 79) on the coupling shaft (32). Tighten housing (12) in case half with cap screws (9 and 13) and lockwashers (10 and 14). Use the cap screws (9) with the nylon seal in lower half of housing and screws (13) in upper half.
- (61) Install tachometer driven gear (29) in drive shaft housing (11) making sure it fits into bushing (30) previously installed in the housing.
- (62) Install sleeve (28) over end of gear (29) and thread into housing (11). Install flinger V-ring (66) on end of the driven shaft (67).
- (63) Install magnetic drain plug (106).
- (64) Install breather (105).
- (65) Install oil level plug (107) and sight plug (108).
- (66) Install sump oil strainer (7) and elbow (6).
- (67) Install gasket (46) over pilot diameter on oil pump (45).
- (68) Position pump (45) with gasket (46) on adapter (47).
- (69) Line up drive tang of oil pump shaft with slot in driven shaft (67).
- (70) Fit pilot diameter of oil pump (45) into adapter (47) making sure tang on oil pump shaft and slot in driven shaft line up and engage.
- (71) Fasten pump (45) to adapter (47) with screws (43) and washers (44) which pass through pump into the adapter (47).

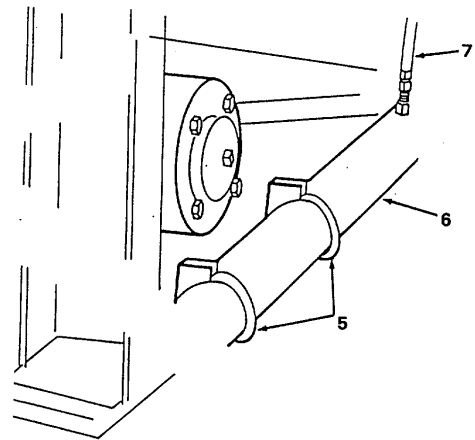
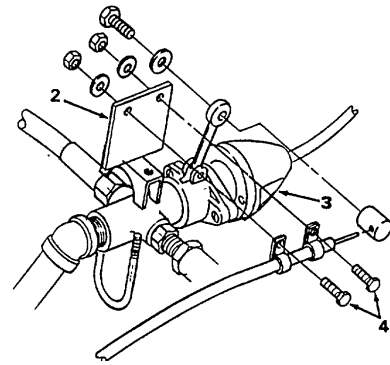
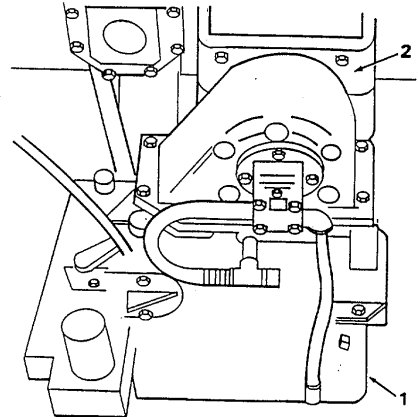
6-6. FIRE PUMP - Continued

- (72) Install nipple (5), tee (4), hose (2) and adapter union (3) in discharge side of pump.
- (73) Install street elbows (6) at sump strainer (7) and inlet of oil pump (45).
- (74) Install adapter union (3) in elbow (6) at sump strainer (7).
- (75) Install hose (1).
- (76) Install screw retainers (104) in slot end of each screw (103).
- (77) Install coverplate (101) and new gasket (102) with screws (99) and washers (100).
- (78) Install drive shaft end yokes, install washers (86 and 87) and lock nuts (84 and 85); tighten nuts securely. Make sure one slot in nut lines up with holes in ends of drive shaft (34) and coupling (32). Install cotter pins (82 and 83) and spread open split ends of pins.

6-6. FIRE PUMP - Continued

e. Installation of Transmission.

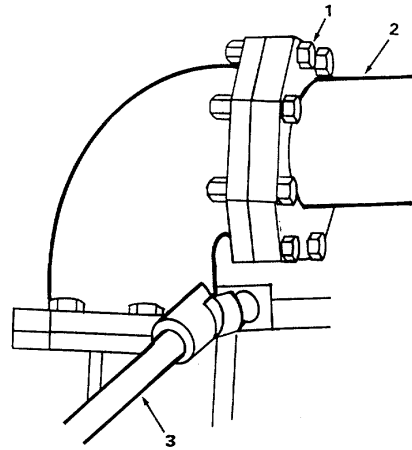
- (1) Support pump transmission with suitable jack.
- (2) Raise transmission (1) into place and install and tighten eight bolts (2).
- (3) Connect tachometer cable.
- (4) Install pump oil pressure gauge line.
- (5) Install manual pump shift rod, manual pump shift disengagement cable, and bracket.
- (6) Install priming pump/motor with five bolts securing pump.
- (7) Install priming tank hose and priming valve hose.
- (8) Install wires from priming valve hose.
- (9) Install two bolts (4) securing bracket (2) to primer valve (3).
- (10) Install roll pin to universal joint of drain valve.
- (11) Install seven copper lines to manifold drain valve.
- (12) Connect two driveshafts (see para 5-7).
- (13) Move cooler (6) back into position.
- (14) Install two clamps (5) on auxiliary cooler (6).
- (15) Install copper tube (7) to auxiliary cooler (6).
- (16) Fill transmission to oil level plug hole (107) with Dexron II oil (Item 12, Appendix E).



6-6. FIRE PUMP - Continued

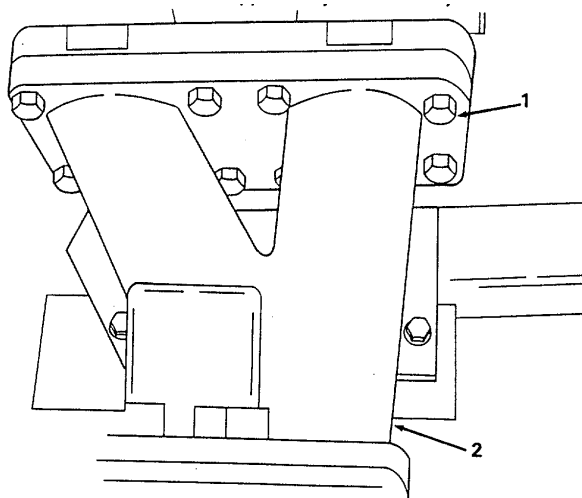
f Removal of Complete Pump Body.

- (1) Complete transmission removal procedure (see para a.).
- (2) Disconnect aerial plumbing and pump flange.
 - a. Remove eight 1/2" bolts, nuts, and lockwashers (1) and support aerial plumbing (2).
 - b. Disconnect discharge valve rod (3).
- (3) Disconnect tank discharge plumbing.
 - a. Separate flange from pump body.
 - b. Remove eight 3/8" bolts.
 - c. Support discharge plumbing.
- (4) Remove tie straps from tubing and wires to allow for tubing and wires to be removed with pump.
- (5) Support the pump with a suitable jack.
- (6) Remove four bolts and nuts from pump mounting angles.
- (7) Carefully move pump side-to-side to gain access to suction adaptor bolts.
 - a. Remove eight 3/4" bolts (1) per adapter (2) (total 16).
 - b. Remove suction adapters.
- (8) Carefully lower pump down between frame rack. Be aware of attached tubing and wires.



NOTE

Truck should be raised or supported by floor hoist or jack.



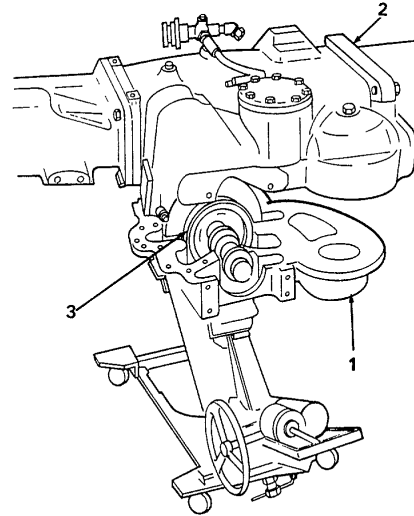
6-6. FIRE PUMP - Continued

g. Disassembly of Pump Body.

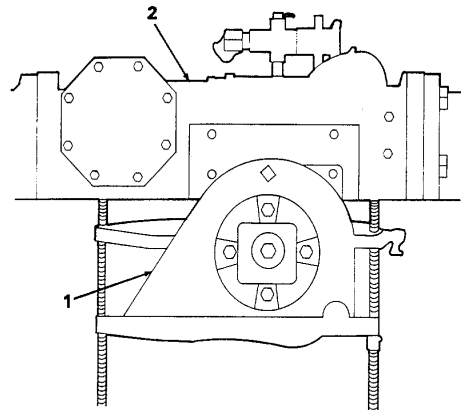
WARNING

Serious injury could occur if heavy equipment is moved/lifted without sufficient personnel to do the job. Use proper physical lifting procedures or use a suitable lifting device or dolly. Wear safety shoes, gloves and other suitable protective clothing. Area should be clear of other personnel. Serious injury or death can result from falling objects.

- (1) Remove transmission (see para a.).
- (2) Remove one cap screw from each corner near dowel pin locations, and install 1/2 in. threaded rods, hex nuts, plain washers, and pipe nipples, or use transmission jack to support cover. Remove all remaining cap screws which attach volute cover (1) to body (2). Use two of the removed cap screws inserted into the threaded holes next to the dowel pins to jack the cover away from the body.
- (3) Turn upper hex nuts on threaded rods down evenly to lower the volute cover (1), or lower the transmission jack. Impeller shaft assembly (3) will come down with volute cover (1). BALANCE MUST BE MAINTAINED.
- (4) Carefully remove impeller shaft assembly (3) from volute cover (1).



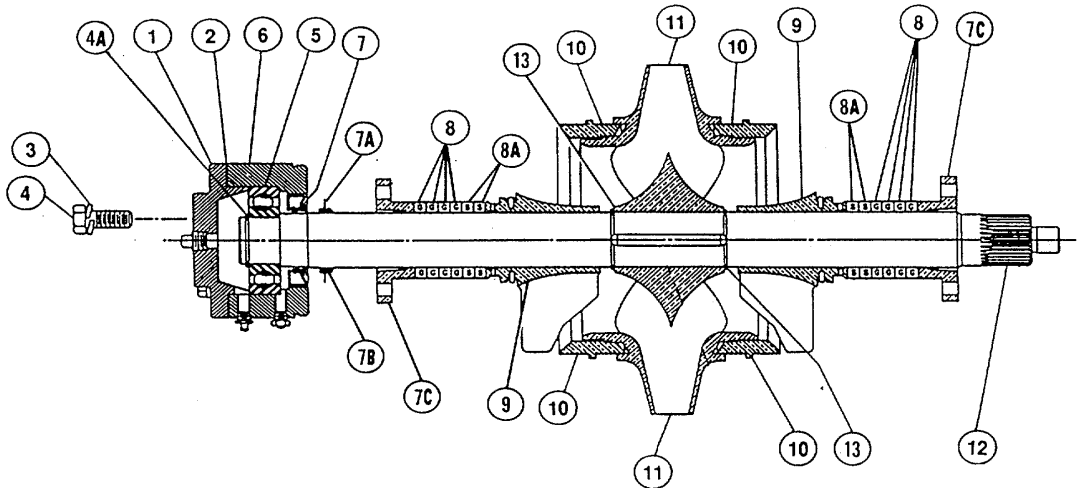
LOWERING VOLUTE COVER WITH TRANSMISSION JACK



VOLUTE COVER AND IMPELLER SHAFT ASSEMBLY SUSPENDED FROM THREADED RODS

6-6. FIRE PUMP - Continued

- (5) Remove snap ring (4A) and use a puller to remove bearing housing (6) from shaft (12). Remove bearing housing cap (1) and gasket (2) by first removing screws (3) and lockwashers (4). Discard gasket. Remove retaining ring (9).

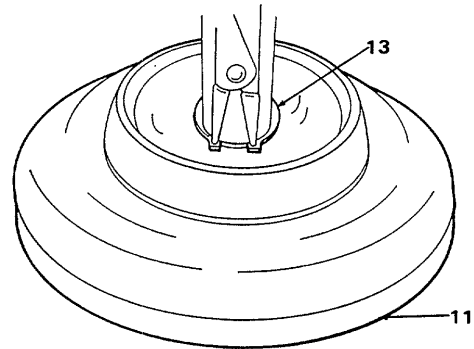


- (6) Remove and discard oil seal (7). Carefully remove flinger disk (7A) and grommet (7B) from shaft (12). Remove half glands (7C) and slide packing (8 and 8A), stuffing box ends (9), and wear rings (10) from each end of shaft (12).

NOTE

Mark wear rings (10) or keep them with the side of impeller (11) from which they were removed to permit checking impeller hub clearance later on.

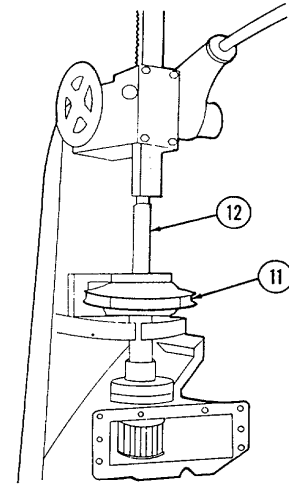
- (7) Remove snap ring (13) on each side of impeller hub (11).



REMOVING IMPELLER SNAP RING

6-6. FIRE PUMP - Continued

- (8) Place impeller and shaft assembly in an arbor press so that impeller assembly (11) is adequately supported by wear ring hub. Apply force to upper end of shaft (12) until impeller (11) is free.



REMOVING IMPELLER ON
AN ARBOR PRESS

h. Inspection of Pump Body.

- (1) Check wear rings and impeller hubs for deep grooves or scratches. Position each wear ring on impeller hub on which it was used, hold wear ring firmly against one side of hub, and measure total clearance on opposite side (original factory clearance is from 0.007 to 0.014 in. (.178-.356 mm)). If clearance is excessive, turn the impeller hubs, and install undersize wear rings as directed below in table A.
- (2) If replacing the impeller is necessary, be sure to install new, standard size wear rings. Examine snap rings, lock nuts, washers, and keys for corrosion and other damage, and replace if condition is doubtful.
- (3) These parts seldom need replacing if handled properly during pump disassembly and reassembly. If the total clearance between the stuffing box end and the impeller shaft is much greater than 0.011 in. (.279 mm), then replacing the stuffing box end may be desirable.

6-6. FIRE PUMP - Continued

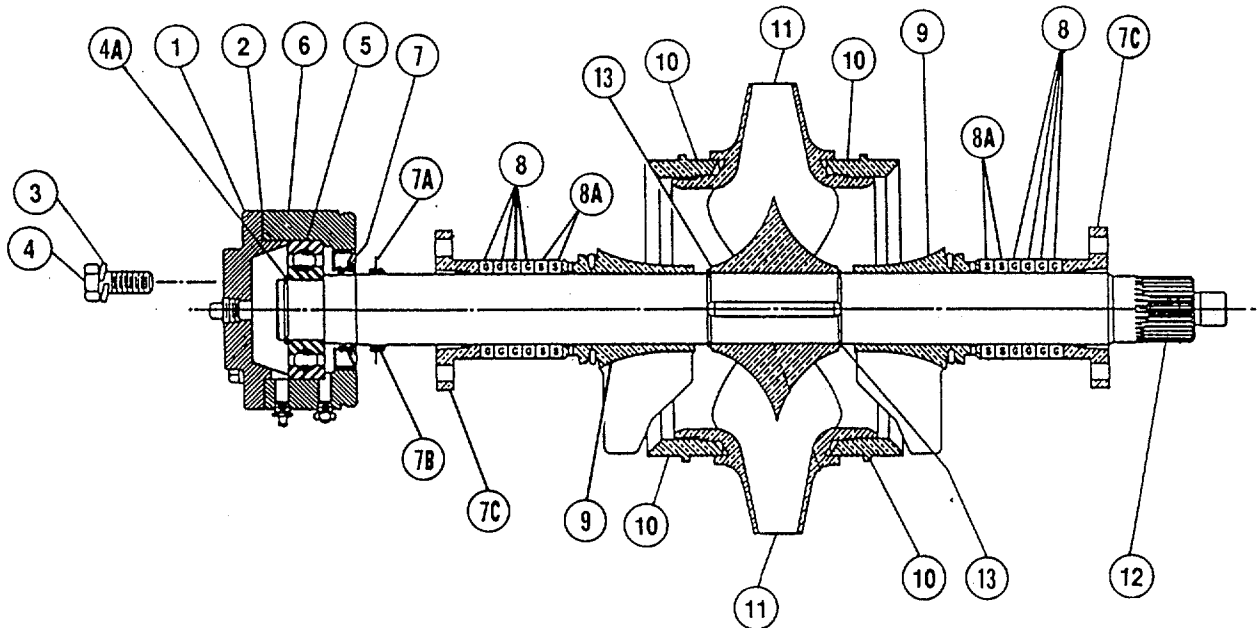
- (4) If inspection shows that the wear ring clearances are excessive, or the impeller hubs are scored or grooved, turn impeller hubs in a lathe to an acceptable rework dimension at which they will clean up and install undersize wear rings during reassembly. These repair rings are available in 0.025, 0.050, and 0.075 inch (.635, 1.27, and 1.905 mm) undersize. Table A gives the original hub dimensions for the impeller and the rework dimensions for each degree of undersize.

**TABLE A
IMPELLER AND WEAR RING REPAIR DIMENSIONS**

Impeller No.	Original Hub Dia.	Original Wear Ring No	Reworked Hub Dia	Undersize Wear Ring No.
71799	5.501"/5.498 " (139.72/139.65 mm)	71800	5.475"/5.473 (139.06/139.01 mm) 5.451 "/5.448" (138.45/138.38 mm) 5.426"/4.423" (137.82/137.74 mm)	71800-25 71800-50 71800-75

i. Assembly of Pump Body.

- (1) Install impeller (11) and snap rings (13). Make sure snap rings (13) are securely seated at the impeller hubs.



6-6. FIRE PUMP - Continued**NOTE**

Impeller (11) is a tight fit on shaft (12). Use an arbor press.

- (2) Install wear rings (10). If undersize wear rings (10) are required, install them at this time. If a new impeller (11) is needed, also install new standard size wear rings (10) for it.
- (3) Install stuffing box ends (9), packing (8 and 8A), and adjustment glands (7C). Adjust half glands (see para k.).
- (4) Install grommet (7B) and flinger disk (7A).
- (5) Install new oil seal (7) in bearing housing (6).
- (6) Press bearing housing (6) on shaft (12) and install snap ring (4A).
- (7) Install new gasket (2) and bearing housing cap (1) with screws (4) and lockwashers (3).
- (8) When installing impeller shaft assembly (12), be sure that the wear rings (10), and stuffing box ends (9) fit into their respective slots in body and volute cover. **THESE SLOTS MUST BE CLEAN BEFORE REASSEMBLY TO PREVENT POSSIBLE INTERFERENCE.**

WARNING

Serious injury could occur if heavy equipment is moved/lifted without sufficient personnel to do the job. Use proper physical lifting procedures or use a suitable lifting device or dolly. Wear safety shoes, gloves and other suitable protective clothing. Area should be clear of other personnel. Serious injury or death can result from falling objects.

- (9) An effective guide can be made for installing the volute cover by cutting the heads off two 1/2"-13-NC x 3 in. long bolts. Screw these studs into the pump body near the dowel pin locations.
- (10) Whether using the threaded rods or a transmission jack, be sure to raise the volute cover and transmission case evenly, or the impeller shaft parts may not enter the body properly or engage the aligning studs.
- (11) Install transmission (see para e.).

6-6. FIRE PUMP - Continued

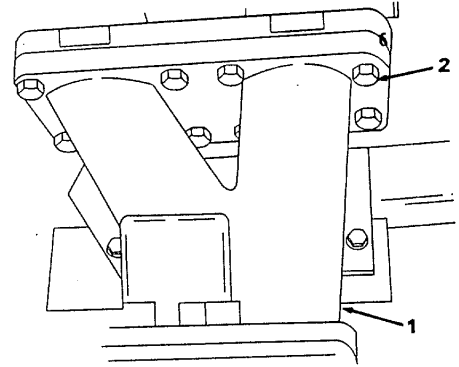
j. Installation of Pump.

- (1) Support the pump with a suitable jack.
- (2) Carefully raise pump up between frame racks. Be aware of attached tubing and wires.

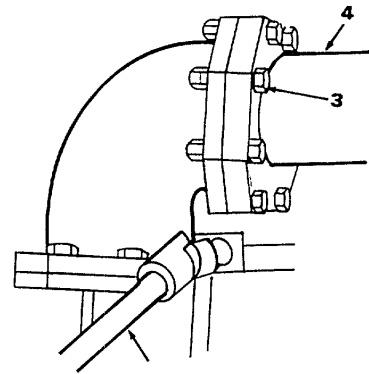
NOTE

Truck should be raised or supported by floor hoist or jack.

- (3) Carefully move pump side-to-side to gain access to suction adaptor bolts
 - a. Install adapter (1) using eight 3/4" bolts (2) per adapter (total 16).
- (4) Install four bolts and nuts which secure pump to mounting angles.
- (5) Replace tie straps for tubing and wires.



- (6) Connect tank discharge plumbing.
 - a. Support discharge plumbing.
 - b. Install flange to pump body.
 - c. Install eight 3/8" bolts.
- (7) Connect aerial plumbing and pump flange.
 - a. Install eight 1/2" bolts, nuts, and lockwashers (3) and support aerial plumbing (4).
 - b. Connect discharge valve rod (5).
- (8) Install transmission (see para e.).



k. Packing Adjustment/Replacement.

- (1) Packing replacement is a five step process. The steps are listed below and then described in detail in the paragraphs that follow:
 1. Select work site, procedure.
 2. Remove old packing.
 3. Clean stuffing box and shaft.
 4. Install new packing.
 5. Adjust new packing.
- (2) The stuffing boxes have six packing rings cooled and lubricated by water supplied from a pressurized lantern ring at one end of the stuffing box. The packing is placed between this lantern ring and the adjustment glands at the other end of the stuffing box. Graphite packings are used.

6-6. FIRE PUMP - Continued

- (3) Flexible Graphite (Grafoil) packing: Packing should not require complete replacement. A Flexible Graphite (Grafoil) ring should be added when the gland cannot go further into the stuffing box. (Flexible Graphite (Grafoil) is 100% lubricant, therefore it is effective as long as force can be applied to deform it toward the shaft.)
- (4) Pressurized Water Source: Another fire truck or hydrant may be required to supply pressurized water to blow out packing if the fire truck does not have an internal tank large enough to allow continuous recirculation. The relief valve system should be set at 80 psig (and operating) on the fire truck supplying pressurized water.
- (5) A compressed air supply and air hose nozzle is useful in cleaning out stuffing box water supply passageways.

WARNING

Immobilize Fire Truck: Park on level ground. The fire truck wheels should be blocked and the parking brake set (if located at the rear wheels, not between truck and pump transmission.)

- (6) Park truck on level ground with adequate provision for draining water from pump.

WARNING

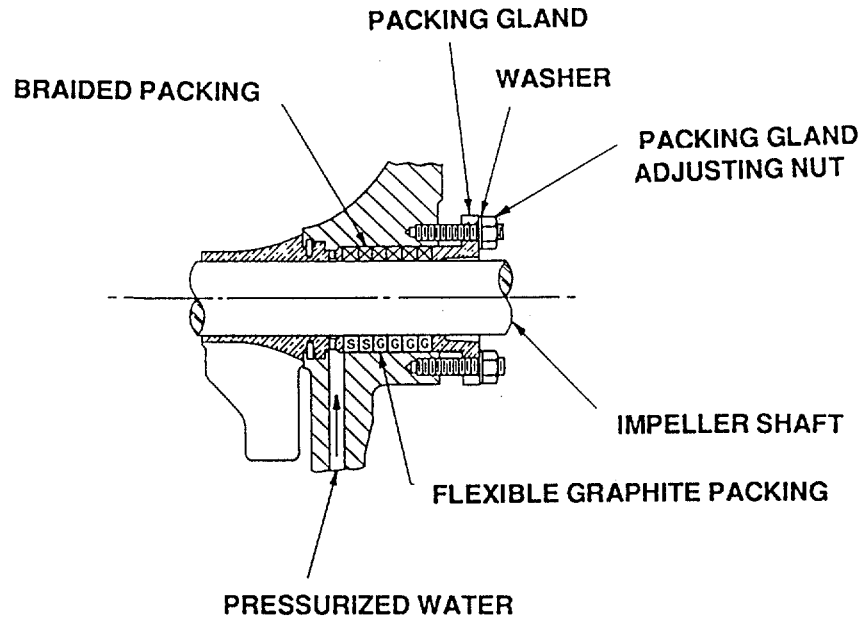
Stuffing Box Leakage: Leakage from a stuffing box can be quite hot even after the pump has been shut down. Wear safety glasses and other protective clothing.

- (7) Blow the packing out with pressurized water provided by running the fire pump or pressurized water provided by an external source such as another fire truck or hydrant.

NOTE

Remove packing from one stuffing box at a time. (Replace packing in one stuffing box before blowing out packing in other stuffing box.)

6-6. FIRE PUMP - Continued

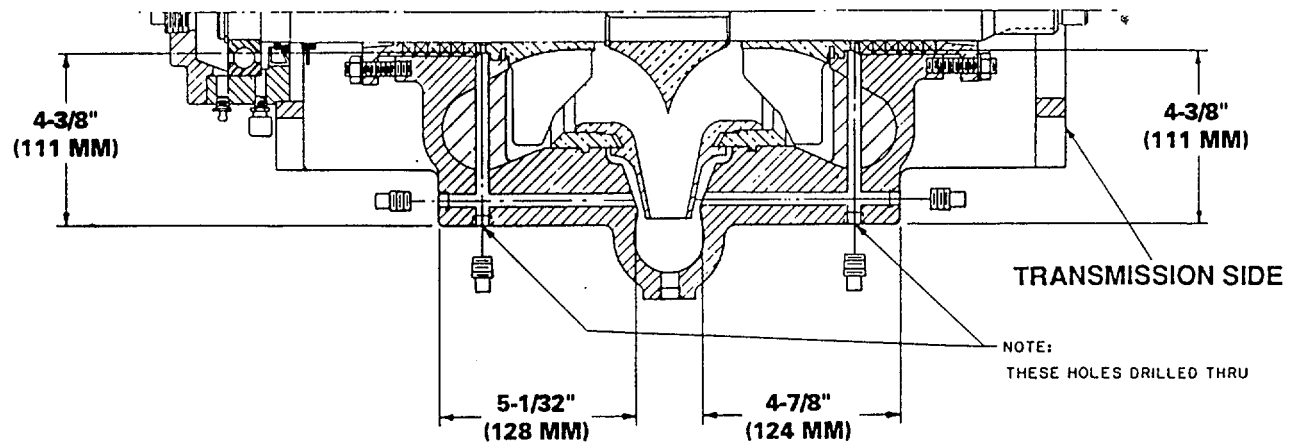


WARNING

Rotating Drive Shaft: Packing, gland nut manipulation, direct observation of the stuffing box and installing or removing rings from the stuffing box should be performed with the fire truck engine off and the drive shaft not rotating. Determine packing gland leakage by watching the ground (or pan under the stuffing boxes) from the side of the truck. Determine packing gland temperature immediately after the engine has been shut off.

- (8) Remove packing gland adjustment nuts, washers, and packing glands from the stuffing box.
- (9) Operate pump at a discharge pressure of 75 to 150 psi (517 to 1034 kPa) for approximately ten seconds.
- (10) Shut down pump and remove blown packing from stuffing box. Repeat if necessary.

6-6. FIRE PUMP - Continued



CS STUFFING BOX WATER PASSAGEWAY
INSPECTION ROD INSERTION DEPTHS

- (11) Inspect stuffing box water supply passageways.
- (12) Remove stuffing box hose and pipe plug for stuffing box water supply passageways.
- (13) Visually inspect or insert 1/8" (3 mm) diameter rod into the three passageways as shown. Note the proper insertion depth.
- (14) Clogged passageways can be backflushed by pressurizing the pump body (from hydrant or other pump) after the packing has been replaced in each stuffing box.
- (15) Remove as much old packing lubricant as possible from the stuffing box and shaft with a clean, dry, lint free cloth (Item 42, Appendix E) wetted with a solvent. Rinse stuffing box with water after using solvent.
- (16) Lubricate stuffing box bore and shaft with automotive engine oil (Item 20, Appendix E).

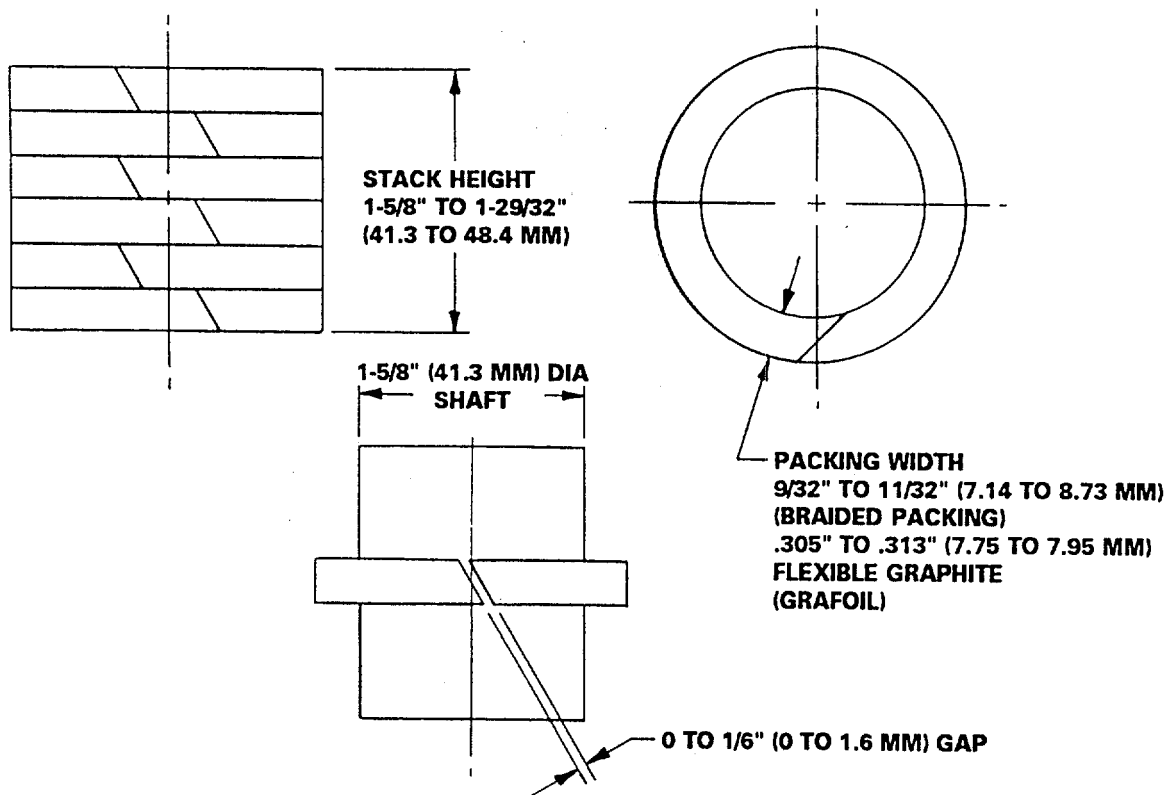
6-6. FIRE PUMP - Continued

- (17) Insert packing rings into the stuffing box using packing glands to push in each ring. (A pair of screw drivers may assist in prying the glands in and out of the stuffing box.) Observe the order of packing ring insertion for Flexible Graphite packing sets shown. The scarf cuts (or slits in Flexible Graphite packing) should be staggered 90 to prevent a direct leakage path.

WARNING

The engine should be shut down (and the drive shaft not rotating) whenever manipulating the packing adjustment nuts or determining packing gland temperature.

- (18) Tighten adjustment nuts one flat beyond finger tight.
- (19) Operate the pump (para 20 through 23) in volume (parallel) with a discharge pressure from 75 to 150 psi (517 to 1034 kPa). Circulate enough flow through the pump to prevent overheating.



6-6. FIRE PUMP - Continued

- (20) Operate the pump at 75 to 150 psi (517 to 1034 kPa) discharge pressure for five minutes and observe leakage. Acceptable leakage for flexible graphite packing is 10 to 15 drops/minute. A leakage of 1 drop/minute is acceptable after complete break-in.
- (21) Shut down pump and feel packing glands. Allow packing glands to cool or wait five minutes to restart pump (whichever is longer) if leakage rate is too low or packing glands are hot.
- (22) Repeat steps (20) and (21) (a maximum of three times) until packing glands are cool (to warm) and water leaks from the stuffing box. Tighten packing gland adjustment nuts one flat if leakage in step (20) was too high and the glands were not hot.
- (23) Operate the pump (at 75 to 150 psi (517 to 1034 kPa) discharge pressure) for two minutes and observe leakage.
- (24) Shut pump down and feel packing glands. Go to step (27) if leakage is high and packing glands are cool to warm. Allow packing glands to cool or wait five minutes (whichever is longer) if leakage is low or packing glands are hot.
- (25) Operate the pump (at 75 to 150 psi (517 to 1034 kPa) discharge pressure) for two minutes and observe leakage.
- (26) Shut pump down and feel packing glands. Go to step (27) if leakage is high and packing glands are cool to warm. Loosen adjusting nuts 1/2 flat if leakage is too low or packing glands are too hot. Then repeat steps (23) to (25) as required.

NOTE

Synthetic packing will melt and seal the shaft if the packing gland nuts are too tight. The melting is usually confined to the packing ring nearest the packing gland. Replacement of the packing ring nearest the packing gland will correct this situation.

- (27) Tighten packing gland adjustment nuts one flat. Operate pump (at 75 to 150 psi (517 to 1034 kPa) discharge pressure) for two minutes and observe leakage. Repeat steps (24) to (26) as required.

6-6. FIRE PUMP - Continuedl. Follow-on Maintenance.

- (1) Connect batteries (see para 4-114).
- (2) Install curb side operators panel (see para 4-26).
- (3) install street side operators panel (see para 4-25).
- (4) Install discharge manifold (see para 6-2 and 6-3).
- (5) Install suction manifold (see para 6-4 and 6-5).
- (6) Install drive shafts (see para 5-7).

m. Testing.

- (1) Before a pump is returned to service, it is advisable to give it both hydrostatic and operational tests to check it for leaks and to make sure the pump operates properly as follows:
 - Connect pump to hydrant or other pressurized water supply.
 - Close all drain lines, and open discharge and priming valve.
- (2) Open hydrant until water runs out through discharge valves and discharge pipe in priming pump. Close all valves. BE SURE ALL AIR IS EVACUATED FROM PUMP.
- (3) Apply hydrant pressure to pump for 15 minutes. With a portable light, check pump for leaks. If leaks are discovered, tighten connections or attaching parts as necessary. If necessary to tighten packing, be sure to loosen and readjust packing.
- (4) After all leaks are eliminated, shut hydrant valve, drain pump completely, and disconnect suction hose.
- (5) Operate pump at its maximum intended service pressure. Do not exceed 400 psi (2756 kPa).
- (6) With a portable light, check pump for water leaks. If leaks are discovered, stop pump and tighten connections or attaching parts as necessary. Repeat until all leaks are eliminated.
- (7) While pump is running, check for unusual noises, oil leaks, overheated bearings, etc. If anything unusual is discovered, stop pump immediately, and determine the cause.

6-7. CAB MOUNTING BRACKETS

This task covers:

- | | |
|----------------------------|--------------------------|
| a. Removal | c. Installation |
| b. Cleaning and Inspection | d. Follow on Maintenance |
-

TOOLS REQUIRED:

Tool Kit, General Mechanics, Automotive
(Appendix B, Section III, Item 1)

Shop Equipment, Automotive
Maintenance and Repair
(Appendix B, Section III, Item 4)

MATERIALS/PARTS REQUIRED

Solvent, Dry Cleaning (Item 3, Appendix E)
Cab Biscuits (Figure 67, Appendix F)

EQUIPMENT CONDITION

Main Engine Shutdown (see para 2-12)
APU Shutdown (see para 2-16.)
Batteries Disconnected (see para 4-114.)

a. Removal.

WARNING

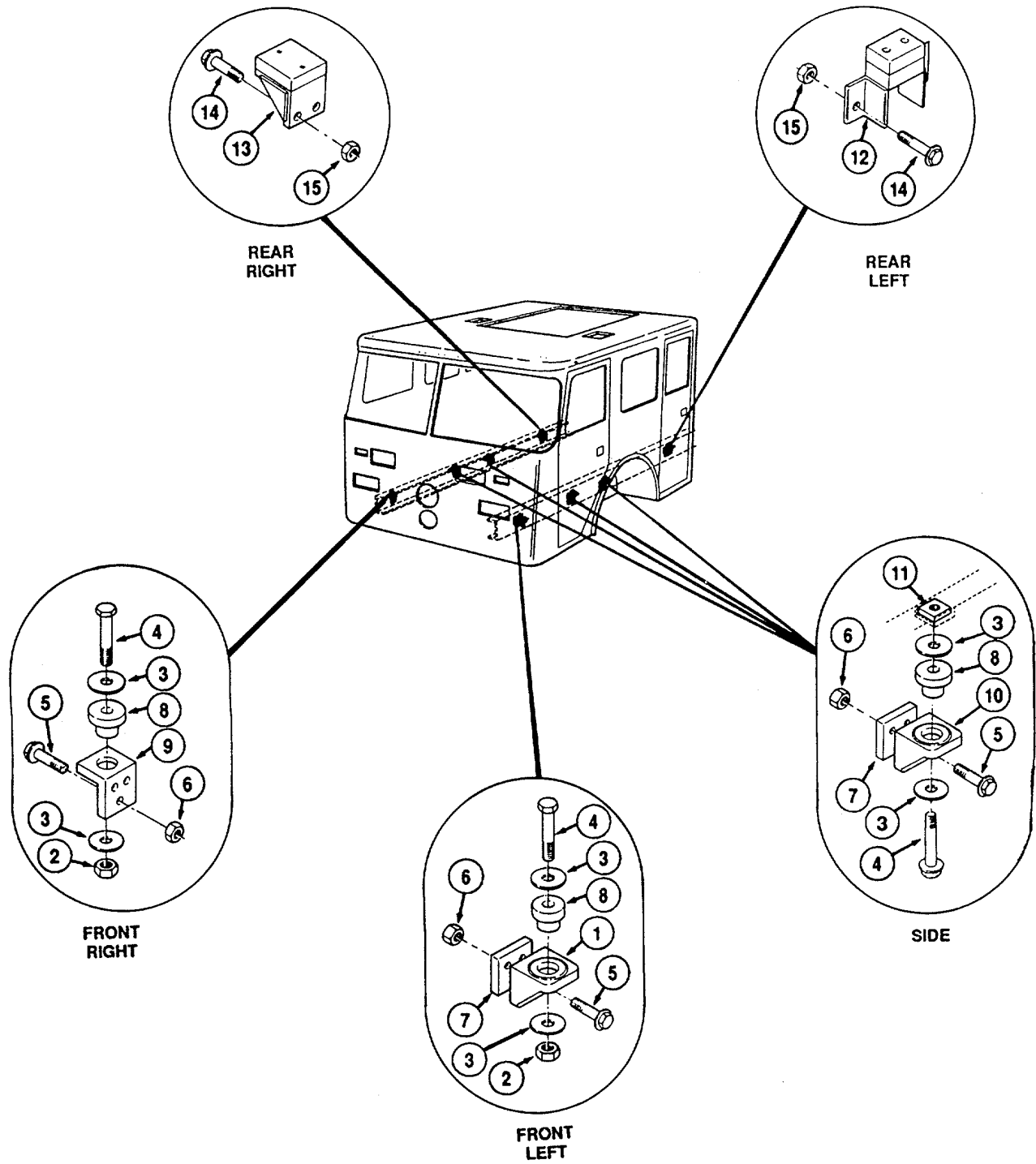
Debris may fall from underside of vehicle while performing removal and installation procedures; wear suitable eye protection.

WARNING

Don't remove more than one cab mounting bracket at a time; replace it before removing another bracket. The cab mounts position the cab above the frame and are the only support it has.

- (1) To remove front left bracket (1), remove nut (2), two lock washers (3) and bolt (4).
- (2) Remove bolt (5) and nuts (6) to remove cab mount (1) and cab mount spacer (7) from frame.
- (3) Remove cab biscuit (8) from bracket (1). Discard biscuit (8).
- (4) To remove front right bracket (9), follow same procedures as for left front bracket (1), steps (1, 2 and 3), except a spacer (7) isn't used.
- (5) To remove side brackets (10), follow same procedures as for left front bracket (1), steps (1, 2 and 3), except side bracket (1) has bolt (4) inserted from underside of bracket and is retained with a captured nut (11).
- (6) To remove rear left and rear right mounting brackets (12 and 13) from frame, remove two bolts (14) and nuts (15) which attach to frame.

6-7. CAB MOUNTING BRACKETS - Continued



6-7. CAB MOUNTING BRACKETS - Continuedb. Cleaning and Inspection.**WARNING**

Dry cleaning solvent P-D-680 is potentially dangerous. Avoid repeated and prolonged breathing of vapors and skin contact with the liquid. Do not use near open flame, arcing equipment or other ignition sources. Always wear eye protection and protective clothing. The flash point of P-D-680 is 100 to 138 deg. F (38 to 59 deg. C).

- (1) Clean all parts in dry cleaning solvent (Item 3, Appendix E).

WARNING

Death or serious injury could occur if compressed air is directed against the skin. Do not use compressed air for cleaning or drying unless the pressure is/has been reduced to 30 psi (2.11 kg/cm²) or less. When working with compressed air, always use chip guards, eye protection and other personal protective equipment.

- (2) Dry parts with compressed air.
- (3) Inspect bolts (4, 5 and 14) and nuts (2, 6 and 15) for damaged threads. Replace all those with damaged threads.
- (4) Perform magnetic particle inspection on mounting brackets (1, 9, 10, 12 and 13) as detailed in paragraph 4-9.

c. Installation.**CAUTION**

Use new cab biscuits (8) when installing mounting brackets (1, 9 and 10). Install new rubber pads on mounting bracket (12 and 13) before installing them.

- (1) Attach rear left and rear right cab brackets (12 and 13) to frame with two bolts (14) and nuts (15) each. Torque to 55 ft lbs (75 Nm).
- (2) Install new cab biscuits (8) in mounting brackets (1, 9 and 10) before attaching brackets to frame.
- (3) Attach front left, front right, and side mounting brackets (1, 9 and 10) to frame with three bolts (5) and nuts (6) each. Torque to 55 ft lbs (75 Nm).

6-7. CAB MOUNTING BRACKETS- Continued

- (4) Install bolts (4), two lock washers (3), and nuts (2) or captured nut (11) to attach cab frame to front left, front right, and side mounting brackets (1, 9 and 10). Torque to 60 ft lbs (82 Nm).

d. Follow-on Maintenance.

- (1) Connect batteries (see para 4-114).

6-8. CYLINDER BLOCK

This task covers:

- | | |
|---|--|
| <ul style="list-style-type: none"> a. Disassembly b. Cleaning Inspection c. Assembly | <ul style="list-style-type: none"> d. Testing e. Follow on Maintenance |
|---|--|

TOOLS REQUIRED:

Tool Kit, General Mechanics, Automotive
(Appendix B, Section III, Item 1)

Shop Equipment, Automotive
Maintenance and Repair
(Appendix B, Section III, Item 4)

Remover/installer, core plug
(Appendix B, Section II, Item 16)
Gauge, cylinder bore
(Appendix B, Section III, Item 18)
Gauge, cylinder liner depth
(Appendix B, Section II, Item 19)
Engine block pressure testing kit
(Appendix B, Section III, Item 20)

PERSONNEL REQUIRED - 2

a. Disassembly.

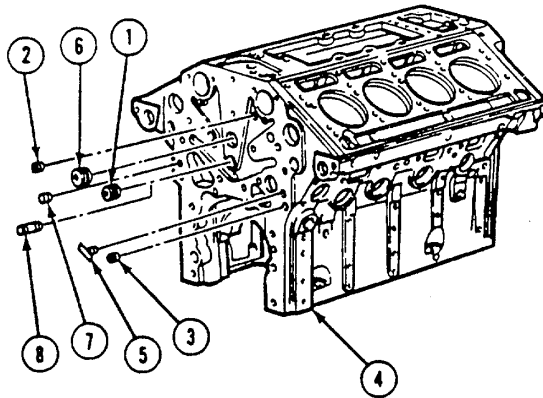
- (1) Remove oil galley plugs (1, 2, and 3) from front of engine block (4).
- (2) Remove drain cock (5).
- (3) Remove plugs (6 and 7).
- (4) Remove connector (8).

MATERIALS/PARTS REQUIRED

Engine Removed (see para 5-11.)
Starter Removed (see para 5-12.)
Oil Cooler Removed (see para 5-15.)
Engine Mounted on Engine Stand
Front End Plate Removed (see para 6-9.)
Rear End Plate Removed (see para 6-10.)
Air Box Covers Removed (see para 6-11.)
Air Box Drains Removed (see para 6-12.)
Crankshaft Removed (see para 6-29.)
Cylinder Heads Removed (see para 6-13.)

MATERIALS/PARTS REQUIRED

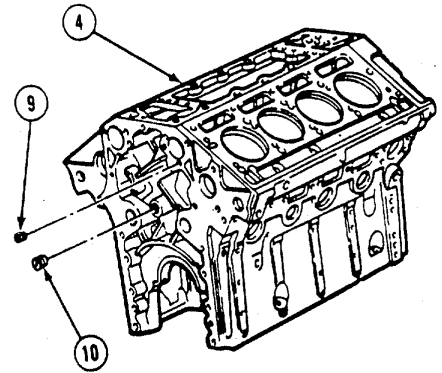
Oil, lubricating (Item 10, Appendix E)
Compound, sealing, lubricating (Item 31, Appendix E)
Compound, sealing, pipe thread (Item 2, Appendix E)
Antifreeze, permanent (Item 29, Appendix E)
Compound, International, No. 2 (Item 37, Appendix E)
Gaskets (Figure 100, Appendix F)
Seals (Figure 100, Appendix F)



6-8. CYLINDER BLOCK- Continued

(5) Remove oil galley plug (9) from rear end of engine block (4).

(6) Remove oil galley plug (10).



(7) Remove two plugs (11) from right side of engine block (4).

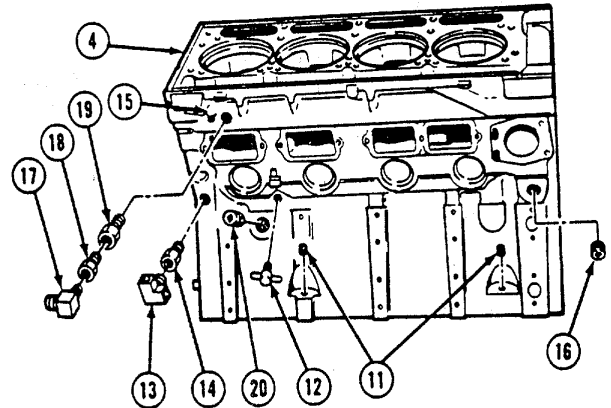
(8) Remove drain cock (12).

(9) Remove compressor oil supply elbow (13) and fitting (14).

(10) Remove oil galley plugs (15 and 16).

(11) Remove elbow (17), fitting (18), and reducer bushing (19).

(12) Remove plug (20).



(13) Remove two plugs (21) from left side of engine block (4).

(14) Remove reducer bushing (22) and ether starting aid thermostat (23).

(15) Remove two plugs (24).

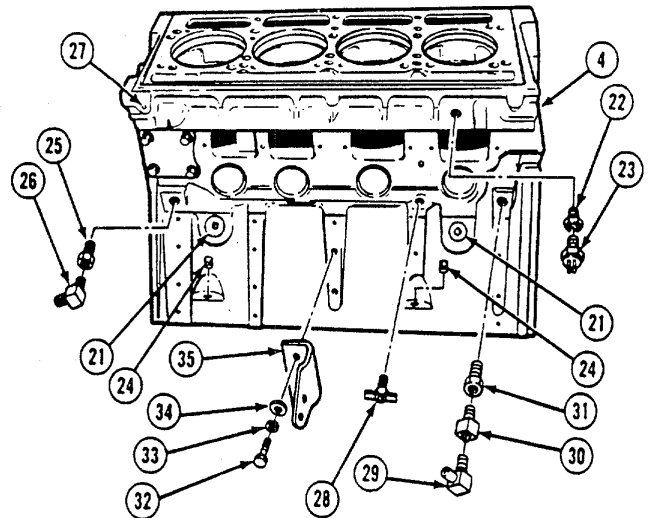
(16) Remove reducing bushing (25) and elbow (26) from engine block (4).

(17) Remove oil plug (27).

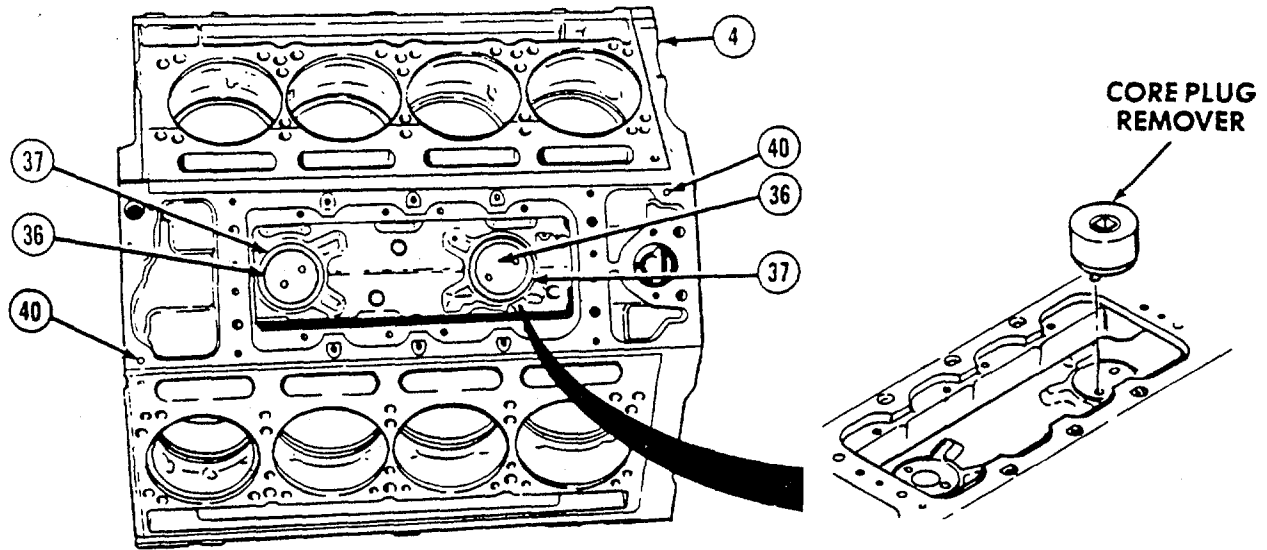
(18) Remove drain cock (28).

(19) Remove elbow (29), reducing bushing (30), and fitting (31).

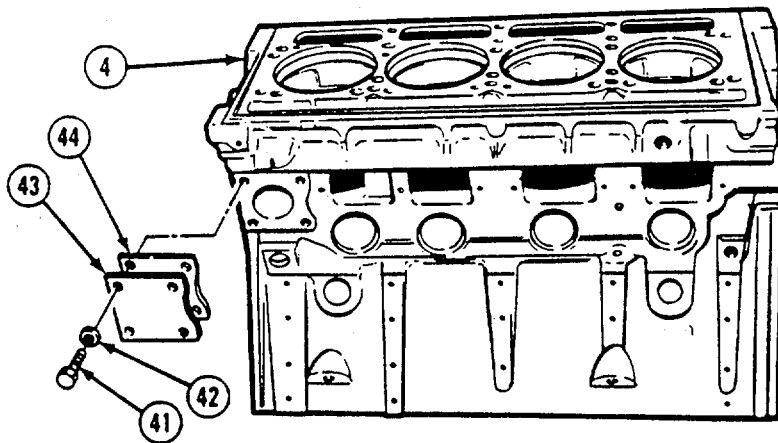
(20) Remove two screws (32), lockwashers (33), washers (34), and starter motor bracket (35).



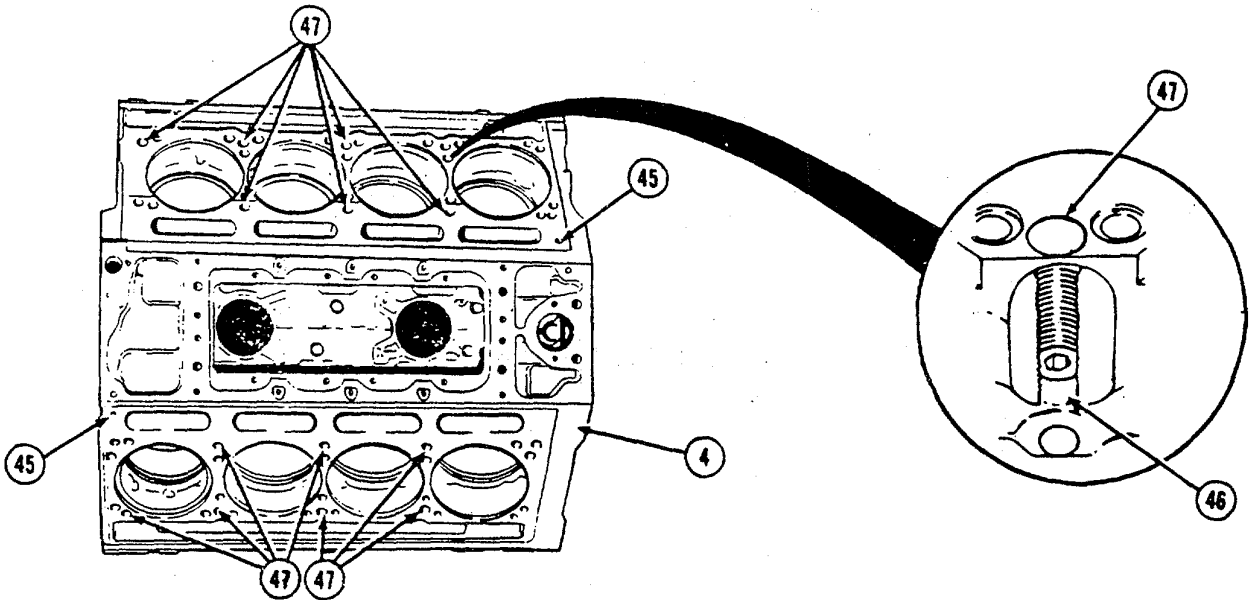
6-8. CYLINDER BLOCK - Continued



- (21) Remove two core plugs (36) and gaskets (37) from top of engine block (4) using core plug remover (Appendix B, Section III, Item 16).
- (22) Discard two gaskets (37).
- (23) Remove oil galley plugs (40).
- (24) Remove four screws (41), washers (42), cover plate (43), and gasket (44) from left side of engine block (4).



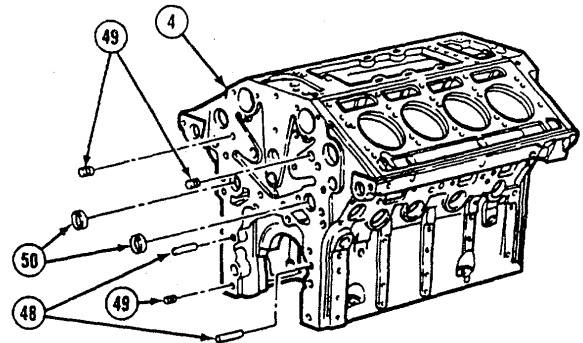
6-8. CYLINDER BLOCK- Continued



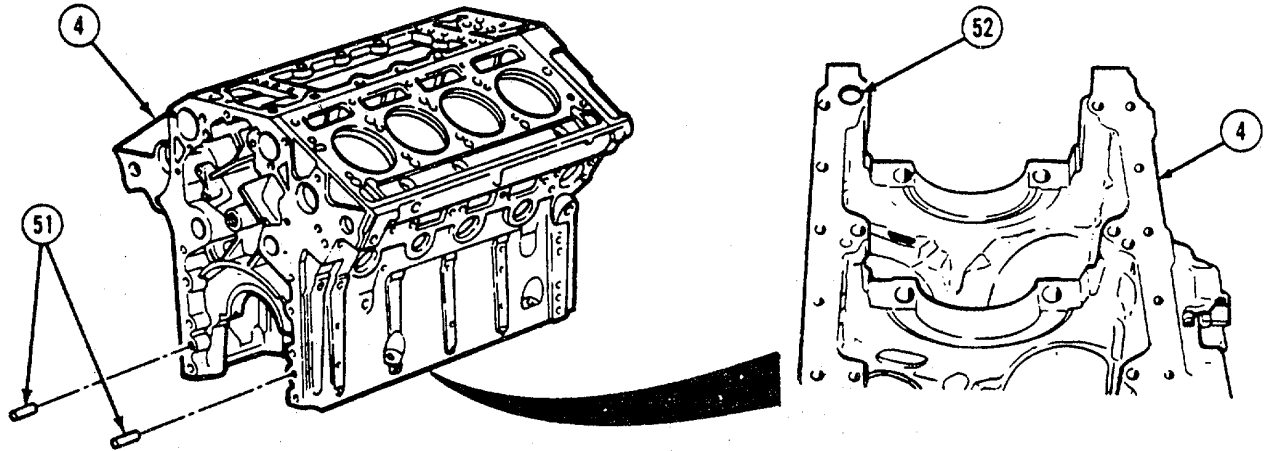
NOTE

Remove the following plugs and dowels only if damaged. Do not remove just to clean engine block.

- (25) Remove two dowels (45) from top of engine block (4).
- (26) Remove 14 plugs (46) from bottom of cylinder head screw holes (47).
- (27) Remove two dowels (48) from front of engine block (4).
- (28) Remove three plugs (49) and two plugs (50).



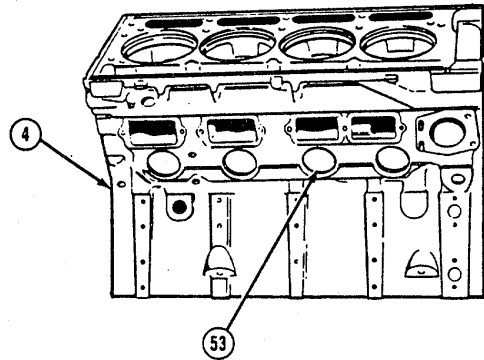
6-8. CYLINDER BLOCK - Continued



(29) Remove two dowels (51) from rear of engine block (4).

(30) Remove cup plug (52) from bottom of engine block (4).

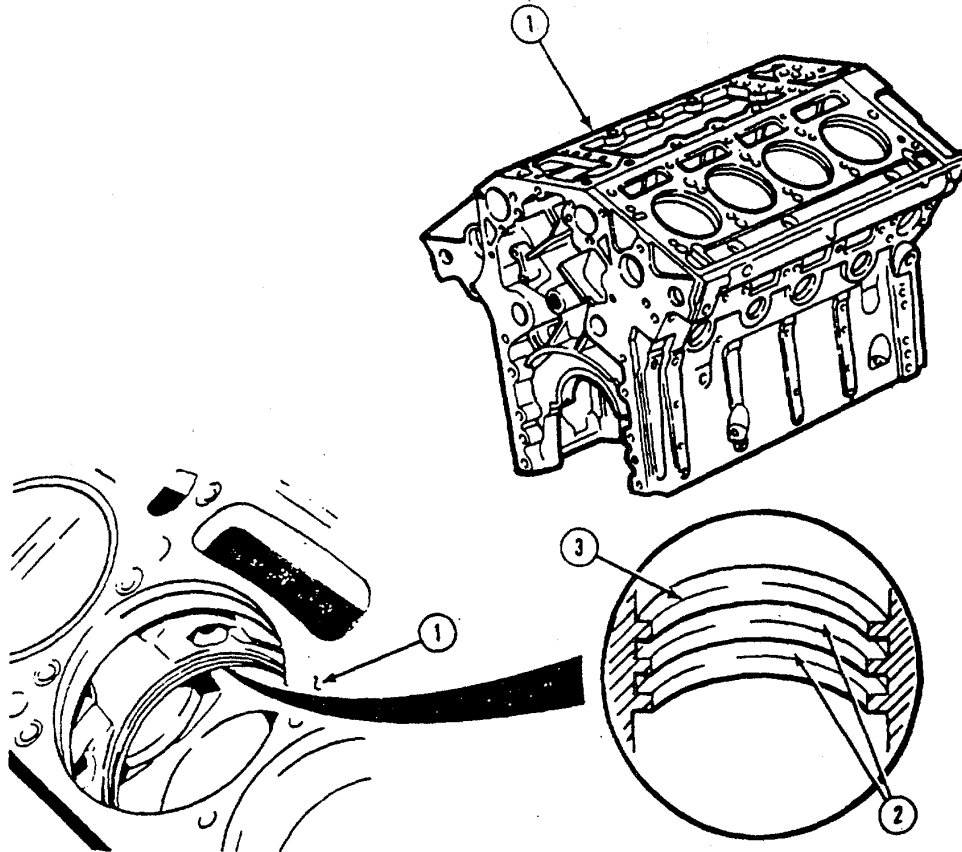
(31) Remove four cup plugs (53) from both right and left sides of engine block (4).



6-8. CYLINDER BLOCK- Continued

b. Cleaning/Inspection.

- (1) Scrape gasket material and sealant off engine block (1) surfaces.



WARNING

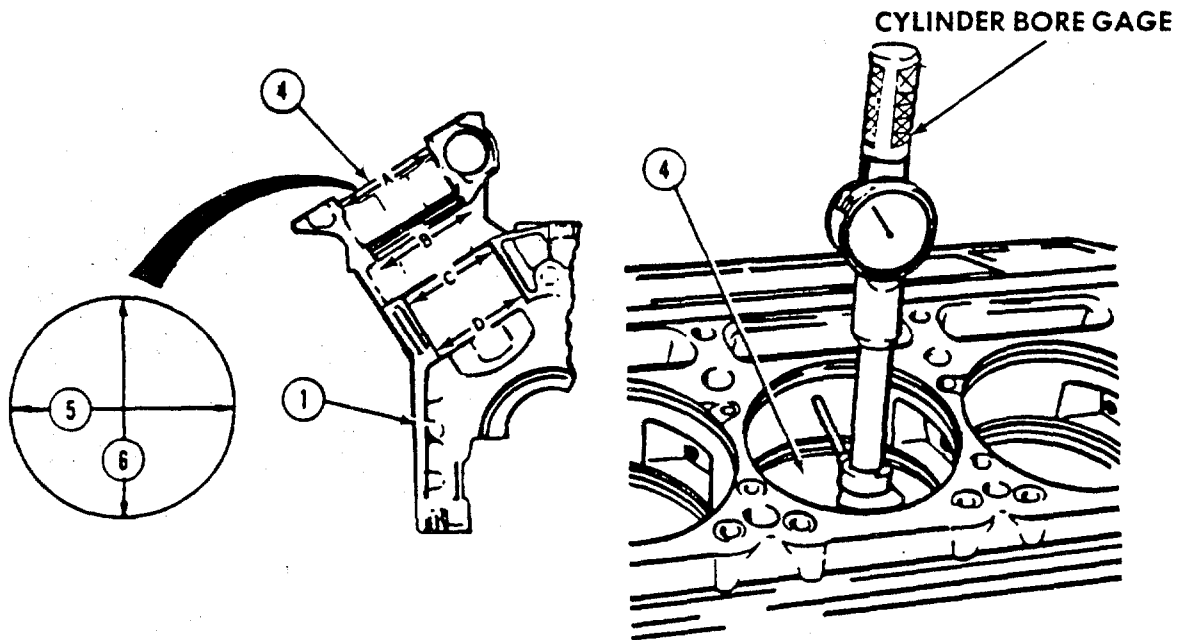
High pressure steam can blow particles into eyes, can cause severe burns, and creates hazardous noise levels. Eye, skin, and hearing protection is required. (2) Steam clean engine block (1). Make sure oil and water galleries are cleaned thoroughly.

WARNING

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

- (3) Dry engine block (1) with compressed air.
- (4) Inspect grooves (2) and lands (3) for pitting and erosion.

6-8. CYLINDER BLOCK - Continued



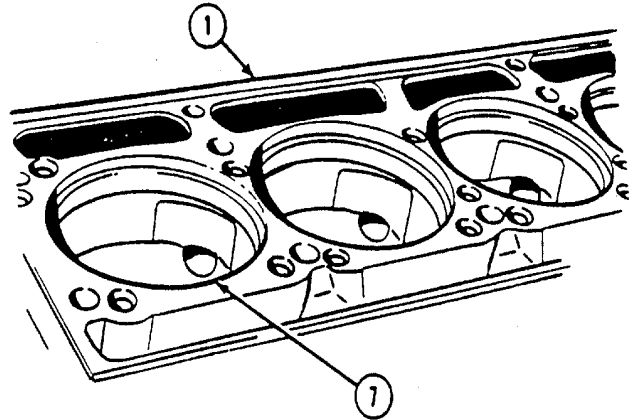
NOTE

All eight cylinders are measured the same. Follow steps (5) through (9). These are average gauge readings at each position.

- (5) Make two cylinder bore (4) measurements (5 and 6) with cylinder bore gauge (Appendix B, Section III, Item 18) in steps (6) to (9).
- (6) Measure cylinder bore (4) at position A. Measurement cannot be greater than 5.3635-in. (136.23 mm).
- (7) Measure cylinder bore (4) at position B. Measurement cannot be greater than 5.3395-in. (135.62 mm).
- (8) Measure cylinder bore (4) at position C. Measurement cannot be greater than 5.2185-in. (132.55 mm).
- (9) Measure cylinder bore (4) at position D. Measurement cannot be greater than 5.2185-in. (132.55 mm).
- (10) Replace engine block (1) if any cylinder bore (4) is beyond limits listed. Also, neither the tapes nor the out-of-roundness must not exceed .001" (.025 mm).

6-8. CYLINDER BLOCK- Continued

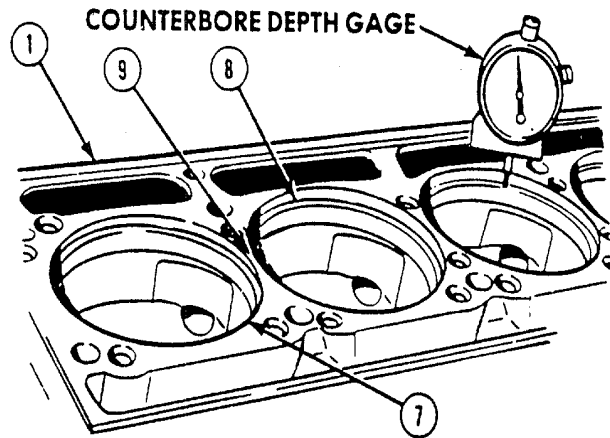
- (11) Use straight edge and feeler gauge to measure flatness of engine block (1) crosswise, between all cylinders (7).
- (12) If block (1) varies more than 0.003-in. (0.076 mm), replace engine block (1).
- (13) Using a straight edge and feeler gauge, measure flatness of engine block contact surface (1) lengthwise. If block (1) varies more than 0.007-in. (0.178 mm), replace engine block (1).



NOTE

Cylinders may be counterbored to either of two depths.

- (14) Using counterbore depth gauge, measure depth of counterbore (8). If depth is not between 0.4755-in. (12.08 mm) and 0.477-in. (12.12 mm) or between 0.4905-in. (12.46 mm) and 0.4920-in. (12.50 mm) and cannot be brought into limits by installing cylinder liner insert, replace engine block.
- (15) If counterbore (8) varies more than 0.0015-in. (0.04 mm) around edge of cylinder, replace engine block (1).



NOTE

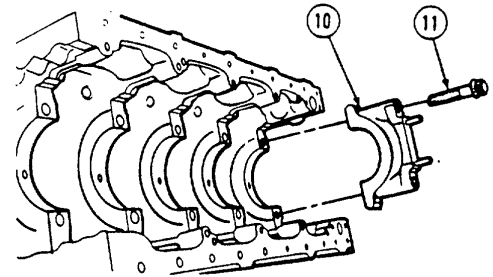
If two adjacent cylinders are in different counterbore depth ranges measured in step (14) above, step (16) does not apply.

- (16) If difference between any two adjacent cylinder counterbores (8) measured at their closest point (9) is more than 0.0015-in. (0.04 mm), replace engine block (1).

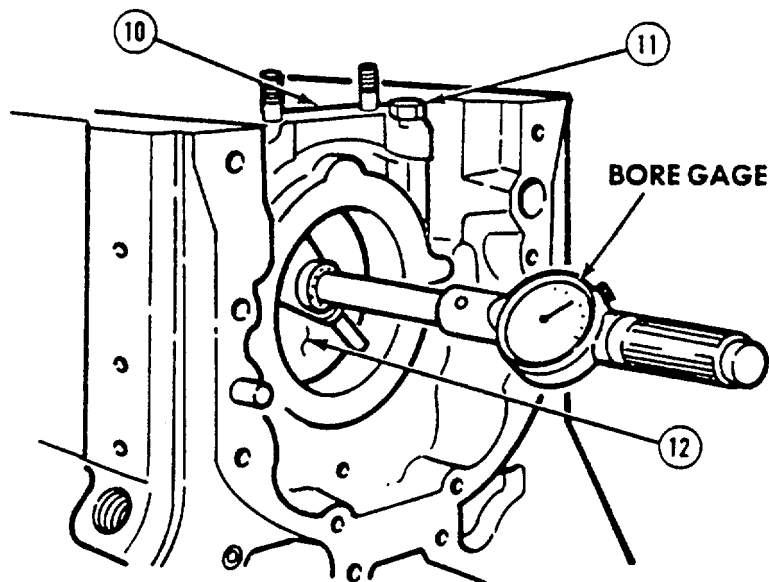
6-8. CYLINDER BLOCK - Continued

NOTE

Main bearing caps must be installed in proper positions in engine block. Bearing caps are numbered 1 thru 5 to correspond with their respective positions in the cylinder block. Number 1 cap is front cap. Make sure caps are firmly seated in engine block and main bearing shells are removed.



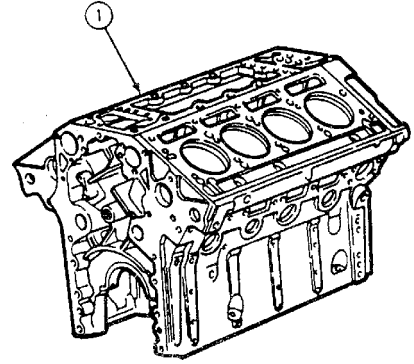
- (17) Install five main bearing caps (10) and ten screws (11). Lubricate threads and head contact surfaces with a small quantity of International Compounds No. 2 (Item 37, Appendix E).
- (18) Tighten screws (11) up snug.
- (19) Strike caps (10) with soft-face hammer to seat them.
- (20) Tighten screws (11) to 50 lb-ft (68 N•m).
- (21) Tighten screws (11) to 110 lb-ft (149 N•m).
- (22) Tighten screws (11) to 230 to 240 lb-ft (312 to 325 N•m).



- (23) Use bore gage to measure each main bearing bore (12) diameter. If main bearing bore diameter is less than 4.812-in. (122.22 mm) or is greater than 4.813-in. (122.25 mm), replace engine block (1).
- (24) Remove five main bearing caps (10) and screws (11).

6-8. CYLINDER BLOCK- Continued

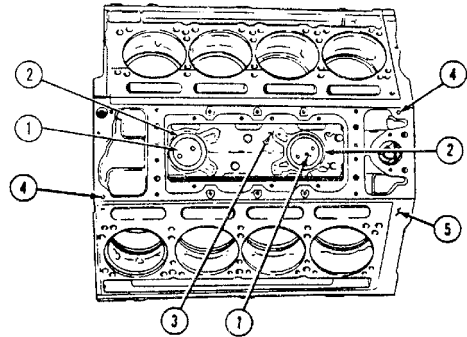
- (25) Inspect dowel holes in engine block (1) for oversize holes or damage. Replace engine block if damaged or oversize.
- (26) Inspect threaded holes for stripped or crossed threads. Use a tap to clean up threads.
- (27) Inspect machined surfaces for flatness, burrs, and scratches. If surfaces cannot be cleaned up by lapping, replace engine block (1).



c. Assembly.

WARNING

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



NOTE

Coat threads of all serviceable plugs, fittings, and draincocks with pipe thread sealing compound (Item 2, Appendix E) and transfer to new engine block (if applicable).

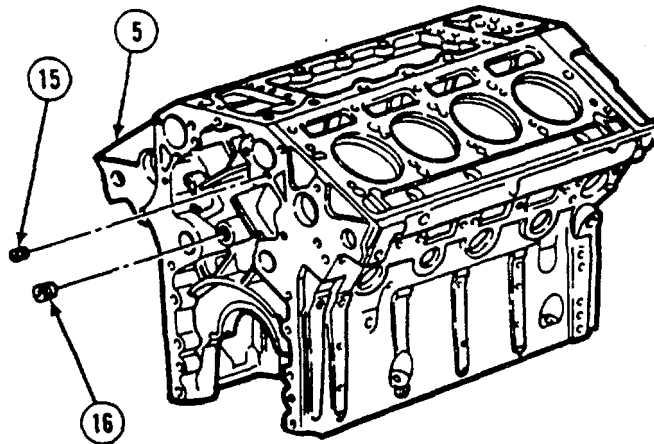
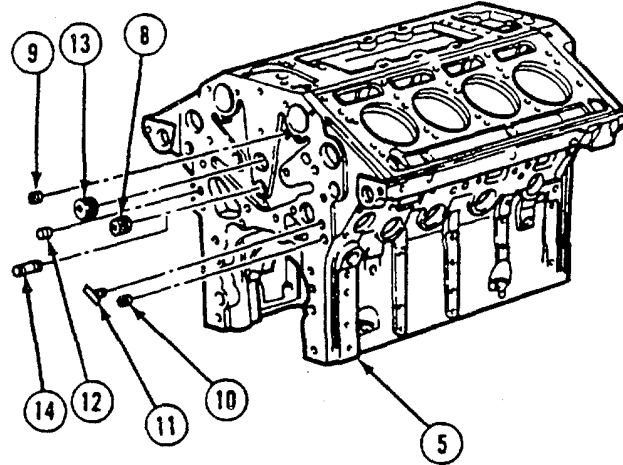
- (1) Use core plug installer (Appendix B, Section Iii, Item 16) to install two core plugs (1) and new gaskets (2) inside air box (3). Tighten plugs to 230 to 270 lb-ft (312 to 366 N•m).
- (2) Install two 1/4-in. oil galley plugs (4) in top of engine block (5).
- (3) Tighten plugs (4) to 14 to 16 lb-ft (1.9 to 22 N•m).

6-8. CYLINDER BLOCK - Continued

NOTE

Front face of engine block is shown.

- (4) Install 3/4-in. oil galley plug (8) in front of engine block (5). Tighten plug to 33 to 37 lb-ft (45 to 50 N•m).
- (5) Install 1/2-in. oil galley plug (9). Tighten plug to 23 to 27 lb-ft (31 to 37 N•m).
- (6) Install 1/4-in. oil galley plug (10). Tighten plug to 14 to 16 lb-ft (19 to 22 N•m). c
- (7) Install 3/8-in. drain cock (11).
- (8) Install 1/4-in. water jacket plug (12). Tighten plug to 14 to 16 lb-ft (19 to 22 N•m).
- (9) Install 1-1/4 in. water jacket plug (13). Tighten plug to 95 to 105 lb-ft (129 to 143 N•m) (10). Install connector (14).



Rear face of engine block is shown.

- (11) Install 1/2-in. oil galley plug (15) in rear end of engine block (5). Tighten plug to 23 to 27 lb-ft (31 to 37 N•m).
- (12) Install 3/4-in. oil galley plug (16). Tighten plug to 33 to 37 lb-ft (45 to 50 N•m).

6-8. CYLINDER BLOCK- Continued

- (13) Install two 1/4-in. plugs (17) in right side of engine block (5). Tighten plugs to 14 to 16 lb-ft (19 to 22 N•m).
- (14) Install 1/4-in. drain cock (18).
- (15) Install 1/4-in fitting (19).
- (16) Install elbow (20) in fitting (19).
- (17) Install 1-in. plug (21). Tighten plug to 75 to 85 lb-ft (102 to 115 N-m).
- (18) Install reducer bushing (22). Install fitting (23) and elbow (24).
- (19) Install 1/8-in. oil galley plug (25). Tighten plug to 10 to 12 lb-ft (14 to 16 N•m).
- (20) Install 3/4-in. oil galley plug (26). Tighten plug to 33 to 37 lb-ft (45 to 50 N•m).
- (21) Install two 1-in. plugs (27) in left side of engine block (5). Tighten plugs to 75 to 85 lb-ft (102 to 115 N•m).
- (22) Install 3/4 x 3/8-in. reducer bushing (28).
- (23) Install either starting aid thermostat (29) in reducer bushing (28).
- (24) Install 1/4-in. plugs (30). Tighten plugs to 14 to 16 lb-ft (19 to 22 N•m).
- (25) Install 1/8-in. oil plug (31). Tighten plug to 10 to 12 lb-ft (14 to 16 N•m).
- (26) Install reducer bushing (32) and elbow (33).
- (27) Install drain cock (34).
- (28) Install fitting (35), reducer bushing (36), and elbow (37).
- (29) Install starter motor bracket (38), two washers (39), two lockwashers (40), and two screws (41).

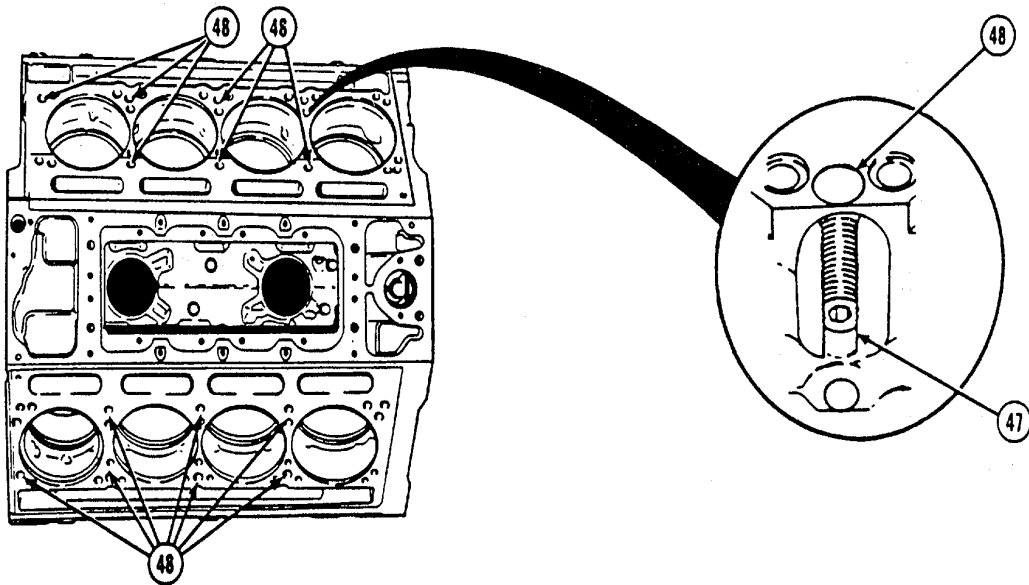
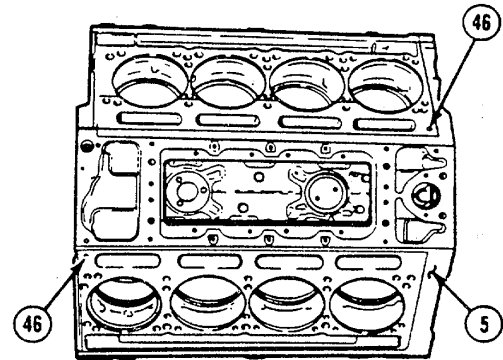
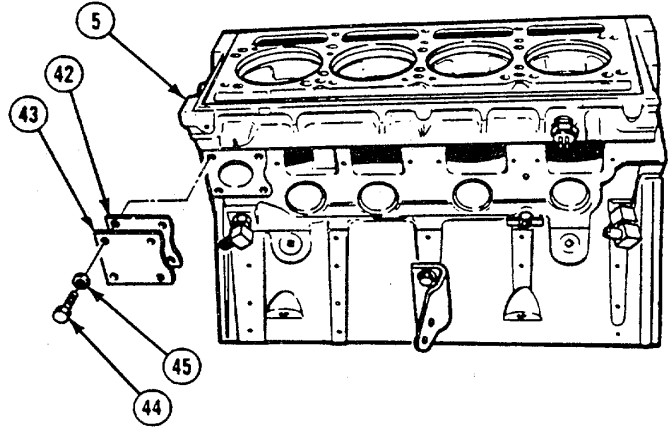
6-8. CYLINDER BLOCK- Continued

- (30) Install gasket (42), cover plate (43), four screws (44), and washers (45) on left front side of engine block (5).

NOTE

If dowel pins were removed, do step (31).

- (31) Install two dowel pins (46) in top of engine block (5) until they are flush with surface of engine block.



6-8. CYLINDER BLOCK- Continued

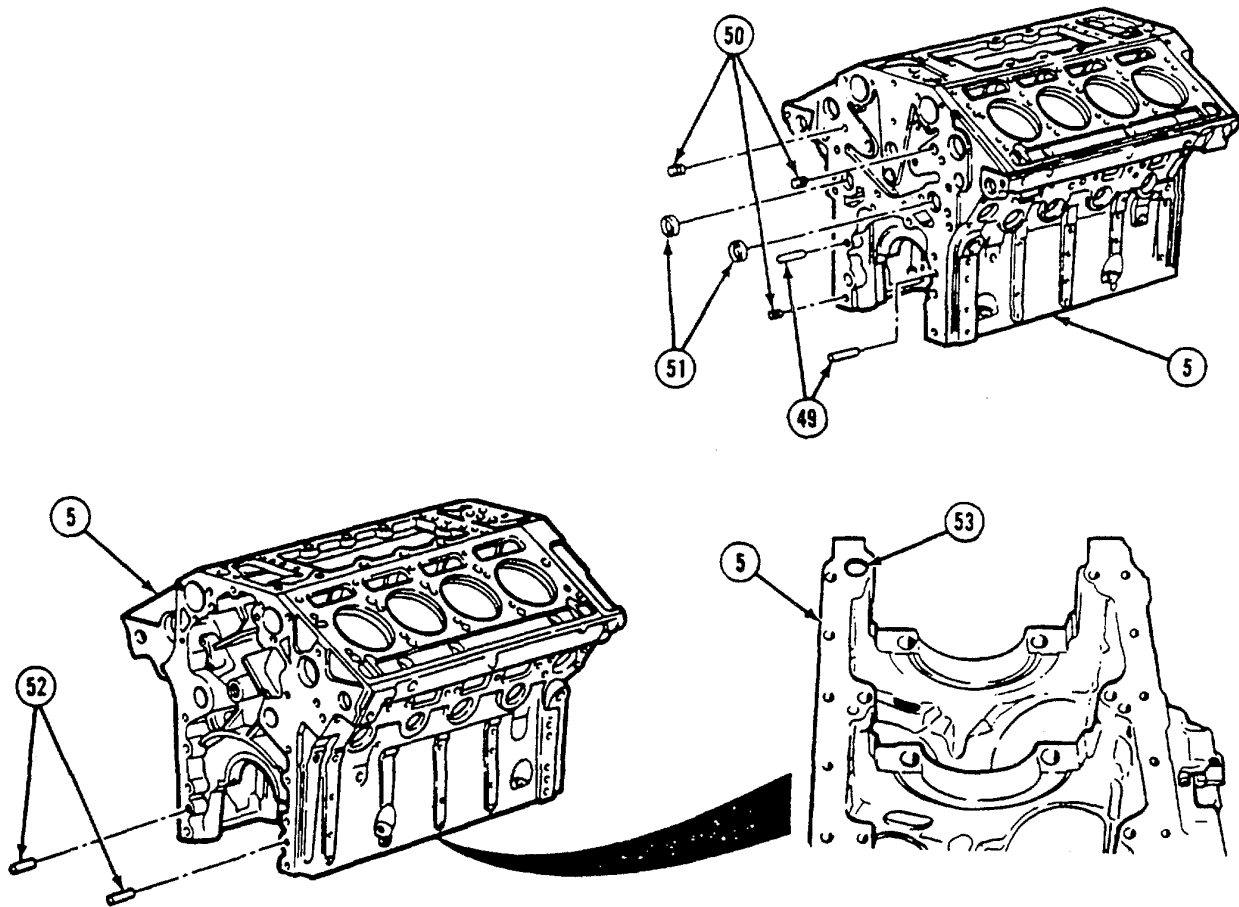
WARNING

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

NOTE

There are 14 plugs, seven in each cylinder bank. Apply small quantity of sealing and lubricating compound (Item 31, Appendix E) to thread area above plug. Do not let sealant get onto threads of cylinder head screws. Allow sealant to set for 12 hours before performing pressure check section d. Testing.

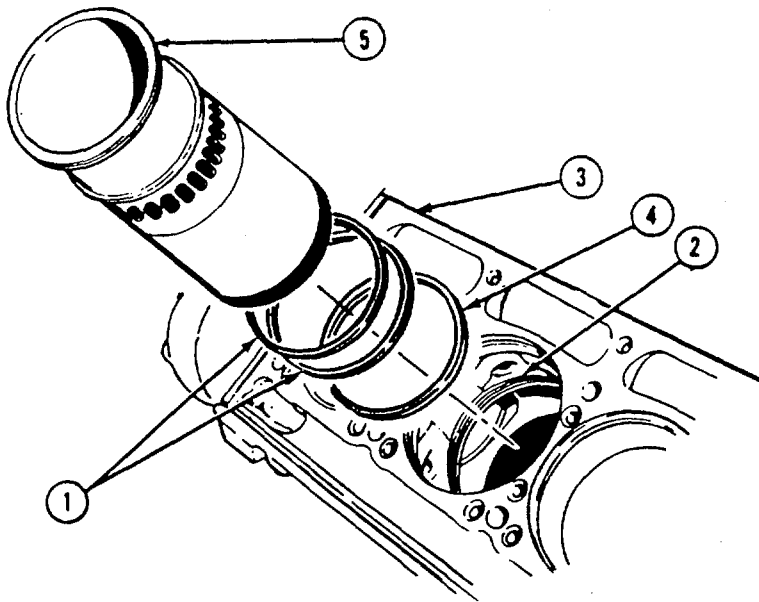
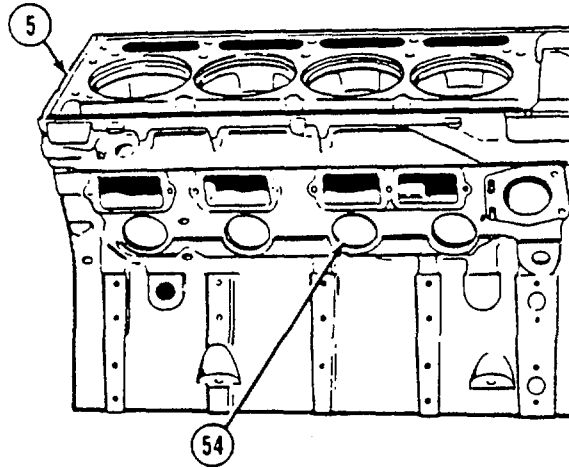
Top of plugs must be 1.960-in (50 mm) below surface of block when installed.



- (32) Coat threads of 11/16-in. plugs (47) with sealing and lubricating compound (Item 31, Appendix E) and install in cylinder head screw holes (48). Tighten to 50 to 60 lb-ft (68 to 81 N•m).
- (33) Install two dowels (49) in front of engine block (5) until they stick out 5/8-in. (16 mm).
- (34) Install three plugs (50) and two plugs (51).
- (35) Install two dowels (52) in rear of engine block (5) until they stick out 5/8-in. (16 mm).
- (36) Install cup plug (53) in bottom of engine block (5).

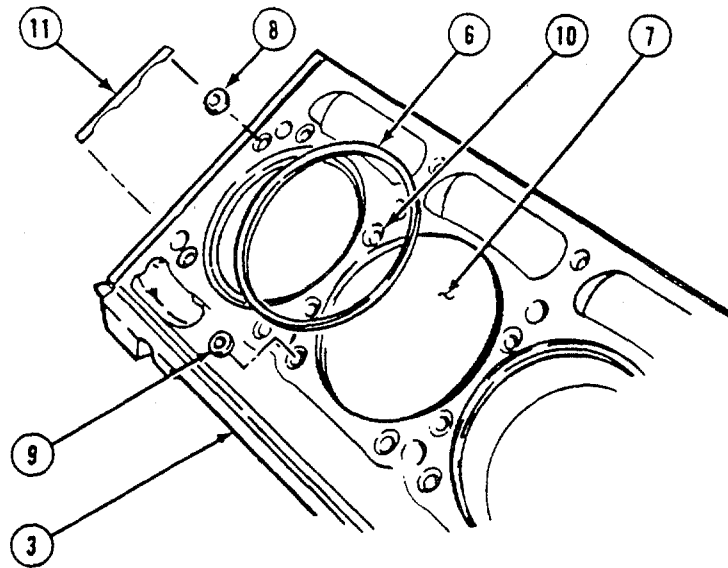
6-8. CYLINDER BLOCK - Continued

- (37) Install four cup plugs (54) in both right and left sides of engine block (5).

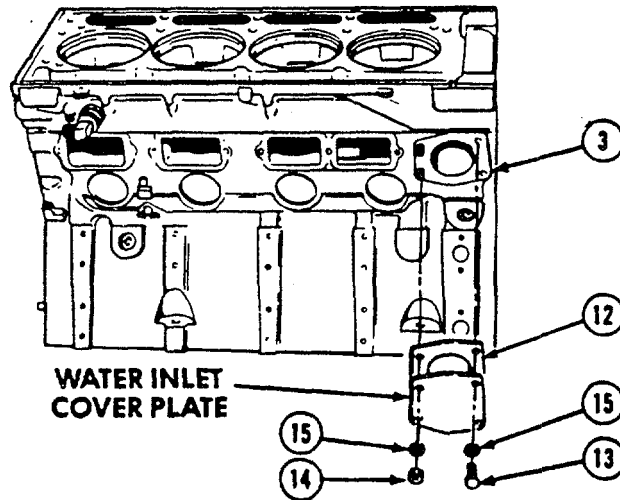
**d. Testing**

- (1) Coat two seal rings (1) with lubricating oil (Item 10, Appendix E).
- (2) Install two seal rings (1) in grooves (2) of each cylinder of engine block (3).
- (3) Install cylinder liner inserts (4) into each cylinder recess.
- (4) Install eight cylinder liners (5) into engine block (3).

6-8. CYLINDER BLOCK- Continued



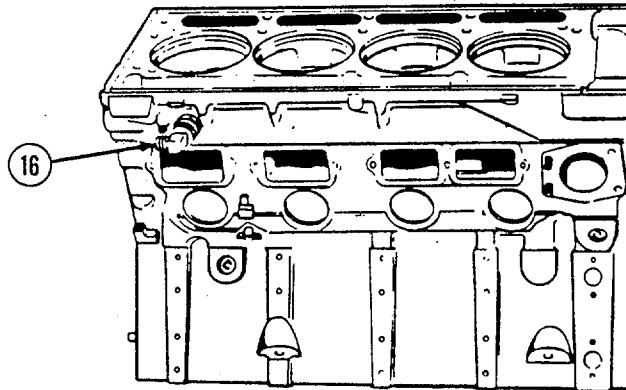
- (5) Install eight new compression gaskets (6) in cylinders (7).
- (6) Install new oil hole seals (8) and new water hole seals (9) in 34 counterbored holes (10) of each side of engine block (3).
- (7) Install four shims (11) one at each end of the cylinder head contact surface of each side of engine block (3).



- (8) Install new gasket (12) and water inlet cover plate on right front side of engine block (3) with two screws (13), nuts (14), and four lockwashers (15).

6-8. CYLINDER BLOCK - Continued

- (9) Pour one gallon of antifreeze (Item 29, Appendix E) into engine block water jacket through fitting (16) and fill with water.
- (10) Connect an air line to fitting (16).
- (11) Route air line from above engine block to prevent antifreeze solution from draining into hose.

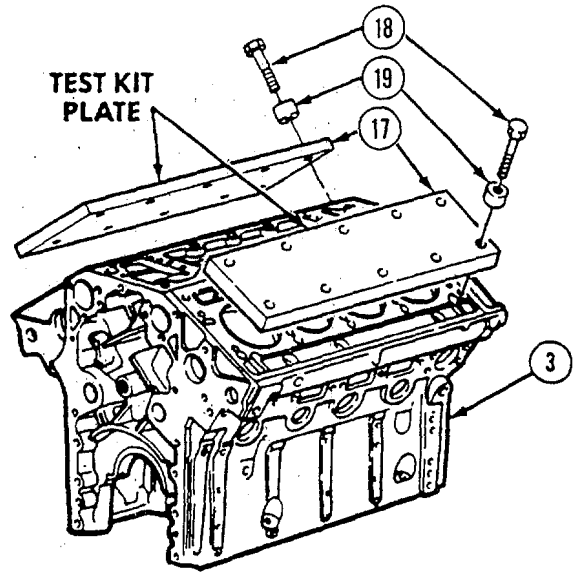


6-8. CYLINDER BLOCK- Continued

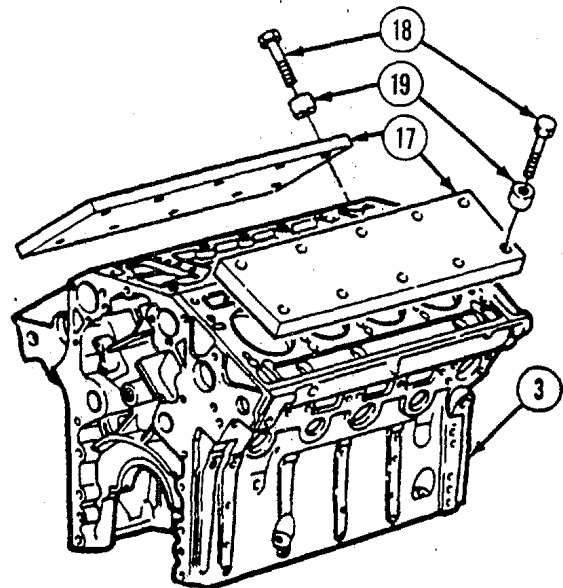
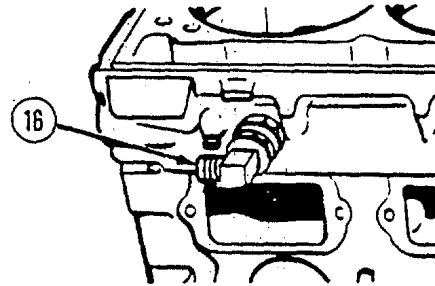
- (12) Install two plates (17) from engine block test kit (Appendix B, Section 111, Item 20) on right and left cylinder banks of engine block (3) with 20 head screws (18) and spacers (19).
- (13) Tighten screws (18) to 50 lb-ft (68 N•m) then to 1 10lb-ft (149 N•m).

WARNING

Be careful when using high air pressure. Make sure connections and seals are tight before applying pressure. High air pressure can blow out parts, hoses, or debris with force. Explosive force can damage equipment and cause injury.

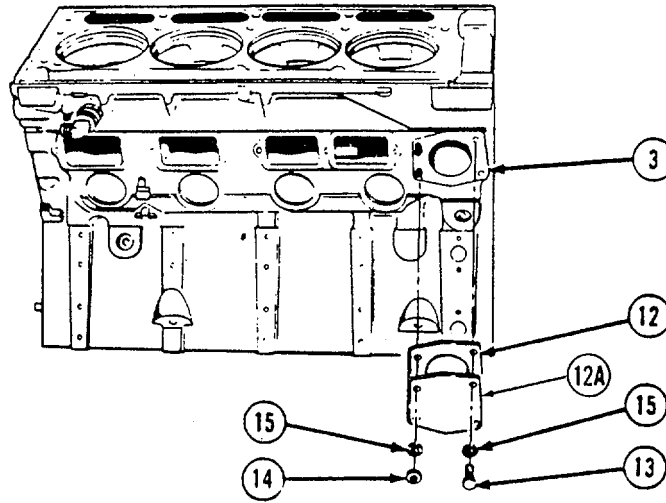


- (14) Apply 40 psi (276 kPa) pressure to engine block (3). Maintain this pressure for at least two hours.
- (15) After test period, inspect engine block (3) for leaking antifreeze. If leaks are found in engine block, engine block must be replaced.
- (16) Relieve 40 psi (276 kPa) pressure from engine block (3).
- (17) Disconnect air line from fitting (16).
- (18) Remove 20 screws (18), spacers (19), and two plates (17) from engine block (3).

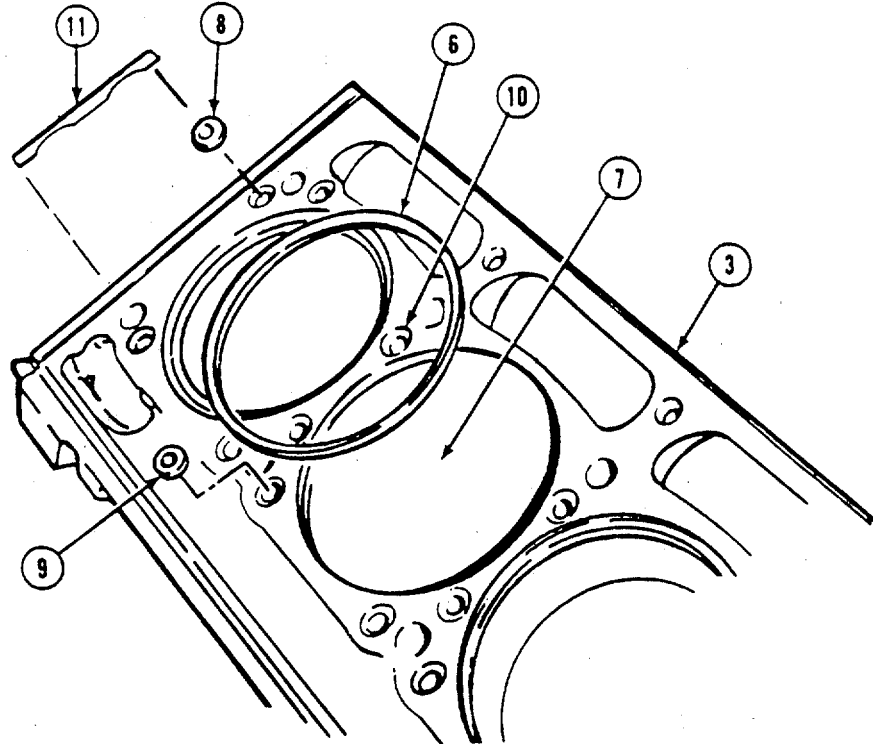


6-8. CYLINDER BLOCK - Continued

- (19) Remove two screws (13), nuts (14), four lockwashers (15), water inlet cover plate (12A) and gasket (12), from right side of engine block (3).



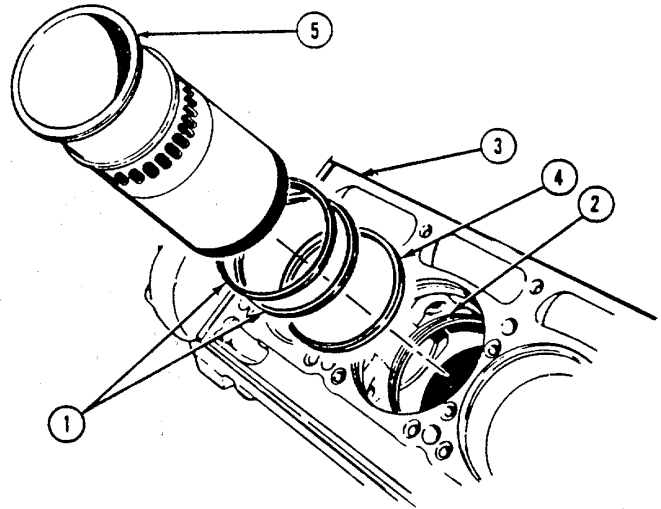
6-8. CYLINDER BLOCK - Continued



- (20) Remove eight compression gaskets (6) from cylinders (7).
- (21) Remove oil hole seals (8) and water hole seals (9) from 34 counterbored holes (10) on each side of engine block (3).
- (22) Remove four shims (11) from each end of cylinder head contact surface on each side of engine block (3).

6-8. CYLINDER BLOCK- Continued

- (23) Remove eight cylinder liners (5) from engine block (3). Coat liners with lubricating oil (Item 10, Appendix E).
- (24) Remove cylinder liner inserts (4) from each cylinder recess.
- (25) Remove two seal rings (1) from grooves (2) of each cylinder of engine block (3).

**WARNING**

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

- (26) Dry engine block (3) with compressed air.
- (27) Coat engine block machined surfaces with lubricating oil (Item 10, Appendix E) to prevent rust.

e. Follow-on maintenance.

- (1) Install air box drains (see para 6-12.).
- (2) Install crankshaft (see para 6-29.).
- (3) Install air box covers (see para 6-11.).
- (4) Install rear end plate (see para 6-10.).
- (5) Install front end plate (see para 6-9.).
- (6) Install cylinder heads (see para 6-13.).
- (7) Install oil cooler (see para 5-15.).
- (8) Install starter (see para 5-12.).
- (9) Install engine from stand (see para 5-11.).

6-9. CYLINDER BLOCK FRONT END PLATE

This task covers:

- a. Removal
 - b. Installation
 - c. Follow-on maintenance
-

TOOLS REQUIRED

Tool Kit, General Mechanics, Automotive
(Appendix B, Section 111, Item 1)

Shop Equipment, Automotive

Maintenance and Repair
(Appendix B, Section 111, Item 4)

MATERIALS/PARTS REQUIRED

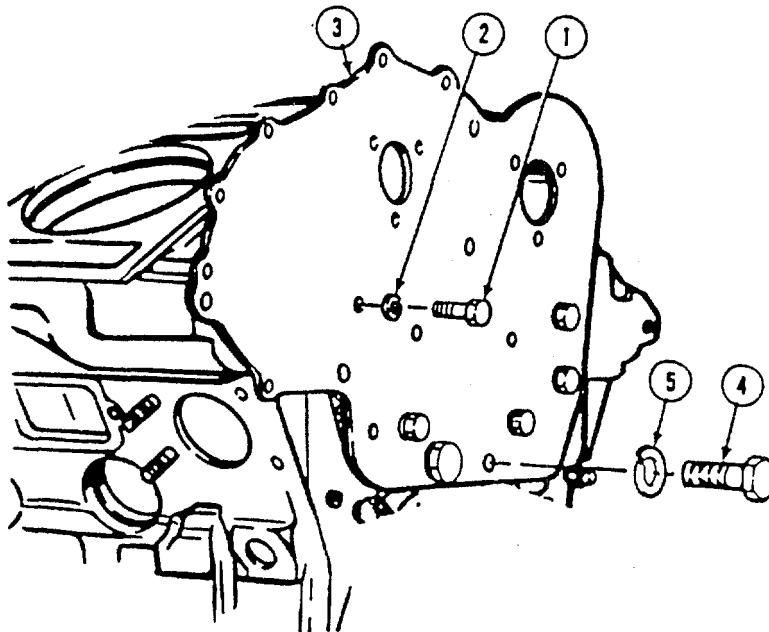
Grease, automotive and artillery
(Item 1, Appendix E)

EQUIPMENT CONDITION

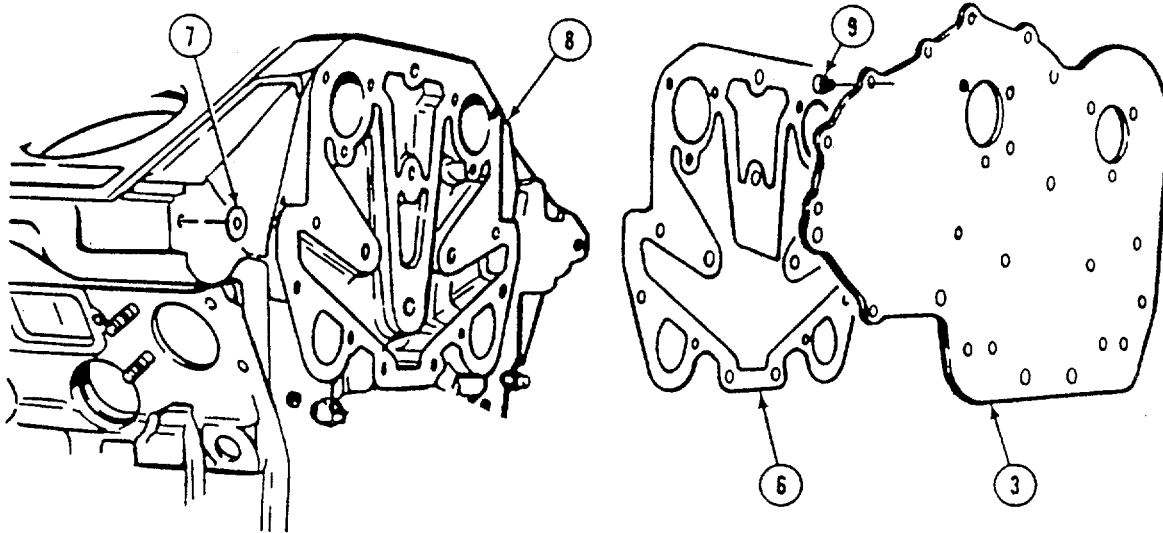
Engine Mounted on Engine Stand
Camshafts Removed (see para 6-36.)

a. Removal.

- (1) Remove five screws (1) and lockwashers (2) from front end plate (3).
- (2) Remove two screws (4) and lockwashers (5) from front end plate (3).



6-9. CYLINDER BLOCK FRONT END PLATE - Continued



- (3) Remove front end plate (3) and gaskets (6 and 7) from engine block (8).

CAUTION

Support front end plate on flat, even surface when removing screw insert to prevent warping or bending end plate.

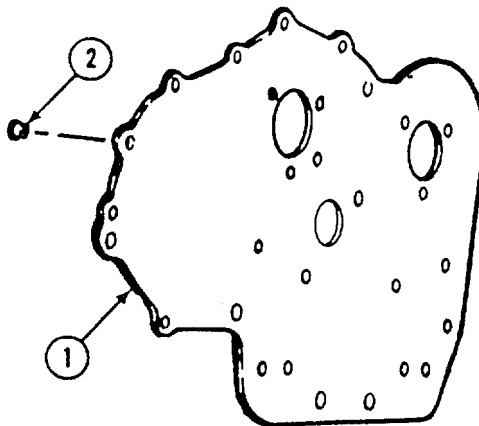
- (4) Remove screw insert (9) from front end plate (3).

b. Installation.

CAUTION

Support front end plate on flat, even surface when installing screw insert to prevent warping or bending end plate.

- (1) Support front end plate (1).
- (2) Press screw insert (2) into front end plate (1) until head seats on end plate surface.

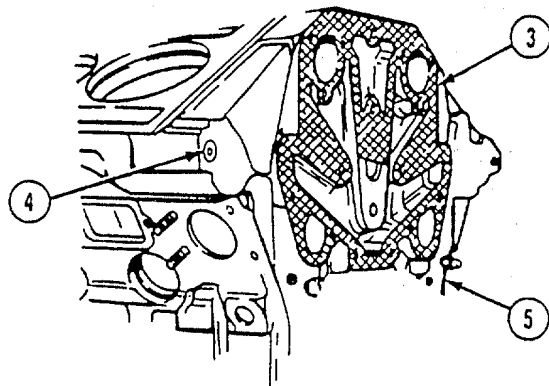


6-9. CYLINDER BLOCK FRONT END PLATE - Continued

- (3) Coat end plate gaskets (3 and 4) with grease (Item 1, Appendix E) and install on engine block (5).
- (4) Install front end plate (1), five screws (6) and, lockwashers (7), two screws (8), and lockwashers (9). Tighten screws (6 and 8) finger tight.

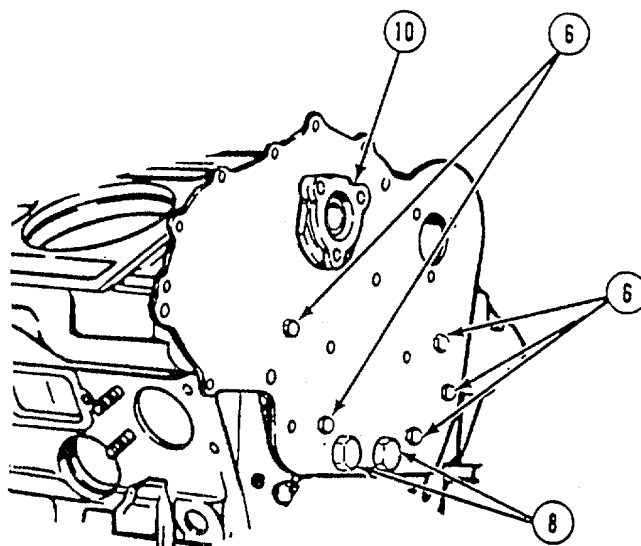
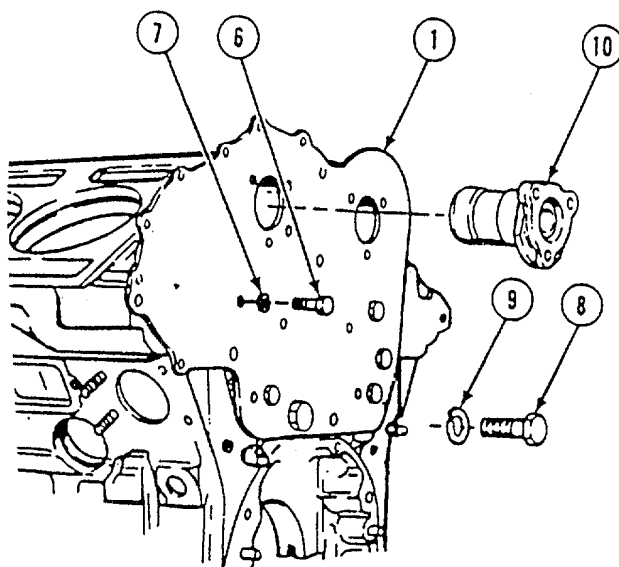
NOTE

Right bank camshaft end bearing will be used as a pilot in small bearing bores when aligning front end plate on engine block.



- (5) Install camshaft end bearing (10) into front end plate (1).
- (6) Tighten five screws (6) to 30 to 35 lb-ft (41 to 47 N•m).
- (7) Tighten two screws (8) to 71 to 75 lb-ft (96 to 102 N•m).
- (8) Remove end bearing (10).

c. Follow-on maintenance. Install camshafts (see para 6-36).



6-10. CYLINDER BLOCK REAR END PLATE

This task covers:

- a. Removal
- b. Installation
- c. Follow-on maintenance

TOOLS REQUIRED

Tool Kit, General Mechanics, Automotive
(Appendix B, Section III, Item 1)

Shop Equipment, Automotive
Maintenance and Repair
(Appendix B, Section III, Item 4)

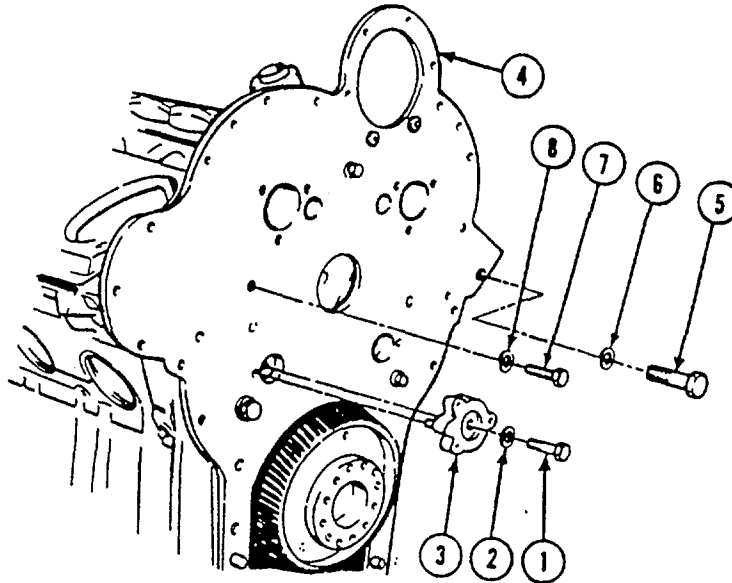
MATERIALS/PARTS

Grease, automotive and artillery
(Item 1, Appendix E)
Adhesive Sealant (Item 35, Appendix E)
Gasket (Figure 101, Appendix F)

EQUIPMENT CONDITION

Engine Mounted on Engine Stand
Camshafts Removed (see para 6-36.)
Idle Gear Removed (see para 6-35.)

a. Removal.



NOTE

Note direction of special washer during removal to aid in correct installation.

- (1) Remove screw (1), special washer (2), and dummy hub (3) from end plate (4).
- (2) Remove screw (5) and lockwasher (6) from end plate (4).
- (3) Remove four screws (7) and lockwashers (8) from end plate (4).

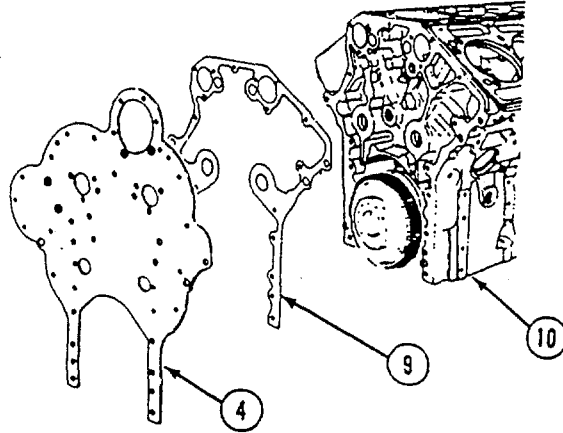
6-10. CYLINDER BLOCK REAR END PLATE - Continued

- (4) Remove end plate (4).
- (5) Remove gasket (9) from end plate (4) and engine block (10).

CAUTION

Support rear end plate on flat, even surface when removing screw inserts to prevent warping or bending plate.

- (6) Remove two screw inserts (11) from end plate (4).
- (7) Remove eight screw inserts (12) from end plate (4).

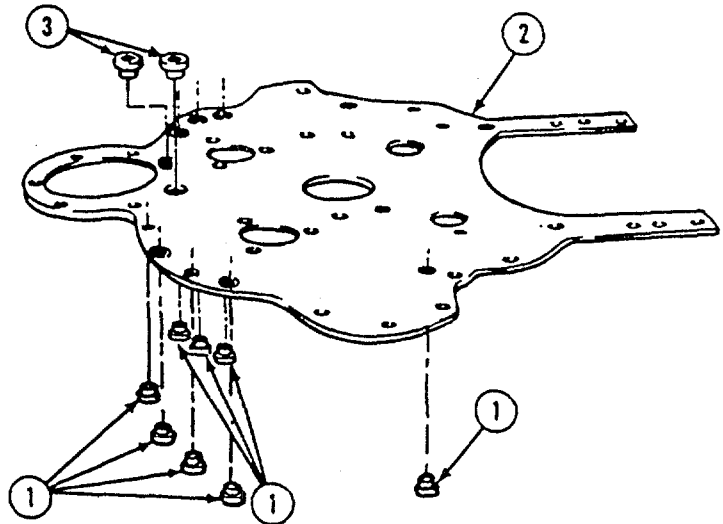
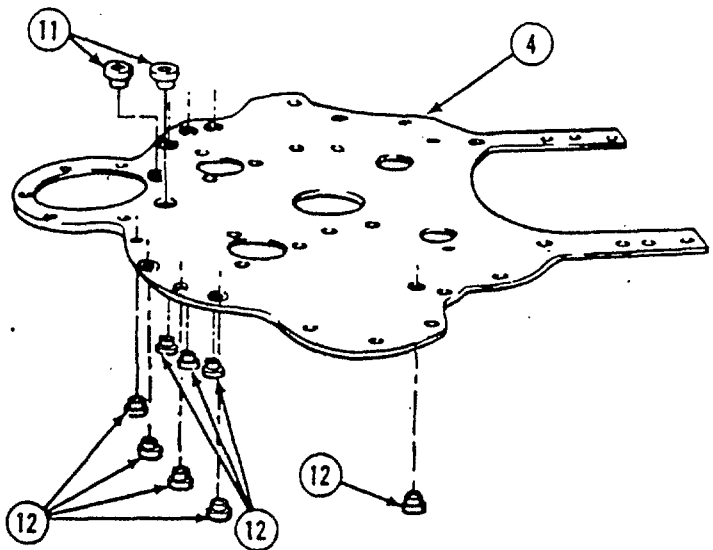


b. Installation.

CAUTION

Support rear end plate on flat, even surface when installing screw inserts to prevent warping or bending end plate.

- (1) Press eight screw inserts (1) into back of end plate.
- (2) Press two screw inserts (3) into front of end plate.
- (3) Coat gasket (4) with grease (Item 1, Appendix E) and install over dowel pins (5) onto engine block (6).

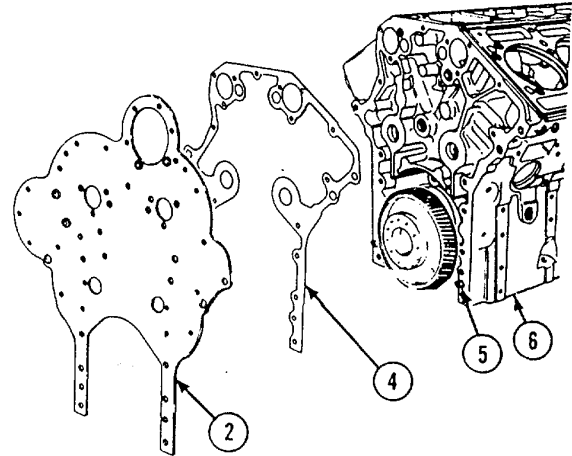


6-10. CYLINDER BLOCK REAR END PLATE - Continued

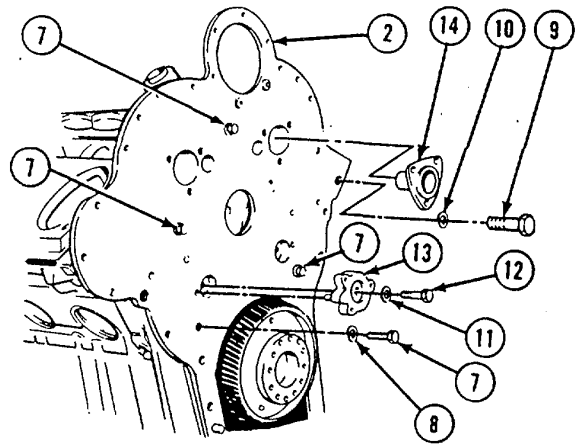
- (4) Install end plate (2) on dowel pins (5).
- (5) Install four screws (7) and lockwashers (8). Tighten screws finger tight.
- (6) Install screw (9) and lockwasher (10). Tighten screw finger tight.

NOTE

Special washer is installed in same direction as noted during removal.



- (7) Install special washer (11) on screw (12) with grooved side facing head of screw.
- (8) Install dummy hub (13), special washer (11), and screw (12). Tighten screw finger tight.
- (9) Install right bank camshaft end bearing (14) into end plate (2).
- (10) Torque four screws (7) to 30 to 35 lb-ft (41 to 47 N•m).
- (11) Torque screw (9) to 103 to 110 lb-ft (140 to 149 N•m).
- (12) Tighten screw (12) to 80 to 90 lb-ft (108 to 122 N•m).
- (13) Remove camshaft end bearing (14).



c. Follow-on maintenance.

- (1) Install camshafts (see para 6-36).
- (2) Install idler gear (see para 6-35).

6-11. AIR BOX COVERS

This task covers:

- a. Removal
- b. Installation
- c. Follow-on maintenance

TOOLS REQUIRED

Tool Kit, General Mechanics, Automotive
(Appendix B, Section 11I, Item 1)

MATERIALS/PARTS REQUIRED

Adhesive-sealant, silicone (Item 35, Appendix E)

EQUIPMENT CONDITION

Shop Equipment, Automotive
Maintenance and Repair
(Appendix B, Section 11I, Item 4)

Main Engine Shutdown (see para 2-12.)

APU Shutdown (see para 2-16.)

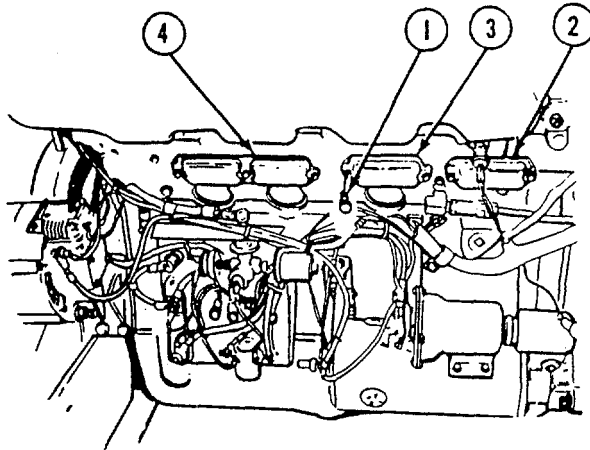
Batteries Disconnected (see para 4-114.)

a. Removal.

NOTE

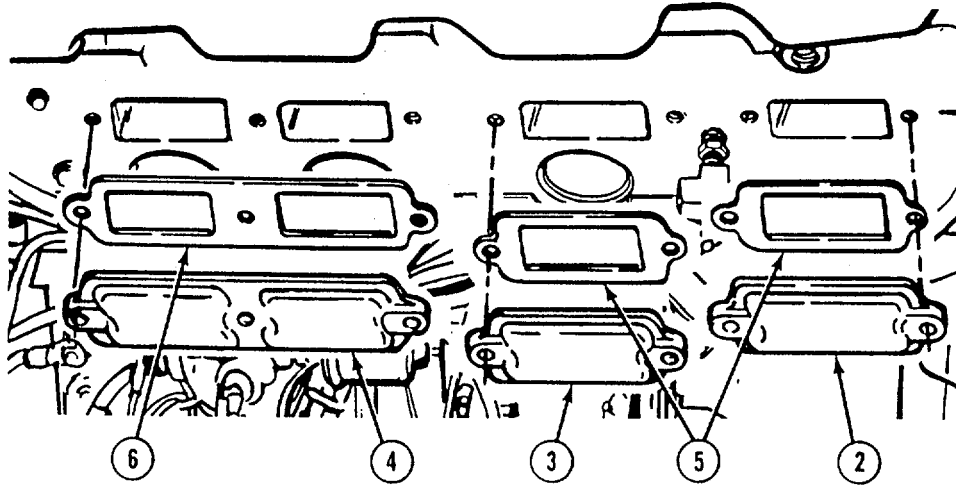
Right and left air box covers are removed and installed the same way.

- (1) Remove seven screws (1) from air box covers (2, 3, and 4).



6-11. AIR BOX COVERS-Continued

- (2) Remove three air box covers (2, 3, and 4), two gaskets (5), and gasket (6).

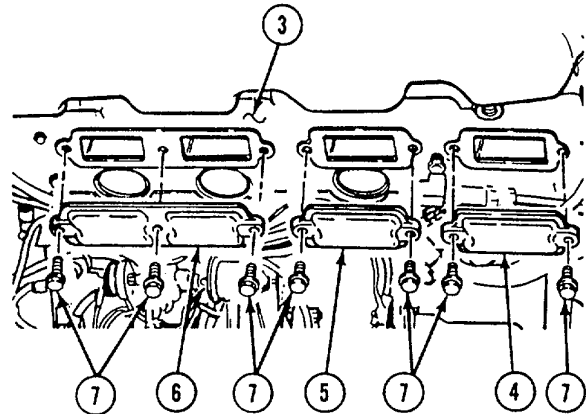
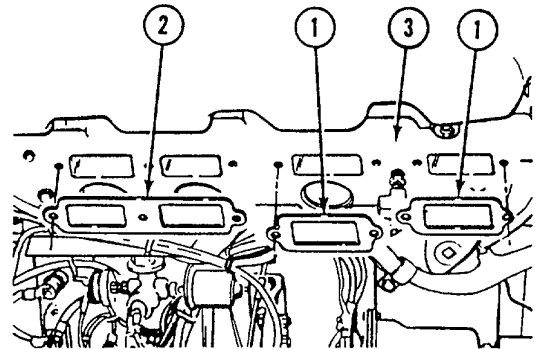


b. Installation.

WARNING

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

- (1) Coat two gaskets (1) and gasket (2) with adhesive-sealant (Item 35, Appendix E) and install on engine block (3).
- (2) Install three air box covers (4, 5, and 6) engine block (3) with seven screws (7). Tighten screws to 96 to 144 lb-in. (11 to 16 N.m).



c. Follow-on Maintenance.

- (1) Connect batteries (see para 4-114).

6-12. AIR BOX DRAINS

THIS TASK COVERS:

- a. Removal
- b. Installation

- c. Testing Air Flow

TOOLS REQUIRED

Tool Kit, General Mechanics, Automotive
(Appendix B, Section III, Item 1)

Shop Equipment, Automotive
Maintenance and Repair
(Appendix B, Section III, Item 4)

Air pressure gauge, 0 to 30 psi (0 to 21 0 kPa)
(Appendix B, Section III, Item 21)

MATERIALS/PARTS REQUIRED

Compound, sealing, pipe thread
(Item 2, Appendix E)

EQUIPMENT CONDITION

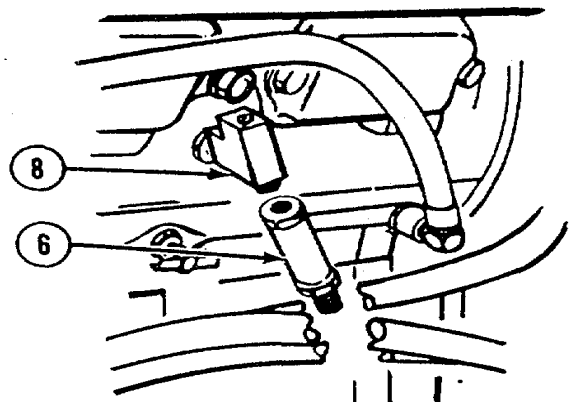
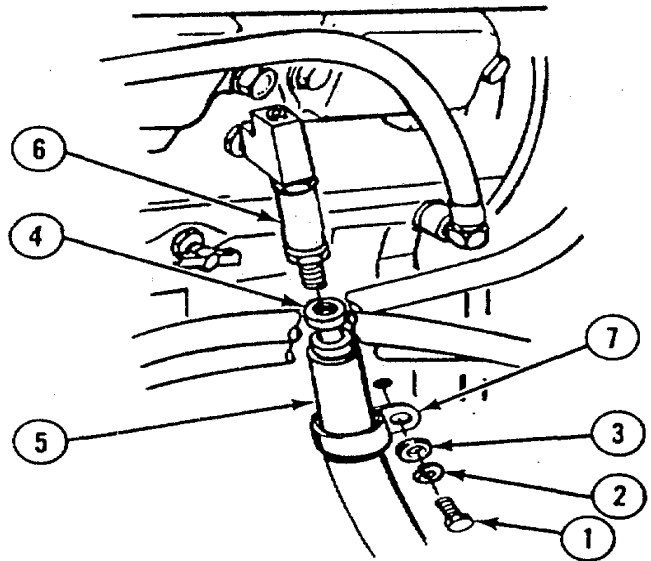
Main Engine Shutdown (see para 2-12.)
APU Shutdown (see para 2-16.)
Batteries disconnected (see para 4-114.)

a. Removal.

NOTE

Right and left air box drains are removed the same way.

- (1) Remove screw (1), and lockwasher (2), and washer (3).
- (2) Remove fitting (4) and hose (5) from check valve (6).
- (3) Remove clamp (7).
- (4) Remove check valve (6) from tee (8).



6-12. AIR BOX DRAINS - Continued

- (5) Remove tee (8) and fitting (9) from engine block (10).
- (6) Remove plug (11).

b. Installation.

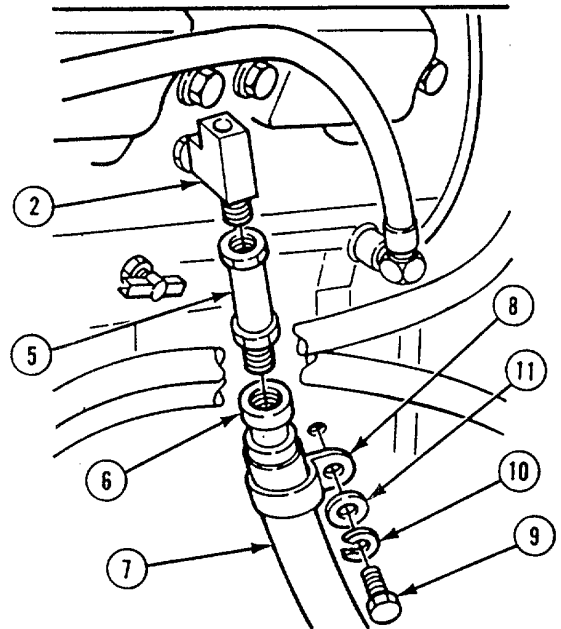
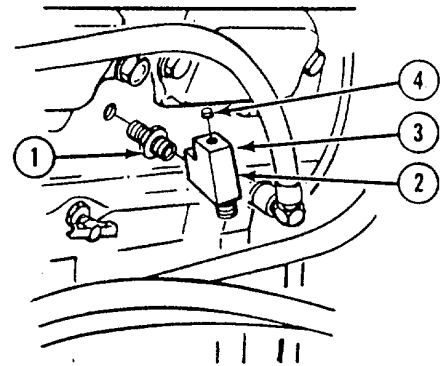
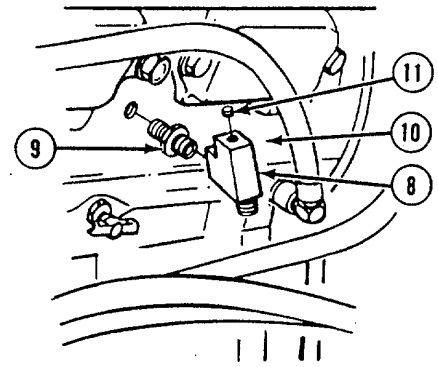
WARNING

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

NOTE

Right and left air box drains are installed the same way.

- (1) Coat threads of fitting (1) with pipe thread sealant (Item 2, Appendix E).
- (2) Install fitting (1) and tee (2) in engine block (3).
- (3) Install plug (4)
- (4) Install check valve (5) on tee (2).
- (5) Install fitting (6) and hose (7) on check valve (5).
- (6) Install clamp (8) with screw (9), lockwasher (10), and washer (11).



6-12. AIR BOX DRAINS - Continuedc. Testing Air Flow.**WARNING**

Do not stand in front of vehicle when testing air box pressure. Brake could release and vehicle could jump forward causing personal injury or death.

CAUTION

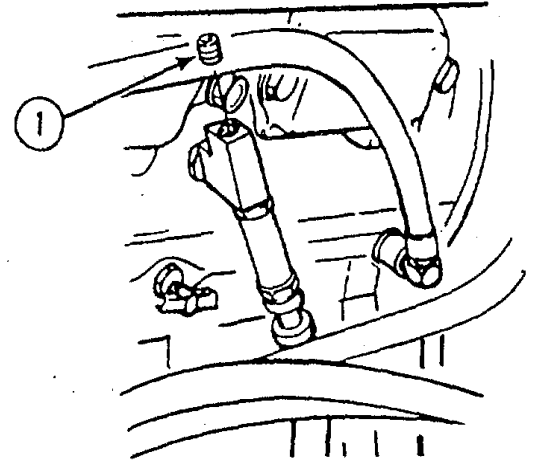
Do not operate vehicle with transmission engaged and at maximum rpm for more than 15 seconds at a time. Transmission oil heats up quickly and could cause transmission to fail.

- (1) Remove plug (1) and install air pressure gauge (Appendix B, Section III, Item 21).
- (2) Chock wheels, set parking brake and foot brake.

NOTE

Low air box pressure can be caused by an obstruction in the air inlet system, dirty or damaged air cleaners, damaged blower rotors, or an air leak from the air box (such as leaking end plate gaskets). High air box pressure reading can be caused by partially plugged cylinder ports.

- (3) Connect batteries (see para 4-114).
- (4) When told, other person starts engine, warms up engine for 5 minutes, then shifts transmission into D (drive).
- (5) Check airbox pressure. Pressure shall be 9 psi (62 kPa) at 1200 rpm, 16 psi (110 kPa) at 1800 rpm and 20 psi (138 kPa) at 1950 rpm.



6-13. CYLINDER HEAD REMOVAL/INSTALLATION

THIS TASK COVERS: a. Removal c. Installation
 b. Cleaning and Inspection d. Follow-on Maintenance

TOOLS REQUIRED

Tool Kit, General Mechanics, Automotive
 (Appendix B, Section III, Item 1)

Shop Equipment, Automotive
 Maintenance and Repair
 (Appendix B, Section III, Item 4)

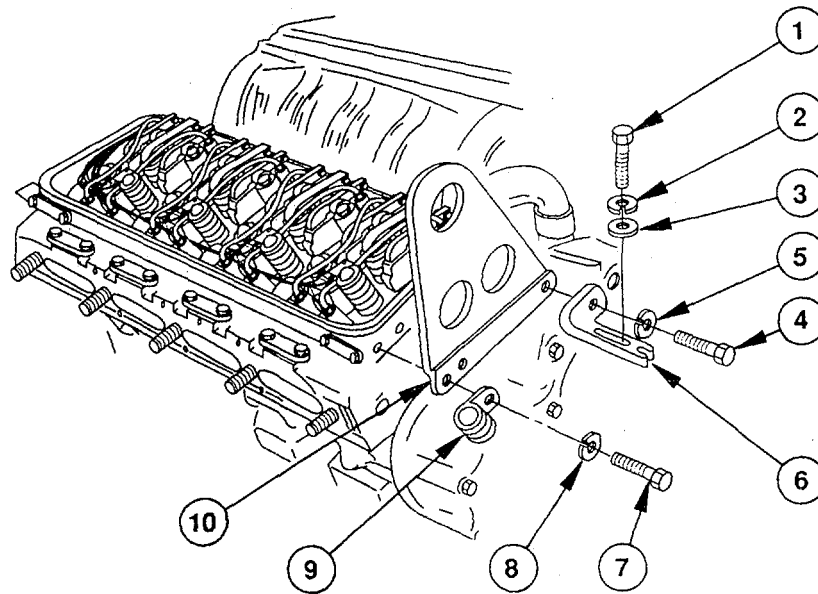
Stud, guide, cylinder head
 (Appendix B, Section III, Item 22)
 Fixture, lifting (Appendix B, Section III, Item 23)
 Wrench, fuel line nut (Appendix B, Section III, Item 24)

MATERIALS/PARTS REQUIRED

Solvent, dry cleaning (Item 3, Appendix E)
 Connector, electrical butt (Item 27, Appendix E)
 Compression Gasket (Figure 103, Appendix F)

EQUIPMENT CONDITION

Engine Cooling System Drained (see para 5-31.)
 Air Cleaner Air Hoses Removed (see para 4-128.)
 Thermostat Housings Removed (see para 4-137.)
 Rocker Covers Removed (see para 4-140.)
 Exhaust Manifolds Removed (see para 5-24.)



a. Removal.

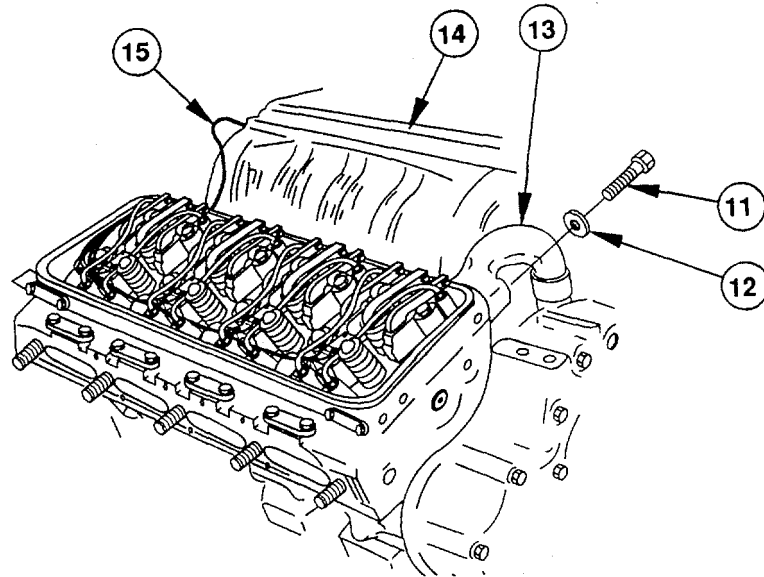
NOTE

Left and right banks are different. Left bank has three screws. Right bank has only two screws. Bracket shown being removed from left bank.

- (1) Remove two screws (1), lockwashers (2), and washers (3).
- (2) Remove screw (4), lockwasher (5), and bracket (6).

6-13. CYLINDER HEAD REMOVAL/INSTALLATION - Continued

- (3) Remove two screws (7), lockwashers (8), and hose clamp (9).
- (4) Remove engine lifting bracket (10).

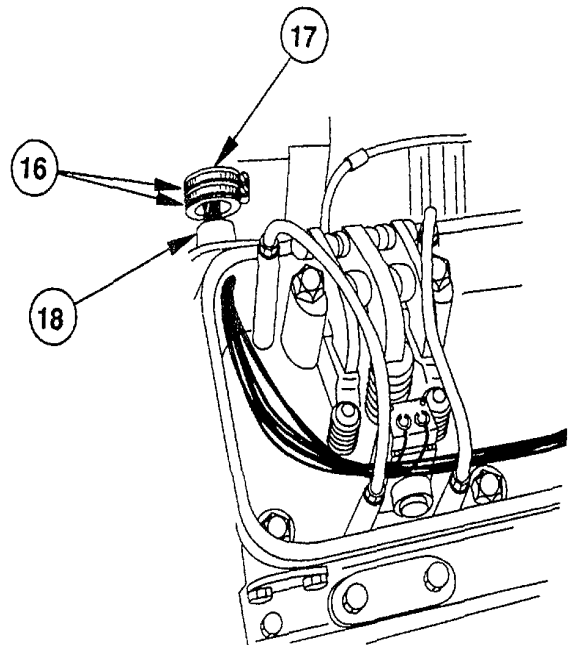


- (5) Remove two screws(11) and washers (12) from cross over tube (13) at rear of engine (14).

NOTE

Tag wire before cutting

- (6) Cut brake retarder wire (15) at butt connector.
- (7) Loosen two hose clamps (16) and slide hose (17) up to clear cover tube (18).

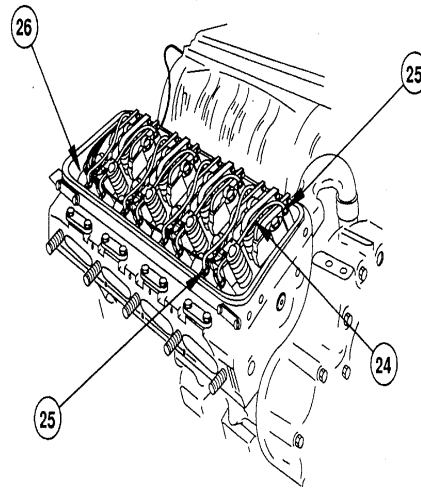
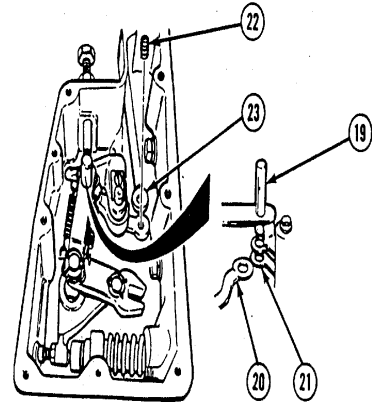


6-13. CYLINDER HEAD REMOVAL/INSTALLATION - Continued

NOTE

Fuel rod is removed through cylinder head. Left and right bank fuel rods are removed differently. Step (8) covers left bank and step (9) covers right bank.

- (8) Lift connecting pin (19) 3/4-in. (19 mm) and remove left bank fuel rod (20) from control link operating lever (21).
- (9) Remove screw (22) and right bank fuel rod (23) from control link operating lever (21).



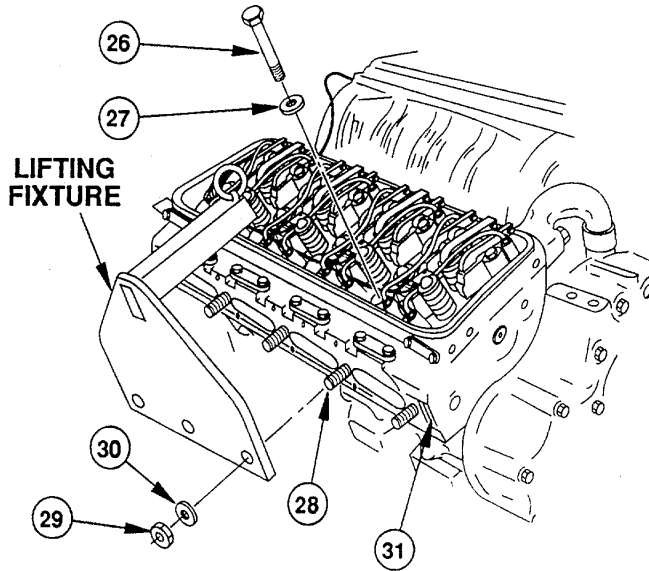
- (10) Tag eight fuel tubes (24), loosen sixteen fuel tube nuts (25), and remove eight fuel tubes.

NOTE

Checking tightness of cylinder head screws may show cause of cylinder head failure.

- (11) Check and record tightness on 10 cylinder head screws (26). Tightness must be between 230 to 240 lb-ft (312 to 325 N.m).

6-13. CYLINDER HEAD REMOVAL/INSTALLATION - Continued



NOTE

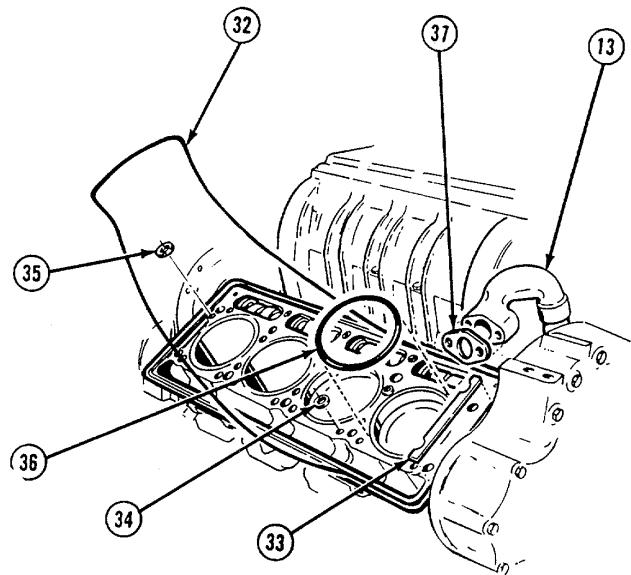
Leave in two screws to right and left of head.

- (12) Remove eight screws (26) and washers (27).
- (13) Install lifting fixture (Appendix B, Section III, Item 22) over three studs (28).
- (14) Secure with three nuts (29) and washers (30).
- (15) Remove two remaining screws (26) and washers (27).
- (16) Using a suitable lifting device lift cylinder head (31).

NOTE

Compression gaskets are color coded. Be sure to note color for replacement.

- (17) Remove seal strip gasket (32), two support shims (33), sixteen water seals (34), oil seal (35), and four compression gaskets (36).
- (18) Remove gasket (37) from crossover tube (13).



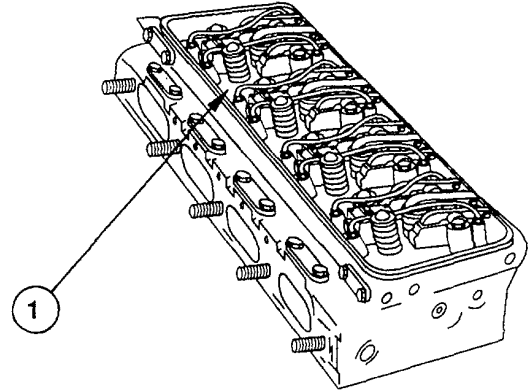
6-13. CYLINDER HEAD REMOVAL/INSTALLATION - Continued

b. Cleaning and Inspection.

WARNING

Dry cleaning solvent P-D-680 is potentially dangerous. Avoid repeated and prolonged breathing of vapors and skin contact with the liquid. Do not use near open flame, arcing equipment or other ignition sources. Always wear eye protection and protective clothing. The flash point of P-D-680 is 100 to 138 deg. F (38 to 59 deg. C).

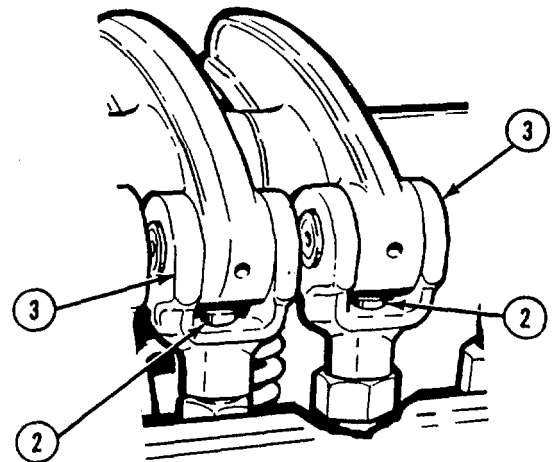
- (1) Clean cylinder head (1) with dry cleaning solvent (Item 3, Appendix E).



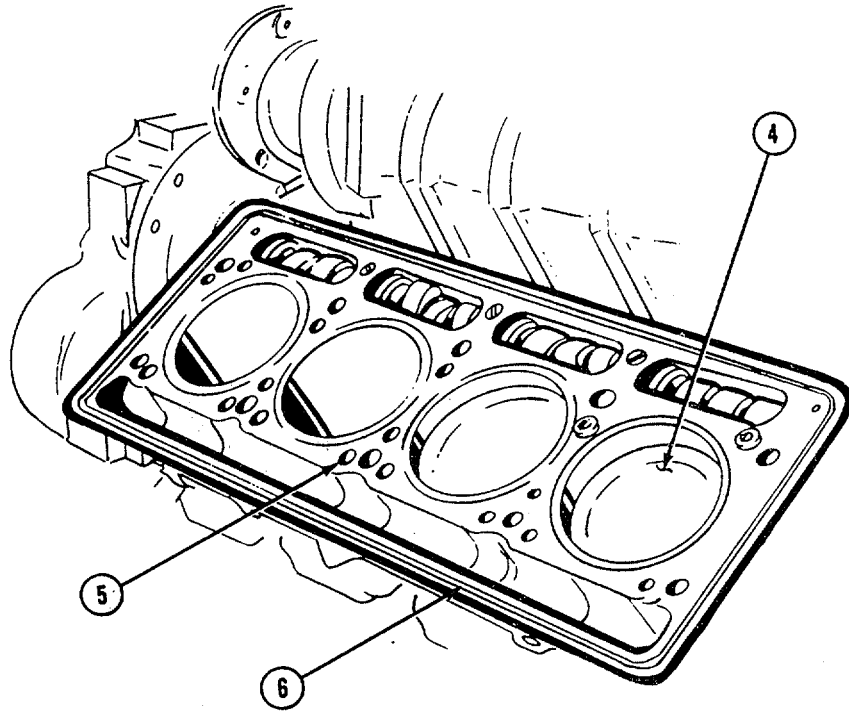
WARNING

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

- (2) Dry cylinder head (1) with compressed air.
- (3) Inspect cylinder head mounting surface to be sure it is clean and free from burrs.
- (4) Inspect push rod ends (2) to be sure they are threaded into clevis (3) until end of push rod projects through clevis.
- (5) Clean cylinder block head gasket surface with dry cleaning solvent (Item 3, Appendix E).
- (6) Dry cylinder block head gasket surface with compressed air.



6-13. CYLINDER HEAD REMOVAL/INSTALLATION - Continued



- (7) Inspect piston crowns (4) to be sure they are clean and free of foreign material.
- (8) Inspect head gasket surface, counterbores (5), and seal grooves (6) to be sure they are clean and free of foreign material.
- (9) Inspect counterbores (5) for burrs or sharp edges.
- (10) Inspect screw holes for accumulation of water or foreign material.

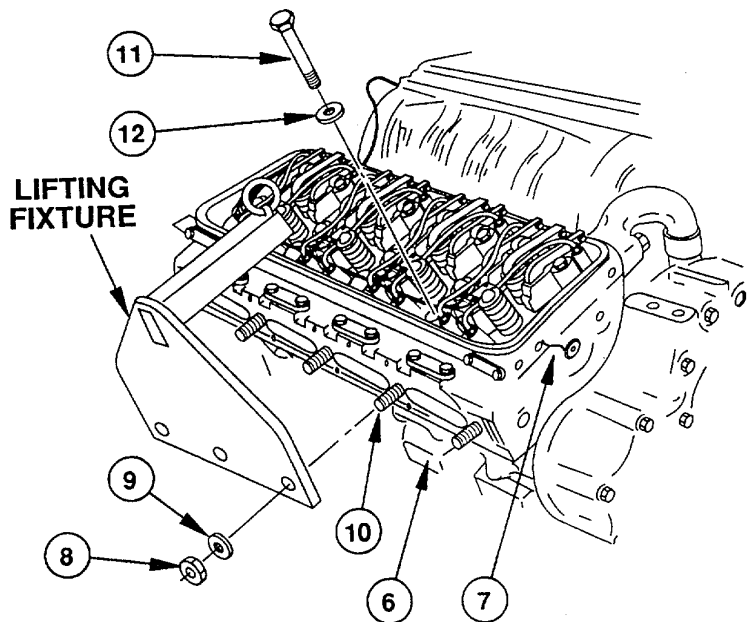
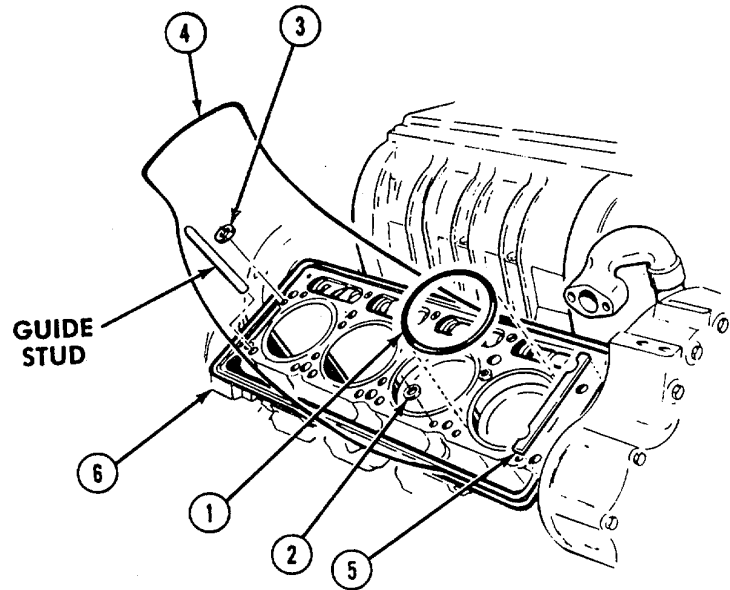
6-13. CYLINDER HEAD REMOVAL/INSTALLATION - Continued

c. Installation.

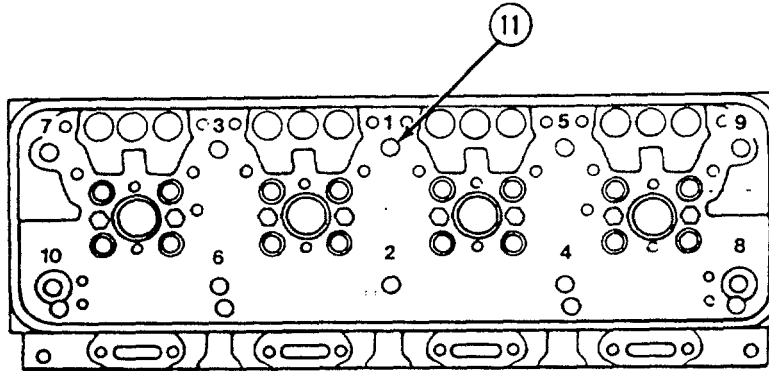
CAUTION

Never install used compression gaskets. They will cause compression leaks.

- (1) Install four compression gaskets (1), sixteen water seals (2), oil seal (3), and seal strip gasket (4).
- (2) Remove paper covering from back of two support shims (5) and install glued side down.
- (3) Install two cylinder head guide studs into two bottom corners of cylinder block (6).
- (4) Align cylinder head (7) with guide studs while operating suitable lifting device.
- (5) Lower cylinder head (7) on cylinder block (6).
- (6) Remove three nuts (8), washers (9), and lifting fixture from studs (10).
- (7) Install eight cylinder head screws (11) and washers (12). Remove two guide studs and install two remaining cylinder head screws and washers. Tighten screws to 15 to 20 lb-ft (20 to 27 N.m).



6-13. CYLINDER HEAD REMOVAL/INSTALLATION - Continued



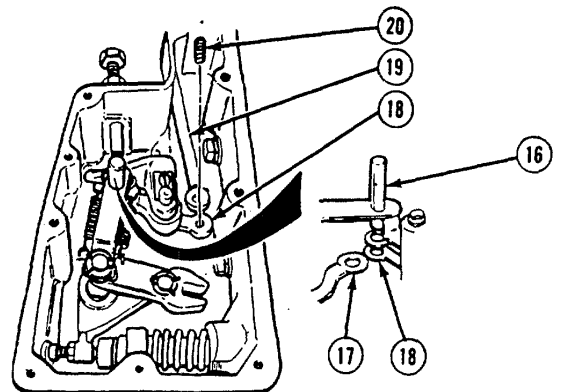
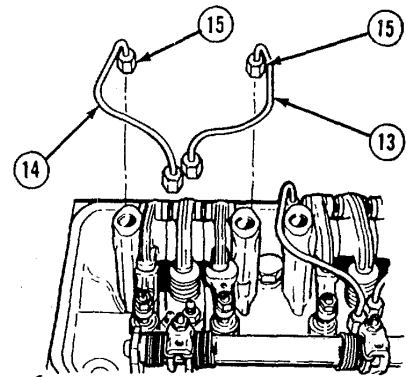
- (8) Tighten 10 cylinder head screws (11) to 100 lb-ft (136 N.m) in order as numbered. Apply a steady pressure for two or three seconds at the prescribed torque to allow the bolts to turn while the gaskets yield to their designed thickness. Repeat the tightening sequence to 100 lb-ft (136 N.m) at least once, because the first bolts tightened in the sequence may lose clamp load during tightening of the remaining bolts. Mark the position of each bolt head in relation to the cylinder head profile face. Turn each bolt, in sequence, 90° from the original mark on the cylinder head profile face. Try to turn each bolt in a single 90° arc with one pull of the wrench, if possible. This completes the operation. No further torquing is required.
- (9) Install eight fuel tubes (13 and 14).
- (10) Tighten 16 nuts (15) to 1 lb-ft (13.6 N-m) using fuel line nut wrench (Appendix B, Section III, Item 24).

NOTE

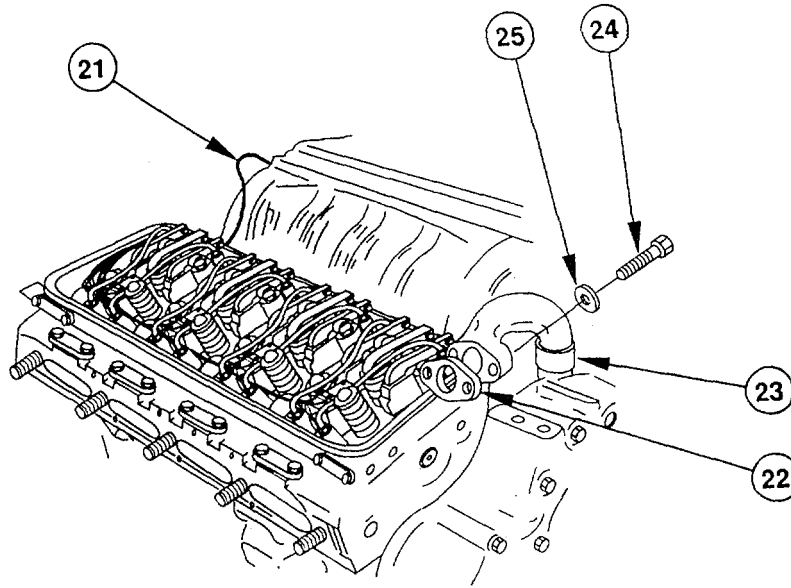
Fuel rod is installed through cylinder head.

Left and right bank fuel rods are installed differently. Step (11) covers installation of left bank, step (12) covers installation of right bank.

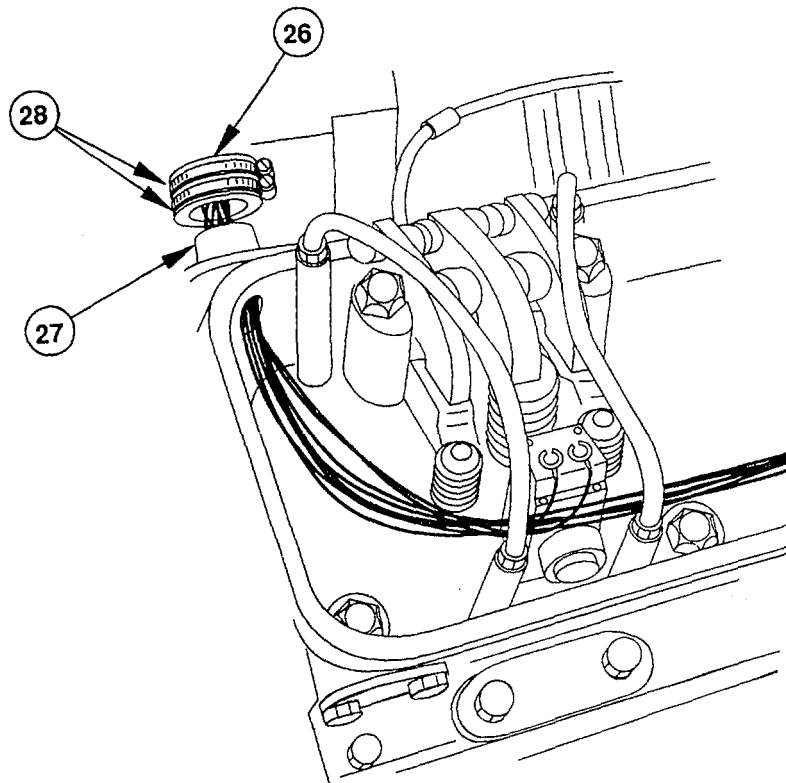
- (11) Lift connecting pin (16) 3/4-in. (19 mm). Install left bank fuel rod (17) to control link operating lever (18). Install screw (20).
- (12) Connect brake retarder wire (21) to cut wire with butt connector (Item 27, Appendix E).



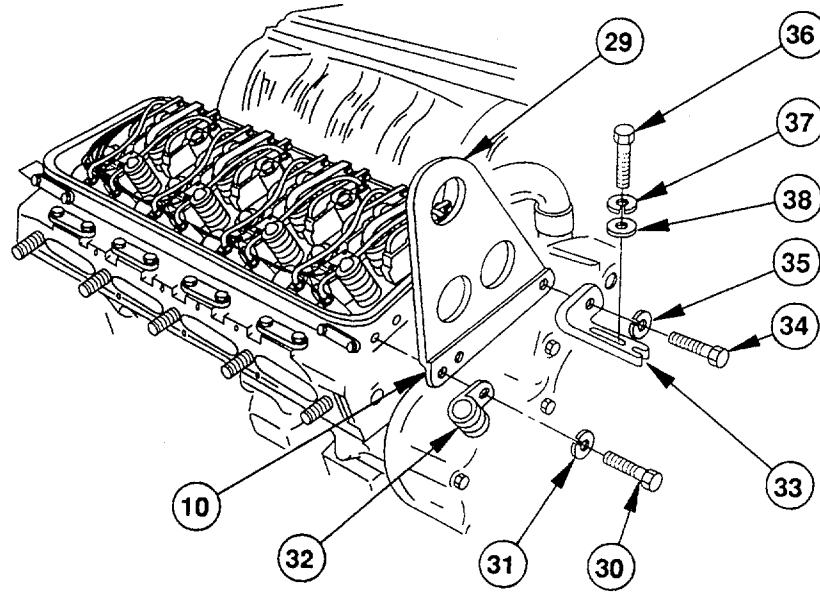
6-13. CYLINDER HEAD REMOVAL/INSTALLATION - Continued



- (13) Install new gasket (22) and crossover tube (23) with two screws (24) and washers (25).
- (14) Slide hose (26) into position over cover tube (27). Tighten two clamps (28).
- (15) Install engine lifting bracket (29).



6-13. CYLINDER HEAD REMOVAL/INSTALLATION - Continued

**NOTE**

Left and right banks are different. Left bank has three screws. Right bank has only two screws. Bracket shown being installed on left bank.

- (16) Install two screws (30), lockwashers (31), and hose clamp (32). Tighten screws to 20 to 25 lb-ft (27 to 34 N·m).
- (17) Install bracket (33), screw (34), and lockwasher (35).
- (18) Install two screws (36), lockwashers (37), and washers (38). Tighten screws to 20 to 25 lb-ft (27 to 34 N·m).

d. Follow-on Maintenance.

- (1) Install exhaust manifolds (see para 5-24).
- (2) Install rocker covers (see para 4-140).
- (3) Install thermostat housings (see para 4-137).
- (4) Install air cleaner air hoses (see para 4-128).
- (5) Install engine coolant (see para 5-31).

6-14. CYLINDER HEAD REPAIR

THIS TASK COVERS:	a. Disassembly	d. Assembly
	b. Cleaning and Inspection	e. Follow-on Maintenance
	c. Testing	

TOOLS REQUIRED

Tool Kit, General Mechanics, Automotive
(Appendix B, Section III, Item 1)

Shop Equipment, Automotive
Maintenance and Repair
(Appendix B, Section III, Item 4)

Fixture, test, head (Appendix B, Section III, Item 25)

MATERIALS/PARTS REQUIRED

Solvent, dry cleaning (Item 3, Appendix E)
Compound, sealing, pipe thread (Item 2, Appendix E)
Gaskets (Figure 103, Appendix F)

PERSONNEL REQUIRED

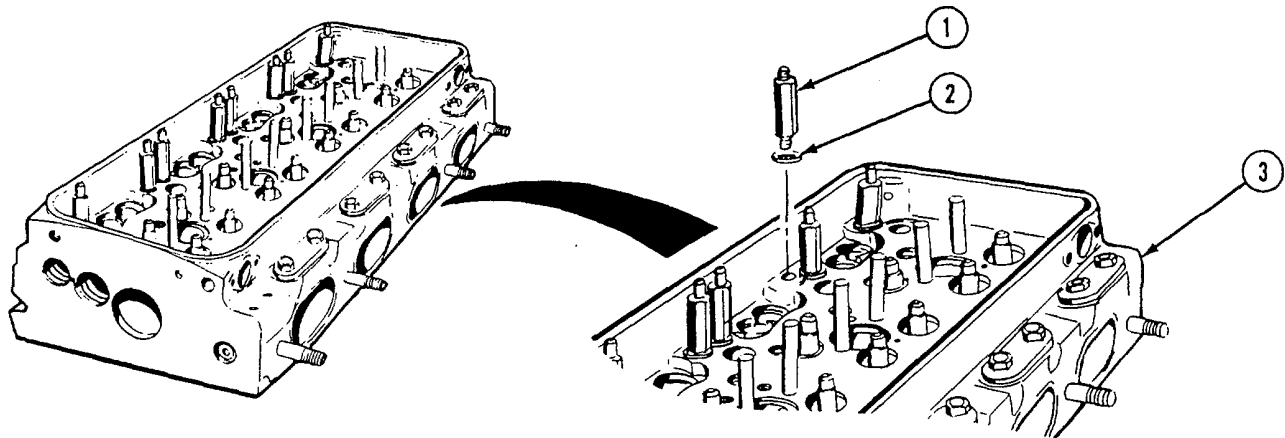
2

EQUIPMENT CONDITION

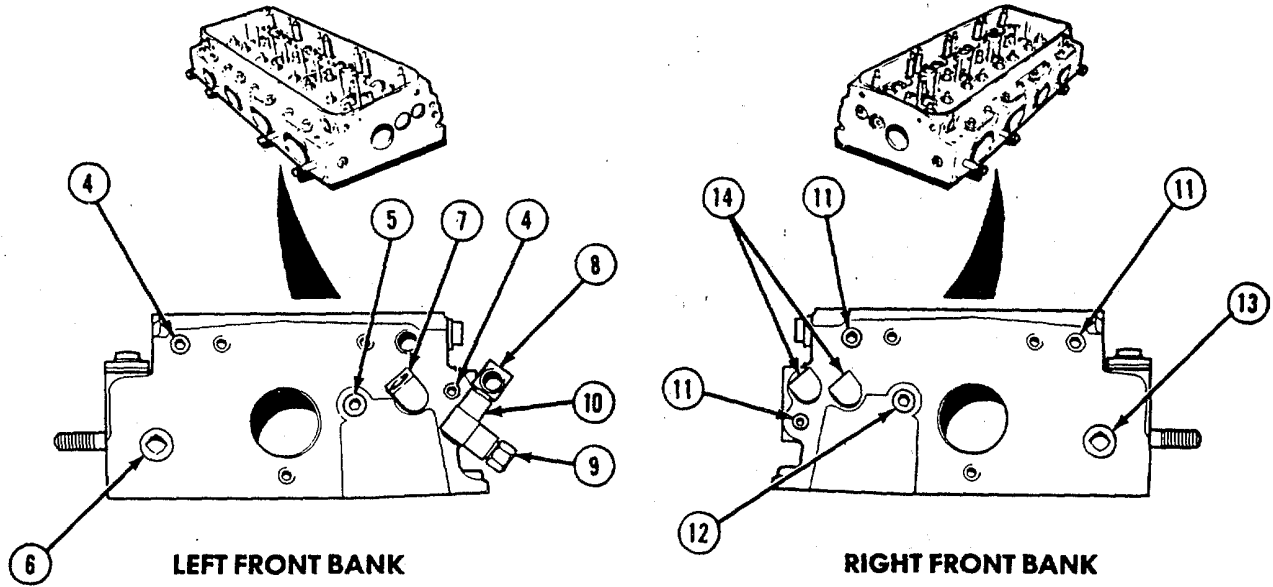
Cylinder Head Removed and on Clean Work Surface (see para 6-13.)
Rocker Arms Removed (see para 6-21.)
Exhaust Valve Bridges Removed (see para 6-24.)
Fuel Injectors Removed (see para 6-43.)
Exhaust Valves Removed (see para 6-20.)
Engine Brake Retarder Removed (see para 6-34.)
Rocker Arms Removed (see para 6-21.)

a. Disassembly.

- (1) Remove eight fuel adapters (1) and washers (2) from cylinder head (3).



6-14. CYLINDER HEAD REPAIR - Continued

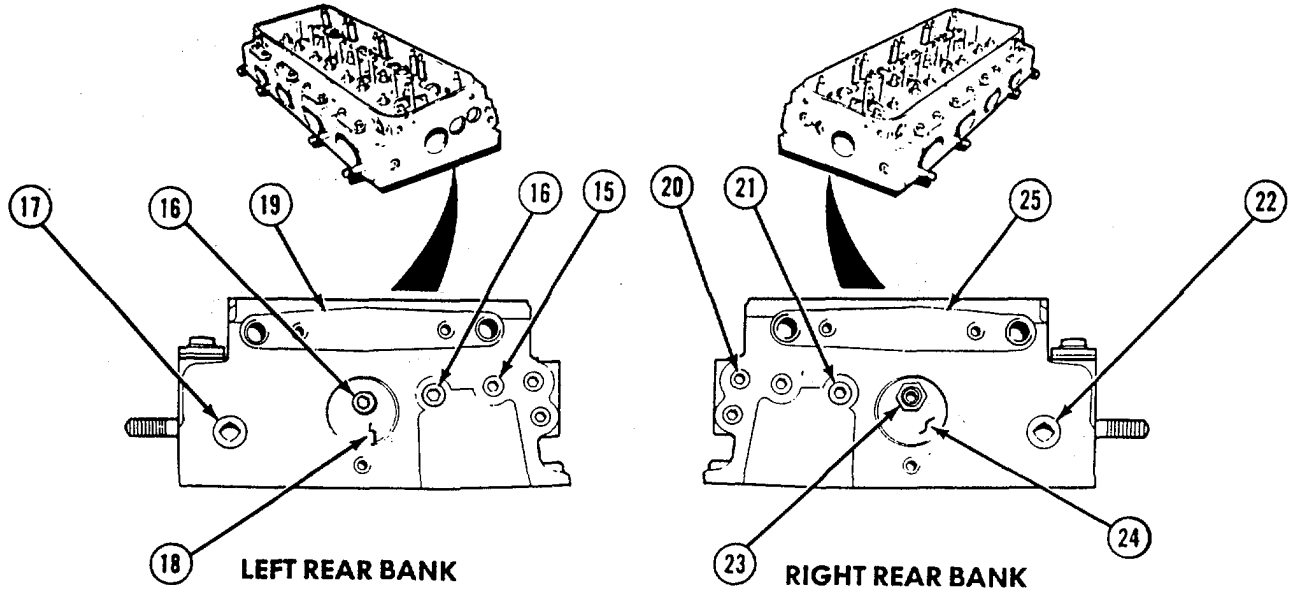


NOTE

It may be necessary to drill plugs and remove with an easy out.

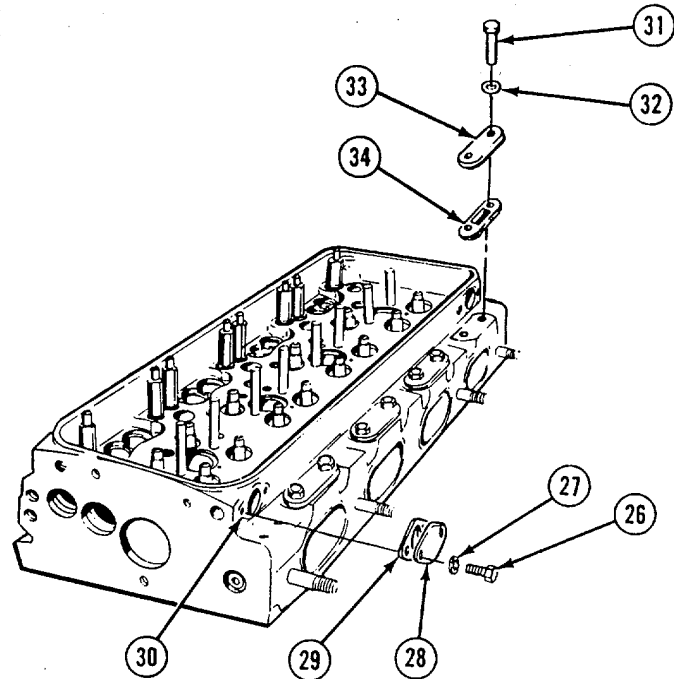
- (2) Remove two plugs (4), plug (5), and plug (6).
- (3) Remove elbow (7), elbow (8), connector (9), and tee (10).
- (4) Remove three plugs (11), plug (12), and plug (13).
- (5) Remove two elbows (14).

6-14. CYLINDER HEAD REPAIR - Continued



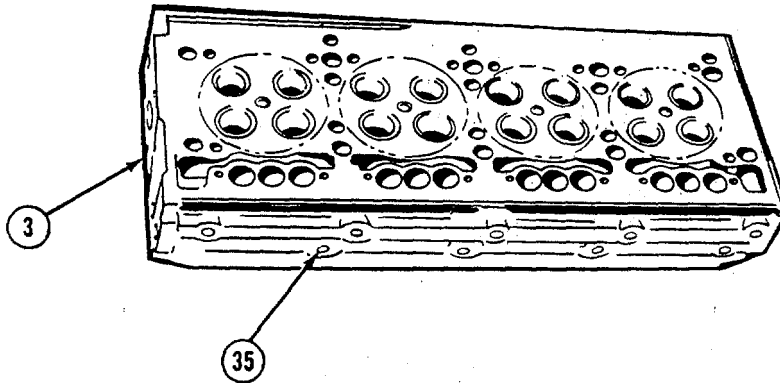
- (6) Remove five plugs (15), two plugs (16), and plug (17).
- (7) Remove plug (18) and gasket (19).
- (8) Remove four plugs (20), plug (21), and plug (22)
- (9) Remove fitting (23).
- (10) Remove plug (24) and gasket (25).

- (11) Remove four screws (26), lockwashers (27), two cover plates (28), and two gaskets (29) from water inlet ports (30).
- (12) Remove eight screws (31), copper washers (32), four covers (33), and gaskets (34).



6-14. CYLINDER HEAD REPAIR - Continued

- (13) Remove nine pipe plugs (35) from cylinder head (3).



b. Cleaning and Inspection.

WARNING

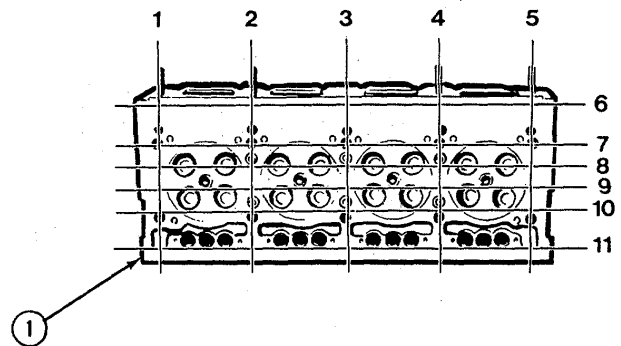
Dry cleaning solvent P-D-680 is potentially dangerous. Avoid repeated and prolonged breathing of vapors and skin contact with the liquid. Do not use near open flame, arcing equipment or other ignition sources. Always wear eye protection and protective clothing. The flash point of P-D-680 is 100 to 138 deg. F (38 to 59 deg. C).

- (1) Clean stripped cylinder head with dry cleaning solvent (Item 3, Appendix E).

WARNING

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

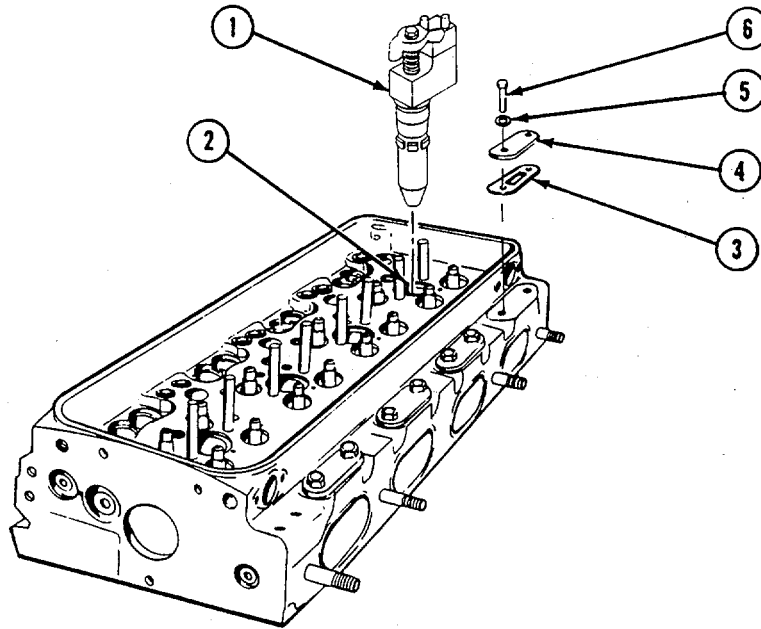
- (2) Dry cylinder head with compressed air.
- (3) Align straightedge along lines 1, 2, 3, 4, and 5 on cylinder head (1). Measure for warp with feeler gauge at points where lines 6, 7, 8, 9, 10, and 11 intersect straightedge.



- (4) If warp measurement exceeds 0.004 in. (0.1 mm), cylinder head (1) must be replaced.
- (5) Align straightedge along lines 6, 7, 8, 9, 10, and 11 on cylinder head (1). Measure at points where lines 1, 2, 3, 4, and 5 intersect straightedge.
- (6) If warp measurement exceeds 0.008-in. (0.2 mm), cylinder head (1) must be replaced.

6-14. CYLINDER HEAD REPAIR - Continued

c. Testing.

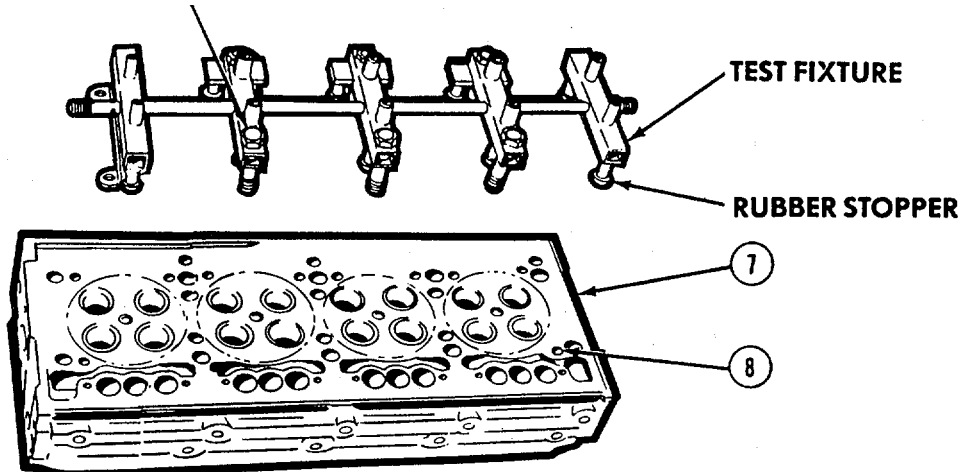


NOTE

The cylinder head must be pressure-tested following cylinder head repair.

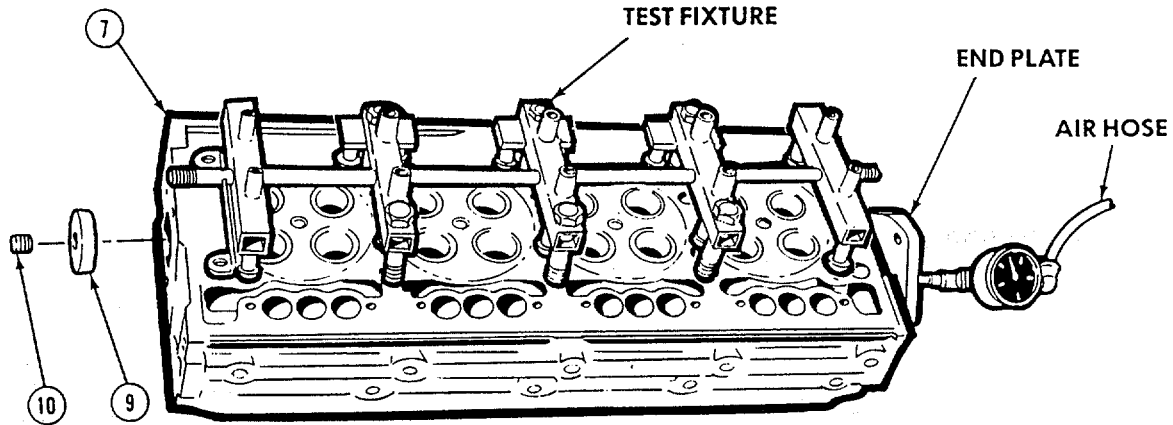
- (1) Using injectors previously removed, install four injectors (1) into injector tubes (2).
- (2) Install four gaskets (3).
- (3) Install four covers (4) with eight copper washers (5) and screws (6).

HOLD DOWN SCREWS

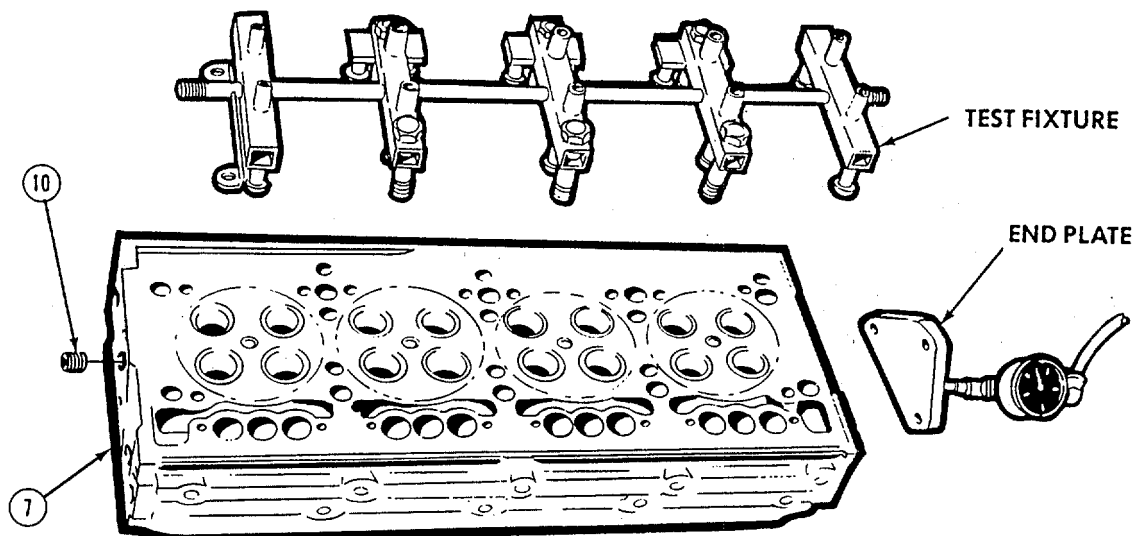


- (4) Align test fixture on top of bottom face of cylinder head (7) so rubber stoppers cover water inlets (8).
- (5) Install and tighten six holddown screws until rubber stoppers start to flatten out.

6-14. CYLINDER HEAD REPAIR - Continued



- (6) Install end plate onto thermostat end of cylinder head (7).
- (7) Install rear plug (9) and pipe plug (10) into rear of cylinder head (7).
- (8) Install air hose to end plate and apply 40 psi (275.8 kPa) to cylinder head (7).
- (9) Put cylinder head (7) in water for 20 minutes and check for leaks.
- (10) If cylinder head (7) does not leak, remove from water.
- (11) If leak is found in cylinder head (7), remove from water and check test assembly for proper seating. Repeat steps (9) and (10).
- (12) If cylinder head (7) leaks when steps (9) and (10) are repeated, replace cylinder head.
- (13) Relieve air pressure.



- (14) Remove test fixture, pipe plug (10), and end plate from cylinder head (7).

6-14. CYLINDER HEAD REPAIR - Continued

(15) Remove four injectors (1) from injector holes (2).

WARNING

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

(16) Dry cylinder head with compressed air.

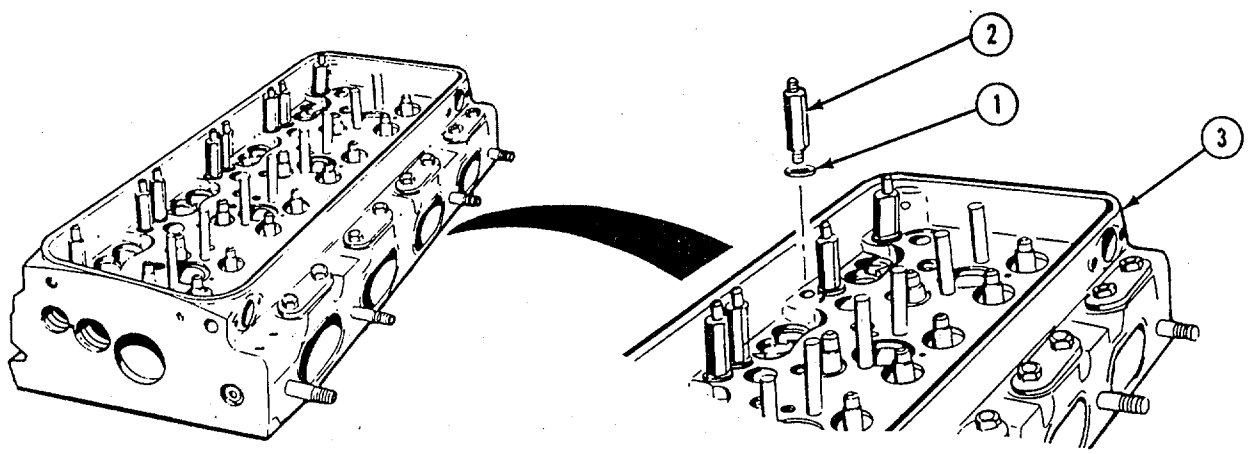
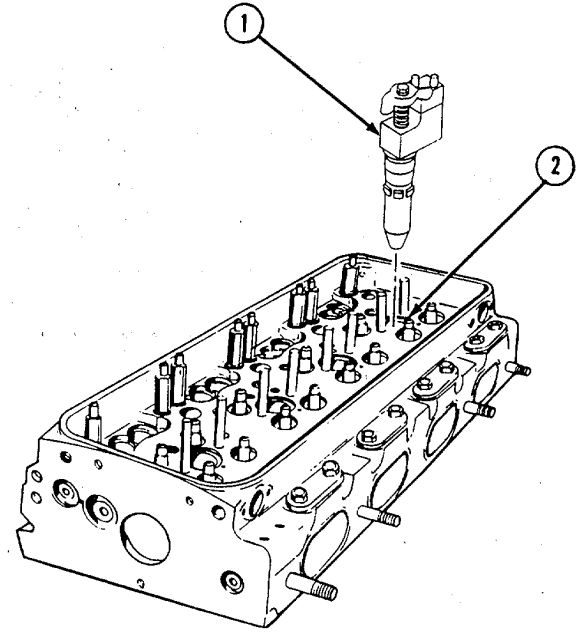
WARNING

Dry cleaning solvent P-D-680 is potentially dangerous. Avoid repeated and prolonged breathing of vapors and skin contact with the liquid. Do not use near open flame, arcing equipment or other ignition sources. Always wear eye protection and protective clothing. The flash point of P-D-680 is 100 to 138 deg F(38 to 59deg. C).

(17) Clean cylinder head with dry cleaning solvent (Item 3, Appendix E).

(18) Dry cylinder head with compressed air.

d. Assembly.



6-14. CYLINDER HEAD REPAIR - Continued

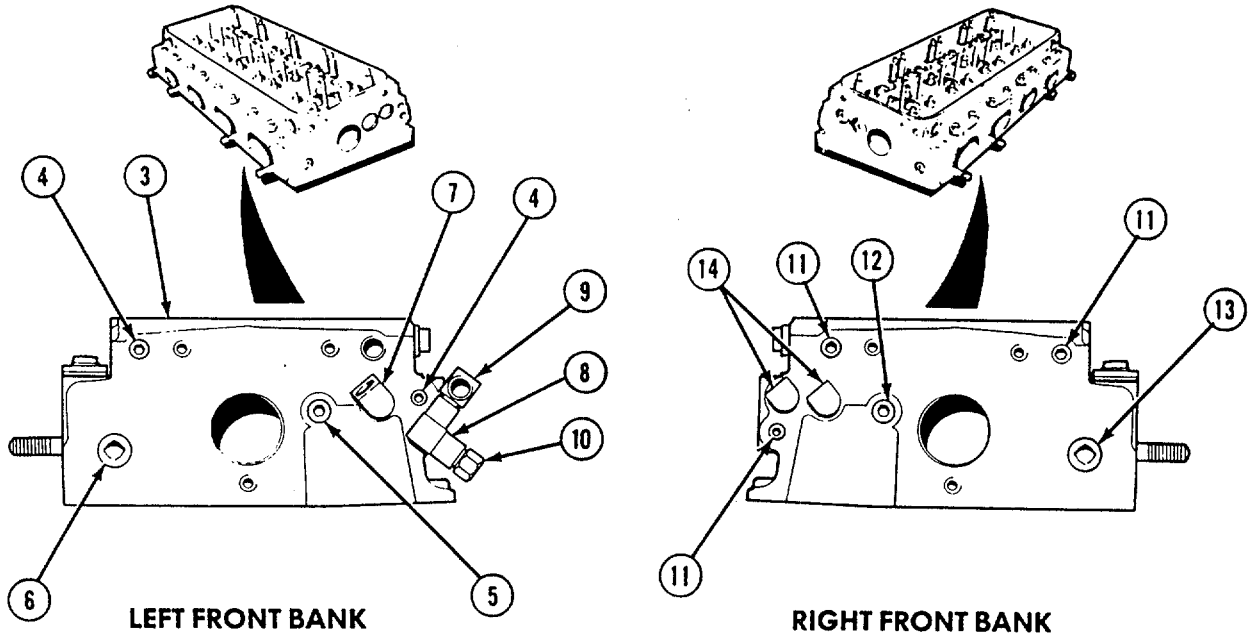
WARNING

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

NOTE

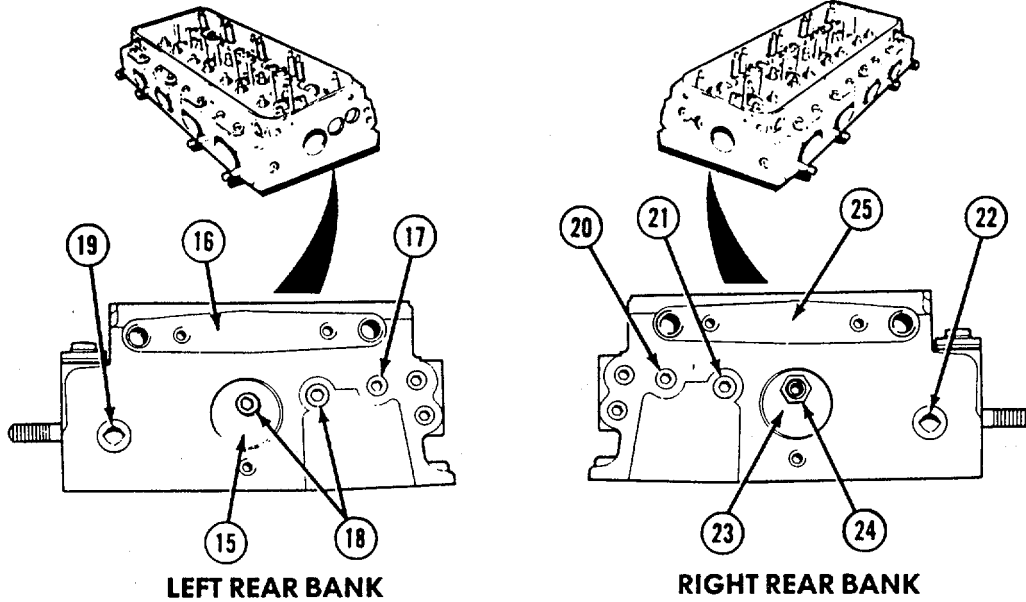
Coat threads of plugs with pipe thread sealing compound (Item 2, Appendix E) before installation.

- (1) Install eight washers (1) and fuel adapters (2) into cylinder head (3). Tighten adapters to 40 to 45 lb-ft (54 to 61 N.m).

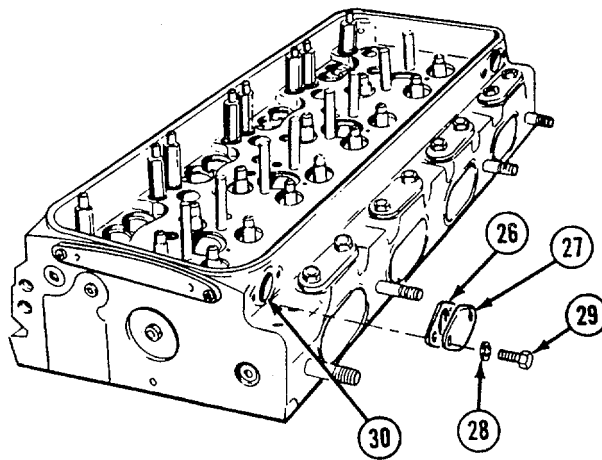


- (2) Install two plugs (4), plug (5), and plug (6) flush with end of cylinder head (3).
- (3) Install elbow (7), elbow (8), tee (9), and connector (10).
- (4) Install three plugs (11), plug (12), and plug (13).
- (5) Install two elbows (14).

6-14. CYLINDER HEAD REPAIR - Continued

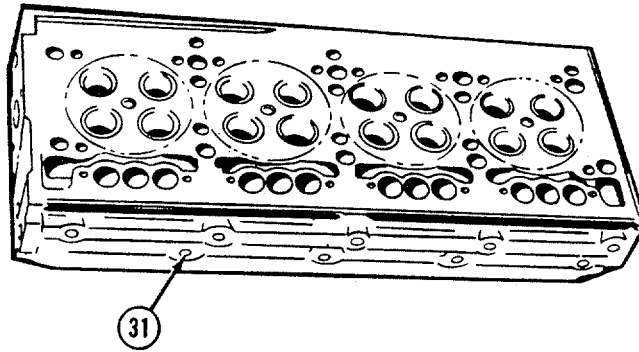


- (6) Install plug (15) and gasket (16).
- (7) Install five plugs (17), two plugs (18), and plug (19).
- (8) Install four plugs (20), plug (21), and plug (22).
- (9) Install plug (23), fitting (24), and gasket (25).
- (10) Install two water manifold gaskets (26), two cover plates (27), four lockwashers (28), and screws (29) into water inlet ports (30).



6-14. CYLINDER HEAD REPAIR - Continued

(11) Install nine pipe plugs (31).



e. Follow-on Maintenance.

- (1) Install valves (see para 6-20).
- (2) Clean and adjust injectors (see para 6-43).
- (3) install fuel injectors (see para 6-43).
- (4) Install exhaust valve bridges (see para 6-24).
- (5) Install rocker arms (see para 6-21).
- (6) Install engine brake retarder (see para 6-34).
- (7) Install cylinder head (see para 6-13).

6-15. INJECTOR TUBES

THIS TASK COVERS:

- a. Removal
- b. Installation

- c. Follow-on Maintenance

TOOLS REQUIRED

Tool Kit, General Mechanics, Automotive
(Appendix B, Section III, Item 1)

Shop Equipment, Automotive
Maintenance and Repair
(Appendix B, Section III, Item 4)

Reconditioning set (Appendix B, Section III, Item 26)
Gauge, sled (Appendix B, Section III, Item 27)

MATERIALS/PARTS REQUIRED

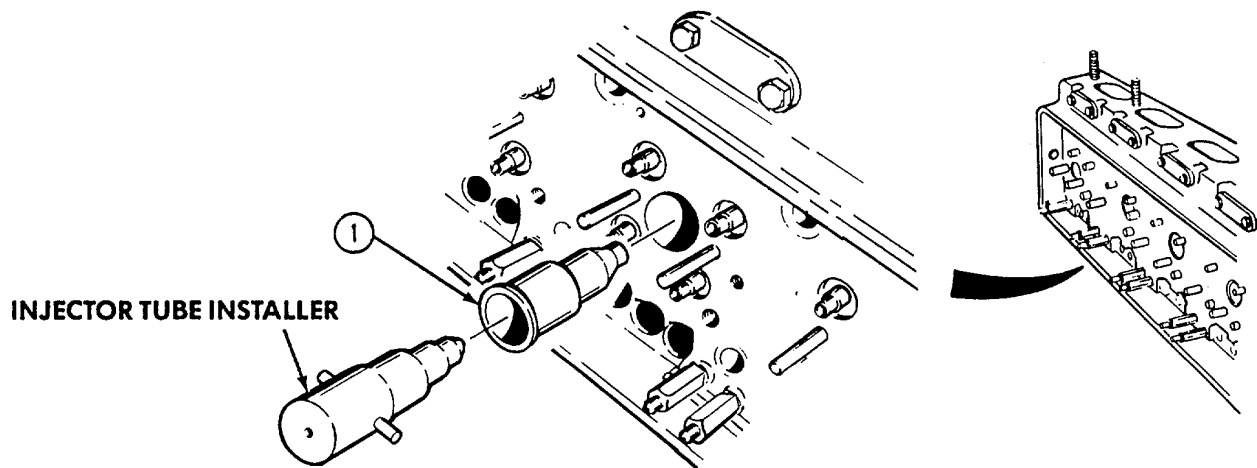
Solvent, dry cleaning (Item 3, Appendix E)
Oil, lubricating (Item 10, Appendix E)

PERSONNEL REQUIRED - 2

EQUIPMENT CONDITION

Cylinder Head Removed (see para 6-13.)
Engine Brake Retarder Removed (see para 6-34.)
Rocker Arms Removed (see para 6-21.)
Exhaust Valve Bridges Removed (see para 6-24.)
Fuel Injectors Removed (see para 6-43.)
Exhaust Valves Removed (see para 6-20.)
Cam Followers and Push Rods Removed
(see para 6-22.)

a. Removal

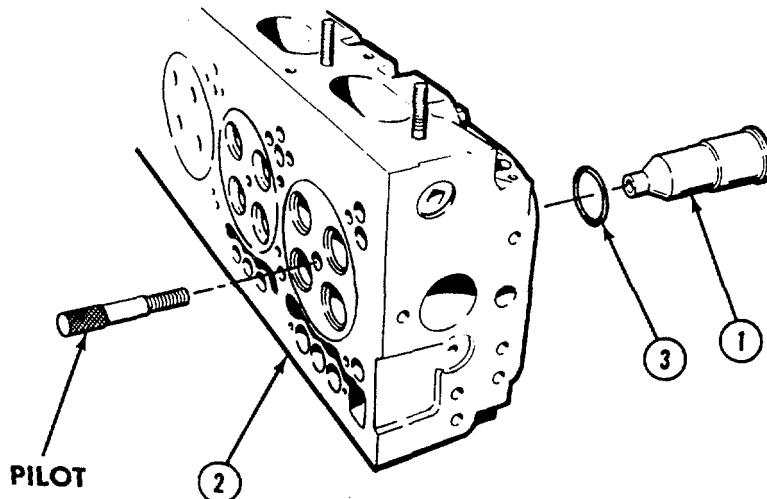


NOTE

All injector tubes are removed the same way.

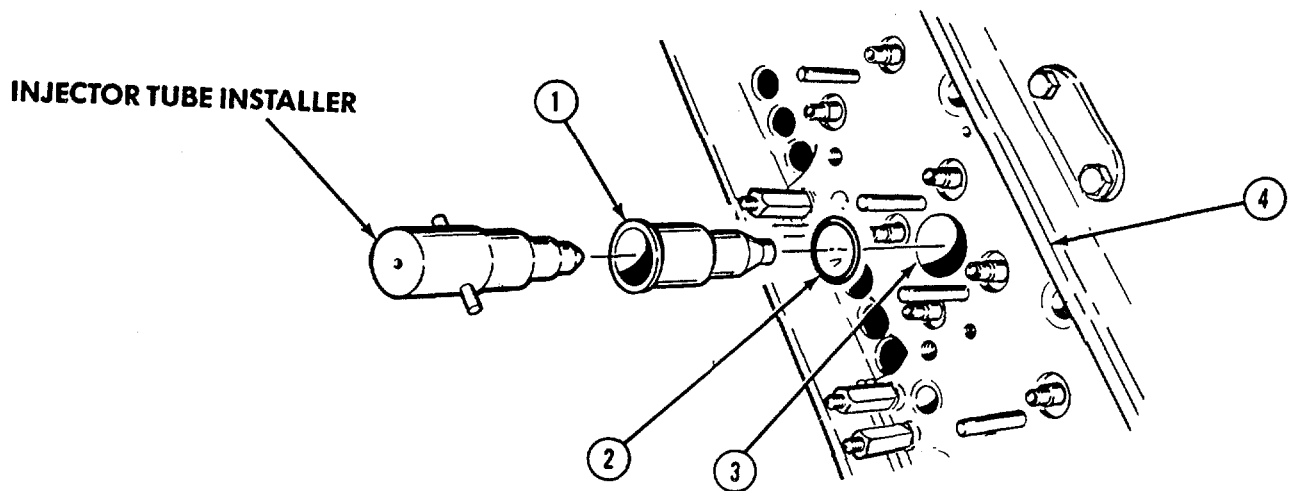
- (1) Insert injector tube installer into injector tube (1).

6-15. INJECTOR TUBES - Continued



- (2) Install pilot into injector tube installer through bottom of cylinder head (2).
- (3) Tap pilot to loosen injector tube (1).
- (4) Remove injector tube (1), preformed packing (3), pilot, and installer from cylinder head (2).

b. Installation.

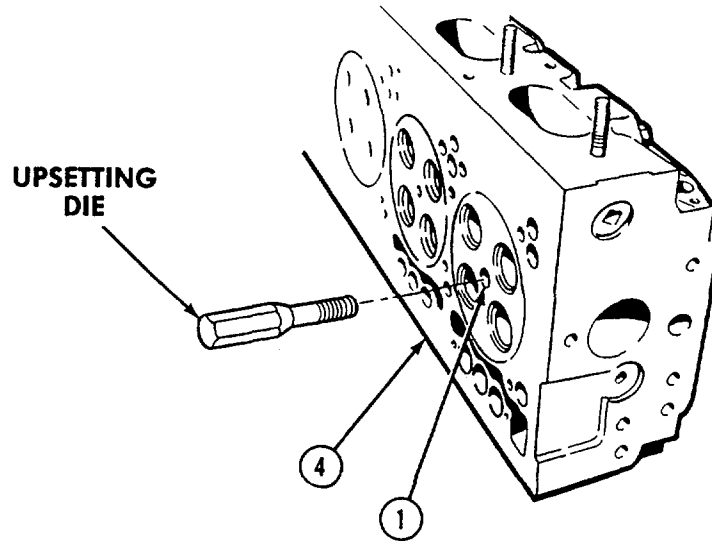


NOTE

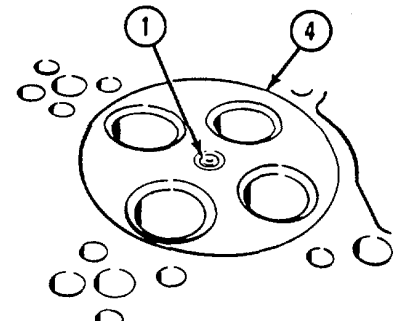
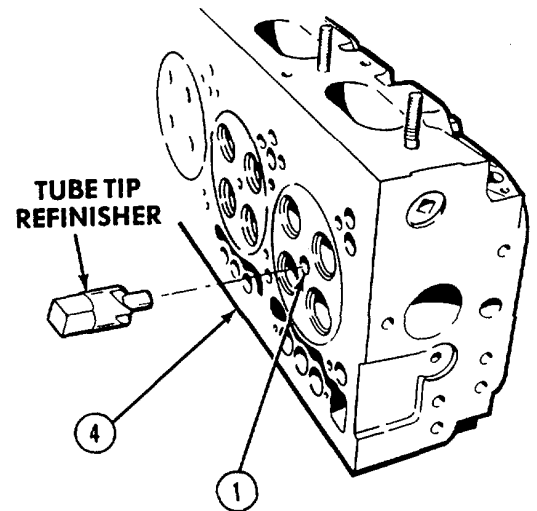
Injector tube must be reamed before injectors can be installed.
All injector tubes are installed the same way.

- (1) Clean dirt from injector tube (1) and hole.
- (2) Install preformed packing (2) into cylinder head counterbore (3).
- (3) Tap injector tube (1) into injector tube hole using installer until bottom of rim of installer is flush with cylinder head (4).

6-15. INJECTOR TUBES - Continued



- (4) Set cylinder head (4) upside down on two wood blocks.
- (5) Seat injector tube (1) using upsetting die. Torque to 30 lb-ft (40 N.m) and remove die.
- (6) Remove excess material from tip of injector tube (1) with tube tip refinisher until finisher contacts bottom of cylinder head.
- (7) Clean out inside of injector tube (1).
- (8) Measure depth of gauge in injectortube (1) beneath face of cylinder head (4) using sled gauge (Appendix B, Section III, Item 27).
- (9) Measurement must be 0 ± 0.014 in. (0.36 mm). If measurement is within tolerance, do steps (16) and (17). If measurement is more than 0.014" above 0 reading, replace tube (1) and do steps (10) through (15).
- (10) Set cylinder head (4) right side up on work surface.



6-15. INJECTOR TUBES - Continued**WARNING**

Dry cleaning solvent P-D-680 is potentially dangerous. Avoid repeated and prolonged breathing of vapors and skin contact with the liquid. Do not use near open flame, arcing equipment or other ignition sources. Always wear eye protection and protective clothing. The flash point of P-D-680 is 100 to 138 deg.F (38 to 59 deg. C).

(11) Wash injector tube (1) with dry cleaning solvent (item 3, Appendix E).

(12) Lubricate reamer blades while reaming injector tubes.

CAUTION

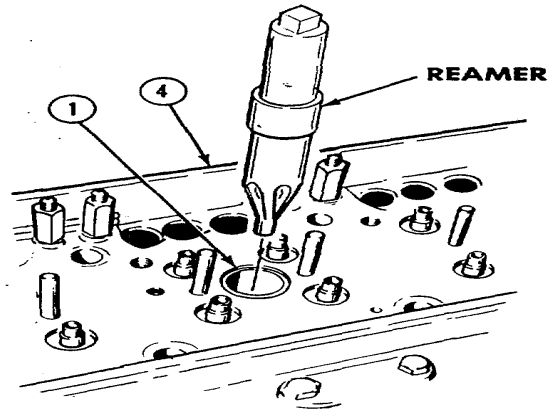
Counterclockwise reaming will damage reamer blades and injector tube.

(13) Ream injectortube (1) clockwise.

(14) Clean filings from injectortube (1).

(15) Repeat steps (11) through (14) until protrusion gauge is flush ± 0.014 in. (0.36 mm).

(16) Clean injector tube (1) with dry cleaning solvent (Item 3, Appendix E).

**WARNING**

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

(17) Dry with compressed air.

c. Follow-on Maintenance.

(1) Install exhaust valves (see para 6-20).

(2) Install fuel injectors (see para 6-43).

(3) Install exhaust valve bridges (see para 6-24).

(4) Install rocker arms (see para 6-21).

(5) Install brake retarder (see para 6-34).

(6) Install cam followers and push rods (see para 6-22).

(7) Install cylinder head (see para 6-13).

6-16. VALVE SEAT INSERTS

THIS TASK COVERS:

- a. Removal
- b. Installation

- c. Follow-on Maintenance

TOOLS REQUIRED

Tool Kit, General Mechanics, Automotive
(Appendix B, Section III, Item 1)

Shop Equipment, Automotive
Maintenance and Repair
(Appendix B, Section III, Item 4)

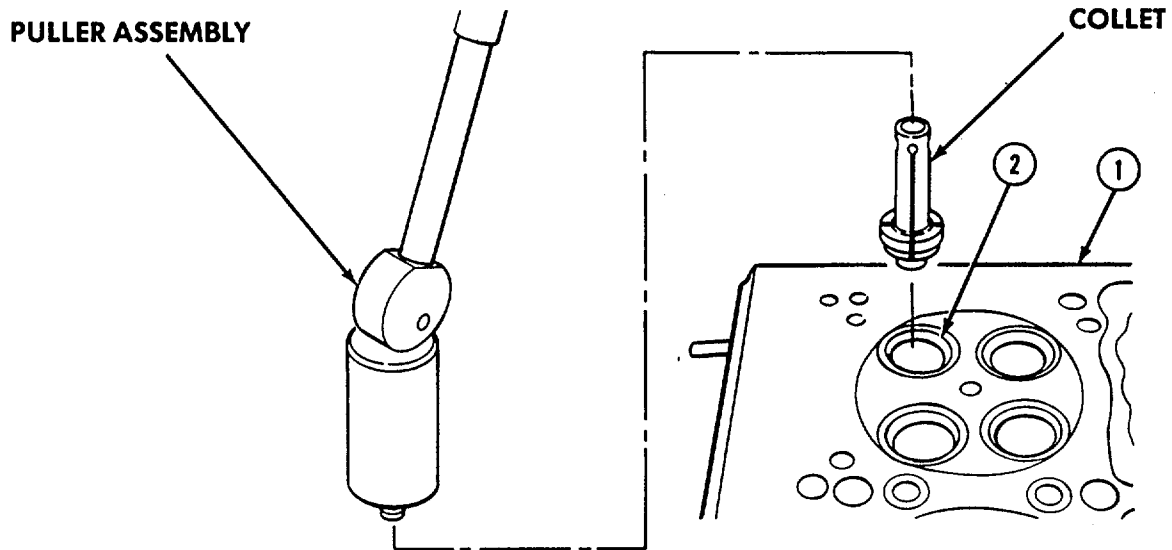
Installing tool (Appendix B, Section III, Item 29)
Puller assembly, (Appendix B, Section III, item 30)
Collect, valve seat (Appendix B, Section III, Item 31)
Set, dial indicator (Appendix B, Section III, Item 32)

EQUIPMENT CONDITION

Cylinder Head Removed (see para 6-13.)
Rocker Arms Removed (see para 6-21.)
Cam Followers and Push Rods Removed
(see para 6-22.)
Exhaust Valve Bridges Removed (see para 6-24.)
Fuel Injectors Removed (see para 6-43.)
Exhaust Valves Removed (see para 6-20.)
Engine Brake Retarder Removed (see para 6-34.)

MATERIALS/PARTS REQUIRED

Lubricating Oil (Item 10, Appendix E)



There are 16 valve seat inserts on a cylinder head. All valve seat inserts are removed in same manner.

- (1) Support cylinder head (1), bottom side up, on two thick wooden blocks.
- (2) Remove valve seat insert (2) out of cylinder head (1) using valve seat collect (Appendix B, Section III, Item 31) and puller assembly (Appendix B, Section III, Item 30).

6-16. VALVE SEAT INSERTS - Continued**b. Installation.****NOTE**

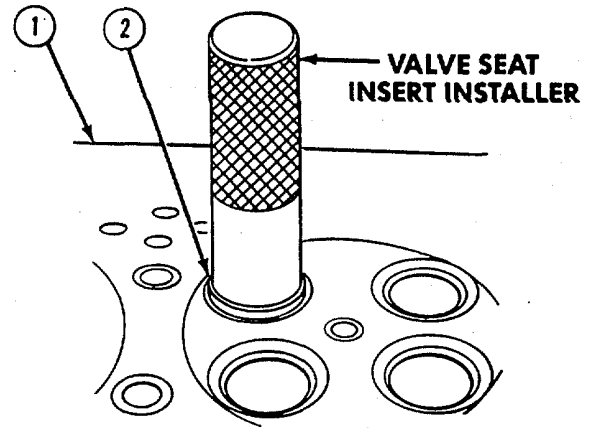
New valve seat inserts are pre-ground and need not be ground after installation. All inserts are installed in same manner.

- (1) Put cylinder head (1) in water heated to a temperature of 180 to 200°F (82 to 93°C) for not less than 30 minutes.

WARNING

Be sure to wear protective gloves and clothing to prevent personal injury when handling heated part.

- (2) Place cylinder head (1), bottom side up, on wooden blocks and place valve seat insert (2), seat side up, in counterbore.
- (3) Drive valve seat insert (2) into place until seated solidly in cylinder head using valve seat insert installer (Appendix B, Section III, Item 29).
- (4) Set dial indicator (Appendix B, Section III, item 32) on cylinder head and check roundness of each valve seat insert relative to valve guide. Total runout must not exceed 0.002-in. (0.05 mm).
- (5) If runout exceeds 0.002-in. (0.05 mm), check for damaged or worn valve guide.

**c. Follow-on Maintenance.**

- (1) Install engine brake retarder (see para 6-34).
- (2) Install cam followers and push rods (see para 6-22).
- (3) Install exhaust valves (see para 6-20).
- (4) Install fuel injectors (see para 6-43).
- (5) Install exhaust valve bridges (see para 6-24).
- (6) Install rocker arms (see para 6-21).
- (7) Install cylinder head (see para 6-13).

6-17. WATER NOZZLES

THIS TASK COVERS:

- a. Removal
- b. Installation

- c. Follow-on Maintenance

TOOLS REQUIRED

Tool Kit, General Mechanics, Automotive
(Appendix B, Section III, Item 1)

Shop Equipment, Automotive
Maintenance and Repair
(Appendix B, Section III, Item 4)

Installer, water nozzle
(Appendix B, Section III, Item 33)

PERSONNEL REQUIRED

2

EQUIPMENT CONDITION

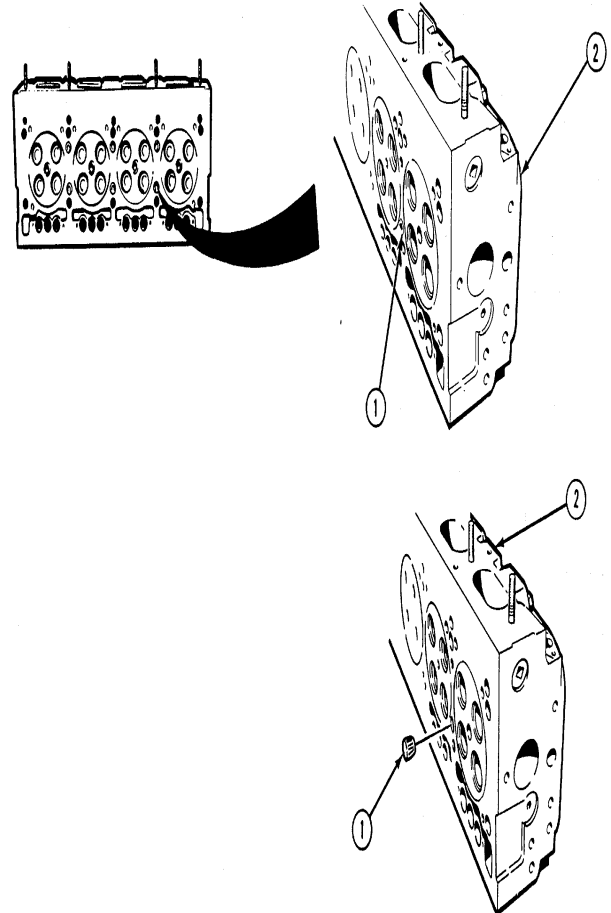
Cylinder Head Removed (see para 6-13.)
Rocker Arms Removed (see para 6-21.)
Exhaust Valve Bridges Removed (see para 6-24.)
Fuel Injectors Removed (see para 6-43.)
Exhaust Valves Removed (see para 6-20.)
Cam Followers and Push Rods Removed
(see para 6-22.)
Engine Brake Retarder Removed (see para 6-34.)

a. Removal.

NOTE

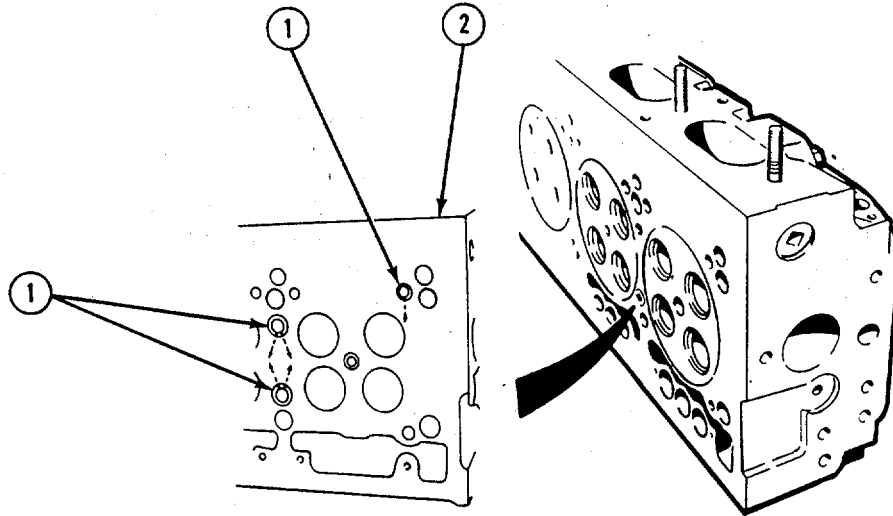
Repeat steps (1) through (3) for removing all water nozzles.

- (1) Install 1/2-in. tap into water nozzle (1) of cylinder head (2).
- (2) Tap water nozzle (1) 1/2-in. (12.7 mm) deep.
- (3) Remove water nozzle (1) from cylinder head (2).



6-17. WATER NOZZLES - Continued

b. Installation.

**CAUTION**

Water nozzles must be installed so holes are pointed toward cylinder for proper cooling water flow to prevent engine overheating.

NOTE

Repeat steps (1) and (2) to install all water nozzles.

- (1) Gently tap water nozzle (1) into water nozzle hole using water nozzle installer (Appendix B, Section III, Item 33).
- (2) Make sure nozzle (1) is recessed 0.004-in (0.1 mm) into face of cylinder head (2).
- (3) Pressure test cylinder head (para 6-14).

c. Follow-on Maintenance.

- (1) Install cam followers and push rods (see para 6-22).
- (2) Install exhaust valves (see para 6-20).
- (3) Install fuel injectors (see para 6-43).
- (4) Install exhaust valve bridges (see para 6-24).
- (5) Install rocker arms (see para 6-21).
- (6) Install cylinder head (see para 6-13).

6-18. VALVE BRIDGE GUIDES

THIS TASK COVERS:

- a. Removal
- b. Installation

- c. Follow-on Maintenance

TOOLS REQUIRED

Tool Kit, General Mechanics, Automotive
(Appendix B, Section III, Item 1)

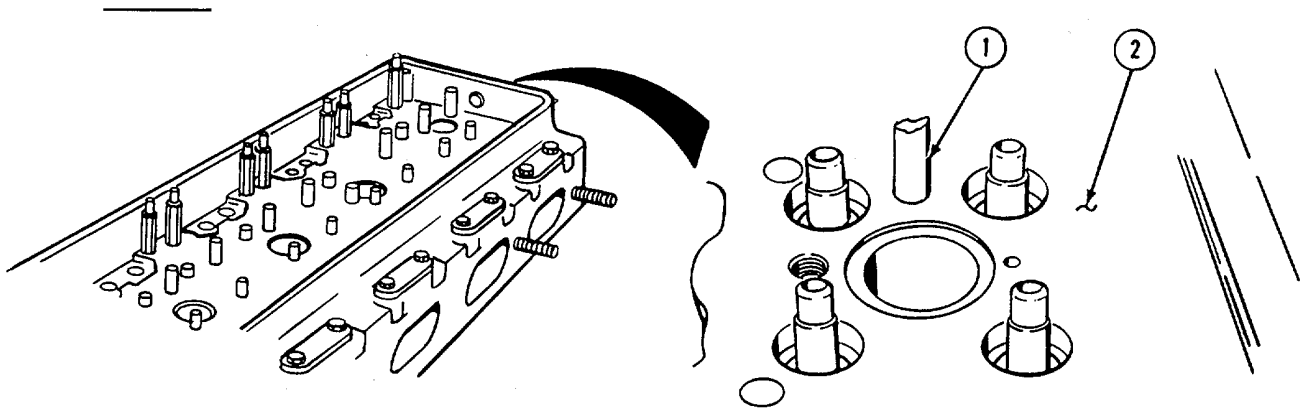
Shop Equipment, Automotive
Maintenance and Repair
(Appendix B, Section III, Item 4)

Installer, valve bridge guide
(Appendix B, Section III, Item 34)

EQUIPMENT CONDITION

Cylinder Head Removed (see para 6-13.)
Engine Brake Retarder Removed (see para 6-34.)
Rocker Arms Removed (see para 6-21.)
Exhaust Valve Bridges Removed (see para 6-24.)
Fuel Injectors Removed (see para 6-43.)
Exhaust Valves Removed (see para 6-20.)

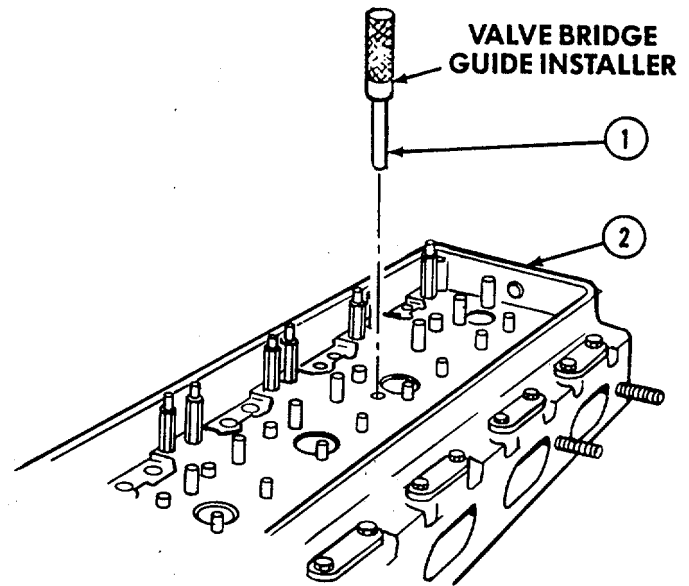
a. Removal.



- (1) Break off bridge guide (1).
- (2) Center punch bridge guide (1).
- (3) Drill hole into bridge guide (1) using No. 3, 0.213 in. (5.4 mm) drill bit.
- (4) Using screw extractor, remove bridge guide (1) from cylinder head (2).

6-18. VALVE BRIDGE GUIDES - Continued**b. Installation.**

- (1) Install undercut edge of bridge guide (1) in tap hole.
- (2) Install bridge guide (1) straight into cylinder head (2) using valve bridge guide installer.

**c. Follow-on Maintenance.**

- (1) Install exhaust valves (see para 6-20).
- (2) Install fuel injectors (see para 6-43).
- (3) Install exhaust valve bridges (see para 6-24).
- (4) Install rocker arms (see para 6-21).
- (5) Install engine brake retarder (see para 6-34).
- (6) Install cylinder head (see para 6-13).

6-19. VALVE GUIDES

THIS TASK COVERS:

- a. Removal
- b. Installation

- c. Follow-on Maintenance

TOOLS REQUIRED

Tool Kit, General Mechanics, Automotive
(Appendix B, Section III, Item 1)

Shop Equipment, Automotive
Maintenance and Repair
(Appendix B, Section III, Item 4)

Remover, valve guide (Appendix B, Section III, Item 35)
Installer, valve guide (Appendix B, Section III, Item 36)

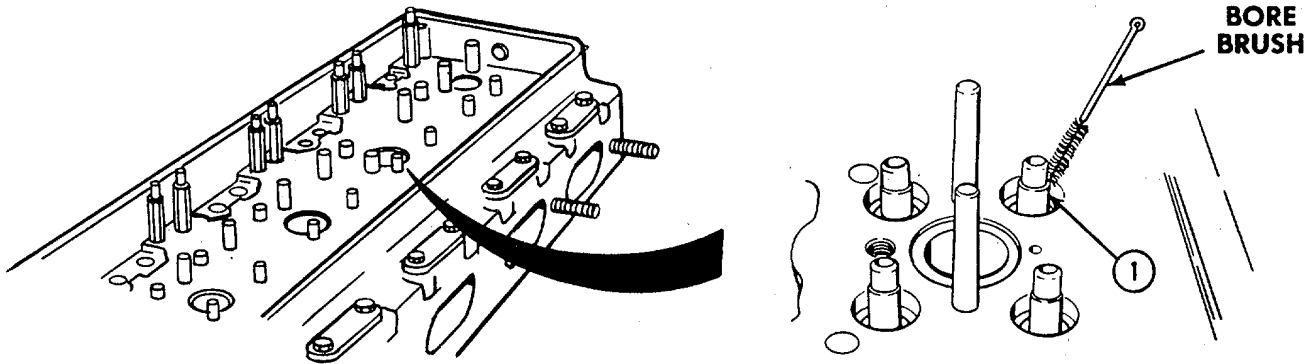
MATERIALS/PARTS REQUIRED

Oil, lubricating (Item 10, Appendix E)
Brush, bore (Item 38, Appendix E)

EQUIPMENT CONDITION

Cylinder Head Removed (see para 6-13.)
Engine Brake Retarder Removed (see para 6-34.)
Rocker Arms Removed (see para 6-21.)
Exhaust Valve Bridges Removed (see para 6-24.)
Fuel Injectors Removed (see para 6-43.)
Exhaust Valves Removed (see para 6-20.)
Cam Followers and Push Rods Removed
(see para 6-22.)

a. Removal

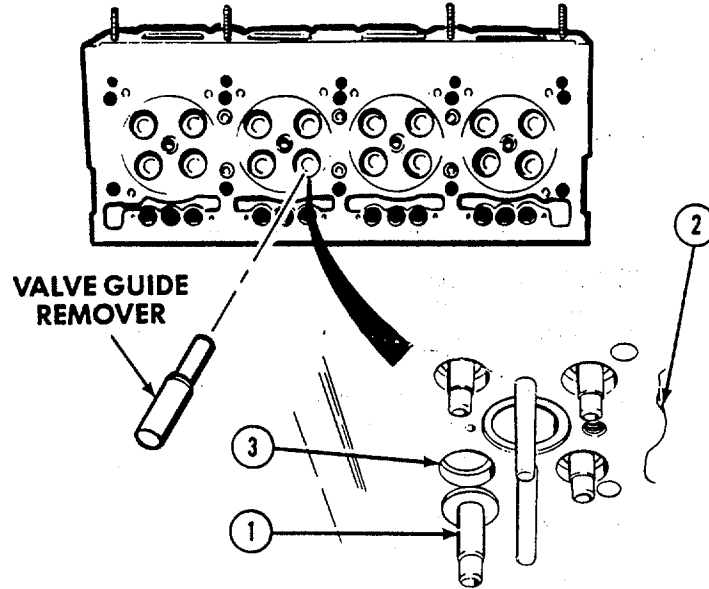


NOTE

There are 16 valve guides on cylinder heads. Repeat steps (1) through (3) for removal of each valve guide.

- (1) Clean valve guide (1) using bore brush (Item 38, Appendix E).

6-19. VALVE GUIDES-Continued



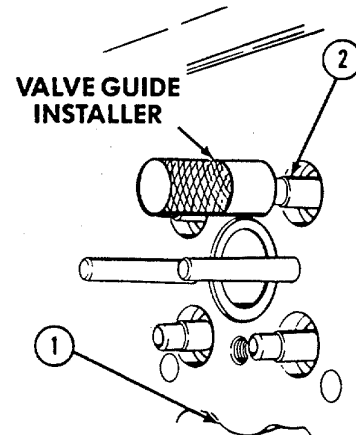
- (2) Set cylinder head (2) upside down on two wood blocks.
- (3) Drive valve guide (1) out of valve bore (3) using valve guide remover (Appendix B, Section III, Item 35).

b. Installation.

NOTE

There are 16 valve guides on cylinder heads. Repeat steps (1) through (3) to install each valve guide.

- (1) Turn cylinder head (1) on right side.
- (2) Install threaded end of valve guide (2) into valve guide installer (Appendix B, Section III, Item 36).
- (3) Install valve guide (2) into cylinder head (1) until valve guide extends above face of cylinder head 0.67 to 0.71-in. (17.02 to 18.03 mm).



c. Follow-on Maintenance.

- (1) Install cam followers and push rods (see para 6-22).
- (2) Install exhaust valves (see para 6-20).
- (3) Install fuel injectors (see para 6-43).
- (4) Install exhaust valve bridges (see para 6-24).
- (5) Install rocker arms (see para 6-21).
- (6) Install engine brake retarder (see para 6-34).
- (7) Install cylinder head (see para 6-13).

6-20. EXHAUST VALVES

THIS TASK COVERS:

- | | |
|------------------------|--------------------------|
| a. Removal | d. Installation |
| b. Cleaning/inspection | e. Follow-on Maintenance |
| c. Repair | |

TOOLS REQUIRED

Tool Kit, General Mechanics, Automotive
(Appendix B, Section III, Item 1)

Shop Equipment, Automotive
Maintenance and Repair
(Appendix B, Section III, Item 4)

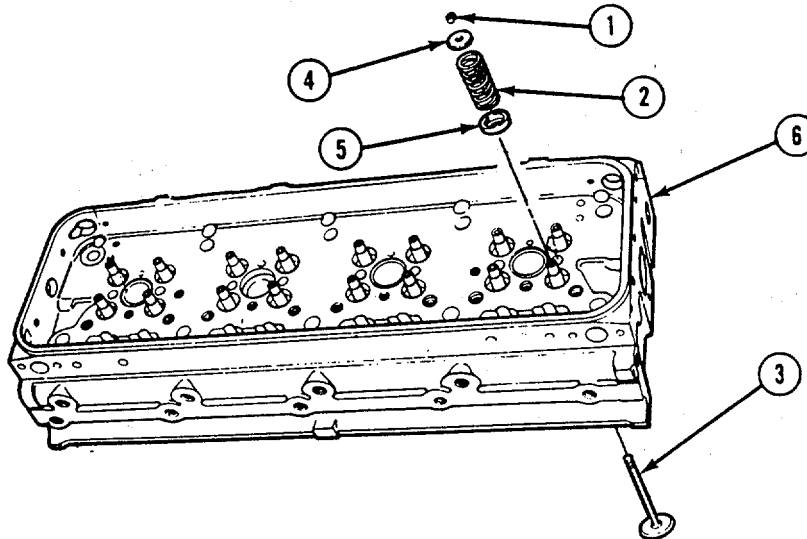
EQUIPMENT CONDITION

Cylinder Head Removed (see para 6-13.)
Engine Brake Retarder Removed (see para 6-34.)
Rocker Arms Removed (see para 6-21.)
Exhaust Valve Bridges Removed (see para 6-24.)
Fuel Injectors Removed (see para 6-43.)
Cam Followers and Push Rods Removed
(see para 6-22.)

MATERIALS/PARTS REQUIRED

Solvent, dry cleaning (Item 3, Appendix E)
Oil, lubricating (Item 10, Appendix E)

a. Removal.



- (1) Remove valve spring retainers (1) by compressing spring (2) on valve (3).
- (2) Release pressure on spring (2).
- (3) Remove seat (4), spring (2), and washer (5).
- (4) Remove valve (3) from cylinder head (6).

6-20. EXHAUST VALVES - Continued

b. Cleaning/Inspection.

WARNING

Dry cleaning solvent P-D-680 is potentially dangerous. Avoid repeated and prolonged breathing of vapors and skin contact with the liquid. Do not use near open flame, arcing equipment or other ignition sources. Always wear eye protection and protective clothing. The flash point of P-D-680 is 100 to 138 deg. F (38 to 59 deg. C).

- (1) Clean all metal parts with dry cleaning solvent (Item 3, Appendix E).

WARNING

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

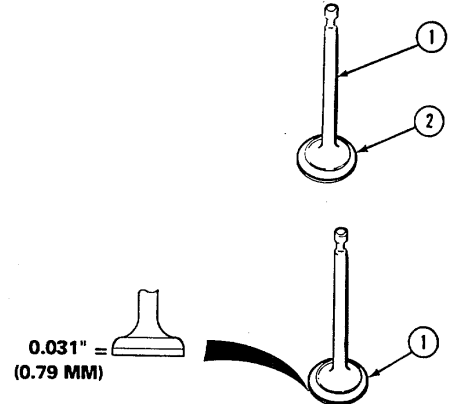
- (2) Dry all parts with compressed air.
- (3) Inspect spring for pitting or fractures.
- (4) Check tension of each spring using valve spring compressor. Replace spring when a load of less than 25 lbs (11 kg) will compress it to 1.80 in. (45.72 mm) installed length.
- (5) Inspect valve stem (1) and valve face (2) for cracks, pitting, and warpage. Replace if damaged.
- (6) Inspect outer diameter of valve face (2) for scoring or galling. Grind or replace as necessary.

c. Repair.

NOTE

Valve seat must be ground before valve is installed.

- (1) Grind exhaust valve seat (1) using 300 grinding stone.
- (2) Edge of valve seat (1) must not be less than 0.031 -in. (0.79 mm) thick after grinding.



6-20. EXHAUST VALVES - Continued**WARNING**

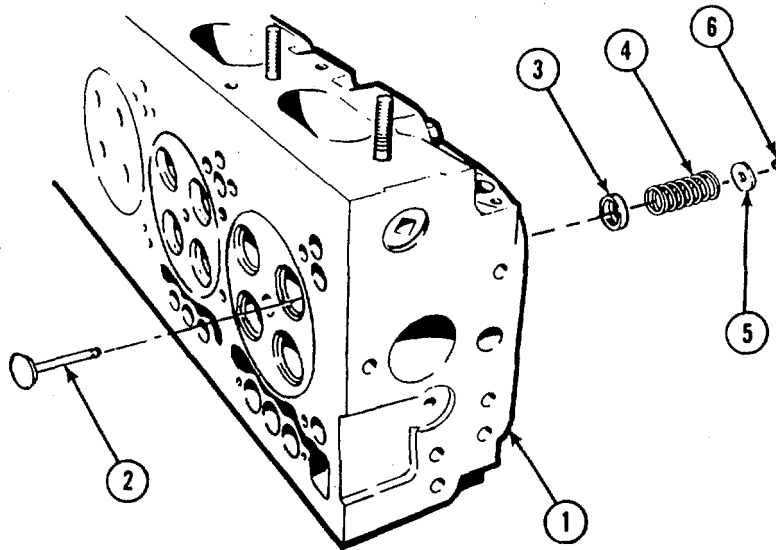
Dry cleaning solvent P-D-680 is potentially dangerous. Avoid repeated and prolonged breathing of vapors and skin contact with the liquid. Do not use near open flame, arcing equipment or other ignition sources. Always wear eye protection and protective clothing. The flash point of P-D-680 is 100 to 138 deg. F (38 to 59 deg. C).

- (3) Clean valve with dry cleaning solvent (Item 3, Appendix E).

WARNING

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

- (4) Dry with compressed air.

d. Installation.**NOTE**

Repeat steps (2) through (4) for each valve.

- (1) Set cylinder head (1) on side.
- (2) Lubricate valve (2) with lubricating oil (Item 10, Appendix E).
- (3) Install valve (2) in cylinder head (1).
- (4) Secure valve (2) with tape to keep from falling out.

6-20. EXHAUST VALVES - Continued**NOTE**

Board must be thick enough to keep exhaust valves from touching work surface while installing spring retainers.

- (5) Set cylinder head (1) right side up on top of a board.

NOTE

Repeat steps (6) through (9) for each valve being installed.

- (6) Install washer (3), spring (4), and seat (5).
- (7) Compress spring (4) using valve spring compressor.
- (8) Install valve spring retainer (6) on valve (2).
- (9) Release pressure on spring (4).

e. Follow-on Maintenance.

- (1) Install cam followers and push rods (see para 6-22).
- (2) Install fuel injectors (see para 6-43).
- (3) Install exhaust valve bridges (see para 6-24).
- (4) Install rocker arms (see para 6-21).
- (5) Install cylinder head (see para 6-13).

6-21. ROCKER ARMS

This task covers:

- | | |
|--|--|
| <ul style="list-style-type: none"> a. Removal b. Disassembly c. Cleaning and Inspection | <ul style="list-style-type: none"> d. Assembly e. Installation f. Follow-on Maintenance |
|--|--|

TOOLS REQUIRED:

Tool Kit, General Mechanics, Automotive
(Appendix B, Section III, Item 1)

Shop Equipment, Automotive
Maintenance and Repair
(Appendix B, Section III, Item 4)

MATERIALS/PARTS REQUIRED

Solvent, dry cleaning (Item 3, Appendix E)
Oil, lubricating (Item 10, Appendix E)
Caps, shipping and sealing (Item 39, Appendix E)
Tags, identification (Item 32, Appendix E)

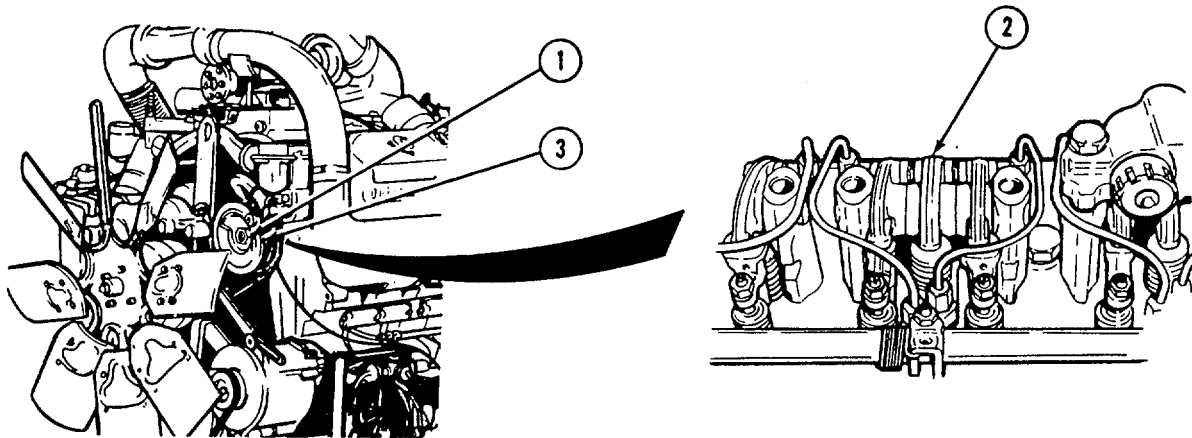
PERSONNEL REQUIRED

2

EQUIPMENT CONDITION

Rocker Cover Removed (see para 4-140.)
Engine Brake Retarder Removed (see para 6-34.)
Engine Brake Wire Harness Removed

a. Removal.



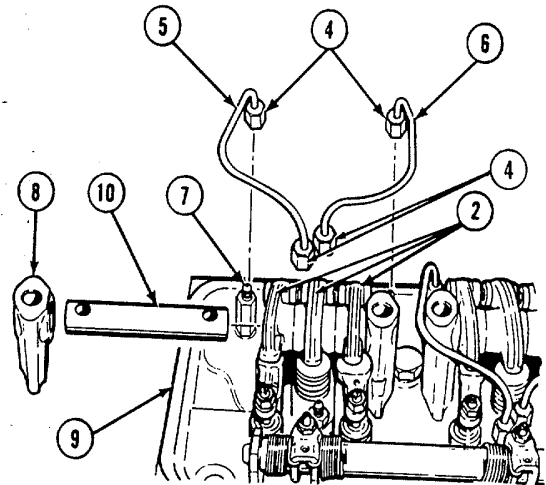
NOTE

This task shows removal of one set of rocker arms. Remove other rocker arms in the same way.

- (1) One person turns nut (1) on camshaft pulley (3) clockwise until told to stop by other person.
- (2) One person tells the other to stop turning nut (1) when three rocker arms (2) line up.

6-21. ROCKER ARMS Continued

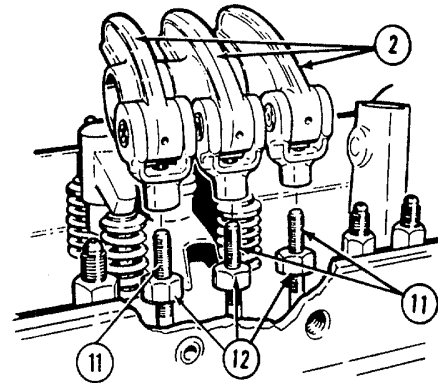
- (3) Tag and loosen four fuel tube nuts (4) and remove two fuel tubes (5 and 6).
- (4) Cover four fuel line connectors (7) with caps.
- (5) Remove two brackets (8) from cylinder head (9).



CAUTION

Do not force rocker arms all the way back with shaft in place. This could result in damage to push rods.

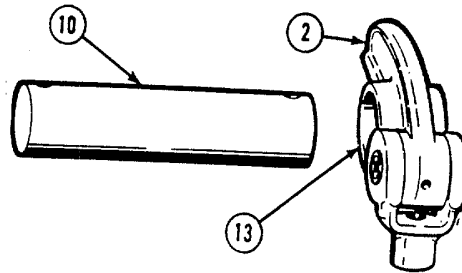
- (6) Move three rocker arms (2) up and toward center of engine to permit shaft (10) to be removed.
- (7) Hold three push rods (11) and loosen three locknuts (12).



NOTE

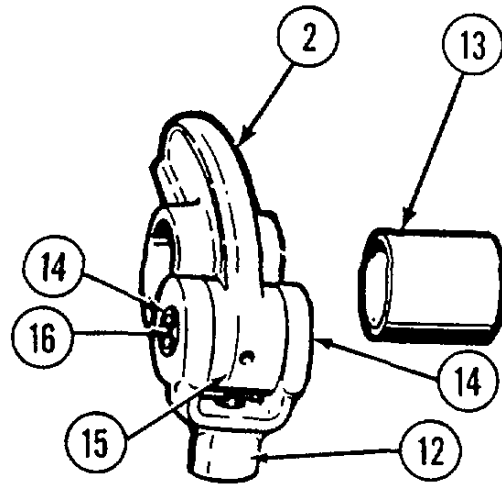
Tag rocker arms before removal.

- (8) Unscrew three rocker arms (2) from three push rods (11).
- (9) Measure inside diameter of bushing (13) in rocker arms (2) and outside diameter of shaft (10). Clearance between bushing (13) and shaft (10) must not exceed 0.004-in. (0.102 mm).



6-21. ROCKER ARMS Continuedb. Disassembly.

- (1) Place rocker arm (2) in press.
- (2) Press bushing (13) from rocker arm (2).

c. Cleaning/Inspection.**WARNING**

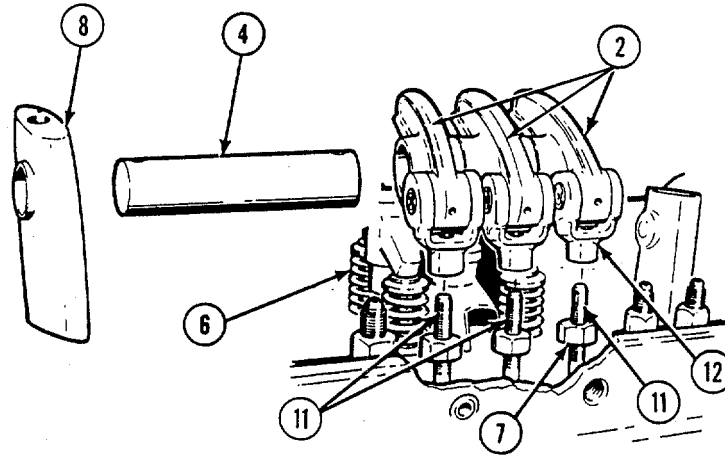
Dry cleaning solvent P-D-680 is potentially dangerous. Avoid repeated and prolonged breathing of vapors and skin contact with the liquid. Do not use near open flame, arcing equipment or other ignition sources. Always wear eye protection and protective clothing. The flash point of P-D-680 is 100 to 138 deg. F (38 to 59 deg. C).

- (1) Clean metal parts in dry cleaning solvent (Item 3, Appendix E).
- (2) Inspect rocker arm assembly and brackets for cracks and other damage. Replace as required.
- (3) Check for looseness of clevis pin small rocker arm bushing (15) in clevis end of rocker arm (2). If it wobbles, it should be replaced. The bushing (15) is pressed onto the clevis pin (16) and rotates in the rocker arm bore. The clevis pin (16) must be pressed out of the two clevis pin bushings (14) as well as the small rocker arm bushing (15). Replace two clevis pin bushings (14) also if necessary, although that is seldom necessary. Replace the rocker arm if the small end bore is worn excessively beyond its machined bore of .564 to .565 in. (14.32 to 14.35 mm).

d. Assembly.

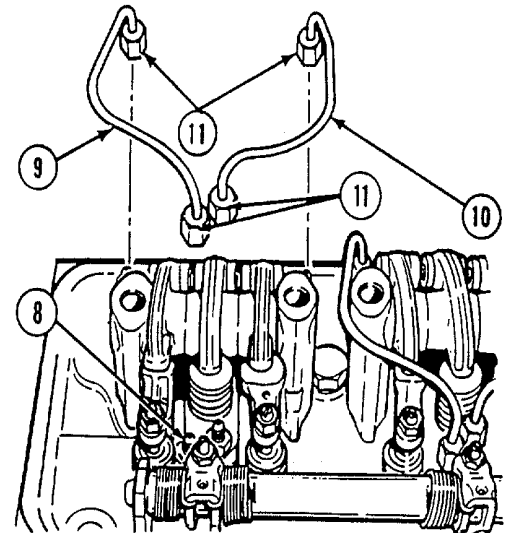
- (1) Place rocker arm (2) in press.
- (2) Press new bushing (13) in rocker arm (2).
- (3) Ream replacement bushing (13) to .875 to .876 in. (22.22 to 22.25 mm).

6-21. ROCKER ARMS



e. Installation.

- (1) Thread each of three rocker arms (2) onto push rod (11) until end of push rod is above inside of clevis yoke (12).
- (2) Coat shaft (4) with oil (Item 10, Appendix E) and slide it through three rocker arms (1).
- (3) Install two brackets (5), one over each end of shaft (4), with finished face next to rocker arms (1).
- (4) Position rocker arms (1) down on valve bridge (6).
- (5) Hold each push rod (2) while tightening three locknuts (7).
- (6) Remove caps from four fuel line connectors (8).
- (7) Install two fuel tubes (9 and 10).
- (8) Tighten four nuts (11) to 120 lb-in (13.6 N•m) using fuel line nut wrench (Item 37, Appendix B, Section 111).



f. Follow-on Maintenance.

- (1) Install engine brake retarder (see para 6-34).
- (2) Install engine brake wire harness.
- (3) Install rocker cover (see para 4-140).

6-22. CAM FOLLOWERS AND PUSH RODS

This task covers:

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

TOOLS REQUIRED

Tool Kit, General Mechanics, Automotive
(Appendix B, Section III, Item 1)

Shop Equipment, Automotive
Maintenance and Repair
(Appendix B, Section III, Item 4)

Gauge, feeler (Appendix B, Section III, Item 38)

MATERIALS/PARTS REQUIRED

Tags, identification (Item 32, Appendix E)
Oil, lubricating (Item 10, Appendix E)

EQUIPMENT CONDITION

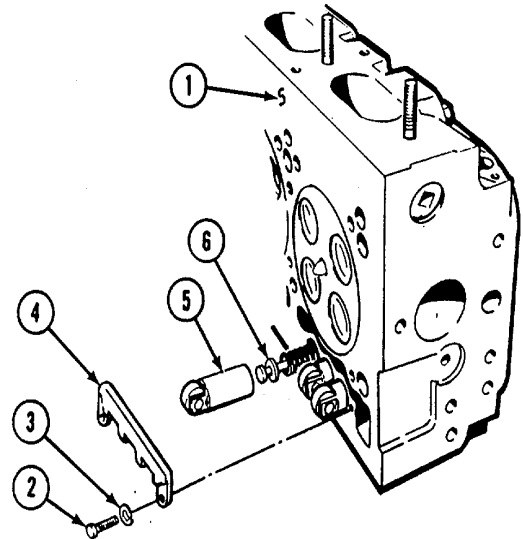
Cylinder Head Removed from Engine
(see para 6-13.)
Rocker Arms Removed (see para 6-21.)
Exhaust Valve Bridge Removed (see para 6-24.)

a. Removal.

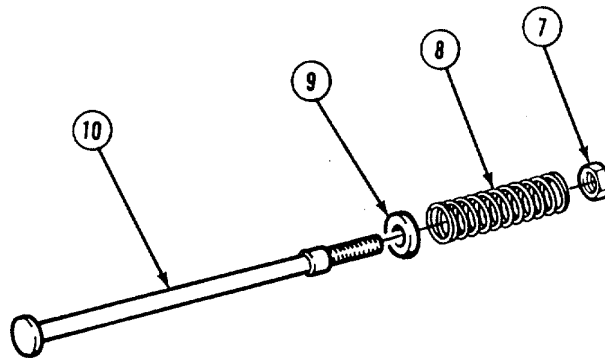
NOTE

- Tag (Item 32, Appendix E) cam follower and associated parts so they may be installed in original location.
- This procedure shows removal of one cam follower. Remove other cam followers in same way.

- (1) Set cylinder head (1) on side on 1 in. (25 mm) wooden blocks.
- (2) Remove two screws (2) and lockwashers (3) from cam follower guide (4).
- (3) Remove cam follower guide (4) from cylinder head (1).
- (4) Remove cam follower (5) and push rod assembly (6), as a unit, from cylinder head (1).
- (5) Remove cam follower (5) from push rod assembly (6).



6-22. CAM FOLLOWERS AND PUSH RODS Continued

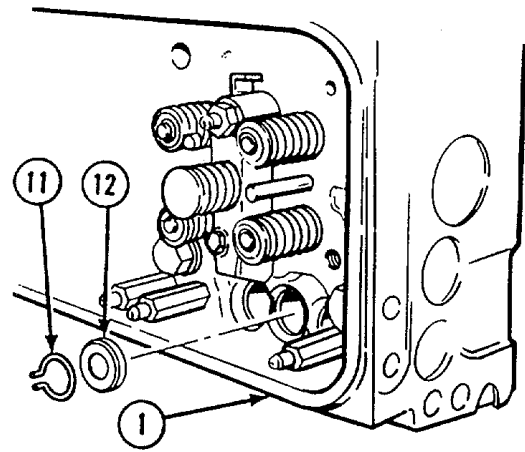


- (6) Remove locknut (7), spring (8), and lower spring seat (9), and push rod (10).

NOTE

Spring retainer must point in proper direction when installed. Mark direction of spring retainer for installation.

- (7) Remove spring retainer (11) from top side of cylinder head (1).
- (8) Remove upper spring seat (12) from cylinder head (1).

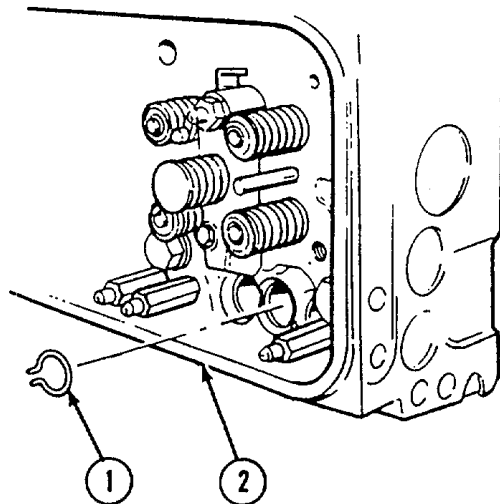


b. Installation.

NOTE

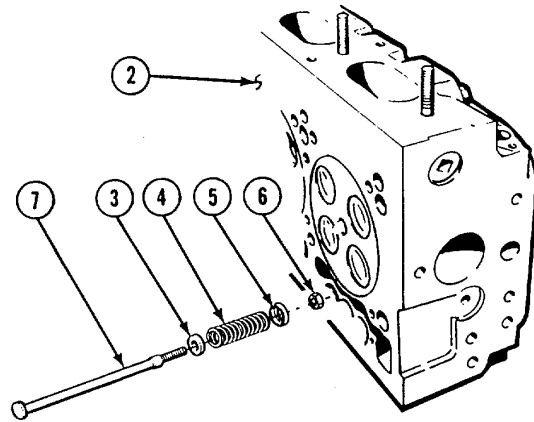
Apply lubricating oil (Item 10, Appendix E) to all parts before installation.

- (1) Install spring retainer (1) in top of cam follower bore in cylinder head (2).

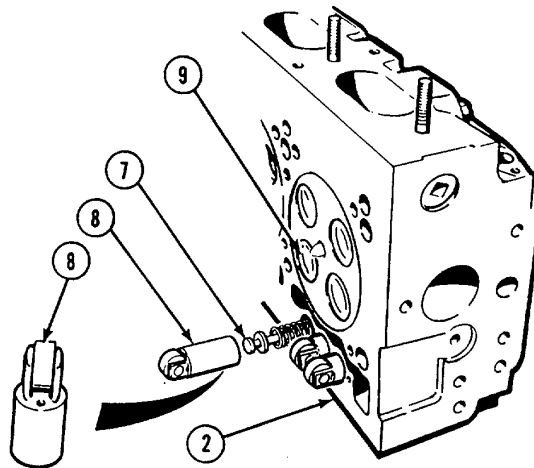


6-22. CAM FOLLOWERS AND PUSH RODS Continued

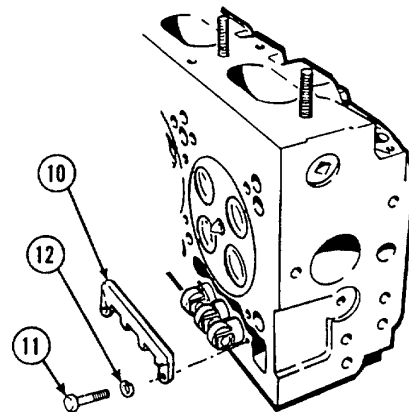
- (2) Check tension of each spring using valve spring compressor. Replace spring when a load of less than 250 lbs (113 kg) will compress it to 2.14 inches (54.4 mm) in installed length.
- (3) Install lower spring seat (3), spring (4), upper spring seat (5), and nut (6) on pushrod (7).
- (4) Install push rod (7) in cylinder head (2).



- (5) Position cam follower (8) so oil hole points away from exhaust valves (9).
- (6) Install cam follower (8) over push rod (7) and into cylinder head (2).
- (7) Install other push rods (7) and cam followers (8) in same manner.



- (8) Install cam follower guide (10), two screws (11), and lockwashers (12).
- (9) Tighten screws (11) to 12 to 15 lb-ft (16 to 20 N•m).



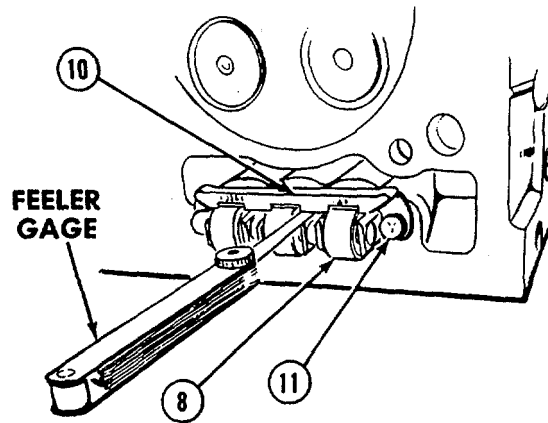
6-22. CAM FOLLOWERS AND PUSH RODS Continued**NOTE**

There must be 0.005-in. (0.13 mm) clearance between cam follower guide and cam follower.

- (10) Insert 0.005 in. (0.13 mm) feeler gauge between cam follower guide (10) and legs of cam followers (8).
- (11) If there is not enough clearance, loosen screws (11), move guide (10), and repeat steps (9) and (10).

c. Follow-on Maintenance.

- (1) Install exhaust valve bridge (see para 6-24).
- (2) Install rocker arms (see para 6-21).
- (3) Install cylinder head (see para 6-13).



6-23. CAM FOLLOWER REPAIR

This task covers:

- a. **Cleaning/inspection**
- b. **Disassembly**
- c. **Assembly**
- d. **Follow-on Maintenance**

TOOLS REQUIRED

Tool Kit, General Mechanics, Automotive
(Appendix B, Section III, Item 1)

Shop Equipment, Automotive
Maintenance and Repair
(Appendix B, Section III, Item 4)

Set, dial indicator (Appendix B, Section III, Item 32)
Gauge, feeler (Appendix B, Section III, Item 38)

MATERIALS/PARTS REQUIRED

Solvent, dry cleaning (Item 3, Appendix E)
Oil, lubricating (Item 10, Appendix E)

EQUIPMENT CONDITION

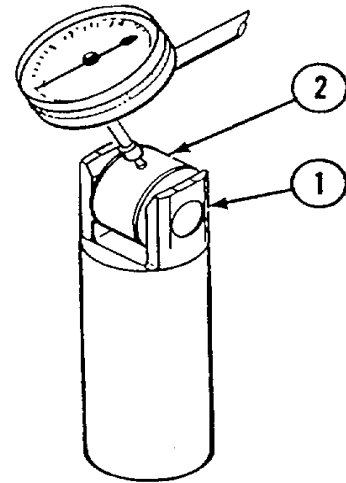
Cam Followers and Push Rods Removed
(see para 6-22.)

a. Cleaning/inspection.

WARNING

Dry cleaning solvent P-D-680 is potentially dangerous. Avoid repeated and prolonged breathing of vapors and skin contact with the liquid. Do not use near open flame, arcing equipment or other ignition sources. Always wear eye protection and protective clothing. The flash point of P-D-680 is 100 to 138 deg. F (38 to 59 deg. C).

- (1) Clean cam follower (1) with dry cleaning solvent (Item 3, Appendix E).
- (2) Inspect cam follower (1) for damage.
- (3) Check side clearance between cam follower body (1) and roller (2) is not more than 0.023 in. (0.58 mm). If clearance is more than 0.023 in. (0.58 mm) go to step b.
- (4) Put cam follower in vise. Check for more than 0.010 in. (0.25 mm) pin-to-bushing clearance using dial indicator (Appendix B, Section III, Item 32). If clearance is more than 0.010 in. (0.25 mm) go to step b.

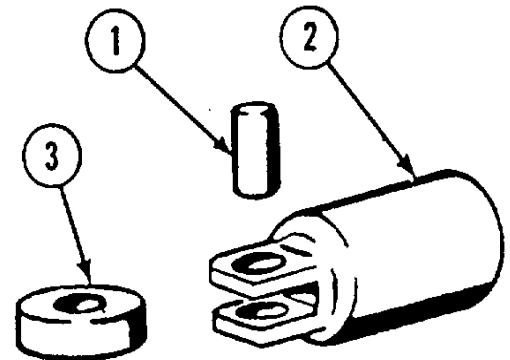


b. Disassembly.

NOTE

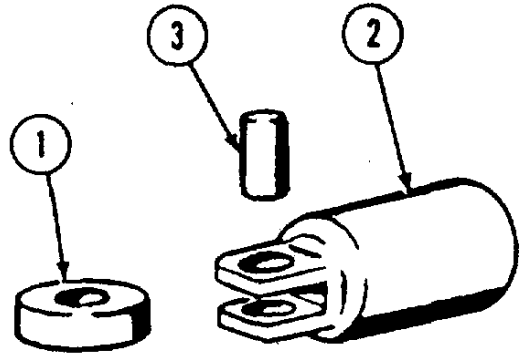
Pin and roller must be replaced together.

- (1) Drive pin (1) out of cam follower body (2).
- (2) Remove roller (3).



6-23. CAM FOLLOWER REPAIR- Continuedc. Assembly.**NOTE**

Apply lubricating oil (Item 10, Appendix E) to all parts before assembly.



- (1) Install roller (1) in cam follower body (2).
- (2) Install pin (3) through cam follower body (2) and roller (1).
- (3) Check side clearance between cam follower body (2) and roller (1) using feeler gauge (Appendix B, Section III, Item 38). Clearance must be between 0.011 and 0.023 in. (0.28 and 0.58 mm).
- (4) Check pin-to-bushing clearance using dial indicator. Clearance must be less than 0.010 in. (0.25 mm).

d. Follow-on Maintenance.

- (1) Cam followers and push rods installed (see para 6-22).

6-24. EXHAUST VALVE BRIDGES

This task covers:

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

TOOLS REQUIRED

Tool Kit, General Mechanics, Automotive
(Appendix B, Section III, Item 1)

Shop Equipment, Automotive
Maintenance and Repair
(Appendix B, Section III, Item 4)

Gauge, feeler (Appendix B, Section III, Item 38)

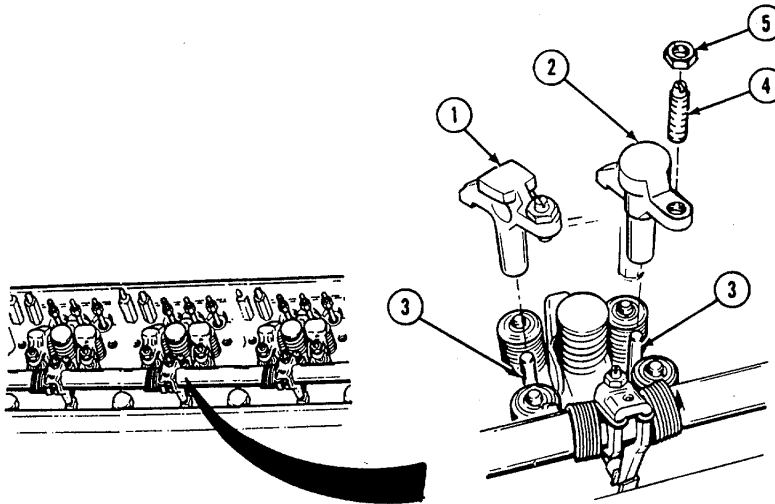
MATERIALS/PARTS REQUIRED

Tags, identification (Item 32, Appendix E)
Oil, lubricating (Item 10, Appendix E)

EQUIPMENT CONDITION

Rocker Arms Removed (see para 6-21.)

a. Removal.



NOTE

Tag valve bridges when removed so bridges may be installed in original locations at installation.

- (1) Remove valve bridges (1 and 2) from valve bridge guides (3).

NOTE

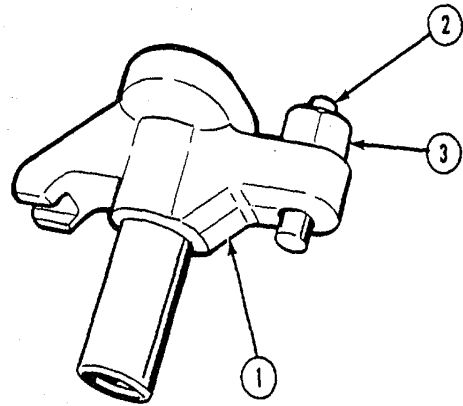
Remove remaining valve bridges in same way.

- (2) Remove screw (4) and nut (5) from valve bridge (1 and 2).
- (3) Remove nut (5) from screw (4).

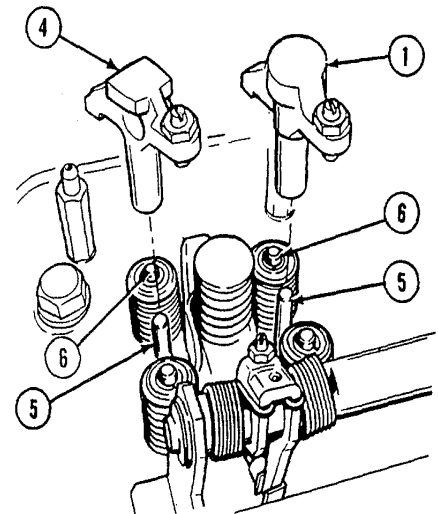
6-24. EXHAUST VALVE BRIDGES - Continued

b. Installation.

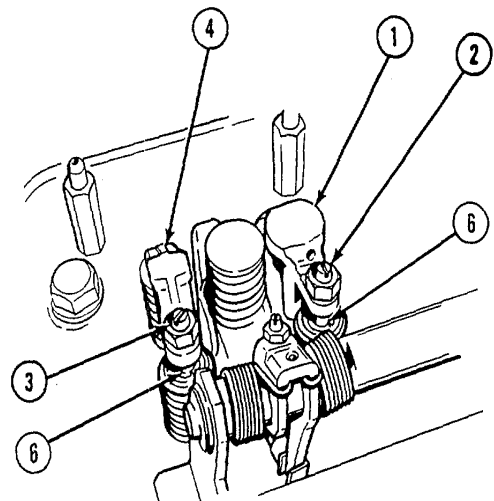
- (1) Place valve bridge (1) in vise with soft jaws.
- (2) Install screw (2) into valve bridge (1).
- (3) Install nut (3) on screw (2). Do not tighten.



- (4) Install valve bridges (1 and 4) on bridge guides (5), making sure grooves in bridges fit over top of valve stems (6).

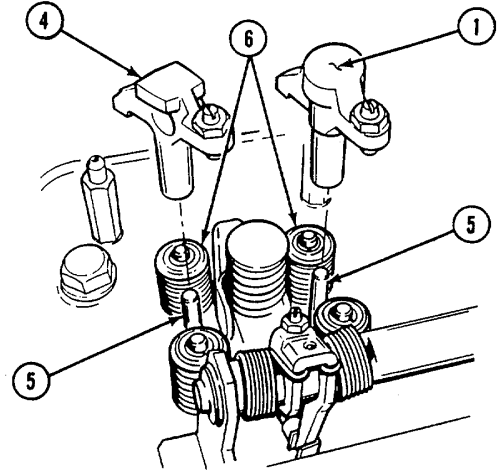


- (5) Push down on top of valve bridge (1 or 4) and turn adjusting screw (2) clockwise until it just touches valve stem (6).
- (6) Turn screw (2) an additional 1/8 to 1/4-turn clockwise and tighten nut (3) finger tight.
- (7) Remove valve bridge (1 or 4) and mount in vise with soft jaws.
- (8) Hold screw (2) and tighten nut (3) to 20 to 25 lb-ft (27 to 34 N•m).

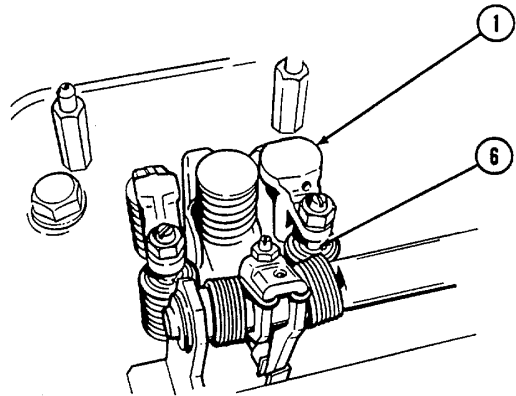


6-24. EXHAUST VALVE BRIDGES - Continued

- (9) Coat valve bridges (1 and 4) and valve bridge guides (5) with lubricating oil (Item 10, Appendix E).
- (10) Install valve bridges (1 and 4) on valve bridge guides (5) making sure grooves in bridges fit over top of valve stems (6).



- (11) Insert 0.001 5-in. (.04 mm) feeler gauge between end of valve bridge (1) and exhaust valve stem (6).
- (12) Press down on top surface of valve bridge (1). Feeler gauge must be tight.
- (13) Repeat steps (11) and (1 2) for other end of valve bridge (1).
- (14) Install all other valve bridges in the same manner.



c. Follow-on Maintenance.

- (1) Install rocker arms (see para 6-21).

6-25. CRANKSHAFT PULLEY

This task covers:

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

TOOLS REQUIRED

Tool Kit, General Mechanics, Automotive
 (Appendix B, Section 111, Item 1)
 Fan Removed (see para 4-132.)
 Shop Equipment, Automotive
 Maintenance and Repair
 (Appendix B, Section 111, Item 4)

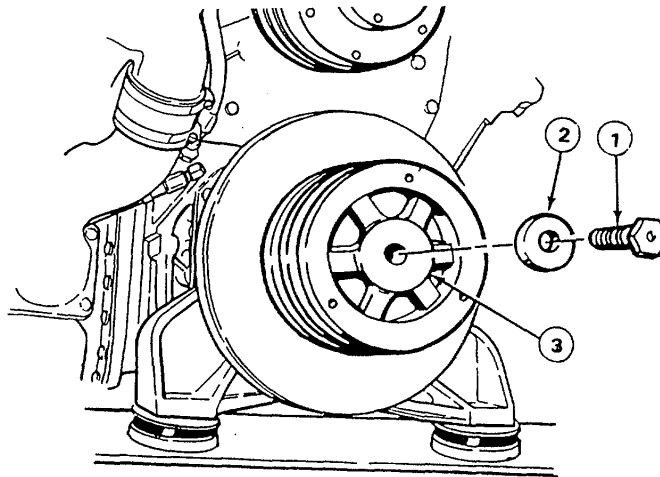
EQUIPMENT CONDITION

Fan Belts Removed (see para 4-131.)
 Radiator Removed (see para 5-31.)

MATERIALS/PARTS REQUIRED

Oil, lubricating (Item 10, Appendix E)

- a. Removal.

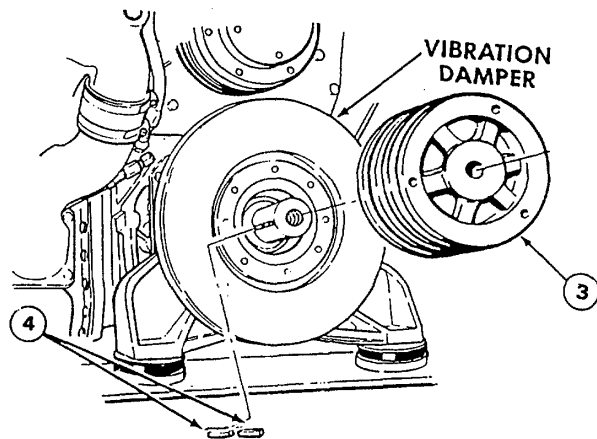


- (1) Remove screw (1) and retainer (2) from crankshaft pulley (3).

CAUTION

Use care when removing crankshaft pulley. Do not pry on vibration damper or damage can occur.

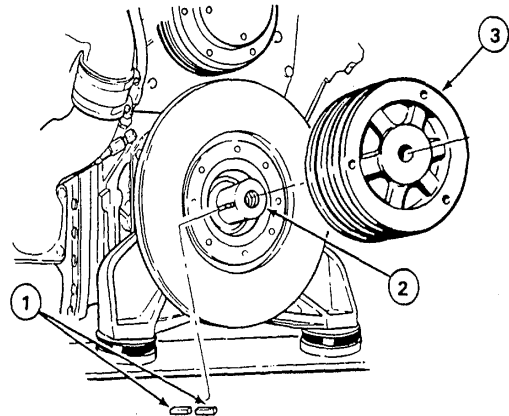
- (2) Remove crankshaft pulley (3).
- (3) Remove two keys (4).



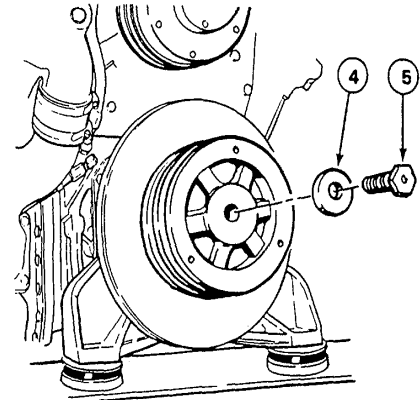
6-25. CRANKSHAFT PULLEY - Continued

b. Installation.

- (1) Lubricate end of crankshaft (2) with lubricating oil (Item 10, Appendix E).
- (2) Install two keys (1) in end of crankshaft (2).
- (3) Install crankshaft pulley (3) on crankshaft (2).



- (4) Install screw (5) and retainer (4).
- (5) Tighten screw (5) to 180 lb-ft (244 N•m).
- (6) Strike head of screw (5) with soft face hammer.
- (7) Tighten screw (5) to 300 lb-ft (407 N•m) and strike screw again.
- (8) Tighten screw (5) to 290 to 310 lb-ft (393 to 421 N•m).



c. Follow-on Maintenance.

- (1) Install radiator (see para 5-31).
- (2) Install fan belts (see para 4-131).
- (3) Install fan (see para 4-132).

6-26. CRANKSHAFT VIBRATION DAMPER

This task covers:

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

TOOLS REQUIRED

Tool Kit, General Mechanics, Automotive (Appendix B, Section III, Item 1)

Shop Equipment, Automotive Maintenance and Repair (Appendix B, Section III, Item 4)

MATERIALS/PARTS REQUIRED

Oil, lubricating (Item 1 0, Appendix E)

EQUIPMENT CONDITION

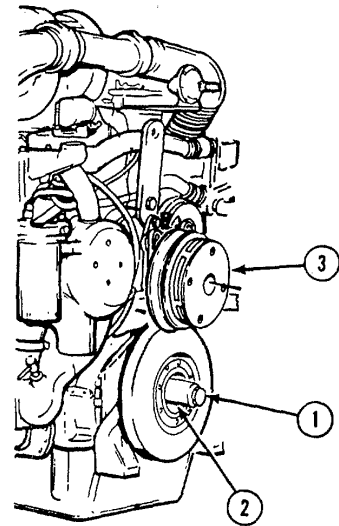
Crankshaft pulley removed (see para 6-25.)

- a. Removal.

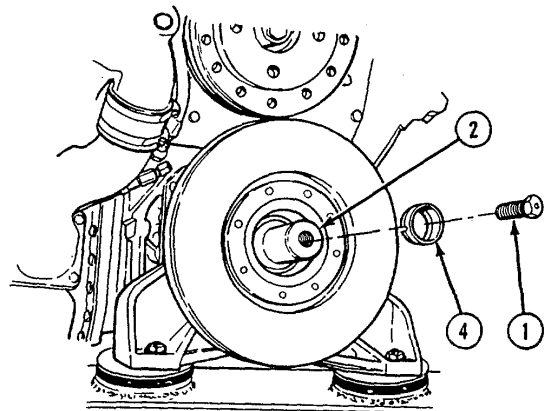
CAUTION

Use care when removing vibration damper. Pounding or prying can dent and cause damage.

- (1) Install screw (1) in end of crankshaft (2). Use a puller to loosen vibration damper (3).

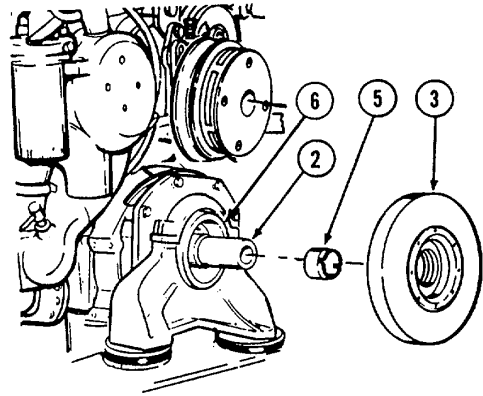


- (2) Remove screw (1) and sleeve spacer (4) from crankshaft (2).

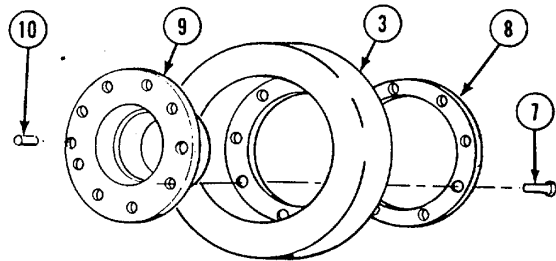


6-26. CRANKSHAFT VIBRATION DAMPER - Continued

- (3) Remove vibration damper (3).
- (4) Turn cone (5) clockwise and remove from crankshaft (2) inside trunnion support (6).

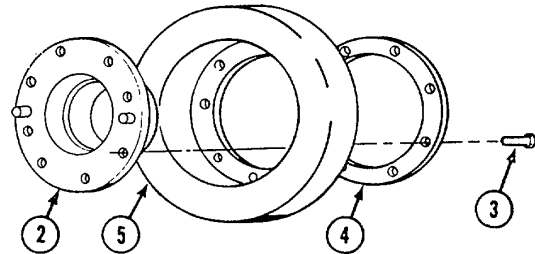
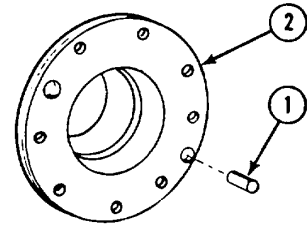


- (5) Position damper (3) in soft jaw vise.
- (6) Remove eight screws (7), scuff plate (8), and hub (9) from vibration damper (3).
- (7) Remove two pins (10) from hub (9).



b. Installation.

- (1) Install two pins (1) in unthreaded bores in hub (2).
- (2) Press two pins (1) through hub (2) until pins stick out from hub 3/8 in. (9.5 mm).
- (3) Install eight screws (3), scuff plate (4), and hub (2) in vibration damper (5).
- (4) Tighten eight screws (3) to 75 to 85 !b-ft (102 to 115 N•m).



6-26. CRANKSHAFT VIBRATION DAMPER - Continued

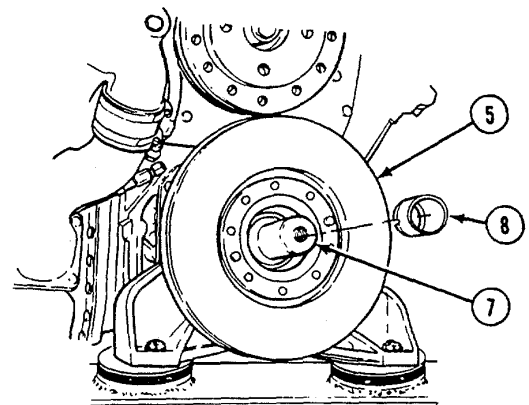
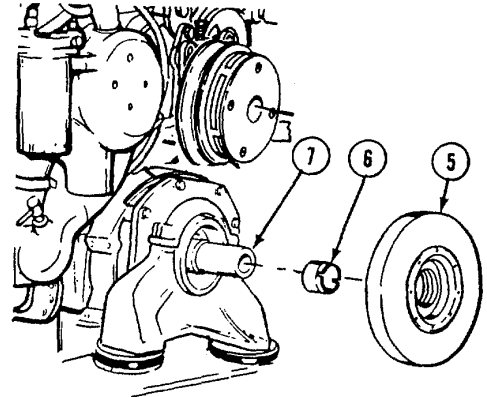
- (5) Apply lubricating oil (Item 10, Appendix E) to cone (6) and crankshaft (7).
- (6) Turn cone (6) clockwise and install tapered end pointing out on crankshaft (7).

CAUTION

Use care when installing vibration damper. Pounding or hammering vibration damper can cause damage.

- (7) Install vibration damper (5) on crankshaft (7).

- (8) Install sleeve spacer (8) on crankshaft (7) with tapered end pointing toward vibration damper (5).



c. Follow-on Maintenance.

- (1) Install crankshaft pulley (see para 6-25).

6-27. CRANKSHAFT COVER AND FRONT OIL SEAL

This task covers:

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

TOOLS REQUIRED

Tool Kit, General Mechanics, Automotive (Appendix B, Section III, Item 1)

Shop Equipment, Automotive Maintenance and Repair (Appendix B, Section III, Item 4)

MATERIALS/PARTS REQUIRED

Oil, lubricating (Item 10, Appendix E)

Grease, automotive and artillery (Item 1, Appendix E)

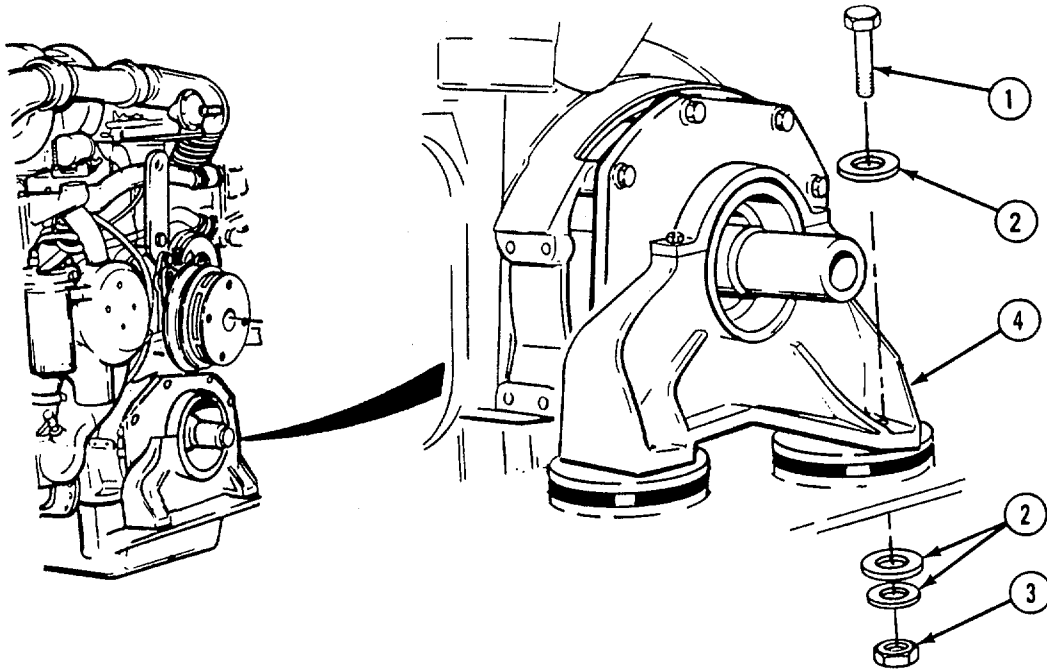
Gasket (Figure 110, Appendix F)

Seal (Figure 1 10, Appendix F)

EQUIPMENT CONDITION

Vibration Damper Removed (see para 6-26.)

Oil Pan Removed (see para 5-27.)

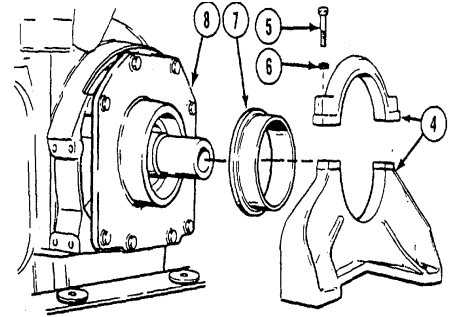


a. Removal.

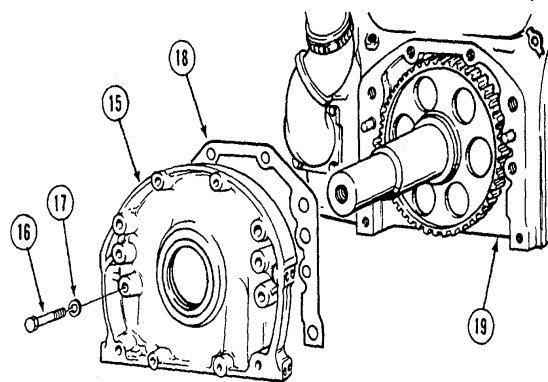
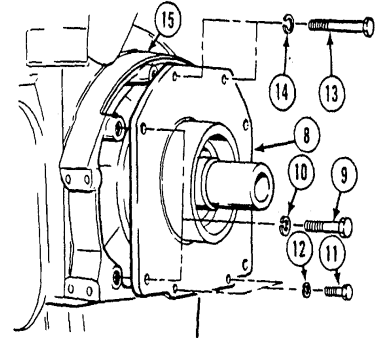
- (1) Support engine with a suitable lifting device.
- (2) Remove two screws (1), six washers (2), and two locknuts (3) from support (4).

6-27. CRANKSHAFT COVER AND FRONT OILSEAL - Continued

- (3) Remove two screws (5) and lockwashers (6) from support (4).
- (4) Remove support (4) and ring (7) from trunnion (8).



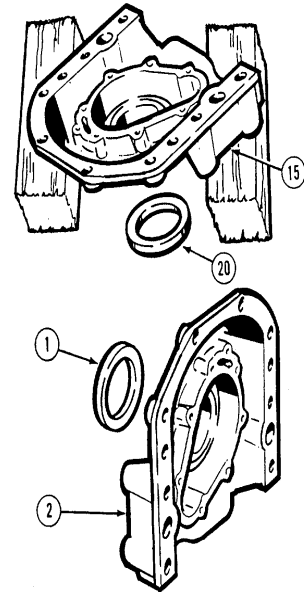
- (5) Remove four screws (9) and lockwashers (10) from trunnion (8).
- (6) Remove two screws (11) and lockwashers (12).
- (7) Remove two screws (13) and lockwashers (14).
- (8) Remove trunnion (8) from crankshaft cover (15).



- (9) Remove two screws (16) and lockwashers (17) from inside crankshaft cover(15).
- (10) Remove crankshaft cover (15) and gasket (18).
- (11) Remove old sealant from crankshaft cover(15) and engine block (19).

6-27. CRANKSHAFT COVER AND FRONT OIL SEAL - Continued

- (12) Support crankshaft cover (15) outer face on two wooden blocks.
- (13) Drive front seal (20) out front side of crankshaft cover (15).

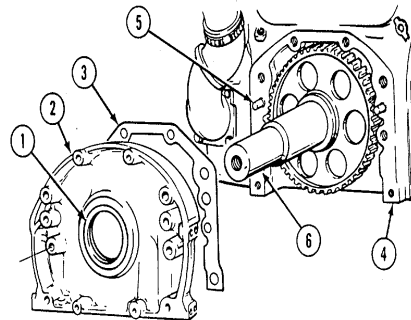


b. Installation.

NOTE

Do not remove lubricant or plastic coating on outer surface of new front seal.

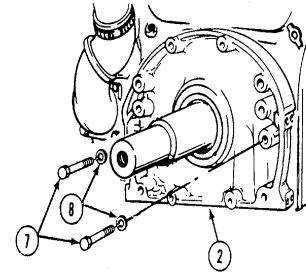
- (1) Coat sealing lip of front seal (1) with grease (Item 1, Appendix E).
- (2) Position front seal (1) in crankshaft cover (2) with sealing lip of front seal against inner face of crankshaft cover.
- (3) Drive front seal (1) into crankshaft cover (2).



- (4) Coat gasket (3) with grease (Item 1, Appendix E) and install on engine block (4).
- (5) Install crankshaft cover (2) on dowels (5) and engine block (4) while sliding oil seal (1) over crankshaft (6).

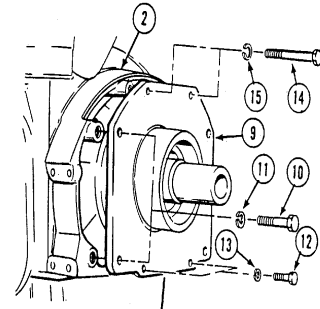
6-27. CRANKSHAFT COVER AND FRONT OIL SEAL - Continued

- (6) Install two screws (7) and lockwashers (8) in crankshaft cover (2).
- (7) Tighten two screws (7) to 80 to 90 lb-ft (108 to 122 N·m).



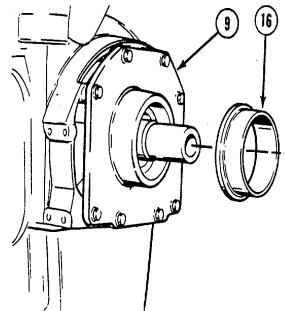
- (8) Position trunnion (9) against crankshaft cover (2).

- (9) Install four screws (10) and lockwashers (11) in trunnion (9).



- (10) Install two screws (12) and lockwashers (13).
- (11) Install two screws (14) and lockwashers (15).
- (12) Torque screws (1 2 and 14) to 30 to 35 lb-ft (41 to 47 N·m).

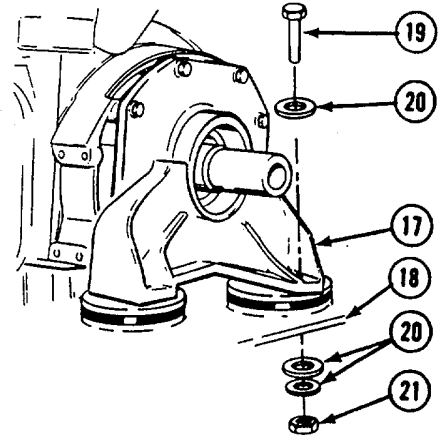
- (13) Torque screws (10) to 70 to 75 lb-ft (94 to 102 N·m).



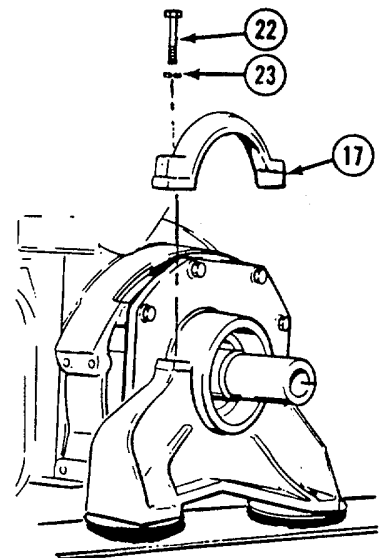
- (14) Coat ring (16) with light coat of grease (Item 1, Appendix E) and slide over trunnion (9).

6-27. CRANKSHAFT COVER AND FRONT OIL SEAL - Continued

- (15) Install bottom half of support (17) on engine support bracket (18).
- (16) Install two screws (19), six washers (20), and two locknuts (21) in support (17).



- (17) Install top half of support (17).
- (18) Install two screws (22) and lockwashers (23) to support (17).
- (19) Tighten screws (22) to 45 to 50 lb-ft (61 to 67 N·m).
- (20) Remove lifting device from engine.



c. Follow-on Maintenance.

- (1) Install oil pan (see para 5-27).
- (2) Install vibration damper (see para 6-26).

6-28. SYNCHRONOUS AND TIMING REFERENCE SENSOR

This task covers:

- a. **Adjustment**
 - b. **Follow-on Maintenance**
-

TOOLS REQUIRED

Tool Kit, General Mechanics, Automotive
(Appendix B, Section 1II, Item 1)

Crankshaft Position Timing Tool
(Appendix B, Section III, Item 39)
SRS/TRS Timing Tool (Appendix B, Section III, Item 40)

EQUIPMENT CONDITION

Electronic Control Unit Removed
(see para 5-28.)
Rocker Cover Removed (see para 4-140.)
Engine Brake Retarder Removed
(see para 6-34.)

MATERIALS/PARTS REQUIRED

Silicon Grease (Item 11, Appendix E)
Antiseize Compound (Item 4, Appendix E)

- a. Adjustment.

NOTE

Whenever a sensor assembly on a pulse wheel is replaced the sensor must be aligned in relationship to the teeth on the pulse wheel.

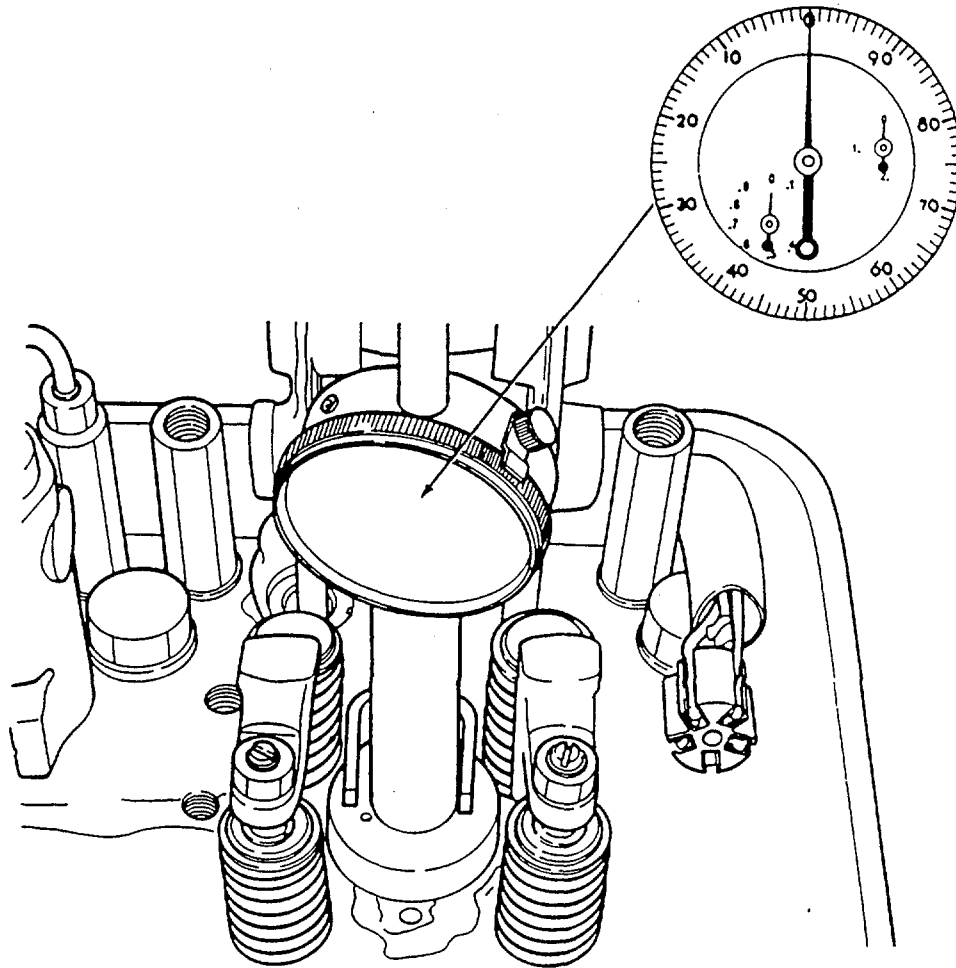
- (1) Refer to injector removal procedures in para 6-43 and remove the one-right (IR) injector. (Passenger side of engine - front of engine).

CAUTION

Failure to insert the spacer could result in damage to the dial indicator if the piston is already at the top of travel when the tool is installed.

- (2) Install the slotted spacer on the chain between the dial indicator and the top of the holder. Tighten the clamp screw.

6-28. SYNCHRONOUS AND TIMING REFERENCE SENSOR - Continued



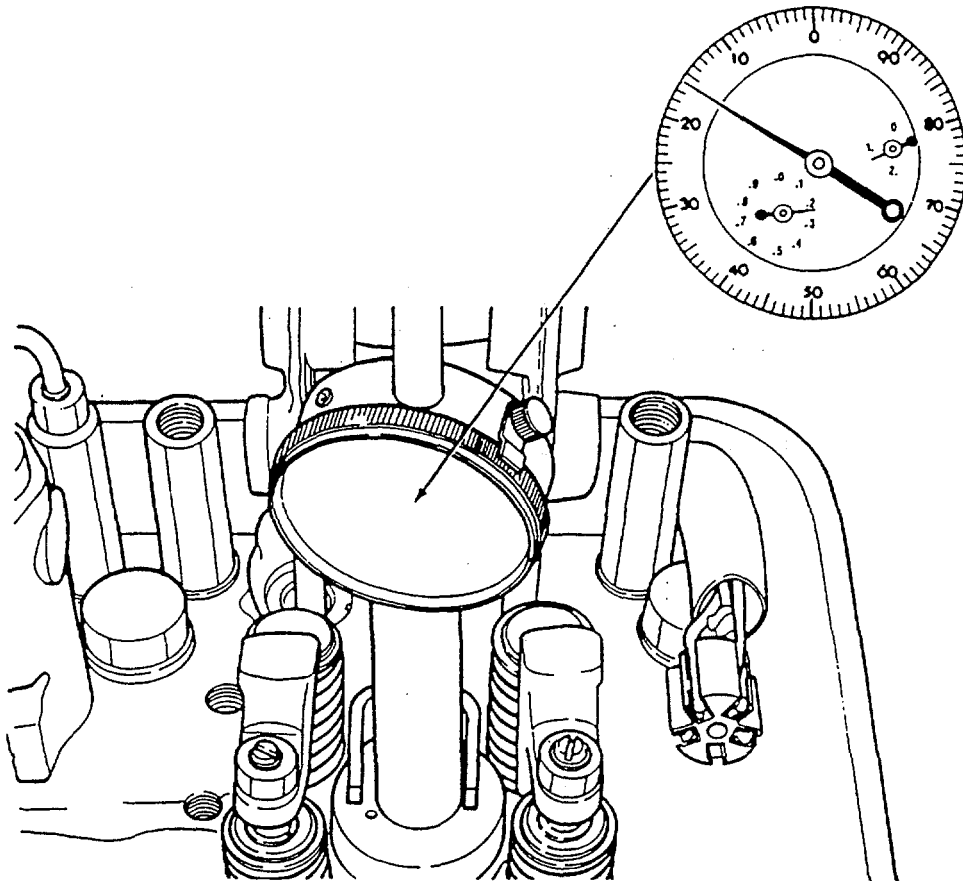
- (3) Insert dial indicator tool into the injector bore, install injector hold-down crab and tighten the bolt.
- (4) Turn the crankshaft slowly in the direction of rotation and note indicator movement. Stop turning when the dial hand just stops.
- (5) Turn the crankshaft slowly, opposite the direction of rotation, until the dial indicator hand just starts to move. The piston is now at top-dead-center.
- (6) Before piston downward travel can be measured, the dial indicator must be "zeroed". Loosen the clamp screw and remove the slotted spacer. Lower the dial indicator until the two smaller indicator hands are at "O" and the large hand is near "O".
- (7) Tighten the clamp screw and zero the large hand by turning the outer ring of the dial face. Tighten the bezel screw so the outer ring will not turn.

6-28. SYNCHRONOUS AND TIMING REFERENCE SENSOR - Continued

- (8) Turn the crankshaft slowly, in the direction of rotation, until the dial indicator pointer reads exactly 1.216" (30.89 mm) of piston travel.

NOTE

At this point, the teeth on the rear of the pulse wheel, located on the rear of the cam pulley, are in the proper location for positioning the sensors. The sensor bracket must be positioned correctly in relation to the engine front end plate. Use SRS/TRS timing tool (Appendix B, Section III, Item 40) to accomplish this task.



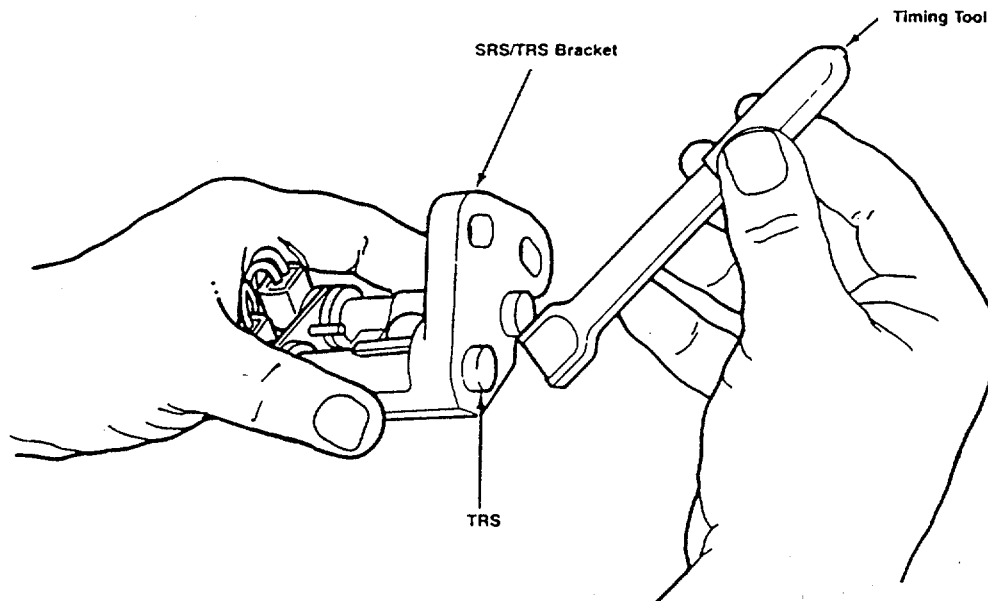
- (9) Tap the end of the camshaft pulley with a fiber mallet or rubber hammer to take up the camshaft end play.

6-28. SYNCHRONOUS AND TIMING REFERENCE SENSOR - Continued



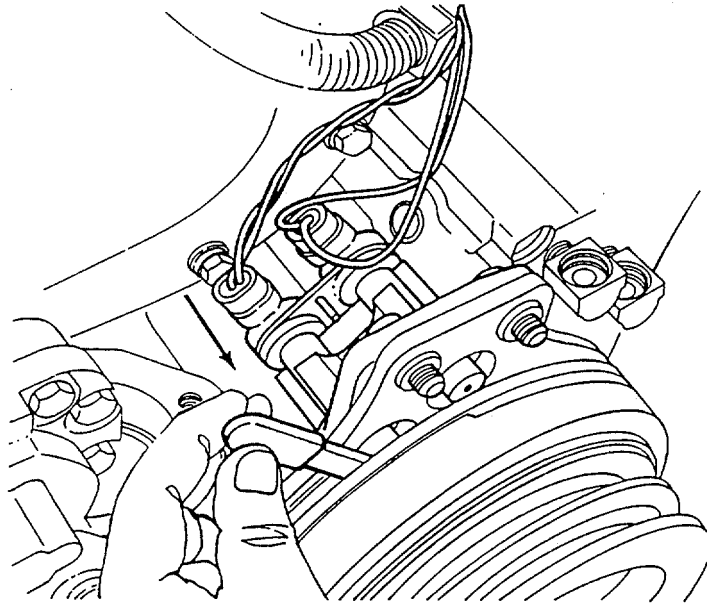
(10) Insert the SRS/TRS timing tool (Appendix B, Section 111, Item 40) between the double teeth on the pulse wheel, and the TRS so that the groove at the rear of the tool slides over the teeth in the pulse wheel.

(11) This operation is necessary if the sensor bracket has been loosened from its original mounting position. If the sensor bracket has not been loosened, go to Step 13. Position the SRS/TRS bracket so that the round end of the TRS is located in the half moon portion at the front of the timing tool.



6-28. SYNCHRONOUS AND TIMING REFERENCE SENSOR - Continued

- (12) Tighten the two allen bolts securing the SRS/TRS bracket to the engine front end plate.
- (13) Push gently on the end of the TRS so that the timing tool is in direct contact with the TRS and the raised metal teeth of the pulse wheel.



- (14) Tighten the sensor retaining clip socket head screw. If this adjustment has been done correctly, the resulting air gap between the pulse wheel teeth and the end of the sensor will be .020" ($\pm .002$ ") ($.508 \pm .051$ mm).
 - (15) Loosen and remove the injector crab hold-down bolt. Remove the injector crab.
 - (16) Remove the timing tool.
- b. Follow-on Maintenance.
- (1) Install electronic control unit (see para 5-28).
 - (2) Install rocker cover (see para 4-140).
 - (3) Install engine brake retarder (see para 6-34).

6-29. MAIN BEARINGS AND CRANKSHAFT**This task covers:**

- | | |
|-----------------------------------|---------------------------------|
| a. Removal | d. Assembly |
| b. Disassembly | e. Installation |
| c. Cleaning and Inspection | f. Follow-on Maintenance |

TOOLS REQUIRED

Tool Kit, General Mechanics, Automotive
(Appendix B, Section III, Item 1)

Shop Equipment, Automotive
Maintenance and Repair
(Appendix B, Section III, Item 4)

Set, Dial Indicator (Appendix B, Section III, Item 32)

MATERIALS/PARTS REQUIRED

Compound, International No. 2 (Item 37, Appendix E)
Oil, fuel, diesel (Item 41, Appendix E)
Tags, identification (Item 32, Appendix E)
Oil, lubricating (Item 10, Appendix E)
Cloth, crocus, abrasive (Item 34, Appendix E)
Cloth, cleaning, low-lint (Item 42, Appendix E)
Gauge, plastic (Item 43, Appendix E)

PERSONNEL REQUIRED

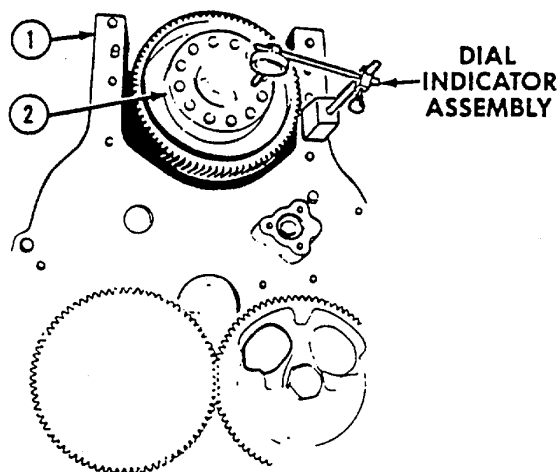
2

EQUIPMENT CONDITION

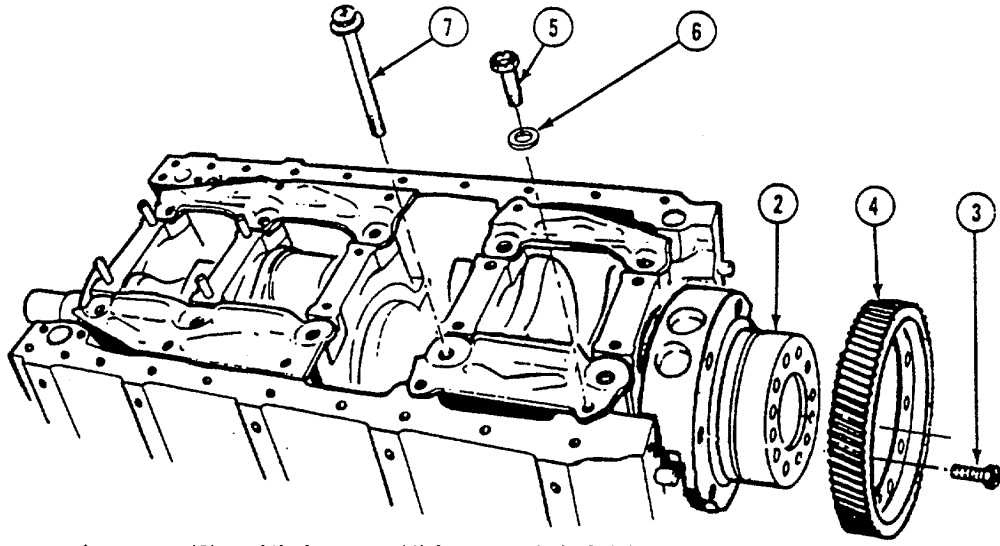
Engine Turned Upside Down on Engine Stand
Oil Pump Removed (see para 6-46.)
Crankshaft Cover and Front Seal Removed
(see para 6-27.)
Flywheel Housing and Rear Oil Seal Removed
(see para 6-31.)
Idle Gear Removed (see para 6-35.)
Pistons, Connecting Rods, and Liners Removed
(see para 6-32.)

a. Removal.

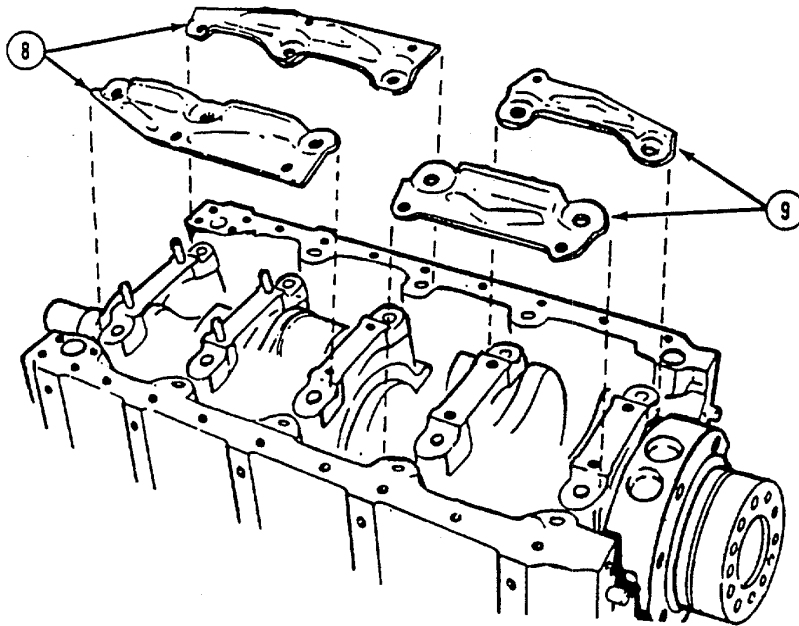
- (1) Install dial indicator on engine block (1) and push crankshaft (2) towards gage with pry bar while adjusting dial indicator to zero.
- (2) Note end play while another person removes pry bar and forces crankshaft (2) in opposite direction. Normal end play is .004 to .011" (.102 to .279 mm) with a maximum of .018" (.457 mm).



6-29. MAIN BEARINGS AND CRANKSHAFT - Continued

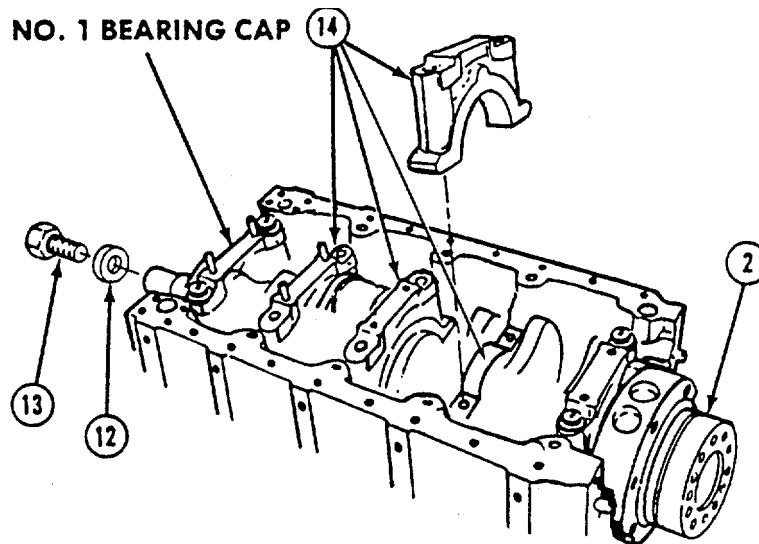
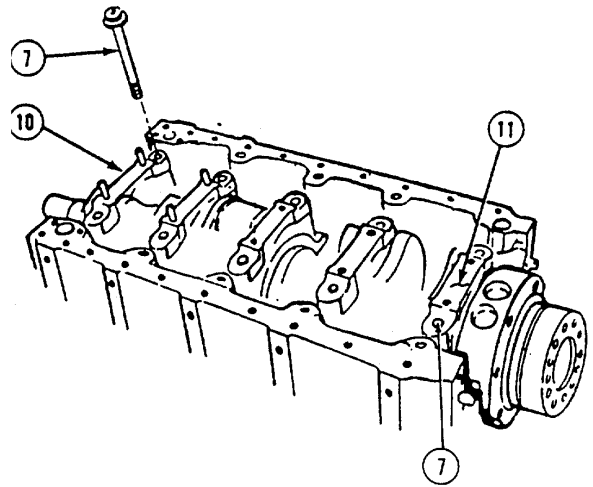


- (3) Remove six screws (3) and timing gear (4) from crankshaft (2).
- (4) Remove seven screws (5) and washers (6).
- (5) Remove ten screws (7).
- (6) Remove four bearing cap stabilizers (8 and 9).



6-29. MAIN BEARINGS AND CRANKSHAFT - Continued

- (7) Install two screws (7) each in front main bearing cap (10) and rear main bearing cap (11).
- (8) Torque four screws (7) to 50 lb-ft (68 N.m).
- (9) Strike front main bearing cap (10) and rear main bearing cap (11) with soft-face hammer.
- (10) Torque four screws (7) to 110 lb-ft (149 N.m).
- (11) Strike front main bearing cap (10) and rear main bearing cap with soft-face hammer.
- (12) Torque four screws (7) to 230 to 240 lb-ft (312 to 325 N.m).



- (13) Install spacer (12) and screw (13) on front of crankshaft (2).

NOTE

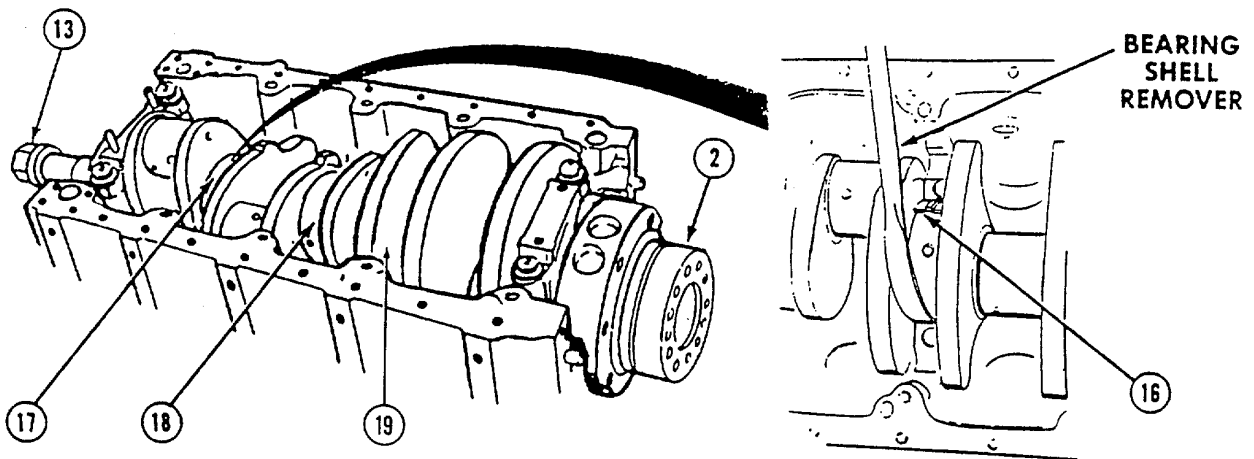
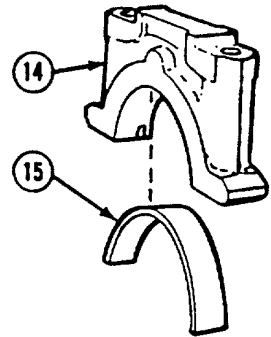
Bearing caps are numbered from 1 to 5 for later installation.
 (14) Remove three center bearing caps (14).

6-29. MAIN BEARINGS AND CRANKSHAFT - Continued

NOTE

If bearing shells will be reused, tag and mark them for installation.

- (15) Remove lower bearing shells (15) from three center bearing caps (14).



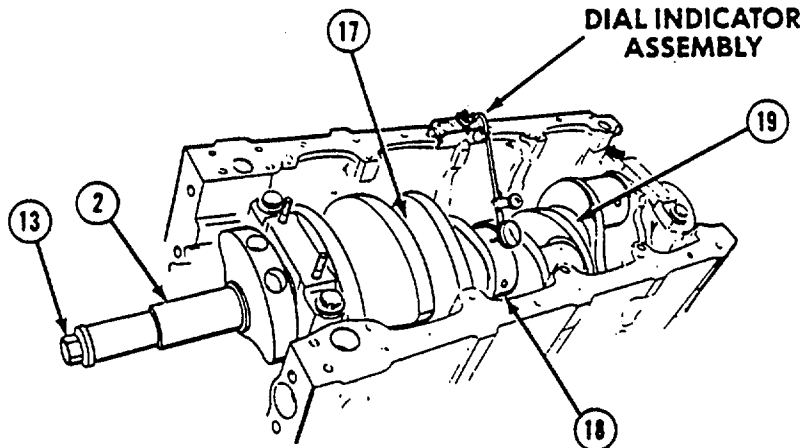
- (16) Push upper bearing shell (16) out from under crankshaft main bearing journal No. 2 (17) with bearing shell remover.

NOTE

Turn crankshaft to aid in removing bearing shell from under bearing journal.

- (17) Remove upper bearing shell (16) while turning screw (13) to turn crankshaft (2).
 (18) Repeat steps (16) and (17) for crankshaft main bearing journals No. 3 (18) and No. 4 (19).

6-29. MAIN BEARINGS AND CRANKSHAFT - Continued

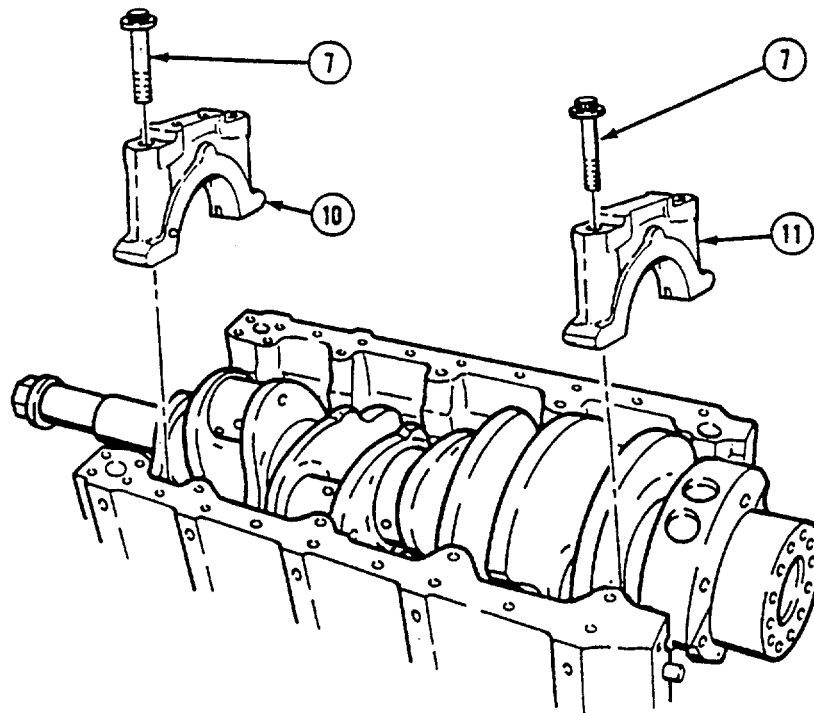


- (19) Turn screw (13) to turn crankshaft (2), while reading runout of main bearing journals (17, 18, and 19) with dial indicator.

NOTE

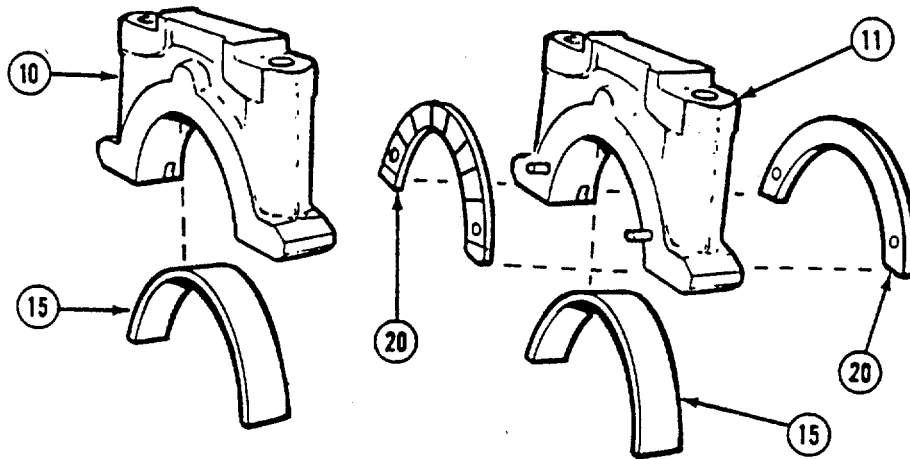
If crankshaft has too much runout, do steps (21) to (27) to remove crankshaft, do steps (28) to (39) to see if bad bearing shell caused crankshaft runout. If runout is within limits only do steps (21) to (27).

- (20) Maximum allowable runout for journals (17 to 19) is 0.002 in. (0.05 mm). Maximum allowable runout for journal (18) is 0.004 in. (0.10 mm).



- (21) Remove four screws (7) and two bearing caps (10 and 11).

6-29. MAIN BEARINGS AND CRANKSHAFT - Continued

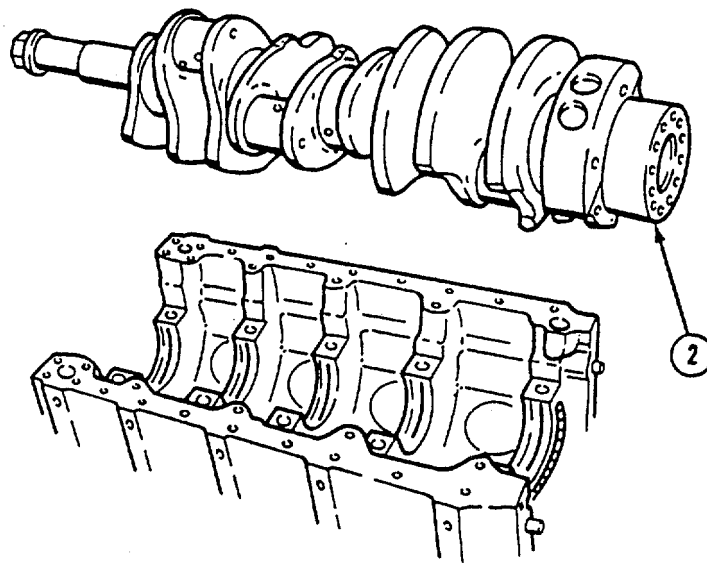


- (22) Remove lower bearing shells (15) from bearing caps (10 and 11).

NOTE

Tag and mark thrust washers before removal.

- (23) Remove thrust washers (20) from bearing cap (11).

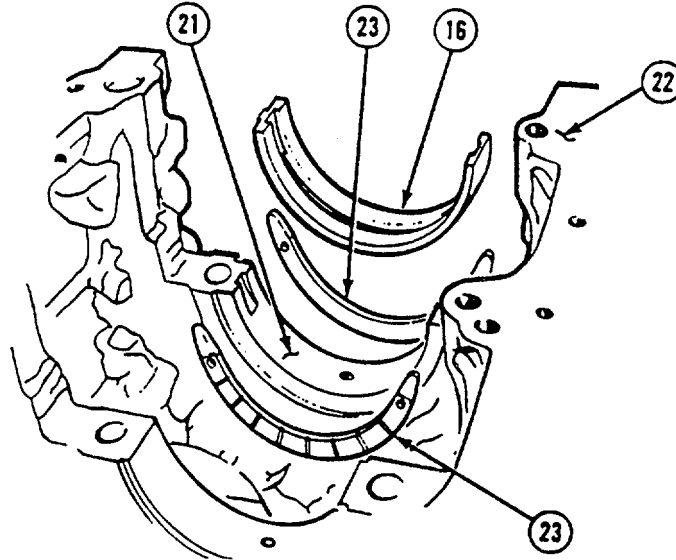


CAUTION

Crankshaft may be bent if stored on side. Store crankshaft on end.

- (24) Attach suitable lifting device to crankshaft (2).

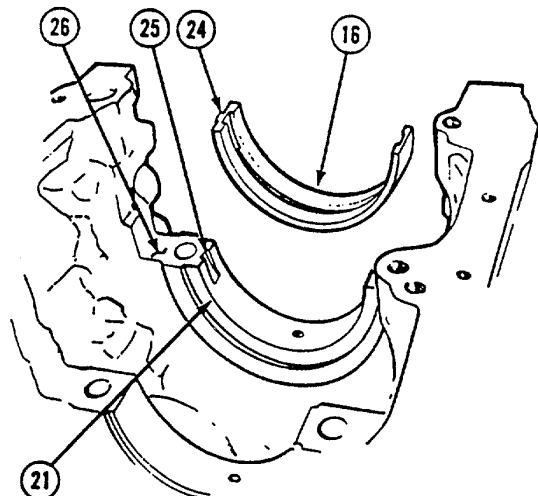
6-29. MAIN BEARINGS AND CRANKSHAFT - Continued



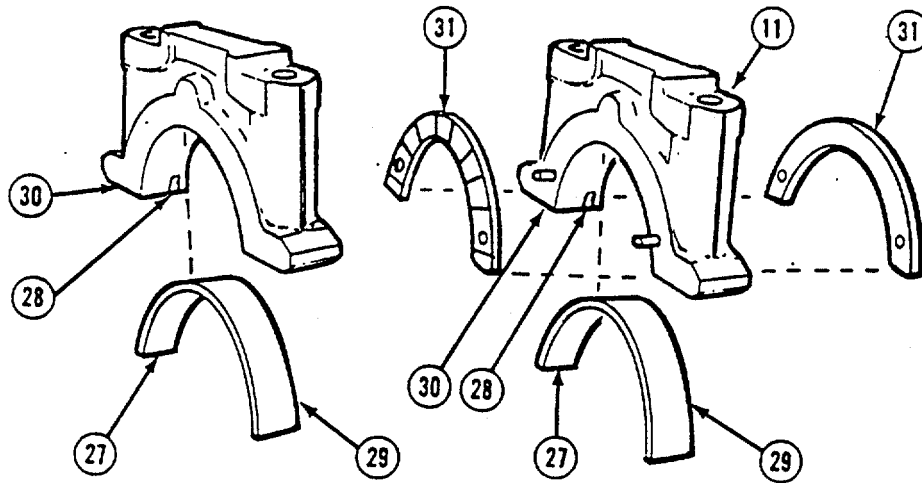
WARNING

Serious injury could occur if heavy equipment is moved/lifted without sufficient personnel to do the job. Use proper physical lifting procedures or use a suitable lifting device or dolly. Wear safety shoes, gloves and other suitable protective clothing. Area should be clear of other personnel. Serious injury or death can result from falling objects.

- (25) Guide crankshaft (2) while operating lifting device to remove crankshaft.
- (26) Remove two remaining upper bearing shells (16) from bearing surfaces (21) at front and rear of engine block (22).
- (27) Remove two thrust washers (23) from rear bearing surface (21).
- (28) Align tab (24) on upper bearing shell (16) with slot (25) on engine block rear bearing surface (21).
- (29) Install bearing shell (16). Make sure both ends of bearing shell are flush with bearing cap mounting surfaces (26). Install another bearing shell on front bearing surface.



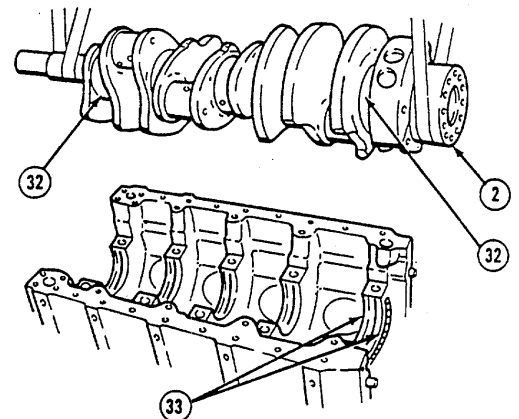
6-29. MAIN BEARINGS AND CRANKSHAFT - Continued



- (30) Align tabs (27) with slots (28) and install bearing shells (29) making sure both ends of bearing shells are flush with bearing cap mounting surfaces (30).
- (31) Install two thrust washers (31) on rear bearing cap (11) so that grooved sides of thrust washers point away from bearing cap.
- (32) Apply oil (item 10, Appendix E) to crankshaft front and rear main bearing journals (32).

WARNING

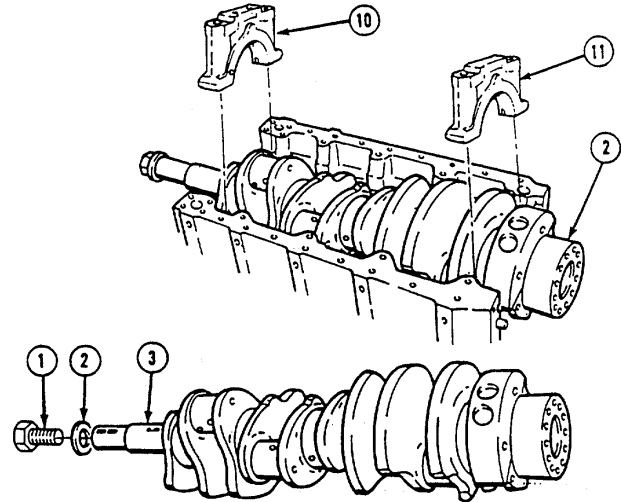
Serious injury could occur if heavy equipment is moved/lifted without sufficient personnel to do the job. Use proper physical lifting procedures or use a suitable lifting device or dolly. Wear safety shoes, gloves and other suitable protective clothing. Area should be clear of other personnel. Serious injury or death can result from falling objects.



- (33) Attach suitable lifting device to crankshaft (2).
- (34) Guide crankshaft (2) while operating lifting device to install crankshaft.
- (35) Push crankshaft (2) to front and install thrust washer (33). Push crankshaft to rear and install other thrust washer.

6-29. MAIN BEARINGS AND CRANKSHAFT - Continued

- (36) Install two bearing caps (10 and 11).
- (37) Do steps (7) to (12).
- (38) Do steps (19) and (20) but disregard note between steps. If crankshaft runout is still too high replace crankshaft (2).
- (39) Do steps (21) to (27).

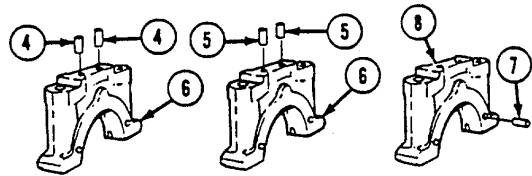


b. Disassembly.

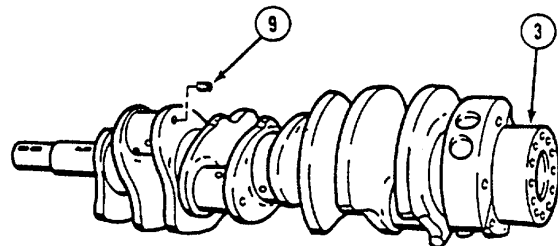
- (1) Remove screw (1) and spacer (2) from crankshaft (3).

NOTE

Following steps will be done only to remove loose or broken plugs, studs, and dowels. Steps (2) through (4) are not necessary for ordinary cleaning and inspection.



- (2) Remove four studs (4 and 5) from No. 1 and No. 2 bearing caps (6).
- (3) Remove four dowel pins (7) from rear bearing cap (8).
- (4) Remove four plugs (9) from crankshaft.

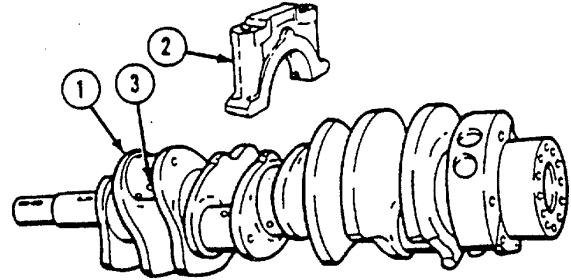


6-29. MAIN BEARINGS AND CRANKSHAFT - Continued

c. Cleaning/Inspection.

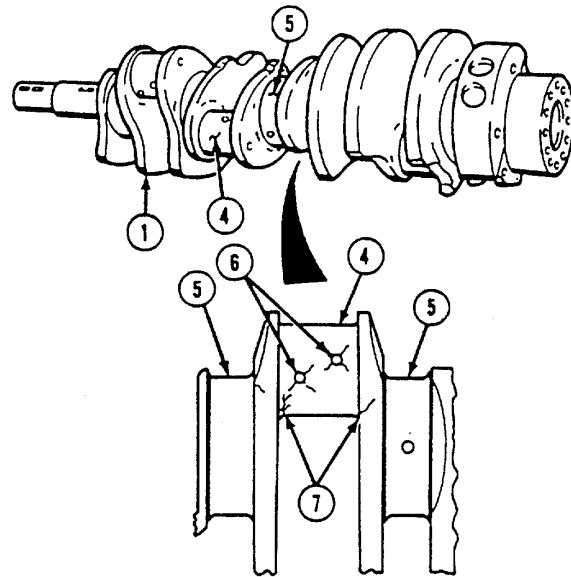
WARNING

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine. Smoking is prohibited while working with fuel.

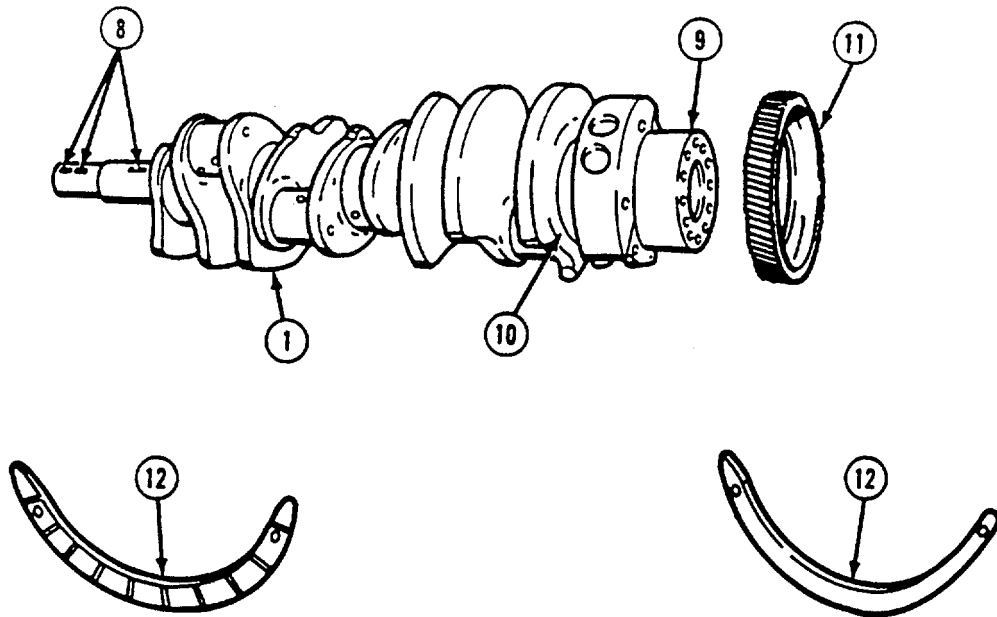


- (1) Clean crankshaft (1) and bearing caps (2) with clean diesel fuel (Item 41, Appendix E) and a lint free cloth (Item 42, Appendix E).

- (2) Flush oil passages (3) in crankshaft (1).
- (3) Visually inspect crankshaft (1) for signs of burning or overheating.
- (4) Inspect crankshaft connecting rod journals (4) and main bearing journals (5) for deep scratches. Replace crankshaft (1) if damaged.
- (5) Inspect connecting rod journals (4) and main bearing journals (5) for signs of cracks at connecting rod journal oil holes (6) or at joining points (7) of connecting rod journal and main bearing journals. Replace crankshaft (1) if damaged.



6-29. MAIN BEARINGS AND CRANKSHAFT - Continued



- (6) Inspect crankshaft keyways (8) for cracks or damage. Replace crankshaft (1) if damaged.
- (7) Inspect rear oil seal (9) contact surface for deep scratching. If scratches cannot be smoothed out with crocus cloth, replace crankshaft (1).
- (8) Inspect crankshaft thrust surfaces (10) for grooving. Replace crankshaft (1) if deep grooves have been scratched in thrust surfaces.
- (9) Inspect timing gear (11) for chipped teeth. Replace if damaged. See table C.
- (10) Measure and note thickness of two thrustwashers (12).

Table a. Main Bearing and Connecting Rod Journal Diameter Specifications

Minimum Diameter (Main Bearing Journals)(13, 14, 15, 16, and 17).....	4.4985 in.	(114.26 mm)
(Connecting Rod Journals)(18).....	2.9985 in.	(76.16 mm)
Maximum Journal Out of Round (All Journals)	0.0005 in.	(0.013 mm)
Maximum Taper (All Journals).....	0.0004 in.	(0.010 mm)

Table b. Main Bearing and Connecting Rod Journal Width Specifications

Maximum Width (Main Bearing Journals) (13, 15, 16, and 17).....	1.505 in.	(38.23 mm)
(Main Bearing Journal) (14)	1.501 in.	(38.12 mm)
(Connecting Rod Journals)(18).....	2.652 in.	(67.36 mm)

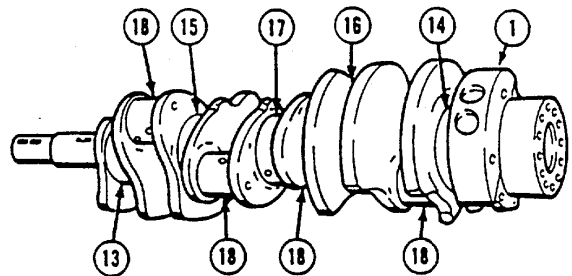
6-29. MAIN BEARINGS AND CRANKSHAFT - Continued

Table c. Crankshaft End Play Specifications

Crankshaft end play found in step (18)	Use this size thrust washer
Less than 0.016in. (0.41 mm)	Standard 0.119-0.122in. (3.02-3.1 mm)
0.017 to 0.026 in. (0.43 to 0.66 mm)	0.005 in. (.127 mm) Oversized 0.124-0.127 in. (3.15-3.23 mm)
0.027 to 0.036 in. (0.69 to 0.91 mm)	0.010 in. (.254 mm) Oversized 0.129-0.132 in. (3.28-3.35 mm)
More than 0.036 in. (0.91 mm)	Replace crankshaft

NOTE

Refer to Table a. for steps (11) to (13).
 Refer to Table b. for steps (14) and (15).
 Refer to Table c. for steps (16) to (19).



- (11) Measure diameter of main bearing journals (13, 14, 15, 16 and 17) at several different spots on each.
- (12) Measure diameter of connecting rod journals (18) at several different spots on each.
- (13) Replace crankshaft (1) if journals (13, 14, 15, 16, 17, and 18) are outside limits shown on Table a.
- (14) Measure width of main bearing journals (13, 14, 15, 16, and 17) and connecting rod journals (18).
- (15) Replace crankshaft if journals (13, 14, 15, 16, 17, and 18) are outside limits shown on Table b.
- (16) Add together thickness of two bottom thrust washers measured in step (10).
- (17) Subtract total in step (16) from 0.244 in. (6.20 mm).
- (18) Subtract result in step (17) from crankshaft end play measured in section a. step (2).
- (19) Find amount of crankshaft end play from step (18) on Table c. and read what size thrust washers to use.

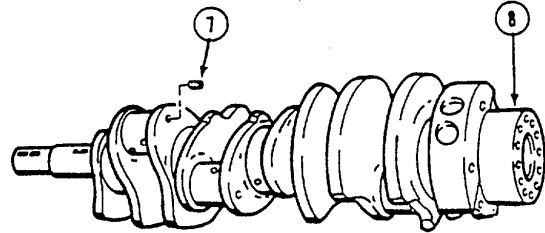
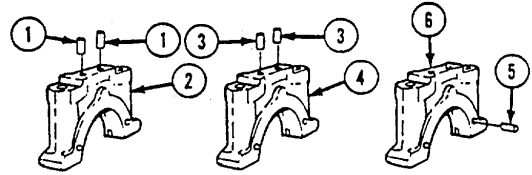
6-29. MAIN BEARINGS AND CRANKSHAFT-Continued

d. Assembly.

NOTE

Do steps (1) to (4) only if the studs, dowels, and plugs have been removed.

- (1) Install two longer studs (1) in front bearing cap (2).
- (2) Install two shorter studs (3) in second bearing cap (4).
- (3) Install four dowel pins (5) in rear bearing cap (6).
- (4) Install four plugs (7) in crankshaft (8).



e. Installation.

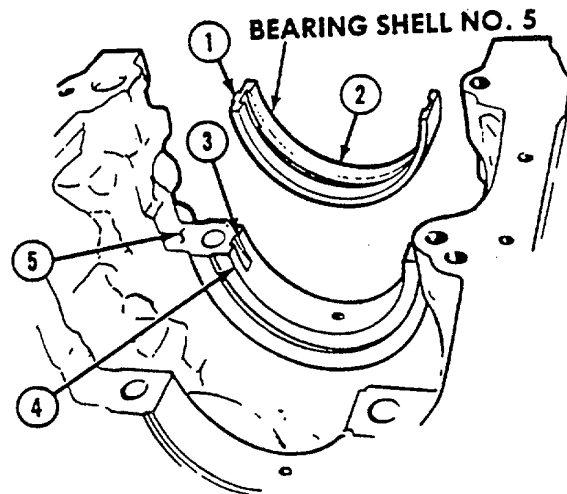
CAUTION

Do not handle bearing shells and thrust washers more than necessary for installation. Sweat from hands can damage bearing shells and thrust washers.

NOTE

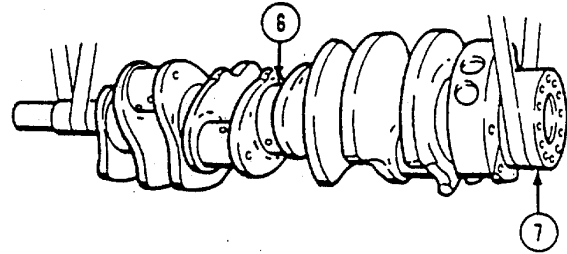
Bearing surfaces are numbered 1 to 5 from front to rear of engine block. Repeat steps (1) and (2) for four other bearing surfaces.

- (1) Align tab (1) on upper bearing shell (2) with slot (3) on engine block bearing surface (4).
- (2) Install shell (2). Make sure both ends of shell are flush with bearing cap mounting surfaces (5).
- (3) Apply oil (Item 10, Appendix E) to bearing shells (2) after installation.



6-29. MAIN BEARINGS AND CRANKSHAFT-Continued

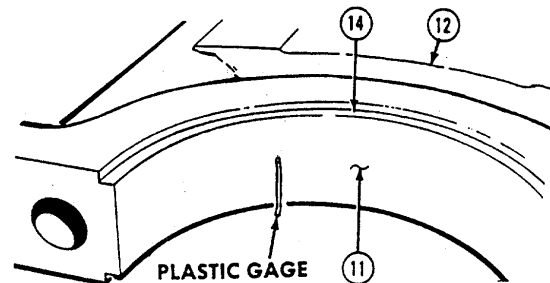
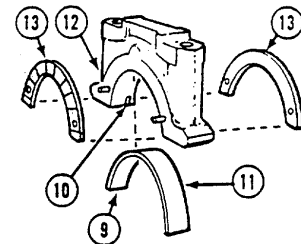
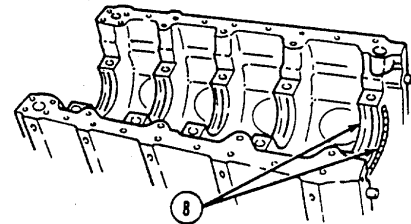
- (4) Apply oil (item 10, Appendix E) to five crankshaft main bearing journals (6).
- (5) Attach suitable lifting device to crankshaft (7).



WARNING

Serious injury could occur if heavy equipment is moved/lifted without sufficient personnel to do the job. Use proper physical lifting procedures or use a suitable lifting device or dolly. Wear safety shoes, gloves and other suitable protective clothing. Area should be clear of other personnel. Serious injury or death can result from failing objects.

- (6) Operate lifting device while installing crankshaft (7).
- (7) Push crankshaft (7) to front and install thrust washer (8). Push crankshaft (7) to rear and install other thrust washer.
- (8) Align tab (9) with slot (10) and install bearing shell (11), making sure both ends of bearing shell are flush with bearing cap (12) mounting surfaces.
- (9) Install four bearing shells (9) on other bearing caps (12).
- (10) Install two thrust washers (13) on rear bearing cap (12) so that grooved sides of thrust washers point away from bearing cap.



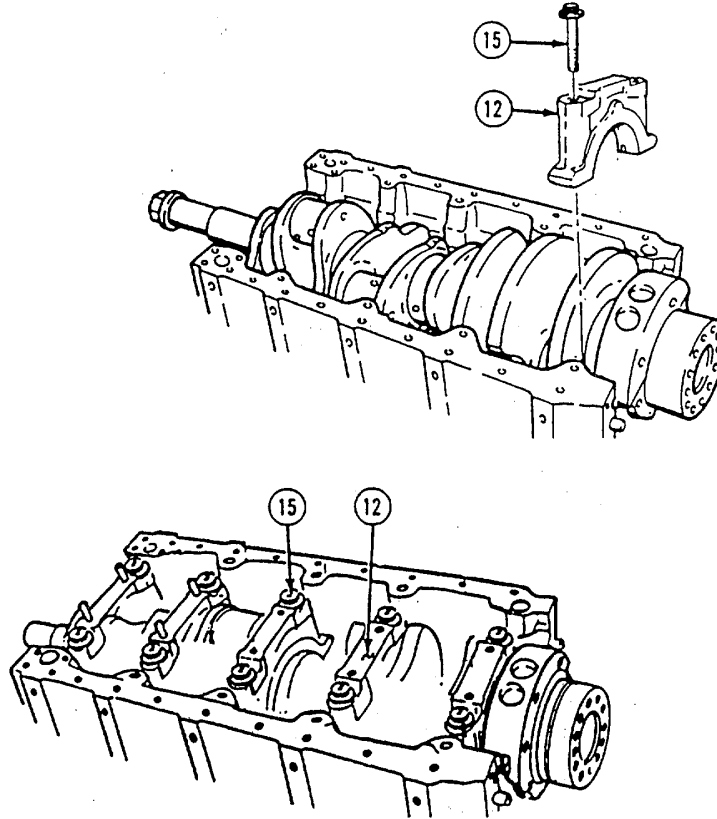
NOTE

Wipe oil (item 10, Appendix E) from bearing shells and crankshaft main bearing journals before doing steps (11) to (13).

- (11) Place strip of plastic gauge across width of bearing shell (11) 1/4-in. (6 mm) from center (14).
- (12) Do step (11) for four other bearing caps (12).

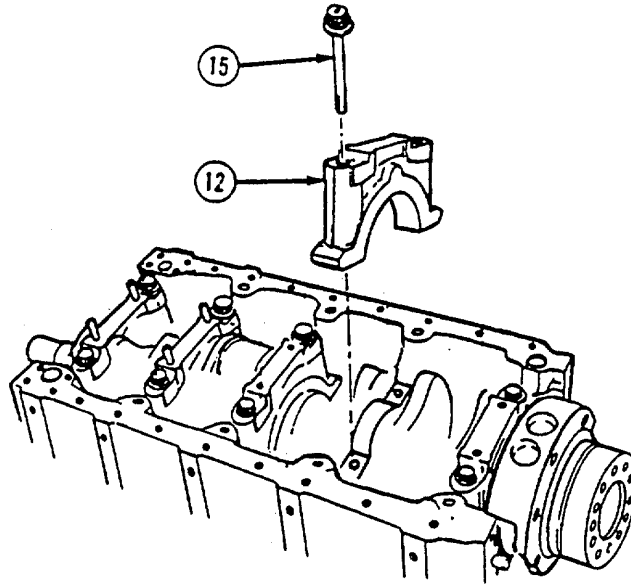
6-29. MAIN BEARINGS AND CRANKSHAFT-Continued

- (13) Install five bearing caps (12).
- (14) Strike bearing caps (12) with soft-face hammer.
- (15) Install ten screws (15).

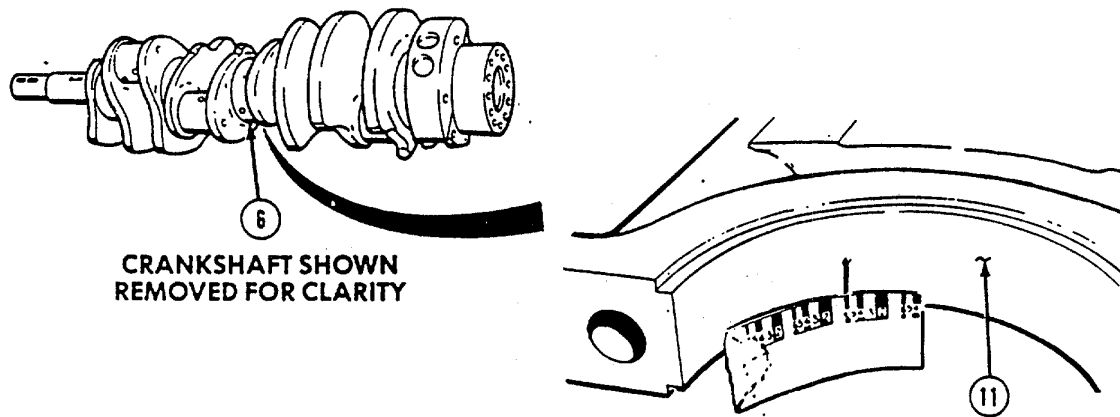


- (16) Torque eight screws (15) for first four bearing caps to 50 lb-ft (68 N·m).
- (17) Strike bearing caps (12) with soft-face hammer.
- (18) Torque eight screws (15) to 110 lb- ft (149 N·m).
- (19) Torque eight screws (15) to 230 to 240 lb-ft (312 to 325 N·m).

6-29. MAIN BEARINGS AND CRANKSHAFT-Continued



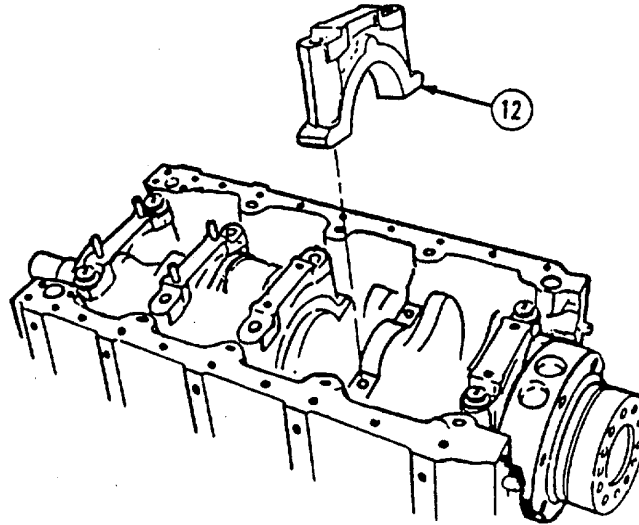
(20) Remove ten screws (15) and five bearing caps (12).



(21) Measure width of plastic gauge with measuring strip. Width must be no more than 0.006-in. (0.152 mm). If greater, replace bearing shells (11).

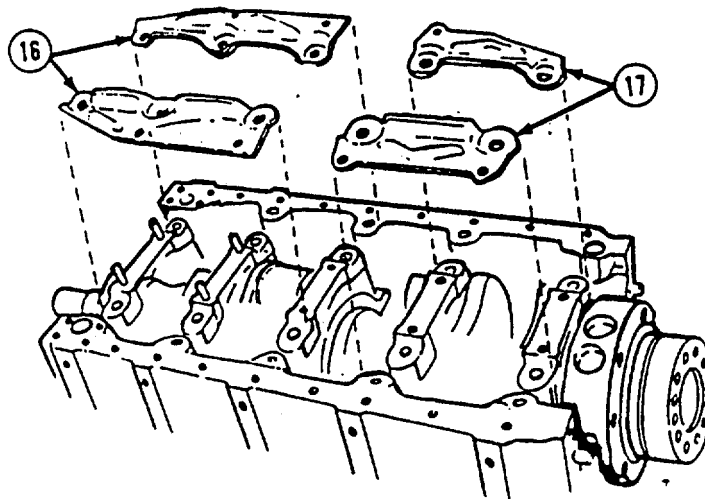
(22) Wipe plastic gauge from five main bearing journals (6) or bearing shells (11) and apply lubricating oil (Item 10, Appendix E) to those surfaces.

6-29. MAIN BEARINGS AND CRANKSHAFT-Continued



(23) Install five bearing caps (12).

(24) Strike bearing caps (12) with soft-face hammer.



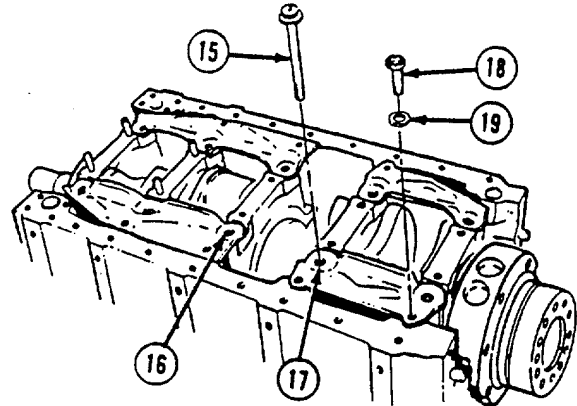
(25) Install four bearing cap stabilizers (16 and 17).

6-29. MAIN BEARINGS AND CRANKSHAFT-Continued

- (26) Install seven screws (18) and washers (19). Tighten screws finger tight.

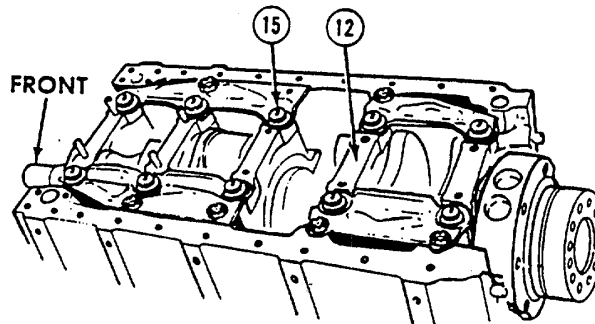
WARNING

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



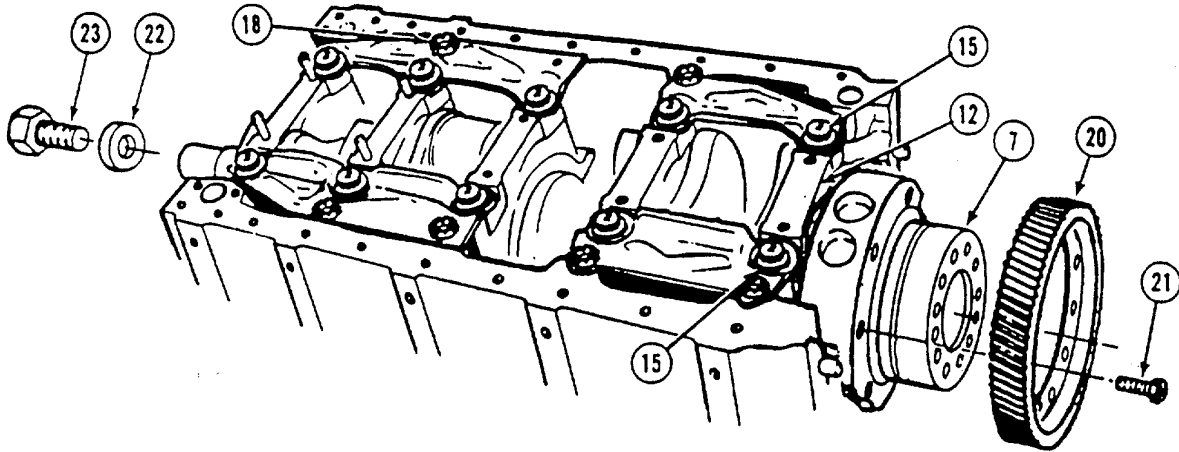
- (27) Apply small amount of compound (Item 37, Appendix E) to threads of ten screws (17A) and surfaces of stabilizers (16 and 17).

- (28) Install ten screws(15).



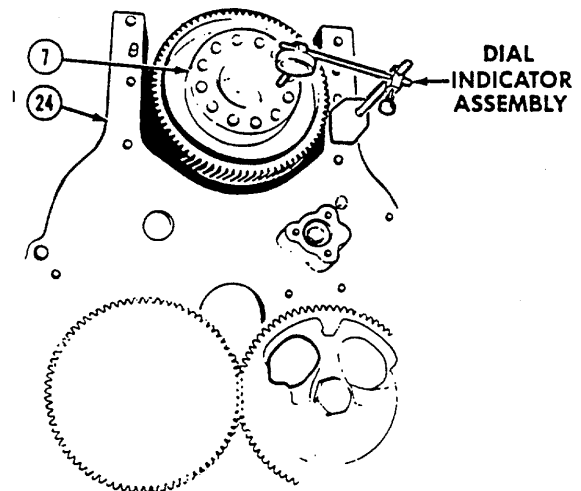
- (29) Strike bearing caps (12) with soft-face hammer.
- (30) Tighten eight screws (15) on four front bearing caps (12) to 50 lb-ft (68 N·m) starting with the middle two caps.
- (31) Strike bearing caps (12) with soft-face hammer and tighten eight screws (15) to 110 lb-ft (149 N·m).
- (32) Strike bearing caps (12) with soft-face hammer and tighten screws (15) to 230 to 240 lb-ft (312 to 325 N·m).

6-29. MAIN BEARINGS AND CRANKSHAFT-Continued



- (33) Tighten two screws (15) on rear bearing cap (12) to 50 lb-ft (68 N-m).
- (34) Strike both ends of crankshaft (7) two or three blows with soft-face hammer.
- (35) Strike rear bearing cap (12) with soft-face hammer.
- (36) Tighten two screws (15) on rear bearing cap (12) to 110 lb-ft (149 N-m).
- (37) Strike rear bearing cap (12) with soft hammer.
- (38) Torque two screws (15) on rear bearing cap (12) to 230 to 240 lb-ft (312 to 325 N-m).
- (39) Torque seven screws (18) to 70 to 75 lb-ft (95 to 102 N-m).
- (40) Install timing gear (20) and six screws (21).
- (41) Install spacer (22) and screw (23) on end of crankshaft (7).
- (42) Hold front end of crankshaft (7) while tightening six screws (21) to 35 to 39 lb-ft (47 to 53 N-m).
- (43) Remove screw (23) and spacer (22) from crankshaft (7).

- (44) Install dial indicator on engine block (24). Push crankshaft (7) towards gauge with pry bar while adjusting dial indicator to zero.
- (45) Read end play while removing pry bar and forcing crankshaft in opposite direction. Minimum end play is 0.004 in. (0.102 mm) and maximum end play is 0.018 in. (0.457 mm). If end play is outside limits, replace crankshaft (7).



6-29. MAIN BEARINGS AND CRANKSHAFT-Continued

f. Follow-on Maintenance.

- (1) Install pistons, connecting rods, and liners (see para 6-32).
- (2) Install idler gear (see para 6-35).
- (3) Install flywheel housing and rear oil seal (see para 6-31).
- (4) Install crankshaft cover and front oil seal (see para 6-27).
- (5) Install oil pump (see para 6-46).

6-30. FLEXPLATE**This task covers:**

- a. Removal
- b. Installation

- c. Follow-on Maintenance

TOOLS REQUIRED

Tool Kit, General Mechanics, Automotive
(Appendix B, Section III, Item 1)

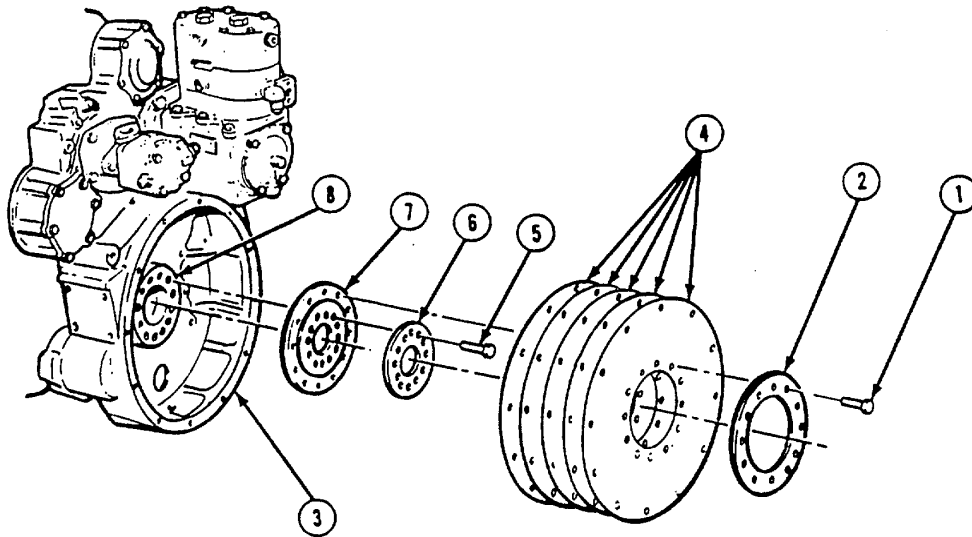
Shop Equipment, Automotive
Maintenance and Repair
(Appendix B, Section III, Item 4)

MATERIALS/PARTS REQUIRED

Compound, international, No. 2
(Item 37, Appendix E)

EQUIPMENT CONDITION

Transmission removed from engine
(see para 6-47.)

a. Removal.

- (1) Remove 12 screws (1) and plate (2), from flywheel housing (3).

NOTE

Mark flexplate disks for proper installation.

- (2) Remove five disks (4) from flywheel housing (3).
- (3) Remove 12 screws (5), plate (6), and hub (7) from crankshaft (8).

6-30. FLEXPLATE-Continuedb. Installation.

- (1) Align screw holes in hub (7) with crankshaft (8) in flywheel housing (3).

WARNING

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

- (2) Apply international No. 2 compound (Item 37, Appendix E) to 12 screws (5).
- (3) With rough side toward engine, install hub (7), plate (6), and 12 screws (5). Tighten screws to 50 lb-ft (67 N·m) and an additional ¼ turn.
- (4) Apply international No. 2 compound (Item 37, Appendix E) to 12 screws (1).
- (5) Align screw holes in five disks (4) and plate (2) with hub (7).
- (6) Install five disks (4), plate (2), and 12 screws (1). Tighten screws to 100 lb-ft (135 N·m).

c. Follow-on Maintenance.

- (1) Install transmission (see para 6-47).

6-31. FLYWHEEL HOUSING AND REAR OIL SEAL

This task covers:

- a. Removal
- b. Installation

c. Follow-on Maintenance

TOOLS REQUIRED

Tool Kit, General Mechanics, Automotive (Appendix B, Section III, Item 1)
 Shop Equipment, Automotive Maintenance and Repair (Appendix B, Section III, Item 4)
 Stud set alignment (Appendix B, Section III, Item 41)
 Installer, seal (Appendix B, Section III, Item 42)
 Lifting eyes (Appendix B, Section III, Item 43)
 Oil Seal (Figure 112, Appendix F)

MATERIALS/PARTS REQUIRED

Oil, lubricating, Item 10, Appendix E
 Grease, automotive and artillery (Item 1, Appendix E)
 Compound, sealing pipe thread (Item 2, Appendix E)
 Compound, sealing, lubricating (Item 31, Appendix E)
 Tags, identification (Item 32, Appendix E)
 Cloth, crocus, abrasive (Item 34, Appendix E)
 Gaskets (Figure 112, Appendix F)

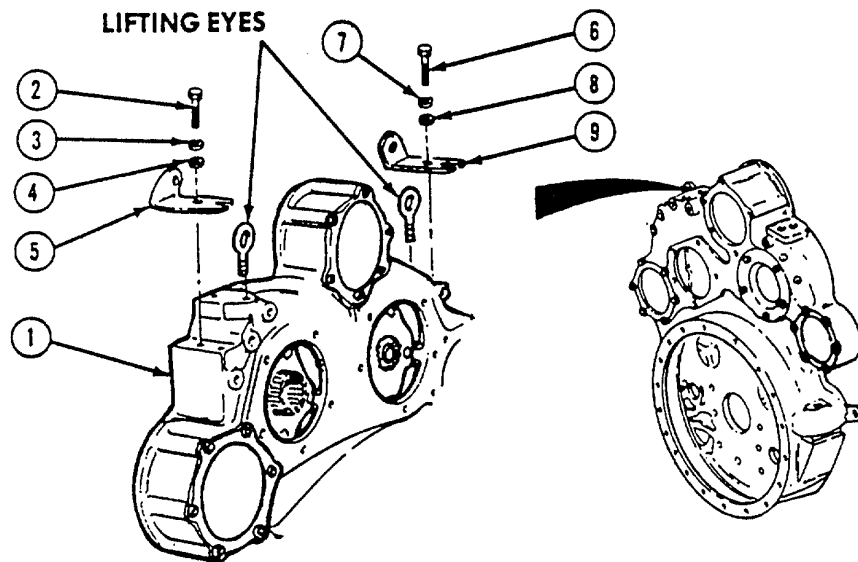
PERSONNEL REQUIRED

2

EQUIPMENT CONDITION

Air Compressor Removed (see para 5-17.)
 Starting Motor Removed (see para 5-12.)
 Power Steering Pump Removed (see para 5-26.)
 Engine Removed (see para 5-11.)
 Oil Pan Removed (see para 5-27.)
 Flexplate Removed (see para 6-30.)
 Alternator Drive Removed (see para 6-42.)

a. Removal.



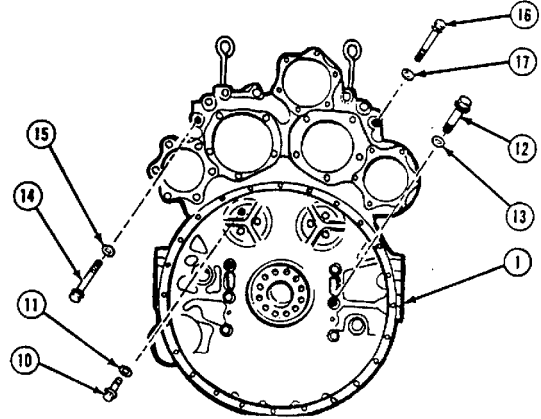
- (1) Install two lifting eyes (Appendix B, Section III, Item 43).
- (2) Support flywheel housing (1) with suitable lifting device.
- (3) Remove three screws (2), lockwashers (3), washers (4), and left bank bracket (5).
- (4) Remove three screws (6), lockwashers (7), washers (8), and right bank bracket (9).

6-31. FLYWHEEL HOUSING AND REAR OIL SEAL- Continued

NOTE

Tag and mark all screws.

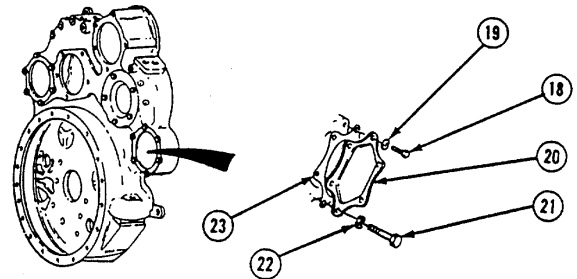
- (5) Remove six screws (10) and washers (11) from flywheel housing (1).
- (6) Remove six screws (12) and lockwashers (13) from flywheel housing (1).
- (7) Remove four screws (14) and washers (15) from flywheel housing (1).



NOTE

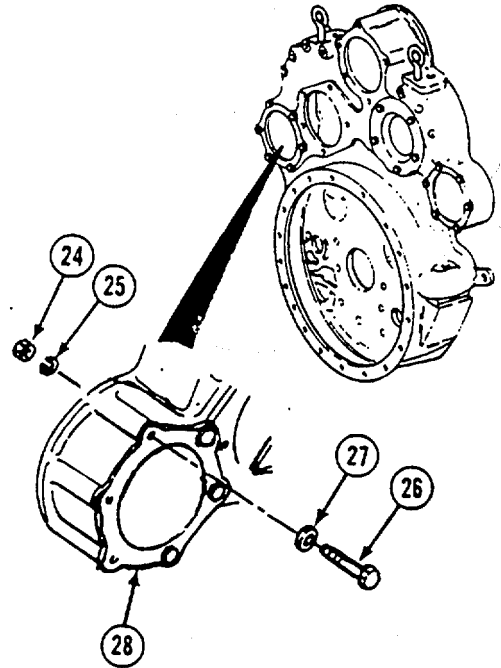
Screws (16) and washers (17) must not be reused.

- (8) Remove three screws (16) and washers (17) from flywheel housing (1).
- (9) Remove five screws (18) and lockwashers (19) from access cover (20).
- (10) Remove screw (21) and copper washer (22).
- (11) Remove access cover (20) and gasket (23). Discard gasket.

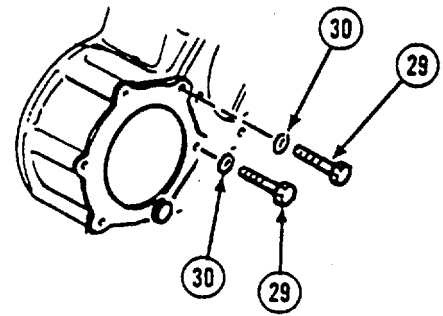


6-31. FLYWHEEL HOUSING AND REAR OIL SEAL- Continued

(12) Remove three nuts (24), lockwashers (25), screws (26), and washers (27) from access cover (28).

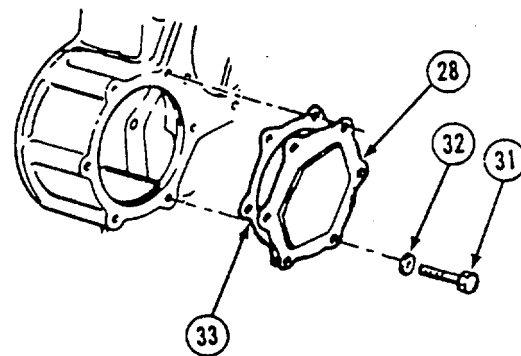


(13) Remove two screws (29) and lockwashers (30).



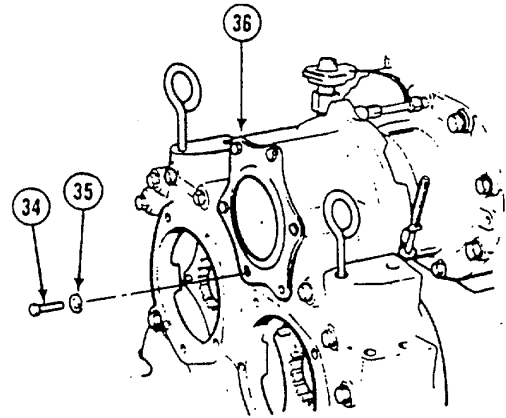
(14) Remove screw (31) and washer (32).

(15) Remove access cover (28) and gasket (33). Discard gasket.

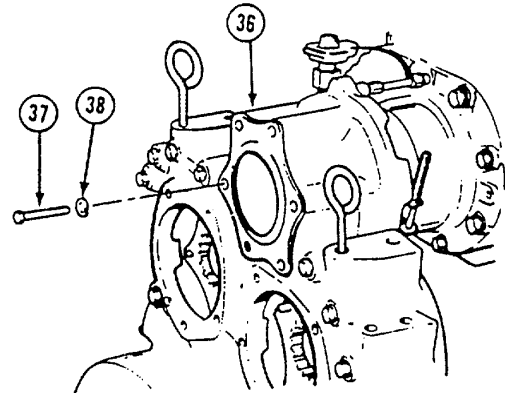


6-31. FLYWHEEL HOUSING AND REAR OIL SEAL- Continued

- (16) Remove two screws (34) and lockwashers (35) from access plate (36).



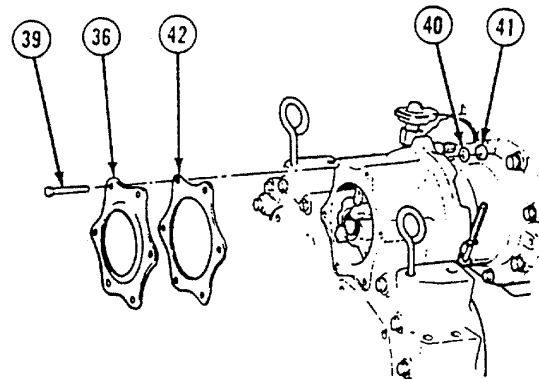
- (17) Remove three screws (37) and lockwashers (38) from access plate (36).



NOTE

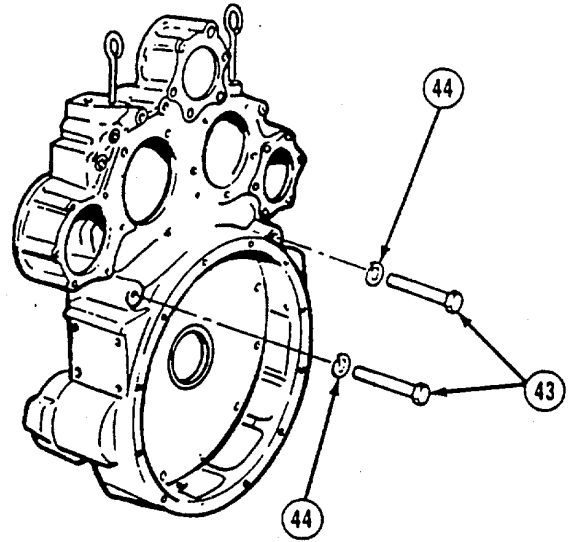
Copper washer must not be reused.

- (18) Remove screw (39), copper washer (40), and nut (41).
- (19) Remove access plate (36) and gasket (42). Discard gasket.

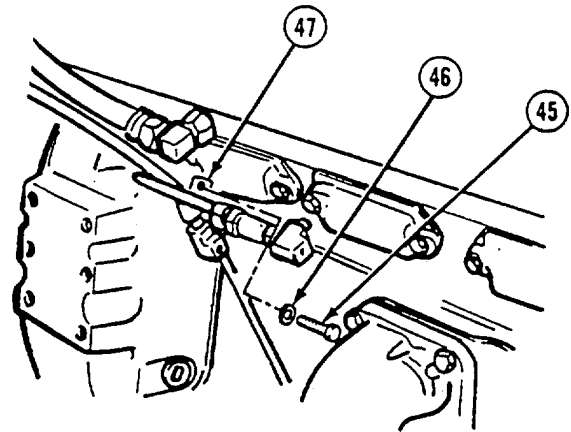


6-31. FLYWHEEL HOUSING AND REAR OIL SEAL- Continued

(20) Remove two screws (43) and lockwashers (44).



(21) Remove screw (45) and washer (46) from air box drain retaining clip (47).



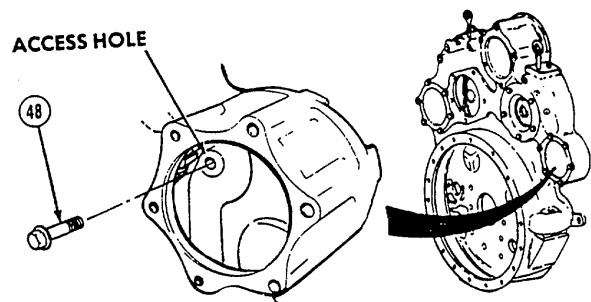
CAUTION

Screw inside access hole must be removed. Failure to remove screw may cause flywheel housing to crack when hoisted from engine.

NOTE

Screw must not be reused.

(22) Remove screw (48) from access hole.



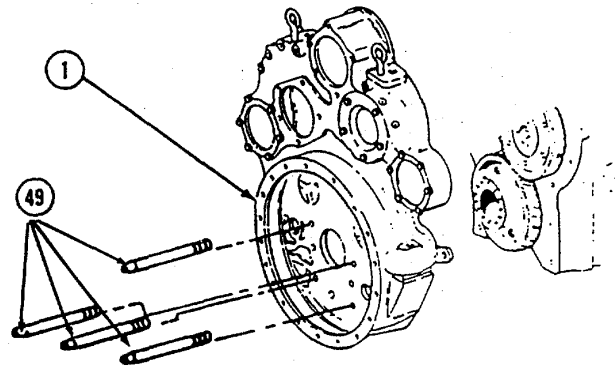
6-31. FLYWHEEL HOUSING AND REAR OIL SEAL- Continued

(23) Install four aligning studs (49) from alignment stud set (Appendix B, Section III, Item 41) in engine block.

WARNING

Make sure lifting device is secured. Keep hands and feet out from under flywheel housing when removing from engine. Falling parts may cause serious personal injury.

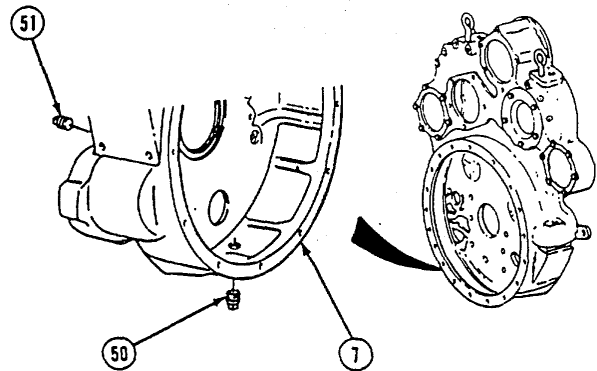
(24) Remove flywheel housing (1) from rear end of engine block.



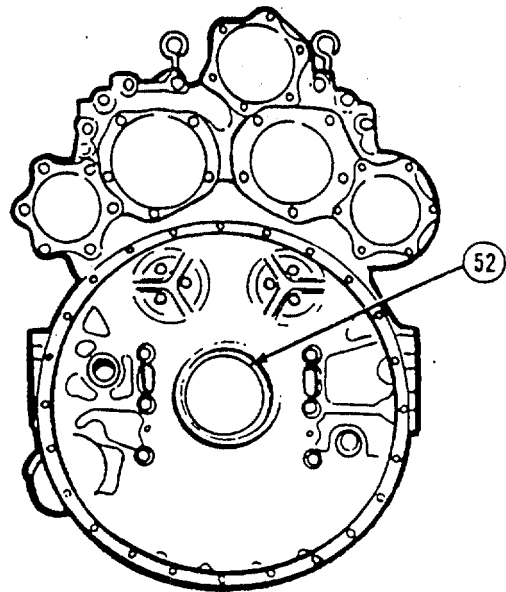
ALIGNING STUDS

(25) Remove pipe plug (50) from bottom of flywheel housing (1).

(26) Remove pipe plug (51) from back side of flywheel housing (1).



(27) Remove and discard crankshaft rear oil seal (52).



6-31. FLYWHEEL HOUSING AND REAR OIL SEAL- Continued

(28) Remove and discard gasket (53) from engine block rear end plate (54) and flywheel housing (1).

CAUTION

Crankshaft must be clean and smooth or oil seal lip will be damaged when flywheel housing is installed.

NOTE

Polishing motion should be clockwise around end of crankshaft.

(29) Polish end of crankshaft (55) with crocus cloth (Item 34, Appendix E) wet with lubricating oil (Item 10, Appendix E).

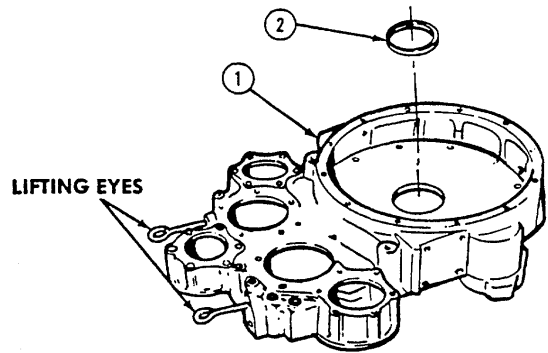
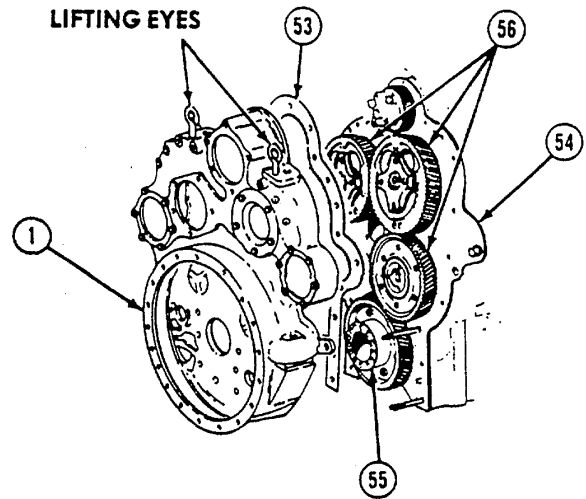
(30) Lubricate gear train teeth (56) with lubricating oil (Item 10, Appendix E).

(31) Remove four aligning studs from engine block.

(32) Remove lifting eyes.

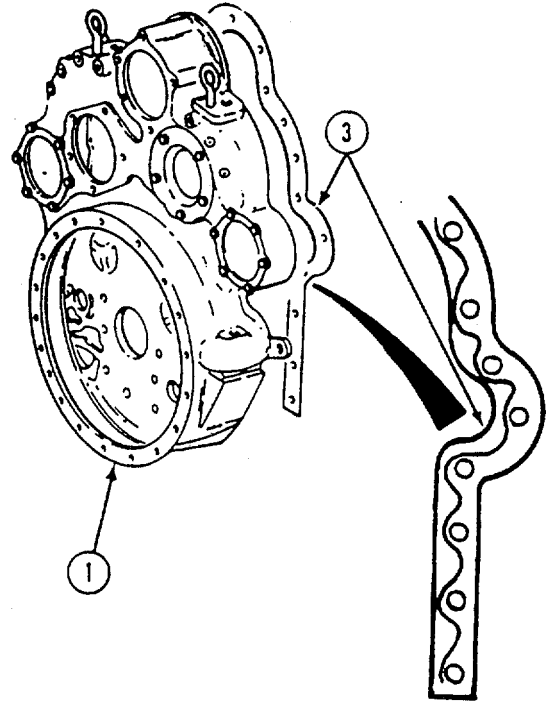
b. Installation.

- (1) Install two lifting eyes.
- (2) Set flywheel housing (1), engine side down, on flat surface.
- (3) Install new crankshaft oil seal (2) numbered side up.

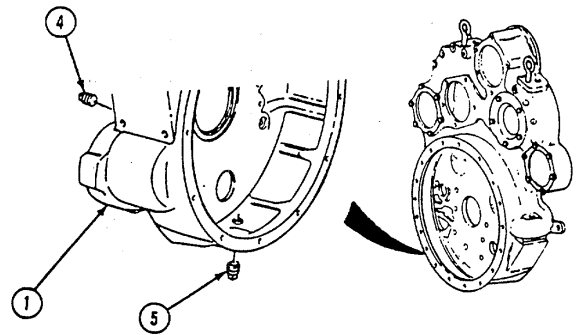


6-31. FLYWHEEL HOUSING AND REAR OIL SEAL- Continued

- (4) Apply grease (Item 1, Appendix E) to engine side of flywheel housing (1).
- (5) Install gasket (3) on engine side of flywheel housing (1).
- (6) Apply grease (Item 1, Appendix E) to gasket (3).

**WARNING**

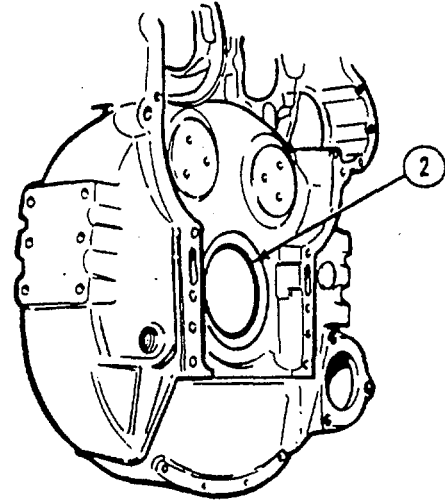
Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with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



- (7) Coat threads of pipe plugs (4 and 5) with pipe thread sealing compound (Item 2, Appendix E) and install pipe plug (4) in back side of flywheel housing (1).
- (8) Install pipe plug (5) in bottom of flywheel housing (1).

6-31. FLYWHEEL HOUSING AND REAR OIL SEAL- Continued

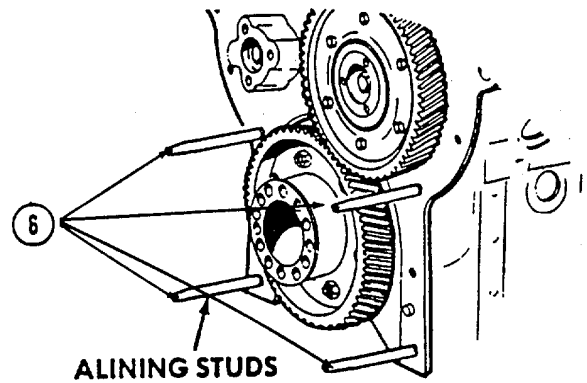
- (9) Coat lip of new crankshaft oil seal (2) with lubricating oil (Item 10, Appendix E).



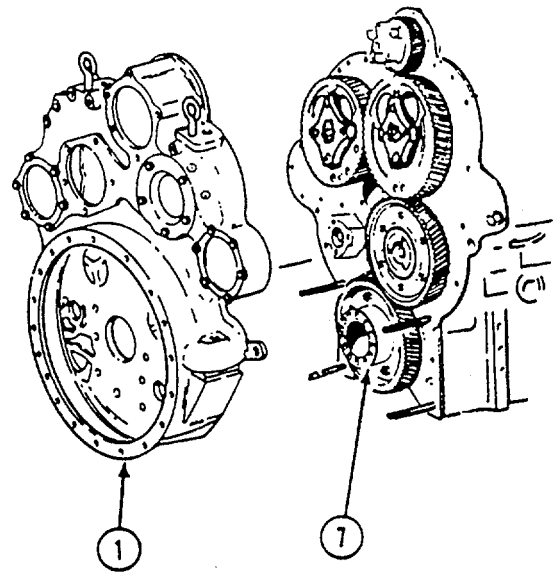
- (10) Install four aligning studs (6) in engine block.

WARNING

Make sure lifting device is secured. Keep hands and feet out from under flywheel housing when removing from engine. Falling parts may cause serious personal injury.

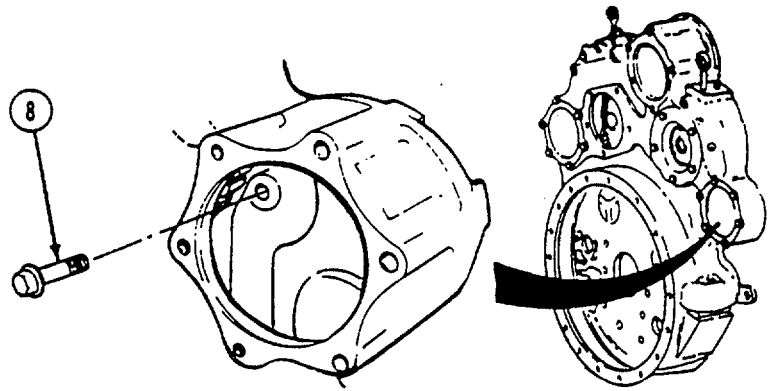


- (11) Operate lifting device while another person installs flywheel housing (1) over crankshaft (7) against engine block.

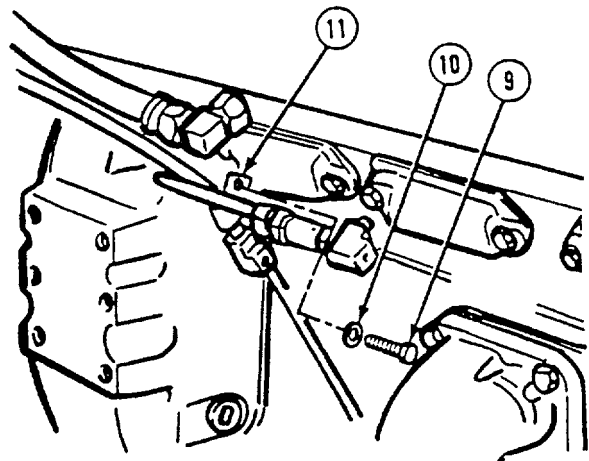


6-31. FLYWHEEL HOUSING AND REAR OIL SEAL-Continued

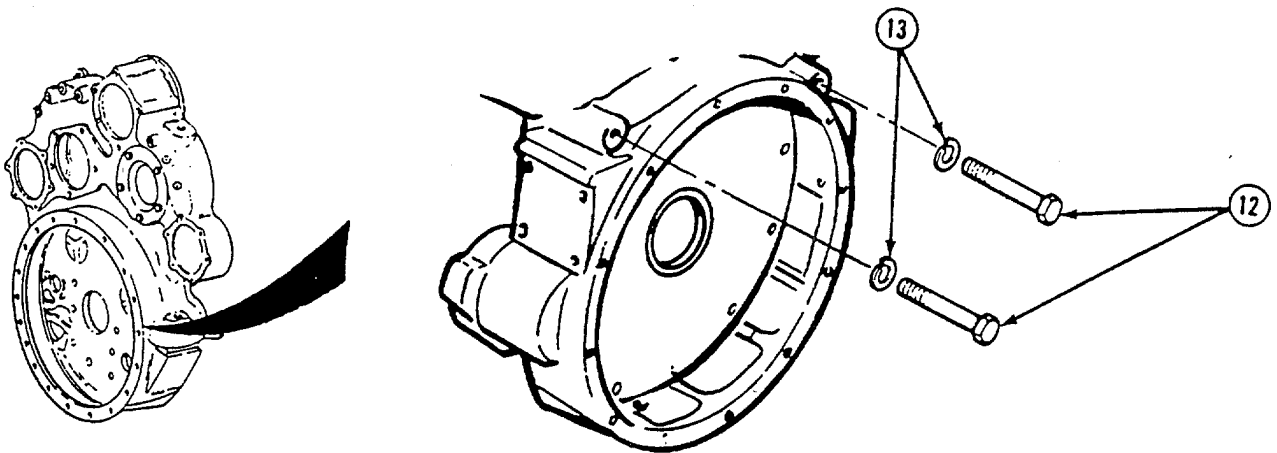
(12) +Install new screw (8).



(13) Install screw (9) and washer (10) to air box drain retaining clip (11) on right side of engine.

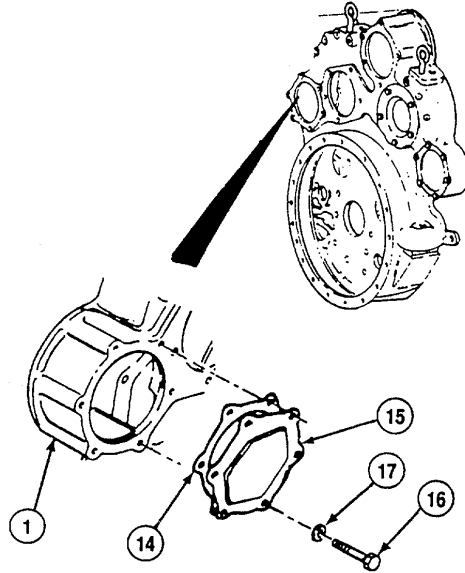


(14) Install two screws (12) and lockwashers (13).

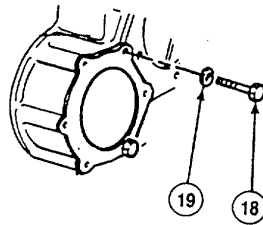


6-31. FLYWHEEL HOUSING AND REAR OIL SEAL - Continued

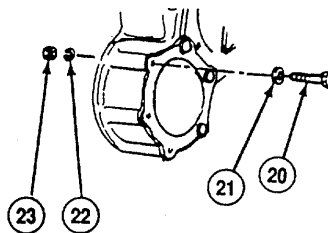
- (15) Apply grease (Item 1, Appendix E) to new gasket (14).
- (16) Install gasket (14), access plate (15), screw (16), and washer (17) to flywheel housing (1).



- (17) Install two screws (18) and lockwashers (19).

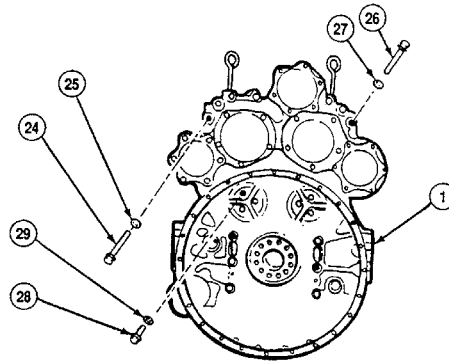


- (18) Install three screws (20), washers (21), lockwashers (22), and nuts (23).

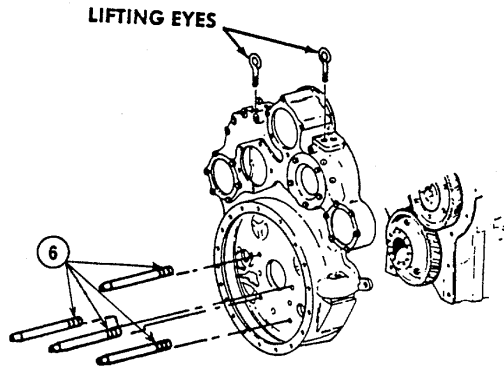


6-31. FLYWHEEL HOUSING AND REAR OIL SEAL - Continued

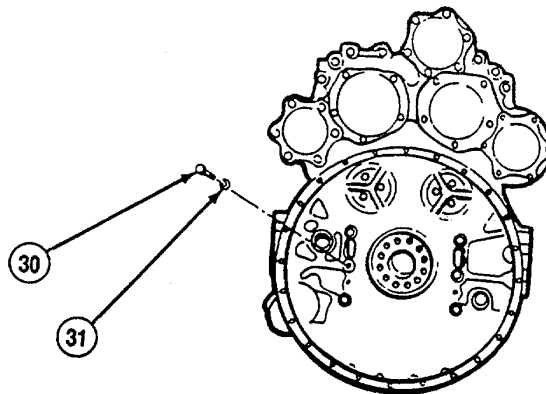
- (19) Install four screws (24) and washers (25) in flywheel housing (1).
- (20) Install three new screws (26) and washers (27).
- (21) Coat six screws (28) with sealing compound (Item 2, Appendix E) and install screws and washers (29).



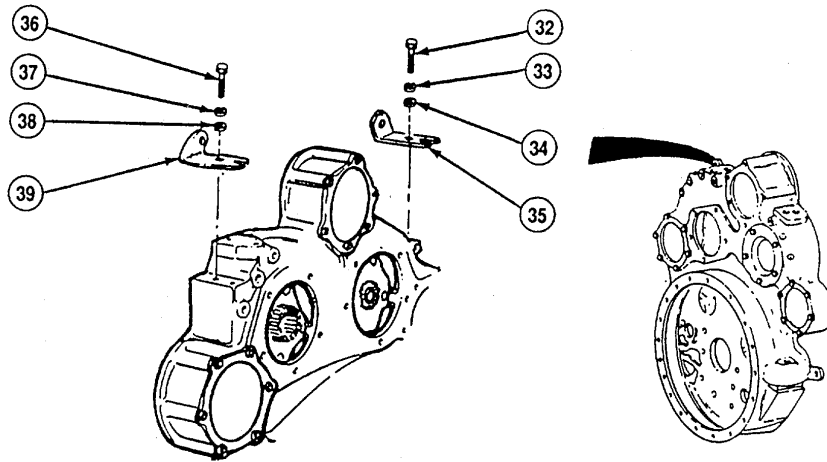
- (22) Remove lifting eyes and four aligning studs (6) from engine block.



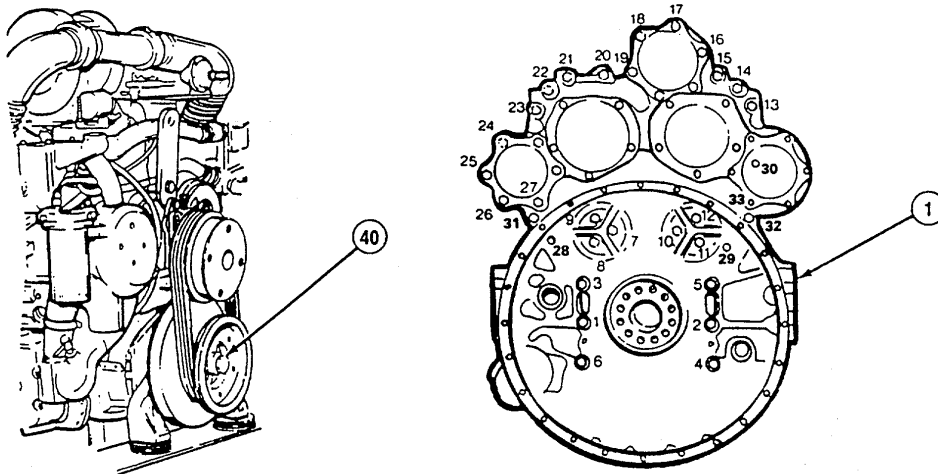
- (23) Install six screws (30) and washers (31)



6-31. FLYWHEEL HOUSING AND REAR OIL SEAL - Continued



- (24) Install three screws (32), lockwashers (33), washers (34), and right bank bracket (35).
- (25) Install three screws (36), lockwashers (37), washers (38), and left bank bracket (39).



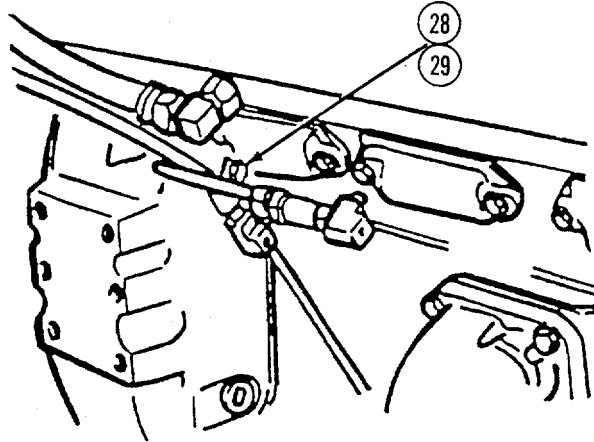
NOTE

Screws are numbered to show tightening sequence. Screws must be tightened in order.

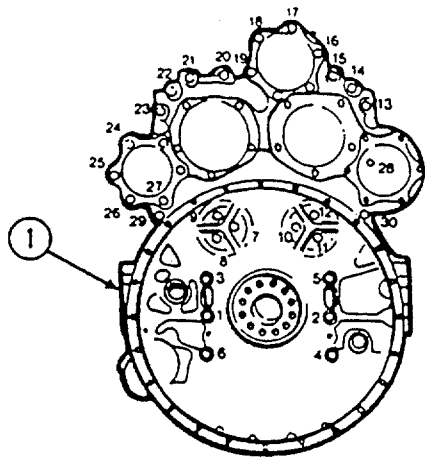
- (26) Tighten first six screws in flywheel housing (1) to 90 to 10 lb-ft (122 to 136 N.m).
- (27) Tighten seventh through ninth screws to 40 to 45 lb-ft (54 to 61 N.m).
- (28) Turn crankshaft screw (40) clockwise, while other person tightens tenth through twelfth screws to 40 to 45 lb-ft (54 to 61 N.m).
- (29) Tighten thirteenth through twenty-seventh screws to 25 to 30 lb-ft (34 to 41 N.m).

6-31. FLYWHEEL HOUSING AND REAR OIL SEAL - Continued

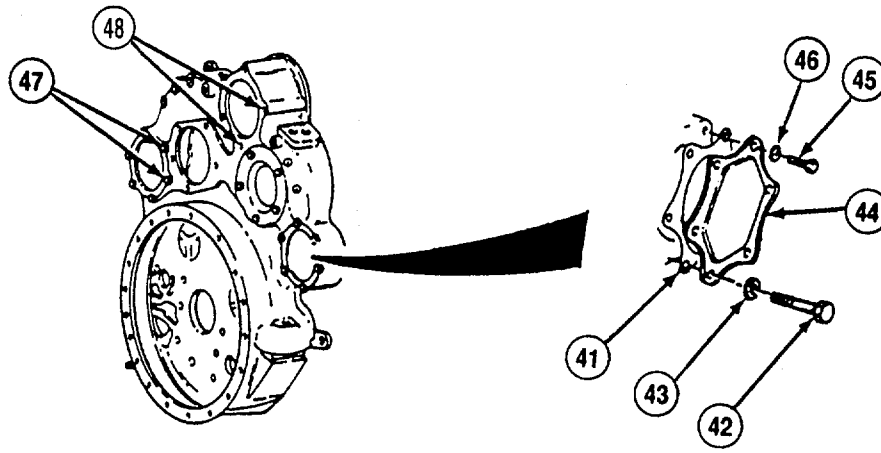
- (30) Tighten two screws (28 and 29) on right side and left side of engine to 40 to 45 lb-ft (54 to 61 N.m).



- (31) Tighten thirtieth screw on flywheel housing to 30 to 35 lb-ft (41 to 47 N.m).
- (32) Tighten thirty-first and thirty-second screws to 137 to 147 lb-ft (186 to 200 N.m).
- (33) Tighten thirty-third screw to 25 to 30 lb ft (34 to 41 N.m).



6-31. FLYWHEEL HOUSING AND REAR OIL SEAL - Continued



- (34) Apply grease (Item 1, Appendix E) to gasket (41).
- (35) Install screw (42), new copper washer (43), access cover (44), and gasket (41).
- (36) Install five screws (45) and lockwashers (46).
- (37) Tighten screws (42 and 45) to 25 to 30 lb-ft (34 to 41 N-m).
- (38) Tighten four screws (47 and 48) to 25 to 30 lb-ft (34 to 41 N.m).

c. Follow-on Maintenance.

- (1) Install Alternator Drive (see para 6-42).
- (2) Install flexplate (see para 6-30).
- (3) Install oil pan (see para 5-27).
- (4) Install power steering pump (see para 5-26).
- (5) Install starting motor (see para 5-12).
- (6) Install air compressor (see para 5-17).
- (7) Install engine (see para 5-1 1).

6.32. PISTON, CONNECTING ROD AND LINER

This task covers:

- a. Removal
- b. Inspection
- c. Follow-on Maintenance

TOOLS REQUIRED

Tool Kit, General Mechanics, Automotive
(Appendix B, Section 111, Item 1)

Shop Equipment, Automotive
Maintenance and Repair
(Appendix B, Section III, Item 4)

Remover assembly, cylinder liner
(Appendix B, Section 111, Item 44)
Clamp, cylinder liner
(Appendix B, Section III, Item 46)

MATERIALS/PARTS REQUIRED

Oil, lubricating, Item 1 0, Appendix E
Tags, identification, Item 32, Appendix E
Cylinder liner seal rings (Figure 1 00, Appendix F)

PERSONNEL REQUIRED

2

EQUIPMENT CONDITION

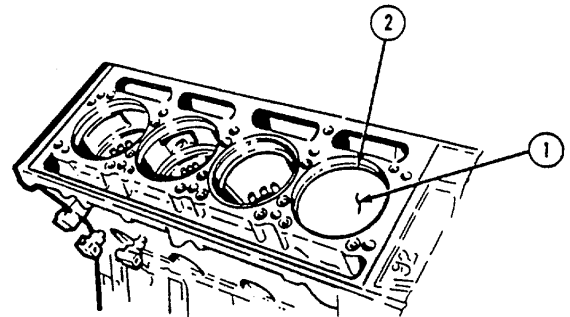
Engine Installed on Engine Stand
Oil Pan Removed (see para 5-27.)
Oil Pump Removed (see para 6-46.)
Cylinder Head Removed (see para 6-13.)

a. Removal.

NOTE

Repeat steps (1) through (4) for each cylinder liner.

- (1) Move piston (1) so top is just above air inlet ports in cylinder liner (2).
- (2) Place clean rag on top of piston (1) to catch carbon deposits as they are removed from cylinder liner (2).
- (3) Scrape carbon ridge from top of cylinder liner (2)
- (4) Remove rag and carbon residue from cylinder liner (2).



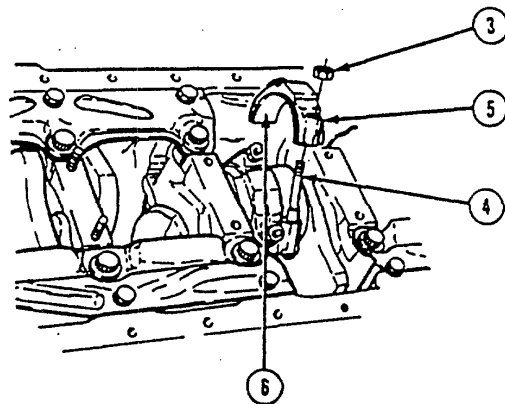
CAUTION

Do not use scribe or punch to mark piston, connecting rods or cylinder head mounting surface. Leaks may be caused.

NOTE

Using identification tags, mark each rod and piston with location.

- (5) Turn engine stand to upside down position. Remove two nuts (3) from two bearing cap screws (4).
- (6) Remove connecting rod bearing cap (5) with bearing shell (6).

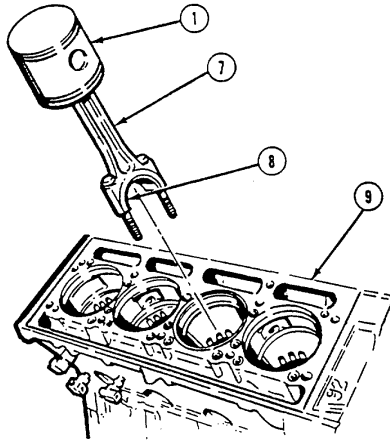


6-32. PISTON, CONNECTING ROD AND LINER - Continued

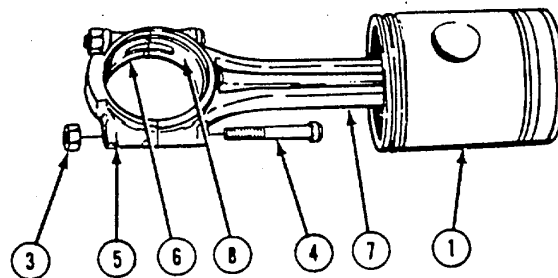
NOTE

Cylinder liner may come out with piston.

- (7) Push piston (1), connecting rod (7) and bearing shell (8) out through engine block (9) and another person removes piston from engine block.



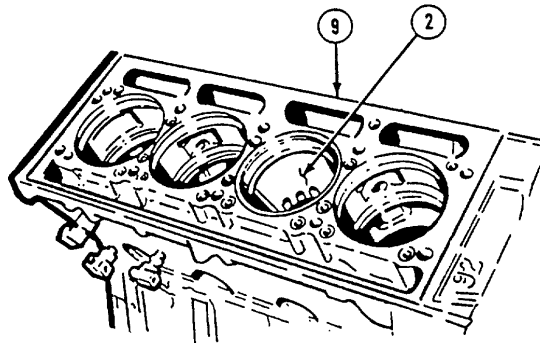
- (8) Place bearing cap (5), upper shell (6), lower shell (8), and two nuts (3) back on two bearing cap screws (4) to keep matched parts together.
 (9) Remove seven remaining pistons (1) and connecting rods (7).
 (10) Turn engine stand to place cylinder head bank facing up.
 (11) Matchmark cylinder liner (2) and engine block (9).



NOTE

Crankshaft may have to be turned to allow C for clearance of special tool.

- (12) Using cylinder liner removal tool (Appendix B, Section 111, Item 44), remove liner (2).

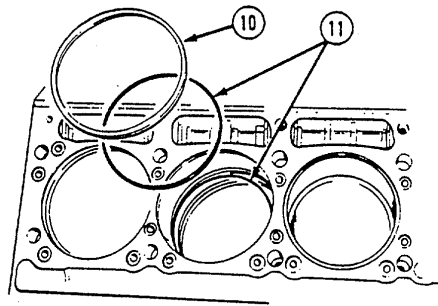


6-32. PISTON, CONNECTING ROD AND LINER - Continued

NOTE

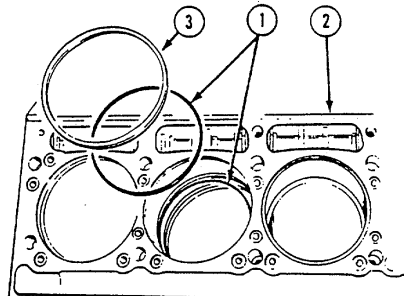
Tag cylinder liner insert noting cylinder number.

- (13) Remove cylinderliner insert (10).
- (14) Remove and discard two cylinder liner seal rings (11).

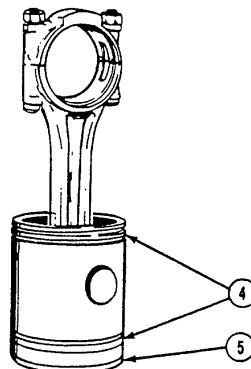


b. Installation.

- (1) Wipe cylinder bore, counterbore, and seal ring grooves clean.
- (2) Install two new cylinder liner seal rings (1) in engine block (2).
- (3) Apply lubricating oil (Item 1 0, Appendix E) to inner surface of cylinder liner seal rings (1).
- (4) Install liner insert (3) in counterbore of engine block (2).

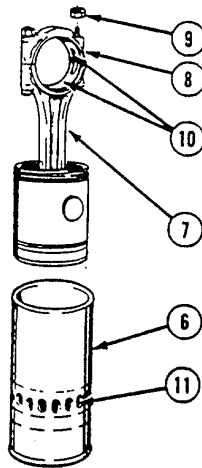


- (5) Apply lubricating oil (Item 10, Appendix E) to piston rings (4).
- (6) Install piston (5) into ring compressor.

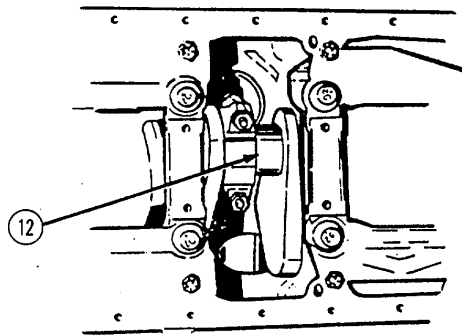


6-32. PISTON, CONNECTING ROD AND LINER - Continued

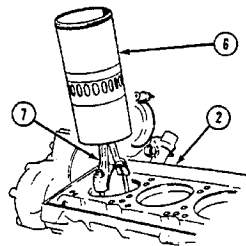
- (7) Coat inside of cylinder liner (6) with lubricating oil (Item 10, Appendix E).
- (8) Hold cylinder liner (6), flange end down, on wood block and another person places ring compressor with piston and connecting rod assembly (7) on cylinder liner.
- (9) Align numbers on rod bearing cap (8) with marks on cylinder liner (6).
- (10) Push piston and connecting rod assembly (7) into cylinder liner (6) until piston is free from ring compressor. Remove ring compressor.
- (11) Remove two nuts (9), bearing cap (8), and bearing shells (10).
- (12) Push piston into cylinder liner (6) until compression rings pass cylinder liner ports (11).
- (13) Coat connecting rod bearing shells (10) with lubricating oil (Item 10, Appendix E).



- (14) Position crankshaft connecting rod journal (12) of cylinder being worked to bottom of its travel.
- (15) Coat journal (12) with lubricating oil (Item 10, Appendix E).

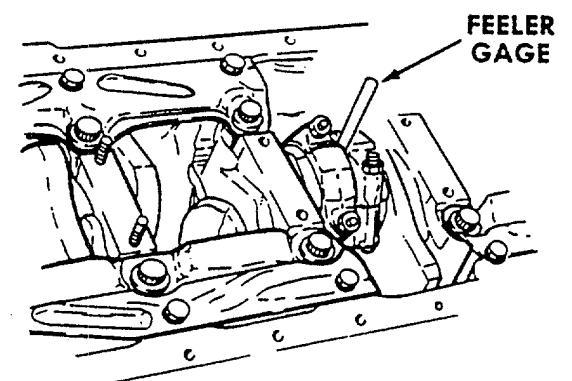
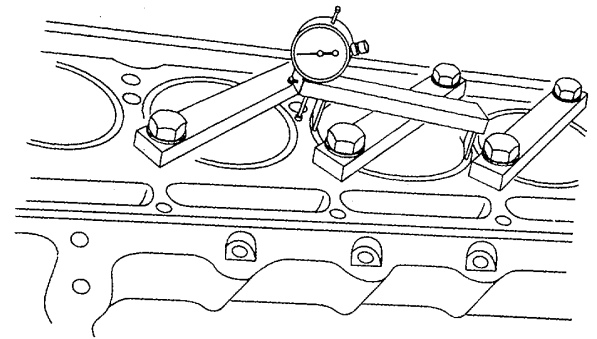
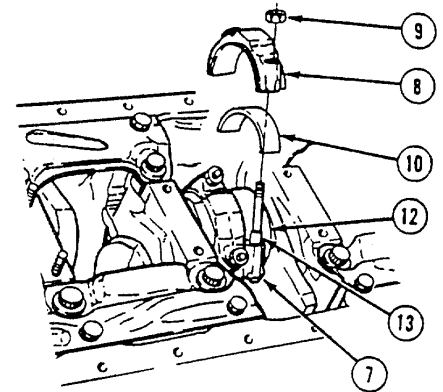


- (16) Align mark on cylinder liner (6) with mark on engine block (2).
- (17) Slide cylinder liner (6) with piston and connecting rod assembly (7) into engine block (2) while another person guides connecting rod assembly over crankshaft journal.



6-32. PISTON, CONNECTING ROD AND LINER - Continued

- (18) Seat connecting rod firmly on crankshaft journal (12).
- (19) Install cap (8) and bearing shell (10) over studs (13).
- (20) Install two nuts (9) and tighten to 60 to 70 lb-ft (81 to 95 N.m).
- (21) Clamp the liner in place with hold-down clamp (Appendix B, Section 111, Item 46) and tighten the two bolts evenly.
- (22) Measure the distance from the top of the liner to the top of the block with a dial indicator. The liner flange must be .0418" to .0482" (1.062 to 1.22 mm) below the surface of the block. However, even though all of the liners are within these specifications, there must not be over .0015" (.038 mm) difference between any two adjacent liners when measured along the cylinder longitudinal centerline. If the above limits are not met, install a different thickness insert, install the liner in another cylinder bore and recheck, or use a new cylinder liner.
- (23) Matchmark the liner and the cylinder block with a felt pen so the liner may be reinstalled in the same position in the same block bore. Place the matchmarks on the side opposite the camshaft. Remove the hold-down clamp and the cylinder liner. Do not remove the liner insert.
- (24) Using feeler gauge, check that clearance between each connecting rod attached to same crankshaft journal is 0.008 to 0.016 in. (0.2 to 0.4 mm).



c. Follow-on Maintenance.

- (1) Install cylinder head (see para 6-13.).
- (2) Install oil pump (see para 6-46.).
- (3) Install oil pan (see para 5-27.).
- (4) Remove engine from engine stand.

6-33. PISTON REPAIR

This task covers:

- | | |
|------------------------|--------------------------|
| a. Disassembly | c. Assembly |
| b. Cleaning/Inspection | d. Follow-on Maintenance |

TOOLS REQUIRED

Tool Kit, General Mechanics, Automotive (Appendix B, Section 11I, Item 1)

Shop Equipment, Automotive Maintenance and Repair (Appendix B, Section III, Item 4)

Tool, piston pin retainer (Appendix B, Section 111, Item 47)
 Gauge set, piston (Appendix B, Section 111, Item 15)
 Gauge, crown, piston (Appendix B, Section 11I, Item 48)
 Gauge, piston groove (Appendix B, Section 111, Item 49)
 Leak detector set (Appendix B, Section 111, Item 50)

MATERIALS/PARTS REQUIRED

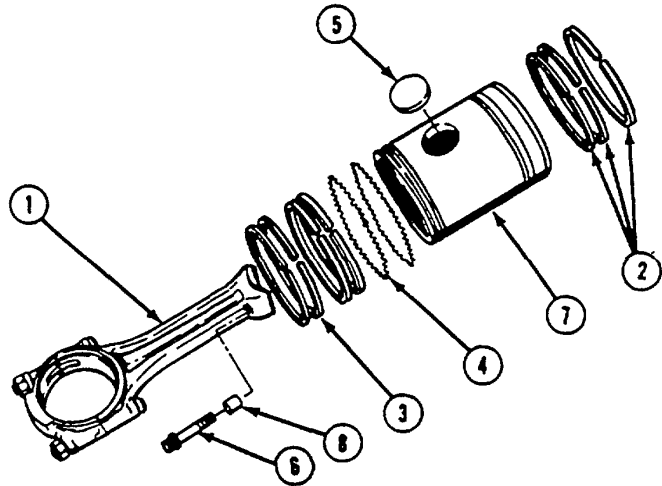
Solvent, dry cleaning (Item 3, Appendix E)
 Oil, lubricating (Item 10, Appendix E)
 Compound, international No. 2) (Item 37, Appendix E)
 Tags, identification (Item 32, Appendix E)
 Brush, paint, oval 1-1/4 in. (32 mm) size 12 (Item 44, Appendix E)

EQUIPMENT CONDITION

Piston, Connecting Rod and Liner Removed (see para 6-32.)

a. Disassembly.

- (1) Place connecting rod (1) in vise with soft jaws.
- (2) Remove three upper piston rings (2) using piston ring remover and installer. Remove four lower piston rings (3) by hand.
- (3) Remove oil ring expander (4) from each lower piston ring groove.
- (4) Punch hole in two piston pin retainers (5). Remove both retainers.
- (5) Loosen two screws (6).
- (6) Remove connecting rod (1) and piston (7) from vise.
- (7) Remove two screws (6) and two spacers (8).



NOTE

Matchmark connecting rod before removal.

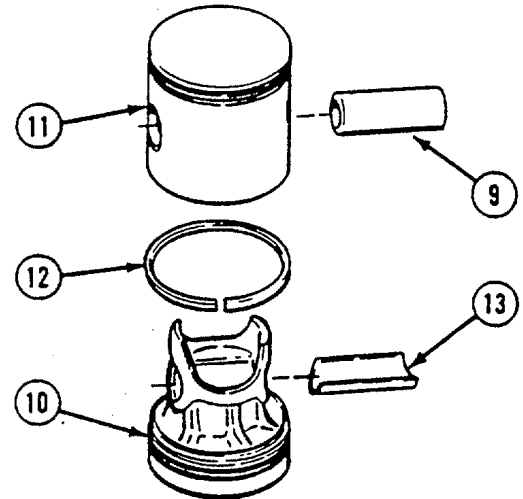
- (8) Remove connecting rod (1) from piston (7)

6-33. PISTON REPAIR - Continued

NOTE

Matchmark piston pin, piston crown, piston skirt and piston pin bearing before removal.

- (9) Remove piston pin (9).
- (10) Separate piston crown (10) from piston skirt (11).
- (11) Remove metal seal ring (12) from piston crown (10).
- (12) Remove piston pin bearing (13).



b. Cleaning/Inspection.

WARNING

Dry cleaning solvent P-D-680 is potentially dangerous. Avoid repeated and prolonged breathing of vapors and skin contact with the liquid. Do not use near open flame, arcing equipment or other ignition sources. Always wear eye protection and protective clothing. The flash point of P-D-680 is 100 to 138 deg. F (38 to 59 deg. C).

- (1) Clean all metal parts with dry cleaning solvent (Item 3, Appendix E).
- (2) Clean ring grooves and oil holes in pistons with paint brush (Item 44, Appendix E) and dry cleaning solvent.

WARNING

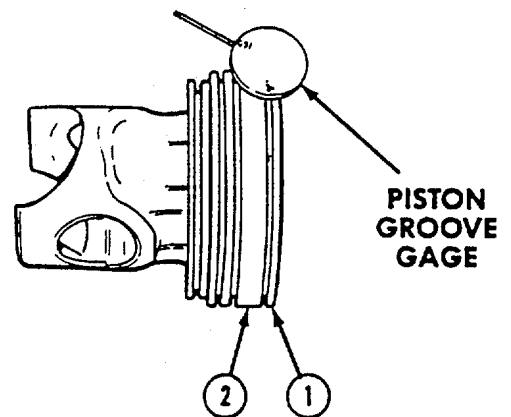
Compressed air used for cleaning purposes will not exceed 30 psi (207 kPa). Use only with effective chip guarding and personal protective equipment (goggles/shield, gloves, etc.).

- (3) Dry parts with compressed air.
- (4) Inspect all parts for damage. Replace damaged parts.
- (5) Check fire ring groove (1) of piston crown (2) with piston groove gauge tool (Appendix B, Section III, Item 49).

NOTE

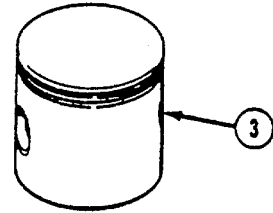
Piston crown, bearing, and pin must be replaced as an assembly.

- (6) Slide groove gauge completely around groove (1). If wire is below flush at any one area, replace crown (2).



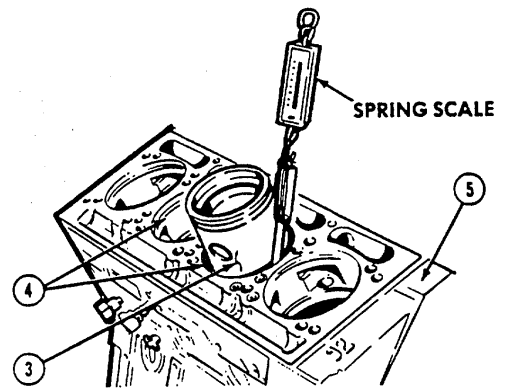
6-33. PISTON REPAIR - Continued

- (7) Measure diameter of piston skirt (3) and check for roundness. Diameter must not be less than 4.829-in. (122.6 mm) at any one point.



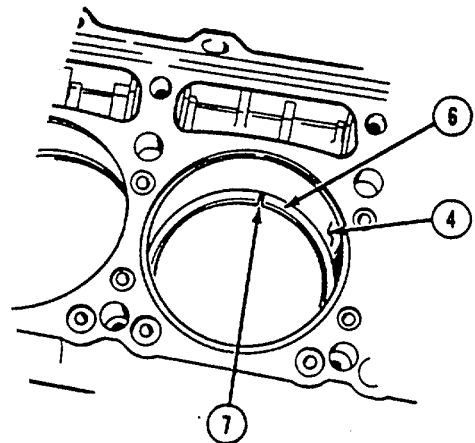
- (8) With cylinder liner (4) installed in engine block (5), hold piston skirt (3) upside down in liner, while other person attaché spring scale to feeler gauge set and checks clearance in four places 90 degrees apart.

- (9) Select feeler gauge thickness that will require a pull of 6 pounds (2.7 kg). Clearance will be 0.001-in. (0.025 mm) greater than feeler gauge thickness when it is withdrawn with a pull of 6 pounds (2.7 kg). Clearance must not exceed 0.012-in. (0.3 mm).



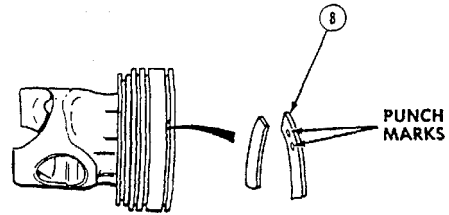
- (10) Insert piston rings (6), one at a time inside cylinder liner (4) far enough to be in area of ring travel 2 to 3 in. (50 to 75 mm) deep. Use piston skirt to position ring parallel with top of cylinder liner.

- (11) Measure ring gap (7) with feeler gauge. Three compression rings should have a gap of 0.025 to 0.045 in. (0.63 to 1.1 mm). Top compression ring is marked with two punch marks, middle compression ring is marked with one punch mark and bottom compression ring is not punch marked. Two oil rings (upper slotted) should have a gap of 0.007 to 0.017 in. (0.17 to 0.43 mm). Two oil rings (lower) should have a gap of 0.010 to 0.025 in. (0.25 to 0.63 mm).



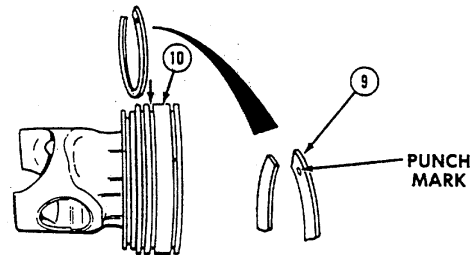
6-33. PISTON REPAIR - Continued

- (12) Install top compression ring (8) with two punch marks up.
- (13) Measure clearance between ring (8) and groove; clearance should be 0.001 to 0.005 in. (0.025 to 0.13 mm).

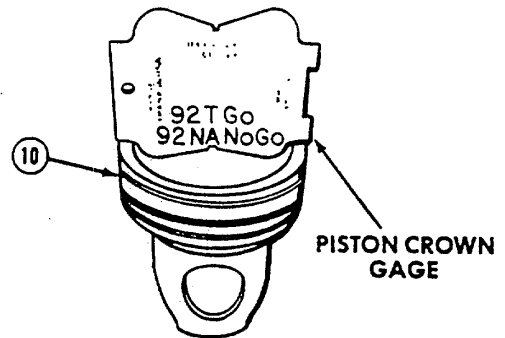


- (14) Put middle compression ring (9) with one punch mark in groove on piston crown (10); clearance should be 0.010 to 0.013 in. (0.25 to 0.33 mm).

- (15) Put lower compression ring in groove side of piston crown (10); clearance should be 0.004 to 0.007 in. (0.10 to 0.18 mm).
- (16) Put seal ring in groove on side of piston crown (10); clearance should be 0.0005 to 0.003 in. (0.013 to 0.08 mm).



- (17) Using edge of piston crown gauge (Appendix B, Section 111, Item 48) marked "92T Go, 92 NA No Go", check piston crown (10) by setting piston crown gauge into bowl of piston crown. Gauge must rest fully down on rim of piston crown.

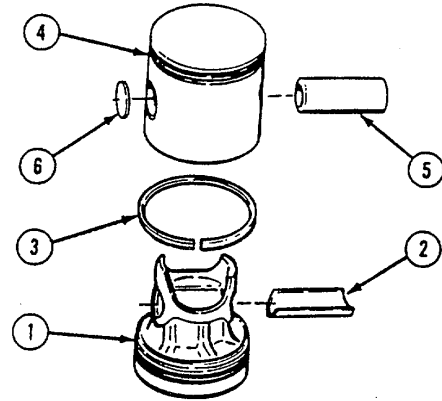


6-33. PISTON REPAIR - Continued

c. Assembly.**NOTE**

Be sure to align all match marks.

- (1) Place piston crown (1) top end down, on work bench.
- (2) Install piston pin bearing (2).
- (3) Coat metal seal ring (3) with lubricating oil (Item 10, Appendix E).
- (4) Install metal seal ring (3) on piston crown (1). Beveled side must face toward bottom of piston crown (1).
- (5) Rotate metal seal ring (3) fully around piston crown (1) and be sure it turns freely with no sticking or binding.
- (6) Compress metal seal ring (3) and push piston skirt (4) down into position on piston crown (1).
- (7) Hold piston crown (1) and spin piston skirt (4). Piston skirt (4) must turn freely with no binding.
- (8) Coat piston pin (5) with lubricating oil.
- (9) Line up hole in piston skirt (4) with hole in piston crown (1).
- (10) Install piston pin (5) with threaded holes toward bottom of piston skirt (4).

**NOTE**

Retainers must be seated fully and evenly in piston skirt.

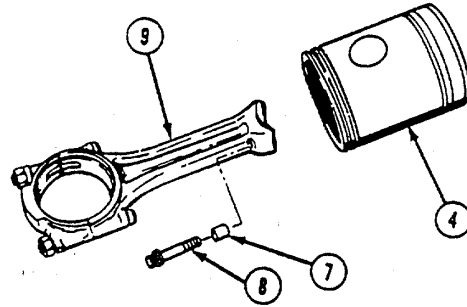
- (11) Install piston pin retainers (6) in piston skirt (4) at each side of piston pin (5) using piston pin retainer tool (Appendix B, Section 111, Item 47): install until they bottom out.
- (12) Using leak detector, apply 10-in. (254 mm) of vacuum to each piston pin retainer (6). There should be no loss of pressure.

6-33. PISTON REPAIR - Continued

- (13) Install two spacers (7) on two screws (8).

WARNING

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



- (14) Apply small amount of international No. 2 compound (Item 37, Appendix E) to threads and head contact surface of two screws (8).
- (15) Insert connecting rod (9) into piston skirt (4).
- (16) Install screws (8) and tighten finger tight.
- (17) Clamp connecting rod (9) in vise with soft jaws.
- (18) Tighten screws (8) to 55 to 60 lb-ft (75 to 81 N.m).

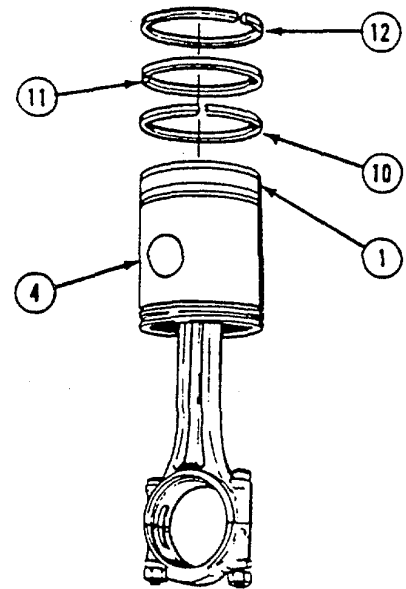
NOTE

Replace piston rings in sets only.

- (19) Coat piston crown (1) and skirt (4) with lubricating oil.

NOTE

Position rings gaps 120° apart, around piston crown.



- (20) Install Lower piston ring (10) (ring without marks).
- (21) Install middle piston ring (1 1) (ring with one punch mark) toward top of piston crown (1).
- (22) Install top piston ring (1 2) (ring with two punch marks) toward top of piston crown (1).

6-33. PISTON REPAIR - Continued

CAUTION

To prevent damage to oil rings when piston is installed in ring compressor, make sure ends of expander rings to not overlap.

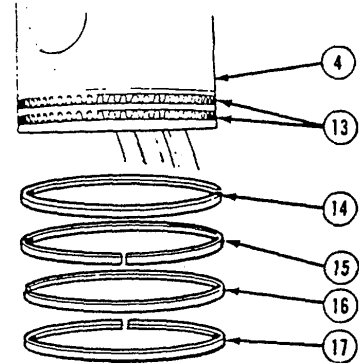
Install two oil ring expanders (13) on piston skirt (4) with ends pointing upward.

- (23) Install chrome, nonslotted, oil ring (14) with gap position 180 degrees from gap in expander ring (13).

NOTE

Install oil rings with beveled edge facing upward.

- (24) Install nonslotted oil ring (15) with gap positioned 90 degrees from gap in oil ring (14).
- (25) Install oil ring (16) with black, slotted bottom down and gap positioned 180 degrees from gap in expander ring (13).
- (26) Install oil ring (17) with black, slotted bottom down and gap positioned 90 degrees from gap in oil ring (16).
- (27) Measure clearance between oil rings and grooves; clearance should be .0015 to .0055" (0.038 to 0.140 mm).



d. Follow-on Maintenance.

- (1) Install piston, connecting rod and liner (para 6-32).

6-34. ENGINE BRAKE RETARDER

This task covers:

- | | |
|----------------------------|--------------------------|
| a. Removal | d. Assembly |
| b. Disassembly | e. Installation |
| c. Cleaning and Inspection | f. Follow-on Maintenance |

TOOLS REQUIRED

Tool Kit, General Mechanics, Automotive
(Appendix B, Section III, Item 1)

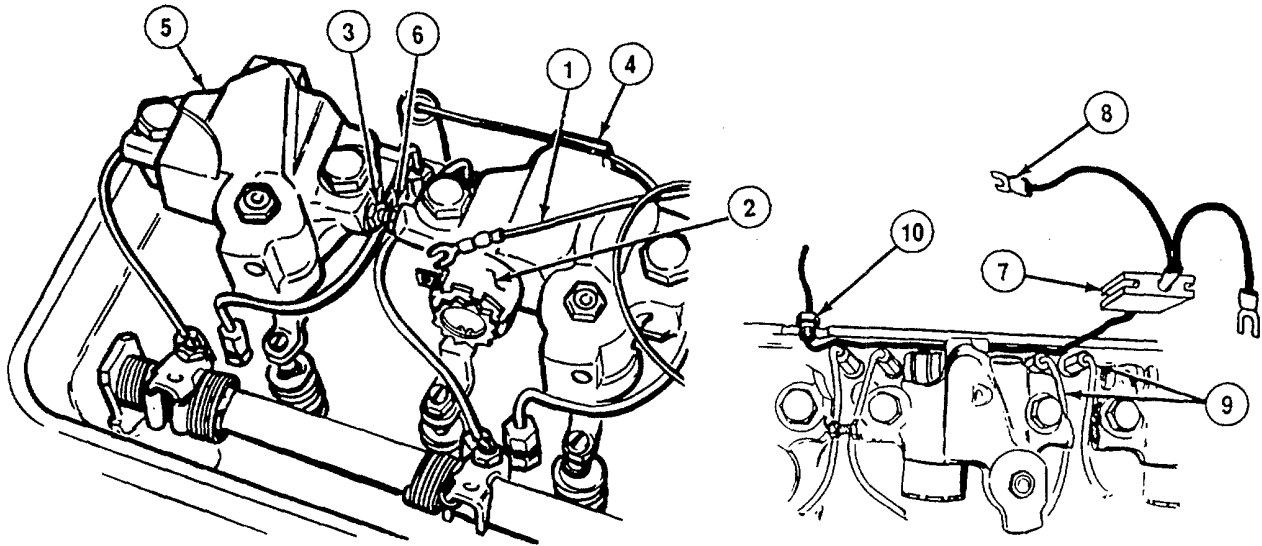
EQUIPMENT CONDITION

Rocker Cover Removed (see para 4-140.).

MATERIALS/PARTS REQUIRED

Solvent, Dry Cleaning (Item 3, Appendix E)
Lubricating Oil (Item 10, Appendix E)
Sealing and Lubricating Compound (Item 31, Appendix E)
Seals (Figure 123, Appendix F)

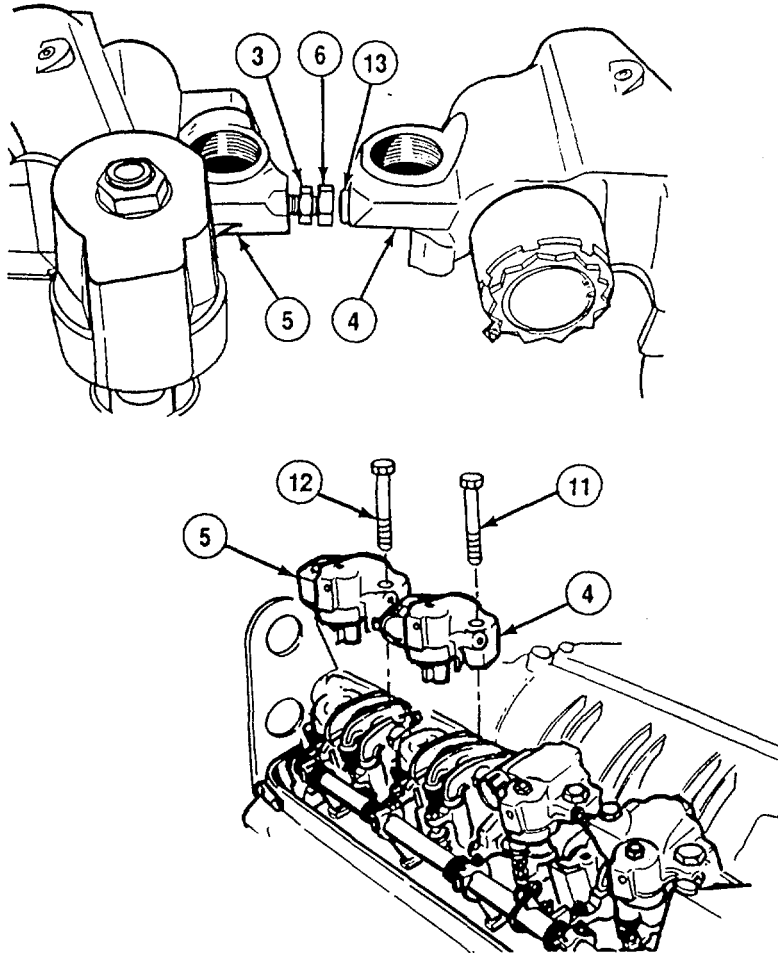
a. Removal.



- (1) Remove solenoid wire (1) from solenoid (2).
- (2) Loosen connector nut (3) between supply brake (4) and drone (5). Screw connector (6) into drone (5) to clear supply brake (4).

6-34. ENGINE BRAKE RETARDER - Continued

- (3) Remove spacer (7) and terminals (8) from fuel tubes (9). Disconnect terminals (8). Remove bushing (10).
- (4) Remove two screws (11) and two screws (12) and remove supply brake (4) and drone (5) from cylinder head. Remove and discard seal ring (13) from supply brake (4).



- (5) Remove remaining brake retarders in the same manner.

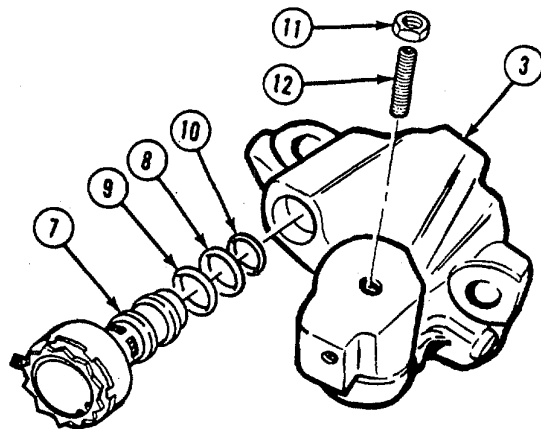
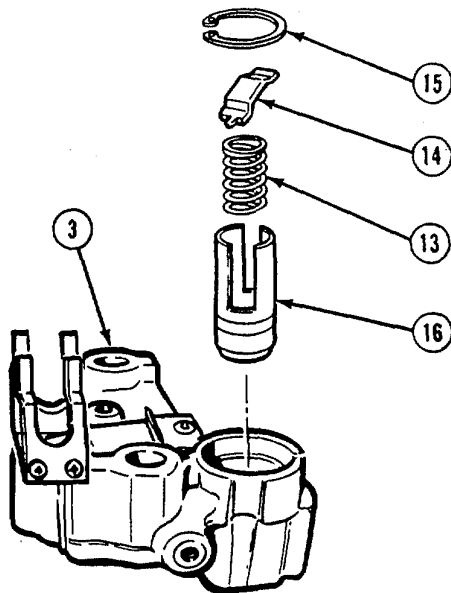
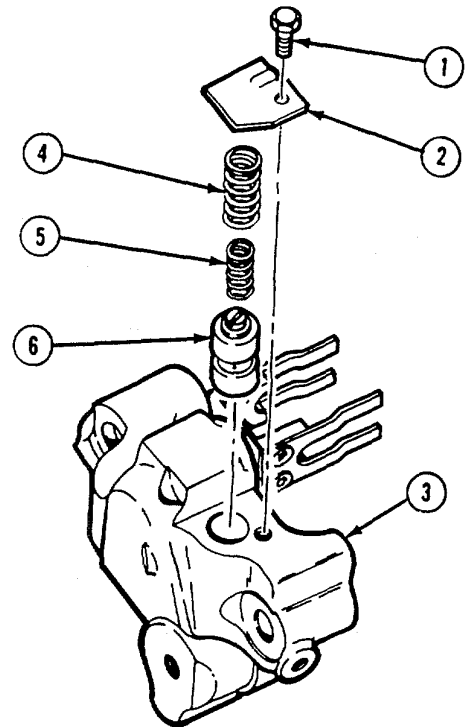
6-34. ENGINE BRAKE RETARDER - Continued

b. Disassembly.

- (1) Remove screw (1) and cover (2) from supply housing (3)
- (2) Remove springs (4 and 5) and control valve (6) from housing (3).

NOTE

The solenoid valve is installed on the supply housing only.



- (3) Remove solenoid valve (7) from housing. Remove seals (8 and 9) from solenoid valve. Remove seal (10) from housing (3). Discard seals.
- (4) Remove nut (11) and setscrew (12) from housing.

WARNING

Slave piston is retained by a spring under compression. Spring can be discharged and cause personal injury.

- (5) Turn the supply housing over. Use a press or other type of pressure to depress spring retainer (14) and hold spring (13) in position.

6-34. ENGINE BRAKE RETARDER - Continued

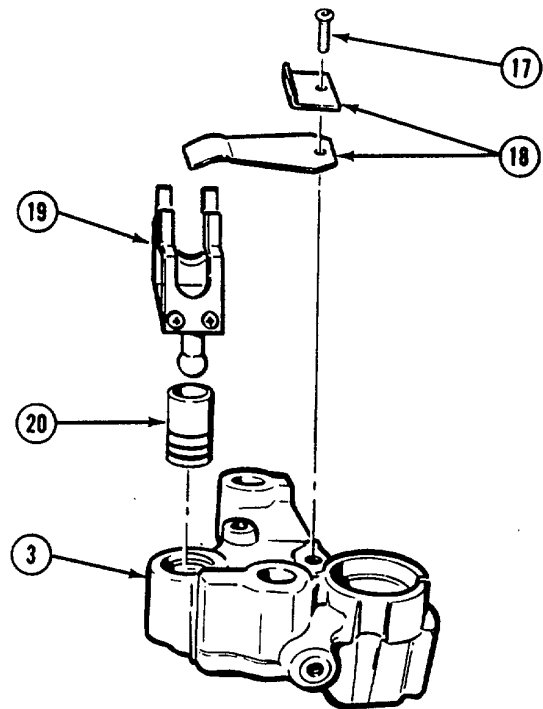
- (6) Carefully remove retaining ring (15). Slowly release force from spring retainer (14) and release slave piston spring (13).
- (7) Remove spring retainer (14), spring (13) and slave piston (16) from supply housing (3).
- (8) Remove screw (17), lockplate assembly (18) and fork assembly (19) from supply housing (3). Remove master piston (20).
- (9) Disassemble the drone in the same manner.

c. Cleaning and Inspection.

WARNING

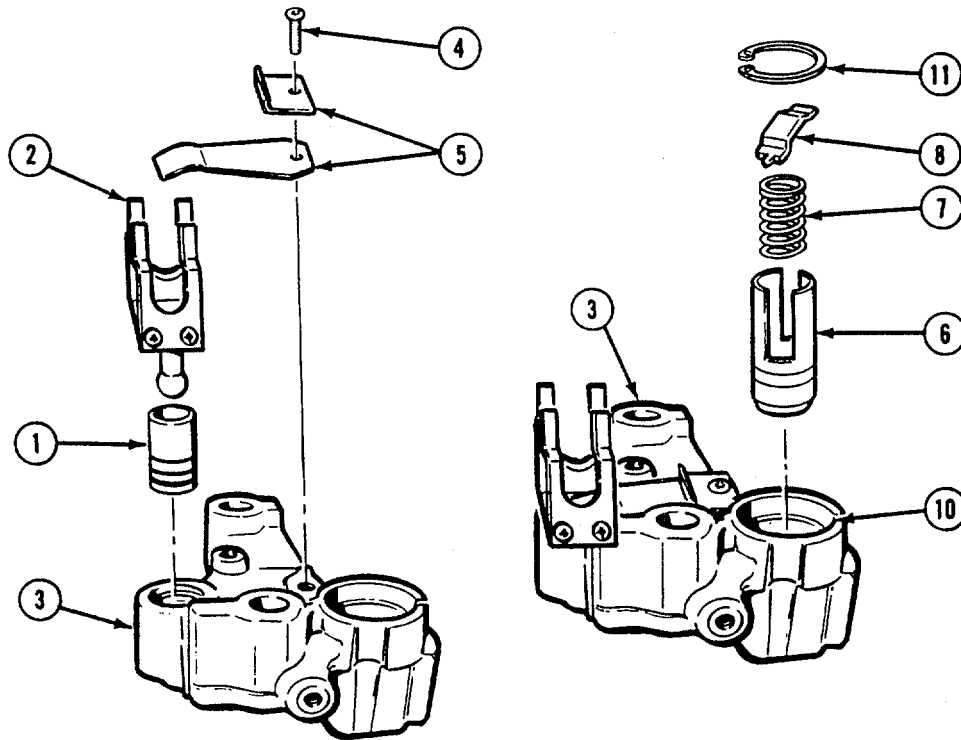
Dry cleaning solvent P-D-680 is potentially dangerous. Avoid repeated and prolonged breathing of vapors and skin contact with the liquid. Do not use near open flame, arcing equipment or other ignition sources. Always wear eye protection and protective clothing. The flash point of P-D-680 is 100 to 138 deg. F (38 to 59 deg. C).

- (1) Clean housings and parts with solvent (Item 3, Appendix E) and dry with compressed air.
- (2) Inspect housing for cracks and damage.
- (3) Check springs for bent and cracked condition.
- (4) Inspect valve and piston for wear and damage to surfaces.
- (5) Replace all damaged or worn parts.



6-34. ENGINE BRAKE RETARDER - Continued

d. Assembly.



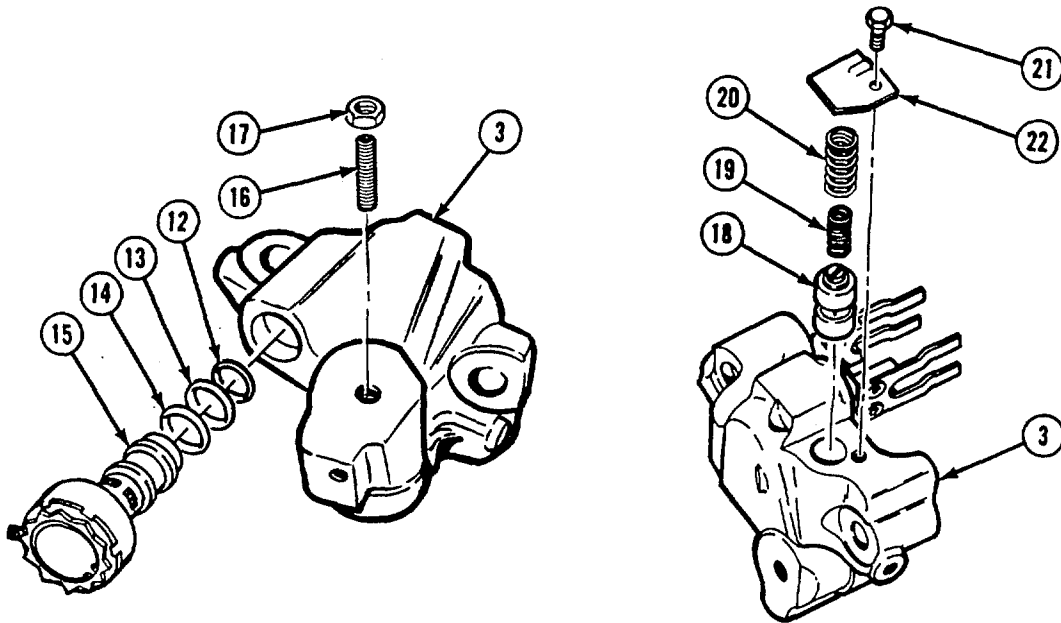
- (1) Apply lubricating oil (Item 10, Appendix E) to master piston (1).
- (2) Install master piston (1) and fork assembly (2) in bottom of supply housing (3).

WARNING

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

- (3) Apply sealing and lubricating compound (Item 31, Appendix E) to screw (4) and install lockplate assembly (5) and screw on housing (3). Tighten screw to 50 lb in (5.5 N.m).
- (4) Apply lubricating oil (Item 10, Appendix E) to slave piston (6) and piston spring (7). Install slave piston (6) and spring (7) in supply housing.
- (5) Align tab on spring retainer (8) and slot in supply housing (3). Press spring (7) and spring retainer (8) into supply housing until retainer is just below retaining ring groove (10). Install retaining ring (11) to secure parts in housing.

6-34. ENGINE BRAKE RETARDER - Continued



- (6) Apply oil (Item 10, Appendix E) to new seals (12, 13 and 14). Install oil seal (12) in housing (3). Install seals (13 and 14) on solenoid (15). Install solenoid (15) in housing (3).
- (7) Install setscrew (16) and nut (17) on solenoid housing.
- (8) Apply oil (Item 10, Appendix E) to control valve (18) and install control valve and springs (19 and 20) in supply housing (3).

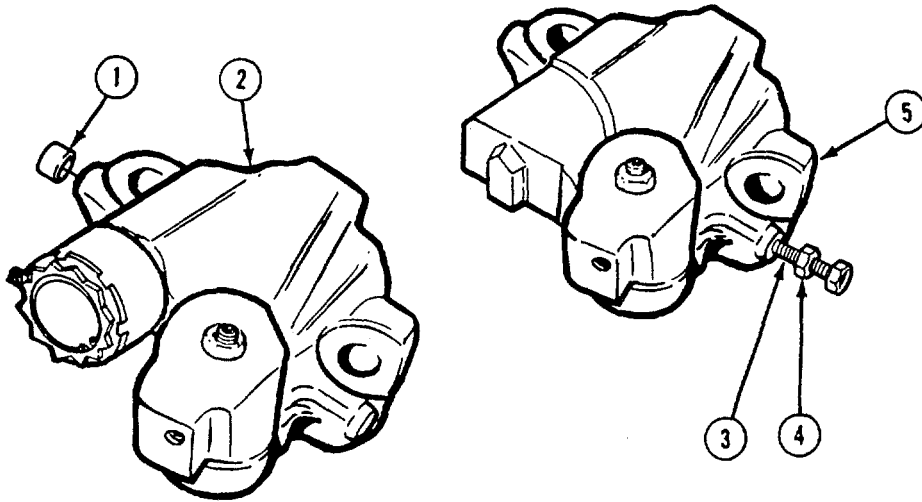
WARNING

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

- (9) Apply sealing and lubricating compound (Item 31, Appendix E) to screw (21). Install cover (22) on supply housing (3). Secure cover with screw (21). Tighten screw to a torque of 110 lb in (12 N-m).

6-34. ENGINE BRAKE RETARDER - Continued

e. Installation.



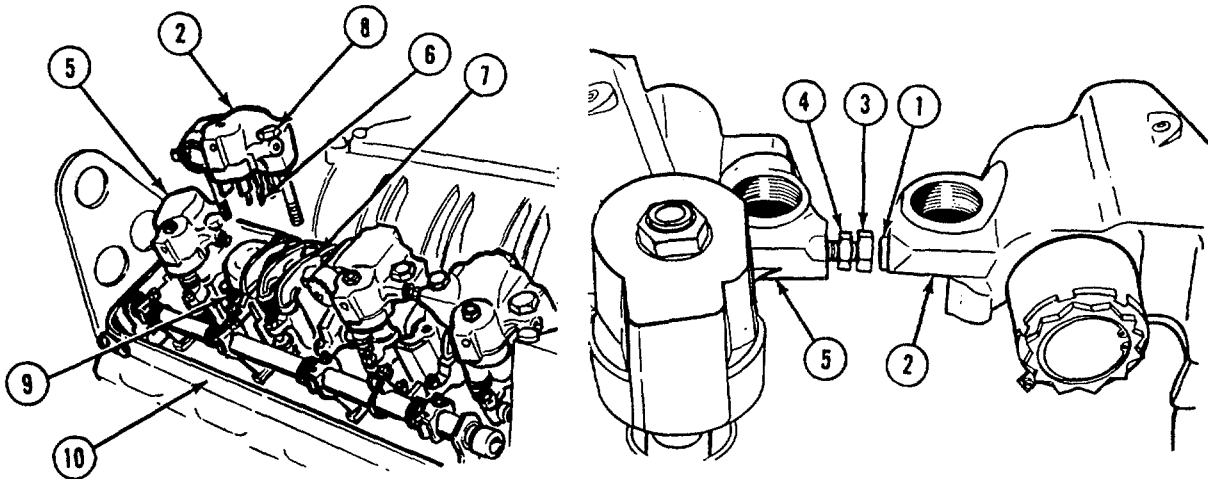
(1) Install new seal ring (1) in supply brake (2).

(2) Install connector (3) and nut (4). Screw connector into housing to the depth of about 1/2 inch (13 mm).

NOTE

Clean mounting surface in cylinder head before positioning supply brakes and drones on engine.

(3) Position master piston fork assembly (6) over injector rocker clevis (7).



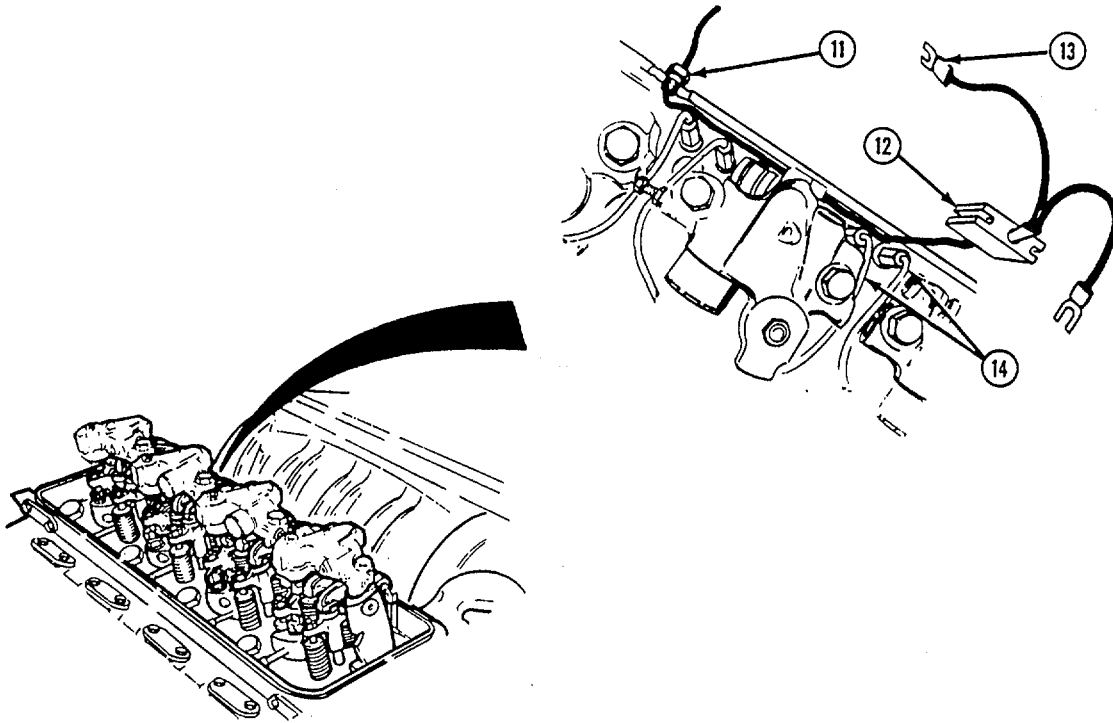
6-34. ENGINE BRAKE RETARDER - Continued

- (4) Install supply brake (2) and drone (5) with mounting screws (8) through rocker arm shaft (9) to cylinder head (10). Tighten screws (8) in two steps, first to a torque of 45 lb ft (61 N.m) then tighten to a final torque of 88 to 92 lb ft (119 to 124 N.m).
- (5) Move master piston fork assembly (6) up and down several times to make sure it rides freely on injector rocker clevis (7).
- (6) Unscrew connector (3) until connector covers seal ring (1) and makes contact with surface of supply brake (2). Hold connector (3) in position and tighten nut (4) against drone (5).

NOTE

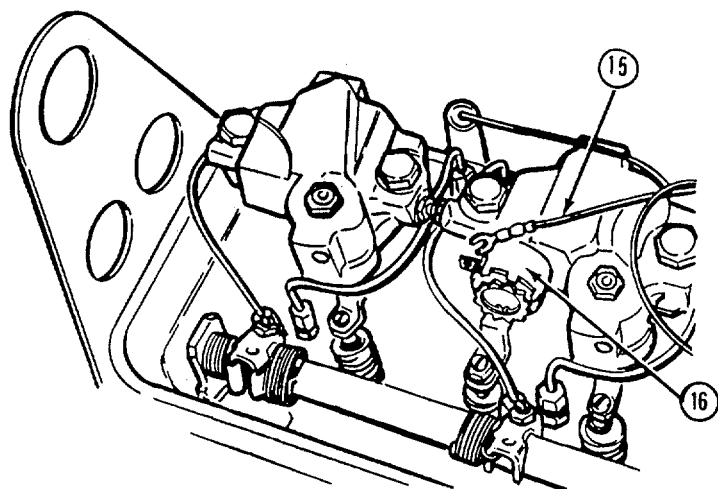
Engine brake wiring harness is installed in left and right cylinder heads in the same manner.

- (7) Install wiring harness by installing bushing (11) in cylinder head. Install spacer (12) and terminals (13) on two fuel tubes (14).



6-34. ENGINE BRAKE RETARDER - Continued

- (8) Install wire (15) on engine brake solenoid (16).



f. Follow-on Maintenance.

- (1) Install rocker arm covers (see para 4-140).

6-35. IDLER GEARS**This task covers:**

- | | |
|------------------------|--------------------------|
| a. Removal | d. Assembly |
| b. Disassembly | e. Installation |
| c. Cleaning/inspection | f. Follow-on Maintenance |

TOOLS REQUIRED

Tool Kit, General Mechanics, Automotive
(Appendix B, Section III, Item 1)

Shop Equipment, Automotive
Maintenance and Repair
(Appendix B, Section III, Item 4)

Holding fixture, idler gear
(Appendix B, Section III, Item 51)
Set, dial indicator (Appendix B, Section III, Item 32)

MATERIALS/PARTS REQUIRED

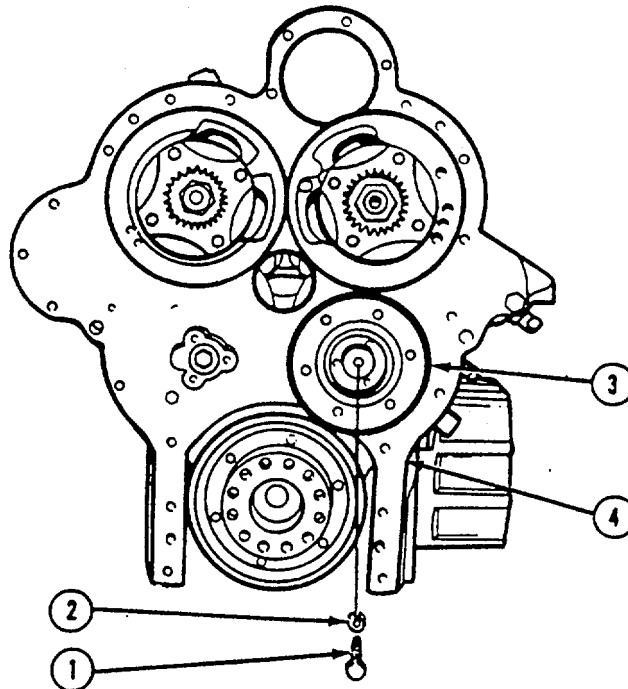
Solvent, dry cleaning (Item 3, Appendix E)
Oil, lubricating (Item 10, Appendix E)
Nylon Patch Screws (Figure 1 13, Appendix F)

EQUIPMENT CONDITION

Engine Mounted on Engine Stand
Flywheel Housing Removed (see para 6-31.)

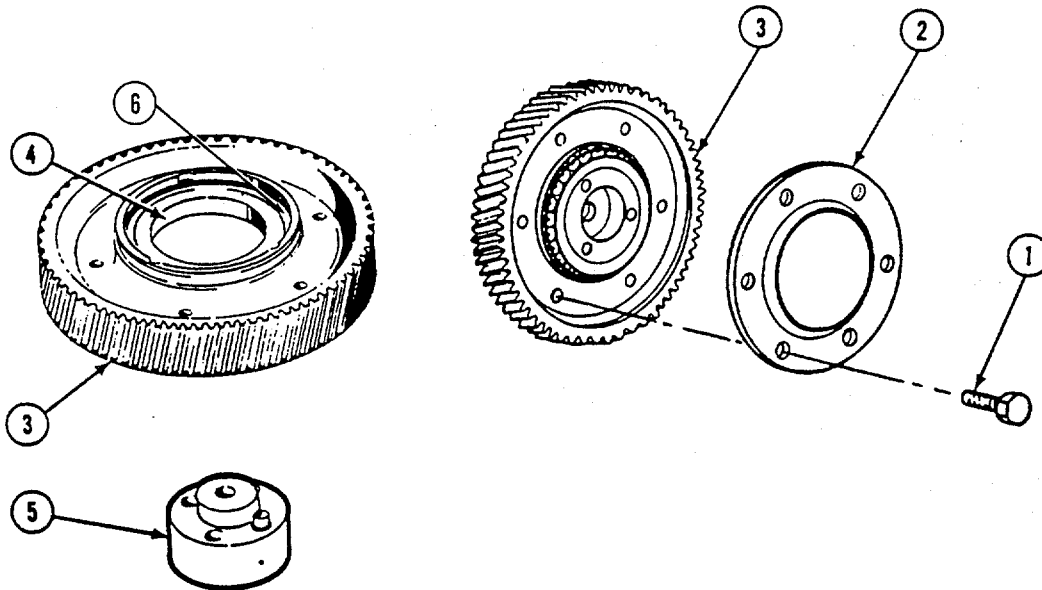
a. Removal.

- (1) Remove screw (1) and special washer (2).
- (2) Remove idler gear assembly (3) from engine block (4).



6-35. IDLER GEARS - Continuedb. Disassembly.

- (1) Remove and discard six nylon patch screws (1).
- (2) Remove retainer (2) from idler gear assembly (3).

**CAUTION**

Mark parts of matched idler gear bearings if they will be reassembled and used again. Do not scratch or damage bearings.

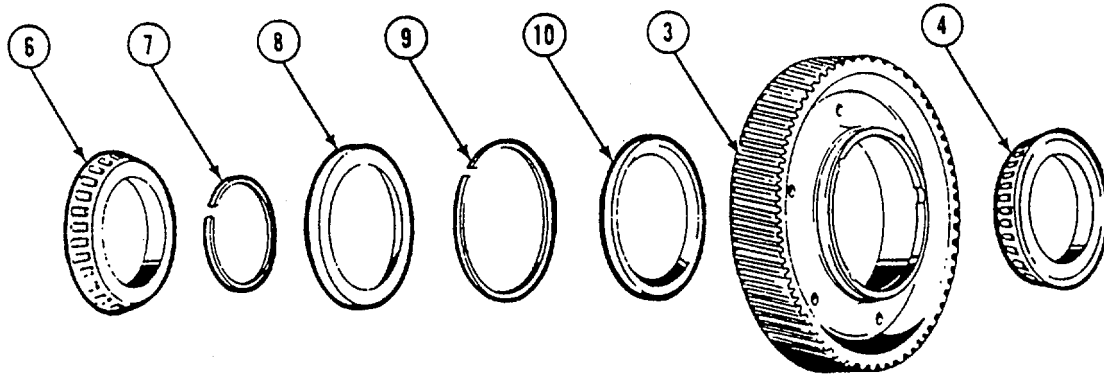
- (3) Place idler gear assembly (3) in press with outer bearing cone (4) supported on steel blocks.

CAUTION

Idler gear assembly must be rotated during disassembly to prevent damage to bearing cones.

- (4) Rotate idler gear assembly (3) while pressing idler gear hub (5) out of bearing cones (4 and 6).
- (5) Remove idler gear assembly (3) as a unit from the press.

6-35. IDLER GEARS - Continued



- (6) Remove outer bearing cone (6), inner spacer ring (7), and inner bearing cone (4) from idler gear assembly (3).

NOTE

Do not remove bearing cups unless they are damaged or loose.

- (7) Remove outer bearing cup (8), outer spacer ring (9), and inner bearing cup (10) from idler gear assembly (3).

c. Cleaning/Inspection.**WARNING**

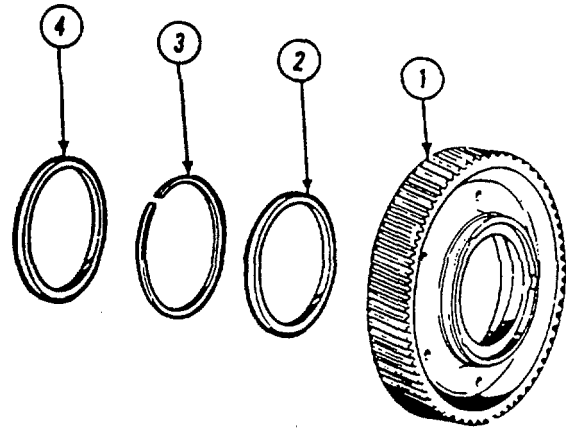
Dry cleaning solvent P-D-680 is potentially dangerous. Avoid repeated and prolonged breathing of vapors and skin contact with the liquid. Do not use near open flame, arcing equipment or other ignition sources. Always wear eye protection and protective clothing. The flash point of P-D-680 is 100 to 138 deg. F (38 to 59 deg. C).

- (1) Clean idler gear and bearing parts with dry cleaning solvent (Item 3, Appendix E).
- (2) Inspect bearing for scoring, pitting, or flat spots on rollers or cones.
- (3) Inspect bearing cups for scoring, pitting, and dents in bearing surface.
- (4) Examine gear teeth for scoring, pitting, and chips.
- (5) Replace all damaged parts.
- (6) Coat all parts with lubricating oil (Item 10, Appendix E).

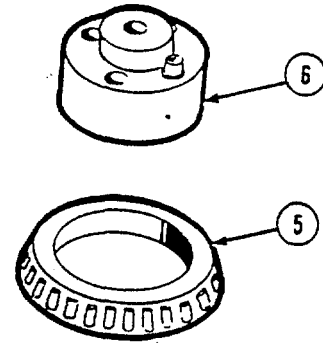
6-35. IDLER GEARS - Continued

d. Assembly.

- (1) Support idler gear (1), shoulder down, on bed of press.
- (2) Apply lubricating oil (Item 10, Appendix E) to bearing cup (2) and start inner bearing cup, numbered side up, into bore of gear (1).
- (3) Press inner bearing cup (2) to seat against shoulder of gear (1).
- (4) Install outer spacer ring (3) on inner bearing cup

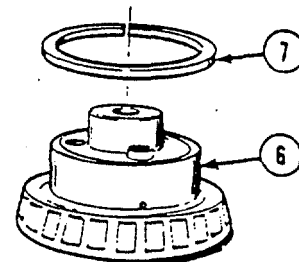


- (5) Apply lubricating oil (Item 10, Appendix E) to outer bearing cup (4) and start outer bearing cup, numbered side down, into bore of idler gear (1).
- (6) Press outer bearing cup (4) against outer spacer ring (3).
- (7) Apply lubricating oil (Item 10, Appendix E) to all parts, place outer bearing cone (5) numbered side down on bed of press.



- (8) Press idler gear hub (6) into outer bearing cone (5) until bottom of hub (6) is flush with bottom of cone (5).

- (9) Install inner spacer ring (7) on idler gear hub (6).
- (10) Position gap in spacer ring (7) on side opposite of oil hole in idler gear hub (6).



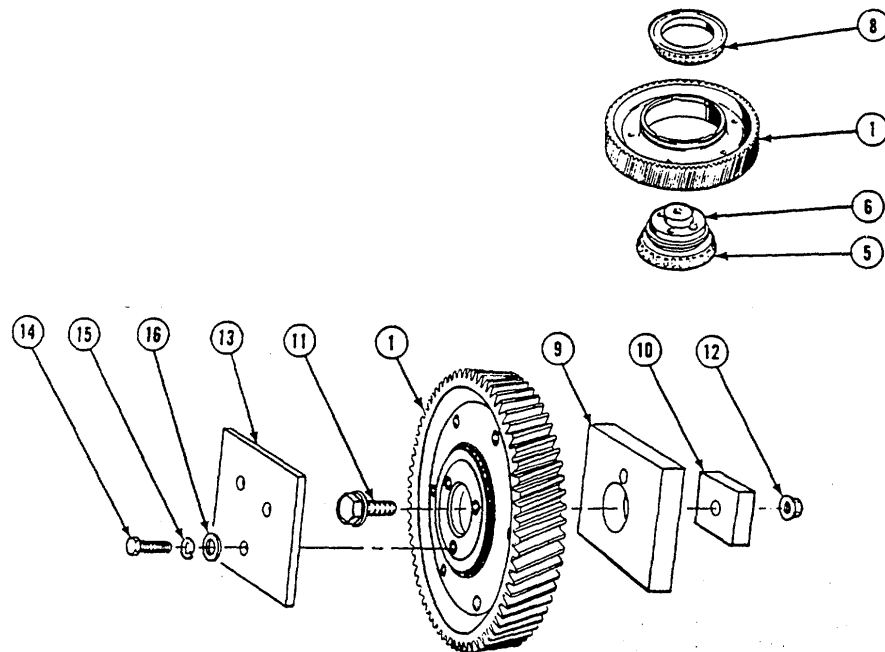
6-35. IDLER GEARS - Continued

- (11) Support outer bearing cone (5) and idler gear hub (6).
- (12) Install idler gear assembly (1) onto idler gear hub (6).

CAUTION

Turn gear while installing bearing cone on idler gear hub to prevent damage to bearing cups.

- (13) Turn idler gear assembly (1) while pressing inner bearing cone (8), numbered side up, over hub (6).
- (14) Hold hub (6) and turn gear assembly (1) to see it binding occurs.

**NOTE**

To check idler gear pre-load, do steps (15) through (25).

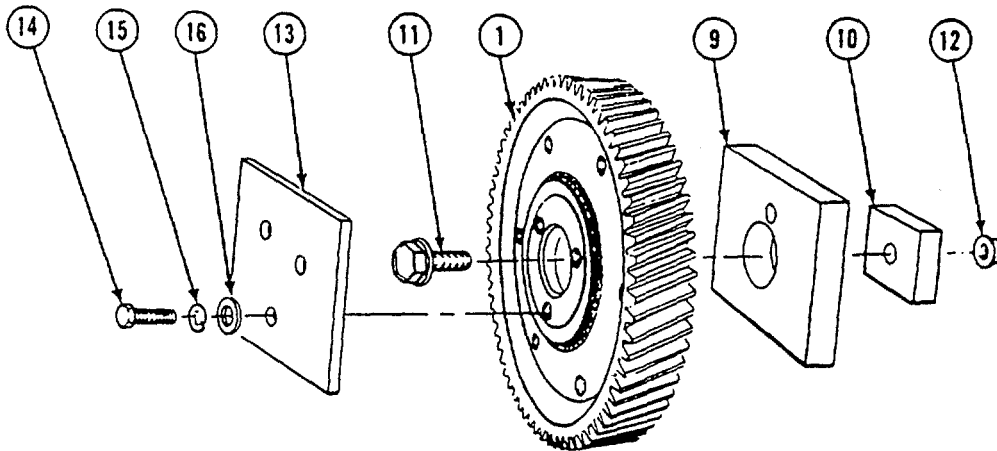
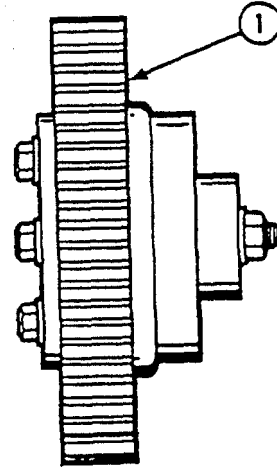
- (15) Mount idler gear (1) in soft jaw vise.
- (16) Mount two test fixture plates (9 and 10) on idler gear (1) with screw (11) and nut (12). Tighten to 80 to 90 lb-ft (108 to 122 N.m).
- (17) Mount test fixture plate (13) on idler gear (1) with three screws (14), lockwashers (15), and washers (16). Tighten to 25 to 40 lb-ft (34 to 54 N.m).
- (18) Place plate (10) in jaws of vise.

6-35. IDLER GEARS - Continued

NOTE

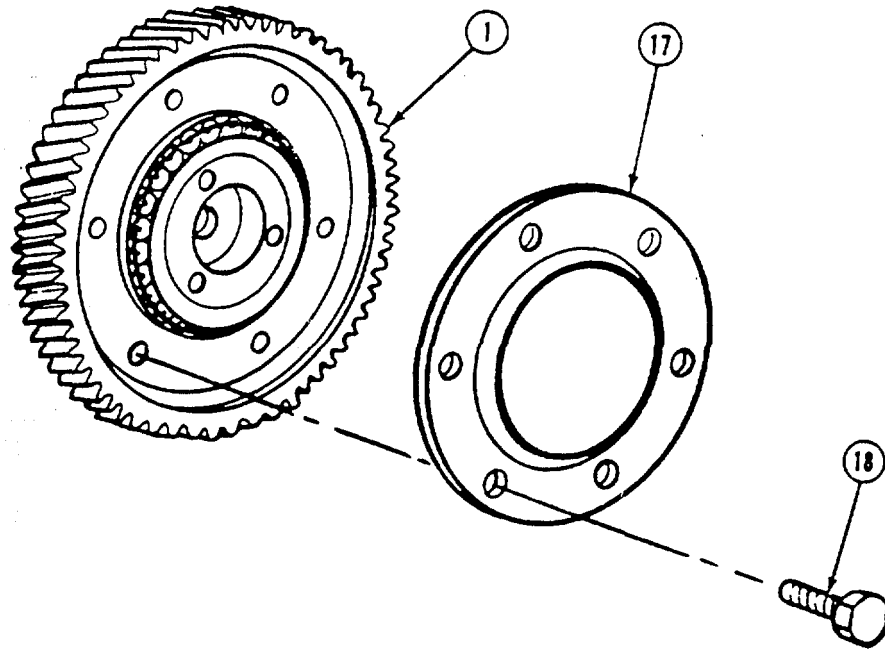
Pull to start gear moving must not be less than 0.5 lb (0.23 kg) or more than 4.0 lbs (1.8 kg).

- (19) Wrap cord several times around idler gear assembly (1) and attach spring scale.
- (20) Pull idler gear assembly (1) several times and record pull required to start gear moving. Maximum difference between pulls is 2 lbs, 11 ounces (1.22 kg).
- (21) If difference between pulls does not fall in correct ranges, replace bearings.



- (22) Place idler gear assembly (1) in soft jaw vise.
- (23) Remove three screws (14), lockwashers (15), washers (16), and test fixture plate (13).
- (24) Remove nut (12), screw (11), and two test fixture plates (1 and 9).
- (25) Remove idler gear assembly (1) from vise.

6-35. IDLER GEARS - Continued



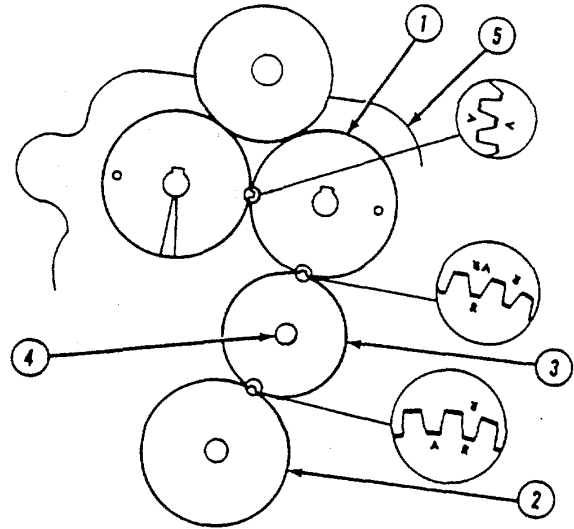
(26) Install retainer (17) and six new nylon patch screws (18) on idler gear assembly (1).

(27) Tighten screws (18) to 24 to 29 lb-ft (33 to 39 N.m).

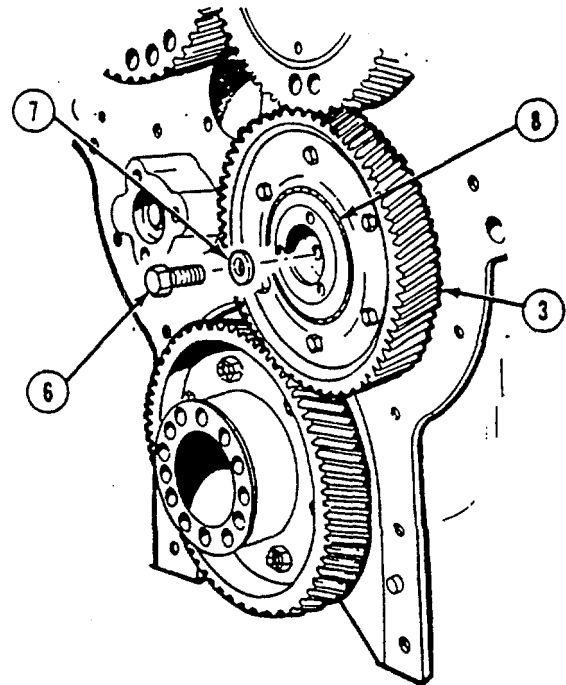
6-35. IDLER GEARS - Continued

e. Installation.

- (1) Align timing marks on camshaft gear (1) and crankshaft gear (2) with timing marks on idler gear (3).
- (2) Slide idler gear (3) into place until crankshaft gear (2) and camshaft gear (1) are fully meshed.
- (3) Rotate gear hub (4) so dowel in hub aligns with hole in end plate (5).
- (4) Tap hub (4) until it seats against end plate (5).
- (5) Check timing marks again to make sure gears (1, 2, and 3) are aligned as shown.



- (6) Install screw (6) and special washer (7).
- (7) Tighten screw (6) to 80 to 90 lb-ft (108 to 122 N.m).
- (8) Coat bearing (8) and idler gear (3) with lubricating oil (Item 10, Appendix E).

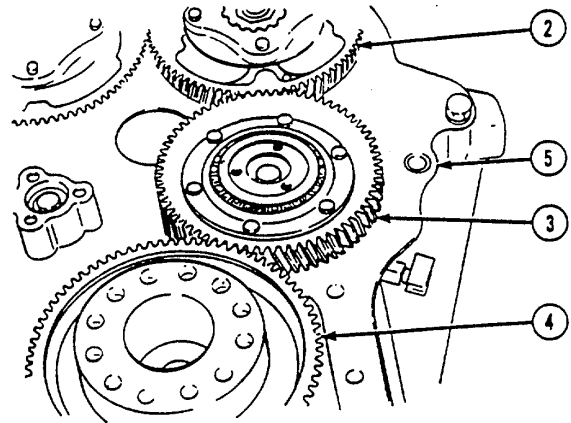


6-35. IDLER GEARS - Continued

- (9) Mount dial indicator on end plate (5) and check backlash between gears (2, 3, and 4). Minimum backlash is 0.002 in. (0.05 mm). Maximum backlash is 0.008 in. (0.20 mm) for new gears, 0.010 in. (0.25 mm) for used gears.

f. Follow-on Maintenance.

- (1) Install flywheel housing (see para 6-31.).
- (2) Remove engine from engine stand.



6-36. CAMSHAFTS AND PULSE WHEEL

This task covers:

- | | |
|------------------------|--------------------------|
| a. Removal | e. Installation |
| b. Disassembly | f. Adjustment |
| c. Cleaning/inspection | g. Follow-on Maintenance |
| d. Assembly | |

TOOLS REQUIRED

Tool Kit, General Mechanics, Automotive
(Appendix B, Section III, Item 1)

Shop Equipment, Automotive
Field Maintenance
(Appendix B, Section III, Item 4)

Puller, camshaft gear (Appendix B, Section III, Item 52)
Remover, camshaft gear and water pump pulley
(Appendix B, Section III, Item 53)
Set, dial indicator (Appendix B, Section III, Item 32)
Gauge, feeler (Appendix B, Section III, Item 38)
Puller (Appendix B, Section III, Item 54)
Adapter (Appendix B, Section III, Item 55)

MATERIALS/PARTS REQUIRED

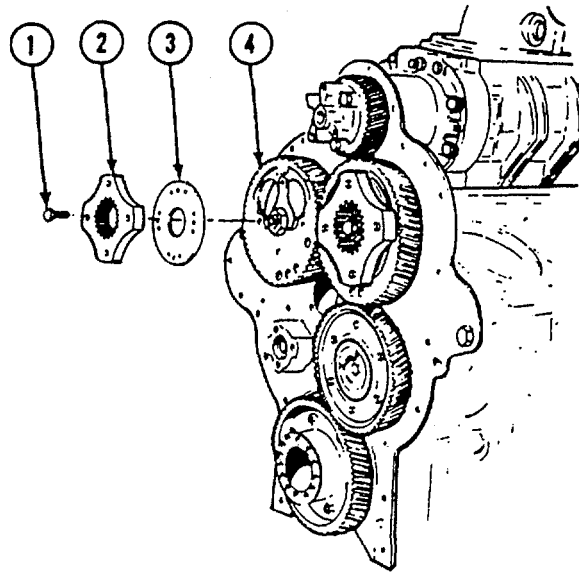
Solvent, dry cleaning (Item 3, Appendix E)
Oil, lubricating (Item 10, Appendix E)
Grease, automotive and artillery
(item 1, Appendix E)
Tags, identification (Item 32, Appendix E)
Gasket (Figure 106, Appendix F)
Oil Seal (Figure 106, Appendix F)

EQUIPMENT CONDITION

Engine Installed on Engine Stand
Cylinder Heads Removed (see para 6-13.)
Flywheel Housing Removed (see para 6-31.)
Front Balance Cover Removed (see para 6-38.)
Water Pump Drive Gear Removed 6-39.)

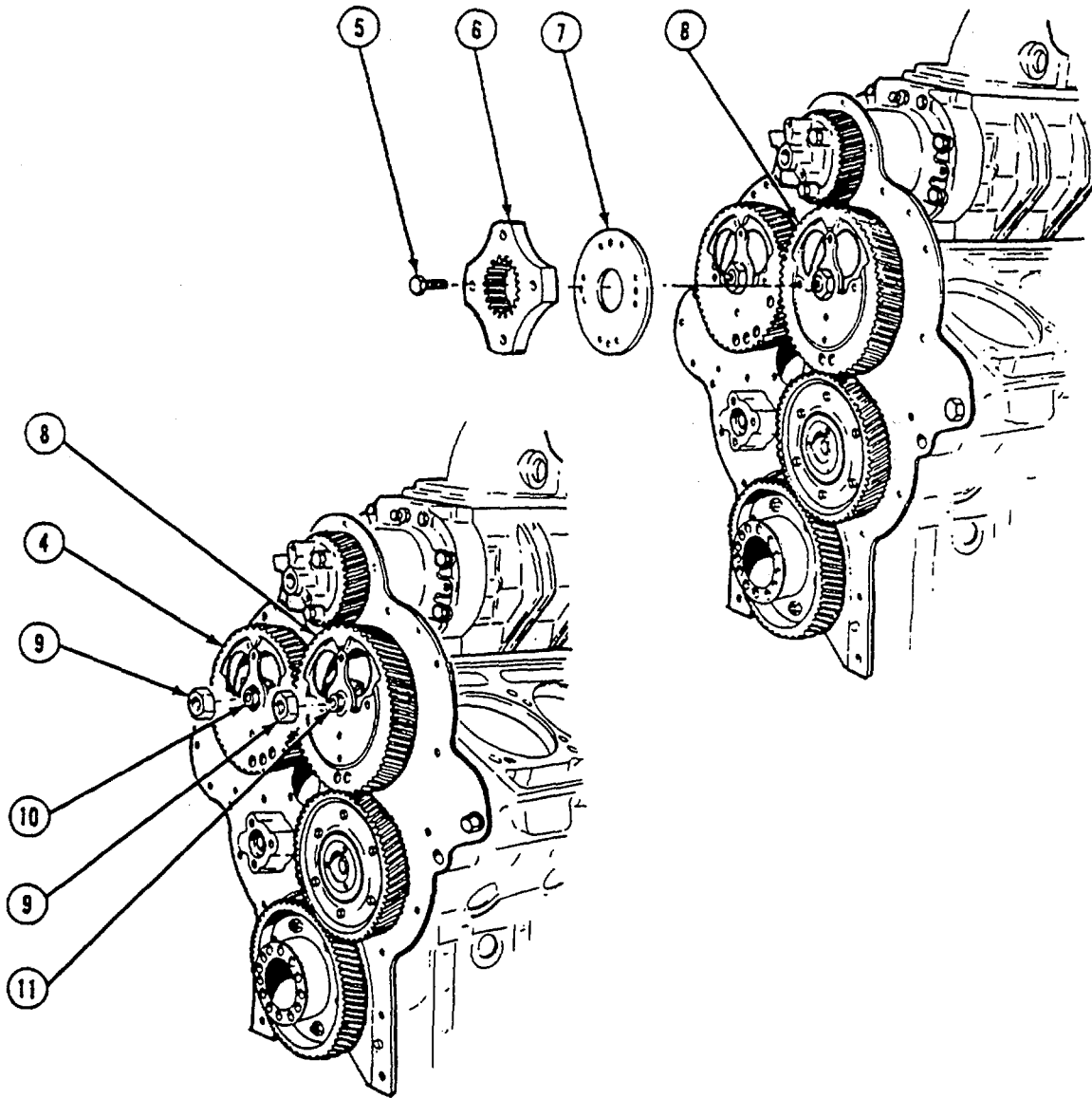
a. Removal.

- (1) Remove four screws (1), adapter (2), and retainer (3) from left camshaft gear (4).



6-36. CAMSHAFTS AND PULSE WHEEL Continued

(2) Remove four screws (5), adapter (6), and retainer (7) from right camshaft gear (8).



NOTE

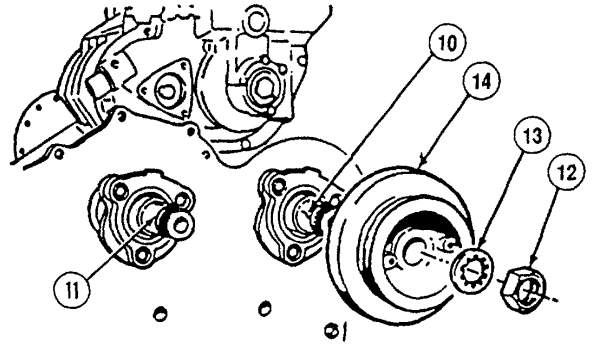
Shop cloth is used between camshaft gears to prevent turning.

(3) Place a clean shop cloth between gears (4 and 8).

(4) Remove two nuts (9) from rear end of camshafts (10 and 11).

6-36. CAMSHAFTS AND PULSE WHEEL Continued

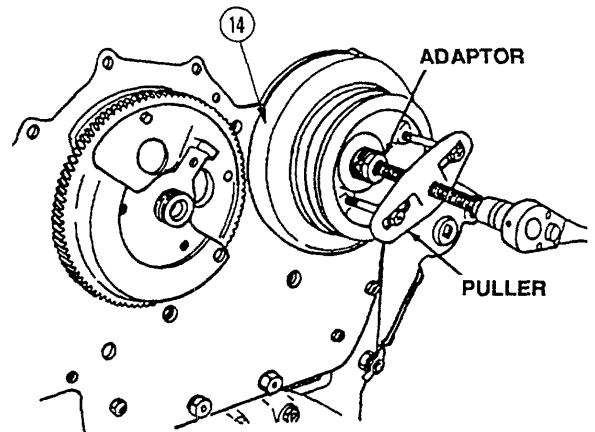
- (5) Remove nut (12) and lockwasher(13), which retain accessory drive pulley (14) on front of left band camshaft (10).



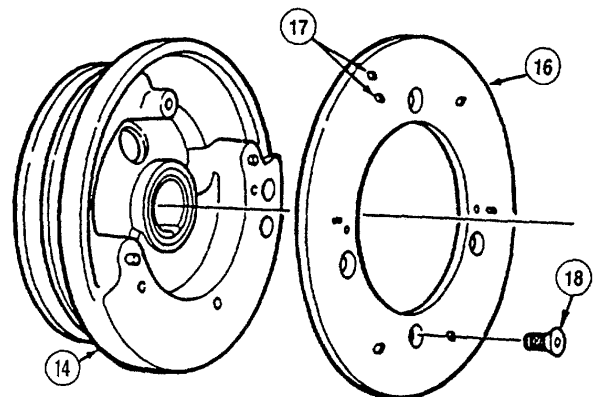
- (6) Attach puller (Appendix B, Section III, Item 54) to the left bank accessory drive pulley (14) using adaptor (Appendix B, Section III, Item 55) between the end of the camshaft and the puller screw.

CAUTION

Do not pry on the pulse wheel (16) to remove it. Damage to pulse wheel teeth (17) may occur.

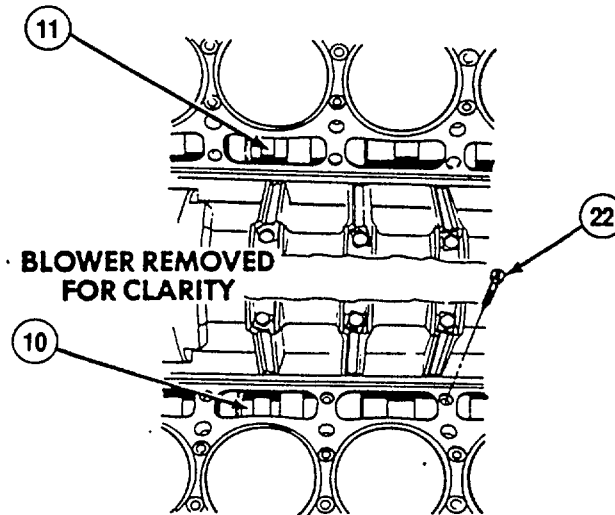
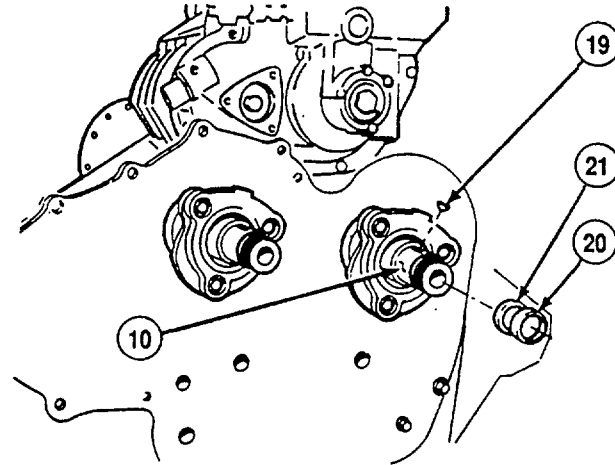


- (7) Remove the four screws (18) that retain the pulse wheel (16) to the left bank accessory drive pulley (14). (8) Remove the pulse wheel (16).



6-36. CAMSHAFTS AND PULSE WHEEL Continued

- (9) Remove woodruff key (19) and spacer (20) from front end of camshaft (10).
- (10) Remove and discard oil seal (21) from camshaft (10).
- (11) Remove three intermediate bearing lock screws (22) from camshafts (10 and 11).

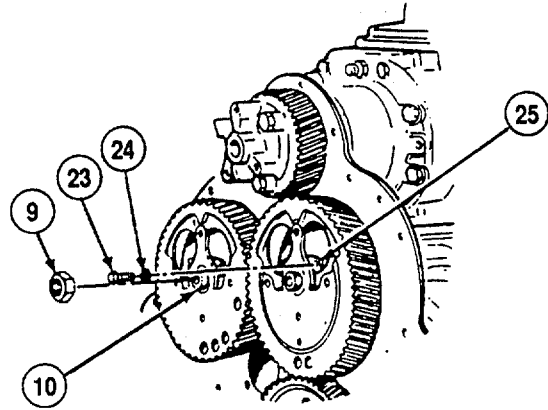


6-36. CAMSHAFTS AND PULSE WHEEL Continued

NOTE

Remove cloth from between gears. Gears can be turned to reach rear end camshaft bearing screws using nut on end of camshaft.

- (12) Install nut (9) on rear end of camshaft (10).
- (13) Remove three camshaft rear end bearing screws (23) and lockwashers (24) from each rear camshaft bearing (25).
- (14) Remove nut (9).



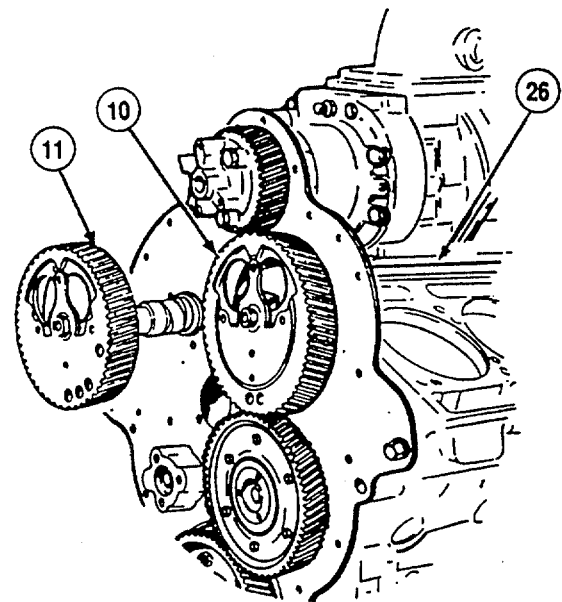
CAUTION

Use care when removing camshafts. Camshafts can be damaged by scraping or hitting engine block or hard surface.

NOTE

Tag and mark all parts to aid in assembly.

- (15) Remove camshaft assemblies (11 and 11) from engine block (26).

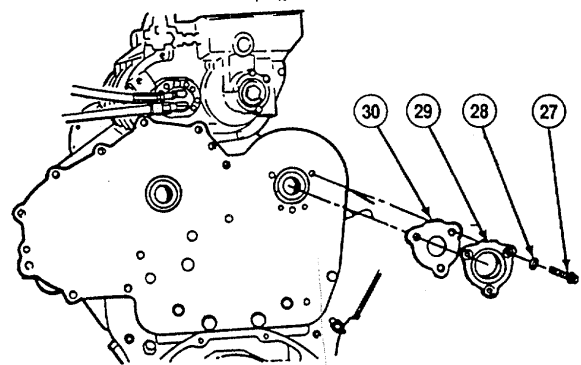


- (16) Remove three screws (27) and lockwashers (28) from each front camshaft bearing (29).

NOTE

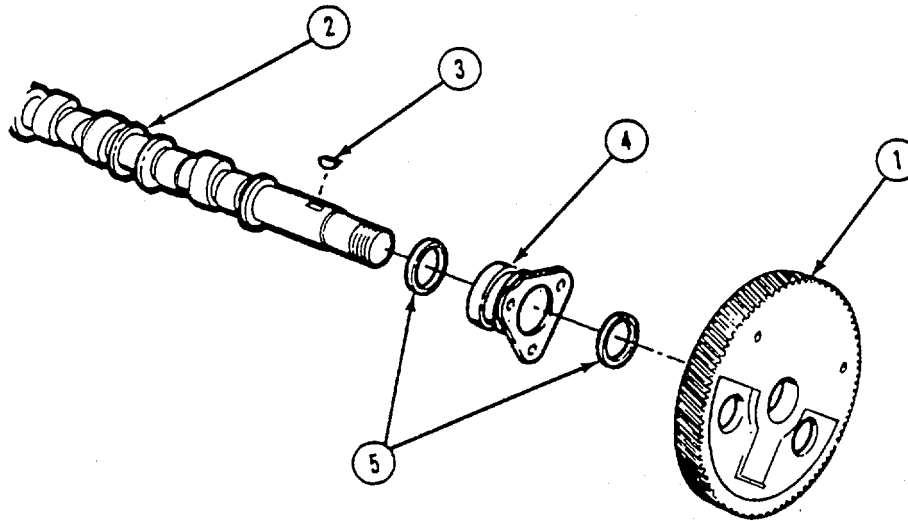
Gasket is on left-hand bearing only.

- (17) Remove two bearings (29) and gasket (30). Discard gasket.



6-36. CAMSHAFTS AND PULSE WHEEL - Continued

b. Disassembly.



NOTE

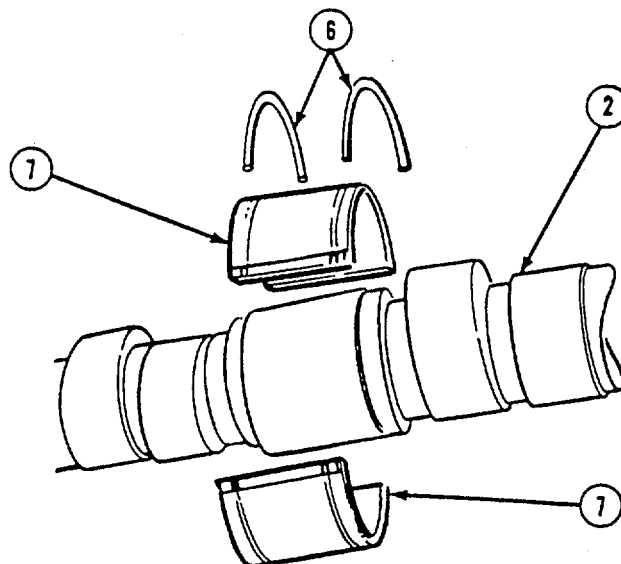
Repeat steps (1) through (5) for disassembly of other camshaft.

- (1) Remove gear(1) from end of camshaft (2) using camshaft gear puller and remover.
- (2) Remove woodruff key (3) from end of camshaft (2).
- (3) Remove end bearing (4) with thrust washers (5) from end of camshaft (2).

NOTE

Tag and mark three camshaft bearings for later installation.

- (4) Remove six lockrings (6) and three camshaft intermediate bearings (7) from camshaft (2).



6-36. CAMSHAFTS AND PULSE WHEEL - Continuedc. Cleaning/Inspection.**WARNING**

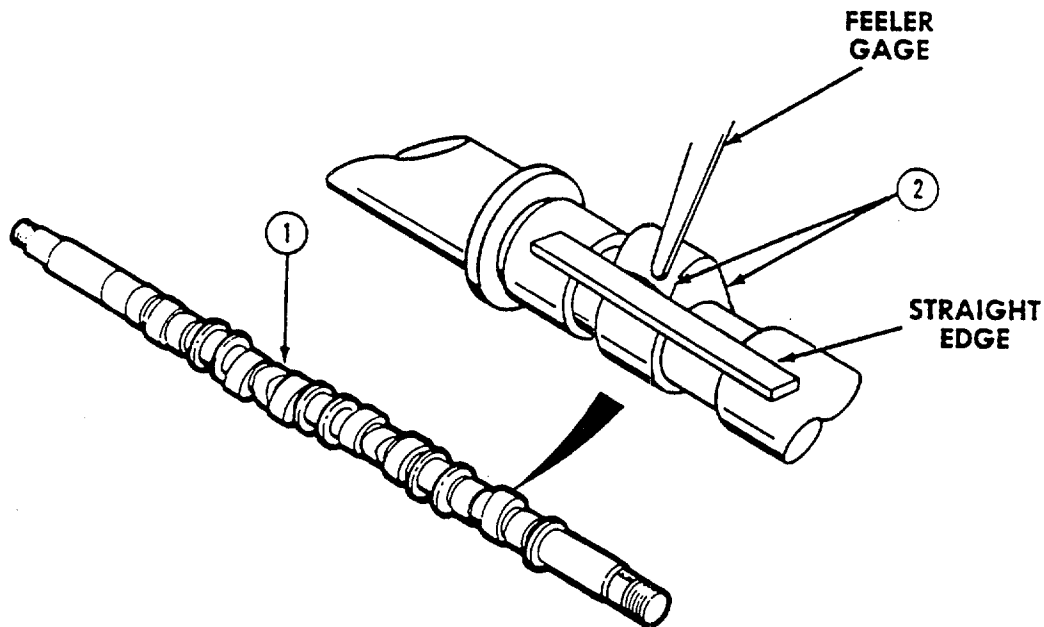
Dry cleaning solvent P-D-680 is potentially dangerous. Avoid repeated and prolonged breathing of vapors and skin contact with the liquid. Do not use near open flame, arcing equipment or other ignition sources. Always wear eye protection and protective clothing. The flash point of P-D-680 is 100 to 138 deg. F (38 to 59 deg. C).

- (1) Clean all camshaft parts with dry cleaning solvent (Item 3, Appendix E).

WARNING

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

- (2) Dry parts with compressed air.



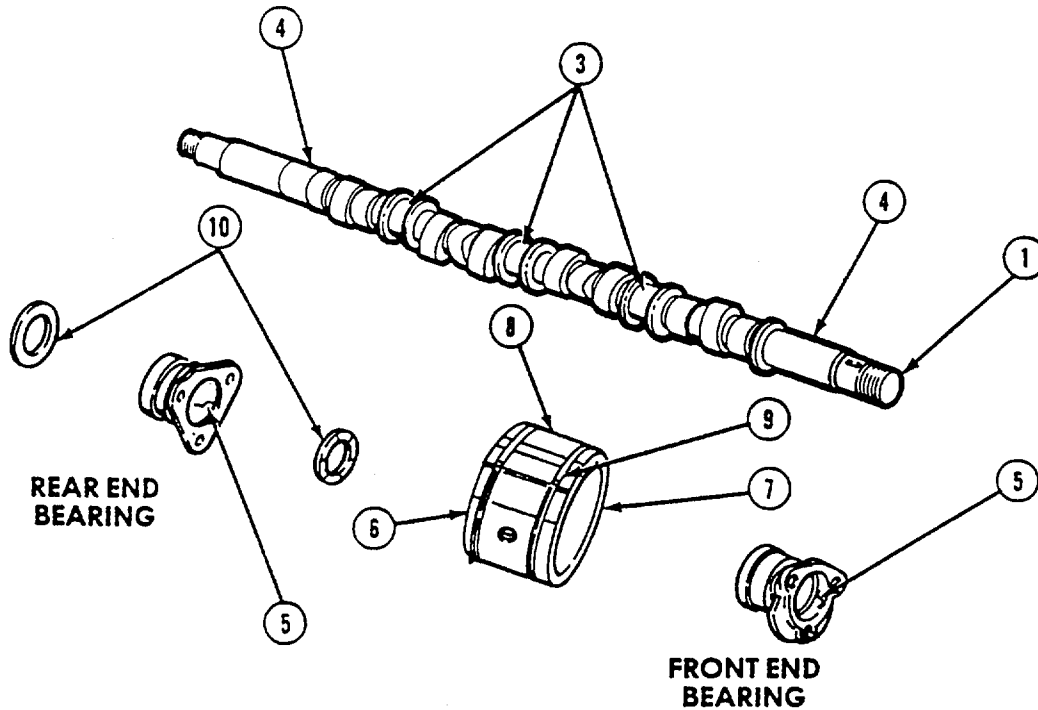
- (3) Inspect camshaft (1) for scratches or damage.
 (4) Damaged keyways may be filed smooth.
 (5) Threaded holes may be retapped.

NOTE

Flat measurements must not exceed 0.003 in. (0.076 mm).

- (6) Measure flats on the injector rise side of the cam lobes (2) on 12 cam lobes using a straight edge and feeler gauge (Appendix B, Section III, Item 38).

6-36. CAMSHAFTS AND PULSE WHEEL - Continued



NOTE

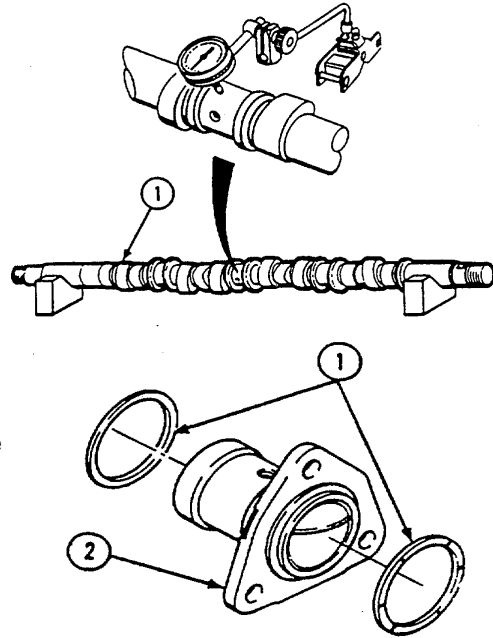
Both ends of lockring must cover split line of bearing.

- (7) Measure and note diameters of three bearing journals (3). Replace camshaft (1) if any diameter is less than 1.4980 in. (38.049 mm).
- (8) Measure and note diameters of two end bearing journals (4). Replace camshaft (1) if any diameter is less than 1.4960 in. (37.998 mm).
- (9) Measure and note inside diameter of four end bearings bushings (5).
- (10) Put lower half (6) of three intermediate bearings (7) together with top half (8).
- (11) Install six lockrings (9) over three intermediate bearings (7).
- (12) Measure and note inside diameter of three intermediate bearings (7).
- (13) Take measurement recorded in step (7) and subtract from measurement recorded in step (12). Total difference may not exceed 0.009 in. (0.23 mm).
- (14) Replace three intermediate bearings (7) if clearance exceeds limit.
- (15) Measure thickness of four rear end bearing thrust washers (10) and replace if less than 0.119 in. (3.02 mm).
- (16) Take measurement recorded in step (8) and subtract it from measurement recorded in step (9). Total difference may not exceed 0.006 in. (0.15 mm).

6-36. CAMSHAFTS AND PULSE WHEEL - Continued

- (17) Replace front or rear end bearing bushings if clearance exceeds limits (para 6-37.).
- (18) Inspect spacers. Replace if damaged.
- (19) Inspect two camshaft gears for worn or damaged teeth. Replace if damaged.
- (20) Place camshaft (1) in V blocks and use dial indicator to check center bearing surface for runout. Runout should not exceed 0.002 in. (0.05 mm).
- (21) If runout exceeds 0.002 in. (0.05 mm) replace camshaft.
- (22) Repeat steps (1) to (21) for other camshaft.

DIAL INDICATOR

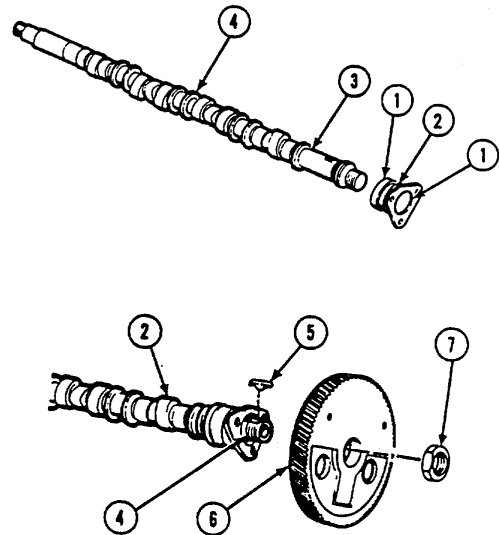


d. Assembly.

NOTE

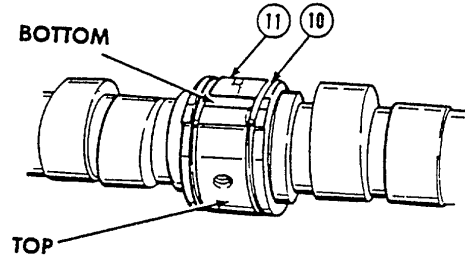
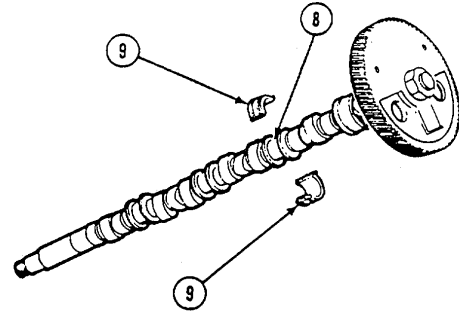
- Repeat steps (1) through (11) for assembly of both camshafts.
- Steel faces of thrust washers are next to bearing.

- (1) Apply grease (Item 1, Appendix E) to steel faces of two thrust washers (1).
- (2) Put thrust washer (1) against each end of camshaft rear end bearing (2).
- (3) Apply lubricating oil (Item 10, Appendix E) to camshaft rear bearing journal (3).
- (4) Install two thrust washers (1) and camshaft rear end bearing (2) on camshaft (4).
- (5) Install woodruff key (5) in keyway at rear of camshaft (4).
- (6) Align camshaft gear (6) with key (5).
- (7) Press gear (6) onto shoulder of camshaft (4)
- (8) Install nut (7) on camshaft (4) and tighten finger tight.



6-36. CAMSHAFTS AND PULSE WHEEL - Continued

- (9) Apply lubricating oil to camshaft intermediate bearing journals (8).
- (10) Put six halves of intermediate bearing (9) on camshaft journals (8).



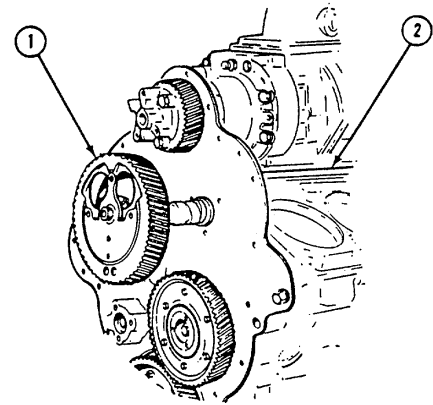
NOTE

Both ends of lockring must cover split line of bearing and be installed over bottom half of bearing. Bottom half of bearing is half without hole.

- (11) Install six lockrings (10) over bottom half of three intermediate bearings (11).

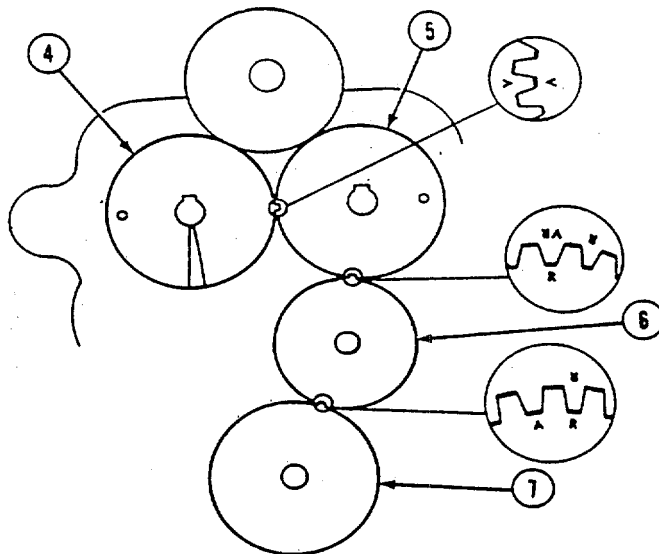
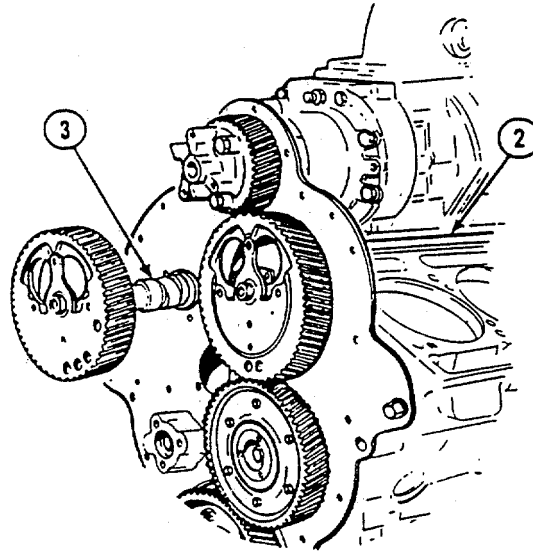
e. Installation.

- (1) Install right bank camshaft (1) into engine block (2).



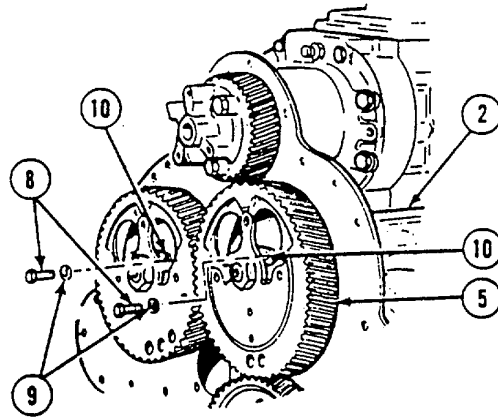
6-36. CAMSHAFTS AND PULSE WHEEL - Continued

- (2) Install left-hand camshaft (3) into engine block (2).
- (3) Align left camshaft gear (4), right camshaft gear (5), idler gear (6), and crankshaft timing gear (7) so that timing marks on gears (4, 5, 6, and 7) are aligned as shown.
- (4) Slide camshaft gears (4 and 5) into place until camshaft gears (4 and 5) and idler gear (6) are fully meshed.
- (5) Check timing marks again to make sure gears (4, 5, 6 and 7) are aligned as shown.

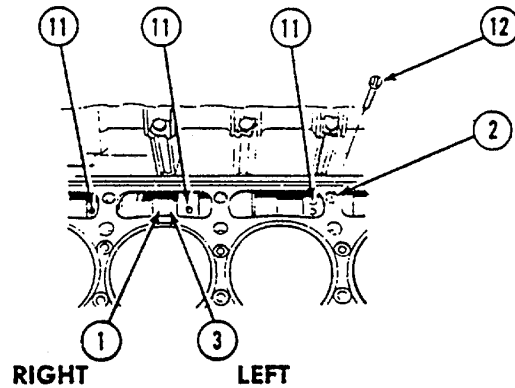


6-36. CAMSHAFTS AND PULSE WHEEL - Continued

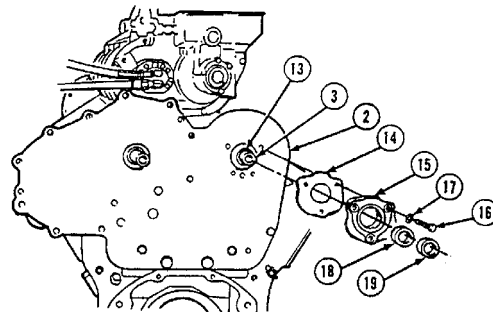
- (6) Turn gear (5) to reach all rear end bearing screw holes.
- (7) Install six screws (8) and lockwashers (9) to both camshaft rear end bearings (10) and engine block (2).
- (8) Tighten screws (8) to 35 to 40 lb-ft (47 to 54 Nm).



- (9) Align holes in three intermediate bearings (11) on right and left camshafts (1 and 3) with tapped holes in engine block (2).
- (10) Install three lock screws (12).
- (11) Tighten lock screws (12) to 15 to 20 lb-ft (20 to 27 Nm).



- (12) Apply clean engine oil (Item 10, Appendix E) to left bank camshaft front end bearing journal (13).
- (13) Install new gasket (14) and bearing (15) on camshaft (3).
- (14) Install three screws (16) and lockwashers (17) to bearing (15) and engine block (2).
- (15) Tighten screws (16) to 35 to 40 lb-ft (47 to 54 Nm).



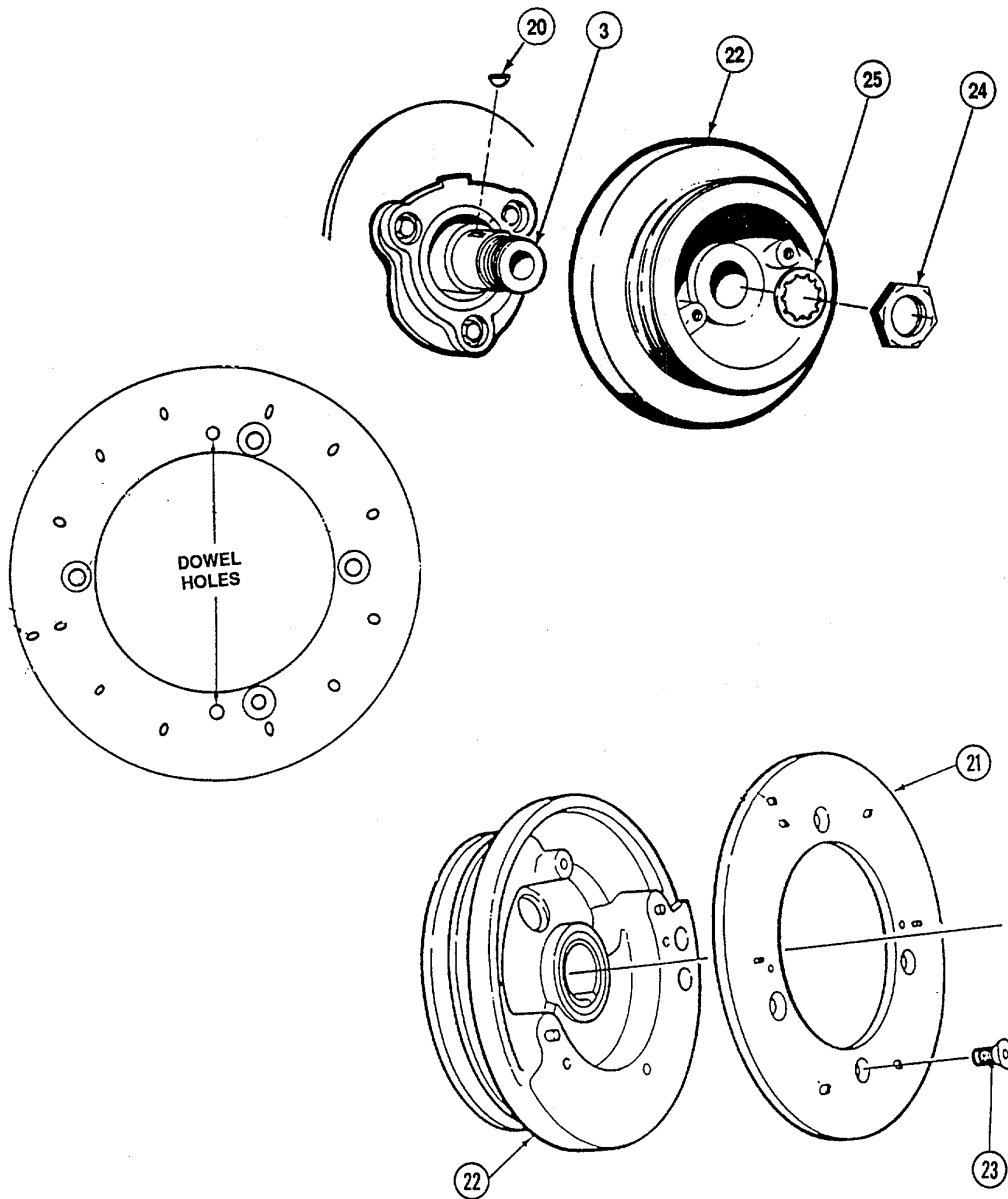
NOTE

Spacers have polished outside diameters.

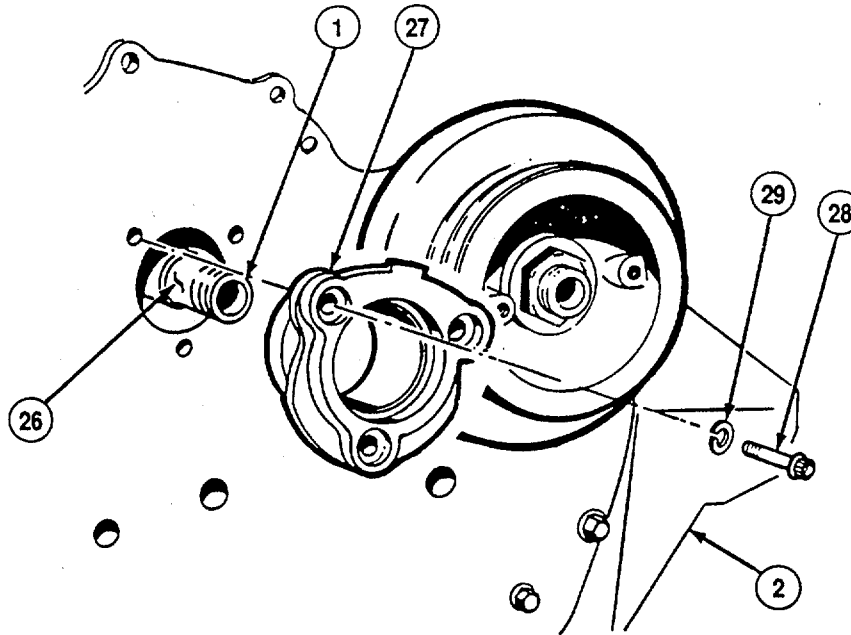
- (16) Install new oil seal (18) and spacer (19).

6-36. CAMSHAFTS AND PULSE WHEEL - Continued

- (17) Install woodruff key (20) in camshaft (3).
- (18) Locate the two small holes in the pulse wheel (21) over the dowels in the rear of the left bank camshaft accessory drive (22).
- (19) Secure the pulse wheel (21) to the pulley with four screws (23).
- (20) Install pulley (22) on camshaft (3).
- (21) Install nut (24) and lockwasher (25) on camshaft (3). Tighten nut finger tight.

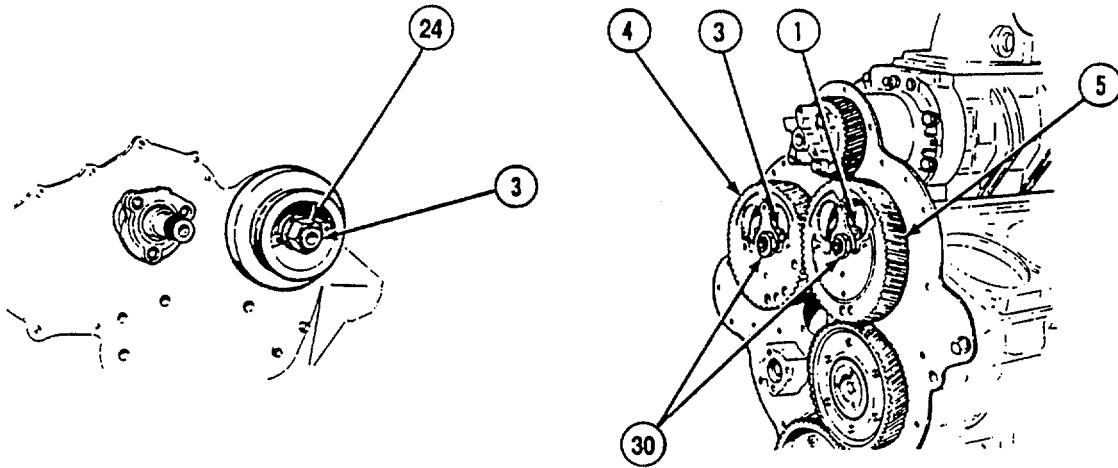


6-36. CAMSHAFTS AND PULSE WHEEL - Continued



- (22) Apply lubricating oil to right bank camshaft front end bearing journal (26).
- (23) Install bearing (27) on camshaft (1).
- (24) Install three screws (28) and lockwashers (29) in bearing (27) and engine block (2).
- (25) Tighten screws (28) to 35 to 40 lb-ft (47 to 54 Nm).

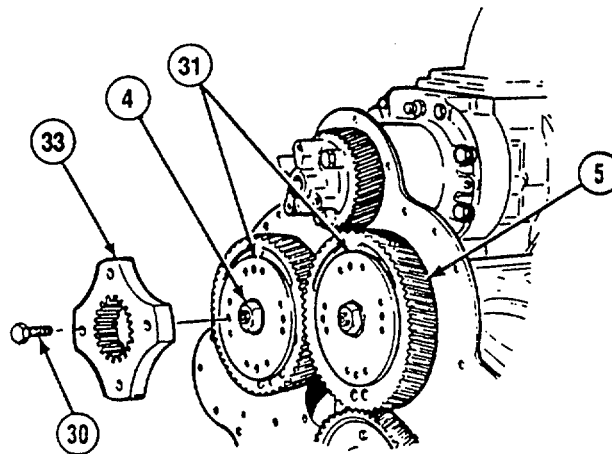
6-36. CAMSHAFTS AND PULSE WHEEL - Continued



- (26) Place clean cloth between teeth of camshaft gears (4 and 5).
- (27) Tighten nuts (30) on rear end of camshafts (1 and 3) to 300 to 325 lb-ft (407 to 441 Nm).
- (28) Tighten nut (24) on front end of left bank camshaft (3) to 300 to 325 lb-ft (407 to 441 Nm).

NOTE

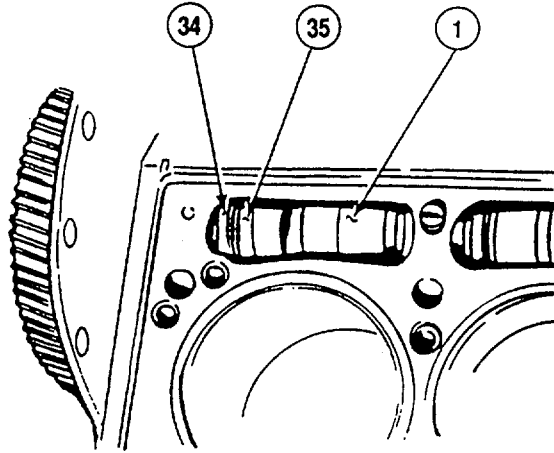
Remaining nut on right bank camshaft is installed with water pump drive gear.



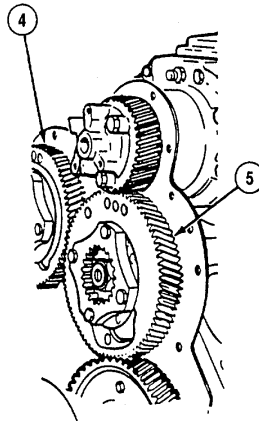
- (29) Put two retainers (31) in mounting position on camshaft gears (4 and 5).
- (30) Install eight screws (32) in two adapters (33) and retainers (31).
- (31) Tighten screws (32) to 35 to 39 lb-ft (47 to 53 Nm).

6-36. CAMSHAFTS AND PULSE WHEEL - Continued

- (32) Check clearance between thrust washer (34) and shoulder (35) of camshaft (1). If clearance is less than 0.003 in. (0.08 mm) or greater than 0.018 in (0.45 mm), replace camshaft (1).



- (33) Check backlash between gears (4 and 5). Minimum backlash is 0.002 in. (0.05 mm). Maximum backlash is 0.010 in. (0.25 mm).

f. Adjustment.

- (1) Refer to Synchronous and Timing Reference Sensor Adjustment procedures (see para 6-28.).

g. Follow-on Maintenance.

- (1) Install water pump drive gear (see para 6-39.).
- (2) Install front balance cover (see para 6-38.).
- (3) Install flywheel housing and rear oil seal (see para 6-31.).
- (4) Install cylinder heads (see para 6-13.).
- (5) Remove engine from engine stand.

6-37. CAMSHAFT END BEARING BUSHINGS

This task covers:

- a. Removal
- b. Installation

c. Follow-on Maintenance

TOOLS REQUIRED

Tool Kit, General Mechanics, Automotive
(Appendix B, Section III, Item 1)

Shop Equipment, Automotive
Maintenance and Repair
(Appendix B, Section III, Item 4)

EQUIPMENT CONDITION

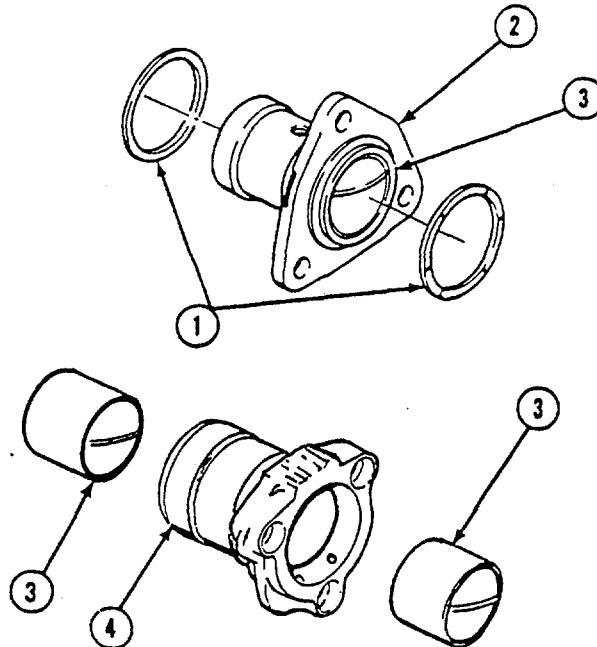
Camshaft End Bearings Removed
(see para 6-36.)

a. Removal.

NOTE

Do this procedure only if camshaft end bearing bushings fail inspection specifications in para 6-36. If one bushing in end bearing has failed both bushings must be replaced.

- (1) Remove two thrust washers (1) from camshaft rear end bearing (2).
- (2) Remove two bushings (3) from camshaft front and rear end bearings (4 and 2).

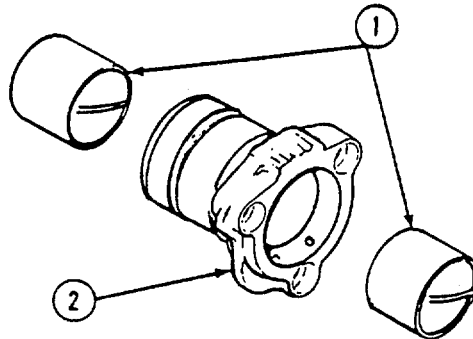


6-224

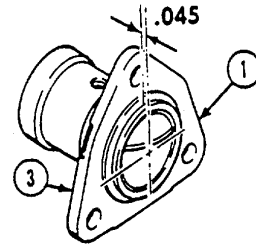
6-37. CAMSHAFT END BEARING BUSHINGS

b. Installation.

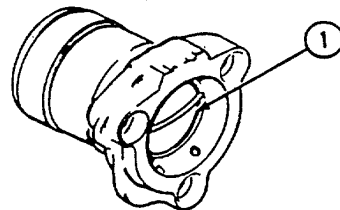
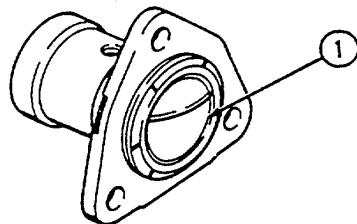
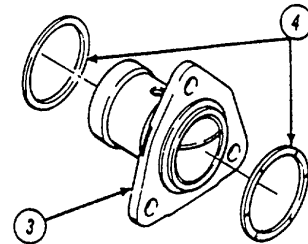
- (1) Press two bushings (1) into camshaft front end bearing (2) until flush with ends of bearing (2).



- (2) Press two bushings (1) into camshaft rear end bearing (3) until bushing sticks out approximately 0.045 to 0.055 in. (1.14 to 1.40 mm).



- (3) Install two thrust washers (4) on rear end bearing (3).



- (4) Bore bushings (1) to 1.500 to 1.501 in. (38.100 to 38.125 mm).

c. Follow-on Maintenance.

- (1) Install camshaft end bearings (see para 6-36).

6-38. FRONT BALANCE COVER AND VIBRATION DAMPER

This task covers:

- | | |
|----------------------------|--------------------------|
| a. Removal | c. Installation |
| b. Cleaning and Inspection | d. Follow-on Maintenance |

TOOLS REQUIRED

Tool Kit, General Mechanics, Automotive
(Appendix B, Section III, Item 1)

MATERIALS/PARTS REQUIRED

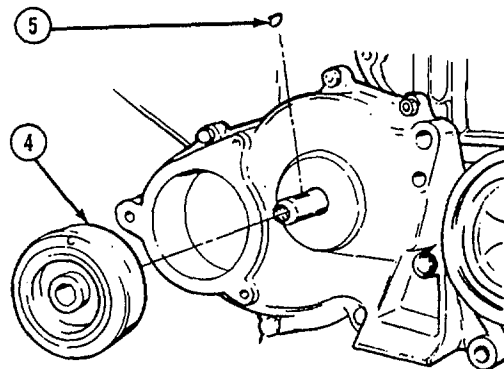
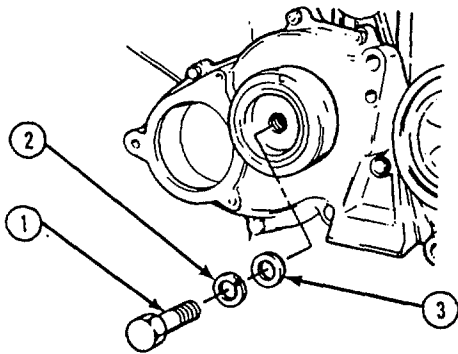
Grease, Automotive and Artillery (Item 1, Appendix E)
Dry Cleaning Solvent (Item 3, Appendix E)
Oil Seal (Figure 108, Appendix F)
Gasket (Figure 108, Appendix F)

EQUIPMENT CONDITION

Engine Removed (see para 5-11.)
Fan and Mounting Removed (see para 4-132.)
Water Pump Removed (see para 5-25.)

a. Removal.

- (1) Remove screw (1), lockwasher (2) and washer (3).



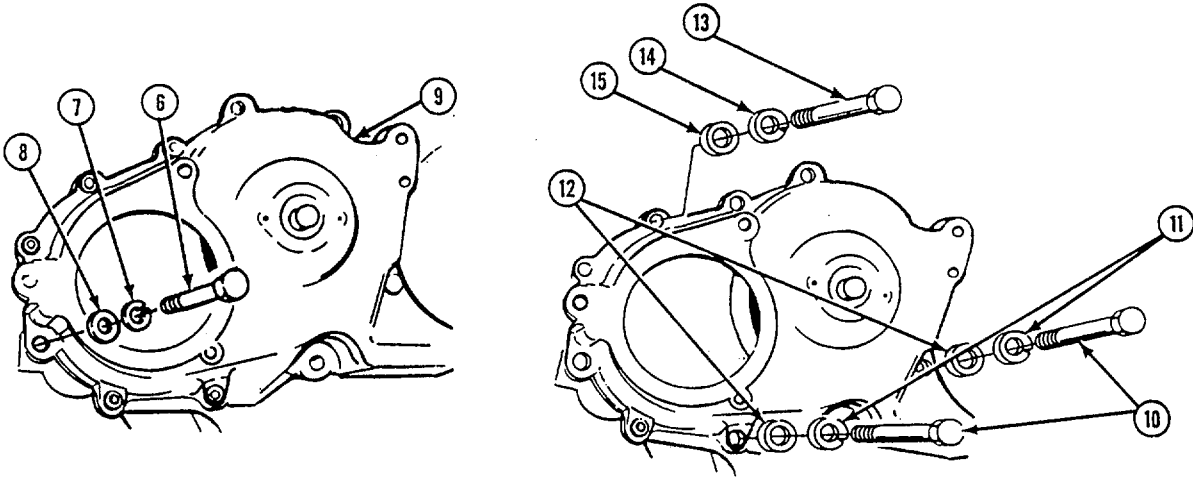
- (2) Remove vibration damper (4) and key (5) from drive shaft.

NOTE

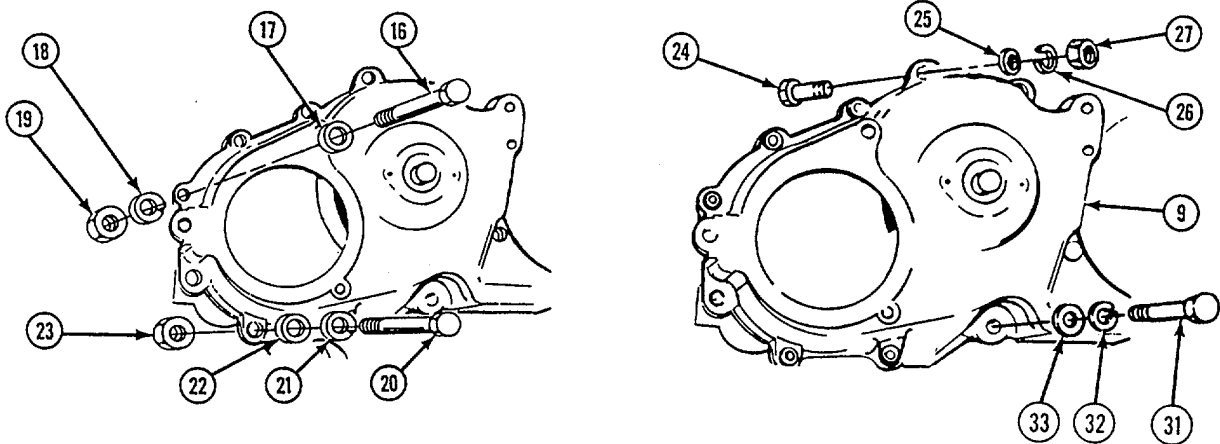
Tag and mark screws, lockwashers, washers and front cover before removing.

6-38. FRONT BALANCE COVER AND VIBRATION DAMPER - Continued

- (3) Remove screw (6) lockwasher (7) and washer (8) from front balance cover (9).

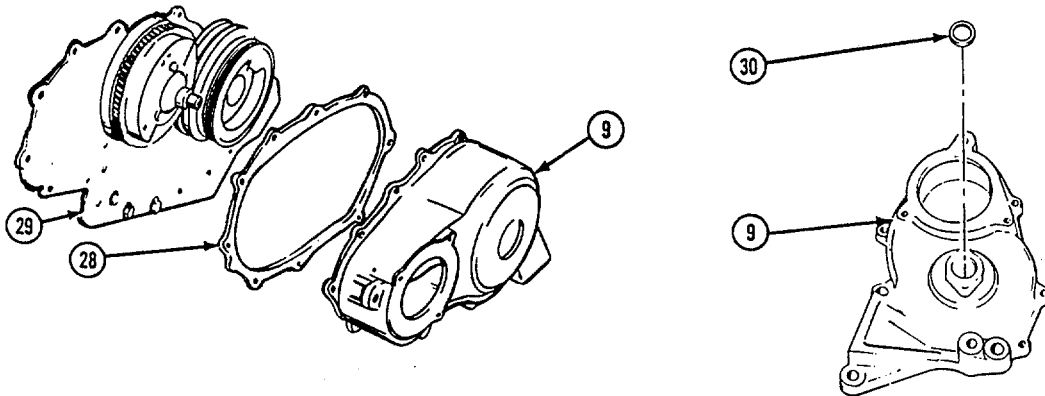


- (4) Remove two screws (10), lockwashers (11) and washers (12). Remove two screws (13), lockwashers (14) and washers (15) from top of balance cover.
- (5) Remove screw (16), washer (17), lockwasher (18) and nut (19). Remove screw (20), lockwasher (21), washer (22) and nut (23).
- (6) Remove three nuts (27), lockwashers (26), washers (25) and screws (24).
- (7) Remove two screws (31), lockwashers (32), and washers (33).



6-38. FRONT BALANCE COVER AND VIBRATION DAMPER - Continued

- (8) Remove front balance cover (9) and gasket (28) from front cover (29). It may be necessary to tap cover with a mallet to free cover. Discard gasket.



- (9) Use a suitable driver or press and remove seal (30) from cover. Discard seal.

b. Cleaning and Inspection.

WARNING

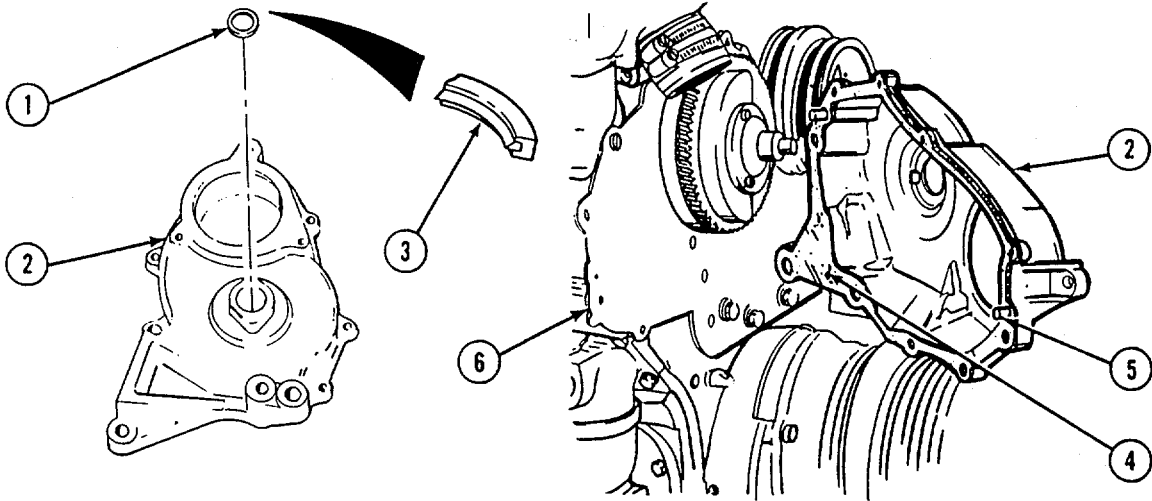
Dry cleaning solvent P-D-680 is potentially dangerous. Avoid repeated and prolonged breathing of vapors and skin contact with the liquid. Do not use near open flame, arcing equipment or other ignition sources. Always wear eye protection and protective clothing. The flash point of P-D-680 is 100 to 138 deg. F (38 to 59 deg. C).

- (1) Clean all parts with dry cleaning solvent (Item 3, Appendix E) and dry thoroughly.

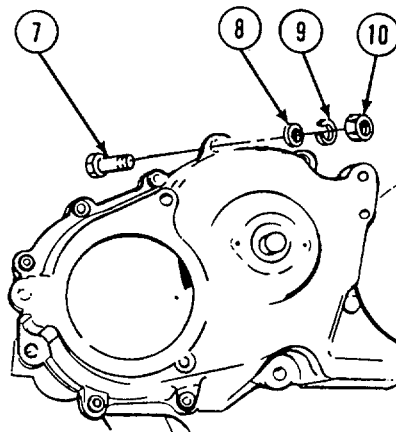
6-38. FRONT BALANCE COVER AND VIBRATION DAMPER - Continued

- (2) Inspect front balance cover for cracks, dents and other damage. Replace cover if damaged.
- (3) Inspect vibration damper for dents and damage and for wear to mounting hole. Replace damper if damaged.
- (4) Replace gasket.

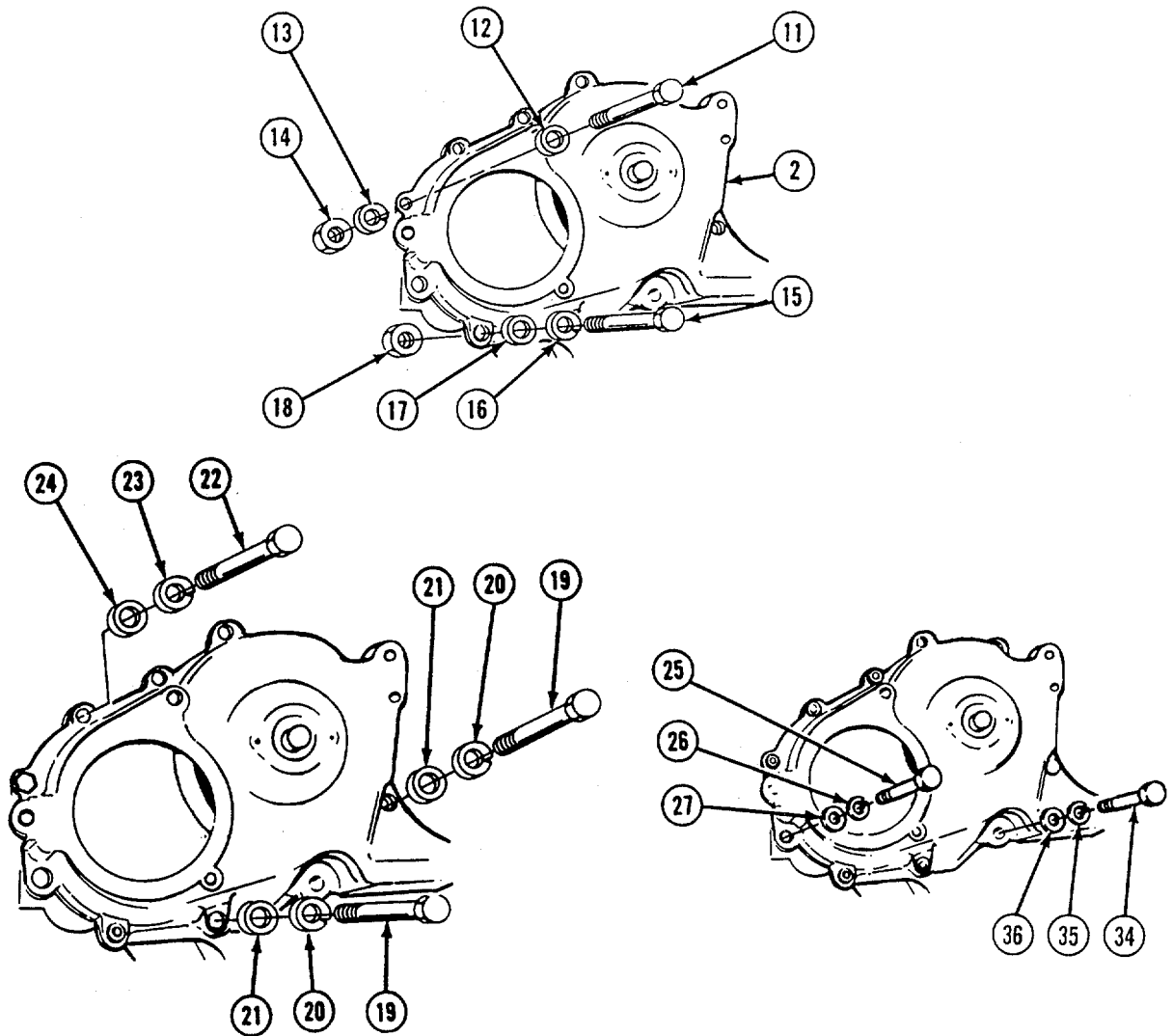
c. Installation.



- (1) Install new oil seal (1) in cover (2) with lip of seal (3) pointing inward. Use a suitable driver and press seal into cover until seal is flush with outer surface of cover. Coat inner lip of seal with grease (Item 1, Appendix E).
- (2) Coat new gasket (4) with grease and install gasket on cover (2).
- (3) Align dowels (5) on cover (2) with holes in end plate (6). Install front cover (2) on end plate (6).
- (4) Install three screws (7), washers (8), lockwashers (9) and nuts (10). Tighten nuts to a torque of 35 to 39 lb ft (47 to 53 Nm).



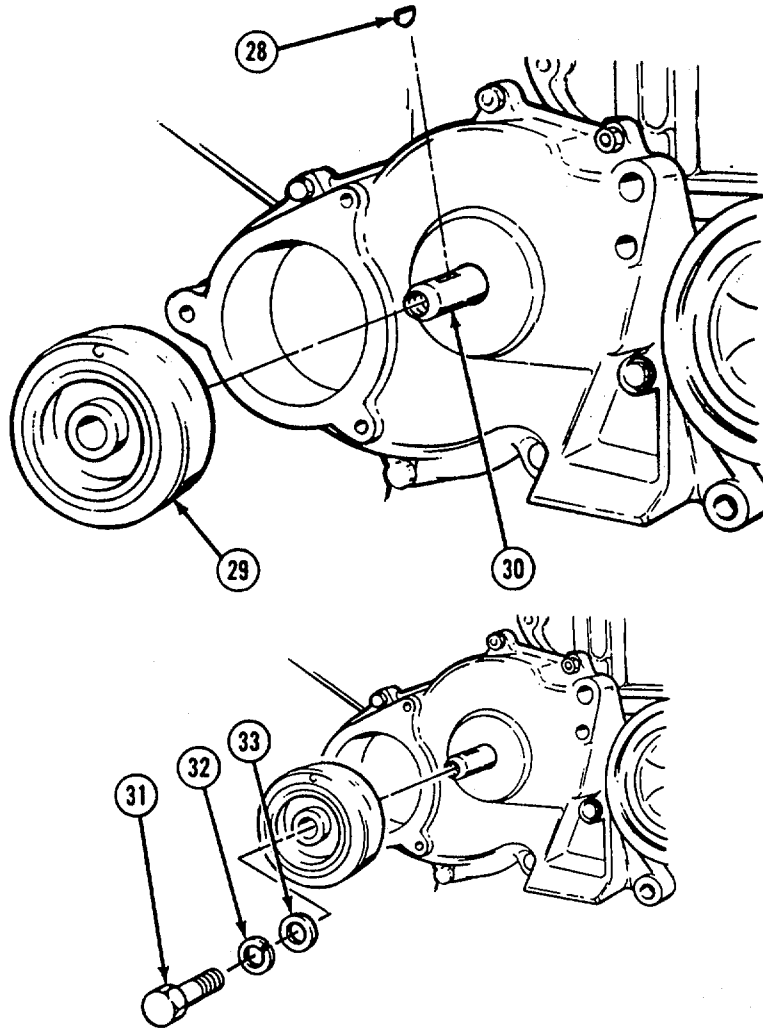
6-38. FRONT BALANCE COVER AND VIBRATION DAMPER - Continued



- (5) Install screws (15 and 11), lockwashers (13 and 16), washers (12 and 17) and nuts (14 and 18). Tighten nuts to a torque of 35 to 39 lb ft (47 to 53 Nm).
- (6) Install two screws (19) lockwashers (20) and washers (21). Tighten screws to a torque of 30 to 35 lb ft (41 to 47 Nm).
- (7) Install two screws (22), lockwashers (23) and washers (24). Tighten screws to a torque of 30 to 35 lb ft (41 to 47 Nm).

6-38. FRONT BALANCE COVER AND VIBRATION DAMPER - Continued

- (8) Install screw (25), lockwasher (26) and washer (27). Tighten screw to a torque of 71 to 75 lb ft (96 to 102 Nm).



- (9) Install two screws (34), lockwashers (35) and washers (36). Tighten screws to a torque of 137 to 147 lb ft (186 to 200 Nm).
- (10) Install key (28) in shaft (30) and install vibration damper (29) on shaft and key.
- (11) Install washer (33), lockwasher (32) and screw (31) to secure vibration damper (29) to shaft. Tighten screw to a torque of 25 lb ft (34 Nm).

g. Follow-on Maintenance.

- (1) Install water pump (see para 5-25).
- (2) Install an and mounting (see para 4-132).
- (3) Install engine (see para 5-11).

6-39. WATER PUMP DRIVE

This task covers:

- a. Removal
- b. Cleaning and Inspection
- c. Installation
- d. Follow-on Maintenance

TOOLS REQUIRED

Tool Kit, General Mechanics, Automotive
(Appendix B, Section III, Item 1)

EQUIPMENT CONDITION

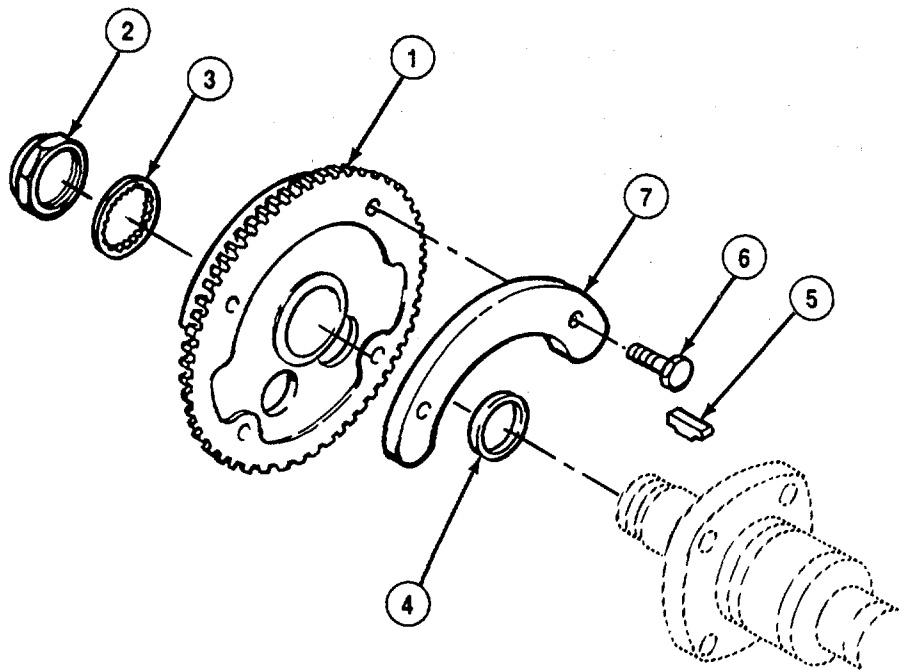
Water Pump Removed (see para 5-25.)
Front Balance Cover Removed (see para 6-38.)

MATERIALS/PARTS REQUIRED

Dry Cleaning Solvent (Item 3, Appendix E)

a. Removal.

- (1) Block drive gear (1) to prevent the shaft and gear from turning. Remove nut (2) and lock washer (3) from shaft.
- (2) Use a puller and remove gear (1) and spacer (4) from shaft. Remove key (5).
- (3) Remove two screws (6) and remove balance weight (7) from gear.



6-39. WATER PUMP DRIVE - Continued

b. Cleaning and Inspection.**WARNING**

Dry cleaning solvent P-D-680 is potentially dangerous. Avoid repeated and prolonged breathing of vapors and skin contact with the liquid. Do not use near open flame, arcing equipment or other ignition sources. Always wear eye protection and protective clothing. The flash point of P-D-680 is 1 00 to 138 deg. F (38 to 59 deg. C).

- (1) Clean all parts in dry cleaning solvent (Item 3, Appendix E) and dry thoroughly.
- (2) Inspect gear for wear and damage. Inspect teeth for cracks and broken teeth.
- (3) Inspect nut for damaged threads.
- (4) Replace all worn or damaged parts.

c. Installation.

- (1) Install balance weight (7) on gear (1) and secure with two screws (6). Tighten screws securely.
- (2) Install spacer (4) on end of camshaft. Install key (5) in groove in camshaft.
- (3) Slide gear (1) on camshaft with slot in gear engaging key (5).
- (4) Install lock washer (3) and nut (2) on camshaft to secure gear. Torque nut (2) to 300 to 325 lb ft (407 to 441 N.m).

d. Follow-on Maintenance.

- (1) Install Water Pump (see para 5-25).
- (2) Replace front balance cover (see para 6-38).

6-40. REAR ACCESSORY DRIVE

This task covers:

- a. Removal
 - b. Cleaning and Inspection
 - c. Installation
 - d. Follow-on Maintenance
-

TOOLS REQUIRED

Tool Kit, General Mechanics, Automotive
(Appendix E, Section III, Item 1)

EQUIPMENT CONDITION

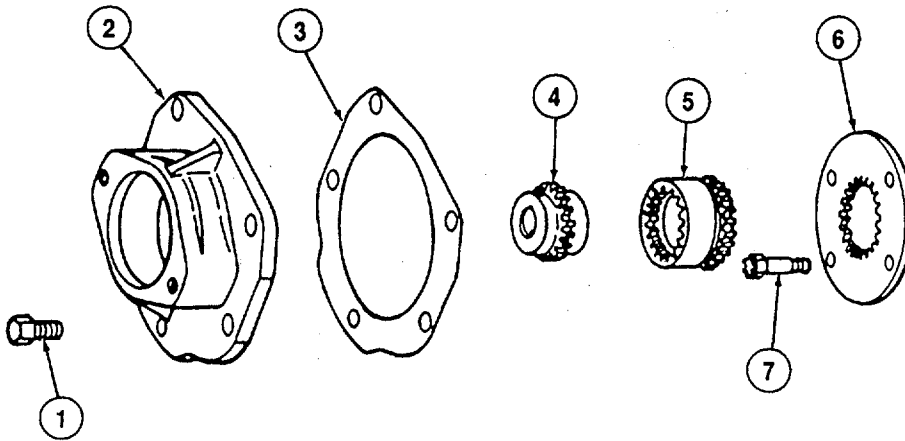
Power Steering Pump Removed (see para 5-26.)

MATERIALS/PARTS REQUIRED

Dry Cleaning Solvent (Item 3, Appendix E)
Gasket (Figure 121, Appendix F)

a. Removal.

- (1) Remove four screws (1) and remove drive adapter (2) and gasket (3). Discard gasket (3).



- (2) Remove the drive gear (4) and coupling (5) from drive plate (6).

- (3) Remove four self-locking screws (7) and remove drive plate (6) from camshaft.

6-40. REAR ACCESSORY DRIVE - Continued

b. Cleaning and Inspection.**WARNING**

Dry cleaning solvent P-D-680 is potentially dangerous. Avoid repeated and prolonged breathing of vapors and skin contact with the liquid. Do not use near open flame, arcing equipment or other ignition sources. Always wear eye protection and protective clothing. The flash point of P-D-680 is 100 to 138 deg. F (38 to 59 deg. C).

- (1) Clean all parts in dry cleaning solvent (Item 3, Appendix E) and dry thoroughly.
- (2) Check the teeth on the drive plate and drive coupling for wear and damage.
- (3) Inspect drive gear for wear and damage.
- (4) Replace all damaged parts.

c. Installation.

- (1) Align holes in drive plate (6) with holes in camshaft gear. Install drive plate on gear and secure with four self-locking screws (7). Torque screws (7) to 45 to 50 lb ft (61 to 68 N.m).
- (2) Install drive coupling (5) and drive gear (4) with gear teeth of coupling meshing with teeth in bore of plate.
- (3) Install a new gasket (3) and drive adapter (2) on flywheel housing. Secure adapter with four screws (1). Torque screws (1) to 30 to 35 lb ft (41 to 47 N.m).

d. Follow-on Maintenance.

- (1) Install power steering pump (see para 5-26).

6-41. BLOWER DRIVE

This task covers:

- | | |
|----------------------------|--------------------------|
| a. Removal | c. Installation |
| b. Cleaning and Inspection | d. Follow-on Maintenance |

TOOLS REQUIRED

Tool Kit, General Mechanics, Automotive
(Appendix B, Section III, Item 1)

EQUIPMENT CONDITION

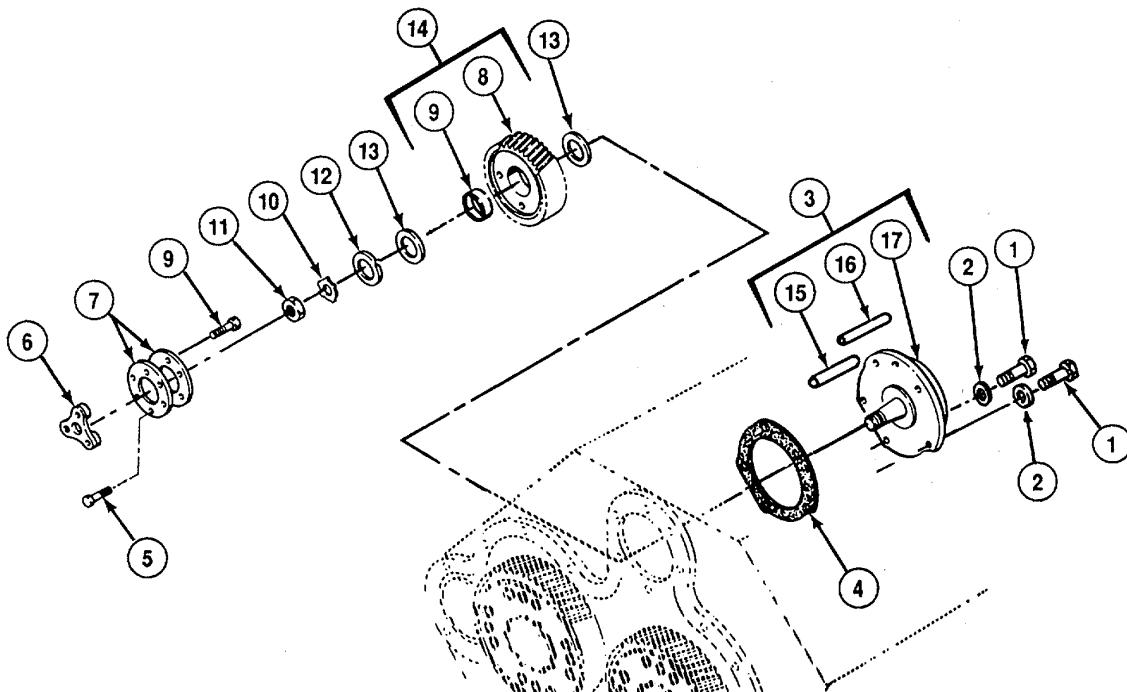
Fuel Pump Removed (see para 5-16.)

MATERIALS/PARTS REQUIRED

Dry Cleaning Solvent (Item 3, Appendix E)
Lubricating Oil (Item 10, Appendix E)
Gasket (Figure 120, Appendix F)

a. Removal.

- (1) Remove two screws (1) and lock washers (2) and remove support (3) with attached parts from engine. Remove and discard gasket (4).
- (2) Clamp support in a vise with soft jaws.
- (3) Remove the three bolts (5) securing the drive gear hub (6) and flex plates (7) to the blower drive gear (8).
- (4) Remove the flex plates (7) and blower drive gear hub (6) as an assembly from the gear. If necessary, the flex plates (7) may be removed from the hub (6) by removing three bolts (9).
- (5) Straighten the lugs on washer (10) and remove nut (11). Remove thrust washer (12) and thrust bearings (13).
- (6) Remove gear assembly (14) from support.



6-41. BLOWER DRIVE - Continued

b. Cleaning and Inspection.**WARNING**

Dry cleaning solvent P-D-680 is potentially dangerous. Avoid repeated and prolonged breathing of vapors and skin contact with the liquid. Do not use near open flame, arcing equipment or other ignition sources. Always wear eye protection and protective clothing. The flash point of P-D-680 is 100 to 138 deg. F (38 to 59 deg. C).

- (1) Clean all parts in dry cleaning solvent (Item 3, Appendix E) and dry thoroughly.
- (2) Make sure oil passage in the blower drive gear support is clean.
- (3) Replace worn thrust bearings.
- (4) Use a micrometer and check the inside diameter of sleeve bearings (9) and outside diameter of shaft of drive support. Replace parts if clearance exceeds 0.050 inch (1.27 mm). Press sleeve bearings from bore of gear using a suitable driver.
- (5) Press new sleeve bearings into bore of hub. Bearings must be pressed in flush to 0.010 inch (0.254 mm) below face of gear. Ream sleeve bearings to an inside diameter of 1.6260 to 1.6265 inch (41.3 to 41.31 mm). The bearing bores must be square with machined faces of the bolt bosses on the gear within 0.003 inch (0.076 mm) total indicator reading and concentric with the outside diameter of the gear.
- (6) Inspect pins (15) and (16) in support. Pins must extend approximately 0.080 inch (2.03 mm) above the threaded end of the support shaft.
- (7) Inspect drive hub for wear and damage. Replace hub if necessary.

c. Installation.

- (1) Clamp the drive support (3) in a vise with soft jaws.
- (2) Install one thrust bearing (13) on to support shaft (17) with the tangs on the bearing engaging the holes in the support.
- (3) Lubricate the hub of the drive support, sleeve bearings in gear, thrust bearings and thrust washer with lubricating oil (Item 10, Appendix E).
- (4) Slide the gear (14) on the support hub (11) with the flat side of gear down.
- (5) Install second thrust bearing (13) on support with tangs on bearing facing away from the gear.
- (6) Install thrust washer (1 2) with slots in washer engaging tangs on thrust bearing.
- (7) Install lockwasher (10) and nut (11). Tighten nut to a torque of 50 to 60 lb ft (68 to 81 N.m). Bend lugs on washer against flats on nut.

6-41. BLOWER DRIVE - Continued

- (8) Check clearance between blower drive gear support thrust washer (1 2) and blower drive gear thrust bearing (13) with a feeler gauge. Clearance must not exceed 0.012 inch (0.30 mm) with used parts. Specified clearance with new parts should be 0.005 to 0.010 inch (0.127 to 0.254 N.m).
- (9) If the flex plates (7) were removed from the blower drive gear hub (6), attach the flex plates (7) to the hub (6) with three special 3/8"-24 x .925 inch lock bolts (9). Tighten the bolts to 35-39 lb ft (47-53 N.m) torque.

NOTE

Do not install any lock washers against the steel plates. (1 0) Assemble the flex plates (7) and the hub (6) to the gear (8) with three special 3/8"-24 x .925 inch lock bolts (5). Tighten the bolts to 35-39 lb ft (47-53 N.m). (11) Install a new gasket (4) on support (3) on engine. Secure support with both washers (2) and screws (1). Tighten screws to a torque of 25 to 30 lb ft (34 to 41 N.m). (12) Install blower drives. Check backlash between drive gear and camshaft gear. Backlash should be 0.002 to 0.008 inch (0.051 to 0.203 mm) and should not exceed 0.01 0 inch (0.254 mm) with worn parts.

d. Follow-on Maintenance.

- (1) Install fuel pump (see para 5-16).

6-42. ALTERNATOR DRIVE

This task covers:

- | | |
|----------------------------|--------------------------|
| a. Removal | c. Installation |
| b. Cleaning and Inspection | d. Follow-on Maintenance |

TOOLS REQUIRED

EQUIPMENT CONDITION

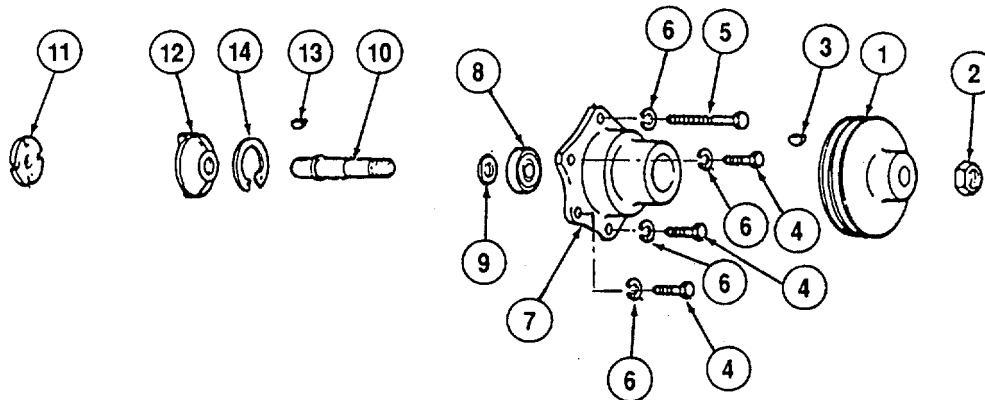
Tool Kit, General Mechanics, Automotive (Appendix B, Section III, Item 1)
 Alternator Belt Removed (see para 4-135.)
 Driver Side Air Intake Removed (see para 5-1 1.)

MATERIALS/PARTS REQUIRED

Lubricating Oil (Item 1 0, Appendix E)
 Seal Retainer (Item 6, Appendix E)
 Dry Cleaning Solvent (Item 3, Appendix E)

a. Removal.

- (1) Block alternator pulley (1) to prevent it from turning. Remove nut (2). Use a suitable puller and remove pulley (1) from shaft. Remove key (3) from shaft.



- (2) Remove screws (4 and 5) and lockwashers (6) and remove retainer (7) with bearing (8) and spacer (9) installed.
- (3) Remove shaft (10) from engine. Remove coupling (11) and hub (12) from blower drive shaft. Remove key (13) from shaft.
- (4) Remove retaining ring (14) from bore of retainer (7). Use a suitable puller or press and remove bearing (8) and spacer (9) from retainer (7).

6-42. ALTERNATOR DRIVE- Continued

b. Cleaning and Inspection.

WARNING

Death or serious injury could occur if compressed air is directed against the skin. Do not use compressed air for cleaning or drying unless the pressure is/has been reduced to 30 psi (2.11 kg/cm²) or less. When working with compressed air, always use chip guards eye protection and other personal protective equipment.

- (1) Clean all parts in dry cleaning solvent (Item 3, Appendix E) and dry with compressed air.
- (2) Check drive coupling and hub for wear and damage to lugs.
- (3) Wipe outside of bearing clean. Hold inner race and revolve outer race by hand. If bearing is worn or does not roll freely, replace bearing.
- (4) Inspect bore of retainer for wear and damage. Replace worn retainer.
- (5) Inspect pulley for wear and damage. Replace if necessary.

c. Installation.

- (1) Place retainer (7) on bench with mounting flange side up. Lubricate the outside diameter of bearing
- (8) and spacer with lubricating oil (Item 10, Appendix E).
- (2) Protruding face of bearing inner race must face toward retainer. Press or tap bearing (8) into retainer (7) until bearing contacts shoulder in retainer. Install spacer (9) and retaining ring (14) in bore of retainer.
- (3) Lubricate drive shaft (10) with lubricating oil (Item 10, Appendix E) and press shaft into bearing until shoulder on shaft contacts face of bearing.
- (4) Install key (13) in shaft and install hub (12) and coupling (11) on shaft.
- (5) Clean all old gasket material from mounting surface of flywheel housing. Coat mounting surface with seal retainer (Item 6, Appendix E). Install assembled drive retainer on flywheel housing.
- (6) Secure retainer (7) to flywheel housing with six lockwashers (6), three screws (5), and three screws (4). Tighten screws to a torque of 30 to 35 lb ft (41 to 47 N.m).
- (7) Install key (13) in slot in shaft. Place pulley (1) on shaft with slot in pulley engaging key. Tap pulley into position on shaft with a leather mallet.
- (8) Install nut (2) on shaft and tighten to a torque of 120 to 140 lb ft (163 to 190 N.m).

d. Follow-on Maintenance.

- (1) Install driver side air intake (see para 5-1 1).
- (2) Install alternator belt (see para 4-135).

6-43. FUEL INJECTORS

This task covers:

- a. Removal
- b. Cleaning and Inspection.
- c. Installation
- d. Adjustments
- e. Follow-on Maintenance

TOOLS REQUIRED

Tool Kit, General Mechanics, Automotive
(Appendix B, Section III, Item 1)

MATERIALS/PARTS REQUIRED

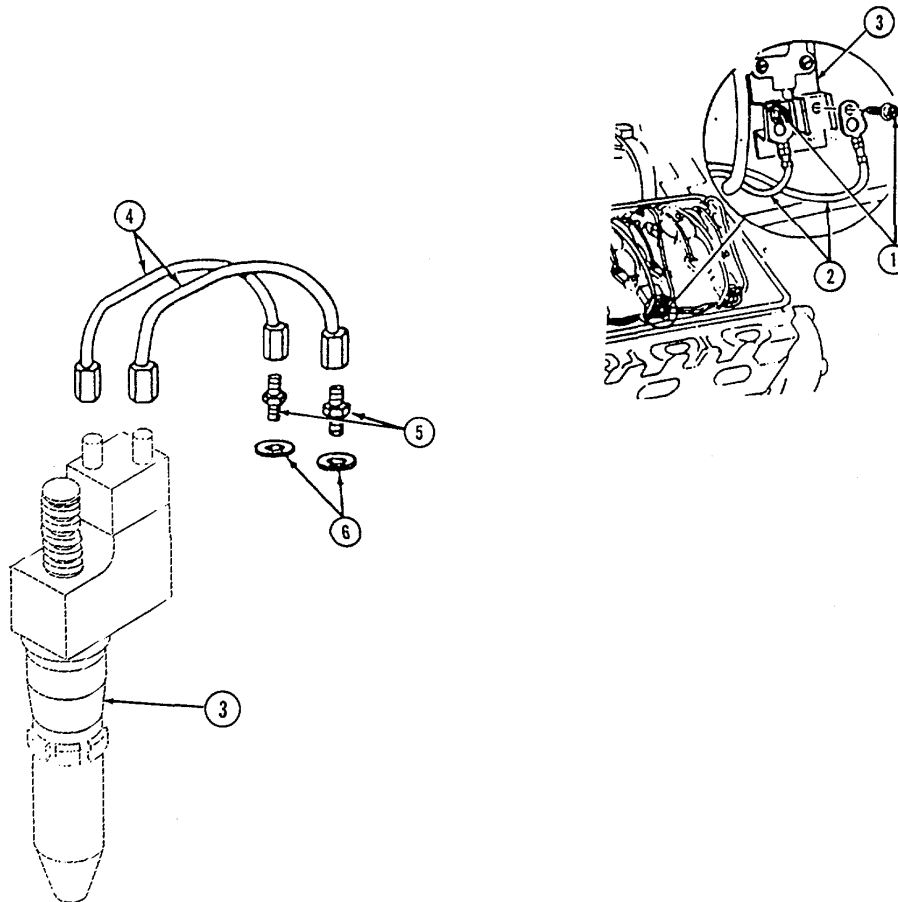
Solvent, Dry Cleaning (Item 3, Appendix E)

EQUIPMENT CONDITION

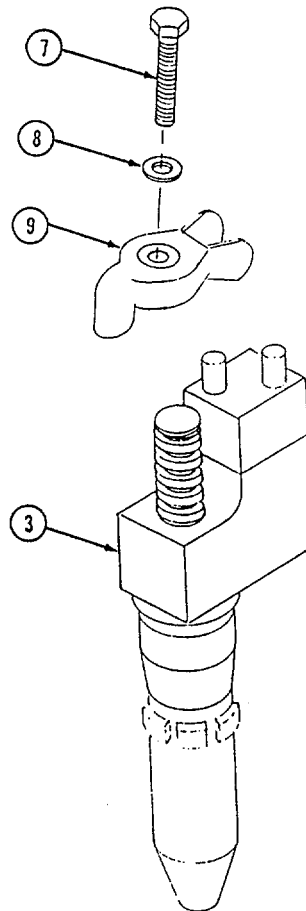
Rocker Cover Removed (see para 4-140.)
Engine Brake Retarder Removed
(see para 6-34.)

a. Removal.

- (1) Remove two screws (1) and disconnect two wires (2) from electronic control on fuel injector (3).
- (2) Disconnect two fuel tubes (4) from injector (3) and from adapters (5). Remove two adapters (5) and washers (6).



6-43. FUEL INJECTORS - Continued



(3) Mark screw (7), washer (8) and clamp (9) with injector location. Remove screw, washer and clamp and remove fuel injector (3) from cylinder head. Remove remaining injectors in the same manner.

(4) Place a cover over injector opening in cylinder head to prevent entrance of foreign matter.

b. Cleaning and Inspection.

WARNING

Dry cleaning solvent P-D-680 is potentially dangerous. Avoid repeated and prolonged breathing of vapors and skin contact with the liquid. Do not use near open flame, arcing equipment or other ignition sources. Always wear eye protection and protective clothing. The flash point of P-D-680 is 1 00 to 138 deg. F (38 to 59 deg. C).

6-43. FUEL INJECTORS - Continued

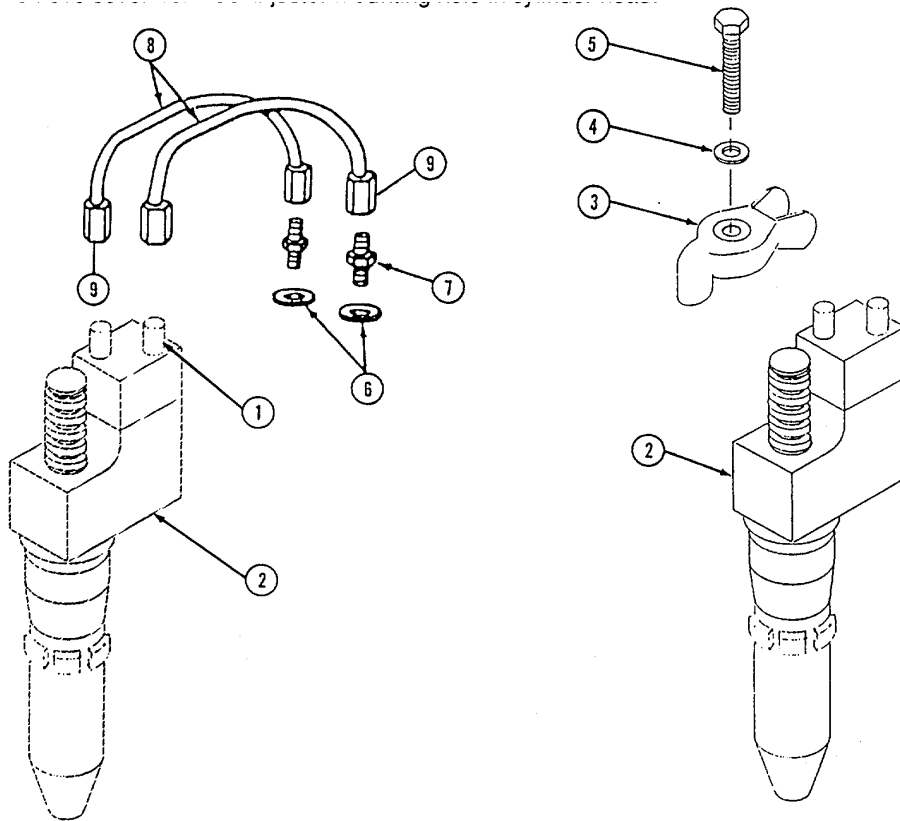
WARNING

Death or serious injury could occur if compressed air is directed against the skin. Do not use compressed air for cleaning or drying unless the pressure is/has been reduced to 30 psi (2.11 kg/cm²) or less. When working with compressed air, always use chip guards eye protection and other personal protective equipment.

- (1) Clean exterior of injector with solvent (Item 3, Appendix E) and dry with compressed air.
- (2) Inspect injector for dents, cracks and damage. Check for evidence of leakage.
- (3) Inspect fuel tubes for bends and cracks. Replace tubes if damaged.
- (4) If injector is damaged or has not been working properly, do not attempt to disassemble or repair injector. Replace injector assembly and forward original injector to General Motors Corporation for repair and rebuild.

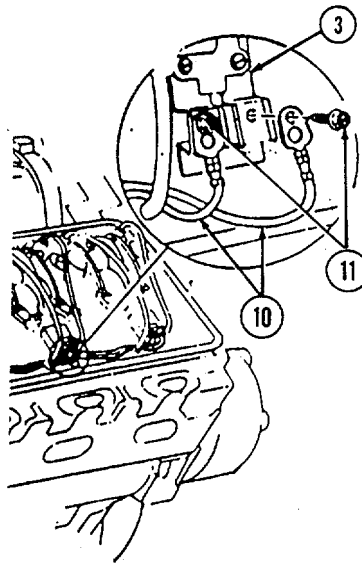
c. Installation.

- (1) Add diesel fuel to injector inlet filter (1) to fill injector.
- (2) Remove cover from fuel injector mounting hole in cylinder head.



6-43. FUEL INJECTORS - Continued

- (3) Install fuel injector (2) in injector tube. Install clamp (3), washer (4) and screw (5). Install washer with curved side of washer toward clamp.
- (4) Tighten screw (5) to a torque of 20 to 25 lb ft (27 to 34 N.m).
- (5) Install washers (6) and adapters (7) in fuel ports of cylinder head. Connect fuel tubes (8) to adapters and inlet and outlet ports of fuel injector. Tighten fuel tube nuts to a torque of 145 lb in. (16.4 N.m).



- (6) Connect electronic control wires (10) to terminals on injector (3). Secure wires with two screws (11). Tighten screws securely.

d. Adjustments.

- (1) Refer to Synchronous and Timing Reference Sensor (see para 6-28).

e. Follow-on Maintenance.

- (1) Install engine brake retarder (see para 6-34).
- (2) Install rocker cover (see para 4-140).

6-44. OIL PUMP INTAKE

This task covers:

- | | |
|-----------------------------------|---------------------------------|
| a. Removal | c. Installation |
| b. Cleaning and Inspection | d. Follow-on Maintenance |
-

TOOLS REQUIRED

Tool Kit, General Mechanics, Automotive

EQUIPMENT CONDITIONOil Pan Removed (see para 5-27.)
(Appendix B, Section III, Item 1)**MATERIALS/PARTS REQUIRED**Solvent, Dry Cleaning (Item 3, Appendix E)
Gasket (Figure 118, Appendix F)**a. Removal.**

- (1) Remove two nuts (1), lockwashers (2), flat washers (3) and screws (4) and remove brackets (6 and 7).
- (2) Remove screws (5), screen (8), cover (9) and gasket (10). Discard gasket.
- (3) Remove two screws (11), lockwashers (12), and spacers (13) and remove oil inlet pipe (14). Remove gasket (15). Discard gasket.
- (4) Inspect brackets (6 and 7). If brackets are damaged, remove brackets.

b. Cleaning and Inspection.**WARNING**

Dry cleaning solvent P-D-680 is potentially dangerous. Avoid repeated and prolonged breathing of vapors and skin contact with the liquid. Do not use near open flame, arcing equipment or other ignition sources. Always wear eye protection and protective clothing. The flash point of P-D-680 is 100 to 138 deg. F (38to 59deg. C).

- (1) Clean all components in dry cleaning solvent (Item 3, Appendix E).
- (2) Check screen (8) for holes and damage. Replace screen if damaged.
- (3) Inspect cover (9) and inlet pipe (1 4) for cracks and damage. Replace unserviceable parts.

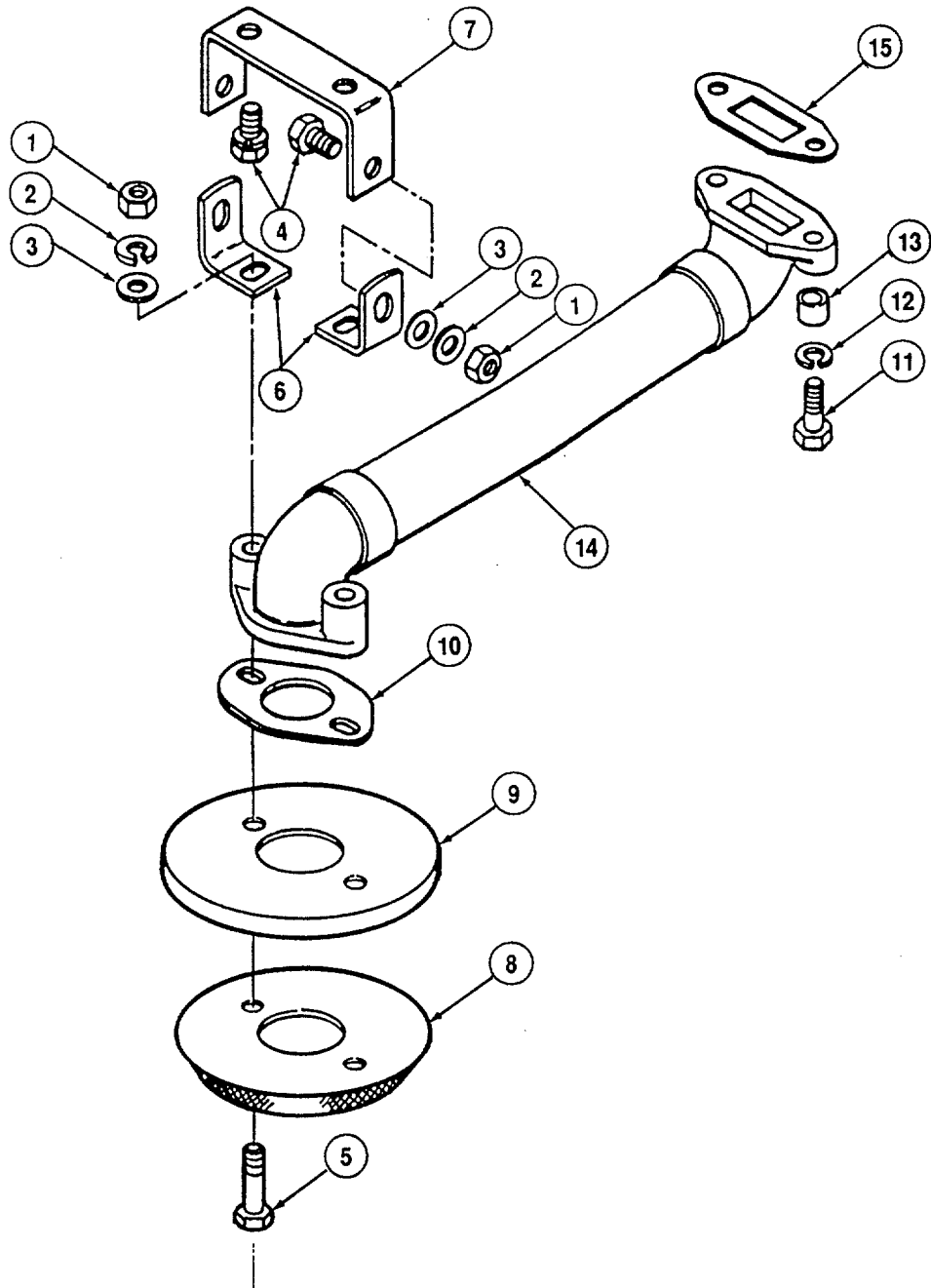
c. Installation.

- (1) Install brackets (6 and 7) on engine and secure with screws (4), flat washers (3), lock washers (2) and nuts (1).
- (2) Install new gasket (15) and place oil pump inlet pipe (14) in position on engine. Secure inlet pipe to crankshaft front cover with two spacers (13), lockwashers (12) and screws (1 1).
- (3) Place new gasket (10) on inlet pipe (14) and install cover (9) and screen (8). Secure screen with two screws (5).

6-44. OIL PUMP INTAKE - Continued

d. Follow-on Maintenance.

(1) Install oil pan (para 5-27).



6-45. OIL PRESSURE REGULATOR AND RELIEF VALVES

THIS TASK COVERS:

- | | | | |
|----|--------------------------------|----|------------------------------|
| a. | Removal | c. | Installation |
| b. | Cleaning and Inspection | d. | Follow-on Maintenance |

TOOLS REQUIRED

Tool Kit, General Mechanics, Automotive
(Appendix B, Section 111, Item 1)

EQUIPMENT CONDITION

Main Engine Shutdown (see para 2-12.)
APU Shutdown (see para 2-16.)
Batteries Disconnected (see para 4-114.)
Oil Pan Removed (see para 5-27.)

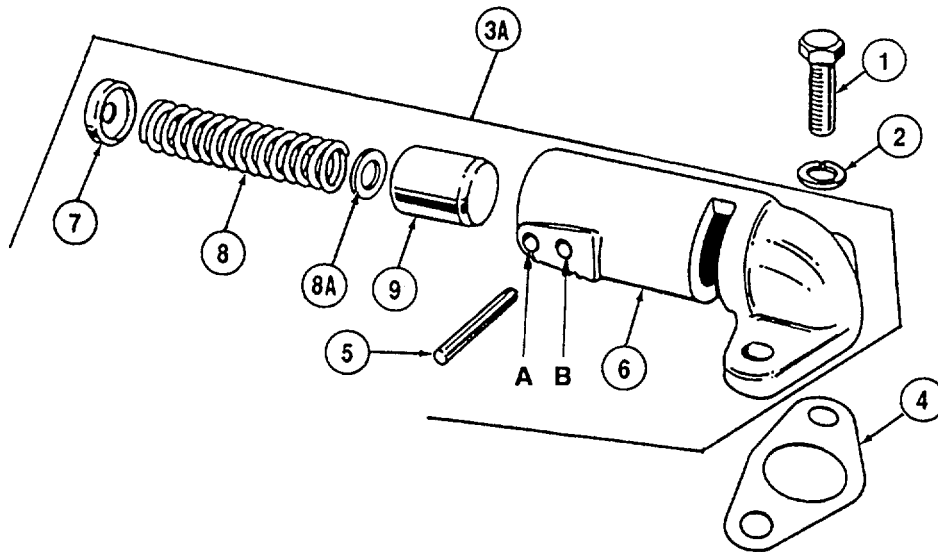
MATERIALS/PARTS REQUIRED

Engine Oil (OE) (Item 20, Appendix E)
Solvent, Dry Cleaning (Item 3, Appendix E)
Gasket (Figure 119, Appendix F)

a. Removal.

NOTE

Oil pressure regulator and oil pressure relief valves are identical except for spring pin (5) location in body and use of flatwasher (8A) in pressure regulator valve only.



PIN LOCATOR

- A. REGULATOR (OPPOSITE COOLER SIDE)
- B. RELIEF (COOLER SIDE)

- (1) Remove two screws (1) (does not use washer No. 8A) and washers (2) and remove oil pressure regulator valve assembly (3) from engine. Remove and discard gasket (4).
- (2) Clamp the regulator in a vise with soft jaws. Remove spring pin (5) from body (6).
- (3) Remove spring seat (7), spring (8) and flatwasher (8A) (pressure regulator valve only) and valve (9) from body.

6-45. OIL PRESSURE REGULATOR AND RELIEF VALVES - Continued

b. Cleaning and Inspection.**WARNING**

- Dry cleaning solvent P-D-680 is potentially dangerous. Avoid repeated and prolonged breathing of vapors and skin contact with the liquid. Do not use near open flame, arcing equipment or other ignition sources. Always wear eye protection and protective clothing. The flash point of P-D-680 is 100 to 138 deg. F (38 to 59 deg. C).
- Death or serious injury could occur if compressed air is directed against the skin. Do not use compressed air for cleaning or drying unless the pressure is/has been reduced to 30 psi (2.11 kg/cm²) or less. When working with compressed air, always use chip guards eye protection and other personal protective equipment.

- (1) Clean all parts in solvent (Item 3, Appendix E) and dry thoroughly with compressed air.
- (2) Check fit of valve (9) in body (6). Valve must move freely in body. If valve or bore in body is scored or damaged, replace parts.
- (3) Inspect spring (8) for pitted or fractured condition. Replace damaged springs.

c. Installation.

- (1) Apply clean engine oil (item 20, Appendix E) to the outer face of the valve (9). Install flatwasher (8A) into valve (9) (for pressure regulator valve only). Slide valve into body (5), closed end first.

CAUTION

Install pin (5) in hole A for pressure regulator valve and in hole B for pressure relief valve.

- (2) Install spring (8) and seat (7) into body. Depress seat (7) into body to compress spring and insert pin (5) behind seat to secure parts in body. Press the pin flush to 0.010 in. (0.25 mm) below surface of hole.
- (3) Remove all traces of oil gasket material from body and cylinder block. Install new gasket (4) on block.
- (4) Install oil pressure regulator valve assembly (3) or oil pressure relief valve assembly (3A) on cylinder block and secure with two washers (2) and screws (1).

d. Follow-on Maintenance.

- (1) Install oil pan (see para 5-27).
- (2) Connect batteries (see para 4-114).

6-46. CRANKSHAFT FRONT COVER AND OIL PUMP

THIS TASK COVERS:	a.	Removal	c.	Installation
	b.	Cleaning and Inspection	d.	Follow-on Maintenance

TOOLS REQUIRED

Tool Kit, General Mechanics, Automotive
 (Appendix B, Section 111, Item 1)
 Seal Installer (Appendix B, Section III, Item 56)
 Oil Seal Expander (Appendix B, Section 111, Item 57)
 Guide Stud (Appendix B, Section 111, Item 58)

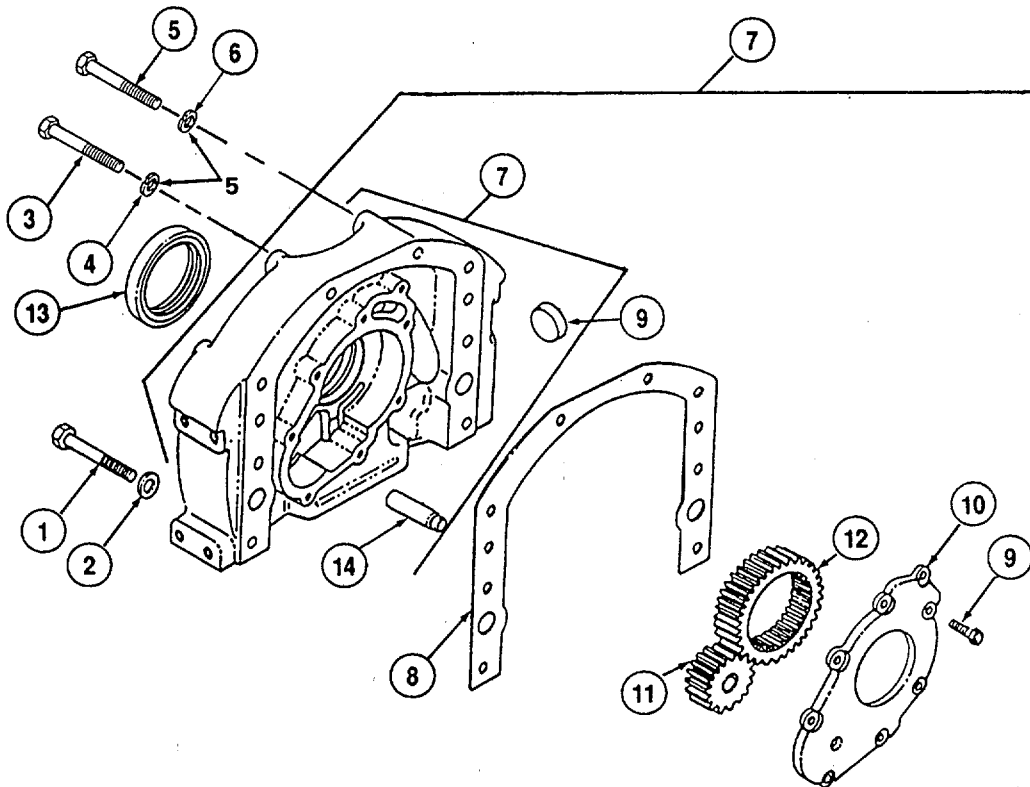
MATERIALS/PARTS REQUIRED

Engine Oil (OE) (Item 20, Appendix E)
 Solvent Dry Cleaning (Item 3, Appendix E)
 Gasket (Figure 11O, Appendix F)

EQUIPMENT CONDITION

Main Engine Shutdown (see para 2-12.)
 APU Shutdown (see para 2-16.)
 Batteries Disconnected (see para 4-114.)
 Crankshaft Pulley Removed (see para 6-25.)
 Crankshaft Vibration Damper Removed
 (see para 6-26.)
 Oil Pan Removed (see para 5-27.)
 Oil Pump Inlet Removed (see para 6-44.)

a. Removal.



- (1) Remove two screws (1) and lockwashers (2), four screws (3) and lockwashers (4), and two screws (5) and lockwashers (6).
- (2) Strike the edges of the front cover (7) with a soft hammer to free cover from dowel pins. Pull cover assembly straight off the end of the crankshaft.

6-46. CRANKSHAFT FRONT COVER AND OIL PUMP - Continued

- (3) Remove and discard gasket (8).
- (4) Remove the oil pump drive gear and key (8A) from the crankshaft.
- (5) Remove eight self-locking screws (9) and remove oil pump cover (10) from front cover(7).
- (6) Remove gears (11 and 12).

b. Cleaning and Inspection.**WARNING**

Dry cleaning solvent P-D-680 is potentially dangerous. Avoid repeated and prolonged breathing of vapors and skin contact with the liquid. Do not use near open flame, arcing equipment or other ignition sources. Always wear eye protection and protective clothing. The flash point of P-D-680 is 100 to 138 deg. F (38 to 59 deg. C).

- (1) Clean all parts in solvent (Item 3, Appendix E) and dry with compressed air.

WARNING

Death or serious injury could occur if compressed air is directed against the skin. Do not use compressed air for cleaning or drying unless the pressure is/has been reduced to 30 psi (2.11 kg/cm²) or less. When working with compressed air, always use chip guards eye protection and other personal protective equipment.

- (2) Examine gear cavity in front cover (7) for wear and scoring. Replace cover if worn or scored. Inspect face of oil pump cover (10) and replace if scored or damaged.
- (3) Inspect oil seal (13) for damage and evidence of leakage. If oil seal (13) is damaged replace seal as follows.
 - (a) Support outer face of cover (7) on wooden blocks.
 - (b) Use a suitable driver and drive or press oil seal (13) from cover.
 - (c) Lubricate seal with engine oil (Item 20, Appendix E). Position seal in front cover (7) with lip of seal pointing toward inner face of cover. Install seal using seal installer J9783.
 - (d) Inspect shaft (14) for wear and scoring. Replace shaft if damaged. Use a suitable driver and drive shaft from front cover (7). Drive or press new shaft into place. When correctly installed the shoulder on the shaft must be 0.020 in. (0.50 mm) below finished face of front cover.

6-46. CRANKSHAFT FRONT COVER AND OIL PUMP - Continued

c. Installation.

- (1) Place front cover (7) on wooden blocks. Lubricate gears (11 and 12) with engine oil (Item 20, Appendix E). Install gears in cavities of front cover (7).
- (2) Install oil pump cover (10) in position over gears (11 and 12). Secure cover with eight self-locking screws (9). Tighten screws to a torque of 13 to 17 lb ft (18 to 23 N.m).
- (3) Install key (8B) in crankshaft and slide drive hub (8A) over key and onto crankshaft.
- (4) Install a new gasket (8) on engine block and position front cover (7) on block.
- (5) Lubricate oil seal (13) and crankshaft oil seal expander J22425 with engine oil (Item 20, Appendix E). Install oil seal expander in seal (13) and use it to pilot oil seal around crankshaft as front cover (7) is installed on engine block. Remove oil seal expander.
- (6) Secure cover to engine block with lockwashers (2, 4 and 6) and screws (1, 3, 5).
- (7) Tighten screws (1) to a torque of 25 to 30 ft lb (34 to 41 N.m). Tighten screws (3 and 5) to a torque of 80 to 90 ft lb (108 to 122 N.m).

d. Follow-on Maintenance.

- (1) Install crankshaft vibration damper and pulley (see para 6-25 and 6-26).
- (2) Install oil pump inlet (see para 6-44).
- (3) Install oil pan (see para 5-27).
- (4) Connect batteries (see para 4-114).

6-47. TRANSMISSION

THIS TASK COVERS: a. **Removal** c. **Follow-on Maintenance**
 b. **Installation**

TOOLS REQUIRED

Tool Kit, General Mechanics, Automotive
 (Appendix B, Section III, Item 1)

EQUIPMENT CONDITION

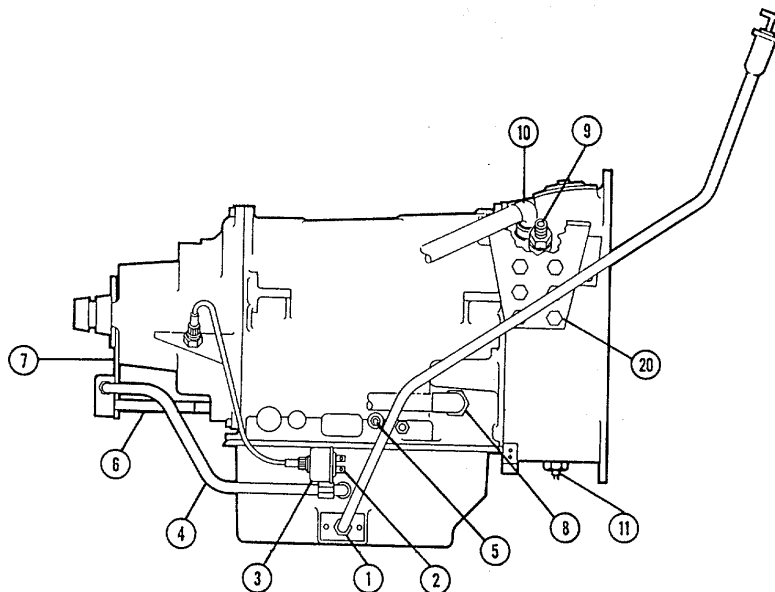
Main Engine Shutdown (see para 2-12.)
 APU Shutdown (see para 2-16.)
 Batteries Disconnected (see para 4-114.)
 Drive Shaft Disconnected (see para 5-7.)
 Transmission Fluid Drained (see para 4-142.)

MATERIALS/PARTS REQUIRED

Transmission Fluid (Item 16, Appendix E)

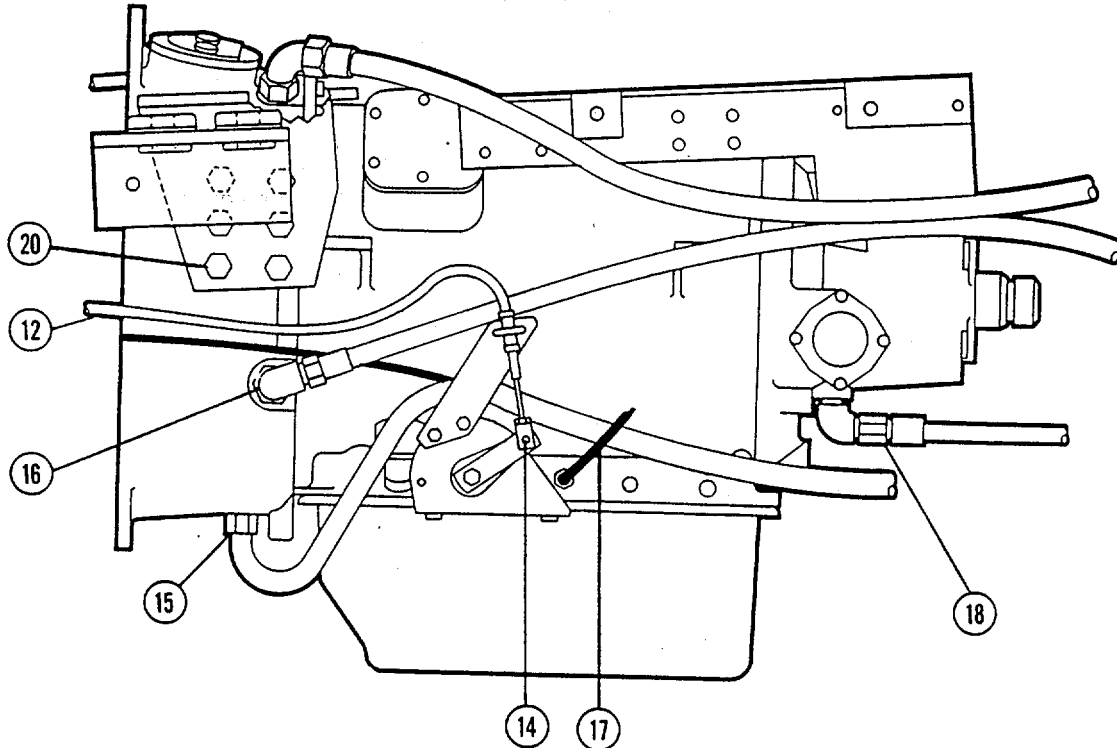
a. Removal.

- (1) Place suitable hydraulic jacks under truck to raise truck at least 36 inches (914 mm). Place blocking under truck frame to support truck.
- (2) Disconnect transmission dipstick tube (1) from transmission.
- (3) Disconnect wires (2) from sending unit (3).
- (4) Disconnect hose (4) from transmission.
- (5) Disconnect wires (5) from sending unit.
- (6) Disconnect hose (6) from transmission.
- (7) Remove two screws and lockwashers and remove bracket (7) with solenoid from rear of transmission.



TRANSMISSION-RIGHT SIDE VIEW

6-47. TRANSMISSION - Continued



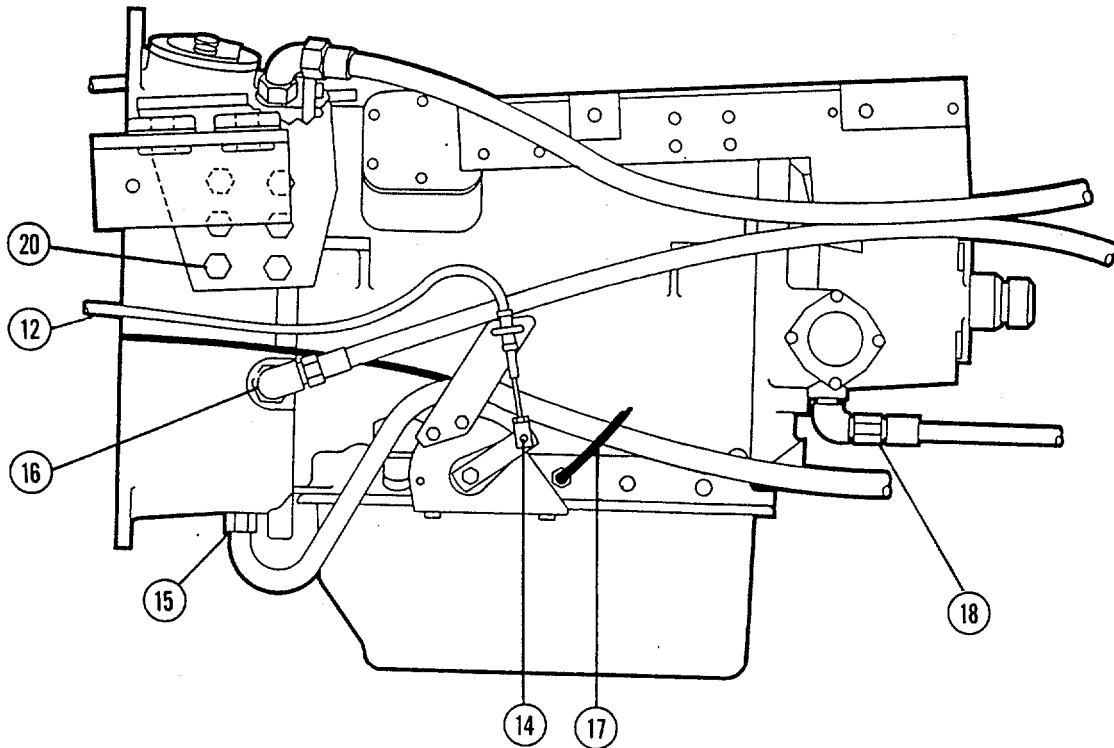
TRANSMISSION - LEFT SIDE VIEW

- (8) Disconnect hose (8) from transmission.
- (9) Disconnect wires from sending unit (9).
- (10) Disconnect hose (10) from elbow in torque converter housing.
- (11) Disconnect wires from temperature sending unit (11).
- (12) Disconnect transmission shift cable (12) from shift lever (14).
- (13) Disconnect two hose assemblies (1 5) from bottom of torque converter.
- (14) Disconnect hose assembly (16) from torque converter.
- (15) Disconnect modulator hose (17) from transmission.
- (16) Disconnect hose (18) from transmission.
- (17) Use a suitable mobile transmission jack and carrier and install carrier beneath transmission.

6-47. TRANSMISSION - Continued

- (18) Raise carrier up to support transmission. Remove six screws and lock washers (20) from left side of transmission.
- (19) Remove six screws and lock washers (19) from right side of transmission.
- (20) Lower jack and raise truck as needed to allow transmission clearance to remove from beneath truck. Roll transmission from beneath truck.

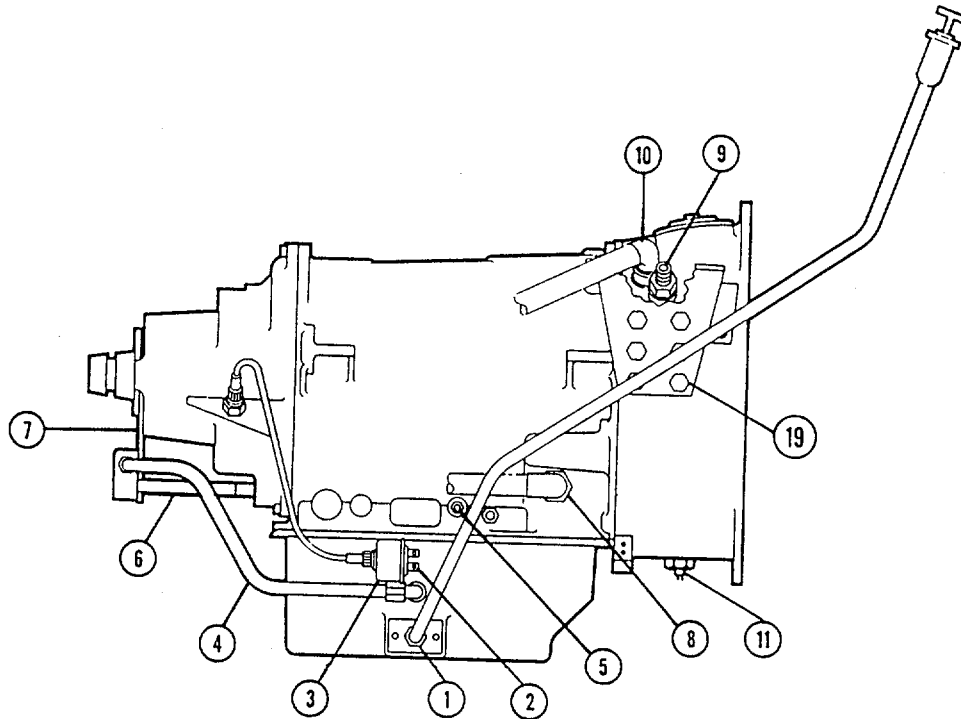
b. Installation.



TRANSMISSION - LEFT SIDE VIEW

- (1) Roll transmission into position under truck. Raise transmission to align holes in mounting brackets with holes in transmission mounting surfaces.
- (2) Install six screws and lockwashers (20) on left side of transmission and six screws and lockwashers (19) on right side of transmission. Tighten screws securely.
- (3) Connect hose assembly (18) to transmission.
- (4) Connect modulator hose (17) to elbow in transmission.

6-47. TRANSMISSION - Continued



TRANSMISSION - RIGHT SIDE VIEW

- (5) Connect hose assembly (1 6) to torque converter.
- (6) Connect two hose assemblies (15) to bottom of torque converter.
- (7) Connect transmission shift cable (12) to shift lever (14).
- (8) Connect wires (2) to sending unit (3).
- (9) Connect hose assembly (10) to transmission elbow.
- (10) Connect wires to temperature sending unit (11).
- (11) Connect hose assembly (4) to transmission.
- (12) Install bracket (7), with attached solenoid, to transmission. Secure bracket with two screws and lockwashers.
- (13) Connect hose assembly (6) to transmission.

6-47. TRANSMISSION - Continued

- (14) Connect hose assembly (4) to transmission.
- (15) Install transmission dipstick tube (1).
- (16) Remove mobile jack from beneath transmission. Use suitable jacks to raise truck and remove locking. Carefully lower truck so that it rests on the wheels.

c. Follow-on Maintenance.

- (1) Connect drive shaft to transmission (para 5-7).
- (2) Fill transmission with oil (see para 4-142).
- (3) Connect batteries (see para 4-114).

6-48. FLYWHEEL ASSEMBLY

This task covers:

- | | |
|----------------------------|--------------------------|
| a. Removal | d. Assembly |
| b. Disassembly | e. Installation |
| c. Cleaning and Inspection | f. Follow-on Maintenance |

TOOLS REQUIRED

Tool Kit, General Mechanics, Automotive
(Appendix B, Section III, Item 1)

Shop Equipment, Automotive
Maintenance and Repair
(Appendix B, Section III, Item 4)

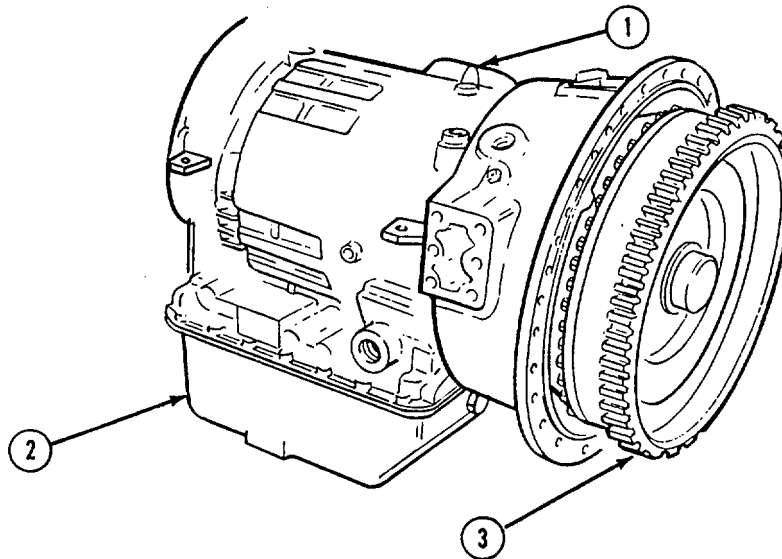
Flywheel Lifting Bracket
Appendix B, Section III, Item 59)

PERSONNEL REQUIRED - 2**MATERIALS/PARTS REQUIRED**

Oil, Lubricating (Item 10, Appendix E)
Solvent, Dry Cleaning (Item 3, Appendix E)
Gasket (Figure 148, Appendix F)
Seals (Figure 132, Appendix F)

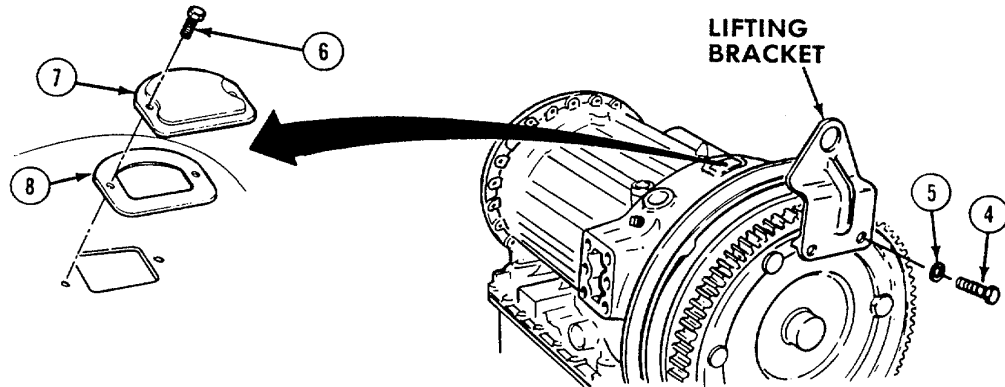
EQUIPMENT CONDITION

Transmission Removed (see para 6-47.)

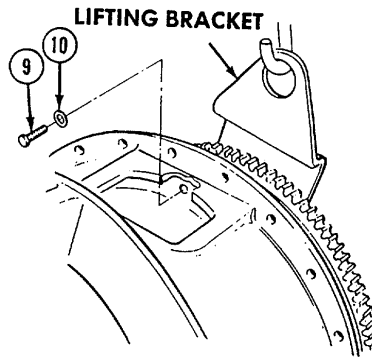
a. Removal.

- (1) Position transmission (1) on blocks so oil pan (2) is at bottom.
- (2) Set drain pan under flywheel (3) to catch draining oil.

6-48. FLYWHEEL ASSEMBLY - Continued



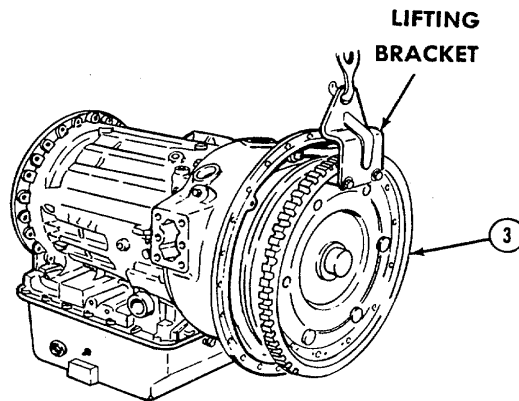
- (3) Align and install lifting bracket (Appendix B, Section III, Item 59) with two screws (4) and washers (5).
- (4) Remove two screws (6) from access cover (7).
- (5) Remove access cover (7) and gasket (8).



NOTE

Use flywheel lifting bracket to turn flywheel for access to screws inside converter housing.

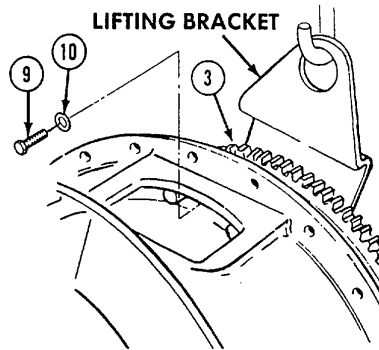
- (6) Remove 29 of 30 screws (9) and washers (10). Leave one screw in place behind lifting bracket.



- (7) Install lifting device to lifting bracket.
- (8) Raise lifting device until it supports weight of flywheel (3).

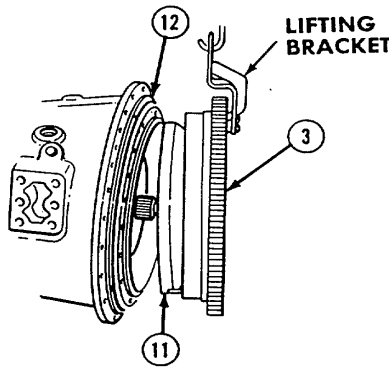
6-48. FLYWHEEL ASSEMBLY - Continued

- (9) Remove one screw (9) and washer (10) from flywheel (3).



WARNING

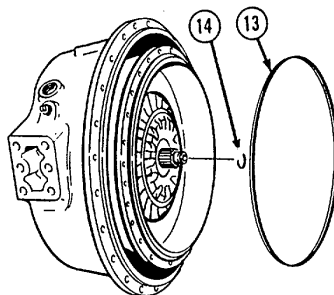
Serious injury could occur if heavy equipment is moved/lifted without sufficient personnel to do the job. Use proper physical lifting procedures or use a suitable lifting device or dolly. Wear safety shoes, gloves and other suitable protective clothing. Area should be clear of other personnel. Serious injury or death can result from falling objects.



CAUTION

When flywheel is removed from converter housing, torque converter turbine may come off with flywheel, stay with converter housing, or be in a position to fall. Take care to prevent torque converter turbine from falling and becoming damaged.

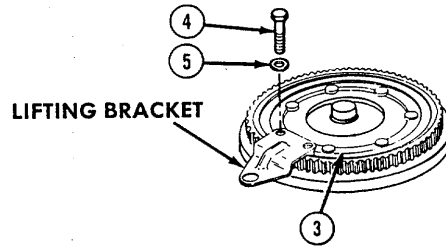
- (10) Remove flywheel (3) with torque converter turbine (11) from converter pump (12) while other person operates lifting device.
- (11). Move flywheel (3) with torque converter turbine (11) to work surface while another person operates lifting device. Remove lifting device.



- (12) Remove converter seal ring (13) and turbine shaft seal ring (14).

6-48. FLYWHEEL ASSEMBLY - Continued

- (13) Remove two screws (4) and washers (5).



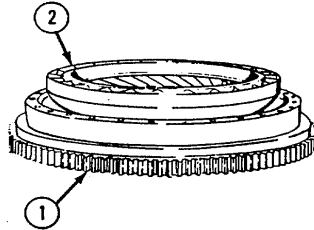
- (14) Remove lifting bracket from flywheel (3).

b. Disassembly.

NOTE

Discard old seals when disassembling.

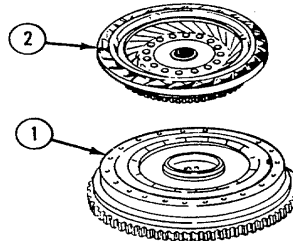
- (1) Set flywheel (1) on work surface with torque converter turbine (2) up.



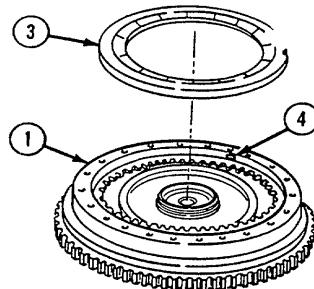
CAUTION

Torque converter turbine must be evenly pried up and off flywheel. Use shop towels at two pry points to prevent scoring or other damage to torque converter turbine or flywheel.

- (2) Remove torque converter turbine (2) from flywheel (1).

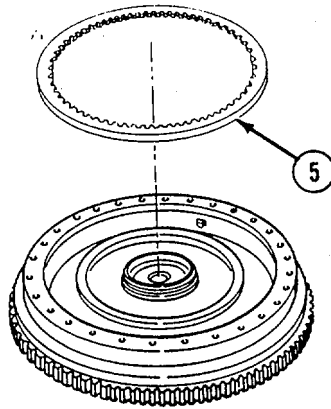


- (3) Remove backplate (3) from flywheel(1).

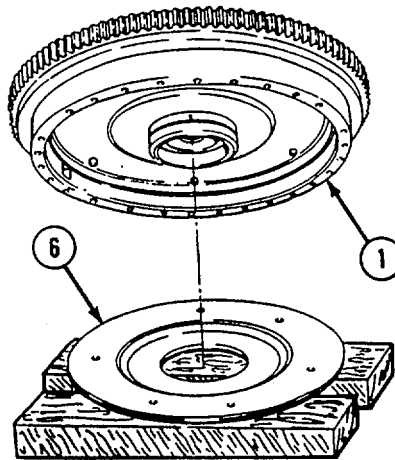


- (4) Remove two keys (4).

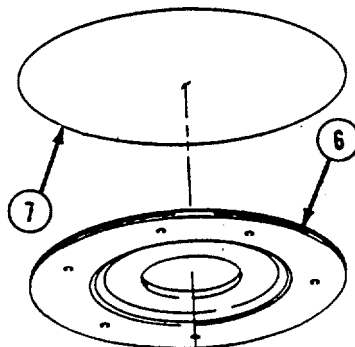
6-48. FLYWHEEL ASSEMBLY - Continued



- (5) Remove lockup clutch plate (5).
- (6) Turn flywheel (1) over and support on wooden blocks.
- (7) Lift flywheel (1) 1 ft (30.5 cm) and drop flywheel to free piston (6).
- (8) Remove piston (6).

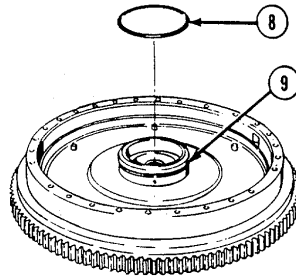


- (9) Remove seal ring (7) from outer groove in piston (6).



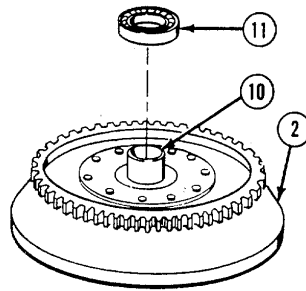
6-48. FLYWHEEL ASSEMBLY - Continued

- (10) Remove seal ring (8) from outer groove in hub (9).



- (11) Set torque converter turbine (2) on work surface with bearing shaft (10) facing up.

- (12) Remove bearing (11) from bearing shaft (10).



c. Cleaning and Inspection.

WARNING

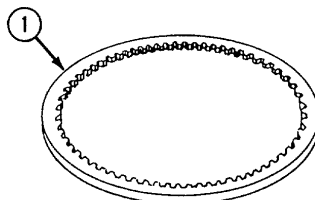
Dry cleaning solvent P-D-680 is potentially dangerous. Avoid repeated and prolonged breathing of vapors and skin contact with the liquid. Do not use near open flame, arcing equipment or other ignition sources. Always wear eye protection and protective clothing. The flash point of P-D-680 is 100 to 138 deg. F (38 to 59 deg. C).

- (1) Clean all metallic parts with dry cleaning solvent (Item 3, Appendix E).

WARNING

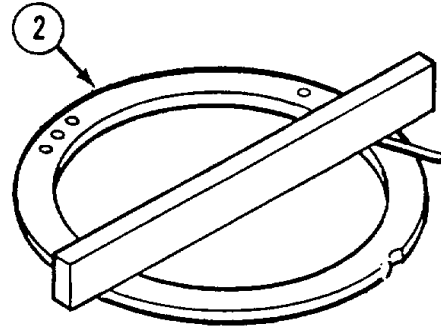
Compressed air used for cleaning purposes will not exceed 30 psi (207 kPa). Use only with effective chip guarding and personal protective equipment, goggles, shield, and gloves.

- (2) Dry all parts, except bearings, with compressed air.
 (3) Inspect all parts for damage.
 (4) Replace damaged parts.
 (5) Measure thickness of lockup clutch plate (1). Replace if less than 0.19-in. (4.8 mm) thick.



6-48. FLYWHEEL ASSEMBLY - Continued

- (6) Place straight edge on backplate (2)
- (7) If feeler gauge larger than 0.010 in. (0.25 mm) will fit under straight edge, replace backplate (2).
- (8) Place straight edge on piston (3).
- (9) If feeler gauge larger than 0.010 in. (0.25 mm) will fit under straight edge, replace piston (3).

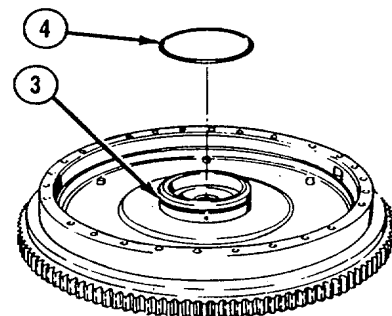
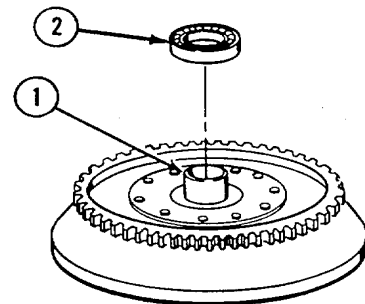
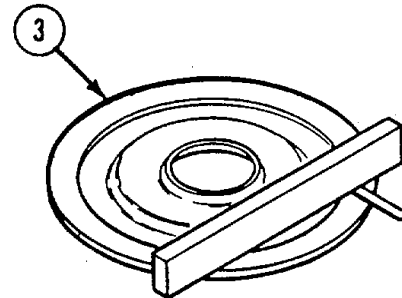


d. Assembly.

NOTE

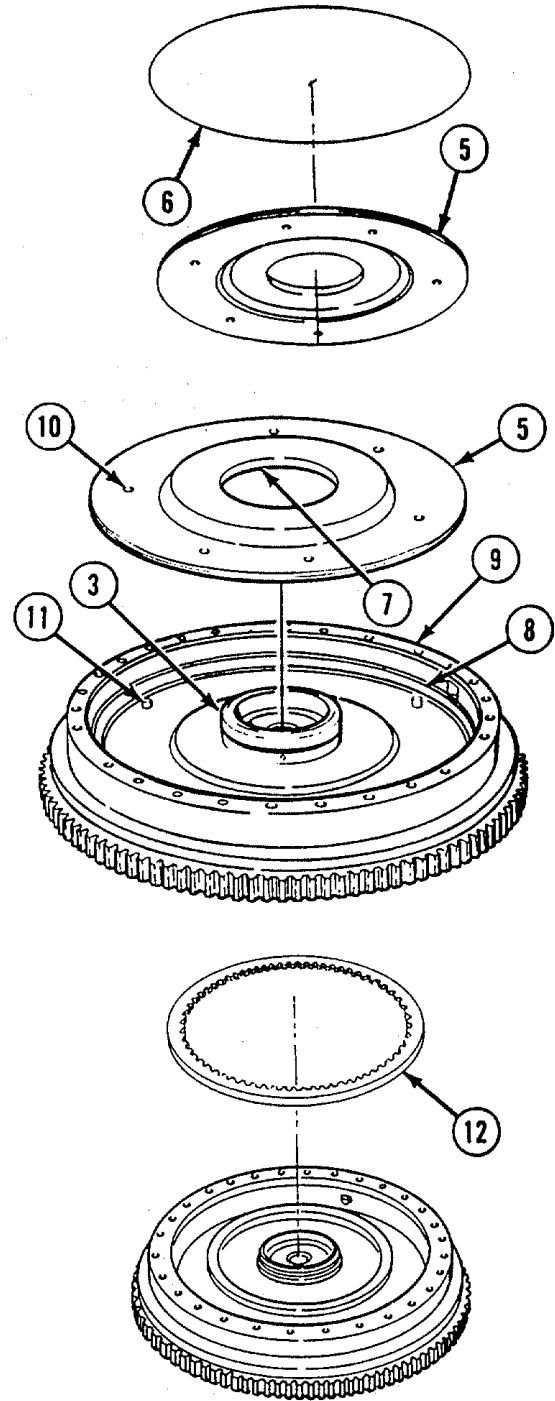
Discard old seals and install new seals when assembling unit.

- (1) Coat bearing shaft (1) and bearing (2) with lubricating oil (Item 10, Appendix E).
- (2) Seat bearing (2) on bearing shaft (1) with identification number up.
- (3) Press bearing (2) on bearing shaft (1).
- (4) Coat outside of hub (3) with lubricating oil (Item 10, Appendix E).
- (5) Apply lubricating oil (Item 10, Appendix E) to seal ring (4) and install seal ring in outer groove on hub (3).

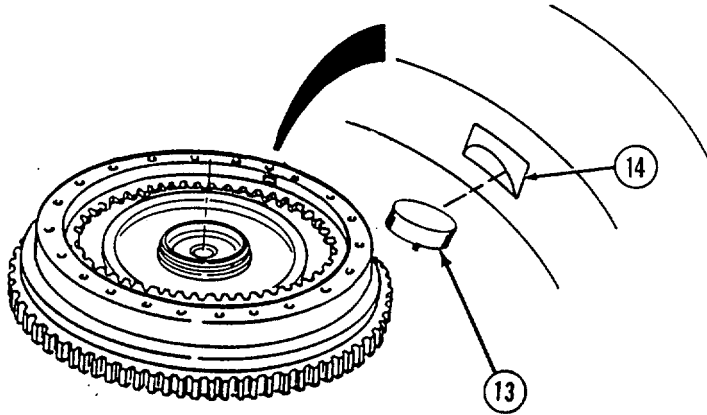


6-48. FLYWHEEL ASSEMBLY - Continued

- (6) Apply lubricating oil (Item 10, Appendix E) to outer groove of piston (5).
- (7) Apply lubricating oil (Item 10, Appendix E) to seal ring (6) and install.
- (8) Apply lubricating oil (Item 10, Appendix E) to inner hub (7) of piston (5) and to piston seal surface (8) of flywheel (9).
- (9) Align six holes (10) with six pins (11).
- (10) Install piston (5) on hub (3). Make sure piston is firmly seated on pins (11).
- (11) Soak lockup clutch plate (12) in lubricating oil (Item 10, Appendix E) for 3 minutes and install.



6-48. FLYWHEEL ASSEMBLY - Continued

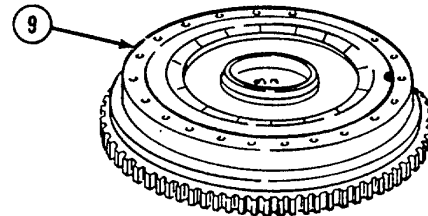
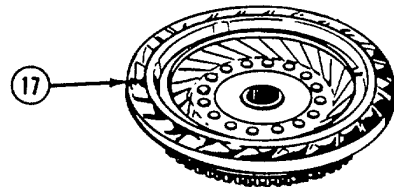
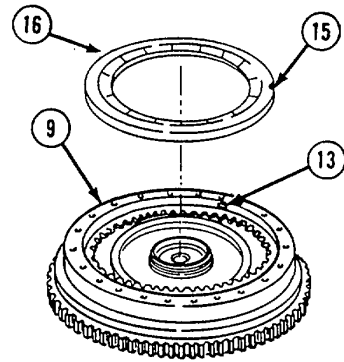


- (12) Install two keys (13) in slots (14).
- (13) Align notches (15) with keys (13) and install backplate (16) in flywheel (9).

NOTE

Gear on torque converter turbine must be lined up with teeth of lockup clutch plate before installation.

- (14) Install torque converter turbine (17) on flywheel (9).



6-48. FLYWHEEL ASSEMBLY - Continued

e. Installation.

(1) Install lifting bracket (Appendix B, Section III, Item 59) with two screws (1) and washers (2).

(2) Coat turbine shaft seal ring (3) converter seal ring (4) with lubricating oil.

(3) Install turbine shaft seal ring (3) in groove and snap ends together.

(4) Install converter seal ring (4) on torque converter pump (5).

(5) Coat torque converter thrust pads (6) with lubricating oil.

(6) Align and install flywheel (7) so flywheel fits flush against torque converter pump (5) while other person operates lifting device.

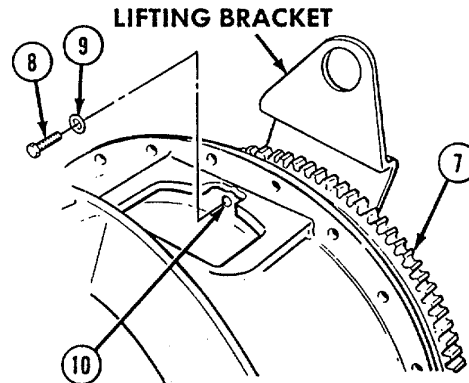
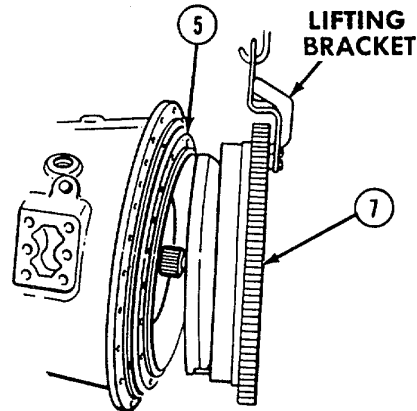
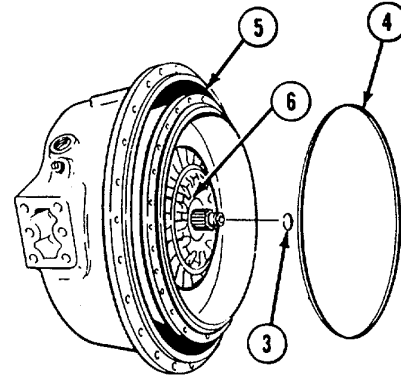
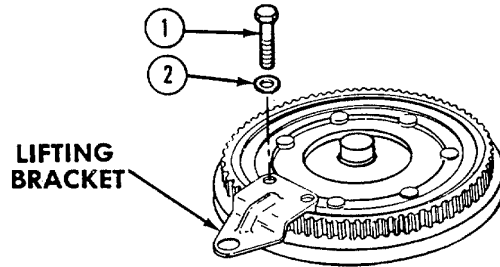
(7) Install one screw (8) and washer (9) through hole (10) in flywheel (7). Tighten screw until snug.

(8) Remove lifting device from lifting bracket.

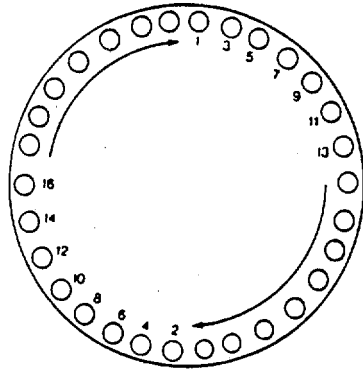
NOTE

Lifting bracket is used to turn flywheel for access to screw holes inside converter housing.

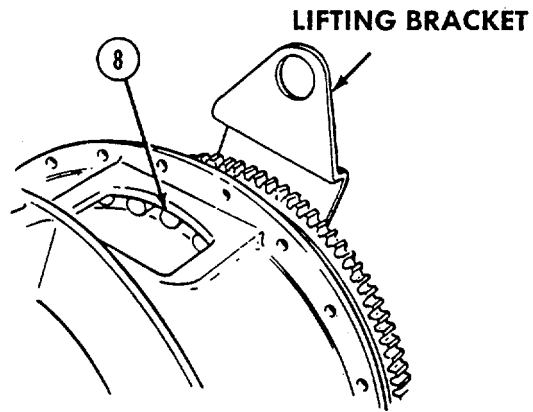
(9) Install 29 screws (8) and washers (9) through holes (10) in flywheel (7). Tighten screws until snug.



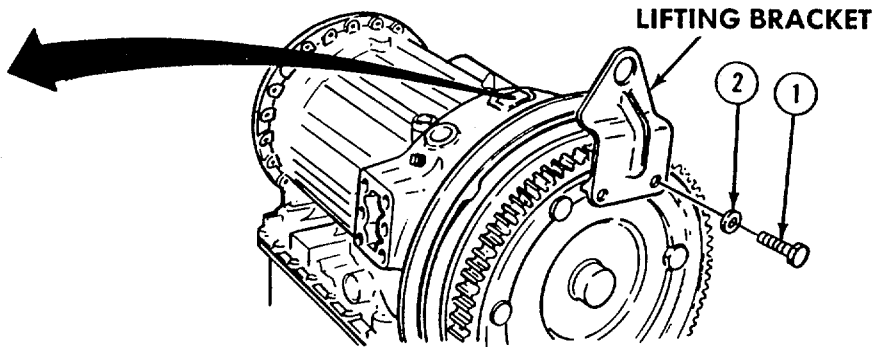
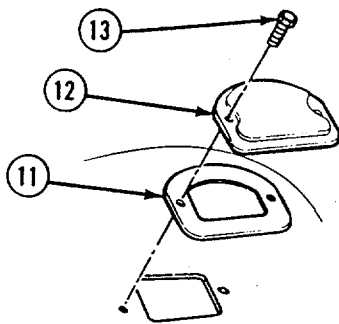
6-48. FLYWHEEL ASSEMBLY - Continued



**TIGHTEN SCREWS
IN ORDER SHOWN**



- (10) Tighten 30 screws (8) to 41 to 49 lb-ft (56 to 66 N.m).



- (11) Remove two screws (1) and washers (2).
- (12) Remove lifting bracket.
- (13) Install gasket (11) and access cover (12).
- (14) Install two screws (13).
- (15) Tighten two screws (13) to 26 to 32 lb-ft (35 to 43 N.m).

f. Follow-on Maintenance.

- (1) Install transmission (see para 6-47).

6-49. TORQUE CONVERTER STATOR

This task covers:

- | | |
|----------------------------|--------------------------|
| a. Removal | d. Assembly |
| b. Disassembly | e. Installation |
| c. Cleaning and Inspection | f. Follow-on Maintenance |

TOOLS REQUIRED

Tool Kit, General Mechanics, Automotive (Appendix B, Section III, Item 1)

Shop Equipment, Automotive Maintenance and Repair (Appendix B, Section III, Item 4)

Stator Roller Holder (Appendix B, Section III, Item 60)

MATERIALS REQUIRED

Oil, Lubricating (Item 10, Appendix E)
Solvent, Dry Cleaning (Item 3, Appendix E)

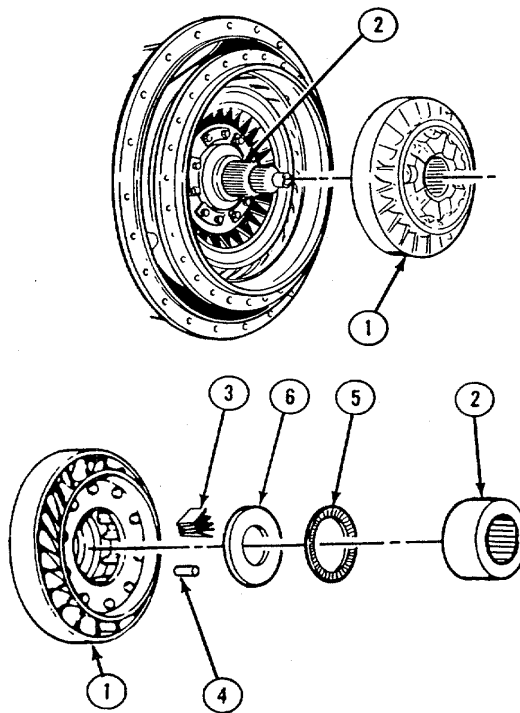
EQUIPMENT CONDITION

Flywheel Assembly Removed (see para 6-48.)

NOTE

- Twist stator counterclockwise and away from torque converter pump when removing stator from shaft.
- Bearings and springs may fall out when stator is removed.

a. Removal. Remove stator (1) from shaft (2).



b. Disassembly.

- (1) Hold rim of stator (1) on work surface.
- (2) Turning roller race (2) clockwise, slowly remove roller race from stator (1).
- (3) Remove 10 roller springs (3) and 10 rollers (4) from stator (1).
- (4) Remove roller bearing (5) and thrust bearing race (6) from stator (1).

6-49. TORQUE CONVERTER STATOR - Continued

c. Cleaning and Inspection.

WARNING

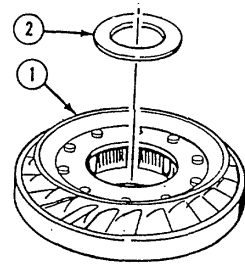
Dry cleaning solvent P-D-680 is potentially dangerous. Avoid repeated and prolonged breathing of vapors and skin contact with the liquid. Do not use near open flame, arcing equipment or other ignition sources. Always wear eye protection and protective clothing. The flash point of P-D-680 is 100 to 138 deg. F (38 to 59 deg. C).

- (1) Clean all parts in dry cleaning solvent (Item 3, Appendix E).

WARNING

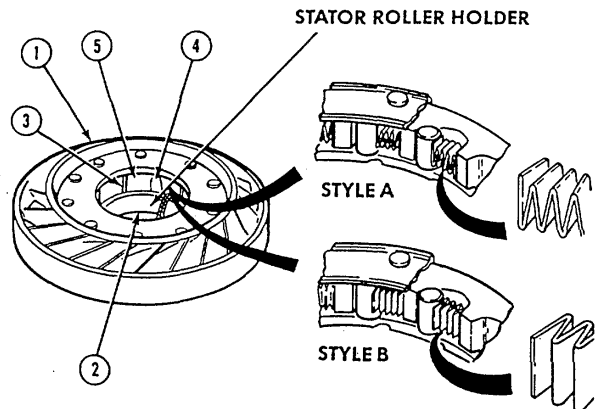
Compressed air used for cleaning purposes will not exceed 30 psi (207 kPa). Use only with effective chip guarding and personal protective equipment, goggles, shield, and gloves.

- (2) Use clean lint free cloth or compressed air to dry parts cleaned with dry cleaning solvent.
- (3) Inspect parts for damage. Replace damaged parts.
- (4) Coat all parts with lubricating oil (Item 10, Appendix E).



d. Assembly.

- (1) Position stator (1) on work surface, rear side upward.
- (2) Install thrust bearing race (2) in stator (1).
- (3) Install stator roller holder against thrust bearing race (2) so string of stator roller holder hangs out bottom of stator (1).

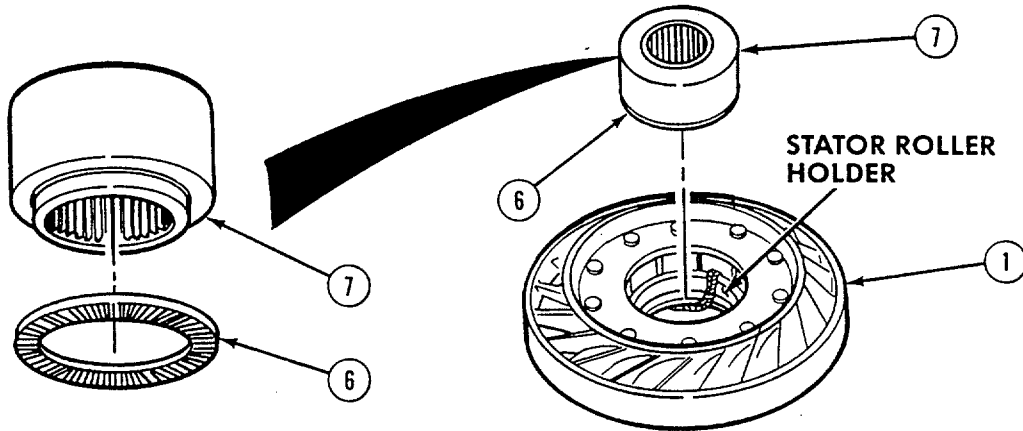


CAUTION

Roller springs must be installed as shown in illustration with center pointing end of spring next to roller.

- (4) Install 10 roller springs (3) and rollers (4) in stator cam pockets (5).

6-49. TORQUE CONVERTER STATOR - Continued



- (5) Install roller bearing (6) on roller race (7).
- (6) Install roller race (7) in stator (1) until roller bearing (6) is near stator roller holder.
- (7) Remove stator roller holder by pulling on attached string.
- (8) Push roller race (7) inward while turning roller race clockwise until roller bearing (6) seats.
- (9) Position stator (1) with roller race (7) up.
- (10) Turn roller race (7) counterclockwise to lock in place.

e. Installation.

CAUTION

Keep outer face of stator down so bearings and springs will not fall out.

- (1) Hold stator (1) with thrust pads (2) away from transmission (3).

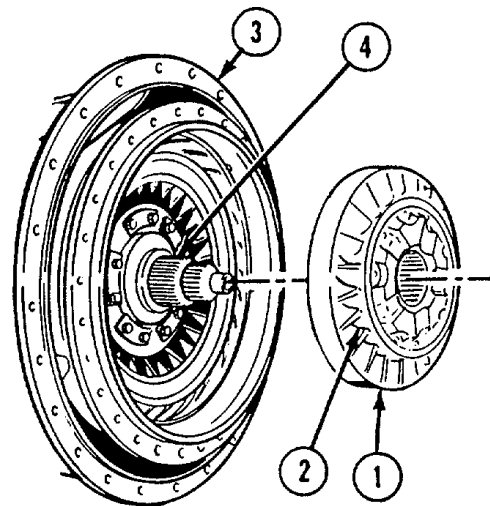
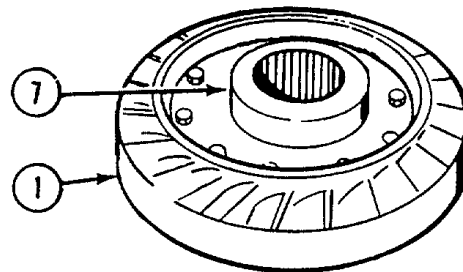
CAUTION

Stator must turn freely in clockwise direction and lock up in counterclockwise direction to operate properly and prevent damage to equipment.

- (2) Install stator (1) on shaft (4).

f. Follow-on Maintenance.

- (1) Install flywheel assembly (see para 6-48).



6-50. TORQUE CONVERTER PUMP

This task covers:

- | | |
|----------------------------|--------------------------|
| a. Removal | d. Assembly |
| b. Disassembly | e. Installation |
| c. Cleaning and Inspection | f. Follow-on Maintenance |

TOOLS REQUIRED

Tool Kit, General Mechanics, Automotive
(Appendix B, Section 1II, Item 1)

Shop Equipment, Automotive
Maintenance and Repair
(Appendix B, Section III, Item 4)

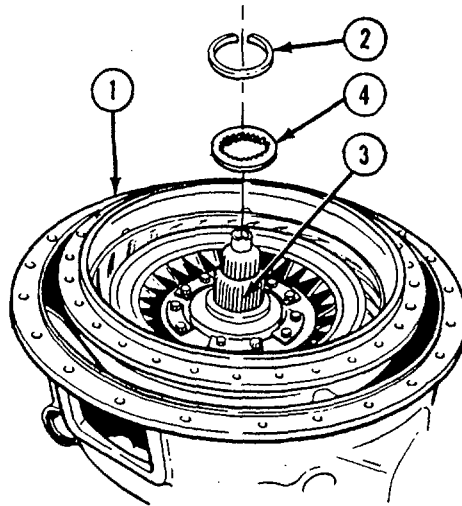
Rear Bearing Installer (Appendix B, Section III, Item 61)
Driver Handle (Appendix B, Section III, Item 62)

MATERIALS/PARTS REQUIRED

Oil, Lubricating (Item 10, Appendix E)
Solvent, Dry Cleaning (Item 3, Appendix E)
Seals (Figure 132, Appendix F)
Gaskets (Figure 132, Appendix F)

EQUIPMENT CONDITION

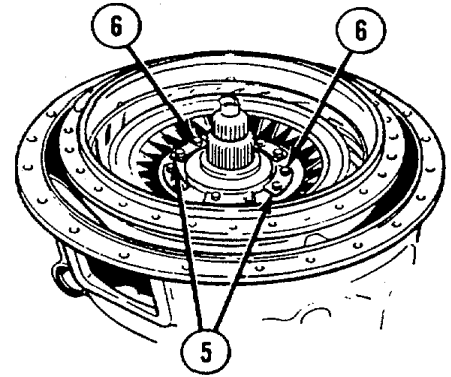
Torque Converter Stator Removed from Torque
Converter Housing (see para 6-49.)

a. Removal.

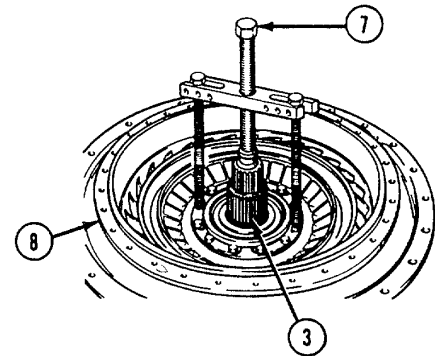
- (1) Turn transmission so torque converter housing (1) faces up.
- (2) Remove retaining ring (2) from ground sleeve (3).
- (3) Remove spacer (4).

6-50. TORQUE CONVERTER PUMP - Continued

- (4) Bend corners of two lockstrips (5) away from heads of two opposing screws (6).
- (5) Remove two screws (6) from lockstrips (5).



- (6) Install puller (7).
- (7) Tighten puller (7) to separate pump (8) from ground sleeve (3).
- (8) Remove puller (7).
- (9) Remove pump (8) and set on work surface.

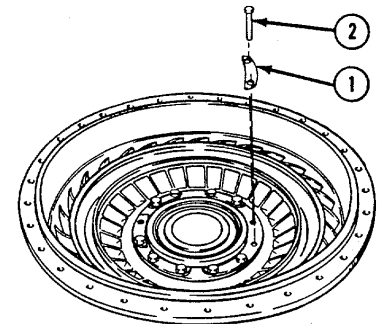


b. Disassembly.

NOTE

Discard old seals when disassembling.

- (1) Bend corners of four lockstrips (1) away from heads of 10 screws (2).
- (2) Remove 10 screws (2) and six lockstrips (1).



6.50. TORQUE CONVERTER PUMP - Continued

- (3) Remove bearing retainer (3) from pump (4).
- (4) Remove hub (5), gasket (6), and seal ring (7).
- (5) Remove gasket (6) and seal ring (7) from hub (5). Discard gasket and seal ring.
- (6) Remove outer race (8) and bearing (9).
- (7) Remove inner race (10).

c. Cleaning and Inspection.**WARNING**

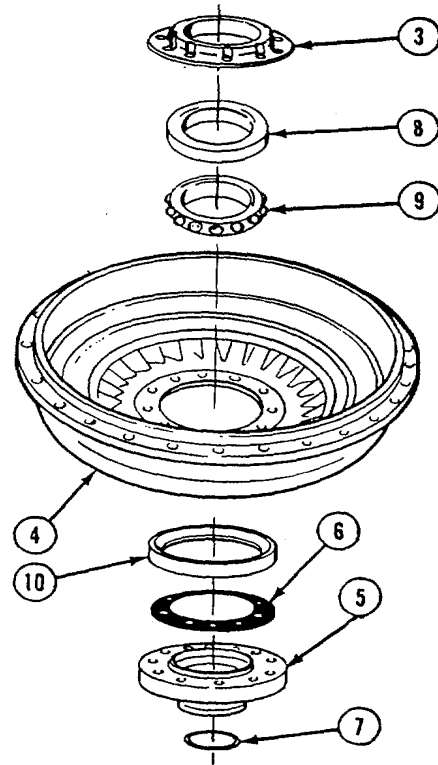
Dry cleaning solvent P-D-680 is potentially dangerous. Avoid repeated and prolonged breathing of vapors and skin contact with the liquid. Do not use near open flame, arcing equipment or other ignition sources. Always wear eye protection and protective clothing. The flash point of P-D-680 is 100 to 138 deg. F (38 to 59 deg. C).

- (1) Clean all metal parts with dry cleaning solvent (item 3, Appendix E).

WARNING

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

- (2) Dry all metal parts, except bearings, with compressed air.
- (3) Install all parts for damage.
- (4) Replace damaged parts.
- (5) Coat all parts with lubricating oil (Item 10, Appendix E).



6.50. TORQUE CONVERTER PUMP - Continued

d. Assembly.

NOTE

Discard old seals and install new seals when assembling unit.

- (1) Apply lubricating oil (Item 10, Appendix E) to new gasket (1) and install on hub (2).

NOTE

Check that three parts of bearing have same serial number.

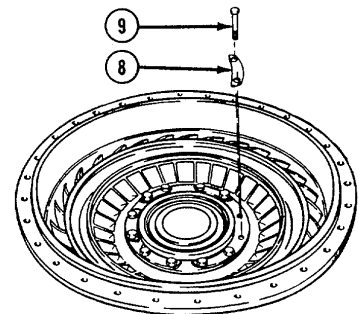
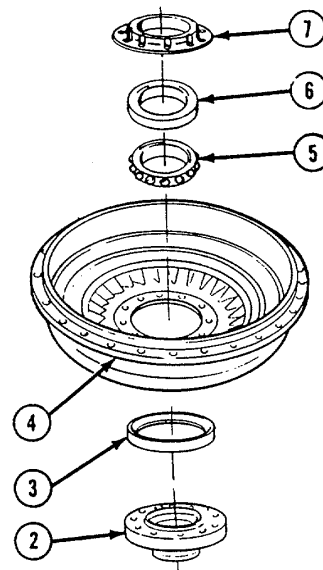
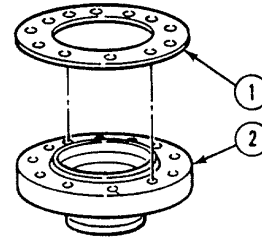
- (2) Install inner race (3) on hub (2).
- (3) Install pump (4) on hub (2).

CAUTION

Bearing must be kept clean during installation. Vaep bearing wrapped until bearing is installed. Set bearing on clean, lint-free paper and never on dirty surface.

- (4) Install bearing (5) in inner race (3).
- (5) Install outer race (6) over bearing (5).
- (6) Position bearing retainer (7) shoulder side up on hub (2).

- (7) Install six lockstrips (8) and 12 screws (9).
- (8) Torque 12 screws (9) to 35 to 40 lb-ft (47 to 54 Nm).
- (9) Bend corners of lockstrips (8) against heads of screws (9).



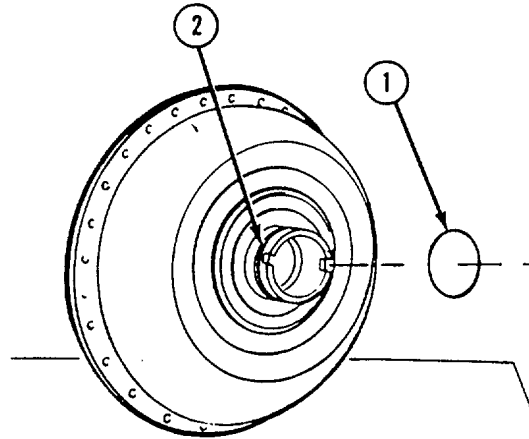
6.50. TORQUE CONVERTER PUMP - Continued

e. Installation.

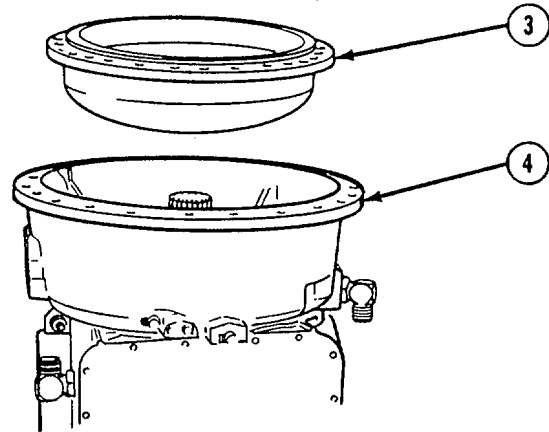
NOTE

Keep new seal ring sealed in package until ready to use so seal ring does not change shape.

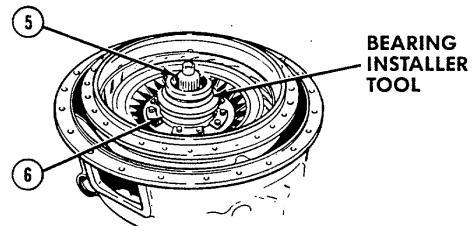
- (1) Roll seal ring (1) to one-half length and hold for at least 10 seconds.
- (2) Install seal ring (1) in groove (2).



- (3) Install pump (3) in torque converter housing (4)

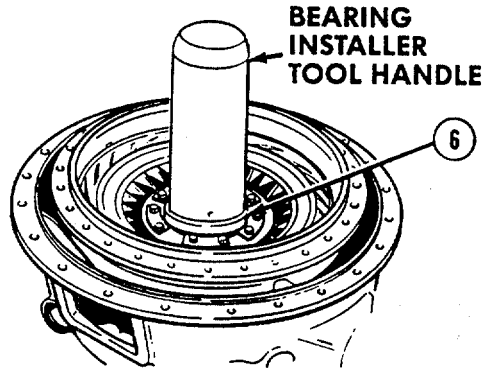


- (4) Install bearing installer tool (Appendix B, Section 111, Item 61) around ground sleeve (5) and on bearing (6).

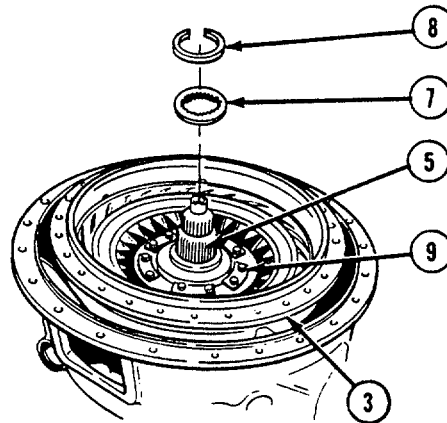


6.50. TORQUE CONVERTER PUMP - Continued

- (5) Place bearing installer tool handle (Appendix B, Section III, Item 62) over bearing installer tool.
- (6) Drive bearing (6) down until seated.
- (7) Remove bearing installer tool.



- (8) Install spacer (7) over ground sleeve (5) on pump (3).
- (9) Install retaining ring (8) on ground sleeve (5).
- (10) Coat pump hub (3) and hub area (9) with lubricating oil (Item 10, Appendix E).



f. Follow-on Maintenance.

- (1) Install torque converter stator into torque converter housing (see para 6-49).

6-51. TORQUE CONVERTER HOUSING

This task covers:

- a. Removal
- b. Disassembly
- c. Cleaning and Inspection
- d. Assembly
- e. Installation
- f. Follow-on Maintenance

TOOLS REQUIRED:

Tool Kit, General Mechanics, Automotive
(Appendix B, Section II, Item 1)

Shop Equipment, Automotive
Maintenance and Repair
(Appendix B, Section 111, Item 4)

Front Support Needle Bearing Installer
(Appendix B, Section III, Item 64)

MATERIALS/PARTS REQUIRED

Oil, Lubricating (item 10, Appendix E)
Adhesive-Sealant, Silicone (Item 35, Appendix E)
Solvent, Dry Cleaning (Item 3, Appendix E)
Tags, Identification (Item 32, Appendix E)
Seals (Figure 132, Appendix E)
Gaskets (Figure 132, Appendix E)

PERSONNEL REQUIRED - 2

EQUIPMENT CONDITION

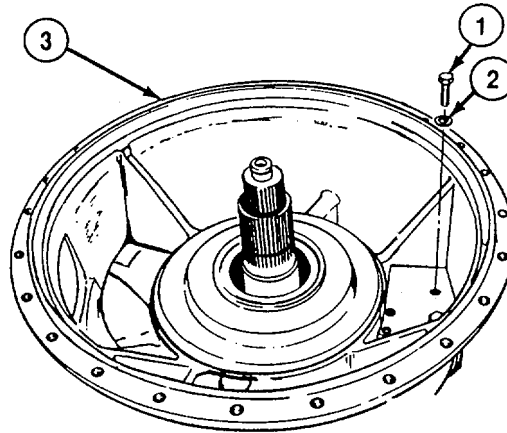
Torque Converter Pump Removed from
Torque Converter Housing (see para 6-50.)

a. Removal.

NOTE

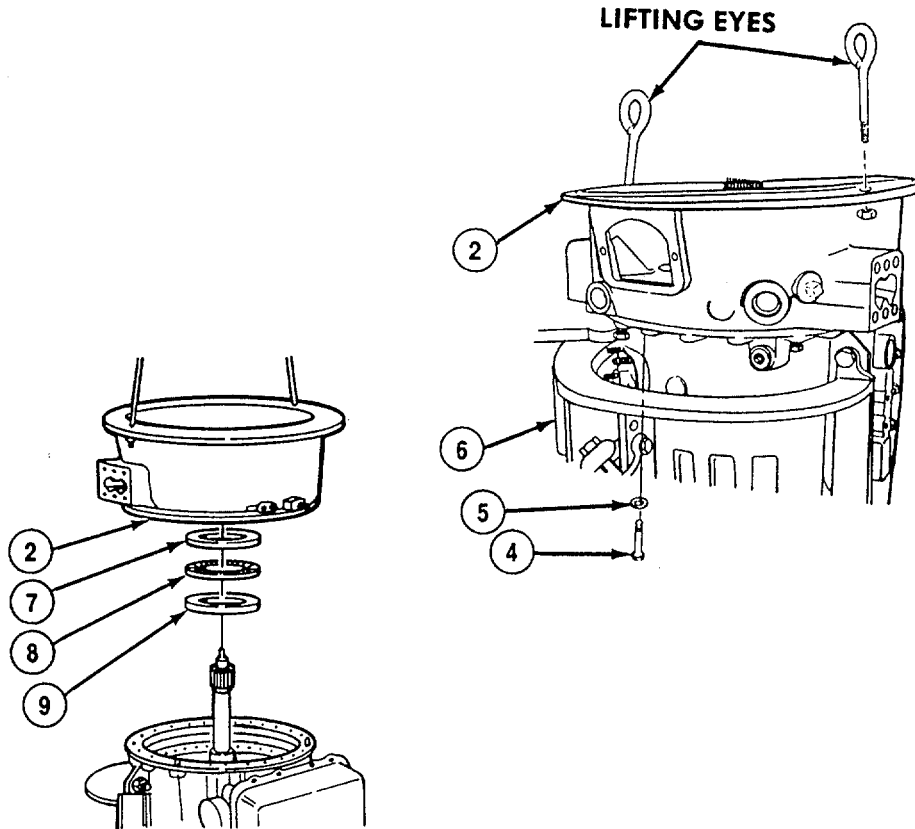
Discard all old seals and gaskets.

- (1) Remove seven screws (1) and lockwashers (2) from inside torque converter housing (3).



6-51. TORQUE CONVERTER HOUSING - Continued

- (2) Remove seven screws (4) and lockwashers (5) holding torque converter housing (2) to transmission housing (6).
- (3) Install two lifting eyes on torque converter housing (2).
- (4) Install lifting device to lifting eyes.

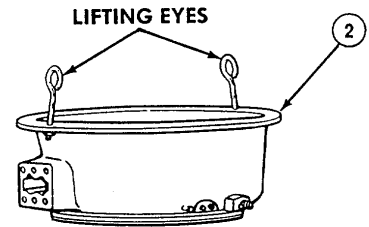


- (5) Remove torque converter housing (2) while other person operates lifting device.
- (6) Remove bearing race (7), roller bearing (8), and bearing race (9).

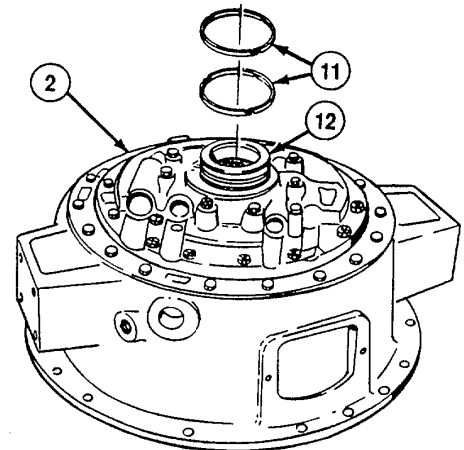
6-51. TORQUE CONVERTER HOUSING - Continued

WARNING

Serious injury could occur if heavy equipment is moved/lifted without sufficient personnel to do the job. Use proper physical lifting procedures or use a suitable lifting device or dolly. Wear safety shoes, gloves and other suitable protective clothing. Area should be clear of other personnel. Serious injury or death can result from falling objects.



- (7) Guide torque converter housing (2) to work surface while other person operates lifting device.
- (8) Remove lifting device and lifting eyes.
- (9) Turn torque converter housing (2) over using two people.
- (10) Remove two seal rings (11) from support hub (12).



b. Disassembly.

NOTE

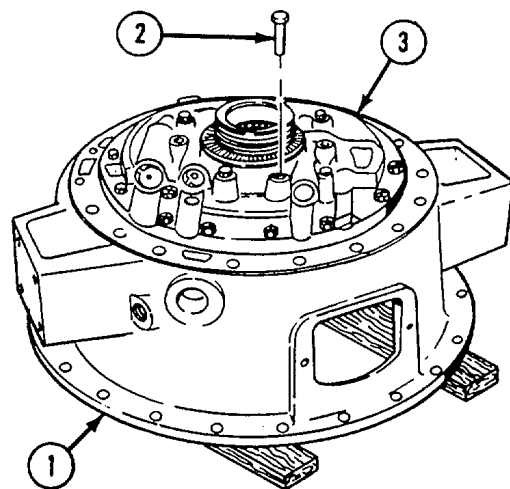
Discard all old seals and gaskets.

- (1) Set torque converter housing (1) on two wooden blocks.

CAUTION

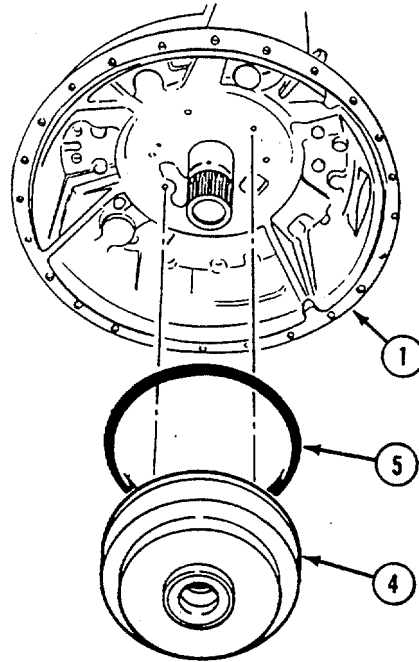
When screws are removed, oil pump will fall. Support oil pump to prevent damage.

- (2) Remove six screws (2) holding oil pump to front support assembly (3).

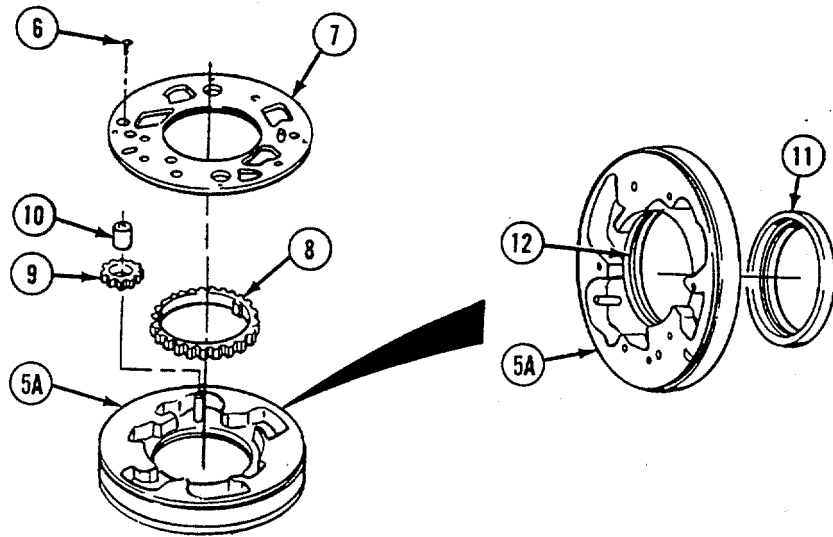


6-51. TORQUE CONVERTER HOUSING - Continued

- (3) Remove oil pump (4) from under torque converter housing (1) using two people.
- (4) Remove outer seal ring (5) from oil pump (4).



- (5) Remove screw (6) from body (5A).
- (6) Remove backplate (7) from body (5A).
- (7) Remove drive gear (8).
- (8) Remove driven gear (9).
- (9) Remove bearing (10) from driven gear (9).
- (10) Set body (5A) on rim and remove oil seal (11) from groove (12).



6-51. TORQUE CONVERTER HOUSING - Continued

WARNING

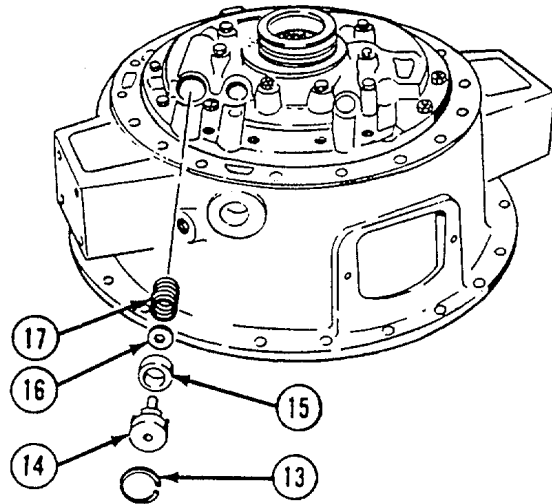
Parts are under spring tension. Release tension slowly to prevent personal injury.

- (11) Remove retaining ring (13) while other person pushes support assembly (14).

NOTE

Tag and mark all parts.

- (12) Remove support assembly (14), valve seat (15), converter bypass valve (16), and spring (17).

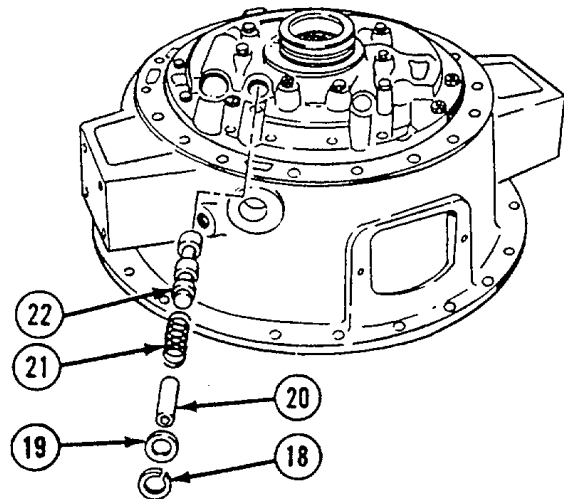


- (13) Remove retaining ring (18) while other person pushes retainer washer (19).

NOTE

Tag and mark all parts.

- (14) Remove retainer washer (19), valve stop (20), valve spring (21), and lockup shift valve (22).

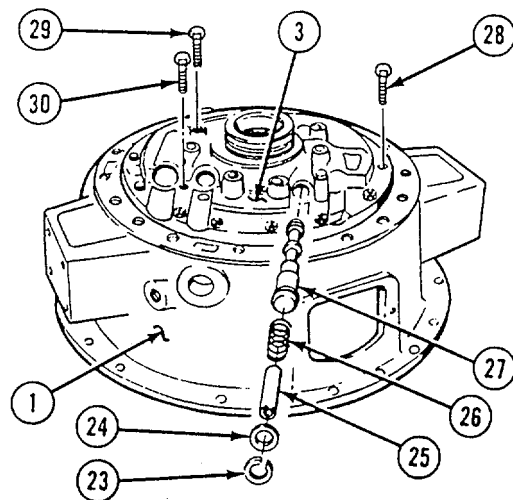


- (15) Remove retaining ring (23) while another person pushes retainer washer (24).

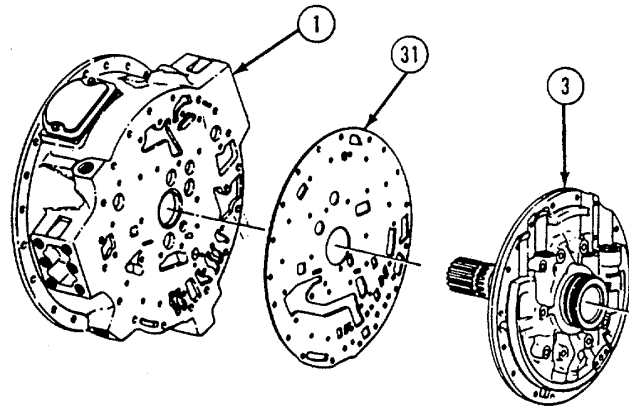
NOTE

Tag and mark all parts.

- (16) Remove retainer washer (24), valve stop (25), main pressure regulator valve spring (26), and main pressure regulator valve (27).
- (17) Remove 15 screws (28) holding front support assembly (3) to torque converter housing (1).
- (18) Remove three screws (29).
- (19) Remove screw (30).

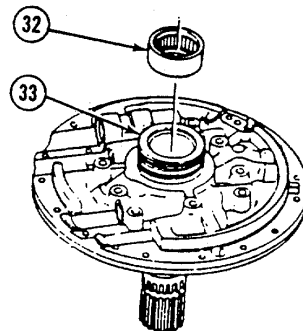


6-51. TORQUE CONVERTER HOUSING - Continued



- (20) Both personnel position and hold torque converter housing (1) on rim.
- (21) Both personnel remove front support assembly (3).
- (22) Remove gasket (31) from torque converter housing (1).
- (23) Remove bearing (32) from ground sleeve bore (33).

c. Cleaning and Inspection.



WARNING

Dry cleaning solvent P-D-680 is potentially dangerous. Avoid repeated and prolonged breathing of vapors and skin contact with the liquid. Do not use near open flame, arcing equipment or other ignition sources. Always wear eye protection and protective clothing. The flash point of P-D-680 is 100 to 138 deg. F (38 to 59 deg. C).

- (1) Clean all metallic parts with dry cleaning solvent (Item 3, Appendix E) and inspect for damage. If there is damage, replace parts.
- (2) Converter bypass valve spring, lockup shift valve spring, and main pressure regulator valve spring must be replaced if load-height specifications, listed in Table a. are not met.

Table a. Valve Spring Load-Height Specifications

Spring	Length Without Load	Length Under Load	Load
Converter bypass valve	2.65 in. (67.3 mm)	1.62 in. (41.2 mm)	21 to 23 lb (9.6 to 10.4 kg)
Lockup shift valve	3.22 in. (81.8 mm)	1.8 in. (45.7 mm)	22 to 24 lb (10 to 10.9 kg)
Main regulator valve	3.94 in. (100.1 mm)	2.64 in. (67.1 mm)	82 to 87 lb (37.2 to 39.4 kg)

6-51. TORQUE CONVERTER HOUSING - Continued

d. Assembly.

NOTE

Install new seal and gasket when assembling unit.

(1) Install bearing (1) in ground sleeve bore (2) using bearing installer (Appendix B, Section III, Item 64).

(2) Set torque converter housing

(3) on wooden blocks.

(3) Install gasket (4) on torque converter housing (3).

(4) Align holes and install front support assembly (5).

(5) Install three screws (6) across from support assembly (5).

(6) Install 15 screws (7) around outer edge of front support assembly (5).

(7) Install screw (8).

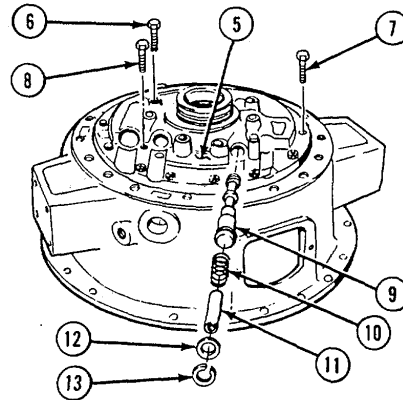
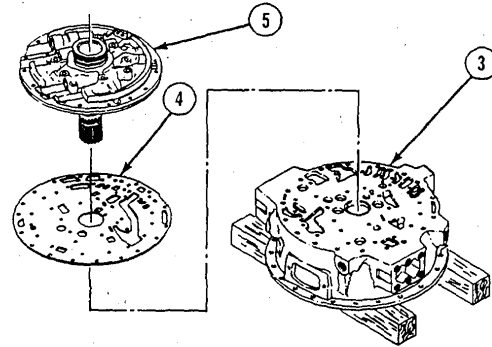
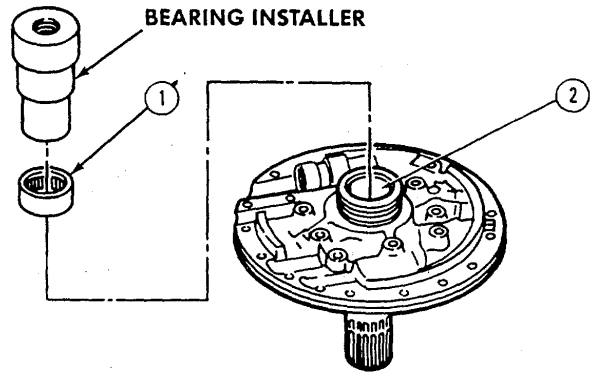
(8) Torque three screws (6), 15 screws (7), and screw (8) to 35 to 45 lb-ft (47 to 61 Nm).

(9) Install main pressure regulator valve (9) small end first.

(10) Install main pressure regulator valve spring (10) and valve stop (11).

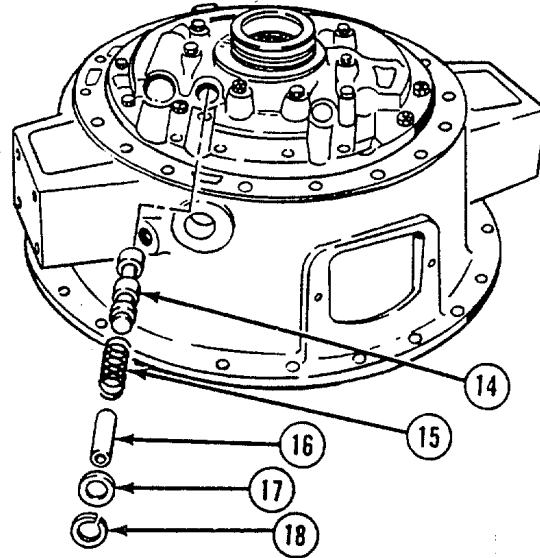
(11) Install retainer washer (12) on main pressure regulator valve spring (10).

(12) Install retaining ring (13) while other person pushes retainer washer (12).

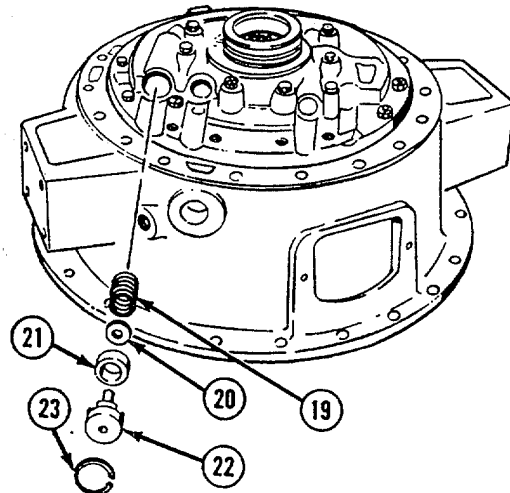


6-51. TORQUE CONVERTER HOUSING - Continued

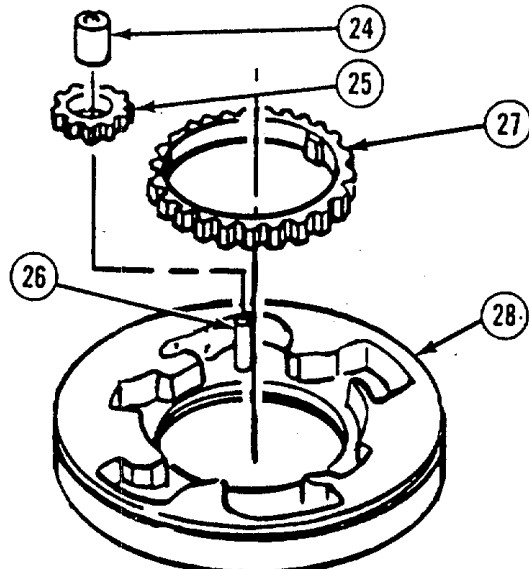
- (13) Install lockup shift valve (14) small end first.
- (14) Install valve spring (15) and valve stop (16).
- (15) Install retainer washer (17) on valve spring (15).
- (16) Install retaining ring (18) while other person pushes retainer washer (17).



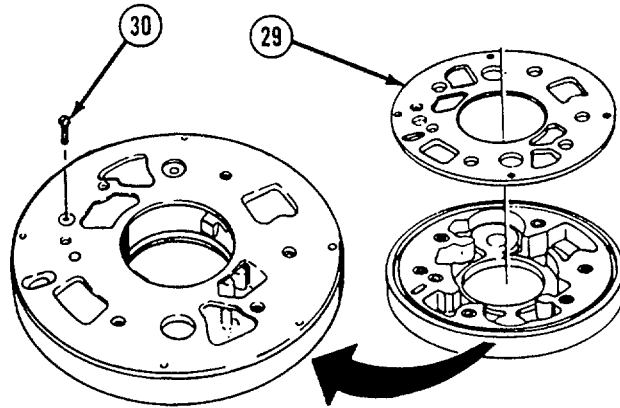
- (17) Install spring (19), converter bypass valve (20), valve seat (21), and support assembly (22).
- (18) Install retaining ring (23) while other person pushes against support assembly (22).



- (19) Install bearing (24) in driven gear (25).
- (20) Install driven gear (25) on shaft (26).
- (21) Install drive gear (27) in oil pump body (28).

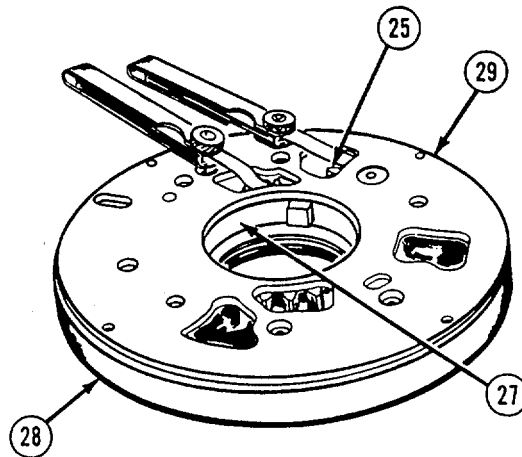


6-51. TORQUE CONVERTER HOUSING - Continued



(22) Install backplate (29).

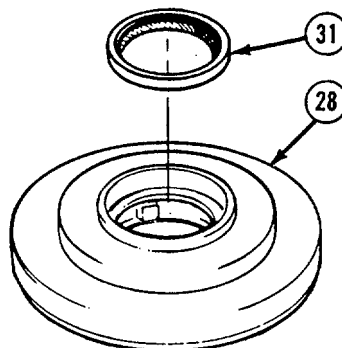
(23) Install screw (30). Torque screw 10 to 15 lb-ft (14 to 20 Nm).



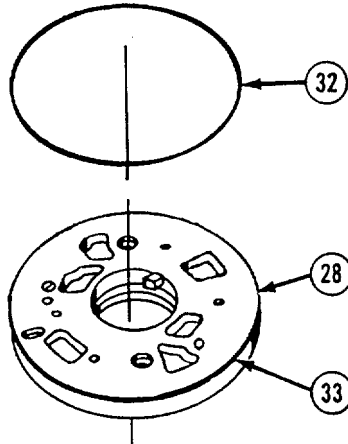
(24) Check clearance between backplate (29), drive gear (27), and driven gear (25). Maximum clearance is 0.006 in. (0.15 mm).

(25) Turn oil pump (28) over.

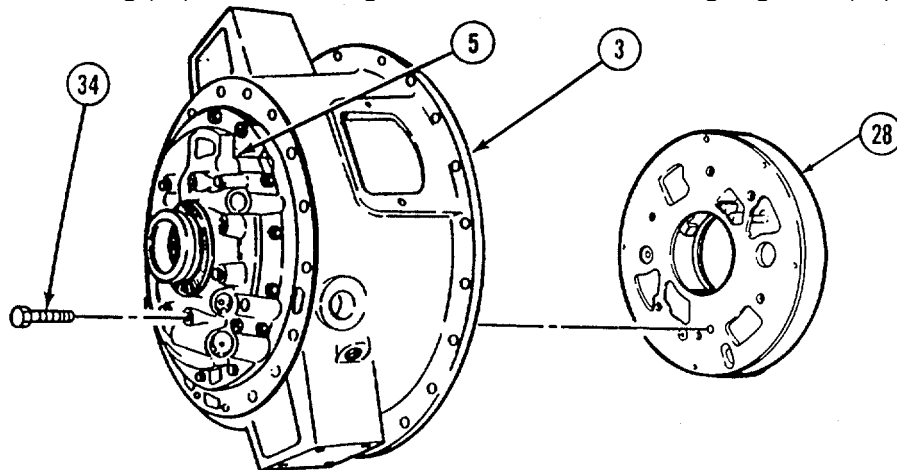
(26) Apply lubricating oil (Item 10, Appendix E) to rubber lip of oil seal (31) and install oil seal in oil pump (28).



6-51. TORQUE CONVERTER HOUSING - Continued



(27) Coat outer seal ring (32) with lubricating oil and install outer seal ring in groove (33) on oil pump (28).



(28) Turn torque converter housing (3) on side.

(29) Align screw holes in oil pump (28) with holes in torque converter housing (3).

(30) Install oil pump (28) while another person holds torque converter housing (3).

(31) Install six screws (34) through front support (5) while other person holds oil pump (28).

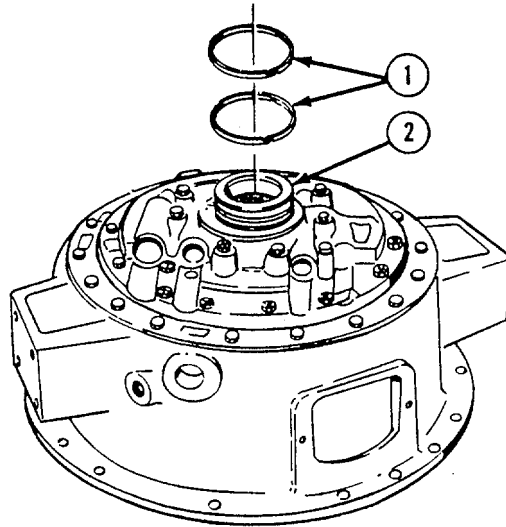
(32) Torque six screws (34) to 35 to 45 lb-ft (47 to 61 Nm).

6-51. TORQUE CONVERTER HOUSING - Continuede. Installation.**NOTE**

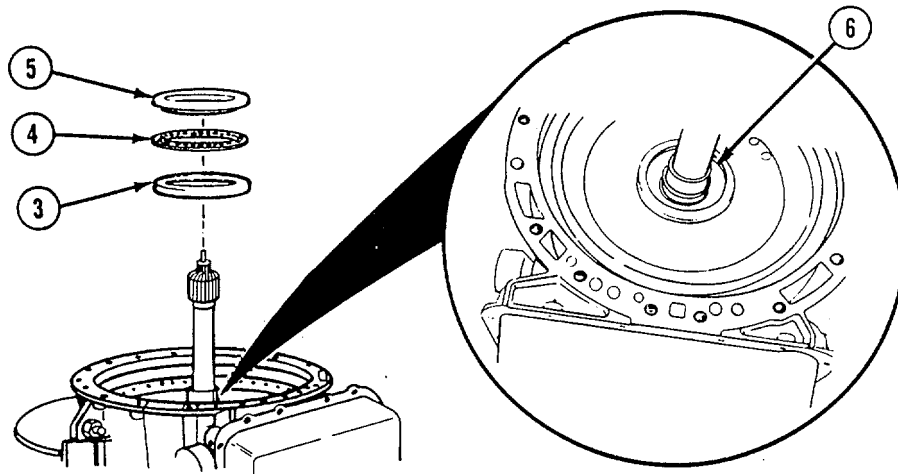
Install new seals and gaskets when assembling unit.

CAUTION

Keep seal rings sealed in package until ready to use to keep from being damaged.



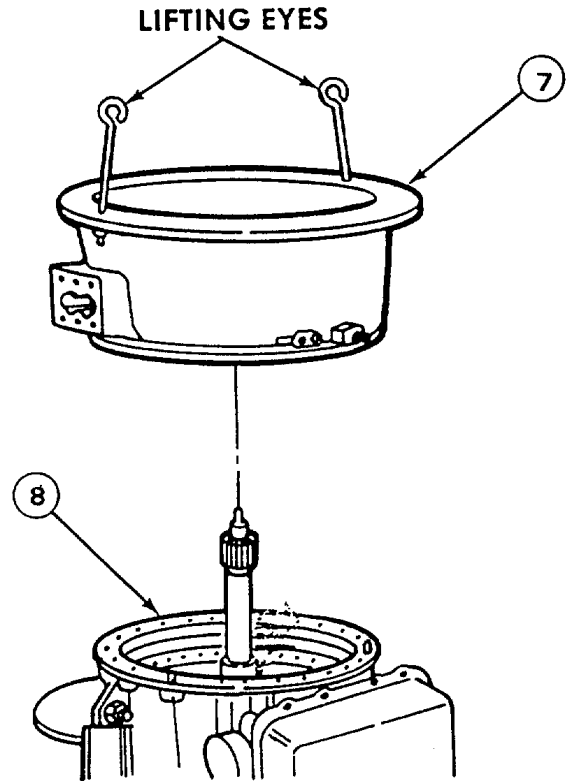
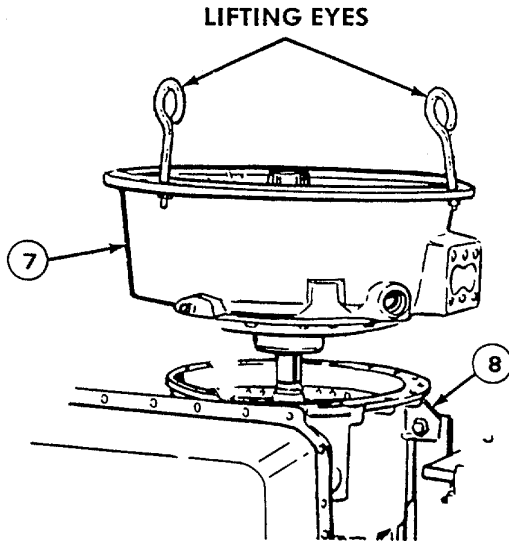
- (1) Roll seal ring (1) to one-half length and hold for at least 10 seconds.
- (2) Install seal ring (1) in lower groove of support hub (2).
- (3) Roll seal ring (1) to one-half length and hold for 10 seconds.
- (4) Install seal ring (1) in upper groove of support hub (2).



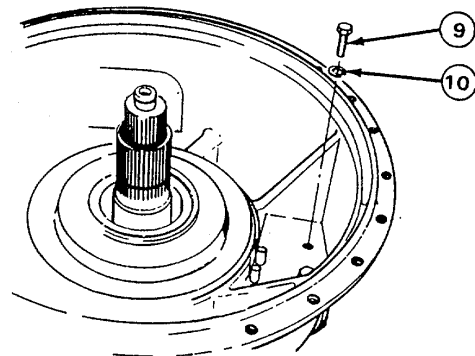
- (5) Turn housing over using two people.
- (6) Install bearing race (3), roller bearing (4), and bearing race (5) on inner bore (6).

6-51. TORQUE CONVERTER HOUSING - Continued

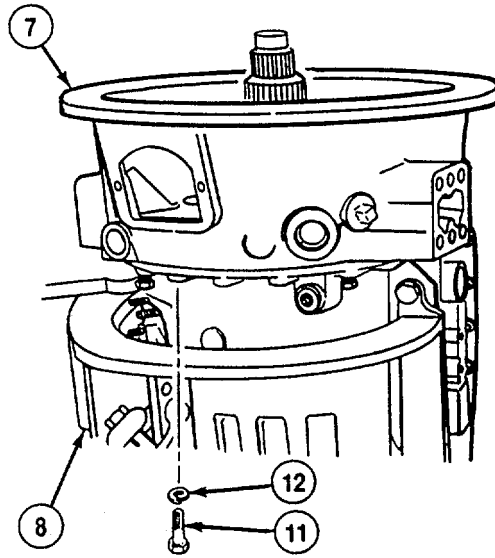
- (7) Install lifting eyes and lifting device on torque converter housing (7).
- (8) Position torque converter housing (7) over transmission housing (8).
- (9) Install torque converter housing (7) on transmission housing (8).
- (10) Remove lifting device and lifting eyes.



- (11) Apply small amount of silicone adhesive-sealant to two screws (9) and washers (10).
- (12) Install screws (9) and washers (10) till snug.



(13) Install seven screws (11) and lockwashers (12) to hold torque converter housing (7) to transmission housing (8). Torque screws to 70 to 80 lb-ft (95 to 108 Nm).



f. Follow-on Maintenance.

(1) Install torque converter pump in torque converter housing (see para 6-50).

6-51. TRANSMISSION HOUSING

This task covers:

- a. Disassembly
- b. Cleaning and Inspection
- c. Assembly
- d. Follow-on Maintenance

TOOLS REQUIRED:

Tool Kit, General Mechanics, Automotive
(Appendix B, Section II, Item 1)

Shop Equipment, Automotive
Maintenance and Repair
(Appendix B, Section 111, Item 4)

Manual Shaft Oil Seal Remover and Installer
(Appendix B, Section 111, Item 65)

MATERIALS/PARTS REQUIRED

Solvent, Dry Cleaning (Item 3, Appendix E)
Compound, Sealing, Lubricating
(Appendix B, Section III, Item 4)
Oil Seal (Figure 133, Appendix F)
Cotter Pin (Figure 133, Appendix F)

EQUIPMENT CONDITION

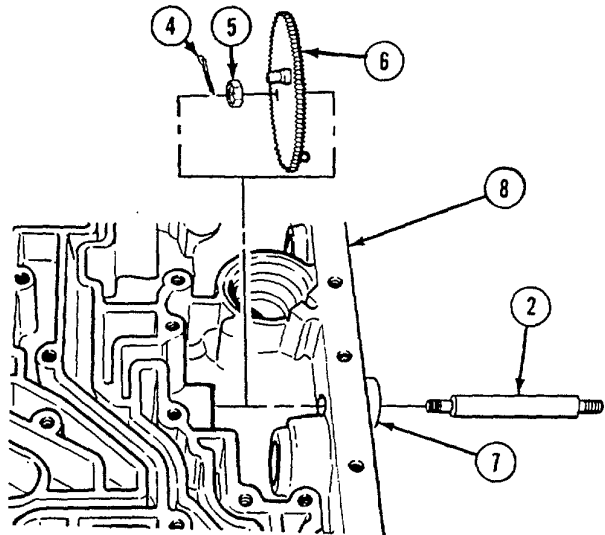
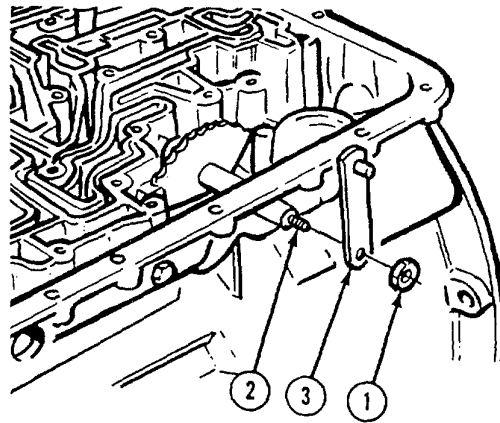
Rear Cover and First Clutch Assembly Removed
(see para 6-58.)
Gear Unit and Main Shaft Assembly Removed
(see para 6-55.)
Control Valve Body Removed (see para 6-62.)

a. Removal.

NOTE

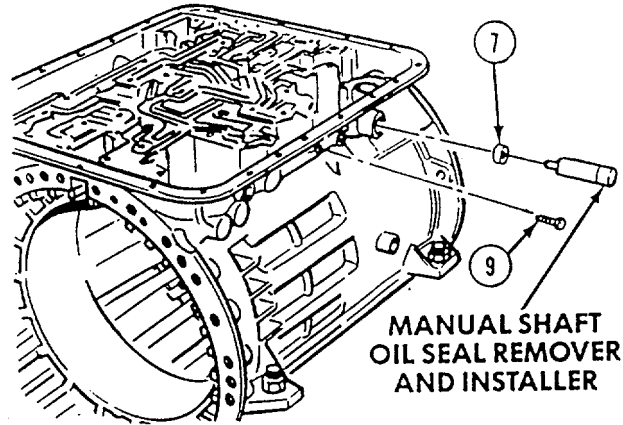
Discard all old seals and gaskets.

- (1) Remove nut (1) from manual shaft (2).
- (2) Remove selector lever (3) from manual shaft (2).
- (3) Remove cotter pin (4).
- (4) Remove locknut (5).
- (5) Hold detent lever (6) with one hand and remove manual shaft (2) by pulling shaft through oil seal (7).
- (6) Remove detent lever (6) from transmission housing (8).

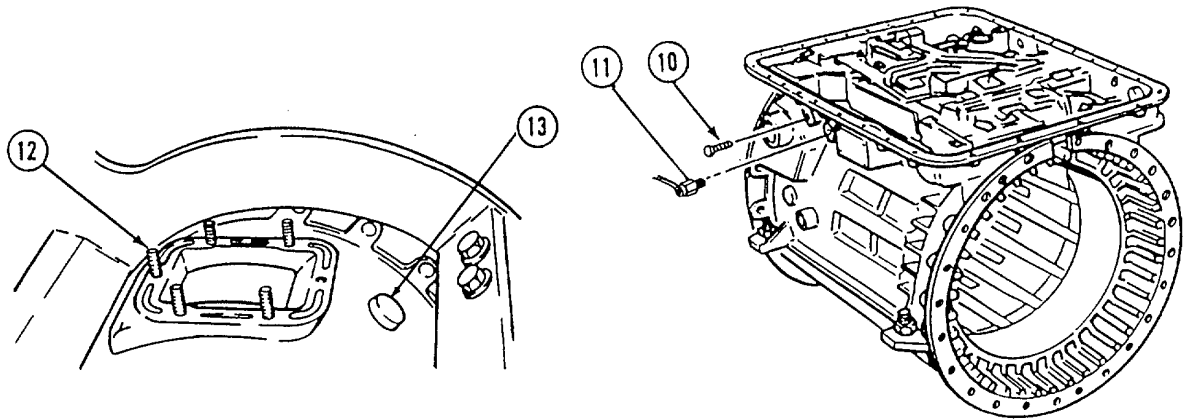


6-51. TRANSMISSION HOUSING - Continued

- (7) Remove oil seal (7) using manual shaft oil seal remover and installer.
- (8) Remove governor pressure tag plug (9).



- (9) Remove fourth clutch pressure tag plug (10).
- (10) Remove reverse signal switch (11).
- (11) Remove five studs (12) and transmission breather (13).



6-51. TRANSMISSION HOUSINGb. Cleaning and Inspection.**WARNING**

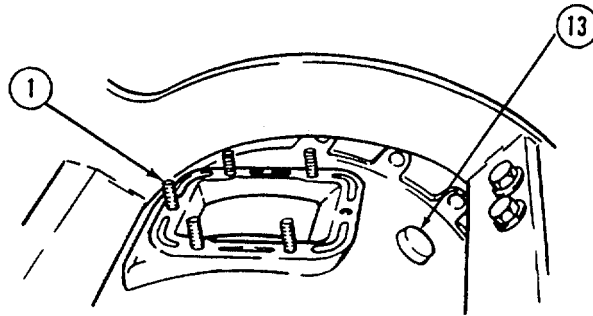
Dry cleaning solvent P-D-680 is potentially dangerous. Avoid repeated and prolonged breathing of vapors and skin contact with the liquid. Do not use near open flame, arcing equipment or other ignition sources. Always wear eye protection and protective clothing. The flash point of P-D-680 is 100 to 138 deg. F (38 to 59 deg. C).

- (1) Clean transmission housing and all metal parts with dry cleaning solvent (Item 3, Appendix E).
- (2) Inspect parts for damage. Replace damaged parts.
- (3) If signs of damage to transmission housing are noted, replace transmission housing.

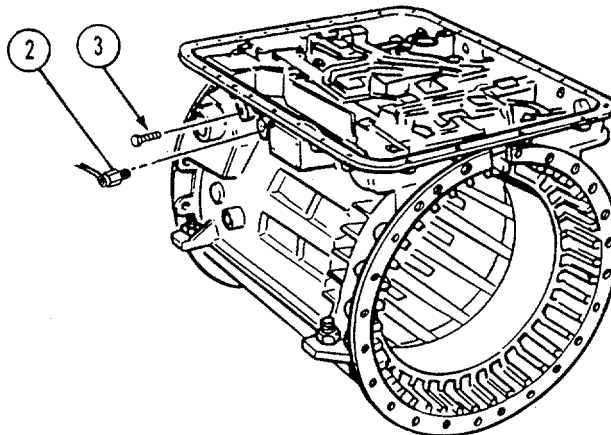
c. Assembly.**NOTE**

Install new seals and gaskets when assembling unit.

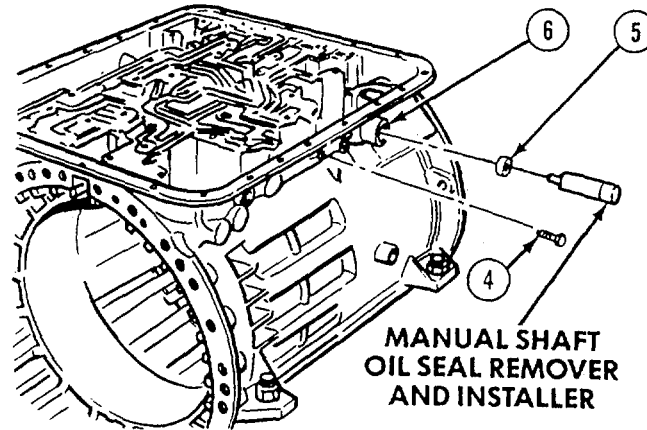
- (1) Install five studs (1) and transmission breather (13).



- (2) Install reverse signal switch (2).
- (3) Install fourth clutch pressure tap plug (3).



6-52. TRANSMISSION HOUSING - Continued

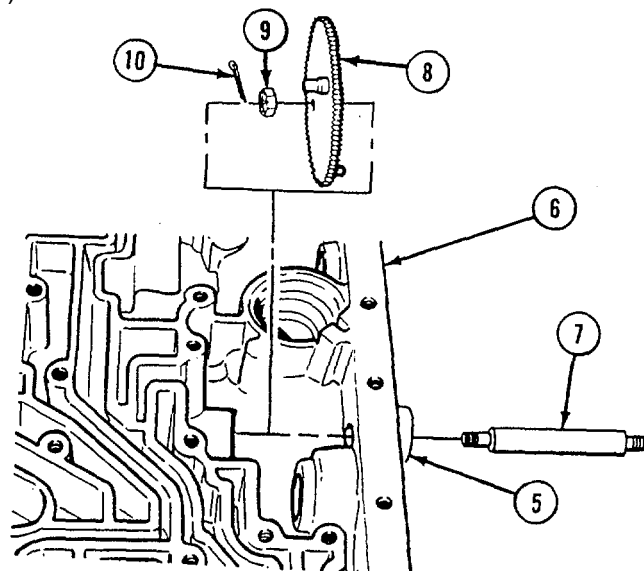


- (4) Install governor pressure tap plug (4).

WARNING

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

- (5) Coat outside of oil seal (5) with sealing and lubricating compound (item 31, Appendix E) and install oil seal in transmission housing (6) using manual shaft oil seal remover and installer.
- (6) Install manual shaft (7) by pushing shaft through oil seal (5) in transmission housing (6).
- (7) Position detent lever (8) in transmission housing (6).
- (8) Install locknut (9) on manual shaft (7).
- (9) Torque locknut (9) to 15 to 20 lb-ft (20 to 27 Nm).
- (10) Install cotter pin (10).



6-52. TRANSMISSION HOUSING - Continued

(11) Install selector lever(11) on manual shaft (7).

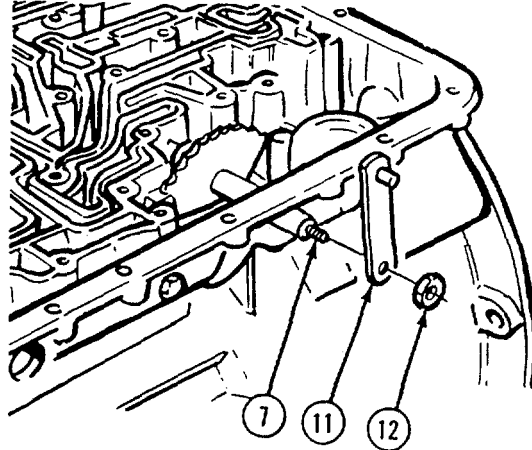
(12) Install nut (12) on manual shaft (7).

d. Follow-on Maintenance.

(1) Install gear unit and main shaft assembly (see para 6-55).

(2) Install rear cover and first clutch assembly (see para 6-58).

(3) Install control valve body (see para 6-62).



6-294

6-53. OIL PAN

This task covers:

- a. Removal
- b. Installation
- c. Follow-on Maintenance
- d.

TOOLS REQUIRED:

Tool Kit, General Mechanics, Automotive
(Appendix B, Section 1II, Item 1)

Shop Equipment, Automotive
Maintenance and Repair
(Appendix B, Section II, Item 4)

MATERIALS/PARTS REQUIRED

Compound, Sealing, Pipe Thread
(Item 2, Appendix E)

Grease, Automotive and Artillery
(Item 1, Appendix E)

Gasket (Figure 133, Appendix F)

EQUIPMENT CONDITION

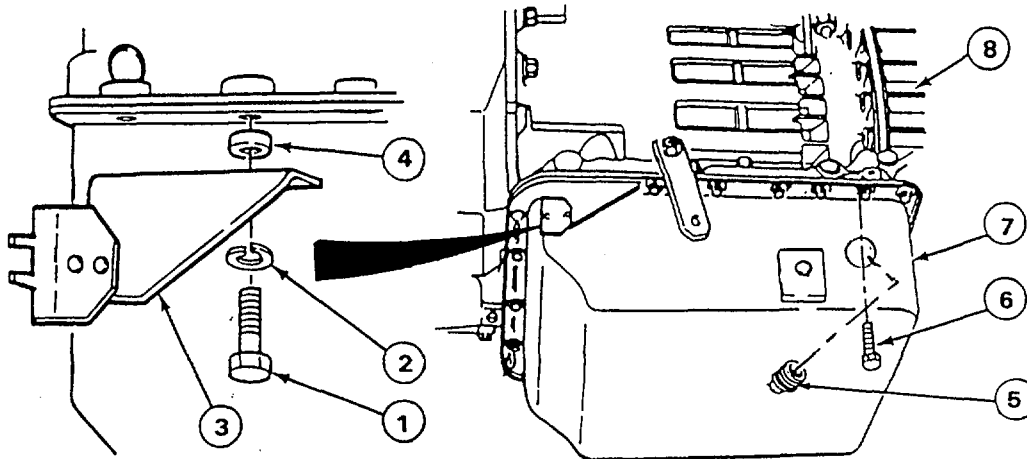
Transmission Oil Drained (see para 4-142.)

Transmission Dipstick Tube Removed
(see para 6-47.)

Transmission Shift Cable Removed
(see para 6-47.)

a. Removal.

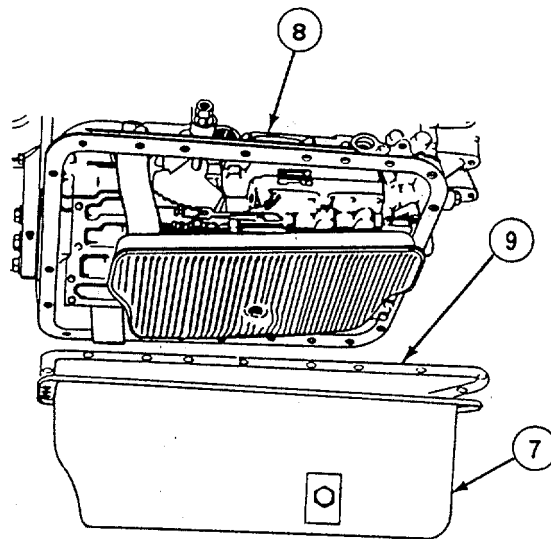
- (1) Remove two screws (1), lockwashers (2), bracket (3), and two spacers (4).



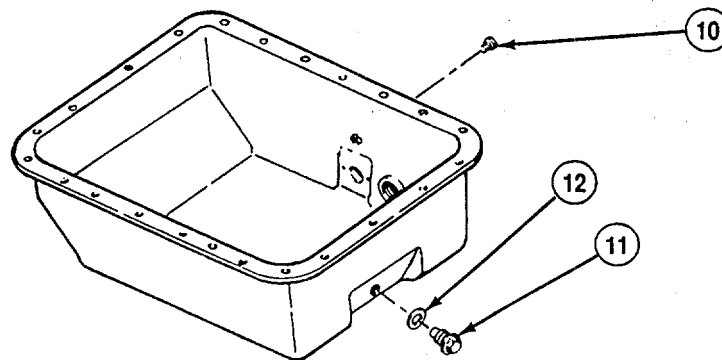
NOTE

Support oil pan while removing screws.

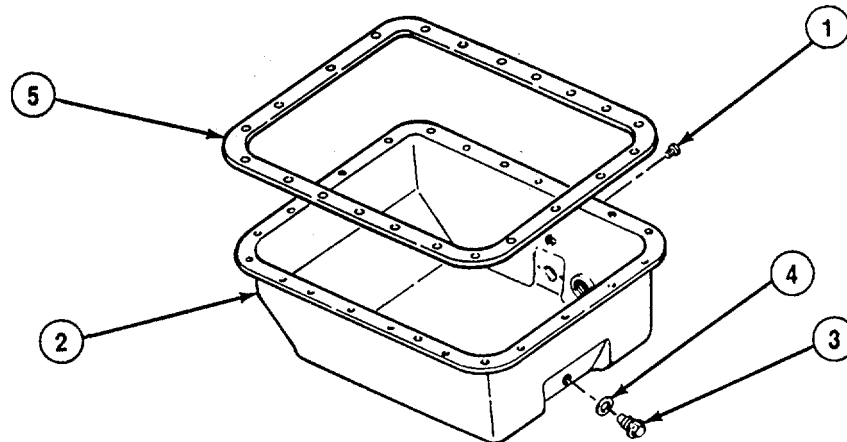
- (2) Remove adapter (5).
- (3) Remove remaining twenty-one screws (6) holding oil pan (7) to transmission (8).

6-53. OIL PAN - Continued

- (4) Remove oil pan (7) from transmission (8).
- (5) Remove gasket (9) from oil pan (7).

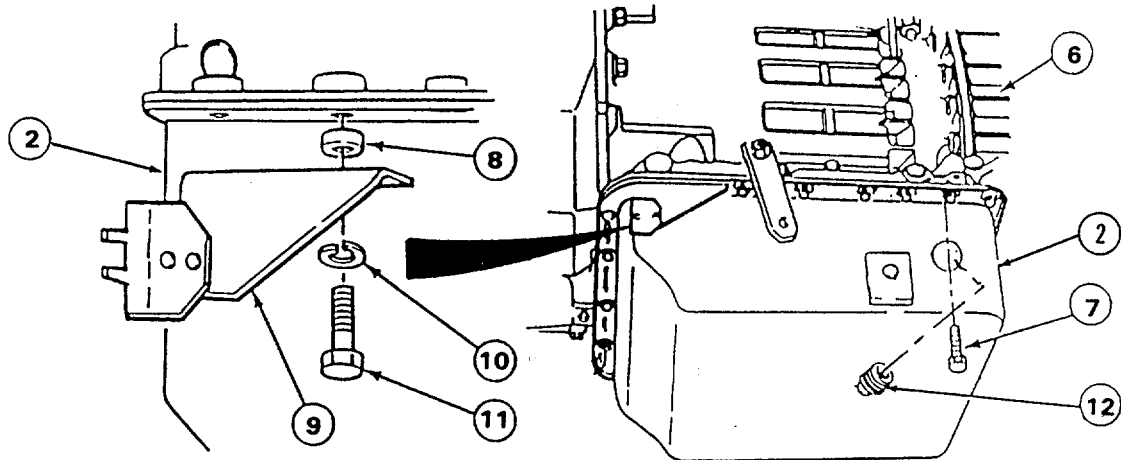


- (6) Remove plug (10).
- (7) Remove plug (11) and washer (12).

6-53. OIL PAN - Continuedb. Installation.**WARNING**

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

- (1) Lightly coat threads of plugs (all) with pipe thread sealing compound (Item 2, Appendix E).
- (2) Install plug (1) in oil pan (2).
- (3) Install plug (3) and washer (4).
- (4) Apply grease (item 1, Appendix E) to lip of oil pan (2) and install gasket (5).

6-53. OIL PAN - Continued

- (5) Install oil pan (2) on transmission (6) with twenty-one screws (7). Do not tighten screws.
- (6) Install two spacers (8), bracket (9), two lockwashers (10), and two screws (11) on oil pan (2).

NOTE

Oil pan has to be drawn evenly to transmission.

- (7) Tighten each second screw (7 and 11) in one direction around oil pan (2) until all twenty-three screws have been tightened to 10 to 13 lb-ft (14 to 18Nm).
- (8) Install adapter(12).

c. Follow-on Maintenance.

- (1) Install transmission dipstick (see para 6-47).
- (2) Install shift cable (see para 6-47).
- (3) Fill transmission with oil (see para 4-142).
- (4) Check for leaks.

6-54. INTERNAL FILTER ELEMENT

This task covers:

- a. Removal
b. Installation

- c. Follow-on Maintenance

TOOLS REQUIRED:

Tool Kit, General Mechanics, Automotive
(Appendix B, Section III, Item 1)

Shop Equipment, Automotive
Maintenance and Repair
(Appendix B, Section III, Item 4)

MATERIALS/PARTS REQUIRED

Oil, Lubricating (Item 10, Appendix E)
Filter Element (Figure 133, Appendix E)

EQUIPMENT CONDITION

Oil Pan Removed (see para 6-53.)

a. Removal.

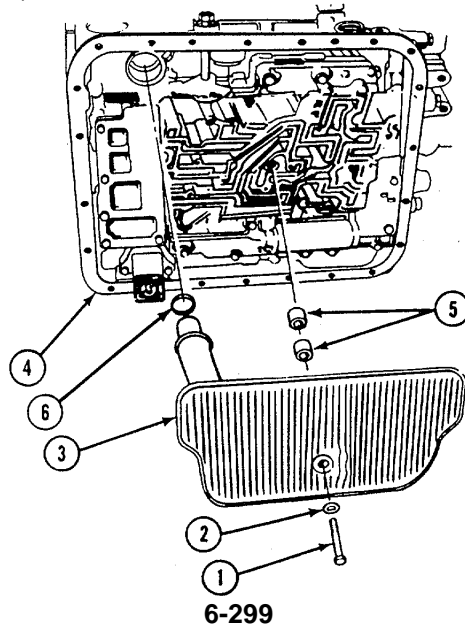
- (1) Remove screw (1), washer (2), and filter element (3) from transmission (4).
- (2) Remove two spacers (5).
- (3) Remove preformed packing (6) from filter element (3) and discard.

b. Installation.

- (1) Coat new preformed packing (6) with lubricating oil (Item 10, Appendix E) and install preformed packing on filter element (3).
- (2) Install screw (1) with washer (2) through filter element (3) and two spacers (5).
- (3) Install filter element (3) in transmission (4).
- (4) Torque screw (1) to 10 to 15 lb-ft (14 to 20 N·m).

c. Follow-on Maintenance.

- (1) Install oil pan (see para 6-53).



6-55. GEAR UNIT AND MAIN SHAFT ASSEMBLY

This task covers:

- a. Removal
- b. Disassembly
- c. Cleaning and Inspection
- d. Assembly
- e. Installation
- f. Follow-on Maintenance

TOOLS REQUIRED:

Tool Kit, General Mechanics, Automotive
(Appendix B, Section III, Item 1)

Shop Equipment, Automotive
Maintenance and Repair
(Appendix B, Section III, Item 4)

Sun Gear Bushing Reamer Set
(Appendix B, Section 111, Item 66)
Bushing Installer (Appendix B, Section 111, Item 67)
Main Shaft Lifting Bracket
(Appendix B Section 111, Item 68)
Bushing Swaging Tool
(Appendix B, Section 111, Item 69)

MATERIALS/PARTS REQUIRED

Solvent, Dry Cleaning (item 3, Appendix E)
Compound, Sealing, Lubricating
(Item 31, Appendix E)
Oil, Lubricating (Item 10, Appendix E)
Tag, Identification (item 32, Appendix E)

PERSONNEL REQUIRED: 2

EQUIPMENT CONDITION

Second Clutch and Center Support Housing
Removed (see para 6-61.)

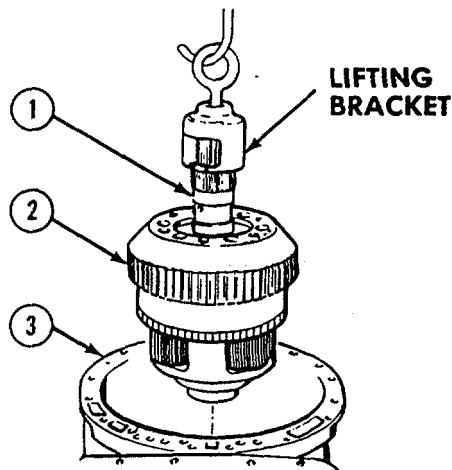
a. Removal.

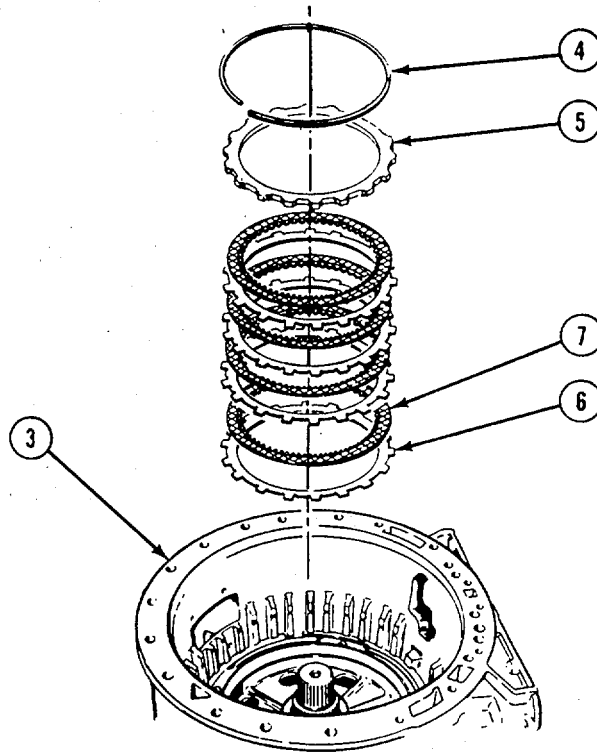
- (1) Install lifting bracket (item 68, Section 111, Appendix B) to main shaft (1) of gear unit assembly (2).

WARNING

Serious injury could occur if heavy equipment is moved/lifted without sufficient personnel to do the job. Use proper physical lifting procedures or use a suitable lifting device or dolly. Wear safety shoes, gloves and other suitable protective clothing. Area should be clear of other personnel. Serious injury or death can result from falling objects.

- (2) Remove gear unit assembly (2) from transmission housing (3) while other person operates lifting device.
- (3) Remove lifting bracket.



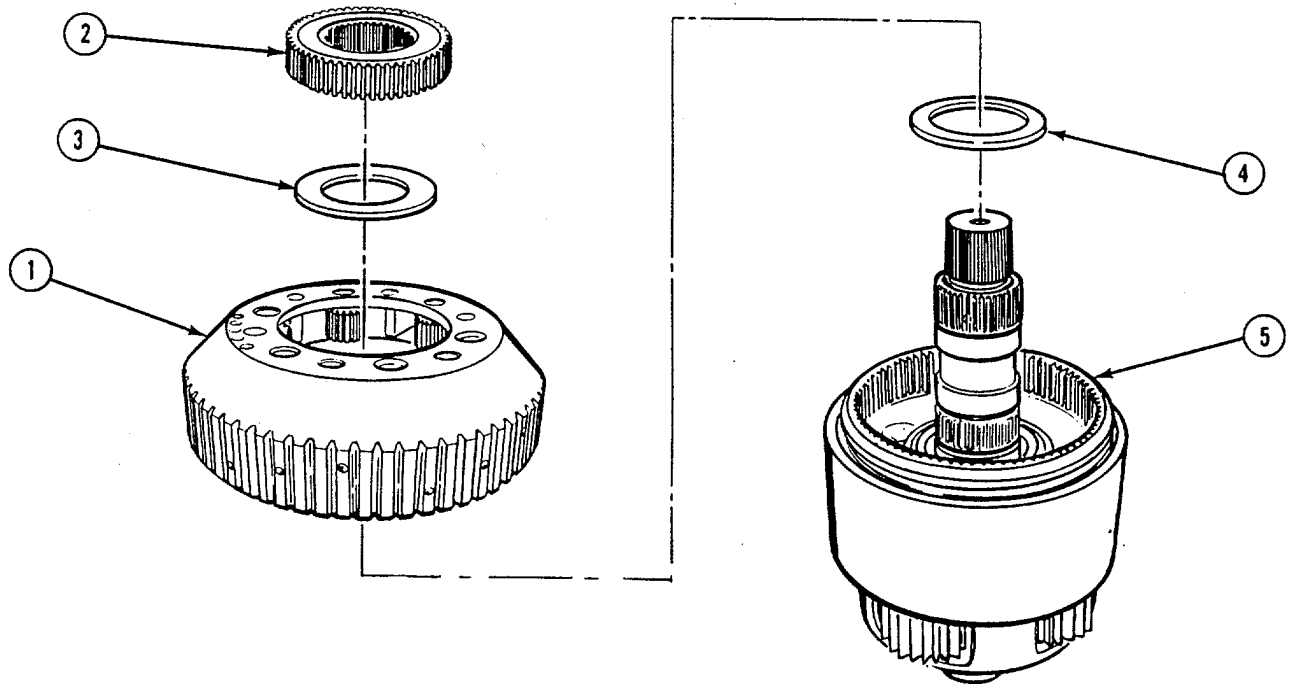
6-55. GEAR UNIT AND MAIN SHAFT ASSEMBLY - Continued**NOTE**

Tag retaining ring and backing plate.

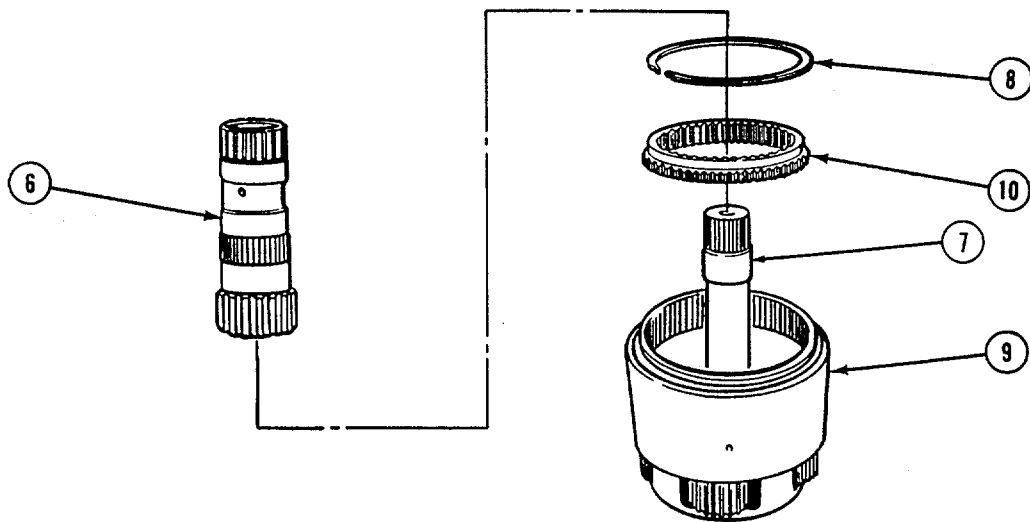
- (4) Remove retaining ring (4) and backing plate (5).
- (5) Remove 12 second clutch plates (6 and 7) from transmission housing (3).

6-55. GEAR UNIT AND MAIN SHAFT ASSEMBLY - Continued

b. Disassembly.



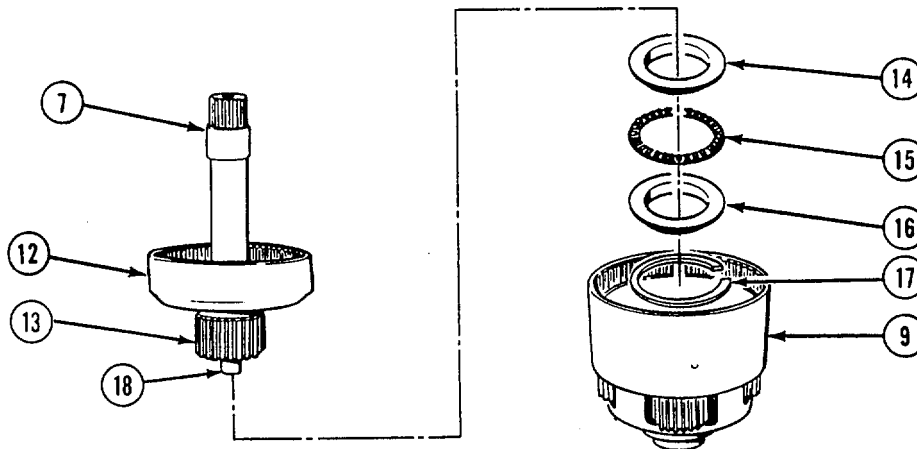
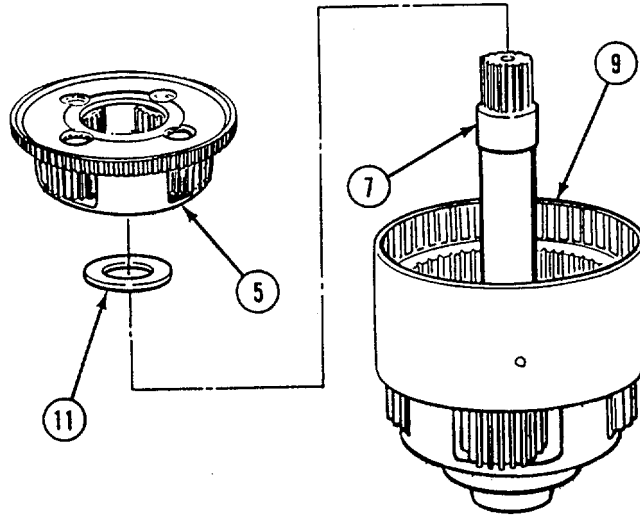
- (1) Remove front carrier assembly (1).
- (2) Remove driven gear (2) from front carrier assembly (1).
- (3) Remove thrust washer (3) from bottom of front carrier assembly (1).



- (4) Remove thrust washer (4) from top of center carrier assembly (5).
- (5) Remove sun gear shaft (6) from main shaft (7).
- (6) Remove retaining ring (8) from transmission drum (9).
- (7) Remove spur gear (10).

6-55. GEAR UNIT AND MAIN SHAFT ASSEMBLY - Continued

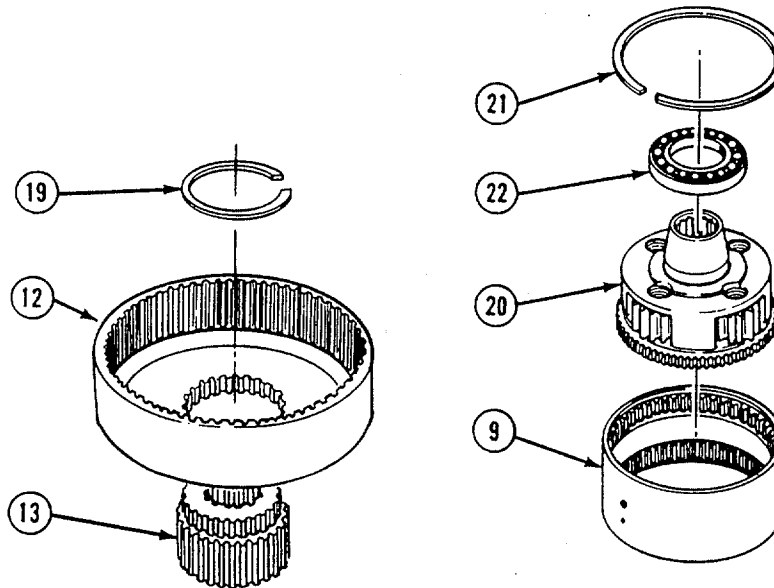
- (8) Remove center carrier assembly (5) from transmission drum (9).
- (9) Remove thrust washer (11) from base of main shaft (7).



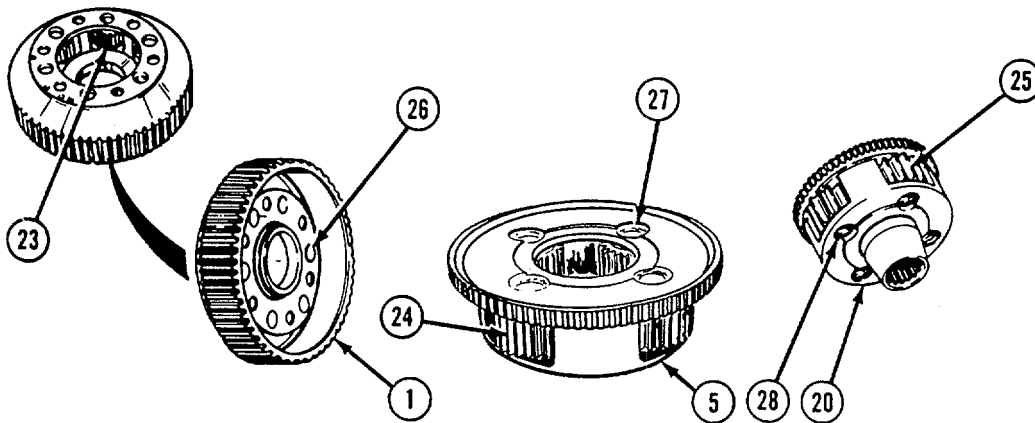
- (10) Remove main shaft (7) from transmission drum (9) with internal gear (12) and spur gear shaft (13) attached.
- (11) Remove bearing race (14), bearing (15), and bearing race (16).
- (12) Remove spiral locking ring (17).
- (13) Remove internal gear (12) from main shaft (7).
- (14) Remove lube orifice plug (18) from main shaft (7).

6-55. GEAR UNIT AND MAIN SHAFT ASSEMBLY - Continued

- (15) Remove retaining ring (19), internal gear (12), and spur gear shaft (13).
- (16) Position transmission drum (9) so rear carrier assembly (20) is up.
- (17) Remove retaining ring (21) and separate rear carrier assembly (20) from transmission drum (9).
- (18) Remove bearing (22) from rear carrier assembly (20).



- (19) Check end play between pinion gears (23, 24 and 25) and carriers (1, 5, and 20). End play must be between 0.008 and 0.031 in. (0.203 and 0.787 mm). If end play is outside these limits, do steps (20) through (25) to replace all pinion gears in that assembly.



NOTE

Steps (20) through (25) are required only if end play of pinion gears is outside limits.

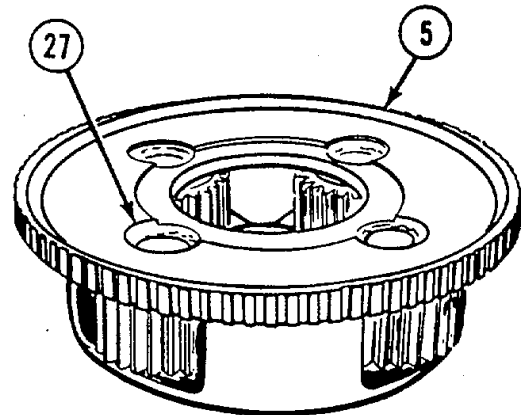
- (20) Drill away staked rear ends of front carrier assembly (1) pinion pins (26) using a 15/16-in. (23.8 mm) bit.

6-55. GEAR UNIT AND MAIN SHAFT ASSEMBLY - Continued

- (21) Drill away staked front ends of center carrier assembly (5) pinion pins (27) using a 15/16-in. (23.8 mm) bit.
- (22) Drill away staked ends of rear carrier assembly (20) pinion pins (28) using a 1-3/16-in. (30.2 mm) bit.

NOTE

Front, center, and rear carrier assemblies are disassembled the same way. Disassembly of center carrier is shown.

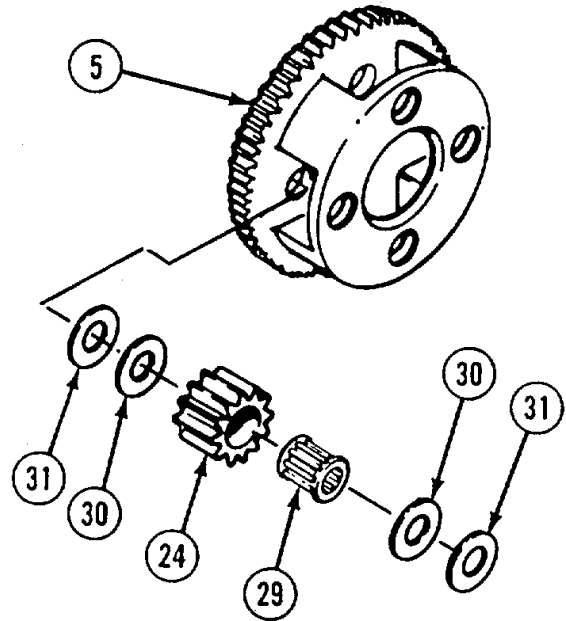


- (23) Position center carrier assembly (5) with drilled ends of pinion pins (27) upward in press.
- (24) Press pinion pins (27) from center carrier assembly (5).
- (25) Remove pinions (24), roller bearings (29), steel thrust washers (30), and bronze thrust washers (31) from center carrier assembly.

c. Cleaning and Inspection.

WARNING

Dry cleaning solvent P-D-680 is potentially dangerous. Avoid repeated and prolonged breathing of vapors and skin contact with the liquid. Do not use near open flame, arcing equipment or other ignition sources. Always wear eye protection and protective clothing. The flash point of P-D-680 is 100 to 138 deg. F (38 to 59 deg. C).



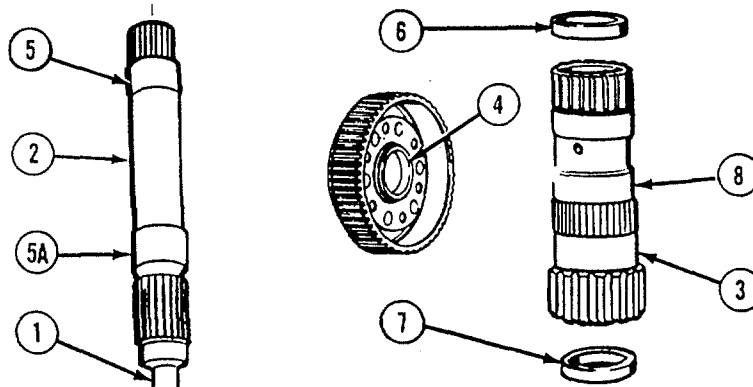
- (1) Clean all metal parts with dry cleaning solvent (Item 3, Appendix E).

NOTE

All planetary gears in a carrier assembly are replaced as a set.

- (2) Inspect parts for damage. Replace damaged parts.
- (3) Measure thickness of thrust washers. Thickness must be no less than 0.091 in. (2.31 mm).

6-55. GEAR UNIT AND MAIN SHAFT ASSEMBLY - Continued



NOTE

Bearing surface measurement will be used in paragraph 6-58 to find output shaft bushing clearance.

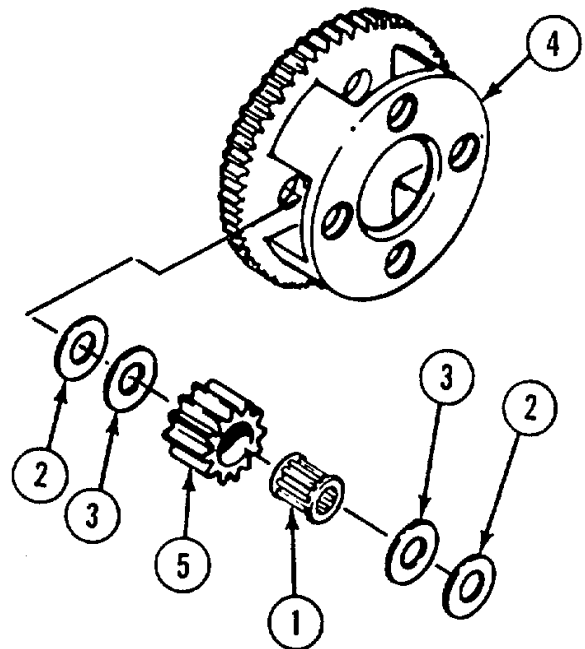
- (4) Measure and note diameter of bearing surface (1) of main shaft (2).
- (5) Measure diameter of front carrier bearing surface (3).
- (6) Measure inside diameter of bushing (4).
- (7) If bushing (4) to front carrier bearing surface (3) clearance is greater than 0.0072 in. (0.18 mm), replace bushing.
- (8) Measure diameter of bearing surfaces (5 and 5A) on main shaft (2).
- (9) Measure inside diameter of bushings (6 and 7) in sun gear shaft (8).
- (10) If clearance between bushings (6 and 7) and bearing surfaces (5 and 5A) is more than 0.0064-in. (0.16 mm), remove bushings.

d. Assembly.

NOTE

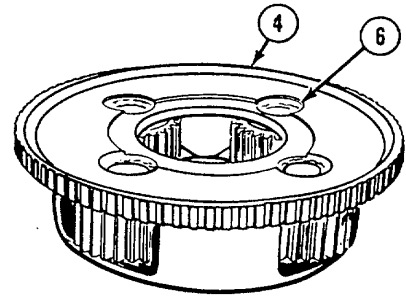
Front, center, and rear carrier assemblies are assembled the same way. Assembly of center carrier is shown.

- (1) Lubricate roller bearings (1), bronze thrust washers (2), and steel thrust washers (3) with lubricating oil.
- (2) Position center carrier assembly (4) in press with front end up.
- (3) Install roller bearings (1) in pinion (5).
- (4) Install steel thrust washer (3) at each end of pinion (5).
- (5) Install bronze thrust washer (2) on each steel thrust washer (3).



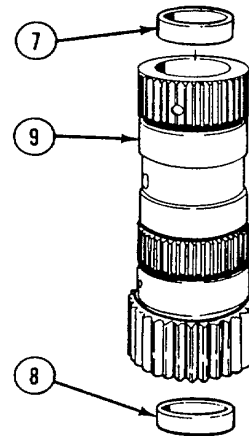
6-55. GEAR UNIT AND MAIN SHAFT ASSEMBLY - Continued

- (6) Install pinion (5) in center carrier assembly (4).
- (7) Press pinion pin (6) in carrier until both ends of pinion pin are equal.
- (8) Remove center carrier assembly (4) from press.
- (9) Stake both ends of pinion pins (6) in four places.

**WARNING**

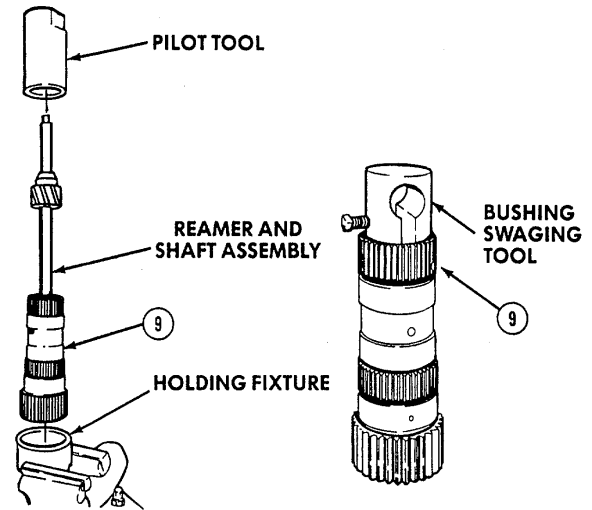
Adhesives, solvents and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap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

- (10) Apply lubricating sealing compound (Item 31, Appendix E) to bushings (7 and 8).
- (11) Position bushing (7) at bore of small end of sun gear shaft (9). Align interlock split in bushing so it is more than 45 degrees from swaging hole in sun gear shaft.
- (12) Using end of bushing installer tool (Appendix B, Section 111, Item 67) marked .360, press in bushing (7).
- (13) Using end of bushing installer tool marked .260, install bushing (8) in larger end of sun gear shaft assembly (9). Align interlock split in bushing so it is more than 45 degrees from swaging hole in sun gear shaft.



6-55. GEAR UNIT AND MAIN SHAFT ASSEMBLY - Continued

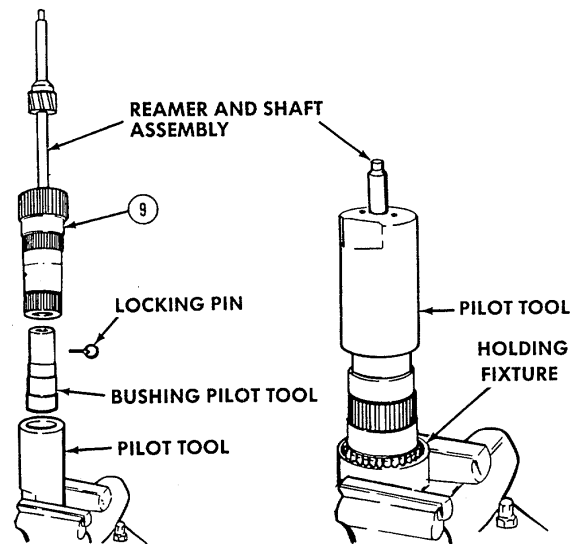
- (14) Using swaging tool (Appendix B, Section 111, Item 69), push both bushings in swaging holes of sun gear shaft assembly (9).
- (15) Clamp holding fixture in vise. Set sun gear shaft (9) in holding fixture with small end up. Position sun gear bushing reamer and pilot tool (Appendix B, Section 111, Item 66).



CAUTION

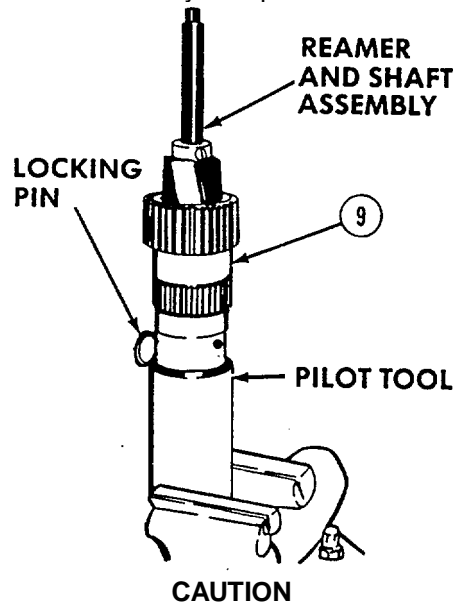
Keep reamer rotating at full drill speed when pulling back through bushing. If reamer is not rotating at full drill speed, bushing could be damaged.

- (16) Using 1/2-in. (13 mm) electric drill, machine bushing at approximately 75 to 150 rpm while adding oil through either hole on top of pilot tool.
- (17) Clamp pilot tool in vise. Insert bushing pilot tool in small end of sun gear shaft (9) and hold with locking pin. Position bushing pilot tool in pilot tool, and position reamer and shaft assembly in sun gear shaft.



6-55. GEAR UNIT AND MAIN SHAFT ASSEMBLY - Continued

(18) Engage shaft of reamer and shaft assembly with pilot tool.

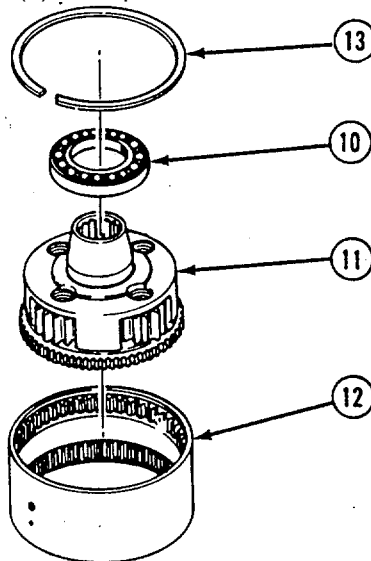


Keep reamer rotating at full drill speed when pulling back through bushing. If reamer is not rotating at full drill speed, bushing could be damaged.

(19) Using 1/2-in. (13 mm) electric drill, machine bushing in approximately 75 to 150 rpm while adding lubricating oil in bore at sides of sun gear shaft (9).

(20) Check inner diameter of bushings for runout. Runout must not exceed 0.002 in. (0.05 mm) total indicator reading. Surface finish should be 30-microinch (0.762 micrometer).

(21) Thoroughly clean sun gear shaft (9) of chips and debris.



(22) bearing (10) on rear carrier assembly (11).

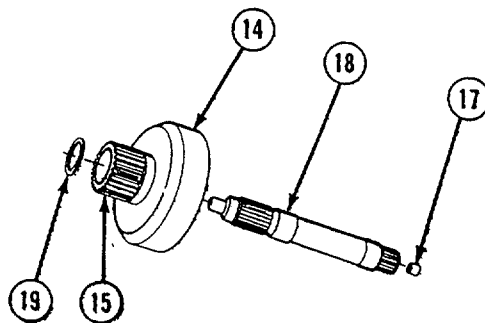
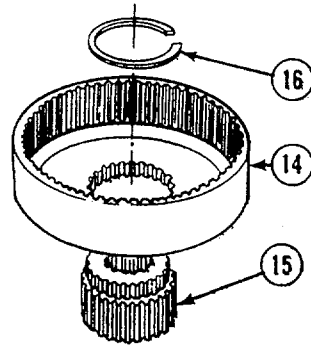
(23) Position rear carrier assembly (11) on transmission drum (12).

(24) Install retaining ring (13).

6-55. GEAR UNIT AND MAIN SHAFT ASSEMBLY - Continued

(25) Install internal gear(14) on spur gear shaft (15).

(26) Install retaining ring (16).

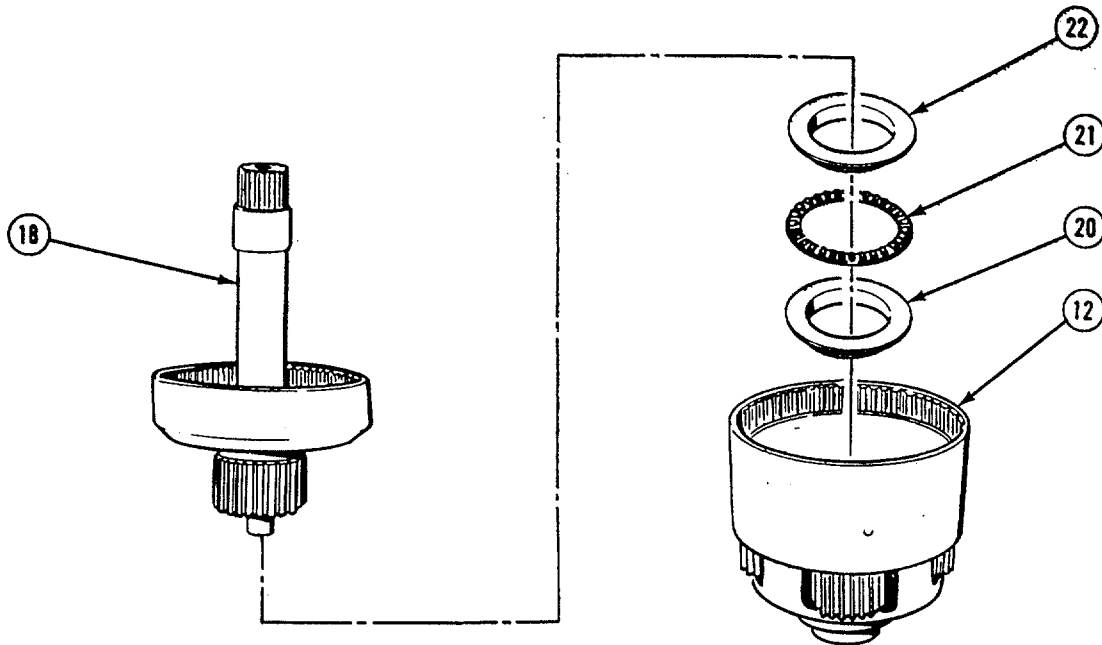


(27) Install lube orifice plug (17) on large end of main shaft (18).

(28) Position main shaft (18) through internal gear (14) and spur gear shaft (15).

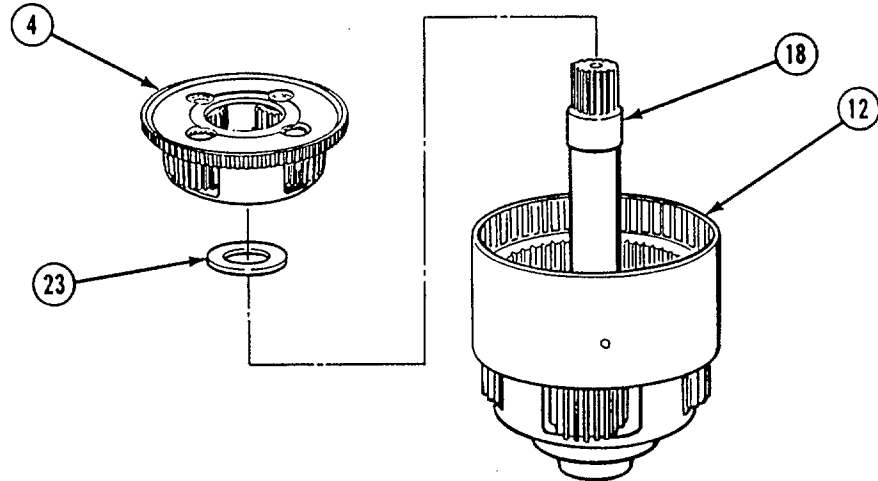
(29) Install spiral locking ring (19).

(30) Install larger bearing race (20), bearing (21), and small bearing race (22) in transmission drum (12).



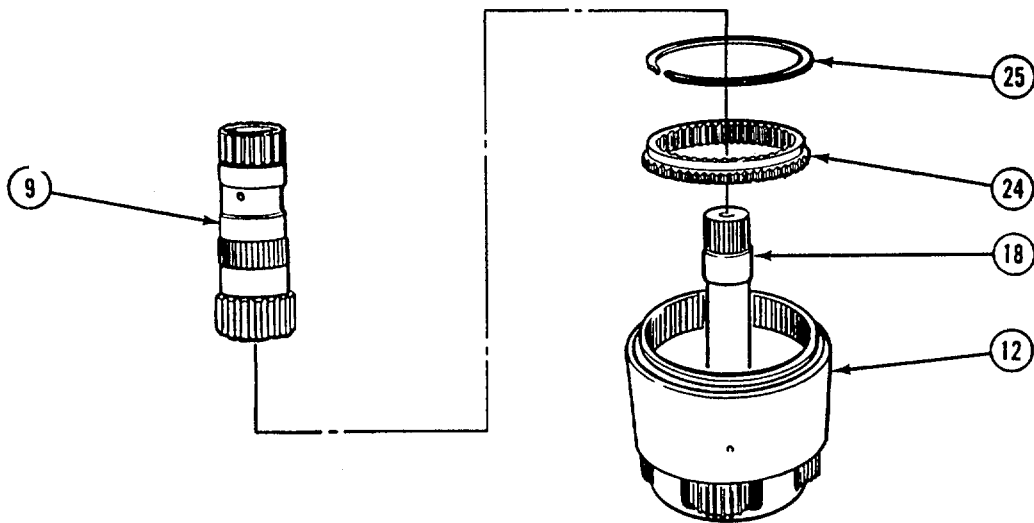
(31) Install main shaft (18) in transmission drum (12).

6-55. GEAR UNIT AND MAIN SHAFT ASSEMBLY - Continued



(32) Install thrust washer (23) on base of main shaft (18).

(33) Install center carrier assembly (4) in transmission drum (12).



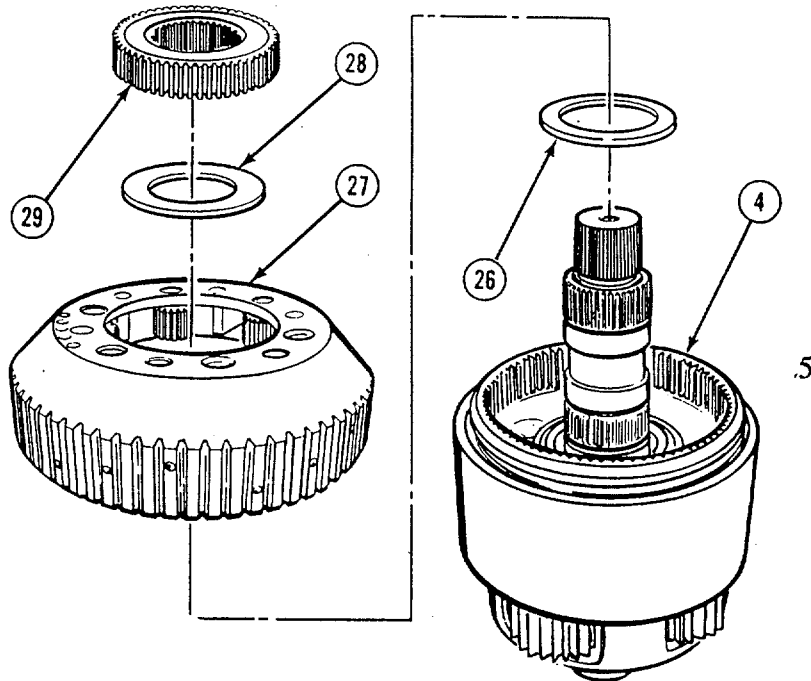
(34) Install spur gear (24) in transmission drum (12).

(35) Install retaining ring (25) in transmission drum (12).

(36) Install sun gear shaft (9) on main shaft (18).

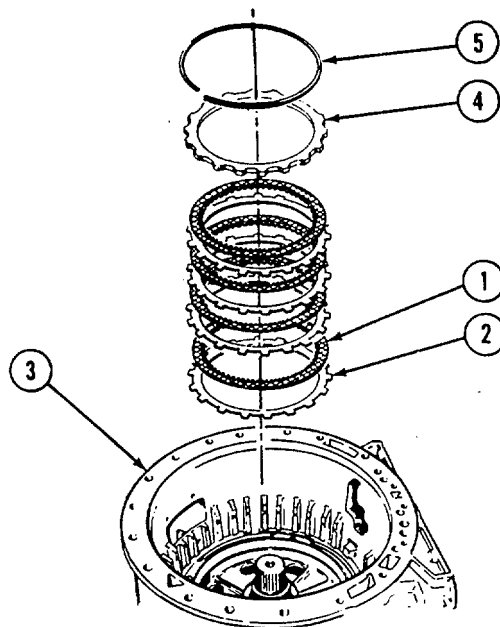
6-55. GEAR UNIT AND MAIN SHAFT ASSEMBLY - Continued

- (37) Install thrust washer (26) on center carrier assembly (4).
- (38) Install front carrier assembly (27) on center carrier assembly (4).
- (39) Install thrust washer (28) on front carrier assembly (27).
- (40) Install driven gear (29) in front carrier assembly (27).



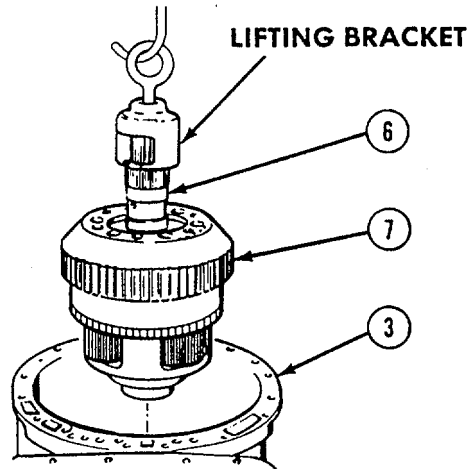
e. Installation.

- (1) Install 12 second clutch plates (1 and 2) in transmission housing (3). Alternate external (2) and internal (1) clutch plates.
- (2) Install backing plate (4) and retaining ring (5).



6-55. GEAR UNIT AND MAIN SHAFT ASSEMBLY - Continued

- (3) Install lifting bracket (Appendix B, Section III, Item 68) to main shaft (6).
- (4) Lower gear unit assembly (7) in transmission housing (3) while other person operates lifting device.
- (5) Remove lifting bracket.



f. Follow-on Maintenance.

- (1) Install center support housing and second clutch (see para 6-61).

6-56. OUTPUT YOKE, DUST SHIELD, AND OIL SEAL

This task covers:

- a. Removal
- b. Cleaning and inspection
- c. Installation
- d. Follow-on Maintenance

TOOLS REQUIRED

Tool Kit, General Mechanics, Automotive
(Appendix B, Section III, Item 1)

Shop Equipment, Automotive
Maintenance and Repair
(Appendix B, Section III, Item 4)

Socket, Lock (Appendix B, Section III, Item 71)
Transmission Oil Seal Installer (Appendix B, Section III, Item 70)
Driver Handle (Appendix B, Section III, Item 72)

MATERIALS/PARTS REQUIRED

Oil, Lubricating (Item 10, Appendix E)
Solvent, Dry Cleaning (Item 3, Appendix E)
Oil Seal (Figure 137, Appendix F)

EQUIPMENT CONDITION

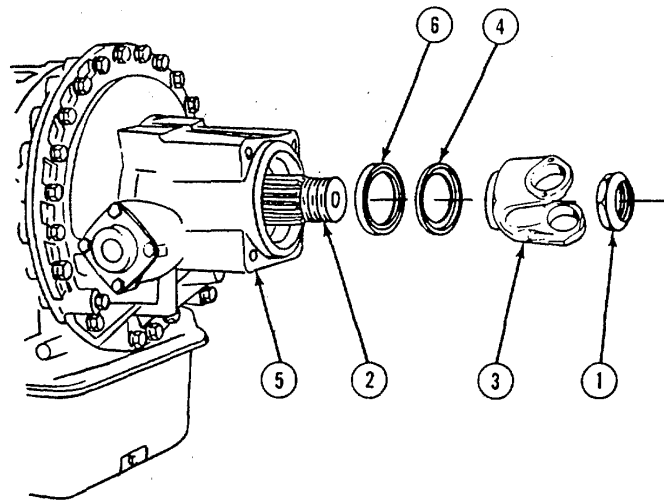
Drive Shaft Removed (see para 5-7.)

a. Removal.

NOTE

Torque value must be measured after loosening nut from output yoke. It must take a minimum of 300 lb-in. (33.90 N m) to turn nut.

- (1) Remove retainer nut (1) from output shaft (2) with lock socket (Appendix B, Section III, Item 71).
- (2) Remove output yoke (3) from output shaft (2).
- (3) Scribe one flat side of nut (1).
- (4) Remove dust shield (4) from rear cover (5).
- (5) Remove oil seal (6) from rear cover (5) and discard.



6-56. OUTPUT YOKE, DUST SHIELD, AND OIL SEAL- Continued**b. Cleaning and Inspection.****WARNING**

Dry cleaning solvent P-D-680 is potentially dangerous. Avoid repeated and prolonged breathing of vapors and skin contact with the liquid. Do not use near open flame, arcing equipment or other ignition sources. Always wear eye protection and protective clothing. The flash point of P-D-680 is 100 to 138 deg. F (38 to 59 deg. C).

- (1) Clean all metal parts with dry cleaning solvent (item 3, Appendix E).

WARNING

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

- (2) Dry all parts with compressed air.
- (3) Inspect all parts for damage.
- (4) Replace damaged parts.

c. Installation.

- (1) Using oil seal installer (Appendix B, Section III, Item 70), install new oil seal (6) with seal lip facing rear cover (5).
- (2) Install dust shield (4) in rear cover (5), flat side first, so rear edge of shield is flush with surface of rear cover.
- (3) Install output yoke (3) on output shaft (2)
- (4) Coat threads of output shaft (2) and retainer nut (1) with lubricating oil (Item 10, Appendix E).
- (5) Install retainer nut (1) on output shaft (2). Tighten nut to 600 to 800 lb-ft (814 to 1085 N m) with lock socket (Appendix B, Section III, Item 71).

d. Follow-on Maintenance.

- (1) Install drive shaft (see para 5-7).

6-57. FORWARD CLUTCH ASSEMBLY

This task covers:

- | | |
|----------------------------|--------------------------|
| a. Removal | d. Assembly |
| b. Disassembly | e. Installation |
| c. Cleaning and Inspection | f. Follow-on Maintenance |

TOOLS REQUIRED

Tool Kit, General Mechanics, Automotive
(Appendix B, Section III, Item 1)

Shop Equipment, Automotive
Maintenance and Repair
(Appendix B, Section III, Item 4)

Clutch Spring Compressor
(Appendix B, Section III, Item 73)
Collector Ring Installer and Staking Set
(Appendix B, Section III, Item 74)
Forward Clutch Piston Inner Seal Protector
(Appendix B, Section III, Item 75)
PTO Gear Removal Fixture
(Appendix B, Section III, Item 76)
Fourth Clutch Alignment Fixture
(Appendix B, Section III, Item 77)

FABRICATED TOOLS

Shim Stock, Item 2, Appendix B

MATERIALS/PARTS REQUIRED

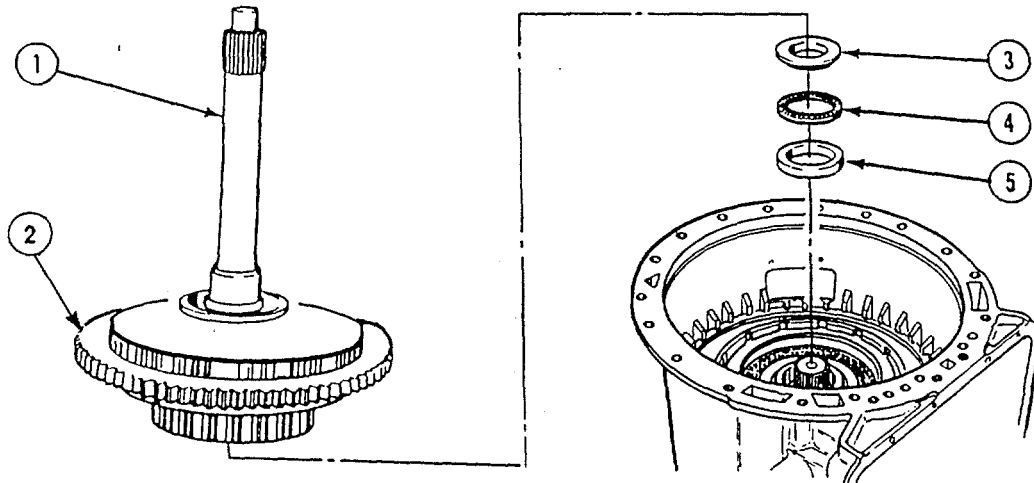
Oil Lubricating (item 10, Appendix E)
Solvent, Dry Cleaning (item 3, Appendix E)
Compound, Retaining (Item 6, Appendix E)
Seal Rings (Figure 135, Appendix F)

PERSONNEL REQUIRED: 2

EQUIPMENT CONDITION

Control Valve Body Removed (see para 6-62.)
Torque Converter Housing Removed (see
para 6-51.)

a. Removal.

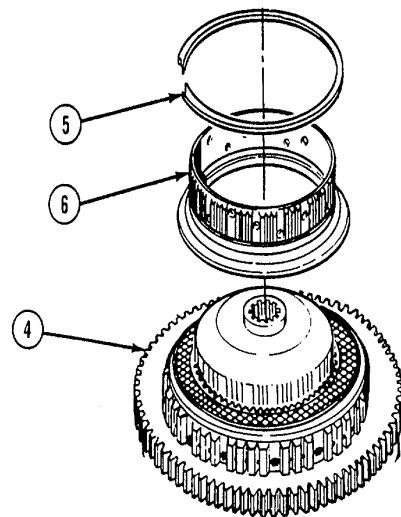
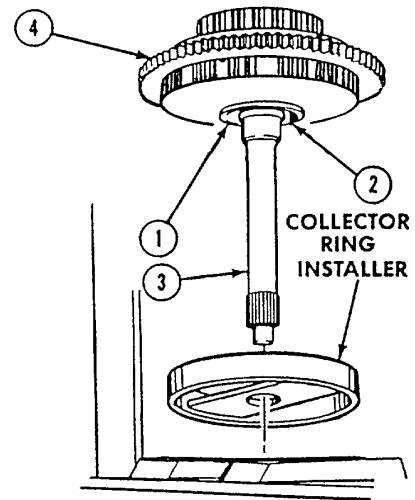


- (1) Hold turbine shaft (1) and remove forward clutch assembly (2), outer race (3), roller bearing (4), and inner race (5).
- (2) Place forward clutch assembly (2) in clean area.

6-57. FORWARD CLUTCH ASSEMBLY - Continued

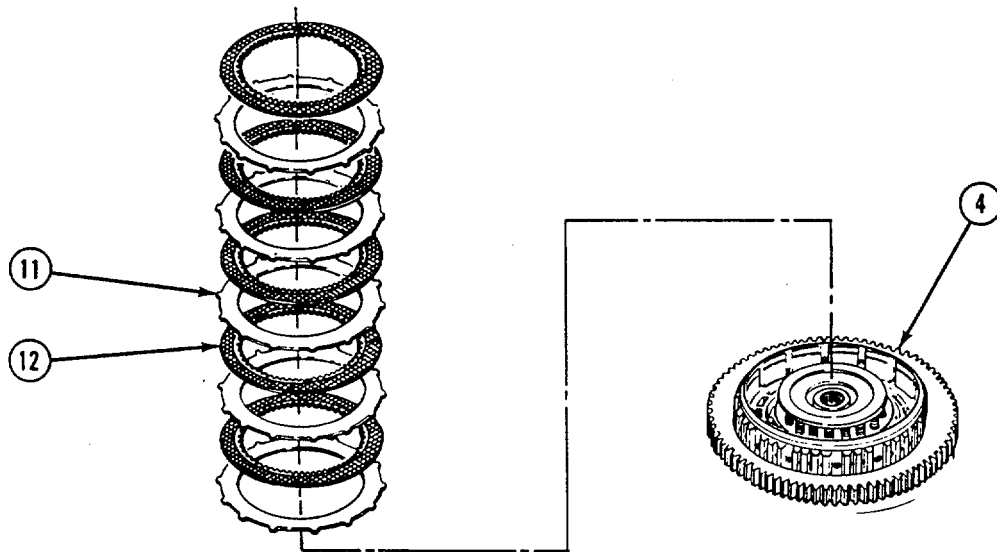
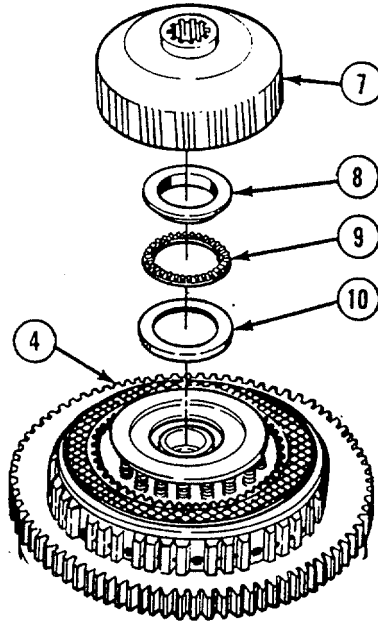
b. Disassembly.

- (1) Remove seal rings (1 and 2) from turbine shaft (3) and discard.
- (2) Place collector ring installer (Appendix B, Section III, Item 74) on bed of press.
- (3) Turn forward clutch assembly (4) over and install through collector ring installer and in bed of press.
- (4) Remove large inner retaining ring (5) holding fourth clutch driving hub (6).
- (5) Remove fourth clutch driving hub (6) from forward clutch assembly (4).



6-57. FORWARD CLUTCH ASSEMBLY- Continued

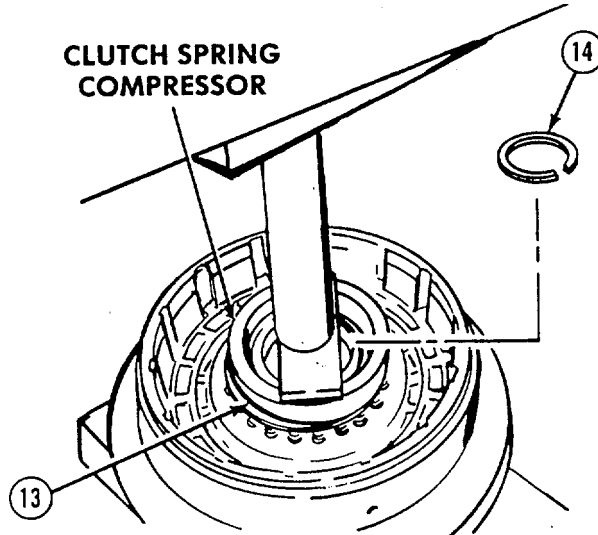
- (6) Remove forward clutch driving hub (7), inner race (8), bearing (9), and outer race (10) from forward clutch assembly (4).



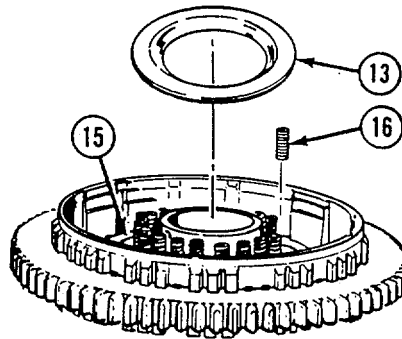
- (7) Remove five steel plates (11) and five friction plates (12) from forward clutch assembly (4).

6-57. FORWARD CLUTCH ASSEMBLY- Continued

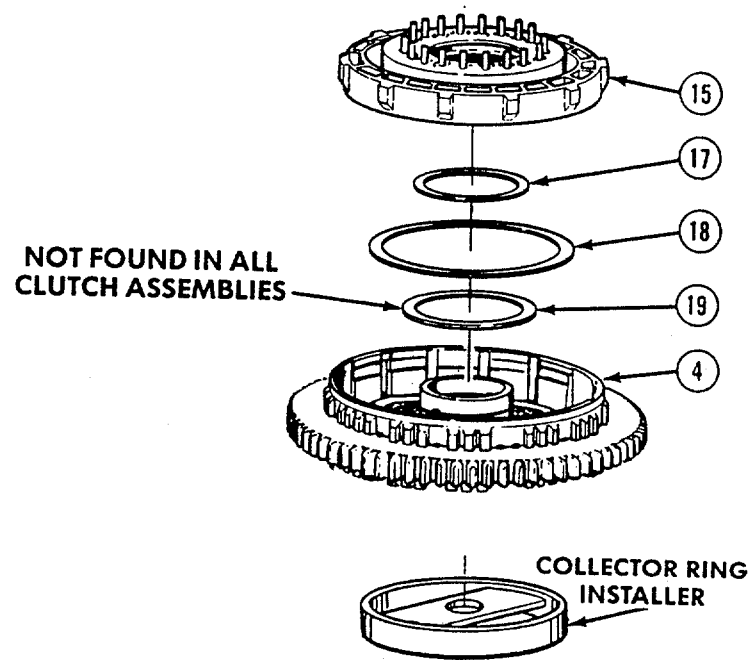
- (8) Compress spring retainer (13) with clutch spring compressor (Appendix B, Section III, Item 73). Remove retaining ring (14).
- (9) Release pressure from spring retainer (13) and remove clutch spring compressor.



- (10) Remove spring retainer (13) from forward clutch piston (15).
- (11) Remove 20 piston return springs (16) from forward clutch piston (15).



6-57. FORWARD CLUTCH ASSEMBLY - Continued

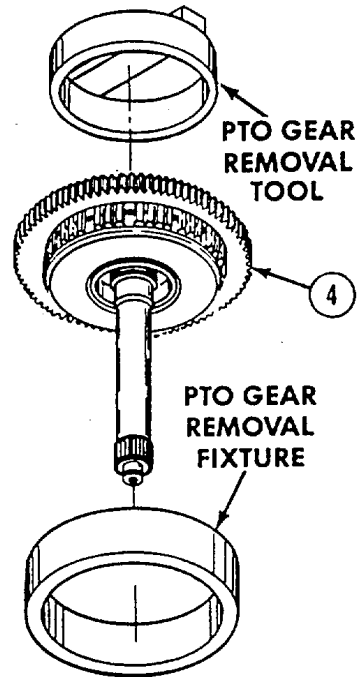
**NOTE**

Not all clutch assemblies will have a seal ring. If seal ring is removed, discard and do not replace during installation.

- (12) Remove forward clutch piston (15) from forward clutch assembly (4).
- (13) Remove inner seal ring (17) and outer seal ring (18) from forward clutch piston (15) and discard.
- (14) Remove seal ring (19) from inner hub in forward clutch assembly (4) and discard.
- (15) Remove forward clutch assembly (4) and collector ring installer from press.

6-57. FORWARD CLUTCH ASSEMBLY - Continued

- (16) Place PTO gear removal fixture (Appendix B, Section III, Item 76) in press.
- (17) Install forward clutch assembly (4) on PTO gear removal fixture.
- (18) Install PTO removal tool in forward clutch assembly (4).
- (19) Find gap in retaining ring (20).
- (20) Install shim stock between retaining ring (20) and teeth of PTO gear (21). Push retaining ring in forward clutch assembly (4). Put shim stock every 3 in. (76 mm) around forward clutch assembly.
- (21) Press forward clutch assembly (4) out of PTO gear (21).
- (22) Remove PTO gear (21), forward clutch assembly (4), PTO gear removal tool, and PTO gear removal fixture from press.

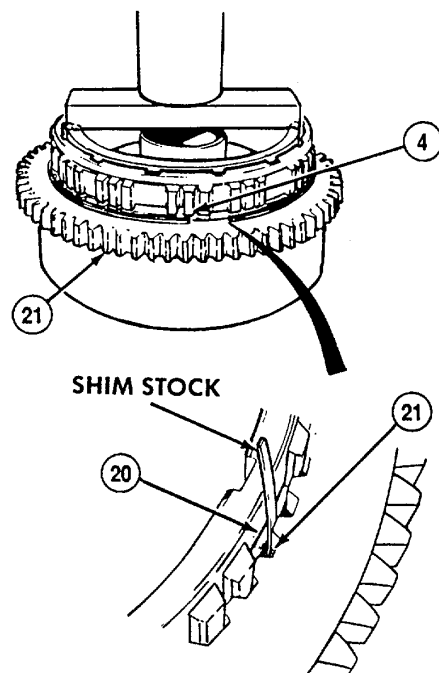


c. Cleaning and Inspection.

WARNING

Dry cleaning solvent P-D-680 is potentially dangerous. Avoid repeated and prolonged breathing of vapors and skin contact with the liquid. Do not use near open flame, arcing equipment or other ignition sources. Always wear eye protection and protective clothing. The flash point of P-D-680 is 100 to 138 deg. F (38 to 59 deg. C).

- (1) Clean all metal parts with dry cleaning solvent (Item 3, Appendix E) and inspect for damage. Replace damaged parts.
- (2) Turbine shaft is pressed in forward clutch housing and should be tight. Replace forward clutch housing if there is any up and down movement.



6-57. FORWARD CLUTCH ASSEMBLY- Continued

- (3) Replace all 20 piston release springs if any three springs do not meet the following load-height requirements:
 - (a) Length without load: 1.25 in. (31.8 mm).
 - (b) Length under load: 0.88 in. (22.4 mm) with load of 1 7.9 to 18.9 lb (8.13 to 8.58 kg).
- (4) Clean ball pockets (1) with dry cleaning solvent (Item 3, Appendix E) if there is leakage at bottom side of housing or if balls do not move freely of their own weight.

WARNING

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

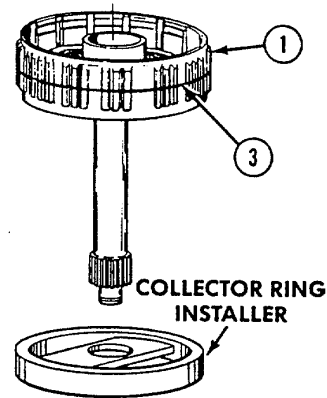
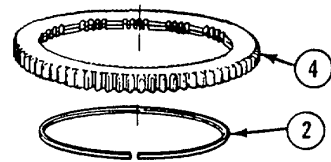
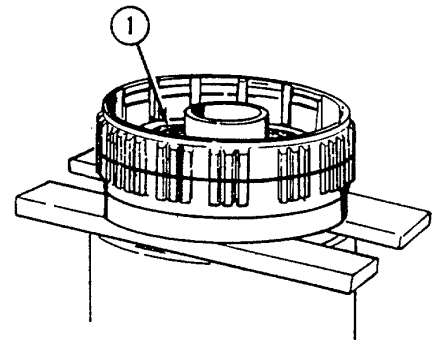
- (5) Dry pockets with compressed air.
- (6) Apply lubricating oil (Item 10, Appendix E) around area of ball pockets (1).

d. Assembly.

NOTE

Coat all parts with lubricating oil before installation.

- (1) Place collector ring installer (Appendix B, Section III, Item 74) in press.
- (2) Install forward clutch assembly (1) on collector ring installer.
- (3) Install retaining ring (2) in groove (3) on outside of forward clutch assembly (1).



WARNING

Wear heat-resistant gloves to prevent burning hands when handling hot PTO gear.

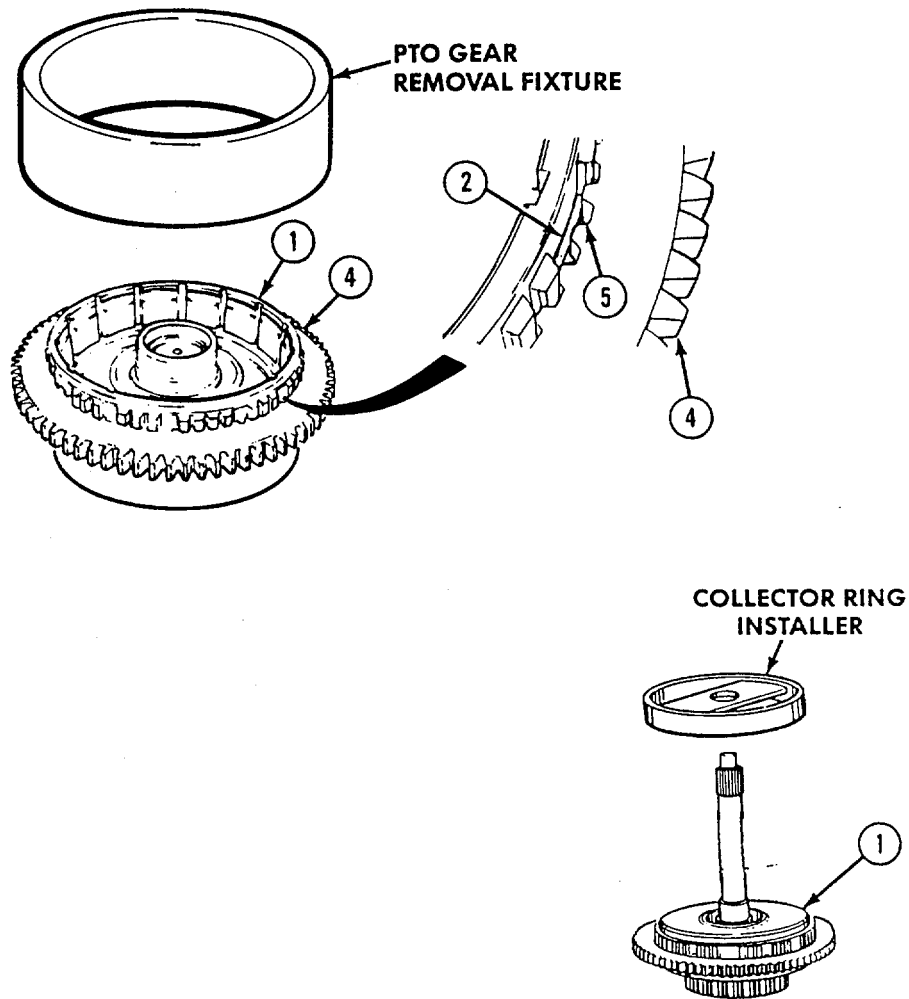
- (4) Heat PTO gear (4) in oven or oil bath to 3500 to 3750 F (1 770 to 191 0 C).

NOTE

Install PTO gear with beveled side of inner teeth down.

6-57. FORWARD CLUTCH ASSEMBLY- Continued

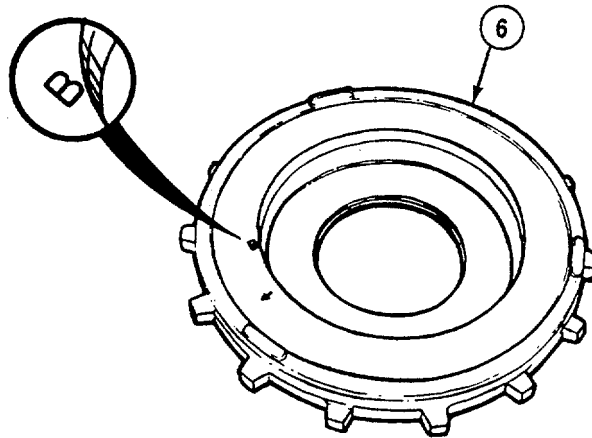
- (5) Carefully place PTO gear (4) on forward clutch assembly (1).



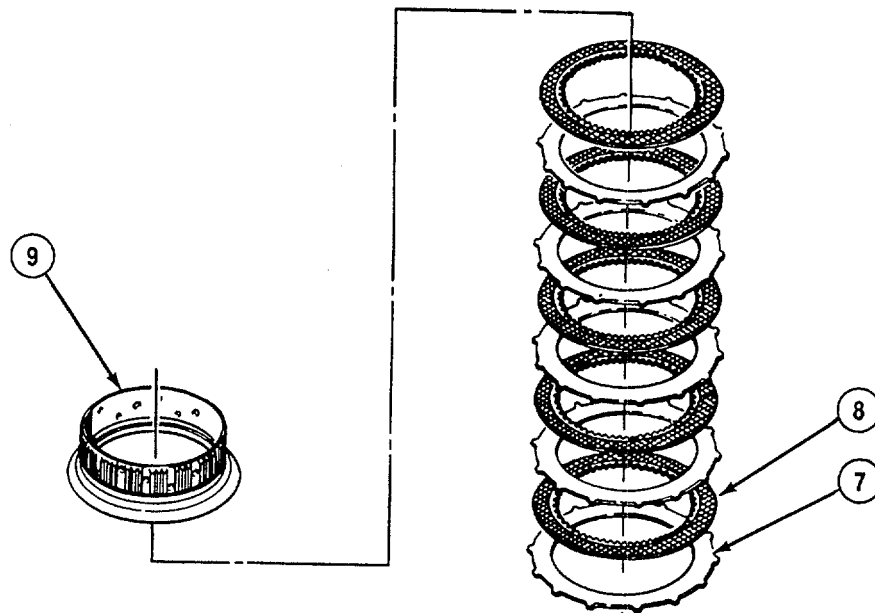
- (6) Install PTO gear removal fixture on forward clutch assembly (1).
- (7) Press PTO gear (4) on forward clutch assembly (1) until retaining ring (2) expands in groove (5) inside PTO gear.
- (8) Remove forward clutch assembly (1) and collector ring installer from press.
- (9) Remove collector ring installer.

6-57. FORWARD CLUTCH ASSEMBLY - Continued

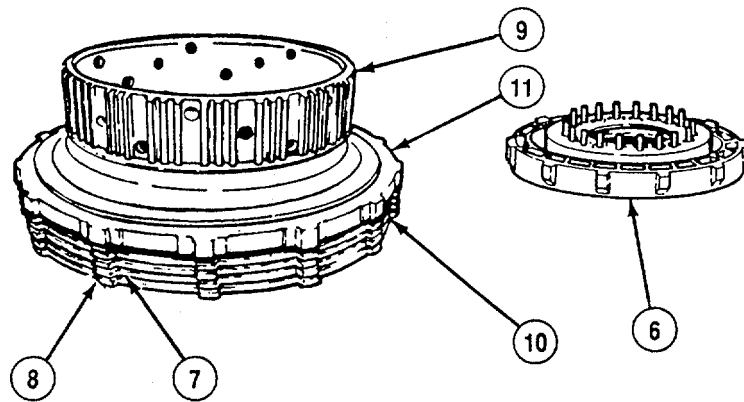
- (10) Look at bottom of forward clutch piston (6) and note whether forward clutch piston is labeled A, B, or C.



- (11) Stack 10 clutch plates (7 and 8) on flat surface of press starting with steel external plate (7) and alternating with internal friction plate (8).
- (12) Place fourth clutch driving hub (9) on clutch plates (7 and 8).



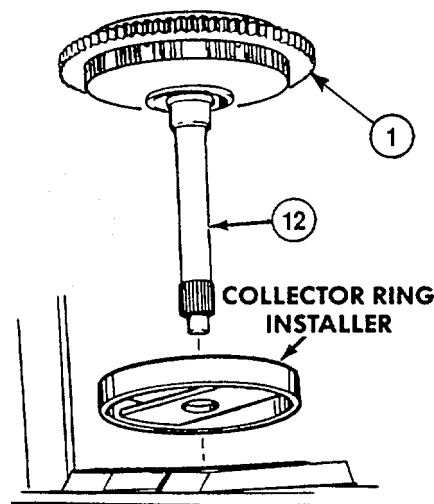
6-57. FORWARD CLUTCH ASSEMBLY - Continued



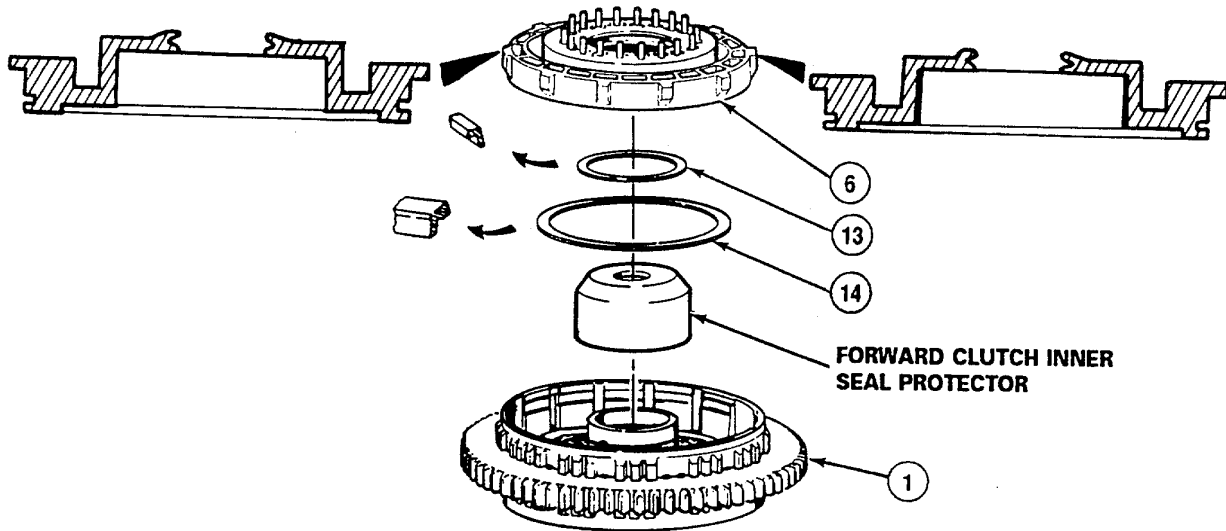
NOTE

Pressure is applied to clutch pack to steady clutch pack.

- (13) Press evenly on fourth clutch driving hub (9) with 100 psi (689.5 kPa).
- (14) Measure distance from base of clutch pack (10) to machined surface (11) of hub (9) to get clutch pack thickness.
- (15) If forward clutch piston (6) is an A piston, clutch pack thickness must be 1.415 to 1.442 in. (35.94 to 36.63 mm). If forward clutch piston is a B piston, clutch pack thickness must be 1.388 to 1.414 in. (35.26 to 35.92 mm). If forward clutch piston is a C piston, clutch pack thickness must be 1.361 to 1.387 in. (34.57 to 35.23 mm). Replace clutch plates (7 and 8) as needed to ensure proper clutch pack thickness.
- (16) Remove clutch pack (10) and fourth clutch driving hub (9) from press.
- (17) Install forward clutch assembly (1) with shaft (12) down through collector ring installer and in hydraulic press.



6-57. FORWARD CLUTCH ASSEMBLY - Continued



CAUTION

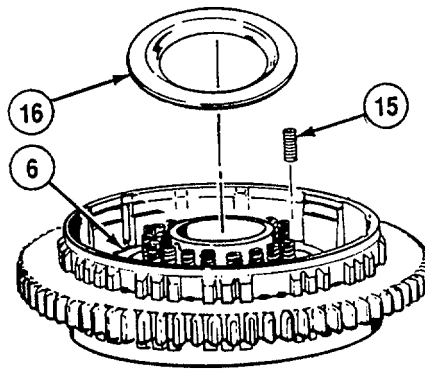
Do not mix old and new style pistons and housings. Equipment may be damaged.

NOTE

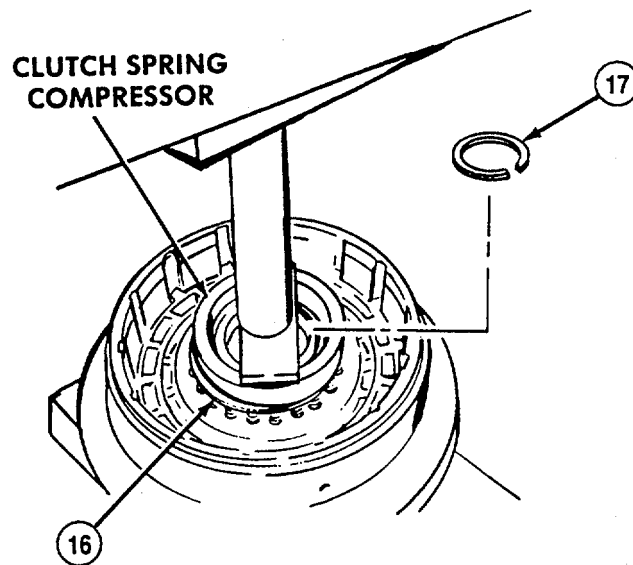
- There are two styles of clutch pistons and clutch assemblies. The old style clutch piston is machined smooth, new style has rough casting. The old style clutch assembly has a groove for installation of a seal ring, new style does not have a groove.
- If new housing is used, a third seal ring is used.

- (18) Apply lubricating oil to two new seal rings (13 and 14).
- (19) Install small seal ring (13) and large seal ring (14), lips down, on forward clutch piston (6).
- (20) Install forward clutch piston inner seal protector (Appendix B, Section III, Item 75) over inner hub of forward clutch assembly (1).
- (21) Install forward clutch piston (6) over seal protector. Carefully work piston completely down until seated.
- (22) Remove seal protector.

6-57. FORWARD CLUTCH ASSEMBLY - Continued



- (23) Install 20 piston release springs (15) on forward clutch piston (6).
- (24) Install piston release spring retainer (16) on piston release springs (15).



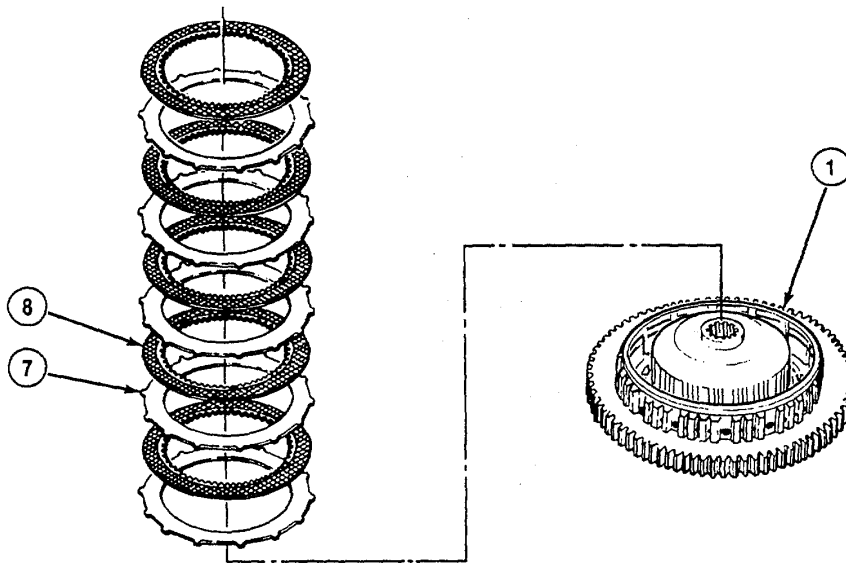
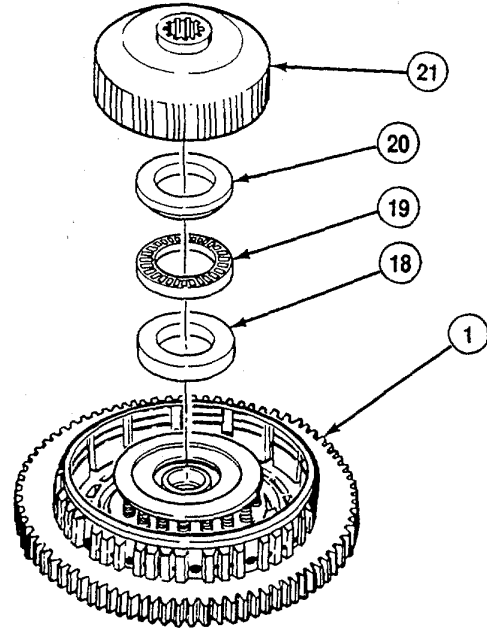
- (25) Compress spring retainer (16) with clutch spring compressor tool (Appendix B, Section III, Item 73) and press. Install retaining ring (17).
- (26) Release pressure from spring retainer (16) and remove clutch spring compressor.

6-57. FORWARD CLUTCH ASSEMBLY-Continued

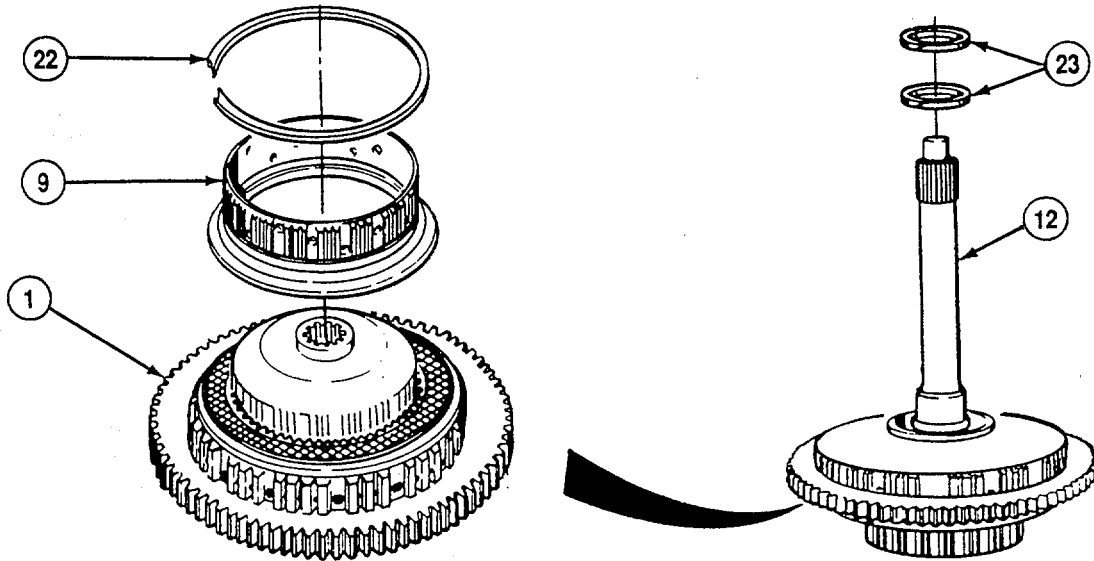
NOTE

Install bearing race with cupped side down.

- (27) Install bearing race (18) on small hub of forward clutch assembly (1).
- (28) Install thrust bearing (19) on thrust bearing race (18).
- (29) Coat bearing race (20) with lubricating oil (Item 10, Appendix E) and install.
- (30) Install forward clutch drive hub (21) on forward clutch assembly (1).
- (31) Soak five friction plates (8) in clean lubricating oil (Item 10, Appendix E) for 2 minutes.
- (32) Install 10 clutch plates (7 and 8), starting with steel external plate and alternating with internal friction plate.

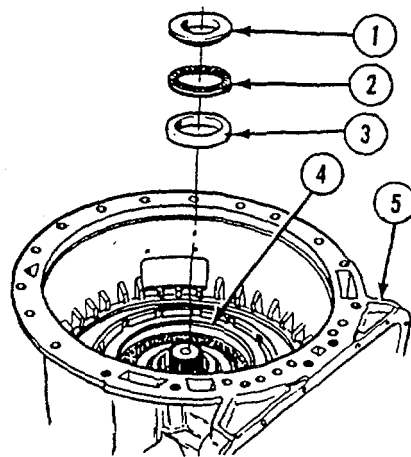


6-57. FORWARD CLUTCH ASSEMBLY - Continued



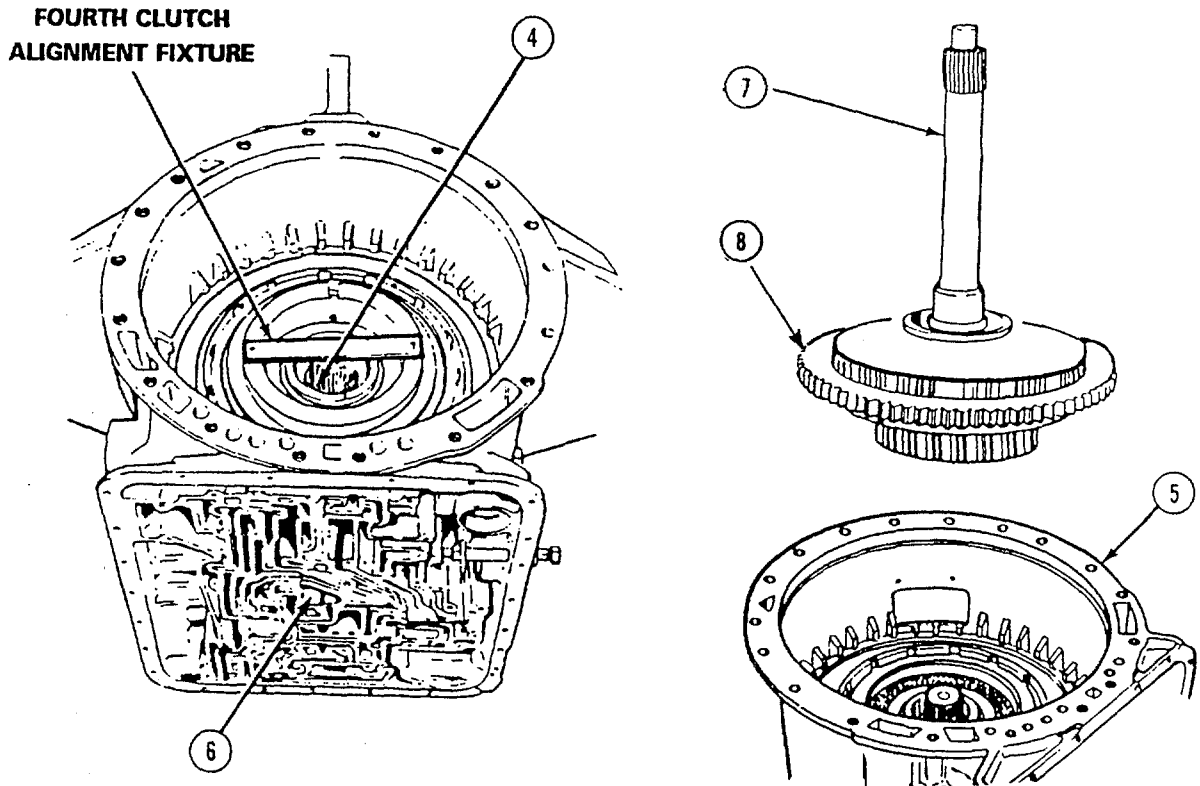
- (33) Install fourth clutch driving hub (9) on forward clutch assembly (1).
- (34) Install large inner retaining ring (22) on fourth clutch driving hub (9).
- (35) Install two new seal rings (23) on turbine shaft (12).

e. Installation.



- (1) Install outer race (1), roller bearing (2), and inner race (3) on fourth clutch assembly (4) in transmission housing (5).

6-57. FORWARD CLUTCH ASSEMBLY - Continued



- (2) Install fourth clutch alignment fixture on fourth clutch assembly (4).

WARNING

Compressed air can cause injury. Compressed air in shop will not exceed 30 psi (207 kPa). Use only with effective chip guarding and personal protective equipment, goggles, shield, and gloves.

- (3) Apply air pressure to port (6) to lock up fourth clutch plates.
- (4) Hold air pressure in fourth clutch assembly (4) while other person removes fourth clutch alignment fixture.
- (5) Continue to apply air pressure in fourth clutch assembly (4) while other person holds turbine shaft (7) and installs forward clutch assembly (8) in transmission housing (5).
- (6) Stop applying air pressure when other person says forward clutch assembly (8) is fully seated in transmission housing (5).

f. Follow-on Maintenance.

- (1) Install torque converter housing (see para 6-51).
- (2) Install control valve body (see para 6-62).

6-58. REAR COVER AND FIRST CLUTCH ASSEMBLY

This task covers:

- | | |
|----------------------------|--------------------------|
| a. Removal | d. Assembly |
| b. Disassembly | e. Installation |
| c. Cleaning and Inspection | f. Follow-on Maintenance |

TOOLS REQUIRED

Tool Kit, General Mechanics, Automotive
(Appendix B, Section III, Item 1)

Shop Equipment, Automotive
Maintenance and Repair
(Appendix B, Section II, Item 4)

Clutch Spring Compressor
(Appendix B, Section III Item 73)
Output Shaft Bushing Installer
(Appendix B, Section III, Item 78)

MATERIALS/PARTS REQUIRED

Oil, Lubricating (Item 10, Appendix E)
Solvent, Dry Cleaning (Item 3, Appendix E)
Compound, Retaining (Item 6, Appendix E)
Compound, Sealing, Pipe Thread
(Item 2, Appendix E)
Grease, General Purpose, Lithium Base
(Item 48, Appendix E)
Seal Ring (Figure 137, Appendix F)

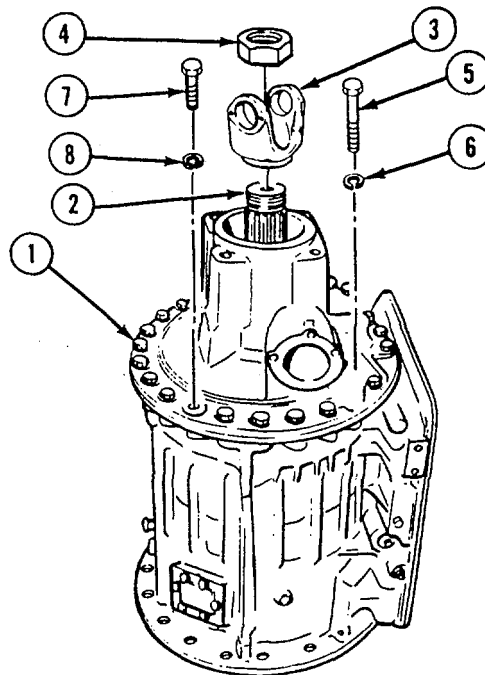
PERSONNEL REQUIRED: 2

EQUIPMENT CONDITION

Output Yoke, Dust Shield, and Oil Seal Removed
(see para 6-56.)
Governor Removed (see para 5-29.)

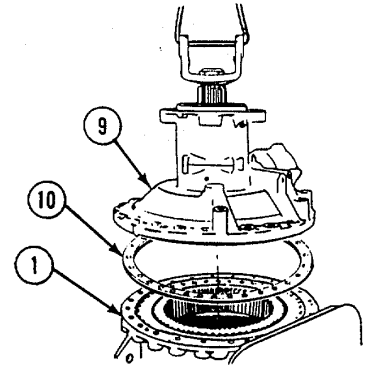
a. Removal.

- (1) Position transmission (1) so output shaft (2) is pointing up.
- (2) Install yoke (3) and nut (4).
- (3) Remove three screws (5) and lockwashers (6).
- (4) Remove 21 screws (7) and lockwashers (8).



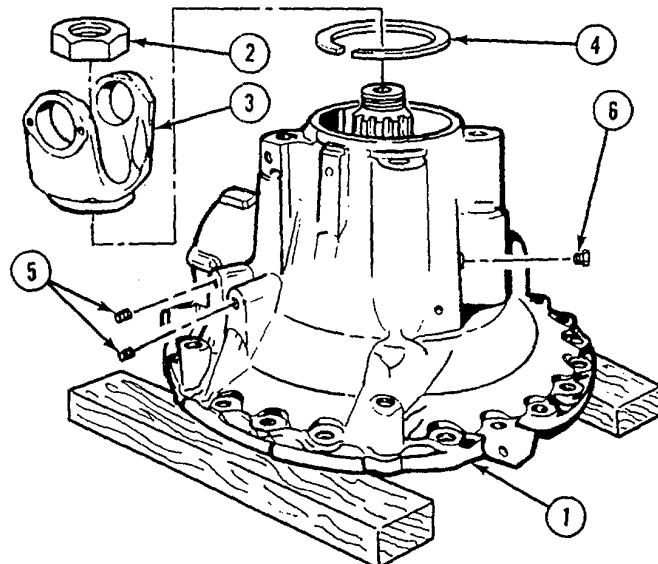
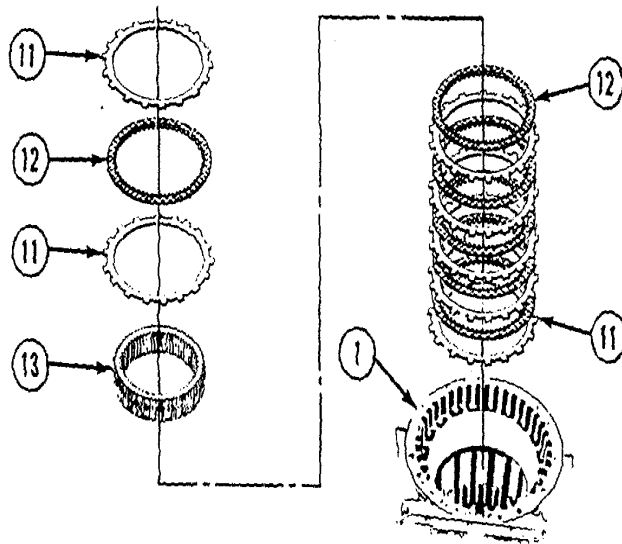
6-58. REAR COVER AND FIRST CLUTCH ASSEMBLY - Continued

- (5) Install suitable sling lifting device to rear cover (9).
- (6) Guide rear cover (9) off and away from transmission (1) while other person operates lifting device. Remove lifting device.
- (7) Remove gasket (10) from transmission (1) and discard.
- (8) Remove two steel plates (11), one friction plate (12), and rear planetary ring gear (13) from transmission housing (1).
- (9) Remove five friction plates (12) and five steel plates (11) from transmission housing (1).

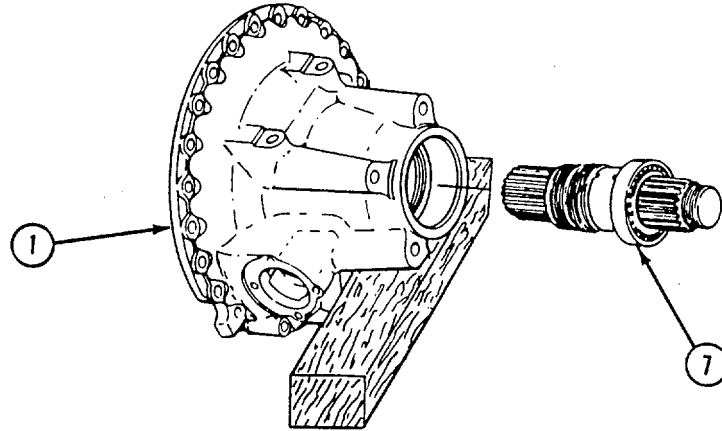


b. Disassembly.

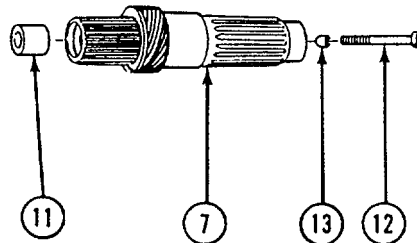
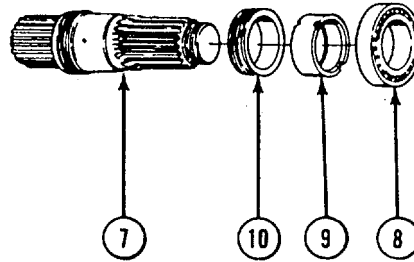
- (1) Set rear cover (1) on wooden blocks.
- (2) Remove nut (2), yoke (3), and output shaft bearing retaining ring (4).
- (3) Remove two plugs (5) and plug (6) from rear cover (1).



6-58. REAR COVER AND FIRST CLUTCH ASSEMBLY - Continued

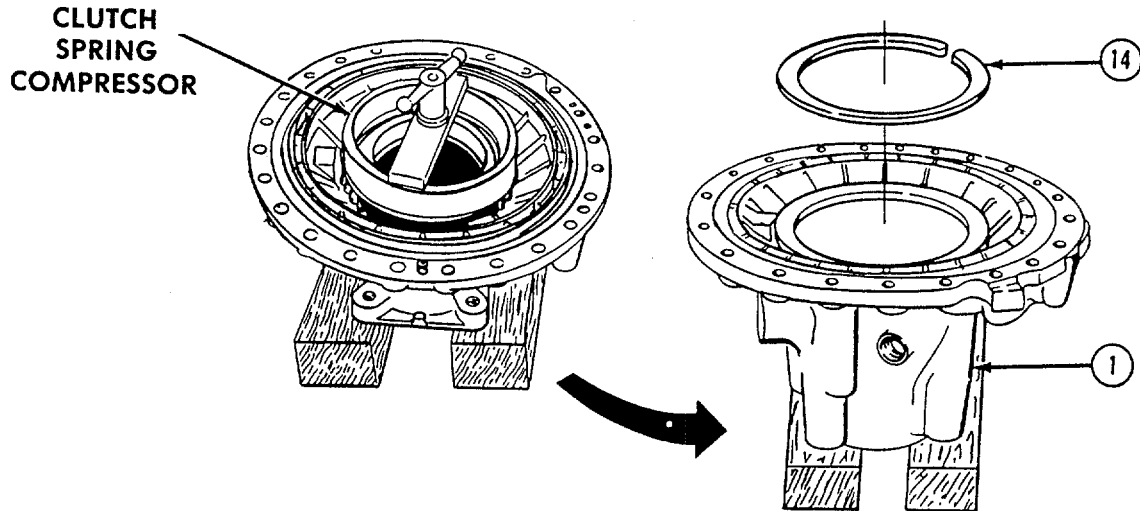


- (4) Position rear cover (1) on side. Use wooden block for support.
- (5) Remove output shaft (7) from rear cover (1).

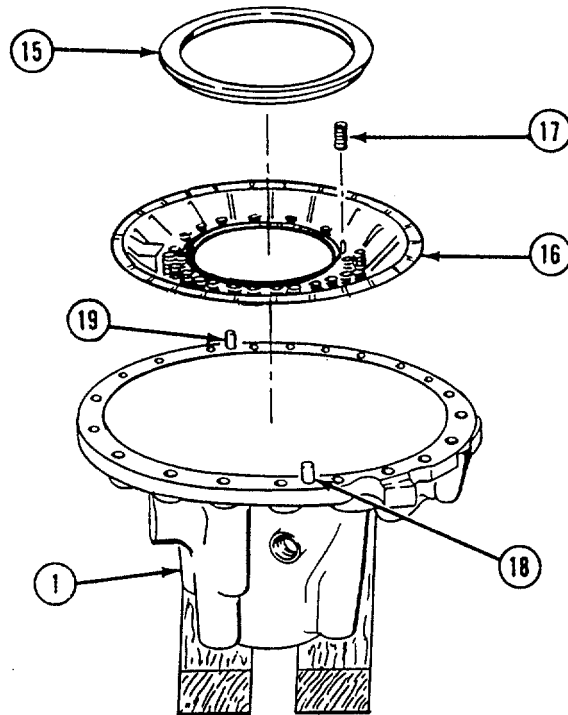


- (6) Press output shaft (7) from bearing (8), spacer (9), and speedometer drive gear (10).
- (7) Remove bushing (11) from output shaft (7).
- (8) Screw long screw (12) into small orifice plug (13). Pry up on screw to remove plug.

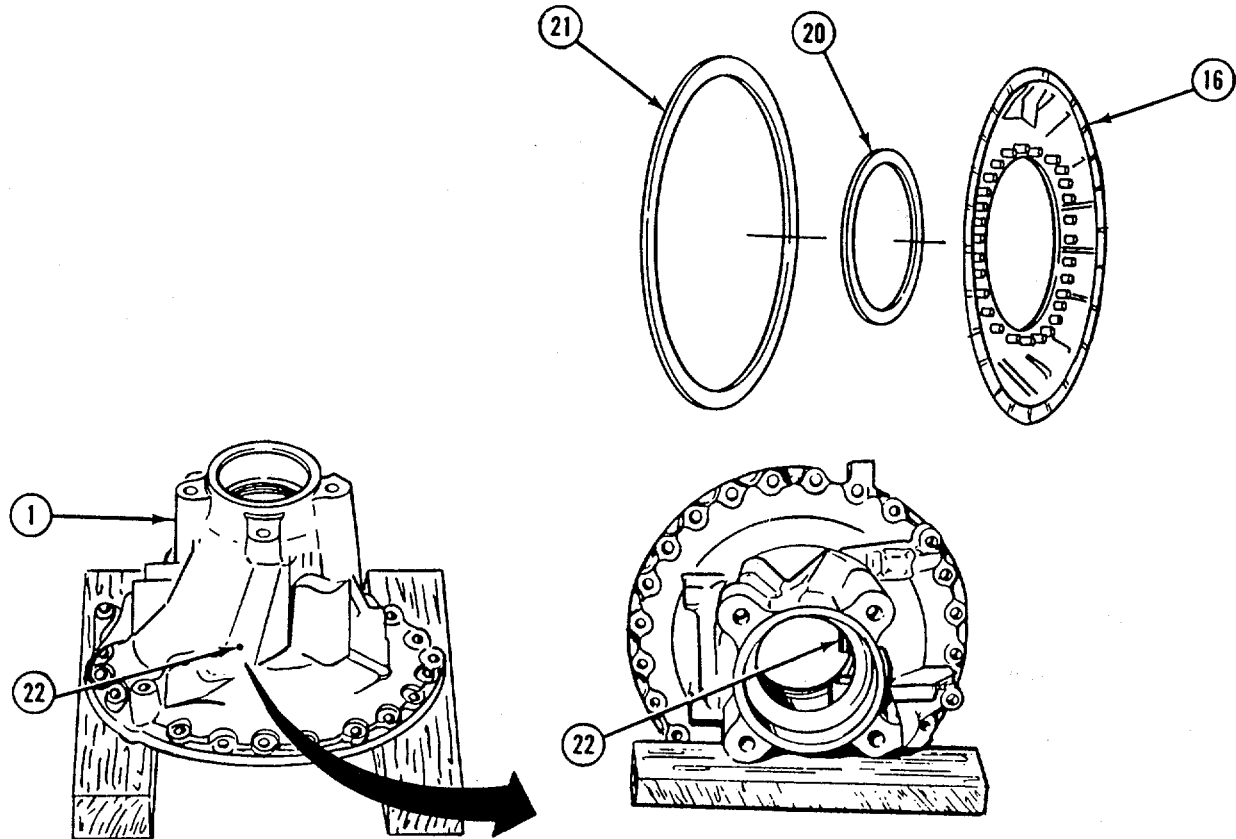
6-58. REAR COVER AND FIRST CLUTCH ASSEMBLY - Continued



- (9) Position rear cover (1) flange side up.
- (10) Install clutch spring compressor (Appendix B, Section 1II, Item 73) inside rear cover (1).
- (11) Compress clutch spring compressor and remove large external retaining ring (14).
- (12) Remove clutch spring compressor.
- (13) Remove piston spring retainer (15) from first clutch piston (16).
- (14) Remove 30 piston release springs (17) from first clutch piston (16).
- (15) Remove first clutch piston (16) from rear cover (1).
- (16) Remove dowel pins (18 and 19) from rear cover (1).



6-58. REAR COVER AND FIRST CLUTCH ASSEMBLY - Continued



- (17) Remove inner seal ring (20) and outer seal ring (21) from first clutch piston (16) and discard.
- (18) Position rear cover (1) flange side down. Use wooden blocks for support.
- (19) Remove governor support pin (22) from rear cover (1).

c. Cleaning and Inspection.

WARNING

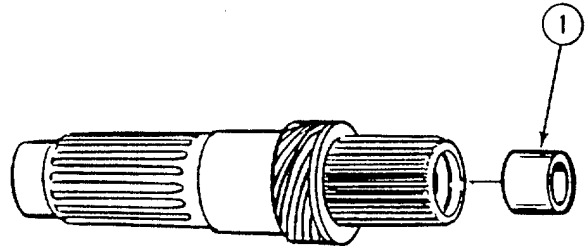
Dry cleaning solvent P-D-680 is potentially dangerous. Avoid repeated and prolonged breathing of vapors and skin contact with the liquid. Do not use near open flame, arcing equipment or other ignition sources. Always wear eye protection and protective clothing. The flash point of P-D-680 is 100 to 138 deg. F (38 to 59 deg. C).

- (1) Clean all metal parts with dry cleaning solvent (Item 3, Appendix E) and inspect for damage. Replace damaged parts.
- (2) Inspect and replace piston release springs if any five springs do not meet the following load-height requirements:
 - (a) Length without load must be at least: 1.29 in. (32.77 mm).
 - (b) Length under load must be at least: 0.82 in. (20.83 mm) with load of 4.3 to 5.7 lb (1.9 to 2.6

kg).

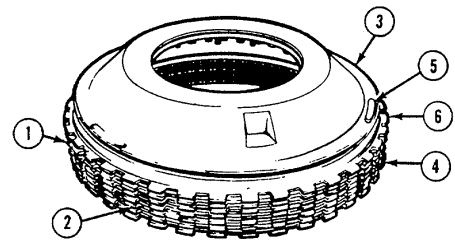
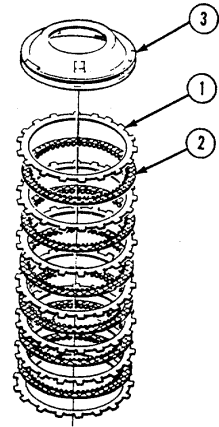
6-58. REAR COVER AND FIRST CLUTCH ASSEMBLY - Continued

- (3) Measure inside diameter of bushing (1).
- (4) Check clearance between diameter of main shaft bearing surface, measured in paragraph 6-55., and bushing diameter measured in step (3). Clearance must not be greater than 0.004 in. (0.10 mm).

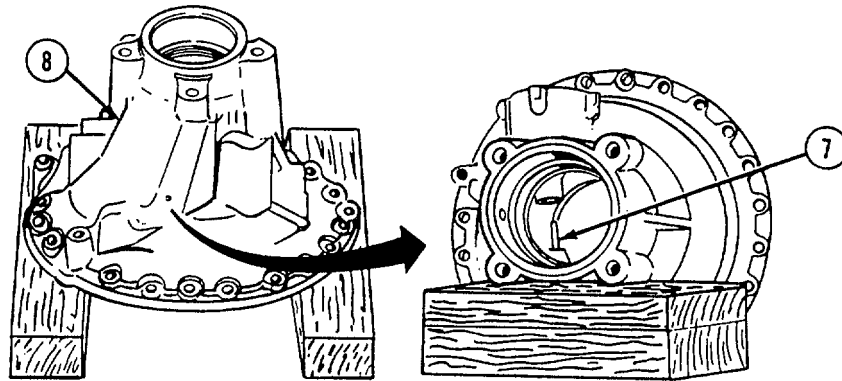


d. Assembly.

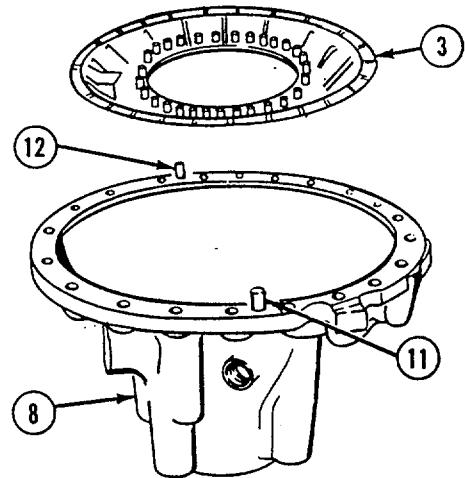
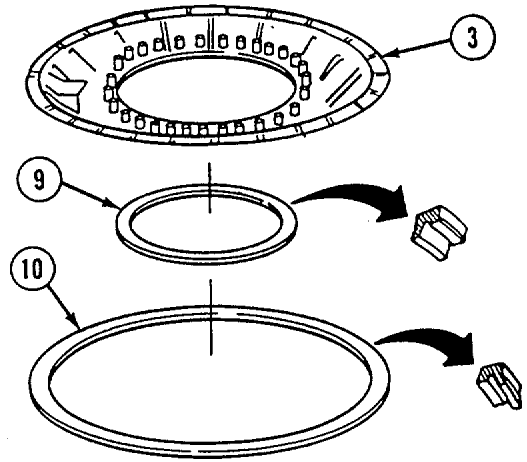
- (1) Stack 13 clutch plates (1 and 2) on flat surface of press, starting with steel plate (1) and alternating with friction plate (2).
- (2) Place first clutch piston (3) on top of clutch plates (1 and 2).
- (3) Press evenly on first clutch piston (3) with 100 psi (689.5 kPa).
- (4) Measure distance from base of clutch pack (4) to thrust pad (5).
- (5) Clutch pack thickness must be 2.521 to 2.553 in. (64.03 to 64.85 mm). Replace clutch plates (1 and 2) as needed to ensure proper clutch pack thickness.
- (6) Measure thickness of one tang (6) on each of seven steel plates (1).
 - (a) If steel plate measures 0.116 to 0.123 in. (2.95 to 3.12 mm), steel plate is thick.
 - (b) If steel plate measures 0.096 to 0.103 in. (2.44 to 2.62 mm), steel plate is thin.
- (7) Repeat steps (1) to (5) to recheck clutch pack thickness.
- (8) Remove first clutch piston (3) and clutch pack (4) from press.



6-58. REAR COVER AND FIRST CLUTCH ASSEMBLY - Continued

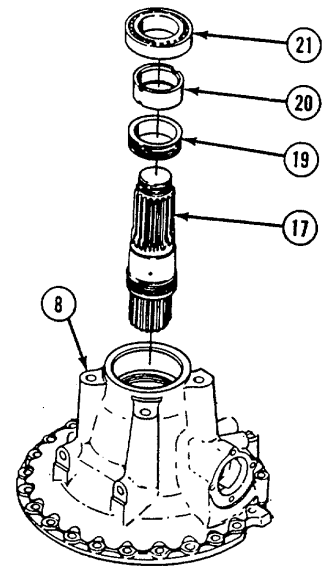
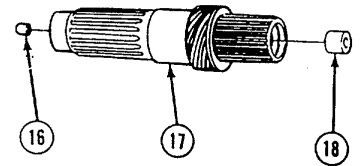
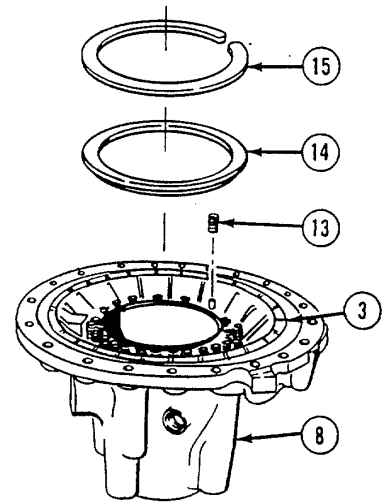


- (9) Install governor support pin (7) in rear cover (8).
- (10) Coat new inner seal ring (9) and outer seal ring (10) with lubricating oil (Item 10, Appendix E).
- (11) Install new inner seal ring (9) and outer seal ring (10) on first clutch piston (3) with lips facing do
- (12) Install first clutch piston (3) in rear cover (8).
- (13) Install two dowel pins (11 and 12).



6-58. REAR COVER AND FIRST CLUTCH ASSEMBLY - Continued

- (14) Install 30 piston release springs (13) in first clutch piston (3).
- (15) Install piston spring retainer (14) on piston release springs (13).
- (16) Using clutch spring compressor (Appendix B, Section III, Item 73), push down on piston spring retainer (14) and piston release springs (13) until retaining ring groove in rear cover (8) is cleared.
- (17) Install retaining ring (15).
- (18) Install small orifice plug (16) in output shaft (17).
- (19) Coat output shaft bushing (18) with retaining compound (Item 6, Appendix E).
- (20) Install output shaft bushing (18) in output shaft (17) using output shaft bushing installer (Appendix B, Section III, Item 78).
- (21) Install speedometer drive gear (19), spacer (20), and bearing (21) on output shaft (17).
- (22) Install output shaft (17) in rear cover (8).



6-58. REAR COVER AND FIRST CLUTCH ASSEMBLY - Continued

- (23) Install retaining ring (22), yoke (23), and nut (24).

WARNING

Dry cleaning solvent P-D-680 is potentially dangerous. Avoid repeated and prolonged breathing of vapors and skin contact with the liquid. Do not use near open flame, arcing equipment or other ignition sources. Always wear eye protection and protective clothing. The flash point of P-D-680 is 100 to 138 deg. F (38 to 59 deg. C).

- (24) Lightly coat threads of two plugs (25) and plug (26) with pipe thread sealing compound (Item 2, Appendix E) and install in rear cover (8).

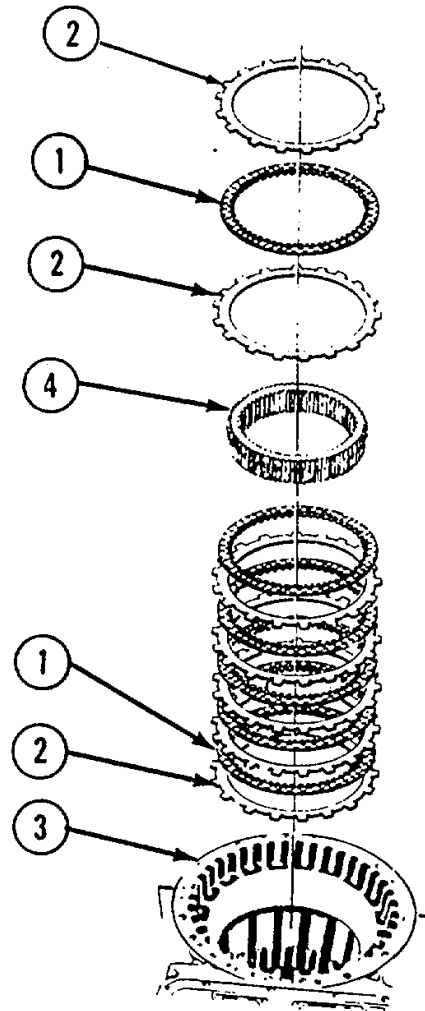
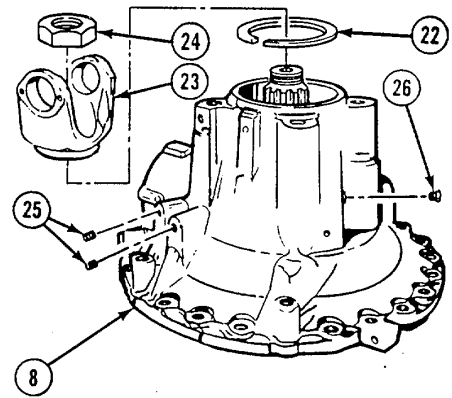
e. Installation.

- (1) Soak six friction plates (1) in clean lubricating oil (Item 10, Appendix E) for at least 2 minutes.

NOTE

Thick external steel clutch plates must be installed on top of stack for proper pressure distribution.

- (2) Install 10 clutch plates (1 and 2) in transmission housing (3), starting with external steel plate (2) and alternating with internal friction plate (1).
- (3) Install rear planetary ring gear (4) in transmission housing (3).
- 4) Install three clutch plates (1 and 2) in transmission housing (3), starting with external steel plate (2) and alternating with internal friction plate (1).

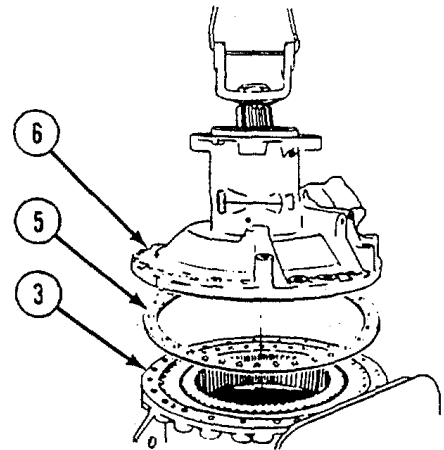


6-58. REAR COVER AND FIRST CLUTCH ASSEMBLY - Continued

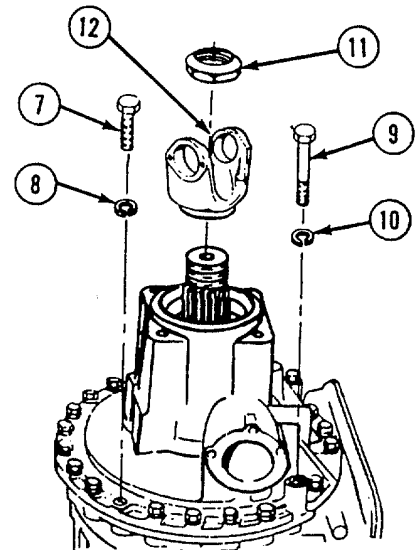
- (5) Lightly coat one side of new gasket (5) with grease (Item 48, Appendix E).
- (6) Set gasket (5) on transmission (3) with greased side of gasket down.
- (7) Align holes in gasket (5) with holes in transmission (3).
- (8) Install sling lifting device on rear cover (6).

NOTE

There are two different size dowel pins on screw flange face of rear cover to help align cover with transmission.



- (9) Align screw holes and install rear cover (6) on transmission (3) while other person operates lifting device. Remove lifting device.
- (10) Install 21 screws (7) with lockwashers (8).
- (11) Install three screws (9) with lockwashers (10).
- (12) Torque screws (7 and 9) alternately to 70 to 80 lb-ft (95 to 108 N m).
- (13) Remove nut (11) and yoke (12).



f. Follow-on Maintenance.

- (1) Install governor (see para 5-29.).
- (2) Install output yoke, dust shield, and oil seal (see para 6-56.).

6-59. FOURTH CLUTCH ASSEMBLY

This task covers:

- | | |
|----------------------------|--------------------------|
| a. Removal | d. Assembly |
| b. Disassembly | e. Installation |
| c. Cleaning and Inspection | f. Follow-on Maintenance |

TOOLS REQUIRED

Tool Kit, General Mechanics, Automotive
(Appendix B, Section 111, Item 1)

Shop Equipment, Automotive
Maintenance and Repair
(Appendix B, Section III, Item 4)

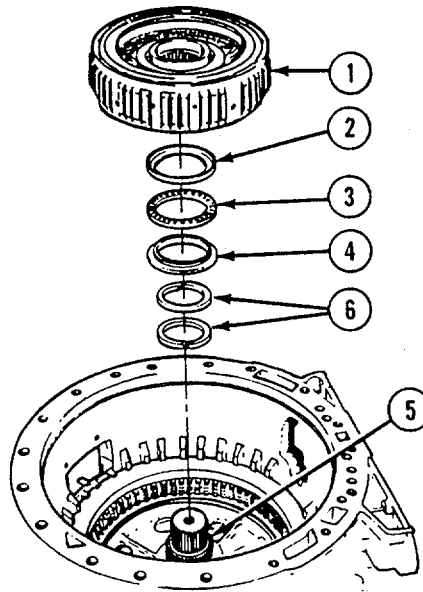
Clutch Spring Compressor
(Appendix B, Section III, Item 73)

MATERIALS/PARTS REQUIRED

Oil, Lubricating (Item 10, Appendix E)
Ties, Cable, Plastic (Item 33, Appendix E)
Solvent, Dry Cleaning (Item 3, Appendix E)
Grease, General Purpose, Lithium Base
(Item 48, Appendix E)

EQUIPMENT CONDITION

Forward Clutch Assembly Removed
(see para 6-57.)

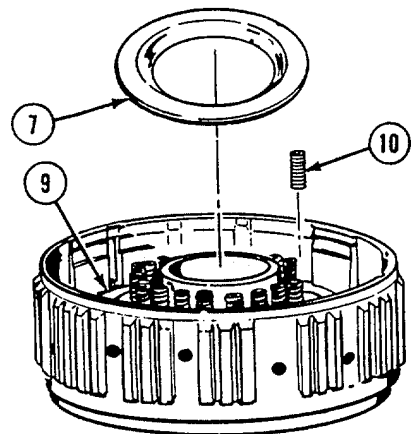
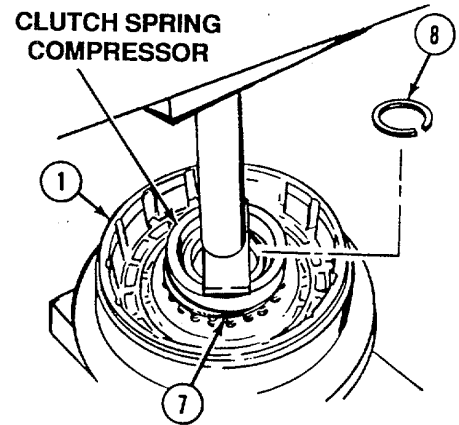
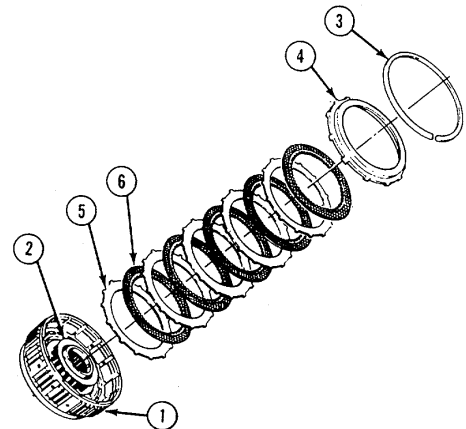
**a. Removal.**

- (1) Remove fourth clutch assembly (1).
- (2) Remove race (2), bearing (3), and race (4) from center support (5) and fourth clutch assembly (1).
- (3) Remove two seal rings (6) from center support (5) and discard.

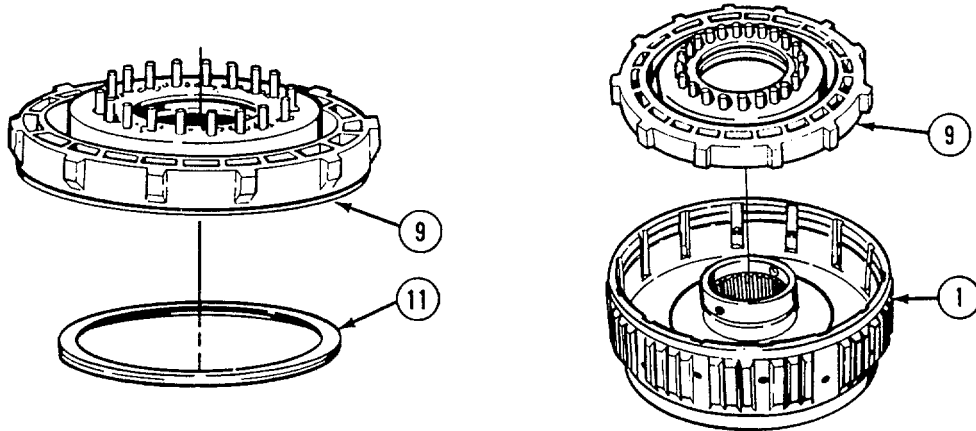
6-59. FOURTH CLUTCH ASSEMBLY - Continued

b. Disassembly.

- (1) Position fourth clutch housing (1) with front hub (2) up and remove large retaining ring (3) and backplate (4).
- (2) Remove five external steel plates (5) and five internal friction plates (6) from fourth clutch housing (1).
- (3) Install fourth clutch housing (1) in hydraulic press.
- (4) Compress spring retainer (7) with clutch spring compressor (Appendix B, Section 111, Item 73). Remove retaining ring (8).
- (5) Release pressure from spring retainer (7) and remove clutch spring compressor.
- (6) Remove fourth clutch housing (1) from press.
- (7) Remove spring retainer (7) from fourth clutch piston (9).
- (8) Remove 20 piston release springs (10) from fourth clutch piston (9).



6-59. FOURTH CLUTCH ASSEMBLY - Continued



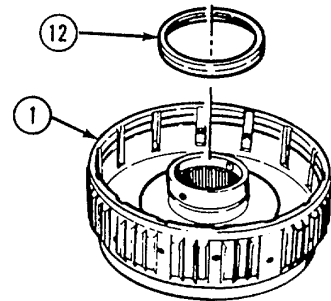
- (9) Remove fourth clutch piston (9) from fourth clutch housing (1).
- (10) Remove outer seal ring (11) from fourth clutch piston (9) and discard.
- (11) Remove inner seal ring (12) from fourth clutch housing (1) and discard.

c. Cleaning and Inspection.

WARNING

Dry cleaning solvent P-D-680 is potentially dangerous. Avoid repeated and prolonged breathing of vapors and skin contact with the liquid. Do not use near open flame, arcing equipment or other ignition sources. Always wear eye protection and protective clothing. The flash point of P-D-680 is 100 to 138 deg. F (38 to 59 deg. C).

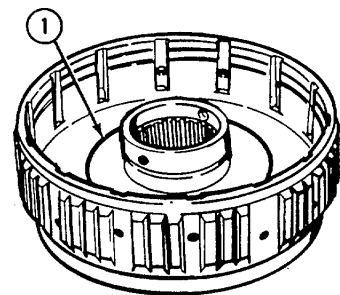
- (1) Clean all metal parts with dry cleaning solvent (Item 3, Appendix E) and inspect for damage. Replace damaged parts.
- (2) Replace all piston release springs if any three do not meet the following load-height requirements:
 - (a) Length without load: Must be at least 1.25 in. (31.8 mm).
 - (b) Length under load: Must be at least 0.88 in. (22.4 mm) with load of 17.9 to 18.9 lb (8.13 to 8.58 kg).
- (3) Clean eight ball pockets (1) with dry cleaning solvent.



WARNING

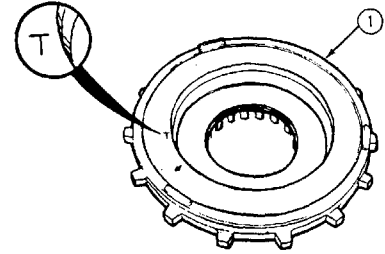
Compressed air used for cleaning purposes will not exceed 30 psi (207 kPa). Use only with effective chip guarding and personal protective equipment, goggles, shield, and gloves.

- (4) Dry ball pockets (1) with compressed air.



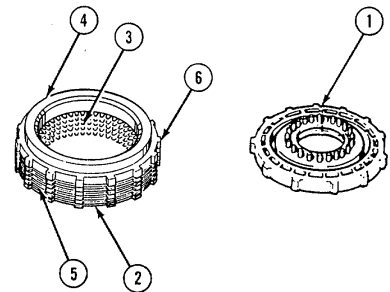
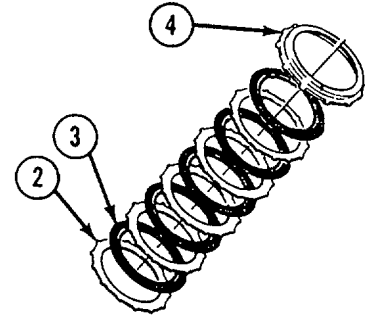
6-59. FOURTH CLUTCH ASSEMBLY - Continued

- (5) Apply lubricating oil (Item 1O, Appendix E) around area of ball pockets (1).



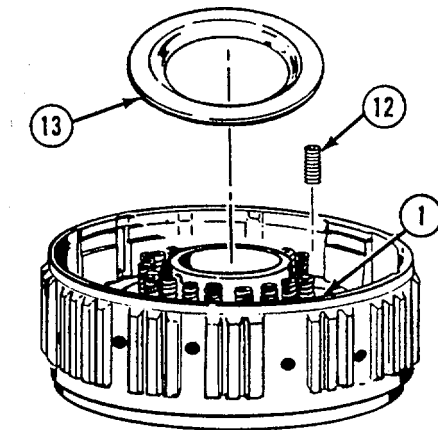
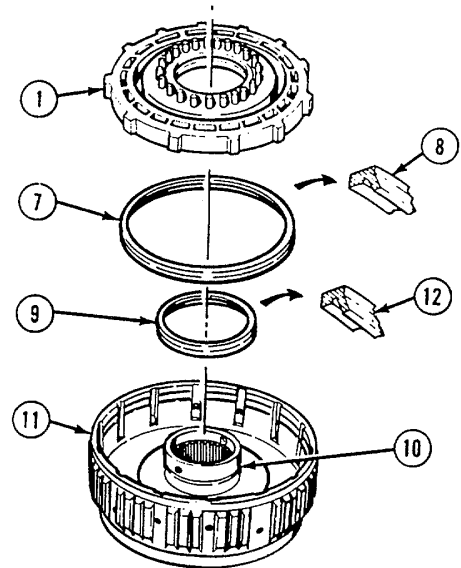
d. Assembly.

- (1) Check bottom of fourth clutch piston (1) and note whether labeled T, S, or M.
- (2) Stack 10 clutch plates (2 and 3) on flat surface of press starting with external steel plate (2) and alternating with internal friction plate (3).
- (3) Place backplate (4) on clutch plates (2 and 3).
- (4) Press evenly on backplate (4) with 100 psi (689.5 kPa).
- (5) Measure distance from base of clutch pack (5) to machined surface (6) of backplate (4). This is clutch pack thickness.
- (6) If fourth clutch piston (1) is a T piston, clutch pack thickness must be 1.361 to 1.387 in. (34.59 to 35.23 mm). If fourth clutch piston is an S piston, clutch pack thickness must be 1.388 to 1.414 in. (35.26 to 35.92 mm). If fourth clutch piston is an M piston, clutch pack thickness must be 1.415 to 1.441 in. (35.94 to 36.60 mm). If measurement is incorrect, replace clutch plates (2 and 3) as needed.
- (7) Remove clutch pack (5) and backplate (4) from press.



6-59. FOURTH CLUTCH ASSEMBLY- Continued

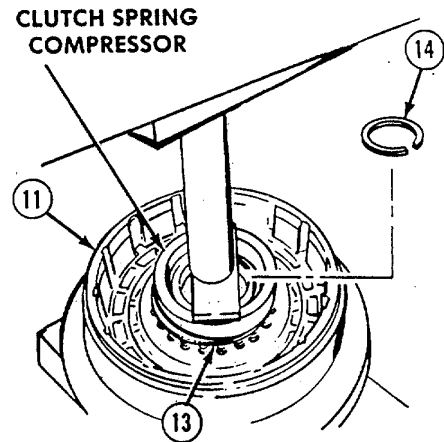
- (8) Coat new seal ring (7) and outer rim of fourth clutch piston (1) with lubricating oil (Item 10, Appendix E).
- (9) Install new seal ring (7) on outer rim of fourth clutch piston (1) with seal ring lip (8) facing down.
- (10) Coat new seal ring (9) and hub (10) of fourth clutch housing (11) with lubricating oil (Item 10, Appendix E).
- (11) Install new seal ring (9) on hub (10) with seal ring lip (12) pointing down.
- (12) Install fourth clutch piston (1) in fourth clutch housing (11).
- (13) Install 20 piston release springs (12) on fourth clutch piston (1).



- (14) Install piston release spring retainer (13) on piston release springs (12).

6-59. FOURTH CLUTCH ASSEMBLY - Continued

- (15) Install fourth clutch housing (11) in hydraulic press.
- (16) Compress piston release spring retainer (13) with clutch spring compressor (Appendix B, Section III, Item 73) and press. Install retaining ring (14).
- (17) Release pressure from piston release spring retainer (13) and remove clutch spring compressor.
- (18) Remove fourth clutch housing (11) from press.
- (19) Install 10 clutch plates (2 and 3), starting with external steel plate (2) and alternating with internal friction plate (3).
- (20) Install backplate (4) and retaining ring (15).



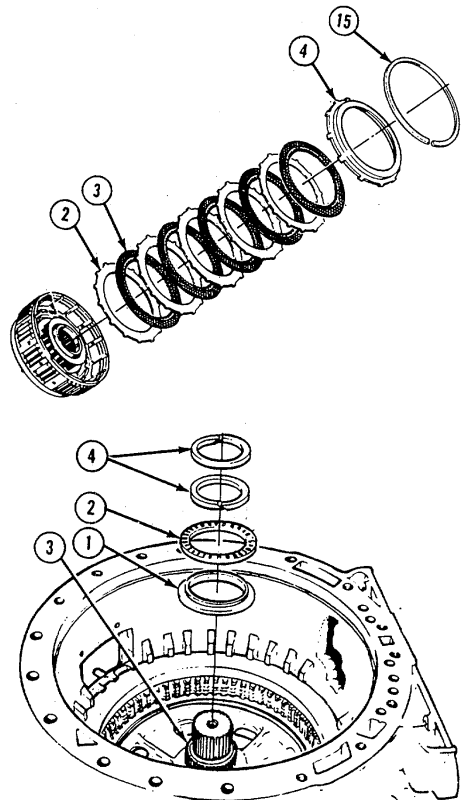
e. Installation.

- (1) Apply lubricating oil (Item 10, Appendix E) to inner bearing race (1) and bearing (2) and install on center support housing hub (3).

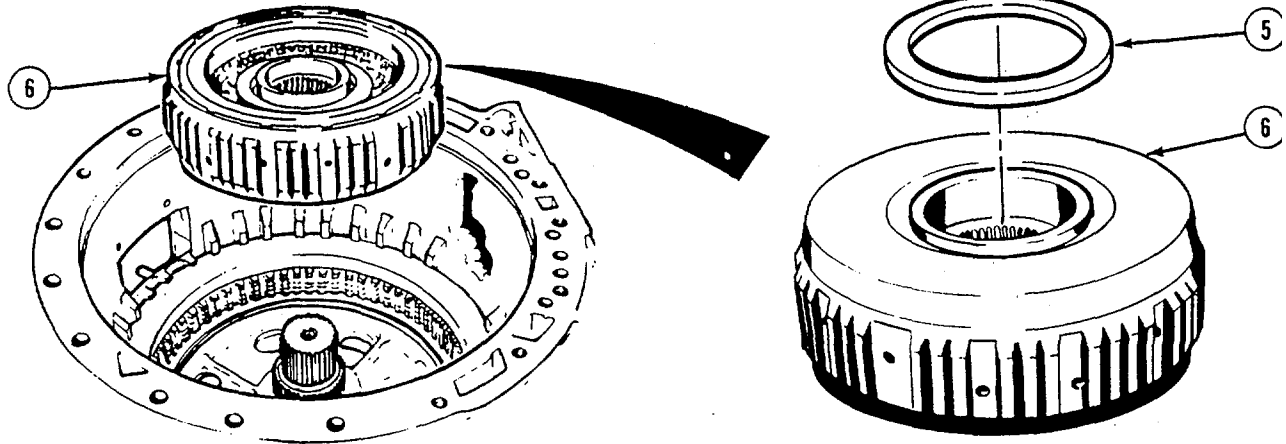
CAUTION

Keep seal rings sealed in packages until ready to use to keep seal rings from being damaged.

- (2) Roll new seal rings (4) one-half length and hold for at least 10 seconds.
- (3) Install one new seal ring (4) in lower groove on center support housing hub (3).
- (4) Install other new seal ring (4) in upper groove on center support housing hub (3).



6-59. FOURTH CLUTCH ASSEMBLY - Continued



(5) Apply grease (Item 48, Appendix E) to outer bearing race (5) and install on bottom of fourth clutch assembly (6).

(6) Install fourth clutch assembly (6).

f. Follow-on Maintenance. Install forward clutch assembly (see para 6-57).

6-60. THIRD CLUTCH AND CENTER SUPPORT HOUSING

This task covers:

- | | |
|----------------------------|--------------------------|
| a. Removal | d. Assembly |
| b. Disassembly | e. Installation |
| c. Cleaning and Inspection | f. Follow-on Maintenance |

MATERIAL/PARTS REQUIRED:

EQUIPMENT CONDITION

TOOLS REQUIRED

Tool Kit, General Mechanics, Automotive
(Appendix B, Section III, Item 1)

Shop Equipment, Automotive
Maintenance and Repair
(Appendix B, Section III, Item 4)

Swaging Tool (Appendix B, Section III, Item 79)
Sleeve, Compressor (Appendix B, Section III, Item 80)
Compressor, Center Support (Appendix B, Section III, Item 81)
Gauge, Retaining Ring (Appendix B, Section III, Item 82)

MATERIALS/PARTS REQUIRED

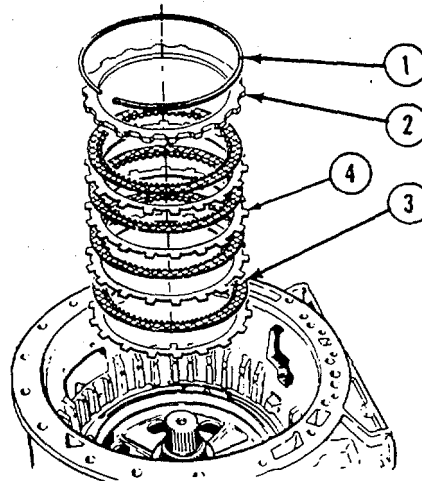
Oil, Lubricating (Item 10, Appendix E)
Solvent, Dry Cleaning (Item 3, Appendix E)

EQUIPMENT CONDITION

Fourth Clutch Assembly Removed
(see para 6-59.)

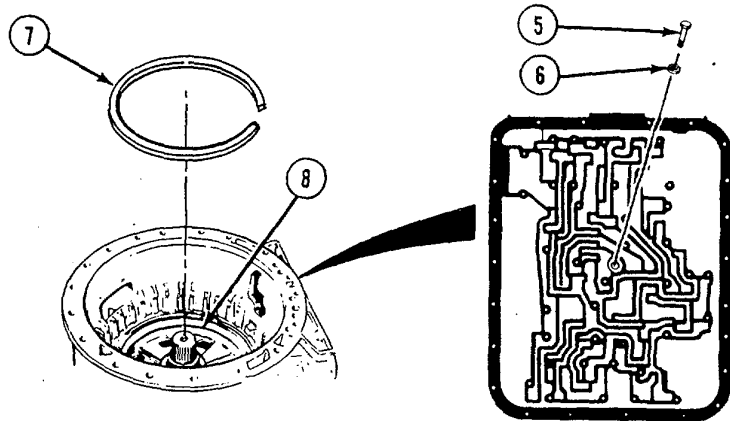
a. Removal.

- (1) Remove retaining ring (1).
- (2) Remove backplate (2).
- (3) Remove four internal friction plates (3) and four external steel plates (4).



6-60. THIRD CLUTCH AND CENTER SUPPORT HOUSING - Continued

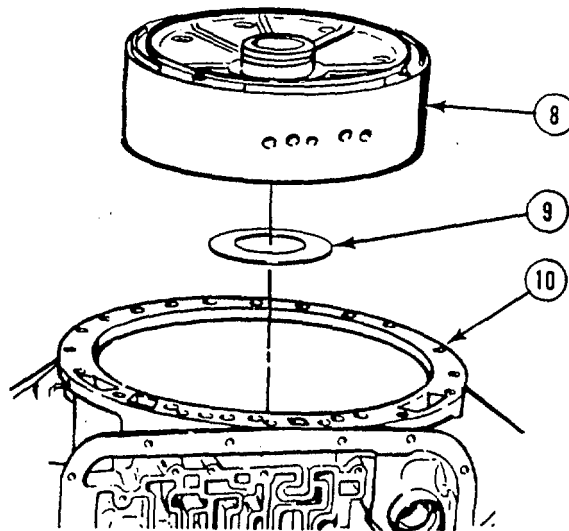
- (4) Remove support housing anchor screw (5) and washer (6).
- (5) Remove retaining ring (7) holding center support housing (8).



NOTE

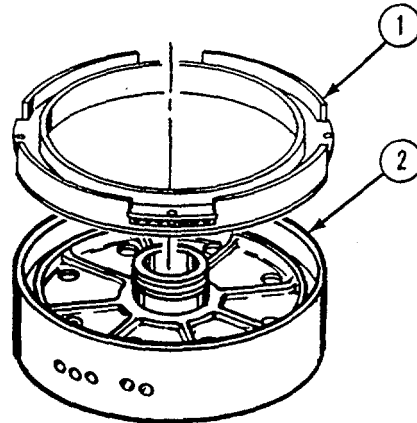
- Center support housing is fitted to transmission housing with very little clearance and may bind if transmission housing is cold. Heat transmission housing with heat lamp or warm current of air.
- If support housing starts upward and then binds, tap center support housing downward and lift again.

- (6) Lifting straight up, remove center support housing (8) and thrust washer (9) from transmission housing (10).

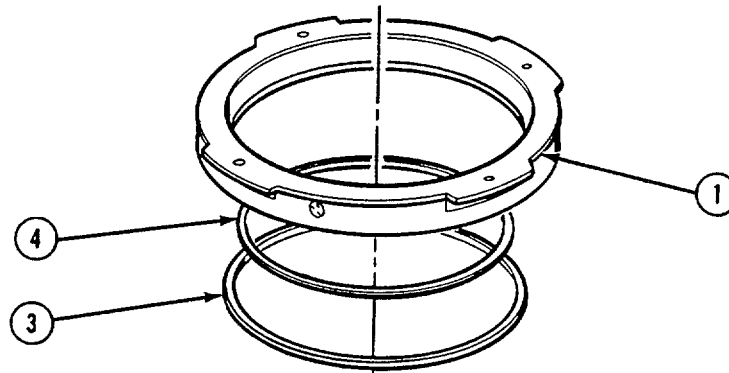


6-60. THIRD CLUTCH AND CENTER SUPPORT HOUSING - Continued

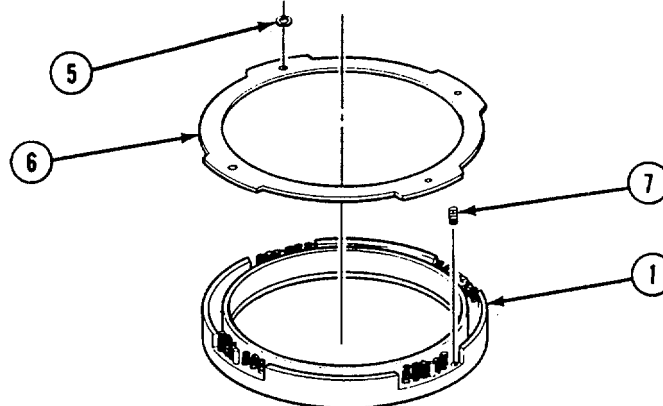
b. Disassembly.



- (1) Remove third clutch piston (1) from center support housing (2).



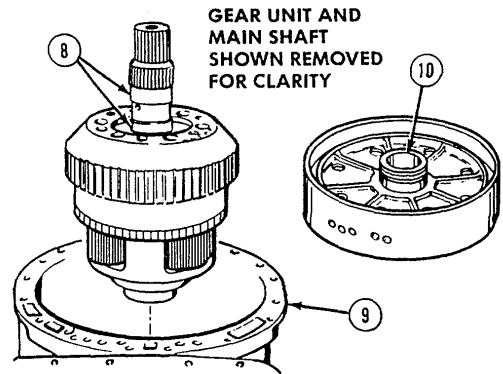
- (2) Remove outer seal ring (3) and inner seal ring (4) from third clutch piston (1) and discard.



- (3) Cut and remove four retaining rings (5).
 (4) Remove clutch ring (6) from third clutch piston (1).
 (5) Remove 20 springs (7) from third clutch piston (1).

6-60. THIRD CLUTCH AND CENTER SUPPORT HOUSING - Continued

- (6) Measure diameter of main shaft bearing surfaces (8) inside transmission housing (9).
- (7) Measure inside diameter of bushing (10).
- (8) If bushing (10) to main shaft bearing surface (8) clearance is greater than 0.0065 in. (0.17 mm), remove bushing.



c. Cleaning and Inspection.

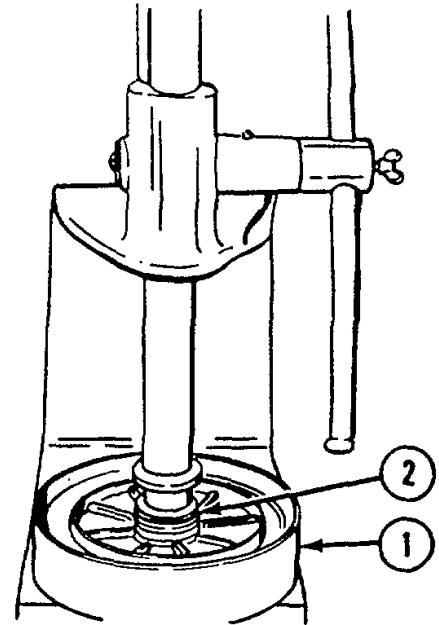
WARNING

Dry cleaning solvent P-D-680 is potentially dangerous. Avoid repeated and prolonged breathing of vapors and skin contact with the liquid. Do not use near open flame, arcing equipment or other ignition sources. Always wear eye protection and protective clothing. The flash point of P-D-680 is 100 to 138 deg. F (38 to 59 deg. C).

- (1) Clean all metallic parts with dry cleaning solvent (Item 3, Appendix E) and inspect for damage. Replace damaged parts.
- (2) Replace piston release springs if any three of each set of 20 do not meet the following load-height requirements:
 - (a) Length without load must be at least 1.29 in. (32.7 mm).
 - (b) Length under load must be at least 0.82 in. (20.8 mm) with load of 4.3 to 5.7 lb (2 to 2.6 kg).
- (3) Measure thrust washer thickness. Thickness must be no less than 0.091 in. (2.31 mm).

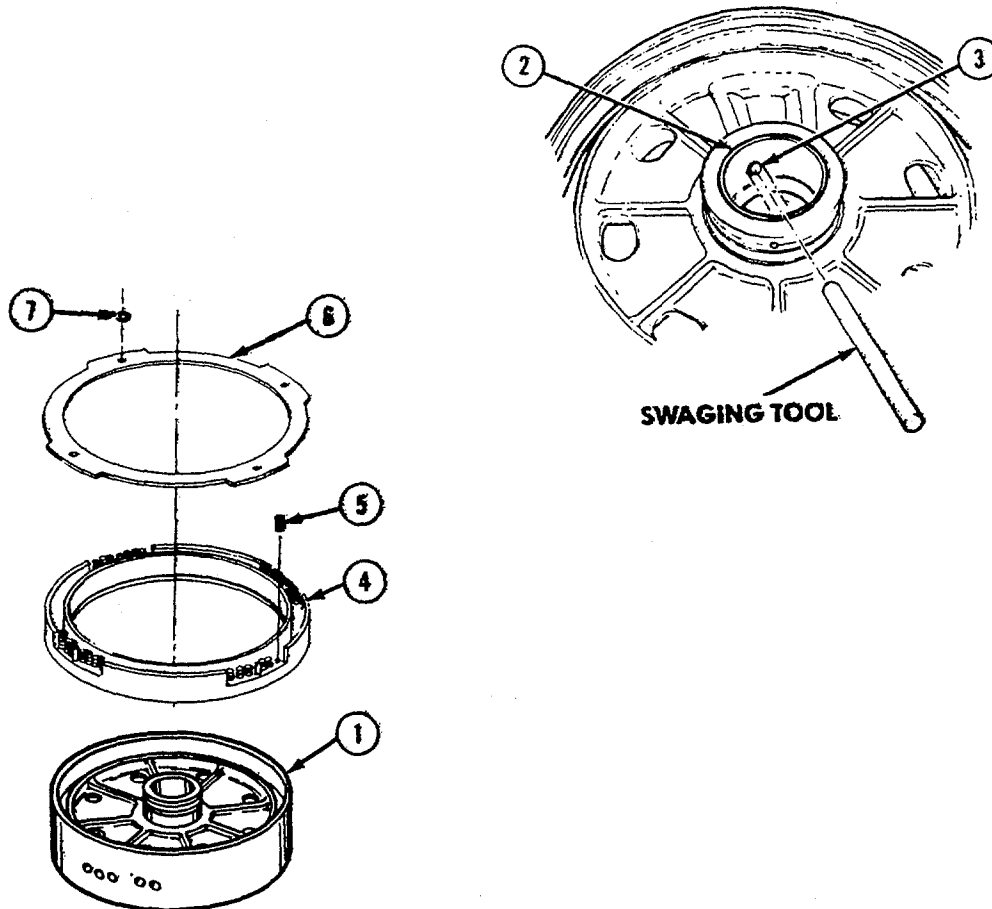
d. Assembly.

- (1) Place center support housing (1) on press, hub side up.
- (2) Install prebored bushing (2). Make sure oil hole in prebored bushing is aligned with oil hole in center support housing (1).



6-60. THIRD CLUTCH AND CENTER SUPPORT HOUSING - Continued

- (3) Use swaging tool (Appendix B, Section III, Item 79) to swage bushing (2) by staking edges of oil hole (3).



- (4) Set third clutch piston (4) in front cavity of center support housing (1).
- (5) Install 20 piston release springs (5) in pockets on third clutch piston (4).
- (6) Install clutch ring (6) on third clutch piston (4).

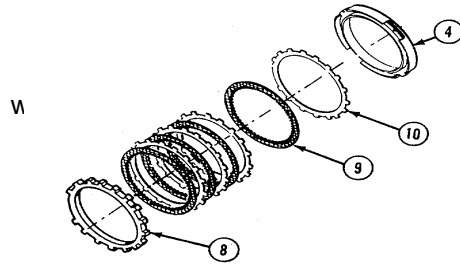
CAUTION

Clutch ring must be pushed completely down in center support housing while installing retaining rings or clutch clearance will be wrong and transmission will not shift properly.

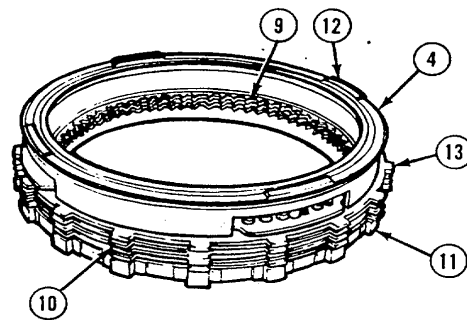
- (7) Install four retainings rings (7). Remove third clutch piston (4) from support housing (1).

6-60. THIRD CLUTCH AND CENTER SUPPORT HOUSING - Continued

- (8) Place back plate (8) on flat surface of press.
- (9) Stack eight clutch plates (9 and 10) on back plate (8), starting with friction plate (9) and alternating
- (10) Place third clutch piston (4) on top of clutch plates (9 and 10).
- (11) Press evenly on third clutch piston (4) with 100 psi (689.5 kPa).



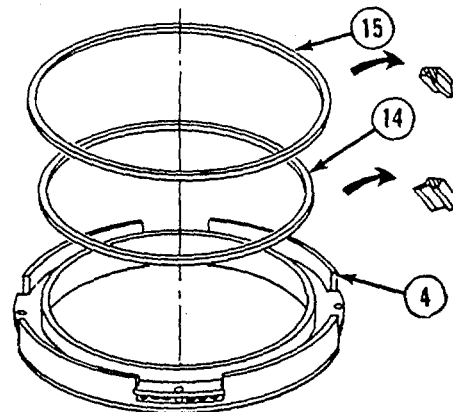
- (12) Measure distance from base of clutch pack (11) to thrust pad (12).
- (13) Clutch pack thickness must be 3.010 to 3.042 in. (76.45 to 77.26 mm). Replace clutch plates (9
- (14) Measure thickness of one tang (13) on each of four steel plates (10).



Clutch pack thickness

- (a) If steel plate measures 0.116 to 0.123 in. (2.95 to 3.12 mm) steel plate is thick.
- (b) If steel plate measures 0.099 to 0.106 in. (2.51 to 2.69 mm) steel plate is thin.

- (15) Repeat steps (8) through (13) to recheck clutch pack thickness.
- (16) Remove clutch pack (11) from press.

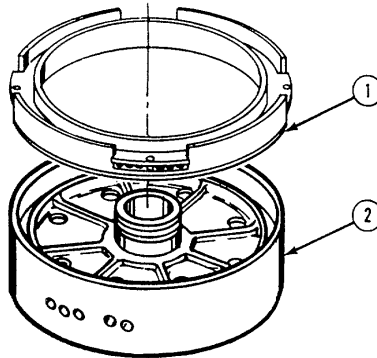


- (17) Apply lubricating oil (Item 10, Appendix E) to new inner seal ring (14) and new outer seal ring (15).
- (18) Install new inner seal ring (14) and new outer seal ring (15) on third clutch piston (4) with lips facing

down.

6-60. THIRD CLUTCH AND CENTER SUPPORT HOUSING - Continued

e. Installation.

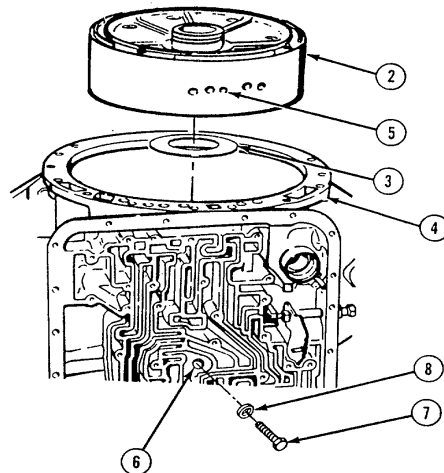


- (1) Install third clutch piston (1) in center support housing (2).
- (2) Install thrust washer (3).

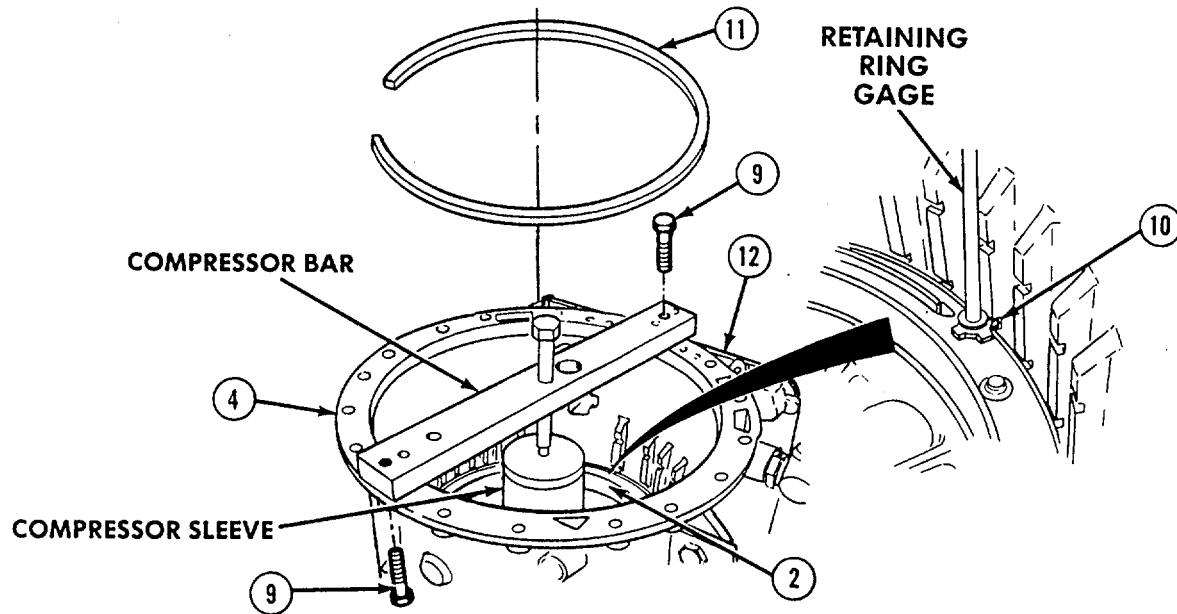
NOTE

Center support housing is fitted to transmission housing with very little clearance and may bind if transmission housing is cold. Heat transmission housing with heat lamp or warm current of air.

- (3) Lower center support housing (2) in transmission housing (4). Make sure tapped hole (5) in support housing is aligned with screw hole (6) in transmission housing.
- (4) Install support housing anchor screw (7) and washer (8). Tighten support housing anchor screw finger-tight.

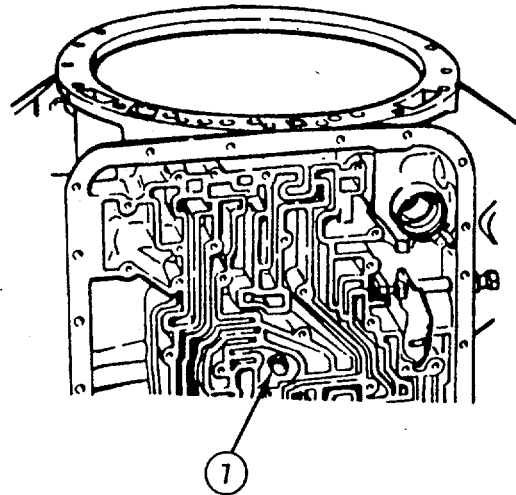


6-60. THIRD CLUTCH AND CENTER SUPPORT HOUSING - Continued



- (5) Install compressor sleeve on hub of center support housing (2) and place compressor bar across transmission housing (4) with two screws (9).
- (6) Tighten compressor center screw to 5 lb-ft (7 N•m) to compress center support housing (2).
- (7) Place snap ring in retaining ring opening (10). Measure retaining ring opening with each of four colored lugs on gauge to determine lug with tightest fit.
 - (a) Blue color coded retaining ring is 0.148 to 0.150-in. (3.76 to 3.81 mm) thick.
 - (b) Yellow color coded retaining ring is 0.152 to 0.154-in. (3.86 to 3.91 mm) thick.
 - (c) White color coded retaining ring is 0.155 to 0.157-in. (3.94 to 3.99 mm) thick.
 - (d) Red color coded retaining ring is 0.158 to 0.160-in. (4.01 to 4.06 mm) thick.
- (8) Install retaining ring (11) that has same color code as lug of gauge. Retaining ring gap must be opposite oil pan side (12) of transmission housing (4).
- (9) Remove compressor bar and compressor sleeve.

6-60. THIRD CLUTCH AND CENTER SUPPORT HOUSING - Continued

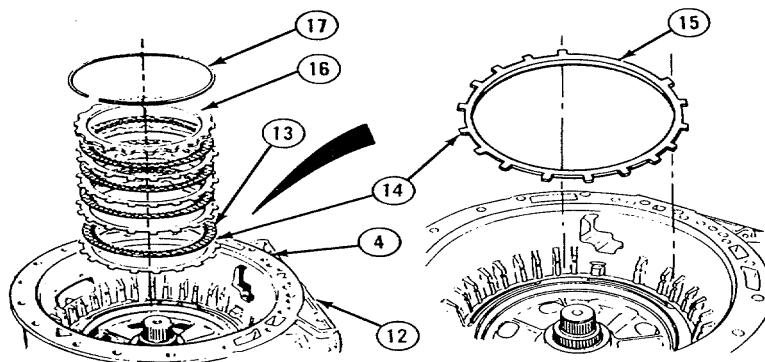


- (10) Tighten support housing screw (7) to 45 lb-ft (61 N•m).
- (11) Soak four friction plates (13) in oil (Item 10, Appendix E) for 2 minutes.

NOTE

Thick external steel plates must be installed on bottom of stack.

- (12) Install external steel plate (14) with gap (15) facing as shown.
- (13) Install seven clutch plates (13 and 14), starting with internal friction plate (13) and alternating with external steel plate (14).



- (14) Install backplate (16).
- (15) Install retaining ring (17) with gap opposite oil pan side (12) of transmission housing (4).

f. Follow-on Maintenance.

- (1) Install fourth clutch assembly (see para 6-59).

6-61. SECOND CLUTCH AND CENTER SUPPORT HOUSING

This task covers:

- | | |
|----------------------------|--------------------------|
| a. Removal | d. Assembly |
| b. Disassembly | e. Installation |
| c. Cleaning and Inspection | f. Follow-on Maintenance |

TOOLS REQUIRED

Tool Kit, General Mechanics, Automotive
(Appendix B, Section 111, Item 1)

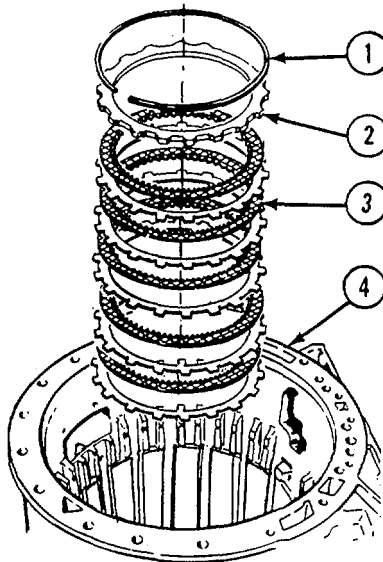
Shop Equipment, Automotive
Maintenance and Repair
(Appendix B, Section 111, Item 4)

MATERIALS/PARTS REQUIRED

Oil, Lubricating (Item 10, Appendix E)
Solvent, Dry Cleaning (Item 3, Appendix E)
Seal Ring (Figure 140, Appendix F)

EQUIPMENT CONDITION

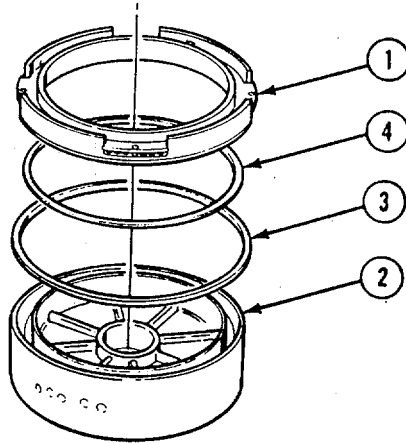
Third Clutch and Center Support Housing
Removed (see para 6-60.)

a. Removal.

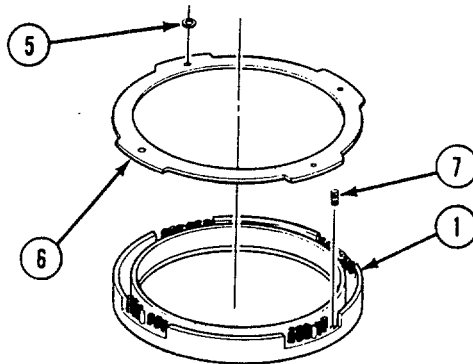
- (1) Remove retaining ring (1).
- (2) Remove seven external steel plates (2) and six internal friction plates (3) from transmission housing (4).

6-61. SECOND CLUTCH AND CENTER SUPPORT HOUSING - Continued

b. Disassembly.



- (1) Remove second clutch piston (1) from bottom of center support housing (2).
- (2) Remove outer seal ring (3) and inner seal ring (4) from second clutch piston (1) and discard.
- (3) Cut and remove four retaining rings (5) and discard.
- (4) Remove clutch ring (6) from second clutch piston (1).
- (5) Remove 20 springs (7) from second clutch piston (1).



6-61. SECOND CLUTCH AND CENTER SUPPORT HOUSING - Continued

c. Cleaning and Inspection.

WARNING

Dry cleaning solvent P-D-680 is potentially dangerous. Avoid repeated and prolonged breathing of vapors and skin contact with the liquid. Do not use near open flame, arcing equipment or other ignition sources. Always wear eye protection and protective clothing. The flash point of P-D-680 is 100 to 138 deg. F (38 to 59 deg. C).

- (1) Clean all metallic parts with dry cleaning solvent (Item 3, Appendix E) and inspect for damage. Replace damaged parts.
- (2) Replace piston release springs if any three in each set of 20 do not meet the following load-height requirements:
 - (a) Length without load must be at least 1.29 in. (32.7 mm).
 - (b) Length under load must be at least 0.82 in. (20.8 mm) with load of 4.3 to 5.7 lb (1.95 to 2.59 kg).

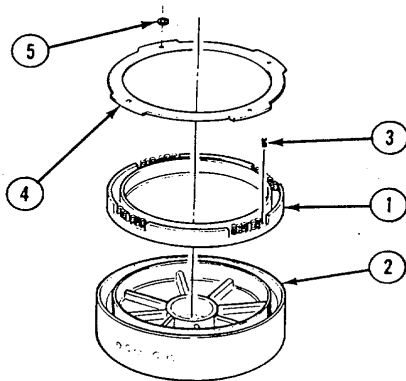
d. Assembly.

- (1) Set second clutch piston (1) in rear cavity of center support housing (2).
- (2) Install 20 piston release springs (3) in second clutch piston (1).
- (3) Install clutch ring (4) on second clutch piston (1).

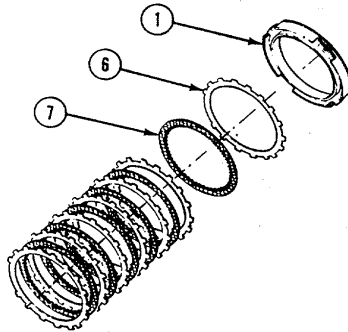
CAUTION

Clutch ring must be pushed completely down in center support housing while installing retaining rings or clutch clearance will be wrong.

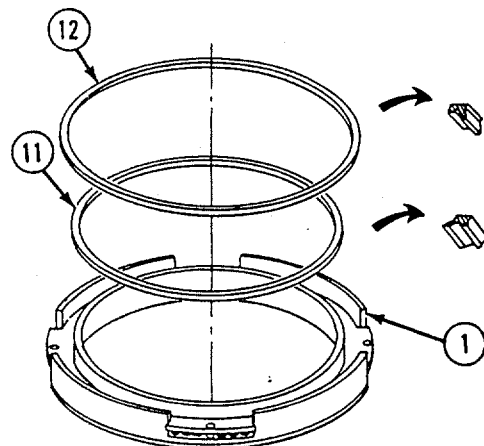
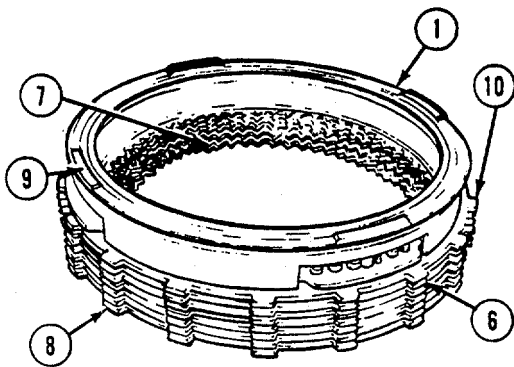
- (4) Install four new retaining rings (5). Remove second clutch piston (1) from center support housing (2).



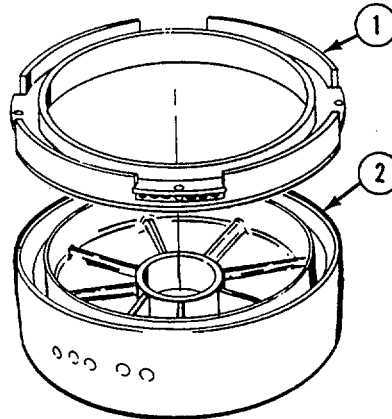
6-61. SECOND CLUTCH AND CENTER SUPPORT HOUSING - Continued



- (5) Stack 13 clutch plates (6 and 7) on fiat surface of press, starting with external steel plate (6) and alternating with internal friction plate (7).
- (6) Place second clutch piston (1) on top of clutch plates (6 and 7).
- (7) Press evenly on second clutch piston (1) with 100 psi (689.5 kPa).
- (8) Measure distance from base of clutch pack (8) on top of thrust pad (9).
- (9) Clutch pack thickness must be 3.136 to 3.161 in. (79.65 to 80.29 mm). Replace clutch plates (6 and 7) as needed to ensure proper clutch pack thickness.
- (10) Measure thickness of one tang (10) on each of seven steel plates (6).
 - (a) If steel plate measures 0.116 to 0.123 in. (2.95 to 3.12 mm), steel plate is thick.
 - (b) If steel plate measures 0.099 to 0.106 in. (2.51 to 2.69 mm), steel plate is thin.
- (11) Repeat steps (5) through (9) to recheck clutch pack thickness.
- (12) Remove clutch pack (8) from press.
- (13) Apply lubricating oil (Item 10, Appendix E) to new inner seal ring (11) and new outer seal ring (12) and install inner seal ring and outer seal ring on second clutch piston (1) with lips facing down.



6-61. SECOND CLUTCH AND CENTER SUPPORT HOUSING - Continued



(14) Install second clutch piston (1) in bottom of center support housing (2).

e. Installation.

(1) Soak six friction plates (1) in oil (Item 10, Appendix E) for 2 minutes.

NOTE

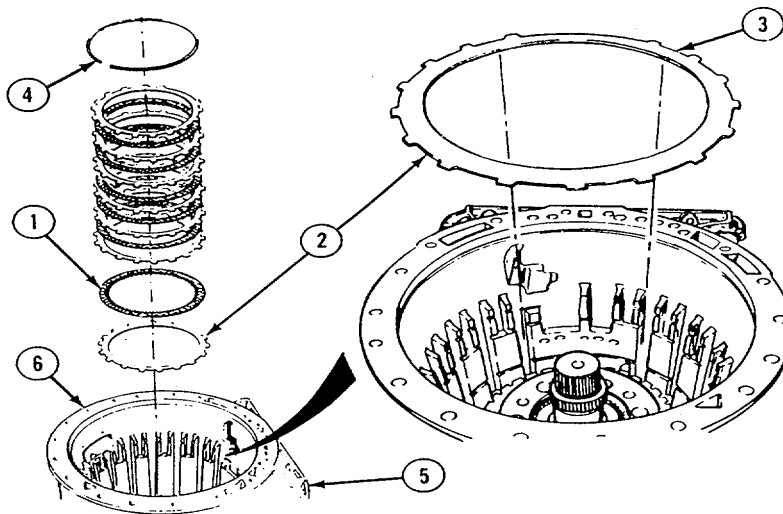
Thick external steel plates must be installed on top of stack.

(2) Install external steel plates (2) with gap (3) facing as shown.

(3) Install 12 clutch plates (1 and 2), starting with external steel plate (2) and alternating with internal friction plate (1).

(4) Install retaining ring (4) with gap opposite oil pan side (5) of transmission housing (6).

f. Follow-on Maintenance. Install third clutch and center support housing (see para 6-60).



6-62. CONTROL VALVE BODY

This task covers:

- | | |
|----------------------------|--------------------------|
| a. Removal | d. Assembly |
| b. Disassembly | e. Installation |
| b. Cleaning and Inspection | f. Follow-on Maintenance |

TOOLS REQUIRED:

Tool Kit, General Mechanics, Automotive
(Appendix B, Section III, Item 1)

Shop Equipment, Automotive
Maintenance and Repair
(Appendix B, Section 111, Item 4)

MATERIAL/PARTS REQUIRED

Oil, Lubricating (Item 10, Appendix E)
Solvent, Dry Cleaning (Item 3, Appendix E)
Tags, Identification (Item 32, Appendix E)

PERSONNEL REQUIRED: 2

EQUIPMENT CONDITION

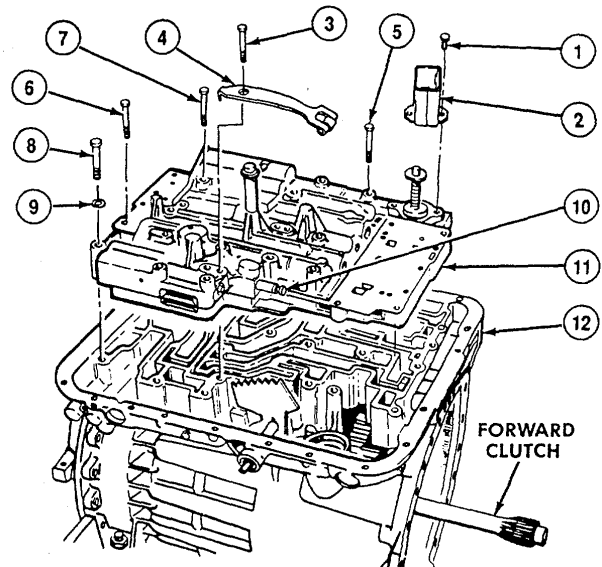
Modulator Valve Removed (see para 6-63.)
Lockup Cutoff Valve Body Removed
(see para 6-64.)

a. Removal.

CAUTION

Be sure forward clutch is secured before turning transmission. Clutch could fall and be damaged if not secured.

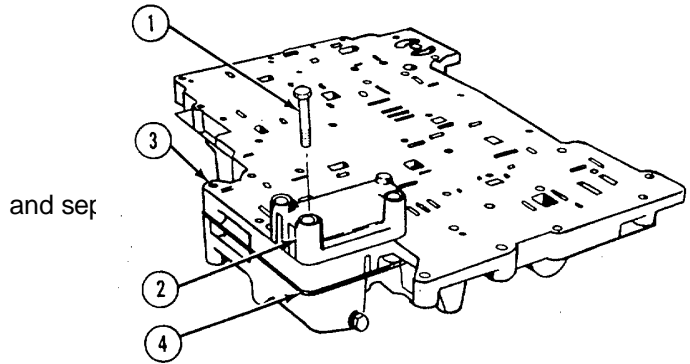
- (1) Remove two screws (1) and oil baffle (2).
- (2) Remove screw (3) and manual detent lever (4).
- (3) Remove 15 screws (5), seven screws (6), three screws (7), two screws (8), and two washers (9).
- (4) While holding selector valve (10), remove control valve body (11) from transmission housing (12).



6-62. CONTROL VALVE BODY - Continued

b. Disassembly.

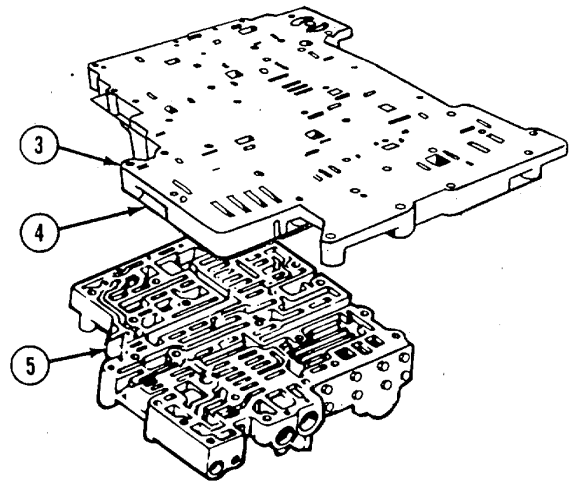
- (1) Remove three screws (1) from modulator valve body (2).
- (2) Remove modulator valve body (2) while holding oil transfer plate (3) and separator plate (4).



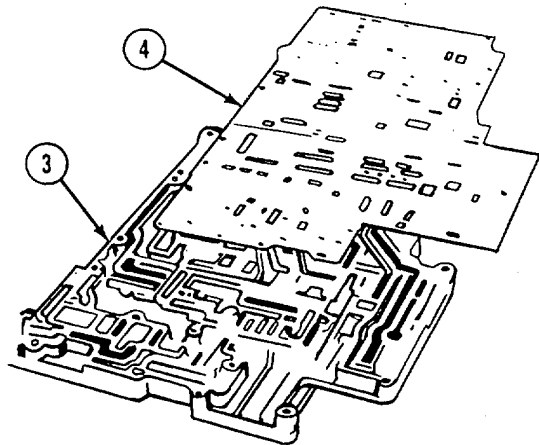
NOTE

Turn transfer plate and separator plate over before placing on work surface.

- (3) Hold oil transfer plate (3) and separator plate (4) together and remove from control valve body (5).



- (4) Lift separator plate (4) from oil transfer plate (3).

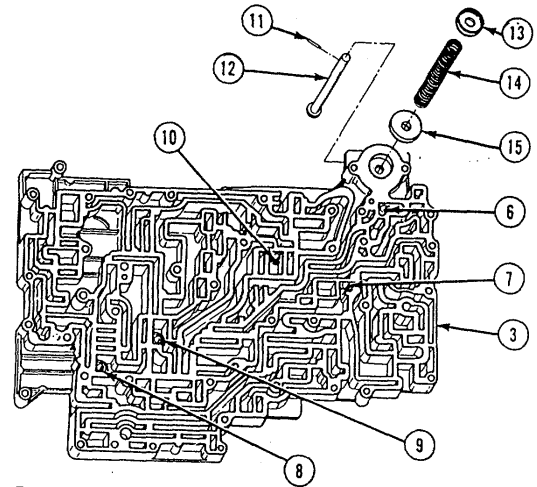


6-62. CONTROL VALVE BODY - Continued

NOTE

Record and identify check balls by size and location.

- (5) Remove check balls (6, 7, 8, 9, and 10).
- (6) Remove retaining pin (11) from check valve pin (12) while other person presses down on cup washer (13).
- (7) Remove cup washer (13), spring (14), lubrication check valve (15), and check valve pin (12) from oil transfer plate (3).



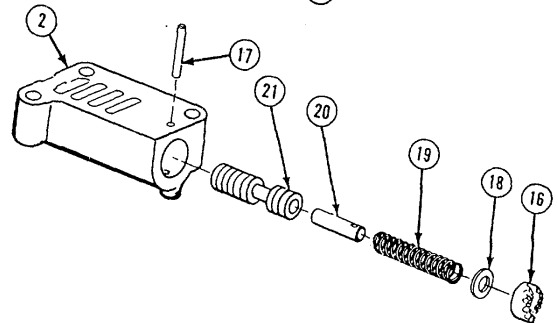
WARNING

All valves are under spring tension. Release springs slowly to avoid personal injury.

CAUTION

Do not use magnets to remove valve bodies.

Ma

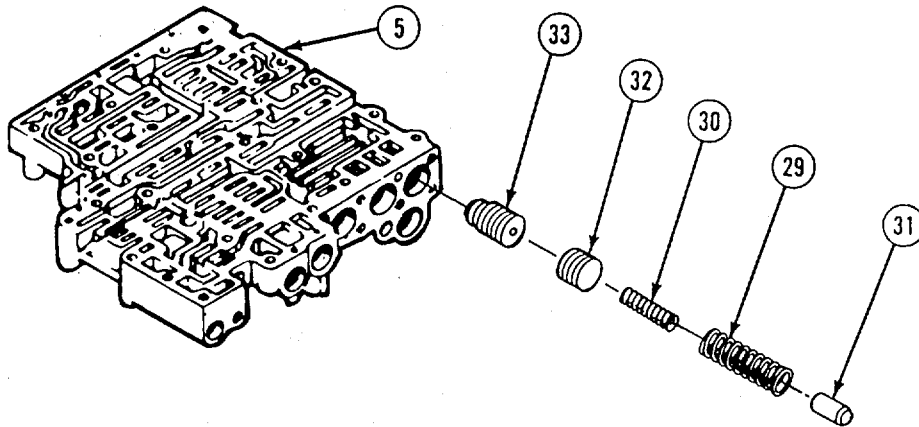
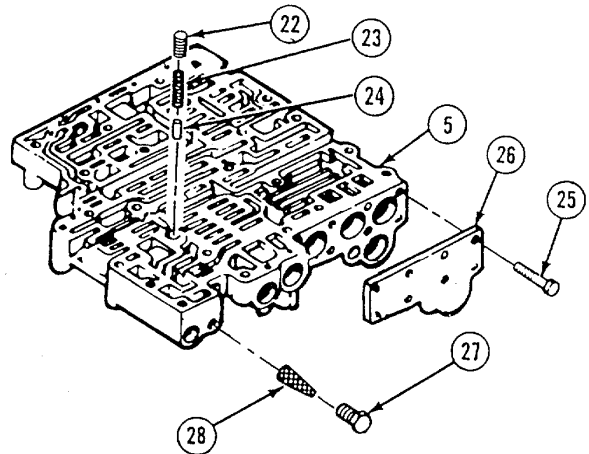


NOTE

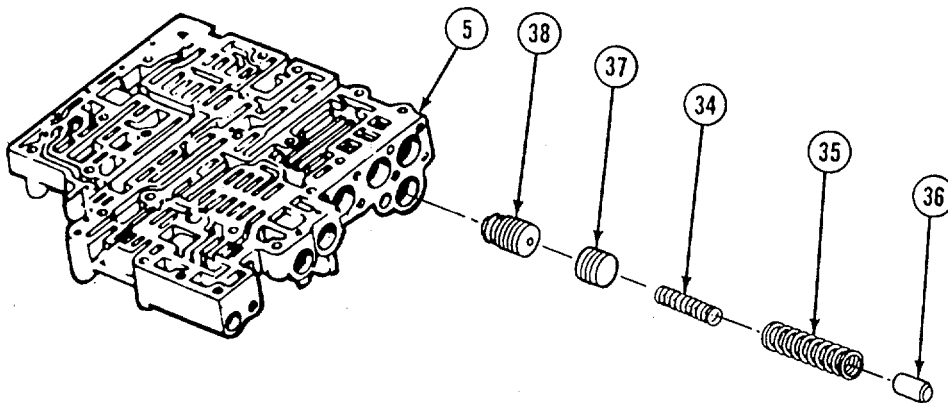
- Tag (Item 32, Appendix E) and mark all parts before removing.
 - Record each notch on adjusting ring that touches retaining pin.
- (8) Press adjusting ring (16) inward and remove retaining pin (17) from modulator valve body (2).
 - (9) Remove adjusting ring (16), washer (18), spring (19), valve stop (20), and valve (21) from modulator valve body (2).

6-62. CONTROL VALVE BODY - Continued

- (10) Remove priority valve (22), spring (23), and valve stop (24) from control valve body (5).
- (11) Remove six screws (25).
- (12) Remove last two screws (25) evenly while holding down trimmer valve cover (26). Remove trimmer valve cover.
- (13) Remove plug (27) and governor screen assembly (28) from control valve body (5).

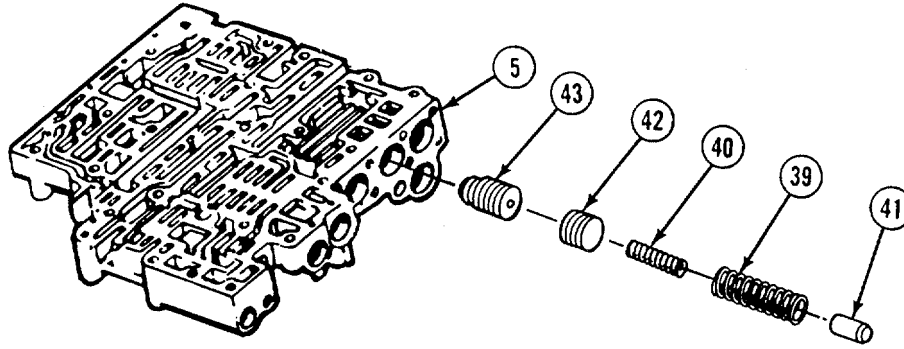


- (14) Remove two springs (29 and 30), valve stop (31), trimmer plug (32), and third clutch trimmer valve (33) from control valve body (5).

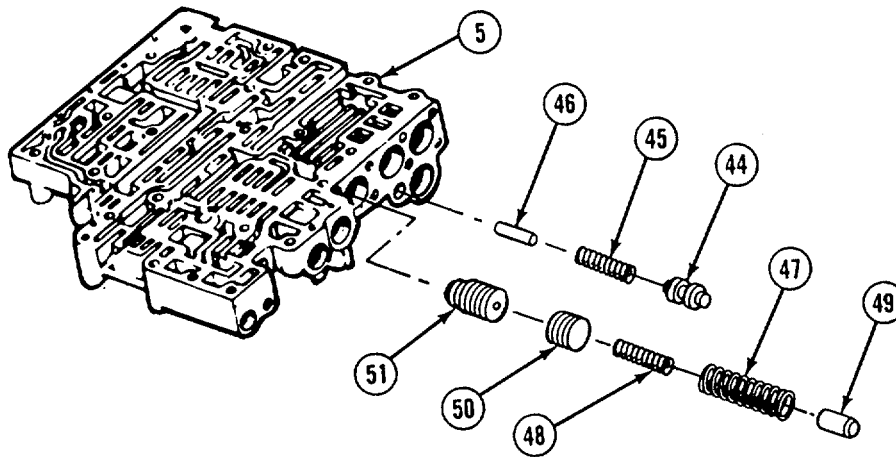


- (15) Remove two springs (34 and 35), valve stop (36), plug (37), and first clutch trimmer valve (38) from control valve body (5).

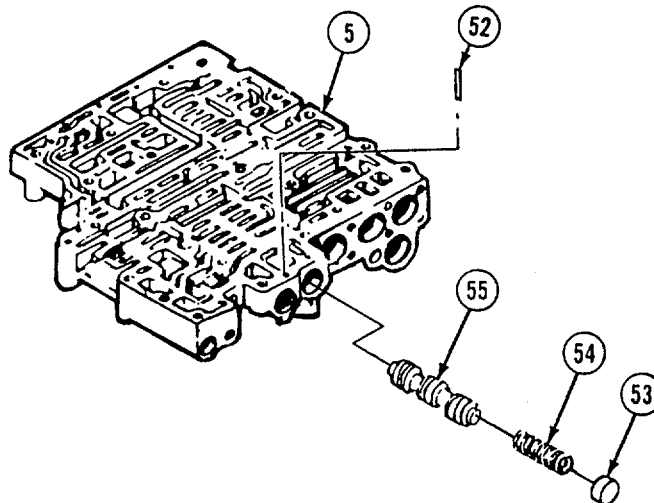
6-62. CONTROL VALVE BODY - Continued



- (16) Remove two springs (39 and 40), valve stop (41), plug (42), and second clutch trimmer valve (43) from control valve body (5).

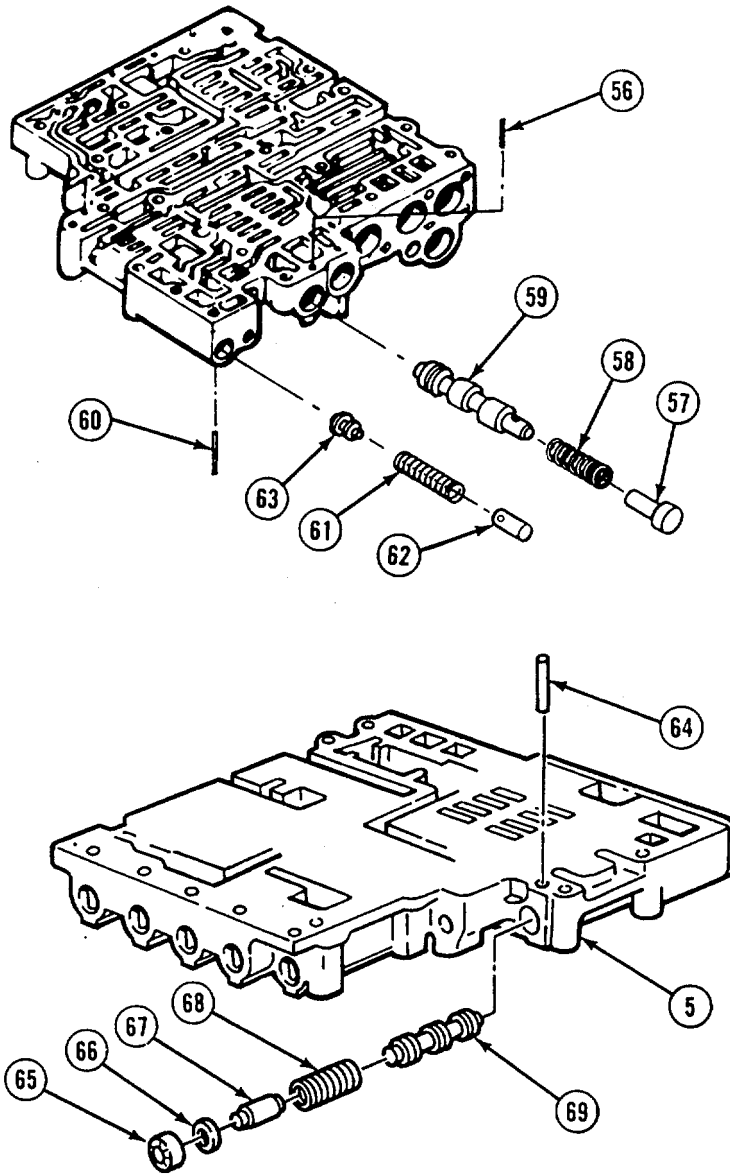


- (17) Remove accumulator valve (44), spring (45), and valve stop (46).
- (18) Remove two springs (47 and 48), valve stop (49), plug (50), and fourth clutch trimmer valve (51) from control valve body (5).
- (19) Remove retaining pin (52), valve stop (53), spring (54), and two-three relay valve (55) from control valve body (5).



6-62. CONTROL VALVE BODY - Continued

- (20) Remove retainer pin (56), spring spacer (57), spring (58), and one-two relay valve (59).
- (21) Remove retaining pin (60), spring (61), valve stop (62), and accumulator valve (63).

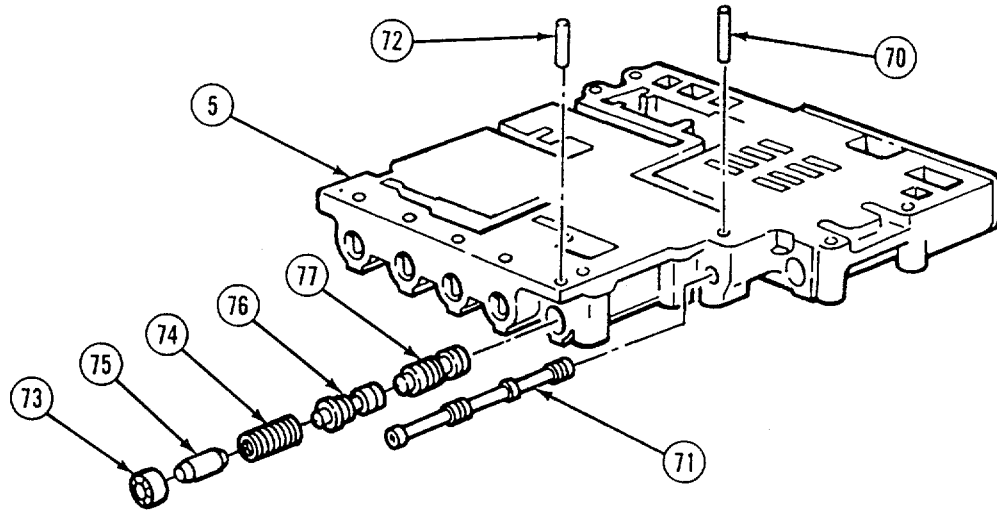


NOTE

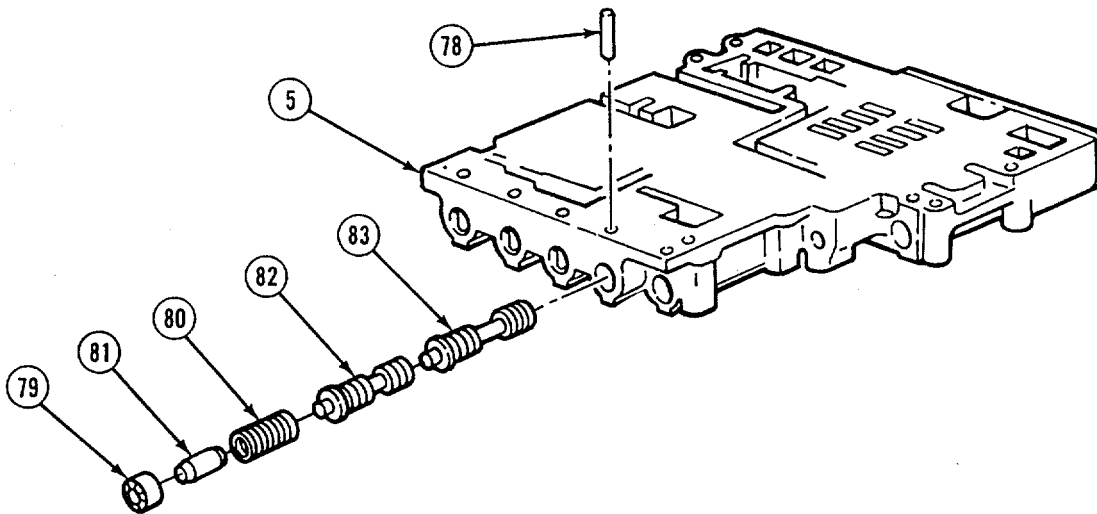
Record each notch on adjusting ring that touch retaining pins.

- (22) Remove retaining pin (64), adjusting ring (65), washer (66), valve stop (67), valve spring (68), and regulator valve (69) from control valve body (5).

6-62. CONTROL VALVE BODY - Continued

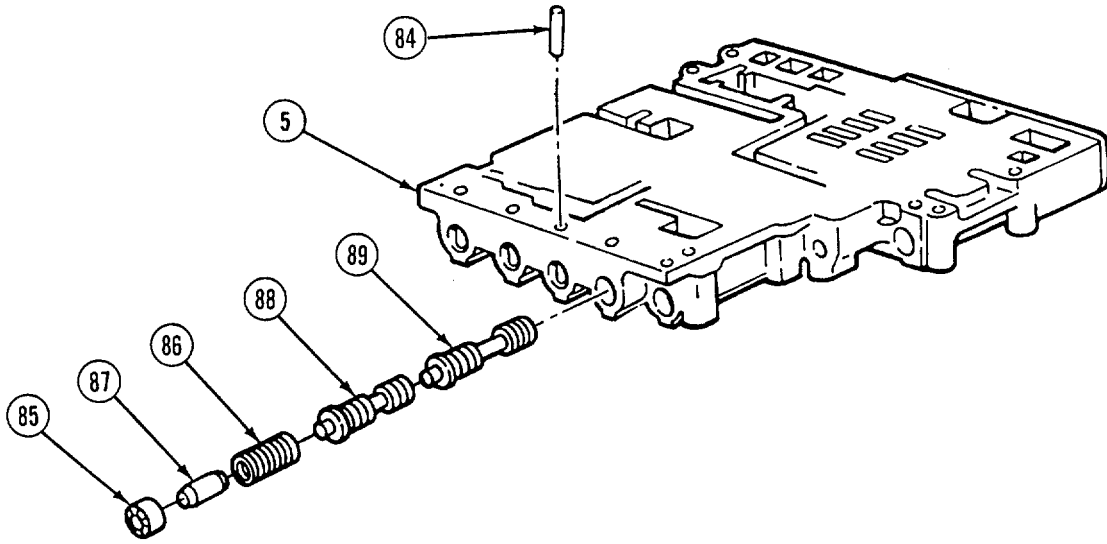


- (23) Remove retaining pin (70) and selector valve (71).
- (24) Remove retaining pin (72), adjusting ring (73), valve spring (74), valve stop (75), one-two modulator valve (76), and one-two shift valve (77) from control valve body (5).

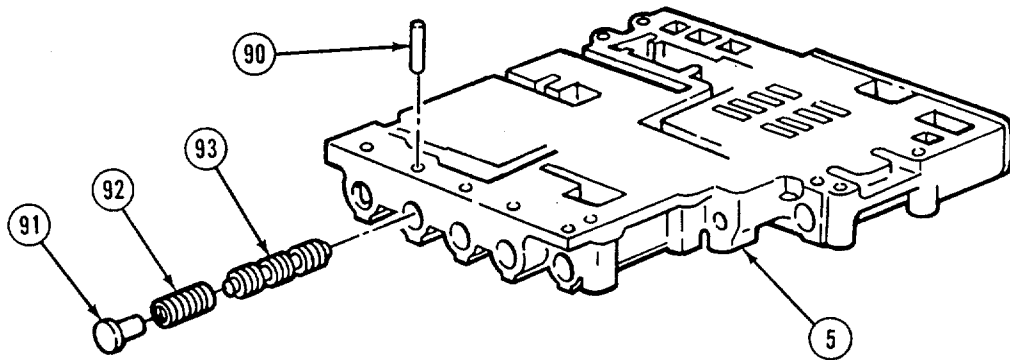


- (25) Remove retaining pin (78), adjusting ring (79), valve spring (80), valve stop (81), two-three modulator valve (82), and two-three shift valve (83) from control valve body (5).

6-62. CONTROL VALVE BODY - Continued

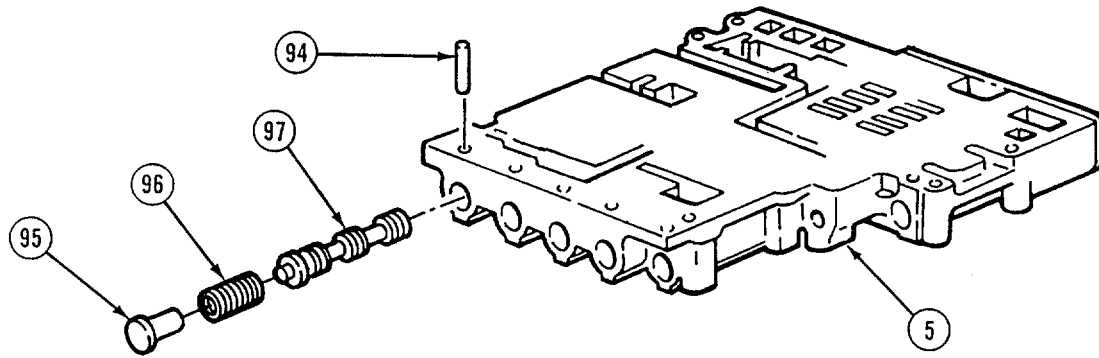


- (26) Remove retaining pin (84), adjusting ring (85), valve spring (86), valve stop (87), three-four modulator valve (88), and three-four shift valve (89) from control valve body (5).



- (27) Remove retaining pin (90), valve stop (91), valve spring (92), and three-four relay valve (93) from control valve body (5).

6-62. CONTROL VALVE BODY - Continued



- (28) Remove retaining pin (94), valve stop (95), valve spring (96), and trimmer regulator valve (97) from control valve body (5).

c. Cleaning and Inspection.**WARNING**

Dry cleaning solvent P-D-680 is potentially dangerous. Avoid repeated and prolonged breathing of vapors and skin contact with the liquid. Do not use near open flame, arcing equipment or other ignition sources. Always wear eye protection and protective clothing. The flash point of P-D-680 is 100 to 138 deg. F (38 to 59 deg. C).

- (1) Clean all metallic parts with dry cleaning solvent (Item 3, Appendix E).
- (2) Inspect all valves, valve stops, and plugs for damage. Replace damaged parts.
- (3) Inspect bores and surfaces of control valve body for damage. Replace if damaged.
- (4) Replace springs which do not meet load-length specifications listed in Table a.

6-62. CONTROL VALVE BODY - Continued

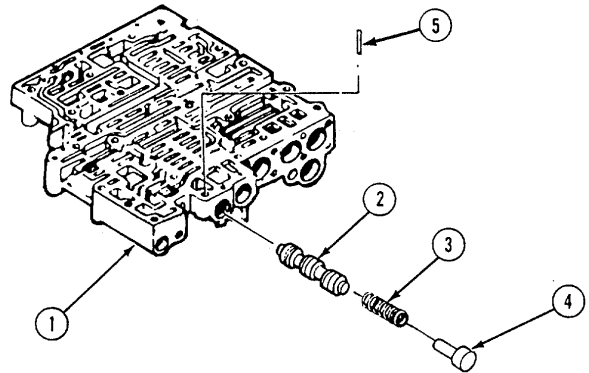
Table a. Spring Load-Length Specifications

Spring	Length Without Load in. (mm)	Length Under Load In. (mm)	Load lb (kg)	Text Reference	
				Step No.	Callout No.
Lubrication Check Valve	2.48 (63.0)	1.97 (50.0)	32.25 - 37.05 (14.6 - 16.8)	(7)	(14)
Modulator Valve	1.47 (37.3)	0.80 (20.3)	11.9 - 13.1 (5.40 - 5.95)	(9)	(19)
Priority Valve	1.17 (29.7)	0.94 (23.9)	8.15 - 9.25 (3.7 - 4.2)	(10)	(23)
Third Clutch Trimmer Valve	1.69 (42.9)	1.10 (27.9)	32.6 - 39.8 (14.80 - 18.07)	(14)	(30)
Third Clutch Trimmer Valve	2.18 (55.4)	1.94 (49.3)	6.2 - 7.4 (2.81 - 3.36)	(14)	(29)
First Clutch Trimmer Valve	1.69 (42.9)	1.10 (27.9)	32.6 - 39.8 (14.80 - 18.07)	(15)	(34)
First Clutch Trimmer Valve	2.96 (75.2)	1.10 (27.9)	8.30 - 10.30 (3.77 - 4.68)	(15)	(35)
Second Clutch Trimmer Valve	1.69 (42.9)	1.10 (27.9)	32.6 - 39.8 (14.80 - 18.07)	(16)	(40)
Second Clutch Trimmer Valve	2.56 (65.0)	1.94 (49.3)	20 - 22 (9.07 - 9.98)	(16)	(39)
Accumulator Valve	2.77 (70.4)	1.49 (37.9)	11.6 - 12.8 (5.27 - 5.81)	(17)	(45) (
Fourth Clutch Trimmer Valve	1.45 (36.8)	1.10 (27.9)	21.7 - 25.3 (9.84 - 11.47)	(18)	(48)
Fourth Clutch Trimmer Valve	2.27 (57.7)	1.94 (49.3)	9.4 - 11.4 (4.26 - 5.17)	(18)	(47)
2-3 Relay Valve	2.18 (55.4)	1.20 (30.5)	16.2 - 19.8 (7.35 - 8.99)	(19)	(54)
1-2 Relay Valve	1.52 (38.6)	1.10 (27.9)	7.2 - 8.8 (3.27 - 3.00)	(20)	(58)
Governor Accumulator Valve	1.84 (46.7)	0.7 (17.8)	9.6 - 10.6 (4.35 - 4.81)	(21)	(61)
Regulator Valve	1.68 (42.7)	1.15 (29.2)	5.14 - 5.36 (2.33 - 2.43)	(22)	(68)
1-2 Shift Valve	2.39 (60.7)	1.15 (29.2)	7.18 - 7.68 (3.26 - 3.48)	(24)	(74)
2-3 Shift Valve	2.51 (63.8)	1.15 (29.2)	10.75 - 11.25 (4.88 - 5.11)	(25)	(80)
3-4 Shift Valve	2.41 (61.2)	1.15 (29.2)	10.0 - 10.5 (4.54 - 4.76)	(26)	(86)
3-4 Relay Valve	2.18 (55.4)	1.20 (30.5)	16.2 - 19.8 (7.35 - 8.99)	(27)	(92)
Trimmer Regulator Valve	1.37 (34.8)	0.89 (22.6)	2.43 - 2.69 (1.10 - 1.22)	(28)	(96)

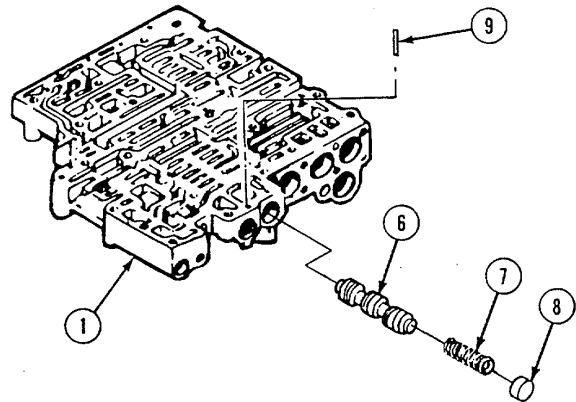
6-62. CONTROL VALVE BODY - Continued

d. Assembly.

- (1) Place control valve body (1) with flat side up.
- (2) Install one-two relay valve (2), spring (3), and spring spacer (4) in bore of control valve body (1).
- (3) Press spring spacer (4) and install retaining pin (5) in control valve body (1).



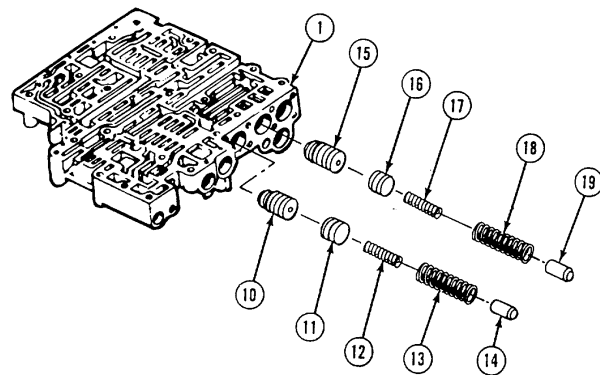
- (4) Install two-three relay valve (6), spring (7), and valve stop (8) in control valve body (1).
- (5) Press valve stop (8) and install retainer pin (9) in control valve body (1).



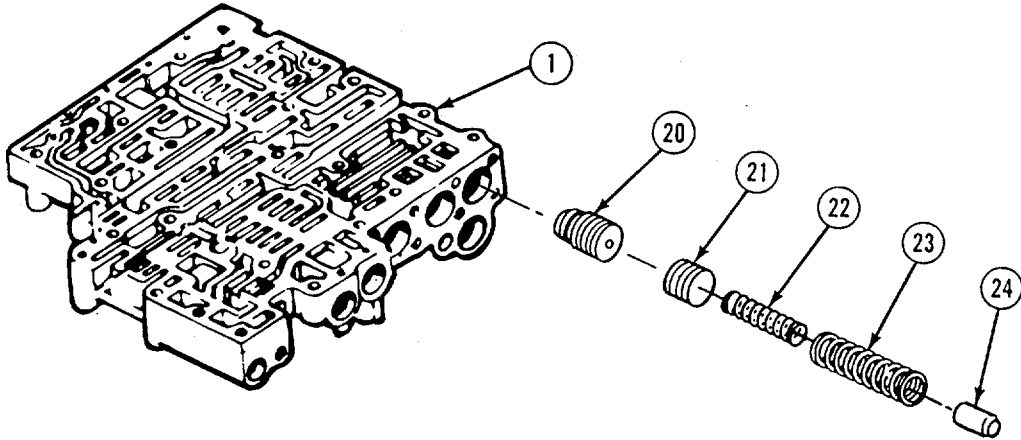
NOTE

Install four clutch trimmer valves with small end first.

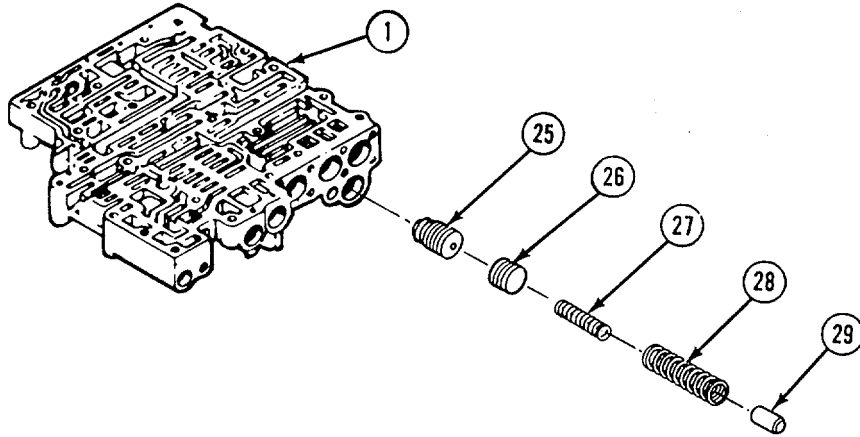
- (6) Install fourth clutch trimmer valve (10), plug (11), spring (12), spring (13), and valve stop (14).
- (7) Install second clutch trimmer valve (15), plug (16), spring (17), spring (18), and valve stop (19) in control valve body (1).



6-62. CONTROL VALVE BODY - Continued

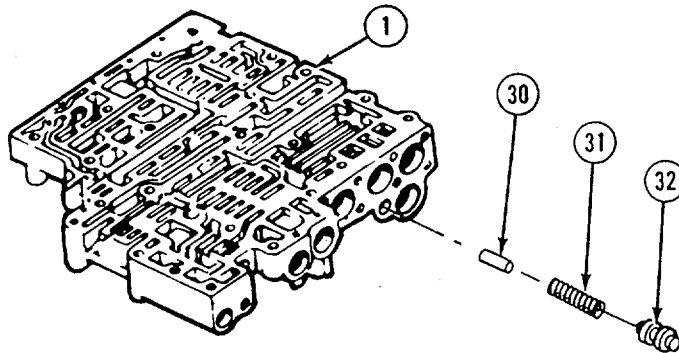


- (8) Install third clutch trimmer valve (20), plug (21), spring (22), spring (23), and valve stop (24) in control valve body (1).

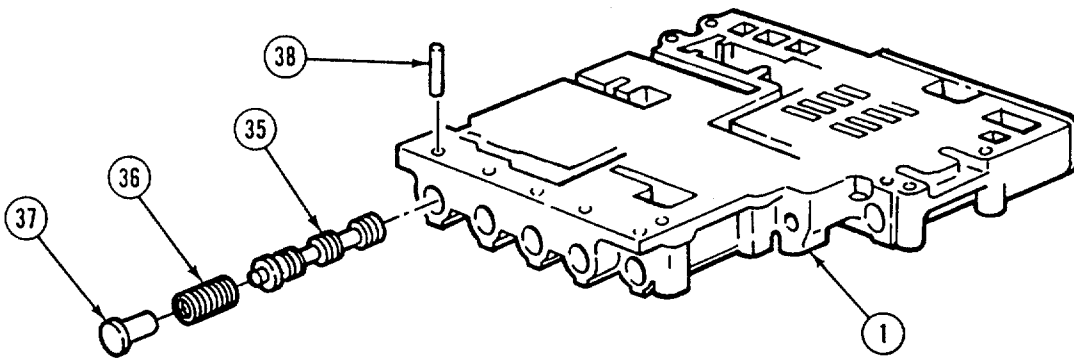
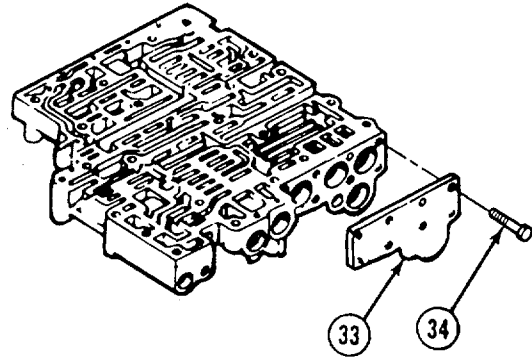


- (9) Install first clutch trimmer valve (25), plug (26), secondary spring (27), primary spring (28), and valve stop (29) in control valve body (1).

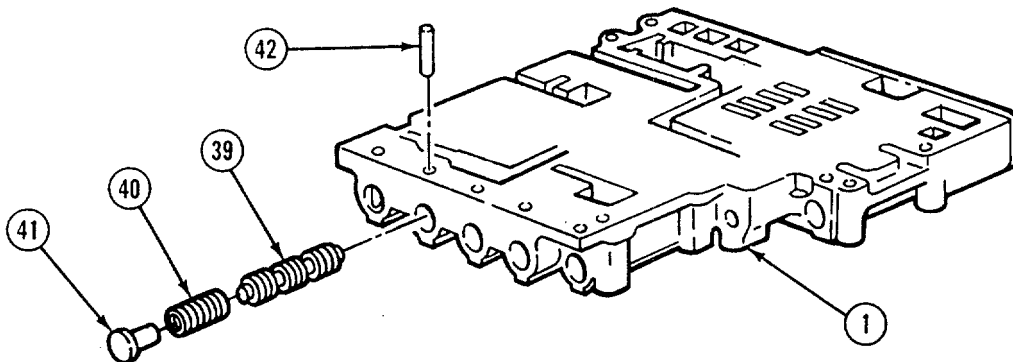
- (10) Install valve stop (30), spring (31), and accumulator valve (32) in control valve body (1).



6-62. CONTROL VALVE BODY- Continued

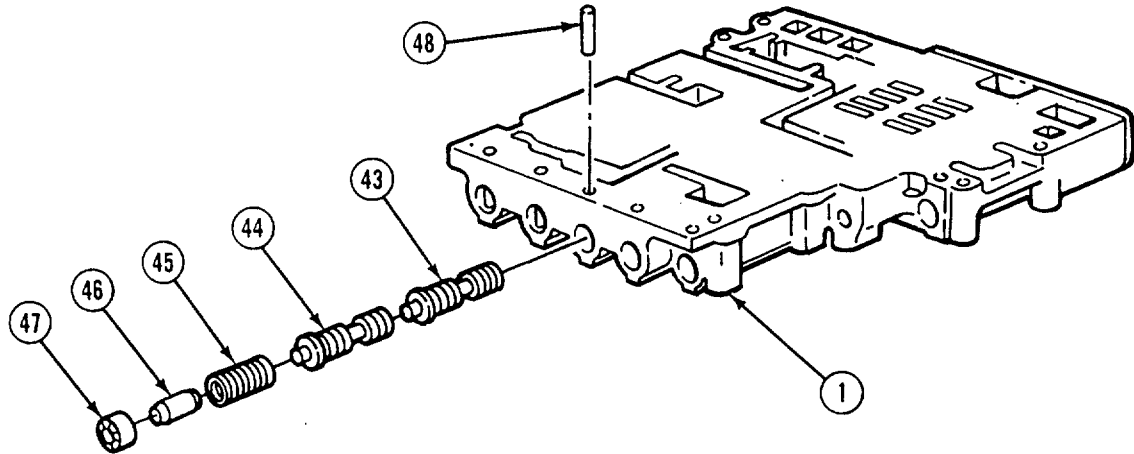


- (11) Install trimmer valve cover (33) and eight screws (34) while pressing on springs. Tighten screws to 48 to 60 lb-in. (5.4 to 6.8 N m).
- (12) Install trimmer regulator valve (35), valve spring (36), and valve stop (37) in control valve body (1).
- (13) Press valve stop (37) and install retaining pin (38) in control valve body (1).

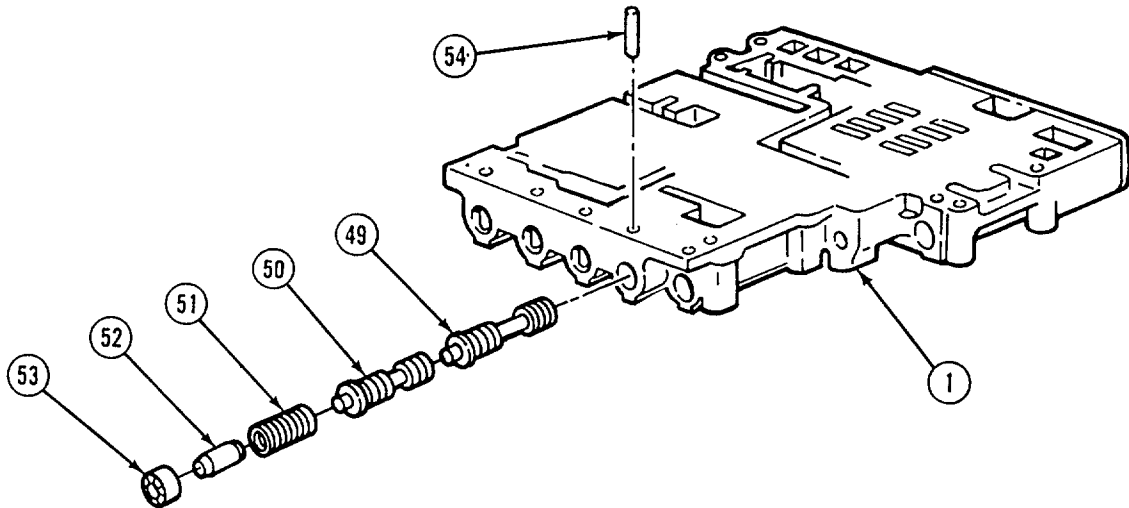


- (14) Install three-four relay valve (39), valve spring (40), and Valve stop (41).
- (15) Press valve stop (41) and install retaining pin (42) in control valve body (1).

6-62. CONTROL VALVE BODY - Continued

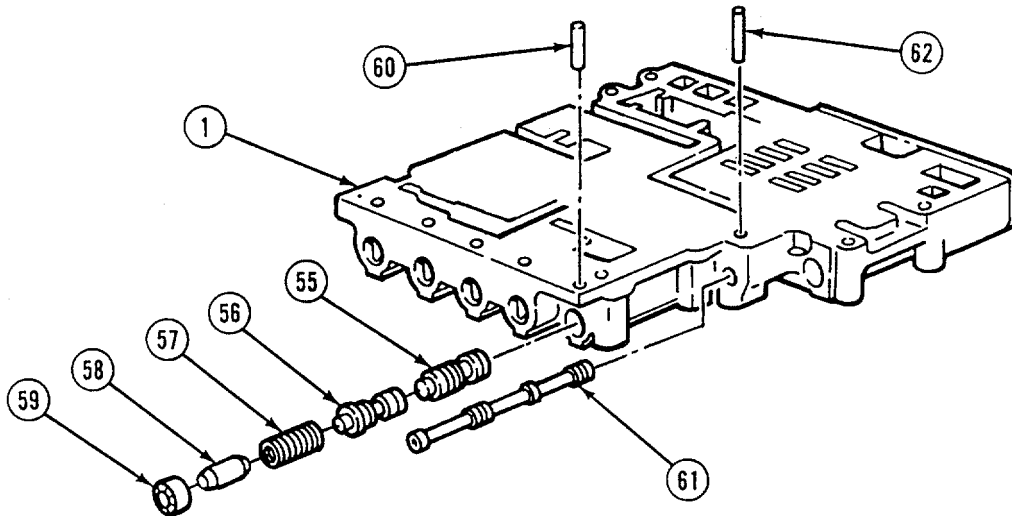


- (16) Install three-our shift valve (43), modulator valve (44), valve spring (45), valve stop (46), and adjusting ring (47).
- (17) Align pinhole in valve stop (46) with pinholes in control valve body (1).
- (18) Press adjusting ring (47) and install retaining pin (48) in control valve body (1).

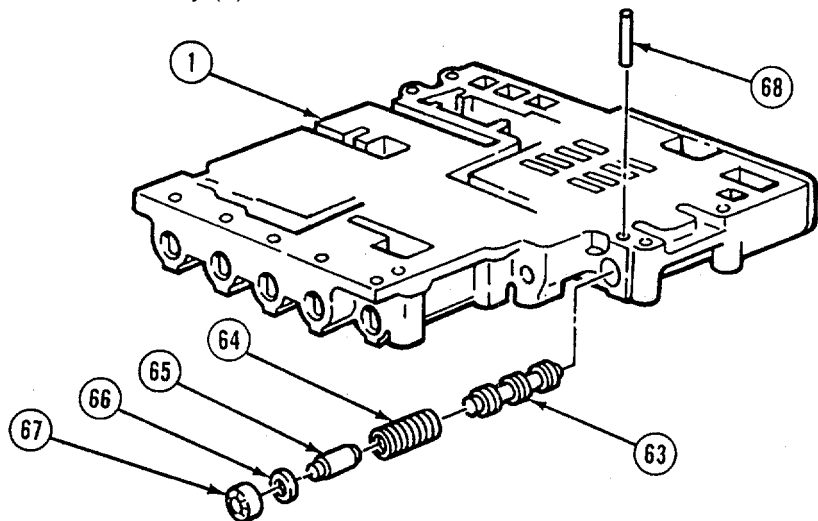


- (19) Install two-three shift valve (49), two-three modulator valve (50), valve spring (51), valve stop (52), and adjusting ring (53).
- (20) Align pinhole in valve stop (52) with pinholes in control valve body (1).
- (21) Press adjusting ring (53) and install retaining pin (54) in control valve body (1).

6-62. CONTROL VALVE BODY - Continued



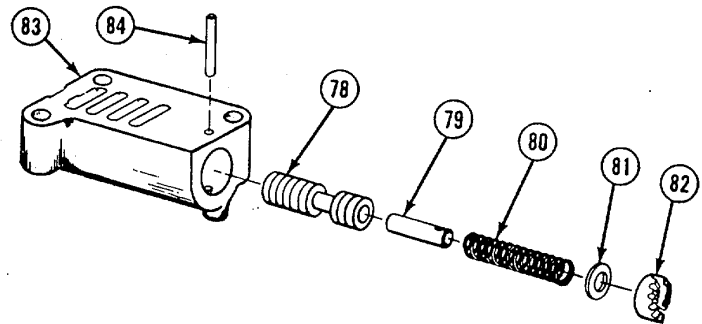
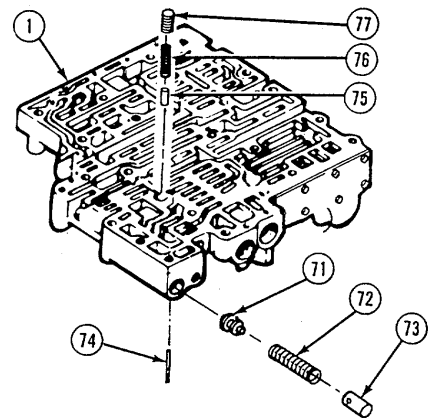
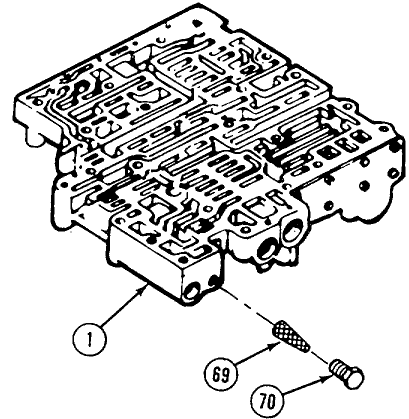
- (22) Install one-two shift valve (55), one-two modulator valve (56), spring (57), valve stop (58), and adjusting ring (59).
- (23) Align pinhole in valve stop (58) with pinholes in control valve body (1).
- (24) Press adjusting ring (59) and install retaining pin (60) in control valve body (1).
- (25) Install selector valve (61).
- (26) Align pinhole in selector valve (61) with pinhole in control valve body (1).
- (27) Install retaining pin (62) in control valve body (1).



- (28) Install regulator valve (63), valve spring (64), valve stop (65), washer (66), and adjusting ring (67).
- (29) Align pinhole in valve stop (65) with pinholes in control valve body (1).
- (30) Press adjusting ring (67) and install retaining pin (68) in control valve body (1).

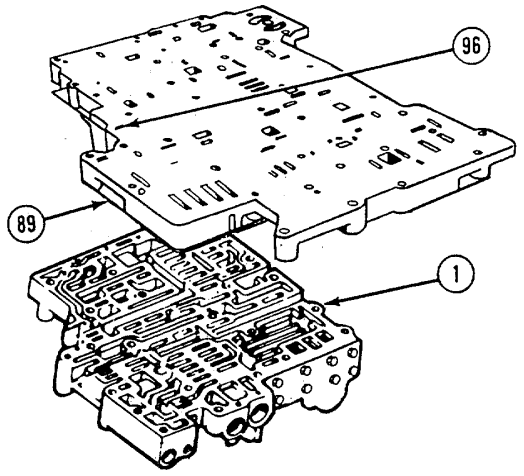
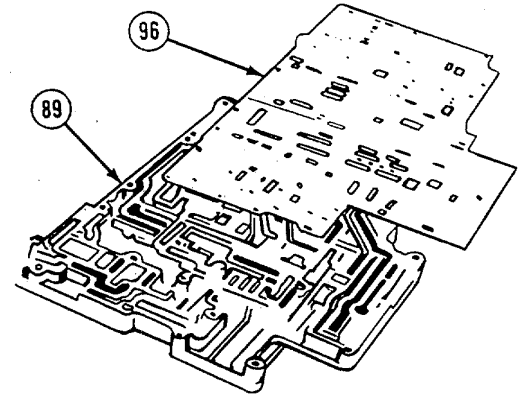
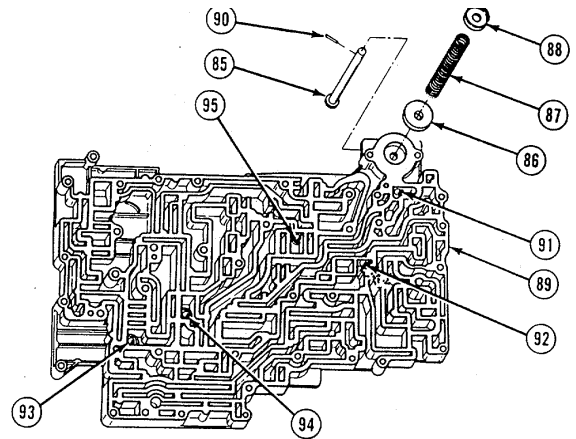
6-62. CONTROL VALVE BODY - Continued

- (31) Install governor screen assembly (69) and plug (70) in control valve body (1). Tighten plug to 50 to 60 lb-in. (5.6 to 6.8 N.m).
- (32) Install accumulator valve (71), spring (72), and valve stop (73) in control valve body (1).
- (33) Align pinhole in valve stop (73) with pinholes in control valve body (1).
- (34) Press valve stop (73) and install retaining pin (74) in control valve body (1).
- (35) Install valve stop (75), spring (76), and priority valve (77) in control valve body (1).
- (36) Install modulator valve (78), valve stop (79), spring (80), washer (81), and adjusting ring (82) in modulator valve body (83).
- (37) Align pinhole in valve stop (79) with pinholes in modulator valve body (83).
- (38) Press adjusting ring (82) and install retaining pin (84) in modulator valve body (83).



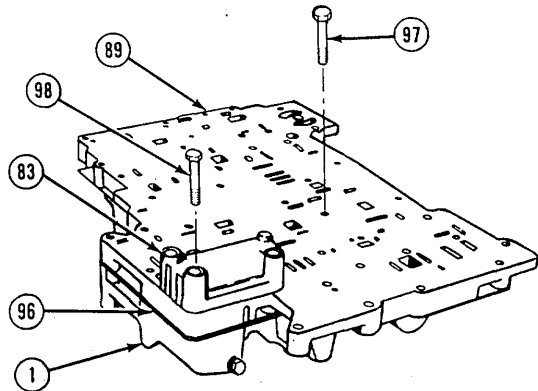
6-62. CONTROL VALVE BODY - Continued

- (39) Install check valve pin (85), lubrication check valve (86), spring (87), and spring cup washer (88) on oil transfer plate (89).
- (40) Install retaining pin (90) while other person presses down on spring cup washer (88).
- (41) Install check balls (91, 92, 93, 94, and 95).
- (42) Side separator plate (96) on oil transfer plate (89).
- (43) Hold separator plate (96) and oil transfer plate (89) together, turn plates over, and place on control valve body (1).



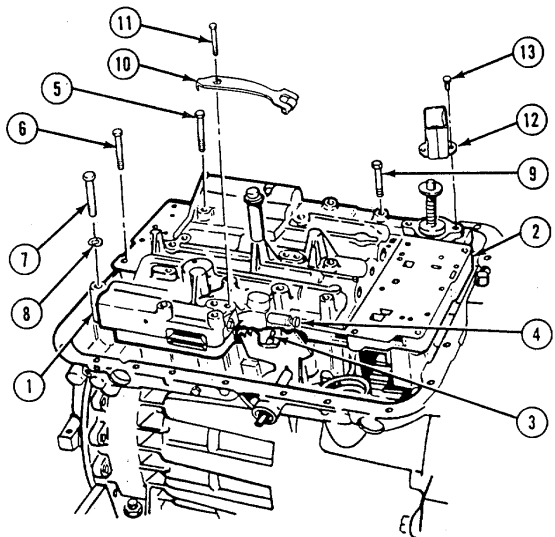
6-62. CONTROL VALVE BODY - Continued

- (44) Insert six screws (97) through oil transfer plate (89), separator plate (96), and control valve body (1) to align screw holes.
- (45) Place modulator valve body (83) on oil transfer plate (89) and install three screws (98).
- (46) Tighten screws (98) to 108 to 132 lb-in. (12 to 15 N.m).
- (47) Remove six screws (97).



e. Installation.

- (1) Install control valve body (1) and transfer plate (2), making sure shift (rack pin (3) engages slot on selector valve (4).
- (2) Install three screws (5).
- (3) Install seven screws (6).
- (4) Install two screws (7) and washers (8).
- (5) Install 15 screws (9) in control valve body (1).
- (6) Install manual detent lever (10) and screw (11) in control valve body (1).
- (7) Install oil baffle (12) and two screws (13).
- (8) Torque screws (5, 6, 7, 9, 11, and 13) to 108 to 132 lb-in. (12 to 15 N.m).



f. Follow-on Maintenance.

- (1) Install lockup cutoff valve body (see para 6-64.).
- (2) Install modulator valve (see para 6-63.).

6-63. MODULATOR VALVE

This task covers:

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

TOOLS REQUIRED

Tool Kit, General Mechanics, Automotive
(Appendix B, Section III, Item 1)

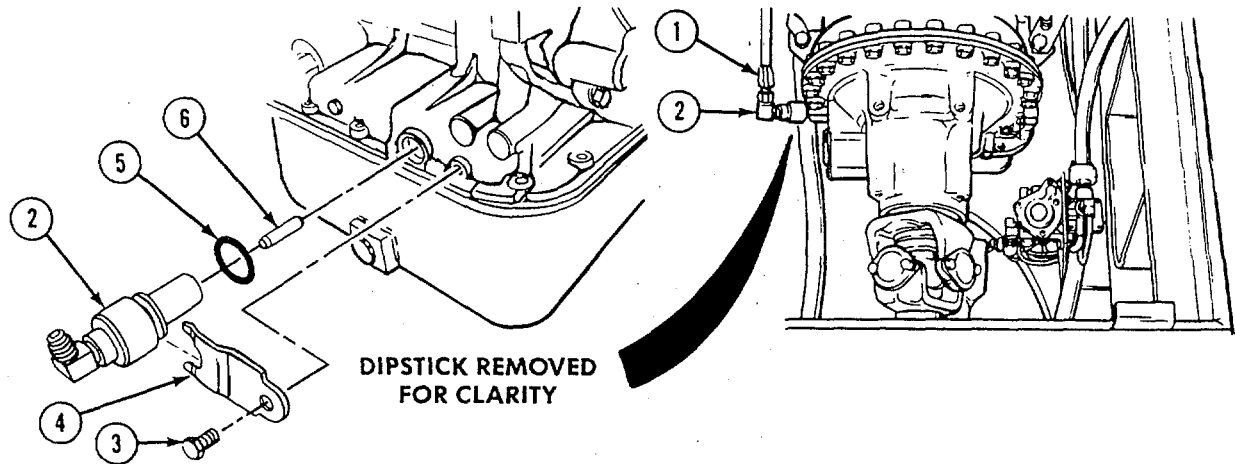
EQUIPMENT CONDITION

Transmission Oil Drained (see para 4-142.)

MATERIALS/PARTS REQUIRED

Tags, Identification (Item 32, Appendix E)
Preformed Packing (Figure 131, Appendix F)

a. Removal.



NOTE

Tag (Item 32, Appendix E) and mark hose before disconnecting.

- (1) Disconnect hose (1) from modulator valve (2).
- (2) Remove screw (3), bracket (4), modulator valve (2), preformed packing (5), and pin (6). Discard preformed packing.

b. Installation.

- (1) Install pin (6), new preformed packing (5), modulator valve (2), bracket (4), and screw (3).
- (2) Tighten screw (3) to 8 to 10 lb-ft (11 to 14 N-m).
- (3) Connect hose (1) to modulator valve (2).

c. Follow-on Maintenance.

- (1) Refill Transmission with oil (see para 4-142).

6-64. LOCKUP CUTOFF VALVE BODY

This task covers:

- | | |
|----------------------------|--------------------------|
| a. Removal | d. Assembly |
| b. Disassembly | e. Installation |
| c. Cleaning and Inspection | f. Follow-on Maintenance |
-

TOOLS REQUIRED

Tool Kit, General Mechanics, Automotive
(Appendix B, Section III, Item 1)

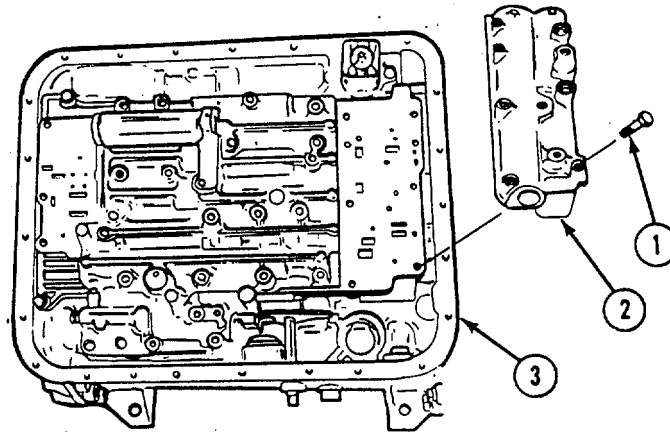
EQUIPMENT CONDITION

Internal Filter Element Removed (see para 6-54.)

MATERIALS/PARTS REQUIRED

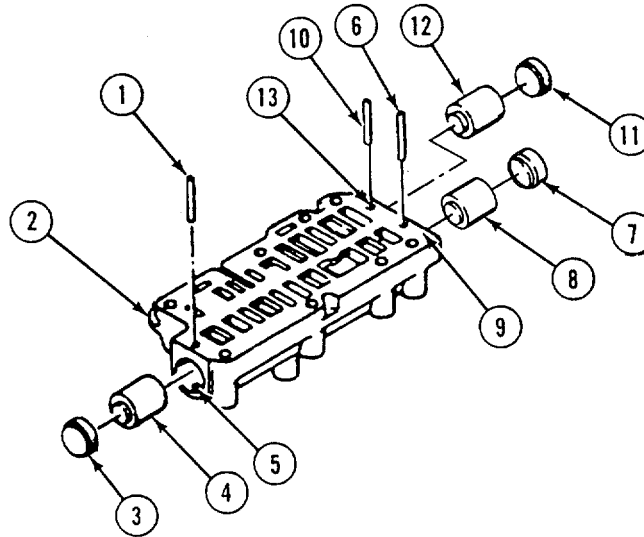
Solvent, Dry Cleaning (Item 3, Appendix E)
Oil, Lubricating, Item 10 (Appendix E)
Tags, Identification (Item 32, Appendix E)
Cloth, Crocus (Item 34, Appendix E)

- a. Removal. Remove eight screws (1) and valve (2) from transmission (3).



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6-64. LOCKUP CUTOFF VALVE BODY - Continued

b. Disassembly.**NOTE**

When assembled, each valve should be installed in same bore from which valve was removed. Tag and mark all parts.

- (1) Remove retainer pin (1) from valve body (2).
- (2) Remove valve plug (3) and second and third clutch lockup cutoff valve (4) from bore (5).
- (3) Remove retainer pin (6) from valve body (2).
- (4) Remove valve plug (7) and first and second clutch lockup cutoff valve (8) from bore (9).
- (5) Remove retainer pin (10) from valve body (2).
- (6) Remove valve plug (11) and third and fourth clutch lockup cutoff valve (12) from bore (13).

c. Cleaning and Inspection.**WARNING**

Dry cleaning solvent P-D-680 is potentially dangerous. Avoid repeated and prolonged breathing of vapors and skin contact with the liquid. Do not use near open flame, arcing equipment or other ignition sources. Always wear eye protection and protective clothing. The flash point of P-D-680 is 100 to 138 deg. F (38 to 59 deg. C).

- (1) Clean valve body and valves with dry cleaning solvent (Item 3, Appendix E).
- (2) Inspect valve body and valves for nicks burrs, and scratches. Remove defects with crocus cloth. If scratches are deep or part is cracked, replace part.

d. Assembly.

NOTE

- Each valve should be installed in same bore from which valve was removed.
- When dry, check that all lockup cutoff valves move freely in their bores.
- Apply lubricating oil (item 1 0, Appendix E) to all parts.

(1) Apply lubricating oil to valve body (2).

(2) Install valve (12) and valve plug (1 1) in bore (13).

(3) Install retainer pin (1 0) in valve body (2).

(4) Install valve (8) and valve plug (7) in bore (9).

(5) Install retainer pin (6) in valve body (2).

(6) Install valve (4) and valve plug (3) in bore (5).

(7) Install retainer pin (1) in valve body (2).

e. Installation. Install valve (1) with eight screws (2) in transmission (3). Torque screws to 108 to 132 lb-in. (12 to 15 N-m).

f. Follow-on Maintenance. Install internal filter element (see para 6-54).

3-3. PRIMING TANK

This task covers:

- | | |
|---|---|
| <ul style="list-style-type: none"> a. Disassembly b. Cleaning | <ul style="list-style-type: none"> c. Assembly d. Follow on Maintenance |
|---|---|
-

TOOLS REQUIRED:

Tool Kit, General Mechanics, Automotive
(Appendix B, Section 111, Item 1)
Inlet Valve Cage Remover
(Appendix B, Section 111, Item 95)

EQUIPMENT CONDITION

Air Compressor Removed (see para 5-17.)

MATERIALS/PARTS REQUIRED

Silicone Grease (Item 1 1, Appendix E)
Seal Retainer Compound (Item 6, Appendix E)
Solvent, Dry Cleaning (Item 3, Appendix E)
Brush, Paint (Item 44, Appendix E)
Gasket and Seal Kit (Figure 87, Appendix F)

- a. Disassembly.

WARNING

A compressor should never be disassembled while mounted to the engine.

CAUTION

Cover or plug all openings to prevent contamination.

WARNING

Dry cleaning solvent P-D-680 is potentially dangerous. Avoid repeated and prolonged breathing of vapors and skin contact with the liquid. Do not use near open flame, arcing equipment or other ignition sources. Always wear eye protection and protective clothing. The flash point of P-D-680 is 1 00 to 138 deg. F (38 to 59 deg. C).

- (1) Before disassembly, clean compressor's exterior surface using dry cleaning solvent (Item 3, Appendix E) and stiff brush (Item 44, Appendix E).

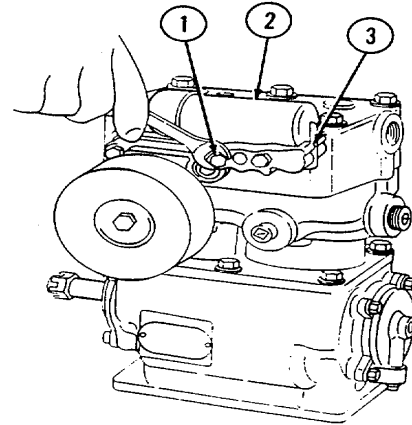
NOTE

Compressor crankcase, cylinder block and cylinder head are designed to be assembled in different ways to meet various installation requirements. Matchmark these parts to insure each part is reassembled in its proper position.

6-65. AIR COMPRESSOR - Continued

NOTE

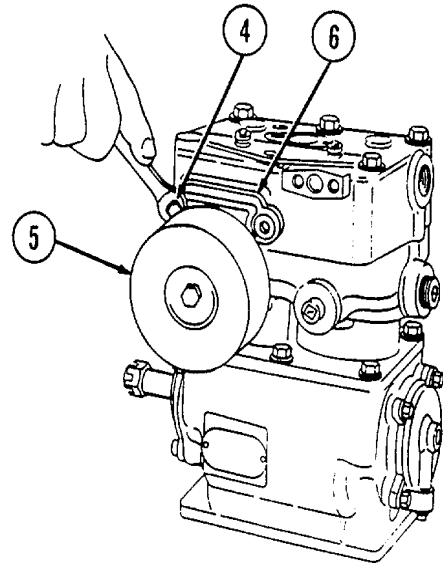
- If exhaust valve components are damaged to where replacement is not sufficient by using head repair kit, replacement head is recommended.
- If compressor has been used to where rings, bearings and seals need replacing, use repair kits.



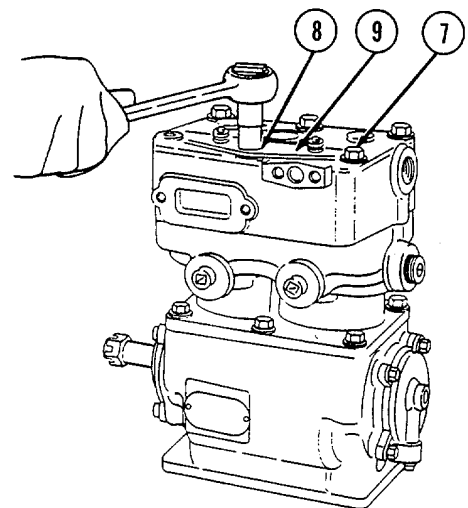
- (2) Remove two bolts (1) holding governor (2) to cylinder head. Remove the governor (2)
- (3) Remove and discard gasket (3).

CAUTION

Be extremely careful to avoid scratching machined surfaces.



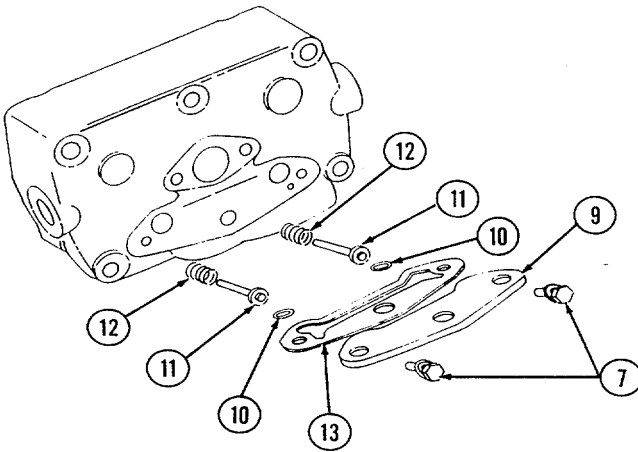
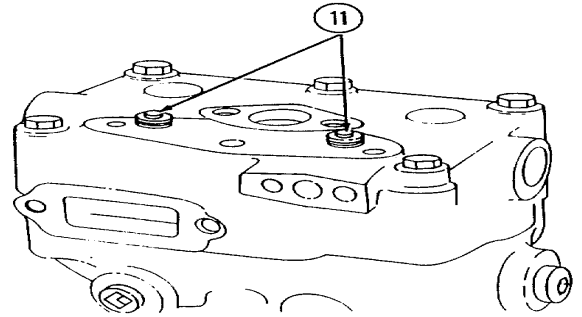
- (4) Clean both gasket surfaces and inspect each for damage.
- (5) Remove two air cleaner mounting bolts (4). Remove the air cleaner (5).
- (6) Remove and discard air cleaner gasket (6).
- (7) Clean gasket surfaces and inspect for damage.



- (8) Remove two 7/16" hex-head unloader cover bolts (7) and one 9/16" hex-head cylinder head bolt (8) located at top of cylinder head.
- (9) Remove unloader cover (9). Unloader O-ring (10) and end of pins (11) will protrude from head.

6-65. AIR COMPRESSOR - Continued

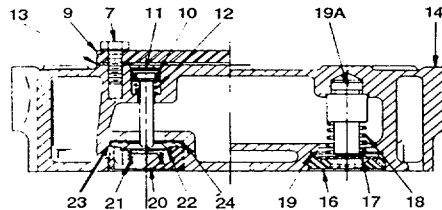
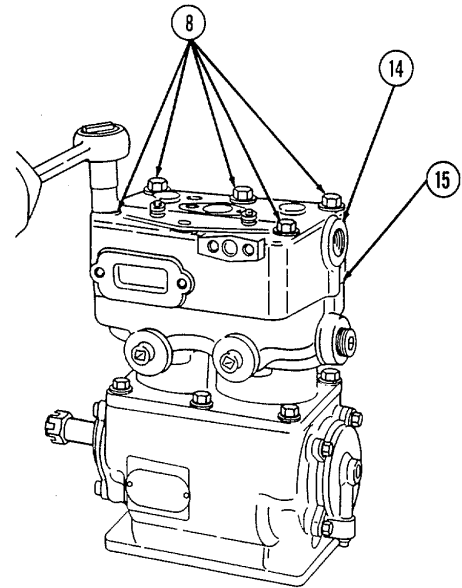
- (10) Remove unloader components (10, 11, and 12). Remove O-rings (10) from pins (11) and discard.
- (11) Remove and discard gasket (13). Clean gasket surfaces and inspect for damage.



CAUTION

Be extremely careful to avoid scratching machined surfaces.

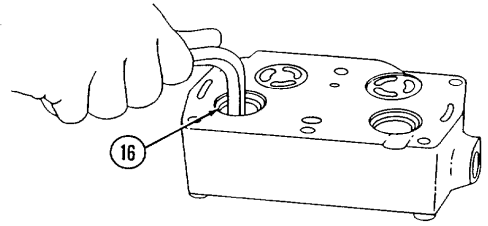
- (12) Remove the five remaining bolts (8) holding the head (14) to the block.
- (13) Tap head gently with brass or plastic mallet to loosen, if necessary.
- (14) Lift head assembly off block.
- (15) Remove and discard gasket (15) and clean gasket surfaces.



- | | |
|------------------------|--------------------------|
| 7. Cover Bolt | 18. Exhaust Valve Spring |
| 9. Unloader Cover | 19. Washer |
| 10. O-ring | 19A. Exhaust Valve Stop |
| 11. Unloader Pin | 20. Inlet Valve Cage |
| 12. Unloader Spring | 21. Inlet Valve Spring |
| 13. Unloader Gasket | 22. Inlet Valve |
| 14. Head | 23. Inlet Valve Seat |
| 16. Exhaust Valve Seat | 24. Washer |
| 17. Exhaust Valve | |

6-65. AIR COMPRESSOR - Continued

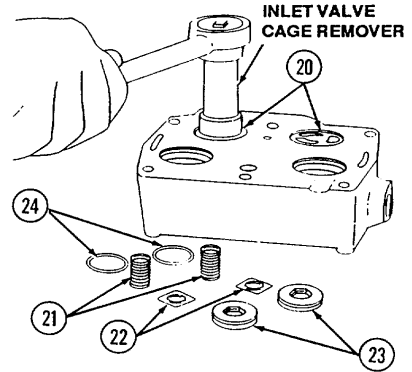
- (16) Place head bottom side up on a table and remove exhaust valve seats (cages) (16) using a 9/16" Allen wrench.
- (17) Remove exhaust valve (17), exhaust valve spring (18), washer (19) and exhaust valve stop (19A). Discard the washers.



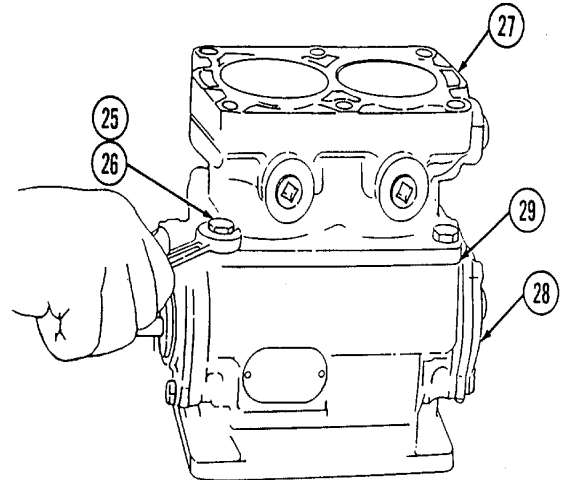
CAUTION

Be extremely careful to avoid scratching machined surfaces.

- (18) Using remover tool (Appendix B, Section 111, Item 95) remove the inlet valve cages (20), inlet valve springs (21), inlet valves (22), inlet valve seats (23), and washers (24). Discard the washers.
- (19) Clean gasket surfaces and inspect for damage.

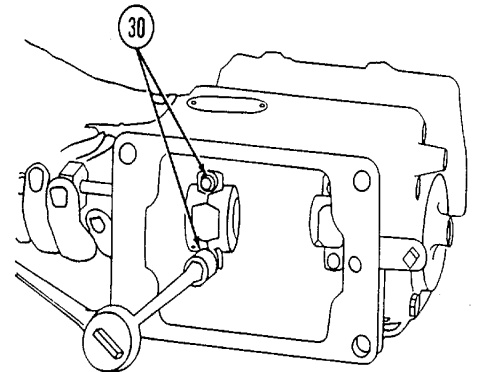


- (20) Remove six 9/16" hex head bolts (25) and lockwashers (26) holding cylinder block (27) to the crankcase (28).
- (21) Tap block lightly with a brass or plastic hammer to loosen, if necessary.



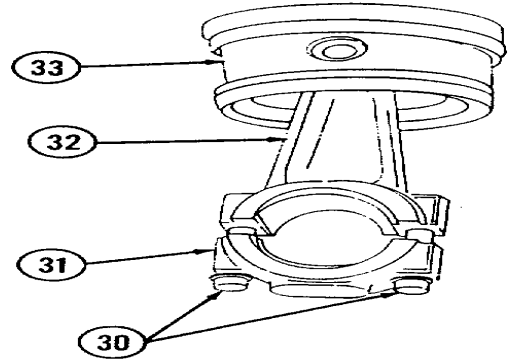
- (22) Pull block off crankcase and pistons, taking care not to damage pistons.
- (23) Remove and discard gasket (29).
- (24) Clean gasket surfaces and inspect for damage.

- (25) Turn crankcase (28) on its side to expose connecting rod to crankshaft bolts (30). Remove bottom cover plate.
- (26) Mark the rod caps (31) to insure they are returned to the same rod (32) from which they are removed.
- (27) Turn crankshaft so that one connecting rod is at bottom of its stroke. Remove rod bolts.

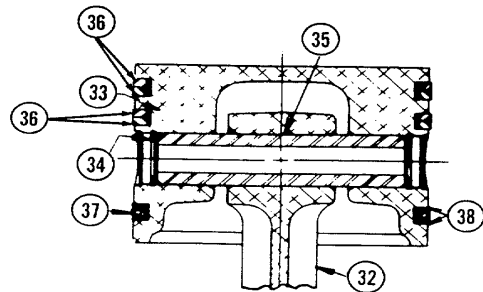


6-65. AIR COMPRESSOR - Continued

- (28) Lift piston (33) and connecting rod (32) through top of crankcase. Temporarily install rod cap (31) and bolts (30) back on rod (32).
- (29) Repeat steps (26 thru 28) on remaining rod.



- (30) Remove snap rings (34) from pistons (33).
- (31) Press piston pin (35) out of piston taking care not to damage piston.
- (32) Remove the rings (36, 37, and 38) from the piston using a piston ring expander.
- (33) Remove four bolts (39) securing cap (40) to crankcase (28).



CAUTION

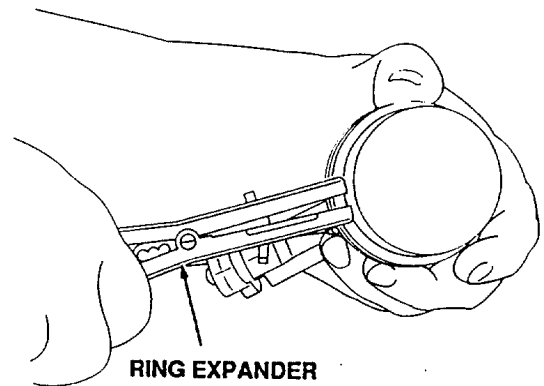
Do not attempt to pry cap off.

- (34) Tap cap gently with a brass or plastic hammer to loosen.

CAUTION

Be extremely careful to avoid scratching machined surfaces.

- (35) Remove cap from crankcase. Remove and discard gasket (41).



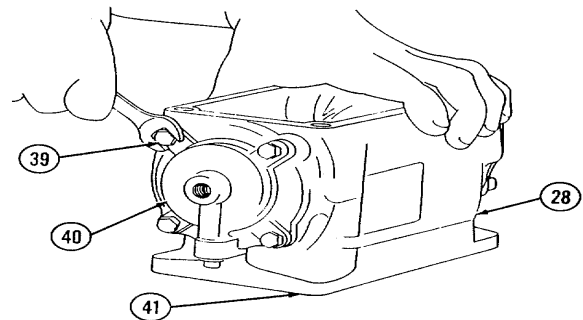
- (36) Clean gasket surfaces and inspect for damage.

CAUTION

Removal of crankshaft may cause main bearing damage. Therefore, inspection while assembled is recommended.

NOTE

If visual inspection shows that crankcase or crankshaft is damaged, compressor should be replaced.



6-65. AIR COMPRESSOR - Continued

b. Cleaning and Inspection.

CAUTION

Do not use solvents containing chemicals injurious to aluminum alloy. Never use gasoline, fuel oil or kerosene as a cleaning solvent.

WARNING

Dry cleaning solvent P-D-680 is potentially dangerous. Avoid repeated and prolonged breathing of vapors and skin contact with the liquid. Do not use near open flame, arcing equipment or other ignition sources. Always wear eye protection and protective clothing. The flash point of P-D-680 is 100 to 138 deg. F (38 to 59 deg. C).

- (1) Wash all parts in cleaning solvent (Item 3, Appendix E). Blow dry with compressed air.

CAUTION

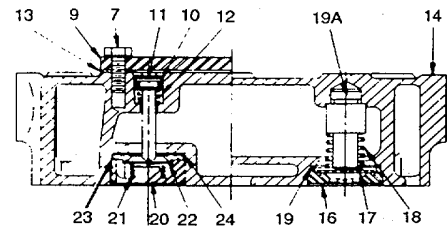
Be extremely careful to avoid scratching machined surfaces.

- (2) Clean carbon deposits from cylinder head's (14) interior surfaces. Clean all interior air and water passageways.
- (3) Remove carbon from piston (33) crowns and ring grooves.
- (4) Blow out all drilled passageways with compressed air to insure they are open.
- (5) Remove old gasket material sealer from gasket surface

- (6) Examine cylinder head (14) for cracks and damaged threads. Head gasket surface must be free of nicks and gouges. Replace head if damaged.

- (7) Inspect inlet (22) and exhaust valve (17) disc for wear. Replace valves if cracked, pitted or grooved on either side.

- (8) Check inlet (21) and exhaust valve (18) springs for loads at specified heights. Inlet valve spring load should be .36 to .62 lbs (.16 to .28 kg) at .287 in. (7.29 mm). Exhaust valve spring load should be 3.30 to 3.70 lbs (1.50 to 1.68 kg) at .73 in. (18.5 mm).



- | | |
|------------------------|--------------------------|
| 7. Cover Bolt | 18. Exhaust Valve Spring |
| 9. Unloader Cover | 19. Washer |
| 10. O-ring | 19A. Exhaust Valve Stop |
| 11. Unloader Pin | 20. Inlet Valve Cage |
| 12. Unloader Spring | 21. Inlet Valve Spring |
| 13. Unloader Gasket | 22. Inlet Valve |
| 14. Head | 23. Inlet Valve Seat |
| 16. Exhaust Valve Seat | 24. Washer |
| 17. Exhaust Valve | |

- (9) Examine inlet valve cages (20) for damage and wear. Measure valve guide diameter and distance from top of cage to valve stop. Examine inlet valve seat (23) for damage. Measure from valve seating surface to surface that contacts valve cage. Inlet valve guide diameter should be .916 to .920 in. (23.27 to 23.37 mm). Top of inlet valve cage to valve stop should be .131. to 137 in. (3.33 to 3.48 mm). Valve seating surface to valve cage contact surface should be .0235 to .0265 in. (.5969 to .6731 mm).

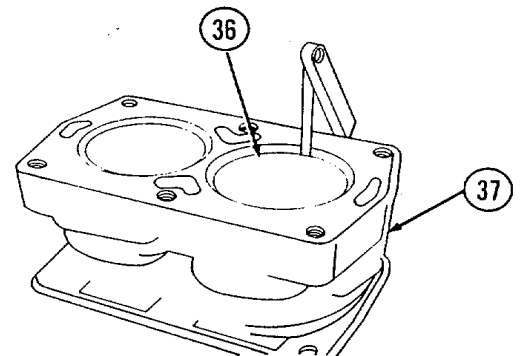
6-65. AIR COMPRESSOR - Continued

- (10) Examine exhaust valve seat (1 6) for damage and wear. Measure valve guide diameter and distance from top of valve seat to valve stop. Exhaust valve guide diameter should be 1 .145 to 1 .151 in. (29.08 to 29.24 mm). Top of valve seat to valve stop should be .1 25 to .128 in. (3.18 to 3.25 mm).
- (11) Examine exhaust valve stop (19A) for damage, looseness or wear. Measure distance from valve end of stop to surface on which spring sets. If the exhaust valve stop is loosen, worn, damaged or distance from valve stop surface to spring seating surface is not .72 to .74 in. (18.3 to 18.8 mm), head assembly must be replaced.
- (12) Examine unloader seal bore diameters for scoring or pitting. Check unloader pins (1 1) for damage. Measure length of unloader pins, which should be 1.850 to 1.854 in. (46.99 to 47.09 mm).
- (13) Check unloader springs (12) for loads at specified heights. Unloader spring load should be 3.38 to 4.18 lbs (1.53 to 1.89 kg) at .395 in. (10 mm).
- (14) Examine pistons (33) for scoring, cracks or other damage. Replace as needed.
- (15) Measure the outside diameter at a 90 degree angle to the piston pin bore. Compare this measurement with diameter of the cylinder bore. Piston diameter (below compression rings) should be 2.744 to 2.745 in. (69.70 to 69.72 mm) and cylinder bore diameter should be 2.7495 to 2.7500 in. (69.84 to 69.85 mm). Piston to bore clearance should not exceed .008 inches (0.20 mm). If clearance exceeds .008 inches (0.20 mm) replace the pistons. The block must be replaced or bored oversize to 0.020 inches (.508 mm). Oversize pistons at 0.020 inches (.508 mm) are available.

NOTE

When measuring the outside piston diameter make sure the micrometer is at a 90 degree angle to the piston pin bore. This will permit a correct measurement.

- (16) Check piston pins (35) for wear. Piston pins that have a variation in diameter of more than .003 inches (.076 mm) must be replaced.
- (17) Check fit of piston pin (35) and connecting rod (32). Pin should be a slip fit in piston and rod. Piston pin bore in piston should be .5615 to .5618 in. (14.26 to 14.27 mm) and piston pin diameter should be .5618 to .5620 in. (14.27 to 14.275 mm). Piston pin bore in connecting rod should be .5622 to .5624 in. (14.28 to 14.285 mm). Visually check for worm or damaged areas and replace parts as required or replace with complete piston and rod assembly. Connecting rod and rod bearing cap must be replaced as a unit.
- (18) Check fit of compression and oil rings in piston ring grooves. Place rings in piston ring grooves and measure side clearance. Place rings in cylinder bores and measure gap.

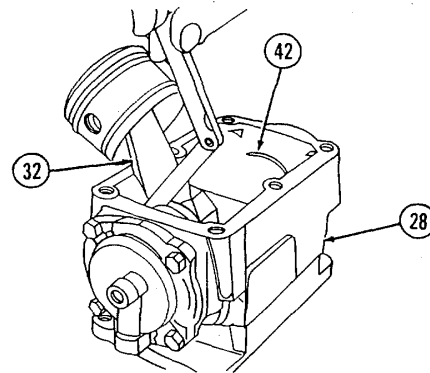


6-65. AIR COMPRESSOR - Continued

NOTE

- Clearance between rings and ring grooves gap must be .0015 to .0045 in. (.0381 to .1143 mm) for compression rings and .0005 to .0045 in. (.0127 to .1143 mm) for oil ring. Ring gap must be .007 to .017 in. (.178 to .432 mm) for compression rings and .015 to .055 in. (.381 to 1.341 mm) for oil ring. If clearance or gaps are not within these limits, new rings must be installed.
- Whenever a complete compressor teardown is accomplished, new rings are recommended.

- (19) Examine connecting rod bearing inserts for scoring, pitting or visible wear. Check fit of rod bearings on crankshaft journals. Clearance between bearing and crankshaft journals must be between 0.005 and 0.0021 in. (.127 and .053 mm). If damage is evident or clearance does not meet the specified dimensions new inserts must be installed.
- (20) Check clearance between side of connecting rod bearing cap and crankshaft (42). If clearance exceeds 0.010 in. (.254 mm), new rod and bearing cap must be installed. Connecting rod journal width should be 1.365 to 1.367 in. (34.67 to 34.72 mm).



NOTE

The connecting rod and rod bearing cap must be replaced as a unit.

- (21) Examine cylinder blocks (27) for cracks. Replace it damaged.
- (22) Examine cylinder bores for scratches, scoring and pitting. Check bores for out-of-round and taper. If out-of-round more than 0.0005 in. (.0127 mm) or tapered more than 0.001 in. (.0254 mm) from top to bottom of bore, block must be rebored or honed oversize, or replaced with new cylinder block.
- (23) A bent or twisted crankshaft (42) cannot be repaired. If connecting rod journals are scored beyond repair or worn beyond 1.850 to 1.855 in. (46.99 to 47.12 mm), replace with a new crankshaft or regrind journals. Service insert bearings are available at 0.010 and 0.020 in. (0.25 mm and 0.51 mm) undersize.
- (24) Thread, keyway, and all ground and machined surfaces must not be mutilated or worn.
- (25) Examine ball bearings for worn or damaged balls; rotate bearing by hand to detect roughness. If wear, roughness or damage is evident, bearing must be replaced.
- (26) Examine crankshaft front and rear bearing caps and replace if worn or cracked.

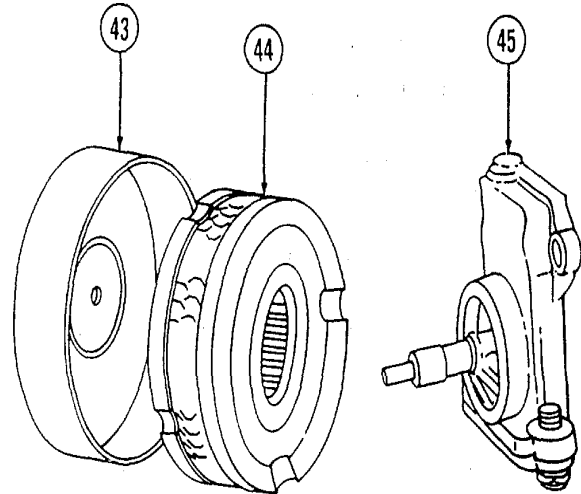
6-65. AIR COMPRESSOR - Continued

- (27) Check the seal and spring or bowed washer in rear bearing cap.
 - (a) Check wear of seal where it contacts crankshaft. Seal must be replaced if grooved more than 0.005 in. (0.13 mm). Measure outside diameter of seal ring. If diameter is not .635 to .636 in. (16.13 to 16.15 mm) the seal ring must be replaced.
 - (b) Check oil seal spring or bowed washer for wear. if worn, replace.

(28) Examine crankcase for cracks and damage to gasket surfaces. Replace if necessary.

(29) Unscrew air cleaner assembly cover (43) and remove the air cleaner element (44). Replace element if dirty, crushed or damaged.

(30) Replace air cleaner cover (43) or base (45) if either is bent, crushed or damaged.



c. Assembly.

CAUTION

Do not attempt to force any components du ring assembly. Investigate the problem if assembly is not smooth and force free.

NOTE

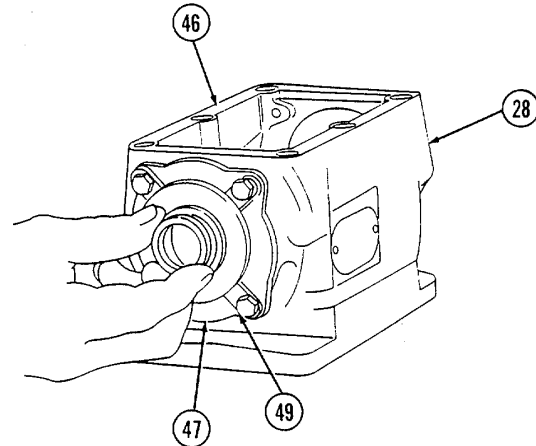
Coat crankshaft, bearings, connecting rod bearings, pistons, pins and cylinder block bores with engine oil (Item 1 0, Appendix E) before reassembly.

NOTE

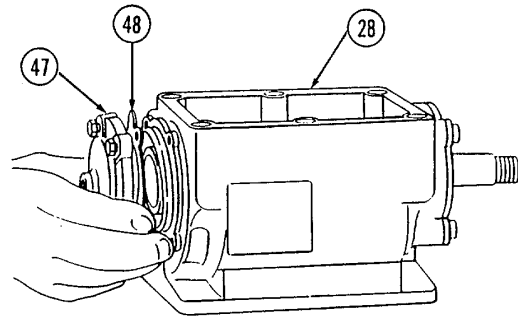
Special parts, in addition to standard parts, are available for overhauling each compressor. Included are 0.020 in. (.51 mm) oversize pistons and rings, cylinder blocks with 0.020 in. (.51 mm) oversize cylinder bores, and 0.01 0 and 0.020 in. (.255 and .51 mm) undersize bearing inserts.

6-65. AIR COMPRESSOR-Continued

- (1) Press new oil seal (46) into front bearing cap (47). Use seal retainer compound (Item 6, Appendix E) on seal's outer rim. Spring side of seal must face inside of crankcase when installed. Seal case should be flush to .005 inch (.13 mm) below front of cap.
- (2) Crankshaft (42) should be installed in crankcase (28) before front (47) or rear (40) end caps are installed. Ball bearings should already be pressed on crankshaft. Press crankshaft and bearing assembly into crankcase. Be sure that both front and rear bearings protrude an equal amount from each end of crankcase. Rotate crankshaft to be sure it turns freely.



- (3) Place new gasket (48) on crankcase front cap mating surface.
- (4) Apply small amount of engine oil (item 10, Appendix E) to crankshaft seal (46). Slide front bearing cap (47) over crankshaft end. Do not damage oil seal.
- (5) Place new gasket on rear end cap (40) mating surface. Install spring or bowed washer in end cap. Outer diameter of bowed washer must contact bottom of hole in end cap. Install new seal in end cap. Lubricate seal with oil. Install end cap making sure seal and spring or bowed washer do not fall out.

**CAUTION**

Do not overtighten bolts.

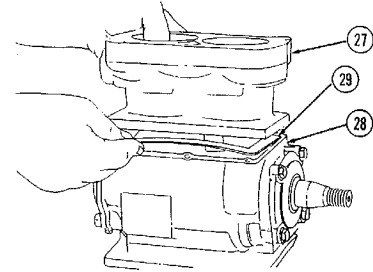
- (6) Pull both front and rear bearing caps into position by alternately tightening four attaching bolts (39 and 49). Torque to 120 to 160 in. lbs (13.6 to 18.1 N·m).

CAUTION

Crankshaft should revolve freely after assembling cap.

6-65. AIR COMPRESSOR-Continued

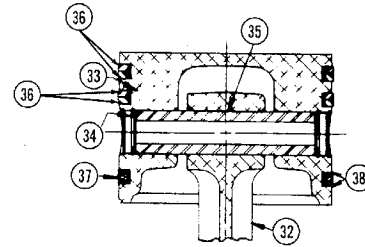
- (7) Place new cylinder block to crankcase gasket (29) on crankcase. Place cylinder block (27) on crankcase (28) in same orientation as it was removed.
- (8) Assemble six bolts (25) and lockwashers (26), torquing two center bolts to eight (8) ft. lbs. (11 N·m), then four end bolts. Increase bolt torque to 27 to 33 ft. lbs. (37 to 44 N·m), torquing center two bolts and then four end bolts.



CAUTION

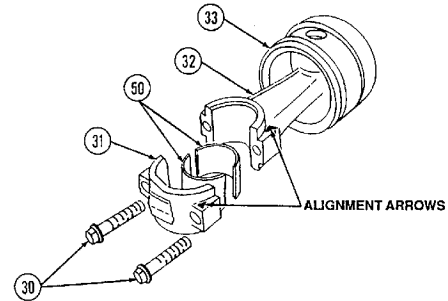
Do not overtighten bolts.

- (9) Position connecting rod (32) in piston (33) and slip piston pin (35) into place.
- (10) Install snap rings (34) into piston at ends of piston pin.
- (11) Install compression rings (36) and oil rails (38) and expander rings (37) on pistons. Seven rings are used in each piston—two compression rings in each of top two grooves, and two oil rails and an expander ring in bottom groove.



CAUTION

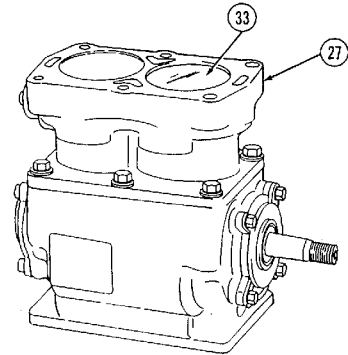
Compression rings must be installed with surface marked "TOP" facing top of piston. Some compression rings may have dots indicating top of ring.



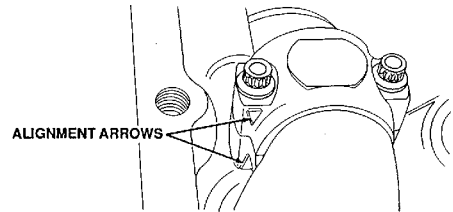
- (12) Staggering gaps by 120 degrees.
- (13) Insert connecting rod bearing inserts (50) into connecting rod (32) and bearing cap (31). Make sure locating tangs on inserts engage locating notches in rod and cap. Align arrows on cap and rod. Make sure each rod cap is installed on rod from which it was removed.

6-65. AIR COMPRESSOR-Continued

- (14) Coat rod bearings with engine oil (Item 10, Appendix E).
- (15) Lubricate the cylinder walls and pistons.
- (16) Remove rod cap and bearing from connecting rod. Stagger ring gaps by 120 degrees. Using ring compressor, insert piston so that top of piston is flush with top of the block.
- (17) Turn assembly over and position connecting rod on crankshaft journal making sure bearing inserts are in place. Lubricate rod journal with engine oil (Item 10, Appendix E).



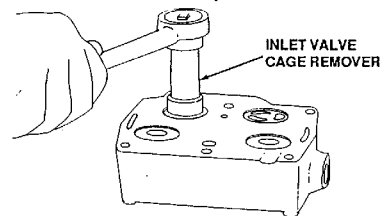
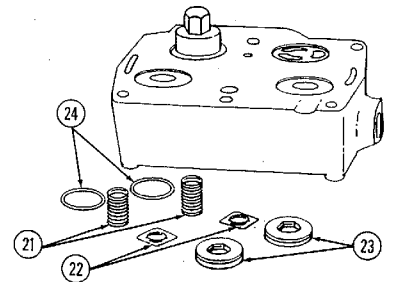
- (18) Install connecting rod bearing caps and inserts aligning arrows on bearing caps and rods. Install connecting rod bolts; tighten bolts with 5/16" 12 point heads to 185 to 225 in. lbs. (21 to 25 N·m), tighten bolts with 1/4" 12 point heads to 105 to 135 in. lbs. (12 to 15 N·m).



CAUTION

Do not overtighten bolts.

- (19) Assemble the second rod using same procedure.
- (20) Replace the bottom plate. Tighten the six hex head bolts 110 to 150 in. lbs. (13 to 17 N·m).
- (21) Invert cylinder head and insert new copper washers (19 and 24) into all four valve ports.
- (22) Insert exhaust valve spring (18), exhaust valves (17) and exhaust valve seats (16). Using a 9/16" Allen wrench tighten valve seats to 70 to 90 ft. lbs. (95 to 122 N·m).
- (23) Insert inlet valve seat (23), inlet valve (22), inlet valve springs (21), and inlet valve cages (20).

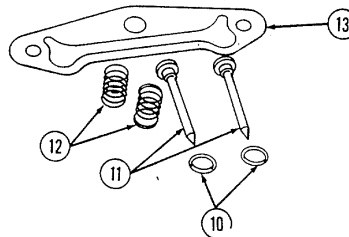


NOTE

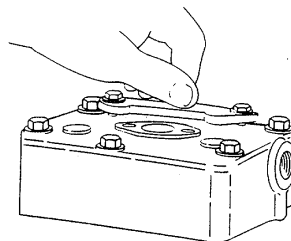
The inlet valve and inlet valve springs must be centered to insure the valve is not torqued between the valve seat and valve cage. Torque the inlet valve cages to 70 to 80 ft. lbs. (95 to 108 kPa) using remover tool (Appendix B, Section III, Item 95).

6-65. AIR COMPRESSOR-Continued

- (24) Turn head over to insert unloader springs (12).
- (25) Install springs (12) and new O-rings (10) on unloader pins (11).

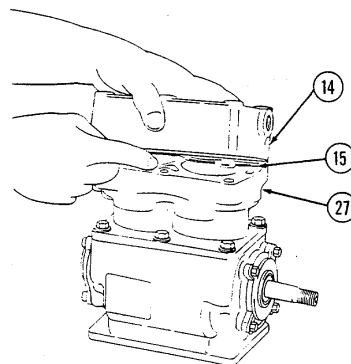


- (26) Apply silicone grease (item 11, Appendix E) to O-rings.
- (27) Insert assembled unloader pins into head.
- (28) Place new unloader gasket (13) on unloader cover. Assemble these two items to head as a unit compressing unloader springs; hold firmly until unloader cover bolts (7) and washers are installed.



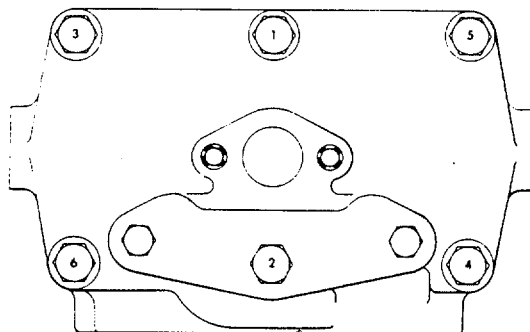
- (29) Tighten these bolts to approximately 10 in. lbs. (1 N·m). These bolts will be tightened to final torque after head bolts are torqued.

- (30) Place new head to block gasket (15) on cylinder block (27). Place head (14) on gasket assembling six head bolts. One long head bolt is to be inserted through unloader cover plate. Tighten head bolts to 18 to 22 it. lbs. (25 to 29 N·m) in proper sequence. Retighten head bolts to 27 to 33 ft. lbs. (37 to 44 N·m) in same sequence.



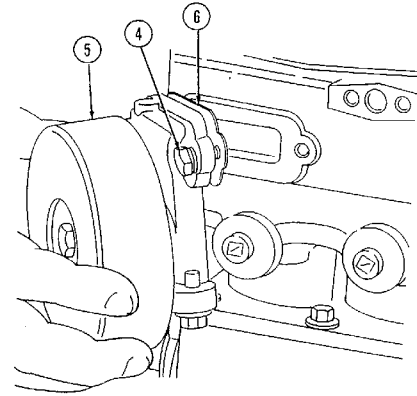
CAUTION

Do not overtighten bolts.

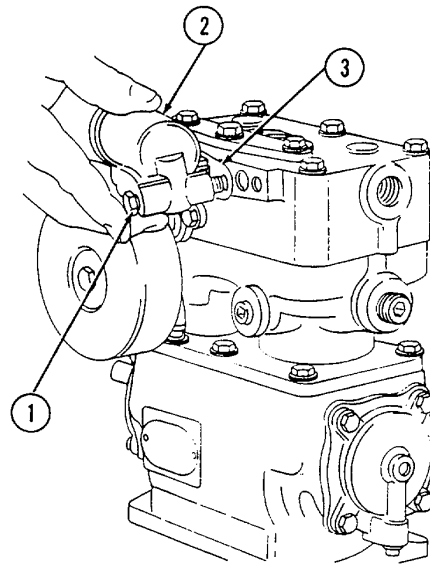


6-65. AIR COMPRESSOR-Continued

- (31) Tighten two unloader cover bolts to 100 to 150 in. lbs. (12 to 17 N·m) after torquing head bolts.



- (32) Use new gasket (6).
- (33) Attach assembled air cleaner (5) to head with attaching bolts.
- (34) Torque bolts to 110-150 in. lbs. (13-17 N·m).
- (35) Use a new governor gasket (3).
- (36) Attach governor (2) to head with two bolts (1).
- (37) Torque bolts to 110 to 150 in. lbs. (13 to 17 N·m).



NOTE

Torque crankshaft coupling nut to 115 to 125 ft. lb. (156 to 170 N·m).

d. Follow-on Maintenance

- (1) Install air compressor (see para 5-17).

6-65. AIR COMPRESSOR-Continued

- (2) Start main engine to adjust and test governor. During this test check for oil and air leakage, overheating and excessive noise. Close quick opening valve and check build-up time from 0 to 100 PSI in air tank.
- (3) Build-up time must not exceed 24 seconds per 1000 cu. in. of tank volume.

6-66. RADIATOR

This task covers:

a. Repair

TOOLS REQUIRED:

Tool Kit, General Mechanics, Automotive
(Appendix B, Section III, Item 1)

EQUIPMENT CONDITION

Radiator Removed (see para 5-31.)

a. Repair.

- (1) Inspect radiator for bent fins or leaking core.
- (2) Straighten bent fins, using care not to damage core.
- (3) Repair leaking core by soldering.
- (4) Inspect filler neck, brackets, and hose flanges for cracks or leaking areas.
- (5) Inspect interior for scale deposits, clean as required.

6-67. BRAKE DRUMS

This task covers:

- a. Repair

TOOLS REQUIRED:

Tool Kit, General Mechanics, Automotive
(Appendix B, Section III, Item 1)

EQUIPMENT CONDITION

Brake Drums Removed (see para 5-37.)

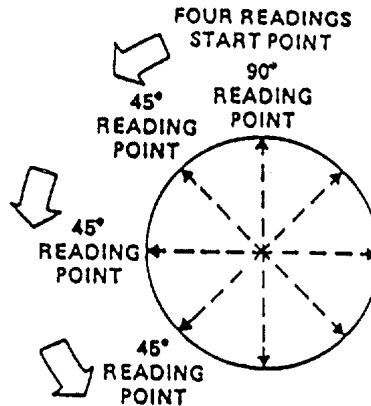
MATERIALS/PARTS REQUIRED:

Solvent, Dry Cleaning (Item 3, Appendix E)
Crocus Cloth (Item 34, Appendix E)

- a. Repair.

WARNING

Dry cleaning solvent P-D-680 is potentially dangerous. Avoid repeated and prolonged breathing of vapors and skin contact with the liquid. Do not use near open flame, arcing equipment or other ignition sources. Always wear eye protection and protective clothing. The flash point of P-D-680 is 100 to 138 deg. F (38 to 59 deg. C).



- (1) Clean brake drum with dry cleaning solvent (Item 3, Appendix E).
- (2) 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 (Item 34, Appendix E). Heavy scoring and out-of-round conditions 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.

- (3) Check inner brake surface of drum for heat checking, scoring or warpage.
- (4) Using micrometer, check inside of brake drum for out-of-round or tapered wear.
- (5) Record each reading. The maximum difference between the four readings cannot exceed 0.006 inch (0.1524 mm). Drums with out-of-round exceeding limits must be turned.

6-67. BRAKE DRUMS-Continued**NOTE**

If turning causes drum to exceed original 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.

- (6) To refinish inner braking surface, mount brake drum on refinishing lathe. Make several shallow cuts until scoring has been removed.
- (7) Refinish other drum on that axle to the same specifications.

6-68. ENGINE FUEL SYSTEM

This task covers:

- | | |
|-----------------------------------|---------------------------------|
| a. Removal | c. Installation |
| b. Cleaning and Inspection | d. Follow-on Maintenance |
-

TOOLS REQUIRED:

Tool Kit, General Mechanics, Automotive
(Appendix B, Section III, Item 1)

MATERIALS/PARTS REQUIRED:

Cleaning Cloth, Lint Free (Item 42, Appendix E)

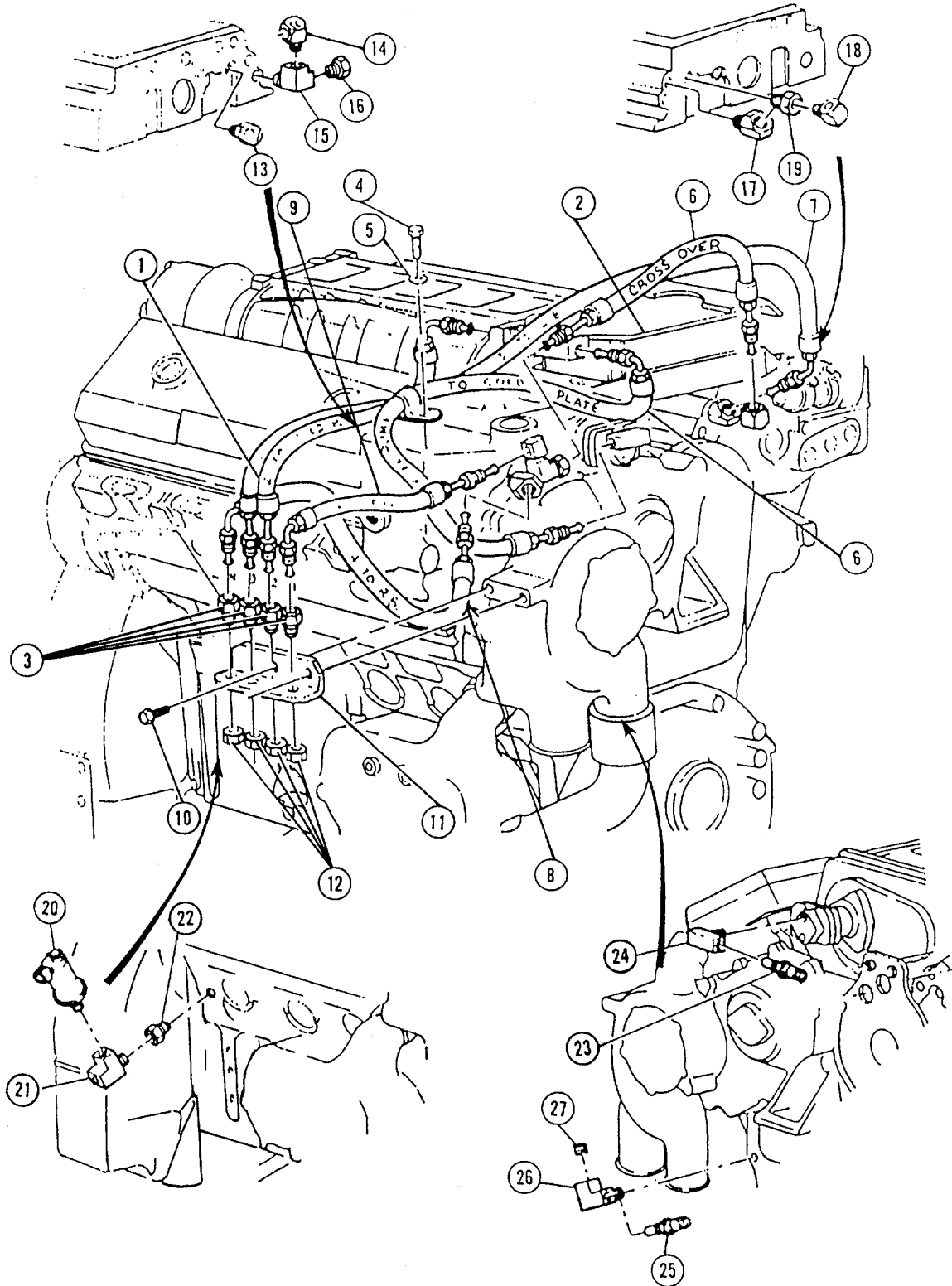
EQUIPMENT CONDITION

Main Engine Shutdown (see para 2-12.)
 APU Shutdown (see para 2-16.)
 Batteries Disconnected (see para 4-114.)
 Engine Enclosure Removed (see para 4-127.)
 Heater Hoses and Fittings Removed (see para 5-31.)
 Fuel Filters and Piping Removed (see para 4-130)
 Thermostat Housings Removed (see para 4-137.)

a. Removal.

- (1) Disconnect hose assembly (1) from block on electronic control unit (2) and from bulkhead fitting (3).
- (2) Remove screw (4) and lock washer (5). Disconnect one hose assembly (6) from block on electronic control unit (2) and from fitting at fuel pump.
- (3) Disconnect remaining hose assembly (6) from fittings in cylinder head.
- (4) Disconnect hose assembly (7) from fitting in cylinder head and from bulkhead fitting (3).
- (5) Disconnect hose assembly (8) from fitting in cylinder head and from bulkhead fitting (3).
- (6) Disconnect hose assembly (9) from cylinder head and bulkhead fitting (3).
- (7) Remove two screws (10) and remove bracket (11) from water pump. Remove four nuts (12) and remove bulkhead fittings (3) from bracket.
- (8) Remove elbows (13 and 14). Remove adapter (16) from tee and remove tee (15) from cylinder head.
- (9) Remove elbow (17) from other cylinder head. Remove elbow (18) and bushing (19) from cylinder head.
- (10) Disconnect harness from sensor (20) and remove fuel pressure sensor (20) from tee (21). Remove tee (21) and adapter (22) from engine.
- (11) Remove adapter (23) and tee (24) from fuel pump.
- (12) Disconnect wires from sensor (25) and remove sensor (25) from tee (26). Remove tee (26) and plug (27) from engine.

6-68. ENGINE FUEL SYSTEM-Continued



6-68. ENGINE FUEL SYSTEM-Continuedb. Cleaning and Inspection.

- (1) Clean all hoses and fittings with a clean, dry, lint free cloth (Item 42, Appendix E).
- (2) Inspect hoses for fraying, wear and deterioration. Check connections to hose fittings.
- (3) Inspect fittings and hoses for evidence of leakage.
- (4) Replace any damage or deteriorated hose assemblies.

c. Installation.

- (1) Install tee (26) and plug (27) in engine. Install sensor (25) in tee and connect wires to sensor.
- (2) Install tee (24) and adapter (18) in fuel pump.
- (3) Install adapter (22) in engine and connect tee (21) to adapter. Install sensor (20) in tee and connect wiring harness to sensor.
- (4) Install bushing (19) and elbows (17 and 18) in cylinder head. Install elbow (13) and tee (15) in cylinder head and install elbow (14) and adapter (16) in tee.
- (5) Install four bulkhead fittings (3) in bracket (11). Secure bulkhead fittings with four nuts (1 2).
- (6) Install assembled bracket on water pump and secure with two screws (10).
- (7) Connect hose assembly (9) to bulkhead fitting (3) and to elbow at cylinder head.
- (8) Connect hose assembly (8) to bulkhead fitting (3) and to elbow in cylinder head.
- (9) Connect hose (7) to fitting in cylinder head and to bulkhead fitting (3).
- (10) Connect one hose assembly (6) to fittings in cylinder heads.
- (11) Connect other hose assembly (6) to fitting block on electronic control unit and to fitting at fuel pump.
- (12) Connect hose assembly (1) to fitting block on electronic control unit and to bulkhead fitting (3).
- (13) Install lock washer (5) and screw (4) to secure hose clamp to engine.

d. Follow-on Maintenance.

- (1) Install thermostat housing (see para 4-137).
- (2) Install fuel system piping and fuel filters (see para 4-130).
- (3) Install heater hoses and fittings (see para 5-31).
- (4) Install engine enclosure panels (see para 4-127).
- (5) Connect batteries (see para 4-114).

6-69. POWER TAKE-OFF UNIT

This task covers:

- a. Disassembly
- b. Cleaning and Inspection
- c. Assembly
- d. Follow-on Maintenance

TOOLS REQUIRED:

Tool Kit, General Mechanics, Automotive
(Appendix B, Section III, Item 1)

Shop Equipment, Automotive
Maintenance and Repair
(Appendix B, Section III, Item 4)

MATERIALS/PARTS REQUIRED

Dry Cleaning Solvent (Item 3, Appendix E)
Automatic Transmission Fluid (Item 16, Appendix E)
Low-Lint Cleaning Cloth (Item 42, Appendix E)
Oil Seals (Figure 222, Appendix F)

EQUIPMENT CONDITION

Gaskets (Figure 222, Appendix F)
Retaining Rings (Figure 222, Appendix F)
O-Rings (Figure 222, Appendix F)
Vee Ring (Figure 222, Appendix F)

EQUIPMENT CONDITION

Main Engine Shutdown (see para 2-12.)
APU Shutdown (see para 2-16.)
Batteries Disconnected (see para 4-114.)
Power Take-off Unit Removed
(see para 5-49.)

- a. Disassembly.

NOTE

Check residual fluid for burnt or other unusual smell.
Check for metal particles which may indicate damage or
excessive wear. Check for damaged or excessively worn
parts.

- (1) Remove four hex head cap screws (1) and remove open end bearing cover (2) with back-up plate (3), oil seal (4), gasket (5), and retaining ring (6). Discard gasket (5).
- (2) Remove retaining ring (6), back-up plate (3) and oil seal (4) from bearing cover (2). Discard oil seal (4) and retaining ring (6).
- (3) Remove output shaft (7) with entire drive assembly (8 thru 25) out of open end of housing (26).

CAUTION

Support inner race of ball bearing (25).

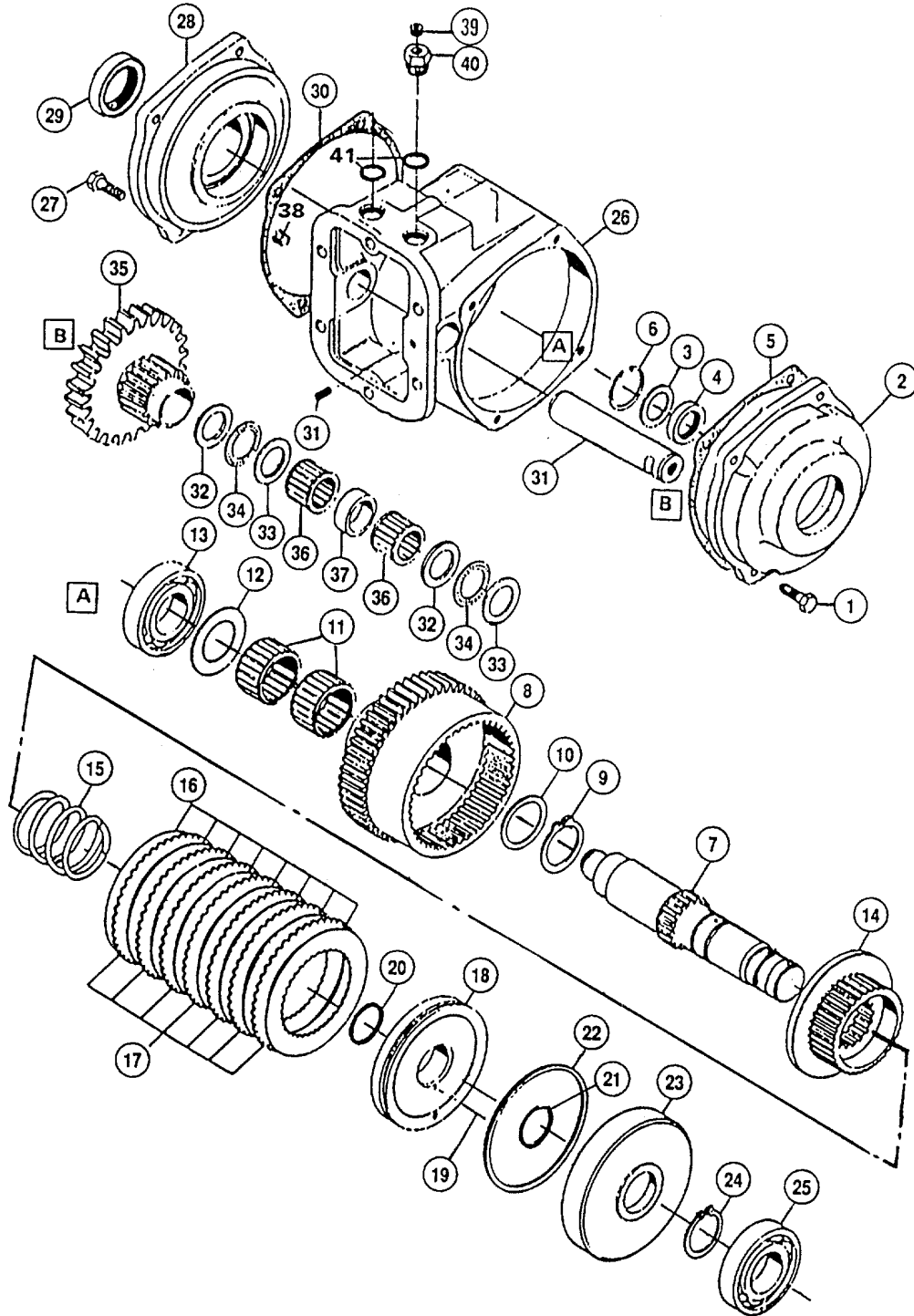
- (4) Press drive end of shaft (7) out of ball bearing (25).
- (5) Remove retaining ring (24) from output shaft (7). Discard retaining ring (24).
- (6) Slide clutch back-up cylinder (23) and clutch piston and ball assembly (18) with wiggler wire (19), Vee ring (22), and two O-rings (20 and 21) off end of shaft (7).

NOTE

Piston and ball assembly (18) can not be disassembled.

- (7) Remove piston and bail assembly (18) with two O-rings (20 and 21) and vee ring (22) from clutch back-up cylinder (23).

6-69. POWER TAKE-OFF UNIT-Continued



6-69. POWER TAKE-OFF UNIT-Continued

- (8) Remove two O-rings (20 and 21), vee ring (22) and wiggler wire (19) from piston and ball assembly (18). Discard two O-rings (20 and 21) and vee ring (21).

CAUTION

Use a twist tie to keep eight friction discs (16) and seven clutch plates (17) in same sequence as removed; wear patterns have been established and should not be disturbed by interchanging discs and/or plates.

- (9) Remove eight friction discs (16), and seven clutch plates (17) with clutch spring (15) and inner clutch gear (14) from drive end of shaft (7).

CAUTION

Support inner race of bearing (13).

- (10) Press driven end of shaft (7) out of ball bearing (13).
- (11) Slide thrust washer (12), output gear (8) with two needle bearings (11) and spacer (10) from driven end of shaft (7).
- (12) Withdraw two needle bearings (11) from output gear (8).
- (13) Remove retaining ring (9) from shaft (7). Discard retaining ring.
- (14) Remove four hex head cap screws (27) and remove closed end bearing cover (28) with oil seal (29) and gasket (30), from housing (26). Discard gasket.
- (15) Press oil seal (29) from bearing cover (28). Discard oil seal (28).
- (16) Remove set screw (31) from bottom of housing (26).
- (17) Press idler shaft (31) slowly out of housing (26) while removing two each thrust races (32 and 33), two needle thrust bearings (34), and input gear (35) with two needle bearings (36), and spacer (37) from housing (26).
- (18) Remove two needle bearings (36) and spacer (37) from input gear (35).
- (19) Remove pipe plug (38) from end of idler shaft (31).
- (20) Remove two pipe plugs (39) from two adapter plugs (40) in housing (26).
- (21) Remove two adapter plugs (40) and two O-rings (41) from housing (26).
- (22) Remove two O-rings (41) from plugs (40). Discard O-rings.

6-69. POWER TAKE-OFF UNIT-Continuedb. Cleaning and Inspection.**WARNING**

Dry cleaning solvent P-D-680 is potentially dangerous. Avoid repeated and prolonged breathing of vapors and skin contact with the liquid. Do not use near open flame, arcing equipment or other ignition sources. Always wear eye protection and protective clothing. The flash point of P-D-680 is 100 to 138 deg. F (30 to 50 deg. C).

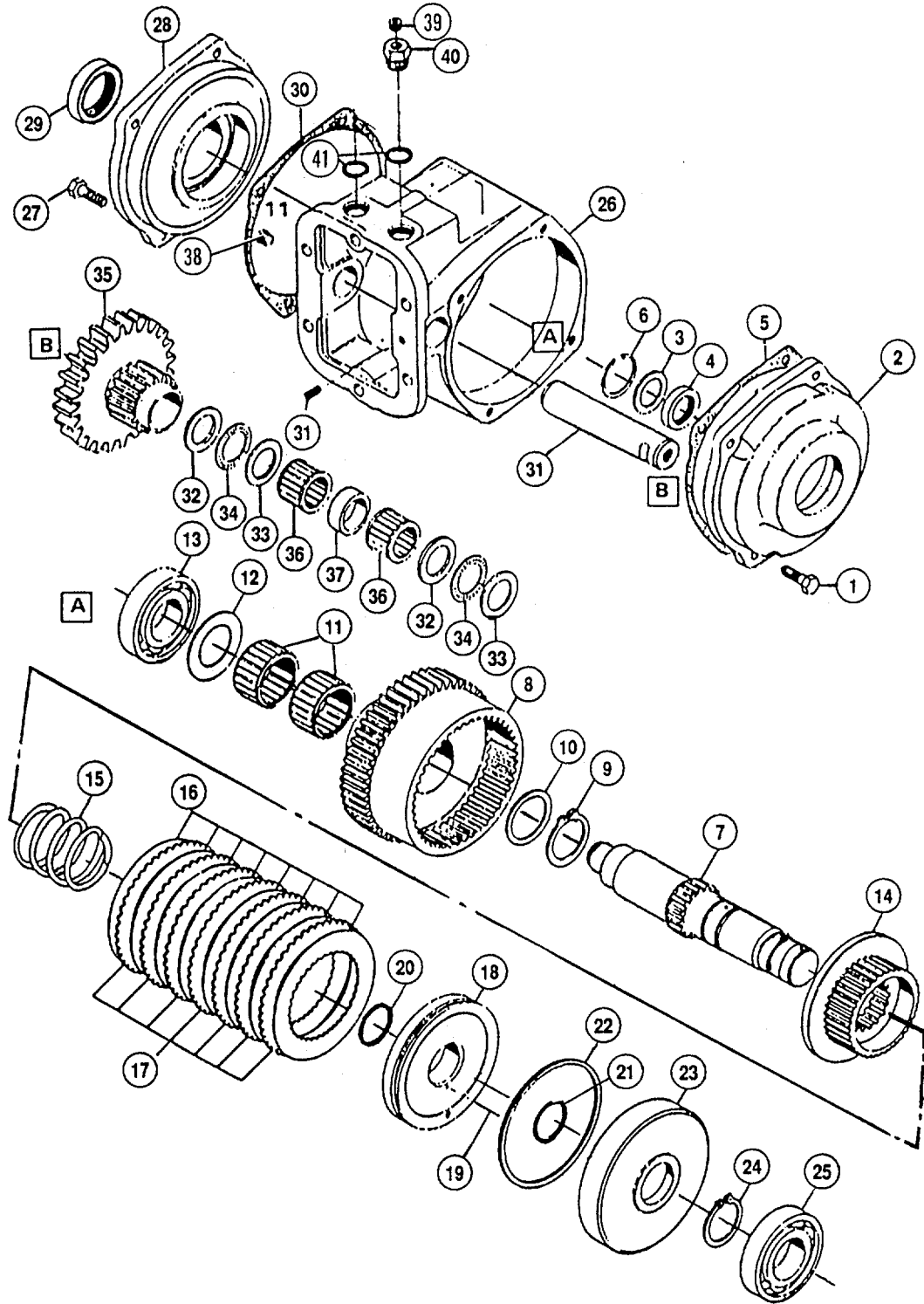
- (1) Clean all parts in dry cleaning solvent (Item 3, Appendix E).

WARNING

Death or serious injury could occur if compressed air is directed against the skin. Do not use compressed air for cleaning or drying unless the pressure is/has been reduced to 30 psi (2.11 kg/cm²) or less. When working with compressed air, always use chip guards, eye protection and other personal protective equipment.

- (2) Dry all parts with compressed air.
- (3) Visually inspect threads of parts removed for damage. Replace all those with damaged threads.
- (4) Visually inspect ail tapped holes and O-ring seal counterbores in housing (26). Replace housing if damaged.
- (5) Check ball and needle bearings (11, 13, 25 and 36) and needle thrust bearings (34) as detailed in paragraph 4-9. Replace as required.
- (6) Check all gears (8, 14 and 35) and gear teeth on and internal spline in gear teeth shaft (7) and on seven clutch plates (1 7) as detailed in para 4-9. Replace as required.
- (7) Examine clutch spring (15) for damage. Replace as required.
- (8) While maintaining in same sequence as removed, inspect friction surfaces of eight friction discs (16) and seven clutch plates (17). If any are not reusable, replace entire set.
- (9) Inspect wear face of clutch piston and ball assembly (18). Replace as required.

6-69. POWER TAKE-OFF UNIT-Continued



6-69. POWER TAKE-OFF UNIT-Continued

c. Assembly.

CAUTION

All parts should be lightly coated with automatic transmission fluid (Item 16, Appendix E) prior to assembly.

- (1) Install two adapter plugs (40) in housing (26). Torque to 25 ft lbs (34 N·m).
- (2) Install two pipe plugs (39) in adapter plugs (40).
- (3) Install pipe plug (38) in end of idler shaft (31) so it is below surface of shaft.
- (4) Install two needle bearings (36) and spacer (37) in input gear (35).
- (5) With groove in idler shaft (31) facing towards tapped hole for set screw (31) in base of housing (26), slowly press idler shaft into bore in housing, while installing two each thrust washers (32 and 33) two thrust needle bearings (34), and input gear (35) with two needle bearings (36) and spacer (37) onto shaft.
- (6) Install set screw (31). Torque to 12 ft lbs (16 N·m).
- (7) Press oil seal (29) in to closed end bearing cover (28).
- (8) Install gasket (30) on bearing cover (28) and attach bearing cover to housing (26) with four hex head cap screws (27). Torque to 13 ft lbs (18 N·m).

CAUTION

Friction discs (16) must be alternated with clutch plates (17) for proper assembly. If reusing removed friction discs and clutch plates, they must be reinstalled in same sequence as removed. Wear patterns have been established and should not be disturbed by interchangeable discs and/or plates. Damage and improper operation would result.

- (9) Install eight friction discs (16) and seven clutch plates (17) onto external teeth of inner clutch gear (14).

NOTE

Rotate seven clutch plates (17) to align their inner teeth with external teeth of inner clutch gear (14).

- (10) Install inner clutch gear(14) with eight friction discs (16) and seven clutch plates (17) onto drive end of shaft (7). Rotate gear as required to engage inner teeth with teeth on shaft.
- (11) Install new retaining ring (9) to retain inner clutch gear (14) on output shaft (7).
- (12) Place clutch spring (15) over shaft (7) and into inner clutch gear (14).
- (13) Install vee ring (22), two new O-rings (20 and 21) and wiggler wire (19) into clutch piston and ball assembly (18).

6-69. POWER TAKE-OFF UNIT-Continued

- (14) Insert clutch piston and ball assembly (18) with two O-rings (20 and 21), vee ring (22) and wiggler wire (19) into clutch back-up cylinder (23), and slide assembled parts onto output shaft (7).
- (15) Install new retaining ring (24) on output shaft (7).

CAUTION

Support inner race of ball bearing (25).

- (16) Press drive end of shaft (7) into ball bearing (25) until retaining ring (24) contacts bearing (25).
- (17) Insert two roller bearings (11) into output gear (8).
- (18) Slide spacer (10) and output gear (8) with two roller bearings onto output shaft (7), aligning inner teeth of output gear (8) with outer teeth of clutch plates (23).

CAUTION

Support inner race of ball bearing (13).

- (19) Slide thrust washer (12) onto non-drive end output of shaft (7) and press drive end of shaft into ball bearing (13) until it seats.
- (20) Insert output shaft (7), with entire drive assembly (8 thru 25), into housing (26), aligning external teeth of output gear (8) with teeth of input gear (35), and ball bearing (13) entering closed end bearing cover (28).
- (21) Insert new oil seal (4), back-up plate (3), and new retaining ring (6) into open end bearing cover (2).
- (22) Place gasket (5) on bearing cover (2), slide cover onto ball bearing (25), and attach cover to housing (26) with four hex head cap screws (1). Torque to 13 ft lbs (18 N·m).

d. Follow-on Maintenance.

- (1) Install power take-off (see para 5-49).
- (2) Connect batteries (see para 4-114).

6-70. HOIST CYLINDERS

This task covers:

- a. Disassembly
- b. Cleaning and Inspection
- c. Assembly
- d. Follow-on Maintenance

TOOLS REQUIRED:

Tool Kit, General Mechanics, Automotive
 (Appendix B, Section III, Item 1)
 Shop Equipment, Automotive Maintenance and Repair
 (Appendix B, Section III, item 4)

EQUIPMENT CONDITION

Main Engine Shutdown (see para 2-12.)
 APU Shutdown (see para 2-16.)
 Batteries Disconnected (see para 4-114.)
 Hoist Cylinder Removed (see para 5-51.)

MATERIALS/PARTS REQUIRED:

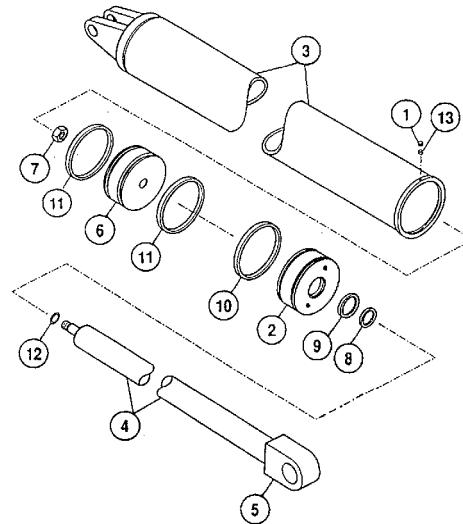
Dry Cleaning Solvent (Item 3, Appendix E)
 Hydraulic Oil (Item 28, Appendix E)
 Emery Cloth (Item 25, Appendix E)
 O-rings (Figure 173, Appendix E)
 Nylon Plug (Figure 173, Appendix E)
 Seals (Figure 173, Appendix E)

a. Disassembly.

NOTE

Discard all O-rings, seals and nylon plug.

- (1) Remove set screw (1).
- (2) Use spanner wrench to turn gland (2) counterclockwise until free from tube assembly (3).
- (3) Remove gland (2), rod (4), rod lug (5), piston (6) and nut (7), with seals and O-rings as an assembly.
- (4) Remove nut (7) and piston (6) with seals (11) from rod (4).
- (5) Remove gland (2) with wiper seal (8), rod seal (9) and giant O-ring (10) from rod (4).
- (6) Remove and discard wiper seal (8), rod seal (9), and gland O-ring (10) from gland (2).



6-70. HOIST CYLINDERS-Continued

- (7) Remove and discard two piston seals (11) from piston (6).
- (8) Remove nut (7) and O-ring (12) from rod (4).
- (9) Remove nylon plug (13) from tube assembly (2).

b. Cleaning and Inspection.

WARNING

Dry cleaning solvent P-D-680 is potentially dangerous. Avoid repeated and prolonged breathing of vapors and skin contact with the liquid. Do not use near open flame, arcing equipment or other ignition sources. Always wear eye protection and protective clothing. The flash point of P-D-680 is 100 to 138 deg. F (38 to 59 deg. C).

- (1) Clean all parts in dry cleaning solvent (Item 3, Appendix E).

WARNING

Death or serious injury could occur if compressed air is directed against the skin. Do not use compressed air for cleaning or drying unless the pressure is/has been reduced to 30 psi (2.11 kg/cm²) or less. When working with compressed air, always use chip guards, eye protection and other personal protective equipment.

- (2) Dry all parts with compressed air.
- (3) Inspect inside of tube assembly (3). If it has deep grooves, score marks, or is severely damaged, replace it.
- (4) Inspect rod (4). If rod is bent, grooved, or pitted; replace it. Minor scratches can be removed using emery cloth (Item 25, Appendix E).
- (5) Inspect gland (2) and piston (6). If gland and/or piston are cracked or broken; replace it (them).
- (6) Inspect rod lug (5). If rod lug is cracked or broken; replace it.

6-70. HOIST CYLINDERS-Continuedc. Assembly.

- (1) Install new rod seal (9), wiper seal (8), and gland O-ring (10) on gland (2).
- (2) Apply hydraulic oil (item 28, Appendix E) to gland (2).
- (3) Install gland (2) on rod (4).
- (4) Install rod O-ring (12), piston (6), and nut (7) on rod (4).
- (5) Torque nut (4) to 210 ft lbs (283 Nm).
- (6) Apply hydraulic oil (Item 28, Appendix E) to piston (6) and gland (2).
- (7) Install two piston seals (11) on piston (6).
- (8) Install piston (6), rod (4), rod lug (5), and gland (2), with O-rings and seals, as assembly in tube assembly (3).
- (9) Using a spanner wrench to thread gland (2) snugly into cylinder (3), until gland is flush.
- (10) Install new nylon plug (13) and set screw (1); tighten set screw so plug deforms against gland threads.

d. Follow-on Maintenance.

- (1) Install hoist cylinder (see para 5-51).
- (2) Connect batteries (see para 4-114).

6-71. HOIST MANIFOLD BLOCK

This task covers:

- | | |
|----------------------------------|---------------------------------|
| a Disassembly | c. Assembly |
| b Cleaning and Inspection | d. Follow-on Maintenance |
-

TOOLS REQUIRED

Tool Kit, General Mechanics, Automotive
 (Appendix B, Section III, Item 1)
 (Appendix B, Section III, Item 4)

EQUIPMENT CONDITION

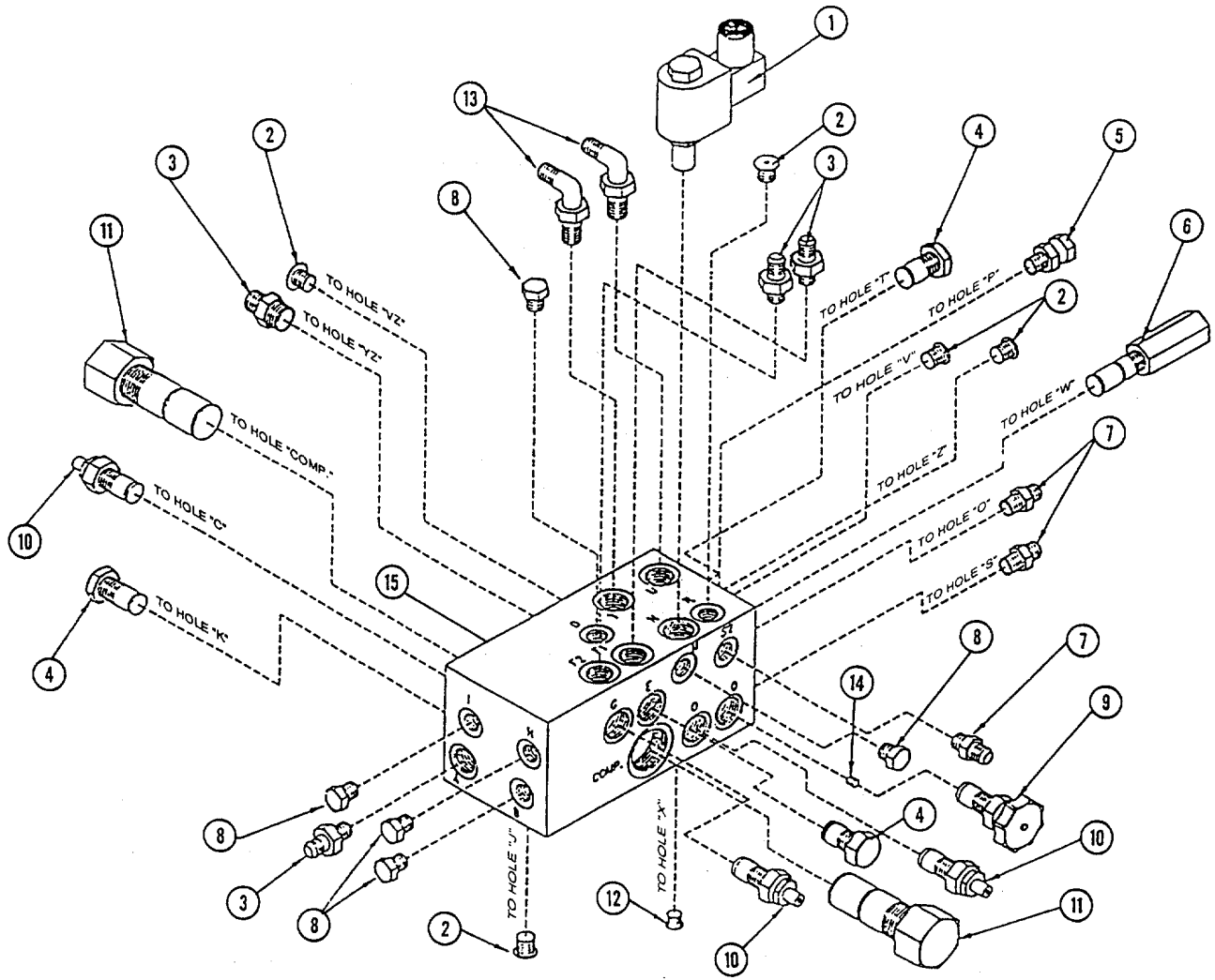
Hoist Manifold Block Removed (see para 5-52.)
 Main Engine Shutdown (see para 2-12.)
 APU Shutdown (see para 2-16.)
 Batteries Disconnected (see para 4-114.)

MATERIALS/PARTS REQUIRED

Dry Cleaning Solvent (Item 3, Appendix E)
 Hydraulic Oil (Item 28, Appendix E)
 Seal Kits (Figure 181, Appendix F)

a. Disassembly.

- (1) Remove solenoid valve (1).
- (2) Remove six hollow hex plugs (2 and 12) and five hex head plugs (8).
- (3) Remove four adapters (3) and three adapters (7).
- (4) Remove three check valves (4).
- (5) Remove swivel adapter (5).
- (6) Remove pressure reducing valve (6).
- (7) Remove needle valve (9).
- (8) Remove three flow control valves (10).
- (9) Remove two pressure compensators (11).
- (10) Remove two 900 fittings (13).
- (11) Remove restrictor pipe plug (14).



6-71. HOIST MANIFOLD BLOCK - Continuedb. Cleaning and Inspection.**WARNING**

Dry cleaning solvent P-D-680 is potentially dangerous. Avoid repeated and prolonged breathing of vapors and skin contact with the liquid. Do not use near open flame, arcing equipment or other ignition sources. Always wear eye protection and protective clothing. The flash point of P-D-680 is 100 to 138 deg. F (38 to 59 deg. C).

- (1) Clean all parts in dry cleaning solvent (Item 3, Appendix E).

WARNING

Death or serious injury could occur if compressed air is directed against the skin. Do not use compressed air for cleaning or drying unless the pressure is/has been reduced to 30 psi (2.11 kg/cm²) or less. When working with compressed air, always use chip guards, eye protection and other personal protective equipment.

- (2) Dry all parts with compressed air.

CAUTION

If any adjustable valves (6, 10, and 11) are damaged entire hoist manifold block assembly must be replaced. It is adjusted as a complete assembly on a special test stand by the manufacturer.

- (3) Visually inspect threads of parts removed for damage. Replace solenoid valve (1), plugs (2, 8, and 12), adapters (3, 5, and 7), check valves (4), needle valve (9), fittings (13) and restrictor pipe plug (14) if damaged threads. If pressure reducing valve (6), any of three flow control valves (10), or either of two pressure compensators (11) have damaged threads, entire hoist manifold block assembly must be replaced.
- (4) Visually inspect all tapped holes and O-ring seal counterbores in manifold block (15). Replace entire hoist manifold block assembly if damaged.
- (5) Check that passages in manifold block (15) are not blocked as detailed in para 4-9.

6-71. HOIST MANIFOLD BLOCK - Continuedc. Assembly.**CAUTION**

Apply hydraulic oil (Item 28, Appendix E) to all threads and to all seals. Check seals for nicks or cuts before installation.

- (1) Install restrictor pipe plug (14).
- (2) Install two 900 fittings (13).
- (3) Install new seal kit on two pressure compensators (11) and install compensators.
- (4) Install new seal kit on three flow control valves (10) and install valves.
- (5) Install new seal kit on needle valve (9) and install valve.
- (6) Install new seal kit on pressure reducing valve (6) and install valve.
- (7) Install swivel adapter (5).
- (8) Install new seal kits on three check valves (4) and install valves.
- (9) Install four adapters (3) and three adapters (7).
- (10) Install six hollow hex plugs (2 and 12) and four hex head plugs (8).
- (11) Install new seal kit or solenoid valve (1) and install valve.

d. Follow-on Maintenance.

- (1) Install hoist manifold block (see para 5-52).
- (2) Connect batteries (see para 4-114).

6-72. PLANETARY SPEED REDUCER

This task covers:

- | | |
|-------------------------------------|--------------------------------|
| a Disassembly | e Shaft Assembly Repair |
| b Cleaning and Inspection | f Case Assembly repair |
| c Follow-on Maintenance | g Unit Assembly |
| d Secondary Planetary Repair | h Follow-on Maintenance |

TOOLS REQUIRED

Tool Kit, General Mechanics, Automotive
(Appendix B, Section III, Item 1)

Shop Equipment, Automotive
Maintenance and Repair
(Appendix B, Section III, Item 4)

EQUIPMENT CONDITION

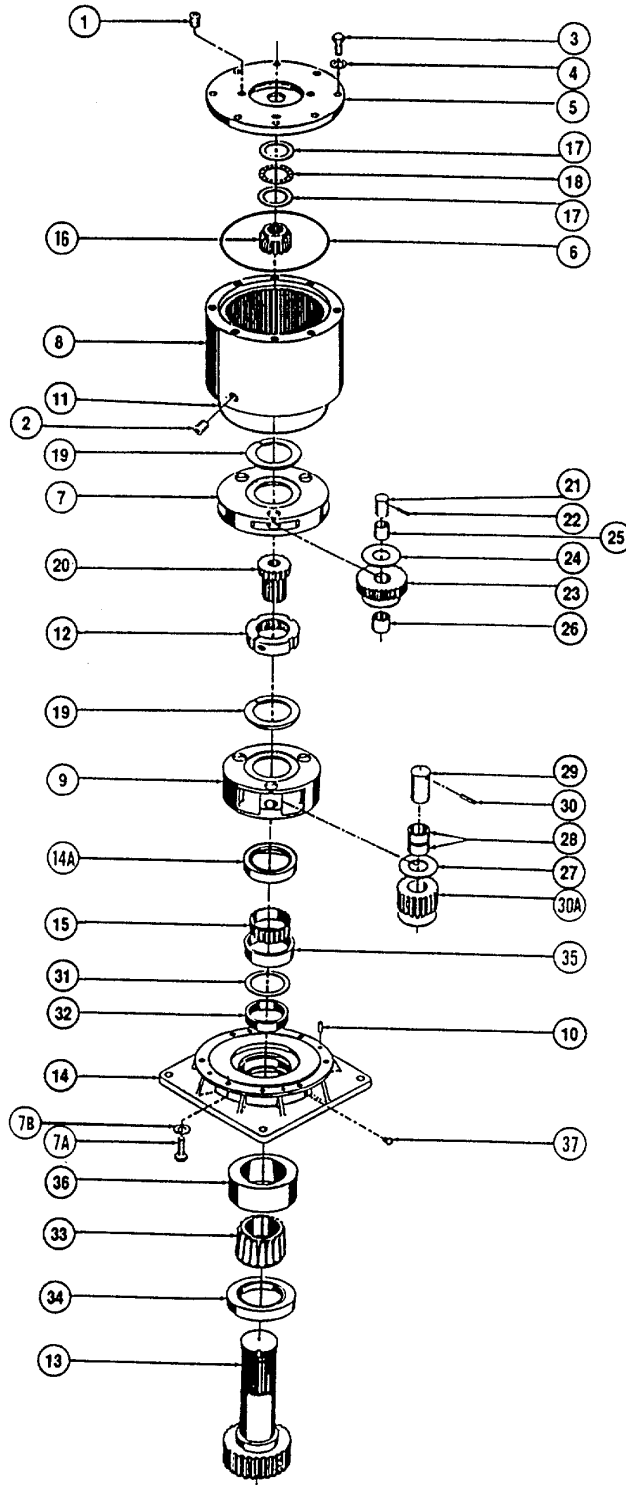
Main Engine Shutdown (see para 2-12.)
APU Shutdown (see para 2-16.)
Batteries Disconnected (see para 4-114.)
Planetary Speed Reducer Removed
(see para 5-53.)

MATERIALS/PARTS REQUIRED

Grease, High Temperature, (Item 15, Appendix E)
Sealant, Pipe (Item 2, Appendix E)
Oil, Gear, 90 WT (Item 45, Appendix E)
Solvent, Dry Cleaning (Item 3, Appendix E)
O-rings (Figure 180, Appendix F)
Roll Pins (Figure 180, Appendix F)
Seals (Figure 180, Appendix F)

a. Disassembly.

- (1) Remove fill plug (1) and two drain plugs (2) and drain oil from unit. Maximum drainage occurs when oil is warm.
- (2) Remove eight cover bolts (3) and lockwashers (4).
- (3) Lift cover (5) off. Remove and discard cover O-ring (6).
- (4) Lift primary planetary assembly out of case by lifting up on planet carrier (7).
- (5) To remove ring gear (8), first remove eight case bolts (7A) and lockwashers (7B), then devise a puller by using the cover, some long 3/8" in. bolts and a small bottle jack. Set jack inside unit on top of secondary carrier (9). Turn cover upside down and set it on jack. Screw at least two bolts into ring gear (8) and use jack to pull ring gear (8) free from dowel pins (10). Remove and discard ring gear O-ring (11).
- (6) To remove secondary carrier assembly, loosen lock screw in clamp nut (12) with 5 mm hex wrench. Unscrew clamp nut until it touches bottom of secondary planet gears (13). Then use puller to move secondary carrier (9) up shaft spline until clamp nut (12) is again tight. Unscrew clamp nut again until it touches planet gears (13). Repeat process until clamp nut and carrier are off.



6-72. PLANETARY SPEED REDUCER-Continued**WARNING**

Clamp nut is no longer retaining output shaft, so care should be taken if moving case because output shaft can fall out. Care should be taken not to damage output shaft (13) or injure your feet when shaft falls out of case.

- (7) To remove output shaft (13), case (14) should be set on a plate or table with the output shaft protruding downward through hole in table. Push output shaft out bottom of case by applying load to top end (threaded end) of output shaft until it passes through upper shaft bearing (15).

NOTE

The unit is now disassembled into groups of parts. The area(s) requiring repair should be identified by thorough inspection of the parts after they have been washed in solvent (Item 3, Appendix E). Then, refer to the appropriate group repair paragraph below.

- b. Cleaning and Inspection.

WARNING

Dry cleaning solvent P-D-680 is potentially dangerous. Avoid repeated and prolonged breathing of vapors and skin contact with the liquid. Do not use near open flame, arcing equipment or other ignition sources. Always wear eye protection and protective clothing. The flash point of P-D-680 is 100 to 138 deg. F (38 to 59 deg. C).

- (1) Clean all parts in dry cleaning solvent (Item 3, Appendix E) as detailed in para 4-9.

WARNING

Death or serious injury could occur if compressed air is directed against the skin. Do not use compressed air for cleaning or drying unless the pressure is/has been reduced to 30 psi (2.11 kg/cm²) or less. When working with compressed air, always use chip guards, eye protection and other personal protective equipment.

- (2) Dry all parts with compressed air.
- (3) Inspect all parts as detailed in para 4-9.

6-72. PLANETARY SPEED REDUCER-Continued

c. Primary Planetary Repair.

- (1) Lift input gear (16), two thrust races (17), and thrust bearing (18) out of primary carrier assembly (7).

CAUTION

Outside diameter of primary carrier thrust washer (19) is beveled. Larger diameter must be installed into carrier first when replacing washer.

- (2) To replace primary carrier thrust washer (19), snap out with screw driver and snap back in by hand.
- (3) Lift sun gear (20) out of primary carrier assembly (7).
- (4) Remove three planet pins (21) by pressing them out of primary carrier (7), thus shearing off three roll pins (22). Support carrier while pressing out planet pins.
- (5) Slide three planet gears (23) along with six planet washers (24) out of primary carrier (7). The three inner bearing races (25) should drop out of the planet bearings (26) as the gears are being removed from the carrier.
- (6) If planet bearings (26) must be replaced, they may now be pressed out of primary planet gears (23).
- (7) Use 1/8" pin punch to remove pieces of sheared off roll pins from primary planet pins (21) and primary carrier (7).
- (8) Rebuild primary planet carrier assembly in reverse order using any needed new parts. New roll pins (22) are always required. Planet pins (21) should be installed with chamfered end of 1/8" hole toward outside diameter of carrier. This will aid in alignment of holes while inserting new roll pins (22).

d. Secondary Planetary Repair.

- (1) Procedure is same as para c. on Primary Planetary Repair for secondary carrier (9), secondary planet gears (30A), planet washer (27), planet bearings with inner bearing races (28), secondary planet pins (29), and roll pins (30).

NOTE

Secondary planet gears (30A) are not to be installed into secondary carrier (9) until step (8) of Unit Assembly (para. g.) is completed. Press fit not required on reinstallation of secondary planet pins (29) into secondary carrier (9).

6-72. PLANETARY SPEED REDUCER-Continuede. Shaft Assembly Repair.

- (1) Remove shims (31) and spacer (32) from output shaft (13). Hold shims and spacer for reinstallation during Unit Assembly, paragraph g.
- (2) Remove tapered bearing cone (33) using gear puller.
- (3) Lubricate lip of new seal (14A) with oil (Item 45, Appendix E) and with open side upward slide it down output shaft (13) all the way to gear teeth or until it fits snug over seal diameter of shaft.

CAUTION

Press bearing cone (33) onto output shaft by pressing on inner race only. DO NOT press on roller cage or it may damage bearing.

- (4) Press bearing cone (33), with large end down, onto output shaft (13). Be sure bearing cone is seated tightly against shoulder of output shaft. Old bearing cone may be reused if it was removed only to replace seal.

f. Case Assembly Repair.

- (1) Remove seal (14A) and discard.
- (2) Lift bearing cone (15) out of case (14).
- (3) Pull upper and lower bearing cups (35 and 36) and replace with new ones if needed.
- (4) Clean all foreign material from magnetic fill and drain plugs (1 and 2).

6-72. PLANETARY SPEED REDUCER-Continuedg. Unit Assembly,

When all the subassemblies are complete, the unit is ready to be assembled. Start with case assembly (14) with internal end down (end with 12 holes) on press table. Apply thick layer of high temperature grease (item 15, Appendix E) to surface of lower bearing cup (36).

- (1) Invert output shaft assembly (threaded side down) and carefully lower it into case (14) until bearing cone (33) is seated.
- (2) Press shaft seal (34) into case until it is flush, using either a press fixture or hammer and large flat-ended bar or rod.
- (3) Invert unit and stand it on pinion gear end of output shaft (13).

WARNING

Output shaft and case are not retained together at this point, so securely invert unit, not allowing shaft and case to separate. Care should be taken not to damage output shaft or injure your feet if shaft falls out of case.

- (4) While holding gear end of output shaft (13) with one hand, rotate case (14) to be sure it moves freely. The slight resistance you feel is due to the seal load on the output shaft.
- (5) Slide spacer (32) over threaded end of output shaft (13) until it comes to rest on lower shaft bearing cup (36). Install shims (31) in same manner until they come to rest on top of spacer. Use same number of shims that came out of unit to allow correct bearing preload.
- (6) Apply a thick layer of high temperature grease (Item 15, Appendix E) to surface of upper bearing cup (31).

CAUTION

DO NOT continue to press bearing on after it is seated. this will cause rollers to damage race resulting in premature bearing failure.

- (7) Slide bearing cone (15) small end down, over threaded end of output shaft. Press bearing on slowly until it is just seated. If you can hold pinion gear end of output shaft (13), and rotate case (14) while pressing bearing on, it will be seated when all rollers are rotating evenly.
- (8) Place new lip seal (14A) (open side down) over threaded end of output shaft and press in until flush with case.
- (9) Spread high temperature grease (item 15, Appendix E) on hub of secondary planet carrier (9). Turn secondary carrier over (hub down) and install into case.

6-72. PLANETARY SPEED REDUCER-Continued

- (10) Before installing clamp nut (12), make certain lock screw is loosened. With thrust side of clamp nut (12) down (side opposite stamped part number), insert between posts of secondary carrier (9). Carefully place carrier over threaded end of output shaft (13), making sure not to damage threads on shaft. Move carrier by hand until you are certain carrier spline has started cleanly and squarely onto shaft spline. Press carrier slowly onto shaft spline. Be sure hub on secondary carrier (9) slides through seal lip (14A) without damaging it. Rotating case (14) while carrier hub starts through seal will help. Continue slowly pressing carrier on shaft until you feel slight increase in drag load as you are rotating case. At this point, bearings are seated and it's time to set bearing preload. Proper bearing preload will be determined by rolling torque method. This method involves increasing press load until drag or rolling resistance of 50 to 80 in lbs (6 to 9 Nm) torque is achieved when rotating case, including seal drag. This torque is equal to a force of 11 to 18 lbs (5 to 8 kg) when rotating case (14) by pulling on one of support ribs that are located above mounting flange. If uncertain, use a fish scale or similar measuring device to check rolling torque.

CAUTION

If lock screw in side of clamp nut (12) is not accessible to hex wrench, loosen clamp nut to first accessible location for tightening. DO NOT tighten nut to obtain lock screw access. If nut is tightened too much before lock screw is tightened, nut will spread apart and touch only one side of shaft threads. This would allow nut to unscrew if highly loaded. Clamp nut threads need to contact both sides of shaft threads to be properly locked into position.

- (11) Once proper bearing preload is achieved, start threading clamp nut (12) onto output shaft (13) while maintaining press load. Tighten nut all the way down to carrier spline until "hand tight." Using a 5 mm hex wrench, torque lock screw in clamp nut to 150 in lbs (17 Nm). This will securely clamp nut to output shaft threads. Press load may now be relieved.
- (12) Lubricate O-ring (11) with oil (Item 45, Appendix E) and place over pilot on case (14).

WARNING

Hold ring gear by outside diameter to avoid injuring fingers or sharp gear teeth.

- (13) With dowel holes pointing down, place ring gear (8) over secondary carrier assembly. Rotate ring gear (8) back and forth to line up planet gear teeth (30A) with ring gear teeth (8). While letting ring gear down to case, rotate until dowel pins (10) line up with dowel holes. Orient one of two drain holes in ring gear as near as possible to grease fitting in case.
- (14) Place heavy plate over ring gear (8) and press down, leaving 1/4" gap between ring gear and case (14). To be sure ring gear orientation is correct, start eight case bolts (7A) with lockwashers (7B) into ring gear. If bolt holes are not properly aligned it will be easier to remove ring gear with 1/4" gap left. If bolt holes line up, press ring gear (8) down tight against case.
- (15) Tighten eight case bolts (7A) to 32 ft lbs (43 Nm).
- (16) Put pipe sealant (Item 2, Appendix E) on two drain plugs (2) and install into drain holes in ring gear (8).

6-72. PLANETARY SPEED REDUCER-Continued

- (17) Turn primary carrier assembly upside down so that spline end of carrier is upward. Insert spline end of sun gear (20) into spline end of primary carrier assembly and push in until spline is completely engaged.
- (18) Invert primary carrier assembly (sun gear down). Install primary carrier assembly into secondary carrier assembly until sun gear (20) meshes with secondary planet gears (30A). Primary carrier assembly will drop down to where primary planet gears (23) touch top of ring gear teeth (8). Hold inside diameter of carrier (7) and rotate until planet gears line up with ring gear teeth; assembly will drop into place.
- (19) Put one thrust washer (17), thrust bearing (18), and another thrust washer (17) over step of input gear (16).
- (20) Insert input gear (16) into primary planet assembly so teeth mesh with primary planet gears (23).

NOTE

A simple planetary such as this one does not require a "timing" procedure.

- (21) Fill unit with 4.5 pints of gear oil (Item 45, Appendix E). Correct oil level will measure to middle of primary planet gears (23).
- (22) Lubricate new O-ring (6) and stretch over pilot of cover (5).
- (23) Invert cover (5) and set on top of unit. Rotate cover until oil fill hole is in proper orientation with grease fitting in case. Install eight cover bolts (3) with lockwashers (4) and tighten to 32 ft lb (43 Nm). Put pipe sealant (Item 2, Appendix E) on fill plug (1) and install into oil fill hole in cover.
- (24) Stick a shaft into the input gear (6) and rotate by hand to be sure unit runs smoothly and easily.

h. Follow-on Maintenance.

- (1) Install planetary speed reducer (see para 5-53).
- (2) Connect batteries (see para 4-114).

6-73. SWING BRAKE

This task covers:

- | | |
|----------------------------|--------------------------|
| a. Disassembly | c. Assembly |
| b. Cleaning and Inspection | d. Follow-on Maintenance |

TOOLS REQUIRED

Tool Kit, General Mechanics, Automotive
(Appendix B, Section III, Items 1 and 4)

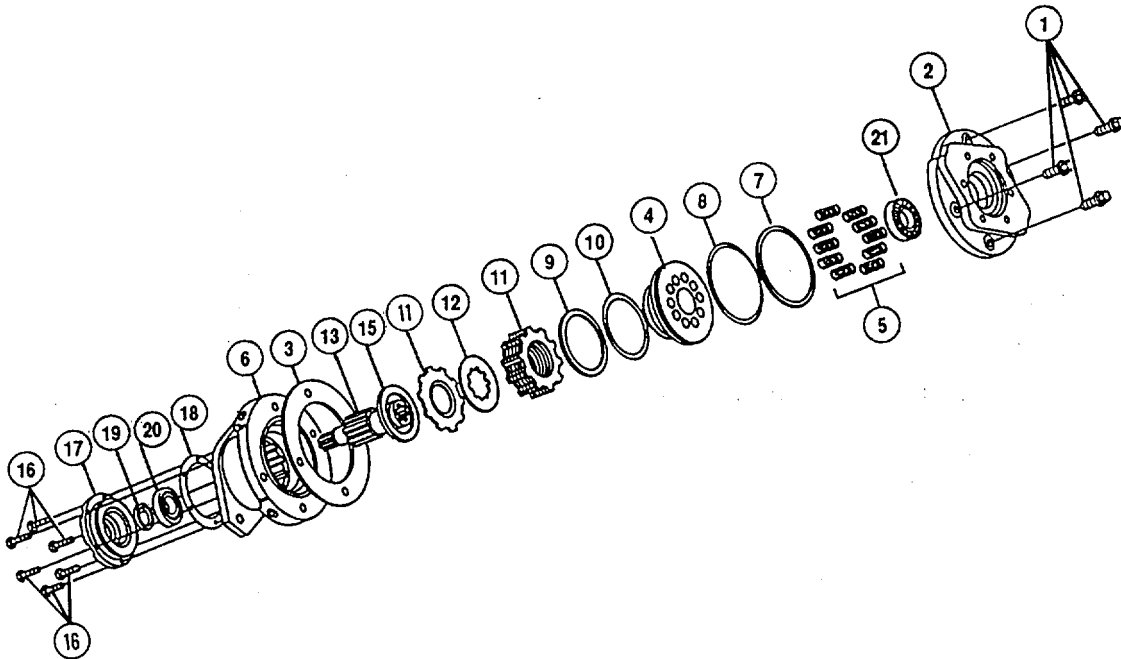
EQUIPMENT CONDITION

Swing Brake Removed (see para 5-54.)

MATERIALS/PARTS REQUIRED

Dry Cleaning Solvent (Item 3, Appendix E)
Dexron II (Item 12, Appendix E)
O-rings (Figure 179, Appendix F)
Gaskets (Figure 179, Appendix F)
Seal Kit (Figure 179, Appendix F)

a. Disassembly.



- (1) Alternately loosen four 12 point capscrews (1) until all internal spring force is relieved.
- (2) Remove cover (2) and cover gasket (3). Discard gasket.
- (3) Place one hand on top of piston (4) and springs (5).
- (4) Apply low air pressure (20 to 30 psi (138 to 206 kPa)) to brake release port to force piston (4) with springs (5) out of case (6).
- (5) Remove upper back-up ring (7), upper O-ring (8), lower back-up ring (9), and lower O-ring (10). Discard O-rings.

6-73. SWING BRAKE-Continued**CAUTION**

Note the order in which friction discs (11) and separator plates (12) are stacked. They must be installed in the same order to prevent unit from overheating.

- (6) Remove shaft (13), friction discs (11), separator plates (12), and spacer (15).
- (7) Remove six base bolts (16), base (17), and base gasket (18). Discard gasket.
- (8) Remove and discard seal (19).

b. Cleaning and Inspection.

- (1) Discard all gaskets, O-rings, and seals.

WARNING

Dry cleaning solvent P-D-680 is potentially dangerous. Avoid repeated and prolonged breathing of vapors and skin contact with the liquid. Do not use near open flame, arcing equipment or other ignition sources. Always wear eye protection and protective clothing. The flash point of P-D-680 is 100 to 138 deg. F (38 to 59 deg. C). (2) Clean all components in dry cleaning solvent (Item 3, Appendix E).

WARNING

Death or serious injury could occur if compressed air is directed against the skin. Do not use compressed air for cleaning or drying unless the pressure is/has been reduced to 30 psi (2.11 kg/cm²) or less. When working with compressed air, always use chip guards eye protection and other personal protective equipment.

- (3) Dry all parts with compressed air.
- (4) Inspect bearings (20 and 21) and shaft (13) as detailed in para 4-9.
- (5) Remove and replace bearings (20 and 21) as needed.
- (6) Inspect friction discs (11), separator plates (12) and piston (4) for excessive wear.
- (7) Inspect springs (5) for damage.

6-73. SWING BRAKE-Continued

c. Assembly.

- (1) Install new seal (19) in base (17).
- (2) Install new base gasket (18), base (17) with bearing (20), and six base bolts (16).
- (3) Torque six base bolts (16) to 32 ft lbs (43 Nm).
- (4) Push shaft (13) downward through bearing (20) and seal (19) until bearing shoulder on shaft is seated against bearing.
- (5) Soak friction discs (11) in Dexron II (Item 12, Appendix E) for approximately 10 minutes.

CAUTION

Friction discs (11) and separator plates (12) must be stacked in the same order as they were removed. There must be a friction disc (11) located on each end of the stack. If a separator plate (12) is placed against the piston (4) or spacer (15), the unit will overheat and seize up.

- (6) Install spacer (15).
 - (7) Install friction discs (11) and separator plates (12) in case (6) on shaft (13).
 - (8) Pour Dexron II (Item 12, Appendix E) into case (6) until fluid level is even with top friction disc (11).
 - (9) Install new upper O-ring (8), upper back-up ring (7), new lower O-ring (10), and lower back-up ring (9).
 - (10) Gently push piston (4) into case (6).
 - (11) Install springs (5) in piston (4).
 - (12) Install new cover gasket (3), and cover (2) with bearing (21).
 - (13) Install and alternately tighten four 12 point capscrews (1).
 - (14) Torque four 12 point capscrews (1) to 110 ft lbs (149 Nm).
- d. Follow-on Maintenance.
- (1) Install swing brake (see para 5-54).

6-74. SWING CROSSOVER RELIEF VALVE MANIFOLD BLOCK

This task covers:

- | | | | |
|---|-------------------------|----|-----------------------|
| a | Disassembly | c | Assembly |
| b | Cleaning and Inspection | d. | Follow-on Maintenance |
-

TOOLS REQUIRED

Tool Kit, General Mechanics, Automotive
(Appendix B, Section III, Items 1 and 4)

EQUIPMENT CONDITION

Swing Crossover Relief Valve Manifold Block
Removed (see para 5-55.)

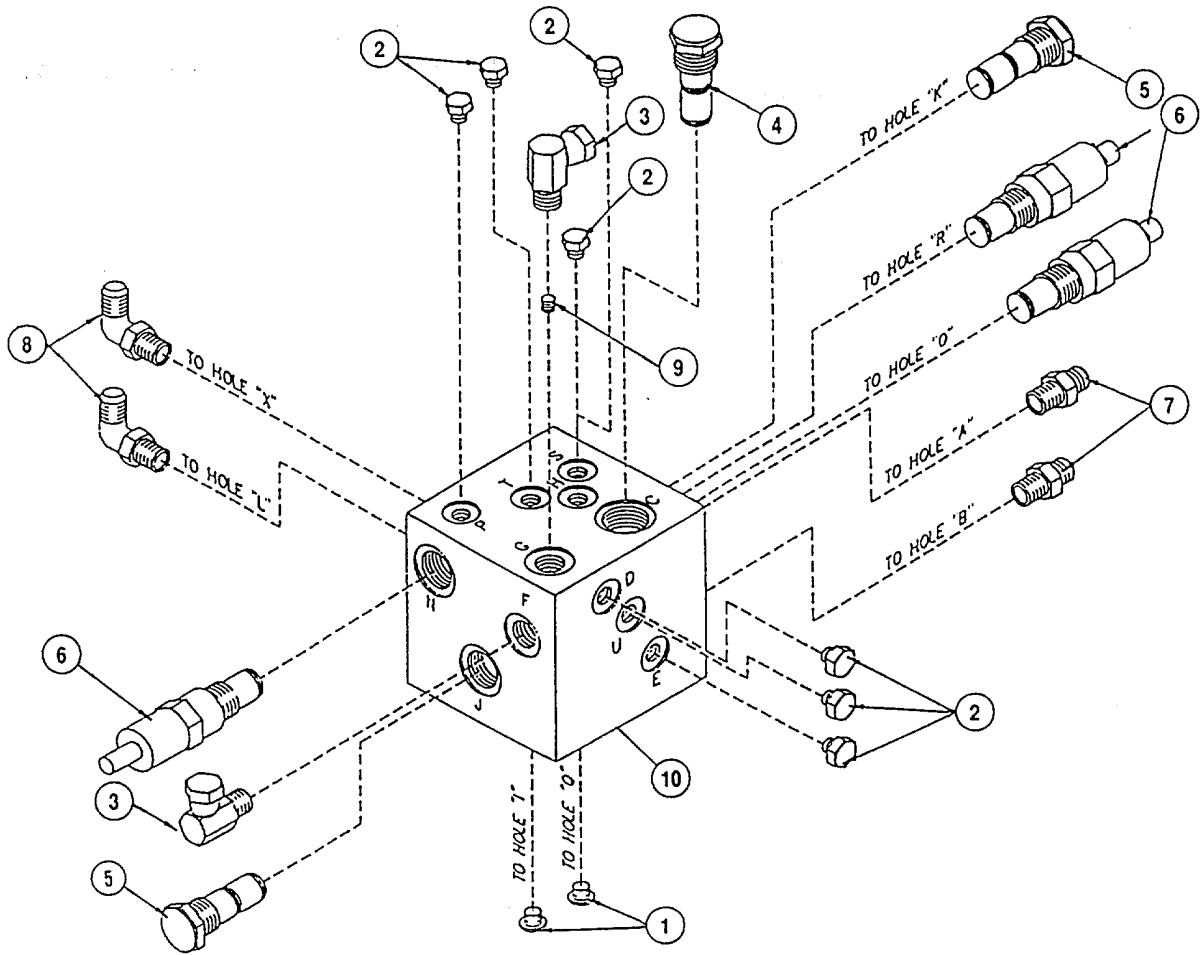
MATERIALS/PARTS REQUIRED

Dry Cleaning Solvent (Item 3, Appendix E)
Hydraulic Oil (Item 28, Appendix E)
Seal Kits (Figure 174, Appendix F)

a. Disassembly.

- (1) Remove two hollow hex plugs (1) and seven hex head plugs (2).
- (2) Remove two 900 swivel fittings (3).
- (3) Remove shuttle valve (4).
- (4) Remove two single check valves (5).
- (5) Remove three thermal relief valves (6).
- (6) Remove four adapters (7 and 8).
- (7) Remove restrictor pipe plug (9).

6-74. SWING CROSSOVER RELIEF VALVE MANIFOLD BLOCK-Continued



6-74. SWING CROSSOVER RELIEF VALVE MANIFOLD BLOCK-Continued

b. Cleaning and Inspection.

WARNING

Dry cleaning solvent P-D-680 is potentially dangerous. Avoid repeated and prolonged breathing of vapors and skin contact with the liquid. Do not use near open flame, arcing equipment or other ignition sources. Always wear eye protection and protective clothing. The flash point of P-D-680 is 100 to 138 deg. F (38 to 59 deg. C).

- (1) Clean all parts in dry cleaning solvent (Item 3, Appendix E).

WARNING

Death or serious injury could occur if compressed air is directed against the skin. Do not use compressed air for cleaning or drying unless the pressure is/has been reduced to 30 psi (2.11 kg/cm²) or less. When working with compressed air, always use chip guards, eye protection and other personal protective equipment.

- (2) Dry all parts with compressed air.
- (3) Visually inspect threads on parts removed for damage. Replace all parts with damaged threads.
- (4) Visually inspect all tapped holes and O-ring seal counterbores in manifold block (10). Replace block if any threads are damaged.
- (5) Check that passages in manifold block (10) are not blocked as detailed in para 4-9.

c. Assembly.**CAUTION**

Apply hydraulic oil (Item 28, Appendix E) to all threads and to all seals before installation.

- (1) Install restrictor pipe plug (9).
- (2) Install four adapters (7 and 8).
- (3) Install new seal kit on three relief valves (6) and install valves.
- (4) Install new seal kit on two single pilot check valves (5) and install valves.
- (5) Install new seal kit on shuttle valve (4) and install valve.
- (6) Install two 900 swivel fittings (3).
- (7) Install two hollow hex plugs (1) and seven hex head plugs (2).

6-74. SWING CROSSOVER RELIEF VALVE MANIFOLD BLOCK - Continued

d. Follow-on Maintenance.

- (1) Install swing relief valve manifold block (see para 5-55).

6-75. MAIN HYDRAULIC PUMP

THIS TASK COVERS:

- a. **Disassembly**
- b. **Cleaning and Inspection**
- c. **Assembly**
- d. **Follow-on Maintenance**

TOOLS REQUIRED

Tool Kit, General Mechanics, Automotive
(Appendix B. Section III, Item 1)
Shop Equipment, Automotive
Maintenance and Repair
(Appendix B. Section III, Item 4)

MATERIALS/PARTS REQUIRED

Dry Cleaning Solvent (Item 3, Appendix E)
Hydraulic Oil (Item 28, Appendix E)
Low-lint Cleaning Cloth (Item 42, Appendix E)
Deburring Stone (Item 46, Appendix E)
Retaining Compound (Item 7, Appendix E)
Seal Ring (Figure 178, Appendix F)
O-rings (Figure 178, Appendix F)
Back-up Rings (Figure 178, Appendix F)

EQUIPMENT CONDITION

Main Hydraulic Pump Removed (see para 5-61.)

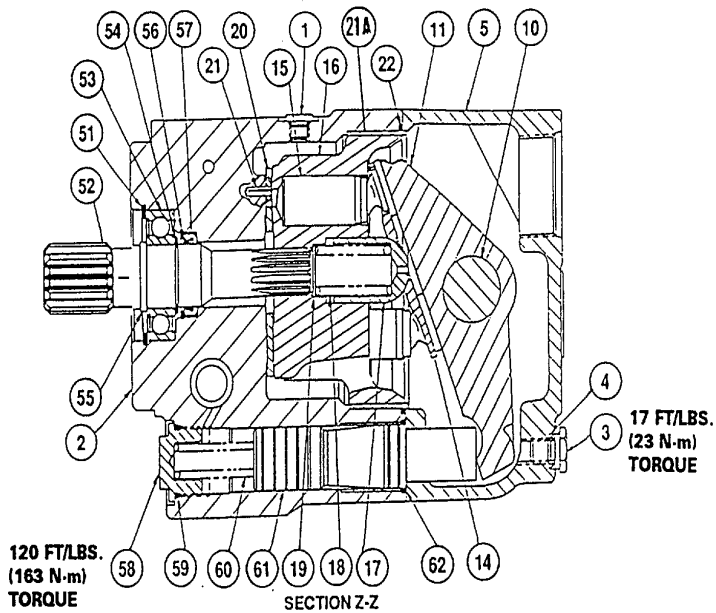
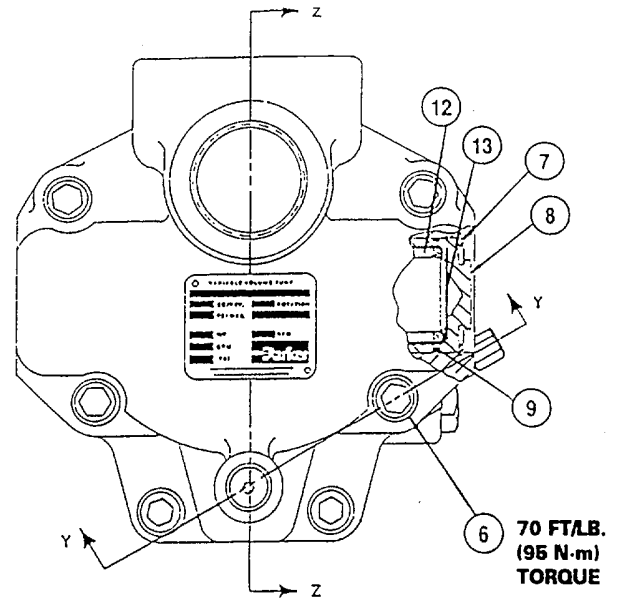
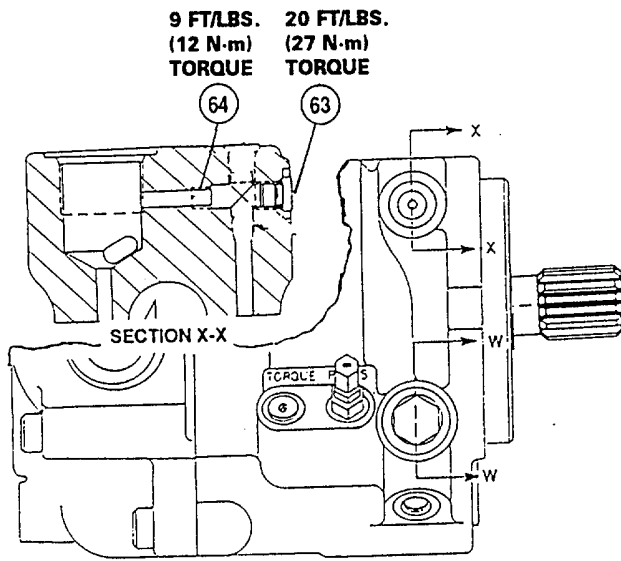
a. Disassembly.

NOTE

Discard all O-rings and seals.

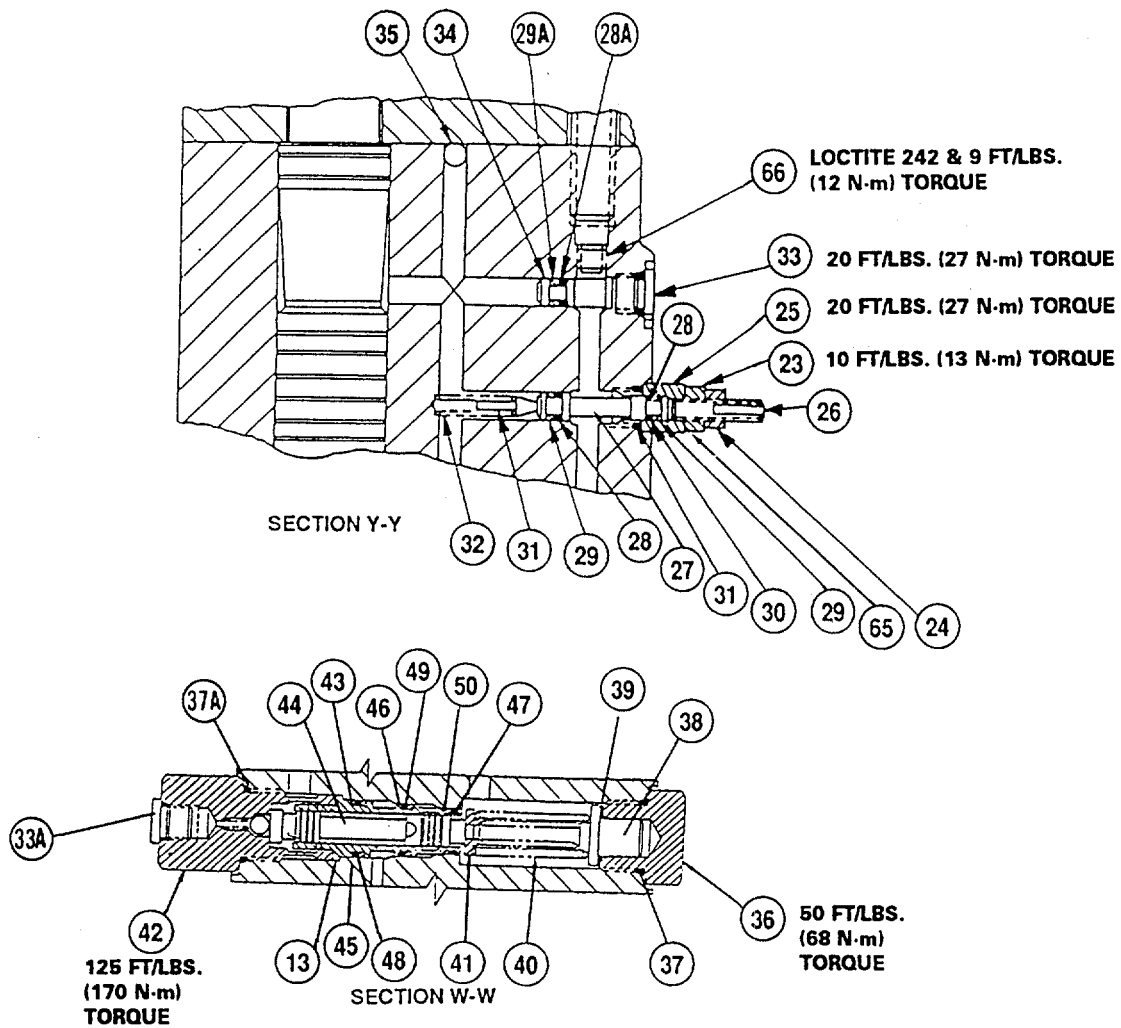
- (1) Remove fill plug (1) from top of pump housing (2).
- (2) Remove drain plug (3) with seal ring (4) from trunnion housing (5).
- (3) Remove and discard seal ring (4).
- (4) Drain residual hydraulic fluid into a clean container and retain for inspection.
- (5) Remove six hex socket head screws (6) to separate trunnion housing (5) from pump housing (2).
- (6) Remove two retaining rings (7) from trunnion housing (5).
- (7) Remove two trunnion caps (8) with O-rings (9) from trunnion housing (5).
- (8) Remove and discard two O-rings (9).
- (9) Withdraw trunnion pin (10) from swash plate (11) to free swash plate (11).
- (10) Withdraw two needle bearings (12) and remove two thrust washers (13) from trunnion caps (8).
- (11) Remove slipper retainer (14) with seven piston assemblies (15) from barrel (16) in pump housing (2).
- (12) Withdraw seven piston assemblies (15) from slipper retainer (14).
- (13) Remove ball seat (17), barrel spring (18), and washer (19) from bore in barrel (16).
- (14) Withdraw barrel (16) from pump housing (2).

6-75. MAIN HYDRAULIC PUMP- Continued



- 1 FILL PLUG
- 2 PUMP HOUSING
- 3 DRAIN PLUG
- 4 SEAL RING
- 5 TRUNNION HOUSING
- 6 HEX SOCKET HEAD SCREW
- 7 RETAINING RING
- 8 TRUNNION CAP
- 9 O-RING
- 10 TRUNNION PIN
- 11 SWASH PLATE
- 12 NEEDLE BEARING
- 13 THRUST WASHER
- 14 SLIPPER RETAINER
- 15 PISTON ASSEMBLY
- 16 BARREL
- 17 BALL SEAT
- 18 BARREL SPRING
- 19 WASHER
- 20 PORT PLATE
- 21 ROLL PIN
- 21A BARREL BUSHING
- 22 O-RING
- 51 RETAINING RING
- 52 SHAFT
- 53 BALL BEARING
- 54 RETAINING RING
- 55 RETAINING RING
- 56 RETAINING RING
- 57 OIL SEAL
- 58 SERVO PLUG
- 59 O-RING
- 60 SERVO SPRING
- 61 SERVO PISTON
- 62 O-RING
- 63 PLUG
- 64 ORIFICE PLUG

6-75. MAIN HYDRAULIC PUMP - Continued



- | | |
|-----------------------|-----------------------|
| 23 NUT | 37 OWING |
| 24 JAM NUT | 37A O-RING |
| 25 PLUG | 38 PISTON |
| 26 ADJUSTABLE RN SEAT | 39 SHIMS |
| 27 ADJUSTING STEM | 40 MODULATOR SPRING |
| 28 O-RING | 41 SPRING RETAINER |
| 28A O-RING | 42 AIR BLEED ASSEMBLY |
| 29 BACKUP RING | 43 SPOOL SLEEVE |
| 29A BACKUP RING | 44 SPOOL |
| 30 O-RING | 45 OWING |
| 31 O-RING | 46 O-RING |
| 31 DART | 47 O-RING |
| 32 PRESSURE SPRING | 48 BACKUP RING |
| 33 PLUG | 49 BACKUP RING |
| 34 PLUG | 50 BACK-UP RING |
| 35 BALL | 65 LOCKING TAB |
| 36 DIFFERENTIAL CAP | 66 PLUG |

6-75. MAIN HYDRAULIC PUMP - Continued

- (15) Lift port plate (20) off of two roll pins (21) and out of pump housing (2).
- (16) Pull barrel bushing (21A) from pump housing (2).
- (17) Remove and discard O-ring (22).
- (18) Hold nut (23) to loosen jam nut (24); then loosen nut (23).
- (19) Unscrew plug (25) to remove it with adjustable R/V seat (26) and adjusting stem (27).
- (20) Remove two nuts (23 and 24) and RN seat (26) from stem (27).
- (21) Withdraw adjusting stem (27) with O-rings (28) and back-up rings (29) and locking tab (65) from plug (25)
- (22) Remove and discard two O-rings (28) and their back-up rings (29) and O-rings (30 and 31).
- (23) Withdraw dart (31) and pressure spring (32) from pump housing (2).
- (24) Unscrew and remove plug (33) for access to torque plug (34); then withdraw torque plug with O-ring (28A) and back-up ring (29A) from pump housing (2).
- (25) Remove O-ring (28A) and back-up ring (29A) from torque plug (34). Discard them.
- (26) Use a drift pin to tap out ball (35).
- (27) Remove differential cap (36) with O-ring (37), piston (38) and shims (39).
- (28) Remove and discard O-ring (37).
- (29) Remove piston (38) with shims (39) from differential cap (36).
- (30) Remove shims (39) from piston (38).
- (31) Measure shims and note quantity and thickness of each (either .005" or .010") (.127 to .254 mm).
- (32) Withdraw modulator spring (40) and spring retainer (41) from housing (2).
- (33) Unscrew and remove plug (33A) from air bleed assembly (42).
- (34) Unscrew and remove air bleed assembly (42) with O-ring (37A) from housing (2).

NOTE

If air bleed assembly (42) needs its ball and/or spring replaced, the entire air bleed assembly must be replaced because the ball is staked in place.

- (35) Remove and discard O-ring (37A).
- (36) Withdraw spool sleeve (43) and spool (44) from housing (2); carefully withdraw spool from sleeve.

6-75. MAIN HYDRAULIC PUMP - Continued

- (37) Remove O-rings (45,46 and 47) and back-up rings (48, 49 and 50) from spool sleeve (43) -discard them.
- (38) Remove retaining ring (51) from housing (2).
- (39) Withdraw assembled shaft (52) and bearing (53) from housing.

CAUTION

Support inner race of ball bearing (53) when pressing shaft (52) out of it.

- (40) Remove retaining ring (54) from shaft (52) and press shaft out of ball bearing (53).
- (41) Remove retaining ring (55) from shaft.
- (42) Remove retaining ring (56) from housing (2) to remove shaft seal (57). Discard seal.
- (43) Remove servo plug (58) with O-ring (59) from housing (2).
- (44) Remove servo spring (60) and servo piston (61) from housing (2).
- (45) Remove and discard O-rings (62 and 59).
- (46) Unscrew and remove plug (63) from side of housing (2) for access to orifice plug (64).
- (47) Withdraw orifice plug (64) from housing (2).
- (48) Remove plug (66) from housing (2).

b. Cleaning and Inspection.**WARNING**

Dry cleaning solvent P-D-680 is potentially dangerous. Avoid repeated and prolonged breathing of vapors and skin contact with the liquid. Do not use near open flame, arcing equipment or other ignition sources. Always wear eye protection and protective clothing. The flash point of P-D-680 is 100 to 138 deg. F (38 to 59 deg. C).

- (1) Clean all parts in dry cleaning solvent (Item 3, Appendix E).

WARNING

Death or serious injury could occur if compressed air is directed against the skin. Do not use compressed air for cleaning or drying unless the pressure is/has been reduced to 30 psi (2.11 kg/cm²) or less. When working with compressed air, always use chip guards, eye protection and other personal protective equipment.

- (2) Dry all parts with compressed air.

6 75. MAIN HYDRAULIC PUMP - Continued

- (3) Visually inspect threads of parts removed for damage. Replace all those with damaged threads.
- (4) Visually inspect all tapped holes and O-ring seal counterbores in trunnion housing (5) and pump housing (2). Replace trunnion housing and/or pump housing if damaged.
- (5) Check that passages in pump housing (2) are not blocked (as detailed in paragraph 4-9.).
- (6) Check ball and needle bearings (53 and 12) as detailed in paragraph 4-9.
- (7) Check spline of shaft (52) as detailed in paragraph 4-9. Replace shaft as required.

c. Assembly.

CAUTION

All parts should be coated lightly with hydraulic oil (Item 28, Appendix E) prior to assembly.

- (1) Screw orifice plug (64) into "B" passage in right side of pump housing (2). Torque to nine ft lbs (12 Nm).

CAUTION

Use all new seals, O-rings and back-up rings.

- (2) Screw plug (63) with new O-ring into "B" port in right side of pump housing (2). Torque to 20 ft lbs (27 Nm).
- (3) Install new O-ring (62) in pump housing (2).
- (4) Install servo piston (61) and servo spring (60) in bore in pump housing (2).
- (5) Screw servo plug (58) with new O-ring (59) into pump housing (2). Torque to 120 ft lbs (163 Nm).
- (6) Install new shaft seal (57) in pump housing (2).
- (7) Install new retaining ring (56) in pump housing (2).
- (8) Install new retaining ring (55) on shaft (12).

CAUTION

Support inner race of ball bearing to avoid damaging it.

- (9) Press shaft (52) into ball bearing (53).
- (10) Install new retaining ring (54) on shaft (52).
- (11) Insert assembled shaft and bearing into pump housing (2).
- (12) Install new retaining ring (51) in pump housing (2).
- (13) Install new O-rings (45, 46 and 47) and back-up rings (48, 49 and 50) onto spool sleeve (43).

6-75. MAIN HYDRAULIC PUMP - Continued

- (14) Carefully insert spool (44) into spool sleeve (43).
- (15) Screw assembled spool sleeve (43) and spool (44) into pump housing (2).
- (16) Install new O-ring (37A) on air bleed assembly (42).

NOTE

If air bleed assembly ball and/or spring need to be replaced, the entire air bleed assembly must be replaced because the ball is staked in place.

- (17) Screw air bleed assembly (42) with new O-ring (37A) into pump housing (2). Torque to 125 ft lbs (170 Nm).
- (18) Screw new plug (33A) with new O-ring into air bleed assembly. Torque to 20 ft lbs (27 Nm).
- (19) Insert spring retainer (41) and modulator spring (40) into pump housing (2).

CAUTION

Same quantity and thickness of shims (either .005" or .010" (.127 or .254 mm) thick) must be replaced as were removed for correct differential pressure.

- (20) Place shims (39) on piston (38).
- (21) Install piston (38) with shims (39) into differential cap (36).
- (22) Install new O-ring (37) on differential cap (36).
- (23) Screw differential cap (36) with piston (38) and shims (39) into pump housing (2). Torque to 60 ft lbs (81 Nm).
- (24) Drive ball (35) into pump housing (2). Lightly stone surface of pump housing (use deburring stone, Item 46, Appendix E) to remove any burrs after ball is driven in.
- (25) Install new O-ring (28A) and back-up ring (29A) onto torque plug (34).
- (26) Insert torque plug (34) into pump housing (2).
- (27) Screw plug (33) new with O-ring into pump housing (2). Torque to 20 ft lbs (27 Nm).
- (28) Insert pressure spring (32) and dart (31) into bore in pump housing (2).
- (29) Install new O-ring (31) in pump housing (2).
- (30) Install new O-rings (28 and 30) and their back-up rings (29) on adjusting stem (27).
- (31) Insert adjusting stem (27) with O-rings (28 and 30) and back up rings (29) into plug (25).
- (32) Screw plug (25) with adjusting stem (27) into pump housing (2). Torque plug to 20 ft lbs (27 Nm).
- (33) Thread nut (23) onto adjusting stem (27). Torque to 10 ft lbs (13 Nm).

6-75. MAIN HYDRAULIC PUMP- Continued

- (34) Install locking tab (65) on adjusting stem (27).
- (35) Thread jam nut (24) onto adjusting stem (27).
- (36) Thread R/V seat (26) into jam nut (24).
- (37) Turn adjustable R/V seat in slowly until locking tab (65) prevents further rotation; then hold nut (23) and tighten jam nut (24) to lock adjustable R/V seat in this position.
- (38) Press barrel bushing (21A) into pump housing (2).
- (39) Install new O-ring (22).
- (40) Lightly stone port plate (20) (use deburring stone, Item 46, Appendix E) free of burrs and insert plate into pump housing (2) and position on two roll pins (21).
- (41) Insert barrel (16) into barrel bushing (21A) and onto spline end of shaft (52).
- (42) Insert washer (19) (rounded edge she facing in), barrel spring (18), and ball seat (17) into bore in barrel (16).
- (43) Install seven piston assemblies (15) in slipper retainer (14).
- (44) Install slipper retainer (14) with piston assemblies (15) into barrel (16).
- (45) Install one new O-ring (9) onto each of two trunnion caps (8).
- (46) Insert one thrust washer (13) and one needle bearing (12) into each of two trunnion caps (8).
- (47) Insert one assembled trunnion cap (8) into trunnion housing (5); retain it with retaining ring (7).
- (48) Position swash plate (11) in trunnion housing (5) and insert trunnion pin (10) into housing, through swash plate, and into trunnion cap (8) already in one end of housing.
- (49) Insert other assembled trunnion cap (8) in trunnion housing (5) to retain trunnion pin (10).
- (50) Install retaining ring (7) in trunnion housing (5) to retain trunnion cap (8).
- (51) Set trunnion housing assembly (5) onto pump housing (2).
- (52) Insert six hex socket head screws (6) through trunnion housing (5) and thread into pump housing (2). Torque to 70 ft lbs (95 Nm).
- (53) Coat threads of plug (66) with Loctite threadlock liquid (Item 7, Appendix E); thread plug into pump housing (2). Torque to nine ft lbs (12 Nm).

NOTE

The four longer screws (6) go into the upper four holes; the two shorter screws go into the lower two holes.

- (54) Install new seal ring (4) onto drain plug (3) and screw plug into trunnion housing (5). Torque to 17 ft lbs (23 Nm).

6-75. MAIN HYDRAULIC PUMP - Continued

d. Follow-on Maintenance.

- (1) Install main hydraulic pump (see para 5-62).

6-76. SWING MOTOR

THIS TASK COVERS:

- | | |
|----------------------------|--------------------------|
| a. Disassembly | c. Assembly |
| b. Cleaning and Inspection | d. Follow-on Maintenance |

TOOLS REQUIRED

Tool Kit, General Mechanics, Automotive

(Appendix B. Section III, Item 1
Shop Equipment, Automotive
Maintenance and Repair
(Appendix B. Section III, Item 4)

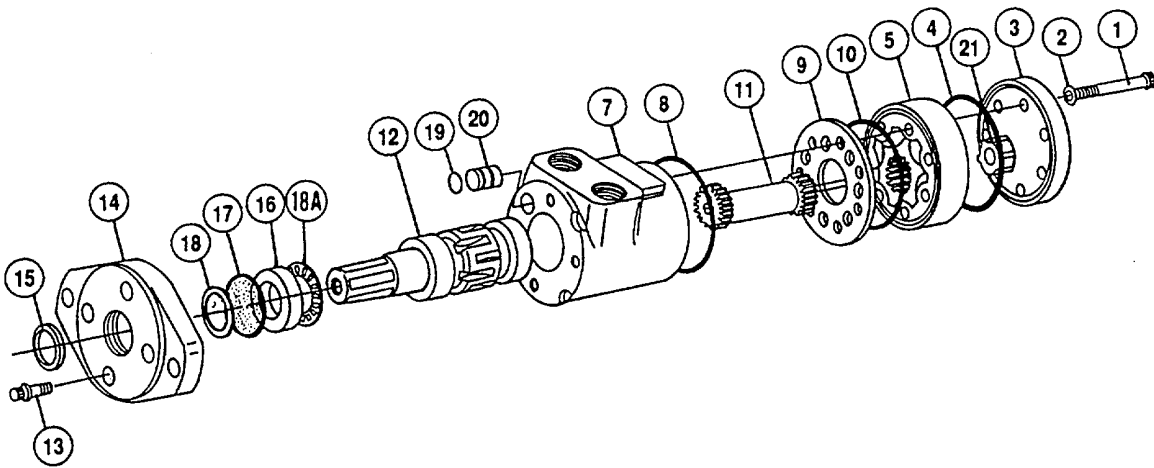
MATERIALS/PARTS REQUIRED

O-rings (Figure 178, Appendix F)
Seals (Figure 178, Appendix F)
Dry Cleaning Solvent (Item 3, Appendix E)
Hydraulic Oil (Item 28, Appendix E)

EQUIPMENT CONDITION

Swing Motor Removed (see para 5-62.)

a. Disassembly



- (1) Remove seven 12-point capscrews (1) with seven seal washers (2) to remove end cap (3).
- (2) Remove and discard seal (4) from end cap (3).
- (3) Lift geroter set (5) with spacer (21) off of housing (7).
- (4) Slide spacer (6) out of geroter set (5).
- (5) Remove and discard seal (10) from stator of geroter set (5).
- (6) Carefully withdraw rotor stator to disassemble geroter set (5).
- (7) Lift off spacer plate (9).

6-76. SWING MOTOR

- (8) Remove and discard seal (8) from housing (7).
- (9) Carefully withdraw drive (11) from driven end of output shaft (12).
- (10) Remove four 12-point capecrews (13) to remove mounting flange (14).
- (11) Remove dust seal (15) from mounting flange (14). Discard seal.
- (12) Press bearing race (16) from mounting flange (14).
- (13) Remove seal (17) and shaft pressure seal (18) from mounting flange (14).
- (14) Slide thrust needle bearing (18A) off output shaft (12).
- (15) Carefully withdraw output shaft (12) from housing (7).
- (16) Remove O-ring (19) and plug (20) from housing (7).
- (17) Remove spacer (21).

b. Cleaning and Inspection.**WARNING**

Dry cleaning solvent P-D-680 is potentially dangerous. Avoid repeated and prolonged breathing of vapors and skin contact with the liquid. Do not use near open flame, arcing equipment or other ignition sources. Always wear eye protection and protective clothing. The flash point of P-D-680 is 100 to 138 deg. F (38 to 59 deg. C).

- (1) Clean all parts in dry cleaning solvent (Item 3, Appendix E). See para 4-9.

WARNING

Death or serious injury could occur if compressed air is directed against the skin. Do not use compressed air for cleaning or drying unless the pressure is/has been reduced to 30 psi (2.11 kg/cm²) or less. When working with compressed air, always use chip guards, eye protection and other personal protective equipment.

- (2) Dry all parts with compressed air.
- (3) Inspect all parts for damage and destructive wear patterns. See para 4-9.

6-76. SWING MOTOR - Continuedc. Assembly.

- (1) Set housing (7) on end and slide in output shaft (12).

NOTE

Lubricate new O-rings and seals (19, 15, 18, 17, 10, 4, and 8) with hydraulic oil (Item 28, Appendix E) before installation.

- (2) Install new O-ring (19) on plug (20) and insert them into bore in housing.
- (3) Place lubricated thrust needle bearing (18A) over end of output shaft (12).
- (4) Insert shaft pressure seal (18) and seal (17) into counterbore in mounting flange (14).
- (5) Press bearing race (16) into flange (14).
- (6) Insert dust seal (15) into counterbore in mounting flange (14).
- (7) Carefully slide assembled mounting flange (14) over end of output shaft (12) and rotate it as necessary to align four holes in it with four holes in housing (7).
- (8) Attach mounting flange (14) to housing (7) with four 12-point capscrews (13). Torque to 25 ft lbs (34 Nm).
- (9) Set housing (7) with assembled shaft (12) and mounting flange (14) on its side.
- (10) Rotate drive (11) until teeth align with internal teeth in output shaft (12) and insert drive into shaft.
- (11) Insert new seal (8) into groove in housing (7).
- (12) Place spacer plate (9) on housing (7) and rotate it as necessary to align seven holes in it with seven holes in housing (7).
- (13) Carefully insert lubricated rotor into stator to assembly geroter set (5).
- (14) Assemble spacer (21) into rotor of assembled geroter set (5).
- (15) Insert new seal (10) into groove in stator of geroter set (5) and place assembled geroter set and spacer over end of drive (11), engaging internal teeth of rotor with external teeth of drive.
- (16) Place new seal (4) in groove in end cap (3), align seven mounting holes and use seven 12-point capscrews (1) and seven new seal washers (2) to attach end cap to housing (7). Torque screws to 25 ft lbs (34 Nm).

d. Follow-on Maintenance.

- (1) Install swing motor (see para 5-62).

6-77. FRONT OR REAR EXTENSION/RETRACTION CYLINDERS

THIS TASK COVERS: a. Disassembly c. Assembly
 c. Cleaning and Inspection d. Follow on Maintenance

TOOLS REQUIRED

Tool Kit, General Mechanics, Automotive
 (Appendix B. Section III, Item 1 and 4)
 Shop Equipment, Automotive Maintenance and Repair
 (Appendix B. Section III, Item 4)

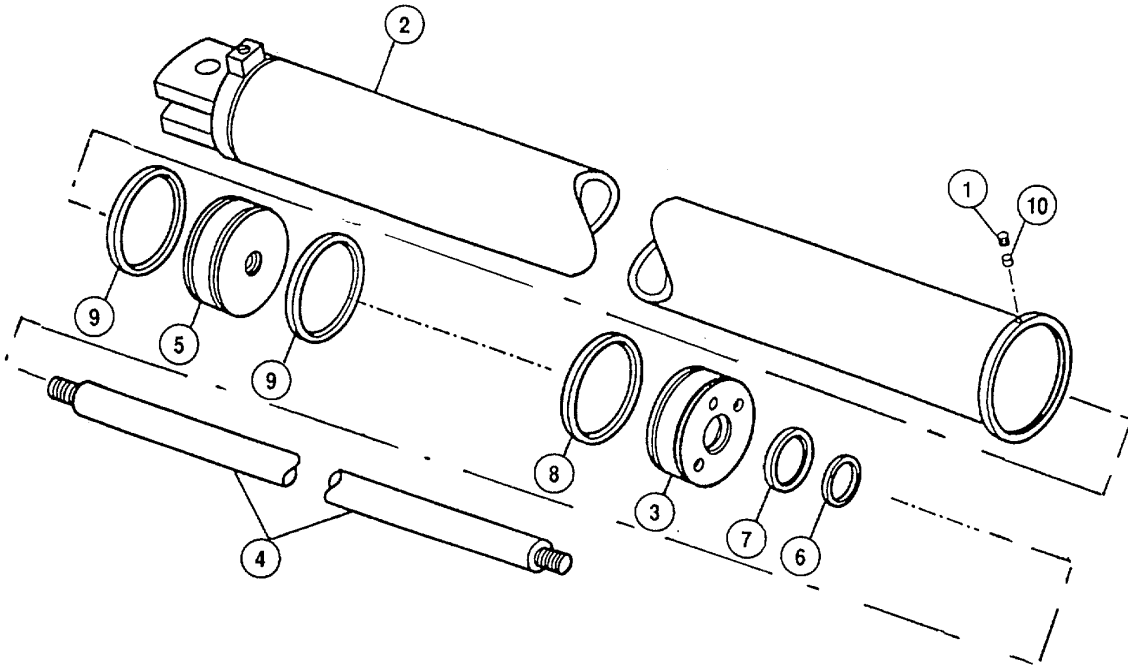
EQUIPMENT CONDITION

Front Extension/Retraction Cylinder Removed
 (see para 5-64.)
 Rear Extension/Retraction Cylinder Removed
 (see para 5-65.)

MATERIALS/PARTS REQUIRED

Dry Cleaning Solvent (Item 3, Appendix E)
 Hydraulic Oil (Item 28, Appendix E)
 Emery Cloth (item 25, Appendix E)
 Seal Kit (Figure 196, Appendix F)
 Nylon Plug (Figure 196, Appendix F)

a. Disassembly



NOTE

Discard all O-rings and seals.

- (1) Remove set screw (1) from tube assembly (2).
- (2) Use spanner wrench to turn gland (3) counterclockwise until free from tube assembly (2).
- (3) Remove gland (3), rod (4), and piston (5) as an assembly.
- (4) Unscrew piston (5) from rod (4).

6-77. FRONT OR REAR EXTENSION/RETRACTION CYLINDERS- Continued

- (5) Remove gland (3) from rod assembly (4).
- (6) Remove and discard wiper seal (6), rod seal (7), and gland O-ring (8).
- (7) Remove and discard two piston seals (9).
- (8) Remove nylon plug (10) from tube assembly (2).

b. Cleaning and Inspection.**WARNING**

Dry cleaning solvent P-D-680 is potentially dangerous. Avoid repeated and prolonged breathing of vapors and skin contact with the liquid. Do not use near open flame, arcing equipment or other ignition sources. Always wear eye protection and protective clothing. The flash point of P-D-680 is 100 to 138 deg. F (38 to 59 deg. C).

- (1) Clean all components in dry cleaning solvent (Item 3, Appendix E).

WARNING

Death or serious injury could occur if compressed air is directed against the skin. Do not use compressed air for cleaning or drying unless the pressure has been reduced to 30 psi (2.11 kg/cm²) or less. When working with compressed air, always use chip guards eye protection and other personal protective equipment.

- (2) Dry all parts with compressed air.
- (3) Inspect inside of tube assembly (2). If it has deep grooves, score marks, or is severely damaged, replace it.
- (4) Inspect rod (4). If rod is bent, grooved, or pitted, replace it. Minor scratches can be removed using emery cloth (Item 25, Appendix E). Visually inspect rod end threads for damage; repair or replace rod.
- (5) Inspect gland (3) and piston (5). If gland and/or piston are cracked or broken, replace it (them).

6-77. FRONT OR REAR EXTENSION/RETRACTION CYLINDERS - Continuedc. Assembly.

- (1) Apply hydraulic oil (Item 28, Appendix E) to gland (3).
- (2) Install new rod seal (7), wiper seal (6), and gland O-ring (8) on gland (3).
- (3) Install gland (3) on rod (4).
- (4) Screw piston (5) on rod (4).
- (5) Apply hydraulic oil (Item 28, Appendix E) to piston (5).
- (6) Install two new piston seals (9) on piston (5).
- (7) Install piston (5), rod (4) and gland (3) as assembly in tube assembly (2).
- (8) Using a spanner wrench, thread gland (3) into tube assembly (2) until they are flush.
- (9) Install new nylon plug (10) and set screw (1); tighten set screw so plug deforms against gland threads.

d. Follow-on Maintenance.

- (1) Install extension/retraction cylinder (see para 5-64 or 5-65).

6-78. LADDER ASSEMBLY

THIS TASK COVERS:	a. Removal	f. Cleaning and Inspection
	b. Fly Section Disassembly	g. Base-Section Assembly
	c. Upper Mid-Section Disassembly	h. Lower Mid-Section Assembly
	d. Lower Mid-Section Disassembly	i. Upper Mid-Section Assembly
	e. Base Section Disassembly	j. Fly-Section Assembly
		k. Installation
		l. Follow-on Maintenance

TOOLS REQUIRED

Tool Kit, General Mechanics, Automotive (Appendix B. Section III, Item 1)
 Shop Equipment, Automotive Maintenance and Repair (Appendix B. Section III, Item 4)

MATERIALS/PARTS REQUIRED

Dry Cleaning Solvent (Item 3, Appendix E)
 Wear Pads (Figure 184 thru 187, Appendix F)
 Wear Pads (Figure 190, Appendix F)
 Bushings (Figure 190, Appendix F)
 Seals (Figure 23, Appendix F)

EQUIPMENT CONDITION

Outriggers Extended (see para 2-14.)

NOTE

The ladder may be removed as an assembly or disassembled while mounted to truck. Once removed as an assembly, the ladder may be disassembled on the ground.

a. Removal.

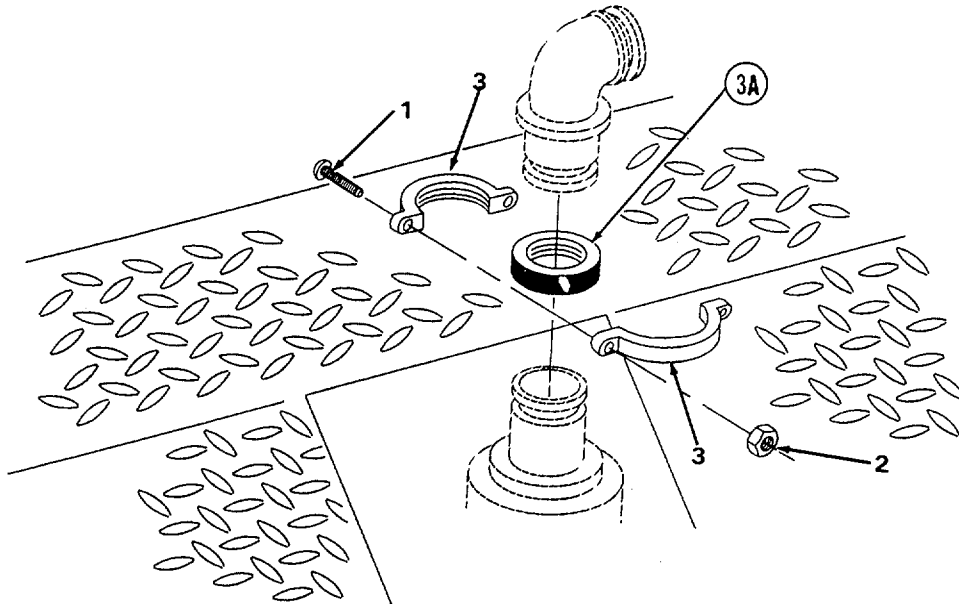
WARNING

Serious injury could occur if heavy equipment is moved/lifted without sufficient personnel to do the job. Use proper physical lifting procedures or use a suitable lifting device or dolly. Wear safety shoes, gloves and other suitable protective clothing. Ladder sections weigh approximately one ton each. Area should be clear of other personnel. Serious injury or death can result from falling objects.

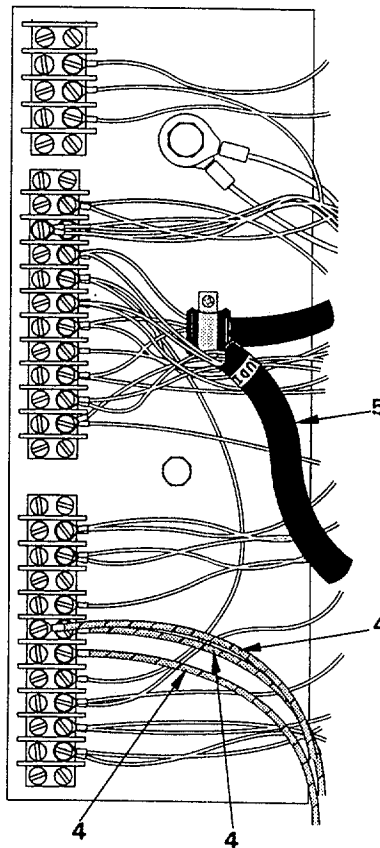
- (1) Connect a six ton overhead crane with a spreader I-beam to support the ladder while it is being disconnected and lifted off the truck and lowered to the floor. However, if available, two overhead cranes (minimum rating three tons each) may be used, one connected to each end of the ladder assembly.
- (2) Remove the monitor and nozzle assembly as described in paragraph 4-202.

6-78. LADDER ASSEMBLY - Continued

- (3) Disconnect water pipe by removing two bolts (1), nuts (2) and flanges (3). Remove and discard seal (3A).

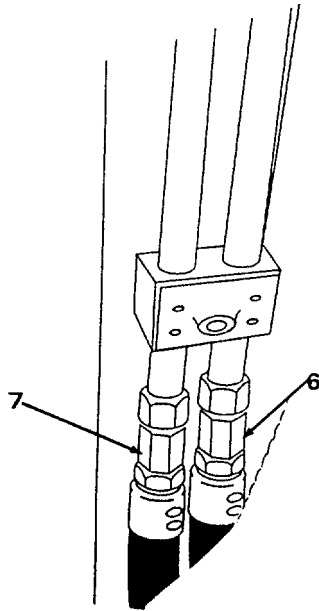


- (4) Disconnect three small electrical cables (4) and one large cable (5) that lead to ladder from terminal boards inside control console.

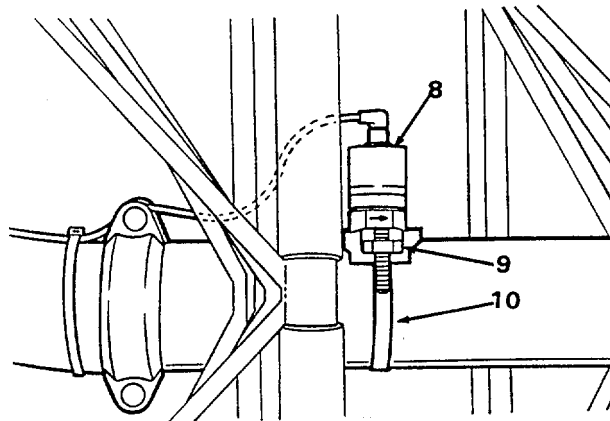


6-78. LADDER ASSEMBLY- Continued

(5) Disconnect two each extension/retraction hydraulic hoses (6 and 7) from tubes under base of ladder.



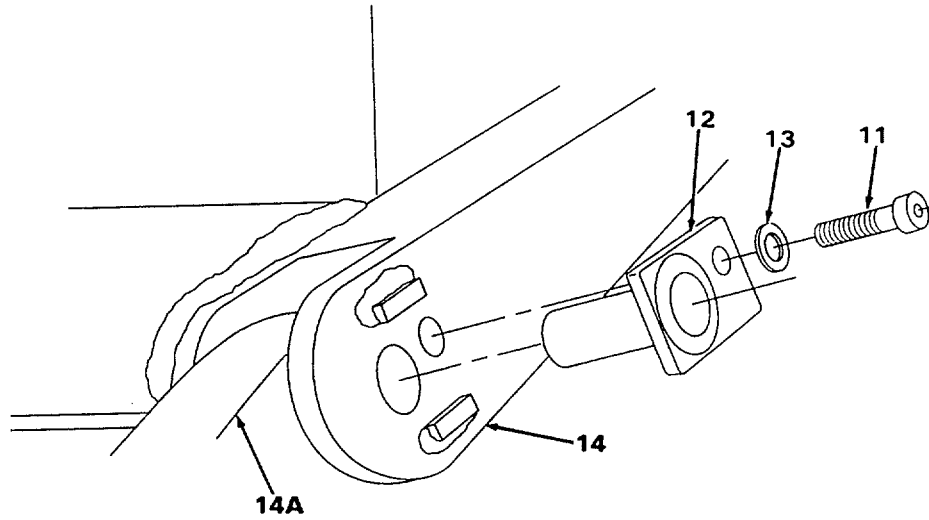
(6) Remove flow meter sensor (8) from base section water pipe by removing two nuts (9) and U-bolt (10).



6-451

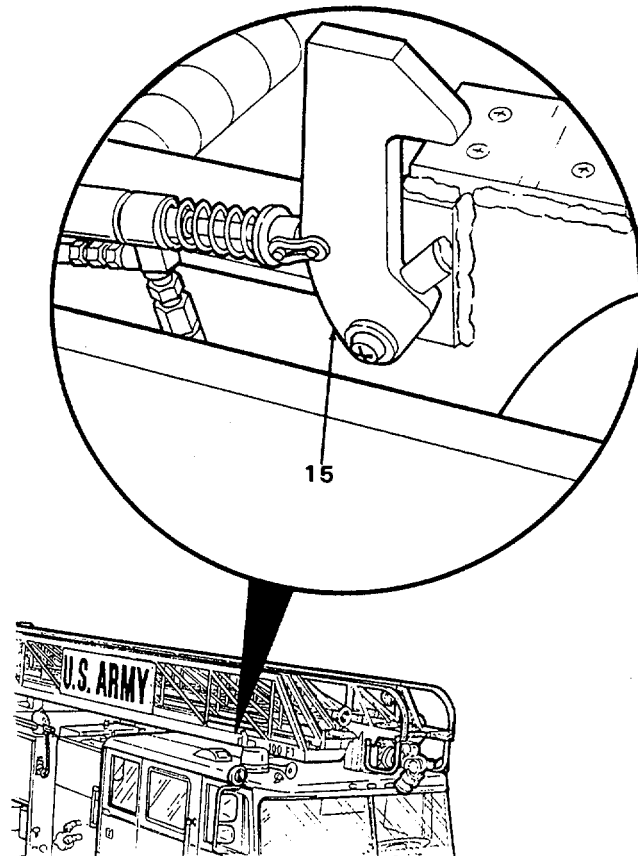
6-78. LADDER ASSEMBLY - Continued

- (7) Remove two hoist cylinders (see para 5-51).
- (8) Remove two bolts (11), pins (12) and washers (13) from ladder (14) and turntable (14A).



6-78. LADDER ASSEMBLY - Continued

- (9) Tie both ladder locks (15) in open position.

**WARNING**

Serious injury could occur if heavy equipment is moved/lifted without sufficient personnel to do the job. Use proper physical lifting procedures or use a suitable lifting device or dolly. Wear safety shoes, gloves and other suitable protective clothing. Ladder sections weigh approximately one ton each. Area should be clear of other personnel. Serious injury or death can result from falling objects.

- (10) Remove ladder assembly from truck.

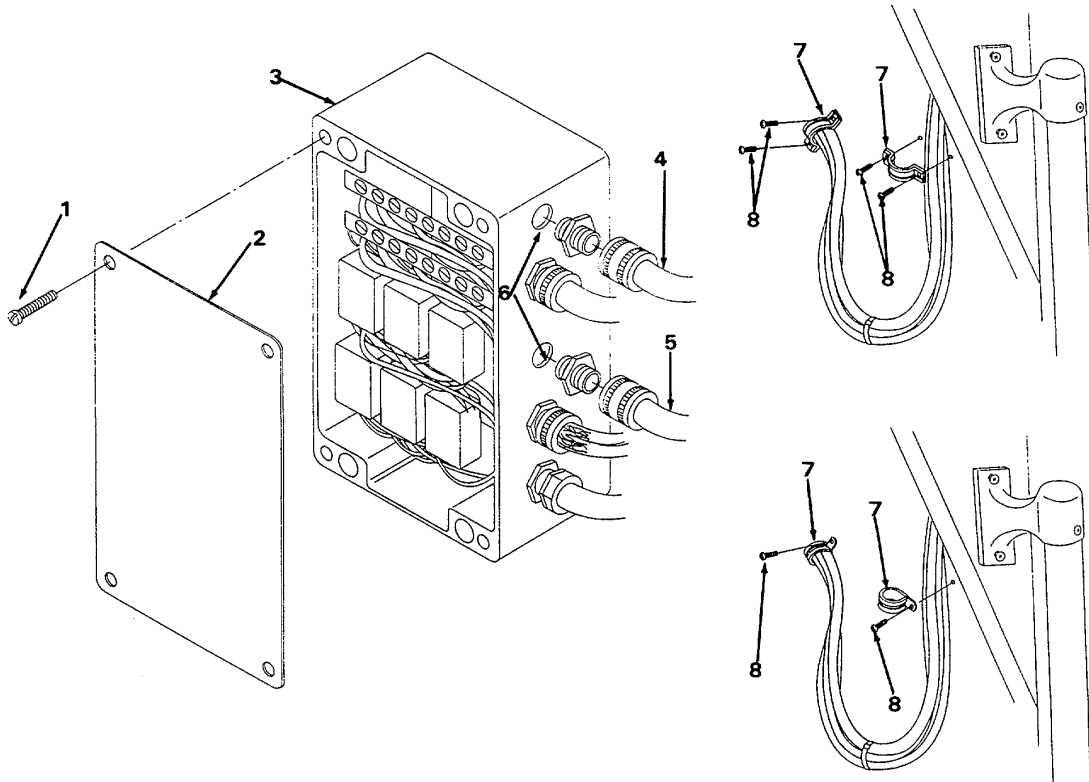
6-78. LADDER ASSEMBLY - Continued

b. Fly-Section Disassembly.

NOTE

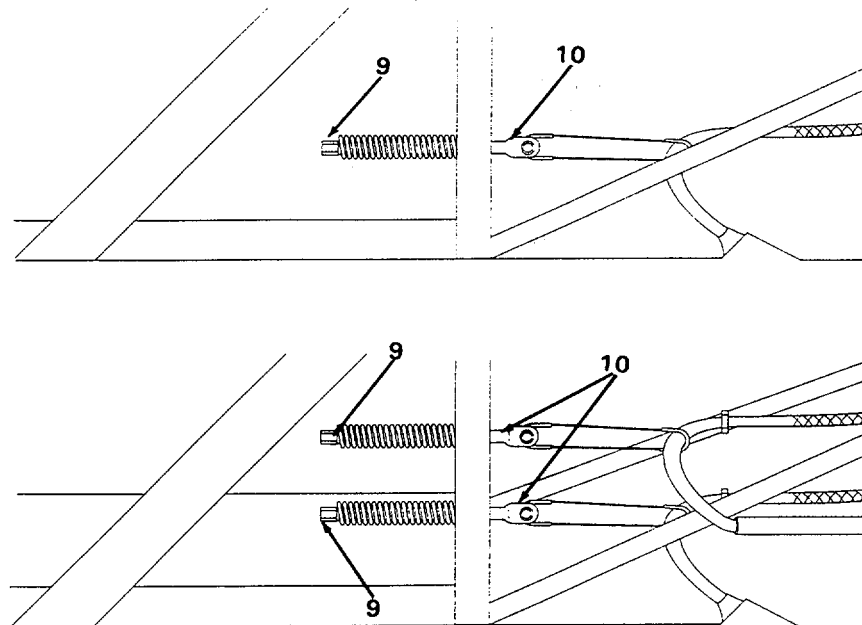
The ladder may be disassembled while installed on the truck or while removed. The following procedure is applicable to both situations.

- (1) If ladder is installed on truck, swing ladder approximately 30° to side of truck. Lower ladder as far as possible and extend ladder approximately three feet.
- (2) Shut down engine and disconnect batteries (see para 4-114).
- (3) If installed, remove monitor and nozzle assembly (see para 4-202).
- (4) Remove water pipe from fly section (see para 4-201).
- (5) Remove and tag wires and remove 110 VAC outlet box.
- (6) Remove four screws (1) and cover (2) from electrical box (3). Tag and disconnect all wires from cables (4) and (5) from inside of electrical box (3). Remove cable reliefs (6). Remove cable clamps (7) as required by removing screw (8).

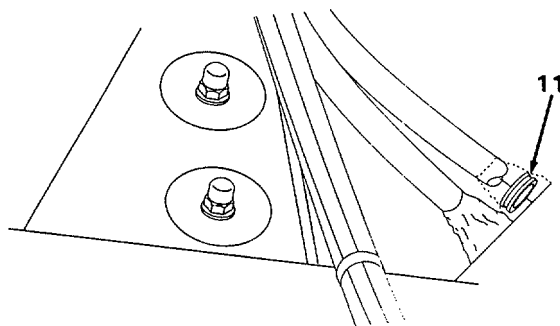


6-78. LADDER ASSEMBLY - Continued

(7) Loosen nuts (9) on electrical cable tension adjusters (10) on base and lower mid-sections until no threads are exposed.

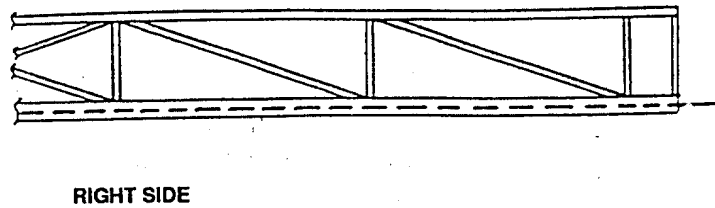
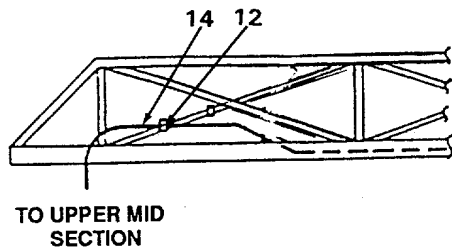
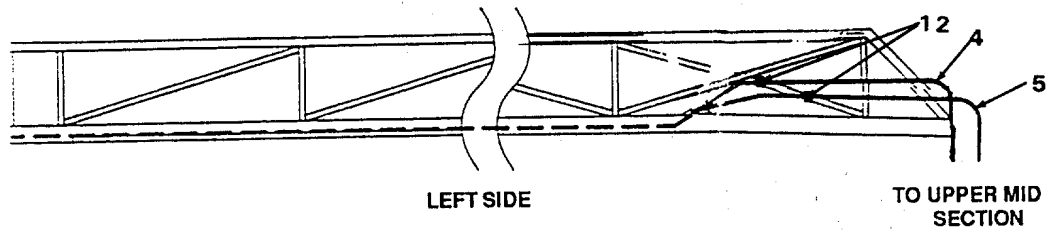
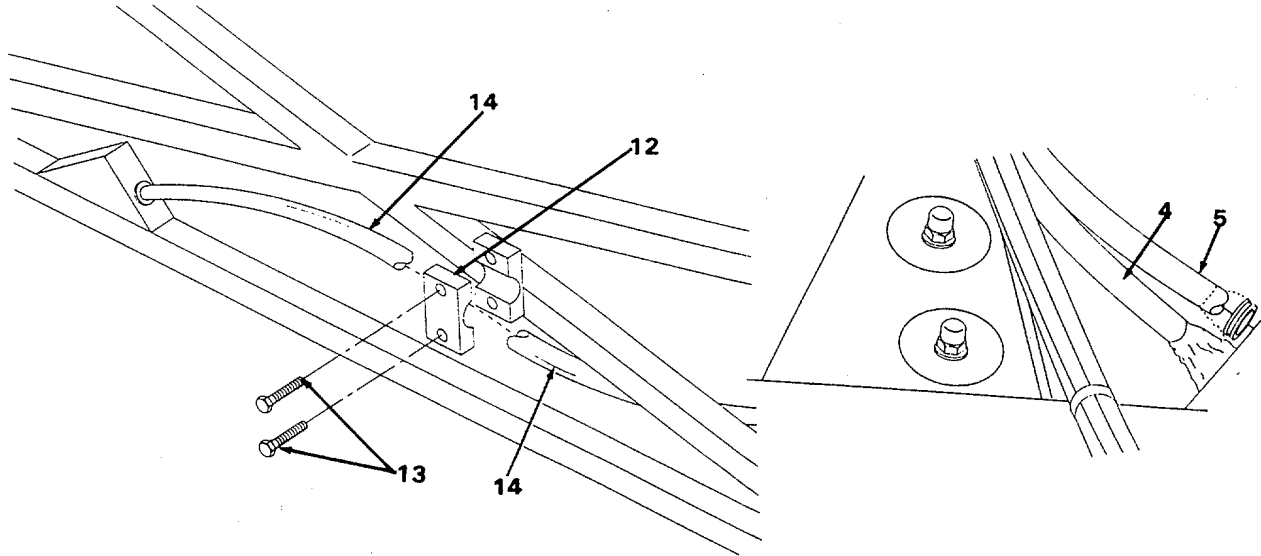


(8) Remove putty and grommet (11) from cables at end of fly section.



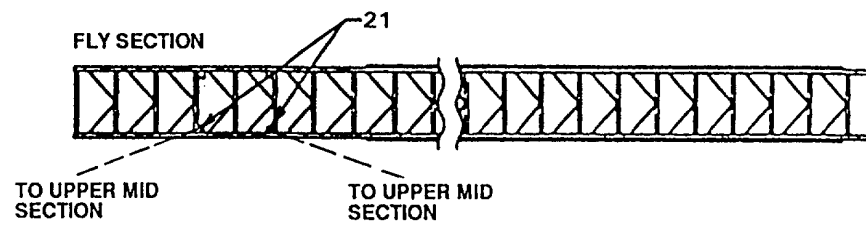
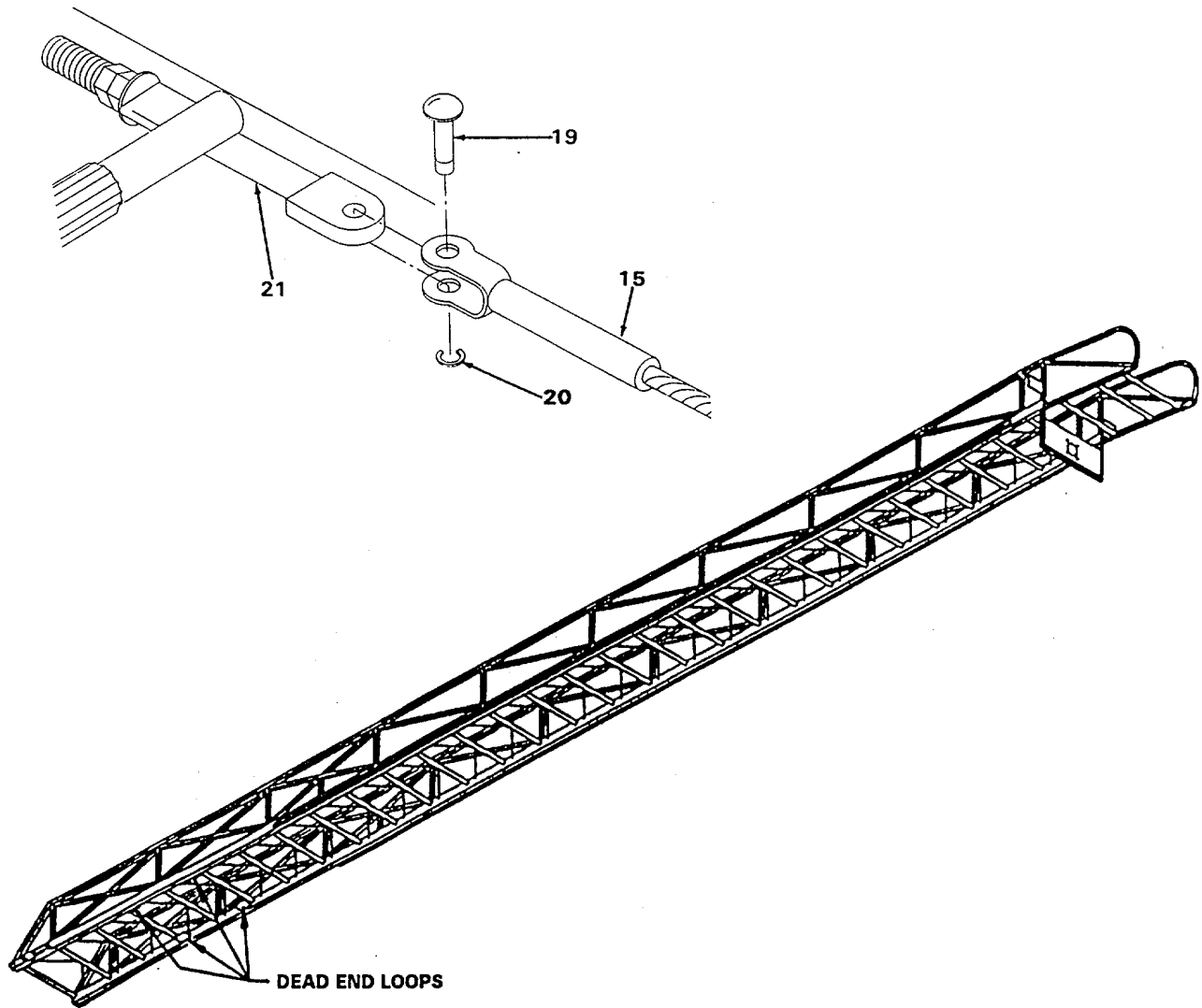
6-78. LADDER ASSEMBLY - Continued

- (9) Remove three cable clamps (12) (two on left side and one on right side) by removing two screws (13). Pull electrical cables (4, 5 and 14) from fly section.



6-78. LADDER ASSEMBLY - Continued

- (10) Remove pin (19) and retaining ring (20) from two dead end cable loops (21) on each side of ladder as required to remove cable (15). Pull tension cables (15) from fly section.

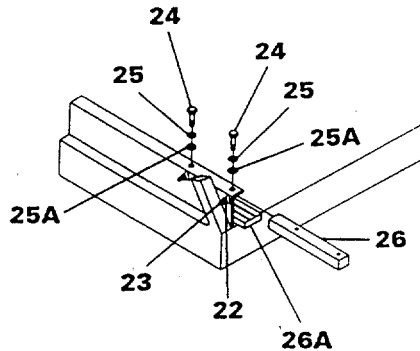


6-78. LADDER ASSEMBLY - Continued

WARNING

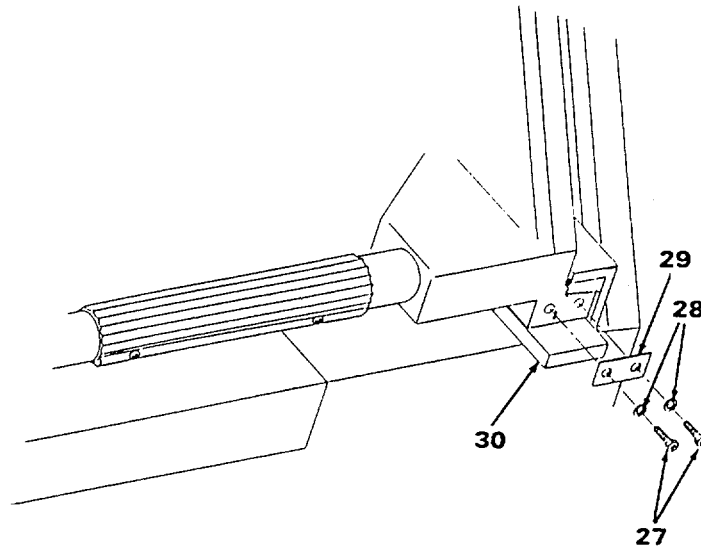
Serious injury could occur if heavy equipment is moved/lifted without sufficient personnel to do the job. Use proper physical lifting procedures or use a suitable lifting device or dolly. Wear safety shoes, gloves and other suitable protective clothing. Ladder sections weigh approximately one ton each. Area should be clear of other personnel. Serious injury or death can result from falling objects.

- (11) Attach a hoist at mid-point of the fly section and slide fly section from mid-section.
- (12) At top of upper mid-section, loosen jam nuts (22) and back out side wear pads adjusting screws (23). Remove two bolts (24), lockwashers (25) and flatwashers (25A). Remove and discard vertical wear pads (26). Horizontal wear pads (26A) may be lifted out after fly section is removed.

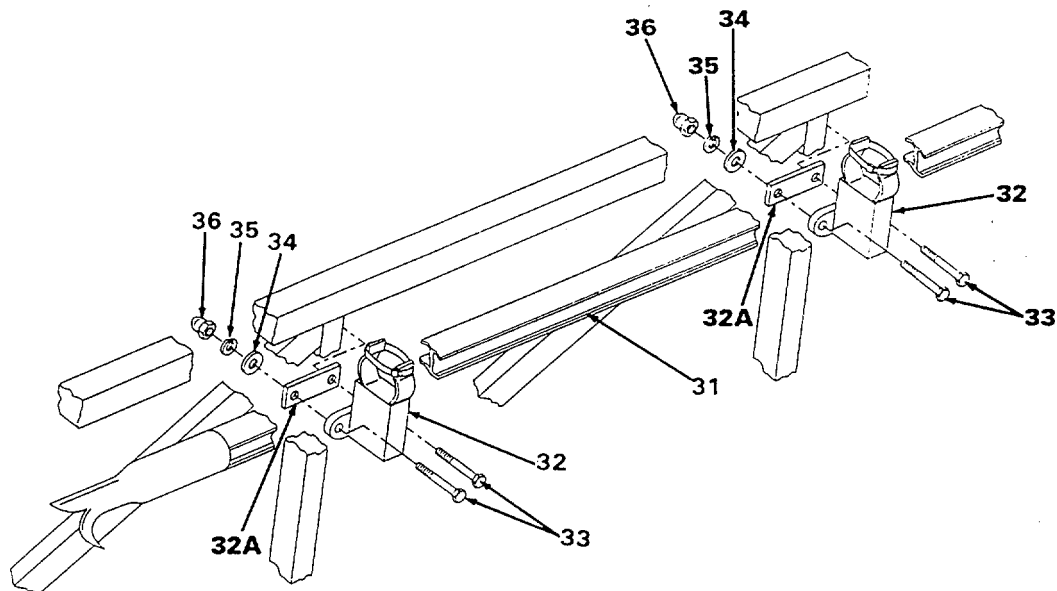


6-78. LADDER ASSEMBLY - Continued

- (13) Remove screws (27), lockwashers (28) and retainers (29) from rear end of fly section. Remove horizontal wear pads (30). Rear vertical wear pads will fall out during removal of ladder.

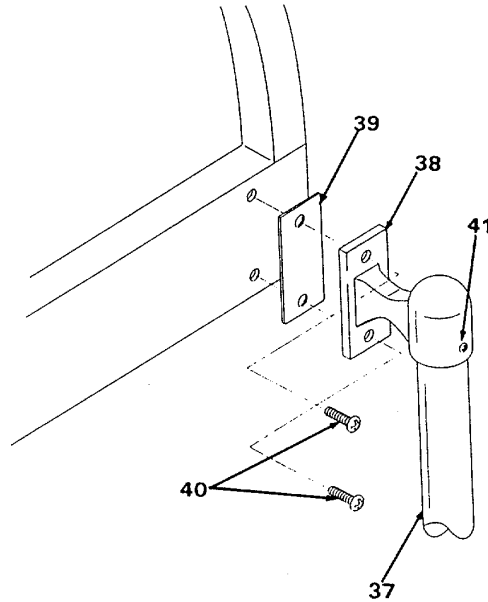


- (14) Remove spotlights (see para 4-177).
- (15) Remove intercom speaker/microphone (see para 4-198).
- (16) Remove monitor and nozzle controls (see para 4-203).
- (17) Remove pike pole (31) from pike pole holders (32). Remove two pike pole holders (32) by removing brackets (32A), two each by head capscrews (33), flatwashers (34), lockwashers (35) and acorn nuts (36).

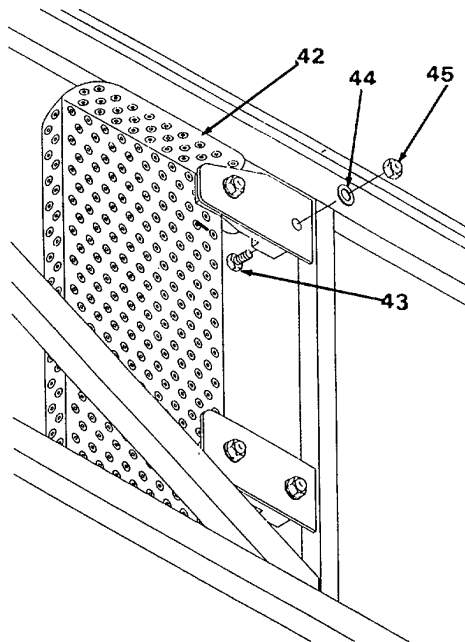


6-78. LADDER ASSEMBLY - Continued

- (18) Remove two curved grab rails (37) at front along with two stanchions (38) and gaskets (39) by removing four each screws (40). Remove screws (41) from each stanchion to remove grab rails from stanchion.



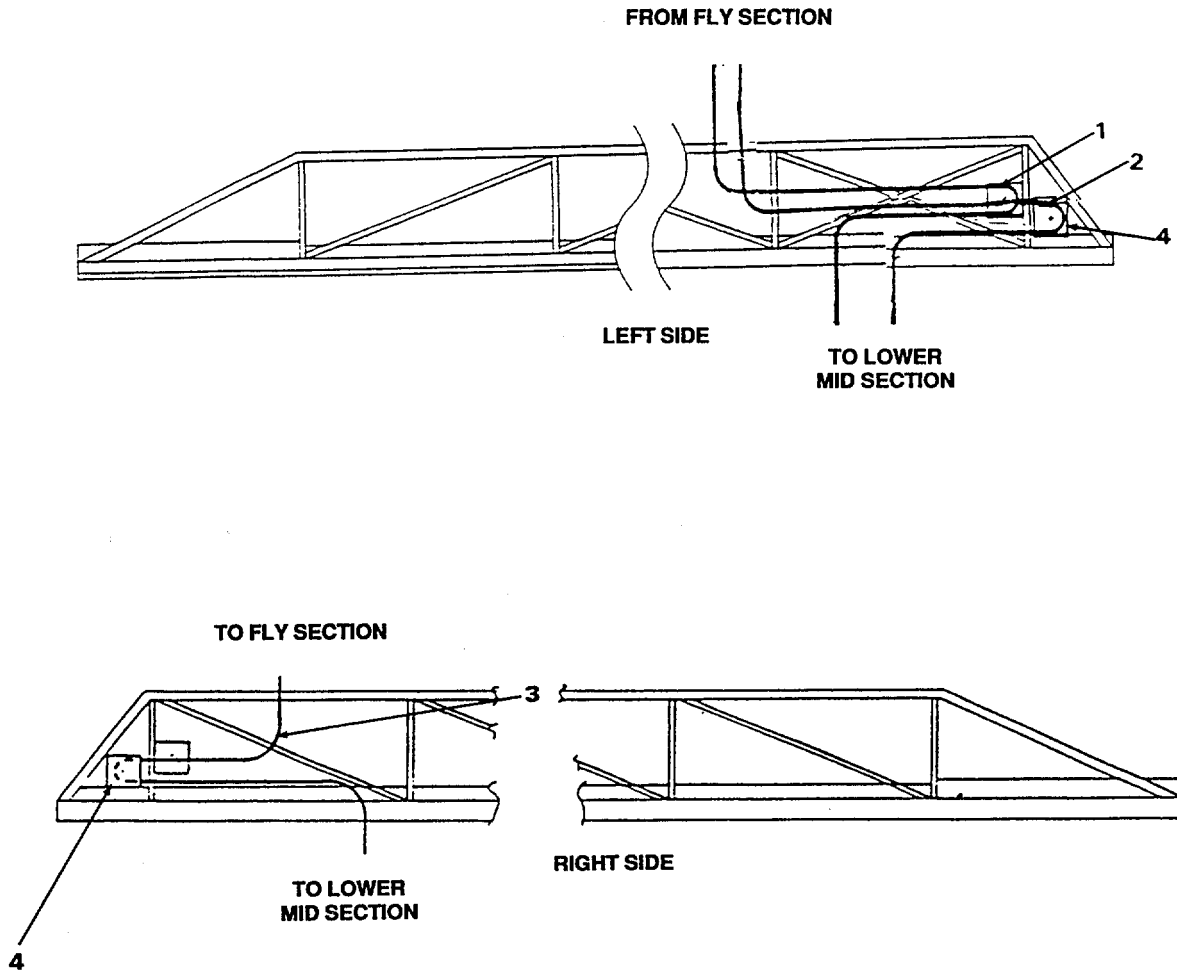
- (19) Remove two folding steps (42) by removing four each screws (43), washers (44), and acorn nuts (45).



6-78. LADDER ASSEMBLY - Continued

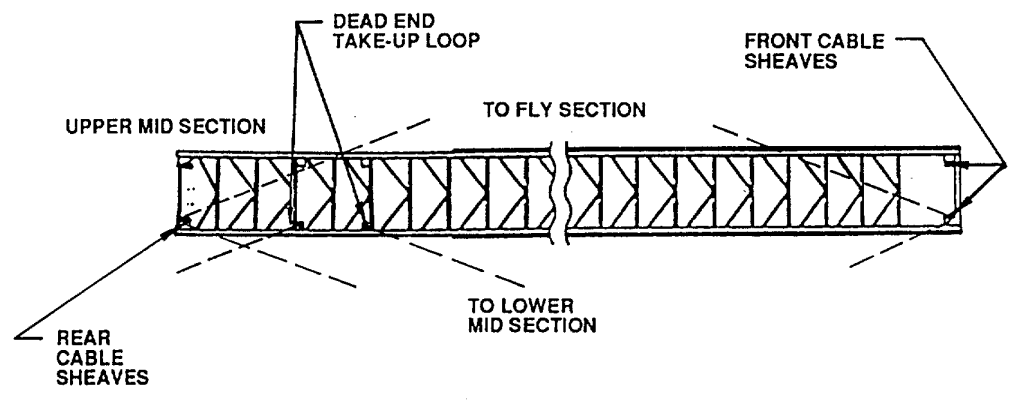
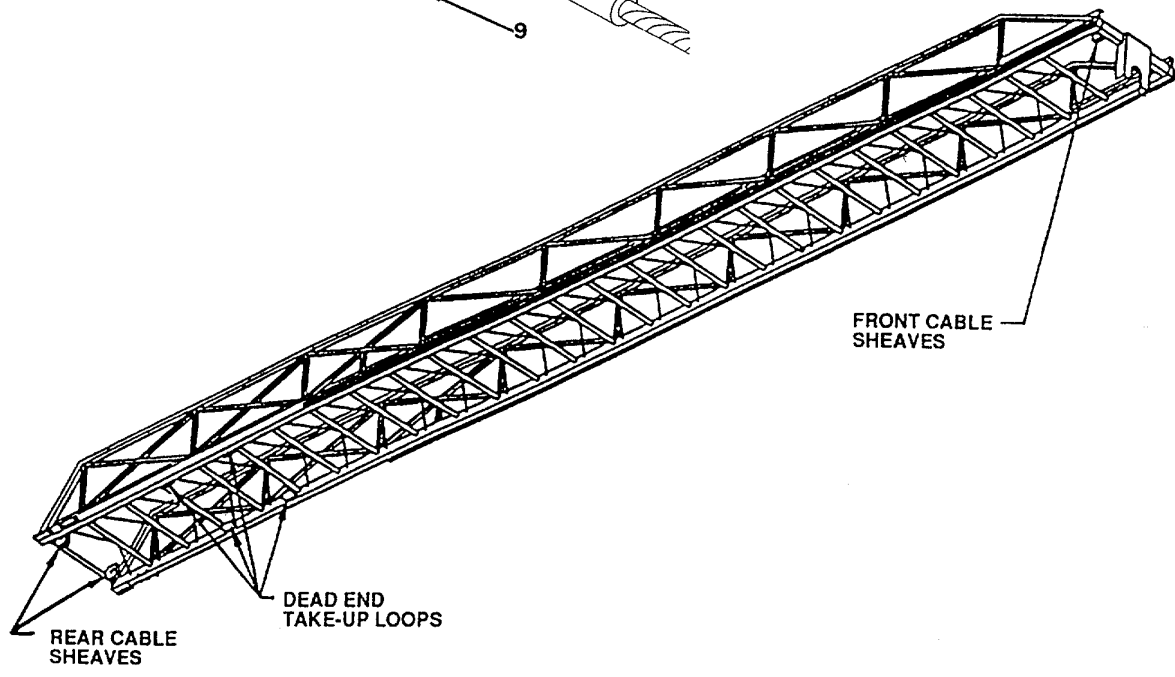
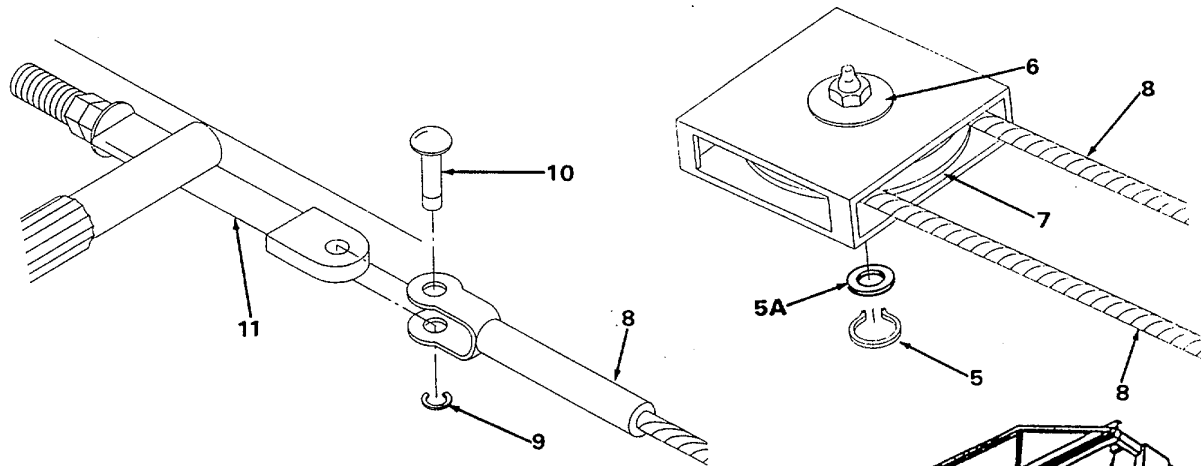
c. Upper Mid-Section Disassembly.

- (1) Remove fly section (see para a.).
- (2) Remove water pipe as required (see para 4-201).
- (3) Pull three electrical cables (1, 2 and 3) through three sheaves (4) at front and rear of upper mid-section as shown.



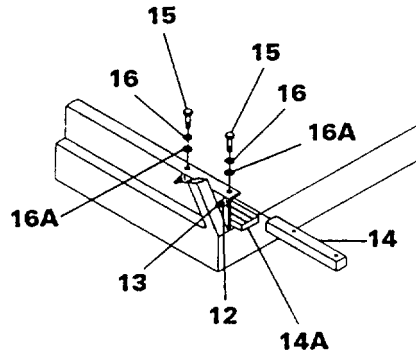
6-78. LADDER ASSEMBLY - Continued

- (4) Remove retaining rings (5), flatwashers (5A) and pins (6), and remove sheaves (7) and tension cables (8) at front and rear of upper mid-section. Remove retaining rings (9) and clevis pins (10) from four dead end cable take-up loops (11) at rear end of upper mid-section. Pull tension cables from upper mid-section.

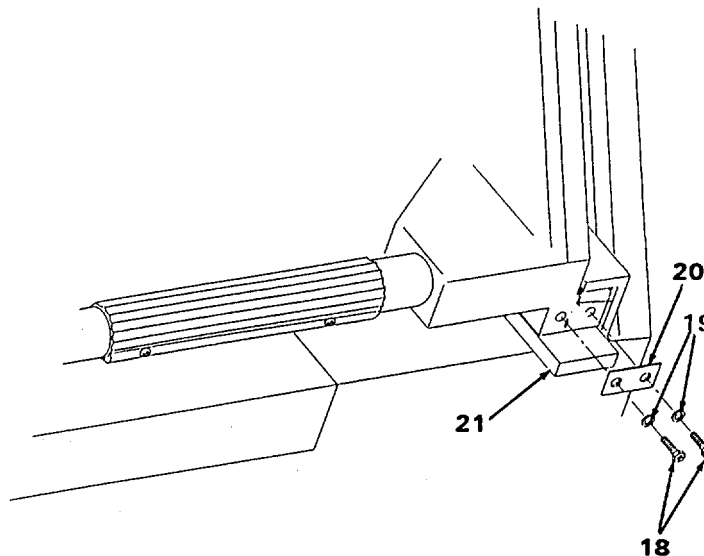


6-78. LADDER ASSEMBLY - Continued

- (5) Attach a hoist at the mid-point of the upper mid-section and slide it out away from the lower mid-section.
- (6) At front of lower mid-section, loosen jam nuts (12) and back out adjusting screws (13) for wear pads (14). Remove two bolts (15), lockwashers (16), and flatwashers (16A). Remove and discard vertical wear pads (14). Horizontal wear pads (14A) may be lifted out.



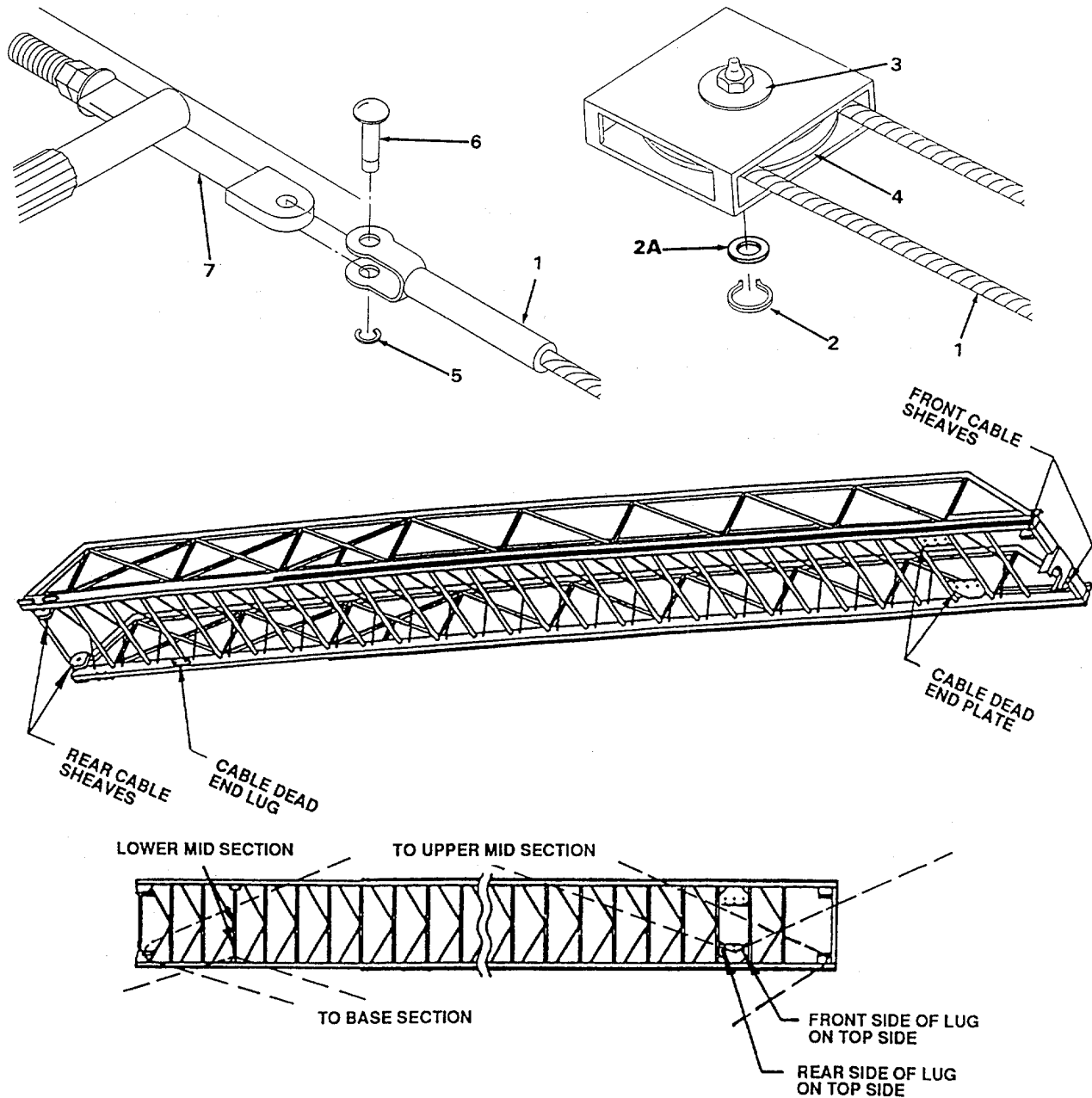
- (7) At rear of upper mid-section, remove screws (18), washers (19) and retainers (20) and remove horizontal wear pads (21). Rear vertical wear pads will fall out during ladder section removal.



6-78. LADDER ASSEMBLY - Continued

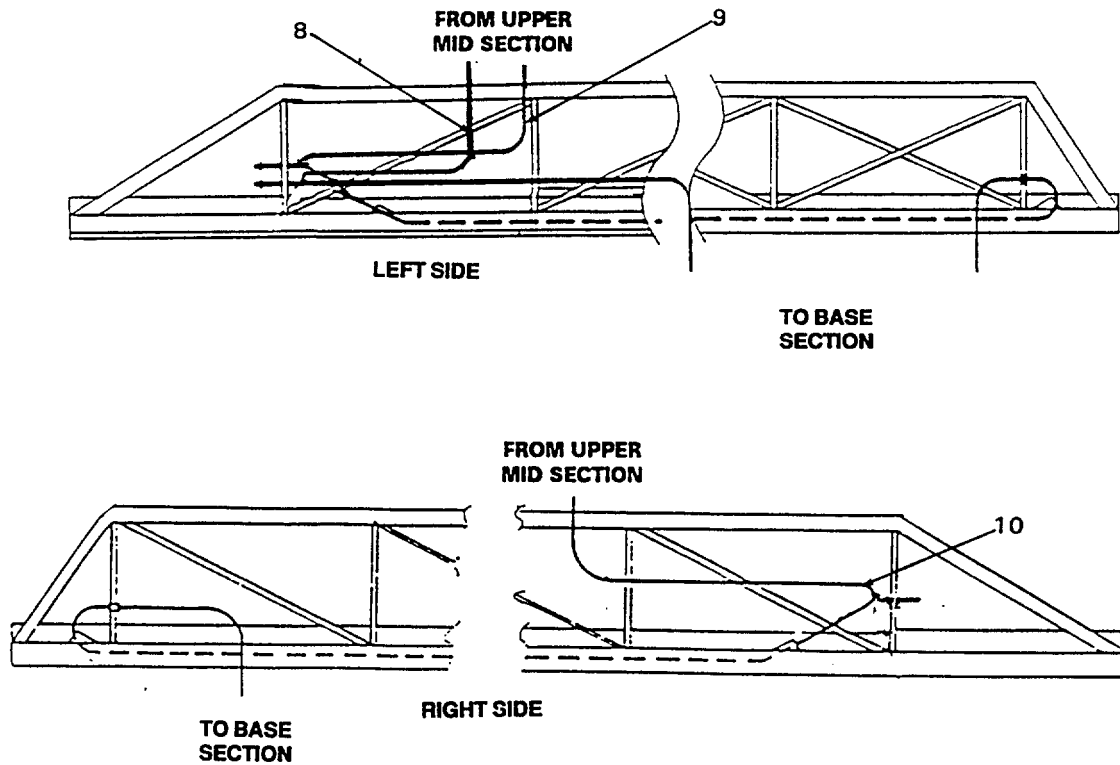
d. Lower Mid-Section Disassembly.

- (1) Remove fly and upper mid-sections (see para a. and b.).
- (2) Remove water pipe as applicable (see para 4-201).
- (3) Remove retaining rings (2), flatwashers (2A), pins (3) and remove sheaves (4) and cables (1). Remove retaining rings (5) and clevis pins (6) and remove cables (1) from two dead end lugs (7) as required at rear end of lower mid-section. Disconnect cables at cable dead end plates at front end of lower mid-section.

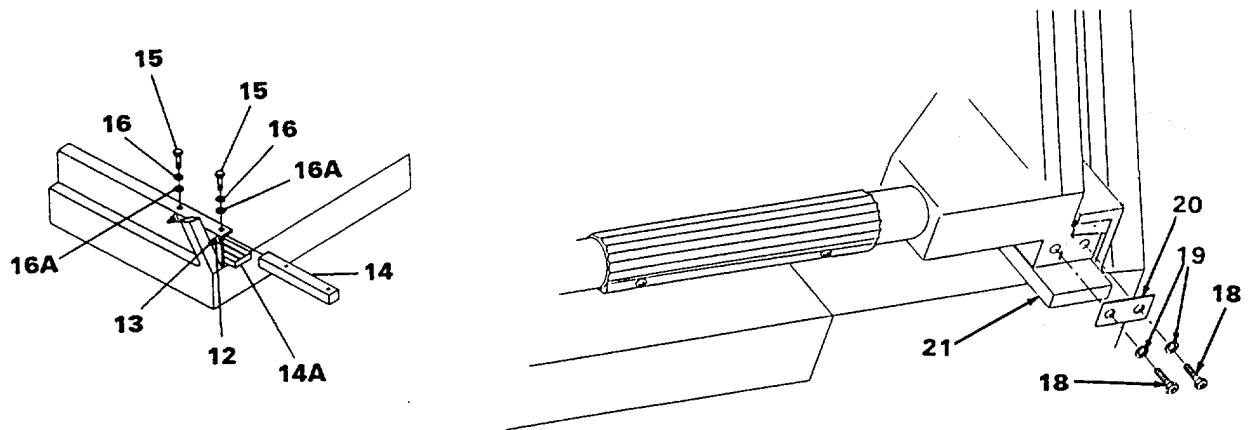


6-78. LADDER ASSEMBLY - Continued

- (4) Pull electrical cables (8, 9 and 10) through tension slings. Remove grommets and pull electrical cables through lower mid-section.



- (5) Attach a hoist at the mid-point of the lower mid-section and slide it out away from the base mid-section.
- (6) At front of base mid-section, loosen jam nuts (12) and back out adjusting screws (13) for wear pads (14). Remove two bolts (15), lockwashers (16), and flatwashers (16A). Remove and discard vertical wear pads (14). Horizontal wear pads (14A) may be lifted out.



6-78. LADDER ASSEMBLY - Continued

(7) At rear of lower mid-section, remove screws (18), washers (19) and retainers (20) and remove horizontal wear pads (21). Rear vertical wear pads will fall out during ladder section removal.

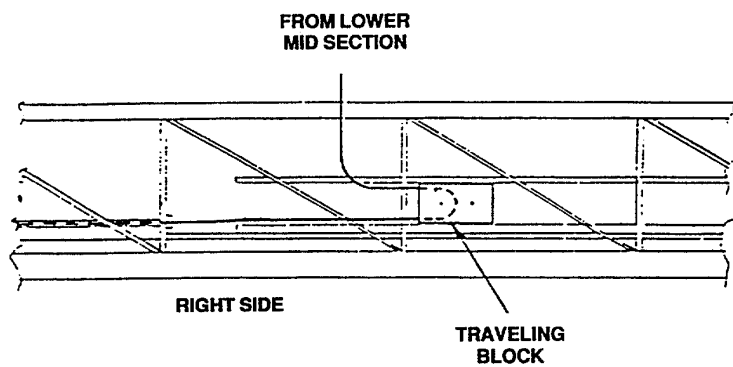
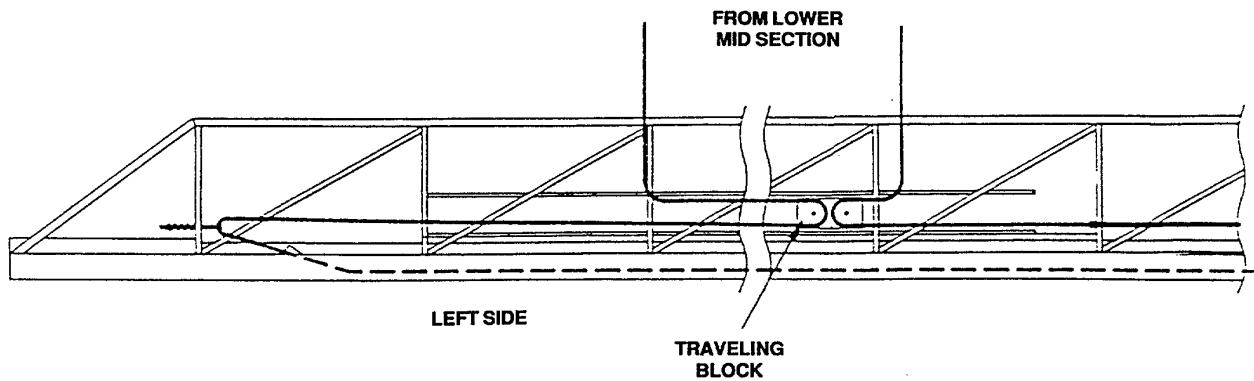
e. Base Section Disassembly.

- (1) Remove fly and upper and lower mid-sections (see para a., b. and c.).
- (2) Remove water pipe as required (see para 4-201).

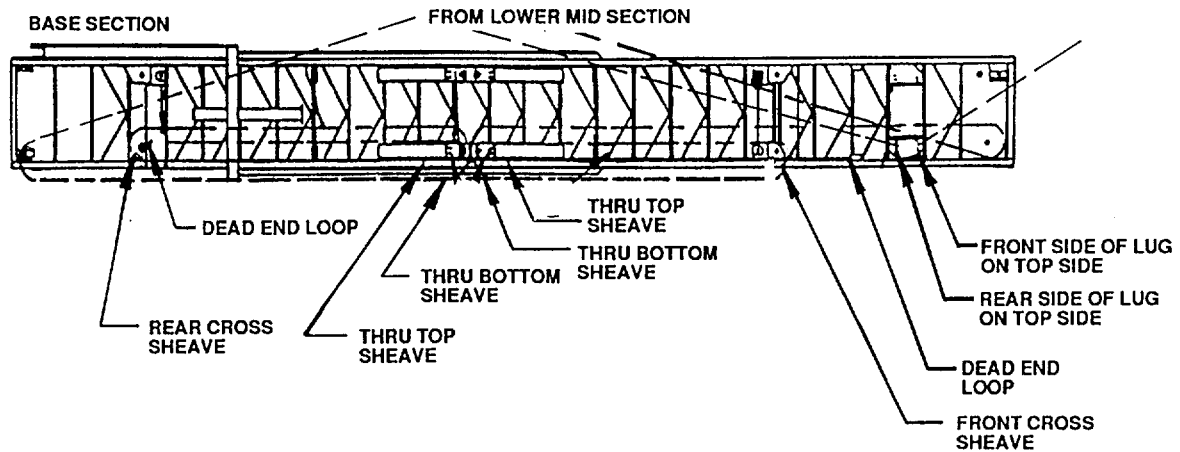
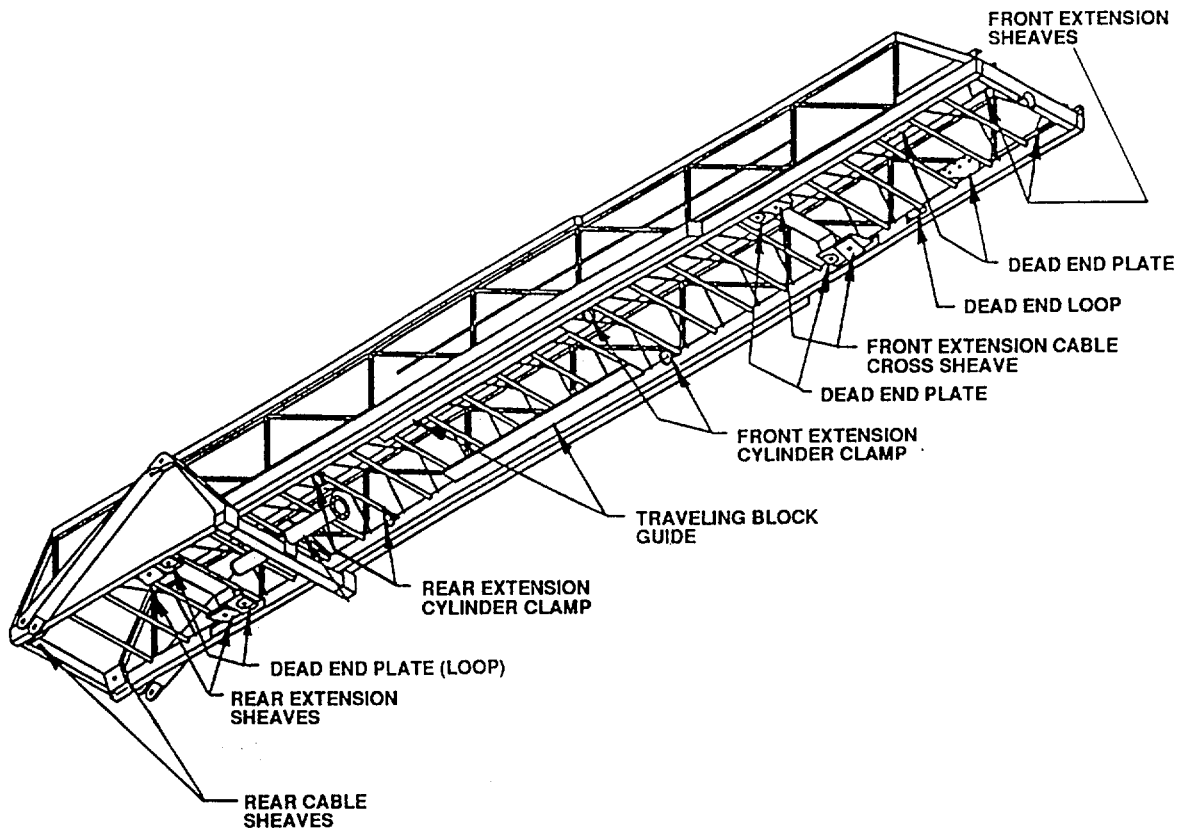
CAUTION

Support base section with hoist attached at mid-point.

- (3) If base section is installed on truck, perform steps (3) thru (8) (see para a.).
- (4) Observe the electrical cable and tension cable configurations in the following illustrations.

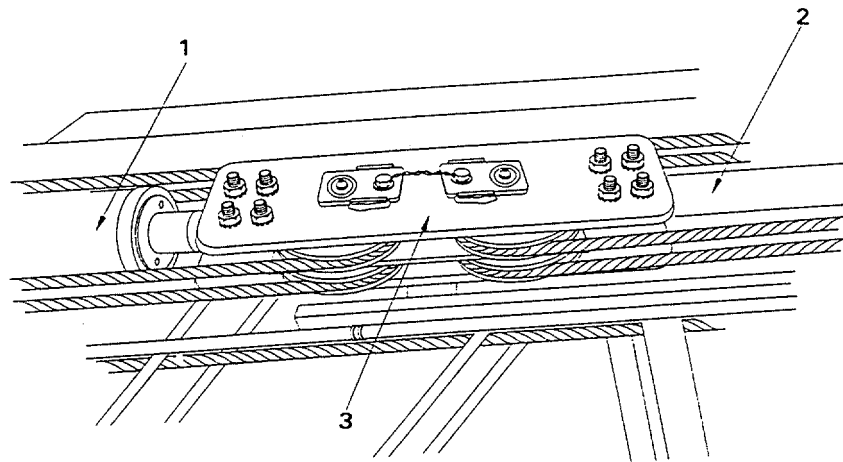


6-78. LADDER ASSEMBLY - Continued

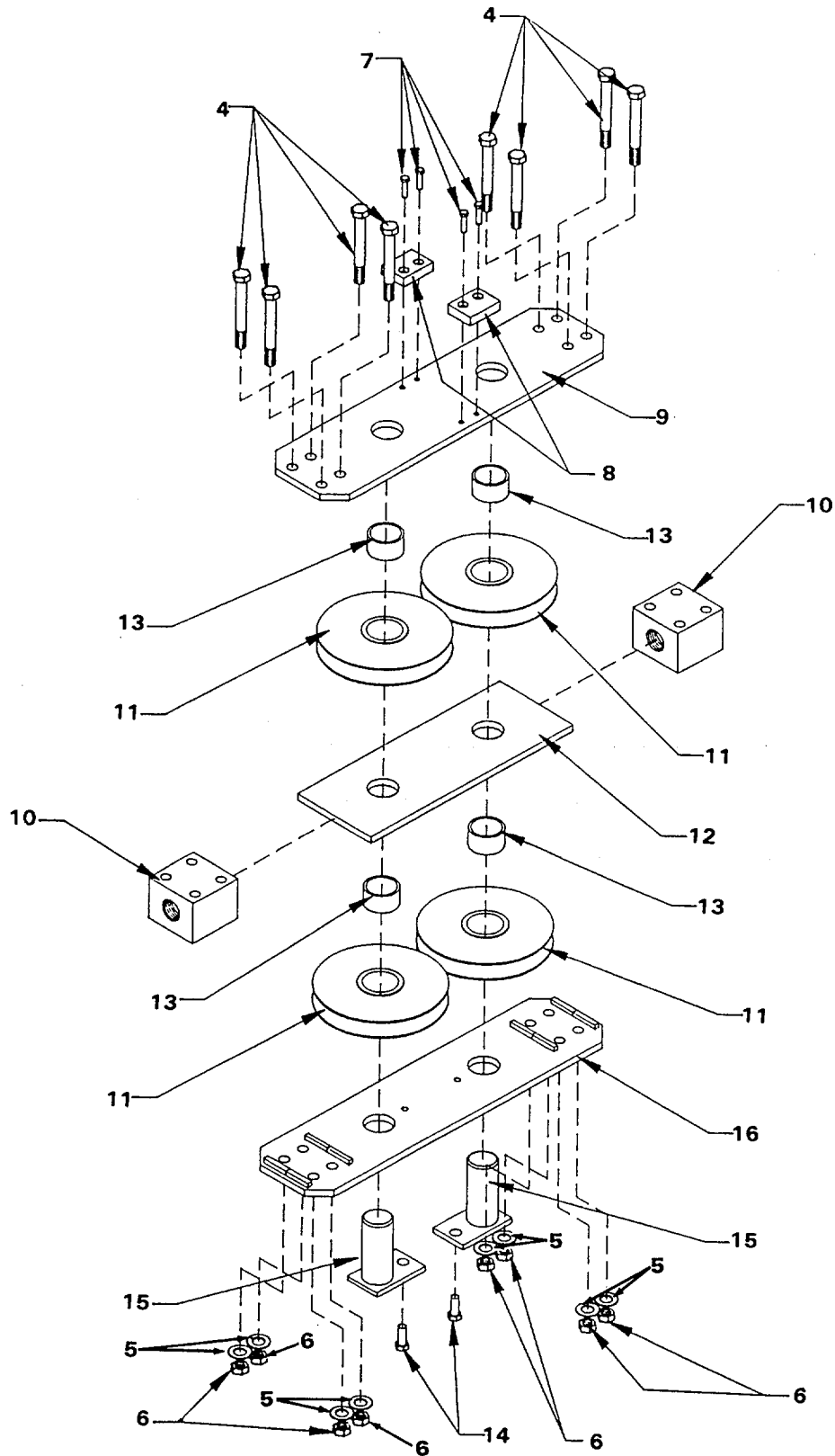


6-78. LADDER ASSEMBLY - Continued

- (5) Remove front (1) and rear (2) extension/retraction cylinders (see para 5-64 and 5-65). This will free the two extension cable traveling blocks (3).
- (6) Remove traveling blocks (3) by removing eight each screws (4), flat washers (5), nuts (6) and four each screws (7) and wear pads (8). Discard wear pads (8).
- (7) Lift off top plate (9) and two cylinder block connectors (10).
- (8) Lift out four upper 6-1/2" sheaves (11) and center plate (12).
- (9) Press bushings (13) out of sheaves (11). Discard bushings.
- (10) Remove two screws (14) to remove sheave pins (15) from bottom plate (16).

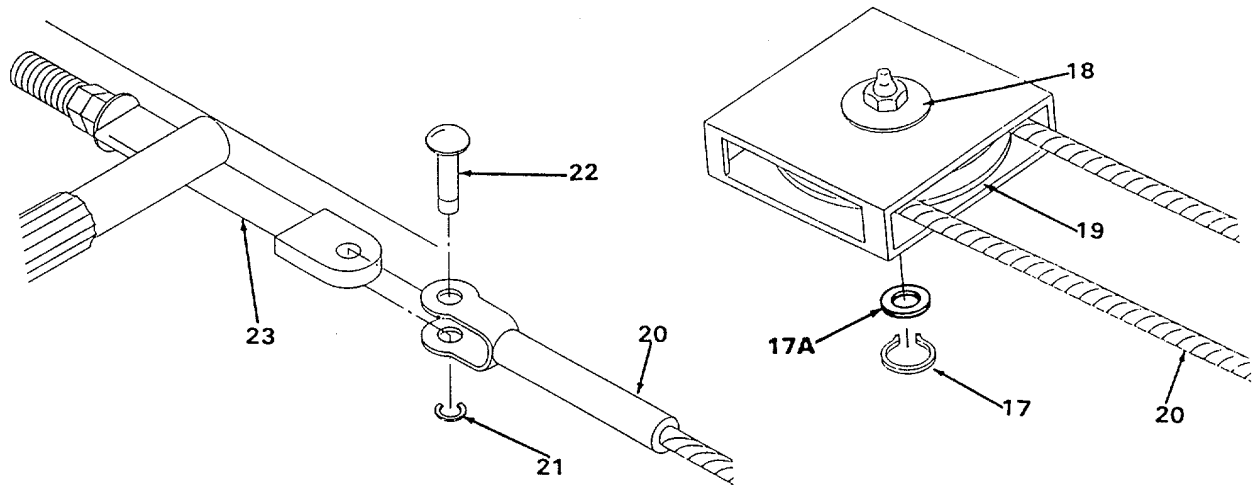


6-78. LADDER ASSEMBLY - Continued



6-78. LADDER ASSEMBLY - Continued

- (11) Remove retaining rings (17), flatwasher (17A) and pins (18) to remove sheaves (19) and cables (20). Remove retaining rings (21) and clevis pins (22) to remove cable (20) from dead-end loops (23). Remove tension cables (20) from base section.



6-470

6-78. LADDER ASSEMBLY - Continuedf. Cleaning and Inspection.

WARNING

Dry cleaning solvent P-D-680 is potentially dangerous. Avoid repeated and prolonged breathing of vapors and skin contact with the liquid. Do not use near open flame, arcing equipment or other ignition sources. Always wear eye protection and protective clothing. The flash point of P-D-680 is 100 to 138 deg. F (38 to 59 deg. C).

- (1) Clean all parts in dry cleaning solvent (Item 3, Appendix E).

WARNING

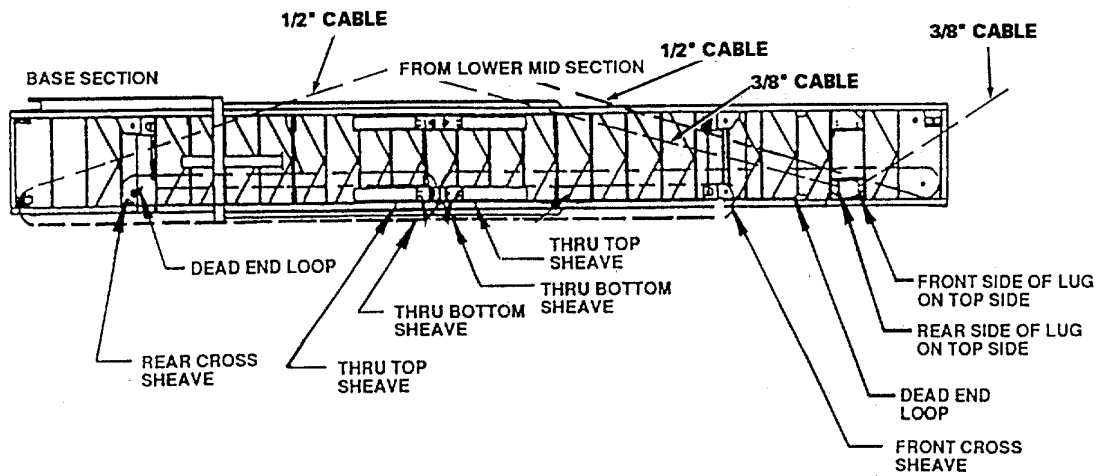
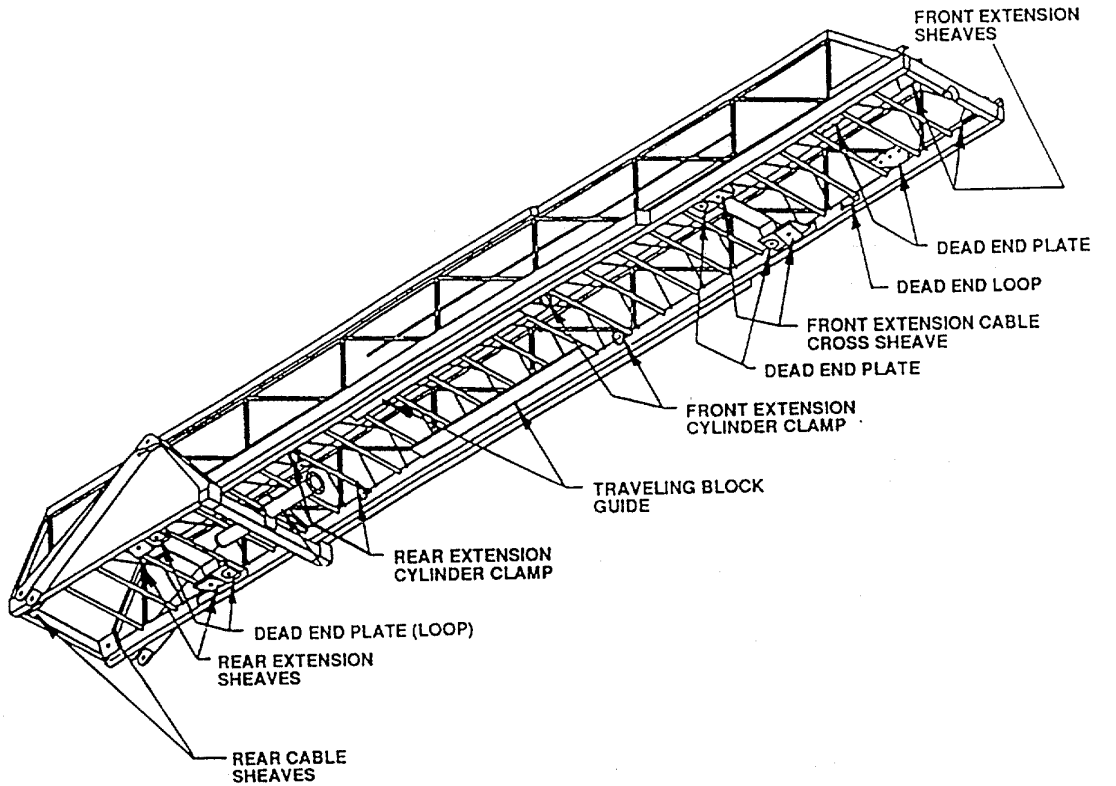
Death or serious injury could occur if compressed air is directed against the skin. Do not use compressed air for cleaning or drying unless the pressure is/has been reduced to 30 psi (2.11 kg/cm²) or less. When working with compressed air, always use chip guards, eye protection and other personal protective equipment.

- (2) Dry all parts with compressed air.
- (3) Inspect, repair or replace water pipes (see para 4-201).
- (4) Perform a magnetic inspection of ladder sections (see para 4-9).
- (5) Inspect electrical and tension cables (see para 4-9).

6-78. LADDER ASSEMBLY - Continued

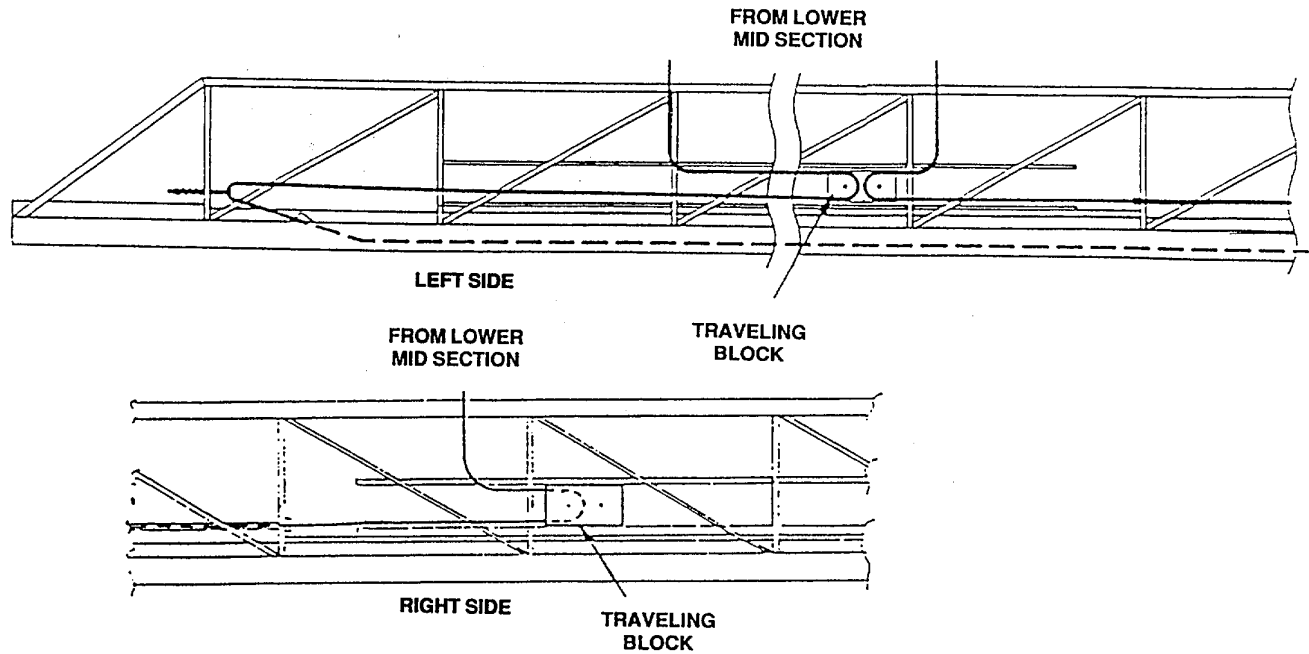
g. Base Section Assembly.

(1) Loosely lay 1/2" and 3/8" cables on base section as shown.

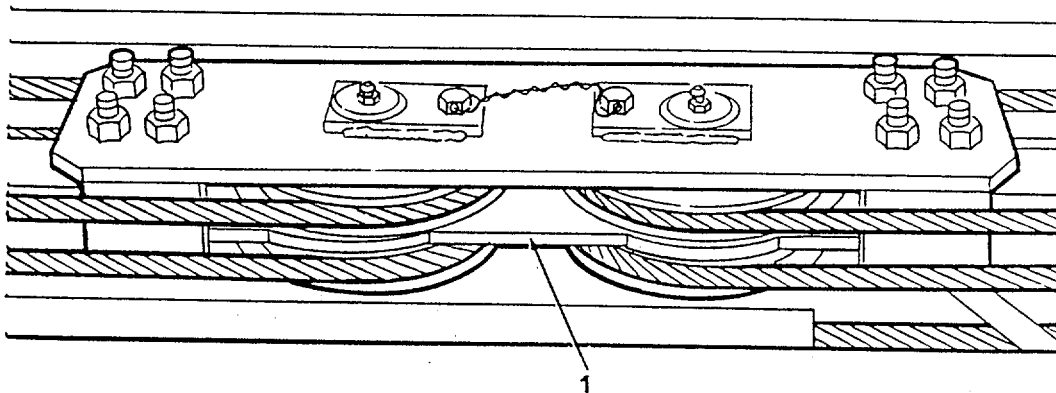


6-78. LADDER ASSEMBLY- Continued

- (2) Route or verify routing of electrical cables.

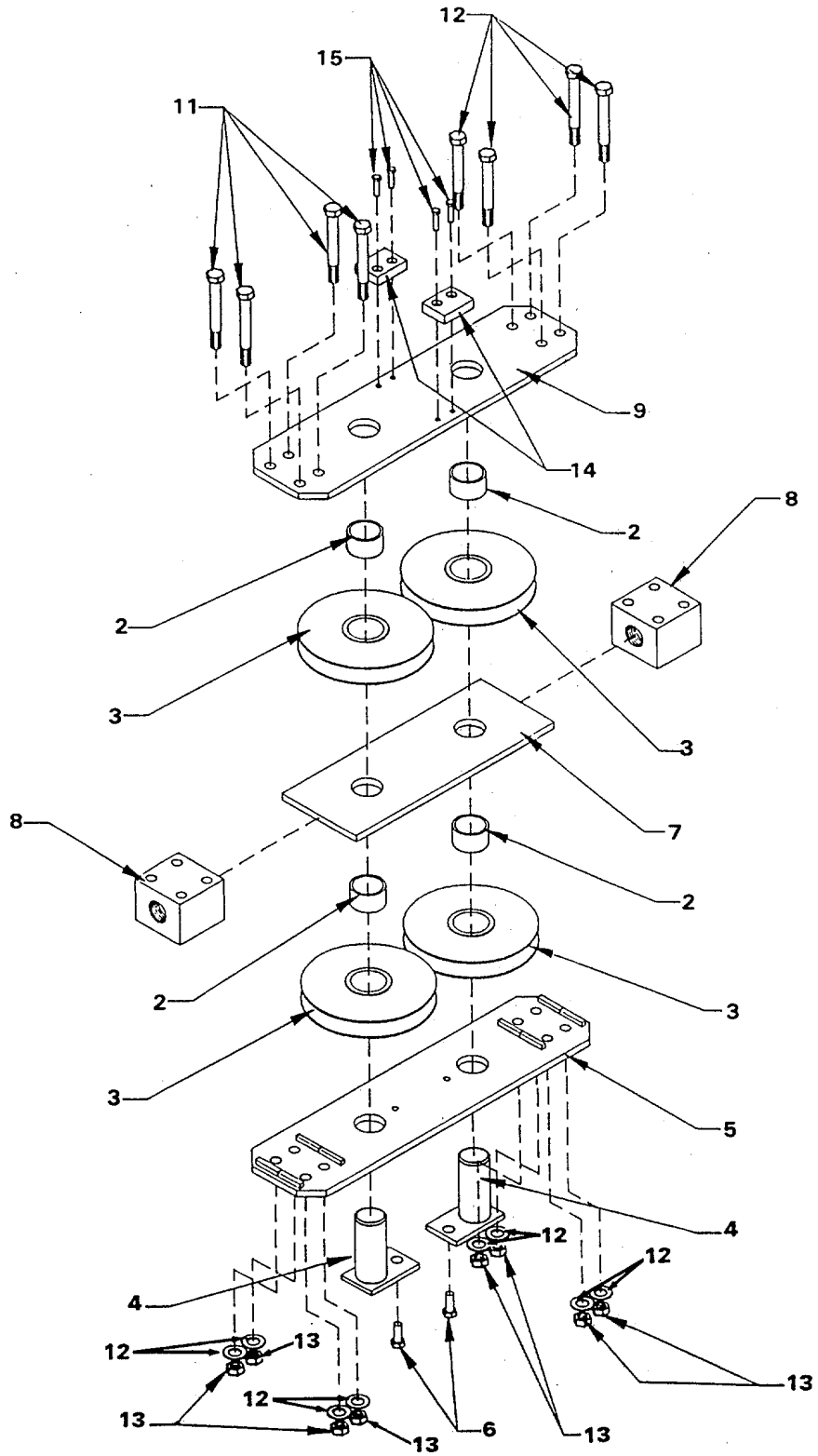


- (3) Assemble/install two traveling blocks (1) by pressing new bushings (2) in sheaves (3).



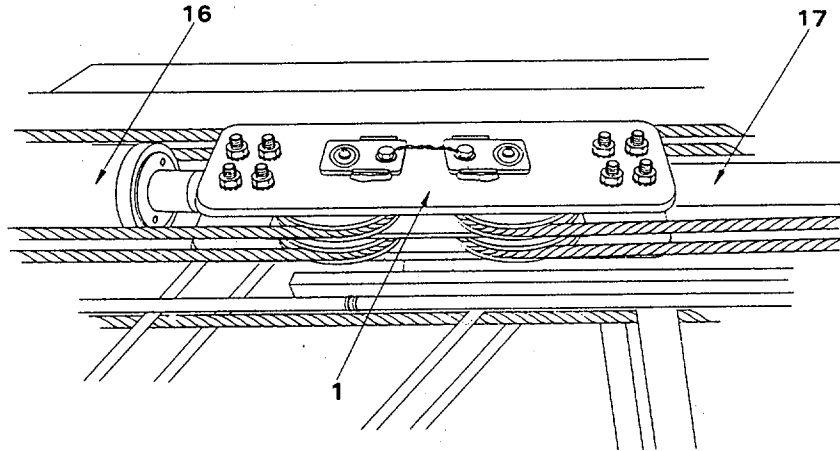
- (4) install sleeve pins (4) through bottom plate (5) using screws (6).
- (5) Assemble sheaves (3), center plate (7), cylinder block connectors (8) and top plate (9).
- (6) Secure traveling block assembly (1) together with tension cables with screws (11), flatwashers (12) and nuts (13).
- (7) Install new wear pads (14) with screws (15).

6-78. LADDER ASSEMBLY - Continued

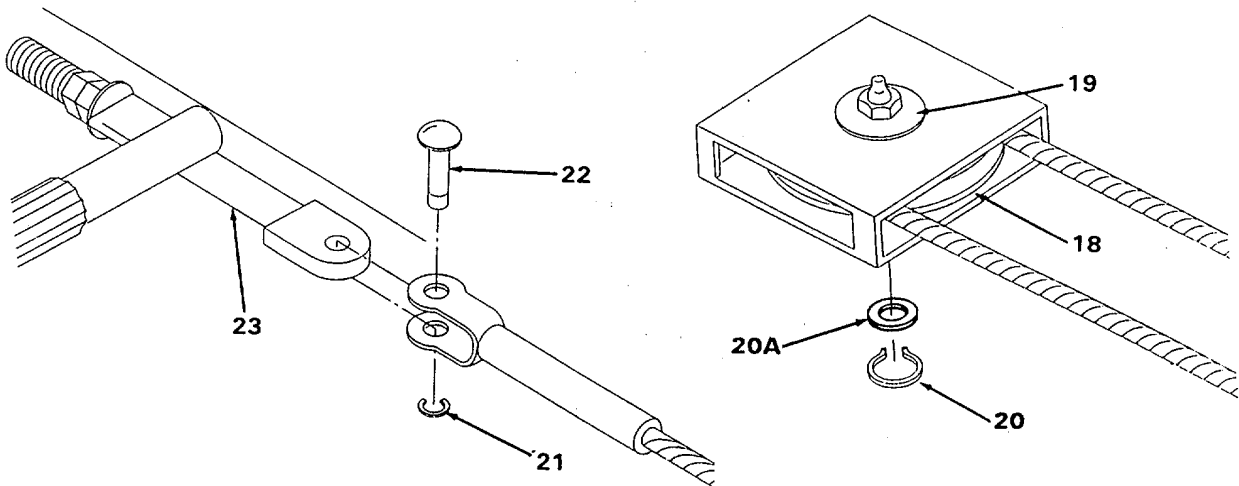


6-78. LADDER ASSEMBLY - Continued

- (8) Install, front (16) and rear (17) extension cylinders on traveling block (1) (see para 5-64 and 5-65).



- (9) Install sheaves (18) at front and rear (with tension cables installed) with sheave pins (19), flatwashers (20A) and retaining rings (20). Install retaining rings (21) and clevis pins (22) and install cables on dead end lugs (23) at front and rear of base section.



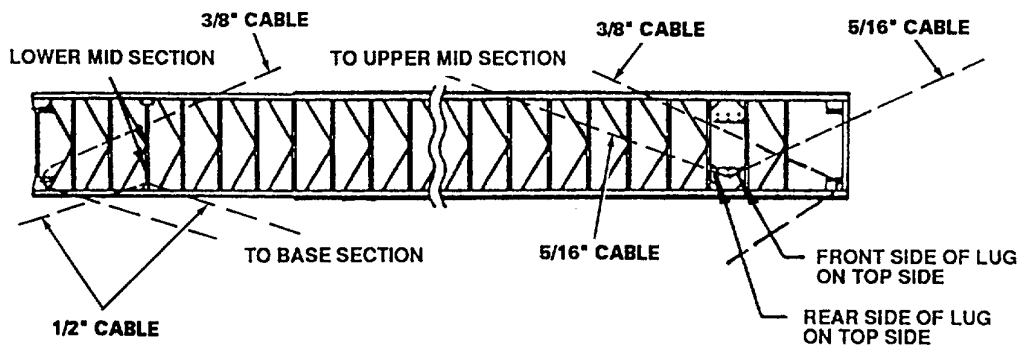
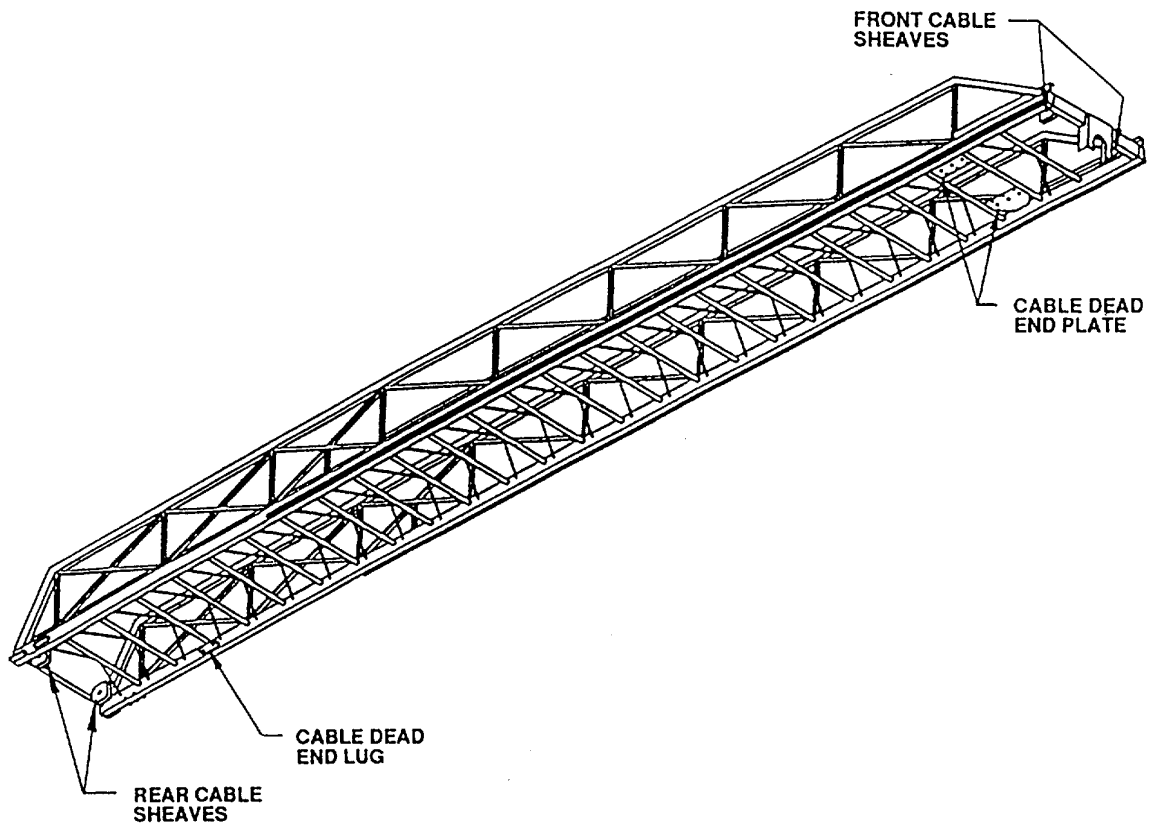
6-78. LADDER ASSEMBLY - Continued

- (10) if base section is not installed on truck and it is desired to do so before further assembly, refer to paragraph k.

6-78. LADDER ASSEMBLY - Continued

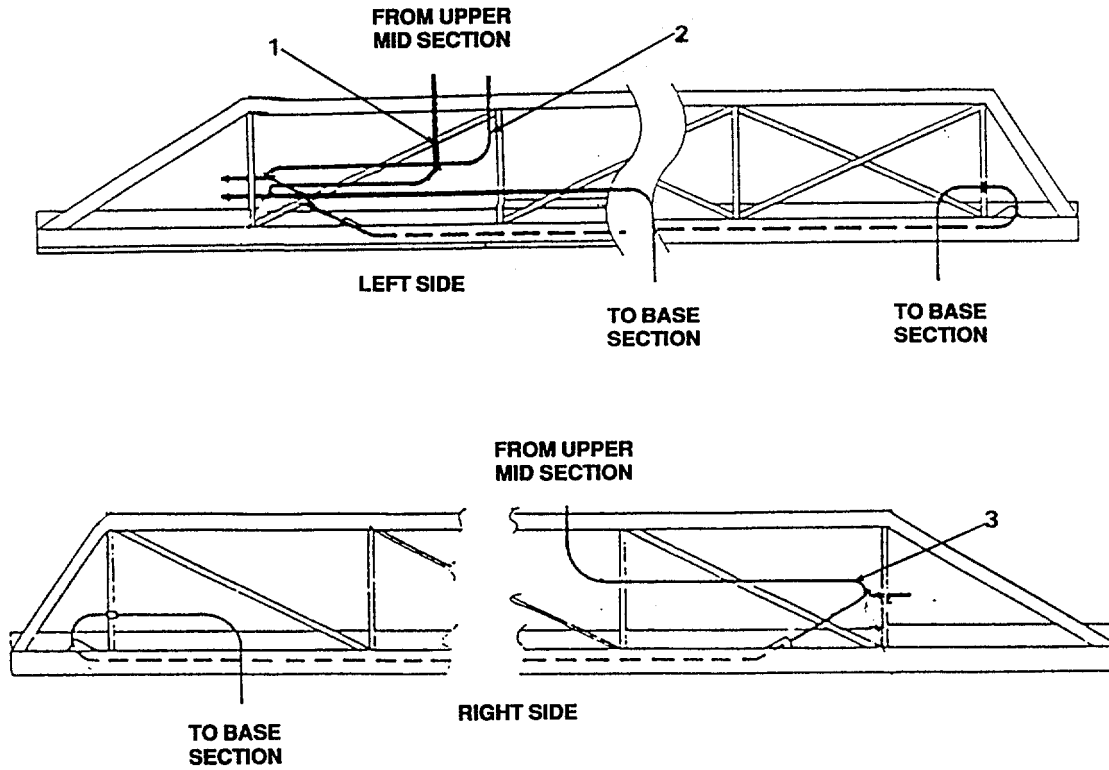
h. Lower Mid-Section Assembly.

- (1) Accomplish base section assembly.
- (2) Install new rear horizontal and vertical wear pads as required and slide lower mid-section into place in base section assembly.
- (3) Loosely lay 1/2", 3/8", and 5/16" cables on lower mid-section assembly as shown.



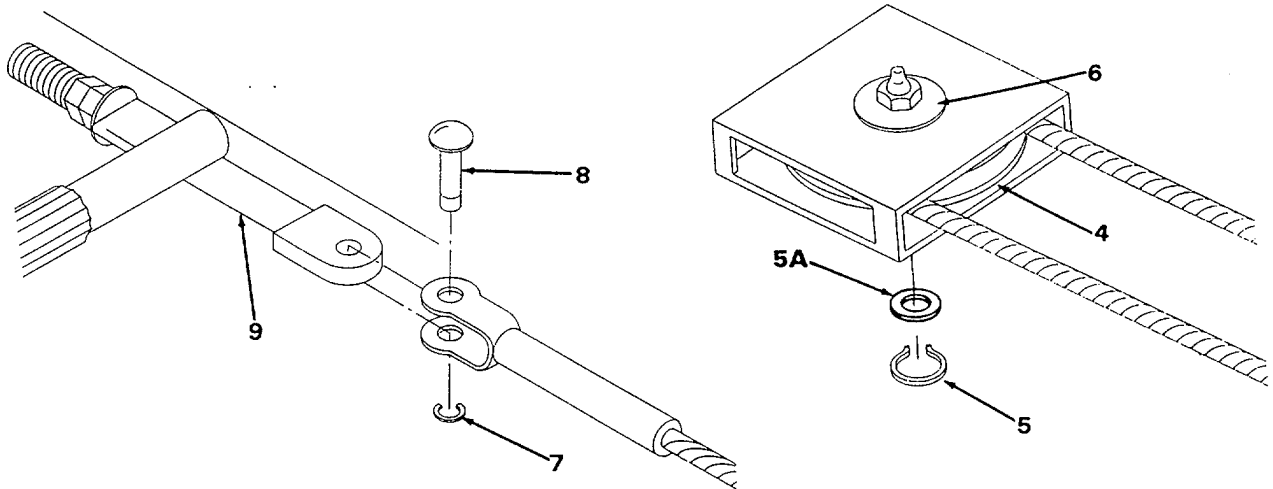
6-78. LADDER ASSEMBLY - Continued

- (4) Pull electrical cables (1, 2 and 3) through tension slings and route as shown. Install grommets as required. Install hose clamps.

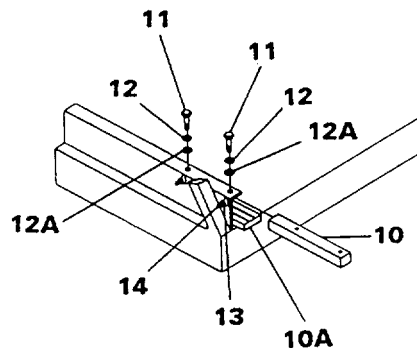


6-78. LADDER ASSEMBLY - Continued

- (5) At rear and front end of lower mid-section, install cables on sheaves (4) and mount with retaining rings (5), flatwashers (5A) and pins (6). Install retaining rings (7) and clevis pins (8) on dead end lugs (9) at rear and front ends of lower mid section.

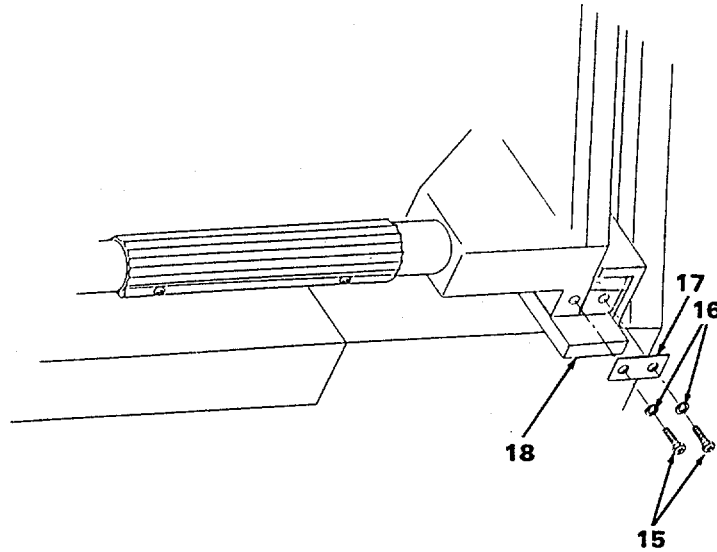


- (6) Install vertical wear pads (10) at front of upper mid-section with bolts (11), lockwashers (12) and flatwashers (12A). Tighten jam nuts (13) and adjusting screws (14). Horizontal wear pads (10A) fit into recesses.



6-78. LADDER ASSEMBLY - Continued

- (7) At rear of lower mid-section, install screws (15), washers (16), retainers (17) and horizontal wear pads (18). Vertical wear pads fit into recesses in sides of ladder.

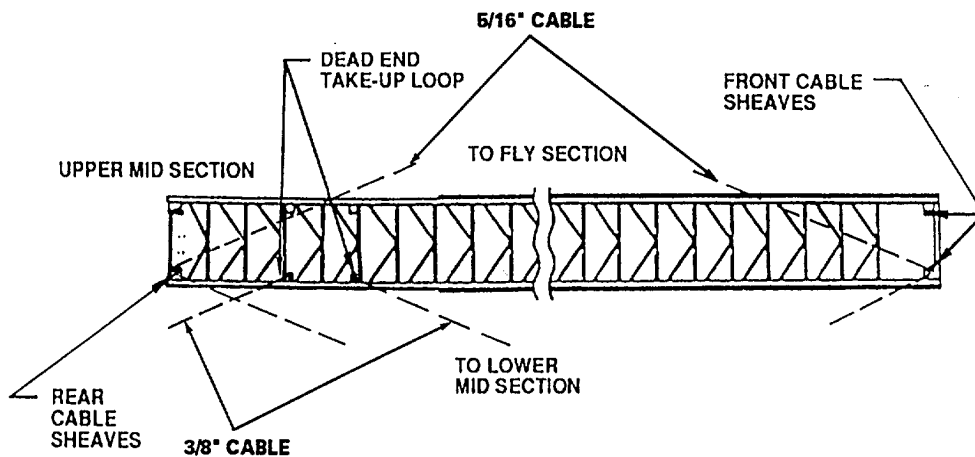
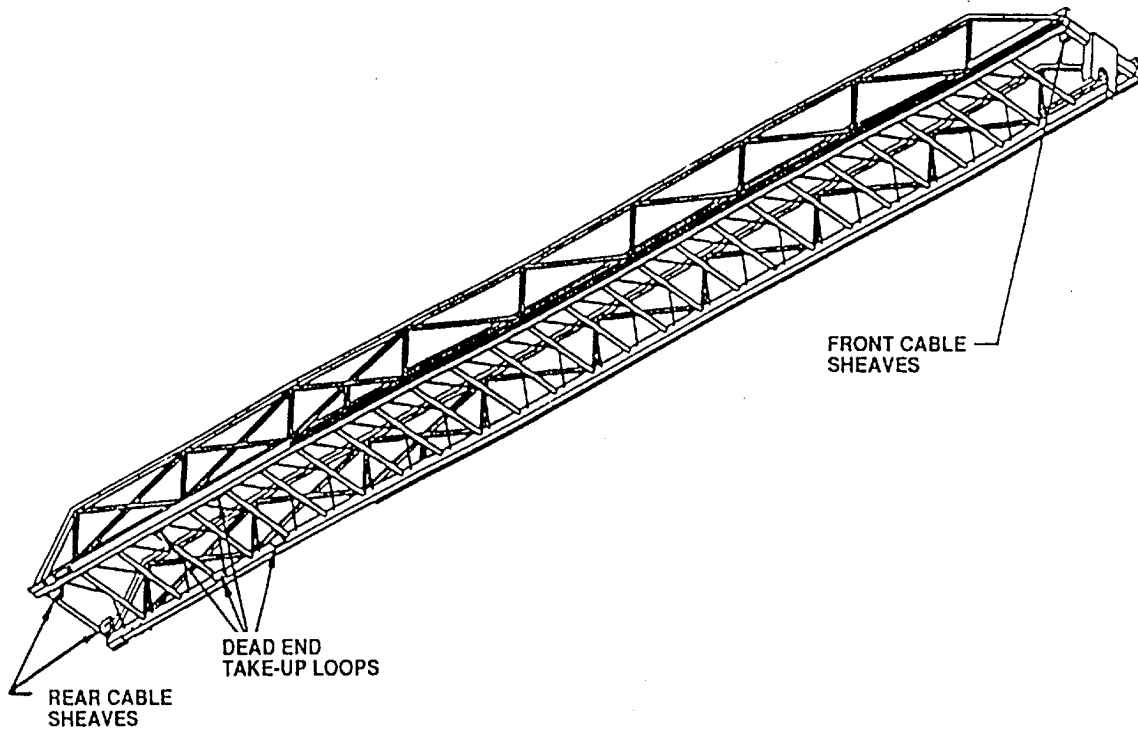


6-480

6-78. LADDER ASSEMBLY- Continued

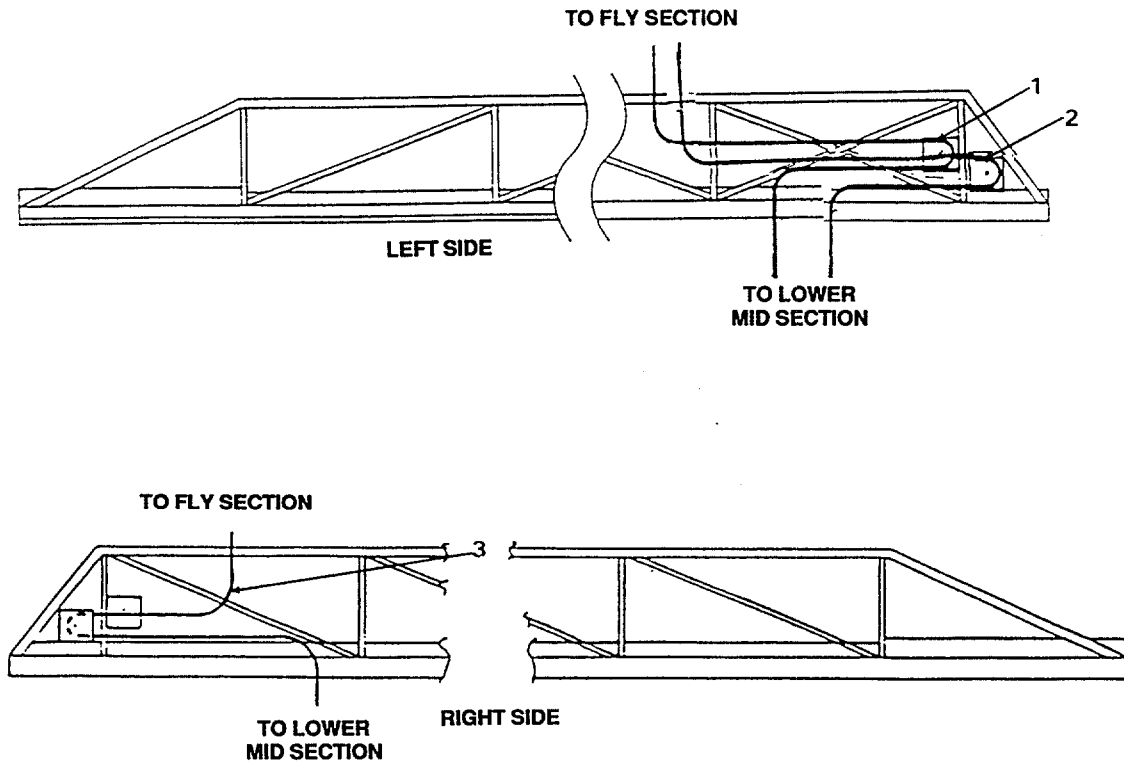
i. Upper Mid-Section Assembly.

- (1) Accomplish lower mid-section assembly.
- (2) Install new rear horizontal and vertical wear pads as required and slide upper mid-section into lower mid-section.
- (3) Loosely lay 3/8" and 5/16" cables on upper mid-section as shown.

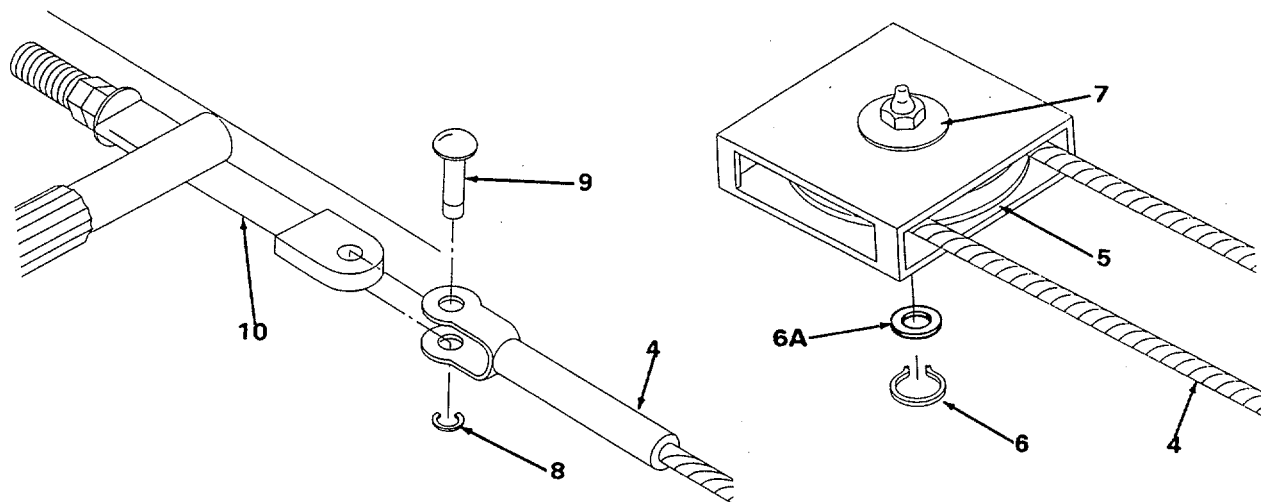


6-78. LADDER ASSEMBLY - Continued

(4) Route electrical cables (1, 2 and 3) as shown.

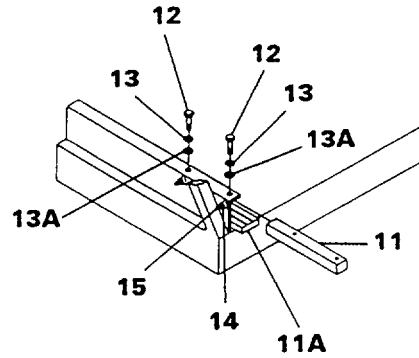


(5) Install tension cables (4) on sheaves (5) and install sheaves (5) with retaining rings (6), flatwashers (6A) and pins (7). Install snap rings (8) and clevis pins (9) and connect cables (4) to dead end lugs (10) at rear end of upper mid-section.

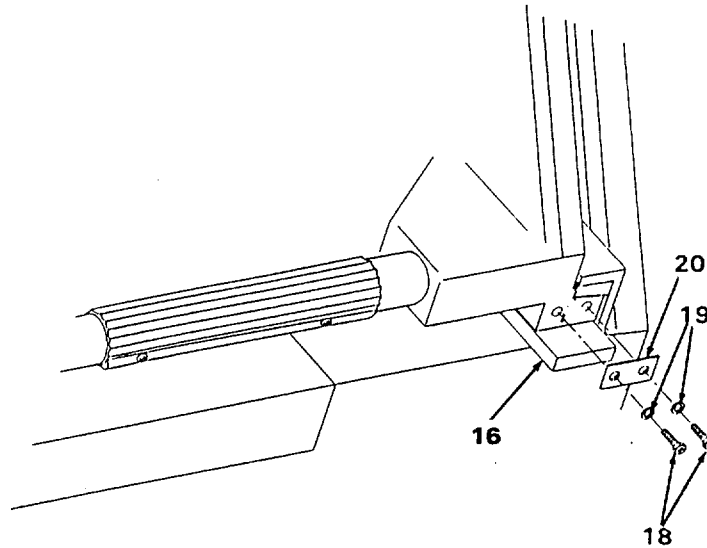


6-78. LADDER ASSEMBLY - Continued

- (6) Install front wear pads (11) with bolts (12), lockwashers (13), flatwashers (13A), and install jam nuts (14) and set adjusting screw (15). Horizontal wear pads (11A) fit into recesses.



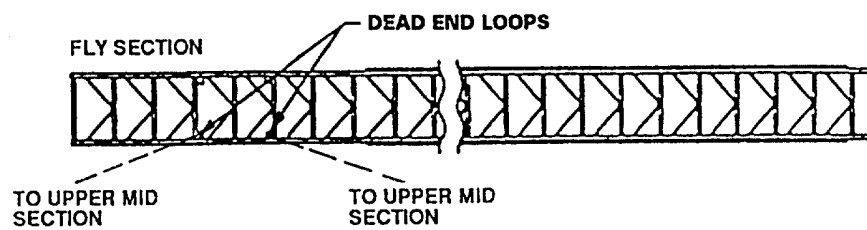
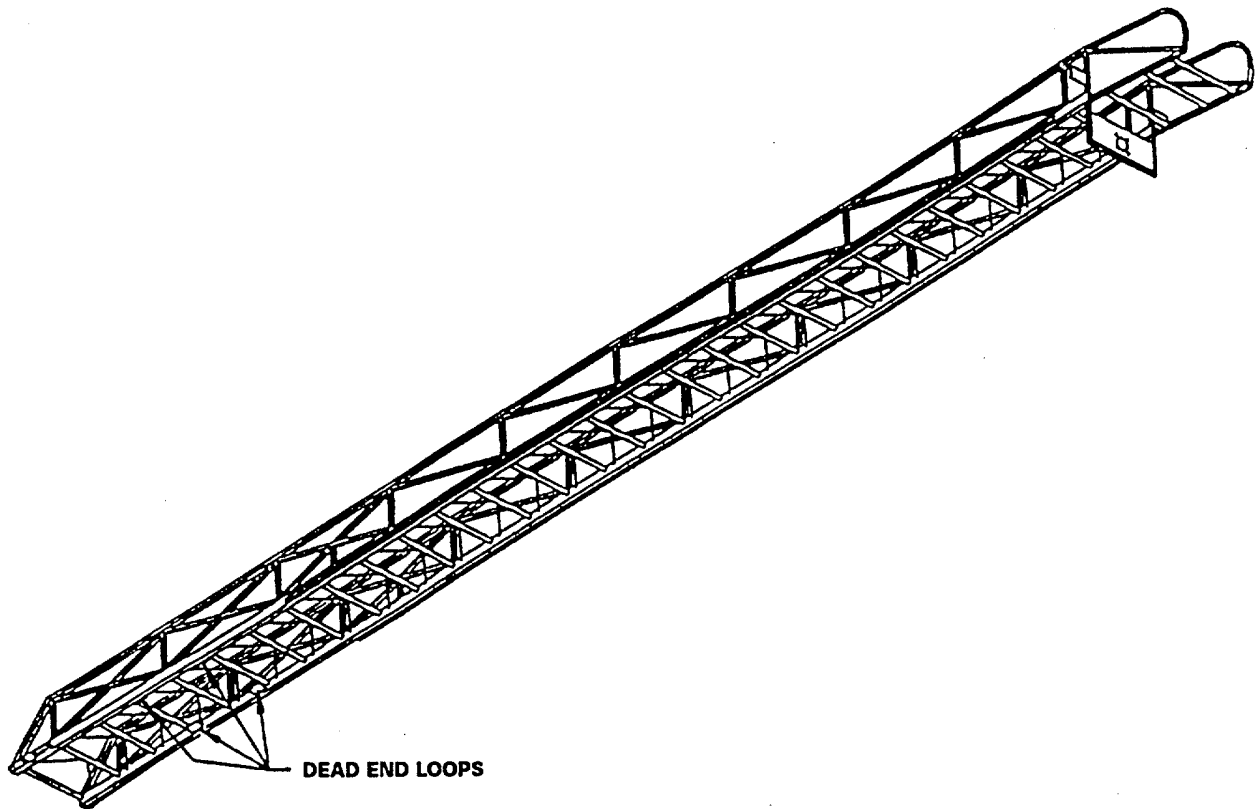
- (7) Install horizontal wear pads (16) at rear of upper mid-section with bolts (17), lockwashers (18) and retainers (19). Vertical wear pads fit into recesses in sides of ladder.



6-78. LADDER ASSEMBLY - Continued

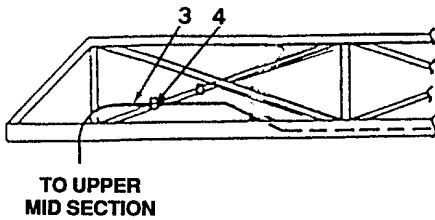
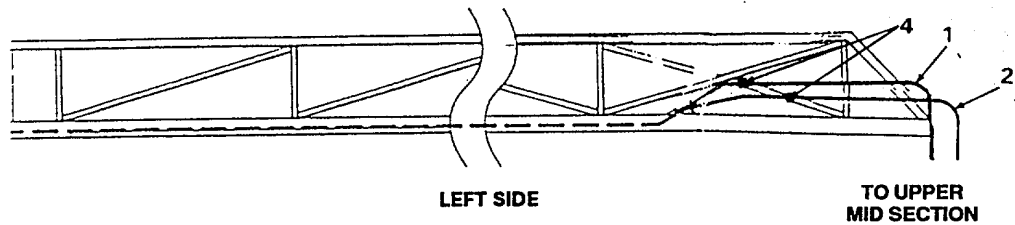
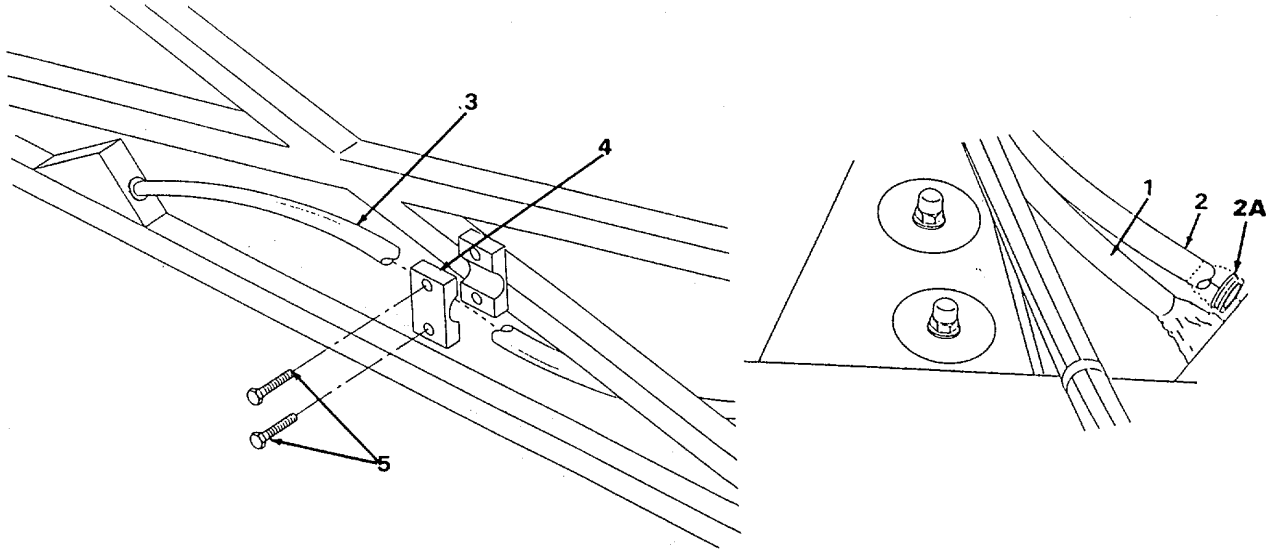
j. Fly Section Assembly.

- (1) Accomplish upper mid-section assembly.
- (2) Install new rear horizontal and vertical wear pads as required and slide fly section into upper mid-section.
- (3) Loosely lay 5/16" cables on fly section as shown.



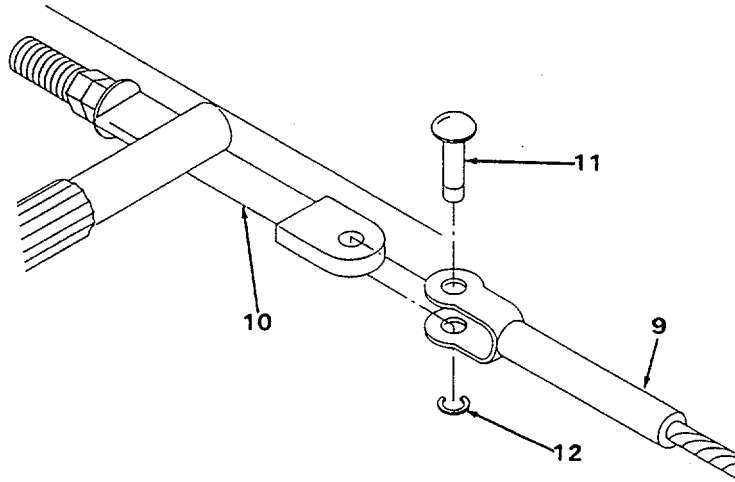
6-78. LADDER ASSEMBLY - Continued

- (4) Route electrical cables (1, 2 and 3) through section as shown. Install cable clamps (4) with screws (5). Install grommet (2A) and putty on cables at end of fly section.



6-78. LADDER ASSEMBLY - Continued

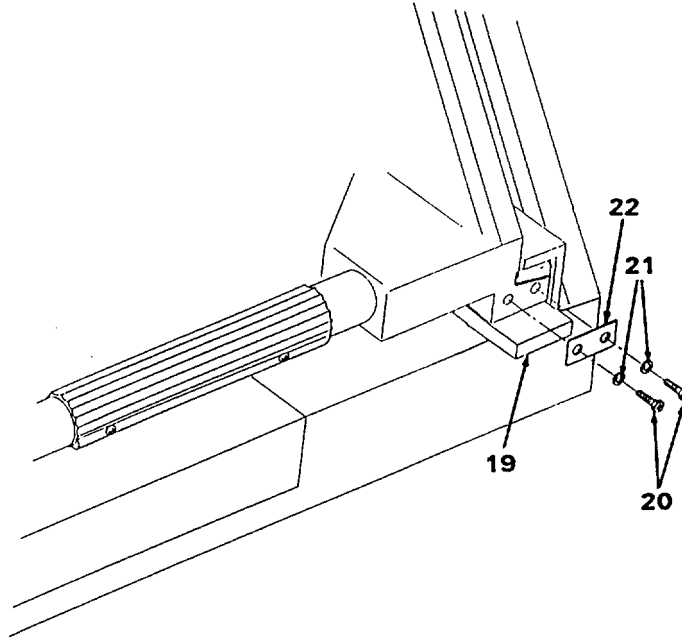
- (5) Install tension cables (9) on dead end loops (10) with pins (11) and retaining rings (12).



6-486

6-78. LADDER ASSEMBLY - Continued

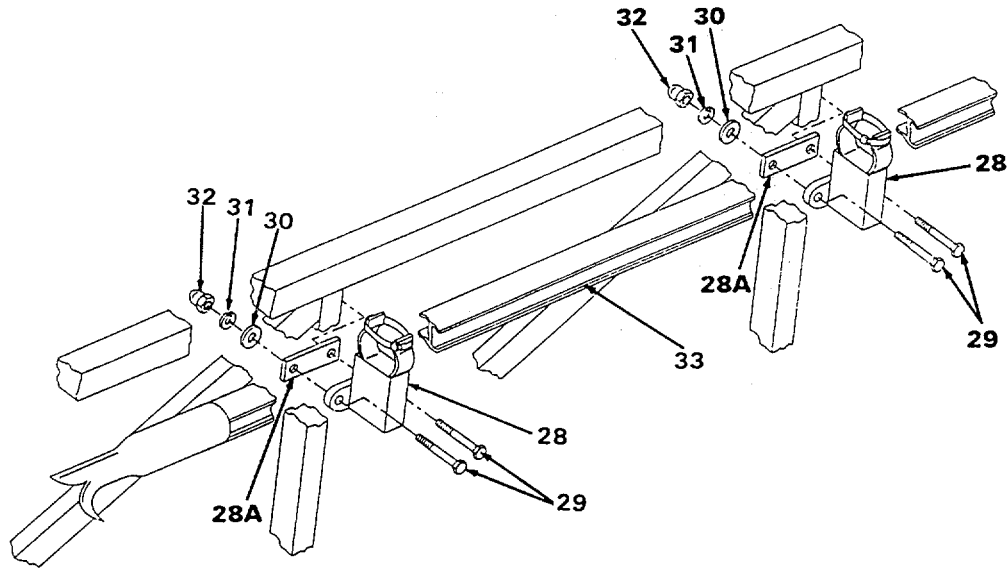
- (6) Install two horizontal wear pads (19) with screws (20), lockwashers (21) and retainers (22) on rear end of upper mid-section.
- (7) Rear vertical wear pads fit into recesses in sides of ladder.



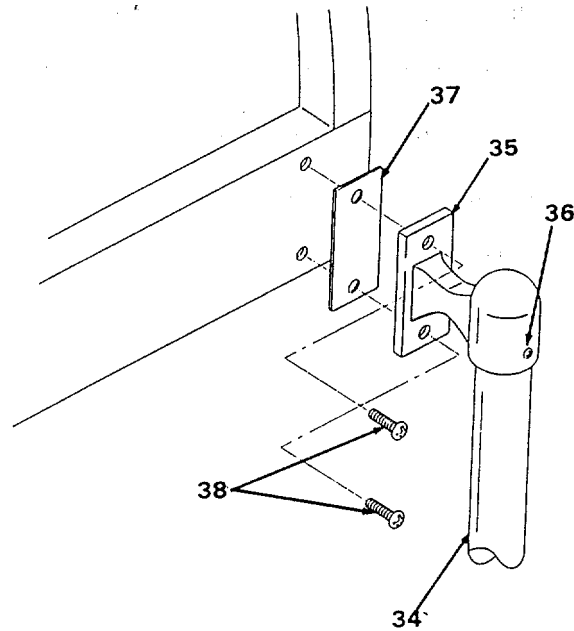
6-487

6-78. LADDER ASSEMBLY - Continued

- (8) Install pike pole holders (28) and brackets (28A) with screws (29), flatwashers (30), lockwashers (31) and nuts (32). Install pike pole (33).

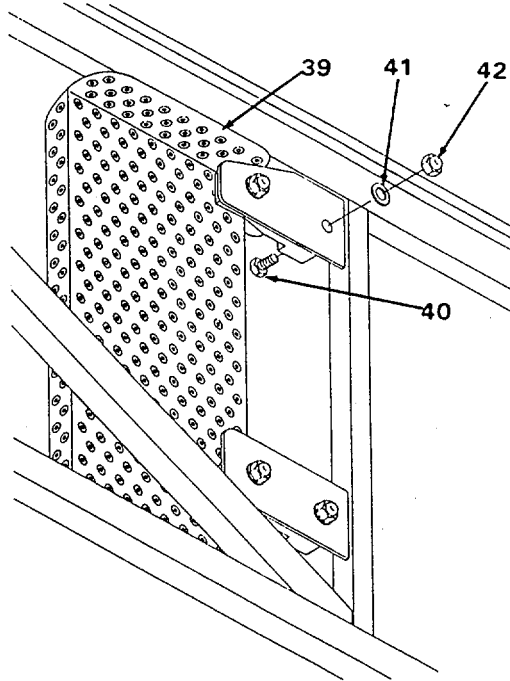


- (9) Install two curved grap rails (34) in stanchions (35) with screws (36). Install assembled rails and stanchions on fly section with gaskets (37) and screws (38).



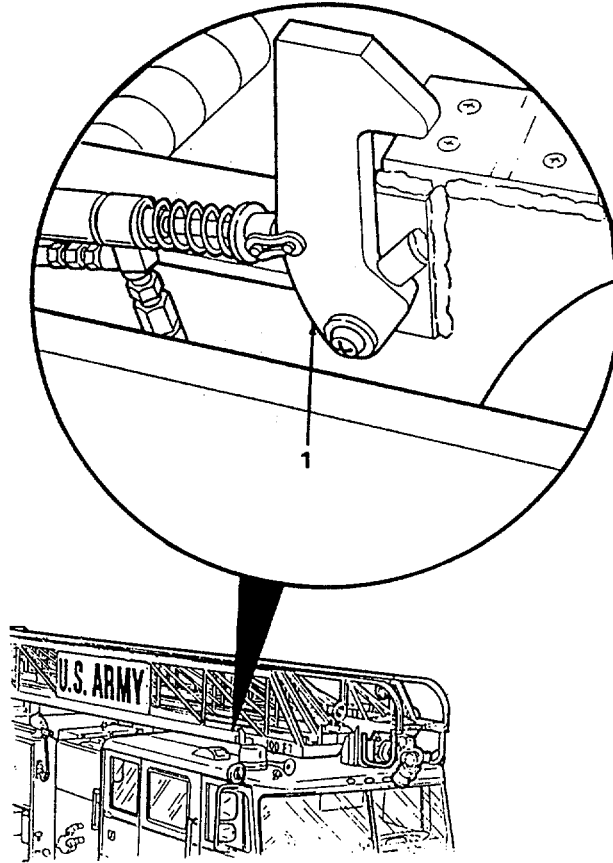
6-78. LADDER ASSEMBLY- Continued

- (10) Install two folding steps (39) with four each screws (40), washers (41) and acorn nuts (42).



- (11) Install spotlights (see para 4-177).
- (12) Install intercom speaker microphone (see para 4-198).
- (13) Install monitor and nozzle controls (see para 4-203).
- (14) Install monitor and nozzle (see para 4-202).
- (15) Install water pipe on fly section (see para 4-201).
- (16) If not installed on ladder, install assembled ladder per paragraph k.

6-78. LADDER ASSEMBLY - Continued

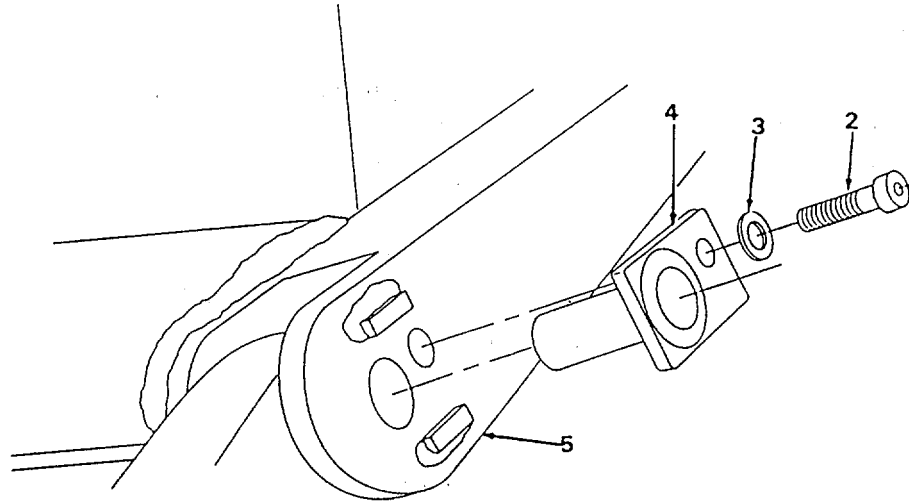
k. Installation.**WARNING**

Serious injury could occur if heavy equipment is moved/lifted without sufficient personnel to do the job. Use proper physical lifting procedures or use a suitable lifting device or dolly. Wear safety shoes, gloves and other suitable protective clothing. Ladder sections weigh approximately one ton each. Area should be clear of other personnel. Serious injury or death can result from falling objects.

- (1) Connect a six ton overhead crane with a spreader I-beam to support the ladder while it is being lifted and connected to the truck. However, if available, two overhead cranes (minimum rating three tons each) may be used, one hooked to each end of the ladder assembly.
- (2) Tie both ladder locks (1) in open position.
- (3) Lower ladder into place above truck aligning water pipe connection and mounting area on turntable.

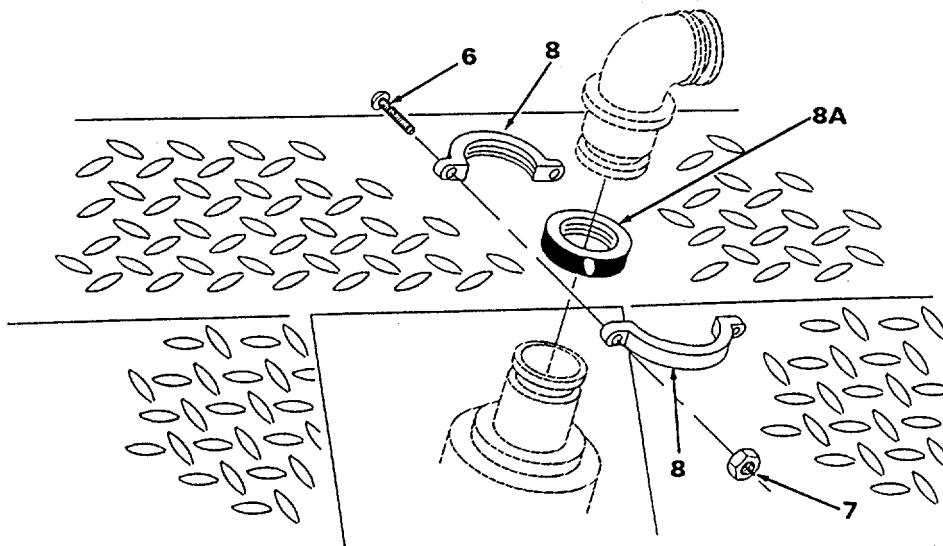
6-78. LADDER ASSEMBLY - Continued

- (4) Install bolks (2), washers (3) and pins (4) in ladder (5) and through turntable (5A).



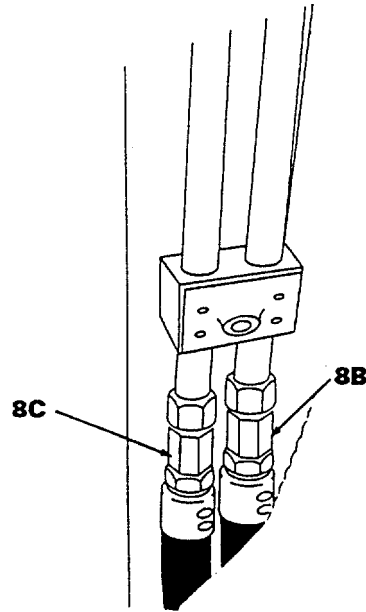
- (5) Install hoist cylinders (see para 5-51).

- (6) Install new seal (8A) and connect water pipe with bolts (6), nuts (7) and flanges (8).



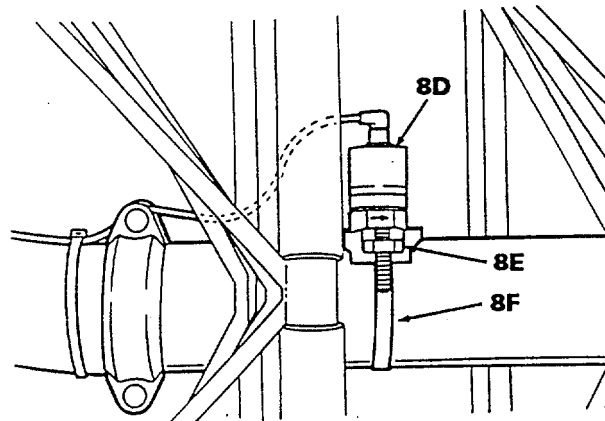
6-78. LADDER ASSEMBLY - Continued

- (7) Connect two each extension/retraction hydraulic hoses (8C and 8B).



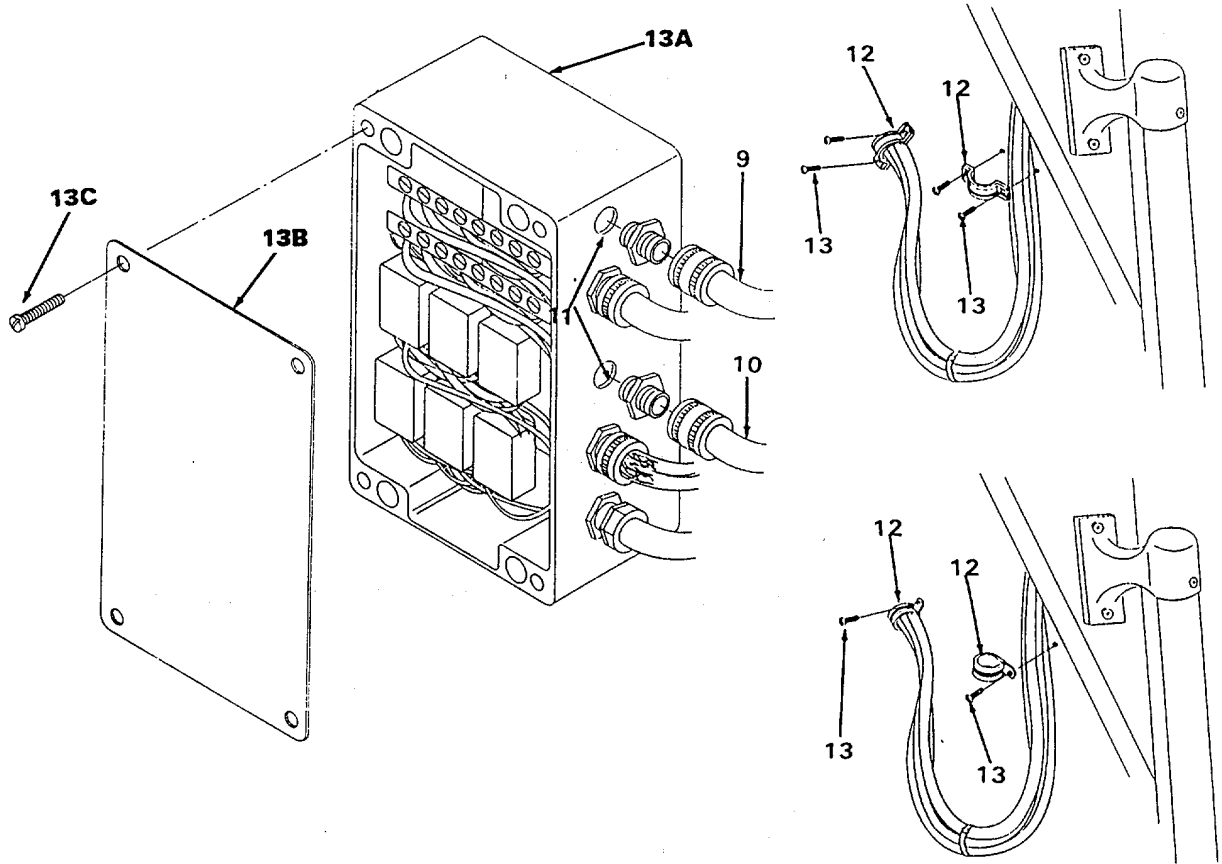
- (8) Install water piping per paragraph 4-201.

- (9) Connect flowmeter sensor (8D) on base section water pipe with nuts (8E) and U-bolt (8F).



6-78. LADDER ASSEMBLY - Continued

- (10) Route electrical cables (9 and 10) to electrical junction box (13A) and install after removing cover (13B) and four screws(13C) with cable reliefs (11). Install cable clamps (12) with screws (13).



6-78. LADDER ASSEMBLY - Continued

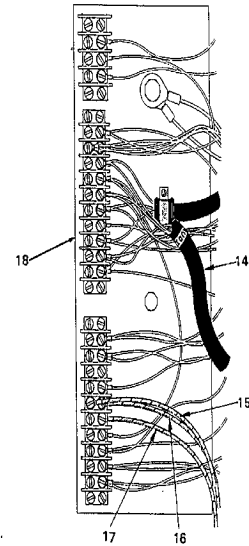
(11) Install cable and wires (14 through 17) in junction box (18) as was tagged during disassembly.

(12) Connect wires and install 110 VAC outlet box.

(13) Adjust ladder tension cables (see para 4-205).

(14) Adjust ladder electrical cables (see para 4-206).

(15) Perform an operational check (see para 2-14).



I. Follow-on Maintenance.

(1) Retract outriggers.

6-79. SWIVEL

This task covers:

- | | |
|---|--|
| <p>a. Removal</p> <p>b. Cleaning and Inspection</p> | <p>c. Installation</p> <p>d. Follow-on Maintenance</p> |
|---|--|

TOOLS REQUIRED

Tool Kit, General Mechanics, Automotive
(Appendix B, Section III, Item 1)

MATERIALS/PARTS REQUIRED

Dry Cleaning Solvent (Item 3, Appendix E)
Multi-purpose Grease (Item 17, Appendix E)
Lint Free Cloth (Item 42, Appendix E)
Shipping and Sealing Caps (Item 39, Appendix E)
Identification Tags (Item 32, Appendix E)
O-ring (Figure 23, Appendix F)
Seal (Figure 23, Appendix F)

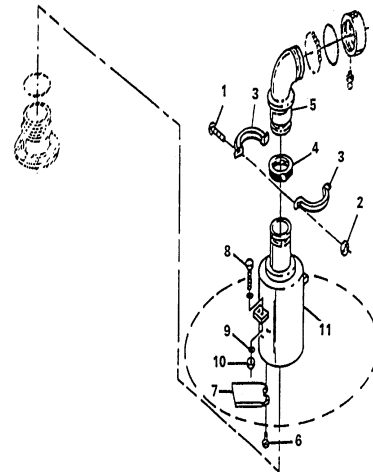
EQUIPMENT CONDITION

Main Engine Shutdown (see para 2-12.)
APU Shutdown (see para 2-16.)
Batteries Disconnected (see para 4-114.)
Aerial Water Pipe Drained
Hydraulic Pressure Relieved

a. Removal

- (1) Remove two screws (1) and nuts (2) to remove clamps (3).
- (2) Slide seal (4) up onto elbow (5) and pivot elbow 90 to allow removal of swivel. Slide seal off elbow and discard.
- (3) Tag and disconnect twelve swivel wires from two terminal boxes in torque box.

- (4) Tag and disconnect cleves swivel wires from three terminal boards in ladder control console.
- (5) Tag and disconnect swivel ground wire.
- (6) Tag and remove pressure and return hoses from swivel. I
- (7) Plug parts in swivel and cap hoses with shipping and sealing caps (Item 39, Appendix E).
- (8) Remove two screws (6) and retainer (7).
- (9) Remove four screws (8), eight washers (9) and four nuts (10).



6-79. SWIVEL - Continued

- (10) Lift swivel (11) off of flange (13).
- (11) Remove and discard O-ring (12) from flange (13).

b. Cleaning and Inspection.**WARNING**

Dry cleaning solvent P-D-680 is potentially dangerous. Avoid repeated and prolonged breathing of vapors and skin contact with the liquid. Do not use near open flame, arcing equipment or other ignition sources. Always wear eye protection and protective clothing. The flash point of P-D-680 is 100 to 138 deg. F (38 to 59 deg. C).

- (1) Use a lint free cloth (Item 42, Appendix E) moistened with dry cleaning solvent (item 3, Appendix E) to wipe exterior surfaces of swivel.
- (2) Visually inspect swivel for evidence of hydraulic fluid or water leakage and check electrical continuity of slip rings and brushes

NOTE

Swivel must be returned to manufacturer for repairs if necessary.

c. Installation.

- (1) Lubricate new O-ring (12) with multi-purpose grease (Item 17, Appendix E) and install on flange (13).
- (2) Carefully set swivel (11) onto flange (13).
- (3) Install four screws (8), eight washers (9) and four nuts (10).
- (4) Install retainer (7) and secure with two screws (6).
- (5) Remove shipping and sealing caps from hoses and parts in swivel and connect pressure and return hoses to swivel.
- (6) Connect swivel ground wire and eleven wires to three terminal boards in control console and twelve wires to two terminal boards in torque box.
- (7) Lubricate new seal (4) with multi-purpose grease (Item 17, Appendix E) and install it on elbow (5).
- (8) Pivot elbow (5) to align it with top of swivel, and slide seal (4) down elbow (5) to seal joint of swivel and joint of elbow.
- (9) Install two clamps (3), screws (1), and nuts (2).

d. Follow-on Maintenance.

- (1) Connect batteries (see para 4-114).

APPENDIX A

REFERENCES

A-1. SCOPE

This appendix lists all forms, field manuals, technical manuals and miscellaneous publications referenced in this manual.

A-2. FORMS

Equipment Inspection And Maintenance Worksheet	DA Form 2404
Discrepancy In Shipment Report	SF361
Product Quality Deficiency Report (EIR)	SF368
Recommended Changes To DA Publications	DA Form 2028-2

A-3. TECHNICAL MANUALS

Warranty Technical Bulletin for Fire-fighting Truck, 100 ft. Aerial Ladder, 1000 GPM	TB-5-4210-233-24
The Army Maintenance Management System (TAMMS)	DA PAM 738-750
Destruction Of Army Material To Prevent Enemy Use	TM 750-244-2 and TM 750-244-3
Welding Manual	TM 9-237
First Aid For Soldiers	FM 21-11
	TM 10-277
Chemical, Biological, and Radiological (CBR) Decontamination	TM 3-220

A-4. MISCELLANEOUS PUBLICATIONS

Fuels, Lubricants, Oil And Waxes	C910011
Consolidated Index Of Army Publications And Blank Forms	DA PAM 310-1

A-1/(A-2 Blank)

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 III lists the tools and test equipment (both special tools and common tool sets) required for each maintenance function as referenced from Section II.

d. Section IV contains supplemental instructions and explanatory notes for a particular maintenance function.

B-2. MAINTENANCE FUNCTIONS

Maintenance functions 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.

B-2. MAINTENANCE FUNCTIONS - Continued

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 service-able/operational condition as required by maintenance standards in appropriate technical publications (i.e., DMWR). Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like new condition.

k. Rebuild. Consists of those services/actions necessary for the restoration of unserviceable equipment to a like new condition in accordance with original manufacturing standards. Rebuild is the highest degree of material maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurements (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 time includes preparation time (including any necessary disassembly/assembly time), troubleshooting/fault location time, and quality assurance/quality control time in addition to the time required to perform the specific tasks identified 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 functions.

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

MAINTENANCE ALLOCATION CHART									
NOMENCLATURE OF END ITEMS: TRUCK, 100 FT. AERIAL LADDER									
(1) GROUP NO.	(2) COMPONENT/ ASSEMBLY	(3) MAINT. FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS & EQUIP.	(6) REMARKS
			UNIT		DIRECT	GENERAL	DEPOT		
			C	O	SUPPORTS	SUPPORTS			
00	TRUCK, FIREFIGHTING, 100 FT. AERIAL LADDER								
01	ACCESSORIES								
	HARD SUCTION HOSES	Inspect Test Repair	.25	.25 1.0 1.0				1	
	SOFT SUCTION HOSES	Inspect Test Repair	.25	1.0 1.0				1	
	AXES	Inspect	.25						
	PIKE POLES	Inspect	.25						
	LADDERS	Inspect	1.0						
	STRAINER	Inspect	.25						
	REDUCER	Inspect	.25						
02	PUMP COMPARTMENT								
	PUMP PANEL LIGHTS	Inspect Replace	10	.10 1.0				1	
	COMPARTMENT LIGHTS	Inspect Repair Replace	.10	.10 .25 .75				1 1	
	STEP LIGHTS	Inspect Repair Replace	.10	.10 .75 .50				1 1	
	CROSSLAY HOSE BIN DIVIDERS	Inspect Replace	.25	1.0				1	

SECTION II MAINTENANCE ALLOCATION CHART

MAINTENANCE ALLOCATION CHART									
NOMENCLATURE OF END ITEMS: TRUCK, 100 FT. AERIAL LADDER									
(1) GROUP NO.	(2) COMPONENT/ ASSEMBLY	(3) MAINT. FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS & EQUIP.	(6) REMARKS
			UNIT	DIRECT		GENERAL			
				C	O	F	H		
02	PUMP COMPARTMENT (Continued)								
	CROSSLAY HOSE BIN ROLLERS	Inspect Replace	.10	1.0				1	
	GAUGES, CROSSLAY, DISCHARGE, PUMP PRESSURE AND VACUUM	Inspect Replace	.25	1.0				1	
	GAUGES, ENGINE STATUS	Inspect Replace	.25	1.0				1	
	WATER TANK LEVEL GAUGE	Inspect Test Replace Repair	.50	1.0 1.0 1.0				1 1	
	TACHOMETER	Inspect Replace	.10	1.0				1	
	PUMP PANEL INDICATOR LIGHTS	Inspect Replace Repair	.50	1.0 1.0				1 1	
	ENGINE COOLER VALVE	Replace		1.0				1	
	PRIMER CABLE	Replace		1.0				1	
	PUMP PANEL TOGGLE SWITCHES	Inspect Replace	.50		.25			1	
	OPERATOR'S PANEL, STREETSIDE	Inspect Replace	.50		8.0			1, 4	
	THROTTLE CONTROL	Inspect Replace	.10		2.0			1	
	GAUGE PANEL ENCLOSURE	Inspect Replace	.10		1.0			1	
	OPERATOR'S PANEL, CURB SIDE	Inspect Replace	.50		3.50			1,4	

SECTION II MAINTENANCE ALLOCATION CHART

MAINTENANCE ALLOCATION CHART									
NOMENCLATURE OF END ITEMS: TRUCK, 100 FT. AERIAL LADDER									
(1) GROUP NO.	(2) COMPONENT/ ASSEMBLY	(3) MAINT. FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS & EQUIP.	(6) REMARKS
			UNIT						
			C	O	F	H	D		
02	PUMP COMPARTMENT (Continued)								
	RUNNING BOARDS	Inspect Replace	.25	3.0				1	
	PULL-OUT TREAD PLATE	Inspect Replace	.10	1.0				1	
03	PROPELLER SHAFT ASSEMBLY								
	DRIVE SHAFTS	Inspect Replace	.25		2.0			1, 4	
04	PUMP, PIPING SYSTEM, AND VALVES								
	FOAM METERING VALVE	Replace Repair		3.0 2.0				1 1	
	FOAM METERING VALVE DRAIN VALVE	Replace		1.0				1	
	EDUCATOR	Replace		3.0				1	
	RELIEF VALVE	Replace Repair		2.0 2.0				1 1	
	CHECK VALVE, 1-1/2'	Replace Repair		1.0 1.0				1 1	
	Y-STRAINER	Replace Repair		2.0 1.0				1 1	
	RELIEF VALVE PILOT ASSEMBLY	Replace Repair		1.0 1.0				1 1	
	Y-STRAINER AND DRAIN VALVE AND CHECK VALVE	Replace		1.0				1	
	#1 DISCHARGE DRAIN VALVE	Replace Repair		1.0 1.0				1 1	

SECTION II MAINTENANCE ALLOCATION CHART

MAINTENANCE ALLOCATION CHART									
NOMENCLATURE OF END ITEMS: TRUCK, 100 FT. AERIAL LADDER									
(1) GROUP NO.	(2) COMPONENT/ ASSEMBLY	(3) MAINT. FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS & EQUIP.	(6) REMARKS
			UNIT	DIRECT		GENERAL			
				SUPPORT	SUPPORT	SUPPORT	DEPOT		
C	O	F	H	D					
04	PUMP, PIPING SYSTEM, AND VALVES (Continued)								
	#2 DISCHARGE DRAIN VALVE	Replace		1.0					1
		Repair		1.0					1
	AERIAL DISCHARGE DRAIN VALVE	Replace		1.0					1
		Repair		1.0					1
	FLUSH VALVE	Replace		1.0					1
		Repair		1.0					1
	FOAM VALVE	Replace		1.0					1
		Repair		1.0					1
	WATER VALVE	Replace		1.0					1
		Repair		1.0					1
	#1 CROSSLAY VALVE	Replace		2.0					1
		Repair		1.0					1
	#2 CROSSLAY VALVE	Replace		2.0					1
		Repair		1.0					1
	#1 DISCHARGE VALVE	Replace		1.0					1
		Repair		1.0					1
	#2 DISCHARGE VALVE	Replace		1.0					1
	Repair		1.0					1	
#3 DISCHARGE VALVE	Replace		1.0					1	
	Repair		1.0					1	
#4 DISCHARGE VALVE	Replace		1.0					1	
	Repair		1.0					1	
TANK FILL AND RECIRCULATING VALVE	Replace		1.0					1	
	Repair		1.0					1	
AERIAL DISCHARGE VALVE	Replace		1.5					1	
	Repair		1.0					1	

SECTION II MAINTENANCE ALLOCATION CHART

MAINTENANCE ALLOCATION CHART									
NOMENCLATURE OF END ITEMS: TRUCK, 100 FT. AERIAL LADDER									
(1) GROUP NO.	(2) COMPONENT/ ASSEMBLY	(3) MAINT. FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS & EQUIP.	(6) REMARKS
			UNIT	DIRECT		GENERAL			
				SUPPORT	SUPPORT	SUPPORT	DEPOT		
C	O	F	H	D					
04	PUMP, PIPING SYSTEM, AND VALVES (Continued)								
	TANK DRAIN VALVE	Replace		2.0					1
		Repair		1.0					1
	TANK DISCHARGE VALVE	Replace		2.0					1
		Repair		1.0					1
	PUMP DRAIN VALVE	Replace		1.0					1
		Repair		1.0					1
	FRONT SUCTION VALVE	Replace		1.0					1
		Repair		1.0					1
	DRIVER'S SIDE AUXILIARY SUCTION VALVE	Replace		1.0					1
		Repair		1.0					1
	#3 DISCHARGE DRAIN VALVE	Replace		1.0					1
		Repair		1.0					1
	#4 DISCHARGE DRAIN VALVE	Replace		.50					1
		Repair		.50					1
	FOAM TANK DRAIN VALVE	Replace		.50					1
		Repair		.50					1
	SUCTION DRAIN VALVES	Replace		.50					1
		Repair		.50					1
	TANKASSEMBLY, FOAM	Inspect		.25					
		Replace			3.0				1, 4
	STREETSIDE PUMP DISCHARGE MANIFOLD	Replace				8.0			1, 4
	CURBSIDE PUMP DISCHARGE MANIFOLD	Replace				2.0			1, 4
	STREET SIDE PUMP SUCTION MANIFOLD	Replace				6.0			1, 4
	CURB SIDE PUMP SUCTION MANIFOLD	Replace				2.0			1, 4

SECTION II MAINTENANCE ALLOCATION CHART

MAINTENANCE ALLOCATION CHART									
NOMENCLATURE OF END ITEMS: TRUCK, 100 FT. AERIAL LADDER									
(1) GROUP NO.	(2) COMPONENT/ ASSEMBLY	(3) MAINT. FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS & EQUIP.	(6) REMARKS
			UNIT	DIRECT		GENERAL			
				C	O	F	H		
04	PUMP, PIPING SYSTEM, AND VALVES (Continued)								
	FRONT SUCTION ASSEMBLY	Replace			12.0			1, 4	
	FIRE PUMP	Inspect	.25						
		Test	1.0						
		Replace				40.0		1, 4	
		Repair				8.0		1, 4	
	OPERATING RODS	Replace		1.5				1	
	RELIEF VALVE	Replace		2.0				1	
		Repair		2.0				1	
	DISCHARGE CONNECTIONS/CHROME ADAPTERS	Inspect	.10						
		Replace		.50				1	
	PRE-PLUMBING	Replace		5.0					
	PRIMING PUMP	Inspect	.25						
		Replace		2.0				1	
Repair			3.5				1		
PRIMING PUMP MOTOR	Replace		2.0				1		
PRIMING PUMP TUBING	Inspect	.10							
	Replace		.50				1		
PRIMING PUMP OIL TANK	Inspect	.10							
	Service	.25							
	Replace		.50				1		
05	HOSE BODY ASSEMBLY	Inspect	1.50						
	REAR STROBE LIGHT	Inspect	.10						
		Repair		.50				1	
		Replace		.50				1	
REAR STROBE LIGHT POWER SUPPLY	Inspect	.10					1		
	Replace		1.0						

SECTION II MAINTENANCE ALLOCATION CHART

MAINTENANCE ALLOCATION CHART									
NOMENCLATURE OF END ITEMS: TRUCK, 100 FT. AERIAL LADDER									
(1) GROUP NO.	(2) COMPONENT/ ASSEMBLY	(3) MAINT. FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS & EQUIP.	(6) REMARKS
			UNIT	DIRECT		GENERAL			
				C	O	F	H		
05	HOSE BODY ASSEMBLY (Continued)								
	HOSE BED FLOODLIGHT	Inspect Repair Replace	.10		.50 .25				1 1
	STOP, TURN, AND TAIL LIGHTS	Inspect Repair Replace	.10		.50 .50				1 1
	BACK-UP LIGHTS	Inspect Replace Repair	.10		1.0 1.0				1 1
	REAR SCENE LIGHT	Inspect Replace Repair	.10		1.0 1.0				1 1
	BACK-UP ALARM	Replace			.50				1
	WARNING BUZZER PUSH BUTTONS	Replace			1.0				1
	CLEARANCE MARKER LIGHTS	Inspect Replace Repair	.10		1.0 1.0				1 1
	COMPARTMENT LIGHTS	Inspect Repair Replace	.10		.25 .50				1 1
	HANDRAILS	Inspect Replace	.10		1.0				1
	UPPER AND LOWER COMPARTMENT DOORS	Inspect Replace Repair	.50		2.0 2.0				1 1
	COMPARTMENT DOOR HOLD OPEN SPRING	Replace			.50				1
	REAR ROLL-UP DOOR	Inspect Replace	.25		8.0				1
	AIR BOTTLE RACK AND SLIDE TRAY	Inspect Replace	.10		2.0				1

SECTION II MAINTENANCE ALLOCATION CHART

MAINTENANCE ALLOCATION CHART									
NOMENCLATURE OF END ITEMS: TRUCK, 100 FT. AERIAL LADDER									
(1) GROUP NO.	(2) COMPONENT/ ASSEMBLY	(3) MAINT. FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS & EQUIP.	(6) REMARKS
			UNIT	DIRECT SUPPORT		GENERAL SUPPORT			
				C	O	F	H		
06	WATER TANK ASSEMBLY	Inspect		2.0					
	WATER TANK LEVEL SENDING UNIT	Replace		1.0				1	
	TANK	Inspect Replace		.50		8.0			1, 4
07	CAB ASSEMBLY, LIGHTS, AND CONTROLS								
	CAB ROOF PANEL	Inspect Replace	.25	1.0					1
	CAB DOORS	Inspect Repair Replace	.25	5.0 3.0					1 1
	CAB DOOR GLASS	Inspect Replace	.10	2.0					1
	WINDSHIELD	Inspect Replace	.10	1.0					1
	MIRRORS	Inspect Replace	.10	.50					1
	HEADLIGHTS	Inspect Adjust Replace	.10	.50 1.0					1 1
	DIRECTIONAL MARKER LIGHTS	Inspect Repair Replace	.25	.50 .50					1 1
	WARNING LIGHTS	Inspect Repair Replace	.25	1.0 1.0					1 1
	CAB SPOTLIGHTS	Inspect Repair Replace	.25	.50 .50					1 1
	AIR HORNS	Inspect Replace	.25	1.0					1

SECTION II MAINTENANCE ALLOCATION CHART

MAINTENANCE ALLOCATION CHART									
NOMENCLATURE OF END ITEMS: TRUCK, 100 FT. AERIAL LADDER									
(1) GROUP NO.	(2) COMPONENT/ ASSEMBLY	(3) MAINT. FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS & EQUIP.	(6) REMARKS
			UNIT	DIRECT		GENERAL			
				C	O	F	H		
07	CAB ASSEMBLY, LIGHTS, AND CONTROLS (Continued)								
	ROOF BEACON LIGHT	Inspect Repair Replace	.25	.50 2.0				1 1	
	CAB ROOF VENT FAN	Inspect Repair	.10	.50				1	
	CAB SUN ROOF	Inspect Replace	.10	.50				1	
	MECHANICAL SIREN	Inspect Replace	.10	.50				1	
	SIREN AND PA SYSTEM	Test Replace	.50	2.0				1	
	CAB EXTERIOR TRIM	Inspect Replace	.25	4.0				1	
	SCUFF PLATES	Inspect Replace	.25	.50				1	
	CAB INSTRUMENT PANEL GAUGES	Inspect Replace	1.0	.50				1	
	CAB INSTRUMENT PANEL SWITCHES	Test Replace	.50	.50				1	
	CAB INSTRUMENT PANEL INDICATOR LIGHTS	Test Replace Repair	.50	.50 1.0				1 1	
	WARNING BUZZER	Replace		.50				1	
	CAB DOME LIGHTS	Inspect Replace	.10	.50				1	
	DASHBOARD COMPARTMENT DOORS	Inspect Replace	.10	.50				1	
	CIRCUITBREAKERS	Replace		.50				1	

SECTION II MAINTENANCE ALLOCATION CHART

MAINTENANCE ALLOCATION CHART									
NOMENCLATURE OF END ITEMS: TRUCK, 100 FT. AERIAL LADDER									
(1) GROUP NO.	(2) COMPONENT/ ASSEMBLY	(3) MAINT. FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS & EQUIP.	(6) REMARKS
			UNIT	DIRECT		GENERAL			
				C	O	F	H		
07	CAB ASSEMBLY, LIGHTS, AND CONTROLS (Continued)								
	TRANSMISSION SHIFT CONTROL	Inspect Repair Replace	.25 1.0 2.0					1 1	
	BATTERY SELECTOR SWITCH	Replace	1.0					1	
	HEATER CONTROL HEAD ASSEMBLY	Replace	1.75					1	
	HEATER VALVE	Replace	1.0					1	
	HEATER/DEFROSTER	Test Repair Replace	.25 4.0 2.0					1 1	
	DRIVER'S SEAT	Inspect Replace Repair	.25 2.0 4.0					1 1	
	PASSENGER AND JUMP SEATS	Inspect Replace	.25 1.0					1	
	FOLD-DOWN JUMP SEATS	Inspect Replace	.25 1.0					1	
	SEAT BELTS	Inspect Replace	.25 1.0					1	
	WINDSHIELD WASHER PUMP	Inspect Replace	.10 1.0					1	
	WINDSHIELD WASHER RESERVOIR	Inspect Replace	.10 1.0					1	
	WINDSHIELD WIPER MOTOR	Test Replace	.10 1.0					1	
	WINDSHIELD WIPER ARMS	Inspect Replace	.25 .50					1	

SECTION II MAINTENANCE ALLOCATION CHART

MAINTENANCE ALLOCATION CHART									
NOMENCLATURE OF END ITEMS: TRUCK, 100 FT. AERIAL LADDER									
(1) GROUP NO.	(2) COMPONENT/ ASSEMBLY	(3) MAINT. FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS & EQUIP.	(6) REMARKS
			DIRECT GENERAL						
			UNIT	SUPPORTS	SUPPORT	DEPOT			
C	O	F	H	D					
07	CAB ASSEMBLY, LIGHTS, AND CONTROLS (Continued)								
	WINDSHIELD WIPER BLADES	Inspect Replace	.25 .25					1	
	CAB MOUNTING BRACKETS	Inspect Replace		.25		6.0		1, 4	
08	1 2-VOLT DC ELECTRICAL SYSTEM								
	BATTERY ISOLATOR	Test Replace		0.5 1.0				1	
	BATTERIES	Inspect Service Test Replace	.25 .25 .50 .50					1 1	
	BATTERY BOXES	Inspect Repair	.25	1.0				1	
	BATTERY CHARGE RECEPTACLE	Replace		.50				1	
09	100-VOLT AC ELECTRICAL SYSTEM	Test	1.0						
	110 VAC, 60 HZ RECEPTACLES	Inspect Replace	.10 1.0					1 1	
	AERIAL CIRCUIT ON/OFF SWITCH	Inspect Replace	.10	1.0				1	
	CIRCUIT BREAKERS	Replace		.50				1	
	12 VDC/1 10 VAC RELAYS	Replace		1.0				1	
	12 VDC IN-LINE FUSE	Replace		.25				1	
	CURRENT TRANSFORMER	Replace		1.0				1	

SECTION II MAINTENANCE ALLOCATION CHART

MAINTENANCE ALLOCATION CHART									
NOMENCLATURE OF END ITEMS: TRUCK, 100 FT. AERIAL LADDER									
(1) GROUP NO.	(2) COMPONENT/ ASSEMBLY	(3) MAINT. FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS & EQUIP.	(6) REMARKS
			UNIT	DIRECT		GENERAL			
				C	O	F	H		
09	110-VOLTAC ELECTRICAL SYSTEM (Continued)								
	AC AMMETERS	Inspect Test Replace	.10		1.0 1.0			1 1	
	AC VOLTMETERS	Inspect Test Replace	.10		1.0 1.0			1 1	
	PORTABLE WORK LIGHTS (1 10 VAC)	Inspect Replace Repair	.10		1.0 1.0			1	
10	ENGINE ENCLOSURE	Inspect	.50						
	ENGINE ENCLOSURE INSULATION	Inspect Replace	.25		2.0			1	
	ENGINE ENCLOSURE LATCHES	Inspect Replace	.10		1.0			1	
	ENGINE ENCLOSURE HINGES AND PANELS	Inspect Replace	.10		2.0			1	
11	ENGINE AND ACCESSORIES								
	ENGINE ASSEMBLY	Service Replace		.50	12.0			1, 4	
	STARTER MOTOR	Inspect Replace Repair	.25		1.5 4.0			1, 4 1, 4	
	STARTER MOTOR SOLENOID	Repair Replace			1.5 2.0			1 1	
	AIR CLEANER ASSEMBLY	Inspect Replace	.25		1.0			1	
	OIL FILTER	Inspect Replace	.25 .50					1	

SECTION II MAINTENANCE ALLOCATION CHART

MAINTENANCE ALLOCATION CHART									
NOMENCLATURE OF END ITEMS: TRUCK, 100 FT. AERIAL LADDER									
(1) GROUP NO.	(2) COMPONENT/ ASSEMBLY	(3) MAINT. FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS & EQUIP.	(6) REMARKS
			UNIT	DIRECT		GENERAL			
				C	O	F	H		
11	ENGINE AND ACCESSORIES (Continued)								
	OIL COOLER	Inspect Replace	.25		2.0			1	
	FUEL FILTERS, PRIMARY AND SECONDARY	Inspect Replace	.25	.50 1.0				1	
	FUEL PUMP	Inspect Replace Repair	.25		1.0 2.0			1 1	
	FAN BELT	Inspect Adjust Replace		.25 .25 1.0				1 1	
	FAN	Inspect Replace		.25 1.0				1 1	
	AIR COMPRESSOR	Inspect Replace Repair		.50	3.0	8.0		1 1	
	ALTERNATOR	Inspect Replace Repair		.50 2.0	4.0			1 1, 4	
	ALTERNATOR DRIVE	Inspect Replace				.25 4.0		1, 4	
	ENGINE STARTING AID	Inspect Replace	.10	.25				1	
	ALTERNATOR BELT	Inspect Adjust Replace		.50 .50 1.0				1 1	
	AIR INLET ADAPTER	Replace			2.0			1, 4	
	TURBOCHARGER	Inspect Replace Repair		.50	2.0 8.0			1 1, 4	
	BLOWER	Replace Repair			2.0	4.0		1, 4 1, 4	

SECTION II MAINTENANCE ALLOCATION CHART

MAINTENANCE ALLOCATION CHART									
NOMENCLATURE OF END ITEMS: TRUCK, 100 FT. AERIAL LADDER									
(1) GROUP NO.	(2) COMPONENT/ ASSEMBLY	(3) MAINT. FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS & EQUIP.	(6) REMARKS
			UNIT	DIRECT		GENERAL			
				C	O	F	H		
11	ENGINE AND ACCESSORIES (Continued)								
	EXHAUST MANIFOLD	Inspect Replace		.25		6.0			1
	THERMOSTATS	Test Replace		.50 3.0					1
	THERMOSTAT HOUSINGS	Inspect Replace		.25 1.0					1
	ENGINE WATER PUMP	Inspect Replace Repair		.25		3.0 5.0			1 1
	POWER STEERING PUMP	Replace Repair				2.0 4.0			1, 4 1, 4
	ENGINE SENDING UNITS	Test Replace		1.0 4.0					1 1
	ENGINE OIL DIPSTICK ASSEMBLY	Inspect Replace		.25 .50					1
	CYLINDER BLOCK	Repair Replace				25.0 25.0			1, 4 1, 4
	CYLINDER BLOCK FRONT END PLATE	Replace				4.0			1, 4
	CYLINDER BLOCK REAR END PLATE	Replace				4.0			1, 4
	AIR BOX DRAINS	Replace				1.0			1, 4
	AIR BOX COVERS	Replace				1.0			1, 4
	CYLINDER HEAD Repair	Replace				4.0 16.0			1, 4 1, 4
	INJECTOR TUBES	Replace				2.0			1, 4
	VALVE SEAT INSERTS	Replace				2.0			1, 4

SECTION II MAINTENANCE ALLOCATION CHART

MAINTENANCE ALLOCATION CHART									
NOMENCLATURE OF END ITEMS: TRUCK, 100 FT. AERIAL LADDER									
(1) GROUP NO.	(2) COMPONENT/ ASSEMBLY	(3) MAINT. FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS & EQUIP.	(6) REMARKS
			UNIT						
			C	O	F	H	D		
11	ENGINE AND ACCESSORIES (Continued)								
	WATER NOZZLES	Replace					1.0		1, 4
	VALVE BRIDGE GUIDES	Replace					1.0		1, 4
	VALVE GUIDES	Replace					2.0		1, 4
	EXHAUST VALVES	Replace					2.0		1, 4
		Repair					2.0		1, 4
	ROCKER ARMS	Replace					2.0		1, 4
		Repair					2.0		1, 4
	CAM FOLLOWERS AND PUSH RODS	Replace					1.0		1, 4
		Repair					2.0		1, 4
	EXHAUST VALVE BRIDGES	Replace					2.0		1, 4
	ROCKER ARM COVERS	Inspect		.25					
		Replace		1.0					1
	CRANKSHAFT PULLEY	Replace					1.0		1, 4
	CRANKSHAFT VIBRATION DAMPER	Replace					2.0		1, 4
	CRANKSHAFT COVER, FRONT OIL SEAL AND PUMP DRIVE GEAR	Replace					8.0		1, 4
	SYNCHRONOUS AND TIMING REFERENCE SENSOR	Replace					2.0		1, 4
	MAIN BEARINGS AND CRANKSHAFT	Replace					6.0		1, 4
		Repair					20.0		1, 4
	FLEX PLATE	Replace					4.0		1, 4
	FLYWHEEL HOUSING AND REAR OIL SEAL	Replace					3.0		1, 4

SECTION II MAINTENANCE ALLOCATION CHART

MAINTENANCE ALLOCATION CHART									
NOMENCLATURE OF END ITEMS: TRUCK, 100 FT. AERIAL LADDER									
(1) GROUP NO.	(2) COMPONENT/ ASSEMBLY	(3) MAINT. FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS & EQUIP.	(6) REMARKS
			UNIT		DIRECT	GENERAL	DEPOT		
			C	O	SUPPORTS	SUPPORTS			
11	ENGINE AND ACCESSORIES (Continued)								
	PISTONS, CONNECTING RODS AND LINERS	Replace Repair				1.0 4.0		1, 4 1, 4	
	ENGINE BRAKE RETARDER	Replace				2.0		1, 4	
	IDLER GEARS	Replace Repair				2.0 4.0		1, 4 1, 4	
	CAMSHAFTS AND PULSE WHEEL	Replace				8.0		1, 4	
	CAMSHAFT END BEARING BUSHINGS	Replace				2.0		1, 4	
	FRONT BALANCE COVER AND VIBRATION DAMPER	Replace				1.0		1, 4	
	CRANKSHAFT TIMING GEAR	Replace				1.0		1, 4	
	WATER PUMP DRIVE	Replace				1.0		1, 4	
	FRONT ACCESSORY DRIVE	Replace				4.0		1, 4	
	REAR ACCESSORY DRIVE	Replace				4.0		1, 4	
	FUELSYSTEM	Repair Replace				1.0 1.0		1, 4	
	FUEL INJECTORS	Replace Repair				2.0 2.0		1, 4	
	OIL PUMP INTAKE	Repair Replace				5.0 5.0		1, 4 1, 4	
	CRANKSHAFT FRONT COVER AND LUBE OIL PUMP	Replace Repair				12.0 4.0		1, 4 1, 4	
	OIL PRESSURE REGULATOR AND RELIEF VALVES	Replace Repair				5.0 5.0		1, 4 1, 4	
	OIL PAN	Inspect Replace		.50		4.0		1, 4	
	COOLING FAN	Replace		2.0				1, 4	
	TACHOMETER DRIVE	Repair Replace		2.0 2.0				1, 4 1, 4	

SECTION II MAINTENANCE ALLOCATION CHART

MAINTENANCE ALLOCATION CHART									
NOMENCLATURE OF END ITEMS: TRUCK, 100 FT. AERIAL LADDER									
(1) GROUP NO.	(2) COMPONENT/ ASSEMBLY	(3) MAINT. FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS & EQUIP.	(6) REMARKS
			UNIT						
			C	O	F	H	D		
11	ENGINE AND ACCESSORIES (Continued)								
	DDEC ELECTRONIC CONTROL MODULE AND TURBBOOST PRESSURE SENSOR	Replace Adjust			2.0 2.0			1, 4 1, 4	
12	TRANSMISSION ASSEMBLY	Service Inspect Repair Replace	.25	.25					
	FLYWHEEL ASSEMBLY	Replace				6.0		1, 4	
	FORWARD CLUTCH ASSEMBLY	Replace				3.0		1, 4	
	REAR COVER/FIRST CLUTCH ASSEMBLY	Replace				2.0		1, 4	
	FOURTH CLUTCH ASSEMBLY	Replace				1.0		1, 4	
	THIRD CLUTCH AND CENTER SUPPORT HOUSING	Replace				2.0		1, 4	
	SECOND CLUTCH AND CENTER SUPPORT HOUSING	Replace				2.0		1, 4	
	CONTROL VALVE BODY	Replace				4.0		1, 4	
	MODULATOR VALVE	Replace				.5		1, 4	
	LOCK-UP CUTOFF VALVE BODY	Replace				1.0		1, 4	
	TORQUE CONVERTER	Replace Repair				16.0 30.0		1, 4 1, 4	
	TRANSMISSION GOVERNOR	Replace				1.0		1, 4	
	INTERNAL FILTER ELEMENT	Replace			1.0			1, 4	
	SPEEDOMETER CABLE ASSEMBLY	Replace			2.0			1	
	OIL PAN	Replace				2.0		1, 4	
	HOUSING	Replace				3.0		1, 4	

SECTION II MAINTENANCE ALLOCATION CHART

MAINTENANCE ALLOCATION CHART									
NOMENCLATURE OF END ITEMS: TRUCK, 100 FT. AERIAL LADDER									
(1) GROUP NO.	(2) COMPONENT/ ASSEMBLY	(3) MAINT. FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS & EQUIP.	(6) REMARKS
			UNIT	DIRECT		GENERAL			
				C	O	F	H		
12	TRANSMISSION ASSEMBLY (Continued)								
	GEAR UNIT AND MAIN SHAFT ASSEMBLY	Replace					4.0		1, 4
	OUTPUT YOKE, DUST SHIELD AND OIL SEAL	Replace					2.0		1, 4
13	COOLING SYSTEM								
	RADIATOR	Inspect Service Repair Replace	.50 .50				2.0		1, 4 1, 4
	RADIATOR HOSES AND PIPING	Inspect Replace	.50 4.0						1
14	WHEEL ASSEMBLY								
	WHEEL LUGS	Adjust Replace	.25		2.5				1 1, 4
	TIRES AND RIMS	Inspect Service Replace	.25 .25	1.0					1
	HUBS, BEARINGS AND SEALS	Inspect Service Replace	.25 .25		3.0				1 1, 4
15	BRAKE SYSTEM								
	BRAKE CONTROL VALVES	Test Replace	.25 .50						1
	SLACK ADJUSTER	Inspect Replace	.25 1.0						1
	BRAKE CHAMBER, REAR AND FRONT	Inspect Replace	.25 .25		3.0				1

SECTION II MAINTENANCE ALLOCATION CHART

MAINTENANCE ALLOCATION CHART									
NOMENCLATURE OF END ITEMS: TRUCK, 100 FT. AERIAL LADDER									
(1) GROUP NO.	(2) COMPONENT/ ASSEMBLY	(3) MAINT. FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS & EQUIP.	(6) REMARKS
			UNIT	DIRECT		GENERAL			
				SUPPORT	SUPPORT	SUPPORT	DEPOT		
C	O	F	H	D					
15	BRAKE SYSTEM- Continued								
	BRAKE SHOES	Service			2.0			1	
		Adjust			2.0			1	
		Replace			3.0			1, 4	
	BRAKE DRUMS	Inspect			0.5			1, 4	
		Repair				1.0		1, 4	
		Replace			.25		1, 4		
	AIR LINES AND PIPING	Inspect		1.0				1	
		Replace		8.0					
	IN-LINE SINGLE CHECK VALVES	Inspect		.25					
		Replace		1.0				1	
	DOUBLE CHECK VALVES	Inspect		.25					
		Replace		1.0				1	
	QUICK RELEASE VALVES	Inspect		.25					
		Replace		1.0				1	
	BRAKE PEDAL VALVE	Inspect		.25					
		Replace		1.0				1	
	SAFETY VALVE	Inspect		.25					
		Replace		1.0				1	
	PRESSURE PROTECTION VALVES	Inspect		.25					
		Replace		1.0				1	
	R-12 RELAY VALVES	Inspect		.25					
		Replace		1.0				1	
	D2 GOVERNOR	Inspect		.25					
		Replace		1.0				1	
	SR-1 SPRING BRAKE VALVE	Inspect		.25					
		Replace		1.0				1	
	AIR TANKS	Inspect		.25					
		Replace		2.0				1	

SECTION II MAINTENANCE ALLOCATION CHART

MAINTENANCE ALLOCATION CHART									
NOMENCLATURE OF END ITEMS: TRUCK, 100 FT. AERIAL LADDER									
(1) GROUP NO.	(2) COMPONENT/ ASSEMBLY	(3) MAINT. FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS & EQUIP.	(6) REMARKS
			UNIT	DIRECT		GENERAL			
				C	O	F	H		
15	BRAKE SYSTEM - Continued								
	AIR DRYER	Inspect		.25					
		Repair			2.0			1	
		Replace			1.0			1	
16	STEERING ASSEMBLY								
	STEERING WHEEL	Replace		1.0				1	
	STEERING COLUMN	Replace		1.0				1	
	MITER BOX	Replace		1.0				1	
		Repair		1.0				1	
	STEERING SHAFT	Service	.25						
		Replace		1.0				1	
	STEERING GEAR	Inspect	.25						
		Replace		1.0				1	
		Repair			4.0			1	
FRONT STEERING AXLE	Inspect	.25							
	Replace				3.0		1		
	Adjust				2.5		1, 4		
POWER STEERING RESERVOIR	Inspect	.25							
	Service	.25							
	Replace		1.0				1		
17	SUSPENSION SYSTEM								
	U-BOLTS	Inspect		.25					
		Replace		1.0				1	
	SHOCKABSORBERS	Inspect	.25						
Replace			2.0				1		
LEAF SPRINGS	Inspect	.50							
	Replace			4.0			1		

SECTION II MAINTENANCE ALLOCATION CHART

MAINTENANCE ALLOCATION CHART									
NOMENCLATURE OF END ITEMS: TRUCK, 100 FT. AERIAL LADDER									
(1) GROUP NO.	(2) COMPONENT/ ASSEMBLY	(3) MAINT. FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS & EQUIP.	(6) REMARKS
			UNIT	DIRECT		GENERAL			
				SUPPORT	SUPPORT	SUPPORT	DEPOT		
C	O	F	H	D					
18	FRONT AXLE ASSEMBLY	Inspect		1.0					
		Replace			2.0			1, 4	
		Repair			8.0			1, 4	
	TIE ROD ENDS	Inspect		.25					
		Adjust			1.0			1, 4	
		Replace			1.5			1, 4	
	TIE ROD	Inspect		.25					
		Replace			2.0			1, 4	
	TIE ROD ARM	Inspect		.25					
		Replace			2.0			1, 4	
18	STEERING ARMS	Service	.25						
		Replace			1.5			1, 4	
		Adjust			1.0			1, 4	
	STEERING KNUCKLE	Replace			4.0			1, 4	
18		Repair			8.0			1, 4	
	KING PIN	Inspect			.50			1, 4	
		Replace			8.0			1, 4	
18	SPINDLE	Inspect			.50			1, 4	
		Replace			3.0			1, 4	
19	REAR AXLE ASSEMBLY								
	FORWARD TANDEM AXLE AND DRIVE UNIT	Service		.50					
		Inspect		.50					
		Replace			3.0			1, 4	
		Repair			8.0			1, 4	
	REAR TANDEM AXLE AND DIFFERENTIAL	Service		.50					
	Inspect		.50						
	Replace			3.0			1, 4		
	Repair			8.0			1, 4		

MAINTENANCE ALLOCATION CHART									
NOMENCLATURE OF END ITEMS: TRUCK, 100 FT. AERIAL LADDER									
(1) GROUP NO.	(2) COMPONENT/ ASSEMBLY	(3) MAINT. FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS & EQUIP.	(6) REMARKS
			UNIT		DIRECT SUPPORT	GENERAL SUPPORT	DEPOT		
			C	O	F	H	D		
20	EXHAUST SYSTEM								
	EXHAUST PIPE AND EXHAUST OUTLET PIPE	Inspect Replace	.10			3.0			1
	MUFFLER	Inspect Replace	.10			1.0			1
	SPARK ARRESTOR AND TAIL PIPE	Inspect Replace	.10			1.0			1
	EXHAUST PIPE CLAMPS AND HANGERS	Inspect Replace	.10	1.5					1
21	FUEL TANK ASSEMBLY								
	FUEL LINES AND PIPING	Inspect Replace	.50	1.5					1
	FUEL TANK SENDING UNIT	Adjust Replace		3.0 3.0					1 1
	FUEL TANK AND MOUNTING STRAPS	Inspect Replace	.25	3.0					1
22	FRAME AND BUMPER ASSEMBLY								
	FRONT BUMPER	Inspect Replace	.10	1.0					1
	TOW HOOKS	Inspect Replace	.10	.50					1
	FRONT FRAME EXTENSION	Inspect Replace	.10			10.0			1
	WHEEL CHOCK BRACKETS	Inspect Replace	.25	2.0					1

MAINTENANCE ALLOCATION CHART									
NOMENCLATURE OF END ITEMS: TRUCK, 100 FT. AERIAL LADDER									
(1) GROUP NO.	(2) COMPONENT/ ASSEMBLY	(3) MAINT. FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS & EQUIP.	(6) REMARKS
			UNIT		DIRECT SUPPORT	GENERAL SUPPORT	DEPOT		
			C	O	F	H	D		
23	AERIAL LADDER/WATER TOWER ASSEMBLY								
	LADDER TREADS	Inspect Replace	1.0	.50				1	
	SAFETY RAILINGS	Inspect Replace	.10	1.0				1	
	OUTRIGGER WARNING LIGHTS	Inspect	.10						
		Replace Repair		1.0 1.0				1 1	
	OUTRIGGER COMPARTMENT LIGHTS	Inspect	.10						
		Replace Repair		1.0 1.0				1 1	
	AERIAL LADDER SPOTLIGHTS	Inspect	.10						
		Replace Repair		1.0 1.0				1 1	
	CONTROL PANEL INDICATOR LIGHTS	Inspect	.25						
		Replace		1.0				1	
	CONTROL PANEL TOGGLE SWITCHES	Inspect	.25						
		Replace		1.0				1	
	LADDER LOAD GAUGE	Inspect	.10						
		Replace		.50				1	
SYSTEM PRESSURE GAUGE (0-3000 PSI)	Inspect	.10							
	Replace		.50				1		
WATER PRESSURE GAUGE (0-600 PSI)	Inspect	.10							
	Replace		.50				1		
FLOW MINDER	Inspect	.10							
	Replace		.50				1		
FLOW MINDER SENDING UNIT	Replace		.50				1		
RUN/LOCK LEVER AND LINKAGE	Adjust		1.0					1	
	Replace		2.0					1	

MAINTENANCE ALLOCATION CHART										
NOMENCLATURE OF END ITEMS: TRUCK, 100 FT. AERIAL LADDER										
(1) GROUP NO.	(2) COMPONENT/ ASSEMBLY	(3) MAINT. FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS & EQUIP.	(6) REMARKS	
			UNIT		DIRECT SUPPORT	GENERAL SUPPORT	DEPOT			
			C	O	F	H	D			
23	AERIAL LADDER/WATER TOWER ASSEMBLY (Continued)									
	PRESSURE SENSOR GAUGE	Inspect Replace		.25 1.0					1, 4	
	HYDRAULIC SYSTEM	Service Test		1.0 2.0					1	
	HYDRAULIC SYSTEM COMPONENTS	Test			2.0				1	
	HYDRAULIC TANK RETURN FILTER	Replace		.50					1	
	HYDRAULIC OIL TANK	Inspect Replace		.25		2.0			1	
	POWER TAKE-OFF UNIT	Replace Repair				1.0		4.0	1, 4 1, 4	
	HOIST CYLINDERS	Inspect Replace Repair	.25				3.0		4.0	1, 4 1, 4
	HOIST MANIFOLD BLOCK	Replace Repair				1.0		1.0	1 1,4	
	PLANETARY SPEED REDUCER	Inspect Replace Repair	.10				1.0		8.0	1, 4 1, 4
	SWING BRAKE	Test Replace Repair	.50				1.0		4.0	1, 4 1, 4
	SWING CROSSOVER RELIEF VALVE MANIFOLD BLOCK	Replace Repair				1.0		1.0	1, 4 1, 4	
	RUN/LOCK SELECTOR VALVE	Replace Repair		2.0 2.0					1, 4 1, 4	
	OUTRIGGER CONTROL VALVES	Replace		1.0					1	

MAINTENANCE ALLOCATION CHART									
NOMENCLATURE OF END ITEMS: TRUCK, 100 FT. AERIAL LADDER									
(1) GROUP NO.	(2) COMPONENT/ ASSEMBLY	(3) MAINT. FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS & EQUIP.	(6) REMARKS
			UNIT		DIRECT SUPPORT	GENERAL SUPPORT	DEPOT		
			C	O	F	H	D		
23	AERIAL LADDER/WATER TOWER ASSEMBLY (Continued)								
	PRESSURE RELIEF VALVE (PUMP DE-STROKE)	Replace Repair			1.0 2.0			1 1	
	LADDER CONTROL VALVE	Replace			2.0			1	
	PRESSURE REDUCING VALVE (OUTRIGGERS)	Replace Repair		1.0 2.0				1 1,4	
	DIVERTER VALVE	Replace		1.0				1	
	OUTRIGGER BEAMS	Inspect Replace		.50		8.0		1,4	
	OUTRIGGER EXTEND/RETRACT CYLINDERS	Inspect Replace Repair		.50 2.0		4.0		1 1,4	
	OUTRIGGER JACK CYLINDERS AND CHECK VALVES	Inspect Replace Repair		.50 2.0		4.0		1 1,4	
	OUTRIGGER LIMIT SWITCHES	Test Replace		1.0 2.0				1	
	EMERGENCY HYDRAULIC PUMP	Test Replace	.50			1.0		1,4	
	MOTOR, EMERGENCY HYDRAULIC PUMP	Replace				1.0		1,4	
	MAIN HYDRAULIC PUMP	Replace Repair				1.0	8.0	1,4 1,4	
	SWING MOTOR	Replace Repair				1.0	8.0	1,4 1,4	
	AERIAL LADDER LIMIT SWITCHES	Test Adjust Replace				1.0 .50 2.0		1 1	

MAINTENANCE ALLOCATION CHART										
NOMENCLATURE OF END ITEMS: TRUCK, 100 FT. AERIAL LADDER										
(1) GROUP NO.	(2) COMPONENT/ ASSEMBLY	(3) MAINT. FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS & EQUIP.	(6) REMARKS	
			UNIT		DIRECT SUPPORT	GENERAL SUPPORT				DEPOT
			G	O	F	H	D			
23	AERIAL LADDER/WATER TOWER ASSEMBLY (Continued)									
	AERIAL LADDER INTERCOM	Test Replace	.50	2.0				1		
	WATER PIPE ASSEMBLY	Repair		4.0				1		
	MONITOR AND NOZZLE	Inspect Test Replace Repair	1.0 1.0 4.0					1 1, 4		
	AIR OPERATED AERIAL DISCHARGE VALVE	Replace Repair			1.0 1.0			1 1		
	AERIAL DISCHARGE VALVE PNEUMATIC ACTUATOR	Replace Repair		1.0 1.0				1 1		
	CONTROLS, MONITOR AND NOZZLE	Inspect Test Replace	.10 1.0	2.0				1		
	LADDER ASSEMBLY	Inspect Replace Repair		2.0		60.0 60.0		1, 4 1, 4		
	SWIVEL ASSEMBLY	Replace			8.0			1, 4		
	FRONT LADDER EXTENSION/RETRACTION CYLINDER	Inspect Replace Repair	.25		1.0	4.0		1, 4 1, 4		
	TRAVELING BLOCK ASSEMBLY	Replace Repair				1.0 2.0		1, 4 1, 4		
	REAR LADDER EXTENSION/RETRACTION CYLINDER	Inspect Replace Repair	.25		1.0	4.0		1, 4 1, 4		
	COUNTERBALANCE VALVES	Replace		1.0				1		

MAINTENANCE ALLOCATION CHART									
NOMENCLATURE OF END ITEMS: TRUCK, 100 FT. AERIAL LADDER									
(1) GROUP NO.	(2) COMPONENT/ ASSEMBLY	(3) MAINT. FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS & EQUIP.	(6) REMARKS
			UNIT		DIRECT SUPPORT	GENERAL SUPPORT	DEPOT		
			C	O	F	H	D		
23	AERIAL LADDER/WATER TOWER ASSEMBLY (Continued)								
	AERIAL LADDER TENSION CABLES	Inspect Adjust Replace	1.0	2.0	8.0			1 1,4	
	AERIAL LADDER ELECTRICAL CABLES	Inspect Adjust Replace	1.0	2.0	8.0			1 1,4	
	WARNING HORN	Inspect Replace	.10	.50				1	
	LADDER LOCK LIGHT	Inspect Replace	.25	.50				1	
24	AUXILIARY POWER UNIT (APU)	Inspect Replace Test	.50	6.0 1.0				1	
	BRUSHES	Inspect Replace	.50 1.0					1	
	COMMUTATOR AND COLLECTOR RINGS	Replace Repair			1.0 3.0			1 1	
	ARMATURE	Test Replace			1.0 2.0			1 1	
	FIELD WINDINGS	Test Replace			1.0 2.0			1 1	
	ANTI-FLICKER POINTS AND RESISTOR	Adjust Replace		1.0 1.0					
	APU PRIMARY FUEL FILTER	Replace		.50				1	

MAINTENANCE ALLOCATION CHART									
NOMENCLATURE OF END ITEMS: TRUCK, 100 FT. AERIAL LADDER									
(1) GROUP NO.	(2) COMPONENT/ ASSEMBLY	(3) MAINT. FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS & EQUIP.	(6) REMARKS
			UNIT		DIRECT SUPPORT	GENERAL SUPPORT	DEPOT		
			C	O	F	H	D		
24	AUXILIARY POWER UNIT (APU) (Continued)								
	APU SECONDARY FUEL FILTER	Replace		.50				1	
	APU OIL FILTER	Replace		.50				1	
	APU AIR CLEANER	Service	1.0					1	
		Replace		1.0				1	
	APU GLOW PLUG	Replace		1.0				1	
	APU EXHAUST SYSTEM	Inspect	.10						
		Replace		2.0				1	
	APU VALVES	Adjust			2.0			1	
	APU FLYWHEEL	Replace			1.0			1, 4	
	APU GEAR COVER	Replace			1.0			1, 4	
	APU GOVERNOR CUP	Replace			2.0			1, 4	
	APU CAMSHAFT, GEAR & BEARINGS	Replace			4.0			1, 4	
	APU CRANKSHAFT	Replace			4.0			1, 4	
	APU CRANKSHAFT MAIN BEARINGS	Replace			4.0			1, 4	
	APU CRANKSHAFT REAR OIL SEAL	Replace			4.0			1, 4	
	APU CYLINDER HEAD	Replace			2.0			1, 4	
		Repair			2.0			1, 4	
	APU DECOMPRESSION RELEASE	Replace			2.0			1, 4	
	APU PISTONS, RINGS, AND CONNECTING RODS	Replace			4.0			1, 4	
		Repair			4.0			1, 4	

MAINTENANCE ALLOCATION CHART									
NOMENCLATURE OF END ITEMS: TRUCK, 100 FT. AERIAL LADDER									
(1) GROUP NO.	(2) COMPONENT/ ASSEMBLY	(3) MAINT. FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS & EQUIP.	(6) REMARKS
			UNIT		DIRECT SUPPORT	GENERAL SUPPORT	DEPOT		
			C	O	F	H	D		
24	AUXILIARY POWER UNIT (APU) (Continued)								
	APU FUEL TRANSFER PUMP	Replace Repair		1.0		2.0		1 1,4	
	APU ENGINE OIL PUMP AND OIL BASE	Replace Repair			2.0 2.0			1,4 1,4	
	APU INJECTOR NOZZLE	Replace Test Repair			1.0 1.0 1.0			1,4 1,4 1,4	
	APU INJECTION PUMP	Replace Adjust			1.0 1.0			1,4 1,4	
	APU OIL PRESSURE SWITCH	Replace		.50			1		
	APU CRANKCASE BREATHER	Replace		.50			1		
	APU GOVERNOR	Replace Adjust			2.0 2.0			1,4 1,4	

Section III. TOOLS

Tool or Test Equipment Reference Code	Maintenance Level	Nomenclature	National/NATO Stock Number	Tool Number
1	O	Tool Kit, General Mechanics, Automotive	5180-00-177-7033	
2	O	Shop Equipment, Automotive Maintenance and Repair	4910-00-754-0650	
3	O	Tool Kit, Master	5810-00-699-5273	
4	F	Shop Equipment, Automotive Maintenance and Repair	4910-00-754-0705	
5	F	Puller Kit, Universal, 92 pc	5180-88-701-8046	
6	O	Multimeter		
7	O	Hydrometer		
8	F	Tool Set, Blower Service		
9	F	Gage Set, Piston		
10	O	Thermometer		
11	F	Steering Gear Bushing Service Kit		PT-4370-20
12	F	Fuel Pump Tool Set	5180-00-021-98407	J1508-3
13	F	Blower Shaft Alignment Tool	5120-01-158-3991	J24619 or J33001
14	F	Blower Service Tool Set	5120-00-093-64376	J6270-F
15	F	Piston Gage Set	5210-00-671-2275	J3174-02
16	H	Core Plug Remover/Installer	5120-01-130-8864	J23019
17	F	Window Installation Tool	5120-01-048-2180	J25275
18	H	Cylinder Bore Gauge	6685-01-232-5469	J5347-01
19	H	Cylinder Liner Depth Gauge	5210-01-174-4498	J24898
20	H	Engine Block Pressure Testing Kit		2SK737
21	H	Pressure Gauge (0 to 30 psi) (0 to 200 kPa)		
22	H	Cylinder Head Stud Guide	4910-01-157-6152	J24748-1

Tool or Test Equipment Reference Code	Maintenance Level	Nomenclature	National/NATO Stock Number	Tool Number
23	H	Lifting Fixture	4910-00-456-7620	J22062-01
24	H	Fuel Line Nut Wrench	5120-00-014-5232	J8932-01
25	H	Head Test Fixture	4910-01-158-3985	J28454
26	H	Reconditioning Set	2910-00-146-9619	J22525
27	H	Sled Gauge	5210-00-023-4798	J22273
28	H	Injector Gauge		J23521
29	H	Installing Tool	5120-01-048-3118	J24357
30	H	Puller Assembly		J23479-15
31	H	Valve Seat Collet	5120-01-165-1935	J23479-13
32	H	Dial Indicator	5120-00-462-9619	J7872
33	H	Water Nozzle Installer	5120-01-048-3119	J24857-A
34	H	Valve Bridge Guide Installer	5120-00-999-8616	J7482
35	H	Valve Guide Remover	5120-00-733-8880	J6569
36	H	Valve Guide Installer	5120-00-999-8617	
37	H	Fuel Line Nut Wrench	5120-00-019-5232	J8932-01
38	H	Feeler Gauge		FB310B
39	H	Crankshaft Position Timing Tool		J34930
40	H	SRS/TRS Timing Tool		KMJ34729
41	H	Stud Set Alignment	5120-00-629-9781	J1927-01
42	H	Seal Installer	4910-01-176-4230	J21112-B
43	H	Lifting Eyes		28H944
44	H	Cylinder Liner Remover Assembly	4910-01-158-3986	J24563-A
45	F	Seal Driver	5120-01-133-6976	J28490
46	H	Cylinder Liner Clamp	4910-01-158-3984	J24565-02

Tool or Test Equipment Reference Code	Maintenance Level	Nomenclature	National/NATO Stock Number	Tool Number
47	H	Piston Pin Retainer	5120-00-127-7757	J23762
48	H	Piston Crown Gauge	5120-01-130-8869	J25397
49	H	Piston Groove Gauge	5220-01-028-1109	J24599
50	H	Leak Detector Set	5210-01-061-4253	J23987-01
51	H	Idle Gear Holding Fixture		SK900
52	H	Camshaft Gear Puller	5120-00-219-8397	J1902-01
53	H	Camshaft Gear and Water Pump Pulley Remover	5120-00-733-8890	J7932
54	H	Puller	5120-01-048-2152	J-24420-A
55	H	Adapter	5120-00-733-8890	J-7932-A
56	H	Front Oil Seal Installer	5120-00-936-4377	J9783
57	H	Oil Seal Expander	5120-00-443-2508	J22425
58	H	Guide Stud	5120-01-048-2155	J25002
59	H	Flywheel Lifting Bracket	4910-00-105-2823	J24365
60	H	Stator Roller Holder	5120-01-115-1158	J24218-2
61	H	Rear Bearing Installer	5120-01-054-4054	J24447
62	H	Driver Handle	5120-01-054-4048	J24202-4
63	H	Pitot Tube Guide Screws	4910-01-162-3637	J6889-1
64	H	Front Support Needle Bearing Installer	5120-01-115-1160	J24197
65	H	Manual Shaft Oil Seal Remover and Installer	5120-01-115-1161	J26282
66	H	Sun Gear Bushing Reamer Set	5110-01-150-9755	J28489
67	H	Bushing Installer	4910-01-158-3986	J24201
68	H	Main Shaft Lifting Bracket	5120-01-115-1157	J24196
69	H	Bushing Swaging Tool	4910-01-158-3970	J26997-A
70	H	Transmission Oil Seal Installer	5720-01-054-4042	J24202-1A

Tool or Test Equipment Reference Code	Maintenance Level	Nomenclature	National/NATO Stock Number	Tool Number
71	H	Lock Socket		L883
72	H	Driver Handle	5120-01-054-4042	J242024
73	H	Clutch Spring Compressor	5120-01-048-2159	J24204-3
74	H	Collector Ring Installer and Staking Set	5120-01-048-3124	J24200
75	H	Forward Clutch Piston Inner Seal Protector	5120-01-048-2157	J24216-01
76	H	PTO Gear Removal Fixture	4910-01-158-3969	J26899
77	H	Fourth Clutch Alignment Fixture	5720-01-115-1156	J24221
78	H	Output Shaft Bushing Installer	5120-01-115-9174	J24203
79	H	Swaging Tool	4910-01-168-9543	J28525-1
80	H	Compressor Sleeve	4310-01-247-7166	J24208-2
81	H	Center Support Compressor	4910-01-158-3972	J24208-3
82	H	Retaining Ring Gauge	4910-01-158-3999	J24208-13
83	F	Steering Gear Compression Tool		J26740
84	F	Steering Gear Seal Installation Tool		J26739
85	F	Carrier Stand	4910-00-108-57729	J3409-01
86	O	Thermostat Seal Installer		J8550
87	O	Thermostat Seal Installer Driver Handle		J7079-2
88	F	Steering Gear Bearing Mandrel		J26743
89	F	Steering Gear Seal Driving Tool		J28490
90	F	Valve Seat Insert Cutter		420B272
91	F	Nozzle Tester		420P184

Tool or Test Equipment Reference Code	Maintenance Level	Nomenclature Nomenclature	Tool Stock Number	Number
92	F	Nozzle Cleaning Kit		420P208
93	F	Brush Pin		
94	F	Ammeter		
95	H	Inlet Valve Cage Remover		J25447A

Section IV. REMARKS

Reference code	Remarks

APPENDIX C**COMPONENTS OF END ITEM BASIC ISSUE ITEMS LIST****Section 1. INTRODUCTION****C-1. SCOPE**

This appendix lists the components of end item and Basic Issue Items (BI) for the fire truck 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. This listing is for information purposes only, and is not an authority to requisition replacements. These items are part of the end item, but are removed and separately packaged for shipment. As part of the end item, these items must be with the end item whenever it is issued or transferred between property accounts.

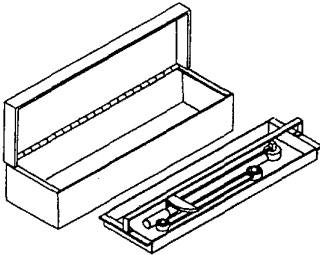
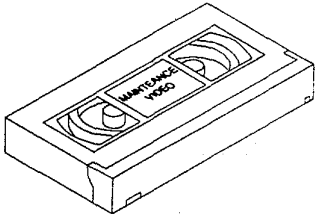
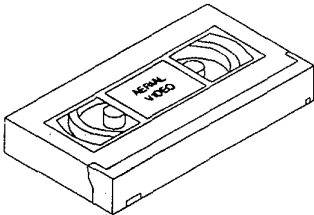
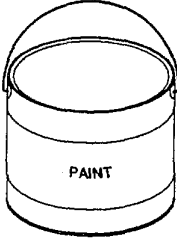

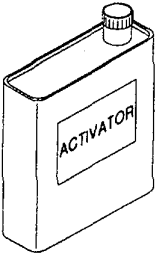
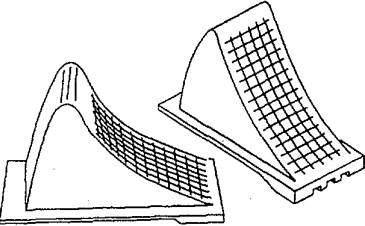
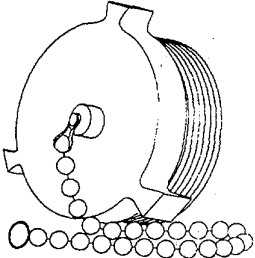
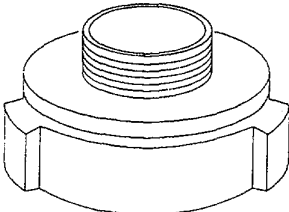
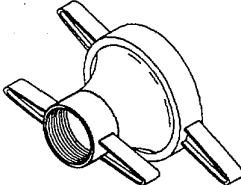
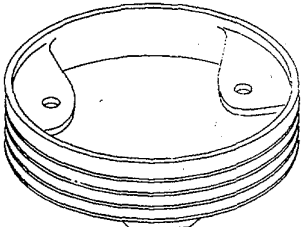
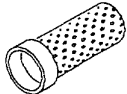
C-3. EXPLANATION OF COLUMNS

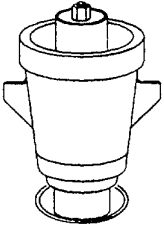

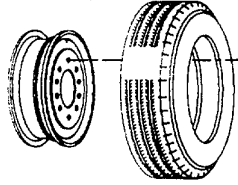
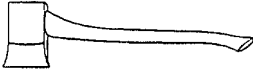
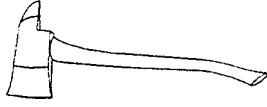
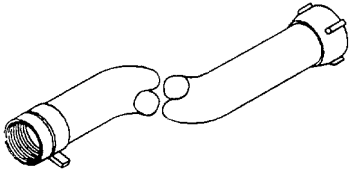
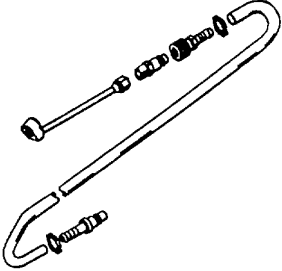
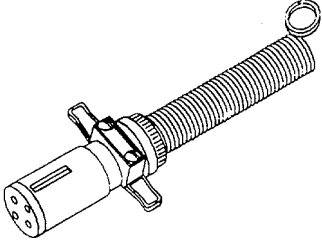
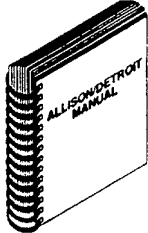
The following provides an explanation of columns found in the tabular listings:

- a. Column (1)-Illustration Number (Illus. Number). This column indicates the number of the illustration in which the item is shown.
- b. Column (2)-National Stock Number. Indicates the National Stock Number 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 FSCM (in parenthesis) followed by the part number.
- d. Column (4)-Unit of Measure. Indicates the measure used in performing the actual operation/ 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/on the equipment.

Section II. Components of End Item

Illustration Item No.	National Stock Number	Description	Unit of Measure	Quantity
1		Aerial Torque Wrench Set (CAGEC) PN 92-0123		1 ea.
2		Maintenance Video (CAGEC) PN 99-6005		1 ea.
3		Aerial Video (CAGEC) PN 99-6010		1 ea.
4		Paint (1-Color 7744 PN 95-0105, 1-Color 508 PN 95-0106) (CAGEC)		2 qts.
5		Spatter Paint (CAGEC) PN 95-1040		1 qt.
6		Activator (CAGEC) PN 95-0111		1 pt.
7		Large Wheel Chocks (CAGEC) PN 99-1088		4 ea.
8		1-1/2" Caps from Discharge (CAGEC) PN 52-0067		4 ea.
9		2-1/2" x 1-1/2" Adapters (CAGEC) PN 51-0069		4 ea.
10		6" x 4-1/2" Reducer (CAGEC) PN 51-0084		1 ea.
11		Screw Plate, 6" (CAGEC) PN 72-0049		1 ea.
12		6" Barrel Strainer (CAGEC) PN 72-0055		1 ea.
13		5058 Akron Nozzle from Aerial (CAGEC) PN 5058		1 ea.
14		Commercial Service Manuals (CAGEC) 2 Set PN 99-6011		2 ea.
15		Spare Wheel and Tire will be Shipped Freight Assembly No. 99-6012		1 ea.
16		Flat Head Axes (CAGEC) PN 72-0021		2 ea.
17		Pick Head Axes (CAGEC) PN 72-0020		2 ea.
18		6" x 12' Soft Suction Hose (CAGEC) PN 33-0181		1 ea.
19		25' air hose (CAGEC) PN 55-0016		1 ea.
20		4 Pole Connector for Charger (CAGEC) PN 63-0010		1 ea.

<p>ITEM 1 AERIAL TORQUE WRENCH SET</p> 	<p>ITEM 2 MAINTENANCE VIDEO</p> 	<p>ITEM 3 - AERIAL VIDEO</p> 
<p>ITEM 4 PAINT (1-COLOR 7744, 1-COLOR 508)</p> 	<p>ITEM 5 SPATTER PAINT</p> 	<p>ITEM 6 ACTIVATOR</p> 
<p>ITEM 7 LARGE WHEEL CHOCKS</p> 	<p>ITEM 8 1 1/2" CAPS FROM DISCHARGE</p> 	<p>ITEM 9 2 1/2" X 1 1/2" ADAPTERS</p> 
<p>ITEM 10 6" X 4 1/2" REDUCER</p> 	<p>ITEM 11 6" SCREW PLATE</p> 	<p>ITEM 12 6" BARREL STRAINER</p> 

<p>ITEM 13 5058 AKRON NOZZEL FROM AERIAL</p>  <p>A technical drawing of a cylindrical nozzle with a top handle and a bottom mounting flange.</p>	<p>ITEM 14 COMMERCIAL SERVICE MANUALS</p>  <p>A technical drawing of a rectangular manual with 'SERVICE MANUAL' printed on the cover.</p>	<p>ITEM 15 SPARE WHEEL AND TIRE</p>  <p>A technical drawing showing a wheel rim and a tire mounted on it.</p>
<p>ITEM 16 FLAT HEAD AXES</p>  <p>A technical drawing of a flat head axe with a long handle.</p>	<p>ITEM 17 PICKHEAD AXES</p>  <p>A technical drawing of a pickhead axe with a long handle.</p>	<p>ITEM 18 6" X 12' SOFT SUCTION HOSE</p>  <p>A technical drawing of a flexible suction hose with a handle and a nozzle.</p>
<p>ITEM 19 AIR HOSE</p>  <p>A technical drawing of an air hose with a nozzle and a handle.</p>	<p>ITEM 20 4 POLE CONNECTOR FOR CHARGER</p>  <p>A technical drawing of a 4-pole connector with a handle and a ring.</p>	<p>ITEM 21 ALLISON/DETROIT MANUALS</p>  <p>A technical drawing of a spiral-bound manual with 'ALLISON/DETROIT MANUAL' printed on the cover.</p>

APPENDIX D

ADDITIONAL AUTHORIZATION LIST

No additional items are authorized for support of the fire truck.

APPENDIX E

EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST

Section I. INTRODUCTION

E-1. SCOPE

This appendix lists expendable supplies and materials you will need to operate and maintain the Fire Truck. This listing is for information 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 8-1 00 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 narrative instructions to identify the material (e.g., Use dry cleaning solvent (Item 3, Appendix E)).
- b. Column (2)-National Stock Number. This is the National stock number assigned to the item; use it to request or requisition the item.
- c. Column (3)-Description. Indicates the Federal item name and, if required, a description to identify the item. When applicable, the last line indicates the Federal Supply Code for Manufacturer (FSCM) in parentheses followed by the part number.
- d. Column (4)-Unit of Measure (U/M). Indicates the measure used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in, pr). If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements.

Section II. EXPENDABLE SUPPLIES AND MATERIALS LIST

(1) Item Number	(2) National Stock Number	(3) Description	(4) U/M
1	9150-00-065-0029 9150-00-935-1017 9150-00-190-0904 9150-00-190-0905 9150-00-190-0907	Grease Automotive and Artillery GAA (MIL-G-10924) 2-1/4 oz tube 14-oz cartridge 1-lb can 5-lb can 35-lb can	oz oz lb lb lb
2	2	Compound, Sealing, Pipe Thread (FSCM 05972) (702350-X)	
3	6850-00-664-5685	Solvent, Dry Cleaning SD (P-D-680) 1-qt can	qt
4	6850-00-281-1985	1-gal can	gal
5	8030-00-597-5367	Compound, Antiseize (MIL-A-907)	lb
	9150-00-448-5009	Baking Soda	

(1) National Item Number	(2) Stock Number	(3) Description	(4) U/M
6		Compound, Seal Retainer (Permatex)	oz
7		Compound, Retaining-Loctite-222	oz
8		Oil, Penetrating	
9	8030-00-873-4792	Gasket Eliminator	
10	9150-00-235-9069	Oil, Lubricating	
11	9150-00-935-3992	Grease, Silicone	
12	9151-00-843-1636	Oil (Dexron II)	gal
13	9150-00-111-0208	Oil, TypeC-3, SAE 10W	gal
14	9150-00-111-0210	Oil, Type C-3, SAE 30	gal
15	9150-00-181-7724	Grease, High Temperature	oz
16	9150-00-843-1636	Automotive Transmission Fluid	gal
17	9150-00-754-2760	Grease, Multi-Purpose	
18		Grease, Grade 2 (MIL-G-23827)	
19	9150-01-035-5393	Oil, Lubricating, Gear, GO 80/90 (MIL-L-2105C) 5-gal drum	gal
20		Oil, SAE 40	
21		Fluid, Power Steering	
22	9150-00-935-1017	Grease, Chassis	
23	9150-00-252-6174	Lubricant, Tire Bead	
24		Compound, Cleaning, Conditioner and Inhibitor for Engine Cooling System (MIL-C-10597)	
	6850-00-598-7328	Package, Consisting of: a. Cleaner, Part 1, Oxalic Acid. b. Cleaner, Part 2, Aluminum Chloride. c. Sodium Silicate Conditioner. d. Alkaline Conditioner. e. Inhibitor. f. instruction Sheet.	ea
25		Cloth, Emery, 80 Grit	
26		Fluid, Windshield Washer	
27		Connector, Electrical, Butt 34072 (FSCM 04618)	
28		Oil, Hydraulic, 150 Class 32 ASTM Grade 105, SSU/100-110	
29		Antifreeze, Permanent, Glycol, Inhibited (MIL-A-46153)	
	6850-00-181-7929	1-gal can	gal
	6850-00-181-7933	5-gal can	
	6850-00-181-7940	55-gal drum	
		Antifreeze, Arctic Type	
		1-gal can (MIL-A-46155)	gal
	6850-00-174-1806	55-gal can	

(1) National Item Number	(2) Stock Number	(3) Description	(4) U/M
30		Oil, Gear, Hypoid, GL-5 SAE 75W/140	
31		Compound, Sealing, Lubricating, Wicking, Thread Locking,	
32	8135-00-178-9200	Anaerobic, Single Component (MIL-S-46163) Type I, Gr K	
33		Tags, Identification (MIL-T-12755)	
34		Ties, Cable Plastic (MIL-S-29190)	
35	8040-00-995-0590	Cloth, Crocus, Abrasive P-C458	
36		Adhesive-Sealant, Silicone, RTV, General Purpose	
37		(MIL-A-46106A) 1OB (FSCM 01139)	
38		Tape, Flame Resistant	
39	1005-00-556-4171	Compound, International, No. 2	
40		Brush, Bore	ea
41		Caps, Shipping and Sealing	
		Compound, Retaining (MIL-R-46082)	
	9140-00-286-5286	Oil, Fuel, Diesel Diesel DF-1 Winter (VV-F-800)	
	9140-00-286-5287	Bulk	gal
	9140-00-286-5288	5-gal can	ea
	9140-00-286-5289	55-gal drum, 16 gauge	ea
		55-gal drum, 18 gauge	ea
	9140-00-286-5294	Oil, Fuel, Diesel DF-2 Regular (VV-F-800)	
	9140-00-286-5295	Bulk	gal
	9140-00-286-5296	5-gal can	ea
	9140-00-286-5297	55-gal drum, 16 gauge	ea
	7920-00-044-9281	55-gal drum, 18 gauge	ea
42		Cloth, Cleaning, Low-Lint (MIL-C-85043A)	
43		Gauge, Plastic, PRI	
44	8020-00-297-6657	Brush, Paint, Oval 1-1/4 in. size 12 (FSCM 81348)	ea
45		Oil, Gear 90WT (MIL-L-2105C)	
46		Stone, Deburring	ea
47		Compound, Sealing-Loctite 277	
48	9150-01-091-9336	Grease, General Purpose Lithium Base	
50		Petroleum Jelly	
51		Grease, Barium Based	
52		Tape, Masking A-A-883	
53		Grease, Wheel Bearing	
54		Distilled Water	gal

(1) Item Number	(2) National Stock Number	(3) Description	(4) U/M
55 56 57 58 59 60 61 62 63		Cord (Rope) Marking Compound (Prussian Blue) Solder (Rusin Flux Cone ASTM B 284-79) Teflon Tape Oil, SAE 5W Oil, SAE 5W-20 Oil, Lubricating, Molycoat Brush, Wire Polishing Cloth, 400 Grain	ea

APPENDIX F

ILLUSTRATED PARTS BREAKDOWN

F-1. GENERAL

F-2. This Illustrated Parts Breakdown lists and describes the parts for the vehicle and is arranged in the following manner:

- Introduction
- Group Assembly Parts Lists
- Index

F-3. INTRODUCTION

F-4. The introduction consists of general information and instructions regarding the use of this Illustrated Parts Breakdown.

F-5. GROUP ASSEMBLY PARTS LIST

F-6. The Group Assembly Parts List contains a breakdown of the equipment into its assemblies, subassemblies and detail parts. Each assembly listed is followed immediately by its component parts property indented to show their relationship to the assembly. An assembly listed in column one has its detail parts listed in column two. If a detail part is in turn an assembly, its detail parts are listed in column three, etc. Attaching parts are listed immediately below and at the same indentation as the items which they attach. They are captioned (ATTACHING PARTS) and the symbol--- *---separates them from subsequent listed parts or subassemblies.

F-7. All parts of the equipment are listed except those parts which lose their identity by being soldered, brazed, welded, riveted, swaged, cemented, potted, sealed or otherwise permanently fastened to other parts of assemblies and not subject to disassembly. See the wiring diagrams and the electrical compartment layout for part numbers of wiring harnesses.

F-8. EXPLANATION OF COLUMNS USED IN THE GROUP ASSEMBLY PARTS LIST. The seven columns used for the listing of information in the Group Assembly Parts List are explained in the following paragraphs.

F-9. FIGURE AND ITEM NUMBER COLUMN . The figure and item numbers key the parts breakdown list to the applicable illustration. The number preceding the dash is the figure number of the illustration. This figure number appears at the beginning of each page of listing. The number following the dash is the item number of a part appearing in the illustration. The item numbers are arranged clockwise on the illustrations.

F-10. CAGE CODE AND OEM PART NUMBERS COLUMNS . All part numbers in the OEM part number column have five digit (CAGE) code 04664 which identifies Pierce Manufacturing Inc. parts.

The OEM column contains the Pierce Manufacturing Inc. Part Number. Part numbers are used to identify all parts to which Pierce Manufacturing Inc. assigns a part number. Exceptions to the above are parts that only have a vendor part number.

F-11. VENDOR CAGE CODE COLUMN. This column lists the commercial and government entity five digit code used to identify the actual manufacturer of the part.

F-12. VENDOR PART NUMBER COLUMN. This column lists parts which are vendor parts. The number represents the part number of the actual manufacturer.

F-13. DESCRIPTION COLUMN. This column identifies the parts being listed by noun name followed by modifiers when applicable. When appropriate, the column also includes descriptive data such as dimensions, material, etc. It may also include a reference to the previous listing of items labeled "REF" as explained in paragraph F-14.

F-14. QUANTITY COLUMN. This column indicates the quantity of parts required for the assembly or subassembly in which that part appears. "REF" (reference) is used in this column when the part has been previously listed, and illustrated, with proper quantity, and is relisted for reference purposes only. The quantities listed in this column are in the case of assemblies the total quantity used at the location indicated. In the case of components of assemblies, the quantities listed indicate the number of parts used in one assembly. The quantities specified are not necessarily the total used in the equipment. The designation "AR" denotes that the quantity of parts used is as required.

F-15. PART NUMBER INDEX. The part number indexes at the end of this section provides all parts in the parts list. The index has Pierce Manufacturing Inc. part numbers to figure and item numbers, and when applicable, vendor part numbers to figure and item numbers.

APPENDIX F

ILLUSTRATED PARTS BREAKDOWN

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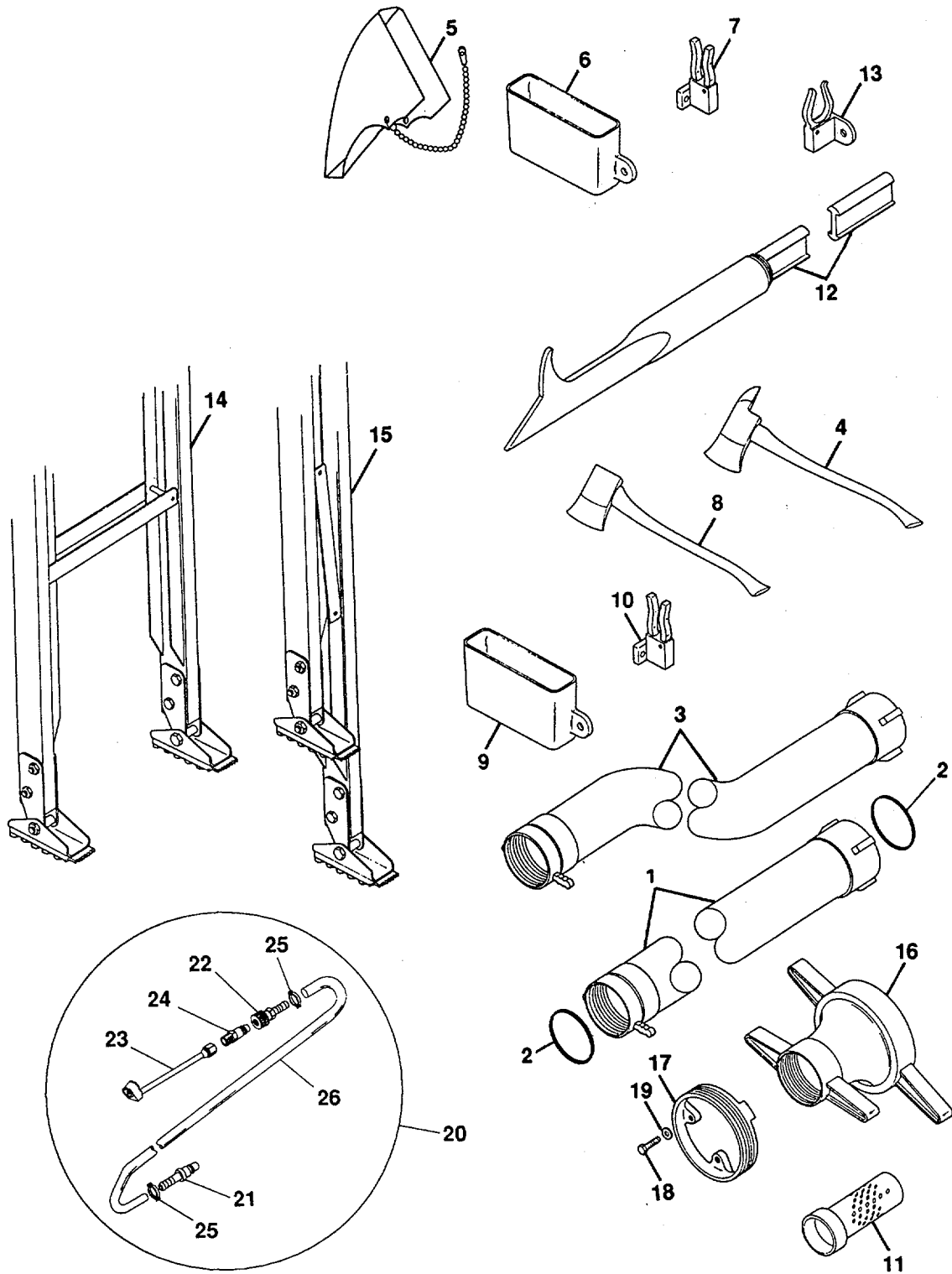


Figure F-1. Accessories
F-0

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-1					ACCESSORIES	1
-1	04664	33-0013	OCME1	390007/SALEM	HOSE, Suction, Hard, 10' x 6" dia.	2
-2	04664	99-2091			GASKET, Swivel	2
-3			4F413	14004-6X12YX	HOSE, Suction, Soft, 12' x 6" dia.	1
-4	04664	72-0022	5R167	AP6	AXE, Pickhead, Fiberglass	1
-5	04664	72-0034	08265	1376C	COVER, Axe Point w/Chain	1
-6	04664	72-0036	60319	ZAH-51	BRACKET, Axe, Shield	1
-7	04664	72-0073			BRACKET, Axe, Side Mount, Rubber Cover	1
-8	04664	72-0023	5R167	FP6	AXE, Flathead, Fiberglass	1
-9	04664	72-0036	60319	ZAH-51	BRACKET, Axe, Shield	1
-10	04664	72-0073			BRACKET, Axe, Side Mount, Rubber Cover	1
-11	04664	72-0055	20266	BS45	STRAINER, Barrel	1
-12	04664	72-0004	5R167	35-060/SPD6	POLE, Pike, 6' (Aerial Ladder)	1
-12	04664	72-0005	5R167	35-080/SPD8	POLE, Pike, 8'	2
-12	04664	72-0007	5R167	35-120/SPD12	POLE, Pike, 12'	1
-13	04664	72-0011			BRACKET, Pike Pole (Aerial Ladder)	2
-14	04664	30-0012-010	18847	585-A	LADDER, Folding, 10'	1
-15	04664	30-0112-024	18847	900A	LADDER, Extension, 24'	1
-15	04664	30-0056-014	18847	775A	LADDER, Roof, 14'	1
-16	04664	51-0084	20266	S-319	REDUCER, 6" N.H. to 4.5" N.H.	1
-17	04664	72-0049	20266	S-320	HOLDER, Adapter (ATTACHING PARTS)	1
-18	04664	82-2063-0075			SCREW, Hex Hd, 1/4"-20 x 3/4", Zn	3
-19	04664	82-1013-006			WASHER, Flat, 1/4", Zn	3
-20	04664	55-0016			HOSE ASSY, Air, Pump Panel	1
-21	04664	55-0020			HOSE END, Air, Male, PI	
-22	04664	55-0022			COUPLING, Air, Female, 3/8" M-Stem	
-23	04664	55-0023	27783	8159B	CHUCK, Air, 6" Ext., 1/4" FNPT	
-24	04664	55-0024			FITTING, Connector, Male, 1/4", Air	1
-25	04664	55-0344-0011			CLAMP, Hose	2
-26	04664	940009-3000			HOSE, Air, 3/8"	1

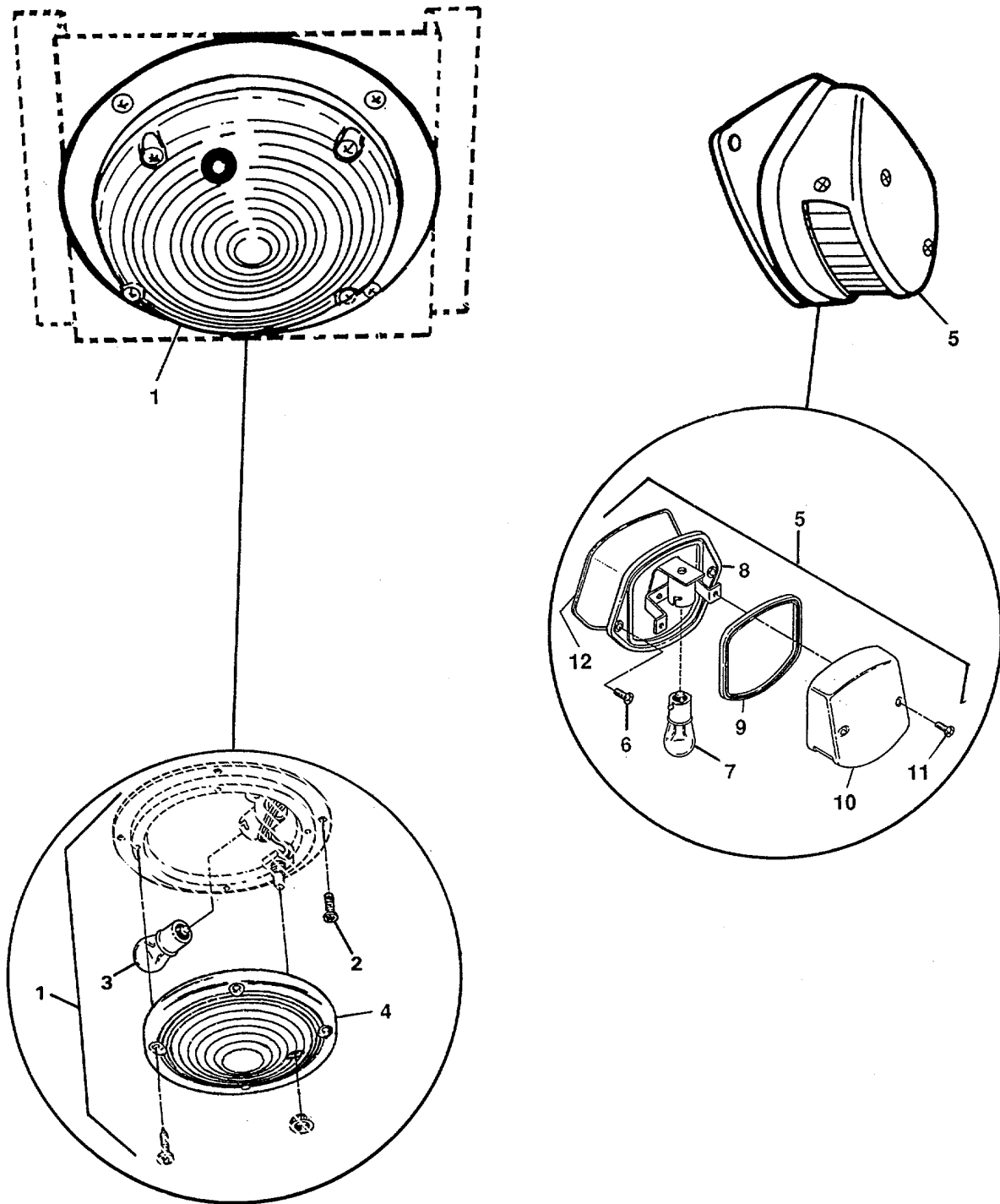


Figure F-2. Compartment Lights and Step Lights
F-2

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-2					COMPARTMENT LIGHTS AND STEP LIGHTS	1
-1	04664	61-0007	71951	79350	LIGHT, Dome (ATTACHING PARTS)	10
-2	04664	82-2039-001			SCREW, T410 Ph Pn Hd, Taptite, No. 10-24 x 1/2	40
-3			1P787	1076	BULB	1
-4	04664	61-0079	71951	99092C	LENS	
-5	04664	60-0615	4L810	96196-79	LIGHT ASSY, Step/Work, w/Gasket (ATTACHING PARTS)	1
-6	04664	82-2039-001			SCREW, T410 Ph Pn Hd, Taptite, No. 10-24 x 1/2"	22
-7			1P787	1155	BULB	
-8			4L810	9619678-76	BASE ASSY	1
-9			4L810	9622077-0	GASKET	1
-10			4L810	9613903-75	DOMES, w/Lens (ATTACHING PARTS)	1
-11			4L810	9612144	SCREW, Machine	2
-12	04664	60-0030			GASKET	1

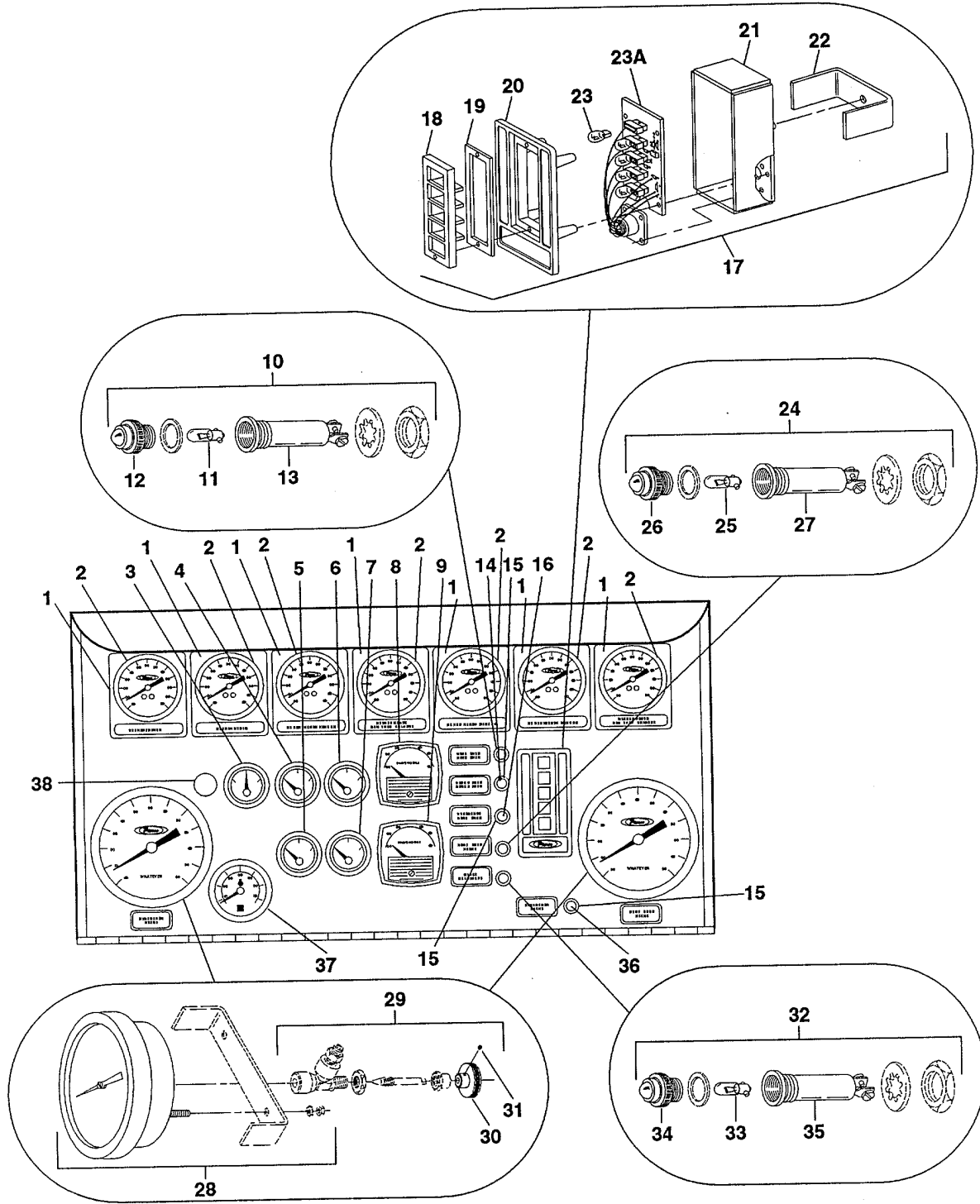


Figure F-3. Small Hose Bin Dividers, Hose Bin Rollers and Hose Bed Floor

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-3-					SMALL-HOSE BIN DIVIDERS, HOSE BIN ROLLERS AND HOSE BED FLOOR	1
-1	04664	81-1002	1GX90	1016-D, BOSTON	BEARING, Roller, 3/8"- Plastic	8
-2	04664	931007-01644			TUBING, 16GaWall, 1-1/4"O.D., S/S	6
-3	04664	SD-00068			ROD, Crosslay Roller (ATTACHING PARTS)	4
-4	04664	82-3018-007			NUT, Acorn Crown High, 3/8"-16, Ch	4
-5	04664	82-1013-008			WASHER, Flat, 3/8", Zn	4
-6	04664	SD-00060			DIVIDER ASSY., Front Crosslay	1
-7	04664	SD-00065			DIVIDER ASSY., Center Crosslay (ATTACHING PARTS)	1
-8	04664	82-2034-0075			SCREW, Ph Tr Hd, 1/4"-20 x 3/4", S/S	4
-9	04664	82-2034-0100			SCREW, Ph Tr Hd, 1/4"-20 x 1", S/S	4
-10	04664	82-1013-006			WASHER, Flat, 1/4", Zn	4
-11	04664	82-1011-0025			WASHER, Lock, 1/4", Zn	4
-12	04664	82-3014-001			NUT, 1/4"-20 Zn	4
-13	04664	AY0675-04000			PLATE, Tread, 4-Way, Al (ATTACHING PARTS)	1
-14	04664	82-2039-002			SCREW, T410 Ph Pn Hd Taptite, No.10-24 x 3/4"	12
-15	04664	82-3018-003			NUT, Acorn, Crown High, No. 10-24, Ch10	
-16	04664	81-1010	1GX90	56949-1016D	BEARING, Roller, 1/2"- Plastic	8
-17	04664	932106-01725			ROD, Aluminum, 1/2" Dia.	2
-18	04664	81-1011	92858	9940.000YEH650	BRACKET, Speedlay Roller, Chrome (ATTACHING PARTS)	4
-19	04664	82-2031-0125			SCREW, Cap, Hex Head, 3/8"-16 x 1-1/4", Gr 8, Zn	4
-20	04664	82-1013-008			WASHER, Flat, 3/8", Zn	4
-21	04664	82-1011-0038			WASHER, Lock, 3/8", Zn	4
-22	04664	82-3014-003			NUT, Hex,3/8"-16, Zn	4
-23	04664	AY0325-01650			PLATE, Tread, 4-Way, Al (ATTACHING PARTS)	1
-24	04664	82-2039-002			SCREW, T410 Ph Pn Hd, Taptite, No.10-24 x 3/4"	4
-25	04664	52-0162			BEZEL, Tag Style B w/Holes (ATTACHING PARTS)	4
-26	04664	82-2003			SCREW, Self-Tapping, No. 10-24 x 1/2"	8
-27	04664	91-0002			TAG, Name, No. 2 Crosslay	2
-28	04664	SD-07867			SCUFFPLATE, Crosslay, Driver Side	1
-28	04664	SD-07866			SCUFFPLATE, Crosslay, Passenger Side	1
-29	04664	91-0001			TAG, Name, No. 1 Crosslay	2
-30	04664	931007-01268			TUBING, 16 GA Wall, 1-1/4" O.D. S/S	2
-31	04664	932106-01400			ROD, Aluminum, 1/2" Dia.	2
-32	04664	SD-00225			GRATING ASSY., Crosslay	1
-33	04664	94-2027	6T698	132BB1202-00-00	PLUG, Square	4

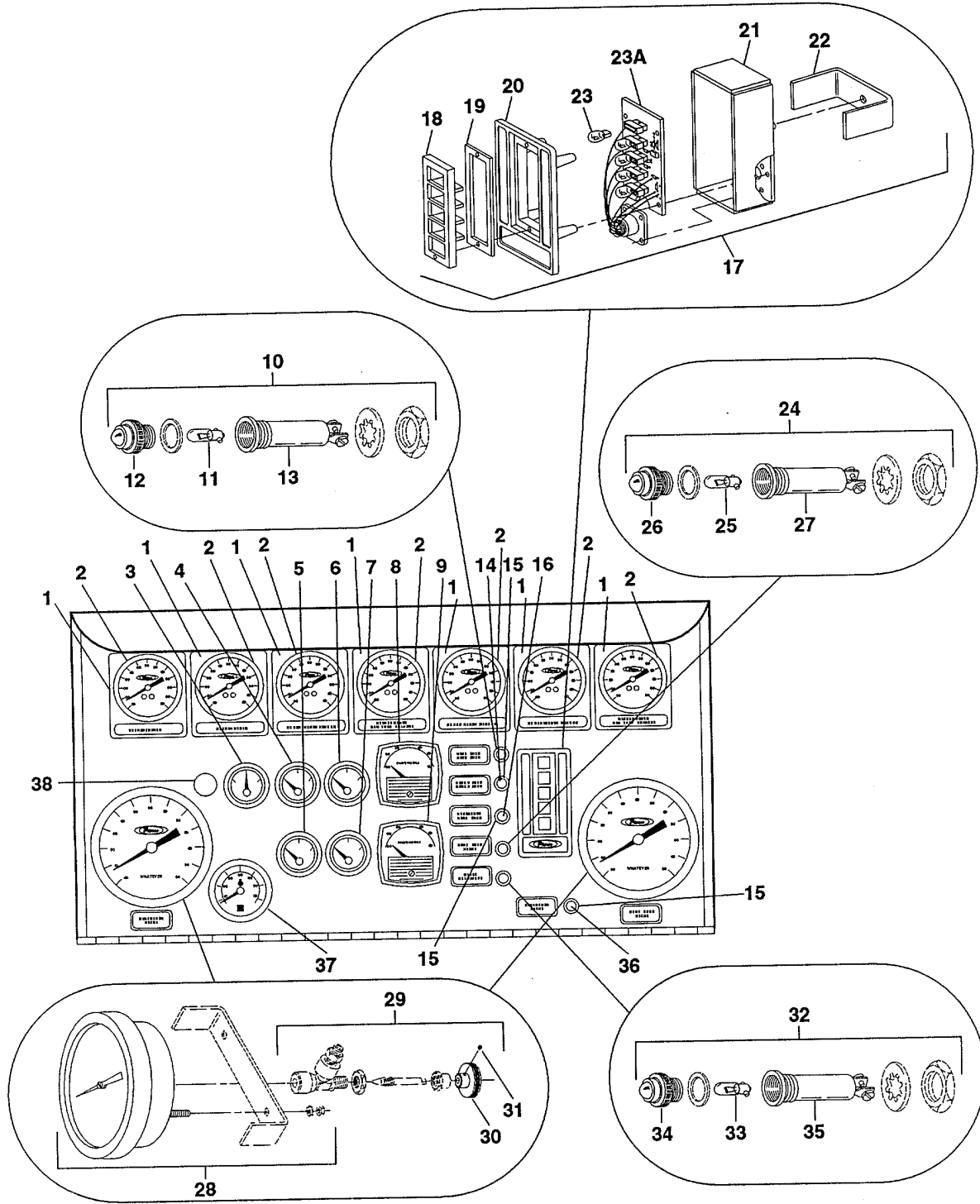


Figure F-4 Pump Compartment Gauge Panel (Sheet 1 of 2)

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-4-					PUMP COMPARTMENT GAUGE PANEL	1
-1	04664	52-0115			BEZEL, 3-1/2"	7
-2	04664	52-0448-001	38056	352000-1/4"CB-XO-AP-TS-VH	GAUGE, 3-1/2", Pressure -30 to +600 psi	7
-3	04664	63-0714	78385	692-AM-144	GAUGE, Water Temperature, 100-265°F	1
-4	04664	63-0739	78385	691-BJ	GAUGE, Oil Pressure, 5-100 psi	1
-5	04664	63-0744	78385	695-E	GAUGE, Voltage	1
-6	04664	63-0745	78385	692-AN-144	GAUGE, Oil Temperature, 140-325°F	1
-7	04664	63-0742	78385	878073	GAUGE, Fuel	1
-8	04664	60-1602	47660	250-244RXXR	VOLTMETER	1
-9	04664	60-2206	47660	250-240-LSNT	AMMETER	1
-10	04664	51-0097	75915	930-527X-797GN	LIGHT, Indicator, Green	1
-11			P787	1815	BULB, 14 VDC	1
-12			75915	894GN	LENS, Green	1
-13			75915	930434R	LAMPHOLDER, Polished Chrome	1
-14	04664	64-0279	13445	55021	SWITCH, Toggle, SPDT, Mom.	1
-15	04664	64-0190	13445	81264	BOOT, Toggle	3
-16	04664	64-0278	13445	55020	SWITCH, Toggle, SPST, Mom.	1
-17	04664	60-0519			GAUGE, Water Level Indicator	1
-18	04664	60-0017			LENS	1
-19	04664	61-0255			GASKET	1
-20	04664	60-0015			ENCLOSURE, Gauge	1
-21	04664	60-0046			BOX	1
-22	04664	60-0037			BRACKET	1
-23			1P787	194	BULB	5
-23A	04664	60-0518			BOARD, Circuit	1
-24	04664	51-0498	75915	930-527X-797RD	LIGHT, Indicator, Red	1
-25			P787	1815	BULB, 14 VDC	1
-26			75915	894RD	LENS, Red	1
-27			75915	930434R	LAMPHOLDER, Polished Chrome	1
-28	04664	52-0448-002	38056	45-1009A-114	GAUGE, 4-1/2", Pressure, -30 to +600 psi	2
-29	04664	51-0034	2Y894	NVA250B	VALVE, Needle, 1/4", Brass (Used with two of gauge No. 28 and seven of gauge No. 2)	9
-30			2Y894	FC7369	KNOB (ATTACHING PARTS)	1
-31			2Y894	FC7389	SETSCREW	1
-32	04664	51-0098	75915	930-527X-797AN	LIGHT, Indicator, Amber	1
-33			1P787	1815	BULB, 14 VDC	1
-34			75915	894AN	LENS, Amber	1
-35			75915	930434R	LAMPHOLDER	1
-36	04664	64-0018	13445	5584-06	SWITCH, Toggle, SPDT	1
-37	04664	44-3267	8E515	785230470	TACHOMETER	1
-38	04664	63-0700	78505	SC616NPU	ALARM	1

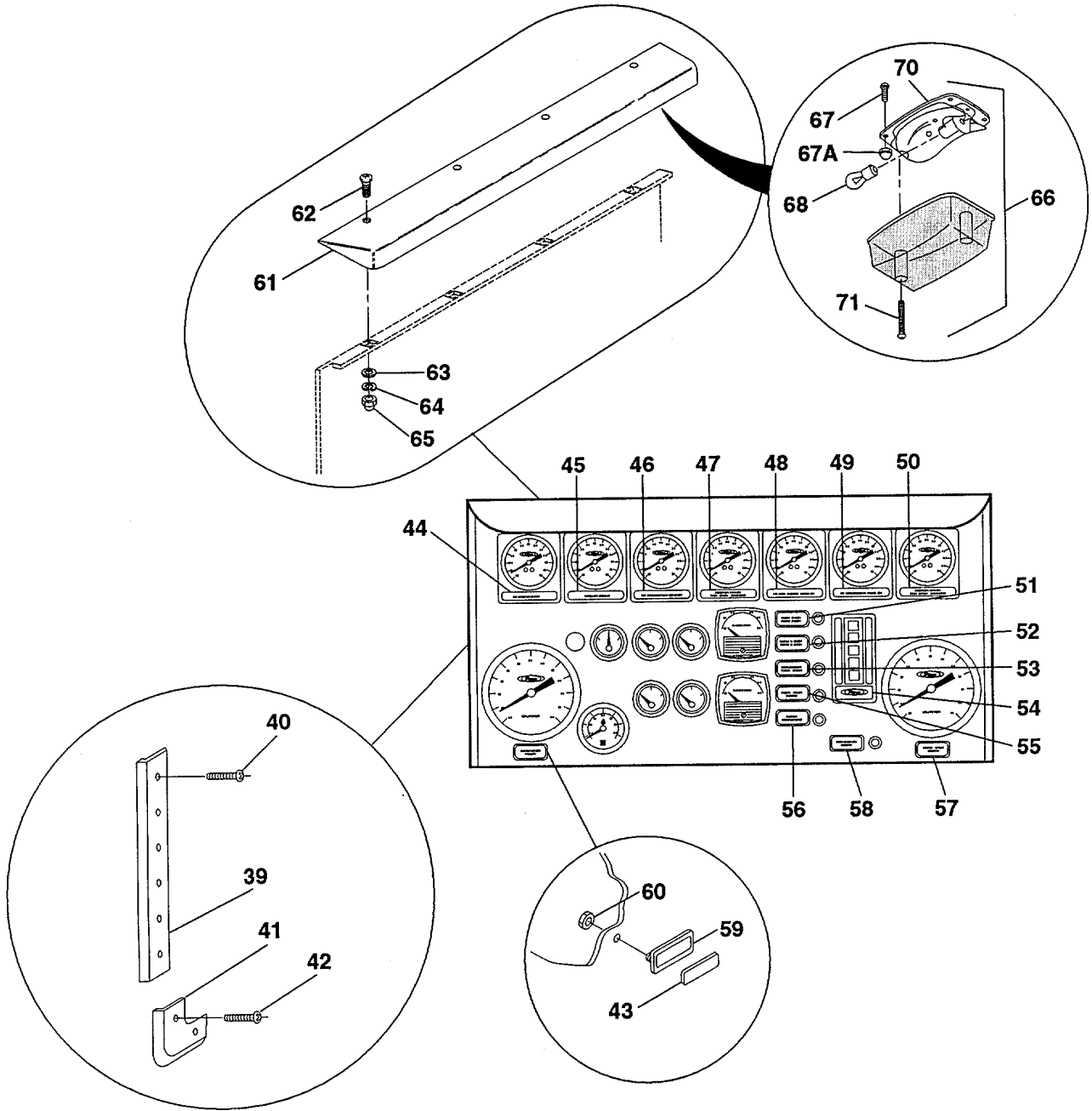
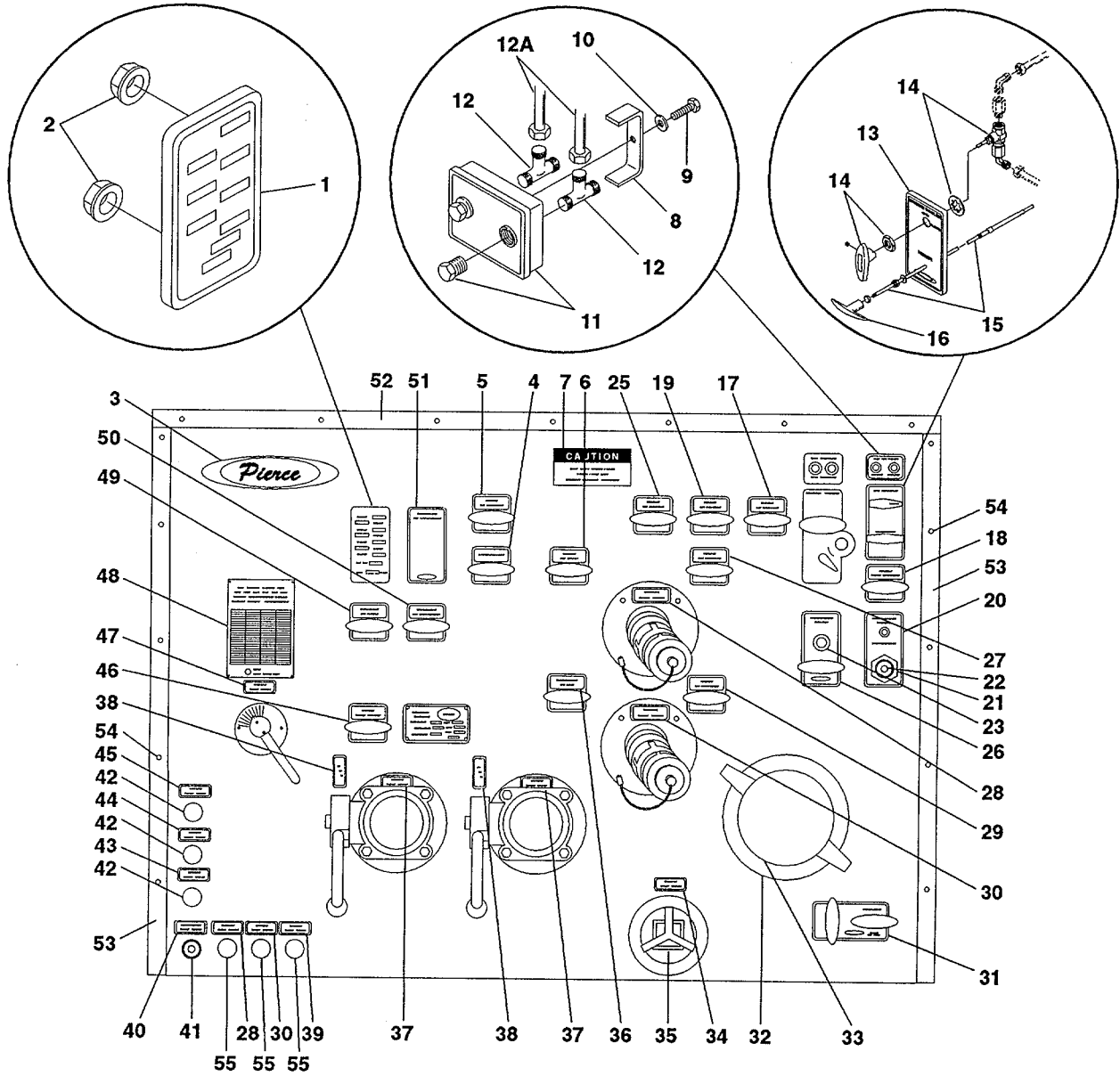


Figure F-4. Pump Compartment Gauge Panel (Sheet 2 of 2)

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-4-39	04664	94-2022			TRIM, Panel (ATTACHING PARTS)	A/R
-40	04664	82-2039-002			SCREW, T410, Ph Pn Hd, Taptite, No. 10-24 x 3/4"	7
-41	04664	94-2023			CAP, Corner (ATTACHING PARTS)	1
-42					SCREW, T410, Ph Pn Hd, Taptite, No. 10-24 x 3/4"	1
-43	04664	91-0233-009B			TAG, Vacuum	1
-44	04664	91-0233-094C			TAG, No. 1 Crosslay	1
-45	04664	91-0233-091C			TAG, No. 2 Crosslay	1
-46	04664	91-0233-086C			TAG, No. 1 Discharge	1
-47	04664	91-0233-088C			TAG, No. 2 Discharge	1
-48	04664	91-0233-077C			TAG, No. 3 Discharge	1
-49	04664	91-0233-087C			TAG, No. 4 Discharge	1
-50	04664	91-0233-081C			TAG, Aerial Discharge	1
-51	04664	91-0233-051B			TAG, Generator Running	1
-52	04664	91-0233-050B			TAG, Start-Generator-Stop	1
-53	04664	91-0233-049B			TAG, Generator, Pre-heat	1
-54	04664	60-0018			TAG, 5-Light Water Level Gauge	1
-55	04664	91-0199			TAG, Stop Engine	1
-56	04664	91-0197			TAG, Check Engine	1
-57	04664	91-0233-004B			TAG, Pump Pressure	1
-58	04664	91-0233-053B			TAG, Panel Light	1
-59	04664	52-0117			BEZEL, Tag Style B w/Pins (ATTACHING PARTS)	21
-60	04664	82-0035			NUT, Pal	42
-61	04664	SD-00123			SHIELD, Light (ATTACHING PARTS)	1
-62	04664	82-2035-0062			SCREW, Ph Tr Hd, 1/4"-20 x 5/8", EP	4
-63	04664	82-1013-006			WASHER, Flat, 1/4", Zn	4
-64	04664	82-1011-0025			WASHER, Lock, 1/4", Zn	4
-65	04664	82-3018-005			NUT, Acorn, Crown High, 1/4"-20, Ch	4
-66	04664	61-0417	12662	7393C	LIGHT, Work, w/Clear Lens (ATTACHING PARTS)	3
-67	04664	82-2039-002			SCREW, T410 Ph Pn Hd, Taptite, No. 10-24 x 3/4"	6
-67A	04664	82-3018-003			NUT, Acorn, Crown High, Ch, No. 10-	24 6
-68			1P787	1141	BULB	1



F-5. Street Side Panel

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-5-					STREET SIDE PANEL	1
-1	04664	100-011V			PLATE, Fire Pump Output Specifications (ATTACHING PARTS)	1
-2	04664	82-0035			NUT, Pal	2
-3	04664	52-0066			MEDALLION, Pierce	1
-4	04664	91-0242-091A			TAG, No. 2 Crosslay	1
-5	04664	91-0245-094A			TAG, No. 1 Crosslay	1
-6	04664	91-0244-077A			TAG, No. 3 Discharge	1
-7	04664	SD-08511			PLATE, Caution, Hearing Protection	1
-8	04664	52-0207			CLIP, Mounting, Gauge Test Panel	1
-9	04664	82-2055-0100			SCREW	1
-10	04664	82-1011-0025			WASHER	1
-11	04664	52-0061			BEZEL, Gauge Test Panel	1
-12	04664	56-0550-0004			TEE	2
-12A	04664	944023			TUBE	A/R
-13	04664	100-005			PLATE, Engine Cooler/Primer	1
-14	04664	51-0035	64938	4F-6BLJ-BP	VALVE, Ball, 1/4"	1
-15	04664	51-0136	63803	A-6655-1A S1396-001	CABLE, Control, HD, 84" lg.	1
-16	63803				HANDLE, Tee	1
-17	04664	SD-08513			TAG, Tank Drain	1
-18	04664	91-0025			TAG, Tank Discharge	1
-19	04664	91-0237-081A			TAG, Aerial Discharge	1
-20	04664	91-0756			PLATE, Throttle	1
-21	04664	63-0806	60602	9410871-1	POT, IOK Vernier Throttle, Linear	1
-22			60602	94	KNOB AND BUTTON	1
-23	04664	52-0060			CABLE, RPM Counter	1
-25	04664	91-0233-006A			TAG, Tank Fill and Recirculate	1
-26	04664	91-0365			PLATE, RPM Counter/Pump Drain	1
-27	04664	91-0018			TAG, No. 1 Discharge	1
-28	04664	91-0240-086B			TAG, No. 1 Discharge	2
-29	04664	91-0366			TAG, No. 2 Discharge	1
-30	04664	91-0236-088B			TAG, No. 2 Discharge	2
-31	04664	100-003H			PLATE, Manual Pump Shift	1
-32	04664	52-0077			GARNISH RING, 6"	1
-33	04664	52-0075	20266	310C/P	CAP, Suction, 6'	1
-34	04664	91-0233-104B			TAG, Open (with Arrows)	1
-35	04664	91-0367			TAG, Front Suction	1
-36	04664	91-0368			TAG, No. 4 Discharge	1
-37	04664	91-0233-039A			TAG, Driver's Side Aux. Suction	2
-38	04664	91-0233-018B			TAG, Open/Closed (Vertical)	2
-39	04664	91-0237-081B			TAG, Aerial Discharge	1
-40	04664	91-0233-062B			TAG, Air Outlet	1
-41	04664	55-0021		23103-013 (3DM3)	COUPLING, Air Outlet	1
-42	04664	51-0036	24894	NVA250BNB	VALVE, Needle, 114" Chrome Plated	3
-42			24894	FC7369NB	KNOB	1
-42	24894	FC7389			(ATTACHING PARTS)	
-43	04664	91 -0233-064B			SETSCREW	1
-44	04664	SD-08514			TAG, Air Supply Valve	1
-45	04664	SD-08512			TAG, Metering Valve Drain/ Open When Flushing	1
-46	04664	91-0247-099A			TAG, Strainer Drain	1
-47	04664	91-0369			TAG, Foam	1
-48			11939	00329120	TAG, Metering Valve	1
-49	04664	91-0370			PLATE, Operating Instructions, Foam System	1
					TAG, Flush	1

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-5-						
-50	04664	91-0371			TAG, Water	1
-51	04664	100-008H			PLATE, Min. Oper. Maint. Schedule	1
-52	04664	942024			TRIM, Panel Seam	A/R
-53	04664	942022			TRIM, Panel (ATTACHING PARTS)	A/R
-54	04664	82-2039-002			SCREW, T410, Ph Hd Taptite, No. 10-24 x 3/4"	17
-55	04664	51-0968	20266	115	VALVE, Drain, 3/4" Panel Mount (See figure F-18 for details)	3

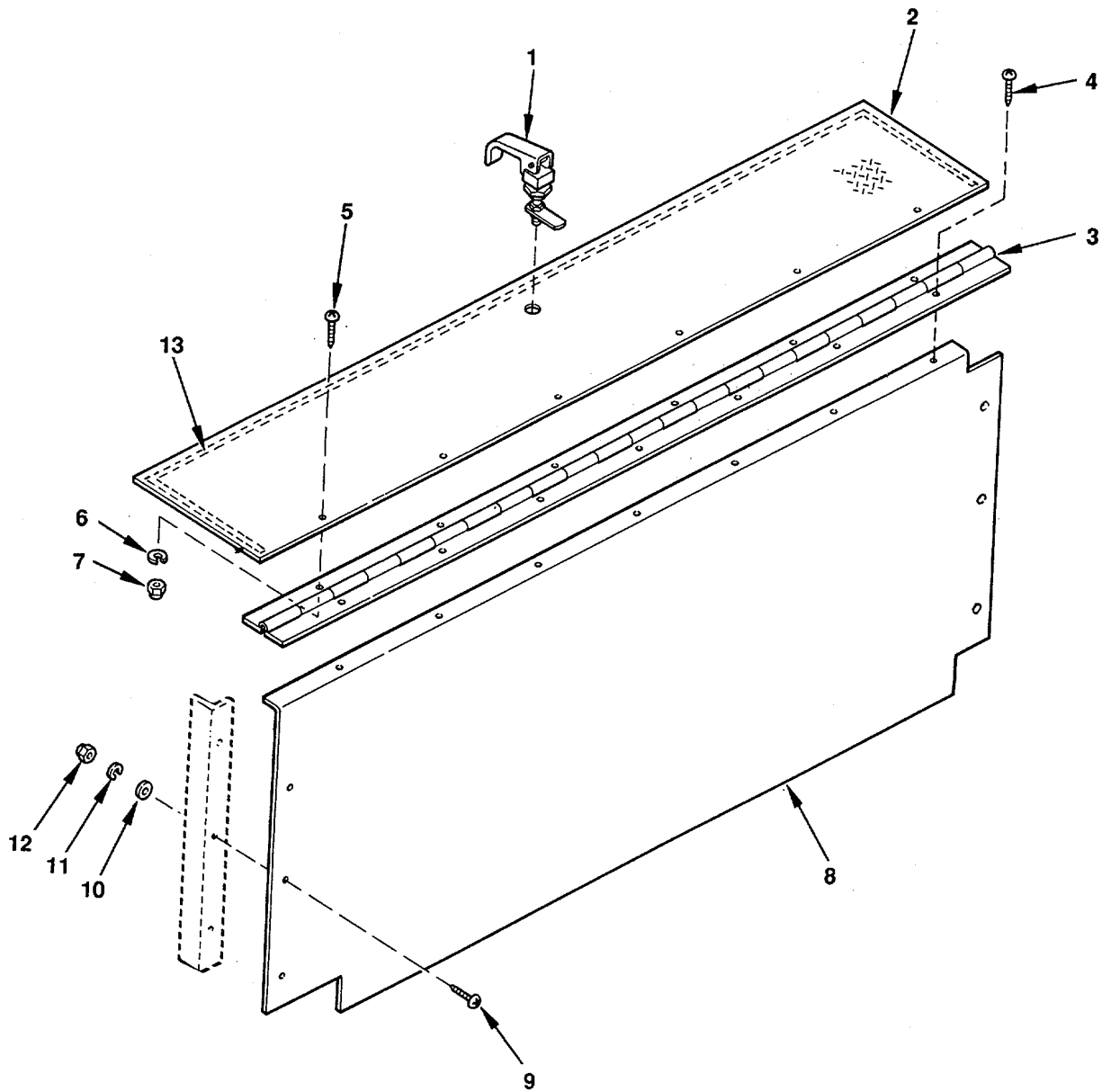


Figure F-6. Gauge Panel Enclosure
F-14

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-6-					GAUGE PANEL ENCLOSURE	1
-1	04664	80-3002	6M181	62-10-10410	LATCH, Lift and Turn, Straight	1
-2	04664	SD-00033			ENCLOSURE, Gauge Panel, Top	1
-3	04664	SD-00150	67820	04F7921024-79	HINGE, Gauge Enclosure I (ATTACHING PARTS)	
-4	04664	82-2039-001			SCREW, Ph Pan Hd, Taptite, No. 10-24 x 1/2"	7
-5	04664	82-2037-005			SCREW, No. 10-24 x 1/2", Ph Pan Hd, T/C PL	6
-6	04664	82-1012-007			WASHER, Lock, No. 10, Zn	6
-7	04664	82-3018-003			NUT, Acorn, Crown High, Ch, No. 10-24	6
-8	04664	SD-00094			ENCLOSURE, Gauge Panel, Back (ATTACHING PARTS)	1
-9	04664	82-2035-0050			SCREW, 1/4"-20 x 1/2", Ph Tr Hd, EP	6
-10	04664	82-1013-006			WASHER, Flat, 1/4", Zn	6
-11	04664	82-1011-0025			WASHER, Lock, 1/4", Zn	6
-12	04664	82-3018-005			NUT, Acorn, Crown High, Ch, 1/4"-20	6
-13	04664	943064	56327	1085-3017	SEAL, Door, "D" Section, Black (ft.)	5

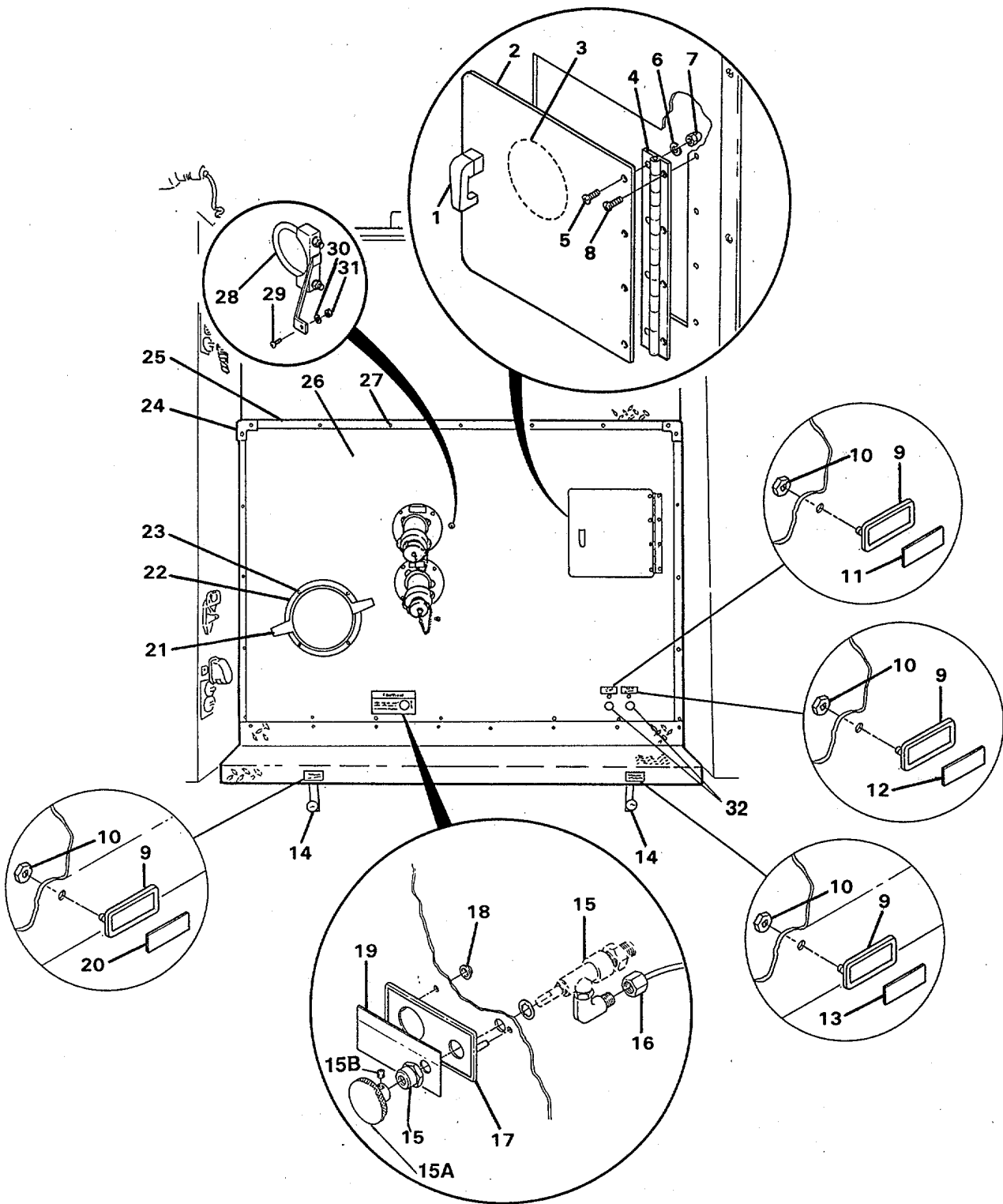


Figure F-7. Curb Side Panel

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-7-					CURB SIDE PANEL	1
-1	04664	80-0003	27182	3200	LATCH, Lift and Turn	1
-2	04664	52-0029			DOOR, Pump Inspection	1
-3	04664	100-006C			LABEL, Primer Oil Tank, Alum	1
-4	04664	52-0030			HINGE, Pump Door (ATTACHING PARTS)	1
-5	04664	82-2037-0038			SCREW, Ph Pn Hd, No. 10-24 x 3/8", T/C PL	4
-6	04664	82-1012-007			WASHER Lock, No.10, Zn	4
-7	04664	82-3017-007			NUT, Hex, No. 10-24, Zn	4
-8	04664	82-2039-001			SCREW, T410 Ph Pn Hd, Taptite No. 10-24 x 1/2"	4
-9	04664	52-0117			BEZEL, Tag Style B, w/Pins (ATTACHING PARTS)	5
-10	04664	82-0035			NUT, Pal	10
-11	04664	91-0244-087B			TAG, No.4 Discharge	1
-12	04664	91-0241-077B			TAG, No. 3 Discharge	1
-13	04664	91-0233-041			TAG, Front Inlet	1
-14	04664	51-0040	20266	110	VALVE, Drain, 3/4 (See figure F-1-8 for details)	2
-15	04664	51-0036	2Y894	NYA250BNB	VALVE, Needle, 1/4" Chrome Pl, Relief Valve Drain	
-15A			2Y894	FC7369NB	KNOB (ATTACHING PARTS)	1
-15B			2Y894	FC7389	SETSCREW	1
-16	04664	944034			TUBE, Drain Valve to Relief Valve, 1/4"	1
-17	04664	52-0116			BEZEL, Tag style D,3" x 6" (ATTACHING PARTS)	1
-18	04664	82-0035			NUT, Pal	2
-19	04664	91-0257-002			TAG, Caution-Relief Valve Drain	1
-20	04664	91-0041			TAG, Suction	1
-21	04664	52-0075	20266	310C/P	CAP, Suction, 6"	1
-22	04664	52-0077			GARNISH RING, 6" (ATTACHING PARTS)	1
-23	04664	82-2039-001			SCREW, T410 Ph Pn Hd, Taptite, No. 10-24x 1/2"	4
-24	04664	94-2023			CAP, Corner, Stainless Steel	2
-25	04664	94-2022			TRIM, Panel	AR
-26	04664	SD-00153			PANEL, Curb Side (ATTACHING PARTS)	1
-27	04664	82-2039-002			SCREW, T410 Ph Pn Hd, Taptite, No. 10-24 x 3/4"	22
-28	04664	52-0149			SUPPORT, Pump Panel (ATTACHING PARTS)	1
-29	04664	82-2035-0100			SCREW, Ph Tr Hd, 1/4"-20 x 1", ER	1
-30	04664	82-1011-0025			WASHER, Lock, 1/4", Zn	1
-31	04664	82-3014-001			NUT, Hex, 1/4"-20, Zn	1
-32	04664	51-0968	20266	115	VALVE, Drain, 3/4", Panel Mount (See figure F-1 8 for details)	2

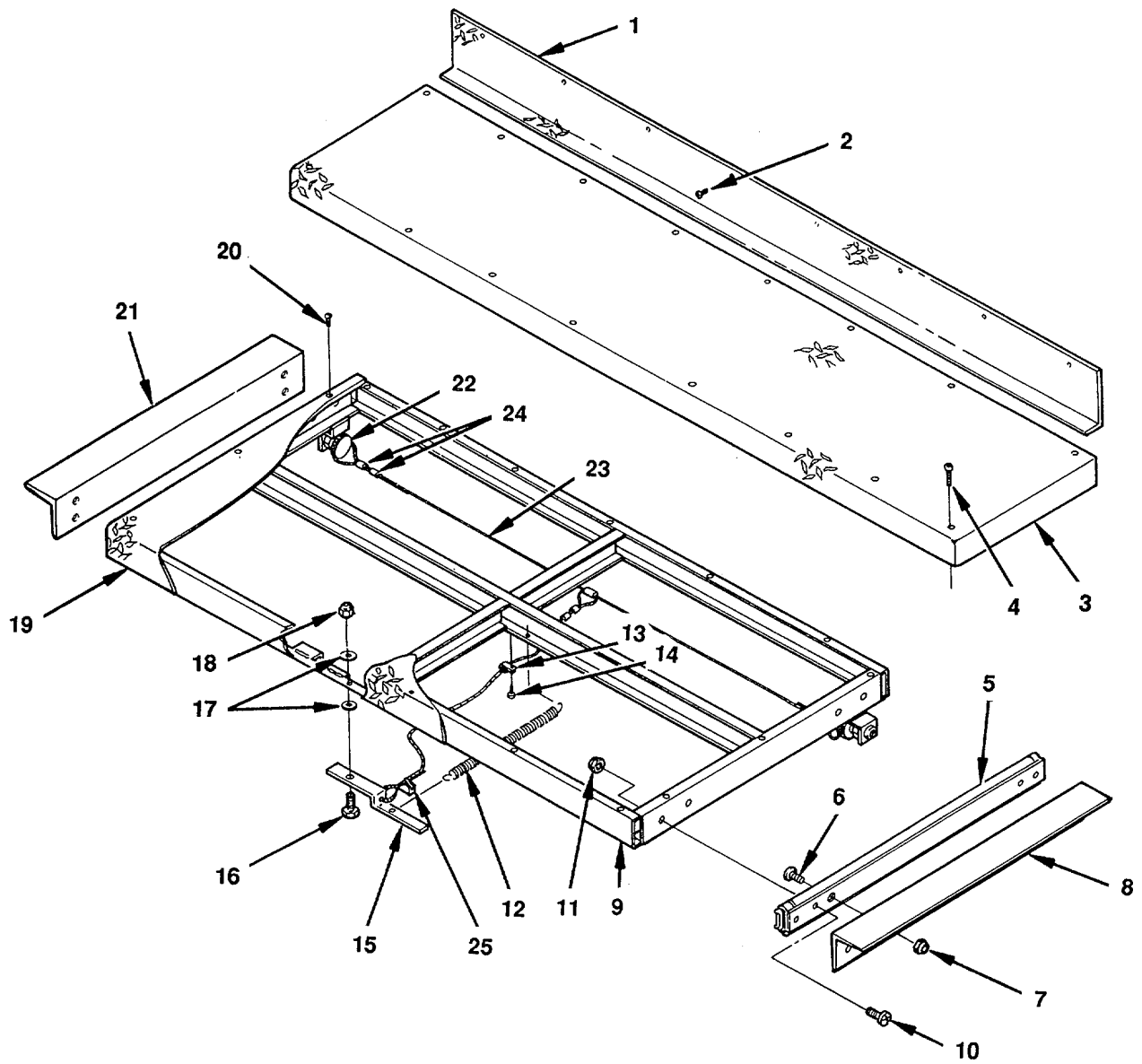
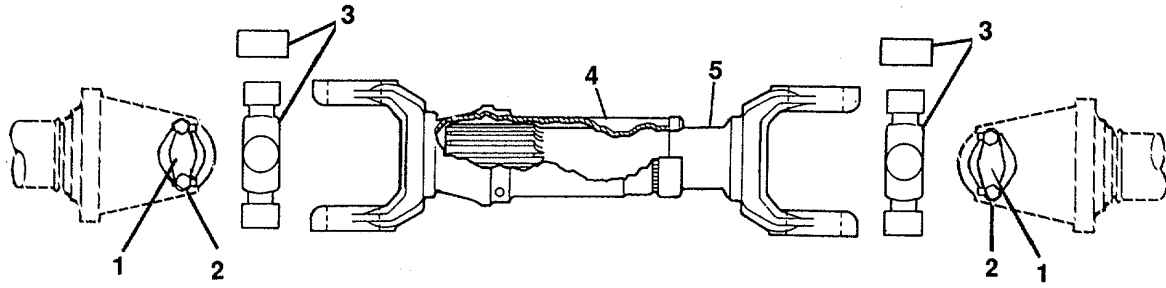
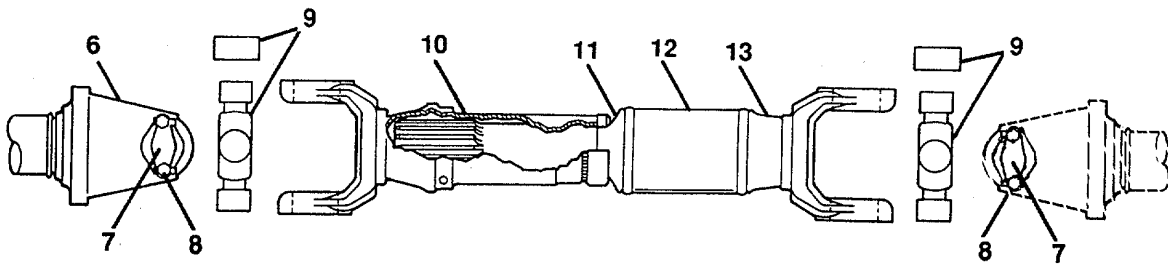


Figure F-8. Running Boards and Pullout Treadplate

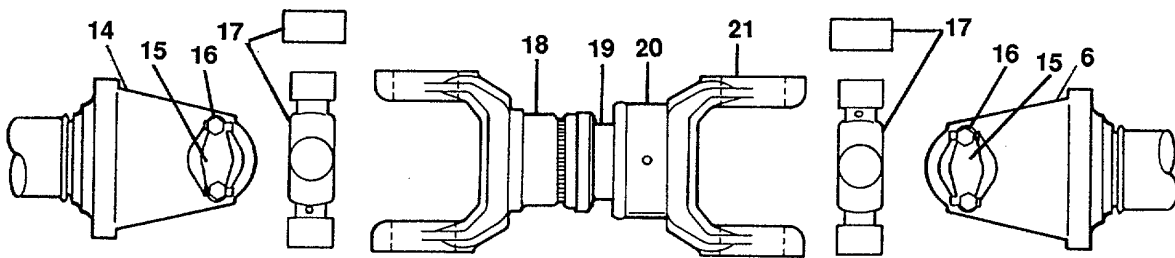
FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-8-					RUNNING BOARDS AND PULLOUT TREADPLATE	1
-1	04664	32-0607-0011			PLATE, Kick, Running Board (ATTACHING PARTS)	2
-2	04664	82-2039-002			SCREW, T41 0 Ph Pn Taptite, No.10-24 x 3/4"	16
-3	04664	SD-00143			BOARD, Running (ATTACHING PARTS)	2
-4	04664	82-2039-002			SCREW, T410 Ph Pn Taptite, No. 10-24 x 3/4"	32
-5	04664	80-2264-2200			SLIDE, Side mount, Nonlocking (ATTACHING PARTS)	2
-6	04664	82-3060-0075			SCREW, Ph Flt Hd, 1/4"-20 x 3/4", SIS	8
-7	04664	82-3037-0025			NUT, Lock, Nylon Insert, 1/4"-20, S/S	8
-8	04664	32-2114			ANGLE, Support Pullout Treadplate L.H.	2
-9	04664	SD-00041			FRAME, Pullout Treadplate (ATTACHING PARTS)	1
-10	04664	82-3060-0075			SCREW, Ph Flt Hd, 1/4"-20 x 3/4", S/S	8
-11	04664	82-3037-0025			NUT, Lock, Nylon Insert, 1/4"-20, S/S	8
-12	04664	81-0029			SPRING, Handle Return	1
-13	04664	82-0010			CLAMP, Jiffy Rubber Cov. 1/4" (ATTACHING PARTS)	1
-14	04664	82-2039-001			SCREW, T410 Ph Pn Taptite, No. 10-24 x 1/2"	1
-15	04664	32-0101			HANDLE, Pullout Treadplate (ATTACHING PARTS)	1
-16	04664	82-2037-0125			SCREW, Ph Pn Hd, No. 10-24 x 1-1/4"	1
-17	04664	82-1013-004			WASHER, Flat, No. 10, Zn	4
-18	04664	82-3030-008			NUT, Lock, Nylon Insert, No. 10-24, Zn	1
-19	04664	SD-00042			COVER, Pullout Treadplate (ATTACHING PARTS)	1
-20	04664	82-2039-001			SCREW, T410 Ph Pn Taptite, No. 10-24 x 1/2"	18
-21	04664	32-2110			ANGLE, Support, Pullout Treadplate, R.H.	1
-22	04664	80-2221			PLUNGER, Spring - Hand-Retractable	2
-23	04664	80-2032	1H540	4968-7	CABLE, Pullout Treadplate (ft.)	12
-24	04664	80-2033	3J615	16287	SLEEVE, Loop	7
-25	04664	80-2163-001			CLAMP, Cable	1



INTERAXLE



PUMP-TO-AXLE



TRANSMISSION-TO-PUMP

Figure F-9. Propeller Shaft Assemblies

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-9-					PROPELLER SHAFT ASSEMBLIES	1
-1			95019	230323	LOCKSTRAP (ATTACHING PARTS)	2
-2			95019	6-73-220	SCREW, Hex Hd	4
	04664	41-0199	95019	SC181-10.5-12E	DRIVE SHAFT ASSY, Interaxle	1
-3	04664	41-0050	95019	5-281X	U-JOINT, Interaxle	2
-4	04664	41-016Z	95019	6.5-3-1-1451KX	YOKE, Slip, Interaxle	1
-5	04664	41-0196	95019	YS181-8.875	YOKE, Shaft, Interaxle	1
-6	04664	41-0169	95019	6.5-4-2541	YOKE, Pump	2
-7			95019	98-743	LOCKSTRAP (ATTACHING PARTS)	
-8	95019			7-73-122	SCREW, Hex Hd	4
	04664	41-0238			DRIVE SHAFT ASSY, Pump-to-Axle	1
-9	04664	41-0050	95019	5-281 X	UJOINT, Pump-to-Axle Shaft	2
-10	04664	41-0064	95019	6.5-3-1371KX	YOKE, Slip, Pump-to-Axle	1
-11	04664	41-0063	95019	6.5-40-191	PLUG, Spline, Pump-to-Axle	1
-12	04664	41-0127		32-30-52-10800	TUBING, Steel 4.00" OD X .134" Wall (In.)	41-1/2" 1
-13	04664	41-0135	95019	6.5-28-117	YOKE, Weld, Pump-to-Axle	
-14	04664	41-0134	95019	6.5-4-2581	YOKE, Transmission-to-Pump	1
-15			95019	98-743	LOCKSTRAP (ATTACHING PARTS)	2
-16	95019			7-73-122	SCREW, Hex Hd	4
	04664	41-0199			DRIVE SHAFT ASSY, Transmission-to-Pump	1
-17	04664	41-0049	95018	5-280X	UJOINT, Transmission-to-Pump	2
-18	04664	41-0126	95019	6-3-2651KX	YOKE, Slip, Transmission-to-Pump	1
-19	04664	41-0125	95019	64-521	PLUG, Spline, Transmission-to-Pump	1
-20	04664	41-0127		32-30-52-10800	TUBING, Steel, 4.00" O.D. x .134" Wall (In.)	6-3/8"
-21	04664	41-0138	95019	6-28-347	YOKE, Weld, Transmission-to Pump	1

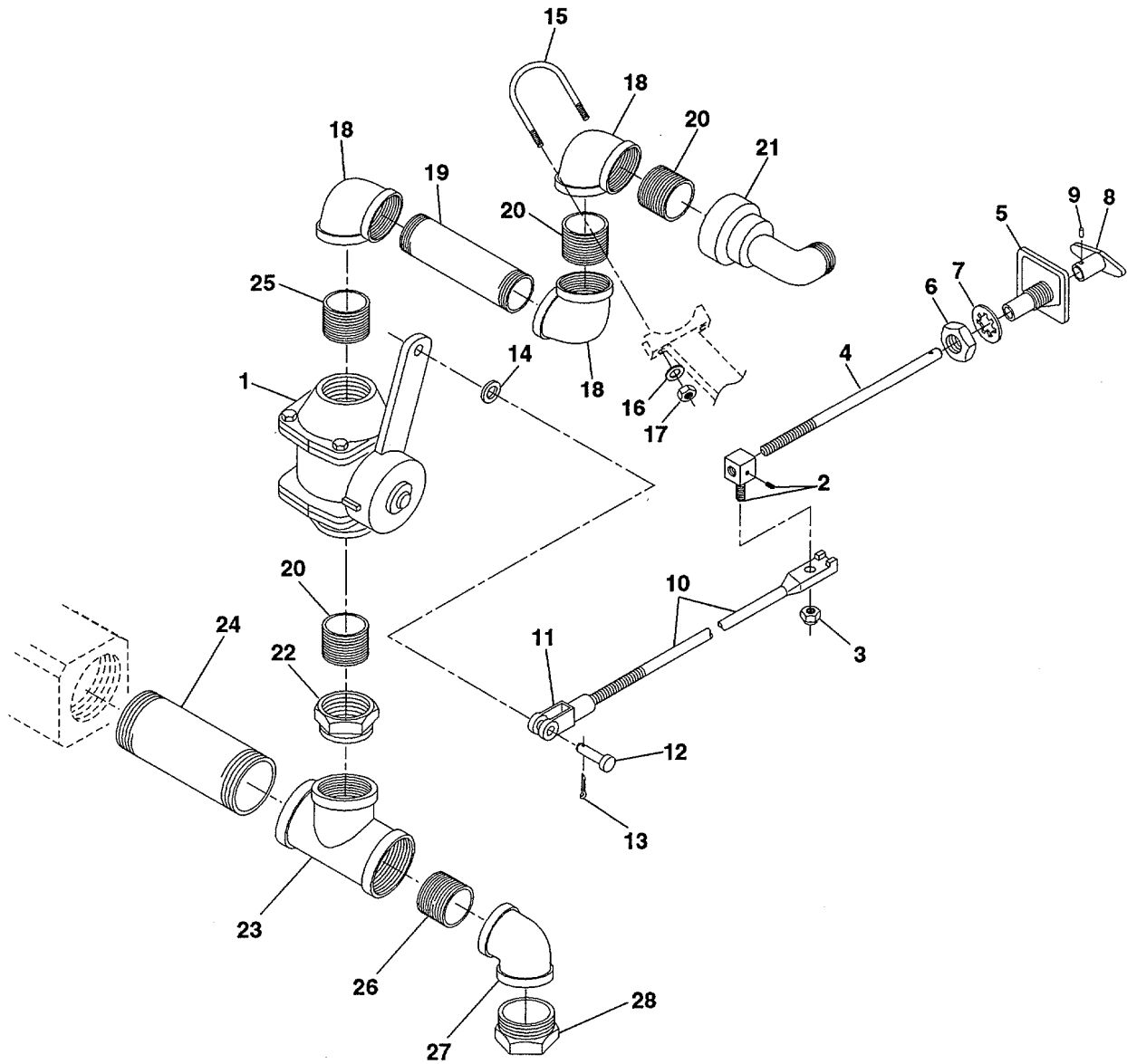


Figure F-10. Crosslay Valve and Piping (No. 1)

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-10-					CROSSLAY VALVE AND PIPING (No. 1)	1
-1	04664	51-0024	20266	2892KKD	VALVE, Inline, 2", Crosslay (See figure F-12 for details)	1
-2	04664	52-0065			BLOCK, Swivel (ATTACHING PARTS)	1
-3	04664	82-3014-006			NUT, Hex, 1/2"-13, Zn	1
-4	04664	52-0036			ROD, Valve, Threaded, 14" Lg	1
-5	04664	52-0046			GUIDE, Valve Rod (ATTACHING PARTS)	1
-6	04664	82-3021-010			NUT, Hex, 1"-14	1
-7	04664	82-1002			WASHER, Lock, Internal Tooth, 1"	1
-8	04664	52-0064	60319	PH60Z	T-HANDLE (ATTACHING PARTS)	1
-9	04664	82-0078-0075			PIN, Roll 1/4" x 3/4"	1
-10	04664	52-0292			ROD, Control, 47" Lg (No. 1 Crosslay)	1
-11	04664	80-9068	71177	9J-480-9068	CLEVIS, 1/2" (ATTACHING PARTS)	1
-12	04664	82-0082-0137			PIN, Clevis 1/2" x 1-3/8", Zn	1
-13	04664	80-9101-0100			PIN, Cotter 1/8" x 1"	1
-14	04664	82-1013-010			WASHER, Flat, 1/2", Zn	1
-15	04664	51-0258			U-BOLT (ATTACHING PARTS)	1
-16	04664	82-1013-008			WASHER, Flat, 3/8", Zn	2
-17	04664	82-3014-003			NUT, Hex 3/8"-16, Zn	2
-18	04664	53-0121-009			ELBOW, 2", Black, 90°	3
-19	04664	SD-07368			NIPPLE, Pipe, 2" x 8-1/2", Black	1
-20	04664	53-0131-007			NIPPLE, Close, 2", Black	3
-21	04664	51-0202	20266	348-L	SWIVEL, 1-1/2" MNST x 2" FNPT, 90°	1
-22	04664	53-0125-034			REDUCER, 2-1/2" to 2", Black	1
-23	04664	53-0114-009			TEE, 2-1/2", Black	1
-24	04664	53-0135-0600			NIPPLE, Pipe, 2-1/2" x 6", Black	1
-25	04664	51-0134-0350			NIPPLE, Pipe, 2" x 3-1/2", Black	1
-26	04664	53-0131-010			NIPPLE, Close, 2-1/2", Black	1
-27	04664	53-0121-010			ELBOW, 2-1/2", Black, 90°	1
-28	04664	53-0125-037			REDUCER, 2-1/2" to 1", Black	1

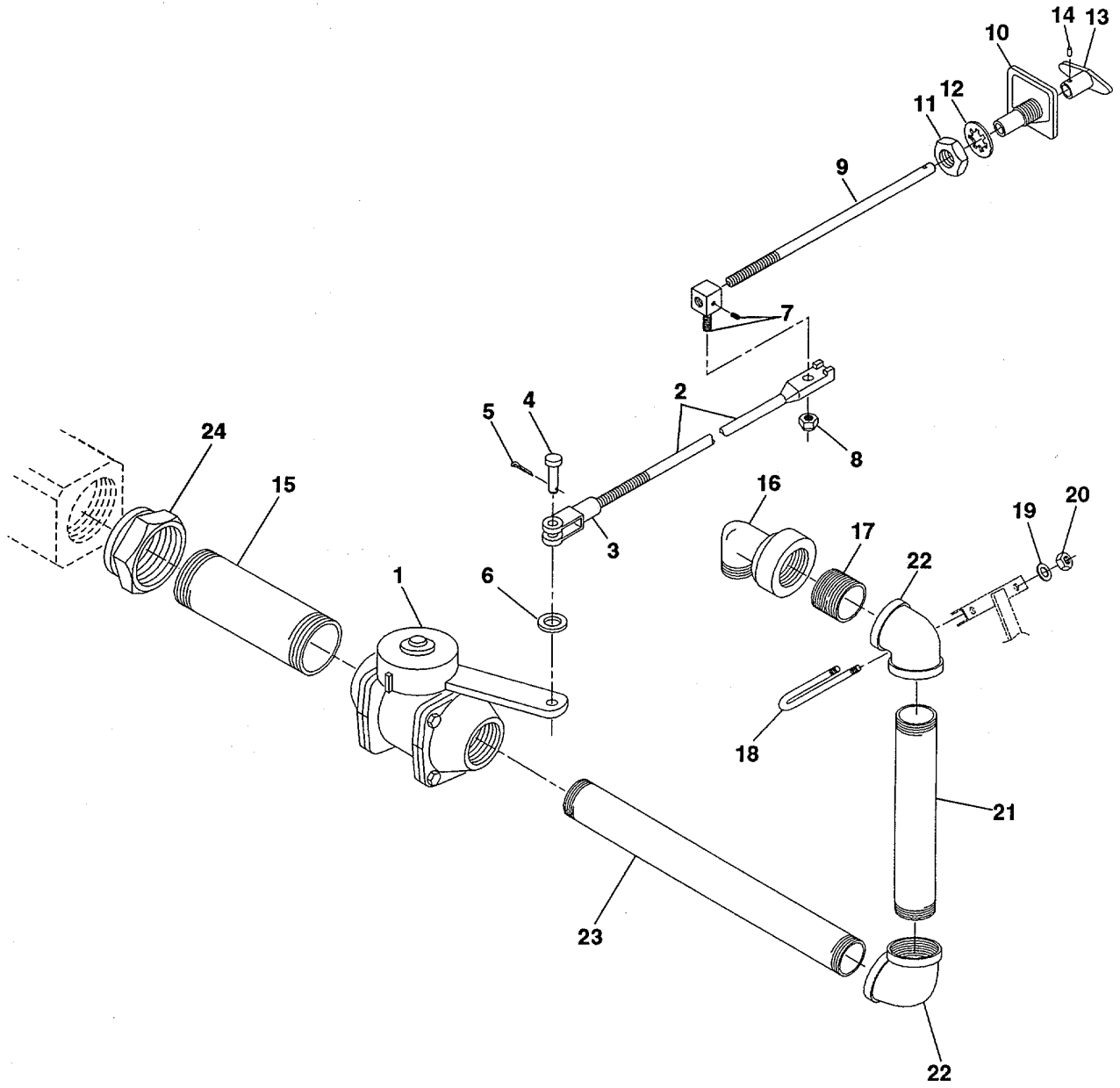


Figure F-11. Crosslay Valve and Piping (No. 2)

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-11-					CROSSLAY VALVE AND PIPING (No. 2)	1
-1	04664	51-0024	20266	2892KKD	VALVE, Inline, 2", Crosslay (See figure F-12 for details)	1
-2	04664	52-0273			ROD, Control, 7-112" Lg (No. 2 Crosslay)	1
-3	04664	80-9068	71177	9J-480-9068	CLEVIS, 1/2" (ATTACHING PARTS)	1
-4	04664	82-0082-0137			PIN, Clevis 1/2" x 1-3/8", Zn	1
-5	04664	80-9101-0100			PIN, Cotter 118" x 1"	1
-6	04664	82-1013-010			WASHER, Flat, 1/2", Zn	1
-7	04664	52-0065			BLOCK, Swivel (ATTACHING PARTS)	1
-8	04664	82-3014-006			NUT, Hex, 1/2"-13, Zn	1
-9	04664	52-0036			ROD, Valve, Threaded, 14" Lg	1
-10	04664	52-0046			GUIDE, Valve Rod (ATTACHING PARTS)	1
-11	04664	82-3021-010			NUT, Hex, 1"-14	1
-12	04664	82-1002			WASHER, Lock, Internal Tooth, 1"	1
-13	04664	52-0064	60319	PH60Z	T-HANDLE (ATTACHING PARTS)	1
-14	04664	82-0078-0075			PIN, Roll 1/4" x 3/4"	1
-15	04664	53-0134-0350			NIPPLE, Pipe, 2" x 3-1/2", Black	1
-16	04664	51-0202	20266	348-L	SWIVEL, 1-112" MNST x 2" FNPT, 90°	1
-17	04664	53-0131-007			NIPPLE, Close, 2", Black	1
-18	04664	51-0258			U-BOLT (ATTACHING PARTS)	1
-19	04664	82-1013-008			WASHER, Flat, 3/8", Zn	2
-20	04664	82-3014-003			NUT, Hex 3/8"-1 6, Zn	2
-21	04664	SD-07370			NIPPLE, Pipe, 2" x 14-1/2", Black	1
-22	04664	53-0121-009			ELBOW, 2", Black, 90°	2
-23	04664	SD-07369			NIPPLE, Pipe, 2" x 16-3/4", Black	1
-24	04664	53-0125-034			REDUCER, 2-1/2" to 2", Black	1

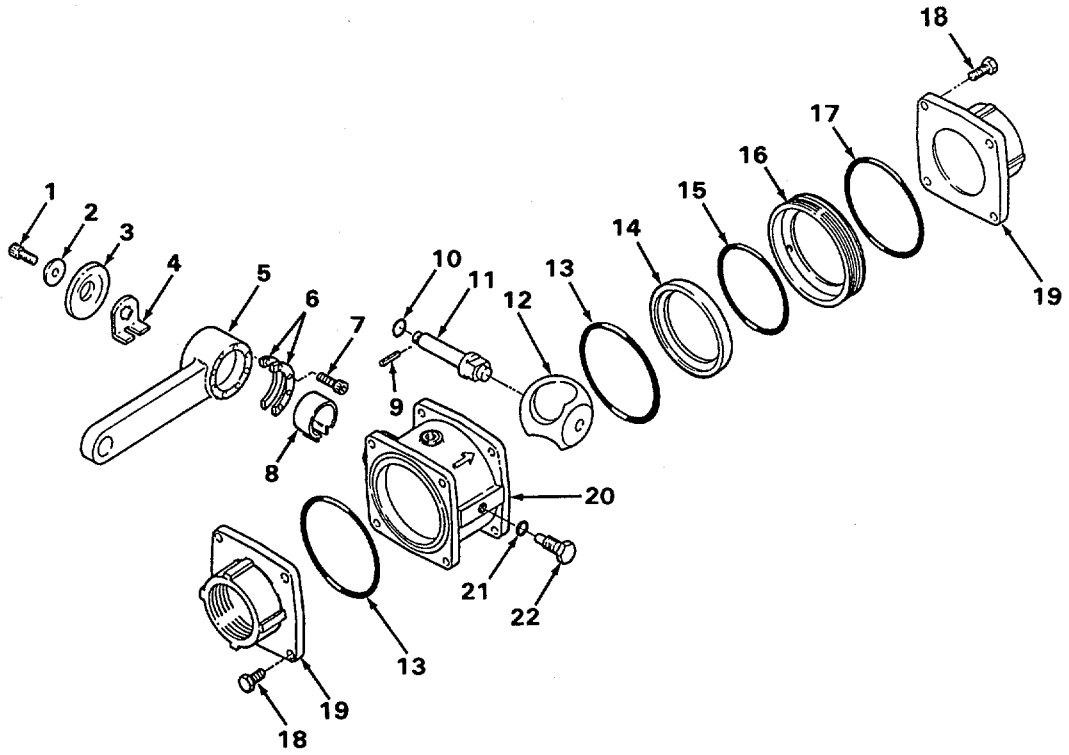


Figure F-12. Ball Valve, 2"

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-12-	04664	51-0024	20266	2892KKD	BALL VALVE, 2" (See figure F-10 for NHA)	REF
-1		20266	61036		SCREW, Cap	1
-2		20266	71082		WASHER, Handle	1
-3		20266	63592		WASHER	1
-4		20266	11514		CLIP, Actuator	1
-5		20266	36158		HANDLE	1
-6		20266	16534		BRACKET, Stop	2
-7		20266	61046		SCREW, Cap	8
-8		20266	61793		SPRING, Lock	1
-9		20266	51246*		PIN, Roll	1
-10		20266	57321*		O-RING	1
-11		20266	63760*		SHAFT, Actuator	1
-12		20266	17305		VALVE, Ball	1
-13		20266	57416*		O-RING	1
		20266	80456*		SEAT SUBASSY	1
-14		20266	63822*		SEAT	1
-15		20266	57338*		O-RING	1
-16		20266	58883*		RETAINER, Seat	1
-17		20266	57296*		O-RING	1
-18		20266	61030		BOLT	8
-19		20266	20060		CAP, End, 2" NPT, Fem	2
-20		20266	16961		BODY VALVE	1
-21		20266	57321*		O-RING	1
-22		20266	63703		BOLT, Pivot	1
	04664	51-0088	20266	80428	KIT, Repair (Includes items marked *)	

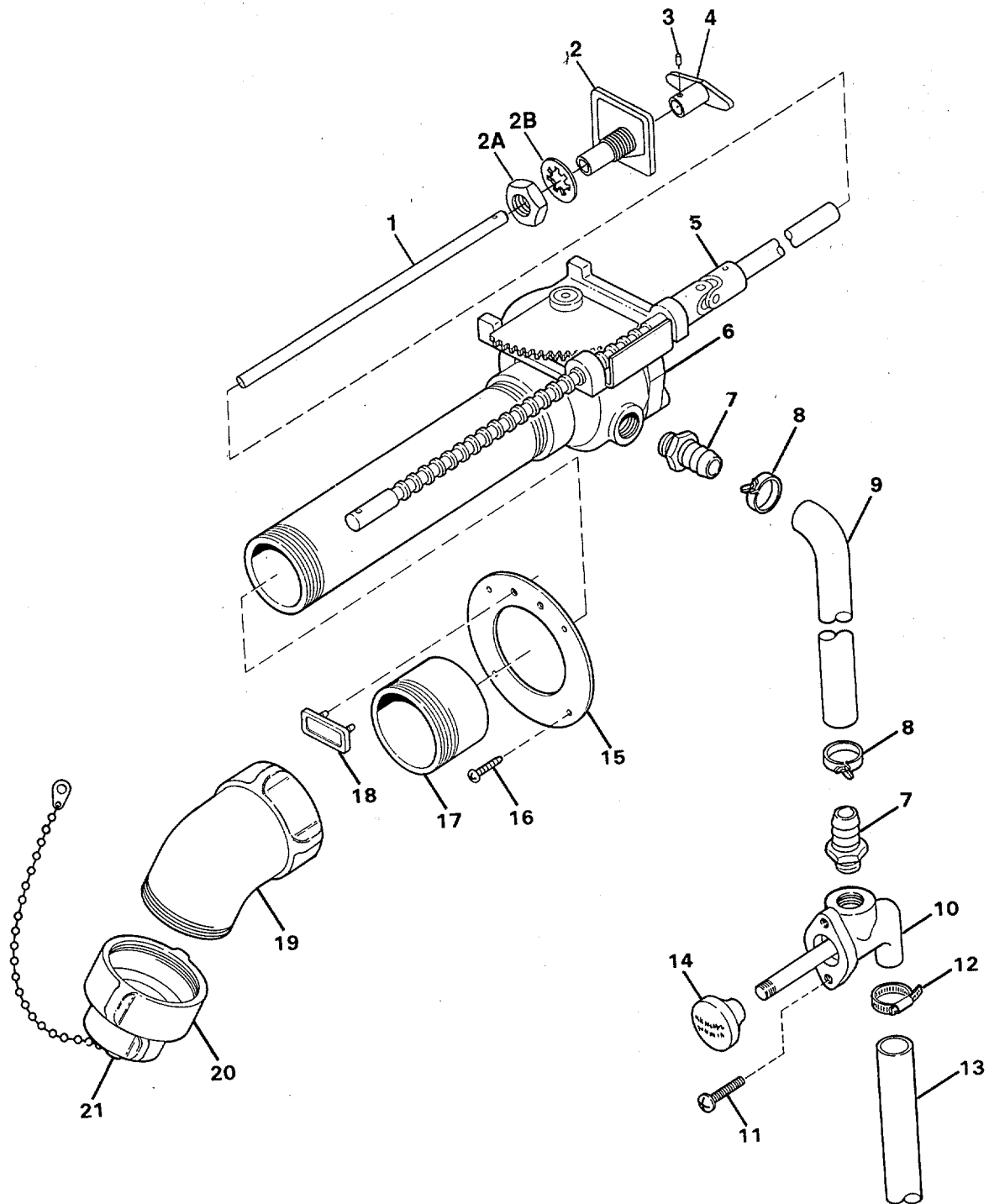


Figure F-13. No. 1, 2, 3, and 4 Side Discharge Valves and Piping

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-13-					NO. 1, 2, 3, AND 4 SIDE DISCHARGE VALVES AND PIPING	
-1	04664	52-0037			ROD, Valve, 18", No Thread*	2
-1	04664	52-0038			ROD, Valve, 10-1/2", No Thread **	2
-2	04664	52-0046			GUIDE, Valve Rod, Long*	2
-2	04664	52-0047			GUIDE, Valve Rod, Short** (ATTACHING PARTS)	2
-2A	04664	82-3021-010			NUT, Hex, 1"-14	4
-2B	04664	81-1002			WASHER, Lock, Internal Tooth, 1"	4
-3	04664	82-0078-0075			PIN, Roll 1/4" x 3/4" Lg	4
-4	04664	52-0064	60319	PH60Z	T-HANDLE	4
-5	04664	51-0182	79218	51057	JOINT, Universal	6
-6			79218	80489-2M	VALVE, Side Discharge* (See figure F-14 for details)	2
-6	79218	80489-2R			VALVE, Side Discharge ** (See figure F-15 for details)	2
-7	04664	56-0569-0001			FITTING, Push-Lok, Male, 3/4"	8
-8	04664	80-6039-0001			CLAMP, Pinch-on	8
-9	04664	940093			HOSE, Push-Lok, 3/4", 250 PSI	AR
-10	04664	51-0968	20266	115	VALVE, Drain, 3/4", Panel Mt. (See figure F-18 for details) (ATTACHING PARTS)	4
-11	04664	82-2142-0001			SCREW, Machine, Type 1 Cross, 3/4" Long	8
-12	04664	80-6029-005	66295	10H	CLAMP, Hose	4
-13	04664	940004			HOSE, Drain, 3/4", (ft.)	AR
-14	04664	80-0016			KNOB, 3/4" Drain Valve	4
-15	04664	52-0057			GARNISH RING, 2-1/2" (ATTACHING PARTS)	
-16	04664	82-2039-001			SCREW, T410 Ph Pn Hd, Taptite, No. 10-24 x 1/2"	16
-17	04664	51-0067	20266	4181	ADAPTER, 2-1/2 FPNT X 2-1/2 MNST	4
-18	04664	52-0117			BEZEL, Tag Style B w/Pins	4
-19	04664	51-0085	20266	105	ELBOW, 45°, 2-1/2"	4
-20	04664	51-0069	60319	A-37	REDUCER, 2-1/2" to 1-1/2"	4
-21	04664	52-0067	20266	310C/P	CAP, Chrome, 1-1/2"	4
					* Used on R.H. Side Only ** Used on L.H. Side Discharge Only	

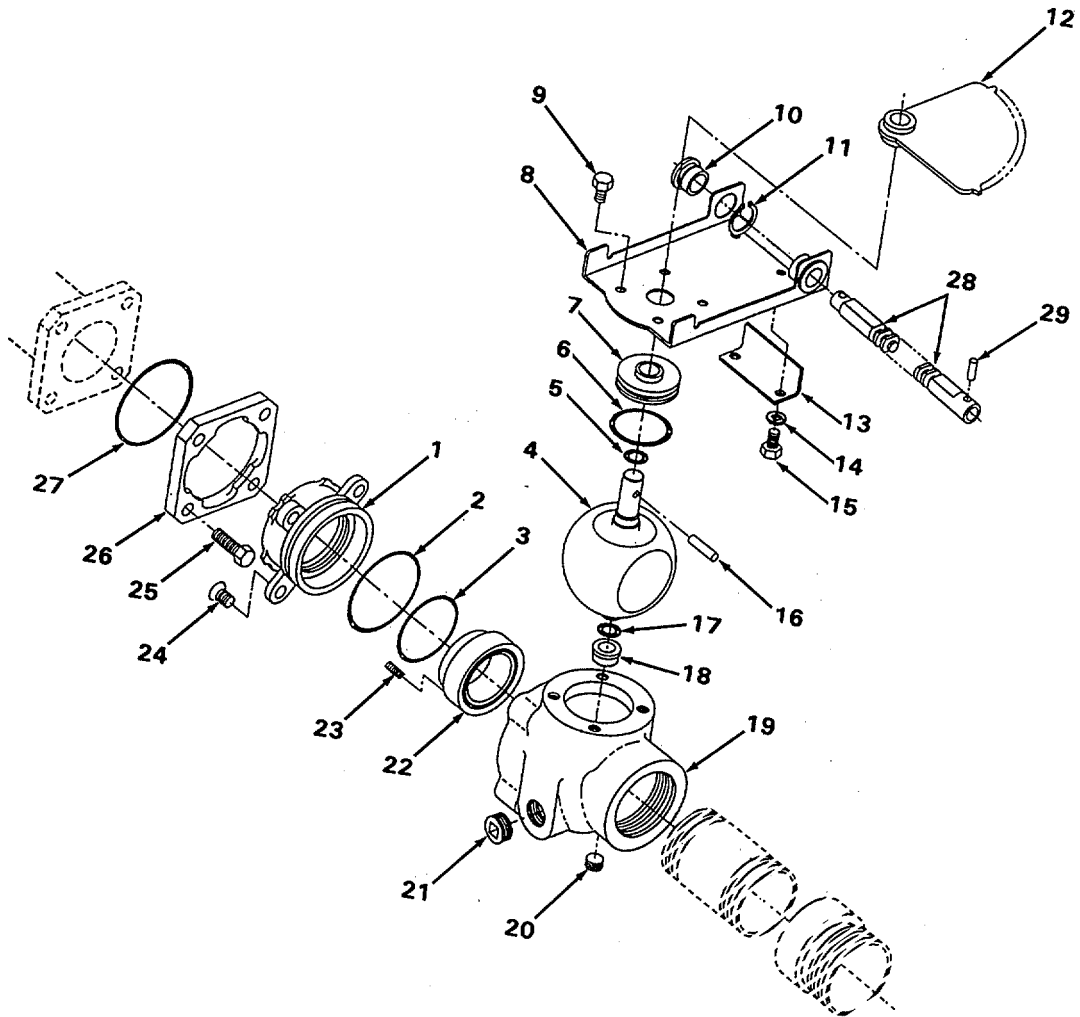


Figure F-14. R.H. Side Discharge Valve (2-1/2")

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-14-			79218	80489-2M	R.H. SIDE DISCHARGE VALVE, 2-1/2" (See figure F-13 for NHA)	REF
			79218	9042-1	VALVE SUBASSY, 2-1/2" Std	1
-1			79218	70601	SEAL, Retaining	1
-2			79218	W3754-4*	O-RING, 3-3/8" x 3-5/8"	1
-3			79218	W3740-4*	O-RING, 2-1/2" x 2-3/4"	1
-4			79218	61691	BALL	1
-5			79218	W3712-3*	O-RING, 3/4" x 15/16"	1
-6			79218	W3734-4*	O-RING, 2-1/8" x 2-3/8"	1
-7			79218	51022	BUSHING, Upper Stem	1
-8			79218	72126	BRACKET	1
-9			79218	W1006-9CA	SCREW, Hex Hd, 3/8"-16	4
-10			79218	52246	BUSHING, Actuator Bracket	2
-11			79218	W4510-100	RING, Retaining	2
-12			79218	61476	GEAR, Sector	1
-13			79218	51429	PLATE, Lock	1
-14			79218	W4105	WASHER, Lock, 5/16"	2
-15			79218	W1005-8CA	SCREW, Hex Hd, 5/16"-18	2
-16			79218	W5806-20SS	PIN, Spring, 3/16" x 1-1/4"	1
-17			79218	W3709-3-	O-RING, 9/16" x 3/4"	1
-18			79218	51023	BUSHING, Tower Stem	1
-19			79218	R71466	BODYASSY	1
-20			79218	W6604	PLUG, Pipe, Headless, 1/4"	1
-21			79218	W6612	PLUG, Pipe, Headless, 3/4"	2
-22			79218	5975*	SEAL	1
-23			79218	5972*	SPRING, Compression	4
-24			79218	W9744-12CA	SCREW, Flat Hd Soc, 7/16"-14	4
-25			79218	W1007-16	SCREW, Hex Hd, 7/16"-14	4
-26			79218	61294	FLANGE, Mounting	1
-27			79218	W3744-4*	O-RING, 2-3/4" x 3"	1
-28			79218	62752	RACK, Discharge Valve	1
-29			79218	W5808-11SS	PIN, Spring, 1/4" x 1 1/16"	1
			79218	K464	KIT, Repair, Discharge Valve (Include items marked *)	1

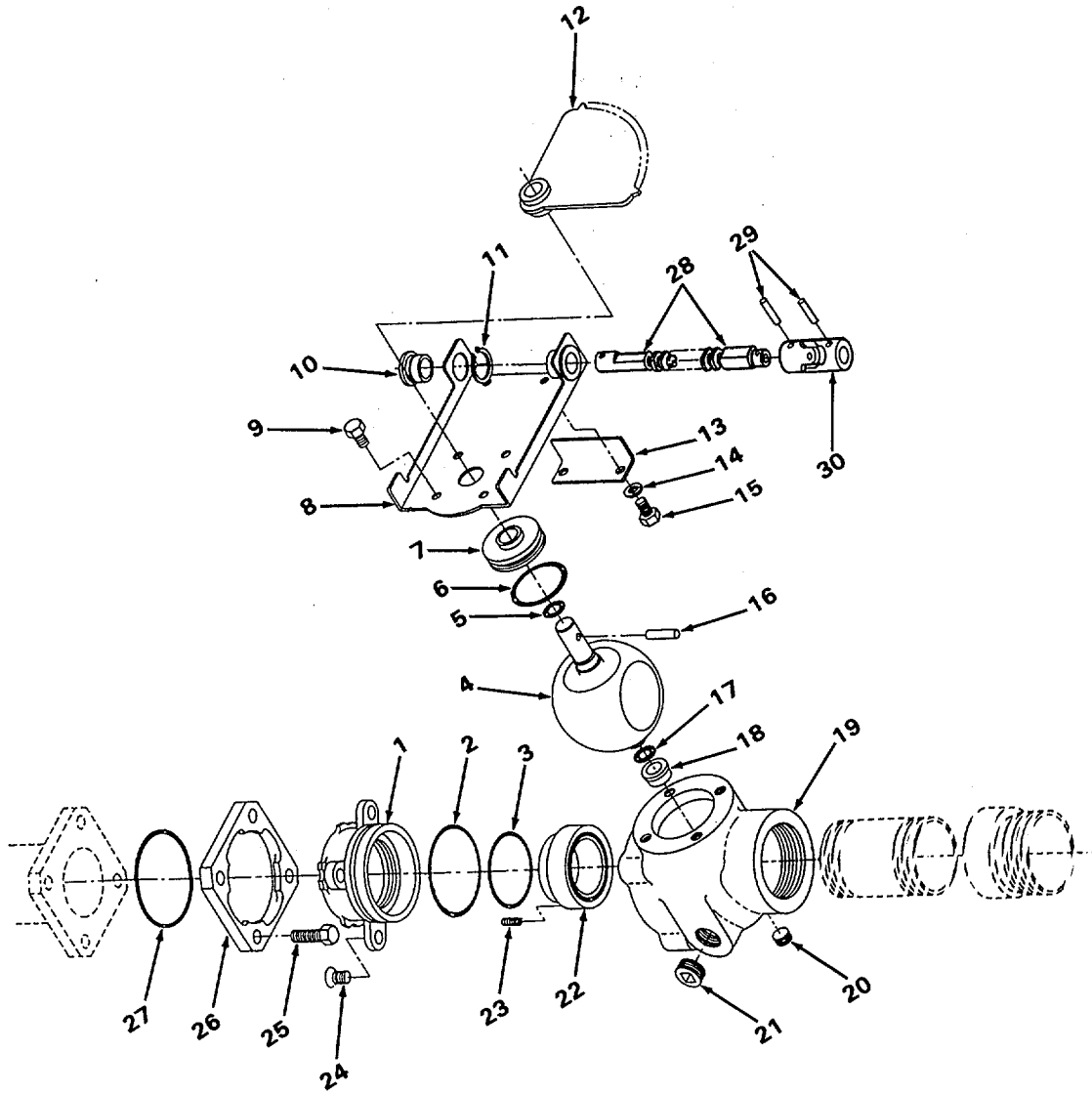


Figure F-15. L.H. Side Discharge Valve (2-1/2")

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-15-			79218	80489-2R	L.H SIDE DISCHARGE VALVE, 2-1/2 (See figure F-13 for NHA)	REF
			79218	9042-1	VALVE SUBASSY, 2-1/2" Std	1
-1			79218	70601	SEAL, Retaining	1
-2			79218	W3754-4*	O-RING, 3-3/8" x 3-5/8"	1
-3			79218	W3740-4*	O-RING, 2-1/2" x 2-3/4"	1
-4			79218	61691	BALL	1
-5			79218	W3712-3*	O-RING, 3/4" x 15/16"	1
-6			79218	W3734-4*	O-RING, 2-1/8" x 2-3/8"	1
-7			79218	51022	BUSHING, Upper Stem	1
-8			79218	72126	BRACKET	1
-9			79218	W1006-9CA	SCREW, Hex Hd, 3/8"-16	4
-10			79218	52246	BUSHING, Actuator Bracket	2
-11			79218	W4510-100	RING, Retaining	2
-12			79218	61476	GEAR, Sector	1
-13			79218	51429	PLATE, Lock	1
-14			79218	W4105	WASHER, Lock, 5/16"	2
-15			79218	W1 005-8CA	SCREW, Hex Hd, 5/16"-18	2
-16			79218	W5806-20SS	PIN, Spring, 3/16" x 1-1/4"	1
-17			79218	W3709-3*	O-RING, 9/16"x3/4"	1
-18			79218	51023	BUSHING, Lower Stem	1
-19			79218	R71466	BODYASSY	1
-20			79218	W6604	PLUG, Pipe, Headless, 1/4"	2
-21			79218	W6612	PLUG, Pipe, Headless, 3/4"	2
-22			79218	5975*	SEAL	1
-23			79218	5972*	SPRING, Compression	4
-24			79218	W9744-12CA	SCREW, Flat Hd, Soc, 7/16"-14	4
-25			79218	W1007-16	SCREW, Hex Hd, 7/16"-14	4
-26			79218	61294	FLANGE, Mounting	1
-27			79218	W3744-4*	O-RING, 2-3/4" x 3"	1
-28			79218	62752	RACK, Discharge Valve	1
-29			79218	W5808-18SS	PIN, Spring, 1/4" x 1-1/8"	2
-30			79218	51057	U-JOINT	1
			79218	K464	KIT, Repair, Discharge Valve (Includes items marked *)	1

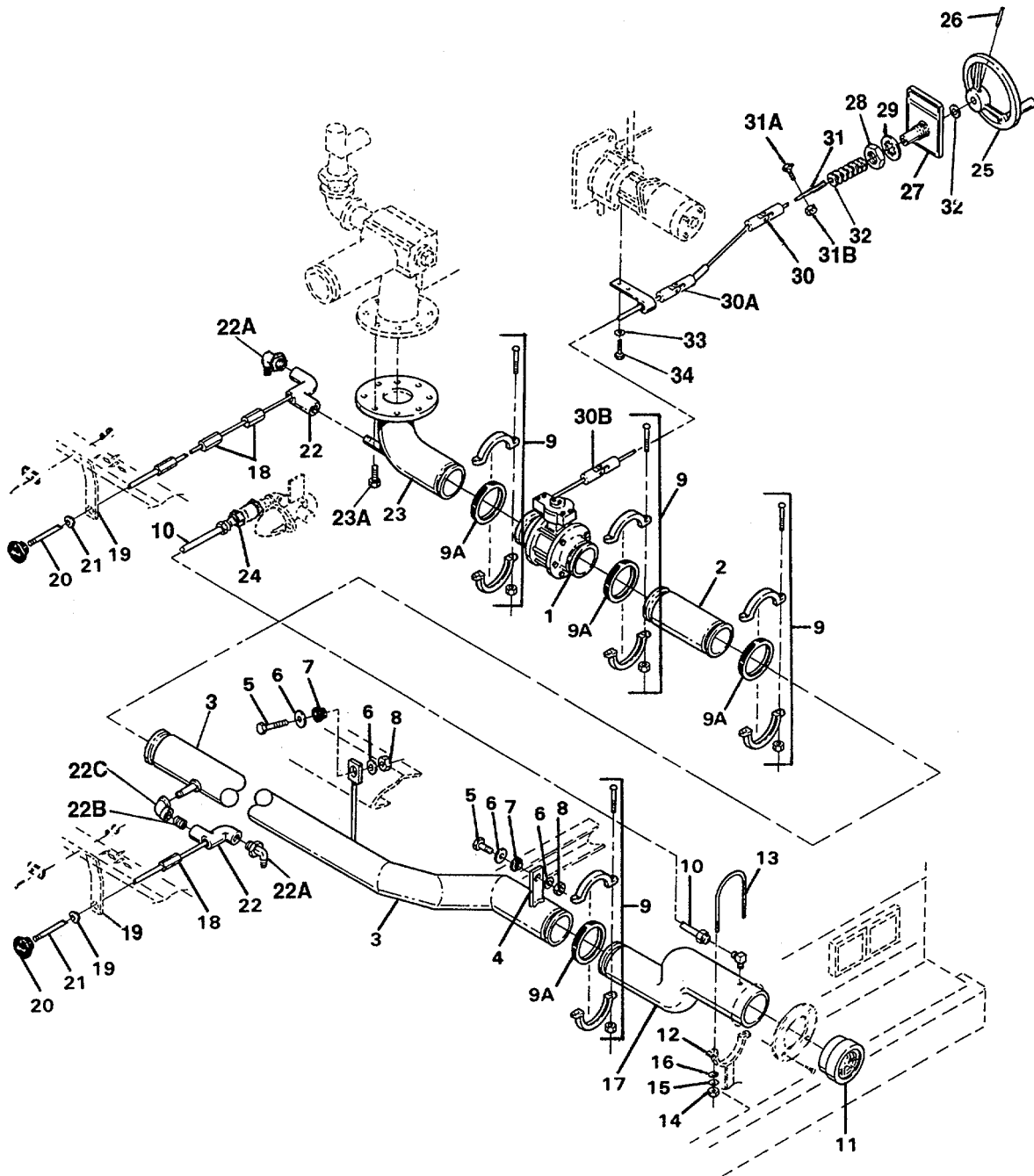


Figure F-16. Front Suction Piping

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-16-					FRONT SUCTION PIPING	1
-1	04664	51-0196	04613	100-060	VALVE, Butterfly, 5" (See figure F-17 for details)	1
-2	04664	SD-00516			PIPE, Front Suction, 5"	1
-3	04664	SD-00519			PIPE, Front Suction, 5"	1
-4	04664	51-0883			BAR, Mounting - Front Suction (ATTACHING PARTS)	1
-5	04664	82-2033-0450			SCREW, Cap, Hex Hd, 1/2"-13 x 4-1/2", Zn, G-8	2
-6	04664	44-0522	30676	44-2212	WASHER, Lord	4
-7	04664	44-0518	30676	CRA28-1050	BISCUIT	2
-8	04664	82-3029-005			NUT, Lock, Nylon Insert, 1/2"-13, Zn	2
-9	04664	56-0008	5L657	Style 77	COUPLING, Grooved, 5"	4
-9A			5L657	Style 77-G	GASKET	1
-10	04664	944004			TUBING, Copper, 3/8" O.D. (ft.)	AR
-11	04664	51-0761	20266	418	ADAPTER, Suction, 5" NPT x 6" M NST	1
-12	04664	51-0252			BRACKET, U-Bolt	1
-13	04664	51-0259			U-BOLT (ATTACHING PARTS)	1
-14	04664	82-3014-003			NUT, Hex, 3/8"-1 6, Zn	2
-15	04664	82-1013-008			WASHER, Flat, 3/8", Zn	2
-16	04664	82-1011-0038			WASHER, Lock, 3/8", Zn	2
-17	04664	SD-00520			PIPE, Front Suction, 5"	1
-18	04664	52-0144	75925	ES433.031	COUPLING, Drain Valve Rod Extension	2
-19	04664	51-0260			BRACKET, Drain Rod - Side	2
-20	04664	80-0016	60319	42026	KNOB, Drain Valve, 3/4"	2
-21	04664	52-0048			ROD, Drain Valve, 12", S/S	2
-22	04664	51-0040	60319	110	VALVE, Drain, 3/4" (See figure F-18 for details)	2
-22A	04664	56-0545-0017			ELBOW, Plastic	2
-22B	04664	53-0131-004			NIPPLE, Pipe	1
-22C	04664	53-0121-005			ELBOW, Pipe	1
-23	04664	SD-00514			ELBOW, Front Suction, 5"	1
-23A	04664	82-2091-0250			SCREW, Cap, Hex Hd	8
-24	04664	51-0194	9C876	61-501-81	VALVE, Check, 1/4"	1
-25	04664	72-0074	57029	BP-5A	WHEEL, Hand, Chrome Plated (ATTACHING PARTS)	1
-26	04664	82-0078-0100			PIN, Roll, 1/4" x 1"	1
-27	04664	52-0046			GUIDE, Valve Rod, Long (ATTACHING PARTS)	1
-28	04664	82-3021-010			NUT, Hex, 1"-14	1
-29	04664	82-1002			WASHER, Lock, Internal Tooth, 1"	1
-30	04664	51-0182	71437	4010	JOINT, Universal	1
-30A	04664	51-0126			JOINT, Universal	1
-30B	04664	51-0184			JOINT, Universal	1
-31	04664	51-0124			ROD ASSY, Control	1
-31A	04664	82-2063-0150			SCREW, Cap, Hex Hd	1
-31B	04664	82-3019-001			NUT, Hex	1
-32	04664	82-1007-0075			WASHER, Flat, Structural, 3/4"	8
-33	04664	82-2031-0100			SCREW, Cap, Hex Hd, 3/8"-1 6 x 1", Zn	2
-34	04664	82-1011-0038			WASHER, Lock, 3/8", Zn	2

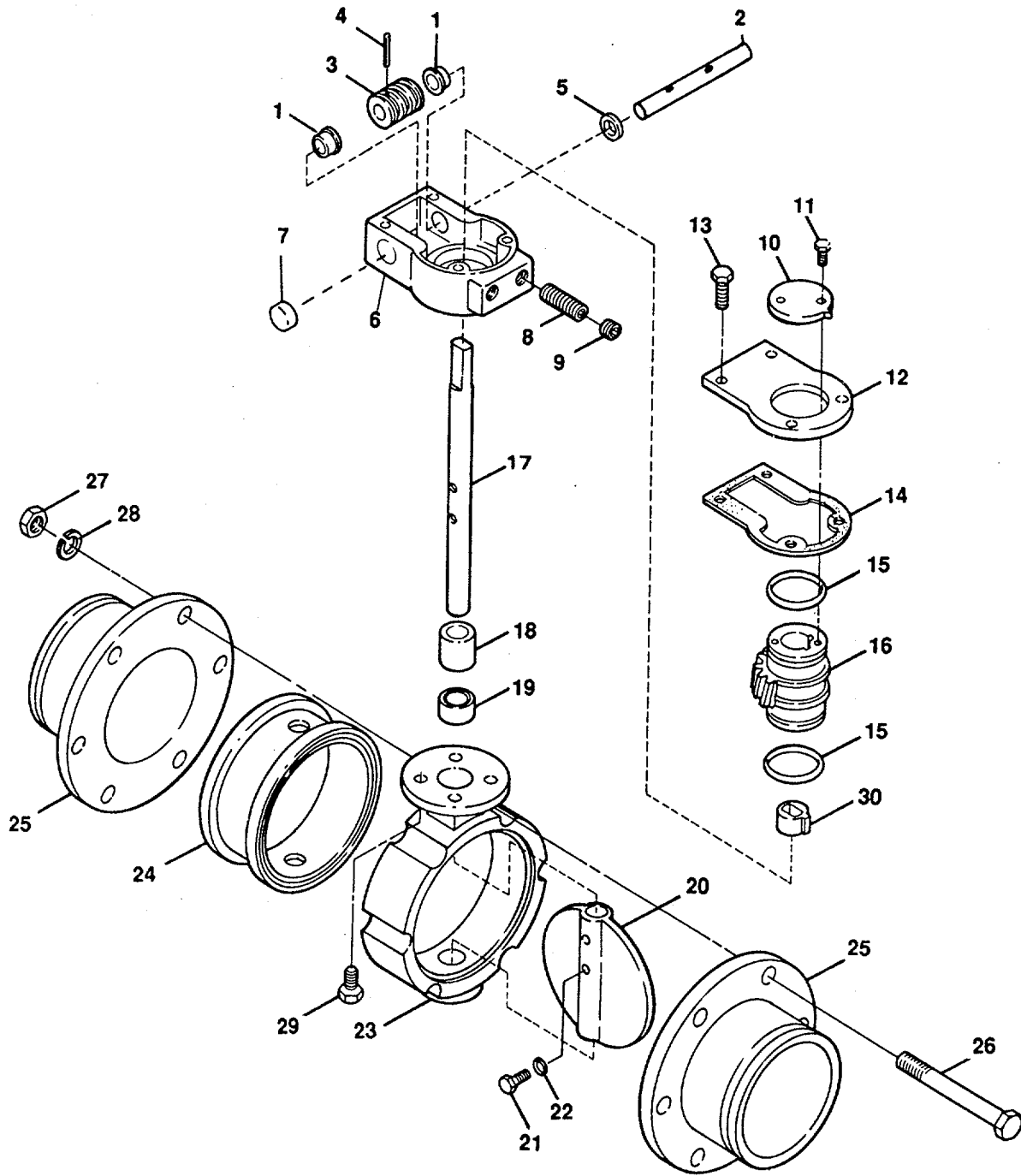


Figure F-17. Front Suction Butterfly Valve

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-17-	04664	51-0196	04613	100-060	FRONT SUCTION BUTTERFLY VALVE (See figure F-16 for NHA)	REF
			04613	SM0038	OPERATOR SUBASSY, Hand Wheel Gear	1
-1			04613	923421	BUSHING, Shaft-Bronze	2
-2			04613	218421	SHAFT, Input	1
-3			04613	924421	GEAR, Worm (ATTACHING PARTS)	1
-4			04613	908-733	PIN, Roll, Worm	1
-5			04613	932421	. SEAL, Shaft	1
-6			04613	219423	. . HOUSING	
-7			04613	922421	.. PLUG, Expanding	1
-8			04613	905-735	SCREW, Stop, Adjusting	2
-9			04613	905-735	SCREW, Stop, Lock	2
-10			04613	251423	INDICATOR (ATTACHING PARTS)	1
-11			04613	905-735	SCREW, Indicator, Steel, Cad	2
-12			04613	259423	COVER (ATTACHING PARTS)	1
-13			04613		SCREW, Cover, Steel, Cad	4
-14			04613	921423	GASKET	1
-15			04613	927-730	O-RING, Segment	2
			04613	SM0010	VALVE SUBASSY	1
-16			04613	924423	GEAR, Segment	1
-17			04613	205-100	STEM	1
-18			04613	207-100	BUSHING	1
-19			04613	928-100	PACKING	1
-20			04613	204-100	DISK (ATTACHING PARTS)	1
-21			04613	905-100	SCREW, Hex Hd	2
-22			04613	927-730	O-RING	2
-23			04613	203-100	BODY	1
-24			04613	206-100	SEAT	1
-25			04613	526710	FLANGE, Grooved (ATTACHING PARTS)	2
-26			04613	668230	BOLT, Hex, 1/2"-13 x 4", Zn	
-27			04613	669310	NUT, Hex, 1/2"-13, Zn	6
-28			04613	669350	WASHER, Lock 1/2", Zn	6
-29			04613	100-060-SCR	SCREW, Valve-to-Operator	4
-30			04613	525590	ADAPTER, Stem	1

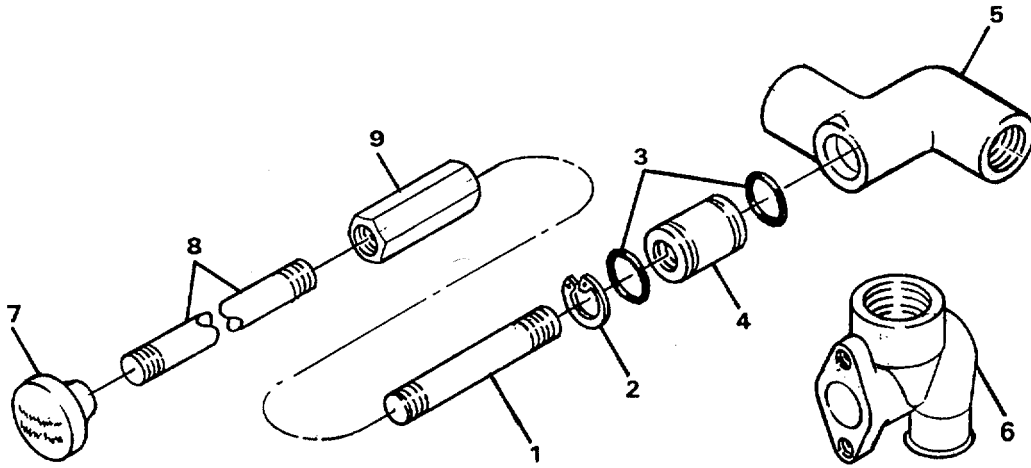


Figure F-18. Drain Valves (3/4")

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-18-	04664	51-0040	20266	110	DRAIN VALVE (3/4") (See figure F-7 for NHA)	REF
	04664	51-0968	20266	115	DRAIN VALVE (3/4") - Panel Mount (See figures F-5, F-1 3, & F-23 for NHA)	REF
-1			20266	61551	ROD, Drain Valve	1
-2			20266	57591	RING, Retaining	1
-3			20266	57341	O-RING	2
-4			20266	51340	PISTON	1
-5			20266	16272	BODY (Part of 51-0040)	1
-6			20266	16959	BODY (part of 51-0968)	1
-7	04664	80-0016	20266	42026	KNOB, Drain Valve	5
-8	04664	52-0048			ROD, Drain Valve - Extension	2
-9	04664	52-0144	75925	ES433.031	COUPLING, Drain Valve Rod	3

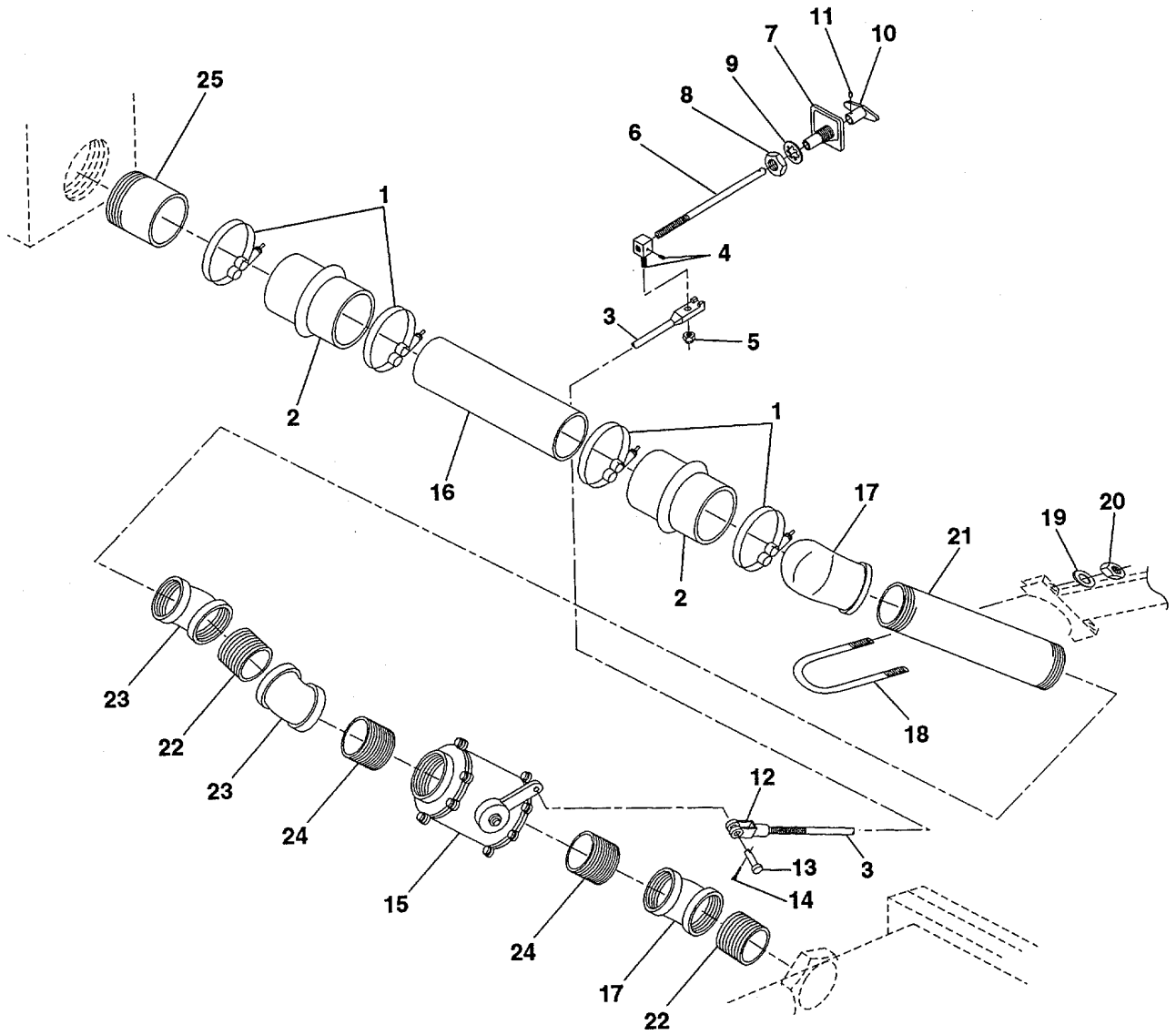


Figure F-1 9. Tank to Pump Valve and Piping

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-19-					TANK TO PUMP VALVE AND PIPING	1
-1	04664	80-6017			CLAMP, Rubber Hose, 3-1/2" ID	4
-2	04664	51-0239			HUMP HOSE, Rubber, 3-1/2"	2
-3	04664	E3675-210070			ROD, Control (Tank Fill)	1
-4	04664	52-0065			BLOCK, Swivel (ATTACHING PARTS)	1
-5	04664	82-3014-006			NUT, Hex, 1/2"-13, Zn	1
-6	04664	52-0036			ROD, Valve, Threaded, 14" Lg	1
-7	04664	52-0046			GUIDE, Valve Rod (ATTACHING PARTS)	1
-8	04664	82-3021-010			NUT, Hex, 1"-14	1
-9	04664	82-1002			WASHER, Lock, Internal Tooth, 1"	1
-10	04664	52-0064	60319	PH60Z	T-HANDLE (ATTACHING PARTS)	1
-11	04664	82-0078-0075			PIN, Roll, 1/4" x 3/4"	5
-12	04664	80-9068	71177	9J-480-9068	CLEVIS, 1/2" (ATTACHING PARTS)	1
-13	04664	82-0082-0137			PIN, Clevis 1/2" x 1-3/8", Zn	1
-14	04664	80-9101-0100			PIN, Cotter 1/8" x 1"	1
-15	04664	51-0026	20266	2893KKD	VALVE, Inline, 3", Water Tank to Pump (See figure F-20 for details)	1
-16	04664	930047-00500			PIPE, PVC, 3" x 5"	1
-17	04664	56-0147			ELBOW, Pipe, 3", Galv., 90°	2
-18	04664	51-0259			U-BOLT (ATTACHING PARTS)	1
-19	04664	82-1013-008			WASHER, Flat, 3/8", Zn	2
-20	04664	82-3014-003			NUT, Hex, 3/8"-16, Zn	2
-21	04664	56-0538-1800			NIPPLE, Pipe, 3" x 18", Galv.	1
-22	04664	53-0169-002			NIPPLE, Close, 3", Galv.	2
-23	04664	56-0146			ELBOW, Pipe, 3", Galv., 45°	2
-24	04664	56-0538-0400			NIPPLE, Pipe, 3" x 4", Galv.	2
-25	04664	50-0069			PIPE, Tank Discharge	1

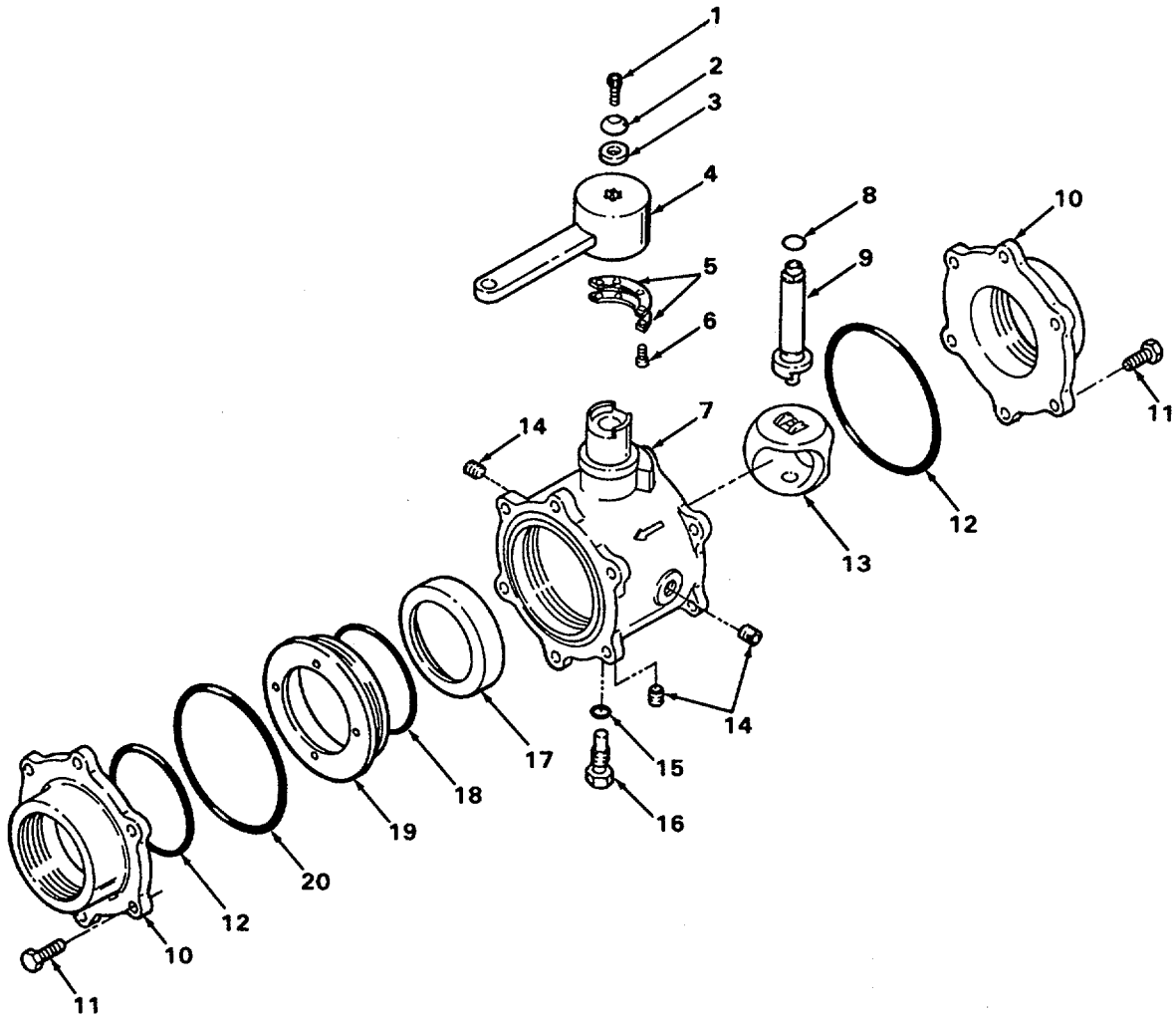


Figure F-20. Ball Valve (3")

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-20-	04664	51-0026	20266	2893KKD	BALL VALVE, 3" (See figure F-19 for NHA)	REF
-1			20266	61036	SCREW, Cap	1
-2			20266	71082	WASHER, Handle	1
-3			20266	63592	WASHER	1
-4			20266	15788	BODY, Handle	1
-5			20266	16507	BRACKET, Stop	2
-6			20266	61046	SCREW, Cap	4
-7			20266	16288	BODY, Valve	1
-8			20266	57295*	O-RING	1
-9			20266	63752	SHAFT, Actuator	1
-10			20266	20086	CAP, End, 3" NPT, Fem	2
-11			20266	16375	BOLT	12
-12			20266	57363*	O-RING	2
-13			20266	15080	BALL, Valve	1
-14			20266	51890	PLUG, 1/4", NPT, Brass	3
-15			20266	57295*	O-RING	1
-16			20266	16406	BOLT	1
			20266	80455*	SEAT SUBASSY	1
-17			20266	63823*	SEAT	1
-18			20266	57307*	O-RING	1
-19			20266	58885*	RETAINER, Seat	1
-20			20266	57308*	O-RING	1
	04664	51-0090	20266	80421	KIT, Repair (Includes items marked *)	1

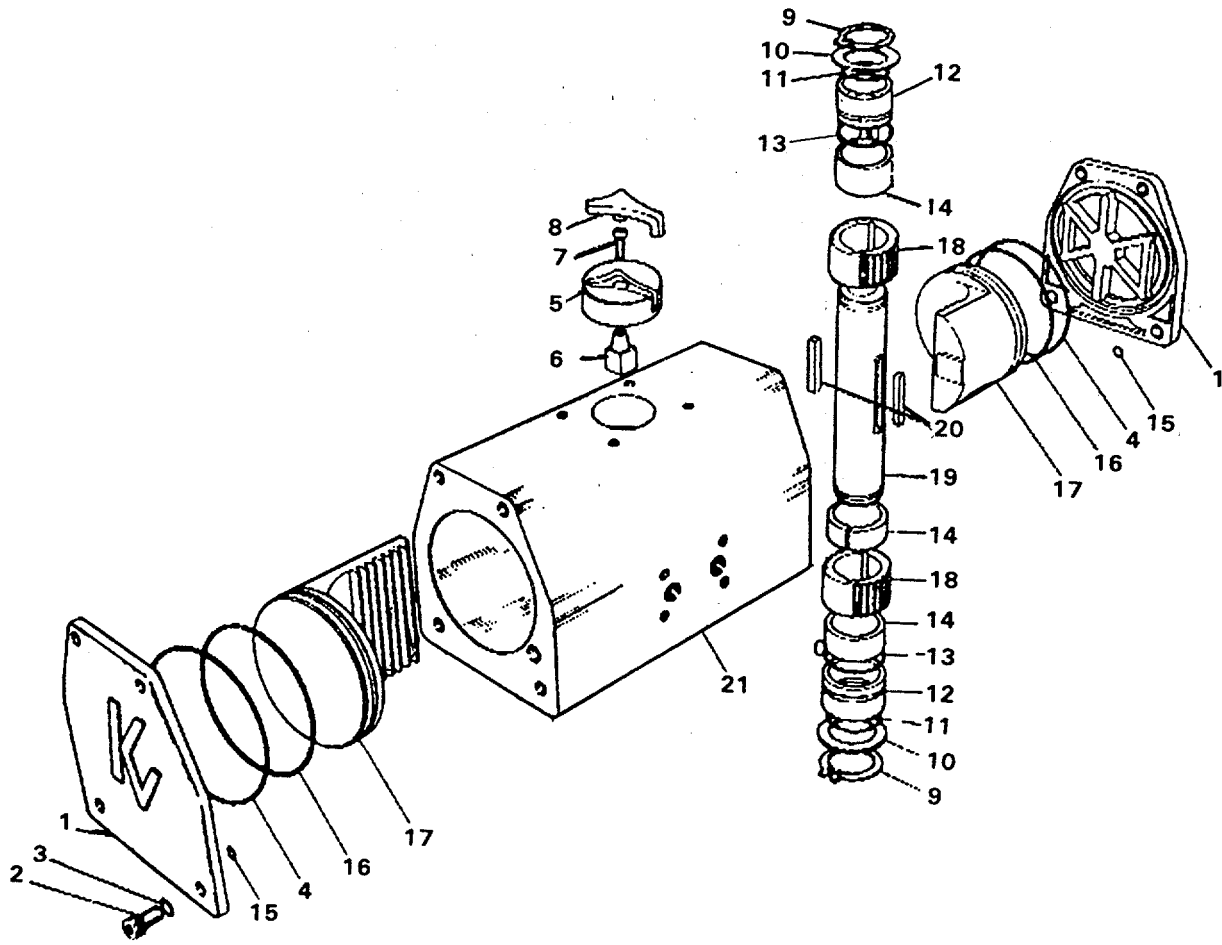


Figure F-21. Aerial Water Valve Pneumatic Actuator

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-21-		04613	020-79X-	200	AERIAL WATER VALVE PNEUMATIC ACTUATOR (See figure F-23 for NHA)	REF
-1			04613	572-227-006-790-200	CAP, End	2
-2			04613	537-905-006-790-002	SCREW, Socket Hd	8
-3			04613	537-904-132-732-010	WASHER, Lock	8
-4			04613	230-927-234-730-000	O-RING, End Cap	2
-5			04613	540-277-006-790-200	KNOB, Indicator	1
-6			04613	752-912-006-790-200	CLAMP, Indicator Knob	1
-7			04613	902-905-236-735-002	SCREW, Socket Hd	1
-8			04613	540-251-006-790-200	INDICATOR, Arrow	1
-9			04613	121-979-100-735-002	RING, Retaining	2
-10			04613	102-904-015-790-001	WASHER, Retaining	2
-11			04613	230-927-022-730-000	O-RING, Internal Body Bearing	2
-12			04613	510-923-006-790-200	BEARING, Shaft	2
-13			04613	230-927-024-730-000	O-RING, Internal Body Bearing	2
-14			04613	521-275-006-790-200	SPACER	3
-15			04613	230-927-200-790-000	O-RING, Air Passage	2
-16			04613	230-927-333-730-000	O-RING, Piston	2
-17			04613	571-974-006-790-200	PISTON	2
-18			04613	102-924-006-790-200	GEAR	2
-19			04613	752-218-006-790-200	SHAFT, Output	1
-20			04613	102-913-020-735-068	KEY, Straight	2
-21			04613	572-237-003-790-200	BLOCK, Actuator Body	1

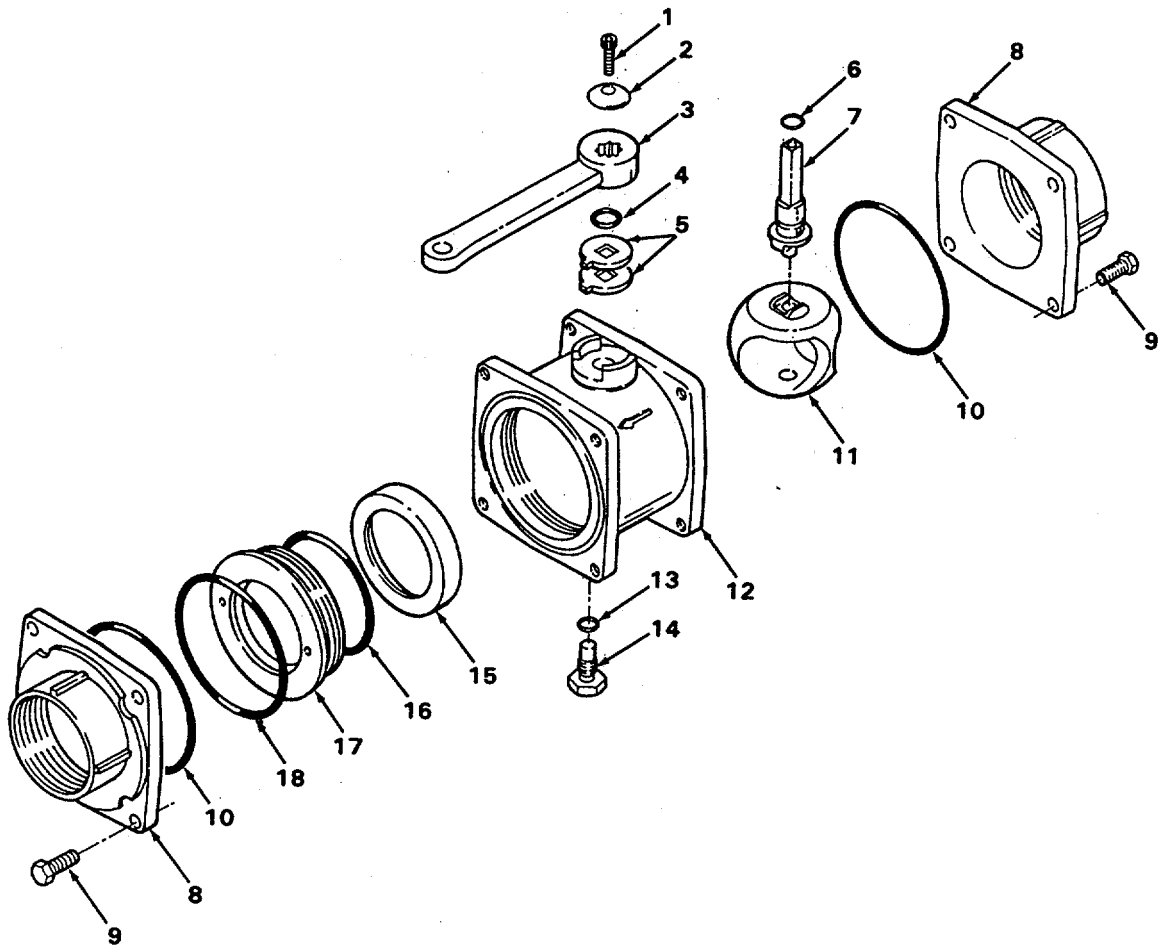


Figure F-22. Ball Valve (1")

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-22-	04664	51-0022	20266	2890KKD	BALL VALVE, 1" (See figure F-28 for NHA)	REF
-1			20266	61036	SCREW, Cap	1
-2			20266	71082	WASHER, Handle	1
-3			20266	36004	HANDLE	1
-4			20266	57395*	O-RING	1
-5			20266	51813	PLATE, Stop	2
-6			20266	57321*	O-RING	1
-7			20266	61476	SHAFT, Actuator	1
-8			20266	20076	CAP, End, 1" NPT Fem	2
-9			20266	61144	BOLT	8
-10			20266	57319*	O-RING	2
-11			20266	15076	BALL, Valve	1
-12			20266	16327	BODY, Valve	1
-13			20266	57348*	O-RING	1
-14			20266	63702	BOLT, Pivot	1
			20266	80478*	SEAT SUBASSY	1
-15			20266	61399*	SEAT	1
-16			20266	57394*	O-RING	1
-17			20266	58880*	RETAINER, Seat	1
-18			20266	57297*	O-RING	1
	04664	51-0086	20266	80426	KIT, Repair (Include items marked*)	1

**Figure F-23 can be found at the rear of this manual
as page FO-1.**

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-23-					AERIAL WATERWAY PIPING	
-1			20266	0650-00-71-29-001	JOINT, Akron, Brass, Swivel	1
-2	04664	56-0006			JOINT, Union, 41/2"	4
-3	04664	M10-1715-4			BOLT, Carriage, 5/8" x 2-1/2" Lg	2
-4	04664	M10-1715-3G			SEAL, Union Joint	1
-5	04664	M10-1715-2			NUT, 5/8"	2
-6	04664	M10-1715-5			BASE TUBE, Water	1
-6A	04664	M10-1906-5A			U-STRAP (ATTACHING PARTS)	1
-6B	04664	M10-1906-5B			NUT	2
-6C	04664	M10-1906-5C			SENDER, Flowmeter	1
-7	04664	M10-1715-29			CLAMP	1
-8	04664	M10-1715-30			SCREW, Cap	2
-9	04664	M10-1715-31			WASHER, Lock	2
-10	04664	M10-1715-8			BOLT, 3/8" x 1-1/4" Lg, Gr 5	8
-11	04664	M10-1715-7			WASHER, 3/8"	8
-12	04664	M10-1715-6			NUT, 3/8"	8
-13	04664	M10-1715-24			O-RING, 5" I.D. x 139 O.S.	4
-14	04664	M10-1715-9			PIPE, Base Section Water	1
-14A	04664	M10-17715-15			PIPE, Lower Mid Section Water	1
-15	04664	M10-1715-13			BOLT, 5/16" x 2" Lg	24
-16	04664	M10-1715-11			WASHER, 5/16"	24
-17	04664	M10-1715-10			NUT, 5/16"	24
-18	04664	M10-1715-12			PAD, Bronze Wear, Water Pipe	3
-19	04664	M10-1715-33			NUT, Hex	3
-20	04664	M10-1715-32			FITTING, Grease	2
-21	04664	M10-1715-14			PAD, Ryertex Wear, Lower Mid Section	1
-22	04664	M10-1715-25			SEAL, "U" Cup, 4" I.D.	1
-23	04664	M10-1715-16			PAD, Ryertex Wear, Upper Mid Section	1
-24	04664	M10-1715-27			SEAL, "U" Cup, 3-1/2" I.D.	1
-25	04664	M10-1715-17			PIPE, Upper Mid Section, Water	1
-26	04664	M10-1715-18			PAD, Ryertex Wear, Fly Section	1
-27	04664	M10-1715-28			SEAL, "U" Cup, 3" I.D.	1
-28	04664	M10-1715-19			PIPE, Fly Section Water	1
-29	04664	M10-1715-25			O-RING, 4" I.D. x .139 O.S.	1
-30	04664	M10-1715-20			BOLT, 5/8" x 2" Lg, Gr 5	4
-31	04664	M10-1715-23			WASHER, 5/8"	4
-32	04664	M10-1715-22			NUT, 5/8"	4
-33	04664	M10-1715-21			ELBOW, Fly Section Offset	1
-34	04664	M10-1715-34			SCREW, Hex Hd	8
-35	04664	M10-1715-35			WASHER, Rat	8
-36	04664	M10-1715-36			NUT, Hex	8
-37	04664	52-0064	60319	PH60Z	T-HANDLE (ATTACHING PARTS)	1
-38	04664	82-0078-0075			PIN, Roll, 1/4" x 3/4"	1
-39	04664	52-0046			GUIDE, Valve Rod, Long	1
-40	04664	81-1002			WASHER, Lock, Internal Tooth, 1"	1
-41	04664	82-3021-010			NUT, Hex, 1"-14	1
-42	04664	51-0124			ROD ASSY, Control	1
-43	04664	51-0182	79218	51057	JOINT, Universal	1
-44	04664	52-0037			ROD, Valve	1
-45			79218	81356-1R	VALVE ASSY, Aerial Discharge, 3-1/2" (See figure F-24 for details)	1
-46			79218	W1008-201T	SCREW, Hex Hd, 1/2"-13 x 1	8
-47			79218	51195	GASKET	4
-48			79218	71597	ELBOW, Flanged	1
-49	04664	82-2033-0225			SCREW, Hex Hd, 1/2"-13 x 2-1/4", Zn, G-8	8
-50	04664	82-1011-0050			WASHER, Lock, 1/2", Zn	8
-51	04664	82-3015-005			NUT, Hex, 1/2"-13, Zn, G-8	8

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-23						
-52	04664	SD-06204			PIPE ASSY, Flanged, 4" x 20-1/2"	1
-53	04664	SD-06202			PIPE, 4" x 16 ft.	1
-54	04664	51-0258			U-BOLT	3
-55	04664	82-3014-003			NUT, Hex, 3/8"-1 6, Zn	6
-56	04664	51-0952			BRACKET ASSY, Hanger	3
-57	04664	SD-06201			PIPE, 4"x 5-1/2"	1
-58	04664	SD-06200			ELBOW ASSY, Flanged, 4", 90°	1
-59	04664	82-2064-0500			SCREW, Hex Hd, 5/8"-11 x 5", Zn, G-8	8
-60	04664	82-1011-0062			WASHER, Lock, 5/8", Zn	8
-61	04664	82-3015-007			NUT, Hex, 5/8"-1 1, Zn, G-8	8
-62	04664	M10-1715-42			GASKET	2
-63			04613	SM0518	VALVE, Air Operated (See figure F-25 for details)	1
-64			04613	020-79X-200	ACTUATOR, Pneumatic (See figure F-21 for details)	
-65	04664	M10-1715-43			WASHER, Lock	4
-66	04664	M10-1715-44			NUT, Hex	4
-67	04664	M10-1715-45			FLANGE	1
-68	04664	M10-1715-46			O-RING	1
-69	04664	M10-1715-37			RETAINER	1
-70	04664	M10-1717-38			SCREW, Hex Hd	1
-71			3V687	03-005-007	SWIVEL	REF
-72	04664	M10-1715-39			SCREW, Hex Hd	2
-73	04664	M10-1715-40			WASHER, Lock	2
-74	04664	M10-1715-41			NUT, Hex	2
-75	04664	56-0569-0001			FITTING, Push-Lok, Male, 3/4"	2
-76	04664	80-6039-0001			CLAMP, Pinch-on	2
-77	04664	940093			HOSE, Push-Lok, 3/4", 250 PSI	AR
-78	04664	51-0968	20266	115	VALVE, Drain, 3/4", Panel Mt. (See figure F-18 for details) (ATTACHING PARTS)	1
-79	04664	82-2142-0001			SCREW, Machine, Type 1 Cross, 3/4" Lg	2
-80	04664	80-6029-005	66295	10H	CLAMP, Hose	1
-81	04664	940004			HOSE, Drain, 3/4" (ft.)	1
-82	04664	80-0016			KNOB, 3/4" Drain Valve	1

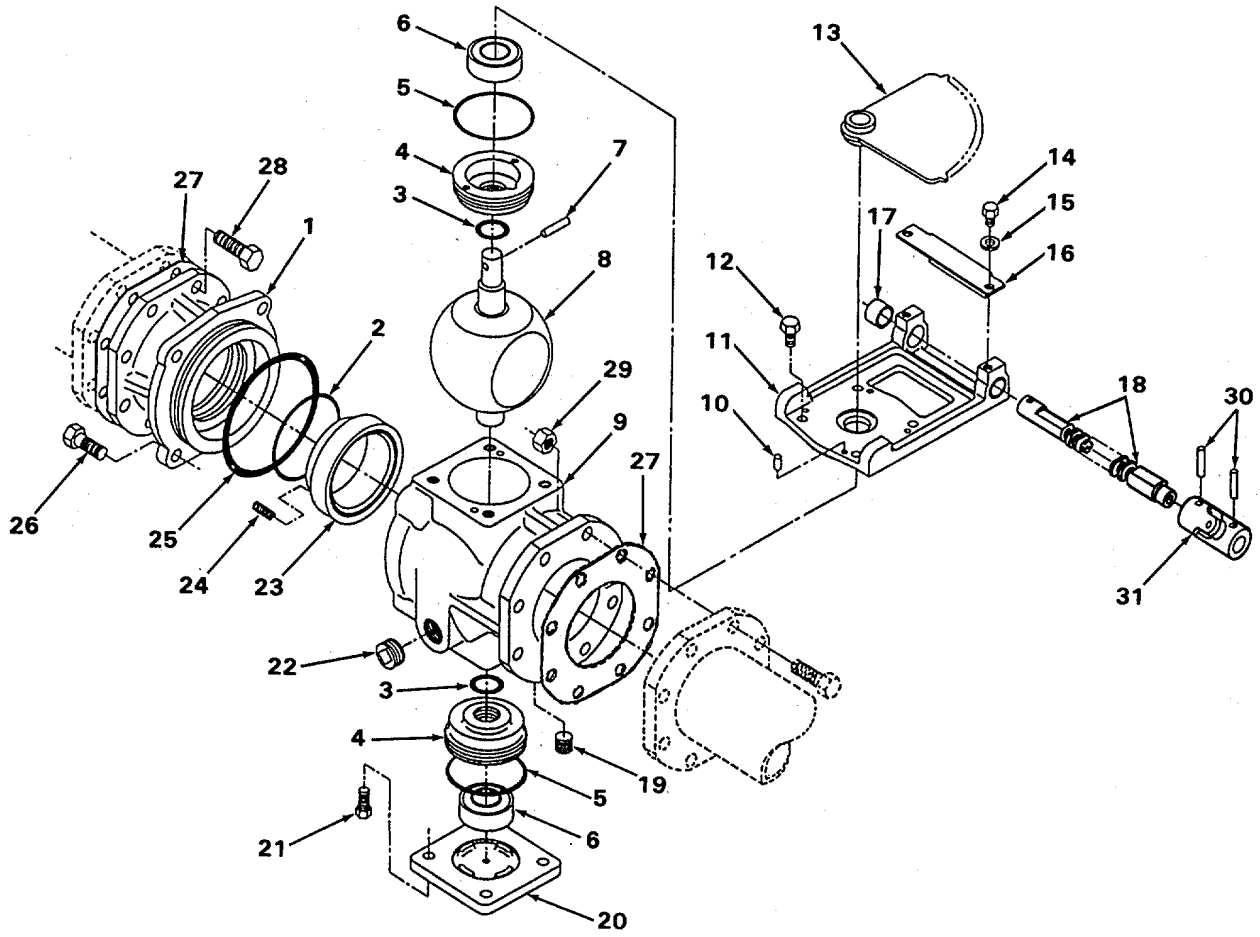


Figure F-24. Aerial Discharge Valve Assembly

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-24-			79218	81356-1R	AERIAL DISCHARGE VALVE ASSEMBLY (See figure F-23 for NHA)	REF
			79218	9114-1A	VALVE SUBASSY, 3-1/2", Std	1
-1			79218	80821	RETAINER, Sea[, 3-1/2"	1
-2			79218	W3754-4*	O-RING, 3-3/8" x 3-5/8"	1
-3			79218	W3716-4UH*	O-RING, 1" x 1-1/4"	1
-4			79218	62051	RETAINER, Bearing	1
-5			79218	W3746-4*	O-RING, 2-7/8" x 3-1/8"	2
-6			79218	V1548	BEARING, Ball	2
-7			79218	W5806-20SS	PIN, Spring, 3/16" x 1-1/4"	1
-8			79218	71592	BALL, Valve, 3-1/2" Std	1
-9			79218	80818	BODY, Valve, 3-1/2" Std	1
-10			79218	W5008-8	PIN, Dowel, .2502 x 1/2"	2
-11			79218	72069	BRACKET, Actuator, 3-1/2" Std	1
-12			79218	W1006-12CA	SCREW, Hex Hd, 3/8"-16	4
-13			79218	61476	GEAR, Sector	1
-14			79218	W1005-8CA	SCREW, Hex Hd, 5/16"-18	2
-15			79218	W4105	WASHER, Lock, 5/16"	2
-16			79218	62598	PLATE, Lock	1
-17			79218	V1484	BEARING, Sleeve	2
-18			79218	62752	RACK, Discharge Valve	1
-19			79218	W6604	PLUG, Pipe, 1/4"	1
-20			79218	62062	COVER, Discharge Valve	1
-21			79218	W1006-14CA	SCREW, Hex Hd, 3/8"-16	4
-22			79218	W6612	PLUG, Pipe, 3/4"	2
-23			79218	71908*	SEAL	1
-24			79218	5972*	SPRING, Compression	4
-25			79218	W3776-4*	O-RING, 4-3/4" x 5"	1
-26			79218	W1008-20CA	SCREW, Hex Hd, 1/2"-13	4
-27			79218	51 195*	GASKET	1
-28			79218	W1 108-28HT*	SCREW, Hex Hd, 1/2"-20	8
-29			79218	W2108	NUT, Hex, 1/2"-20	8
-30			79218	W5808-18SS	PIN, Spring, 1/4" x 1-1/8"	2
-31			79218	51057	U-JOINT	1
			79218	K472	KIT, Repair Aerial Discharge Valve (Includes items marked *)	1

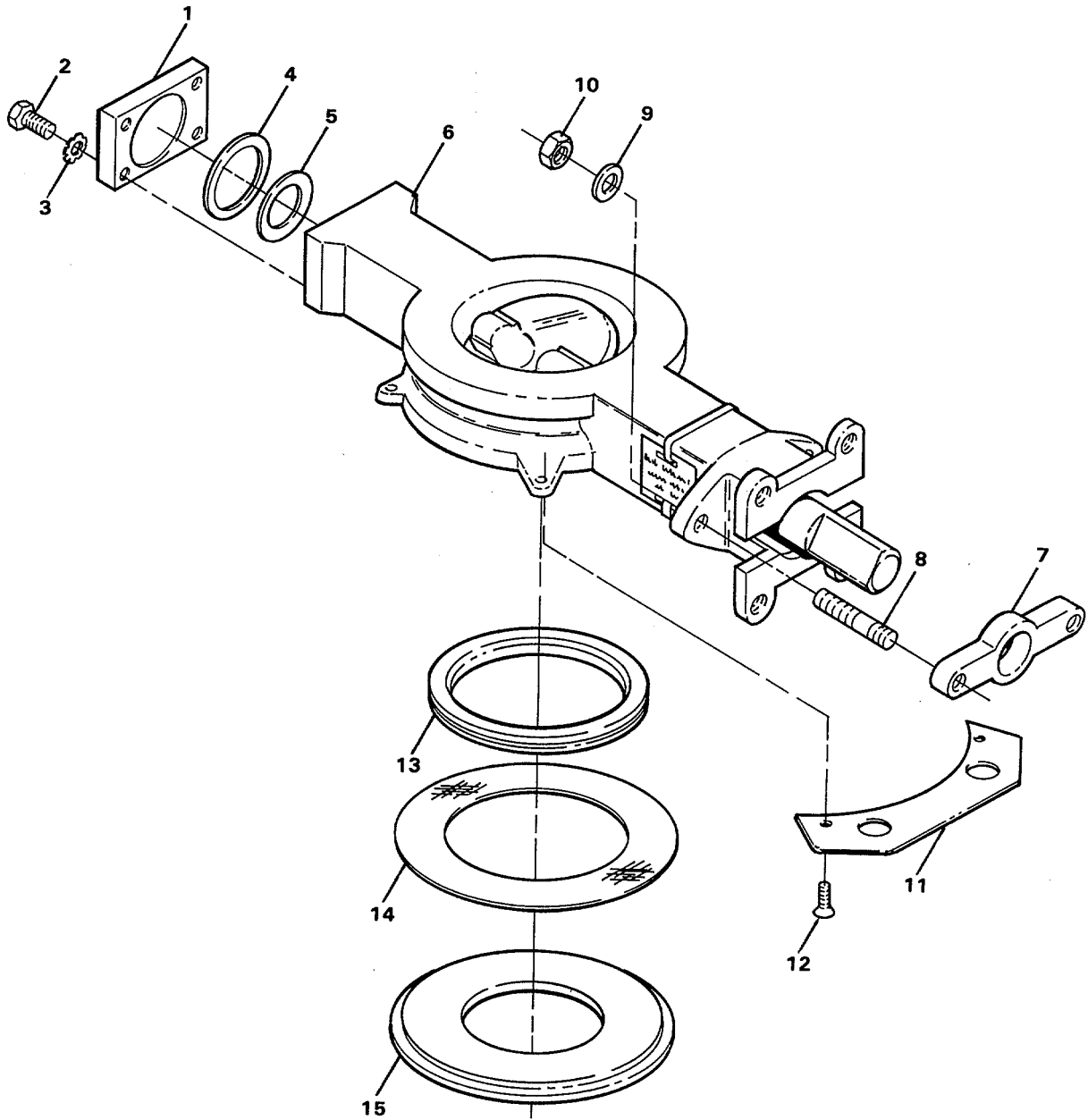


Figure F-25. Air Operated Valve

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-25-			04613	SM0518	AIR OPERATED VALVE (See figure F-23 for NHA)	REF
-1			04613	259-360	COVER, Bottom (ATTACHING PARTS)	1
-2			04613	905-735	SCREW, Hex Hd	4
-3			04613	904-735	WASHER, Lock, External Tooth	4
-4			04613	921-360	GASKET, Bottom Cover	1
-5			04613	253-360	WASHER, Thrust	2
-6					BODY SUBASSY (NSS)	1
-7			04613	236-360	PLATE, Packing Gland (ATTACHING PARTS)	1
-8			04613	904-735S	STUD	2
-9			04613	904-735W	WASHER, Lock	4
-10			04613	904-735N	NUT, Hex	4
-11			04613	278-360	PLATE, Locating (ATTACHING PARTS)	2
-12			04613	905-735	SCREW, Flat Hd, Hex Socket	4
-13			04613	206-360	SEAT	1
-14			04613	921-360	GASKET, Seat Retaining	1
-15			04613	214-360	RING, Seat Retaining	1

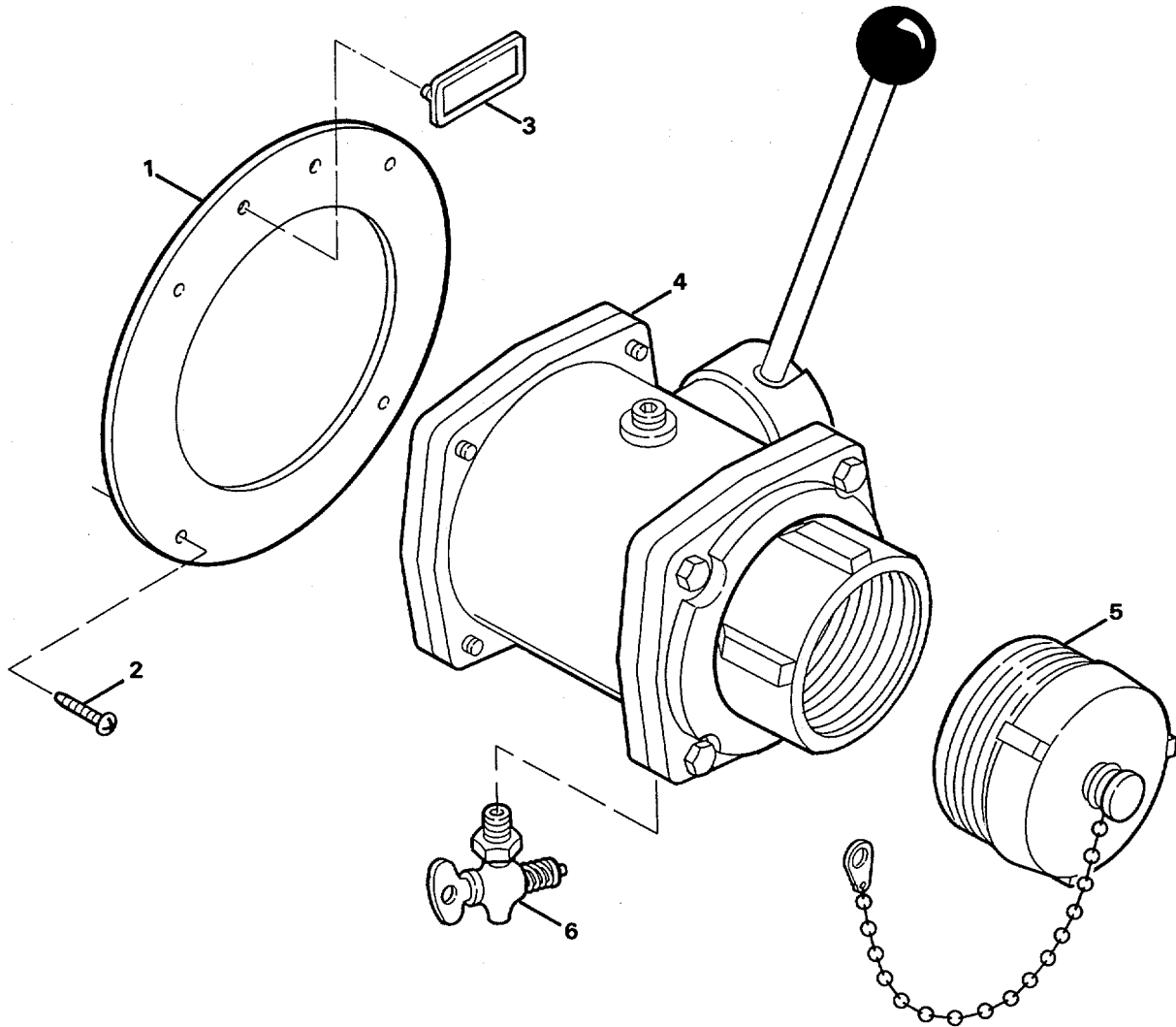


Figure F-26. Driver's Side Auxiliary Suction Valve Assemblies

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-26-					DRIVER'S SIDE AUXILIARY SUCTION VALVE ASSEMBLIES	1
-1	04664	52-0057			RING, Garnish, 2-1/2" (ATTACHING PARTS)	2
-2	04664	82-2039-001			SCREW, T410 Ph Pn Hd, Taptite, No. 10-24 x 1/2" -----*	8
-3	04664	52-0017			BEZEL, Tag Style B w/Pins	2
-4	04664	51-0016	20266	2896PKF	VALVE, Ball, 2-1/2" (See figure F-27 for details)	2
-5	04664	52-0069	20266	311	PLUG, 2-1/2" w/Chain	2
-6	04664	51-0137	79218	5393	COCK, Drain	2

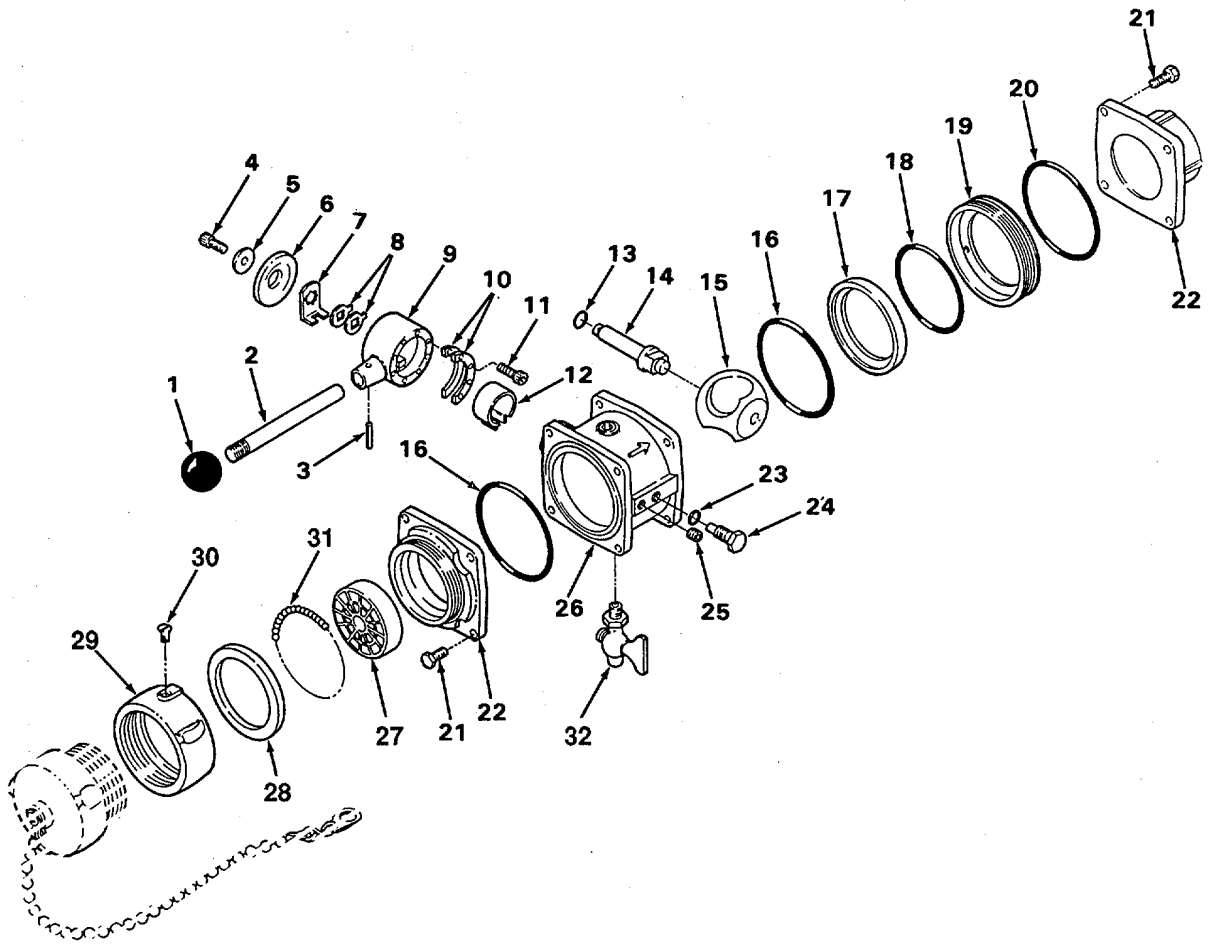


Figure F-27. Ball Valve, 2-1/2"

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-27-	04664	51-0016	20266	2896PKF	BALL VALVE, 2-1/2" (See figure F-26 for NHA)	REF
-1			20266	42023	KNOB, Handle	1
-2			20266	61528	ROD, Handle	1
-3			20266	51246	PIN, Roll	1
-4			20266	61036	SCREW, Cap	1
-5			20266	71082	WASHER	1
-6			20266	25074	DISC	1
-7			20266	11514	CLIP, Actuator	1
-8			20266	51813	PLATE, Stop	2
-9			20266	15807	BODY, Handle	1
-10			20266	16534	BRACKET, Stop	2
-11			20266	61046	SCREW, Cap	4
-12			20266	61793	SPRING, Lock	1
-13			20266	57295*	O-RING	1
-14			20266	61478	SHAFT, Actuator	1
-15			20266	15050	BALL, Valve	1
-16			20266	57378*	O-RING	2
			20266	80454	SEAT SUBASSY	1
-17			20266	63820	SEAT	1
-18			20266	57414*	O-RING	1
-19			20266	58881	RETAINER, Seat	1
-20			20266	57313*	O-RING	1
-21			20266	16375	BOLT, End Cap	1
-22			20266	20073	CAP, End, 2-1/2", NPT, Fem.	2
-23			20266	57321*	O-RING	1
-24			20266	61192	BOLT, Pivot	1
-25			20266	51890	PLUG, NPT, 1/4"	3
-26			20266	16270	BODY, Valve	1
-27			20266	62717	STRAINER, 2-1/2"	1
-28			20266	33083	GASKET, Rubber	1
-29			20266	62919	SWIVEL, 2-1/2", R.L.	1
-30			20266	61222	SCREW, Set	1
-31			20266	15016	BALL, Brass, 3/16" Dia.	52
-32	04664	51-0137	79218	5393	COCK, Drain	1
			20266	80326	KIT. Repair (Includes items marked*)	1

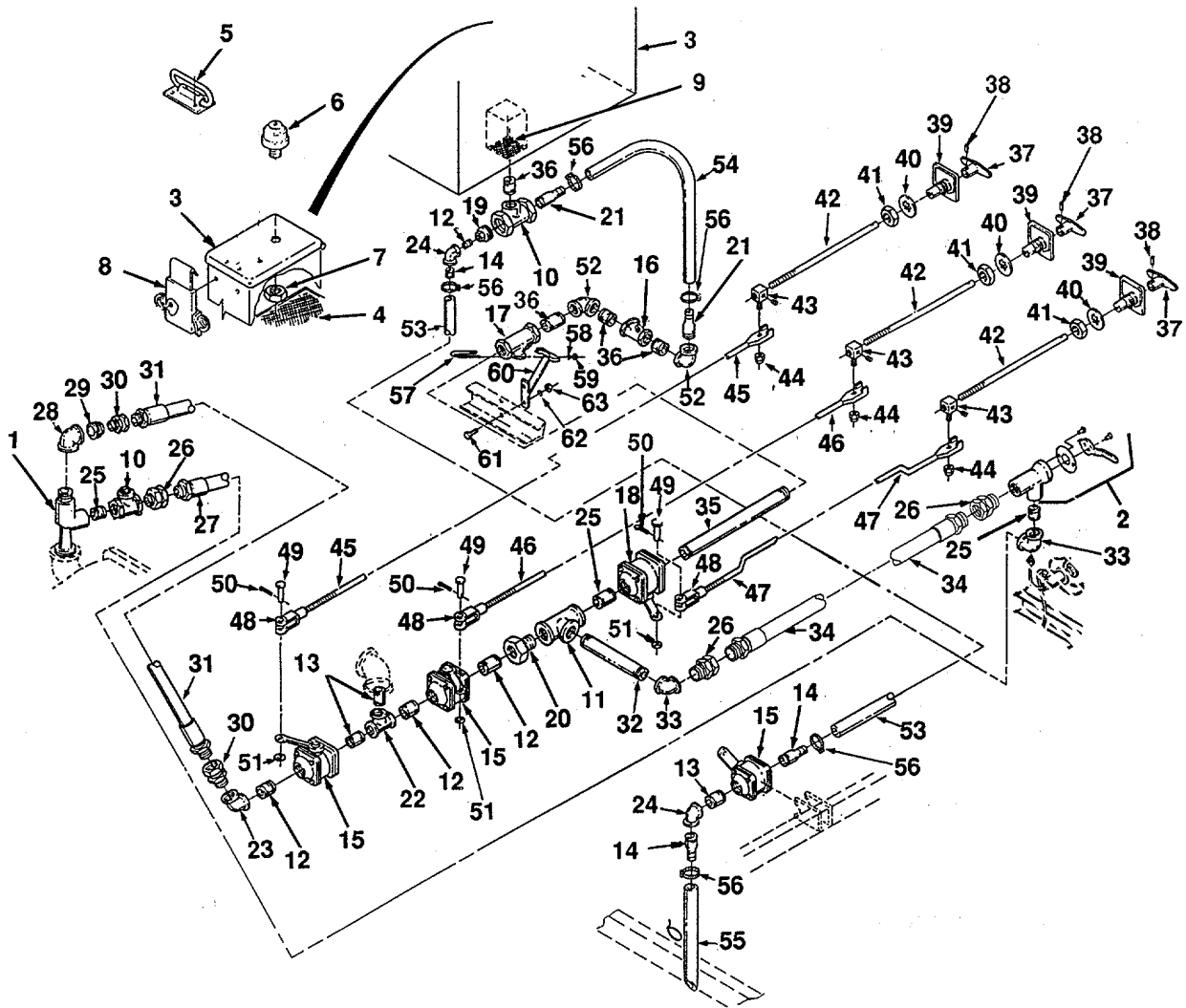


Figure F-28. Foam System

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-28-					FOAM SYSTEM	1
-1			11939	00256523	EDUCTOR, Model AP	1
-2			11939	00253530	VALVE, Metering, 1-1/2"	1
-3	04664	SD-00016			TANK, Foam	1
-4	04664	50-0762-0005			SCREEN, Dome, S/S	1
-5	04664	80-0001	03007	NH-PS-1207	HANDLE, Drop	1
-6	04664	53-4005	6V142	BF-2043	CAP, Breather	1
-7	04664	82-0147-0015			(ATTACHING PARTS)	
-8	04664	80-3006	82240	SL-2-10	NUT, Jam, Nylon, 3/4"-14	1
-9	04664	50-7062-0006			LATCH, Spring Loaded	1
-10	04664	53-0156-008			SCREEN, Sump, S/S	1
-11	04664	53-0114-007			TEE, Pipe, 1-1/2", S/S	2
-12	04664	53-0131-005			TEE, 1-1/2", Black	1
-13	04664	53-0154-002			NIPPLE, Close	3
-14	04664	56-0215-003	24869	2RST-1	NIPPLE, Close, 1", SST	3
-15	04664	51-0022	20266	2890KKD	FITTING, Pipe to Hose, 1", SST	3
-16	04664	51-0031	12168	T-413Y	VALVE, Water, Flush and Foam Tank	
-17			76588	861-22-1-1/2"	Drain, 1" Inline	
-18	04664	51-0023	20266	2891KKD	(See figure F-22 for details)	3
-19	04664	53-0165-015			VALVE, Check, 1-1/2", Bronze	1
-20	04664	53-0125-022			STRAINER, Y, 1-1/2", S/S	1
-21	04664	56-0215-005			VALVE, Foam, 1-1/2"	
-22	04664	53-0114-005			(See figure F-29 for details)	1
-23	04664	53-0121-006			BUSHING, Reducing, 1-1/2" to 1", S/S	1
-24	04664	53-0157-006			REDUCER, 1-1/2" to 1", Black	1
-25	04664	53-0131-007			FITTING, Pipe to Hose, 1-1/2", SST	2
-26	04664	53-0056-019			TEE, 1", Black	1
-27	04664	SD-07364			ELBOW, 1", Black, 90°	1
-28	04664	53-0121-009			ELBOW, 1", SST, 900	2
-29	04664	53-0125-029			NIPPLE, Close, 1-1/2", Black	3
-30	04664	53-0056-016			SWIVEL, 1-1/2", SST	3
31	04664	SD-07365			HOSE, Hydraulic, 1-1/2" x 83"	1
-32	04664	53-0259-0600			ELBOW, 2", Black, 900	1
-33	04664	53-0124-008			REDUCER, 2" to 1", Black	1
-34	04664	SD-07366			SWIVEL, 1", SST	2
-35	04664	SD-07367			HOSE, Hydraulic, 1" x 38"	1
-36	04664	53-0154-003			NIPPLE, Pipe, 1-1/2 x 6", Black	1
-37	04664	52-0064	60319	PH60Z	ELBOW, 1-1/2", Black, 900	2
-38	04664	82-0078-0075			HOSE, Hydraulic, 1-1/2" x 38"	1
-39	04664	52-0046			PIPE, 1-1/2" x 25-1/2", SST	1
-40	04664	82-1002			NIPPLE, Close, 1-1/2", SST	4
-41	04664	82-3012-012			HANDLE	3
-42	04664	52-0036			(ATTACHING PARTS)	
-43	04664	52-0065			PIN, Roll, 1/4" x 3/4"	3
-44	04664	82-3014-006			GUIDE, Valve Rod, Long	3
-45	04664	52-0290			(ATTACHING PARTS)	
-46	04664	52-0288			WASHER, Lock, Internal Tooth, 1"	3
-47	04664	52-0284			NUT, Hex, 1"-14	3
					ROD, Valve, Threaded	3
					(ATTACHING PARTS)	
					BLOCK, Swivel	3
					NUT, Hex, 1/2"-13, Zn	3
					ROD, Control - 43" Lg	1
					ROD, Control - 39" Lg	1
					ROD, Control - 31" Lg	1

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-28-48	04664	80-9068			CLEVIS, w/Pin (ATTACHING PARTS)	3
-49	04664	82-0082-0137			PIN, Clevis, 1/2" x 1-3/8", Zn	1
-50	04664	80-9101-0100			PIN, Cotter, 1/8" x 1"	1
-51	04664	80-1013-010			WASHER, Flat, 1/2", Zn	3
-52	04664	53-0157-008			ELBOW, 1-1/2", SST, 90°	2
-53	04664	940056			HOSE, 1" (in.)	41-1/2"
-54	04664	940076			HOSE, 1-1/2" (in.)	28"
-55	04664	940056			HOSE, 1" (in.)	38"
-56	04664	80-6029-005	81646	5716	CLAMP, Hose	5
-57	04664	80-6006			U-BOLT, Muffler clamp	1
-58	04664	82-1011-0038			WASHER, Lock, 3/8", Zn	2
-59	04664	82-3014-003			NUT, Hex, 3/8"-16, Zn	2
-60	04664	SD-08072			BRACKET, Support (ATTACHING PARTS)	1
-61	04664	82-2031-0075			SCREW, Cap, 3/8"-16 x 3/4", Zn, G-8	2
-62	04664	82-1011-0038			WASHER, Lock, 3/8", Zn	2
-63	04664	82-3014-003			NUT, Hex, 3/8"-16, Zn	2

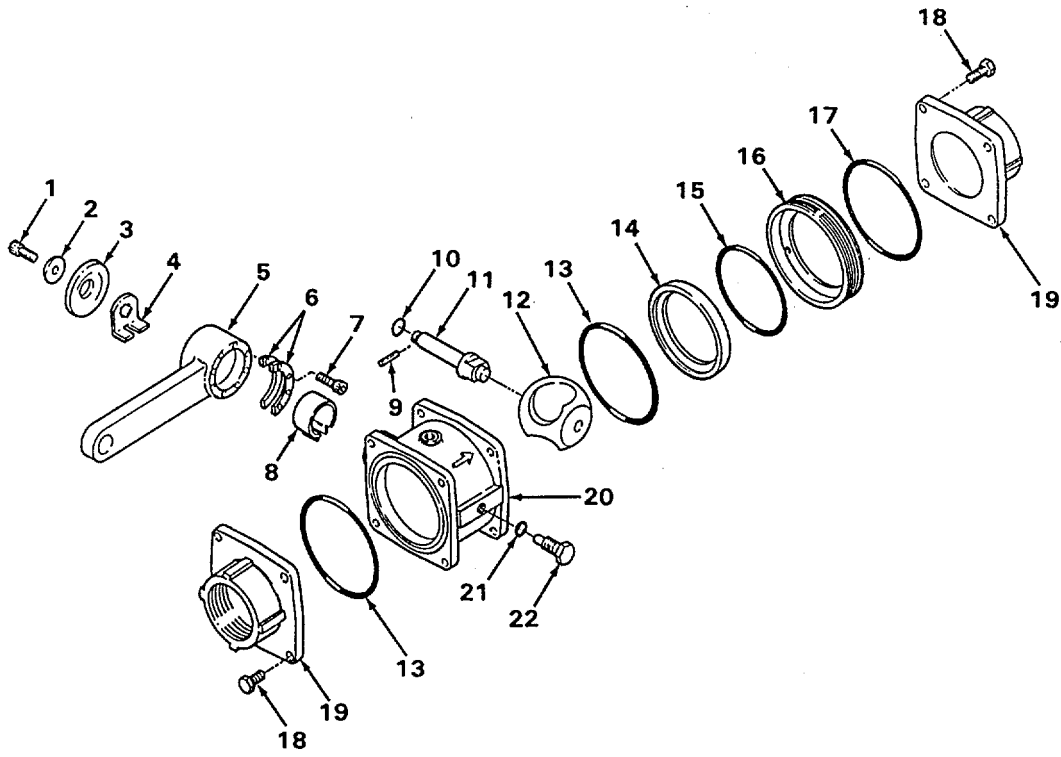


Figure F-29. Ball Valve, 1-1/2"

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-29-	04664	51-0023	20266	2891KKD	BALLVALVE,1-1/2" (See figure F-28 for NHA)	
-1			20266	61036	SCREW, Cap	1
-2			20266	71082	WASHER, Handle	1
-3			20266	63592	WASHER	1
-4			20266	11514	CLIP, Actuator	1
-5			20266	36158	HANDLE	1
-6			20266	16534	BRACKET, Stop	2
-7			20266	61046	SCREW, Cap	8
-8			20266	61793	SPRING, Lock	1
9			20266	51246*	PIN, Roll	1
-10			20266	57321*	D-RING	1
-11			20266	63758*	SHAFT, Actuator	1
-12			20266	15077	VALVE, Ball	1
-13			20266	57338*	D-RING	1
			20266	80457*	SEAT SUBASSY	1
-14			20266	63821*	SEAT	1
-15			20266	57421*	D-RING	1
-16			20266	58882*	RETAINER, Seat	1
-17			20266	57318*	D-RING	1
-18			20266	61144	BOLT	8
-19			20266	20055	CAP, End,1-1/2" NPT, Fem	2
-20			20266	16960	BODY VALVE	1
-21			20266	57348*	D-RING	1
-22			20266	63704	BOLT, Pivot	1
	04664	51-0087	20266	80427	KIT, Repair (Includes items marked *)	1

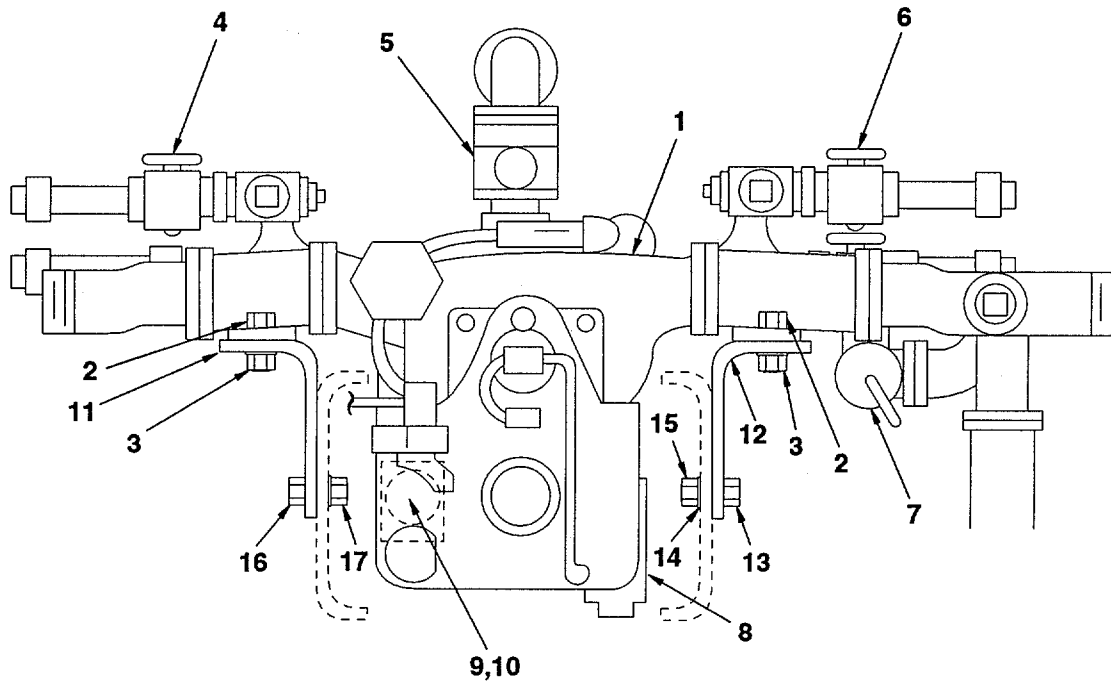


Figure F-30. Fire Pump Assembly And Mounting

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-30-1	04664	51-0739	79218	CSYB-46477001	FIRE PUMP ASSEMBLY AND MOUNTING PUMP, Fire, Mid-ship, 1000 GPM (See Figures F-31 thru F-38 for details) (ATTACHING PARTS)	REF 1
-2	04664	82-2017-0250			BOLT, Flanged, 1/2"-13 x 2-1/2", G-8	4
-3	04664	82-3009			NUT, FRanged, 1/2"-13, G-8	4
-4			79218	80489-2R	VALVE, Discharge, L.H. (See figure F-15 for details)	2
-5			79218	81356-1R	VALVE, Aerial Discharge (See figure F-24 for details)	1
-6			79218	80489-2M	VALVE, Discharge, R.H. (See figure F-14 for details)	2
-7					VALVES, Pilot and Relief (See figure F-36 for details)	1
-8			79218	71803-3	VALVE, Drain (See figure F-37 for details)	1
-9			79218	80841-5A	MOTOR, Priming Pump, 12V DC (See figure F-34 for details)	1
-10			79218	80841-4C	PUMP, Priming, VPE (See figure F-34 for details)	1
-11	04664	51-0628			ANGLE, Pump Mounting, L.H.	1
-12	04664	51-0627			ANGLE, Pump Mounting, R.H. (ATTACHING PARTS)	1
-13	04664	82-2136-0200			BOLT, 1"-14 x 2", G-8	1
-14	04664	82-1011-0100			WASHER, Lock, 1"	1
-15	04664	82-3014-011			NUT, Hex, 1"-14, G-8	1
-16	04664	82-2017-0250			BOLT, Flanged, 1/2"-13 x 2-11/2", G-8	4
-17	04664	82-3009			NUT, Flanged, 1/2"-13, G-8 ---*---	4

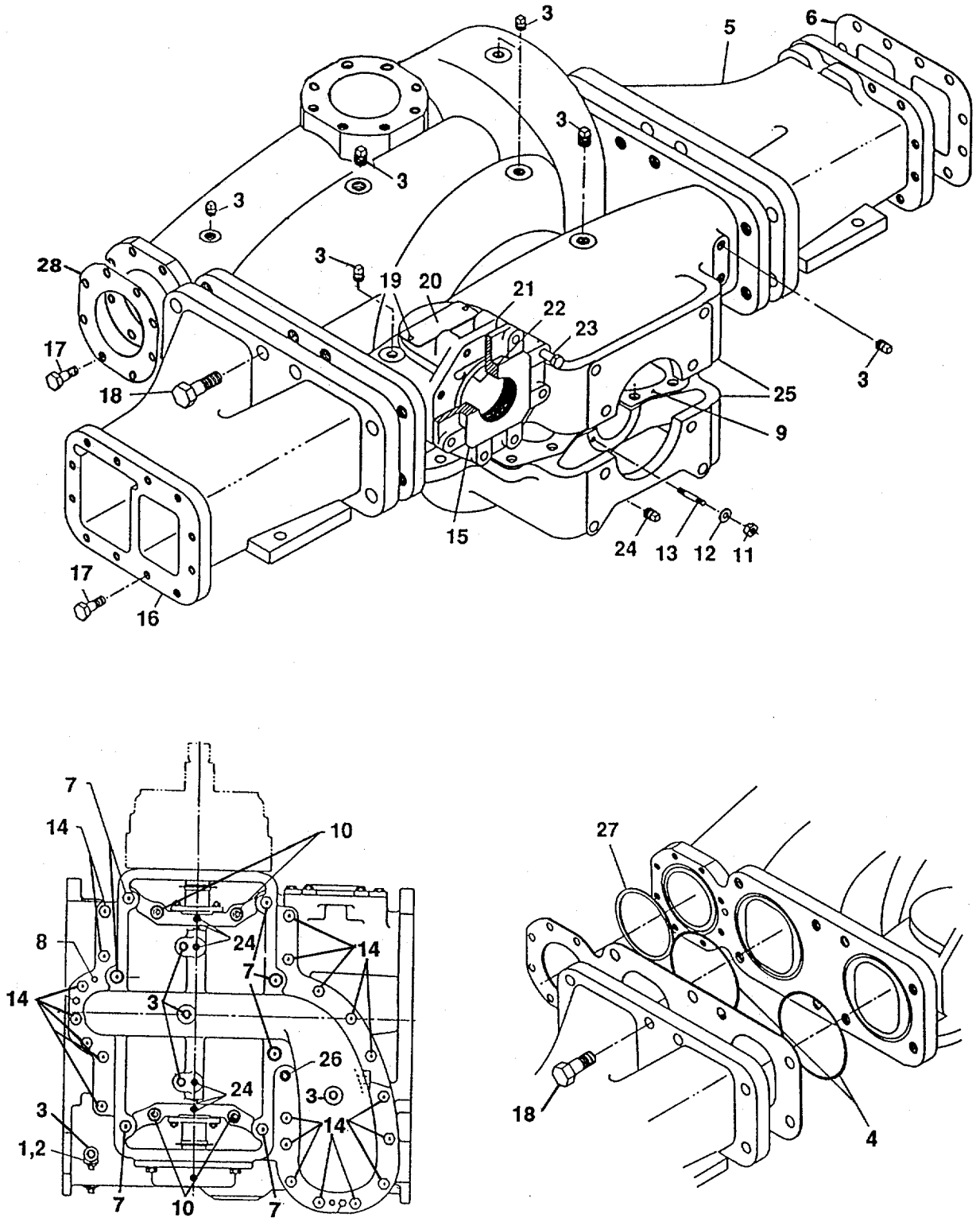


Figure F-31. Water Pump Body Assembly (Sheet 1 of 2)

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-31-			79218	81608	WATER PUMP BODYASSEMBLY (See figure F-30 for NHA)	1
-1			79218	W6304-G	TEE, Pipe, 1/4"	
-2			79218	W6004-14G	NIPPLE, Pipe, 1/4"x7/8"	1
-3			79218	W6504-S	PLUG, Pipe, 1/4"	12
-4			79218	B7	GASKET, Suction Flange	4
-5			79218	80553	ADAPTER, Suction Right	1
-6			79218	B9	GASKET, Suction Fitting	2
-7			79218	W1008-78HT	SCREW, Hex Hd, 1/2"-13	7
-8			79218	W5014-20	PIN, Dowel, .4377-1-1/4"	1
-9			79218	B12*	GASKET, Set-Cover to Body	1
-10			79218	W 1510-36	SCREW, Skt Hd, 5/8"-11	4
-11			79218	5037	NUT, Unbalanced, 5/16"-18	1
-12			79218	W 4305	WASHER, Flat, Brass, 5/16"	4
-13			79218	5036	STUD,5/16"-18 x 1-5/8"	4
-14			79218	W1008-24HT	SCREW, Hex Hd 1/2"-13	20
-15			79218	71318	ADAPTER, Suction Aux.	1
-16			79218	80554	ADAPTER, Suction Left	1
-17			79218	W1008-20HT	SCREW, Hex Hd, 1/2"-13	40
-18			79218	W1012-32HT	SCREW, Hex Hd, 3/4"-10	16
-19			79218	W 9006-4	SCREW, Drive, No. 6 x 1/4"	2
-20			79218	51630	PLATE, Serial	1
-21			79218	B26*	GASKET, Adapter-Tank Suction	1
-22			79218	61718	VALVE, Flap	1
-23			79218	W1006-20HT	SCREW, Hex Hd	8
-24			79218	W6602	PLUG, Pipe, Headless, 1/8"	6
-25			79218	9179	BODYSUBASSY	1
-26			79218	W1508-24	SCREW, Skt Hd, 1/2"-13	1
-27			79218	B42*	GASKET, Flange Discharge	2
				B43	KIT,Gasket Body (Includes items marked*)	1
-28			79218	GU90	GASKET, Discharge	1

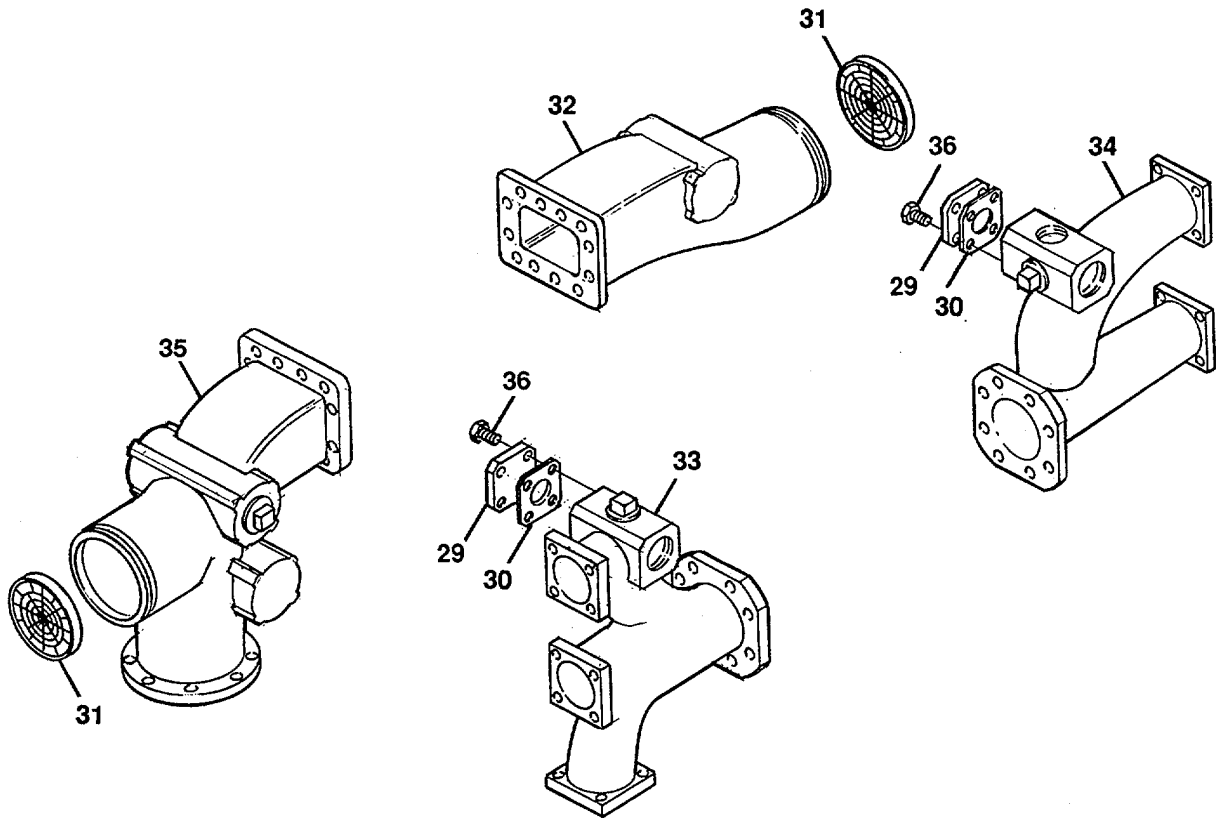


Figure F-31. Water Pump Body Assembly (Sheet 2 of 2)

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-31-						
-29			79218	51217	FLANGE, Blind	2
-30			79218	51218	GASKET	2
-31			79218	61403	SCREEN, Suction, 6"	2
-32			79218	70332-1TT	FITTING, Suction, 6"	1
-33			79218	71441-11	WYE, Discharge	1
-34			79218	71442-13	WYE, Discharge	1
-35			79218	80539-1TTE	FITTING, Suction, 6"	1
-36			79218	1007-22CA	SCREW, Hex Hd, 7/16"-14	8

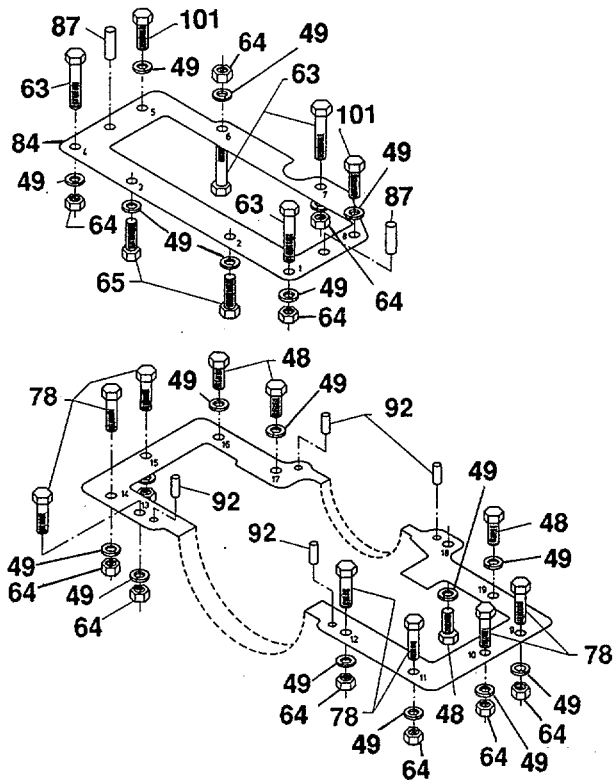
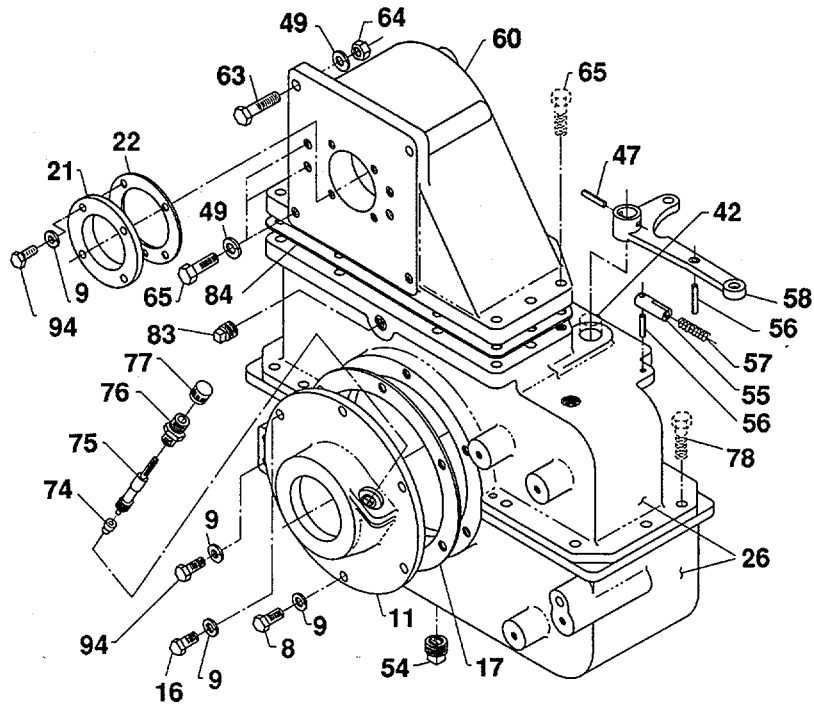


Figure F-32. Water Pump Transmission Assembly (Sheet 1 of 3)

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-32-					WATER PUMP TRANSMISSION ASSEMBLY (See figure F-30 for NHA)	1
-1			79218	W16112	BEARING, Ball	2
-2			79218	51724	SPACER, Shaft Coupling	1
-3			79218	W16306	BEARING, Ball	1
-4			79218	71540-2	COLLAR, Shift	1
-5			79218	80799	SPROCKET, Drive 59T	1
-6			79218	V 2002	BEARING, Needle	2
-7			79218	51672	WASHER, Thrust	1
-8			79218	W10606-18	SCREW, Hex, Nylok, 3/8"-16	8
-9			79218	W 4106	WASHER, Lock, 3/8"	26
-10			79218	52089	GEAR, Tach Drive	1
-11			79218	R80859	HOUSING ASSY, Drive Shaft	1
-12			79218	W 3504-28SS	PIN, Cotter, 1/8" x 1-3/4"	2
-13			79218	81274	SHAFT, Drive	1
-14			79218	52088	SLEEVE, Oil Seal	2
-15			79218	W16212	BEARING, Ball	1
-16			79218	W 1006-20	SCREW, Hex Hd, 3/8"-16	8
-17			79218	71638*	GASKET	1
-18			79218	51706-94	CHAIN, 94 Pitch	1
-19			79218	V 2411	SEAL, Oil	1
-20			79218	W 4105	WASHER, Lock, 5/16"	4
-21			79218	61201	HOUSING, Oil Seal	1
-22			79218	51065*	GASKET	1
-23			79218	W16307	BEARING, Ball	2
-24			79218	71578	SPROCKET, Driven 26T	1
-25			79218	V 1168	BREATHER, 1/2"	1
-26			79218	80811	CASE SUBASSY, Chain	1
-27			79218	51677	SPACER, Shaft Impeller	1
-28			79218	51729-10*	SHIM, Plastic, .010"	3
-28			79218	51729-5*	SHIM, Plastic, .005"	1
-29			79218	62112	HOUSING, Pump Support	1
-30			79218	W 07	WASHER, Bearing Lock	1
-31			79218	N 07	NUT, Bearing Lock	1
-32			79218	V 2061	PUMP, Oil Circulating	1
-33			79218	62049	PIN, Pivot, 5/8" x 2-3/4"	1
-34			79218	62557	ARM, Locking	1
-35			79218	W 3704-2	O-RING, 1/4" x 3/8"	1
-36			79218	51639	SHOE, Shifter	1
-37			79218	51633-10*	SHIM, Alum, .010"	3
-37			79218	51633-5*	SHIM, Alum, .005"	1
-37			79218	51633-7*	SHIM, Alum, .007"	1
-38			79218	62126	HOUSING, Coupling Shaft	1
-39			79218	V 2499	NUT, Castellated, 1-1/4"	2
-40			79218	81277	SHAFT, Coupling	1

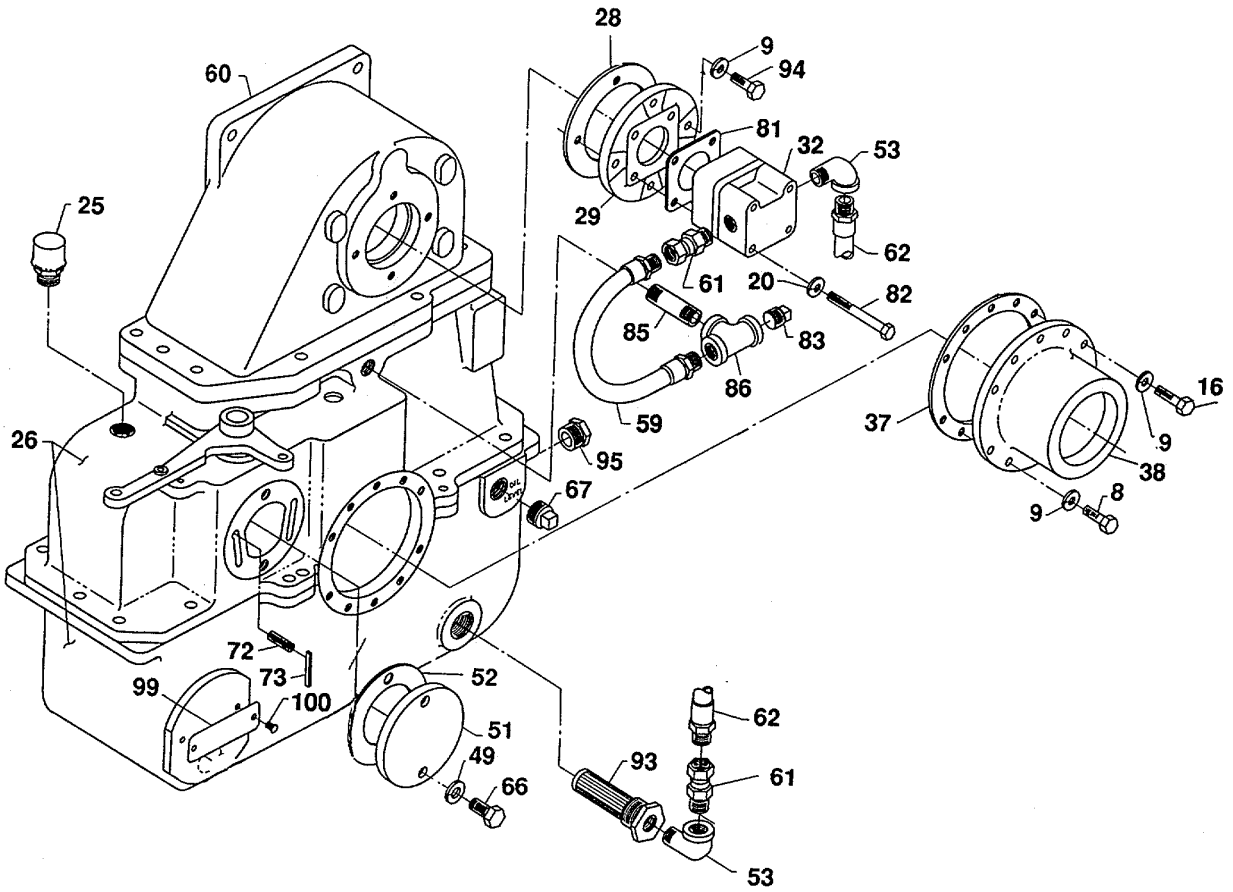


Figure F-32. Water Pump Transmission Assembly (Sheet 2 of 3)

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-32-						
-41			79218	W 3944-350	SEAL, OIL, 2-3/4" x 3-1/2"	2
-42			79218	62184	SHAFT, Shift	1
-43			79218	61987	GEAR, Sector	1
-44			79218	51698	SPACER, Sector	1
-45			79218	W 3714-2	O-RING, 7/8" x 1"	1
-46			79218	51694	BEARING, Sleeve	2
-47			79218	W33010-22SM	PIN, Spirol Hvy, 5/16"	1
-48			79218	W 1008-20HT	SCREW, Hex Hd, 1/2"-13	6
-49			79218	W 4108	WASHER, Lock, 1/2"	27
-50			79218	W33012-28	PIN, Spirol Hvy, 3/8"	1
-51			79218	81617-55	PLATE, Cover	1
-52			79218	50780*	GASKET	1
-53			79218	W 7008	ELBOW, Street 900, 1/2"	2
-54			79218	V 1088	PLUG, Magnetic Drain, 3/4"	1
-55			79218	50912	HOUSING, Spring	1
-56			79218	W33008-20SM	PIN, Spirol Hvy, 1/4"	2
-57			79218	5066	SPRING, Shift Lock	1
-58			79218	61023-2	ARM, Shift	1
-59			79218	51716-1	HOSEASSY, 1/2"NPT	1
-60			79218	81330-7	CAP, Chain Case	1
-61			79218	V2066	ADAPTER, Straight, 1/2"	2
-62			79218	51716-6	HOSE ASSY, 1/2" NPT	1
-63			79218	W1108-36HT	SCREW, Hex Hd, 1/2" NPT	6
-64			79218	W2108	NUT, Hex, 1/2"-20	20
-65			79218	W 1008-24HT	SCREW, Hex Hd, 1/2"-13	8
-66			79218	W 1008-20HT	SCREW, Hex Hd, 1/2"-13	4
-67			79218	W 6512	PLUG, Pipe, 3/4"	1
-68			79218	51639	SHOE, Shifter	2
-69			79218	51638	STUD, Shifter Shoe	2
-70			79218	71539-1	FORK ASSY, Shift	1
-71			79218	V 2062	PIN, Connecting (Set)	1
-72			79218	50915	SCREW, Adjusting	2
-73			79218	51640	RETAINER, Adjusting Screw	2
-74			79218	V 1165	BUSHING, Tachometer/SPDOM	1
-75			79218	V 2076	GEAR, Tach-Driven	1
-76			79218	V 1164	SLEEVE, Tachometer/SPDOM	1
-77			79218	V 2630	PLUG, Cap	1
-78			79218	W 1108-28HT	SCREW, Hex Hd, 1/2"-20	14
-79			79218	W 9920	WASHER, Plain, 1-1/4"	2
-80			79218	51676	SPACER, Bearing	1
-81			79218	51727*	GASKET, Oil Pump	1
-82			79218	W 1005-52	SCREW, Hex Hd, 5/16"-18, SI	4
-83			79218	W 6508	PLUG, Pipe, 1/2"	2
-84			79218	81617-99*	GASKET, Chain Case Cap	1
-85			79218	W 6008-40	NIPPLE, Pipe, 1/2" x 2-1/2"	1

**LONG CONNECTING PIN
MUST BE TOWARD OUTSIDE
EDGE OF GUIDE PLATE**

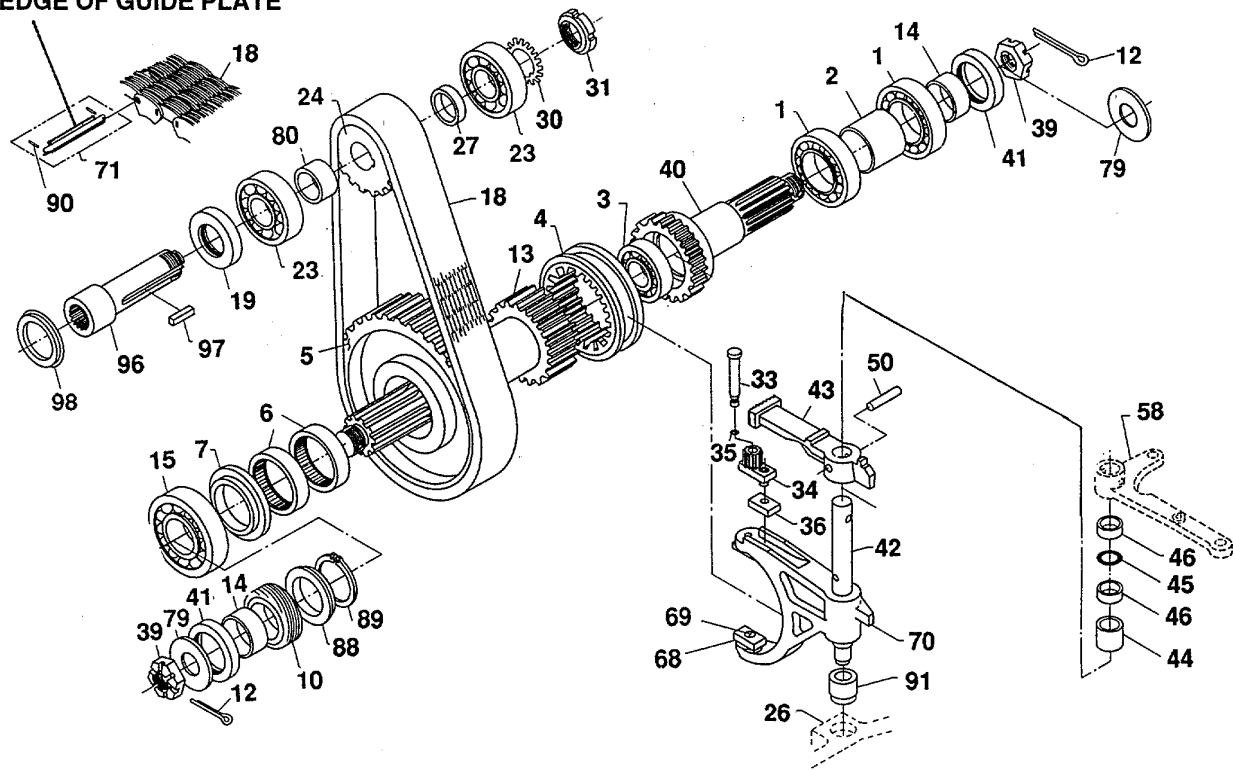


Figure F-32. Water Pump Transmission Assembly (Sheet 3 of 3)

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-32-						
-86			79218	W 6308	TEE, Pipe, 1/2"	
-87			79218	W 5016-24	PIN, Dowel, .5002 x 1-1/2"	2
-88			79218	51725	SPACER, Shaft Drive	1
-89			79218	W 4510-237	RING, Retaining	1
-90			79218	W 33002-4SS	PIN, Spirol Hvy, 1/16"	2
-91			79218	51777	BEARING, Sleeve	1
-92			79218	W 5012-16	PIN, Dowel, .375" x 1"	4
-93			79218	V 2203	STRAINER, Oil	1
-94			79218	W 1006-16	SCREW, Hex Hd, 3/8"-16	10
-95			79218	V 2329	PLUG, Sight	1
-96			79218	72218	SHAFT, Driven	1
-97			79218	W 4905-37	KEY, Square, .313" x .311" x 2-5/16"	1
-98			79218	V 2572	FLINGER, V-Ring	1
-99			79218	51329	PLATE, Serial	1
-100			79218	W 9006-4	SCREW, Drive, No. 6 x 1/4"	2
-101			79218	W 1008-28HTCA	SCREW, Hex Hd, 1/2"-13	2
			79218	K 547	KIT, Gasket-Chain Case (Includes items marked *)	1

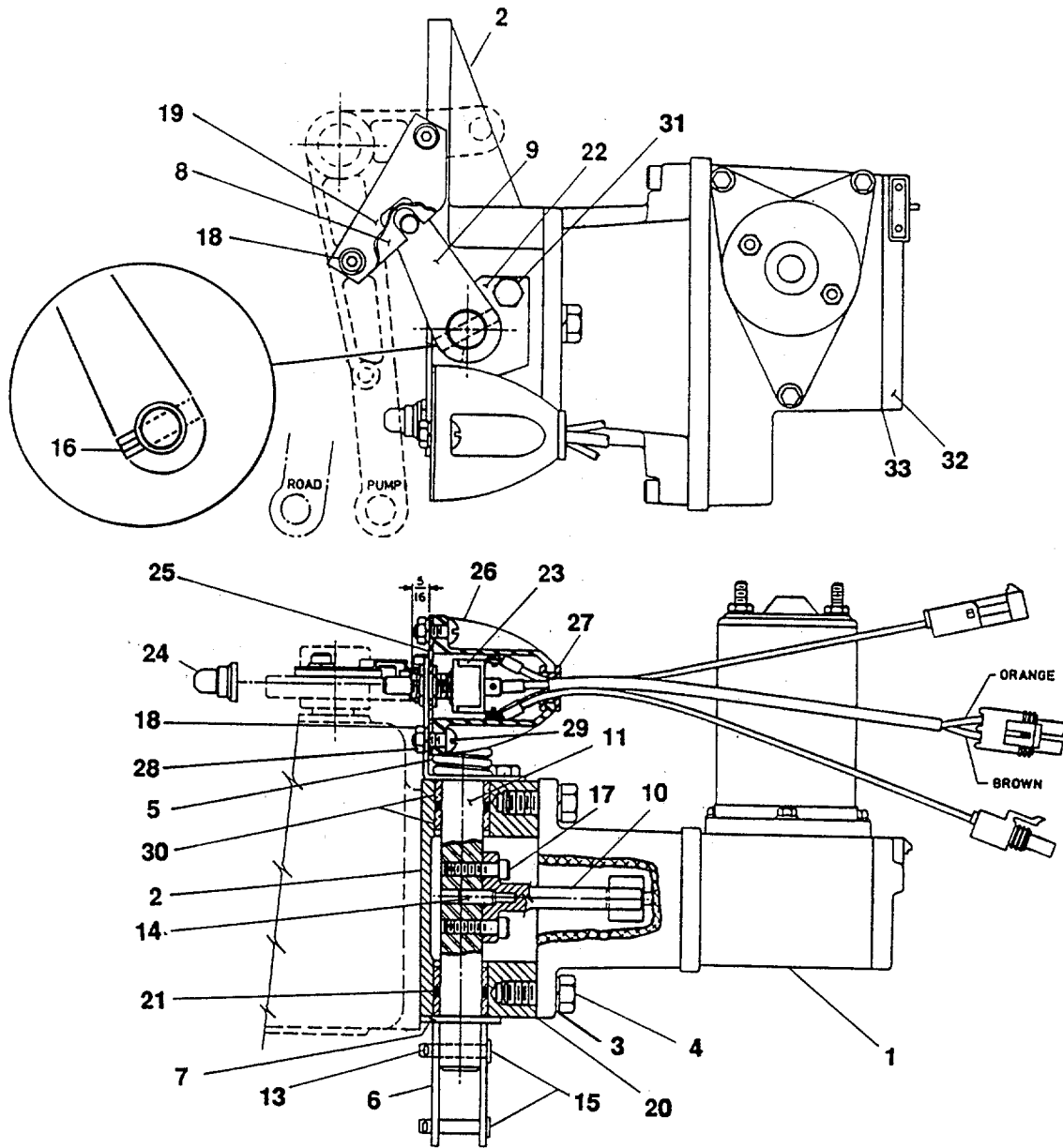


Figure F-33. Water Pump Transmission Shift Assembly

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-33-			79218	81355	WATER PUMP TRANSMISSION SHIFT ASSEMBLY (See figure F-30 for NHA)	1
-1			79218	V 2523	UNIT, Shift, 12-VDC	1
-2			79218	80278	BRACKET, Mounting	1
-3			79218	W 4107	WASHER, Lock, 7/16"	2
-4			79218	W 1007-16	SCREW, Hex Hd, 7/16"-14	2
-5			79218	50904	SPRING, Shift Override	1
-6			79218	50905	CAM	2
-7			79218	50907	WASHER, Cam	1
-8			79218	51326	PLATE, Pivot	1
-9			79218	51327	ARM ASSY	1
-10			79218	61535	LEVER	1
-11			79218	61537	SHAFT, Shift	1
-12			79218	W 1504-10	SCREW, Skt Hd, 1/4"-20	2
-13			79218	W 3503-X8SS	PIN, Cofter, 5/64" x 1/2"	2
-14			79218	W 5008-10	PIN, Dowel, .2502" x 5/8"	1
-15			79218	W5304-20CA	PIN, Clevis, 1/4" x 1-1/4"	2
-16			79218	W33008-20SM	PIN, Spirol Hvy, 1/4"	1
-17			79218	W10825-16	SCREW, Skt Nylok, 1/4"-20	2
-18			79218	W4104	WASHER, Lock, 1/4"	4
-19			79218	51346	COVER, Shift Pivot	1
-20			79218	51601	GASKET	1
-21			79218	W 3712-4D	O-RING, 3/4" x 1"	2
-22			79218	62571	BRACKET, Switch	1
-23			79218	V 2105	SWITCH, Push Button SPDT	1
-24			79218	V 2106	SEAL, Switch	1
-25			79218	51915	PLATE, Cover	1
-26			79218	50353	COVER, Switch	1
-27			79218	V 1148	GROMMET, Rubber	1
-28			79218	W 3225-SS	NUT, Hex Mach, 1/4"-20	2
-29			79218	W9525-10CA	SCREW, Rnd Hd, 1/4"-20	2
-30			79218	V 2315	BEARING, Sleeve	4
-31			79218	W 1005-1	SCREW, Hex Hd, 5/16"-18	1
-32			79218	V 2644	COVER ASSY	1
-33			79218	V 2645	GASKET, Cover Assy	1

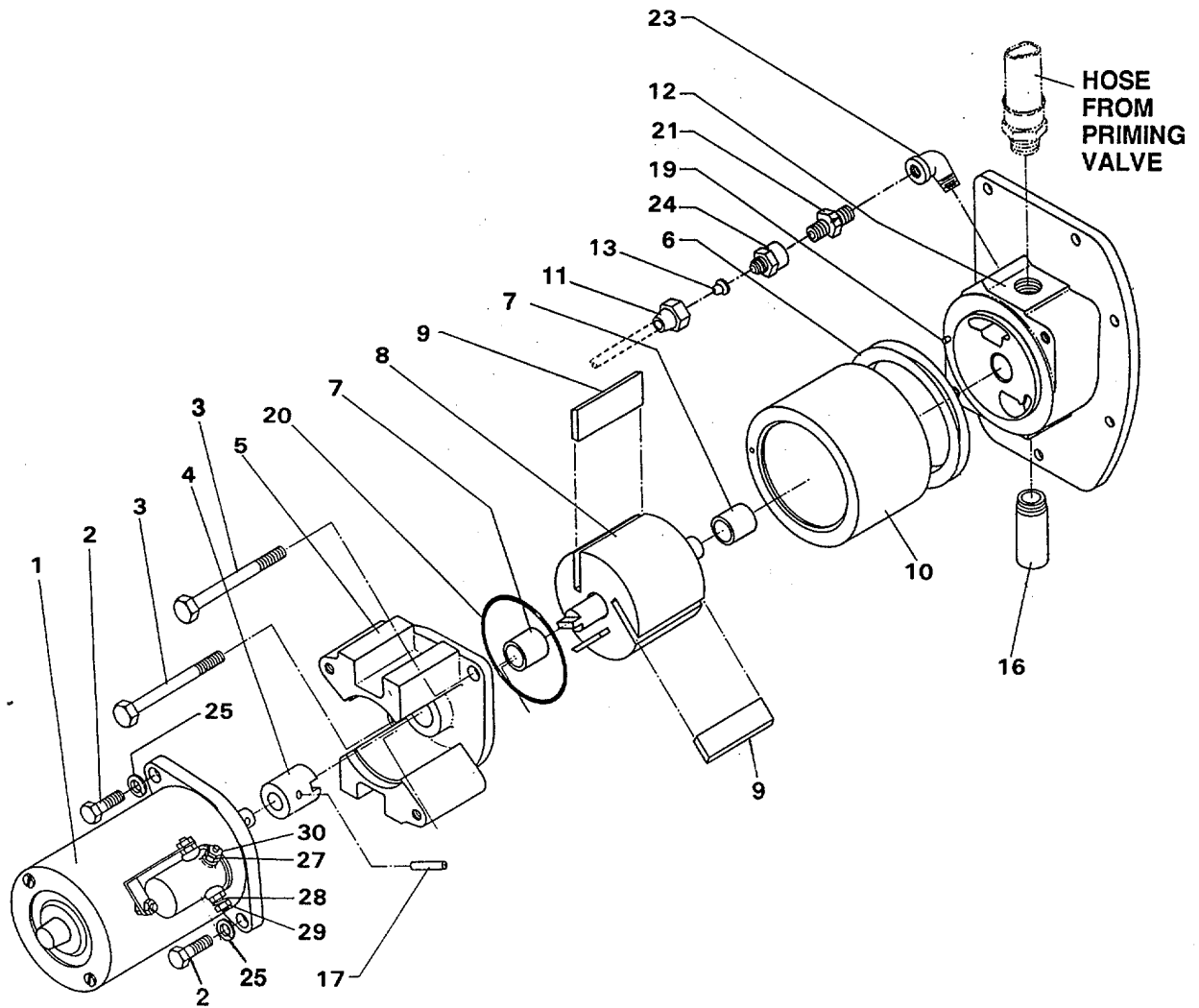


Figure F-34. Water Pump Priming Pump and Motor

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-34-			79218	80841	WATER PUMP PRIMING PUMP AND MOTOR (See figure F-30 for NHA)	1
-1			79218	62113	MOTORASSY, 12Volt	1
-2			79218	W 1006-20	SCREW, Hex Hd, 3/8"-16	6
-3			79218	W 1007-80	SCREW, Hex Hd, 7/16"-14	2
-4			79218	50152	COUPLING, Shaft	1
-5			79218	71634-1	HEAD, Front Primer	1
-6			79218	51728-10*	SHIM, Alum, .010"	1
-6			79218	51728-5	SHIM, Alum, .005"	1
-6			79218	51728-7	SHIM, Alum, .007"	1
-7			79218	5423*	BEARING, Sleeve	2
-8			79218	62001	SHAFT ASSY	1
-9			79218	51650*	VANE	3
-10			79218	62105	CYLINDER, Priming Pump	1
-11			79218	W 8606	NUT, Flared 3/8" Tube	1
-12			79218	81657	HEAD, Rear Primer	1
-13			79218	51653	ORIFICE, Oil Line	1
-16			79218	5528	PIPE, Priming Valve	1
-17			79218	W5808-18SS	PIN, Spring, 1/4"x1-1/8"	1
-19			79218	W10304-10SS	PIN, Groove, 1/8"x7/8"	2
-20			79218	W 3760-2*	O-RING, 3-3/4" x 7/8"	1
-21			79218	V 2231	VALVE, Check, 1/4"	1
-23			79218	W 7004	ELBOW, Str 900, 1/4"	1
-24			79218	W40204-6	CONN, Female, 450 Flare	1
-25			79218	W 4106	WASHER, Lock, 3/8"	6
-27			79218	V 1889	WASHER, Lock, Internal Tooth, No. 10	1
-28			79218	V 1891	WASHER, Lock, Internal, 5/16"	1
-29			79218	W 2505-CA	NUT, Hex, 5/16"-24	1
-30			79218	W3319-CA	NUT, Aux, No. 10-32	2
			79218	K602	KIT, Repair, Vane Primer (Includes items marked*)	1

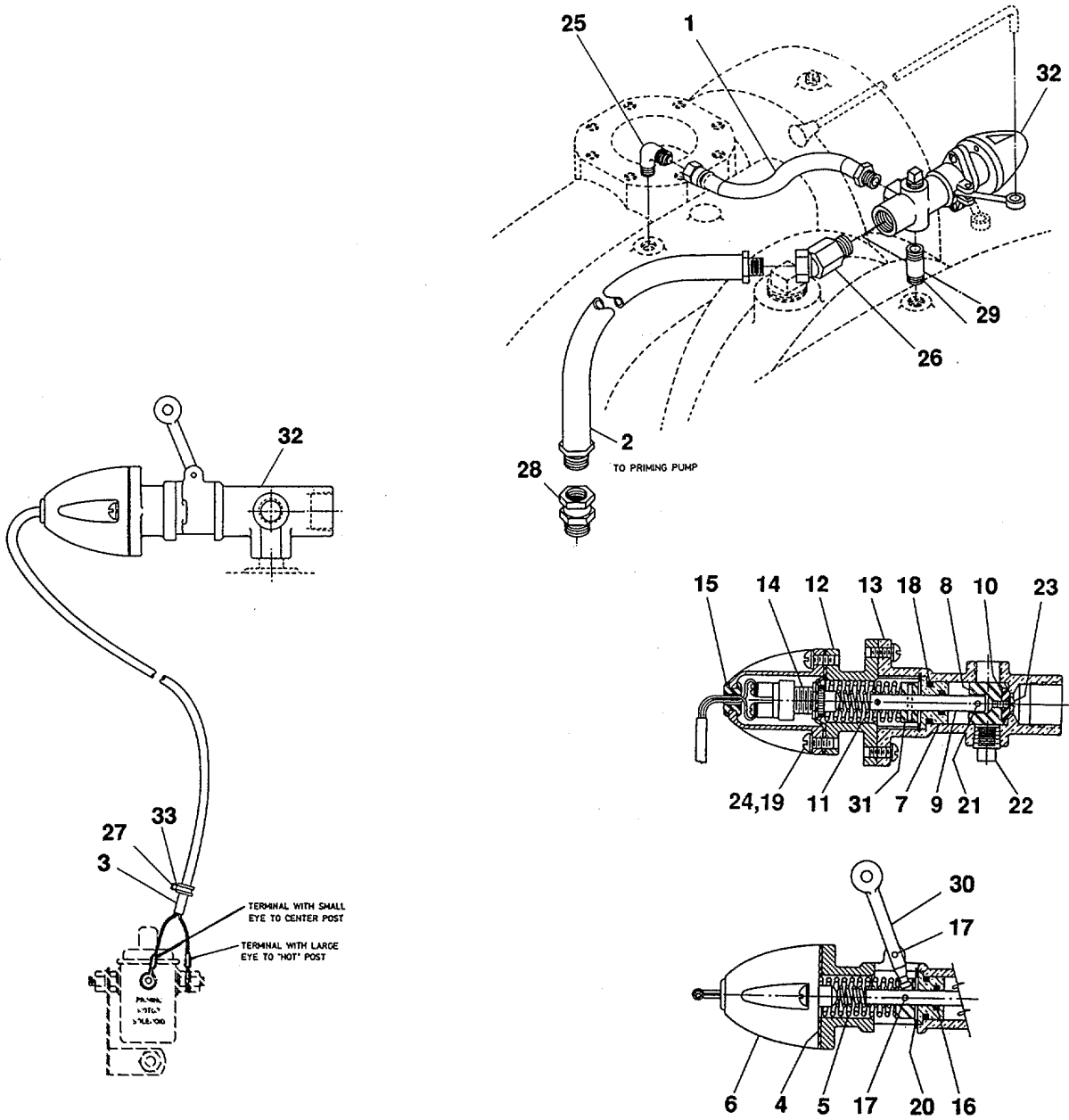


Figure F-35. Priming Valve and Piping Assembly

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-35			79218	81602	PRIMING VALVE AND PIPING ASSEMBLY (See figure F-30 for NHA)	1
-1			79218	51742-1	HOSE ASSY, 3/8", NPT	1
-2			79218	50788-26	HOSE ASSY, 3/4", NPT	1
-3			79218	60470-44	WIRE ASSY	1
-4			79218	51778	PLATE, Cover	1
-5			79218	50319	SPRING, Valve Priming	1
-6			79218	50353	COVER, Switch	1
-7			79218	52265	CAP, End	1
-8			79218	52264	PLUNGER	1
-9			79218	52263	ROD, Plunger	1
-10			79218	50875	INSERT, Plunger	1
-11			79218	50941	SPRING, Valve Priming	1
-12			79218	60985	HOUSING, Spring	1
-13			79218	70358	BODY, Priming, Valve	1
-14			79218	51779	SWITCH ASSY	1
-15			79218	V 1148	GROMMET, Rubber	1
-16			79218	V 1340	RING, Quad	1
-17			79218	W5404-14SS	PIN,Groove, 1/8"x7/8"	2
-18			79218	W 3712-4D	O-RING, 3/4 x 1"	1
-19			79218	W 4104	WASHER, Lock, 1/4"	2
-20			79218	W 4500-125CA	RING, Retaining	1
-21			79218	W 55404-1OSS	PIN, Groove, 1/8"x 5/8"	1
-22			79218	W 6506-B	PLUG, Pipe, 3/8"	1
-23			79218	W 9619-6SS	SCREW, Rd Hd, No. 10-32 x 3/8"	1
-24			79218	W 9525-1OCA	SCREW, Rd. Hd., 1/4"-20	4
-25			79218	W 8806-6	ELBOW, M 90°	1
-26			79218	V 1332	UNION, Adapter, 450	1
-27			79218	V 1371	CLAMP, Wire	1
-28			79218	V 1417	UNION, Adapter Str, 3/4"	1
-29			79218	W 6006-32	NIPPLE, Pipe, 3/8" x 2	1
-30			79218	51215	ARM, Actuating	1
-31			79218	51216	SOCKET, Actuating Arm	1
-32			79218	8683-EI	PRIMING VALVE ASSY	1
-33			79218	W 9519-6TCA	SCREW, Rnd Hd, No. 10-24	1

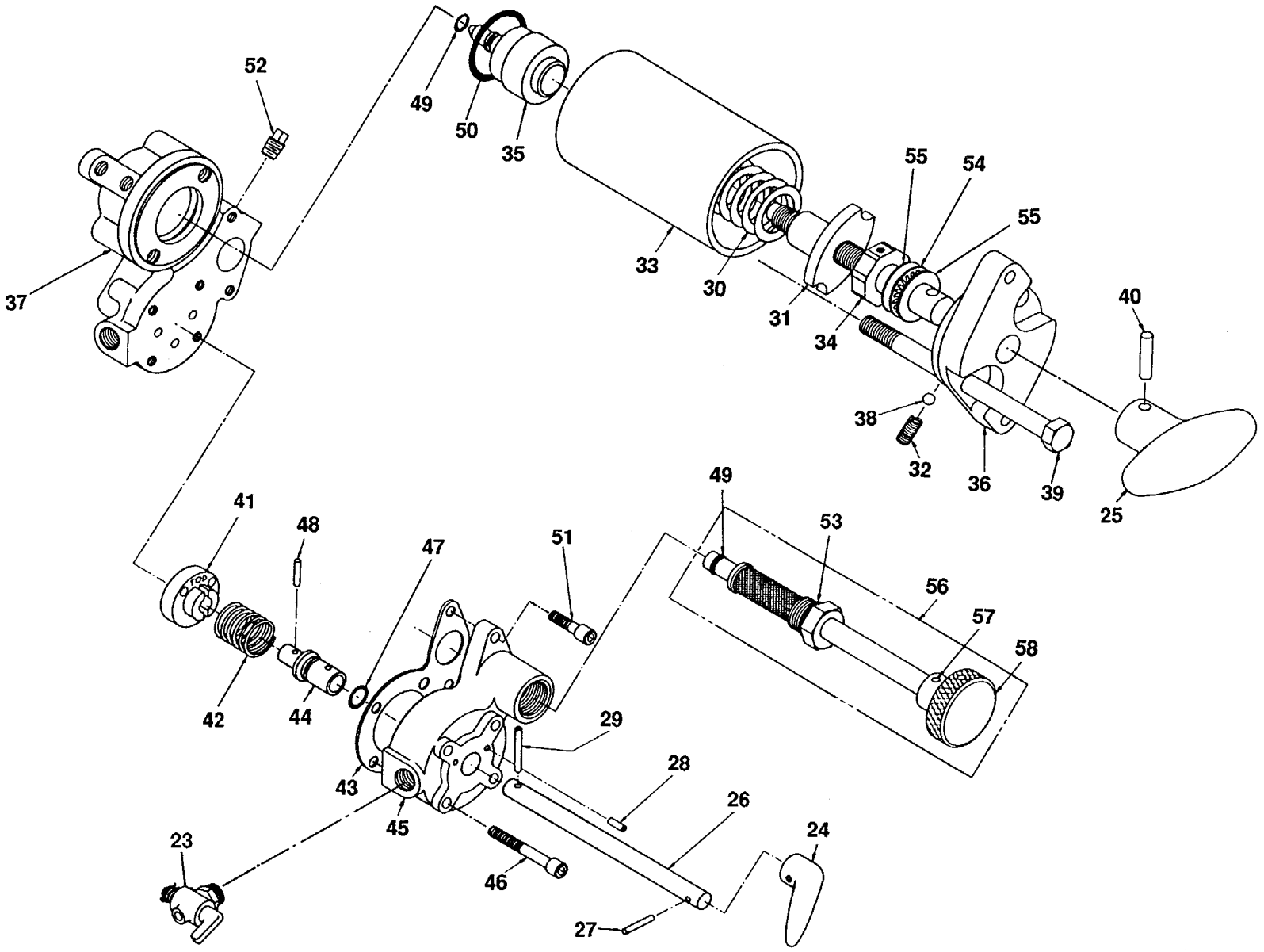


Figure F-36. Pilot and Relief Valves (Sheet 1 of 3)

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-36-					PILOT AND RELIEF VALVES (See figure F-30 for NHA)	1
-1			79218		VALVE ASSY, Pilot (See sheet 2 for details) (ATTACHING PARTS)	1
-2			79218	W3225-SS	NUT, Hex, 1/4"-20	2-3
-4			79218	W4104	WASHER, Lock, 1/4"	2
-5	04664	82-2103-0037	79218	W925-20SS	SCREW, Machine, Rd Hd, 1/4"-20 x 1-1/4"	2
-6	04664	82-1011-0125			SCREW, Ph Pn Hd, No. 8-32 x 3/8"	4
	04664	82-3017-006			WASHER, Lock, No. 8, Zn	4-7
					NUT, Hex, No. 8-32, Zn	4
					---*---	
-8			79218	61712	PLATE, Panel	1
-9			79218	81262-7	VALVE ASSY., Relief (See sheet 3 for details) (ATTACHING PARTS)	1
-10			79218	W1108-96	SCREW, Cap, Hex Hd, 1/2"-20 x 6"	2
-11			79218	V1 815	NUT, Hex, Self-locking, 1/2"-20	2
-12			79218	W10607-20	SCREW, Cap, Hex Head, Nylok, 7/16"-14 x 1-1/4"	4
-13			79218	W4107	WASHER, Lock, 7/16"	4
					---*---	
-14			79218	V1463	SWITCH, Micro	1
-15			79218	61357	BRACKET, Switch Mounting (ATTACHING PARTS)	1
-16	04664	82-3017-006			NUT, Hex, No. 8-32, Zn	4
-17	04664	82-1011-0125			WASHER, Lock, No. 8, Zn	4
-18	04664	82-2103-0037			SCREW, Ph Pan Hd, No. 8-32 x 3/8", Zn	4
					----*----	
-19			79218	W3754-4	O-RING	1
-20			79218	WS37524	O-RING	2
-21			79218	62771	PIPE, Connecting	1
-21A			79218	V1 352	LIGHT, Indicator, Amber	1
-21B						
-22						

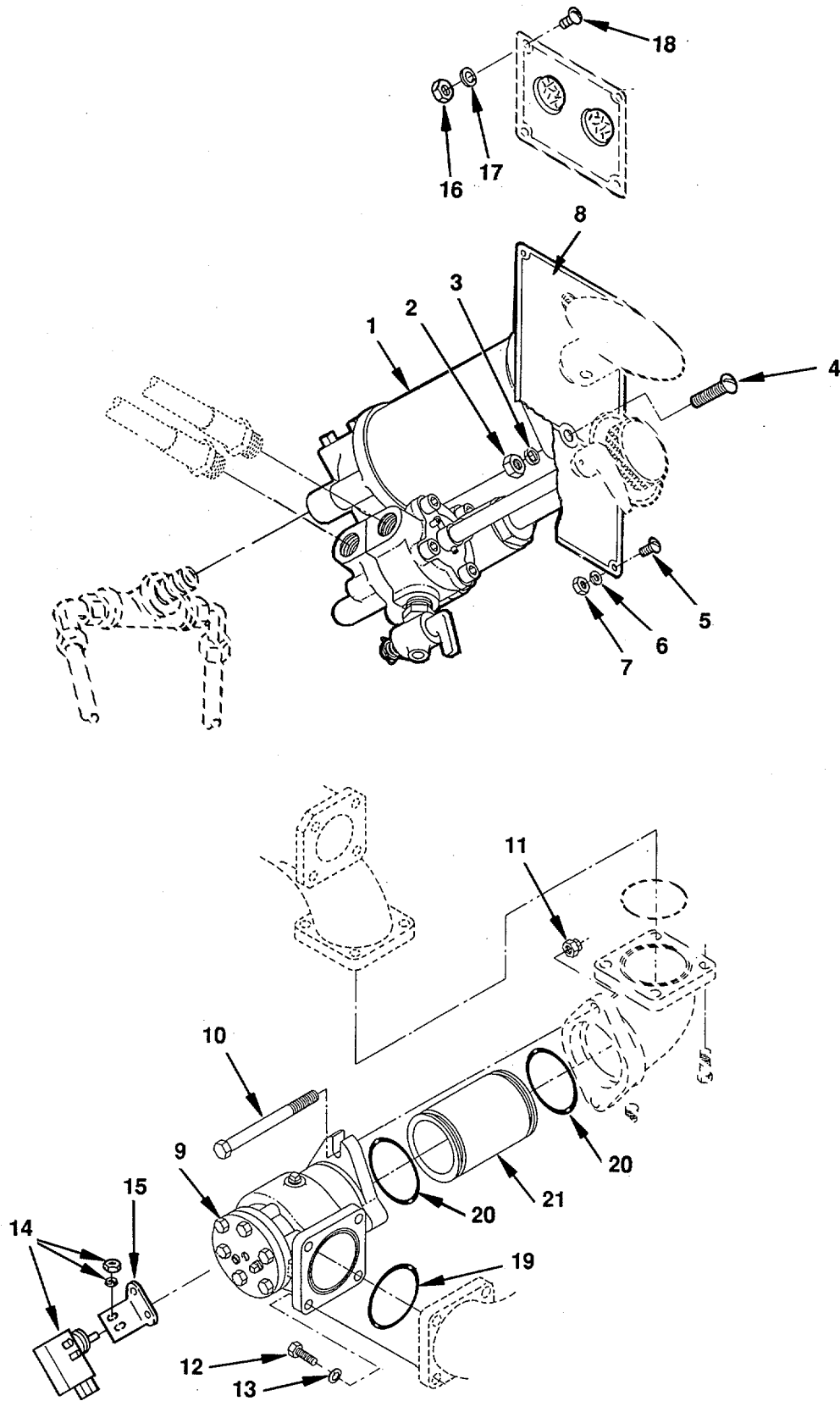


Figure F-36. Pilot and Relief Valves (Sheet 2 of 3)

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-36-						
			79218	80744-4	VALVE ASSY, Pilot (See sheet 1 for NHA)	REF
-23			79218	5393	COCK, Drain	1
-24			79218	62747	HANDLE, 4-Way Valve	1
-25			79218	62746	HANDLE, Pilot Valve	1
-26			79218	51473	ROD, 4-Way Valve	1
-27			79218	W5405-1OSS*	PIN, Groove, 5/32 x 5/8"	1
-28			79218	W31004-6SS	PIN, Spirol, Med, 1/8"	2
-29			79218	W31004-16SS*	PIN, Spirol, Med, 1/8"	1
-30			79218	5182	SPRING, Valve Pilot	1
-31			79218	51466	NUT, Pressure	1
-32			79218	50048	SPRING, Ball	1
-33			79218	61767	HOUSING, Valve Pilot	1
-34			79218	51509	STEM ASSY	1
-35			79218	51454	VALVE, Pilot	1
-36			79218	60708	COVER, Pilot Valve	1
-37			79218	71522	BODY, Pilot Valve	1
-38			79218	V1 026	BALL, 9/32" SST	1
-39			79218	W1 006-88	SCREW, Hex Hd, 3/8"-i 6	2
-40			79218	W5408-16"	PIN, Groove, 1/4" x 1	1
-41			79218	51347*	VALVE, 4-Way	1
-42			79218	51363*	SPRING, 4-Way Valve	1
-43			79218	51456*	GASKET	1
-44			79218	51361	STEM, 4-Way	1
-45			79218	R61708	COVER ASSY, 4-Way Valve	1
-46			79218	W1504-24	SCREW, Skt Hd 1/4"-20	4
47			79218	W3706-2*	O-RING, 3/8" x 1/2"	1
-48			79218	W5404-1OSS*	PIN, Groove, 1/8" x 5/8"	1
-49			79218	W3704-2*	O-RING, 1/4" x 3/8"	2
-50			79218	W37194*	O-RING, 1-3/16" x 1-7/16"	1
-51			79218	W1504-12	SCREW, Skt Hd, 1/4"-20	2
-52			79218	W6502-B	PLUG, Pipe, 1/8"	4
-53			79218	W3712-3*	O-RING, 3/4" x 15/16"	1
-54			79218	Vi903-B*	BEARING, Needle Thrust	1
-55			79218	V1903-R*	RACE, Needle, Thrust Brg	2
-56			79218	62345	STRAINER, Assy	1
-57			79218	W10105-12SS	PIN, Groove, 5/32" x 3/4"	1
-58			79218	51944	KNOB, Strainer	1
			79218	9035-4	PILOT VALVE SUBASSY (Does not include handles and panel plate)	1
			79218	K521 -1	KIT, Repair, Pilot Valve (Includes items marked*)	1

Figure F-36. Pilot and Relief Valves (Sheet 3 of 3)

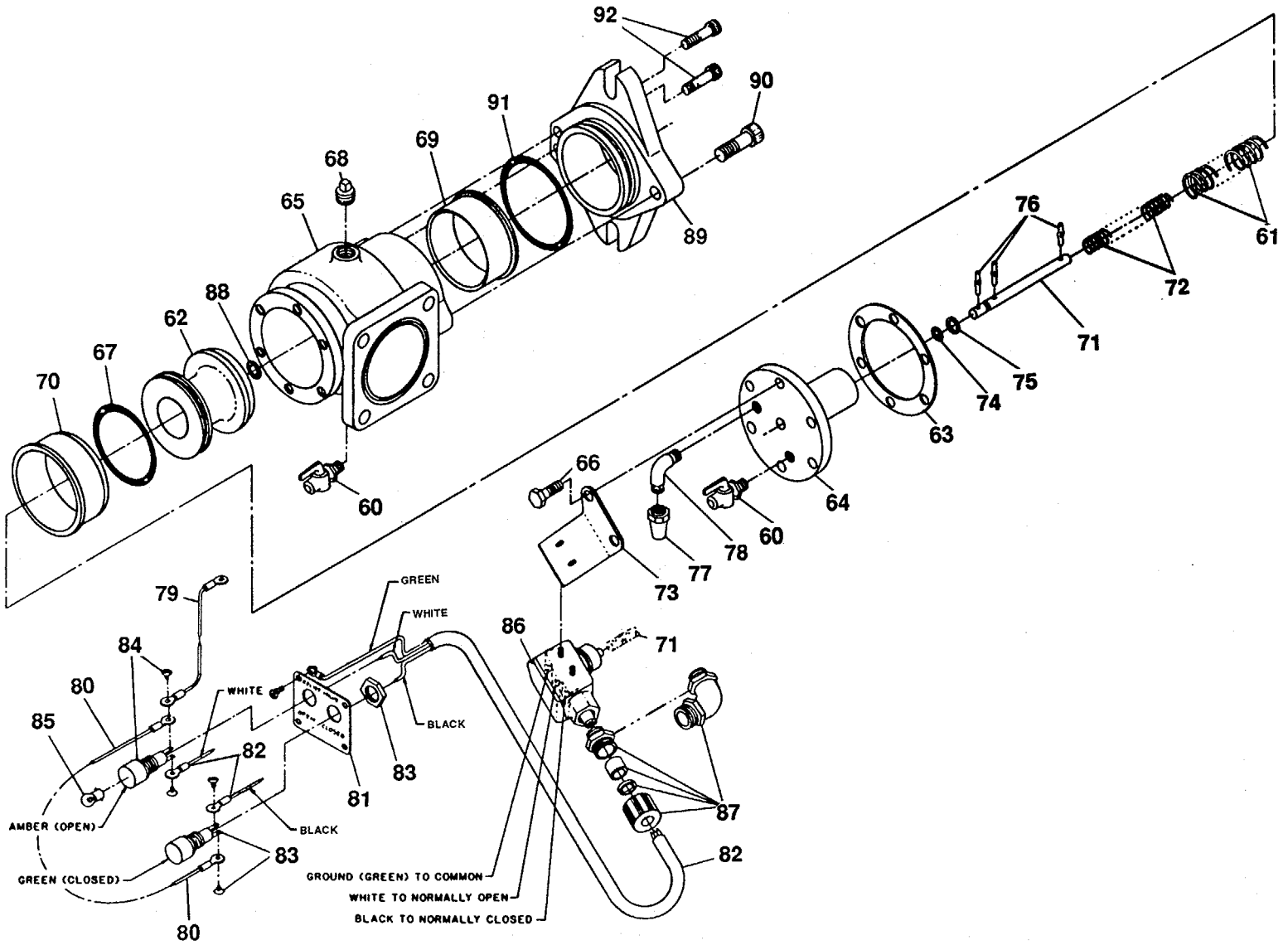


FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-36-			79218	81262-7	VALVE ASSY, Relief (See sheet I for NHA)	REF
-60			79218	5393	COCK, Drain	2
-61			79218	5172	SPRING, Main Valve	1
-62			79218	61629-1	VALVE, Main, 3 In.	1
-63			79218	51384**	GASKET	1
-64			79218	61634-1	CAP, Relief Valve	1
-65			79218	R81324	BODY, Assy, w/Seat & Sleeve	1
-66			79218	W1006-16	SCREW, Hex Hd, 3/8"-16	6
-67			79218	W37484**	O-RING, 3 x 3-1/4"	1
-68			79218	W6504-S	PLUG, Pipe, 1/4"	1
-69			79218	52055	SEAT, Relief Valve	1
-70			79218	61924	SLEEVE, Relief Valve	1
-71			79218	51185	ROD, Switch Actuating	1
-72			79218	51186	SPRING, Switch	1
-73			79218	61357	BRACKET, Mounting Switch	1
-74			79218	W3704-2**	O-RING, 1/4" x 3/8"	1
-75			79218	W4206	WASHER, Rat, Copper, 3/8"	1
-76			79218	W5404-1OSS	PIN, Groove, 1/8" x 5/8"	3
-77			79218	W8606	NUT, Rared, 3/8" Tube	1
-78			79218	W8804-6	ELBOW, Male, 90°	1
-79			79218	51862	WIRE, Assy	1
-80			79218	51187-4	WIRE, Assy	1
-81			79218	51190	PLATE, Panel	1
-82			79218	62588-96	WIRE, Assy	1
-83			79218	Vi351	LIGHT, Ind, Green	1
-84			79218	V1352	LIGHT, Ind, Amber	1
-85			79218	1P787	BULB, 12 Volt	1
-86			79218	V1463	SWITCH, Micro	1
-87			79218	V2531	GRIP, Sealing, Straight	1
-88			79218	W3706-2**	O-RING, 3/8" x 1/2"	1
-89			79218	72010	ADAPTER, Relief Valve	1
-90			79218	W1508-20	SCREW, Skt Hd, 1/2"-13	1
-91			79218	W37544**	O-RING, 3-3/8" x 3-5/8"	1
-92			79218	W1505-22	SCREW, Skt Hd, 5/16"-18	2
			79218	81262-1OR	VALVE ASSY, Relief, Less Wiring	1
			79218	K588-1	KIT, Repair, Relief Valve, 3" (Includes item marked**)	1

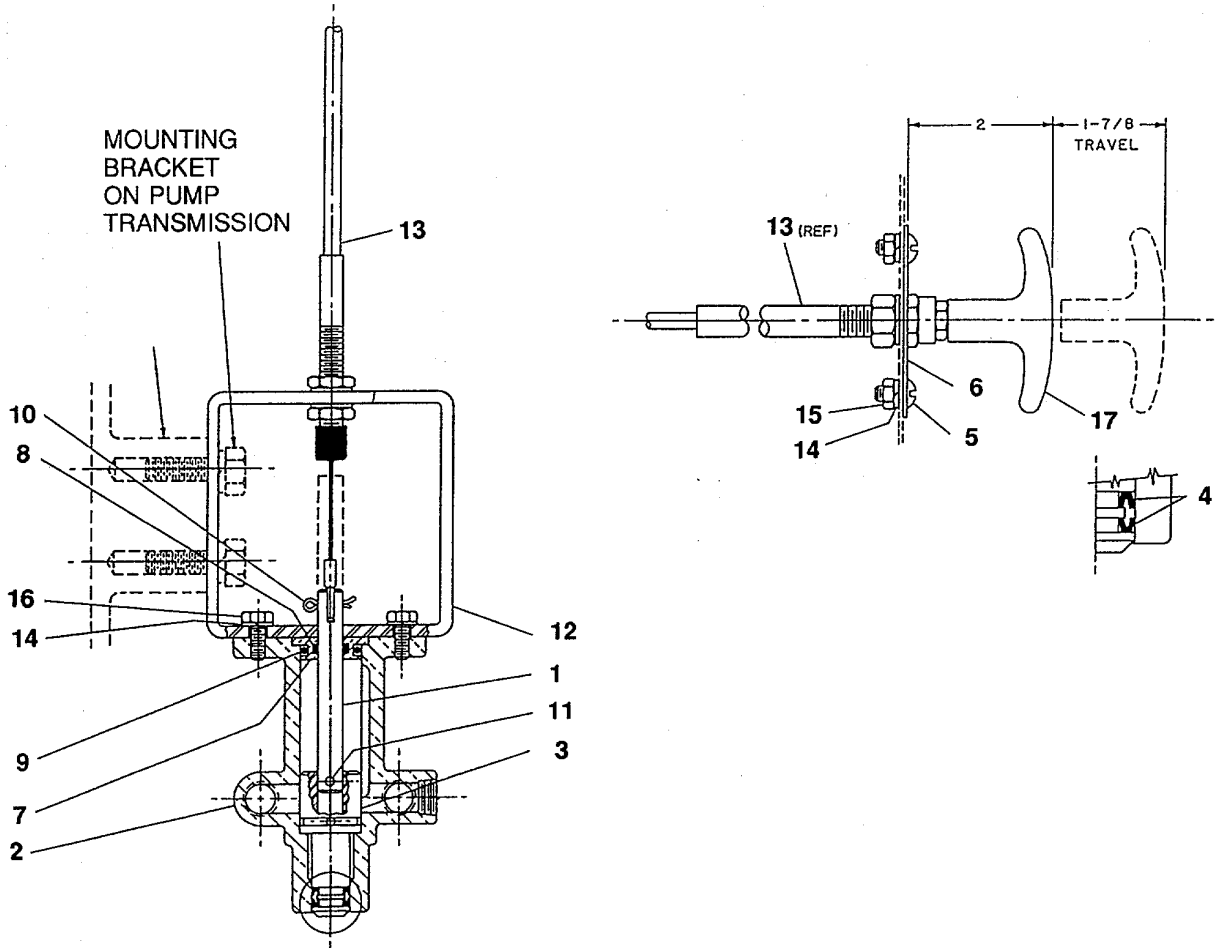


Figure F-37. Water Pump Drain Valve Assembly

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-37-			79218	71803-3	WATER PUMP DRAIN VALVE ASSEMBLY (See figure F-30 for NHA)	1
-1			79218	51873	ROD, Plunger	1
-2			79218	71375	BODY, Drain Valve	1
-3			79218	62767*	PLUNGER, Drain Valve	1
-4			79218	V 2067*	CUP, Packing, 3/8" x 5/8" x 1/8"	2
-5			79218	W 9525-8SS	SCREW, Rnd Hd, 1/4"-20	2
-6			79218	51111	PLATE, Panel	1
-7			79218	50774	CAP, End	1
-8			79218	V 1340*	RING, Quad	1
-9			79218	W 3712-4D*	O-RING, 3/4" x 1"	1
-10			79218	W3506-20SS*	PIN, Cotter, 3/16" x 1-1/4"	1
-11			79218	W5404-14SS*	PIN, Groove, 1/8" x 7/8"	1
-12			79218	72302	BRACKET, Mounting	1
-13			79218	62628	CABLEASSY	1
-14			79218	W4104	WASHER, Lock, 1/4"	4
-15			79218	W3225-SS	NUT, Hex, 1/4"-20	2
-16			79218	W 1004-10	SCREW, Hex Hd, 1/4"-20	2
-17			79218	62643	HANDLE, Tee	1
			79218	71803-3BR	VALVE, Repl, No Brkt/Cable (Not Shown)	1
			79218	K 514-1	KIT, Repair Drain Valve (Includes items marked *)	1

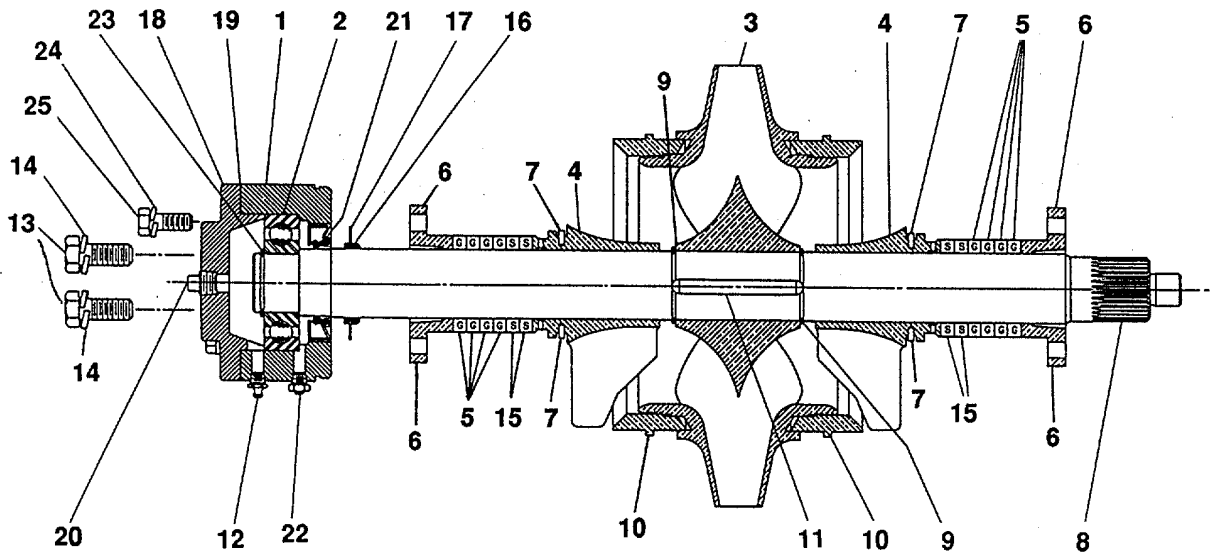


Figure F-38. Water Pump Impeller Shaft Assembly

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-38-			79218	81609	WATER PUMP IMPELLER SHAFT ASSEMBLY (See figure F-30 for NHA)	1
-1			79218	70354	HOUSING, Bearing	1
-2			79218	W16307	BEARING, Ball	1
-3			79218	71799	IMPELLER	1
-4			79218	R60877-1	END ASSY, Stuffing Box	2
-5			79218	51890	RING, Pkg, Flex Gph (Factory)	8
-5			79218	52184	RING, Pkg, Flex Gph Spit (Service)	8
-6			79218	51803	GLAND, Half	4
-7			79218	W31004-65S	PIN, Spirol Med, 1/8"	4
-8			79218	81506	SHAFT, Impeller	1
-9			79218	W4510-162SM	RING, Retaining	2
-10			79218	71800	RING,Wear	2
-11			79218	W 4905-44SS	KEY, Square, .313" x .31 1" x 2-3/4"	1
-12			79218	V 1085	FITTING, Lubrication, 1/8"	1
-13			79218	W 1008-20HT	SCREW, Hex Hd, 1/2"-13	4
-14			79218	W 4108	WASHER, Lock, 1/2"	4
-15			79218	51949	RING, Packing-Graphite	4
-16			79218	V 2406	GROMMET, Flinger	1
-17			79218	52056	DISK, Flinger	1
-18			79218	60943	CAP, Bearing Housing	1
-19			79218	50867	GASKET	1
-20			79218	W 6504-G	PLUG, Pipe, 1/4"	1
-21			79218	W 3926-275	SEAL, Oil, 1-5/8" x 2-3/4"	1
-22			79218	V 2566	FITTING, Lube Relief	1
-23			79218	W4510-137	RING, Retaining	1
-24			79218	W 4106	WASHER, Lock, 3/8"	4
-25			79218	W 1006-16	SCREW, Hex Hd, 3/8"-16	4

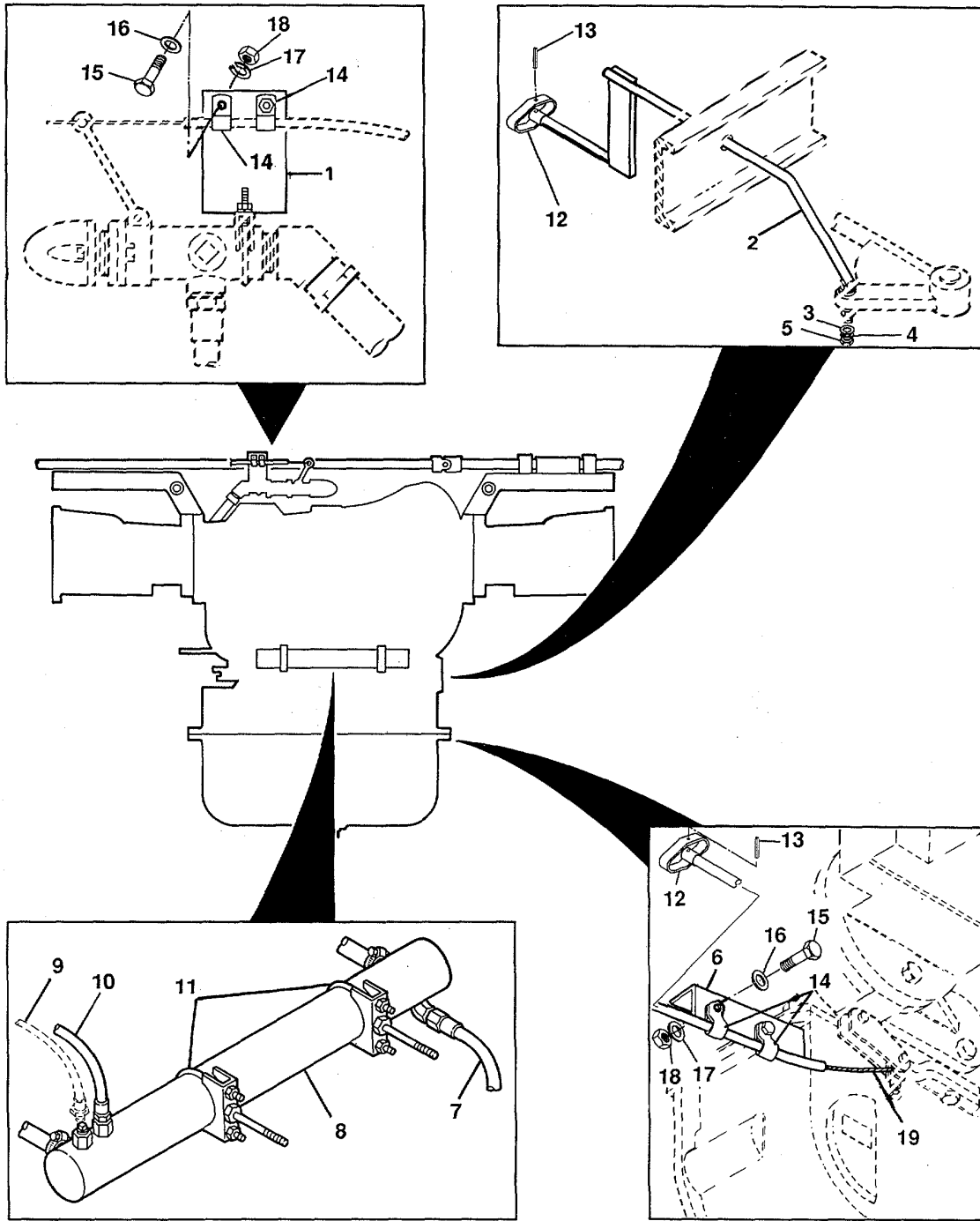


Figure F-39. Engine Cooler and Fire Pump Control Connections

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-39-					ENGINE COOLER AND FIRE PUMP CONTROL CONNECTIONS	1
-1	04664	51-0014	21476	3830	CLAMP, Cable, Primer Valve	
-2	04664	52-0150			LINKAGE, Pump Shift	1
					(ATTACHING PARTS)	
-3	04664	82-1013-008			WASHER, Rat, 3/8", Zn	5
-4	04664	82-1009-008			WASHER, Fender, 3/16" x 1-1/2", Zn	1
-5	04664	82-3014-003			NUT, Hex, 3/8"-16, Zn	1
-6	04664	51-0223			BRACKET ASSY., Pump Shift Cable	1
					(ATTACHING PARTS)	
-6	04664	82-2033-0100			SCREW, Hex Hd, 1/2"-13 x 1", Zn, Gr 8	2
-6	04664	82-1013-010			WASHER, Flat, 1/2", Zn	2
-6	04664	82-3014-006			NUT, Hex, 1/2"-13", Zn	2
-7	04664	944004			TUBING, Copper, 3/8" O.D.	AR
-8	04664	51-0419	21563	3294-1-5	COOLER, Engine	1
-9	04664	944023			TUBING, Plastic Wall, 1/4" O.D.	AR
-10	04664	944008			TUBING, Plastic Wall, 3/8" O.D.	AR
-11	04664	51 -0171			CLAMP ASSY., Cooler	2
-12	04664	52-0064	60319	PA60Z	HANDLE	2
					(ATTACHING PARTS)	
-13	04664	82-0078-0075			PIN, Roll, 1/4" x 3/4"	2
-14	04664	64-0907-0713			CLAMP, Cable	4
					(ATTACHING PARTS)	
-15	04664	82-2063-0075			SCREW, Hex Hd, 1/4"-20 x 3/4", Zn, Gr 5	8
-16	04664	82-1013-006			WASHER, Rat, 1/4", Zn	8
-17	04664	82-1011-0025			WASHER, Lock, 1/4", Zn	8
-18	04664	82-3014-001			NUT, Hex, 1/4"-20, Zn	8
-19	04664	51-0136	63803	A6655-001	CABLE, Control, 84" Lg	1

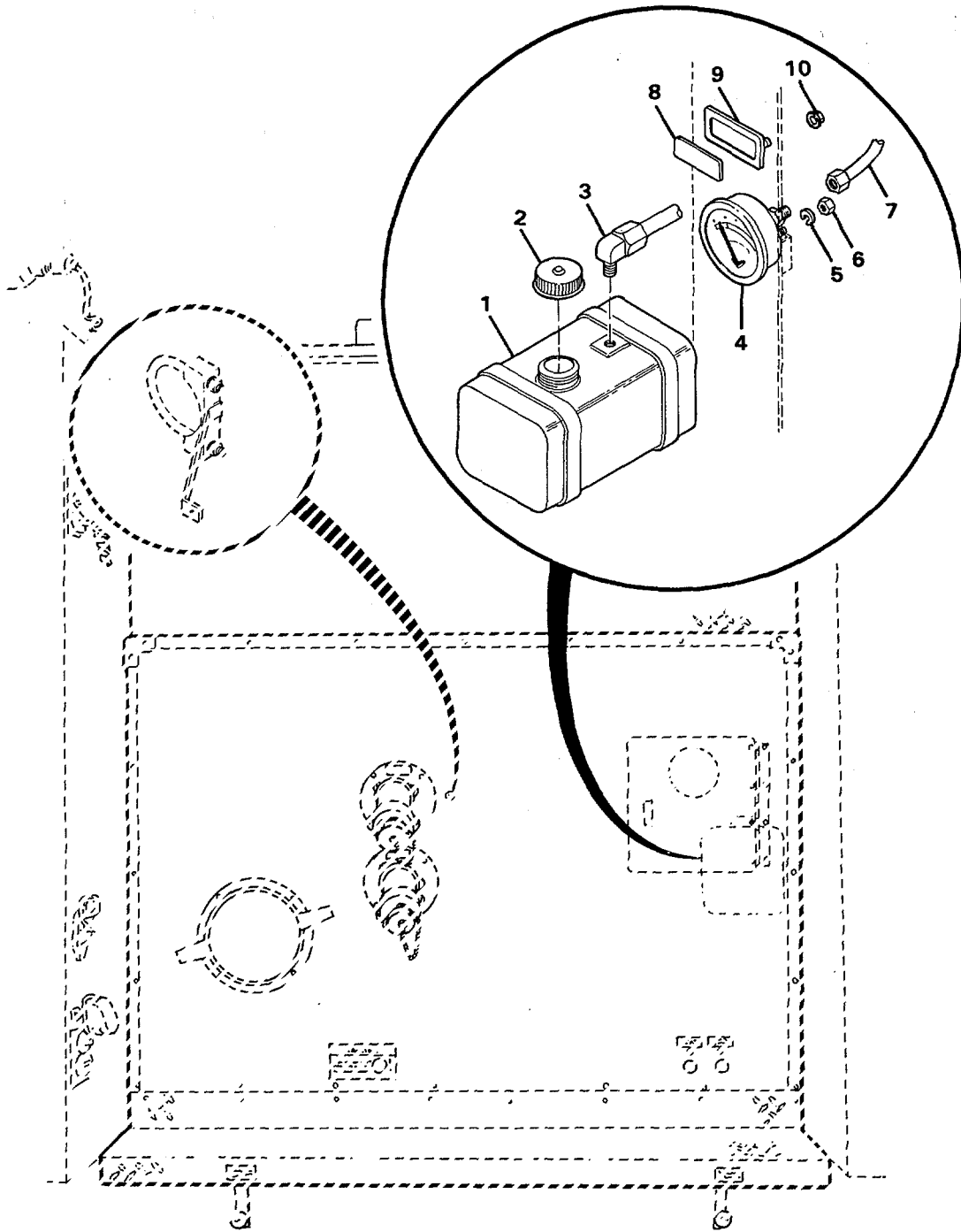


Figure F-40. Priming Pump Oil Tank Assembly

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-40-1	04664	51-0133			PRIMING PUMP OIL TANK ASSEMBLY TANK, Primer1	1
-2	04664	51-0632			CAP, Primer Tank	1
-3	04664	51-1007			TUBE ASSY, Pickup, Primer Tank	1
4	04664	52-0021	09393	2550-00714	GAUGE, Oil, 0-30 PSI (ATTACHING PARTS)	1
-5	04664	82-1011-0125			WASHER, Lock, No. 8, Zn	2
-6	04664	82-3017-006			NUT, Hex, No. 8-32, Zn	2
-7	04664	944034			TUBE ASSY, Pressure Gauge, 1/4"	1
-8	04664	91-0207			TAG, For Maintenance Checks Only	1
-9	04664	52-0117			BEZEL, Tag Style B, w/Pins (ATTACHING PARTS)	1
-10	4664	82-0035			NUT, Pal	2

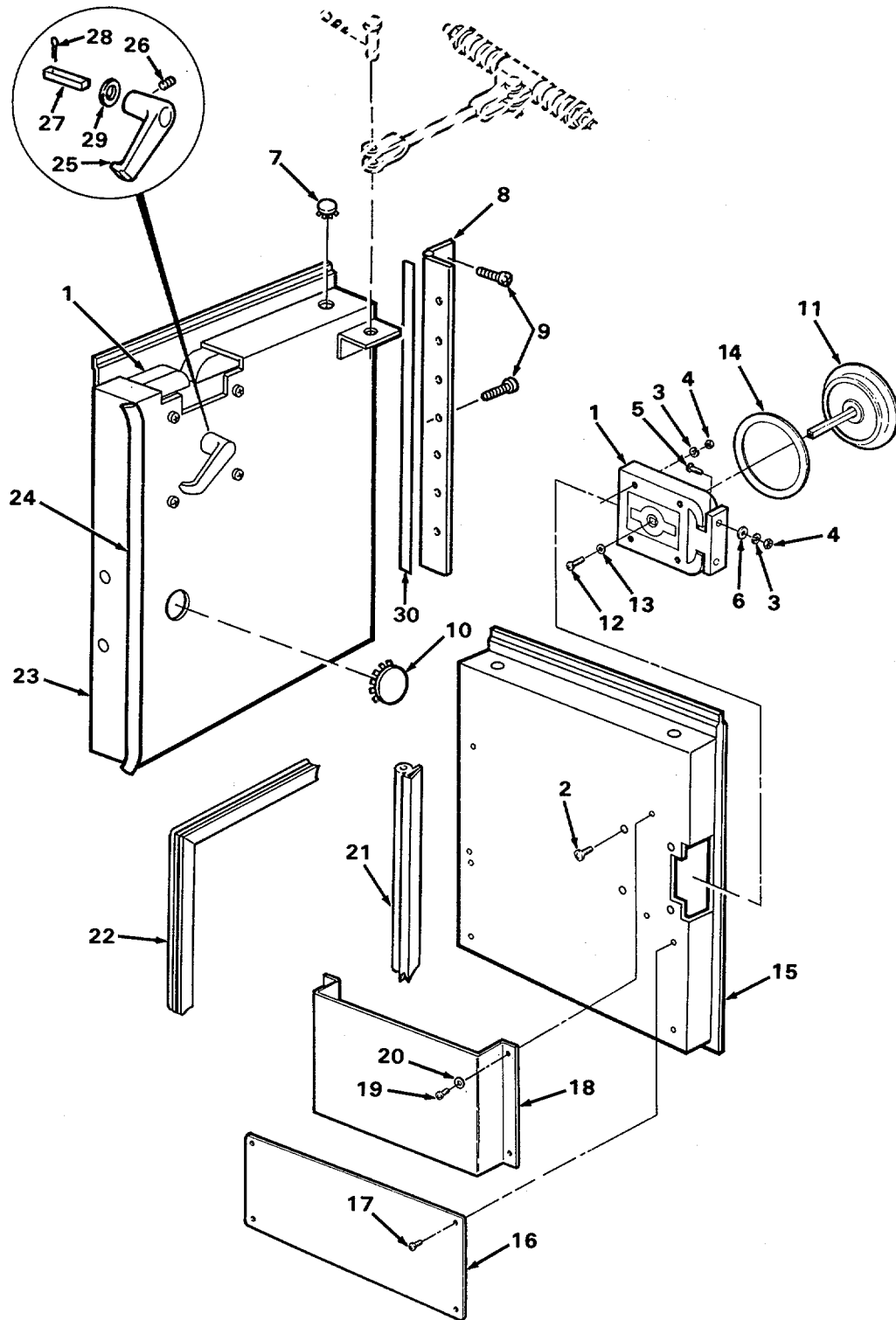


Figure F-41. Upper and Lower Compartment Doors (Sheet 1 of 2)

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-41-					UPPER AND LOWER COMPARTMENT DOORS	1
-1	04664	80-2115	3J615	3-206-U	LOCK, Clam (ATTACHING PARTS)	18
-2	04664	82-2035-0125			SCREW, PhTrHd, 1/4"-20x 1-1/4", EP	72
-3	04664	82-1011-0025			WASHER, Lock, 1/4", Zn	108
-4	04664	82-3014-001			NUT, Hex, 1/4"-20, Zn	108
-5	04664	82-2035-0075			SCREW, Ph Tr Hd, 1/4"-20 x 3/4", EP	36
-6	04664	82-1013-006			WASHER, Flat, 1/4", Zn	36
-7	04664	82-0127-0003			BUTTON, Plastic	64
-8	04664	15-0390-024			HINGE, Door, Lower	6
-8	04664	15-0390-026			HINGE, Door, Upper (ATTACHING PARTS)	12
-9	04664	82-2039-001			SCREW, Ph Pn Hd, No. 10-32x 518", SIS	270
-10	04664	80-9104-0200	75925	IC870.XS48175	BUTTON, Chrome	8
-11	04664	80-2251	3J615	79L	LOCK, "D" Handle (ATTACHING PARTS)	10
-12	04664	82-3053-0063			SCREW, T410 Ph Pn, Taptite, 1 No. 10-24 x 1/2"	
-13	04664	82-1013-004			WASHER, Flat, No. 10, Zn	10
-14	04664	94-4041			GASKET, "D" Ring Lock	10
-15	04664	SD-00213			DOOR, Side Compartment, Lock, Upper	6
-15	04664	SD-00203			DOOR, Side Compartment, Lock, Lower Front	2
-15	04664	SD-00209			DOOR, Compartment, Lock, Lower Rear	2
-16	04664	AP0800-01500			SCUFFPLATE, Bottle Rack Doors (ATTACHING PARTS)	2
-17	04664	82-2039-			SCREW, T410 Ph Pn Hd, Taptite, No. 10-24x 1/2"	16
-18	04664	SD-00102			HOLDER, Binder (ATTACHING PARTS)	10
-19	04664	82-2039-001			SCREW, T410 Ph Pn Hd, Taptite, No. 10-24 x 1/2"	40
-20	04664	82-1016-0019			WASHER, Flat, No. 10, Nylon	40
-21	04664	943098	82942	943098	RUBBER, Door, Compartment, Hinge Side (ft.)	42'
-22	04664	943005	82942	4943005	RUBBER, Door, Compartment (ft.)	104'
-23	04664	SD-00219			DOOR, Side Compartment, Free, Upper PS	3
-23	04664	SD-00216			DOOR, Side Compartment, Free, Lower Front PS	1
-23	04664	SD-00206			DOOR, Side Compartment, Free, Lower Rear DS	1
-23	04664	SD-00223			DOOR, Side Compartment, Free, Upper DS	3
-24	04664	943064	56329	1085-3017	SEAL, Door, "D" Section, Black (ft.)	104'
-25	04664	80-2043	19220	3-5556	HANDLE, Inside (ATTACHING PARTS)	8
-26	04664	82-2016-0025			SCREW, Set, Sckt Hd, 5/16" x 1/4"	
-27	04664	15-0864			SHAFT, Handle, Inside (ATTACHING PARTS)	8
-28	04664	82-0009			PIN, Cotter, 1/8" x 1"	8
-29	04664	82-1013-009			WASHER, Flat, 7/16", Zn	8
-30	04664	943092	6A669	8562	TAPE, Isolation (ft.)	84'

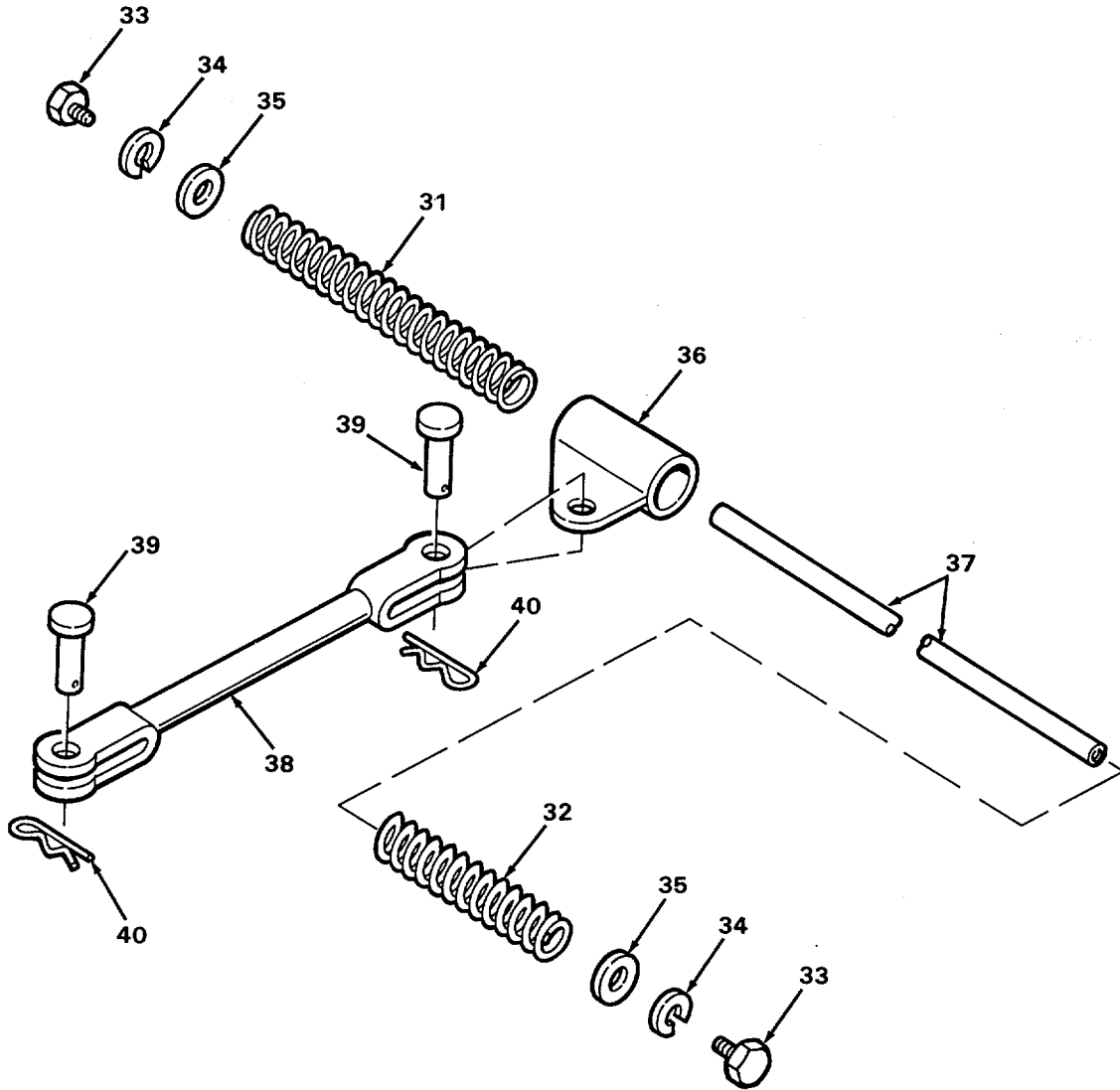


Figure F-41. Upper and Lower Compartment Doors (Sheet 2 of 2)

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-41	04664	80-4012			HOLDER ASSY, Door, Positive	18
-31	04664	80-4038			SPRING	1
-32	04664	80-4039			SPRING	1
					(ATTACHING PARTS)	
-33	04664	82-2063-0062			SCREW, Cap, Hex Head, 1/4"-20 x 5/8", Zn	2
-34	04664	82-1011-0025			WASHER, Lock, 1/4", Zn	2
-35	04664	82-1013-006			WASHER, Flat, 1/4", Zn	2
-36	04664	80-4037			SLIDE, Door	1
-37	04664	80-4036			ROD, Door Slide	1
-38	04664	80-4030			ARM, Door	1
					PIN, Clevis, 1/4" x 3/4" Lg., Zn	
-39	04664	82-0044-0075			(ATTACHING PARTS)	2
-40	04664	80-9012-0075			CLIP, Spring, Hair, Zn	2

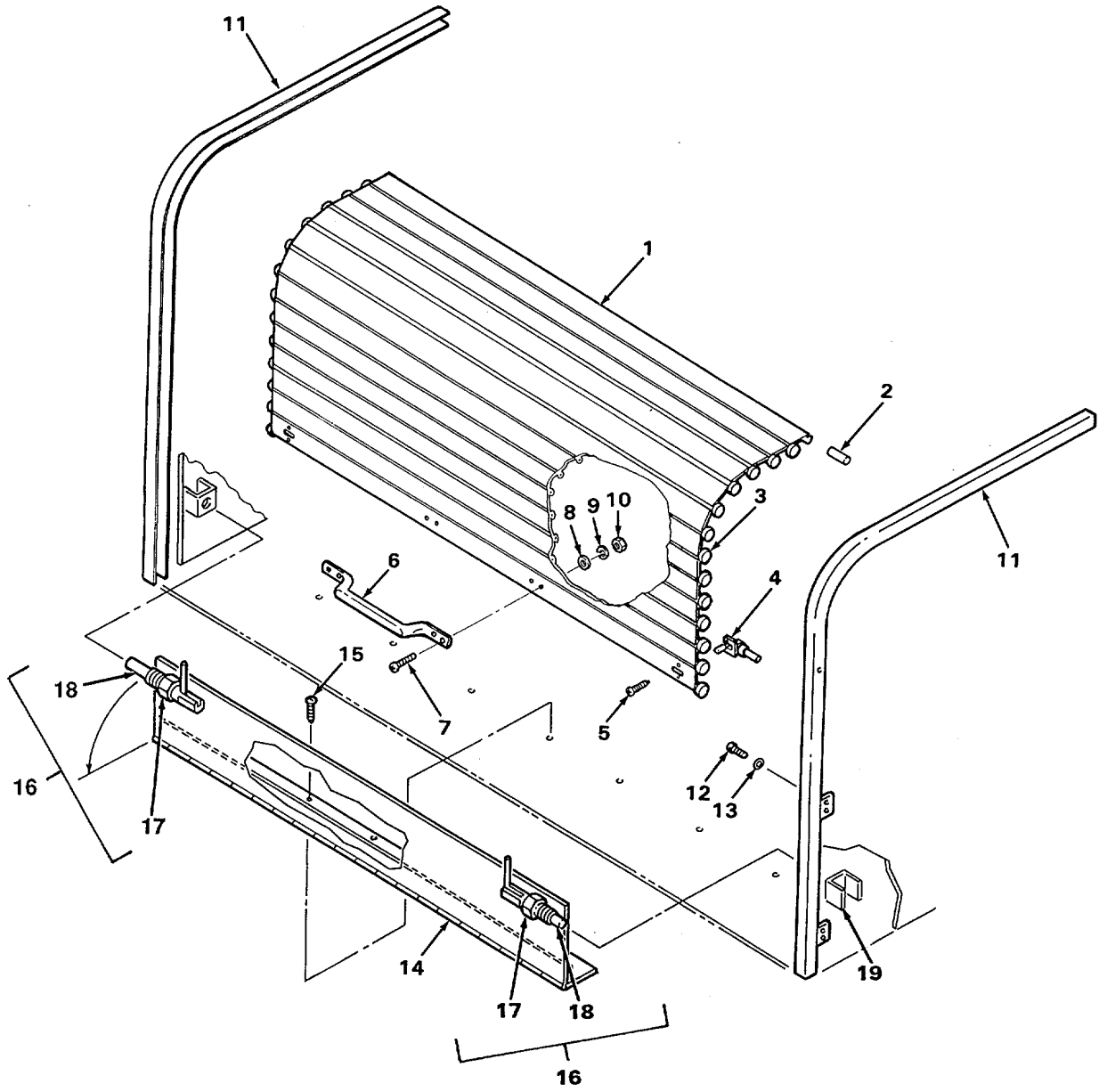


Figure F-42. Rear Roll-Up Door and Ladder Retainer

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-42-					REAR ROLL-UP DOOR AND LADDER RETAINER	1
-1	04684	SD40191			EXTRUSION, Door Slat	13
-2	04664	51-0041			FILLER, Roller	2
-3	04664	519041	61990	69774	ROLLER, Roll-up Door	26
-4	04664	80-9240			LOCK, Roll-up Door	2
					(ATTACHING PARTS)	
-5	04664	82-2111-0100			SCREW, SI Hex Hd. Tap, No. 10 x 1"	4
	04664	80-02	3J615	4300	HANDLE	
					(ATTACHING PARTS)	
-7	04664	82-2047-0100			SCREW, Ph Ft Hd, No. 10-24 x 1", Zn	4
	04664	82-1013-004			WASHER, Flat, No. 10, Zn	4
-9	04664	82-1012-007			WASHER, Lock, No. 10, Zn	4
-10	04664	82-3017-007			NUT, Hex, No. 10 -24, Zn	4
-11	04684	80-9120			TRACK, Roll-up Door, L.H. & R.H.	2
					(ATTACHING PARTS)	
-12	04664	82-2039-DO1			SCREW, T41i0 Ph Pn Hd, Taptite, No. 10-24 x 1t2'	8
-13	04664	82-1017-001			WASHER, Lock, No. 10, Nylon	8
-14	04664	SD07497			RETAINER ASSY, Ladder	1
					(ATTACHING PARTS)	
-15	04664	82-2039-001			SCREW, T410 Ph Pn Hd, Taptite, No. 10-24 x 1/2'	7
-16	04664	SD07538			LOCK ASSY, Ladder Retainer	2
-17	04664	82-3014-006			NUT, Hex, 1/2*-13, Zn	2
-18	04664	80-2140			LOCK, Ladder Retainer Door	2
-19	04664	SD00108			CATCH, Ladder Retainer Assy	2

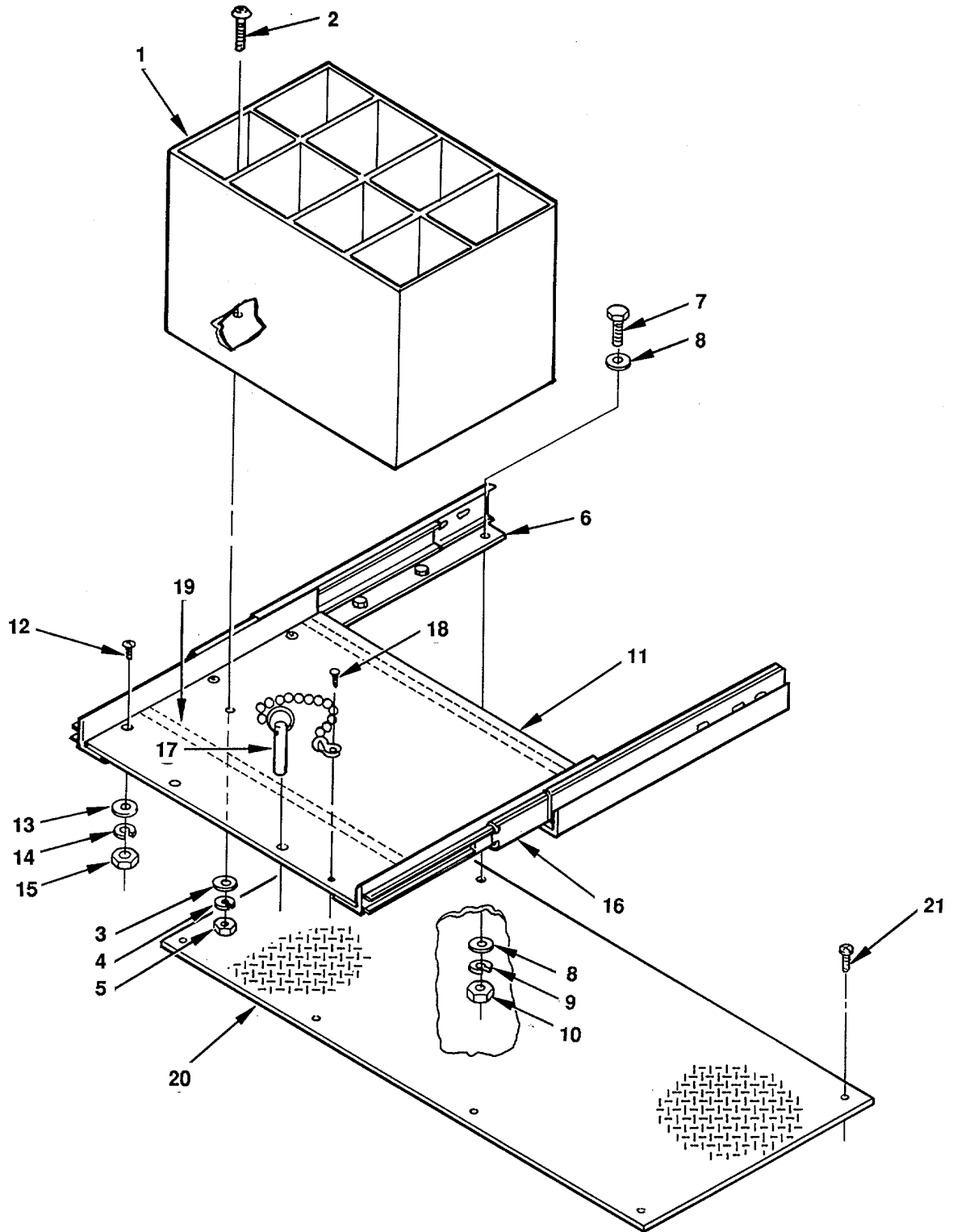


Figure F-43. Inverted Slide-Out Tray and Air Bottle Rack

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-43					INVERTED SLIDE-OUT TRAY AND AIR BOTTLE RACK	1
-1	04664	SD-00194			RACK, Air Bottle (ATTACHING PARTS)	1
-2	04664	82-2035-0075			SCREW, PhTrHd, 1/4"-20x 3/4", EP	2
-3	04664	82-1013-006			WASHER, Flat, 1/4", Zn	2
-4	04664	82-1011-0025			WASHER, Lock, 1/4", Zn	2
-5	04664	82-3014-001			NUT, Hex, 1/4"-20, Zn	2
-6	04664	23-0029			ANGLE, Tray Mounting (ATTACHING PARTS)	4
-7	04664	82-2063-0100			SCREW, Cap, Hex Hd, 1/4"-20 x 1", Zn	6
-8	04664	82-1013-006			WASHER, Flat, 1/4", Zn	12
-9	04664	82-1011-0025			WASHER, Lock, 1/4", Zn	6
-10	04664	82-3014-001			NUT, Hex, 1/4"-20, Zn	6
-11	04664	AD2200-02600			TRAY, Inverted (ATTACHING PARTS)	1
-12	04664	82-2035-0050			SCREW, PhTrHd, 1/4"-20 x 1/2", SP	4
-13	04664	82-1013-006			WASHER, Flat, 1/4", Zn	4
-14	04664	82-1011-0025			WASHER, Lock, 1/4", Zn	4
-15	04664	82-3014-001			NUT, Hex, 1/4"-20, Zn	4
-16	04664	80-9002	83508	330-26-04	SLIDE, Drawer, 22"	2
-17	04664	23-0650			PIN, Retaining, w/Chain (ATTACHING PARTS)	1
-18	04664	82-2039-001			SCREW, T41 0 Ph Pn Hd, Taptite, No. 10-24 x 1/2"	1
-19	04664	943089-02200			BAR, Channel	2
-20	04664	AY2275-03875			PLATE, 4-Way (ATTACHING PARTS)	1
-21	04664	82-2039-002			SCREW, T41 0 Ph Pn Hd, Taptite, No. 10-24 x 3/4"	12

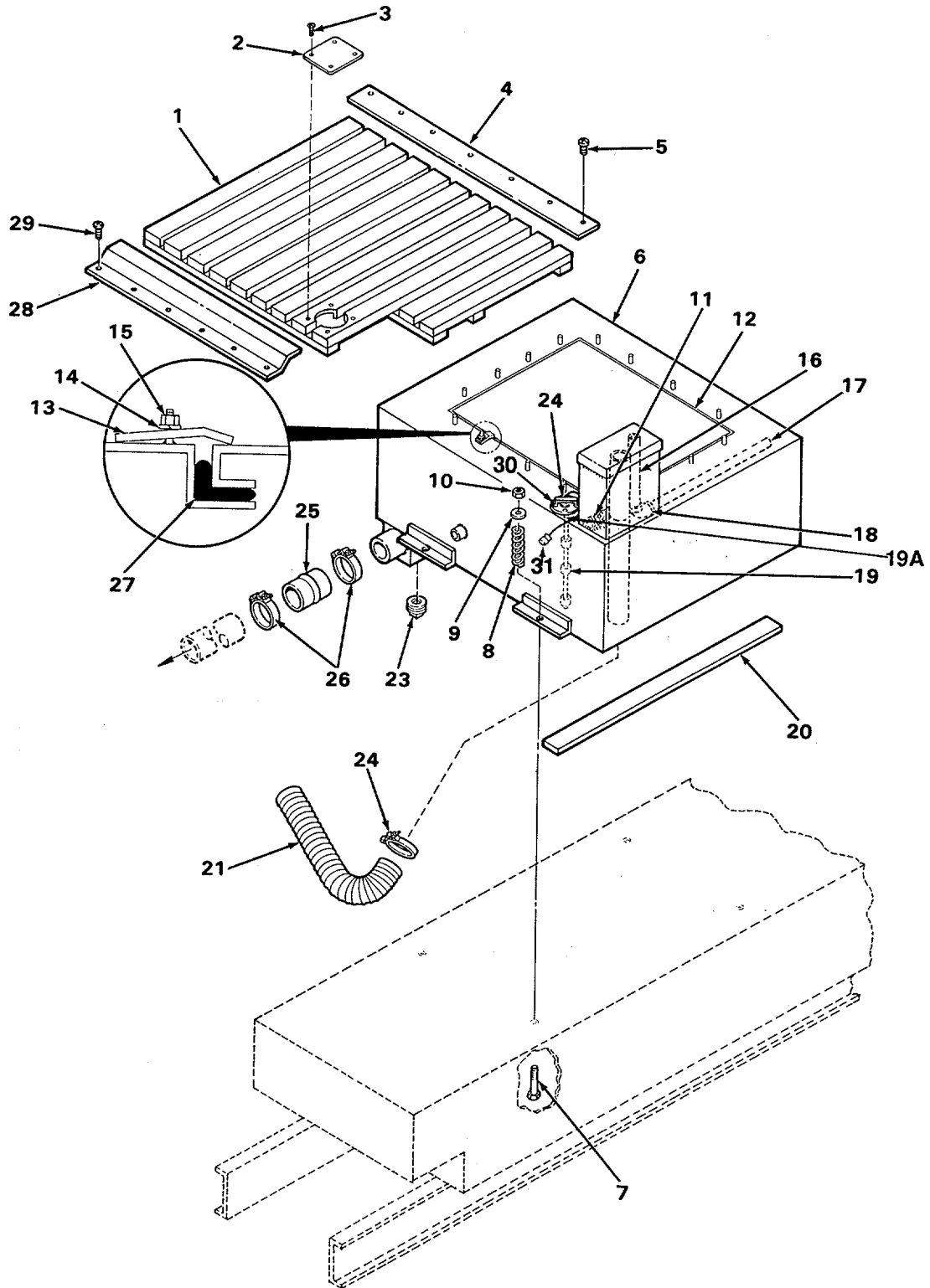


Figure F-44. Water Tank Assembly

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-44-					WATER TANK ASSEMBLY	1
-1	04664	SD-00232			GRATING, Aluminum	1
-2	04664	25-0063			PLATE, Cover, Water Level Probe (ATTACHING PARTS)	1
-3	04664	82-2039-001			SCREW, T410 Ph Pn Hd, Taptite, No. 10-24 x 1/2"4	4
-4	04664	SD-13006			STRIP, Grating Retaining, S/S (ATTACHING PARTS)	1
-5	04664	82-2039-001			SCREW, T410 Ph Pn Hd, Taptite, No, 10-24 x 1/2"	
-6	04664	SD-00059			TANK, Water (ATTACHING PARTS)	1
-7	04664	82-2033-0450			SCREW, Hex Hd, 1/2"-13 x 4-1/2", Zn	4
-8	04664	81 -0002			SPRING, Water Tank Mounting	4
-9	04664	82-1007-0050			WASHER, Structural, A-325, Zn4	
-10	04664	82-3009			NUT, Lock, Flanged, 1/2"-13	4
-11	04664	50-0762-0003			SCREEN, Tank Dome, S/S, Plain	1
-12	04664	SD-00242			COVER ASSY., Tank, S/S	1
-12	04664	SD-00242			COVER A(ATTACHING PARTS)	
-13	04664	82-1011-002 8			HOLDDOWN, Tankcover	18
-13	04664	82501-0020			WASHER, Lock, 3/8", Zn	18
-15	04664	82-3014-003			NUT, Hex, 3/8"-16, Zn	18
-16	04664	930001-02400			TUBE, 3/4" PVC, Tank Vent	1
-17	04664	50-0074			TUBE, 3/4" PVC, Horizontal Tank Vent	1
-17	04664	560-087			ELBOW, PVC, 3/4" x 90°	1
-19	04664	5604283			PROBE ASSY., Water Level, 15-7/8" Lg (ATTACHING PARTS)	1
-19A	04664	82-2039-002			SCREW, T410 Ph Pn Hd, Taptite, No. 10-24 x 3/4"	6
-20	04664	50-0199			STRIP, Filler, Under Tank, 73t*	2
-21	04664	940024			FLEX-TUBING, Tank overflow (ft.)	10
-22	04664	80-6030			CLAMP, Rubber Hose, 4" ID	1
-23	04664	56-0103			PLUG, Galv, 3"*	1
-24	04664	60-0548			COVER, Wire, Water Level Probe	1
-25	04664	51-0130			HUMP HOSE, Rubber, 3-1/2"	1
-26	04664	80-6017			CLAMP, Rubber Hose, 3-1/2" ID	2
-27	04664	943054			GASKET, Water Tank, .38" x .88" (ft.)	16
-28	04664	SD-00193			STRIP, Grating Retaining (ATTACHING PARTS)	1
-29	04664	82-2039-001			SCREW, T410 Ph Pn Hd, Taptite, No. 10-24 x 1/2"	6
-30	04664	60-0255			GASKET, Water Probe	
-31	04664	60-520			WIRING HARNESS, Water Probe	1

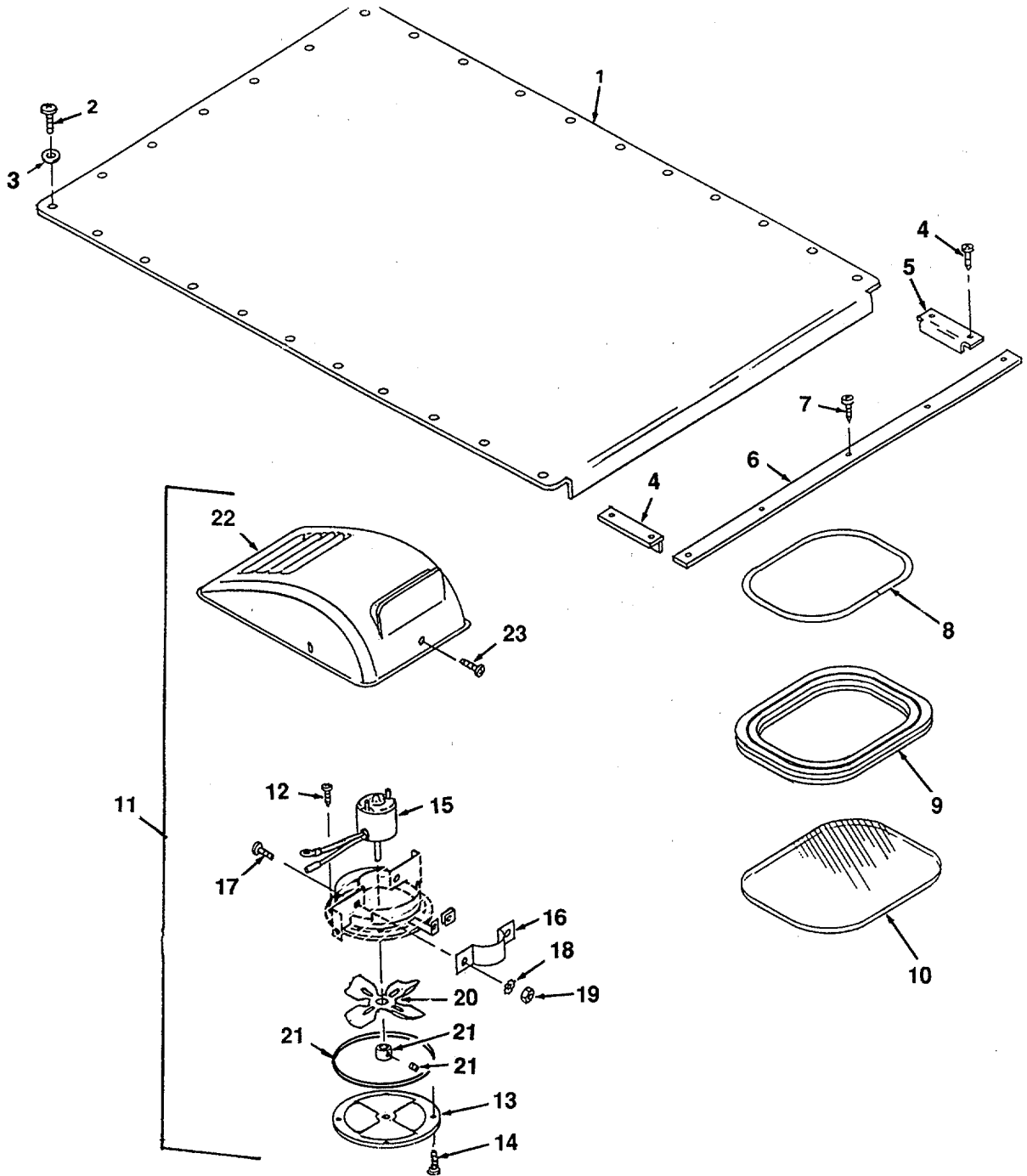


Figure F-45. Cab Components - Roof, Sheet 1 of 2

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-45-					CAB COMPONENTS - ROOF	1
-1	04664	44-3655			ROOF PANEL (ATTACHING PARTS)	1
-2	04664	82-2039-001			SCREW, T410 Ph Pn Hd, Taptite, No. 10-24 x 1/2"	28
-3	04664	82-1016-0019			WASHER, Flat, No. 10, Nylon	28
-4	04664	44-0956			TRIM, Boom Opening Side (ATTACHING PARTS)	2
-5	04664	82-2039-001			SCREW, T4io Ph Pn Hd, Taptite, No. 10-24 x 1/2"	4
-6	04664	440956			TRIM, Boom Opening Front (ATTACHING PARTS)	1
-7	04664	82-2039-001			SCREW, T410 Ph Pn Hd, Taptite, No. 10-24 x 1/2"	5
-8	04664	35-0026	5F845	75000532	GASKET, Window (ft)	AR
-9	04664	35-0027	5F845	75000723	INSERT, Chrome, Window Gasket (ft)	AR
-10	04664	35-0236-004			GLASS, Sunroof	2
-11	04664	63-0065	21102	HV207321	FAN, Exhaust (ATTACHING PARTS)	2
-12	04664	82-2039-001			SCREW, T41 0 Ph Pn Hd, Taptite, No. 10-24 x 1/2"	12
-13	21102	HV209819			VENT, Roof (ATTACHING PARTS)	2
-14	21102	6M144888			SCREW, Oval Hd, No. 10-12 x 5/8"	4
-15	21102	HV210022			MOTOR, Exhaust Fan	1
-16	21102	HV209496			BRACKET, Exhaust Fan Motor (ATTACHING PARTS)	1
-17	21102	6MI21913			SCREW, Hex Hd, 1/4"-20 x 1-1/4"	2
-18	21102	6M121914			WASHER, Lock, Ext Tooth, 1/4"	2
-19	21102	6M271178			NUT, Hex, 1/4"-20	2
-20	21102	HV3841			BLADE, Fan	1
-21	21102	HV14540			RING, Spacer	1
-22	21102	HV206354			COVER, Fan (ATTACHING PARTS)	2
-23	21102	6M445573			SCREW, Ph Hd, No. 10-24 x 1/2"	6

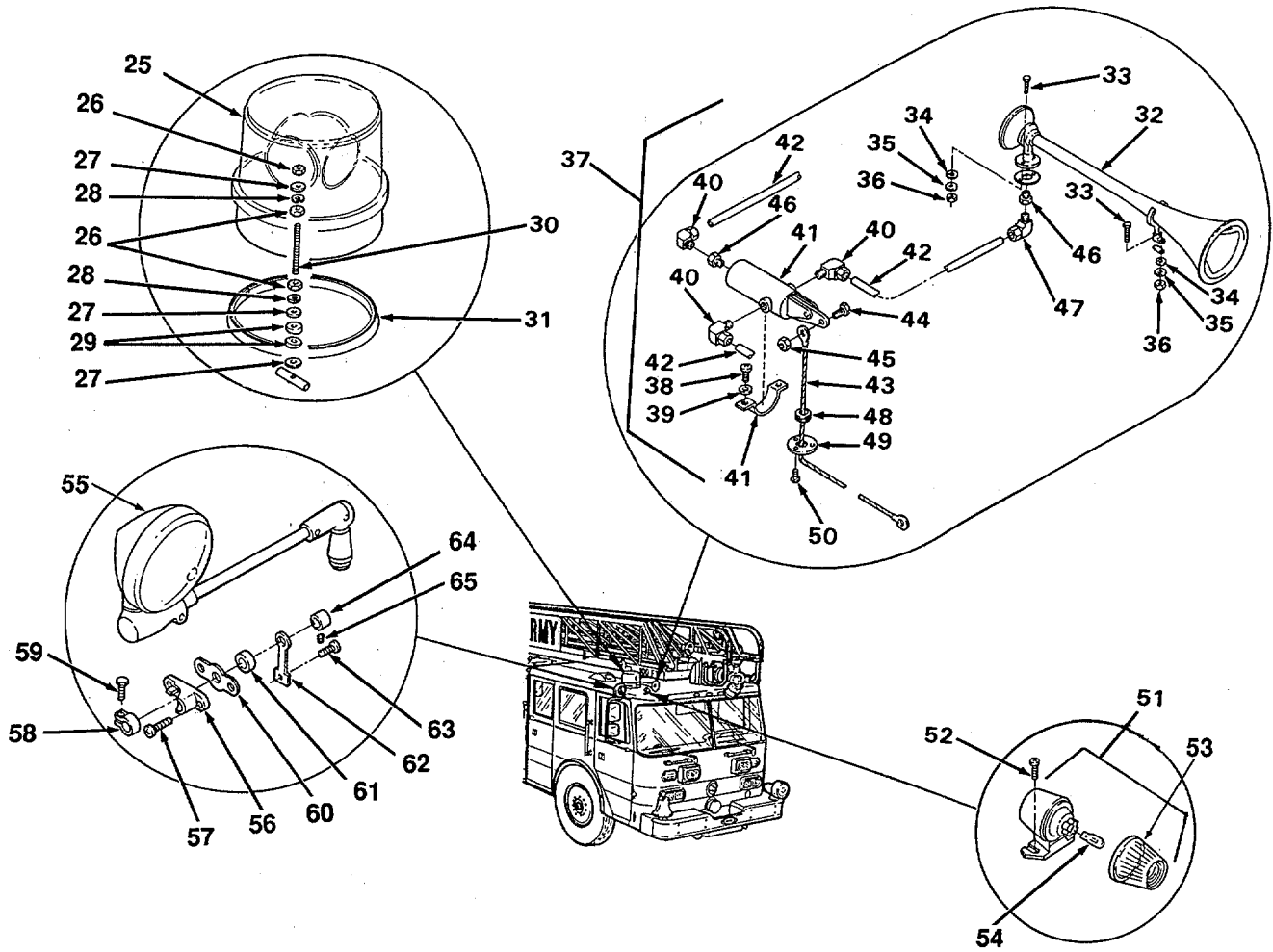


Figure F-45. Cab Components - Roof, Sheet 2 of 2

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F45-25	04664	61-0029	65063	184	LIGHT, Beacon, Red, Rotating (See figure F47 for details) (ATTACHING PARTS)	2
-26	04664	82-3015-001			NUT, Hex, 1/4"-20, Zn, Gr 8	18
-27	04664	82-1013-006			WASHER, FRat, 1/4", Zn	18
-28	04664	82-1011-0025			WASHER, Lock, 1/4", Zn	12
-29			65063	8240A022	WASHER, Rubber	62
-30			65063	8424A01 5	BOLT, Toggle	6
-31			65063	82-1A007-01	GASKET, U-Shaped	2
-32	04664	55-0001	26501	1510	HORN, Air (ATTACHING PARTS)	2
-33	04664	82-2063-0100			SCREW, Cap, Hex Hd, 1/4"-20x1", Zn	6
-34	04664	82-1013-006			WASHER, Flat, 1/4", Zn	6
-35	04664	82-1011-0025			WASHER, Lock, 1/4", Zn	6
-36	04664	82-3015-001			NUT, Hex, 1/4"-20, Zn, Gr 8	6
	04664	99-2076	26501	AL-1522	DIAPHRAGM, Air Horn	1
-37	04664	55-0166			VALVE ASSEMBLY, Air Horn w/Lanyard (ATTACHING PARTS)	1
-38	04664	82-2039-002			SCREW, T410, Ph Pn Hd, Taptite, No. 10-24 x 3/4"	2
-39	04664	82-1013-004			WASHER, FRat, SAE, No. 10, Zn	2
40	04664	56-0490-004			FITTING, Male, 1/8" NPT to 3/8" Tube, 90°	3
-41	04664	55-0002	26501	1110	VALVE, Manual, w/Bracket	1
-42	04664	944035			TUBING, Air Horn, 3/8"	AR
-43	04664	55-0315			LANYARD ASSY, Air Horn (ATTACHING PARTS)	1
-44	04664	82-2063-0050			SCREW, Cap, Hex Hd, 1/4"-20x1/2", Zn	1
-45	04664	82-3014-001			NUT, Hex, 1/4"-20, Zn I	
46	04664	56-0493-001	92003	209P-4-2	FITTING, Reducer, Male, Brass	3
-47	04664	56-0490-004			FITTING, Male, 1/8" NPT to 3/8" Tube, 90°	2
-48	04664	81-1025-0075			BUSHING, Air Horn Lanyard	1
49	04664	55-0118			RING, Garnish (ATTACHING PARTS)	1
-50	04664	82-2115-0075			SCREW, Ph Pn Hd, Taptite, No. 8 x 3/4", Zn	3
-51	04664	61-0010	00553	2-85004	LIGHT, ID, Amber (ATTACHING PARTS)	2
-52	04664	82-2039-002			SCREW, T410 Ph Pn Hd, Taptite, No. 10-24 x 3/4"	4
-53	00553	77-77800			LENS, Yellow	1
-54	1P787	168			BULB, 12V	
-55	04664	61-0044	78977	225A-H763	SPOTLIGHT ASSY, Cab, (See figure F46 for details)	2
04664	61-0047				BRACKET ASSY, Spotlight (Pair) (ATTACHING PARTS)	2
-56			78977	52L	BRACKET, LH	1
-56			78977	52R	BRACKET, RH (ATTACHING PARTS)	1
-57			78977	2226	SCREW	4
-58			78977	52B	CLAMP, Spotlight (ATTACHING PARTS)	2
-59			78977	411-HG	SCREW, Cap, Hex Hd	2

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-45-						
-60			78977	3015-52	GASKET, Spotlight Clamp	2
-61			78977	3C	BUSHING, Rubber	2
-62			78977	2871	BRACE, Spotlight	2
-62					(ATTACHING PARTS)2	
-63			78977	3041 -H	SCREW	2
-64			78977	2209-1	COLLAR, Spotlight, w/Set Screw	2
-65			78977	COML	SET SCREW	1

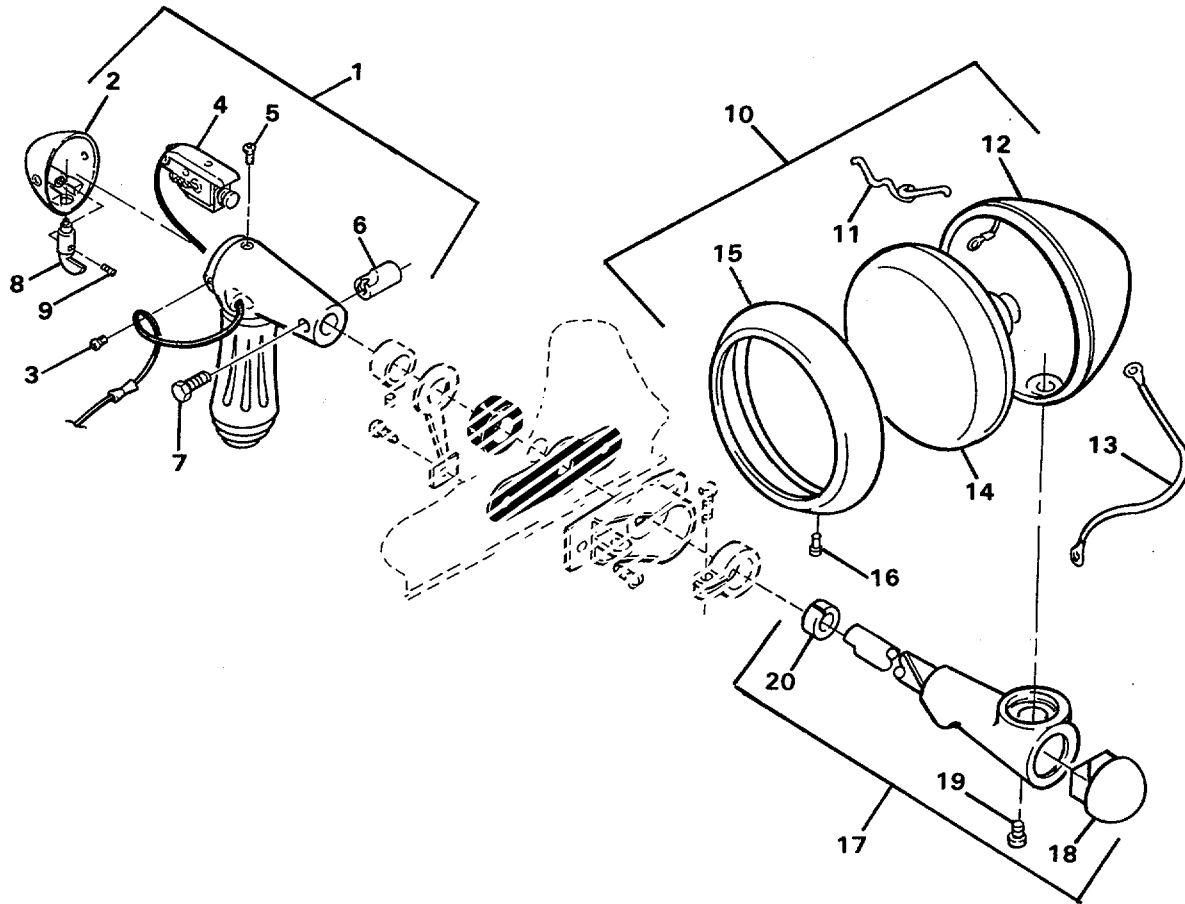


Figure F-46. Cab Spot Light Assembly

F-114

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-46-	04664	61-0044	78977	225A-H763	CAB SPOTLIGHT ASSY) (See figure F-45 for NHA)	REF
-1			78977	6701-001	HANDLE AND HOUSING ASSY	1
-2			78977	6002	CAP, Switch (ATTACHING PARTS)	1
-3			78977	6030	SCREW	2
-4			78977	6453-001	SWITCH AND WIRE (ATTACHING PARTS)	1
-5			78977	P-313-DD	SCREW	1
-6			78977	1834	WEDGE	1
-7			78977	1836	SCREW	1
-8			78977	6151-A	TOGGLE ASSY (ATTACHING PARTS)	1
-9			78977	6051-A	SCREW	1
-10			78977	6570-003	HEAD ASSY	1
-11			78977	6598	SPRING	2
-12			78977	6578-0001	SHELL ASSY	1
-13			78977	2028	WIRE ASSY	1
-14			78977	4435	BULB, Spot	1
-15			78977	6565-U	RING ASSY (ATTACHING PARTS)	1
-16			78977	6471	SCREW	1
-17			78977	6710	HOUSING AND TUBE ASSY	1
-18			78977	6424	PLUG	1
-19			78977	6441	SCREW	1
-20			78977	3062	BUSHING	1

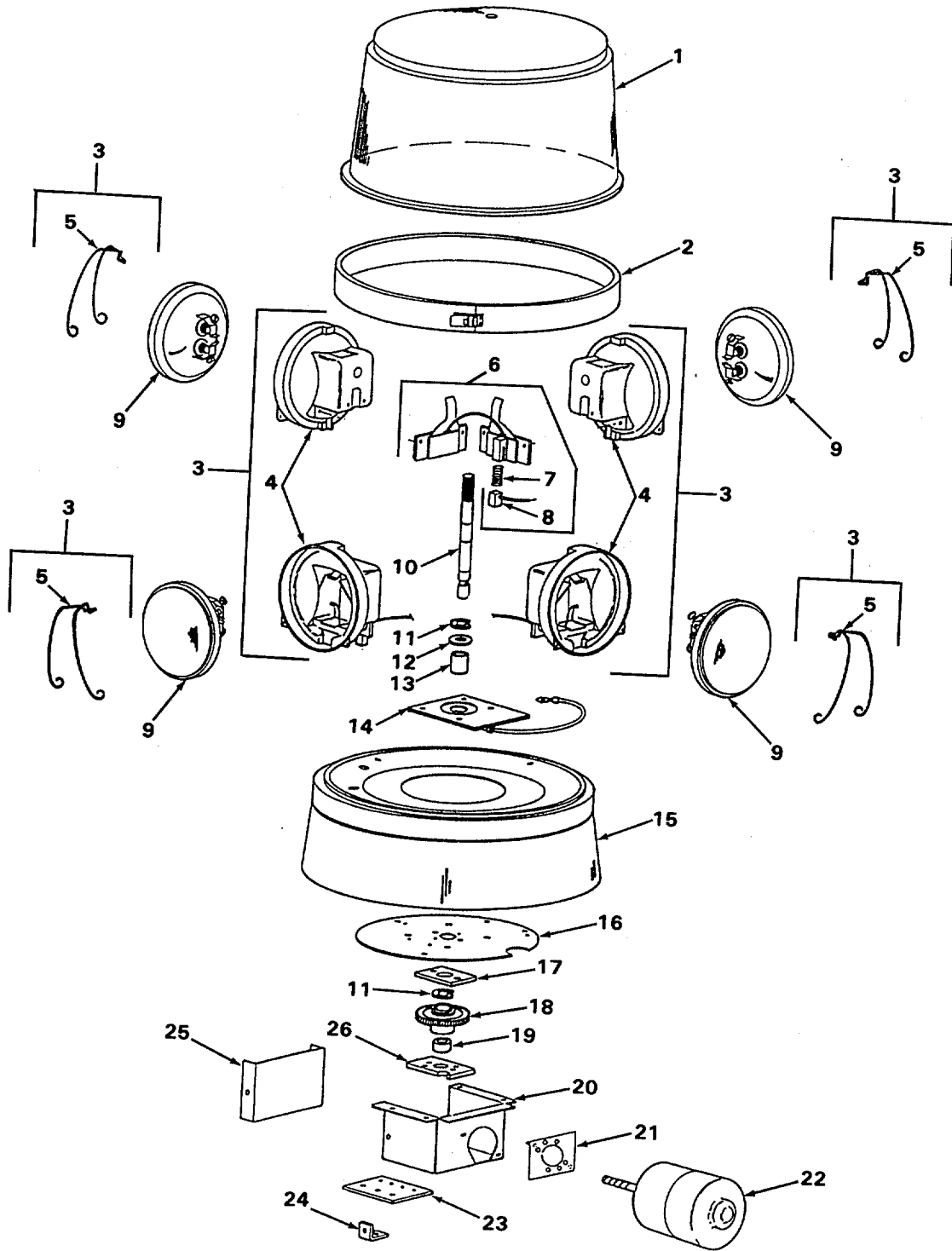


Figure F-47. Red Rotating Beacon Light

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-47-	04664	61-0029	65063	184	RED ROTATING BEACON LIGHT (See figure F-45 for NHA)	REF
-1			65063	8434D101-01	. DOME, Red	1
-2			65063	8424C010	. BAND, Retaining	1
-3			65063	8424C052	. LAMP, Holder Assy	1
-4			65063	8424B012	.. HOLDER, Lamp	4
-5			65063	8422B016	.. CLAMP, Wire, Lamp	4
-6			65063	8424A006	.. BRUSH HOLDER AND CONTACT SPRING ASSY	2
-7			65063	8240A032	... SPRING	2
-8			65063	8240A031-01	... BRUSH	2
-9			1P787	4416	.LAMP, Clear, 12V	4
-10			65063	8424A004	.SHAFT	1
-11			65063	8422A010	. RING, Retaining	2
-12			65063	7072A139A	.WSHER, Flat, 3/8"	1
-13			65063	8240A034-01	. BEARING, Upper	1
-14			65063	8424A002	.RING, Collector	1
-15			65063	8424C055A-01	. HOUSING, Standard	1
-16			65063	8240B39	. PLATE, Base	1
-17			65063	8424A014	. SUPPORT, Bearing	1
-18			65063	8422A114	. WORM GEAR AND CLUTCH ASSY	1
-19			65063	8240A034-02	. BEARING, Lower	1
-20			65063	8240C008	. BOX, Gear	1
-21			65063	8240A631A	.PLATE, Motor Adapter	1
-22			65063	8424A065A	.MOTOR, 12V	1
-23			65063	8240A130	.INSULATOR	1
-24			65063	8240A021	. TERMINAL	1
-25			65063	8240B010	. COVER, Gear Box	1
-26			65063	8240A009	. HOLDER, Bearing	1

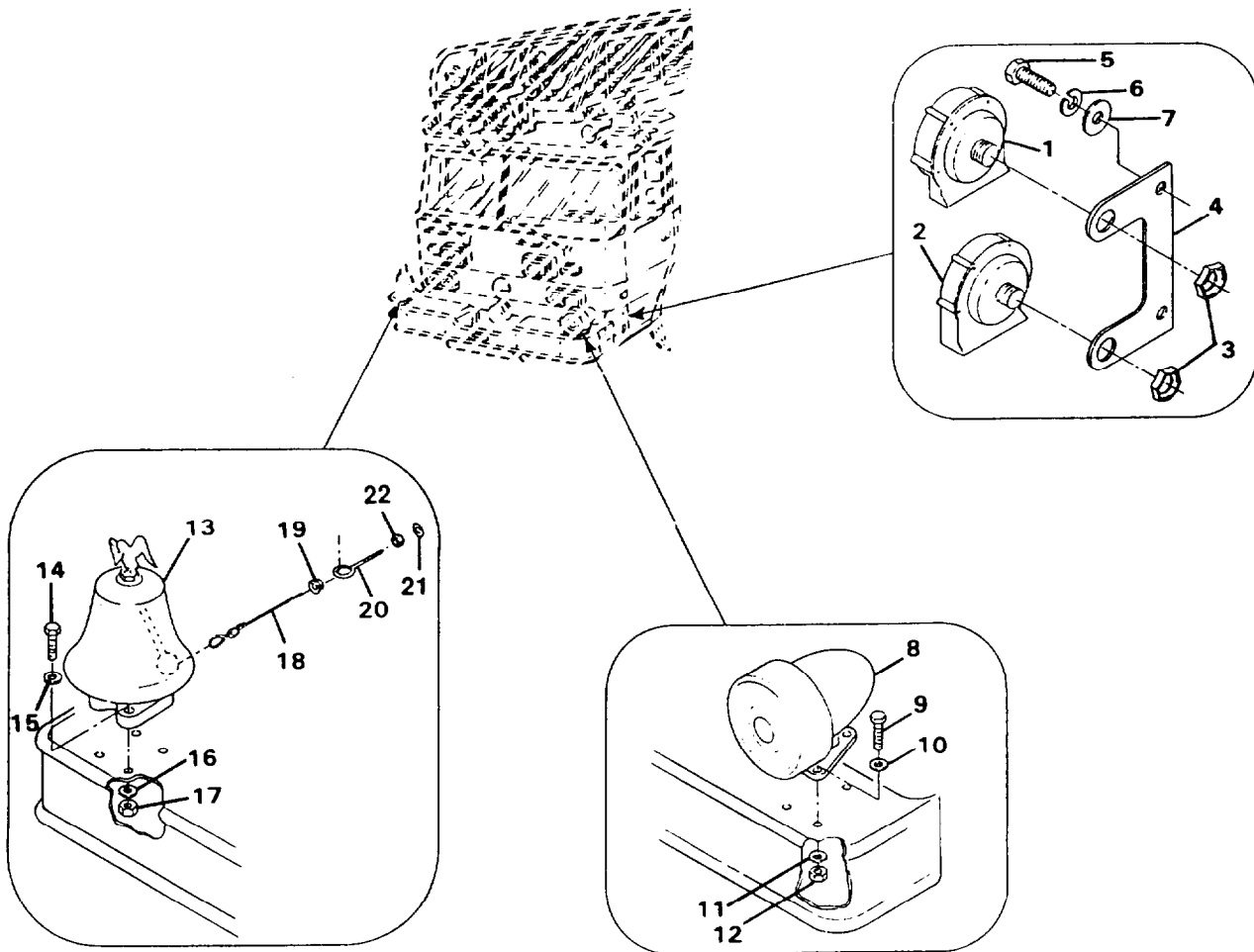


Figure F-48. Cab Components - Front View, Sheet 1 of 3

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-48-					CAB COMPONENTS - FRONT VIEW	REF
-1	04664	63-0113	16764	9000130	HORN, Electric, "F" Note, High Note	1
-2	04664	63-0114	16764	9000131	HORN, Electric, "A" Note, Low Note (ATTACHING PARTS)	1
-3	04664	82-3051	75925	R2001465-50H	NUT, Pal, 7/8"	2
-4	04664	44-3951			BRACKET, Horn Mounting (ATTACHING PARTS)	1
-5	04664	82-2063-0050			SCREW, Cap, Hex Hd, 1/4"-20 x 1/2", Zn	2
-6	04664	82-1011-0025			WASHER, Lock, 1/4", Zn	2
-7	04664	82-1013-006			WASHER, Flat, 1/4", Zn	2
-8	04664	63-0004	65063	Q2B-012NN	SIREN (See figure F-49 for details) (ATTACHING PARTS)	1
-9	04664	82-2062-0100			SCREW, Cap, Hex Hd, 5/16"-18 x 1", Zn	3
-10	04664	82-1013-007			WASHER, Flat, 5/16", Zn	3
-11	04664	82-1011-0031			WASHER, Lock, 5/16", Zn	3
-12	04664	82-3014-002			NUT, HEX, 5/16"-1 8, Zn	3
-13	04664	72-0033	60319	FB-1210C	BELL, Fire, 12", Ch PI Brass (ATTACHING PARTS)	1
-14	04664	82-2063-0125			SCREW, Cap, Hex Hd, 1/4"-20 x 1-1/4", Zn	4
-15	04664	82-1013-006			WASHER, Flat, 1/4", Zn	4
-16	04664	82-1011-0025			WASHER, Lock, 1/4", Zn	4
-17	04664	82-3014-001			NUT, Hex, 1/4", Zn	4
-18	04664	94-5004			LANYARD, Bell	AR
-19	04664	81-1025-0075	8Z679	53/64", 2863	BUSHING, Bell Lanyard	2
-20	04664	82-0060			SCREW, Eye (ATTACHING PARTS)	3
-21	04664	82-1013-004			WASHER, Flat, No.10,Zn	3
-22	04664	82-3017-007			NUT, Hex, No. 10-24, Zn	3

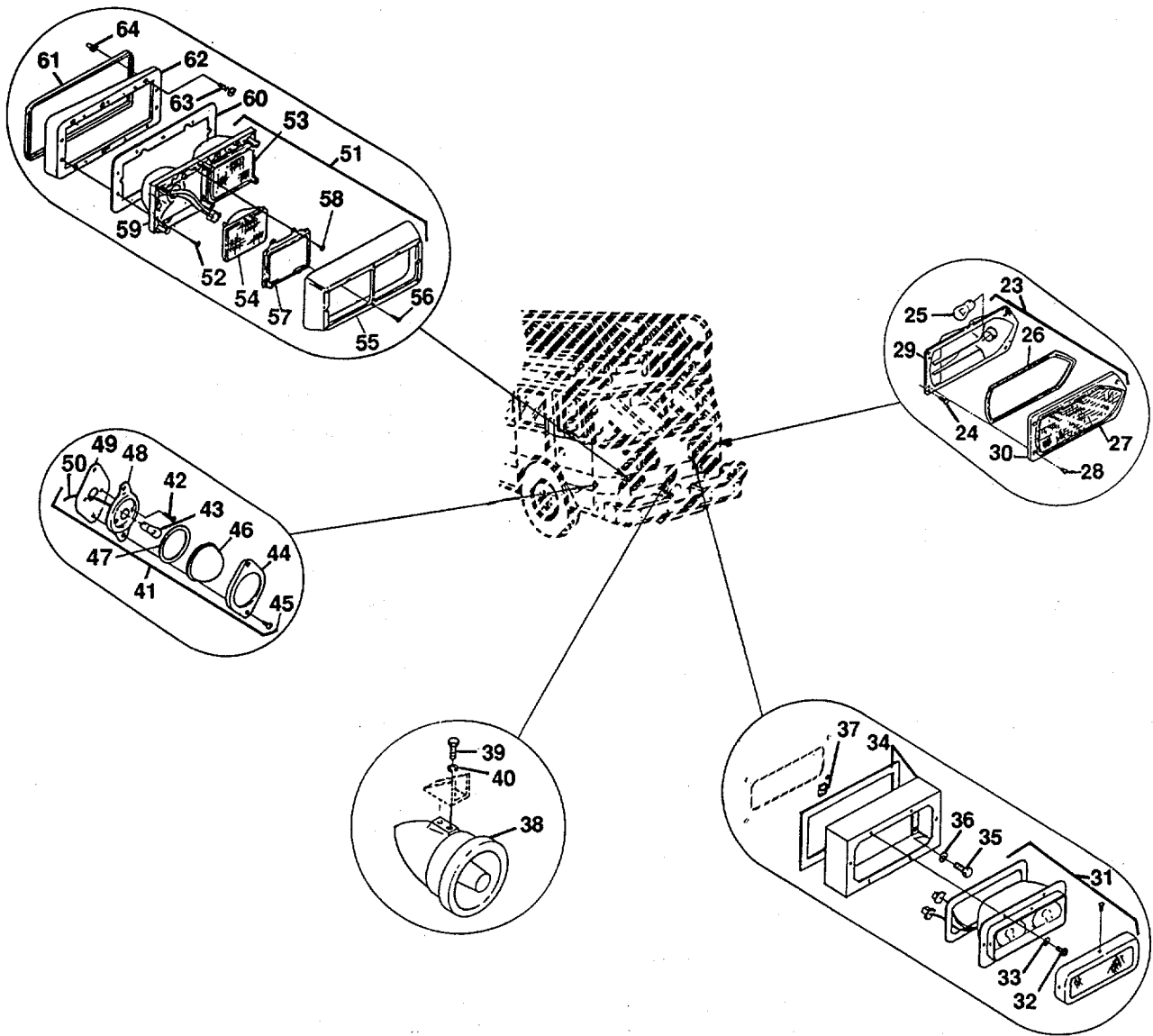


Figure F-48. Cab Components - Front View, Sheet 2 of 3

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-48-23	04664	61-0080	73331	3111-04/897396	LIGHT, Directional, Amber (ATTACHING PARTS)	2
-24	04664	82-2039-001			SCREW, T41 0 Ph Pn Hd, Taptite, No. 10-24 x 1/2"	8
-25			1P787	1141	BULB	2
-26			73331	5936117	GASKET	1
-27	04664	61-0074			LENS, Amber	1
-28			73331	173213	SCREW, Oval Hd, No. 8-32 x 3/8"	4
-29			73331	5941610	BODY ASSY	1
-30			73331	5936265	DOOR ASSY	1
-31	04664	61-0559	65063	CFF-012R	LIGHT, Crossfire (See figure F-50 for details) (ATTACHING PARTS)	2
-32	04664	82-2049-0062			SCREW, Ph Tr Hd, FRat, No. 10-24 x 5/8", SS	12
-33	04664	82-1017-001			WASHER, Nylon, No. 10	12
-34	04664	63-0800			BEZEL ASSY, Crossfire Light (w/Gasket) (ATTACHING PARTS)	2
-35	04664	82-2063-0100			SCREW, Cap, Hex Hd, 1/4"-20 x 1", Zn	8
-36	04664	82-1011-0025			WASHER, Lock, 1/4", Zn	8
-37	04664	82-0148-0009			PLUSNUT, 1/4"-20, Stl	8
-38	04664	63-0173	65063	CP100*S	SPEAKER, Siren (See figure F-51 for details) (ATTACHING PARTS)	1
-39	04664	82-2063-0050			SCREW, Cap, Hex Hd, 1/4"-20 x 1/2", Zn	2
-40	04664	82-1011-0025			WASHER, Lock, 1/4", Zn	2
-41	04664	61-0374	75175	856-31055	LIGHT, Directional, Amber (ATTACHING PARTS)	2
-42	04664	82-2039-001			SCREW, T410 Ph Pn Hd, Taptite, No. 10-24 x 1/2"	4
-43			1P787	1156	BULB	2
44			75175	42432-30	RETAINER, Lens (ATTACHING PARTS)	1
-45			75175	42432-30-S	SCREW	2
46			75175	3741-011	LENS	1
-47			75175	3218-00	ASKET	1
-48			75175	856-31055-B	BASE	1
-49			75175	31106-001	GASKET	1
-50			75175	94417-05	WIRE ASSY	1
-51	04664	61-0375	75175	921-3-3480	HEADLIGHT ASSY., LH	1
-51	04664	61-0376	75175	931-3-3490	HEADLIGHT ASSY., RH (ATTACHING PARTS)	1
-52	04664	82-2039-001			SCREW, T41 0 Ph Pn Hd, Taptite, No. 10-24 x 1/2"	20
-53			75175	H4651	. . BEAM, Sealed - High	1
-54			75175	H4656	BEAM, Sealed - High-Low	1
-55			75175	43029-301	BEZEL, Headlight (ATTACHING PARTS)	1
-56		75175	40735-301		SCREW	6

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-48-57			75175	42127-001	RETAINER, Headlight (ATTACHING PARTS)	2
-58			75175	40735-001	SCREW	8
-59			75175	43567-00	BASE, Headlight	1
-60	04664	61-0385			GASKET, Headlight	2
-61	04664	943087			GASKET, Rubber U-Channel	2
-62	04664	61-0319			BEZEL, Headlight Mounting	2
(ATTACHING PARTS)						
-63	04664	82-2047-0075			SCREW, Ph Fit Hd, No. 10-24 x 3/4", Zn	4
-63	04664	82-2047-0100			SCREW, Ph Fit Hd, No. 10-24 x 1", Zn	4
-63	04664	82-2047-0125			SCREW, Ph Fit Hd, No. 10-24 x 1-1/4", Zn	4
-64	04664	82-3018-003			NUT, Acom, Crown High, No. 10-24, Ch	12

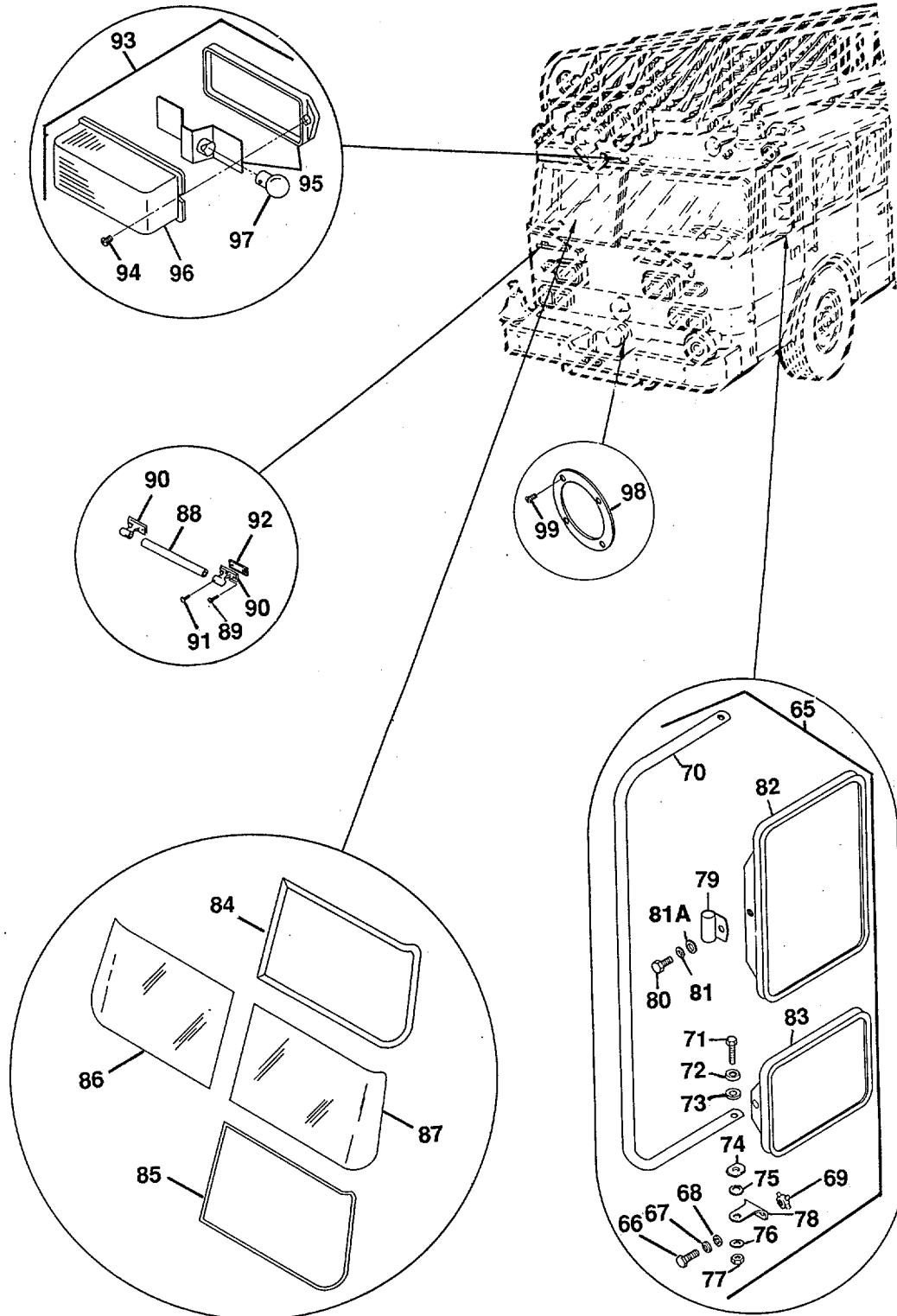


Figure F-48. Cab Components - Front View, Sheet 3 of 3

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-48-						
-65	04664	44-0329	79176	D275	MIRROR ASSY, Pair (ATTACHING PARTS)	1
-66	04664	82-2063-0125			SCREW, Cap, Hex Hd, 1/4"-20 x 1-1/4", Zn	4
-67	04664	82-1011-0025			WASHER, Lock, 1/4", Zn	4
-68	04664	82-1013-006			WASHER, Flat, 1/4", Zn	4
-69	04664	82-3050			UT, Blind Insert, 1/4"-20, Raintite Coated	4
-70			79176	T7806630	LOOP	2
-71			79176	4080660	BOLT	4
-72			79176	T7901510	CAP, Retaining	4
-73			79176	7901520	WASHER, Tension	4
-74			79176	T7901180	LOCKPLATE	4
-75			79176	4010120	LOCKWASHER	4
-76			79176	4080650	WASHER, Nylon	4
-77			79176	4050110	NUT, Hex Hd	4
-78			79176	T7901580	CABFOOT	4
-79			79176	T7901580	CLAMP (ATTACHING PARTS)	4
-80			79176	4080650	BOLT	4
-81			79176	4010200	LOCKWASHER	4
-81A			79176	4010200F	WASHER, Rat	4
-82			79176	7040390	HEAD, Mirror	1
-83			79176	7040400	HEAD, Mirror, Convex	1
-84	04664	35-0027-16000	5F845	75000723	INSERT, Chrome, Window Gasket	2
-85	04664	44-0664	98933	444-0664	GASKET, Windshield	2
-86	04664	35-0030			WINDSHIELD, Right I	
-87	04664	35-0031			WINDSHIELD, Left	1
-88	04664	25-0017			TUBING, 1-1/4" SS (ATTACHING PARTS)	2
-89	04664	822039-002			SCREW, Ph Pn Hd	4
-90	04664	80-0024	60319	ZRB-57	STANCHION, End, Closed, w/Holes (ATTACHING PARTS)	4
-91	04664	82-2034-0100			SCREW, Ph Tr Hd, 1/4"-20 x 1", SS	24
-92	04664	94-4043			GASKET, Stanchion	12
-93	04664	61-0179	OD553	2-54204	LIGHT, ID, Amber (ATTACHING PARTS)	3
-94	04664	82-2039001			SCREW, T410 Ph Pn Hd, Taptite, No. 10-24 x 1/2"	6
-95			OD553		BASE ASSY, w/Socket	1
-96			OD553	8946A	LENS	1
-97			1P785	1895	BULB	3
-98	04664	52-0056			RING, Garnish, 4-1/2"/5"	1
-99	04664	82-2039-001			SCREW, T410 Ph Pn Taptite, No. 10-24 x 1/2"	4

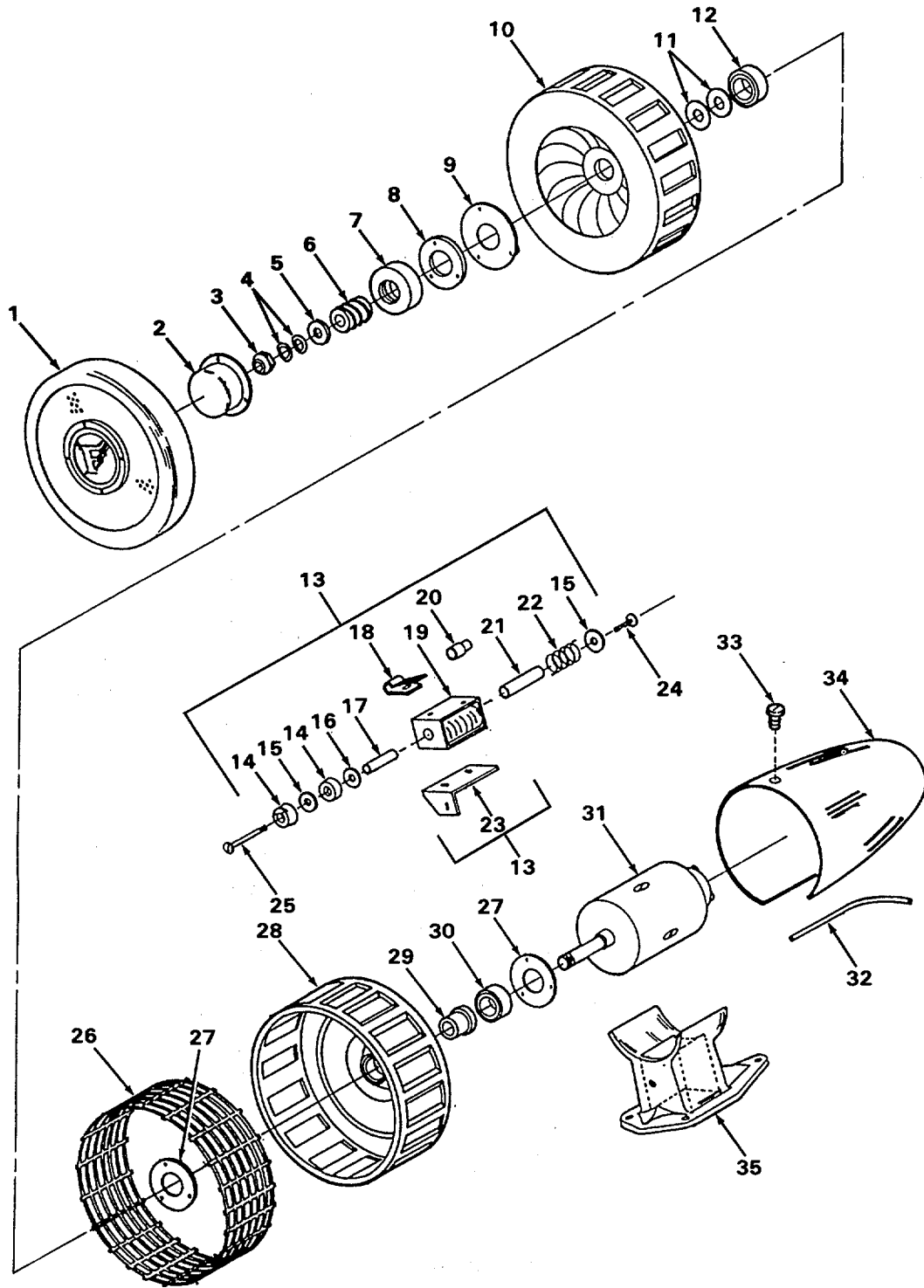


Figure F-49. Siren

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-49-	04664	63-0004	65063	Q2B-012NN	SIREN (See figure F-48 for NHA)	REF
-1			65063	8280C076A	FRONT GRILL ASSY, Chrome	1
-2			65063	8427A011	CAP, Clutch	1
-3			65063	7058A036A	NUT, Stop	1
-4			65063	7074A054A	WASHER, Spring	2
-5			65063	7072A140A	WASHER	1
-6			65063	8427A002	SCREW, Clutch	1
-7			65063	8427A003	NUT, Clutch	1
-8			65063	8427A005	DISC, Clutch	1
-9			65063	8427A016	CLUTCH CAP MTG. DISC ASSY	1
-10			65063	8280D020	ROTOR	1
-11			65063	7072A158A	WASHER	2
-12			65063	8126A017	BEARING	1
-13			65063	8280B003A-02	BRAKE ASSY	1
-14			65063	H7148-OA	PAD, Brake	2
-15			65063	7072A143A	WASHER, Spring Stop	2
-16			65063	H7149-OA	WASHER, Brake Pad	1
-17			65063	8280A009	PLUNGER, End	1
-18			65063	8240A072	CLAMP, Plastic	1
-19			65063	8280A007-01	SOLENOID, 12V	1.
-20			65063	8283A714	CONNECTOR	1
-21			65063	8280A010	PLUNGER	1
-22			65063	8280A017	SPRING, Compression	1
-23			65063	8280A006	BRACKET, Solenoid	1
-24			65063	7006A031 -05	SCREW, Pan Hd, 8-32 x 5/16"	1
-25			65063	7000A230-32	SCREW, Slotted Flat Hd, 10-32 x 2"	1
-26			65063	8280A016-OC	GUARD, Stator, Chrome	1
-27			65063	8088A001	RING, Retainer	2
-28			65063	8280D069A-OC	STATOR, Chrome	1
-29			65063	8459A028	BUSHING	1
-30			65063	8280A008	BEARING	1
-31			65063	8280080A	MOTOR, 12V	1
-32			65063	8280A043	GASKET	1
-33			65063	7000A00-03	SCREW, Binding Hd	1
-34	04664	63-0006	65063	H5205-02	HOUSING, Siren	1
-35	04664	63-0196	65063	8280C077A	BASE, Mounting	1

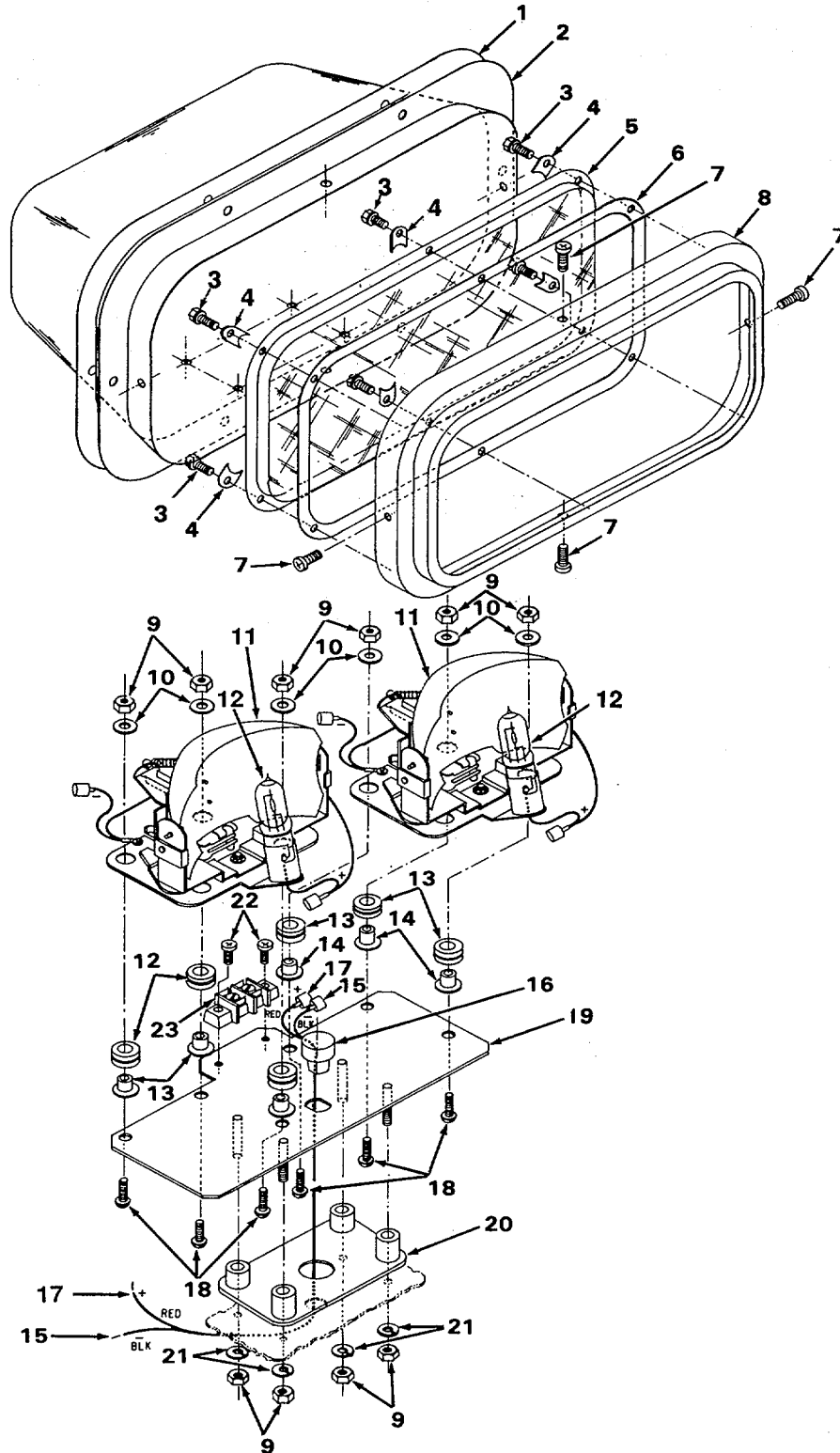


Figure F-50. Crossfire Light, Sheet 1 of 2

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-50-	04664	61-0559	65063	CFF-012R	CROSSFIRE LIGHT (See figure F-48 for NHA)	REF
-1			65063	8548D038A	GASKET	1
-2			65063	8548D043A	HOUSING AND PEM NUT ASSY	1
-3			65063	701 1A061-06	SCREW, Hex Hd, 6-32 x 3/8"	6
-4			65063	8548A054A	CLIP, Lens	6
-5			65063	854DO49A	LENS	1
-6			65063	8548C050A	GASKET, Lens	1
-7			65063	7000A464-06	SCREW, Ph Tr Hd, 6-32 x 3/8"	4
-8			65063	8458C047A	RING, Lens Mounting	1
-9			65063	7059A014	NUT, Hex, 10-32	10
-10			65063	7072A014	WASHER, Flat, #10	6
-11			65063	8431C001A-03	MECHANISM ASSY (See sheet 2 for additional details)	2
-12			65063	8107A119A	LAMP, Halogen, 50W	2
-13			65063	8108A014	GROMMET	6
-14			65063	8559A088A	BUSHING	6
-15			65063	T300A218-10-0150	WIRE, Black (ground)	1
-16			65063	231A148	RELIEF, Strain	1
-17			65063	T300A218-02-0135	WIRE, Red (positive)	1
-18			65063	7000A068-08	SCREW, Round, Hd	6
-19			65063	8548066A	PLATE, Center	1
-20			65063	8548C035A	PLATE, Support	1
-21			65063	7074A009	WASHER, Lock	4
-22			65063	701 1A062-08	SCREW, Ph Tr Hd, 8-32 x 1/2"	2
-23			65063	229213	BLOCK, Terminal	1

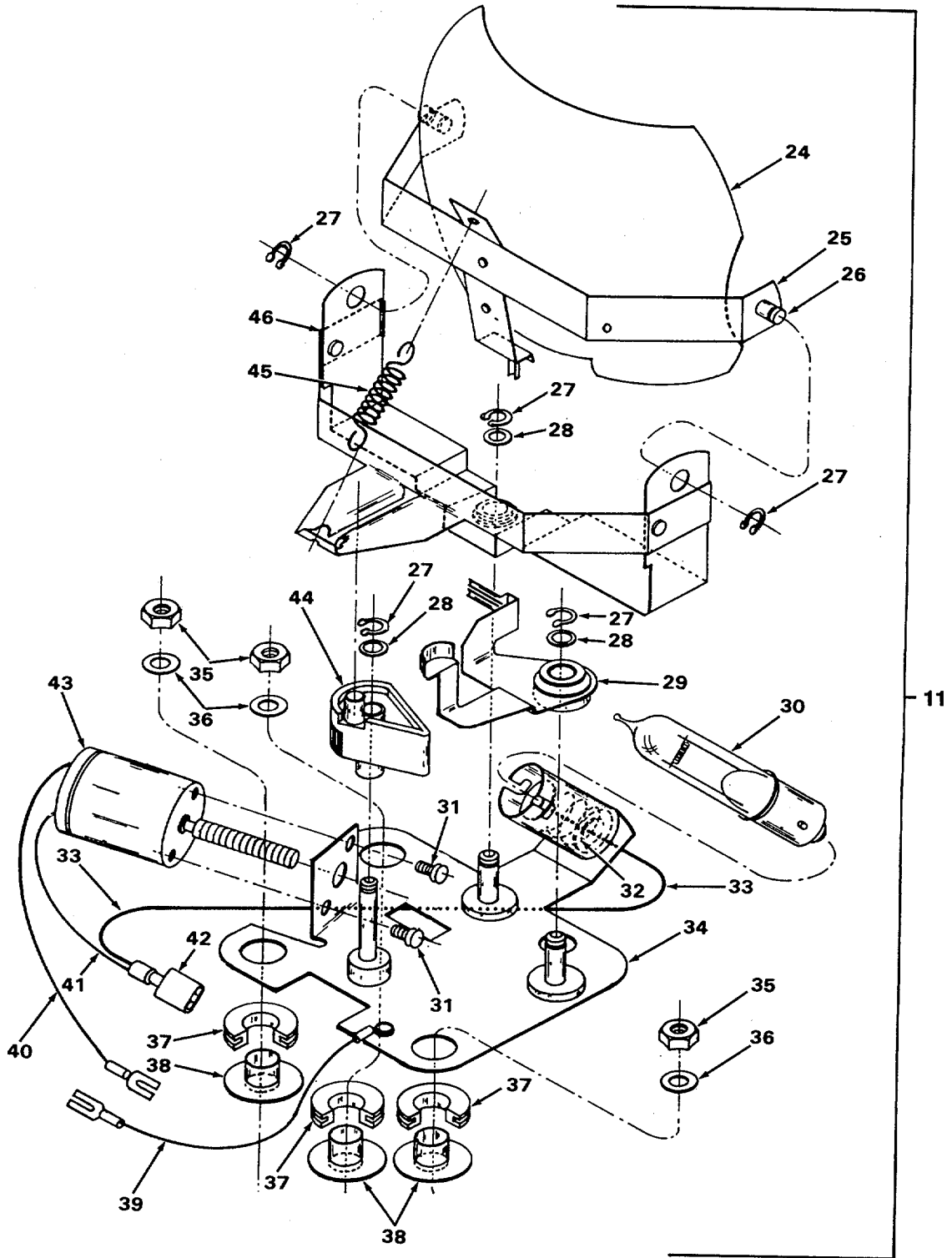


Figure F-50. Crossfire Light, Sheet 2 of 2

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-50-			65063	8431C001A-03	MECHANISM ASSY (See item 12, sheet 1 for NHA)	REF
-24			65063	8431 B01 8A	REFLECTOR	1
-25			65063	8431 B01 6A	BRACKET, Reflector	1
-26			65063	7097A111-12	RIVET, 0.122 O.D. x 11/64" Lg	2
-27			65063	8284A024D	RING, Retainer, #1000-18-ST	5
-28			65063	7072A014	WASHER, FRat	3
-29			65063	8431 B007A	CAM AND BEARING ASSY	1
-30			65063	8107A119A	LAMP, Halogen, 50 Watt	1
-31			65063	7006A016-03	SCREW, Internal, 4-40 x 3/16" SEMS	2
-32			65063	8444A01 7-02	SPRING, Lamp	1
-33			65063	8444A017-03	WIRE, Red (Lamp +)	1
-34			65063	8431BO02A	BASE	1
-35			65063	7059A014	NUT, Hex, 10-32	3
-36			65063	7072A020	WASHER, Rat #1 0	3
-37			65063	8108A014	GROMMET, Rubber	3
-38			65063	8559A088A	BUSHING, Steel	3
-39			65063	T300A422-10-0062	WIRE, Black (Lamp -)	1
-40			65063	T300A422-10-0061	WIRE, Black (Motor -)1	
-41			65063	C300A422-02-0090	WIRE, Red (Motor +)	1
-42			65063	224A216-03L	TERMINAL, Wire, Red	1
-43			65063	8422B399A-01	MOTOR, 12V	1
-44			65063	8431C006A	GEAR, Worm and Cam	1
-45			65063	8431A033A	SPRING, 0187 Dia.	1
-46			65063	8431BO12A	GIMBAL AND BEARING ASSY 1	

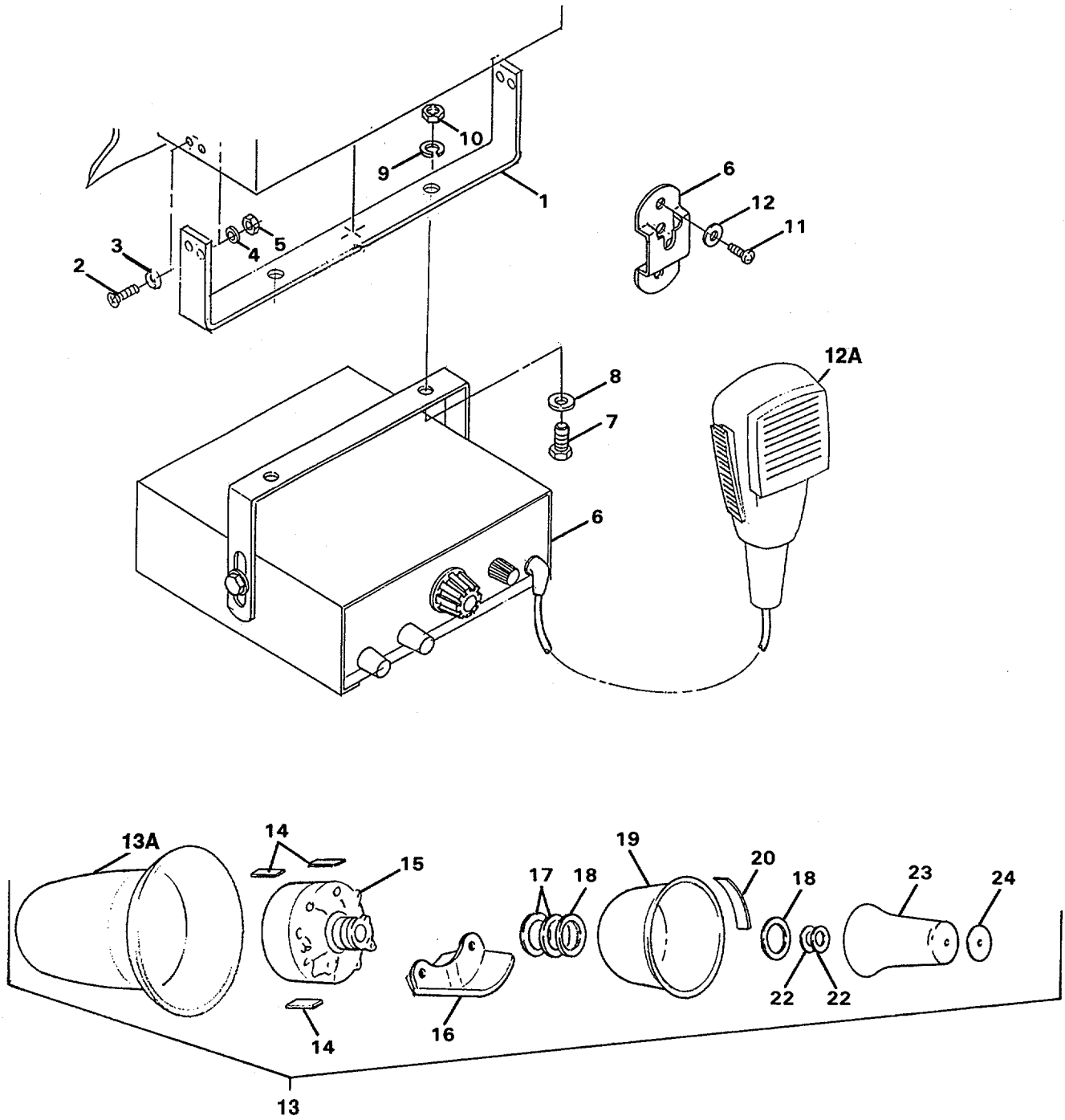


Figure F-51. PA System and Speaker

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-51-					PA SYSTEM & SPEAKER	1
-1	04664	SD-08917			BRACKET, Siren Mounting (ATTACHING PARTS)	1
-2	04664	82-2039-001			SCREW, T410 Ph Pn Hd, Taptite, No. 10-24 x 1/2"	4
-3	04664	80-9128			WASHER, Headliner, Small	4
-4	04664	82-1013-004			WASHER, Flat, No. 10	4
-5	04664	82-3017-007			NUT, Hex, No. 10	4
-6	04664	63-0559	66461	3692 W/MIC	SIREN, Code-3 (ATTACHING PARTS)	1
-7	04664	82-2063-0075			SCREW, Torq Hd, 1/4"-20 x 3/4", Black	2
-8	04664	82-1013-006			WASHER, Special, 1/4"	2
-9	04664	82-1011-0025			WASHER, Lock, 1/4", Zn	2
-10	04664	82-3014-001			NUT, Hex, 1/4"-20, Zn	2
-11	04664	82-2039-001			SCREW, T410 Ph Pn Hd, Taptite, No. 10-24 x 1/2"	2
-12	04664	82-1013-004			WASHER, Flat, No. 10, Zn	2
-12A	66461	13641			MICROPHONE (Wired in)	1
-13	04664	63-0173	65063	CP100*S	SPEAKER, Siren (See figure F-48 for NHA)	REF
-13A			65063	8283C526	HOUSING, Speaker	1
-14			65063	8283A530	SUPPORT PAD, Driver	3
-15			65063	8287B321A	DRIVER	1
-16			65063	8287D137	BRACKET, Driver	1
-17			65063	7072A137	WASHER, Steel	2
-18			65063	8283A451	WASHER, Vellutex	2
-19			65063	8283B527	PROJECTOR, Speaker	1
-20			65063	8283A531	TAPE, Gasket	1
-21			65063	8283A452	WASHER, Rubber	1
-22			65063	8283A453	WASHER, Vellutex	1
-23			65063	8283BA430-01	CONE	1
-24			65063	8146A507-09	NAMEPLATE	1

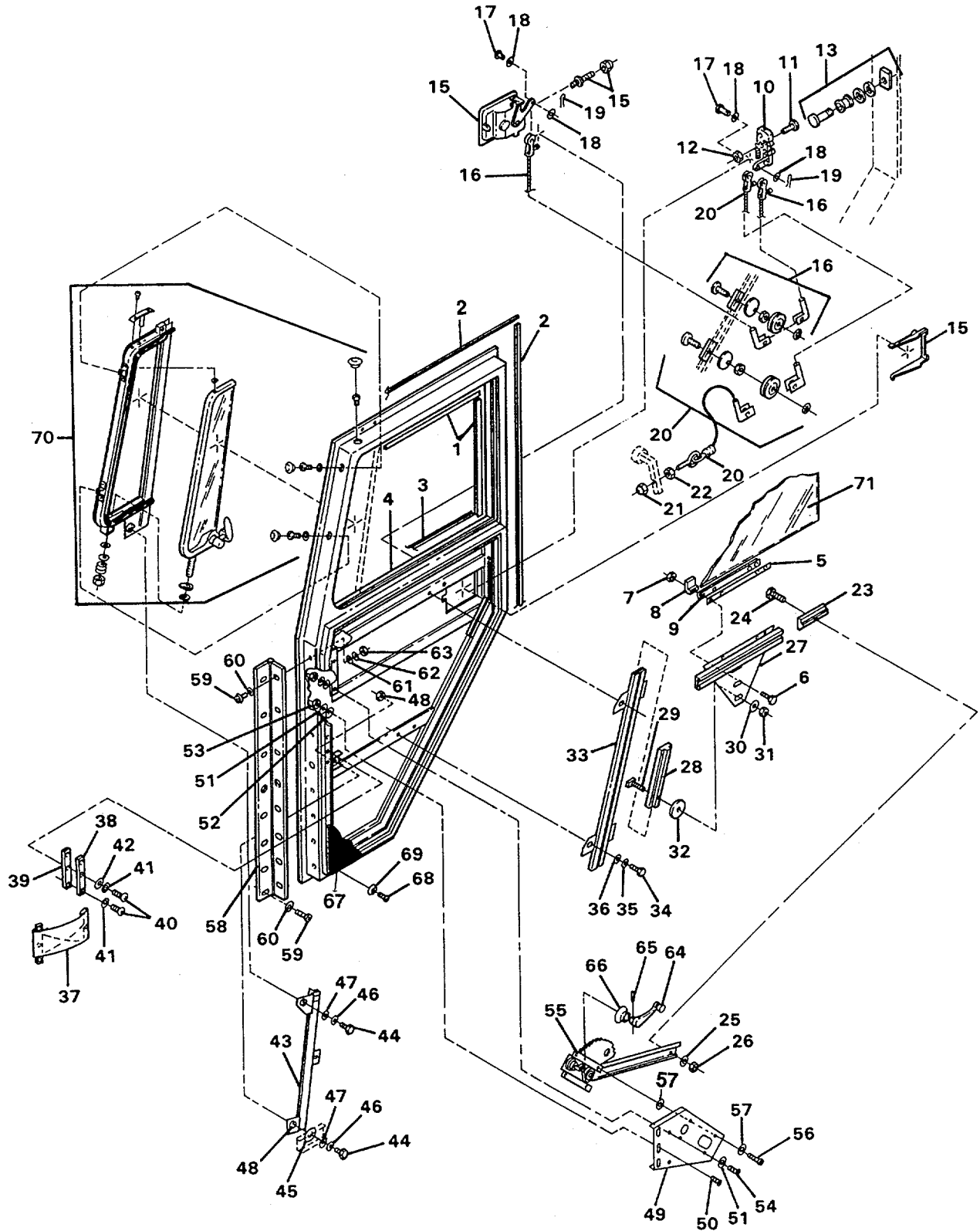


Figure F-52. Cab Door Assemblies

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-52-	04664	SD-09022			CAB DOOR ASSY, Driver Side	
	04664	SD-09023			CAB DOOR ASSY, Passenger Side	
-1	04664	942009	5F845	75000987 (Y961 P)	CHANNEL, Sliding Window (ft.)	4
-2	04664	943064	56329	1085-3017	SEAL, Door, "D" Section, Black (ft.)	12
-3	04664	44-0680	5F845	75000808	SEAL, Weather	2
					(ATTACHING PARTS)	
-4	04664	82-0069	6M181	38-204-05-13	RIVET, Weatherstrip	8
-5	04664	44-2135			RETAINER, Window	1
					(ATTACHING PARTS)	
-6	04664	82-2075-0100			SCREW, Ph Pan Hd, No. 10-24 x 1", Zn	4
-7	04664	82-3030-008			NUT, Lock, Nylon Insert, No. 10-24, Zn	4
-8	04664	44-2182			SPACER, Window	4
-9	04664	80-1006	5F845	75000420	STRIP, Grip (ft.)	1
-10	04664	80-2027	19220	AVM-28904	LOCK, Rotary (Passenger Side)	1
-10	04664	80-2028	19220	AVM-28905	LOCK, Rotary (Driver Side)	1
					(ATTACHING PARTS)	
-11	04664	82-2046-0100			SCREW, Ph Flat Hd, 1/4"-20 x 1", Zn	4
-12	04664	82-3029-001			NUT, Lock, Nylon Insert, 1/4"-20, Zn	4
-13	04664	80-2029	19220	AVM-31670	STRIKER ASSY	1
-14	04664	44-0634			SPRING	1
-15	04664	80-2025	19220	AVM-34931	LOCK, Paddle (Passenger Side)	1
-15	04664	80-2026	19220	AVM-34932	LOCK, Paddle (Driver Side)	1
-16	04664	80-2075			CABLE, Door, Outside	1
					(ATTACHING PARTS)	
-17	04664	82-0154-0050			PIN, Clevis	2
-18	04664	82-1013-004			WASHER, Flat, No. 10, Zn	5
-19	04664	82-0043			CLIP, Spring, Hair, Zn	2
-20	04664	80-2076			CABLE, Door, Inside (Passenger Side)	1
-20	04664	80-2136			CABLE, Door, Inside (Driver Side)	1
					(ATTACHING PARTS)	
-21	04664	82-3030-007			NUT, Lock, Nylon Insert, No. 8-32, Zn	1
-22	04664	82-3017-006			NUT, Hex, No. 8-32, Zn	1
-23	04664	44-2114			SLIDE, Track, Horizontal	1
					(ATTACHING PARTS)	
-24	04664	82-2067-0100			SCREW, Soc Hd, 5/16"-18 x 1"	1
-25	04664	82-1017-004			WASHER, Flat, Nylon, 5/16"	1
-26	04664	823019-002			NUT, Oval Toplock, 5/16"-18, Zn	1
-27	04664	44-2166			TRACK, Horizontal	
-28	04664	44-2115			SLIDE, Track, Vertical	1
					(ATTACHING PARTS)	1
-29	04664	018-025-01002			SCREW, Sq Hd, 1/4"-20 x 1", Zn	
-30	04664	82-1013-006			WASHER, Flat, 1/4", Zn	3
-31	04664	82-3029-001			NUT, Lock, Nylon Insert, 1/4"-20, Zn	3
-32	04664	82-1016-0050			WASHER, Flat, Nylon, .50 x 1.13	3
-33	04664	44-0637			BRACKET, Track, RH	1
-33	04664	44-0638			BRACKET, Track, LH	1
					(ATTACHING PARTS)	
-34	04664	82-2063-0050			SCREW, Hex Hd, 1/4"-20 x 1/2", Zn	4
-35	04664	82-1011 -0025			WASHER, Lock, 1/4", Zn	4
-36	04664	82-1013-006			WASHER, Flat, 1/4", Zn	4

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-52-37	04664	44-0330			WEBBING, Door, 4" x 9" Lg (ATTACHING PARTS)	1
-38	04664	44-0747			MOUNTING, Web Strap	2
-39	04664	44-0642			BACKING, Web Strap	2
-40	04664	82-2034-0100			SCREW, Ph Tr Hd, 1/4"-20 x 1", S/S	6
-41	04664	82-1011-0025			WASHER, Lock, 1/4", Zn	6
-42	04664	82-1013-006			WASHER, Flat, 1/4", Zn	2
-43	04664	44-0116	62265	50234-0002	CHANNEL, Vertical, LH	1
-43	04664	44-0117	62265	50235-0002	CHANNEL, Vertical, RH (ATTACHING PARTS)	1
-44	04664	82-2063-0075			SCREW, Hex Hd, 1/4"-20 x 3/4", Zn	2
-45	04664	82-1009-003			WASHER, Fender, 1/4" x 1", Zn	1
-46	04664	82-1011-0025			WASHER, Lock, 1/4", Zn	2
-47	04664	82-1013-006			WASHER, Flat, 1/4", Zn	2
-48	04664	82-3015-001			NUT, Hex, 1/4"-20, Zn	2
-49	04664	44-2002			BRACKET, Mounting, Regulator, LH	1
-49	04664	44-2003			BRACKET, Mounting, Regulator, RH (ATTACHING PARTS)	1
-50	04664	82-2046-0075			SCREW, Ph Flat Hd, 1/4"-20 x 3/4", Zn	3
-51	04664	82-1011-0025			WASHER, Lock, 1/4", Zn	7
-52	04664	82-1013-006			WASHER, Flat, 1/4", Zn	5
-53	04664	82-3015-001			NUT, Hex, 1/4"-20, Zn	5
-54	04664	82-2035-0100			SCREW, Ph Tr Hd, 1/4"-20 x 1", EP	2
-55	04664	44-2164			REGULATOR, Window, LH	1
-55	04664	44-2165			REGULATOR, Window, RH (ATTACHING PARTS)	1
-56	04664	82-2035-0050			SCREW, Ph Tr Hd, 1/4"-20 x 1/2", EP	4
-57	04664	82-1011-0025			WASHER, Lock, 1/4", Zn	4
-58	04664	80-5035			HINGE, Door (ATTACHING PARTS)	1
-59	04664	82-2035-0075			SCREW, Ph Tr Hd, 1/4"-20 x 3/4", EP	18
-60	04664	82-1010-009			WASHER, Lock, Internal Tooth, 1/4", Zn	18
-61	04664	82-1013-006			WASHER, Flat, 1/4", Zn	8
-62	04664	82-1011-0025			WASHER, Lock, 1/4", Zn	8
-63	04664	82-3015-001			NUT, Hex, 1/4"-20, Zn	8
-64	04664	44-0991	19220	AE1/12308	HANDLE, Regulator	1
-65	04664	82-4001			PIN, Regulator, Handle	1
-66	04664	44-0992	19220	1/16420	ESCUTCHEON, Regulator, Handle	1
-67	04664	44-4308-0010			CAB DOOR LINER ASSY. (Passenger Side) (See figure F-53 for details)	1
-67	04664	44-4309-0010			CAB DOOR LINER ASSY. (Driver Side) (See figure F-53 for details) (ATTACHING PARTS)	1
-68	04664	82-2039-002			SCREW, Ph Pan Hd, Taptite, No. 10-24 x 3/4"	9
-69	04664	80-9129			WASHER, Headliner, Large	9
-70	04664	44-0492	62265	50264-0004	VENT, Tinted, LH	1
-70	04664	44-0493	62265	50265-0004	VENT, Tinted, RH	1
-71	04664	35-0061			WINDOW, Cab, Roll-up	1

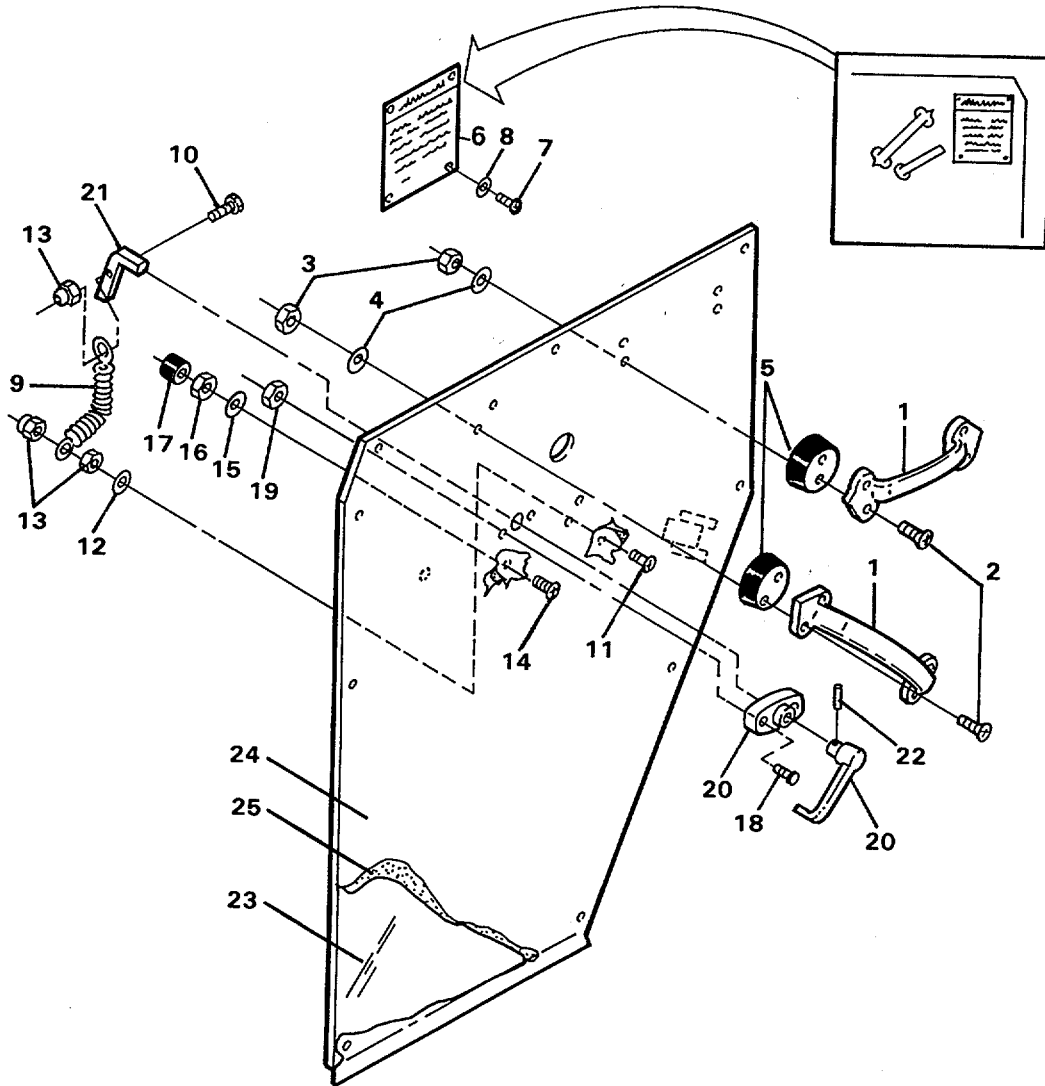


Figure F-53. Cab Door Liner Assembly

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-53-	04664	44-4308-0010			CAB DOOR LINER ASSEMBLY (Passenger Side) (See figure F-52 for NHA)	REF
	04664	44-4309-0010			CAB DOOR LINER ASSEMBLY (Driver Side) (See figure F-52 for NHA)	REF
-1	04664	80-0003	9D455	3200-CH	HANDLE, Grab, Chrome (ATTACHING PARTS)	2
-2	04664	82-2077-0125			SCREW, Ph Flat Hd, 1/4"-20 x 1-1/4", Zn	8
-3	04664	82-3015-001			NUT, Hex, 1/4"-20, Zn	8
-4	04664	82-1011-0025			WASHER, Lock, 1/4", Zn	8
-5	04664	72-0123	1BM35	72-0123	SPACER, Grab Handle	4
-6	04664	91-0165			LABEL, Danger (Seating Capacity) (Driver Side) (ATTACHING PARTS)	1
-7	04664	82-2039-001			SCREW, Ph Pan Hd, Taptite, No. 10-24x1/2"	4
-8	04664	82-1016-0019			WASHER, Flat, Nylon, No. 10	4
-9	04664	44-3402			SPRING, Door Liner (ATTACHING PARTS)	1
-10	04664	82-2037-0062			SCREW, Ph Tr Hd, No. 10-24 x 5/8", T/C PL	1
-11	04664	82-2037-0075			SCREW, Ph Tr Hd, No. 10-24 x 3/4", T/C PL	1
-12	04664	82-1013-004			WASHER, Flat, No. 10, Zn	1
-13	04664	82-3030-008			LOCKNUT, Nylon Insert, No. 10-24, Zn	3
-14	04664	82-2037-0062			SCREW, Ph Tr Hd, No. 10-24 x 5/8", T/C PL	1
-15	04664	82-1013-004			WASHER, Flat, No. 10, Zn	1
-16	04664	82-3030-008			LOCKNUT, Nylon Insert, No. 10-24, Zn	1
-17	04664	940054-00075			BUMPER, Rubber (ft)	1
	04664	80-2167			HANDLE ASSY, Inside Door (Passenger Side)	1
	04664	80-2166			HANDLE ASSY, Inside Door (Driver Side) (ATTACHING PARTS)	1
-18	04664	82-2037-0075			SCREW, Ph Pan Hd, No. 10-24 x 3/4", T/C PL	2
-19	04664	82-3017-037			NUT, Hex, No. 10-24, Zn	2
-20	04664	80-2069			HANDLE, Inside Door	1
-21	04664	80-2165			LEVER, Inside Handle (ATTACHING PARTS)	1
-22	04664	82-0054			PIN, Roll, 5/32" x 5/8", Cad	1
-23	04664	44-0388			PAN, Door, Inside	1
-24	04664	943104-0010			VINYL, Snowskin, Black, 54" Wide	AR
-25	04664	943021	62408	4100	FOAM, Industrial, 1/4" x 54" Wide	AR

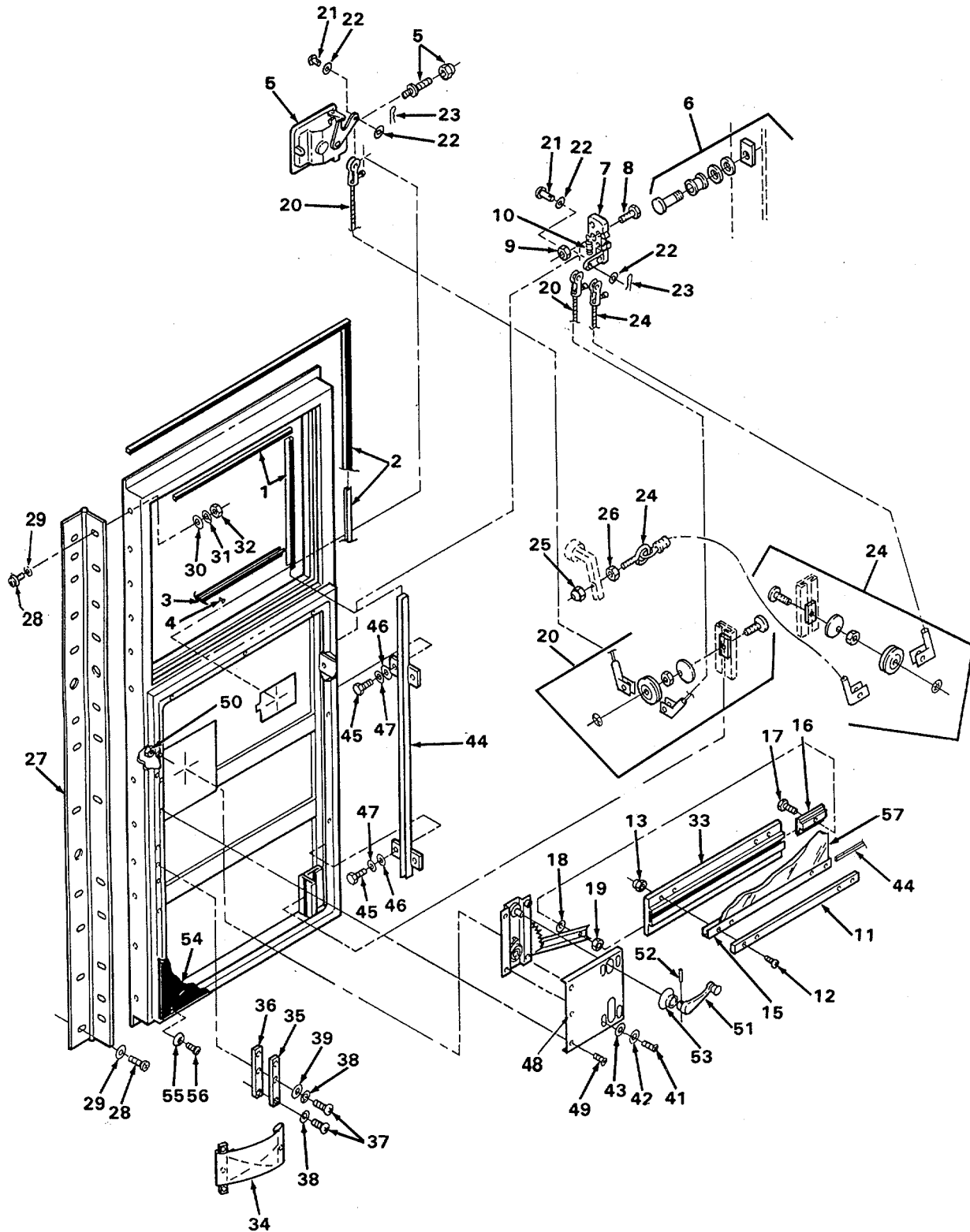


Figure F-54. Canopy Door Assemblies

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-54-	04664	SD-09024			CANOPY DOOR ASSY, Driver Side	1
	04664	SD-09025			CANOPY DOOR ASSY, Passenger Side	1
-1	04664	942009	5F845	75000987 (Y691 P)	CHANNEL, Window (ft.)	6
-2	04664	943064	56329	1085-3017	SEAL, Door, 'D' Section, Black (ft.)	10
-3	04664	44-0680	5F845	75000808	SEAL, Weather (ATTACHING PARTS)	2
-4	04664	82-0069	6M181	38-204-05-13	RIVET, Weatherstrip	8
-5	04664	80-2025	19220	AVM-34931	LOCK, Paddle (Passenger Side)	1
-5	04664	80-2026	19220	AVM-34932	LOCK, Paddle (Driver Side)	1
-6	04664	80-2029	19220	AVM-31670	STRIKER ASSY	1
-7	04664	80-2027	19220	AVM-28904	LOCK, Rotary (Passenger Side)	1
-7	04664	80-2028	19220	AVM-28905	LOCK, Rotary (Driver Side) (ATTACHING PARTS)	1
-8	04664	82-2046-0100			SCREW, Ph Flat Hd, 1/4"-20 x 1", Zn	4
-9	04664	82-3029-001			NUT, Lock, Nylon Insert, 1/4"-20, Zn	4
-10	04664	44-0634			SPRING	1
-11	04664	44-2135			RETAINER, Window (ATTACHING PARTS)	1
-12	04664	82-2075-0100			SCREW, Ph Pan Hd, No. 10-24 x 1", Zn	4
-13	04664	82-3030-008			NUT, Lock, Nylon Insert, No. 10-24, Zn	4
-14	04664	44-2548			SPACER, Window	2
-15	04664	80-1006	5F845	75000420	STRIP, Grip (ft.)	1
-16	04664	44-2114			SLIDE, Track, Horizontal (ATTACHING PARTS)	1
-17	04664	82-2067-0100			SCREW, Soc Hd, 5/16"-18 x 1", Zn	1
-18	04664	82-1017-004			WASHER, Flat, Nylon, 5/16"	1
-19	04664	82-3019-002			NUT, Oval Toplock, 5/16"-18, Zn	1
-20	04664	80-2122			CABLE, Door, Outside I (ATTACHING PARTS)	
-21	04664	82-0154-0050			PIN, Clevis	2
-22	04664	82-1013-004			WASHER, Flat, No. 10, Zn	5
-23	04664	82-0043			CLIP, Spring, Hair, Zn	2
-24	04664	80-2123			CABLE, Door, Inside (Passenger Side)	1
-24	04664	80-2138			CABLE, Door, Inside (Driver Side) (ATTACHING PARTS)	1
-25	04664	82-3030-007			NUT, Lock, Nylon Insert, No. 8-32, Zn	1
-26	04664	82-3017-006			NUT, Hex, No. 8-32, Zn	1
-27	04664	80-5037			HINGE, Door (ATTACHING PARTS)	
-28	04664	82-2035-0075			SCREW, Ph Tr Hd, 1/4"-20 x 3/4", EP	26
-29	04664	82-1010-009			WASHER, Lock, Internal Tooth, 1/4", Zn	26
-30	04664	82-1013-006			WASHER, Flat, 1/4", Zn	12
-31	04664	82-1011-0025			WASHER, Lock, 1/4", Zn	12
-32	04664	82-3015-001			NUT, Hex, 1/4"-20, Zn	12
-33	04664	44-2176			TRACK, Horizontal	1
-34	04664	44-0330			WEBBING, Door, 4" x 9" Lg (ATTACHING PARTS)	1
-35	04664	44-0747			MOUNTING, Web Strap	2
-36	04664	44-0642			BACKING, Web Strap	2
-37	04664	82-2034-0100			SCREW, Ph Tr Hd, 1/4"-20 x 1", SS	6
-38	04664	82-1011-0025			WASHER, Lock, 1/4", Zn	6
-39	04664	82-1013-006			WASHER, Flat, 1/4", Zn	2

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-54-						
-40	04664	44-2174			REGULATOR, Window, LH	1
-40	04664	44-2175			REGULATOR, Window, RH (ATTACHING PARTS)	1
-41	04664	82-2035-0050			SCREW, Ph Tr Hd, 1/4"-20 x 1/2" Lg, EP	4
-42	04664	82-1011-0025			WASHER, Lock, 1/4", Zn	4
-43	04664	82-1013-006			WASHER, Flat, 1/4", Zn	4
-44	04664	44-2216			CHANNEL, Window, Vertical (ATTACHING PARTS)	2
-45	04664	82-2063-0125			SCREW, Hex Hd, 1/4"-20 x 1-3/4", Zn	8
-46	04664	82-1013-006			WASHER, Flat, 1/4" Zn	8
-47	04664	82-1011-0025			WASHER, Lock, 1/4", Zn	8
-48	04664	44-2108			BRACKET, Mounting, Regulator LH	1
-48	04664	44-2107			BRACKET, Mounting, Regulator RH (ATTACHING PARTS)	1
-49	04664	82-2046-0075			SCREW, Ph Flat Hd, 1/4"-20 x 3/4", Zn	3
-50	04664	82-3029-001			NUT, Lock, Nylon Insert, 1/4"-20, Zn	3
-51	04664	44-0991	19220	AE1/12308	HANDLE, Regulator (ATTACHING PARTS)	1
-52	04664	82-4001			PIN, Regulator Handle	1
-53	04664	44-0992	19220	1/16420	ESCLUTCHEON, Regulator Handle	1
-54	04664	44-1271			CANOPY DOOR LINER ASSY. (Passenger Side) (See figure F-55 for details)	1
-54	04664	44-1270			CANOPYDOORLINERASSY (Driver Side) (See figure F-55 for details) (ATTACHING PARTS)	1
-55	04664	82-2039-002			SCREW, Ph Pan Hd, Taptite, NO. 10-24 x 3/4"	10
-56	04664	80-9129			WASHER, Headliner, Large	10
-57	04664	35-0148			WINDOW, Crew, Cab, Roll-up	1

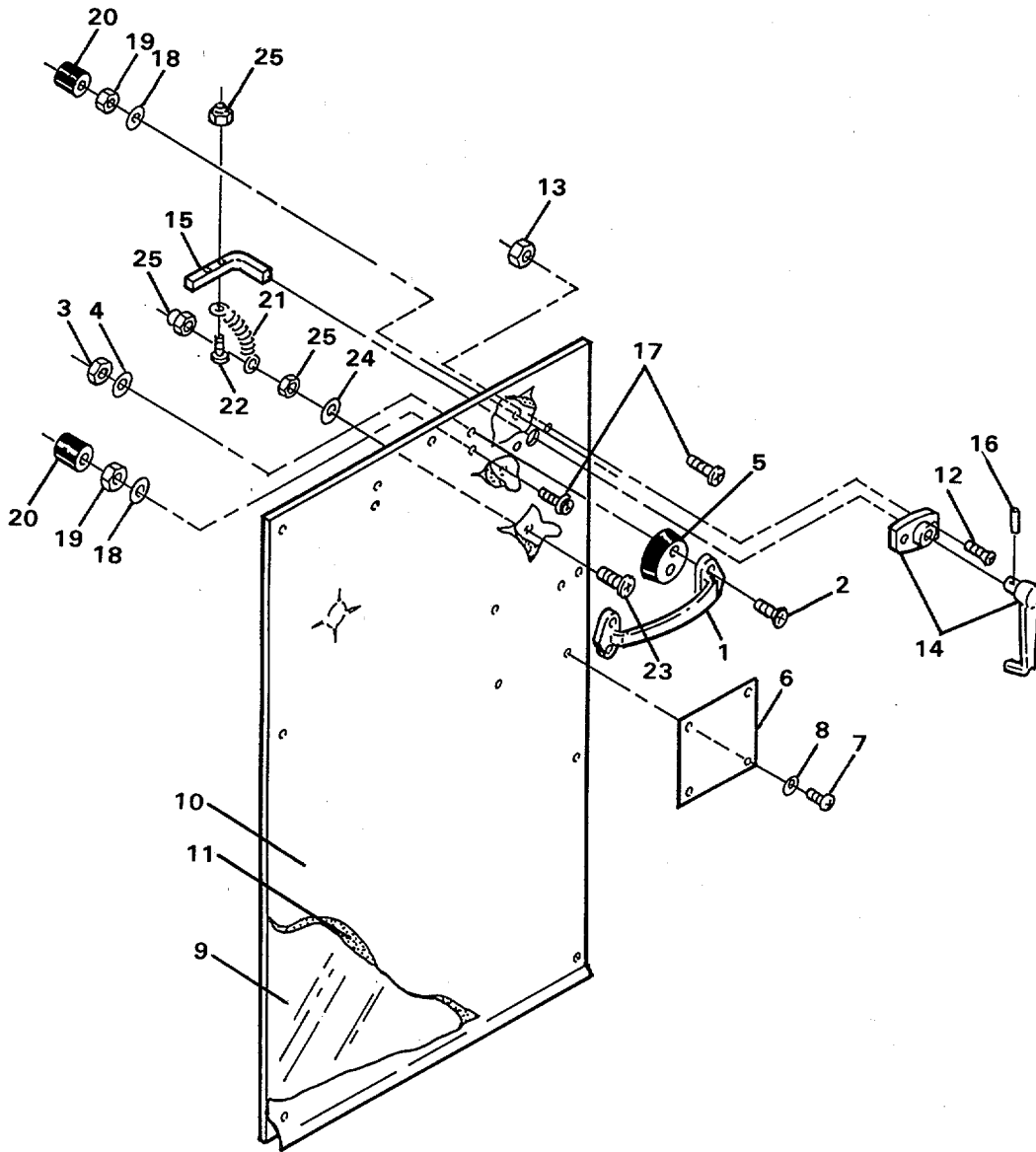


Figure F-55. Canopy Door Liner Assemblies

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-55-	04664	44-1271			CANOPY DOOR LINER ASSEMBLY (Passenger Side) (See figure F-54 for NHA)	REF
	04664	44-1270			CANOPY DOOR LINER ASSEMBLY (Driver Side) (See figure F-54 for NHA)	REF
-1	04664	80-0003	9D455	3200-CH	HANDLE, Grab, Chrome (ATTACHING PARTS)	1
-2	04664	82-2077-0125			SCREW, Ph Flat Hd, 1/4"-20 x 1-1/4" Zn	4
-3	04664	82-3015-001			NUT, Hex, 1/4"-20, Zn	4
-4	04664	82-1011-0025			WASHER, Lock, 1/4", Zn	4
-5	04664	72-0123	1BM35	72-0123	SPACER, Grab Handle	2
-6	04664	91-0140			LABEL, Danger (Jump Seat) (ATTACHING PARTS)	1
-7	04664	82-2039-001			SCREW, Ph Pan Hd, Taptite, No. 10-24 x 1/2"	4
-8	04664	82-1016-0019			WASHER, Flat, Nylon, No. 10	4
-9	04664	44-1272			PAN, Door, Inside	1
-10	04664	934104-0010			VINYL, Snowskin, Black, 54" Wide	AR
-11	04664	943021	62408	4100	FOAM, Industrial, 1/4" x 54" Wide	AR
	04664	80-2166			HANDLE ASSY, Inside Door (Passenger Side)	1
	04664	80-2167			HANDLE ASSY, Inside Door (Driver Side) (ATTACHING PARTS)	1
-12	04664	82-2037-0075			SCREW, Ph Pan Hd, No. 10-24 x 3/4" T/C PL	2
-13	04664	82-3017-007			NUT, Hex, No. 10-24, Zn	2
-14	04664	80-2069			HANDLE, Inside Door	1
-15	04664	80-2165			LEVER, Inside Handle (ATTACHING PARTS)	1
-16	04664	82-0054			PIN, Roll, 5/32" x 5/8", Cad	1
-17	04664	82-2037-0062			SCREW, Ph TrHd, No. 10-24x5/8", T/C PL	2
-18	04664	82-1013-004			WASHER, Flat, No. 1 0, Zn	2
-19	04664	82-3030-008			LOCKNUT, Nylon Insert, No. 10-24, Zn	2
-20	04664	940054-00075			BUMPER, Rubber (ft)	2
-21	04664	44-3402			SPRING, Door Liner (ATTACHING PARTS)	1
-22	04664	82-2037-0062			SCREW, Ph TrHd, No. 10-24x5/8", T/C PL	1
-23	04664	82-2037-0075			SCREW, Ph TrHd, No. 10-24x3/4", T/C PL	1
-24	04664	82-1013-004			WASHER, Flat, No. 1 0, Zn	1
-25	04664	82-3030-008			LOCKNUT, Nylon Insert, No. 10-24, Zn	3

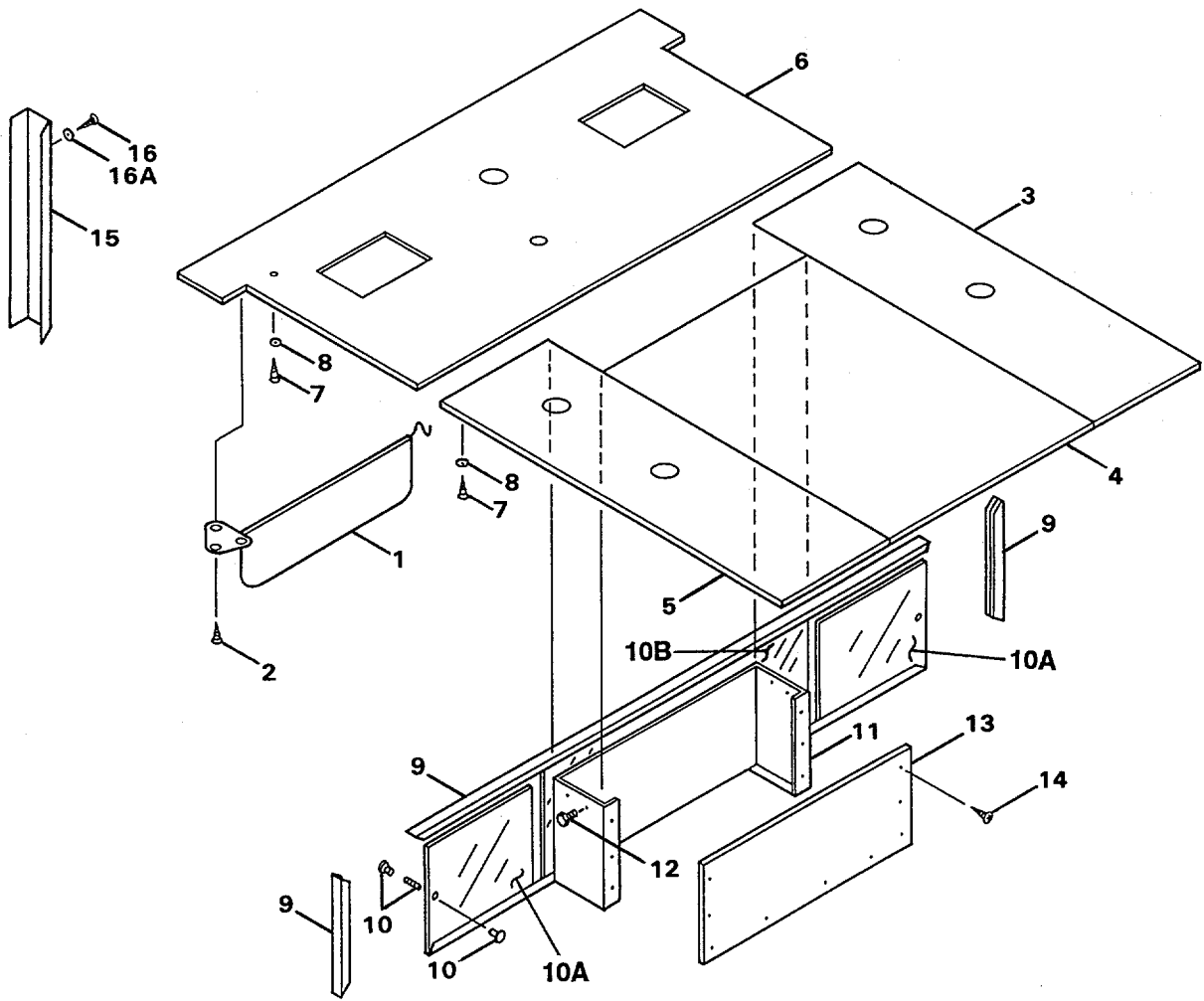


Figure F-56. Cab Components - Interior, Sheet 1 of 3

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-56-					CAB COMPONENTS - INTERIOR	1
-1	04664	44-0303			VISOR, Sun (ATTACHING PARTS)	2
-2	04664	82-2039-001			SCREW, T410 Ph Pn Hd, Taptite, No.10-24x 1/2"	12
-3	04664	44-4307			HEADLINER, Canopy, P.S.	1
-4	04664	44-4396			HEADLINER, Canopy, Center	1
-5	04664	44-4306			HEADLINER, Canopy, D.S.	1
-6	04664	SD-00007			HEADLINER, Cab (ATTACHING PARTS)	1
-7	04664	82-2039-002			SCREW, T410 Ph Pn Hd, Taptite, No. 10-24 x 3/4"	30
-8	04664	80-9129			WASHER, Headliner, Large	30
-9	04664	35-0110	63108	616-0788-3	WINDOW, Sliding	1
-10	04664	992049			KNOB ASSEMBLY, Sliding Window	2
-10A			63108	76280-110	PANEL, Glass, Side	2
-10B			63108	76281 -110	PANEL, Glass, Middle	1
-11	04664	44-0969			ENCLOSURE, Boom Support, Front (ATTACHING PARTS)	1
-12	04664	82-2035-0100			SCREW, Ph Tr Hd, 1/4"-20 x 1", EP	8
-13	04664	44-0970			ENCLOSURE, Boom Support, Backl (ATTACHING PARTS)	
-14	04664	82-2039-001			SCREW, T410 Ph Pn Hd, Taptite, No.10-24x 1/2"	6
-15	04664	44-0386			COVER, Wiring D.S.	1
-15	04664	44-0387			COVER, Wiring, P.S. (ATTACHING PARTS)	1
-16	04664	82-2116-0075			SCREW, Ph Pn Hd, Tapping, No.10x3/4",Zn	6
-1 6A	04664	80-9128			WASHER, Headliner, Small	6

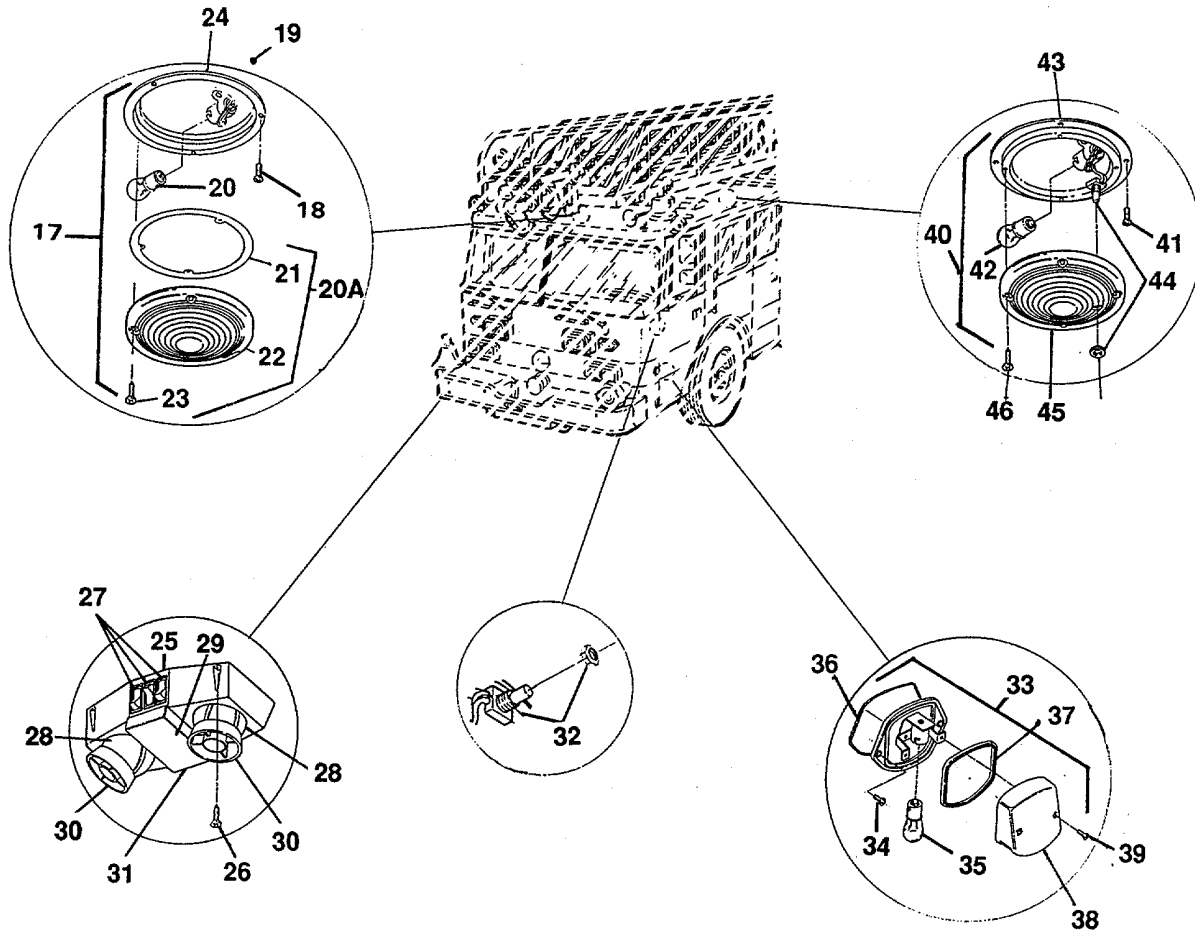


Figure F-56. Cab Components - Interior, Sheet 2 of 3

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-56-17	04664	61-0016	77977	3613	LIGHT, 4", Red (ATTACHING PARTS)	1
-18	04664	82-2039-001			SCREW, T410, Ph Pn Hd, Taptite, No. 10-24 x 1/2"	3
-19	04664	82-3018-003			NUT, Acorn, No. 10-24, Chrome	3
-20			1P787	1156	BULB, 12V	1
-20A			77977	9021	LENS KIT	1
-21					GASKET (NSS)	1
-22			77977	9016	LENS (ATTACHING PARTS)	1
-23					SCREW (NSS)	4
-24					BASE ASSY (NSS)	1
-25	04664	61-0147	75175	534-2544	LIGHT, Map/Dome (ATTACHING PARTS)	1
-26	04664	82-2074-0050			SCREW, Ph Pn Hd, No. 6-32 x 1/2", Zn	4
-27			75175	41099-00	SWITCH	3
-28			1P787	912	BULB, 12V	2
-29			1P787	212-2	BULB, 12V	1
-30			75175	41098-00	BEZEL	2
-31			75175	41104-051	LENS	1
-32	04664	64-0024	60951	37742	SWITCH, Door, DPST, NC, Mom	4
-33	04664	61-0644	20984	437-99025	LIGHT, Step (ATTACHING PARTS)	4
-34	04664	82-2039-001			SCREW, T41 0, Ph Pn Hd, Taptite, No. 10-24 x 1/2"	8
-35		IP787	1141		BULB, 12V	1
-36		20984	19679-1		MOUNTING BRACKET AND SOCKET ASSY	1
-37		20984	22077		GASKET	1
-38		20984	13903-75		DOMES (ATTACHING PARTS)	1
-39		20984	12144		SCREW	2
-40	04664	61-0007	71951	79350	LIGHT, Dome, 5", w/Switch (ATTACHING PARTS)	2
-41	04664	82-2039-001			SCREW, T410, Ph Pn Hd, Taptite, No. 10-24 x 1/2"	8
-42		IP787	1076		BULB, 12V, 32CP.	2
-43					BASE ASSY (NSS)	1
-44	04664	99-2003			SWITCH, Pushbufton	1
-45		71951	P426		LENS (ATTACHING PARTS)	1
-46					SCREW (NSS)	4
NOTE: NSS parts must be purchased as part of their NHA						

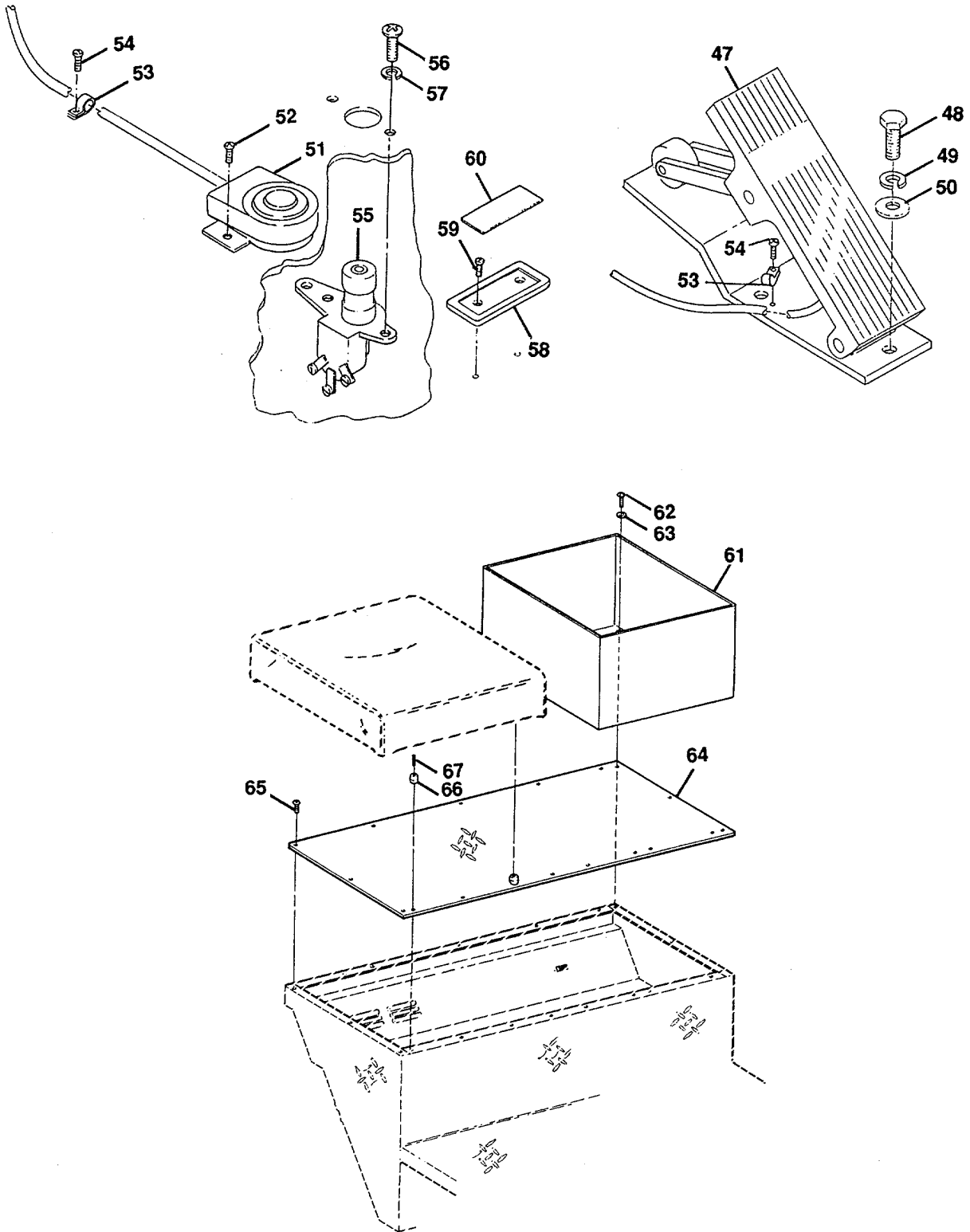


Figure F-56. Cab Components - Interior, Sheet 3 of 3

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-56- -47	04664	42-1147	10100	119595	ACCELERATOR (ATTACHING PARTS)	1
-48	04664	82-2063-0075			SCREW, Cap, Hex Hd, 1/4"-20 x 3/4", Zn	3
-49	04664	82-1011-0025			WASHER, Lock, 1/4", Zn	3
-50	04664	82-1013-006			WASHER, Rat, 1/4", Zn	3
-51	04664	640023	97918	SP491 -S60	SWITCH, Siren Foot (ATTACHING PARTS)	2
-52	04664	82-2039-001			SCREW, T41 0 Ph Pn, Taptite, No.10-24 x 112"	4
-53	04664	640907-0709			CLAMP (ATTACHING PARTS)	2
-54	04664	82-2039-001			SCREW, T410 Ph Pn Hd, Taptite, No. 10-24 x 1/2"	2
-55	04664	640115	13445	7769	SWITCH, Dimmer (ATTACHING PARTS)	1
-56	04664	82-2035-0100			SCREW, Ph Tr Hd, 1/4"-20 x 1", EP	2
-57	04664	82-1011-0025			WASHER, Lock 1/4", Zn	2
-58	04664	52-0117			BEZEL, Tag Style B w/Pins (ATTACHING PARTS)	2
-59	04664	82-2039-001			SCREW, T410 Ph Pn Hd, Taptite, No. 10-24 x 1/2"	4
-60	04664	91-0126			TAG, Name, Mechanical Siren	2
-61	04664	SD-00009			COMPARTMENT, Communications (ATTACHING PARTS)	1
-62	04664	82-2039-002			SCREW, T410 Ph Pn Hd, Taptite, No. 10-24 x 3/4"	4
-63	04664	82-1009-001			WASHER, Fender, No. 10 x 1", Zn	4
-64	04664	AY1 850-04500			COVER, 4Way, Between Seats (ATTACHING PARTS)	1
-65	04664	82-2039-002			SCREW, T410 Ph Pn Hd, Taptite, No. 10-24 x 3/4"	8
-66	04664	80-0041			BUMPER, Rubber (ATTACHING PARTS)	2
-67	04664	82-2039-002			SCREW, T410, Ph Pn Hd, Taptite, No. 10-24 x 3/4"	2

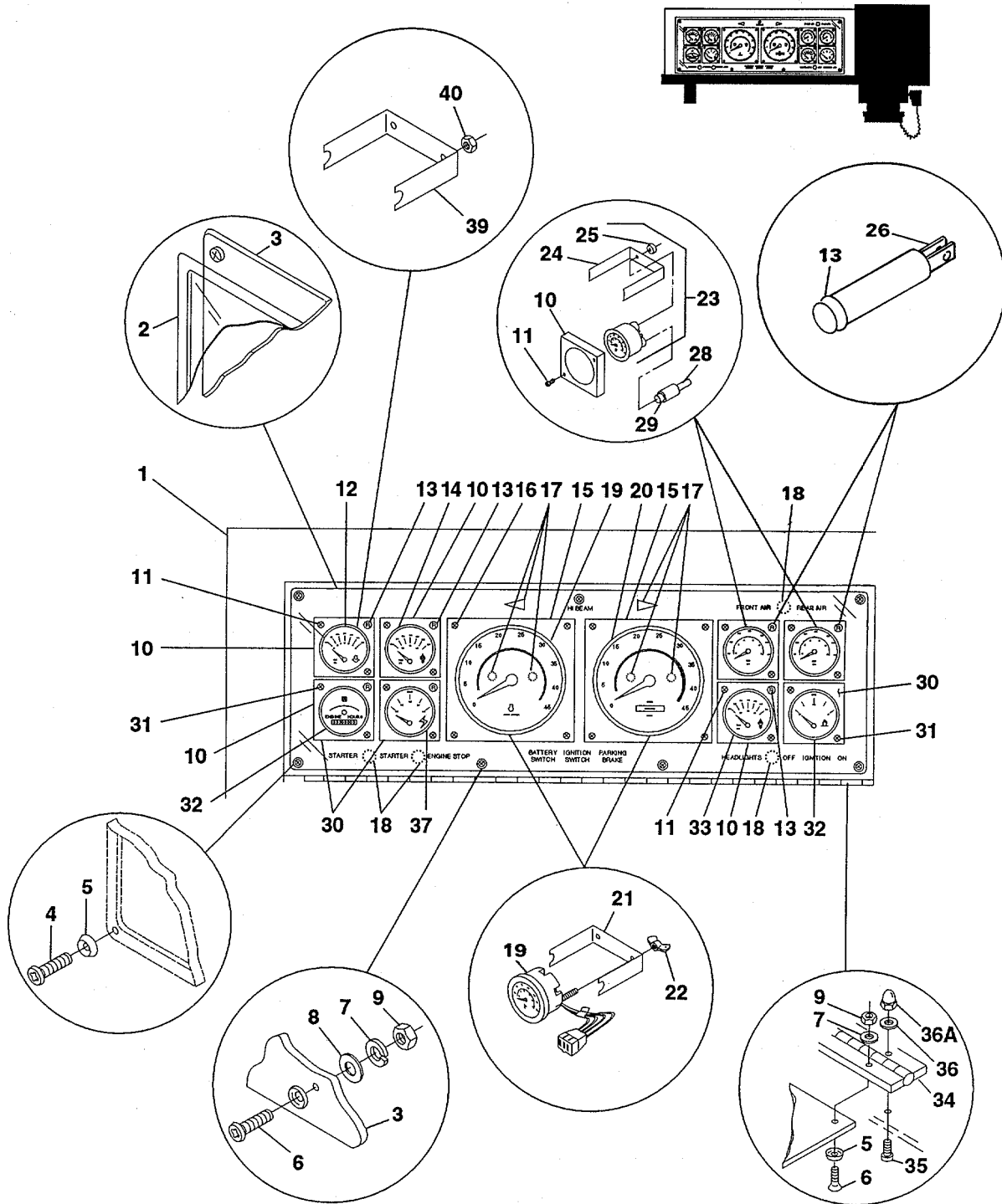


Figure F-57. Cab Instrument Panel, Sheet 1 of 6

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-57-					CAB INSTRUMENT PANEL	1
-1	04664	44-4248-0010			PANEL ASSY., Instrument, D.S., Black	1
-2	04664	44-0122			OVERLAY, Instrument Panel	1
-3	04664	44-3167			PLATE ASSY., Back, Gauge (ATTACHING PARTS)	1
-4	04664	82-2021-0075			SCREW, Ph Pn Hd, Tapping, No. 10 x 3/4", Blk	7
-5	04664	80-9128			WASHER, Headliner, Small	13
-6	04664	82-2022-0075			SCREW, Ph Pn Hd, No. 10-32 x 3/4", Blk	6
-7	04664	82-1012-007			WASHER, Lock, No. 10, Zn	6
-8	04664	82-1013-004			WASHER, Rat No. 10, Zn	6
-9	04664	82-3017-007			NUT, Hex, No. 10 -32, Zn	6
-10	04664	44-0246	39395	6432380	BEZEL, Gauge, Small w/Light (ATTACHING PARTS)	5
-11	04664	82-2125-007			SCREW, Ph Oval Hd, Trim, No. 8 x 3/4', Blk	10
-12	04664	44-1606	59197	350-515	GAUGE, Engine Oil Pressure	1
-13	04664	64-0120	51054	3TF6LRB4	LIGHT, Indicator, Red	5
-14	04664	44-1605	59197	310-501	GAUGE, Engine Water Temperature	
-15	04664	44-0244	39395	5658931	BEZEL, Gauge, Large (ATTACHING PARTS)	2
-16	04664	82-2125-004			SCREW, Ph Oval Hd, Trim, No. 8 x 1-1/4", Blk	8
-17	04664	61-0592-57	1P787	57	BULB Light, Clear, No. 57, 14V, 24A	6
-18	04664	61-0592-53	1P787	53	BULB: Light, Clear, No. 53, 14.4V, 24A	4
-19	04664	44-3267	31211	4-601-TTL	TACHOMETER	1
-20	04664	44-3270	31211	4-801	SPEEDOMETER	1
-21			59197	FD41608S81	(ATTACHING PARTS)	
-21			59197	FD41608S61	BRACKET	2
-22			59197	2841950501	NUT, Wing	4
-23	04664	44-1981	59197	150-513	GAUGE, Air Pressure (ATTACHING PARTS)	2
-24			59197	3-078-001-32	BRACKET	2
-25			59197	3-090-002-0	NUT	4
-26	04664	64-0712-010			RESISTER, 10W, 10 ohm	2
-28	04664	944034-0260	92003	PFT4A-BLIQ250	TUBING, Air Brake, 1/4", Black	2
-29	04664	56-0314			CONNECTOR, Male, Brass	2
-30	04664	44-0245	39395	6432379	BEZEL, Gauge, Small (ATTACHING PARTS)	3
-31	04664	82-2125-007			SCREW, Ph Oval Hd, Trim, No. 8 x 3/4", Blk	6
-32	04664	44-1603	59197	301-501	GAUGE, Fuel	1
-33	04664	63-0688	59197	310-513	GAUGE, Transmission Oil Temperature	1
-34	04664	44-2562			HINGE, Gauge Panel (ATTACHING PARTS)	1
-35	04664	82-2039-001			SCREW, T410 Ph Pn Hd, Taptite, No. 10-24 x 1/2"	6
-36	04664	82-1013-004			WASHER, Rat, No. 10, Zn	6
-36A	04664	82-3018-003			NUT, Acom, Crown High, No. 10-24, Ch	6
-37	04664	44-1604	59197	332-501	VOLTMETER	1
-38	04664	44-1608	59197	331-501	HOURMETER, Engine (ATTACHING PARTS)	1
-39			59197	3-078-001-32	BRACKET	6
-40			59197	3-090-002-0	NUT	12

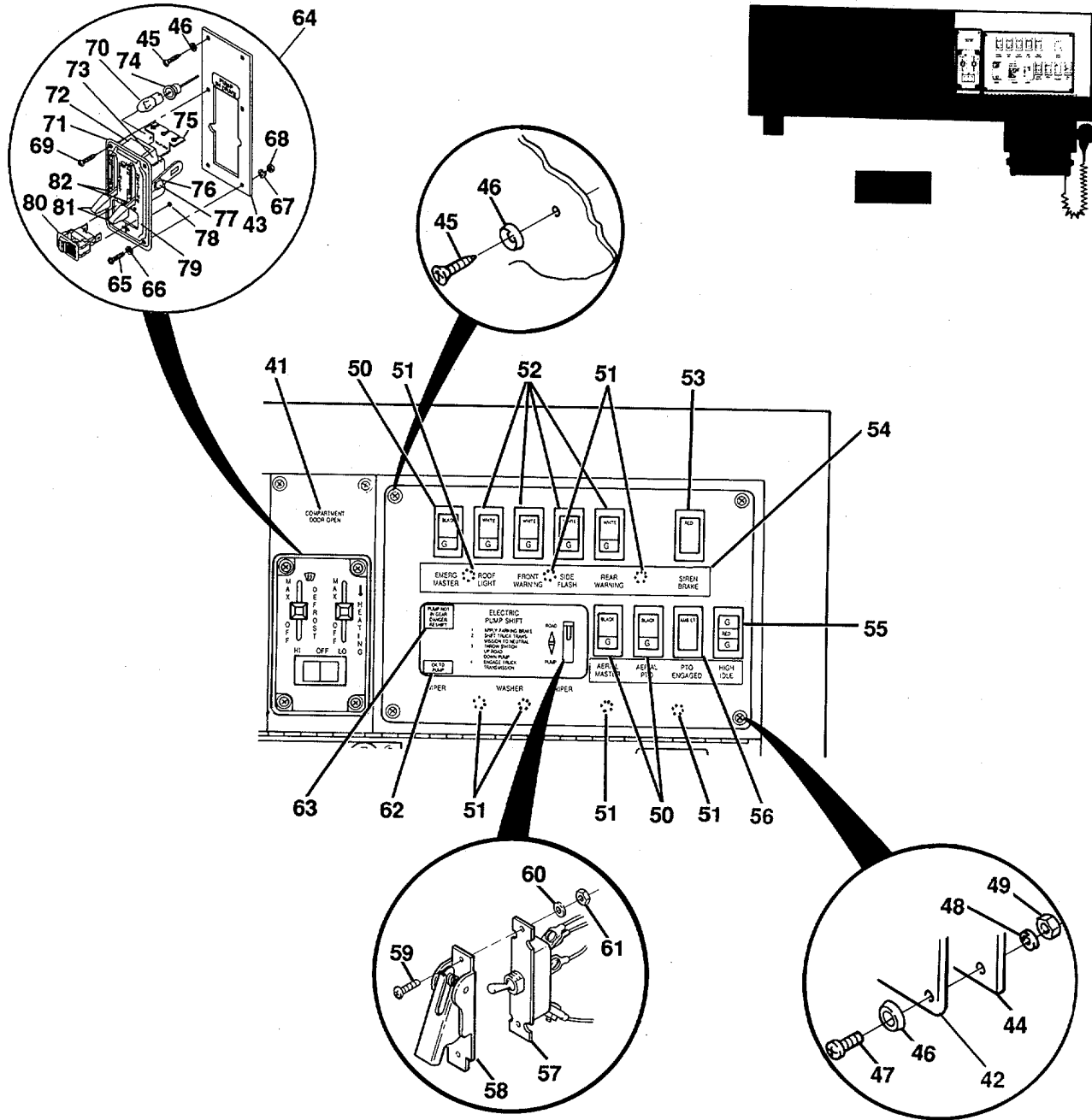


Figure F-57. Cab Instrument Panel, Sheet 2 of 6

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-57-						
-41	04664	61-0592-57	1P787	57	BULB, Light, Clear, No. 57, 14V, 24A	1
42	04664	44-0122			OVERLAY, Instrument Panel	1
-43	04664	44-3169			PLATE ASSY., Heater, Back	1
-44	04664	44-3168			PLATE ASSY., Back, Switch	1
					(ATTACHING PARTS)	
-45	04664	82-2126-0075			SCREW, Ph Pn Hd, Tapping, No. 10 x 3/4", Blk	7
46	04664	80-9128			WASHER, Headliner, Small	13
47	04664	82-2044-0075			SCREW, Ph Pn Hd, No. 10-24 x 3/4", Blk	6
48	04664	82-1012-007			WASHER, Lock, No. 10, Zn	6
-49	04664	82-3017-007			NUT, Hex, 14"-20, Zn	6
-50	04664	611105-0003			SWITCH, Rock, Black, SPST, w/Gn Lt	3
-51	04664	61-0592-53	1 P787	53	BULB, Light, Clear, No. 53, 14.4V, 12A	7
-52	04664	64-1105-0002			SWITCH, Rock, White, SPST, w/Gn Lt	4
-53	04664	64-1105-0005			SWITCH, Rock Red, SPST, Mom	1
-54	04664	SD-00374			STRIP, Label	1
-55	04664	64-1105-0004			SWITCH, Rock, Red, SPDT, Mom, Gn Lt	1
-56	04664	61-0565-002	9K855	522-21-B4	LIGHT, Indicator, Rect, Amber, 14V	1
-57	04664	51-0093	79218	V1368	SWITCH, Toggle, SPDT	1
-58	04664	51-0094	79218	V1 369	GUARD, Toggle Switch	1
					(ATTACHING PARTS)	
-59	04664	82-2104-0050			SCREW, Ph Rd Hd, No. 6-32 x 1/2", Zn	2
-60	04664	82-1012-005			WASHER, Lock, No. 6, Zn	2
-61	04664	82-3017-005			NUT, Hex, No. 6-32, Zn	2
-62	04664	61-0592-57	1 P787	57	BULB, Light, Clear, No. 57, 14V, 24A	1
-63	04664	61-0592-257	1P787	257	BULB, Light, Clear, No. 257, 14V, 27A	1
-64	04664	44-2390	99688	85903	CONTROL ASSY, Heater	1
					(ATTACHING PARTS)	
-65	04664	82-2022-0050			SCREW, Ph Pan Hd, No. 10-32 x 1/2", Blk	2
-66	04664	82-1013-004			WASHER, Flat, No. 10, Zn	2
-67	04664	82-1012-007			WASHER, Lock, No. 10, Zn	2
-68	04664	82-3018-004			NUT, Hex, No. 10-32, Zn	2
-69	04664	82-2021-0075			SCREW, Ph Pn Hd, Tapping, No. 10 x 3/4", Blk	2
-70			1P787	1891	BULB, Light, Clear, 14V, 24A	1
-71			99688	42600	BASE	1
-72			99688	56880	COVER, Light Box	1
-73			99688	57542	CONTAINER, Bulb	1
-74			99688	70550	HOLDER, Bulb	1
-75			99688	42620	BRACKET	1
-76			99688	50970	WASHER	1
-77			99688	61550	RIVET	2
-77			99688	62110	CLIP, Tinnerman	2
-77			99688	55840	SPACER	2
-78			99688	60900	PUSHNUT	4
-79			99688	57793	PLATE, Control	1
-79			99688	58551	ARTWORK, Silk Screen	1
-80			99688	57050	SWITCH	1
-81			99688	55711	KNOB	2
-81			99688	61660	CLIP, Knob	2
-82			99688	56201	LEVER	2

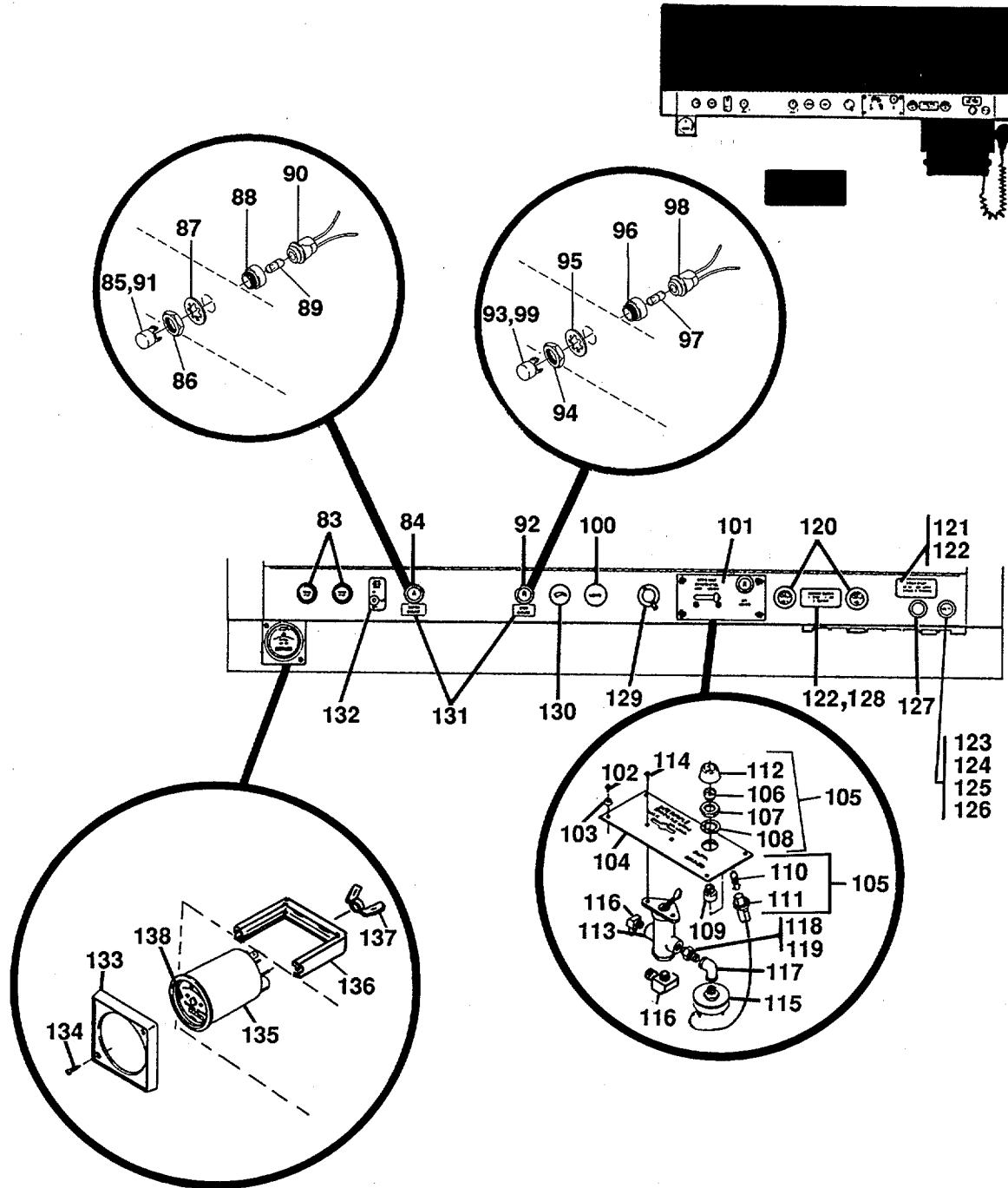


Figure F-57. Cab Instrument Panel, Sheet 3 of 6

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-57-						
-83	04664	64-0214	13445	CH-90047	SWITCH, Pushbutton	2
-84	04664	61-0261	32498	1800059	LIGHT, Indicator, Amber	1
-85			32498	11 1 4-A7B	LENS	1
-86			32498	1118	NUT, Hex	1
-87			32498	11 1 8-W	WASHER, Lock, Int Tooth	1
-88			32498	1183-1	HOUSING	1
-89			1P787	1893	BULB, Light	1
-90			32498	588-2	SOCKET	1
-91			32498	1215	SHROUD, Lens	1
-92	04664	64-0090	32498	1800221	LIGHT, Indicator, Red	1
-93			32498	1114-RED	LENS	1
-94			32498	1118	NUT, Hex	1
-95			32498	1118-W	WASHER, Lock, Int Tooth	1
-96			32498	1183-1	HOUSING	1
-97			1P787	1893	BULB, Light	1
-98			32498	588-2	SOCKET	1
-99			32498	1215	SHROUD, Lens	1
-100	04664	64-0318	13445	72100	SWITCH, Push/Pull	1
-101	04664	55-0094			CONTROL ASSY., Differential Lock (ATTACHING PARTS)	1
-102	04664	82-2021-0075			SCREW, Ph Pn Hd, Tapping, No. 10-24 x 3/4", Blk	4
-103	04664	80-9128			WASHER, Headliner, Small	4
-104	04664	91-0070			PLATE, Differential Lock	1
-105	04664	64-0090	32498	1800221	LIGHT, Indicator, Red	1
-106			32498	1114-RED	LENS	1
-107			32498	1118	NUT, Hex	1
-108			32498	1118-W	WASHER, Lock, Int Tooth	1
-109			32498	1183-1	HOUSING	1
-110			1P787	1893	BULB, Light	1
-111			32498	588-2	SOCKET	1
-112			32498	1215	SHROUD, Lens	1
-113	04664	55-0069	06853	229635	VALVE, Control (ATTACHING PARTS)	1
-114	04664	82-2039-001			SCREW, T410 Ph Pn Hd, Taptite, No. 10-24 x 1/2"	2
-115	04664	44-0334	06853	286404	SWITCH, Stoplight	1
-116	04664	56-0490-004	92003	VS269NTA4-2	FITTING, 1/8" M. Pipe/3/8" Tube, 90°	2
-117	04664	56-0495-003	92003	1200P-4-4	FITTING, 1/4" F. Pipe//4" F. Pipe, 90°	1
-118	04664	56-0500-001	92003	215PN-2	FITTING, Pipe, 1/8" Close Nipple	1
-119	04664	56-0493-001	92003	VS209P-4-2	FITTING, Reducer, 1/8"F. Pipe/ 1/4" M. Pipe	1
-120	04664	44-2251	13445	75228-03	SWITCH, Rotary/Push	2
-121	04664	SD-13256			TAG, Name, Ether Start - Yellow	1
-122	04664	52-0117			BEZEL, Tag Style B w/Pins	2
-123	04664	63-0513	32498	1700	ALARM, Voltage LO/HI	1
-124	04664	64-0425	28107	ECG5814	DIODE, 6A, 400V	1
-125	04664	64-0803-0003	71400	ATC-03	FUSE, 3 Amps	1
-126	04664	64-1292	13445	3031-0	HOLDER, Fuse, Inline	1
-127	04664	52-0063	13445	9231	SWITCH, Pushbutton	1
-128	04664	91-0060			TAG, Name, Warning Buzzer	1
-129	04664	64-0216	13445	956-3124	SWITCH, Rotary, w/Warning Light Tester	1
-130	04664	64-0584	13445	74601-01	RHEOSTAT, Panel Light Dimmer	1
-131	04664	91-0179			TAG, Name, DDEC Indicator Lights	1
-132	04664	63-0284	73586	26651-73	SWITCH, Toggle	1

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-57- -133	04664	44-0245	39395	6432379	BEZEL, Gauge, Small (ATTACHING PARTS)	1
-134	04664	82-2125-007			SCREW, Ph Oval Hd, Trim, No. 8 x 3/4", Blk	8
-135	04664	44-1609	59197	331-503	HOURMETER, Aerial (ATTACHING PARTS)	1
-136			59197	7D41608561	BRACKET	1
-137			59197	2B41950501	NUT, Wing	2
-138	04664	91-0113			TAG, Name, Aerial Hours	1

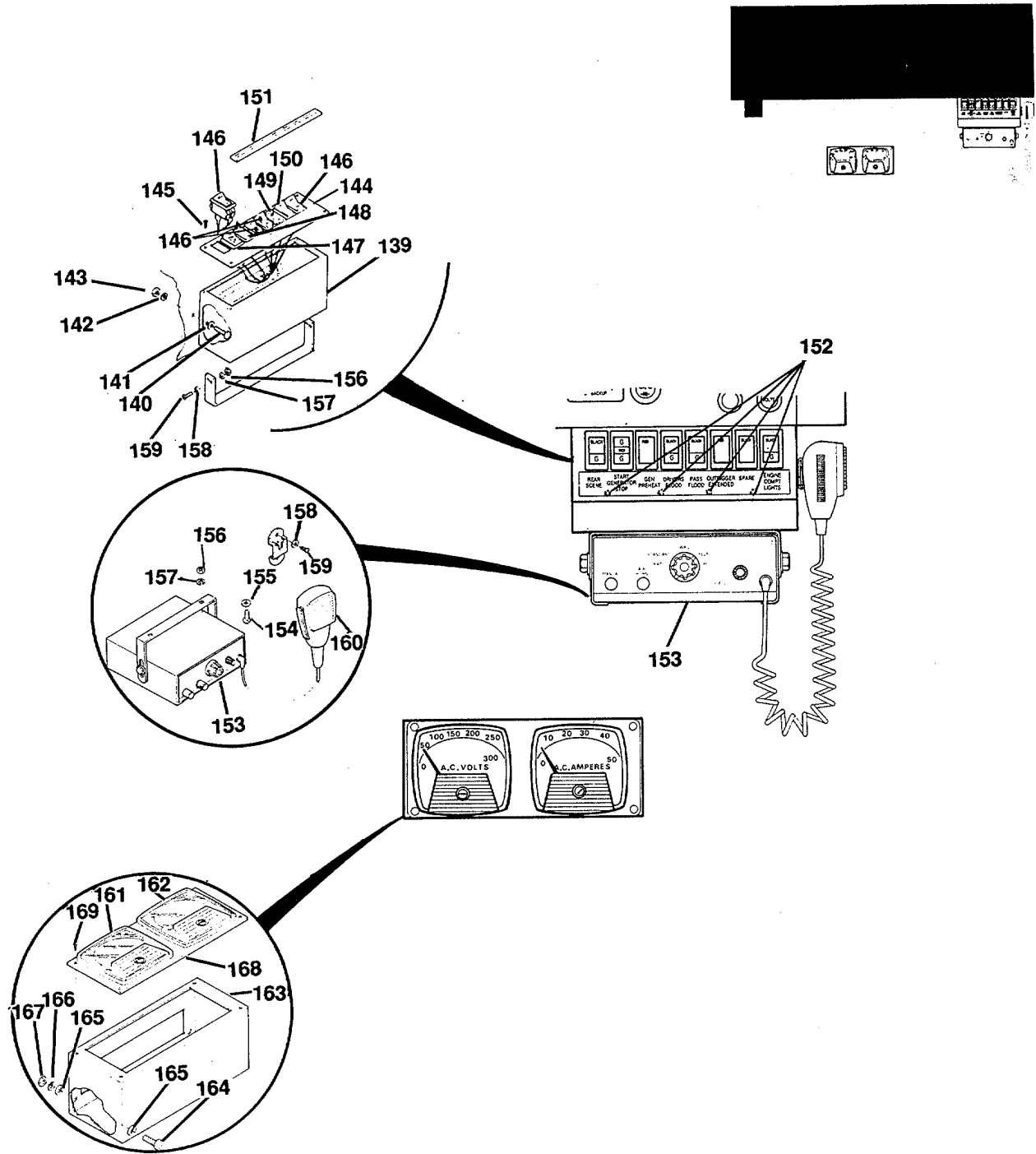


Figure F-57. Cab Instrument Panel, Sheet 4 of 6

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-57- -139	04664	60-1861-008			BOX, Switch Panel (ATTACHING PARTS)	1
-140	04664	82-2063-0075			SCREW, Cap, Hex Hd, 1/4"-20 x 3/4", Zn	2
-141	04664	82-1013-006			WASHER, Flat, 1/4", Zn	4
-142	04664	82-1011-0025			WASHER, Lock, 1/4", Zn	2
-143	04664	82-3014-001			NUT, Hex, 1/4"-20, Zn	2
-144	04664	60-1858-008			PANEL ASSY., Switch (ATTACHING PARTS)	1
-145	04664	82-2157-007			SCREW, Ph Oval Hd, Trim, No. 8 x 3/4", Blk	4
-146	04664	64-1105-0003			SWITCH, Rock, Black, SPST, w/Gn Lt	4
-147	04664	64-1105-0004			SWITCH, Rock, Red, SPDT, Mom., Gn Lt	1
-148	04664	64-1105-0005			SWITCH, Rock, Red, SPST, Mom	1
-149	04664	61-0565-001	51054	521-11-[B4	LIGHT, Indicator, Rect, Red, 14V	1
-150	04664	64-0242	73586	NBL	BLANK, Rocker Switch	1
-151	04664	SD-00374			STRIP, Label	1
-152	04664	61-0592-53	1P787	53	BULB, Light, Clear, No. 53, 14.4V, 12A	4
-153	04664	63-0559	66461	3692 W/MIC	SIREN, Code-3 (ATTACHING PARTS)	1
-154	04664	82-2039-001			SCREW, T410 Ph Pn Hd, Taptite, No. 10-24 x 1/2"	2
-155	04664	82-1013-004			WASHER, Flat, No. 10, Zn	2
-156	04664	82-3014-001			NUT, Hex, 1/4"-20, Zn	2
-157	04664	82-1011-0025			WASHER, Lock, 1/4", Zn	2
-158	04664	82-1013-004			WASHER, Flat, No. 10, Zn	2
-159	04664	82-2039-001			SCREW, T410 Ph Pn Hd, No. 10-24 x 1/2"	2
-160			66461	13641	MICROPHONE (wired-in)	1
-161	04664	60-1602	47660	250-244RXXR	VOLTMETER, 0-300V AC	1
-162	04664	60-2206	47660	250-24OLSNT	AMMETER, 0-50 AMP AC	1
-163	04664	60-2686			BOX ENCLOSURE ASSY., Gauge Panel (ATTACHING PARTS)	1
-164	04664	82-2063-0075			SCREW, Cap, Hex Hd, 1/4"-20 x 3/4", Zn	2
-165	04664	82-1013-006			WASHER, Flat, 1/4", Zn	4
-166	04664	82-1011-0025			WASHER, Lock, 1/4", Zn	2
-167	04664	82-3014-001			NUT, Hex, 1/4"-20, Zn	2
-168	04664	60-2689			PANEL ASSY., Gauge (ATTACHING PARTS)	1
-169	04664	82-2157-007			SCREW, Ph Oval Hd, Trim, No. 8 x 3/4", Black	4

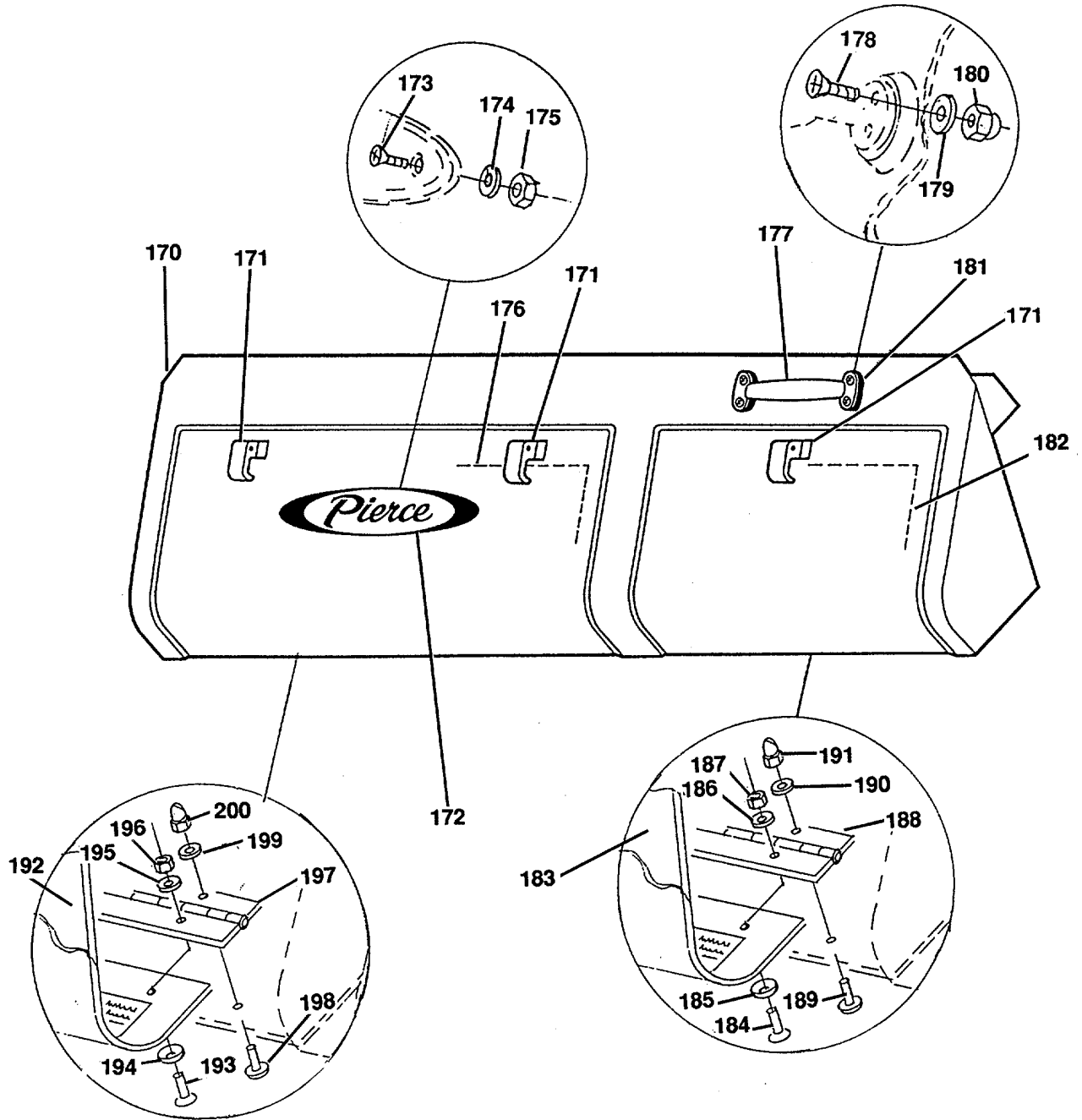
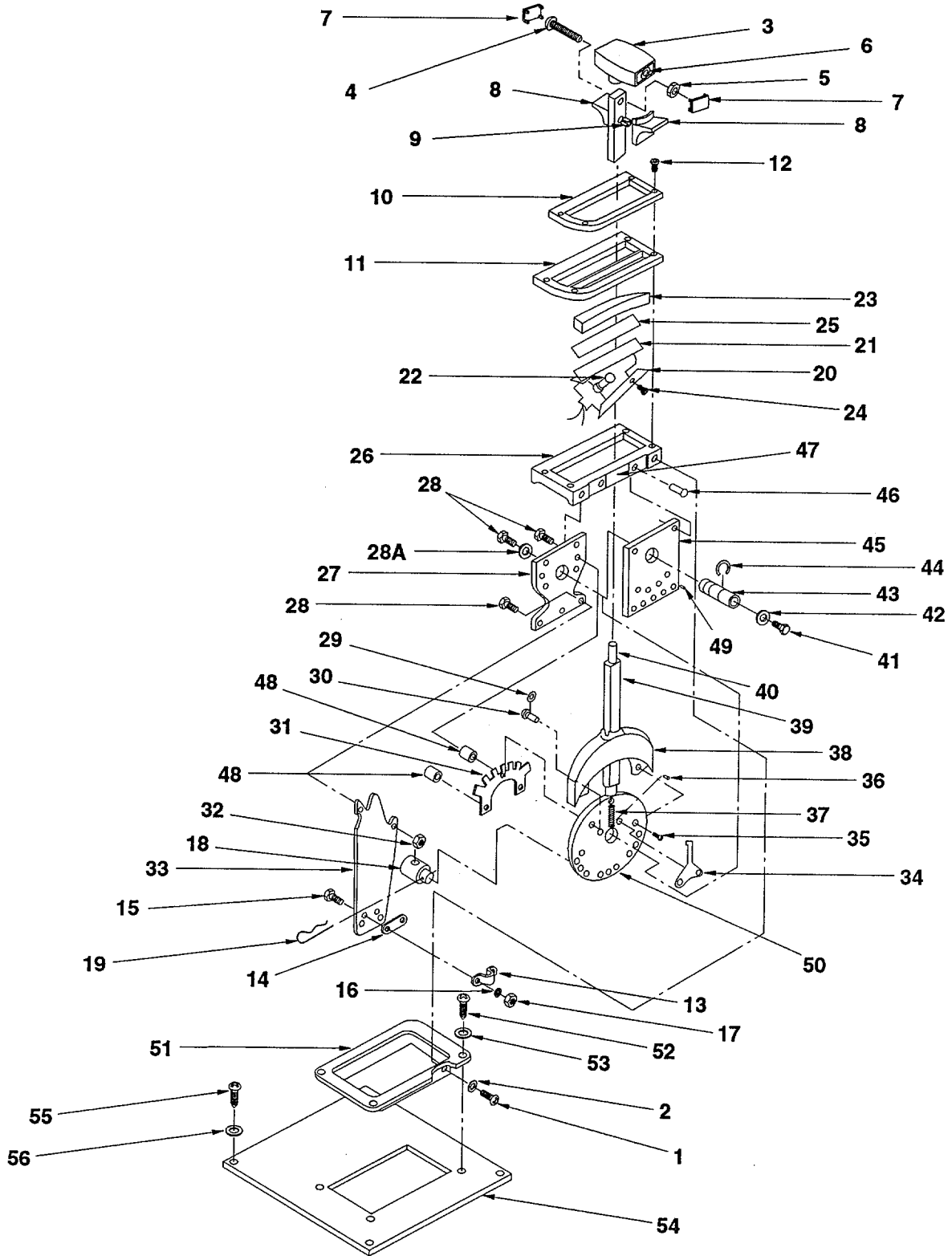


Figure F-57. Cab Instrument Panel, Sheet 5 of 6

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-57-						
-170	04664	44-4249-0010			PANEL ASSY., Instrument, P.S., Black	1
-171	04664	80-3002	94222	62-10-103-10	LATCH, Lift and Turn	3
-172	04664	91-0071			MEDALLION, Pierce Arrow	1
-173					(ATTACHING PARTS)	
					SCREW, Ph Oval Hd, No. 6-32 x 1/2", Brass (NSS)	2
-174	04664	82-1012-005			WASHER, Lock, No. 6, Zn	2
-175	04664	82-3017-005			NUT, Hex, No. 6-32, Zn	2
-176	04664	60-1764			LABEL, Electric Compartment	1
-177	04664	80-0003	94222	62-10-113-10	HANDLE, Grab	1
					(ATTACHING PARTS)	
-178	04664	82-2035-0125			SCREW, Ph Tr Hd, 1/4"-20 x 1-1/4", EP	4
-179	04664	82-1011-0025			WASHER, Lock, 1/4", Zn	4
-180	04664	82-3018-005			NUT, Acom, Crown High, 1/4"-20, Ch	4
-181	04664	72-0123	1 BM35	472-0123	SPACER, Handle, Grab	2
-182	04664	91-0063			CHART, Lubrication	1
-183	04664	44-4251-0010			DOOR, Glovebox	1
					(ATTACHING PARTS)	
-184	04664	82-2022-0050			SCREW, Ph Pn Hd, No. 10-24 x 1/2", Blk	3
-185	04664	80-9128			WASHER, Headliner, Small	3
-186	04664	82-1012-007			WASHER, Lock, No. 10, Zn	3
-187	04664	82-3017-007			NUT, Hex, No. 10 -24, Zn	3
-188	04664	44-1467			HINGE, Glovebox	1
					(ATTACHING PARTS)	
-189	04664	82-2044-0050			SCREW, Ph Tr Hd, No. 10-24 x 1/2", Zn	3
-190	04664	82-1012-007			WASHER, Lock, No. 10, Zn	3
-191	04664	82-3018-003			NUT, Acom, Crown High, No. 10-24, Ch	3
-192	04664	44-4250-0010			DOOR, Electrical Compartment I	
					(ATTACHING PARTS)	
-193	04664	82-2022-0050			SCREW, Ph Pn Hd, No. 10-24 x 1/2", Blk	5
-194	04664	80-9128			WASHER, Headliner, Small	5
-195	04664	82-1012-007			WASHER, Lock, No. 10, Zn	5
-196	04664	82-3017-007			NUT, Hex, No. 10-24, Zn	5
-197	04664	44-1468			HINGE, Electrical Compartment Door	1
					(ATTACHING PARTS)	
-198	04664	82-2044-0050			SCREW, Ph Tr Hd, No. 10-24 x 1/2", Zn	5
-199	04664	82-1012-007			WASHER, Lock, No. 10, Zn	5
-200	04664	82-3018-003			NUT, Acom, Crown High, No. 10-24, Ch	5
NOTE: NSS parts are not serviced separately. They are available only as part of their NHA.						

Figure F-57, Sheet 6 of 6, can be found at the rear of this manual as page FO-2.

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-57-						
-201	04664	64-0008	77326	52-307	SOLENOID, Cont 80A, Interim 150A	4
-202	04664	64-0329	11873	10973-174	BREAKER ASSY, Circuit, 10/20 Amp	2
-203	04664	64-0175	11873	12B10-00	BREAKER, Circuit, Aut, 10 Amp, 12 VDC	1
-204	04664	64-0032	77326	54-120	BREAKER, Circuit, Aut, 20 Amp, 12 VDC	7
-205	04664	63-0120	63477	20301	BLOCK, Terminal, 3/8" Stud	1
-206	04664	64-0364	1T881	332-204-125	RELAY, SPDT, 30 Amp, 12 VDC	13
-207	04664	63-0072	32498	443-10-6	ALARM, Bark, 12 VDC, 6 Function	1
-208	04664	91-0224			TAG, DDEC II, Fuse Label	1
-209	04664	640279	13445	55021	SWITCH, Toggle, SPDT, MOM, NO, 25A	1
-210	04664	64-0804	71400	ATC	HOLDER, Fuse, 4 Place	1
-211	04664	640803-0020	71400	ATC-20	FUSE, 20A	2
-212	04664	64-0806-0002	1JB11	12004563	TERMINAL, Auto Fuse, 10-12 Ga	1
-213	04664	640806-0001	1JB11	12020400	TERMINAL, Auto Fuse, 10-12 Ga	2
-214	04664	640803-07.5	71400	ATC-7.5	FUSE, 7.5A	1
-215	04664	64-0805-0002	1JB11	12004564	TERMINAL, Auto Fuse, 14-16 Ga	1
-216	04664	64-0803-0005	71400	ATC-05	FUSE, 5A	1
-217	04664	64-0805-0001	1JB1i	12020321	TERMINAL, Auto Fuse, 14-16 Ga	2
-218	04664	640026	08715	537	FLASHER	1
-219	04664	64-0027	08715	552	FLASHER	1
-220	04664	64-0089	32498	1100-3	FLASHER	1
-221	04664	64-0657	1 DV73	RV4LAYSai 03A	POTENTIOMETER, IOK, 2W, Locking	1
-222	04664	63-0509	1 DV73	KUL 1i DI 5D-1 2V	RELAY, DPDT, 1 OA, 12V, Dual Coil	1
-223	04664	64-0005	57054	4-1156	RELAY, DPDT, 10A, 12V (ATTACHING PARTS)	3
-224	04664	63-0511	1 DV73	20C247, P&B	HOLDDOWN, Relay	4
-225	04664	640009	87502	F498A	SOLENOID, Interm	1
-226	04664	63-0022	77326	52-400	ALARM, Buzzer	1
-227	04664	64-0088	32498	1100-3A	FLASHER	2
-228	04664	64-0085	11873	10973-148	BREAKER ASSY, Circuit, 8 CKT, 35/20 Amp	1
-229	04664	64-0032	77326	54-120	BREAKER, Circuit, Aut, 20 Amp, 12 VDC	5
-230	04664	64-0460	77326	54-130	BREAKER, Circuit, Aut, 30 Amp, 12 VDC	1
-231	04664	64-0239	11873	12A35-00	BREAKER, Circuit, Aut, 35 Amp, 12 VDC	2
-232	04664	51-0095	77326	54-215	BREAKER, Circuit, Aut, w/Tabs, 15Amp, 12VDC	2
-233	04664	42-1146	72582	23505265	MODULE, Low Coolant, DDEC Engine	1
-234	04664	640460	77326	54-130	BREAKER, Circuit, Aut, 30 Amp, 12 VDC	1
-235	04664	640126	77326	54-220	BREAKER, Circuit, Aut, w/Tabs, 20 Amp, 12 VDC	1
-236	04664	60-2023			MODULE ASSY, High Idle, Interlock, PBK-NS-PIG	1
-237	04664	63-0640	1JB11	SE401	CONNECTOR, Bosch Body	1
-238	04664	72-0120	97084	225-L	CLIP, Spring, Flasher	1



F-58. Transmission Shift Control

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-58-					TRANSMISSION SHIFT CONTROL	1
	04664	44-0215	60602	055734-000001	SHIFTER (ATTACHING PARTS)	1
-1	04664	82-2035-0050			SCREW, Ph Tr Hd, 1/4"-20 x 1/2" EP	4
-2	04664	82-1011-0025			WASHER, Lock, 1/4", Zn	4
			60602	59228	COVER KNOB SERVICE KIT	1
-3				*	KNOB, Cover	1
-4				*	SCREW, 1/4"-20 x 1/2"	1
-5				*	NUT, 1/4"-20	1
-6				*	COVER, Support	2
-7				*	INSERT	2
			60602	59193	RELEASE FINGER KIT	1
-8				*	FINGER, Release	2
-9				*	PIN, Roli	1
			60602	59139	COVER PLATE/SEAL KIT	1
-10				*	PLATE, Cover	1
-11				*	SEAL, Cover	1
-12				*	SCREWS, Ph Pn Hd	4
			60602	50030	CABLE CONNECTION KIT - 4 Series	1
-13				*	CLAMP	1
-14				*	SHIM	1
-15				*	SCREW, No. 10-32 x 5/8"	2
-16				*	WASHER, Look	2
-17				*	NUT, Hex, No. 10-32	2
-18				*	PIVOT, 4 Series	1
-19				*	PIN, Hair, Cotter	1
			60602	59030-11	LIGHT PIPE KIT, 12 VDC	1
-20				*	BRACKET ASSY	1
-21				*	PIPE, Light	1
-22				*	LAMP, 12 VDC	1
-23				*	COVER	1
-24				*	SCREW	1
-25				*	STRIP, Position	1
-26				**	CHASSIS (NSS)	1
-27				**	FLANGE (NSS)	1
-28				**	SCREW, Hex Hd, 1/4"-20 x 7/16" (NSS)	9
-28A				**	WASHER, Flat	1
-29				**	RING, Retaining (NSS)	1
-30				**	PIN, Gate (NSS)	1
-31				**	PLATE, Gate (NSS)	1
-32				**	NUT, Lock, 1/4"-20 (NSS)	1
-33				**	HANGER, Cable (NSS)	1
-34				**	INDICATOR (NSS)	1
-35				**	SCREW, No. 6-32 x 114" (NSS)	9
-36				**	PIN, Groove (NSS)	1
-37				**	SPRING (NSS)	1
-38				**	SHELL, Clam (NSS)	1
-39				**	TUBE, Trim (NSS)	1
-40				**	BAR, Release (NSS)	1
-41				**	SCREW, Bt Hd, 1/4"-28 x 12" (NSS)	1
-42				**	WASHER, FRat, 1/4" (NSS)	1
-43				**	SHAFT (NSS)	1
-44				**	RING, Retaining (NSS)	1
-45				**	FLANGE, Switch Mounting (NSS)	1
-46				**	RIVET (NSS)	2
					* Parts available only in a Kit.	
					** Parts are not serviced or supplied separately, supplied only as part of NHA.	

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-58-				**	TAG, Identification (NSS)	1
-47				**	STAND-OFF (NSS)	2
-48				**	TIE, Cable (NSS)	1
-49					HANDLE (NSS)	1
-50	04664	44-0214	60602	000-59002-0000	MOUNTING, Shifter	1
-51	04664	82-2039			(ATTACHING PARTS)	
-52	04664	82-1013-004			SCREW, T410, Ph Pan Hd, Taptite, 10-24 x 112"	4
-53	04664	44-4287-0010			WASHER, FRat, No. 10, Zn	4
-54	04664	82-2116-0075			PLATE, Shifter	1
-55	04664	80-9128			(ATTACHING PARTS)	
-56	04664				SCREW, Ph Ph Hd, Tap, No. 10x314', Zn	4
					WASHER, Headliner, Small	4
<p>** Parts are not serviced or supplied separately, supplied only as part of NHA.</p>						

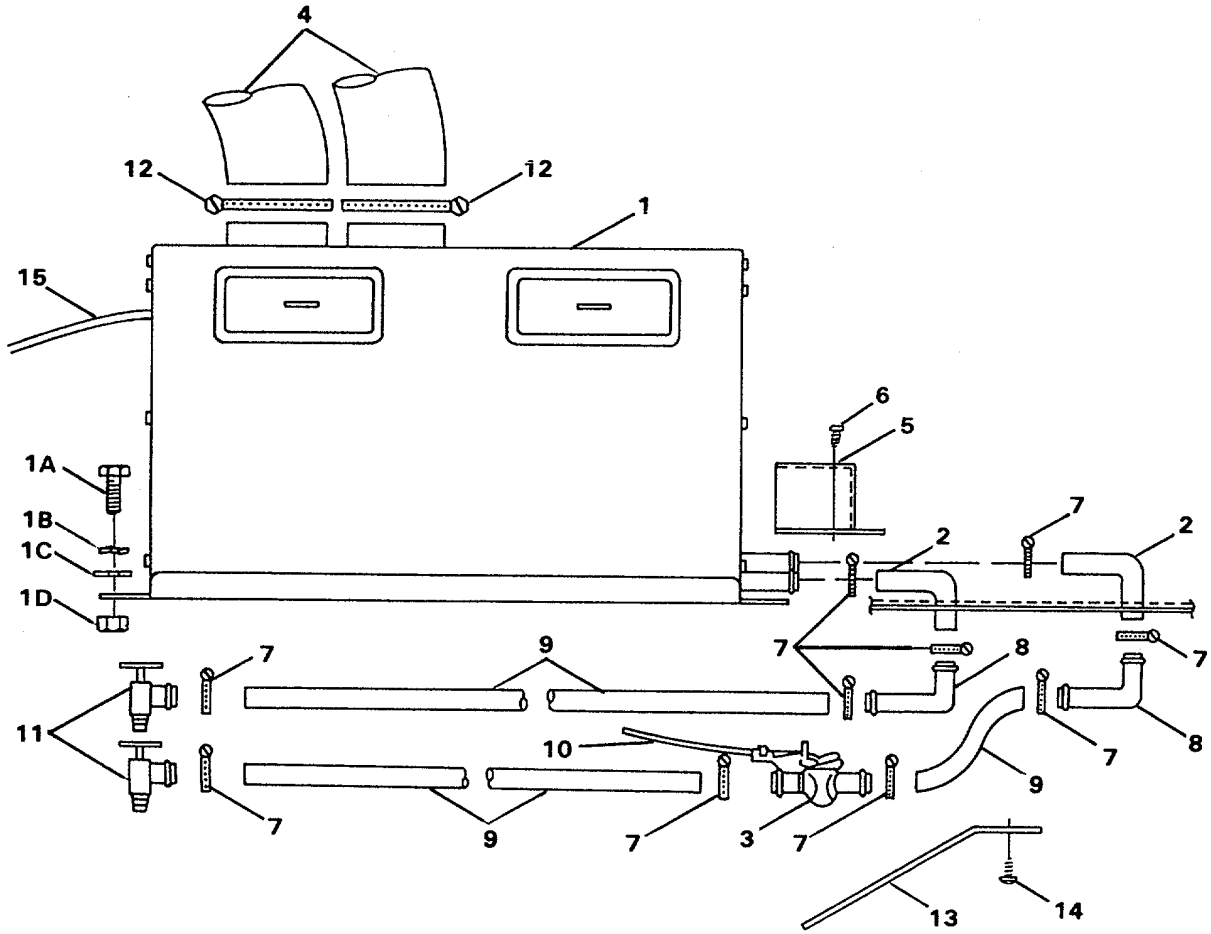


Figure F-59. Cab Heater/Defroster Installation

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-59-					CAB HEATER/DEFROSTER INSTALLATION	1
-1	04664	44-0800	0A9V8	H4850-12-APR	HEATER/DEFROSTER (See figure F-60 for details) (ATTACHING PARTS)	1
-1A	04664	82-2063-0075			SCREW, Hex Hd, 1/4"-20 x 1", Zn	5
-1B	04664	82-1011-0025			WASHER, Lock, 1/4", Zn	5
-1C	04664	82-1013-006			WASHER, Flat, 1/4", Zn	5
-1D	04664	82-3014-001			NUT, Hex, 1/4", Zn	5
-2	04664	44-2628	A09V8	2200-14	ELBOW, Hose 90°	2
-3	04664	44-2627	0A9V8	2600-20	VALVE, Heat, Control	1
-4	04664	940036	0A9V8	1700-69	HOSE, Nylon, Flexible	AR
-5	04664	44-3050			COVER, Heater Hoses (ATTACHING PARTS)	1
-6	04664	82-2039-001			SCREW, T410 Ph Tr Hd, Taptite No. 10-24 x 1/2"	3
-7	04664	80-6029-003	81646	6410	CLAMP, Hose	9
-8	04664	44-0935	0A9V8	PA-1900-17	ELBOW, Heater, 900, 5/8" O.D.	2
-9	04664	940003	OCME1	SAE2OR3	HOSE, Heater, 5/8" I.D. (ft)	38
-10	04664	44-2247	99688	57351	CABLE, Control, 78" Lg.	1
-11	04664	42-0173	92003	V404PH-10-6	VALVE, Shutoff, Heater	2
-12	04664	80-6029-015	81646	6456	CLAMP, Hose	4
-13	04664	59-0096			GUARD, Splash, Cab Heater (ATTACHING PARTS)	1
-14	04664	82-2039-002			SCREW, T410 Ph Tr Hd, Taptite No. 10-24 x 3/4"	4

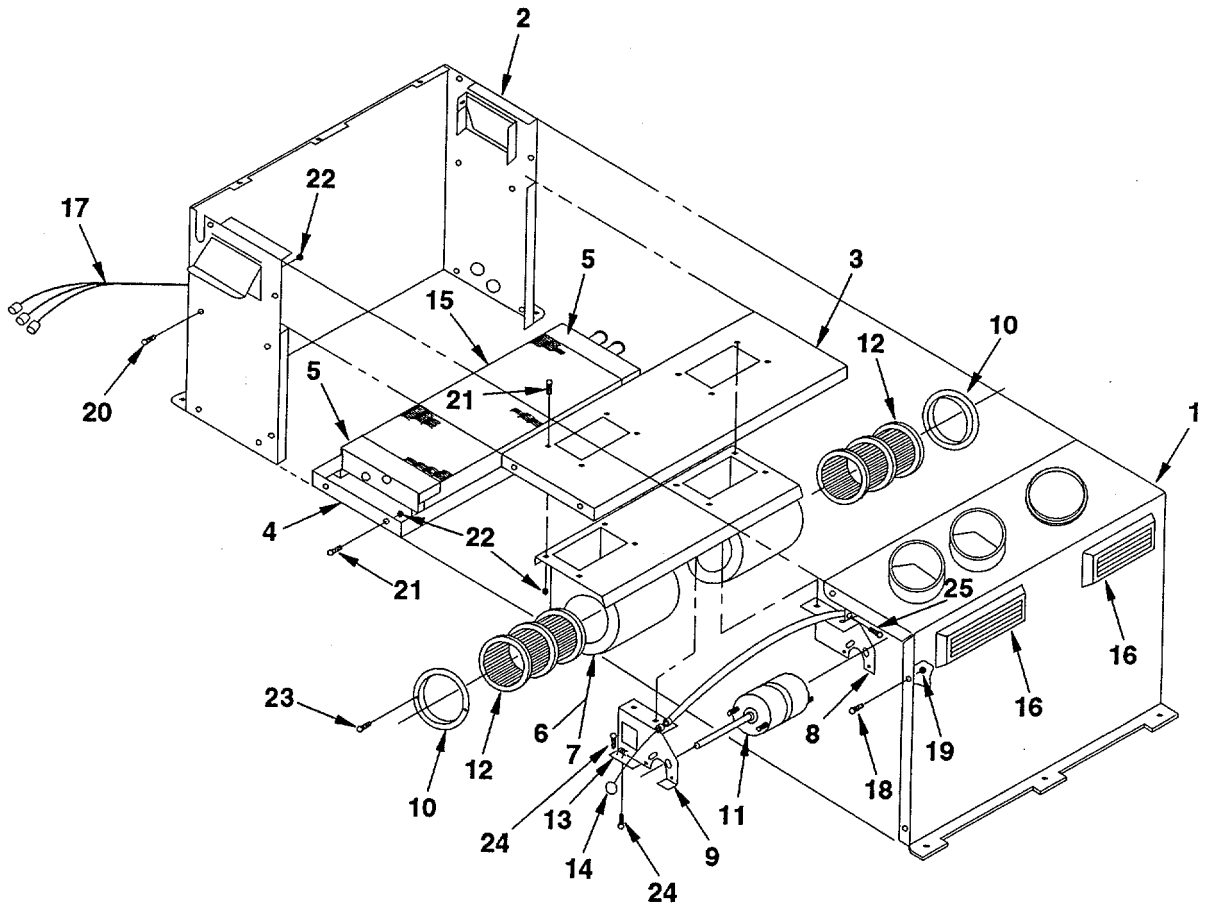


Figure F-60. Heater/Defroster Assembly

F172

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-60-	04664	44-0800	0A9V8	H4850-12-APR	CAB HEATER/DEFROSTER ASSEMBLY (See figure F-59 for NHA)	REF
-1			0A9V8	91-50-5956-0-BT	FRONT ASSY (NSS)	1
-2			0A9V8	91-50-5957-0-BT	WRAPPER (NSS)	1
-3			0A9V8	91-50-5309-0-C	DIVIDER, Blower (NSS)	1
-4			0A9V8	91-20-5329-0-C	DIVIDER, Heater (NSS)	1
-5			0A9V8	91-20-5336-0-C	CLAMP, Core (NSS)	2
-6			0A9V8	B16009-12-LP	BLOWER, 12V	1
-7			0A9V8	WB16009-12-LP	WELDMENT ASSY	1
-8			0A9V8	97-3842-1-B	BRACKET, Motor Mounting, (R.H.)	1
-9			0A9V8	97-4101 -O-A	BRACKET, Motor Mounting, (L.H.)	1
-10			0A9V8	X0070-0012	RING, Inlet	2
-11			0A9V8	1800-044	MOTOR, 12V	1
-12			0A9V8	2700-009	WHEEL, Blower	2
-13			0A9V8	3700-024	RESISTOR, 12V	1
-14			0A9V8	0700CS052	CABLE ASSY	1
-15	04664	44-1372	0A9V8	0800-005	CORE, Heater	1
-16			0A9V8	1300-010	GRILL ASSY	2
-17			0A9V8	0061-0043	HARNESS ASSY, Wire	1
-18			0A9V8	3900-009B	SCREW, Hex Washer Hd, No. 10-32 x 3/8" (Black)	9
-19			0A9V8	0500-021	NUT, Cage, No. 10-32	9
-20			0A9V8	3900-015B	SCREW, Hex Washer Hd, 1/4"-20 x 3/8" (Black)	8
-21			0A9V8	3900-015	SCREW, Hex Washer Hd, 1/4"-20 x 3/8"	10
-22			0A9V8	0500-022	NUT, Cage, 1/4"-20	18
-23			0A9V8	3900-002B	SCREW, Rd Ph, Black, No. 6 x 3/8"	2
-24			0A9V8	3900-037	SCREW, Hex Washer Hd, No. 6 x 3/8"	2
-25			0A9V8	3900-002	SCREW, Hex Washer Hd, No. 10 x 3/8"	2
<p>NOTE: NSS parts are not serviced separately and are available only as part of the Cab Heater/Defroster Assembly.</p>						

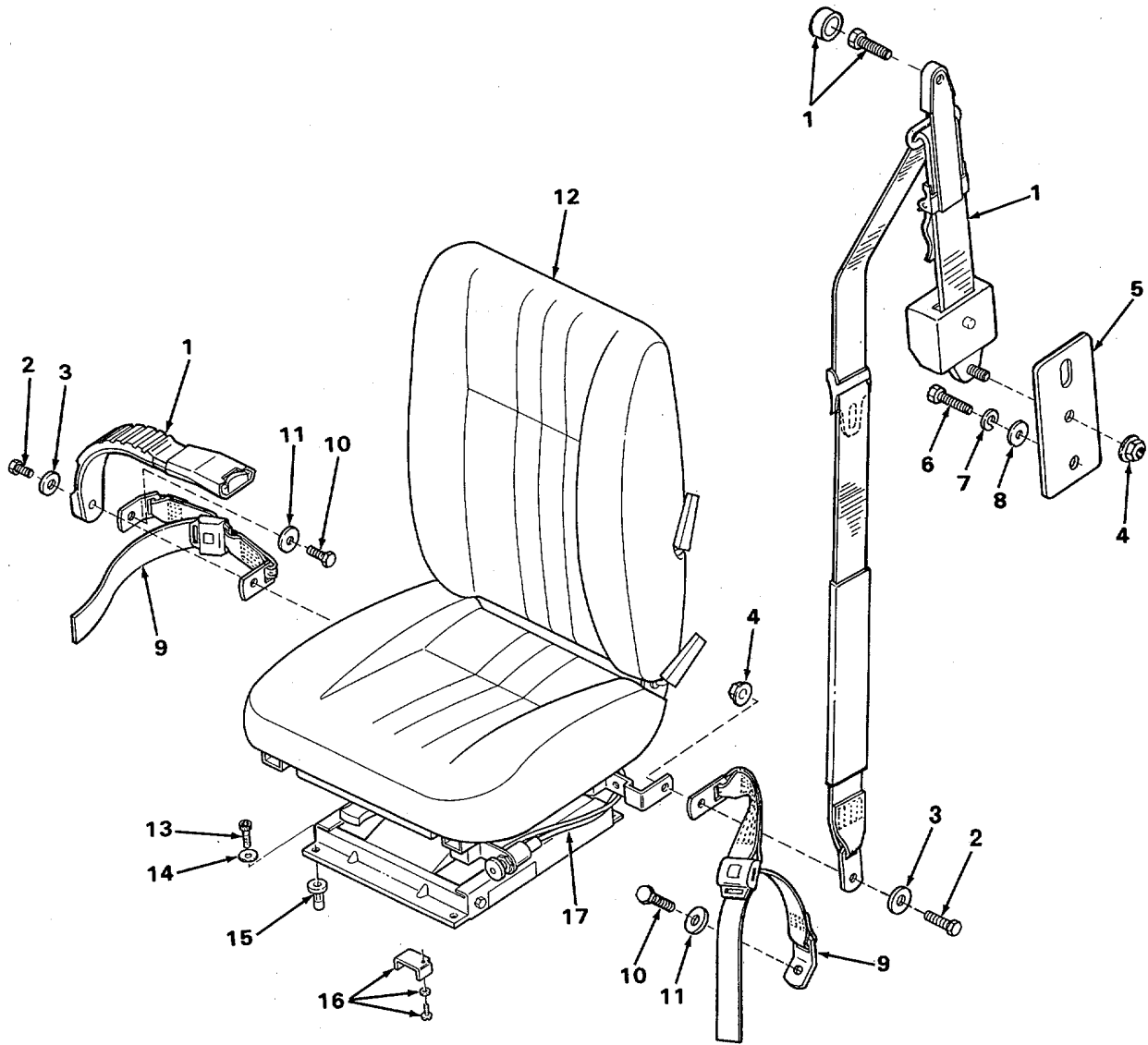


Figure F-61. Driver's Seat Installation

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-61-					DRIVER'S SEAT INSTALLATION	1
-1	04664	31-0613			SEAT BELT, 3 Point (ATTACHING PARTS)	1
-2	04664	82-2080-0125			BOLT, Hex Hd, 7/16"-20 x 1-1/4" Lg, Zn	2
-3	04664	82-1013-009			WASHER, Flat, 7/16", Zn	2
-4	04664	82-3052-0044			NUT, Hex Flanged Oval Lock, 7/16"-20, Gr C	3
-5	04664	31-0443			PLATE, Mounting, Seat Belt Retractor (ATTACHING PARTS)	1
-6	04664	82-2080-0125			BOLT, Hex Hd, 7/16"-20 x 1-1/4" Lg, Zn	1
-7	04664	82-101 1-0044			WASHER, Lock, 7/16", Zn	1
-8	04664	82-1013-009			WASHER, Flat, 7/16", Zn	1
-9	04664	31-1032	29944	F02525	TETHER, Seat Belt (ATTACH,ING PARTS)	
-10	04664	82-2080-0125			BOLT, Hex Hd, 7/16"-20 x 1-1/4" Lg, Zn	2
-11	04664	82-1013-009			WASHER, Flat, 7/16", Zn	2
-12	04664	31-0567-0010	71044	705E	SEAT (Bostrom Air 705E Morbern) (See figure F-62 for details) (ATTACHING PARTS)	1
-13	04664	82-2067-0150			SCREW, Hex Socket Hd, 5/16"-18 x 1-1/2", Zn	4
-14	04664	83-1013-007			WASHER, Flat, 5/16", Zn	4
-15	04664	82-0025			FASTENER, Plusnut, 5/16"-18	4
-16	04664	31-0476	71044	1107031-001	KIT, Restriction (Bostrom) (NOTE: Includes screw & plate)	1
-17	04664	944034	92003	PFT-4A-BLK-250	TUBING, Air Brake, 1/4" (ft.)	AR

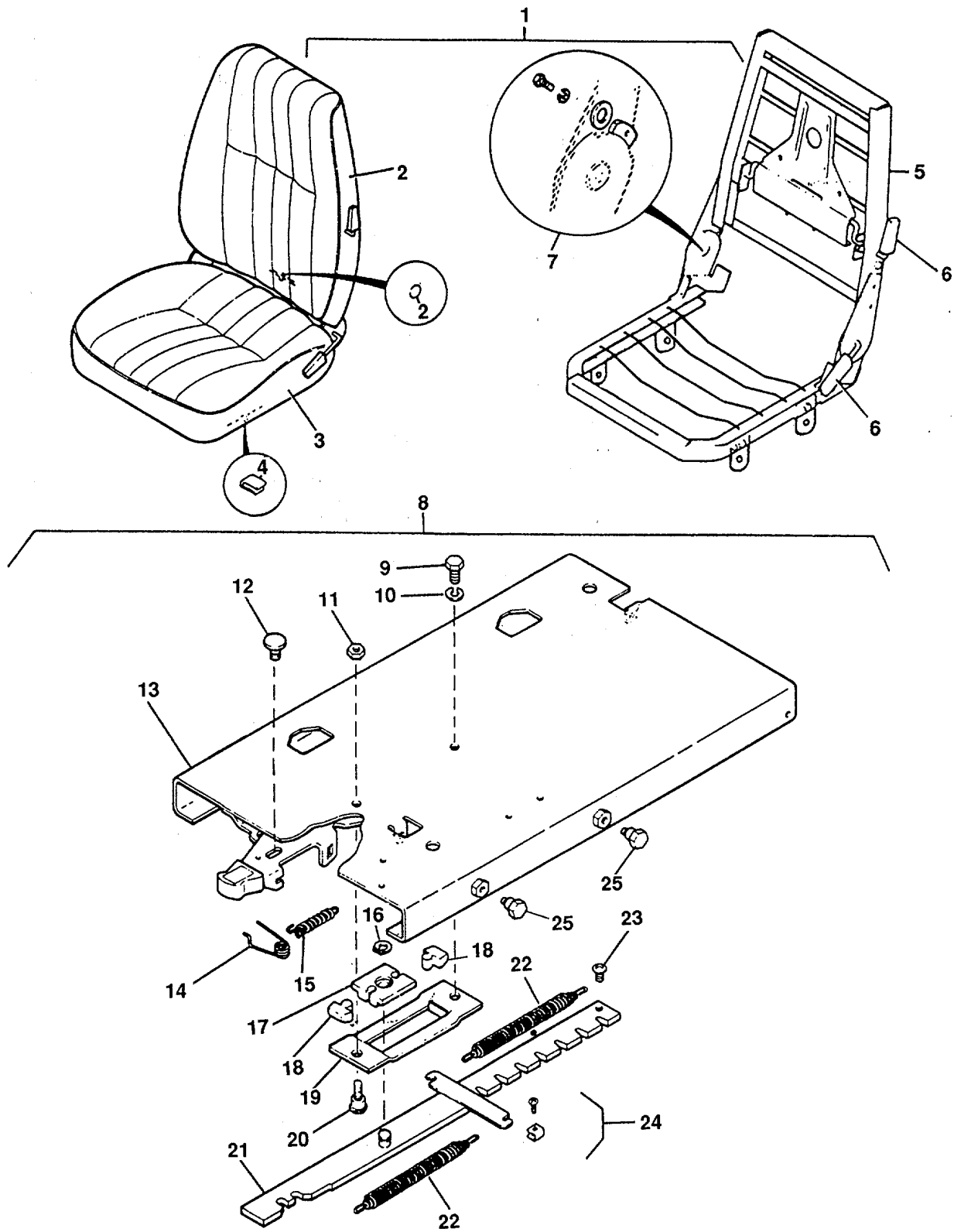


Figure F-62. Seat (Bostrom Air 705E Morbern), Sheet 1 of 2

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-62-	04664	31-0567-0010	71044	705E	SEAT (Bostrom Air 705E Morbern) (See figure F-61 for NHA)	REF
-1			71044	1107519-013	SEAT, Upper, Black Vinyl, Assy	1
-2			71044	1106537-357	COVER, Black	1
-3			71044	1106536-527	COVER, Seat	1
-4			71044	1106523-002	CLIP, Edge	20
-5			71044	1106803-001	FRAME ASSY	1
-6			71044	110365-003	HANDLE, Grip	2
-7			71044	1107030-001	KIT, Back Restriction	1
-8			71044	1106702-004	KIT, Fore and Aft	1
-9			71044	1102769-001	SCREW, Cap M8	1
-10			71044	1104385-002	WASHER, Lock .31	1
-11			71044	1349236-002	NUT, Lock M8	1
-12			71044	1106049-002	PIN, Detent	1
-13			71044	1106529-002	CARRIER ASSY	1
-14			71044	1106065-002	SPRING, Torsion	1
-15			71044	1106214-002	SPRING, Latch	1
-16			71044	1106226-002	RING, Retaining	1
-17			71044	1105999-002	BLOCK, Pivot	1
-18			71044	1105995-002	BUMPER, Rubber	2
-19			71044	1106001-002	GUIDE ASSY	1
-20			71044	1106501-002	SCREW, Cap Hd M8	1
-21			71044	1106706-002	LATCH BAR ASSY	1
-22			71044	1105957-002	SPRING, Isolator	2
-23			71044	1106713-002	SCREW, Machine 1/4"-20	1
-24			71044	1107031-001	KIT, Adjusting	1
-25			71044	1106079-002	BOLT, Shoulder MB	4

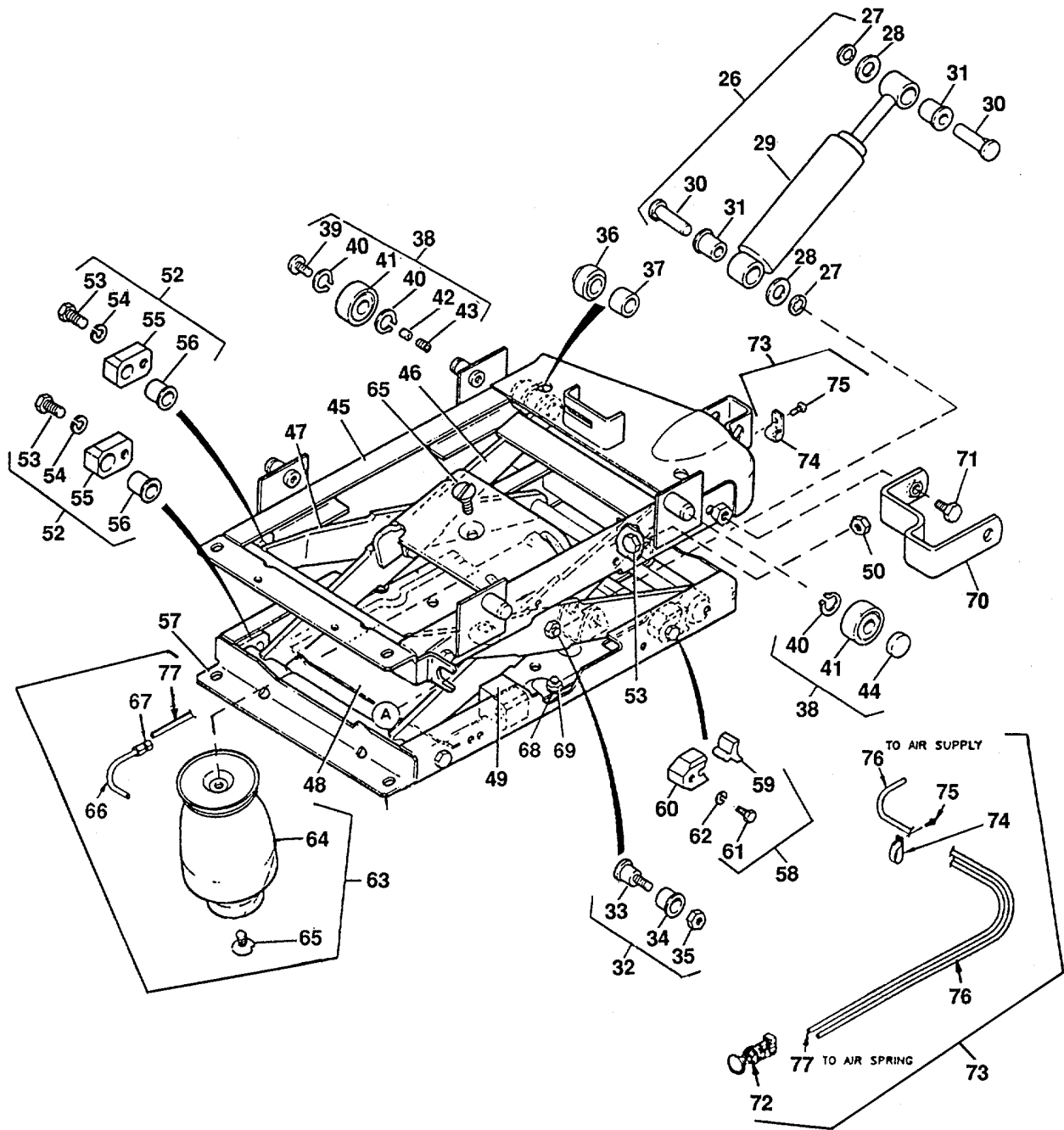


Figure F-62. Seat (Bostrom Air 705E Morbern), Sheet 2 of 2

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-62-						
-26			71044	1106747-001	KIT, Dampner	1
-27			71044	1106750-001	WASHER, Starlock	2
-28			71044	1065579-002	WASHER, Thrust	1
-29			71044	1067276-002	SHOCK	1
-30			71044	1103565-002	PIN, Dampner	2
-31			71044	1103566-002	BEARING, Flange	2
-32			71044	1106731-001	KIT, Pivot Linkage	1
-33			71044	1106617-002	BOLT, Shoulder	2
-34			71044	1063248-801	BEARING, Multilude	2
-35			71044	1349236-002	NUT, Lock M8	2
-36			71044	1100642-001	ROLLER ASSY	4
-37			71044	1063016-002	SPACER, Roller	1
-38			71044	1106729-001	KIT, Roller Assy	1
-39					PAD, Thrust Delrin (NSS)	2
-40					RING, Retaining (NSS)	6
-41					BEARING, Radial Ball (NSS)	4
-42					TUBE, Rubber (NSS)	2
-43					SCREW, Set, Sckt Hd (NSS)	2
-44					CAP, End (NSS)	2
-45			71044	1106527-004	UPPER PLATE ASSY	1
-46			71044	1106528-004	LEVER ASSY, Inner	1
-47			71044	1065662-002	LEVER ASSY, Outer	1
-48			71044	1106404-002	MOUNTING PLATE ASSY	1
-49			71044	1100640-001	BUMPER, Bottom	2
-50			71044	1102816-001	NUT, Hex M6	2
-52			71044	1106748-001	KIT, Bearing Block	1
-53			71044	1102760-001	SCREW, M8 x 20	4
-54			71044	1353024-801	WASHER, Lock	4
-55			71044	1068864-002	BLOCK	4
-56			71044	1063248-801	BEARING, Multilube	4
-57			71044	1102650-001	LOWER BASE ASSY	1
-58			71044	1102659-001	KIT, Step Block	1
-59			71044	1100645-001	BUMPER, Rubber	2
-60			71044	1102810-001	BLOCK, Stop	2
-61			71044	1102757-001	SCREW, M6x12	2
-62			71044	1102815-001	WASHER, Lock 1/4"	2
-63			71044	12220112-001	KIT, Air Spring, Assy	1
-64					AIR SPRING (NSS)	1
-65					SCREW, Flat Hd, M8 x 25 mm (NSS)	2
-66					ADAPTOR, 1/8" NPT (NSS)	1
-67					CONNECTION, Female (NSS)	1
-68			71044	1102815-001	WASHER, Lock 1/4"	2
-69			71044	1102816-001	NUT, Hex M6	2
-70			71044	1102812-001	KIT, ICP Bracket	2
-71			71044	1102769-001	SCREW, Hex Hd, M8	2
-72			71044	1107790-002	VALVE	1
-73			71044	1222014-001	KIT, Tubing	1
-74			71044		CLAMP, Air Line (NSS)	1
-75					SCREW, Thd Cut, No. 10-24 (NSS)	1
-76					TUBING, 35" Long (NSS)	1
-77					TUBING, 30" Long (NSS)	1
					NOTE: Items marked "NSS" are not serviced separately. They are available only as part of their NHA.	

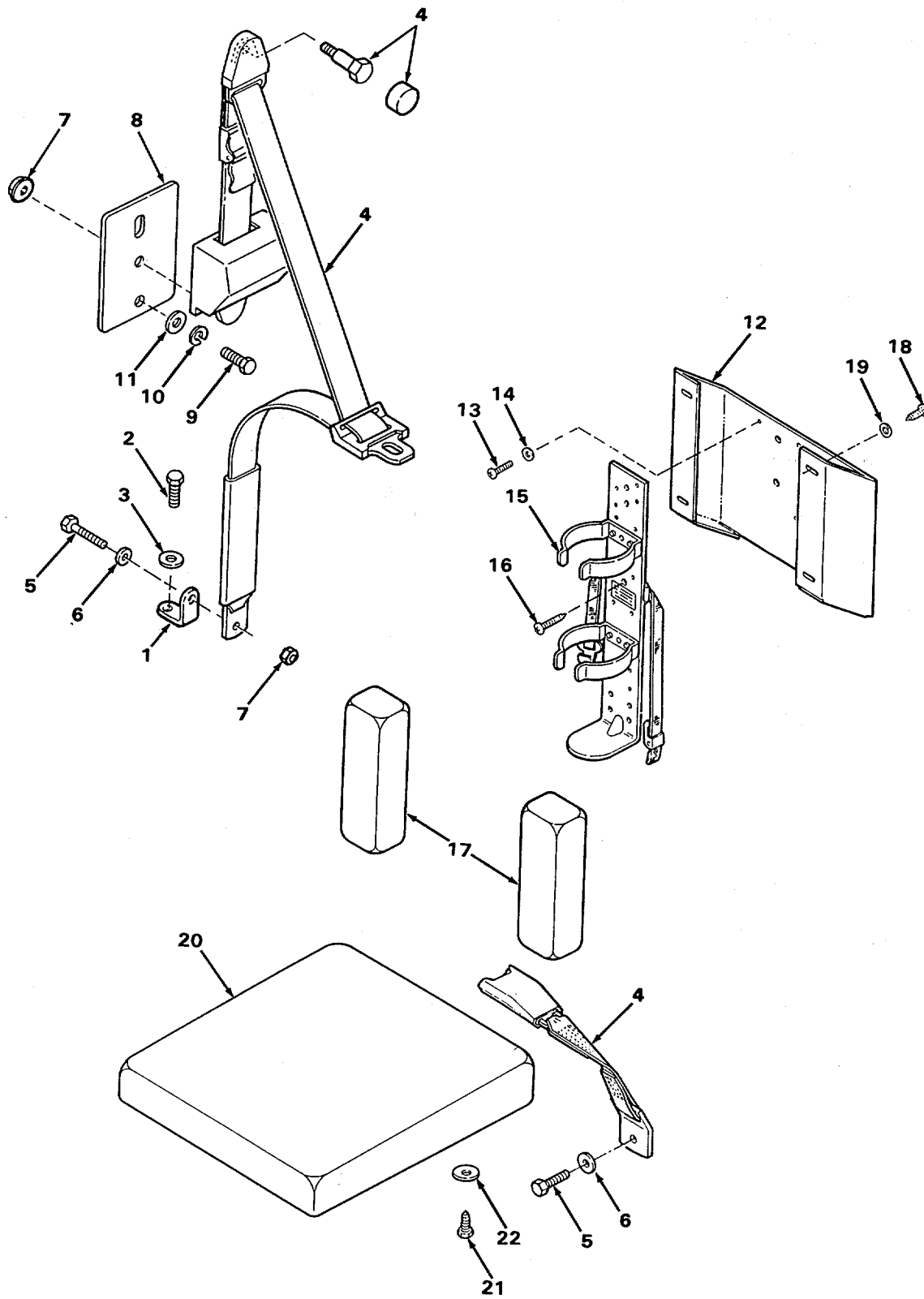


Figure F-63. Passenger Seat
F-180

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-63-					PASSENGER SEAT	1
-1	04664	31-0338			BRACKET, Seat Belt Mount (ATTACHING PARTS)	1
-2	04664	82-2080-0125			SCREW, Cap, Hex Head, 7/16"-20 x 1-1/4", Gr 8, Zn	1
-3	04664	82-1013-009			WASHER, Flat, 7/16", Zn	1
-4	04664	31-0616			SEAT BELT, Shoulder, 3 Point w/Web Buckle (ATTACHING PARTS)	1
-5	04664	82-2080-0125			SCREW, Cap, Hex Head, 7/16"-20 x 1-1/4", Gr 8, Zn	2
-6	04664	82-1013-009			WASHER, Flat, 7/16", Zn	2
-7	04664	82-3052-0044			NUT, Hex, Flanged Oval Lock, 7/16"-20, Gr C	2
-8	04664	31-0443			PLATE, Mounting, Seat Belt Retractor (ATTACHING PARTS)	1
-9	04664	82-2080-0125			SCREW, Cap, Hex Head, 7/16"-20 x 1-1/4", Gr 8, Zn	1
-10	04664	82-1011-0044			WASHER, Lock, 7/16", Zn	1
-11	04664	82-1013-009			WASHER, Flat, 7/16", Zn	1
-12	04664	31-0027			MOUNT, Seat Back (ATTACHING PARTS)	1
-13	04664	82-2039-002			SCREW, Machine, No. 10-24 x 3/4", T410 Ph Pn Hd, Taptite	4
-14	04664	82-1016-0019			WASHER, Flat, Nylon, No. 10	4
-15	04664	72-0067	51010	UN-6-30-3-FPHS	BRACKET, Ziamatic (ATTACHING PARTS)	1
-16	04664	82-2036-0125			SCREW, Machine, 5/16"-18 x 1-1/4", Ph Tr Hd, EP	2
-17	04664	31-0559-0010			CUSHION, Back, Ziamatic, Morbern (ATTACHING PARTS)	2
-18	82-2121	0075			SCREW, Lag, Tr Hd, 3/16" x 3/4", Zn	4
-19	04664	82-1009-001			WASHER, Fender, 3/16" x 1", Zn	4
-20	04664	31-0560-0010			CUSHION, Bottom, Morbern (ATTACHING PARTS)	1
-21	04664	82-0063-0150			SCREW, Lag, Hex Hd, 1/4" x 1-1/2", Zn	4
-22	04664	82-1009-004			WASHER, Fender, 1/4" x 1-1/4", Zn	4

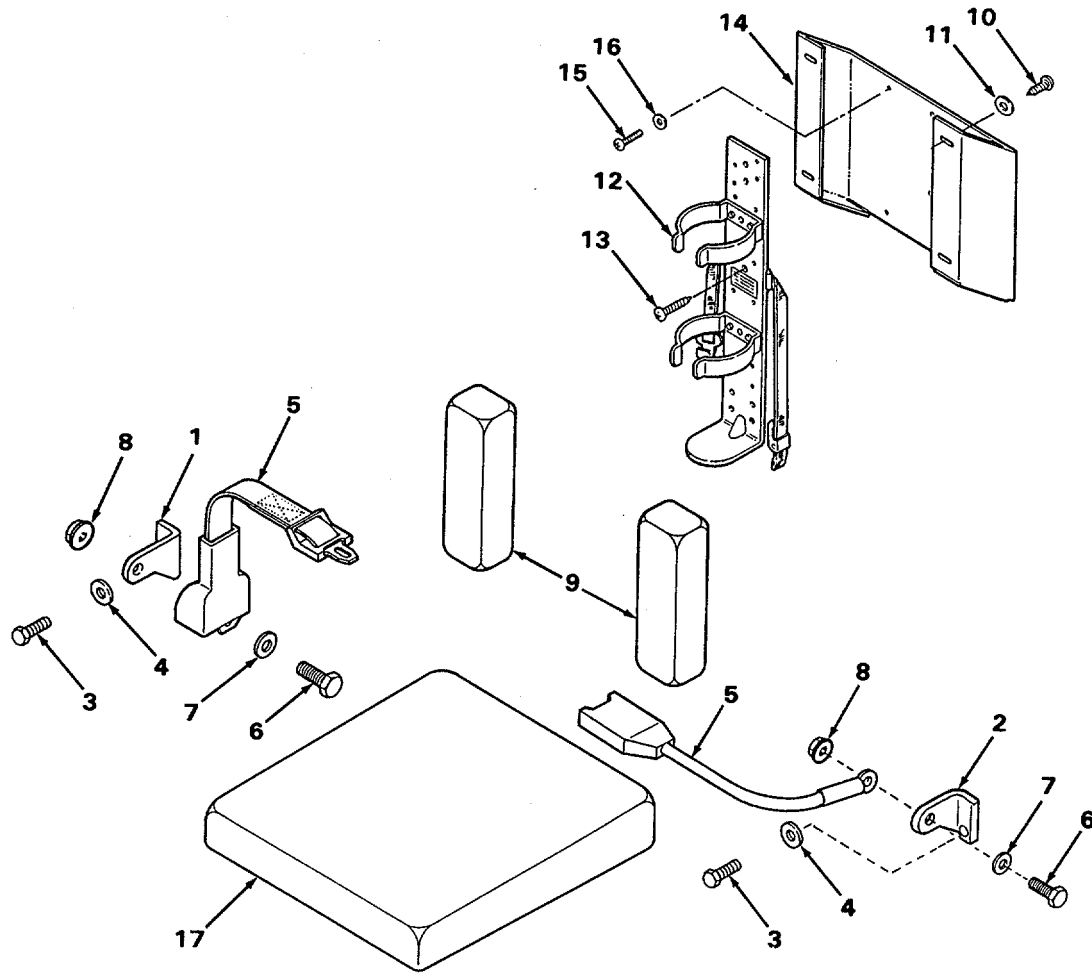


Figure F-64. Stationary Jump Seat

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-64-					STATIONARY JUMP SEAT	2
-1	04664	31-0336			BRACKET, Seat Belt (Driver Side)	2
-2	04664	31-0337			BRACKET, Seat Belt (Passenger Side)	2
-3	04664	82-2080-0125			(ATTACHING PARTS) SCREW, Cap, Hex Hd, 7/16"-20 x 1-1/4", Gr 8, Zn	4
-4	04664	82-1013-009			WASHER, Flat, 7/16", Zn	4
-5	04664	31-0582			SEAT BELT, Lap w/Cable Buckle (ATTACHING PARTS)	2
-6	04664	82-2080-0125			SCREW, Cap, Hex Hd, 7/16"-20x1-1/4", Gr8,Zn	4
-7	04664	82-1013-009			WASHER, Flat, 7/16", Zn	4
-8	04664	80-3052-0044			NUT, Hex Flanged Oval Lock, 7/16"-20, Gr C	4
-9	04664	31-0559-0010			CUSHION, Back, Ziamatic, Morbern (ATTACHING PARTS)	4
-10		82-2121-0075			SCREW, Lag, Tr Hd, 3/16" x 3/4", Zn	8
-11	04664	82-1009-001			WASHER, Fender, 3/16" x 1", Zn	8
-12	04664	72-0067	51010	UN-6-30-3-FPHS	BRACKET, Ziamatic (ATTACHING PARTS)	2
-13	04664	82-2036-0125			SCREW, Machine, 5/16"-18 x 1-1/4", Ph Tr Hd, EP	4
-14	04664	31-0027			MOUNT, Seat Back, Ziamatic (ATTACHING PARTS)	2
-15	04664	82-2039-002			SCREW, Machine, No. 10-24 x 3/4", T410 Ph Pn Hd, Taptite	8
-16	04664	82-1016-0019			WASHER, Flat, Nylon, No. IO	8
-17	04664	31-0562-0010			CUSHION, Bottom, Morbern	2

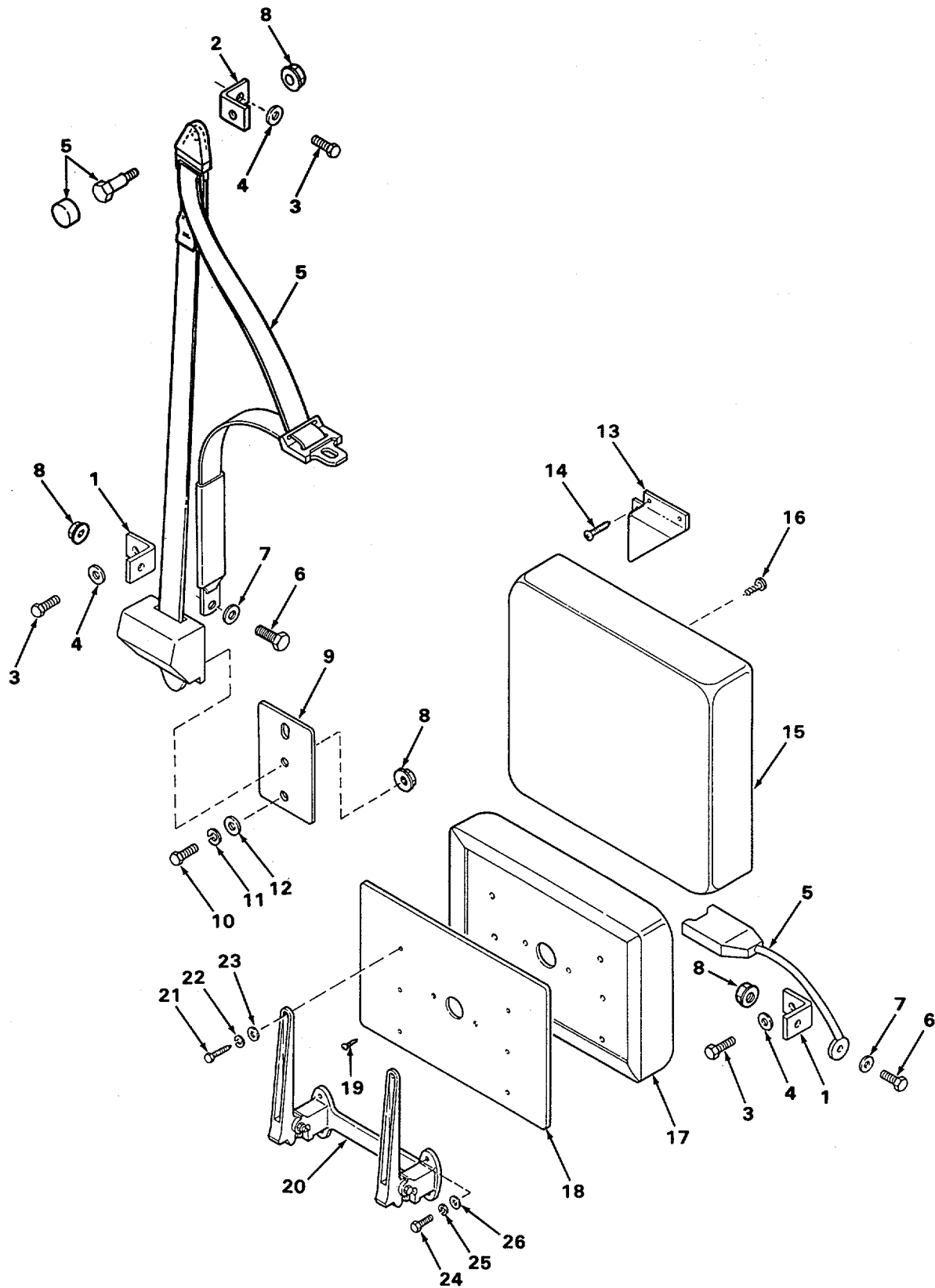


Figure F-65. Fold-Down Jump Seat
F-184

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-65-		No Number			FOLD-DOWN JUMP SEAT	2
-1	04664	31-0498			ANGLE, Seat Belt	4
-2	04664	31-0447			ANGLE, Seat Belt - Vertical Mounting (ATTACHING PARTS)	2
-3	04664	80-2080-0125			SCREW, Cap, Hex Hd, 7/16"-20 x 1-1/4", Gr 8, Zn	6
-4	04664	82-1013-009			WASHER, Flat, 7/16", Zn	6
-5	04664	31-0615			SEAT BELT, 3 Point, Shoulder (ATTACHING PARTS)	2
-6	04664	80-2080-0125			SCREW, Cap, Hex Hd, 7/16"-20 x 1-1/4", Gr 8, Zn	4
-7	04664	82-1013-009			WASHER, Flat, 7/16", Zn	4
-8	04664	82-3052-0044			NUT, Hex, Flanged, Oval Lock, 7/16"-20, GrC	8
-9	04664	31-0443			MOUNTING PLATE, Seat Belt Retractor (ATTACHING PARTS)	2
-10	04664	80-2080-0125			SCREW, Cap, Hex Hd, 7/16"-20 x 1-1/4", Gr 8, Zn	2
-11	04664	82-1011-0044			WASHER, Lock, 7/16", Zn	2
-12	04664	82-1013-009			WASHER, Flat, 7/16", Zn	2
-13	04664	31-0367			GUARD, Corner (ATTACHING PARTS)	2
-14	04664	82-2039-002			SCREW, Machine, No. 10-24 x 3/4", T410 Ph Pn Taptite	8
-15	04664	31-0564-0010			CUSHION, Back, Morbern (ATTACHING PARTS)	2
-16	82-2116-0100				SCREW, No.10 x 1.00", Ph, Pan Hd, Tap, Zn	4
-17	04664	31-0565-0010			CUSHION, Bottom, Fold-down, Morbern (Driver Side)	1
-17	04664	31-0566-0010			CUSHION, Bottom, Fold-down, Morbern (Passenger Side)	1
-18	04664	31-0430			PLATE, Seat (Passenger Side)	1
-18	04664	31-0429			PLATE, Seat (Driver Side) (ATTACHING PARTS)	1
-19	82-2116-0100				SCREW, No. 10x 1.00", Ph, Pan Hd, Tap, Zn	4
-20	04664	31-0518	51010	SE-FD	BRACKET, Fold-Down, Dual (ATTACHING PARTS)	2
-21	82-0063-0150				BOLT, .25-10UNC x 1.50", Hex Hd, Lag, Zn	12
-22	04664	82-1011-0025			WASHER, Lock, 1/4", Zn	12
-23	04664	82-1013-006			WASHER, Flat, 1/4", Zn	12
-24	04664	82-2062-0150			SCREW, Cap, Hex Hd, 5/16"-18 x 1-1/2", Gr 5, Zn	8
-25	04664	82-1011-0031			WASHER, Lock, 5/16", Zn	8
-26	04664	82-1013-007			WASHER, Flat, 5/16", Zn	8

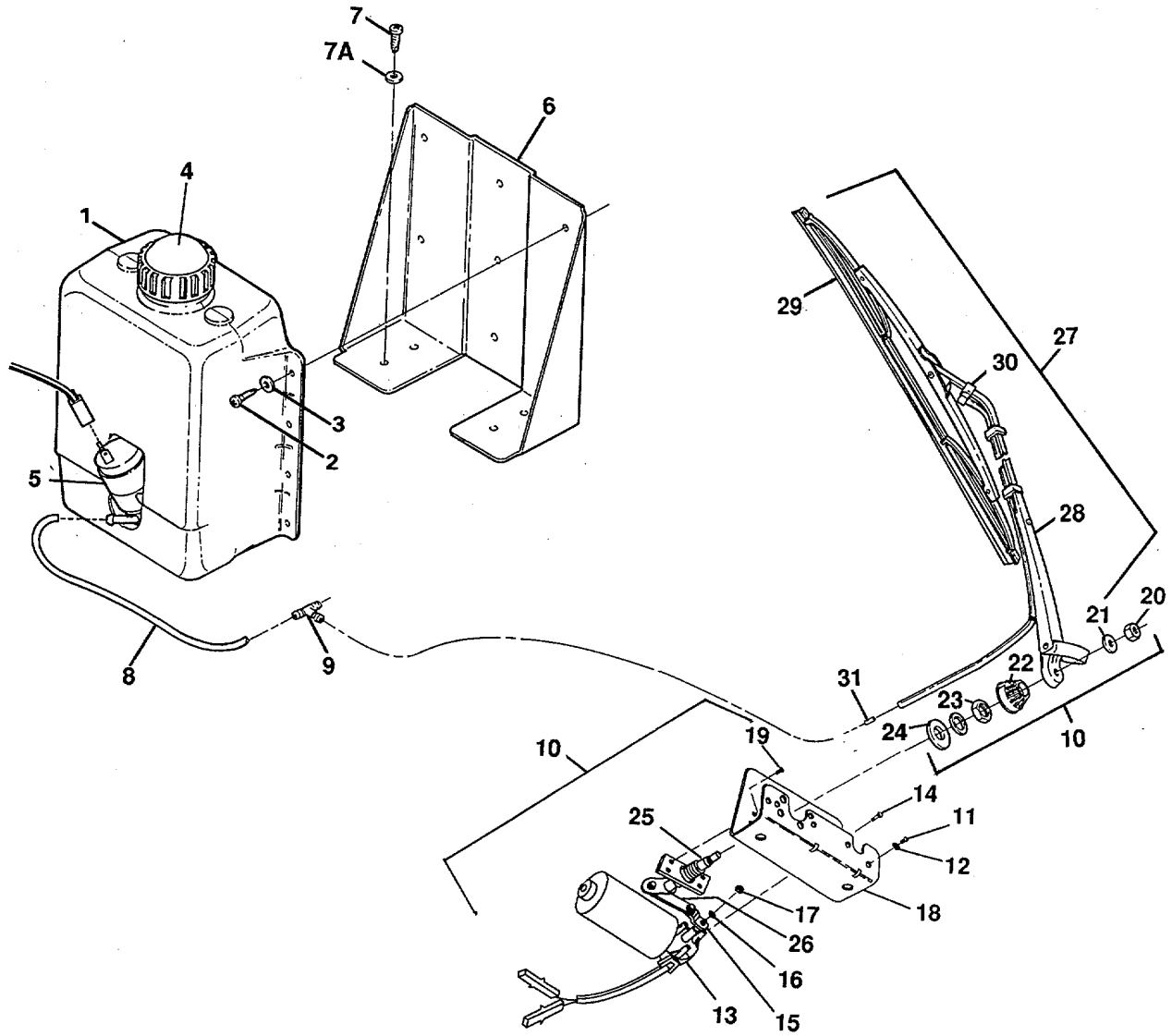


Figure F-66. Windshield Wiper & Washer Assembly

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-66					WINDSHIELD WIPER & WASHER ASSEMBLY	2
-1	04664	63-0698	OE3E3	065400	WASHER ASSY., Electric, Window (ATTACHING PARTS)	1
-2	04664	82-2039-001			SCREW, T410 Ph Pn, Taptite, No. 10-24 x 1/2"	4
-3	04664	82-1013-004			WASHER, Flat, No. 1 0, Zn	4
-4			OE3E3	063351	CAP, Washer Bottle	1
-5			OE3E3	06601	MOTOR, Washer	1
-6	04664	63-0699			BRACKET, Window Washer Bottle Mounting (ATTACHING PARTS)	1
-7	04664	82-2039-001			SCREW, T41 0 Ph Pn Hd, Taptite, No. 10-24x1/2"	4
-7A	04664	82-1013-004			WASHER, Rat, No. 10, Zn	4
-8	04664	940054	8L359	27042	HOSE, Washer, 5/32" ID	AR
-9	04664	66-0573	7J925	AUV10109	FITTING, Tee Connector, 3/16"	1
-10	04664	442249	53867	9-397-232-023	MOTOR ASSY., Wiper (ATTACHING PARTS)	2
-11	04664	82-2035-0062			SCREW, Ph Tr Hd, 1/4"-20 x 5/8"	4
-12	04664	82-1013-006			WASHER, Flat, 1/4"	4
-13			53867	0390241318	MOTOR	1
-14			53867	3393433003	SCREW/WASHER	2
-15			53867	3391901417	CRANK	1
-16			53867	2916069025	WASHER, Spring	1
-17			53867	2915012009	NUT, Hex	1
-18			53867	3391098159	BRACKET	1
-19			53867	3393429005	SCREW	4
-20			53867	2915012009	NUT, Hex	1
-21			53867	3390150026	WASHER, Spring	1
-22			53867	3390522037	CAP, End	1
-23			53867	3393300019	NUT, Hex	1
-24			53867	3390102000	WASHER	1
-25			53867	3398003547	PIVOT, Assembly	1
-26			53867	3398000881	INK, Connecting	1
-27	04664	44-2250	53867	9-397-238-003	WIPER ACC KIT	2
-28	04664	99-3029	53867	9-397-238-002	ARM, Wet, Wiper	1
-29	04664	99-3023	53867	3-398-110-517	BLADES, Wiper	1
-30	04664	99-3024	53867	3-398-699-133	NOZZLE, Wiper	1
-31	04664	99-3031	53867	9-398-239-003	FITTING, Bulkhead, Wiper	1

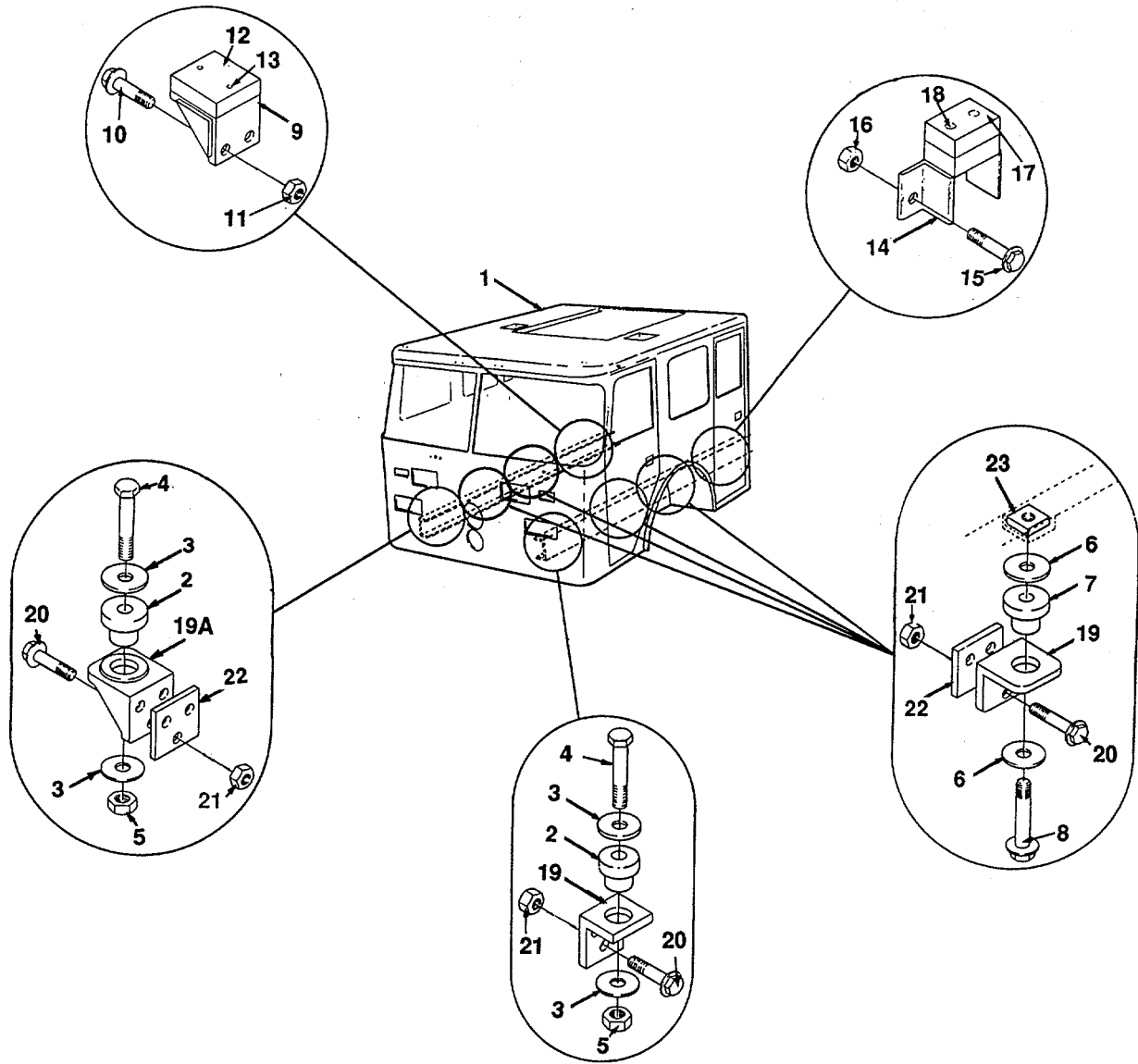


Figure F-67. Cab and Mounting Brackets

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-67-					CAB AND MOUNTING BRACKETS	REF
-1	04664	SD-00002			CAB FINAL ASSY (ATTACHING PARTS)	1
-2	04664	44-0519	30676	CRA20-300	BISCUIT, Cab, Small	2
-3	04664	44-0522			WASHER, Lord	4
-4	04664	82-2086-0400			BOLT, Hex Hd, 3/4"-1 0 x 4'	2
-5	04664	82-3019-008			NUr, Hex Hd, 3/4"-10	2
-6	04664	440521			WASHER, Lord	8
-7	04664	440518	30676	CBA28-1050	BISCUIT, Cab, Large	4
-8	04664	82-2086-0350			BOLT, Hex Hd, 3/4"-iO x 3-1/2"	4
-9	04664	43-0155			MOUNT ASSY, Cab, Right Rear (ATTACHING PARTS)	1
-10	04664	82-2017-0150			BOLT, Flanged Hex Hd	2
-11	04664	82-3009			NUT, Franged Hed Hd	2
-12	04664	44-3183			PAD, Rubber (ATTACHING PARTS)	1
-13	04664	82-2077-0125			SCREW, .25-20UNC x 1.25", Ph Flt Hd, Tc, Zn	2
-14	04664	44-1211			MOUNT, Cab, Left Rear (ATTACHING PARTS)	1
-15	04664	82-2017-0150			BOLT, Flanged Hex Hd	2
-16	04664	82-3009			NUT, Ranged, 1/2Z-13	2
-17	04664	44-1213			PAD, Rubber (ATTACHING PARTS)	1
-18	04664	82-2077-0125			SCREW, .25-20UNC x 1.25", Ph Flt Hd, Tc, Zn	2
-19	04664	440520			BRACKET, Cab Mounting	5
-19A	04664	44-3404			MOUNT, Cab, Left Front (ATTACHING PARTS)	1
-20	04664	82-2017-0250			BOLT, Flanged Hex Hd	18
-21	04664	82-3009			.NUT, Ranged Hex Hd	18
-22	04664	44-2666			SPACER, Cab Mount	5
-23	04664	44-2684			NUT, Captured, Cab Mount	4

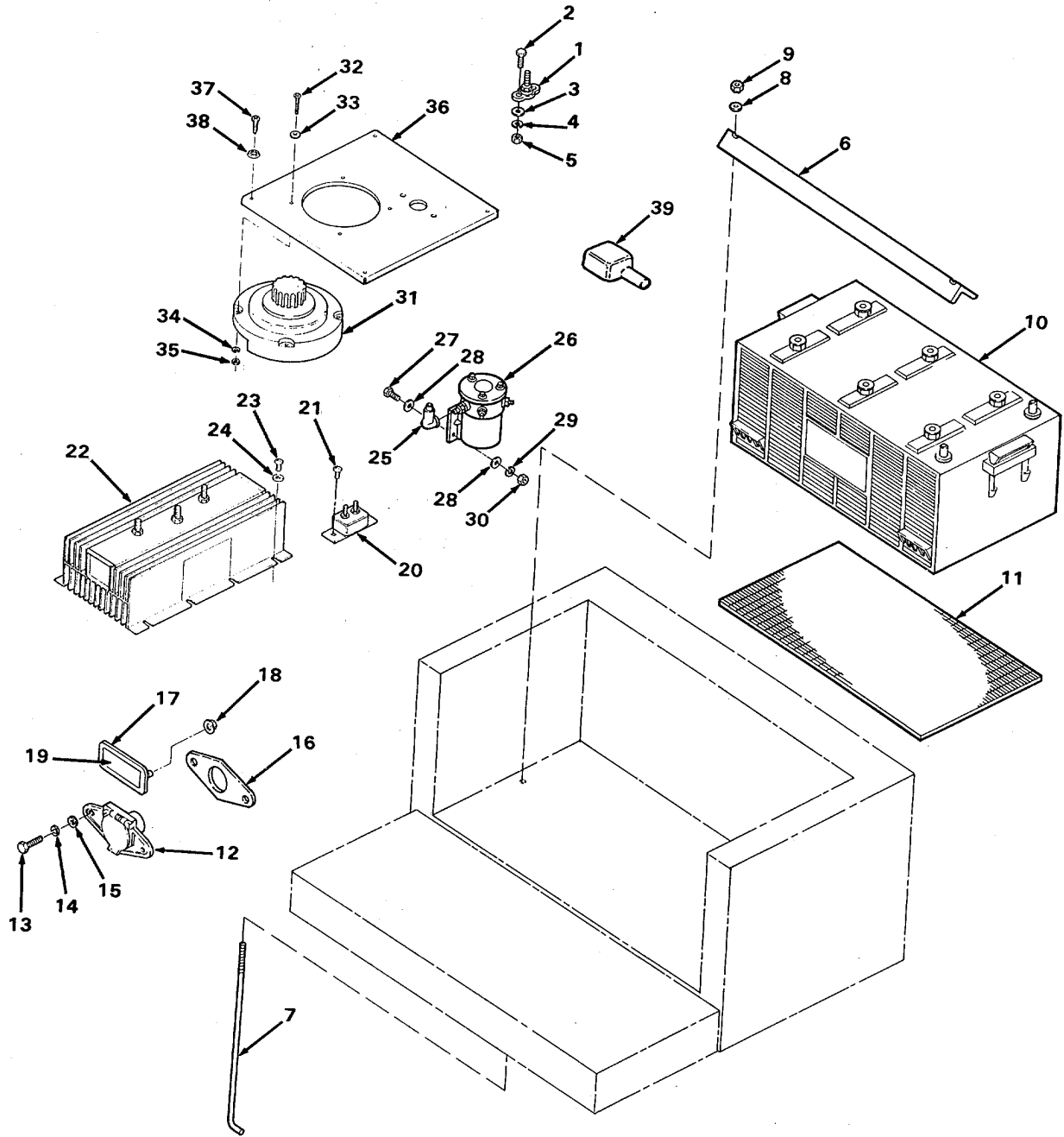


Figure F-68. Batteries, Battery Isolator, and Battery Charge Receptacle

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-68-					BATTERIES, BATTERY ISOLATOR, AND BATTERY CHARGE RECEPTACLE	1
-1	04664	63-0120	63477	20301	BLOCK, Terminal (ATTACHING PARTS)	2
-2	04664	82-2063-100			SCREW, Hex Hd, 1/4"-20 x 1", Zn	2
-3	04664	82-1013-006			WASHER, Flat, 1/4", Zn	2
-4	04664	82-1011-0025			WASHER, Lock, 1/4", Zn	2
-5	04664	82-3014-001			NUT, Hex, 1/4"-20, Zn	2
-6	04664	60-0048			HOLDDOWN, Battery (ATTACHING PARTS)	2
-7	04664	64-0118			ROD, Holddown	4
-8	04664	82-1014-003			WASHER, Flat, 5/16", Zn	4
-9	04664	82-3015-002			NUT, Hex, 5/16"-18, Zn	4
-10	04664	63-0031	63432	8D3	BATTERY, 12V, 225 Amp	2
-11	04664	60-0076			MATTING, Vynagrip	2
-12	04664	63-0750	13445	1 232	RECEPTACLE, Battery Charge (ATTACHING PARTS)	1
-13	04664	82-2063-0100			SCREW, Cap Hex Hd, 1/4"-20 x 1", Zn	2
-14	04664	82-1011-0025			WASHER, Lock, 1/4", Zn	2
-15	04664	82-1013-006			WASHER, Flat, 1/4", Zn	2
-16	04664	63-0752	13445	M-11177	GASKET, Receptacle	1
-17	04664	520117			BEZEL, Style B w/Pins (ATTACHING PARTS)	1
-18	04664	82-0035			NUT, Pal, 5/16"	2
-19	04664	91-0233-116B			TAG, Battery Charging Receptacle	1
-20	04664	64-1192	77326	54-230	BREAKER, Circuit, 30A (ATTACHING PARTS)	1
-21	04664	82-2039-002			SCREW, T41 0, Ph Pn T-tite No. 10-24 x 3/4"	2
-22	04664	63-0171	55156	1602	ISOLATOR, Battery (ATTACHING PARTS)	1
-23	04664	82-2039-002			SCREW, T41 0, Ph Pn T-tite No. 10-24 x 3/4"	4
-24	04664	82-1013-004			WASHER, Flat, No. 10, Zn	4
-25	04664	64-0603	18179	9OPC20B	BOOT, Rubber, Terminal Cover	9
-26	04664	64-0010	16764	1119865	SOLENOID, Start (ATTACHING PARTS)	2
-27	04664	82-2063-0075			SCREW, Hex, Hd, 1/4"-20 x 3/4", Zn	8
-28	04664	82-1013-006			WASHER, Flat, 1/4", Zn	16
-29	04664	82-1011-0025			WASHER, Lock, 1/4", Zn	8
-30	04664	82-3014-001			NUT, Hex, 1/4"-20, Zn	8
-31	04664	64-0013	13445	M-705	SWITCH, Battery, 4 Position (ATTACHING PARTS)	1
-32	04664	82-2075-0200			SCREW, Ph Pan Hd, No. 10-24 x 2"	4
-33	04664	82-1013-004			WASHER, Flat, No. 10, Zn	4
-34	04664	82-1012-007			WASHER, Lock, No. 10, Zn	4
-35	04664	82-3017-007			NUT, Hex, No. 10-24, Zn	4
-36	04664	44-4288-0010			COVER, Console (ATTACHING PARTS)	1
-37	04664	82-2021-0075			SCREW, Ph Pn Hd Tap, No. 10 x 3/4" Blk	4
-38	04664	80-9128			WASHER, Headliner, Small	4
-39	04664	63-0822			BOOT, Battery Terminal Protector, Blk	2
-39	04664	63-0823			BOOT, Battery Terminal Protector, Red	2

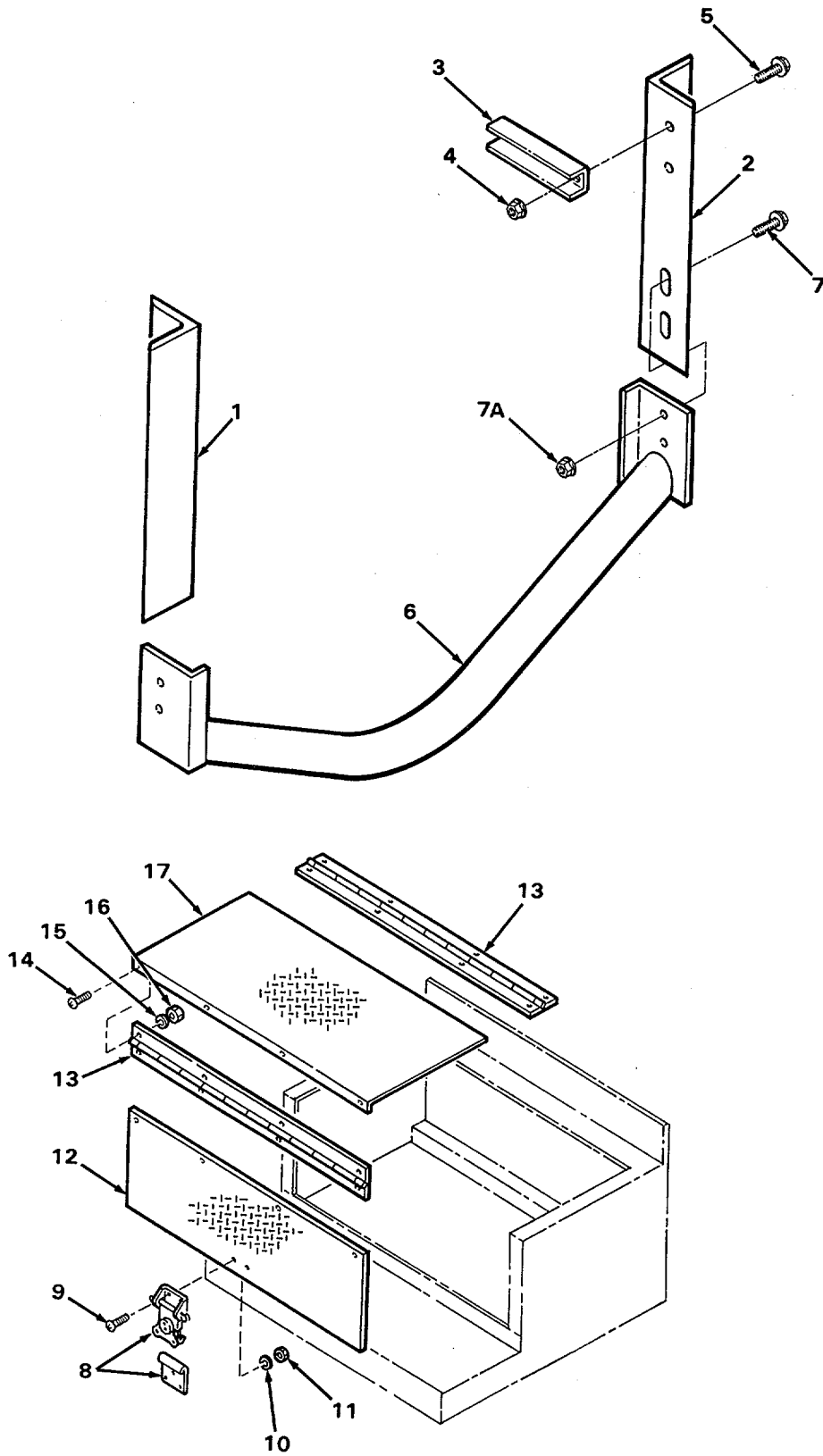


Figure F-69. Battery Boxes
F-192

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-69-					BATTERY BOXES	
-1	04664	60-0759			BRACKET, Belly Band, LH	1
-2	04664	60-0883			BRACKET, Belly Band, RH (ATTACHING PARTS)	1
-3	04664	40-1719			CLIP, Bolt Retaining	4
-4	04664	82-3009			NUT, Hex, Flanged Lock, 1/2"-13, Gr8	4
-5	04664	82-2017-0150			SCREW, Flanged Hex Hd, 1/2"-13 x 1-1/2", Gr8	4
-6	04664	40-0897			CROSSMEMBER, Battery Box (ATTACHING PARTS)	1
-7	04664	82-2017-0150			SCREW, Flanged Hex Hd, 1/2"-13 x 1-1/2", Gr 8	4
-7A	04664	82-3009			NUT, Hex, Flanged Lock, 1/2"-13, Gr 8	4
-8	04664	80-3006	82240	SL-2-10	LATCH, Spring Loaded (ATTACHING PARTS)	2
-9	04664	82-2039-001			SCREW, Machine, T410 Ph Pn Taptite No. 10-24x 1/2"	14
-10	04464	82-1017-007			WASHER, Lock, No. 10, Zn	14
-11	04664	82-3017-007			NUT, Hex, No. 10-24, Zn	14
-12	04664	AY0744-02731			RISER	2
-13	04664	941001-02718	67820	04F7921024-79	HINGE (ATTACHING PARTS)	4
-14	04664	82-2039-001			SCREW, Machine, T410 Ph Pn Taptite No. 10-24 x 1/2"	32
-15	04664	82-1017-007			WASHER, Lock, No. 10, Zn	32
-16	04664	82-3017-007			NUT, Hex, No. 10-24, Zn	32
-17	04664	44-2792			COVER, Battery Box (Passenger Side)	1
-17	04664	44-2152			COVER, Battery Box (Driver Side)	1

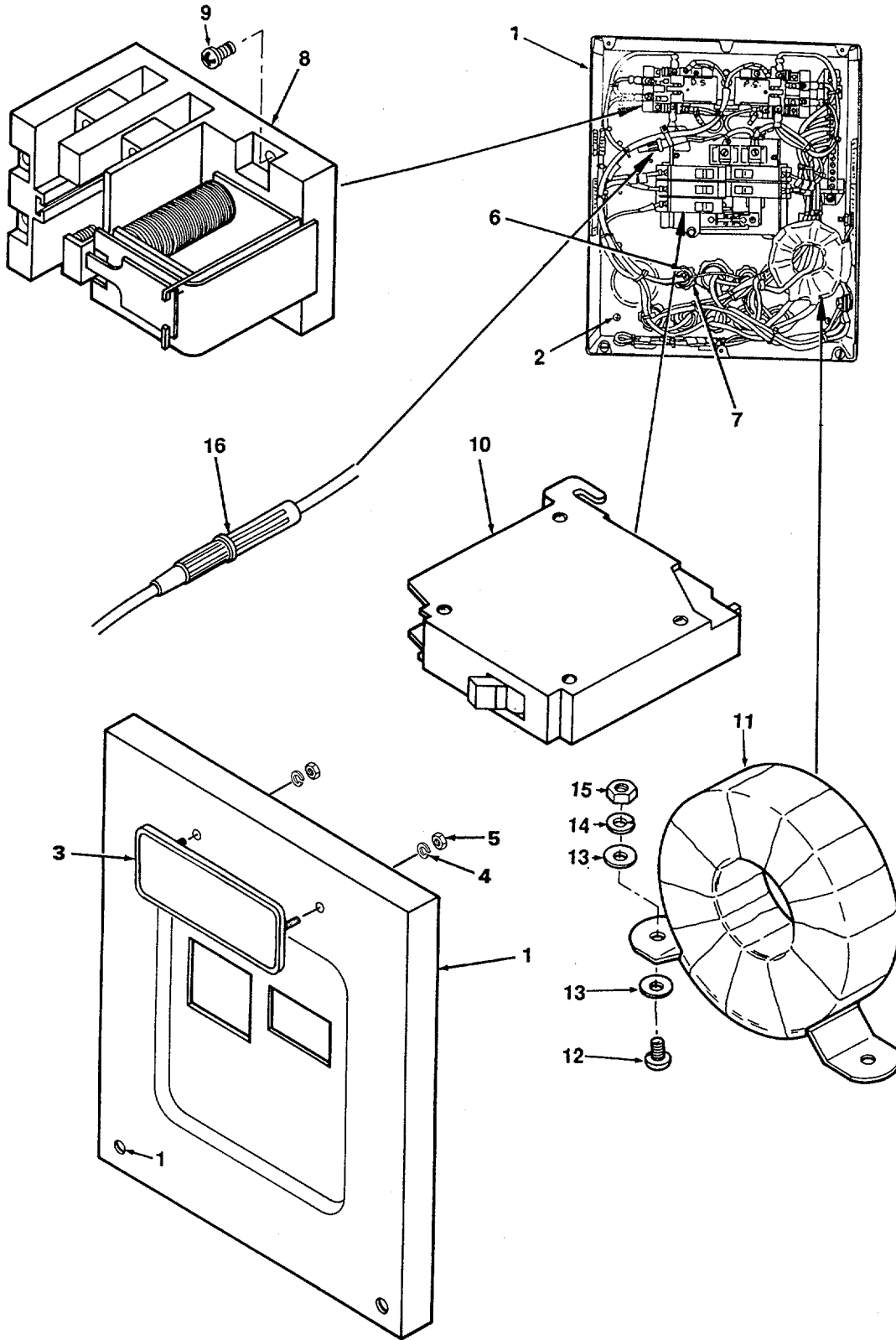


Figure F-70. 110 VAC Load Center

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-70-					110 VAC LOAD CENTER	1
-1	04664	64-0041	15605	CH85	BOX, Breaker, 8 Position w/Cover (ATTACHING PARTS)	1
-2	04664	82-2039-001			SCREW, T41 0 Ph Pn Hd, Taptite, No. 10-24 x 1/2"	4
-3	04664	SD-00374			TAG, Name, Circuit Directory	1
-4	04664	52-0116			BEZEL, Style D (ATTACHING PARTS)	1
-5	04664	82-0035			NUT, Pal, 5/16"	2
-6	04664	64-0177	55327	SCH-1017	CONNECTOR, Cable Strain Relief, 112"	3
-7	04664	64-0344-001	68105	10011	LOCKNUT, Cable Connector, 112"	3
-8	04664	60-0436	15605	9575H2632-106	RELAY, Control, 240V AC, 12V DC (ATTACHING PARTS)	2
-9	04664	82-2039-001			SCREW, T410 Ph Pn Hd, Taptite, No. 10-24 x 1/2"	4
-10	04664	64-0034	15605	CH120	BREAKER, Circuit, 120V, 20A	4
-10	04664	64-0069	15605	CH115	BREAKER, Circuit, 120V, 15A	1
-11	04664	60-2207	47660	3CT15-Bi8551	TRANSFORMER, Current, w/Bracket (ATTACHING PARTS)	1
-12	04664	82-2063-0100			SCREW, Hex Hd, 1/4"-20 x 1", Zn	2
-13	04664	82-1013-006			WASHER, FRat, 1/4", Zn	4
-14	04664	82-1011-0025			WASHER, Lock, i14", Zn	2
-15	04664	82-3015-001			NUT, Hex, 1/4"-20, Zn	2
-16	04664	640803-0003	71400	ATC-03	FUSE	1
-16	04664	64-0071	13445	3031-0	FUSEHOLDER, Inline	1

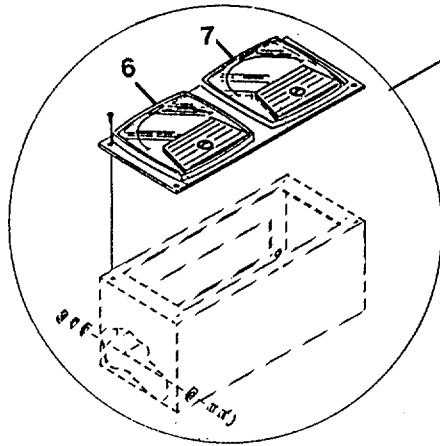
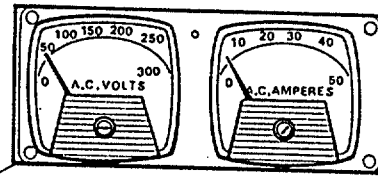
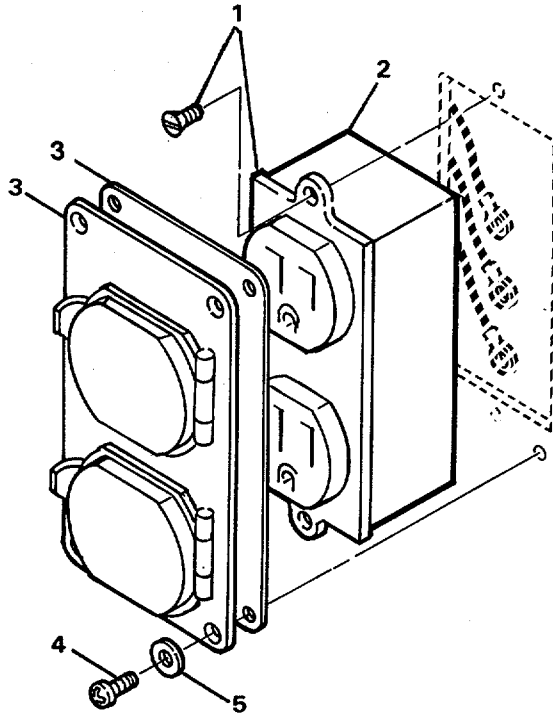


Figure F-71. Load Receptacles & Meters
F-196

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-71-					LOAD RECEPTACLES & METERS	1
-1	04664	63-0342	74545	5352	RECEPTACLE, 125V, 20A, 3W, St Dup Hub	4
-2	04664	63-0038	75282	FS2	BOX, Electrical, FS2, SGL, 3/4" NPT	4
-3	04664	63-0343	74545	5206WO	COVER, Elec Box, Dup, Weatherproof w/gasket (ATTACHING PARTS)	4
-4	04664	82-2074-0100			SCREW, Ph Pn Hd, No. 6-32 x 1", Zn	16
-5	04664	82-1013-002			WASHER, Flat, No. 6, Zn	16
-6	04664	60-1602	47660	250-244RXX	VOLTMETER, 0-300V AC	1
-7	04664	60-2206	47660	250-240LSNT	AMMETER, 0-50 AMP AC	1

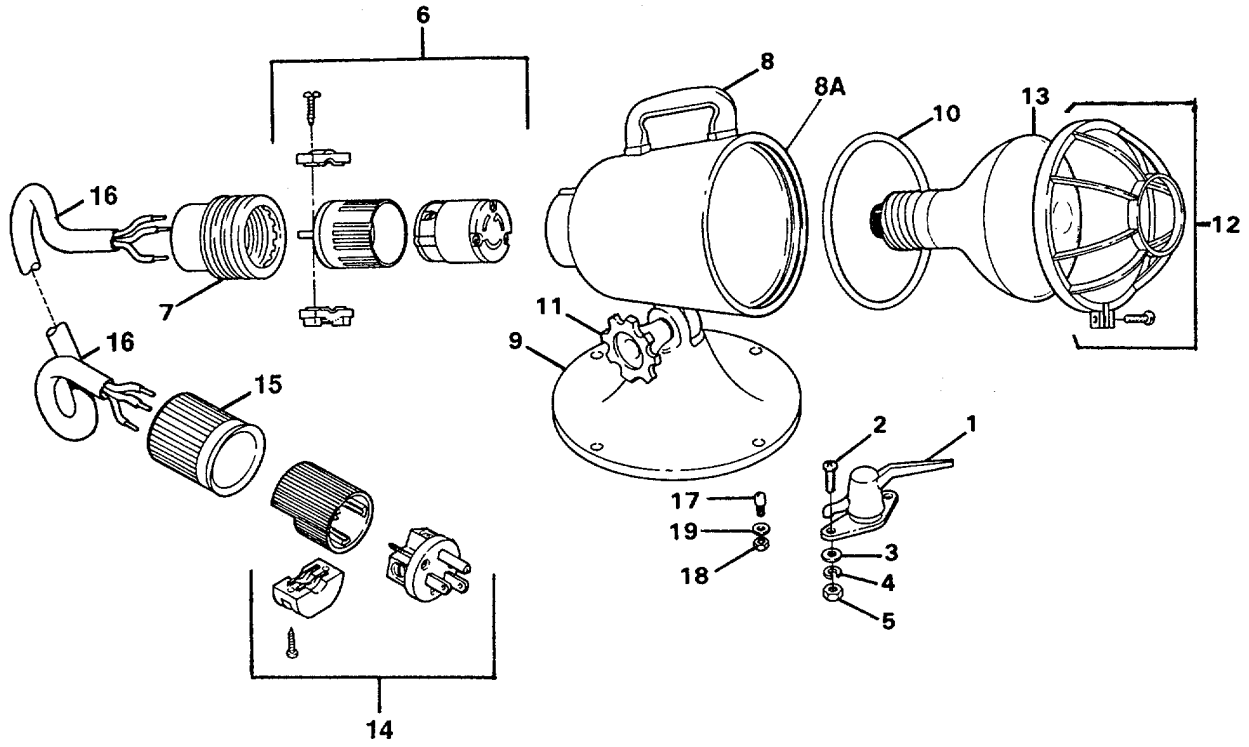


Figure F-72. Portable Work Lights

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-72-	04664	61-0143	08998	150-G-2	PORTABLE WORK LIGHTS (ATTACHING PARTS)	2
-1	04664	61-0145	08998	P-23	CLAMP, Hold-down	4
-2		82-2076-0075			SCREW, SC, Rd Hd, 1/4"-20 x 3/4", Zn	8
-3		82-1013-006			WASHER, Flat, 1/4", Zn	8
-4	04664	82-1011-0025			WASHER, Lock, 1/4", Zn	8
-5	04664	82-3018-005			NUT, Acorn, Crown High, 1/4"-20, Ch	8
-6			08998	P-6	CONNECTOR, Female - Twist Lock	1
-7			08998	P-7	BOOT, Rubber	1
-8			08998	P-8	HANDLE, Plastic-block	1
-8A			08998	150	HOUSING	1
-9			08998	P-21	BASE	1
-10			08998	P-15	SEAL, Lamp	1
-11			08998	P-35	HANDWHEEL	1
-12			08998	SY-401	GUARD, Lamp	1
-13			08998	R-400	LAMP	1
-14	04664	63-0389	4L810	5266C	CABLE, Electric, 16/3 SJO Coil	2
-15	04664	63-0422	54545	6023	PLUG, Electrical, 120V, 20A, 3W, TL	2
-16	04664	640049			BOOT, Male	AR
-17	04664	61-0397	81834	61-2043-01	CABLE, Electric, 16/3 SJO Coil	4
					STUD, Pedestal Light (ATTACHING PARTS)	4
-18	04664	82-3018-005			NUT, Acorn, Crown High, 1/4"-20, Ch	4
-19		82-1013-006			WASHER, Flat, 1/4", Zn	

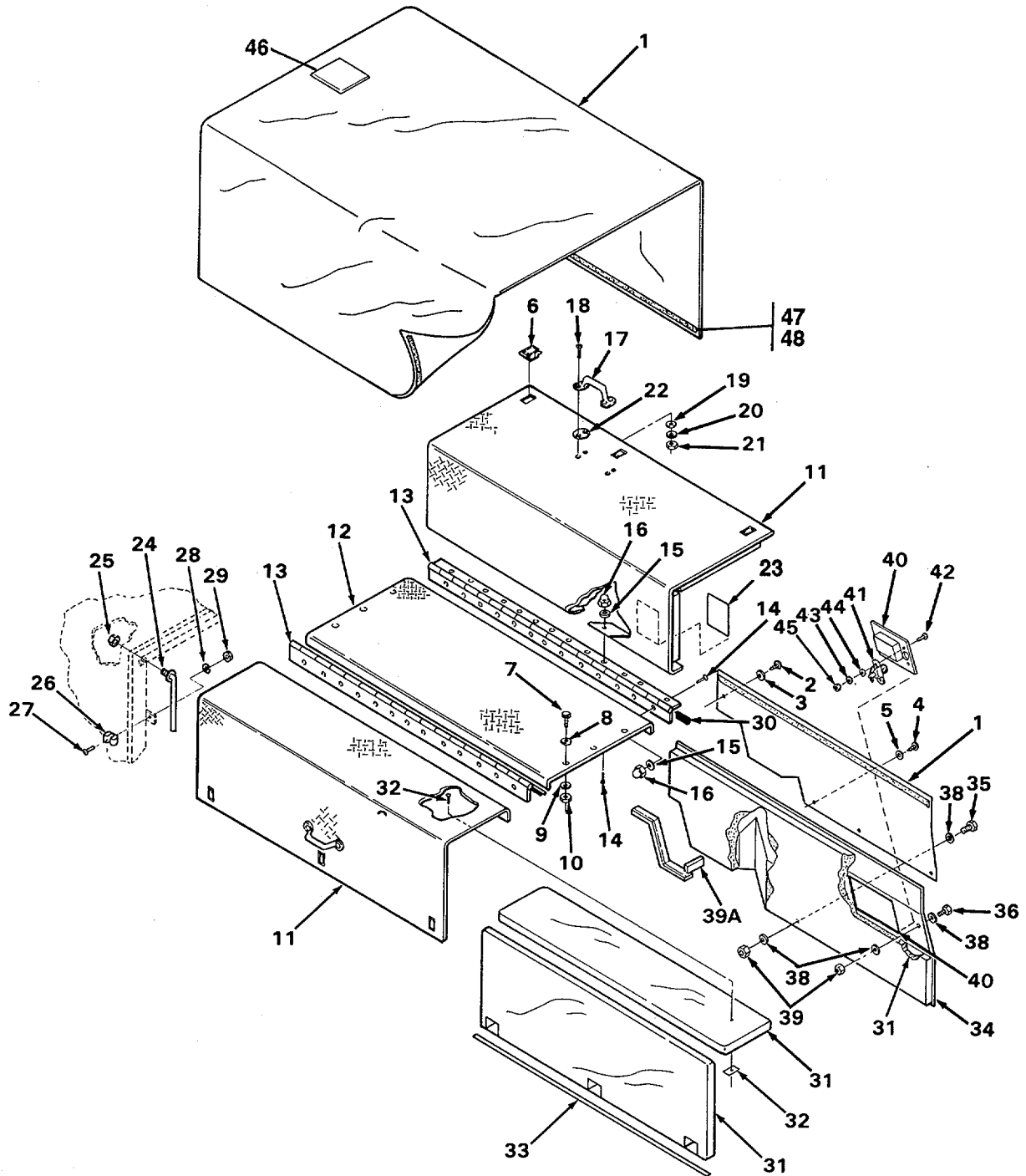


Figure F-73. Engine Enclosure

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-73-					ENGINE ENCLOSURE	1
-1	04664	44-5302			COVER ASSY, Engine Compartment (ATTACHING PARTS)	1
-2	04664	82-2130-0050			SCREW, Ph Pn Hd, No. 6-20 x 1/2", TEK, Zn	9
-3	04664	82-1013-004			WASHER, Flat, No. 10, Zn	9
-4	04664	82-2039-002			SCREW, T41 0 Ph Tr Hd, Taptite, No.10x3/4"	12
-5	04664	80-9129			WASHER, Headliner, Large	12
-6	04664	80-3056	6M181	62-10-401-10	LATCH, Lift and Turn, Flush	6
	04664	44-4960			HOOD ASSY, Engine (ATTACHING PARTS)	1
-7	04664	82-2063-0150			SCREW, Cap, Hex Head, 1/4"-20 x 1-1/2", Zn	3
-8	04664	82-1013-006			WASHER, Flat, 1/4", Zn	3
-9	04664	82-1011-0025			WASHER, Lock, 1/4", Zn	3
-10	04664	82-3014-001			NUT, Hex, 1/4"-20, Zn	3
-11	04664	44-5172			WING ASSY, Engine Hood	2
-12	04664	44-4961			CENTER ASSY, Engine Hood	1
-13	04664	941001-04225	67820	04F7921024-79	HINGE, S/S (ATTACHING PARTS)	2
-14	04664	82-2039-002			SCREW, T410 Ph Pn Hd, Taptite, No. 10-24 x 3/4"	34
-15	04664	82-1012-007			WASHER, Lock, No. 10, Zn	34
-16	04664	82-3018-003			NUT, Acom, Crown High, No. 10-24, Ch	34
-17	04664	80-0003	27182	3200	HANDLE, Grab, Chrome (ATTACHING PARTS)	2
-18	04664	82-2046-0075			SCREW, Ph Flat Hd, 1/4"-20 x 3/4", Zn	8
-19	04664	82-1013-006			WASHER, Flat, 1/4", Zn	8
-20	04664	82-1011-0025			WASHER, Lock, 1/4", Zn	8
-21	04664	82-3014-001			NUT, Hex, 1/4"-20, Zn	8
-22	04664	72-0123			SPACER, Grab Handle	4
-23	04664	91-0344			LABEL, Engine Hood Wing	2
-24	04664	44-5176			ARM ASSY, Stay (ATTACHING PARTS)	2
-25	04664	82-3029-003			NUT, Lock, 3/8"-16, Nylon Inst, Zn	2
-26	04664	44-5178	97084	225-S	CLIP, Spring (ATTACHING PARTS)	2
-27	04664	82-2039-002			SCREW, T41 0 Ph Pn Hd Taptite, No.10-24 x 3/4"	2
-28	04664	82-1012-007			WASHER, Lock, No. 1 0, Zn	2
-29	04664	82-3018-003			NUT, Acom, Crown High, No. 10-24, Ch	2
-30	04664	943059	94956	SCOTCHFOAM 4714	TAPE, Foam, 1/4" x 5/8"	AR
-31	04664	946017			INSULATION, Substrate ABC Facing, Non-woven Backing, 1-1/2" Thick x 3 Lbs/Cu. Ft. (ATTACHING PARTS)	AR
-32	04664	82-0142			FASTENER, Click Bond, 1/4"-20	58
-33	94956	474			TAPE, Plastic Top, Flame Resistant, 3-1/2"	AR
-34	04664	44-4899			BOTTOM ASSY, Engine Hood (Passenger Side)	1

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-73-						
-34	04664	44-4898			BOTTOM ASSY, Engine Hood (Driver Side) (ATTACHING PARTS)	1
-35	04664	82-2063-0300			SCREW, Hex Hd, 1/4"-20 x 3", Zn	4
-36	04664	82-2063-0125			SCREW, Hex Hd, 1/4"-20 x 1-1/4", Zn	8
-37	04664	82-2063-0225			SCREW, Hex Hd, 1/4"-20 x 2-1/4", Zn	4
-38	04664	82-1013-006			WASHER, Flat, 1/4", Zn	32
-39	04664	82-3014-001			NUT, Lock, Nylon Inst, 1/4"-20, Zn	16
-39A	04664	943116			SEAL	AR
-40	04664	44-4905			DOOR, Access	1
-41	04664	82-0042	6M181	57-10-201-40	LATCH, Spring, 1/4" Twin, w/Knob (ATTACHING PARTS)	2
-42	04664	82-2039-002			SCREW, T41 0 Ph Tr Hd, Taptite, No. 10x3/4"	4
-43	04664	82-1012-007			WASHER, Lock, No. 10, Zn	4
-44	04664	82-1013-004			WASHER, Flat, No. 10, Zn	4
-45	04664	82-301 7-007			NUT, Hex, No. 10-24, Zn	4
-46	04664	44-4456-0010			DOOR ASSY, Radiator Access	1
-47	04664	943030			HOOK, Scotchmate (ft)	AR
-48	04664	943031			LOOP, Scotchmate (ft)	AR

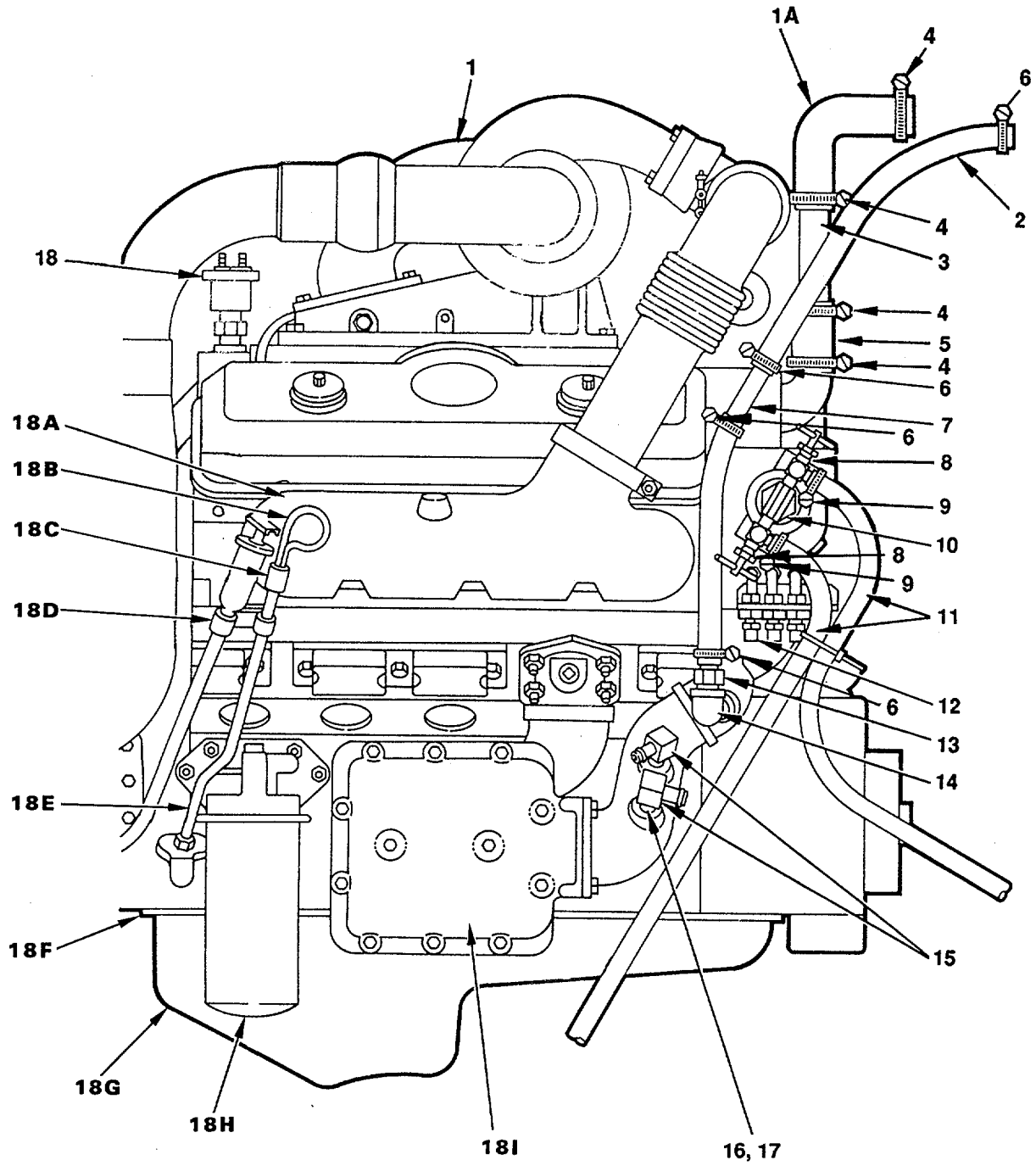


Figure F-74. Engine Installation, Sheet 1 of 3

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-74-					ENGINE INSTALLATION	REF
-1	04664	42-2188	72582	8V92TA	ENGINE (See figures F-77 thru F-79, F-81 thru F-88, F-91, F-93 thru F-130, and F-148 for details)	1
-1A	04664	42-0205	8L359	20172	ELBOW, Hose, Radiator, 2-1/4" Dia.	2
-2	04664	940038	8L359	24216	HOSE, Radiator, 1" Dia.	1
-3	04664	42-0254			TUBE, Radiator Supply, 2-1/4" Dia.	2
-4	04664	80-8020-004	7Z588	CT300L	CLAMP, Hose	12
-5	04664	940037-0400	8L359	24236	HOSE, Radiator, 2-1/4" Dia. x 4" Lg	2
-6	04664	80-6029-012	81646	6444	CLAMP, Hose	8
-7	04864	42-11933			SPLICE ASSY, Radiator Hose	1
-8	04664	42-0173	92003	V404PH-10-6	VALVE, Shutoff, Heater	2
-9	04664	80-6029-005	81646	6416	CLAMP, Hose	4
-10	04664	56-0208-010	OCME1	24SB-16X06	FITTING, 1" to 3/8" Reducer	1
-11	04664	940003	OCME1	SAE2OR3	HOSE, Heater, 5/8" I.D.	AR
-12	04664	53-4024-008	OCME1	848FS-08X04	FITTING, Ext. Pipe/370 Flare	4
-13	04664	42-1101			NIPPLE, Pipe, Male	1
-14	04664	56-0222			ELBOW, Street, 3/4" x 450	2
-15	04664	56-0497-002	92003	269HB-10-8	FITTING, Hose/M/Pipe, 900	2
-16	04664	56-0127			COUPLING, 1/2"	1
-17	04664	56-0235			NIPPLE, Close, 1/2"	1
-18	04664	44-0785	78388	SA2650A	SENDING UNIT, Pulse Generator, Tachometer	1
-18A			72582	5100758	MANIFOLD, Exhaust - RB	1
-18A			72582	5148429	MANIFOLD, Exhaust - LB	1
-18B			72582	8921988	DIPSTICK	1
-18C			72582	5131786	GUIDE, Dipstick	1
-18D	04664	42-0359			BRACKET, Dipstick Mounting	1
-18E			72582	5142271	ADAPTER, Dipstick	1
-18F			72582	23502937	GASKET, Oil Pan	1
-18G			72582	23502939	PAN, Oil	1
-18H			72582	25013192	FILTER, Oil	1
-18I			72582	8540460	CORE ASSY, Oil Cooler	1

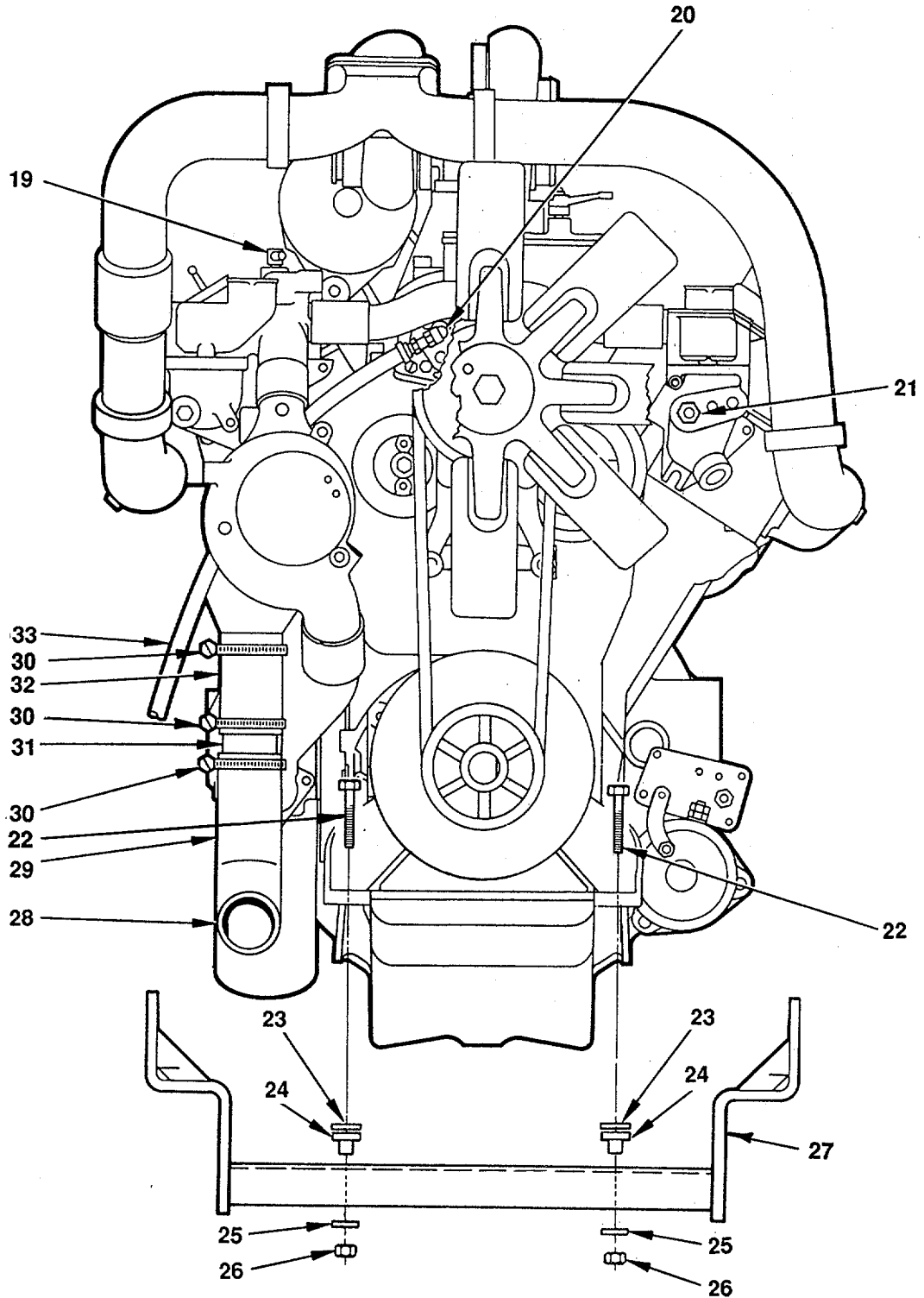


Figure F-74. Engine Installation, Sheet 2 of 3

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-74-						
-19	04664	56-0497-004	92003	269HB-6-6	FITTING, Hose/M/Pipe, 90°	1
-20	04664	53-4019-004	OCME1	879FS-08	FITTING, 370 Flare SW/370 Flare	1
-21	04664	44-1089	59197	323-099	SENDER, Temperature	1
-22	04664	82-2086-300			SCREW, Hex Hd, 3/4"-10 x 3", Zn	2
-23	04664	44-0521			WASHER, Biscuit	2
-24	04664	44-0518	76005	CBA28-1050	BISCUIT	2
-25	04664	42-0795			WASHER, Engine Mount	2
-26	04664	82-3015-008			NUT, Hex, 3/4"-10, Zn, Gr-8	2
-27	04664	42-0646			MOUNT, Engine	1
-28	04664	42-0611	8L359	21042	ELBOW, Radiator Hose, 3" Dia.	1
-29	04664	940051-01000	8L359	24248	HOSE, 3" Dia. x 10" Lg	1
-30	04664	80-6029-015	81646	6456	CLAMP, Hose	4
-31	04664	42-0265			TUBE, Radiator Return, 3" Dia.	1
-32	04664	940051-00500	8L359	24248	HOSE, 3" Dia. x 5" Lg	1
-33	04664	940038	8L359	24216	HOSE, 1" Dia.	1

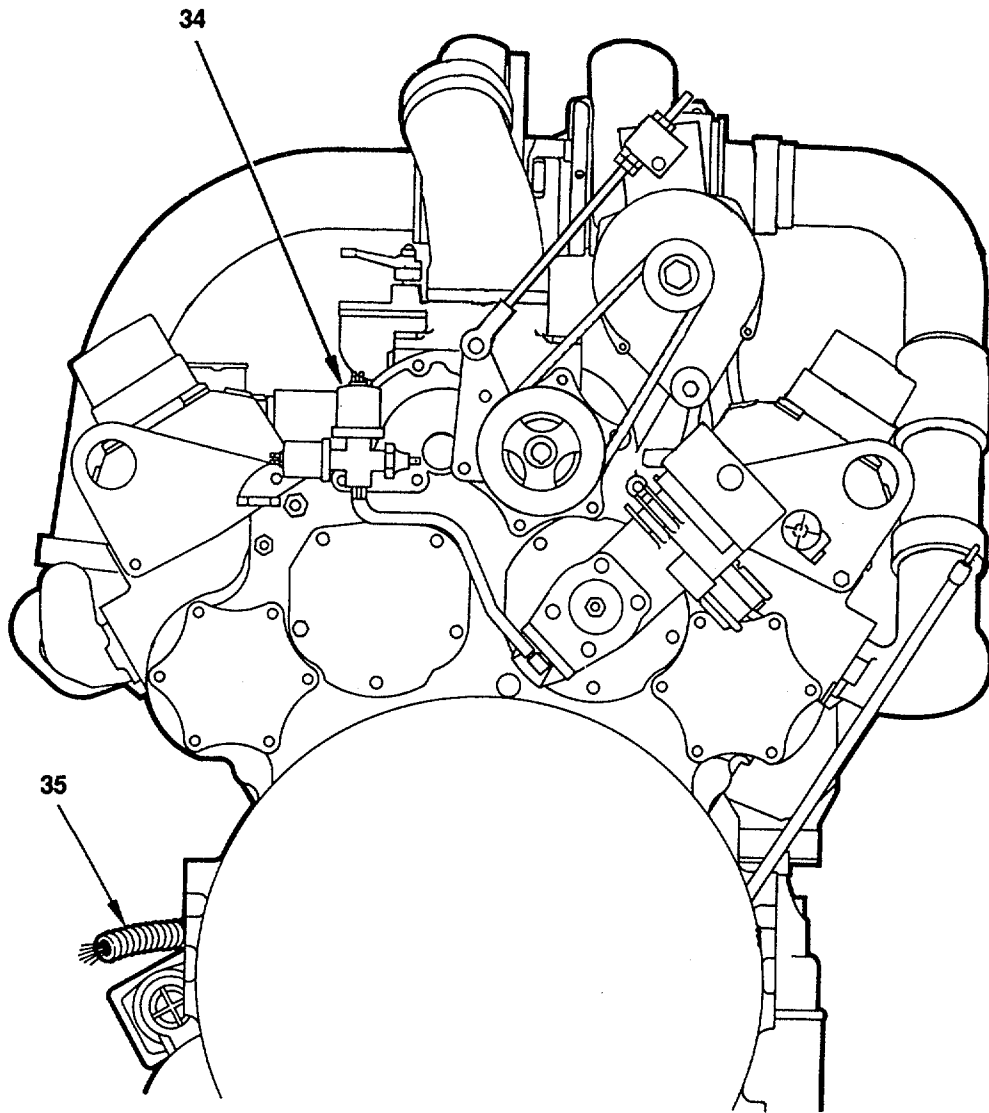


Figure F-74. Engine Installation, Sheet 3 of 3

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-74- -34					OIL PRESSURE SENDING UNIT AND HOUR METER PRESURE SWITCH ASSEMBLY, (See figure F-75 for details)	1
-35	04664	64-0265			TUBING, Split, 7/16" Dia.	AR

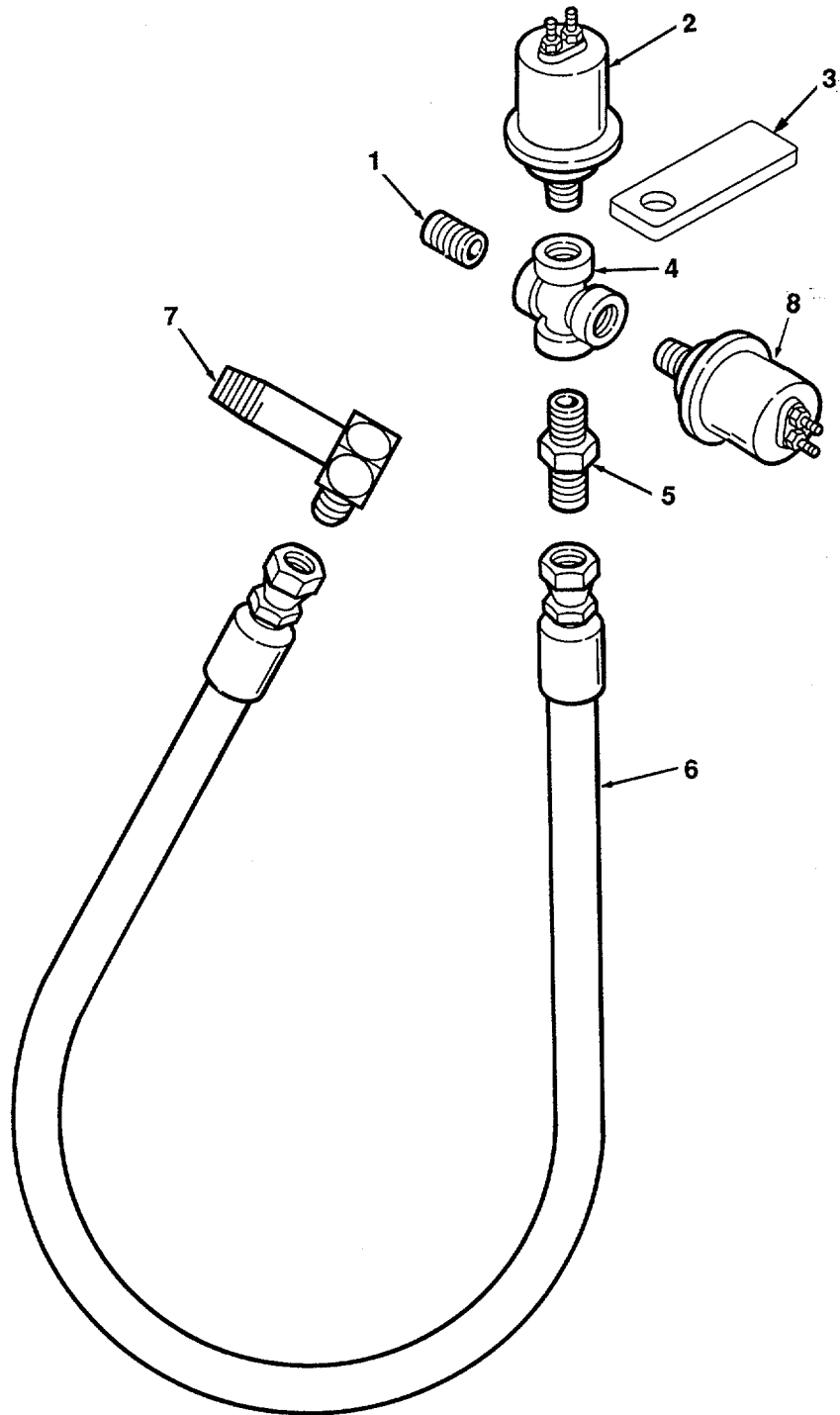


Figure F-75. Engine Oil Pressure Sending Unit and Hour Meter Pressure Switch Assembly

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-75-					ENGINE OIL PRESSURE SENDING UNIT AND HOUR METER PRESSURE SWITCH ASSEMBLY (See figure F-74 for NHA)	REF
-1	04664	56-0498-002			PLUG, 1/8"	1
-2	04664	44-1091	51957	360009	SENDER, w/Switch, 0-80 PSI	1
-3	04664	42-0252			BRACKET, Mounting	1
-4	04664	56-0175-001			FITTING, Cross, 1/8"	1
-5	04664	53-4024-001	OCME1	848FS-04X02	FITTING, Ext Pipe/370, Straight	1
-6	04664	530332-01800			HOSE, Hydraulic, 1/4" I.D. x 18" Lg	1
-7	04664	53-4028-001	OCME1	849LL-FS04X02	FITTING, Ext Pipe/370, 900 Elbow	1
-8	04664	63-0214	74400	4000	SWITCH, Pressure, Hour Meter	1

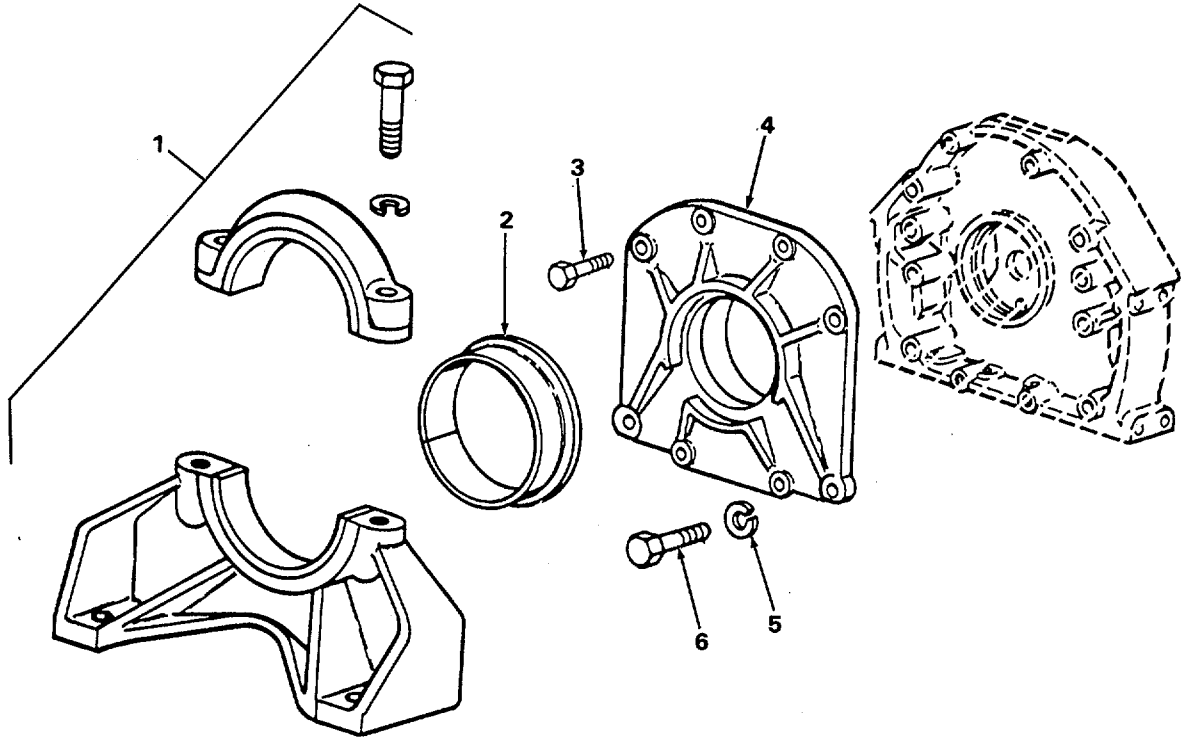


Figure F-76. Engine Mounting

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-76-					ENGINE MOUNTING	
-1			72582	5103957	SUPPORT ASSY	1
-2			72582	5103566	RING, Cushion	1
-3			72582	9415559	SCREW, Cap, Hex Hd	4
-4			72582	8920886	TRUNNION	1
-5			72582	103321	WASHER, Lock	2
-6			72582	455537	SCREW, Cap, Hex Hd	2

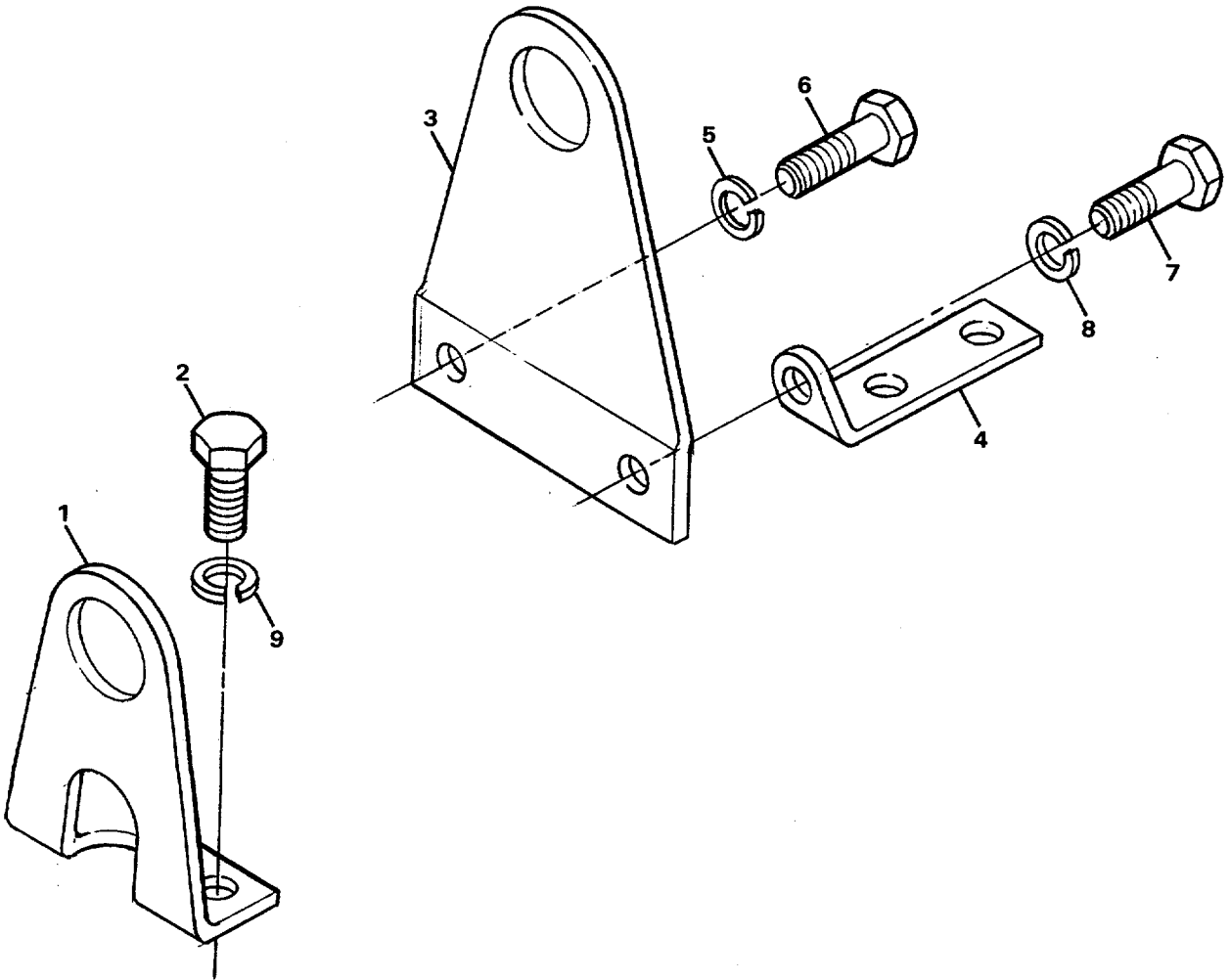


Figure F-77. Engine Lifting Brackets

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-77-					ENGINE LIFTING BRACKETS	
-1			72582	8928583	BRACKET, Front	1
-2			72582	186725	SCREW, Cap, Hex Hd	2
-3			72582	5137761	BRACKET, Rear	2
-4			72582	5133354	BRACKET	2
-5			72582	103321	WASHER, Lock	2
-6			72582	5101377	SCREW, Cap, Hex Hd	2
-7			72582	8921935	SCREW, Cap, Hex Hd	2
-8			72582	103322	WASHER, Lock	2
-9			72582	103323	WASHER, Lock	2

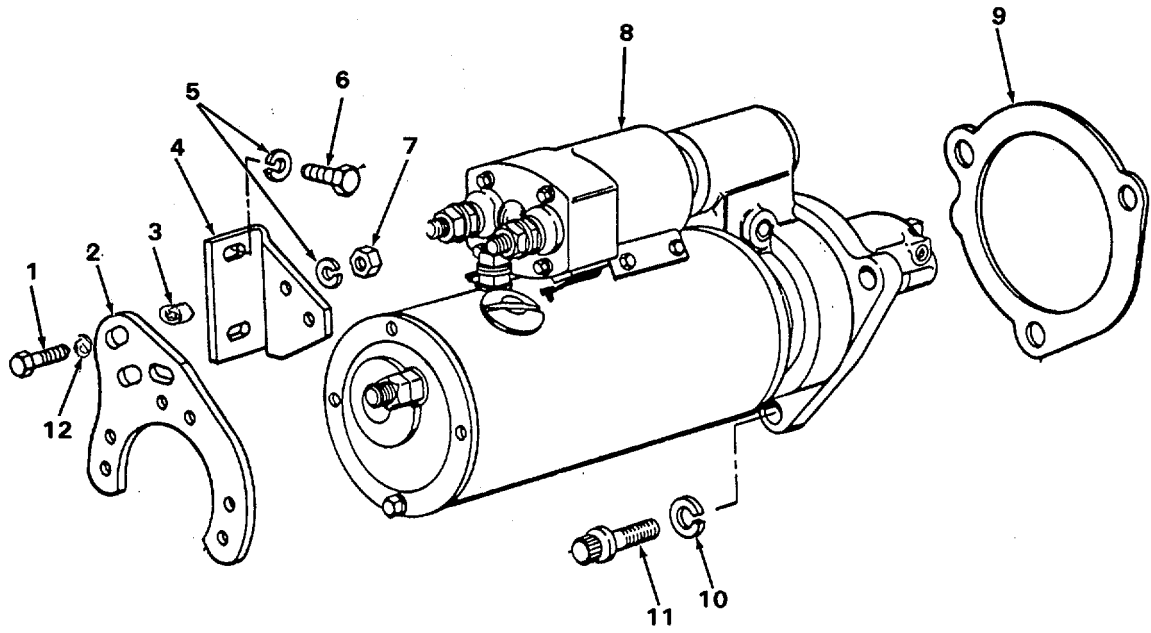


Figure F-78. Engine Starter Mounting

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-78-					ENGINE STARTER MOUNTING	
-1			72582	186628	SCREW, Cap, Hex Hd	2
-2			72582	8922795	BRACKET, Starter	1
-3			72582	8922295	SPACER	2
-4			72582	8922298	BRACKET, Starter	1
-5			72582	103321	WASHER, Lock	4
-6			72582	179839	SCREW, Cap, Hex Hd	2
-7			72582	443321	NUT, Plain, Hex	2
-8			72582	1990277	STARTER, Engine (See figure F-79 for details)	1
-9			72582	5130995	GASKET	1
-10			72582	103325	WASHER, Lock	3
-11			72582	9418228	SCREW, 12 Pt Hd	3

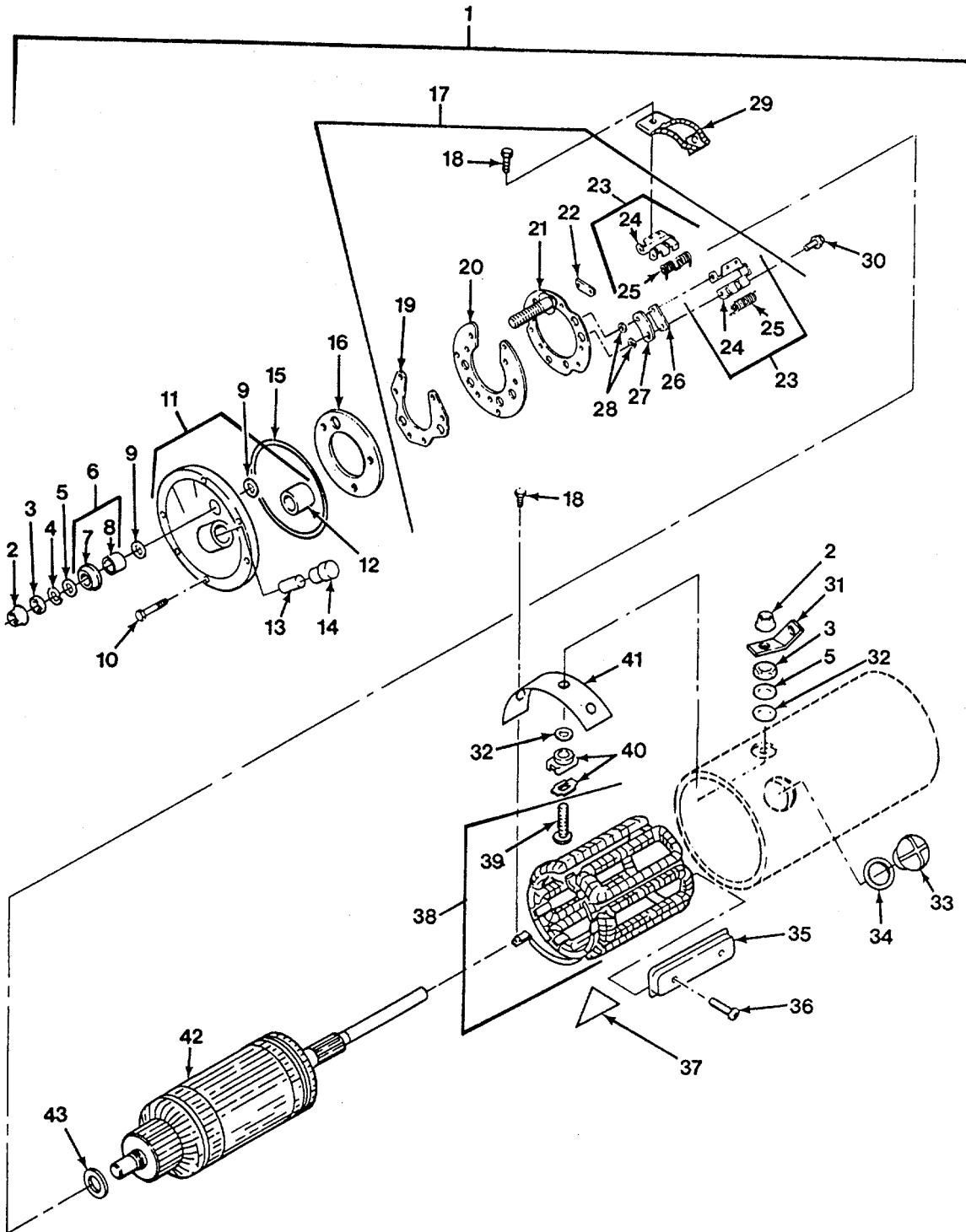


Figure F-79. Engine Starter, Sheet 1 of 2

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-79-					ENGINE STARTER	
-1			16764	1990277	STARTER, Engine (See figure F-78 for NHA)	1
-2			16764	1979451	NUT, Plain, Extended	2
-3			96906	MS51967-14	NUT, Plain, Hex	2
-4			16764	11504248	WASHER, Lock	1
-5			88044	AN960-816L	WASHER, Flat	2
-6			16764	1851632	PARTS KIT, Electrical	1
-7			16764	1913027	INSULATOR, Bowl	1
-8			16764	1851603	BUSHING	1
-9			16764	1913084	WASHER, Flat	2
-10			16764	1914869	BOLT, Machine	13
-11			16764	1945848	HOUSING ASSY, Starter	1
-12			16764	1894638	BEARING, Sleeve	1
-13			16764	1972977	WICK	1
-14			16764	1978756	CAP, Protective, Dust	1
-15			16764	1945860	PACKING, Preformed	2
-16			16764	1964516	INSULATOR, Brush Plate	1
-17			16764	1985066	BRUSH PLATE ASSY	1
-18			16764	1968998	SCREW, Tapping	9
-19			16764	1984981	PLATE, Stator, Motor	1
-20			16764	1984981	PLATE, Stator, Motor	1
-21			16764	1985067	PLATE ASSY	1
-22			16764	1979389	PLATE, Insulator Holder	3
-23			16764	1984979	HOLDER ASSY, Electrical Contact	6
-24			16764	1984980	HOLDER, Electrical Contact	1
-25			16764	1979391	SPRING, Helical, Torsional	1
-26			16764	1979388	PLATE, Ground Holder	3
-27			16764	1965093	INSULATOR, Plate	3
-28			16764	1913080	WASHER, Flat	6
-29			16764	1852888	BRUSH, Electrical	6
-30			16764	1847807	SCREW, Machine	3
-31			16764	1953238	BRACKET, Electrical	1
-32			16764	1922457	WASHER, Flat	2
-33			16764	1945356	PLUG, Machine Thread	2
-34			16764	1964857	GASKET	2
-35			16764	1869747	POLE SHOE, Starter	6
-36			16764	1964294	SCREW, Assembled Washer	12
-37			16764	1914873	PLATE, Insulation	3
-38			16764	1945853	WINDING ASSY, Motor Field	1
-39			16764	1950561	TERMINAL, Stud	1
-40			16764	1965472	INSULATOR, Bushing	1
-41			16764	1955989	INSULATOR, Plate	1
-42			16764	1945840	ARMATURE	1
-43			16764	1953237	WASHER, Flat	1
-44			16764	1979600	LEAD ASSY, Electromagnet	1
-45			16764	1115563	RELAY, Electromagnet	1
-46			16764	1930611	BOLT, Machine	4
-47			16764	1948522	PLUNGER, Solenoid	1
-48			16764	1948519	WASHER, Flat	1
-49			16764	801077	BELLOWS, Protection	1
-50			16764	1948520	WASHER, Recessed	1
-51			16764	1948521	SPRING, Helical, Compression	1
-52			16764	1948526	WASHER, Recessed	1
-53			16764	9416374	RING, Retaining	2
-54			16764	801078	CLAMP, Hose	1
-55			96906	MS16997-85	SCREW, Cap, Socket, Hd	1
-56			16764	1957846	HOUSING ASSY, Starter	1
-57			16764	1978756	CAP, Protective, Dust	1
-58			16764	1978754	WICK	1

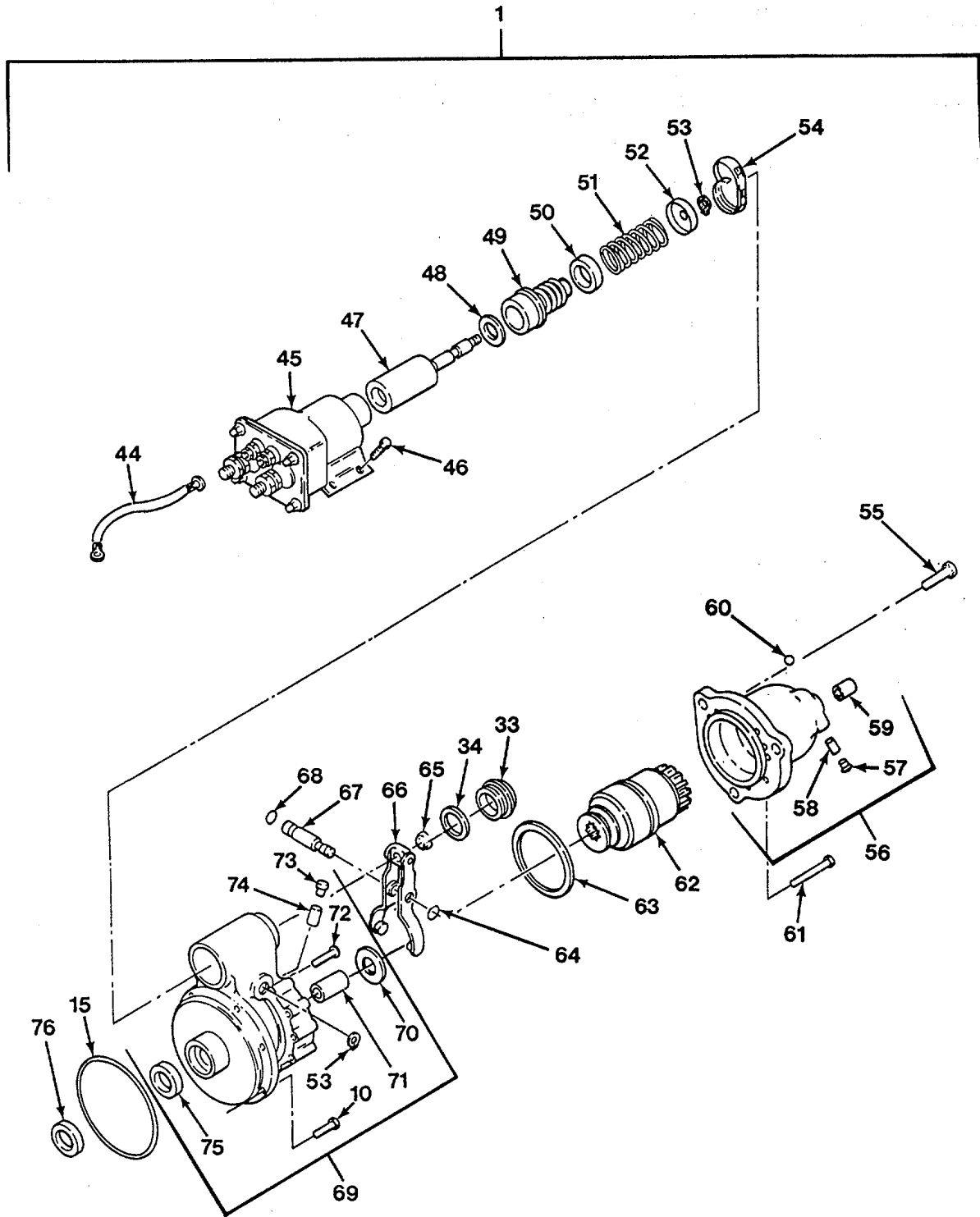


Figure F-79. Engine Starter, Sheet 2 of 2

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-79-						
-59			16764	1894635	BUSHING, Sleeve	1
-60			16764	1949619	PLUG	6
-61			96906	MS16997-82	SCREW, Cap, Socket Hd	5
-62			16764	1976884	DRIVE, Engine, Electric Starter	1
-63			16764	1945476	PACKING, Preformed	1
-64			16764	1894642	PACKING, Preformed	1
-65			16764	9412305	NUT, Self-Locking, Hex	1
-66			16764	1945484	LEVER ASSY	1
-67			16764	1948529	SHAFT, Shouldered	1
-68			16764	1894643	PACKING, Preformed	1
-69			16764	1979870	HOUSING ASSY, Lever	1
-70			16764	1911644	WASHER, Flat	1
-71			16764	1894637	BEARING, Sleeve	1
-72			16764	1964402	PLUG	1
-73			16764	1978756	CAP, Protective, Dust	1
-74			16764	1978754	WICK	1
-75			16764	1918047	SEAL, Plain Encased	1
-76			16764	1936466	WASHER	1

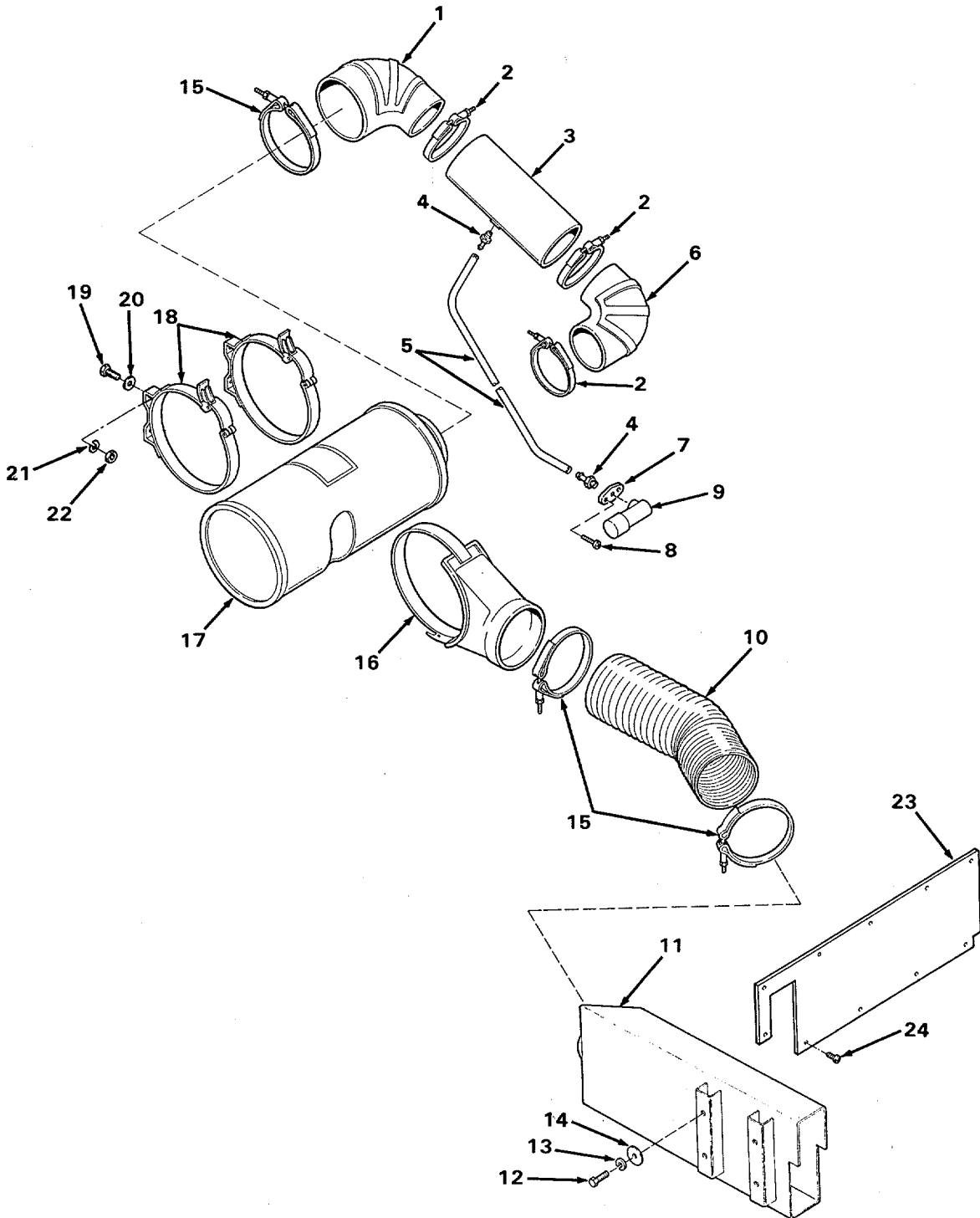


Figure F-80. Air Cleaner Assembly

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-80-					AIR CLEANER ASSEMBLY	1
-1	04664	42-0176	66185	90HL70R50	ELBOW, Rubber, 900	1
-2	04664	80-6018	01652	AC-500	CLAMP, Hose, 5" I.D.	3
-3	04664	42-1188			TUBING, Air Intake Indicator	1
-4	04664	53-0107-001	92003	VS125HBL-4-2	END, Hose, Male to Barb	2
-5	04664	944031	92003	821-4	HOSE, Pushlok, 1/4", 350 PSI (ft.)	16
-6	04664	42-0003	66185	90HL-5	ELBOW, Rubber, 900	1
-7	04664	42-0162	85377	P10-5168	FLANGE, Air Restriction Indicator	1
					(ATTACHING PARTS)	
-8	04664	82-2096-0050			SCREW, Ph Tr Hd, No. 10-24 x 1/2", S/S	2
-9	04664	42-0163	85377	RAX00-2320	INDICATOR, Air Restriction	1
-10	04664	940029-03000	OCME1	413733	TUBING, Flex, 7" I.D.	1
-11	04664	42-3063			INTAKE, Air	1
					(ATTACHING PARTS)	
-12	04664	82-2062-0125			SCREW, Hex Hd, 5/16"-18 x 1-1/4, Zn	4
-13	04664	82-1011-0031			WASHER, Lock, 5/16", Zn	4
-14	04664	82-1009-007			WASHER, Fender, 5/16" x 1-12', Zn	4
-15	04664	80-6026	01652	AC-700	CLAMP, Hose, 7" I.D.	3
-16	04664	42-0134	9G711	71656-002	ADAPTER, Intake, Air Cleaner	1
-17	04664	42-0132	9G711	71338-002	CLEANER, Air	1
-18	04664	42-0175	9G711	71921-002	BAND, Air Cleaner	2
					(ATTACHING PARTS)	
-19	04664	82-2065-0125			SCREW, Hex Hd, 7/16"-14 x 1-1/4", Zn, Gr-8	4
-20	04664	82-1013-009			WASHER, Flat, 7/16", Zn	4
-21	04664	82-1011-0044			WASHER, Lock, 7/16", Zn	4
-22	04664	82-3014-004			NUT, Hex, 7/16"-14, Zn	4
-23	04664	44-3660			BAFFLE, Air Intake	1
					(ATTACHING PARTS)	
-24	04664	82-2039-001			SCREW, T410 Ph Pn Hd, Tapite, No.10-24 x 1/2"	10

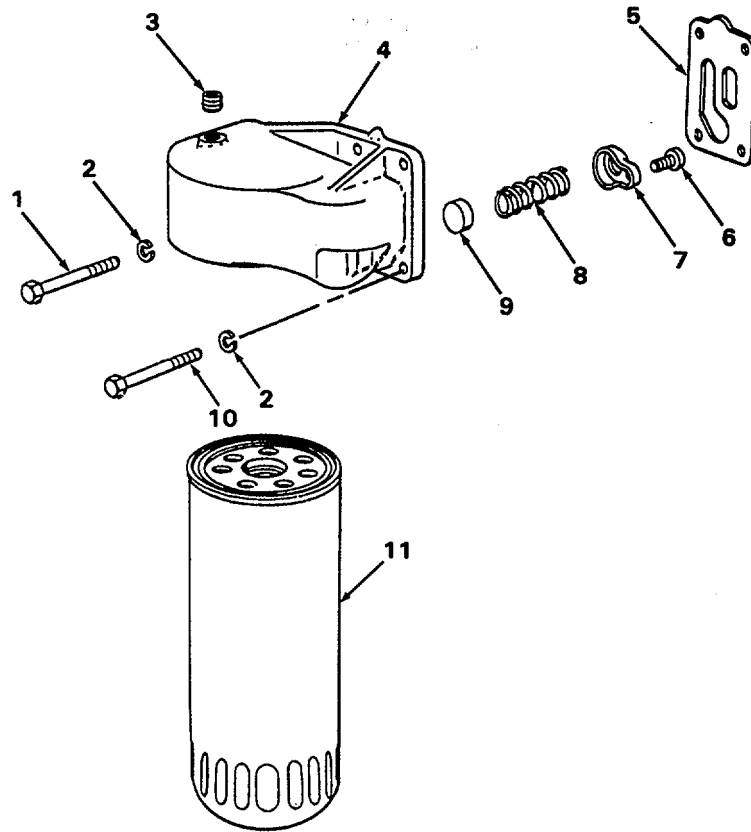


Figure F-81. Oil Filter

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-81-					OIL FILTER	
-1			72582	8923389	SCREW, Cap, Hex Hd	4
-2			96906	HS35338-46	WASHER, Lock	6
-3			72582	8923847	PLUG, Pipe	1
-4			72582	5104420	ADAPTER	1
-5			72582	8921312	GASKET	1
-6			72582	160221	SCREW, Cap, Hex Hd	2
-7			72582	5126686	PLUG, Bypass Valve	1
-8			72582	5134477	SPRING, Helical, Comp	1
-9			72582	5133431	DISK, Valve	1
-10			72582	179850	SCREW, Cap, Hex Hd	2
-11			72582	25013192	ELEMENT, Filter	1

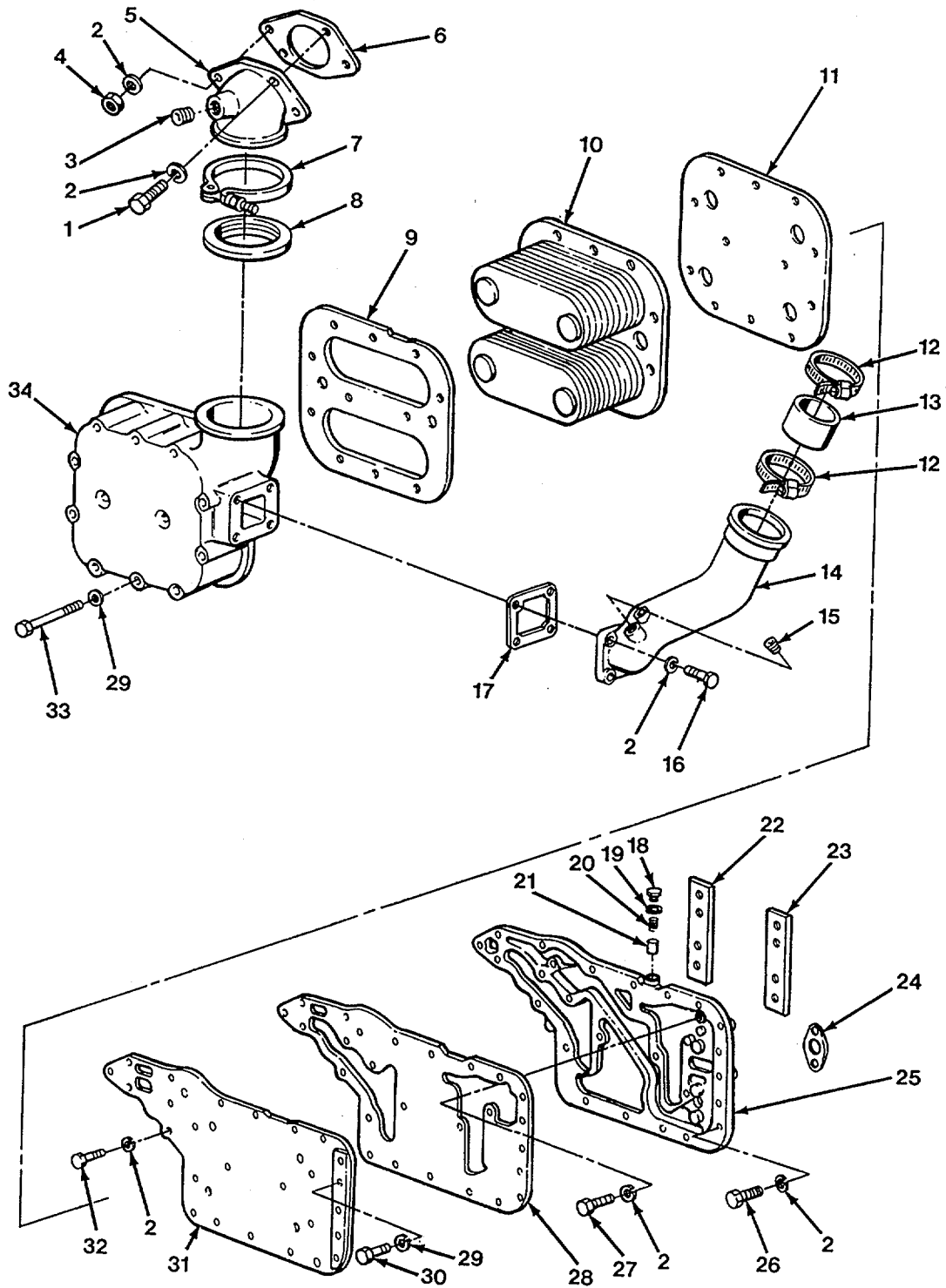


Figure F-82. Oil Cooler

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-82-					OIL COOLER	
-1			72582	8927580	SCREW, Cap, Hex Hd	2
-2			96906	MS35338-46	WASHER, Lock	14
-3			72582	8923313	PLUG, Pipe	1
-4			72582	103026	NUT, Plain, Hex	2
-5			72582	5103663	ELBOW, Flange	1
-6			72582	5117254	GASKET	1
-7			72582	5143999	CLAMP, Hose	1
-8			72582	5102098	SEAL	1
-9			72582	8926782	GASKET	1
-10			27462	8547552	CORE ASSY, Oil Cooler	1
-11			72582	23501587	GASKET	1
-12			72582	5138336	CLAMP, Hose	2
-13			72582	5107607	HOSE, Nonmetallic	1
-14			72582	5101173	ELBOW, Oil Cooler, Inlet	1
-15			96105	F190038	PLUG, Pipe	2
-16			72582	8927581	SCREW, Cap, Hex Hd	4
-17			72582	5100638	GASKET	1
-18			72582	5127797	PLUG, Pipe	1
-19			72582	5177773	GASKET	1
-20			72582	8923176	SPRING, Helical, Comp	2
-21			72582	5177777	DISK, Valve	1
-22			72582	5102853	SPACER	1
-23			72582	5102793	SPACER	1
-24			72582	5117535	GASKET	2
-25			72582	8925411	ADAPTER ASSY	1
-26			72582	8927589	BOLT	10
-27			72582	8927581	SCREW	3
-28			72582	8923512	GASKET	1
-29			96906	MS35338-45	WASHER, Lock	20
-30			96906	MS90728-33	BOLT, Machine	8
-31			72582	5103307	COVER, Oil Cooler	1
-32			72582	5104156	SCREW, Cap, Hex Hd	2
-33			72582	455971	BOLT, Machine	12
-34			72582	5116863	HOUSING, Oil Cooler	1

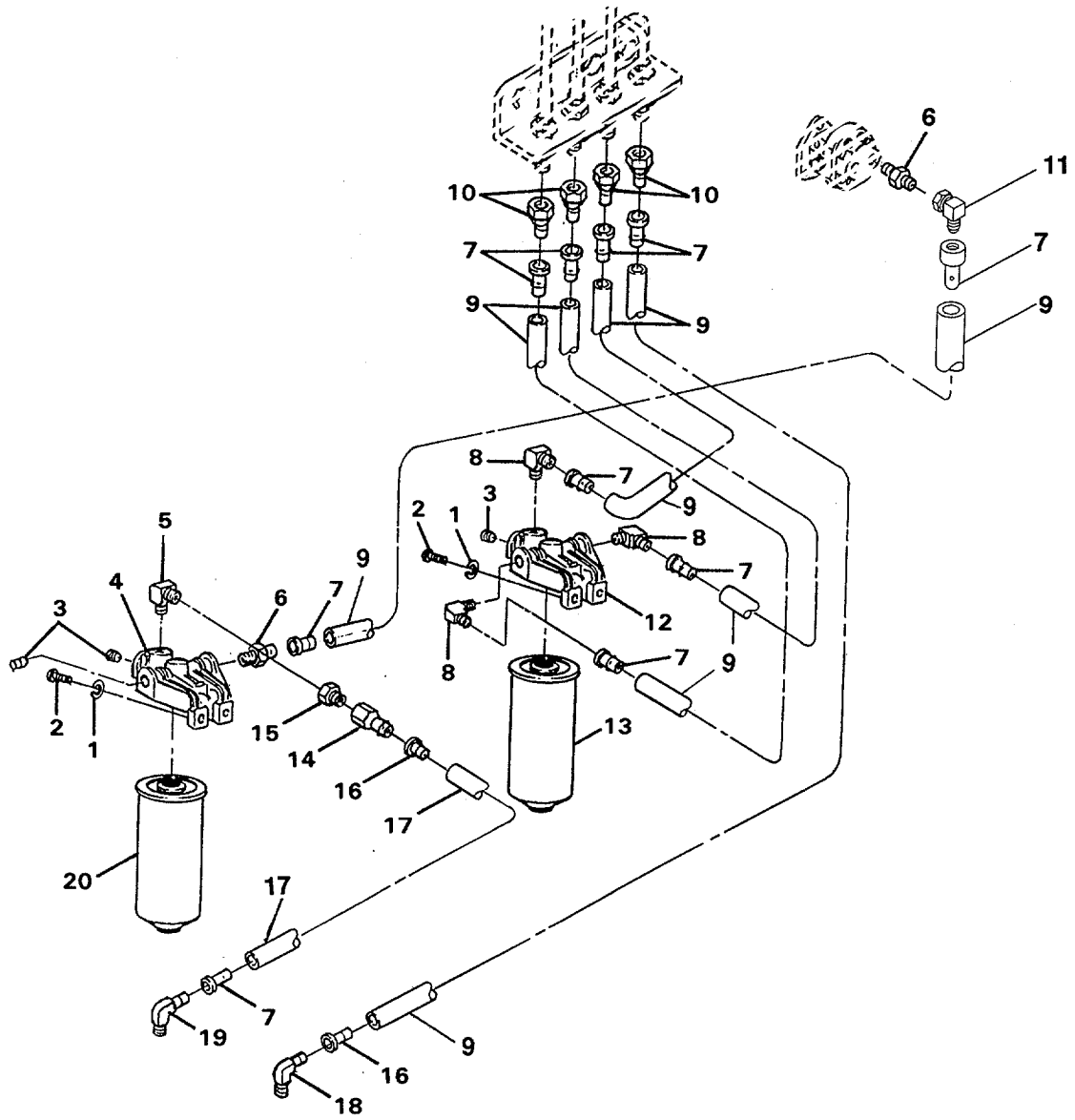


Figure F-83. Fuel Filters and Hoses

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-83-					FUEL FILTERS AND HOSES	
-1			96906	MS35338-46	WASHER, Lock	4
-2			96906	MS90725-62	SCREW, Cap, Hex Hd	4
-3			72582	8924517	PLUG, Pipe	3
-4			72582	5148023	COVER, Primary Filter	1
-5	04664	56-0494-006	92003	1202P-6-6	ELBOW	1
-6	04664	53-4024-012	0CM31	848FS-06X08	FITTING, Hose	2
-7	04664	54-4017			HOSE END, Push Lock	10
-8	04664	53-4025-007			ELBOW	3
-9	04664	544016			HOSE, Push Lock, 50"	AR
-10	04664	53-4024-008	0CME1	16-C6X-S	FITTING, Hose	4
-11	04664	53-4019-004	0CME1	879FS-08	FITTING, Hose	1
-12			72582	5148171	COVER, Secondary Filter	1
-13			72582	25010778	CARTRIDGE, Secondary Filter	1
-14	04664	54-0010	30780	2650	VALVE, Check;	1
-15	04664	53-4024-013	0CME1	849FS0-12X10	FITTING, Hose	1
-16	04664	54-4037			HOSE END, Push Lock	2
-17	04664	544036			HOSE, Push Lock, 63"	AR
-18	04664	53-4025-021	92003	10-12CTS-X	ELBOW	1
-19	04664	53-4025-020	0CME1	849FS-08X12	ELBOW	1
-20			72582	25010776	CARTRIDGE, Primary Filter	1

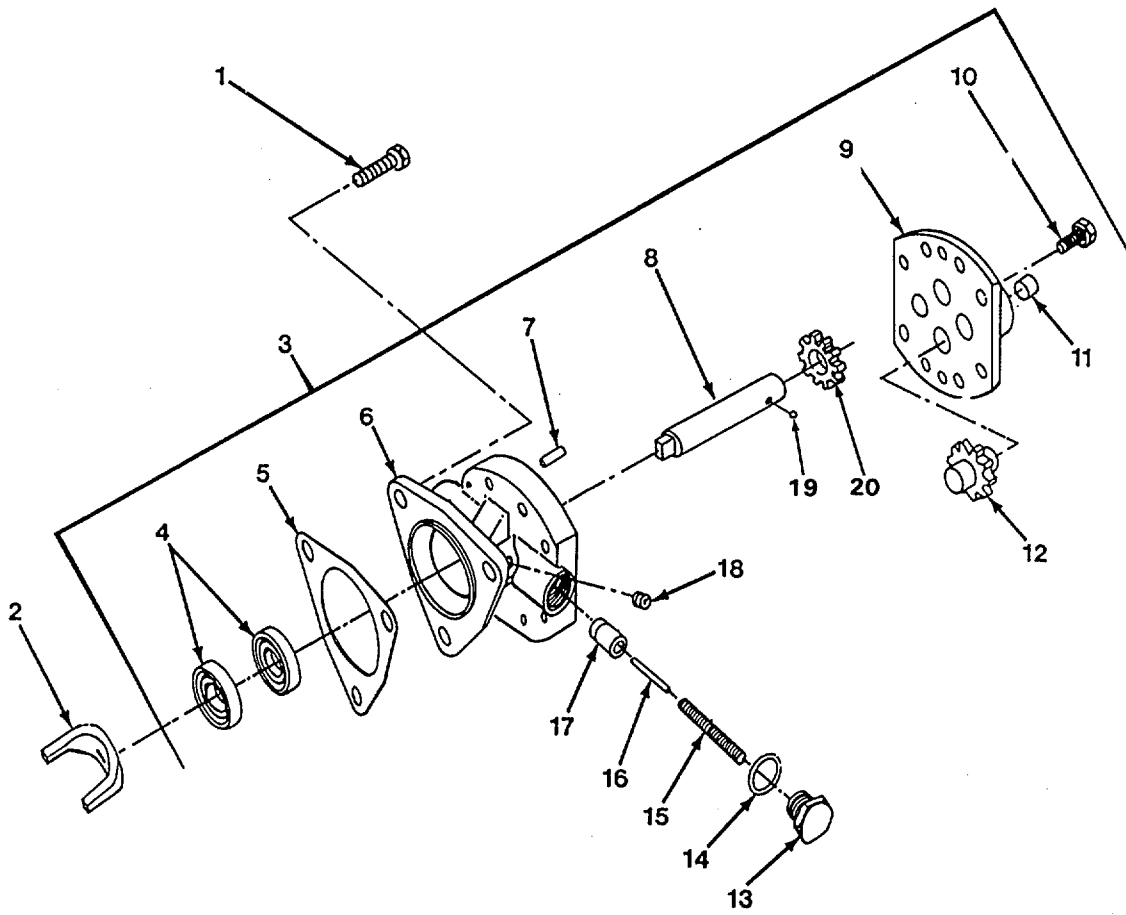


Figure F-84. Fuel Pump

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-84-					FUEL PUMP	
-1			72582	895603	BOLT	3
-2			72582	5102257	FORK, Coupling, Fuel	1
-3			72582	5199735	PUMP ASSY, Engine Fuel	1
-4			72582	5107223	SEAL, Plain Encased	2
-5			72582	5150193	GASKET	1
-6			72582	5146339	HOUSING, Fuel Pump	1
-7			72582	141195	PIN, Straight, Headless	2
-8			72582	5146705	GEARSHAFT, Spur	1
-9			72582	5130031	COVER, Pump	1
-10			72582	3719219	BOLT, Machine	8
-11			72582	5198558	BUSHING, Pipe	1
-12			72582	5100313	GEAR, Spur	1
-13			72582	8924380	PLUG, Machine Thread	1
-14			72582	5161003	GASKET	1
-15			72582	5184530	SPRING, Helical	1
-16			72582	103709	PIN, Straight, Headless	1
-17			72582	5174973	VALVE, Relief	1
-18			72582	8924380	PLUG, Pipe	2
-19			72582	147481	BALL	1
-20			72582	5128217	GEAR, Drive	1

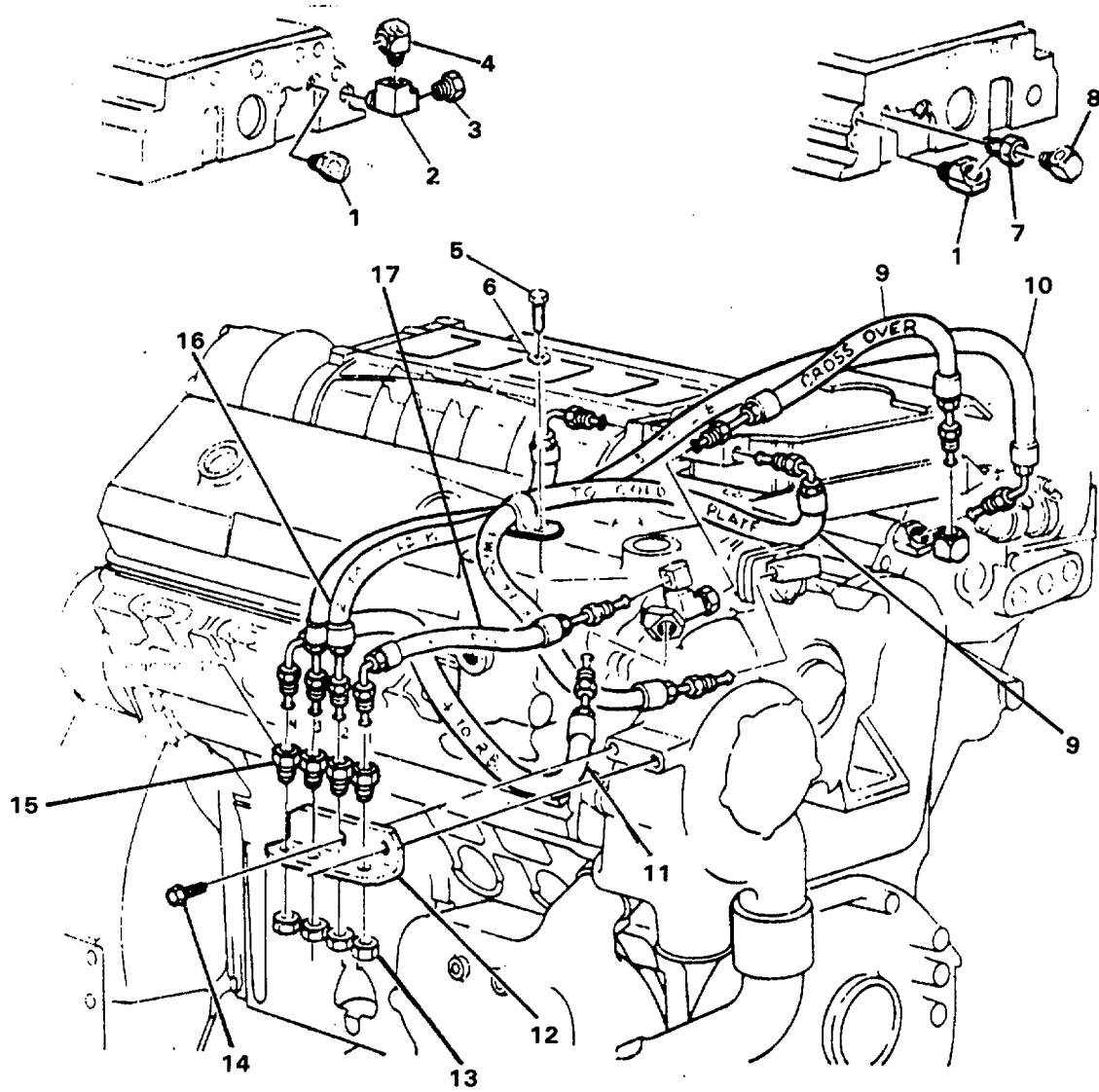


Figure F-85. Engine Fuel System, Sheet 1 of 2

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-85-					ENGINE FUEL SYSTEM	1
-1			72582	8924161	ELBOW	2
-2			72582	8924200	TEE	1
-3			72582	8924171	ADAPTER	1
-4			72582	8924185	ELBOW	1
-5			72582	179816	SCREW, Cap, Hex Hd	1
-6			72582	103320	WASHER, Lock	1
-7			72582	8925325	BUSHING, Reducing	1
-8			72582	8925030	ELBOW	1
-9			72582	5199575	HOSE, 10.5" Lg	2
-9			72582	5199579	FITTING, Hose, Straight	2
-9			72582	5199588	FITTING, Hose, 90°	2
-10			72582	5199575	HOSE, 23" Lg	1
-10			72582	5199579	FITTING, Hose, Straight	1
-10			72582	5199588	FITTING, Hose, 90°	1
-11			72582	5199575	HOSE, 7.5" Lg	1
-11			72582	5199579	FITTING, Hose, Straight	1
-11			72582	5199588	FITTING, Hose, 90°	1
-12			72582	5102364	BRACKET, Hoses	1
-13			72582	219759	NUT, Hex, Jam	4
-14			72582	8927579	SCREW, Cap, Hex Hd	2
-15			72582	2090390	FITTING, Bulkhead	4
-16			72582	5199575	HOSE, 17" Lg	1
-16			72582	5199579	FITTING, Hose, Straight	1
-16			72582	5199588	FITTING, Hose, 90°	1
-17			72582	5199575	HOSE, 11" Lg	1
-17			72582	5199579	FITTING, Hose, Straight	1
-17			72582	5199588	FITTING, Hose, 90°	1

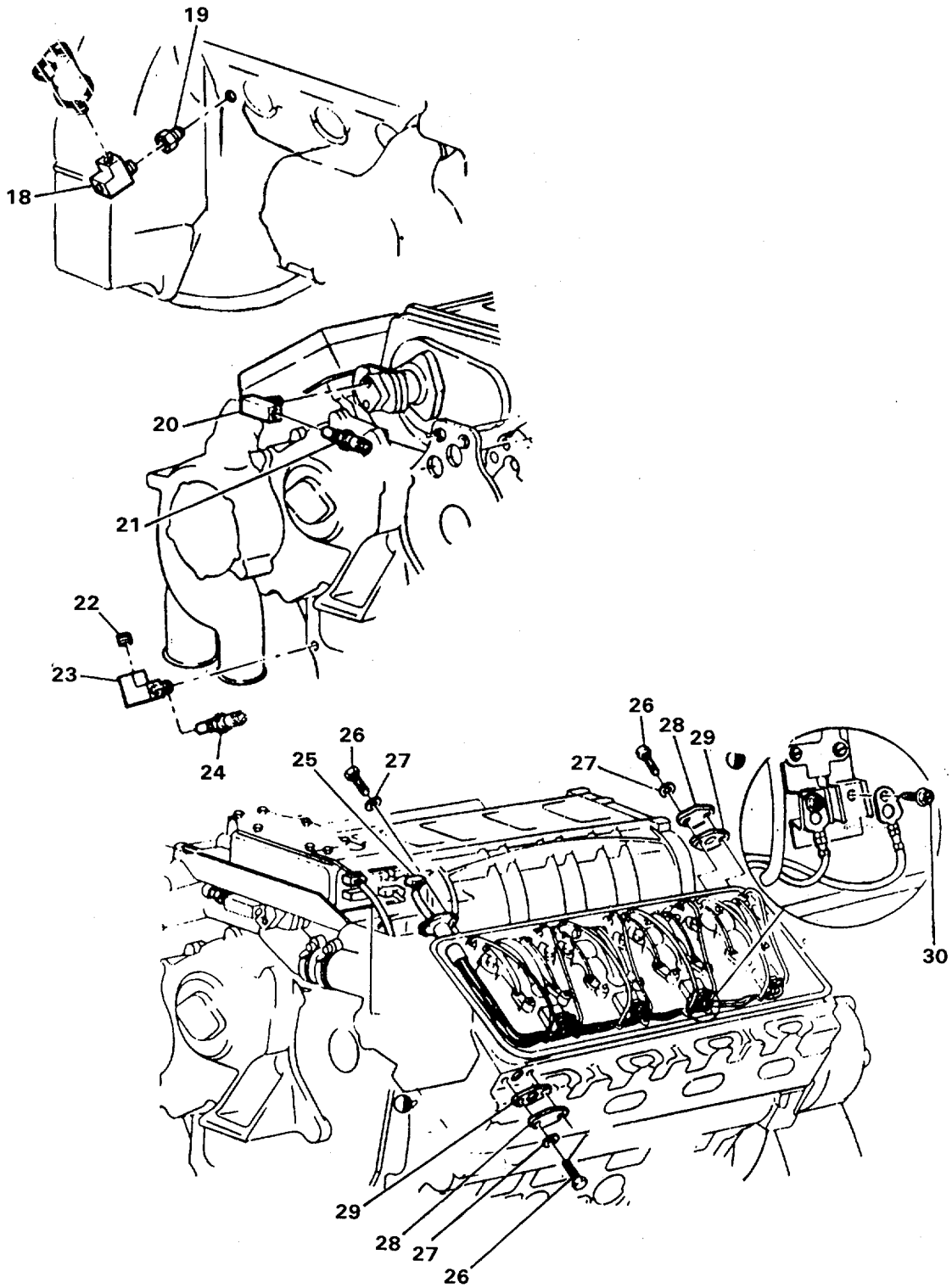


Figure F-85. Engine Fuel System, Sheet 2 of 2

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-85-						
-18			72582	8924178	ELBOW	1
-19			72582	8924172	ADAPTER	1
-20			72582	23502283	TEE	1
-21			72582	25036693	ADAPTER	1
-22			72582	8923847	PLUG, Pipe	1
-23			72582	8928669	TEE	1
-24			72582	25036693	SENSOR	1
-25			72582	23505066	HARNESS, LB	1
-25			72582	23505067	HARNESS, RB	1
-26			72582	5104089	SCREW, Cap, Hex Hd	16
-27			72582	120392	WASHER, Flat	20
-28			72582	5150268	COVER, Cyl Hd	6
-29			72582	2305526	GASKET	6
-30			72582	5104089	SCREW	16

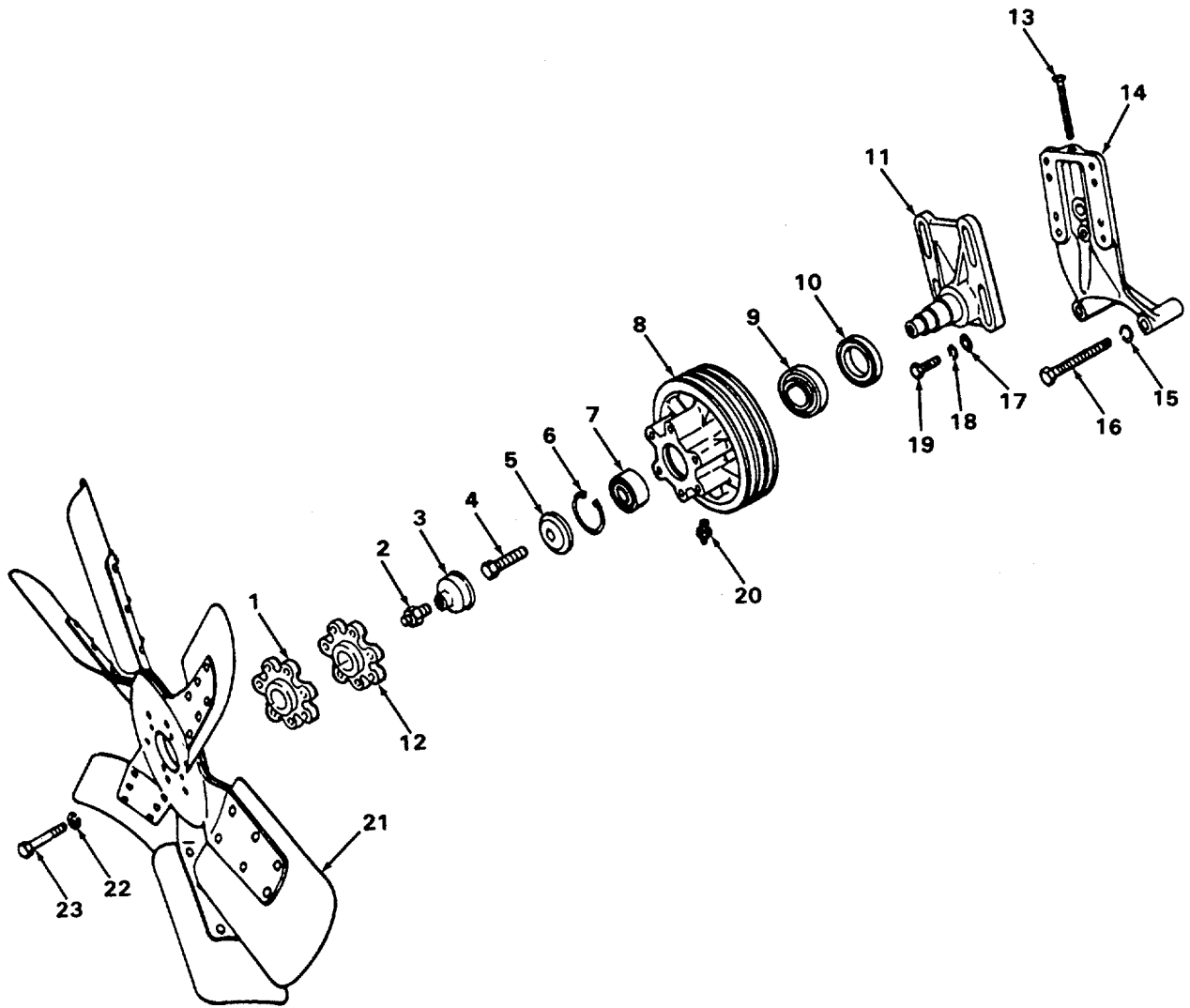


Figure F-86. Cooling Fan and Hub

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-86-					COOLING FAN AND HUB	
-1			72582	5103676	SPACER	1
-2			72582	455322	FITTING, Lube	1
-3			72582	5100890	CAP	1
-4			72582	9409060	SCREW, Cap, Hex Hd	1
-5			72582	5104317	SPACER	1
-6			72582	9422755	RING, Retaining	1
-7			72582	23503535	BEARING, Ball	1
-8			72582	5103862	PULLEY, Fan	1
-9			72582	23505480	BEARING, Ball	1
-10			72582	5103951	SEAL	1
-11			72582	5103868	BRACKET, w/Shaft	1
-12			72582	5124203	SPACER	1
-13			72582	5124203	SCREW, Cap, Hex Hd	1
-14			72582	8928581	SUPPORT, Fan	1
-15			72582	103325	WASHER, Lock	2
-16			72582	271574	SCREW, Cap, Hex Hd	1
-17			72582	5131978	WASHER, Flat	4
-18			72582	103323	WASHER, Lock	4
-19			72582	9409053	SCREW, Cap, Hex Hd	4
-20			72582	191758	FITTING, Lube	1
-21	04664	42-1136	45454	411769	FAN, Engine	1
-22			96906	MS35338-45	WASHER, Lock	6
-23			72582	179830	SCREW, Cap, Hex Hd	6

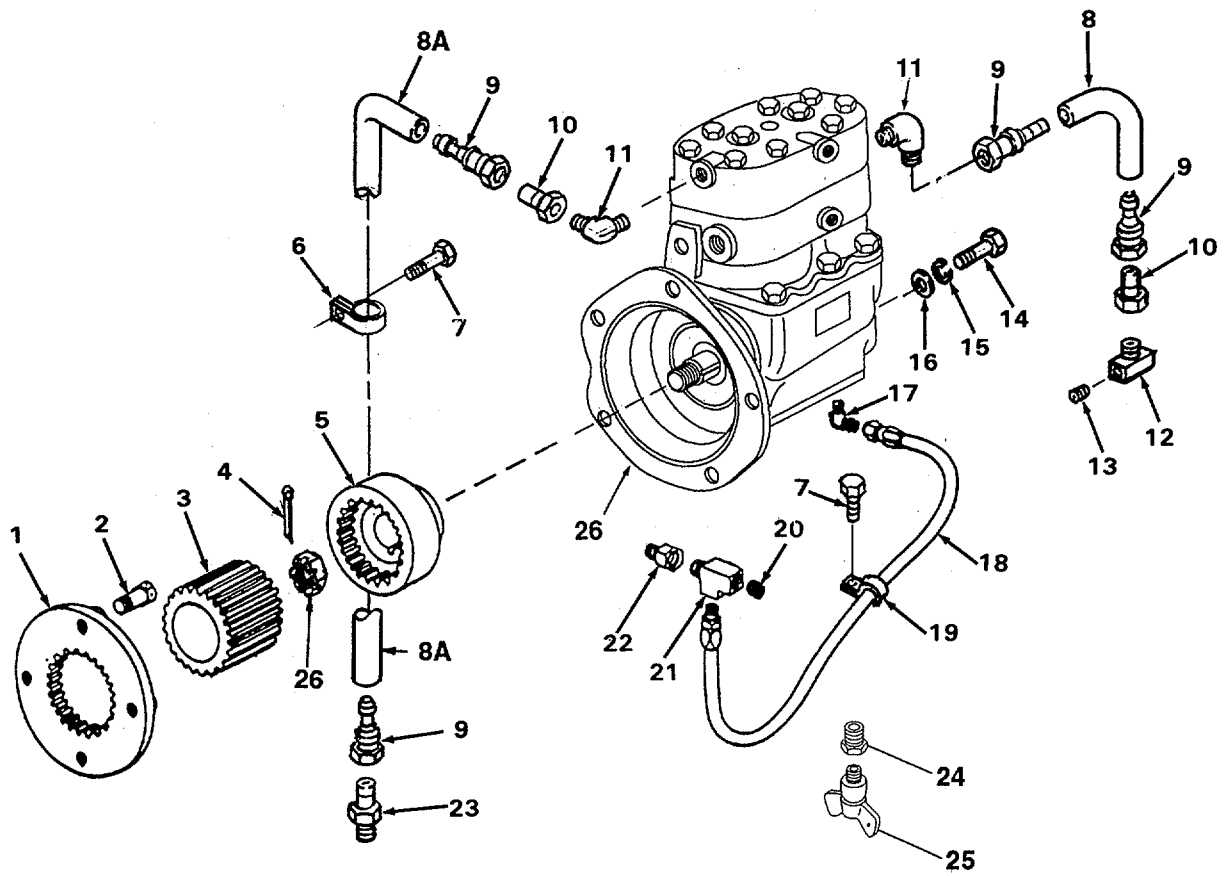


Figure F-87. Air Compressor and Mounting

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-87-					AIR COMPRESSOR AND MOUNTING	
-1			72582	5170450	PLATE, Drive	1
-2			72582	5145091	SCREW, Cap, Hex Hd	4
-3			72582	5141773	COUPLING	1
-4			72582	103375	PIN, Coffe	1
-5			72582	5144866	HUB, Drive	1
-6			72582	5151189	CLAMP, Loop	1
-7			72582	8927581	SCREW, Cap, Hex Hd	2
-8			72582	5129157	HOSE (19")	2
-8A			72582	5121957	HOSE (14")	1
-9			72582	5120020	FITTING, Hose	4
-10			72582	8924148	ADAPTER	2
-11			72582	8924220	ELBOW	2
-12			72582	8924177	TEE	1
-13			72582	5123847	PLUG, Pipe	1
-14			72582	179884	SCREW, Cap, Hex Hd	4
-15			72582	103323	WASHER, Lock	4
-16			72582	5132715	WASHER, Flat	1
-17			72582	8924168	ELBOW	1
-18			72582	5133163	HOSE ASSY	1
-19			72582	5153473	CLAMP, Loop	1
-20			72582	8923847	PLUG, Pipe	1
-21			72582	8924200	TEE	1
-22			72582	8924172	ADAPTER	1
-23			72582	894198	CONNECTOR	1
-24			72582	8924159	BUSHING, Reducer	1
-25			72582	8925710	COCK, Drain	1
-26			6A120	NT7210E	COMPRESSOR, Air (See figure F-87A for details)	1
			6A120	RN26HH	REPAIR KIT, Rear End Cap	1
			6A120	RN26GY	REPAIR KIT, Gaskets and Seals	1
			6A120	RNT26	REPAIR KIT, Head	1
			6A120	RN26ED	PISTON RING SET, Std Size	1
			6A120	RN26EE	PISTON RING SET, .020" O/S	1
			6A120	RNT26C	PISTON AND ROD ASSY, Std Size	1
			6A120	RNT26D	PISTON AND ROD ASSY, .020" O/S	1
			6A120	RN26EG	BEARING ASSY KIT, Conn. Rod, Std Size	1
			6A120	RN26EH	BEARING ASSY KIT, Conn Rod, .010" O/S	1
			6A120	RN26ES	BEARING ASSY KIT, Conn Rod, .020" O/S	1
			6A120	RNT26A	REPAIR KIT, Unloader	1
			6A120	SN3072BR	DRIVE GEAR KIT	1
			6A120	SN3072BT	DRIVE HUB KIT	1

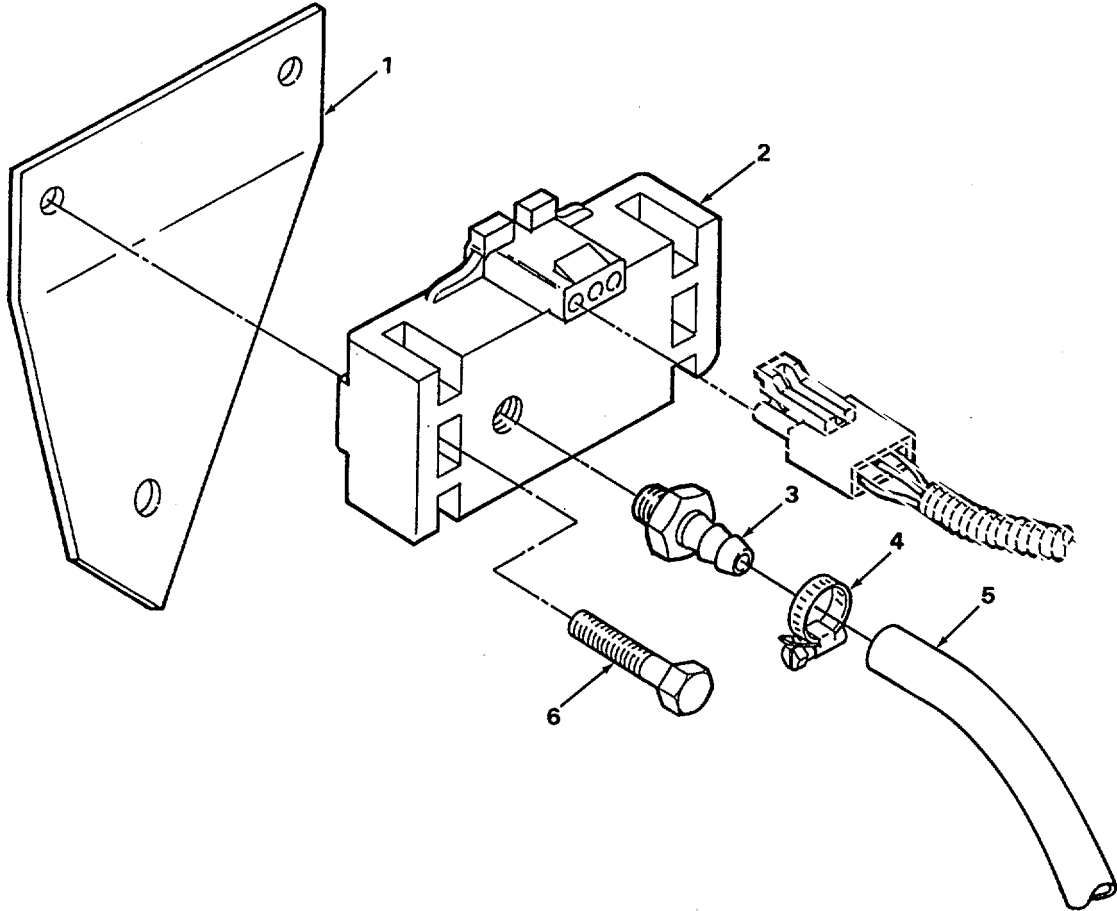


Figure F-88. Compressor Air Pressure Sensor

F-240

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-88-					COMPRESSOR AIR PRESSURE SENSOR	
-1			72582	23502895	BRACKET, Sensor	1
-2			72582	16070629	SENSOR, Air Pressure	1
-3			72582	5189292	FITTING, Hose	1
-4			72582	8928651	CLAMP, Hose	2
-5			72582	5129867	HOSE	1
-6			72582	23502923	SCREW, Cap, Hex Hd	2

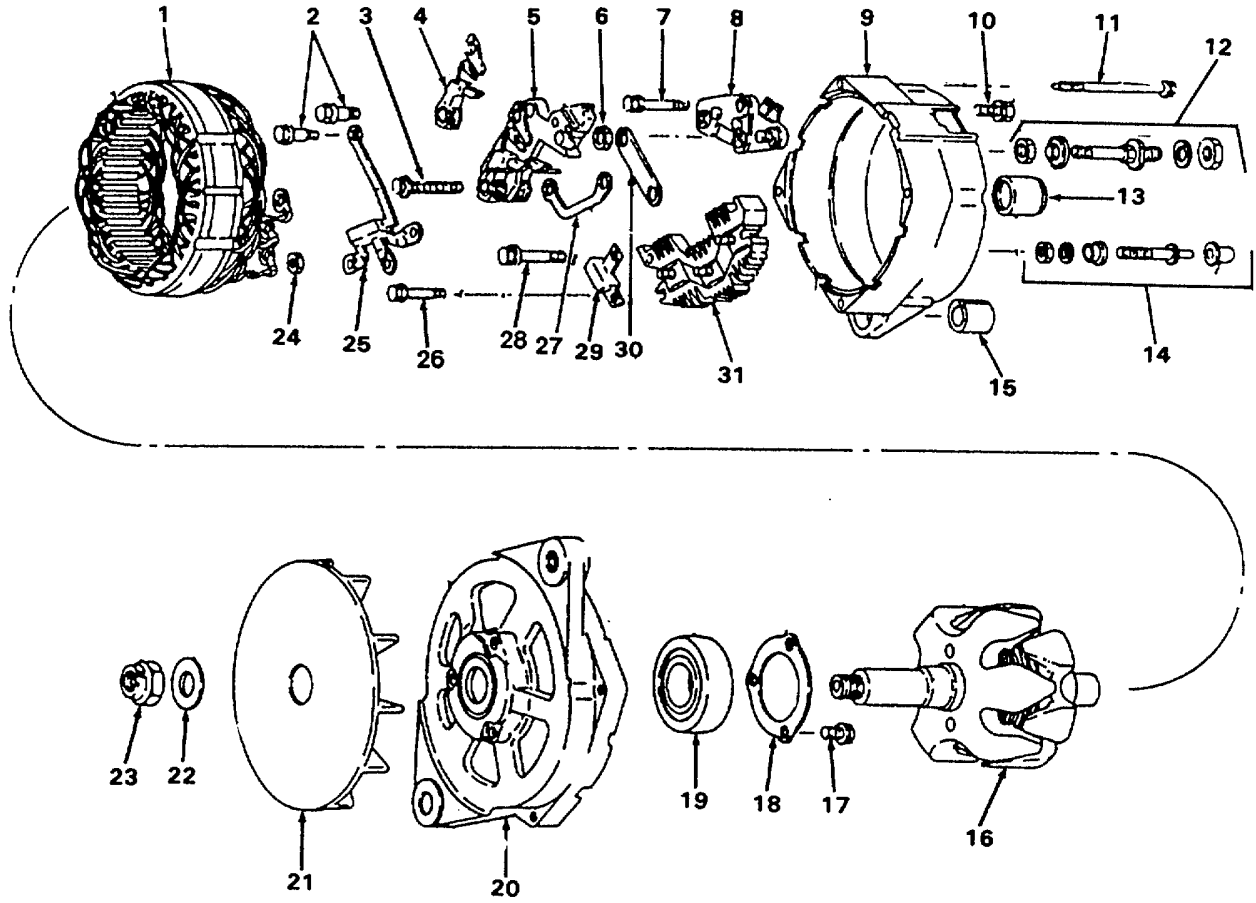


Figure F-89. Alternator

F-242

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-89-			16764	1117899	ALTERNATOR	1
-1			16764	10471065	STATOR	1
-2			16764	1876681	SCREW, Machine	2
-3			16764	1979727	SCREW, Machine	2
-4			16764	10467935	BRUSH	2
-5			16764	10467934	HOLDER. Brush	1
-6			16764	1851808	NUT, Plain, Hex	2
-7			16764	1894458	SCREW, Cap, Hex Hd	2
-8			16764	10470886	REGULATOR	1
-9			16764	10467629	FRAME, SRE	1
-10			16764	1976513	SCREW, Machine	1
-11			16764	1989690	SCREW, Socket Hd	4
-12			16764	10456487	PACKAGE, Terminal	1
-13			16764	9439542	BUSHING	1
-14			16764	10479701	PACKAGE, Terminal	1
-15			16764	1892765	BUSHING	1
-16			16764	10470606	ROTOR	1
-17			16764	1894641	SCREW, Socket Hd	3
-18			16764	10467271	PLATE, Retaining	1
-19			16764	9439751	BEARING, Drive End	1
-20			16764	10467267	FRAME, Drive End	1
-21			16764	10467272	FAN, Alternator	1
-22			16764	1905406	WASHER, Shaft	1
-23			16764	1939567	NUT, Shaft	1
-24			16764	453996	NUT, Plain, Hex	3
-25			16764	1988985	DIODE TRIO	1
-26			16764	1894458	SCREW, Special	2
-27			16764	10468945	CONNECTOR	1
-28			16764	1988970	SCREW, Capacitor	2
-29			16764	1988972	CAPACITOR	1
-30			16764	10469559	CONNECTOR	1
-31			16764	10470609	BRIDGE, Rectifier	1

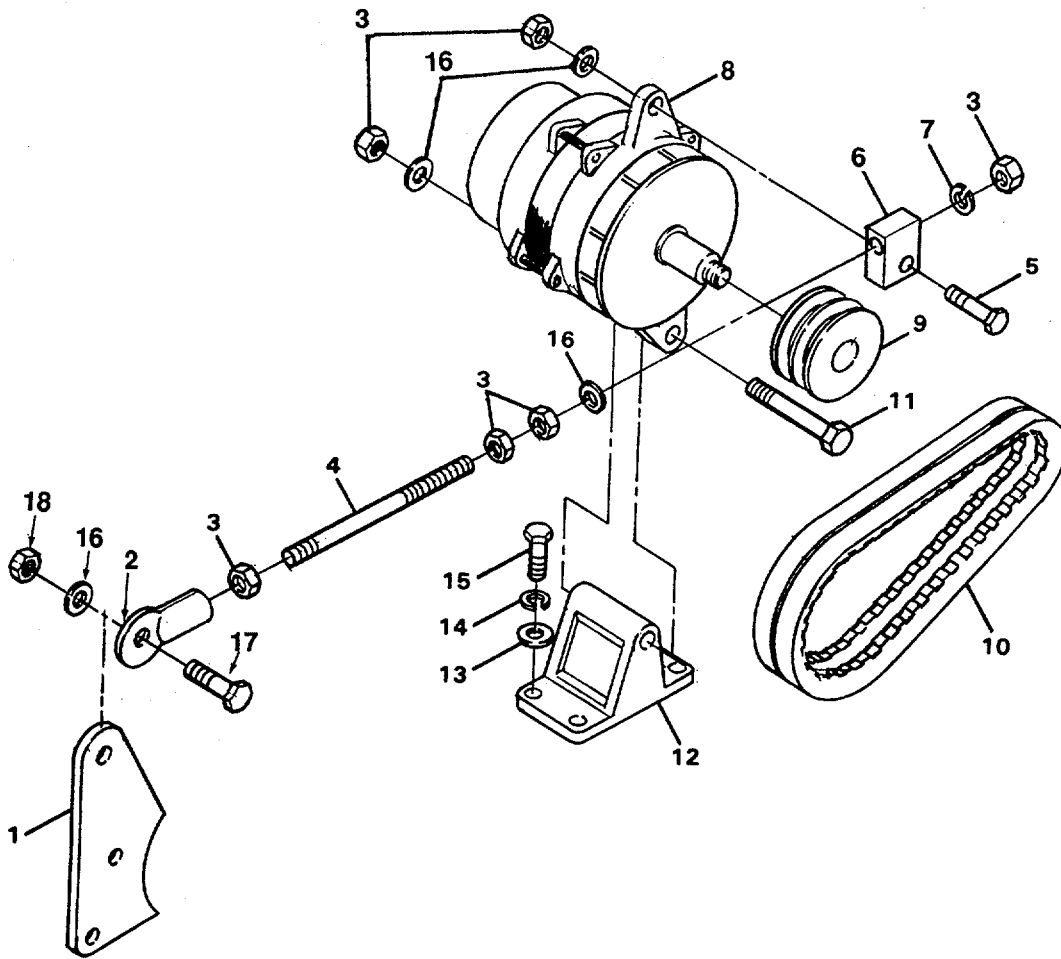


Figure F-90. Alternator Mounting

F-244

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-90-					ALTERNATOR MOUNTING	
-1	04664	42-0311			BRACKET	1
-2	04664	82-0166			ROD END, Ball Joint	1
-3	04664	82-3021-006	96906	MS51967-14	NUT, Hex, 1/2"-20, Zn	6
-4	04664	82-0113-01200			ROD, Threaded	1
-5	04664	82-2032-0200			SCREW, Hex Hd, 1/2"-20 x 2", Zn, G-8	1
-6	04664	42-0964			BRACKET, Tightener	1
-7	04664	82-1011-0050	96906	MS3533848	WASHER, Lock, 1/2"	1
-8	04664	63-0781	39375	1117899	ALTERNATOR (See figure F-89 for details)	1
-9	04664	63-0021	35510	59473	PULLEY, Alternator	1
-10	04664	42-1647-3150	OCME1	325017325	BELT, Alternator	2
-11	04664	82-2032-0650			SCREW, Hex Hd, 1/2"-20 x 6-1/2", Zn, G-8	1
-12	04664	63-0807			BRACKET, Alternator	1
-13	04664	82-1039-0004			WASHER, Flat, 7/16", Zn	2
-14	04664	82-1011-0044			WASHER, Lock, 7/16", Zn	2
-15	04664	82-2065-0150			SCREW, Hex Hd, 7/16"-14 x 1-11/2", Zn, G-8	2
-16	04664		96906	MS27183-17	WASHER, Flat, 1/2"	4
-17	04664	82-2033-0175			SCREW, Hex Hd, 1/2"-13 x 1-3/4", Zn, G-8	1
-18	04664	82-3014-006			NUT, Hex, 1/2"-13, Zn	1

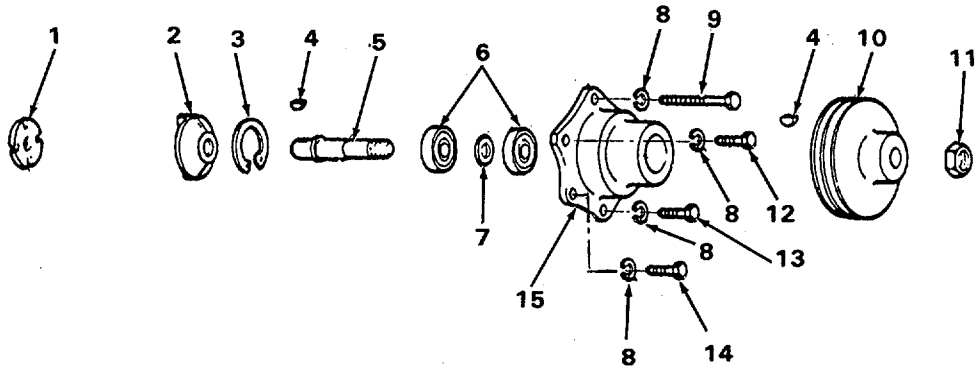


Figure F-91. Alternator Drive

F-246

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-91-					ALTERNATOR DRIVE	
-1			72582	5139545	COUPLING	1
-2			72582	5143234	HUB	1
-3			72582	274621	RING, Retaining	1
-4			72582	124543	KEY	2
-5			72582	5143233	SHAFT	1
-6			72582	23503727	BEARING	2
-7			72582	513682	SPACER	1
-8			96906	MS35338-46	WASHER, Lock	6
-9			72582	9430221	SCREW, Cap, Hex Hd	3
-10			72582	5133377	PULLEY, Drive	1
-11			72582	272906	NUT, Plain, Hex	1
-12			72582	179838	SCREW, Cap, Hex Hd	1
-13			72582	179839	SCREW, Cap, Hex Hd	1
-14			72582	186318	SCREW, Cap, Hex Hd	1
-15			72582	513383	RETAINER	1

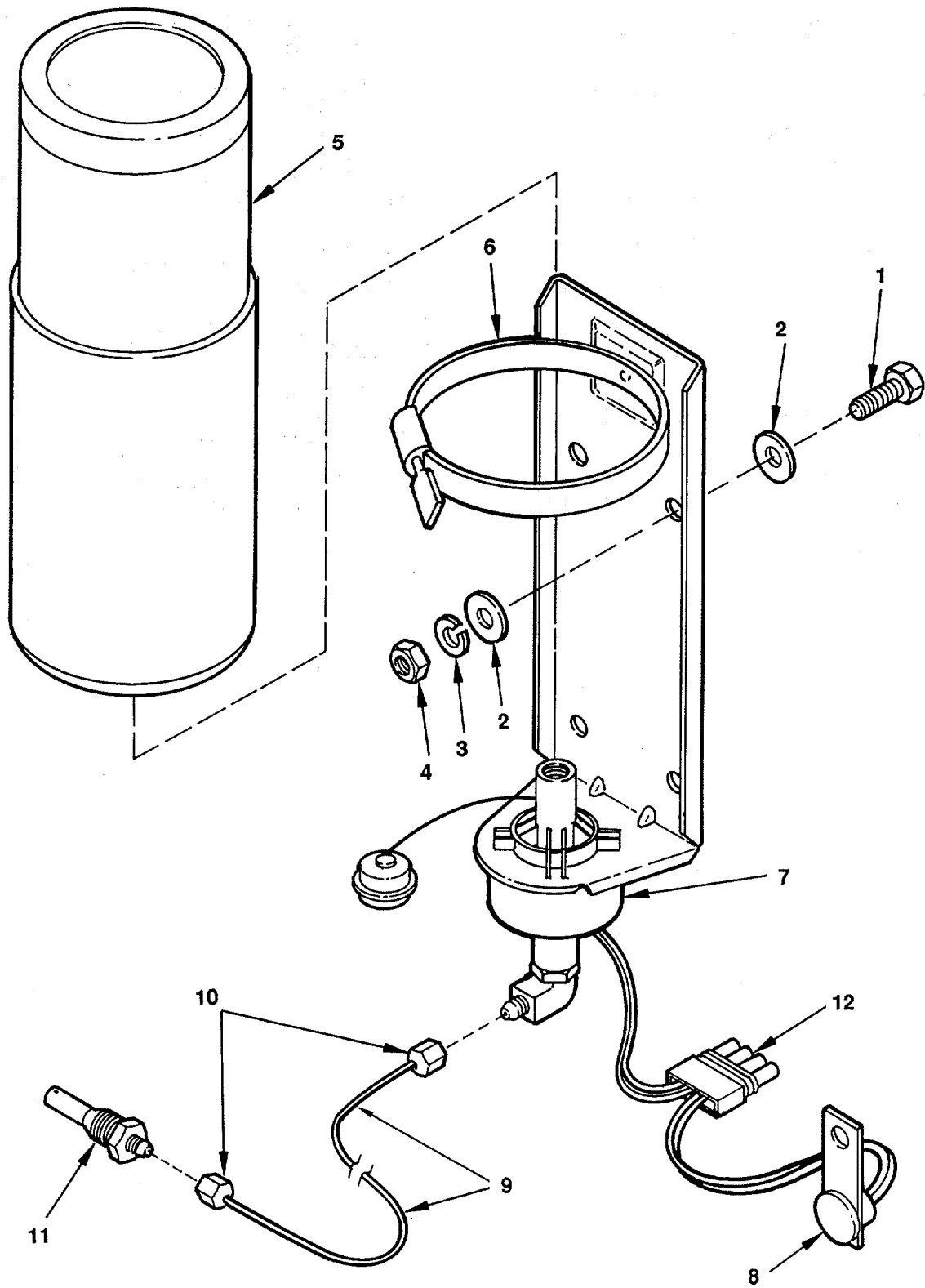


Figure F-92. Starting Aid

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-92-					STARTING AID	1
	04664	42-0471	6Y402	820-3237	KIT, E-Z Mount, Ether Start (ATTACHING PARTS)	1
-1	04664	82-2031-0088			SCREW, Hex Hd, 3/8"-1 6 x 7/8", Gr 8, Zn	4
-2	04664	82-1013-008			WASHER, Flat, 3/8", Zn	8
-3	04664	82-1011-0038			WASHER, Lock, 3/8", Zn	4
-4	04664	82-3014-003			NUT, Hex, 3/8"-16, Zn	4
-5			96906	MS39254	CYLINDER, Fuel (ATTACHING PARTS)	1
-6			6Y402	913020	CLAMP, Cylinder	1
-7			6Y402	913100-02	VALVE, Electric, with Mounting Bracket	1
-8			6Y402	321029	THERMOSTAT	1
-9			6Y402	501096-01	TUBE, Nylon	1
-10			6Y402	125048	FITTING, Straight	2
-11	04664	42-0472	6Y402	820-2958	ATOMIZER, Ether Start	1
-12	04664	64-0539	1JB11	1205797	BODY, Connector, 4 Male	1
-12	04664	64-0550	1JB11	12010182	TERMINAL, Female, 14-16 Weatherpak	2
-12	04664	64-0552	1JB11	12015193	SEAL, Wire, 12 Ga. Weatherpak	2
-12	04664	64-0554	1JB11	12010300	PLUG, Cavity, Weatherpak	2

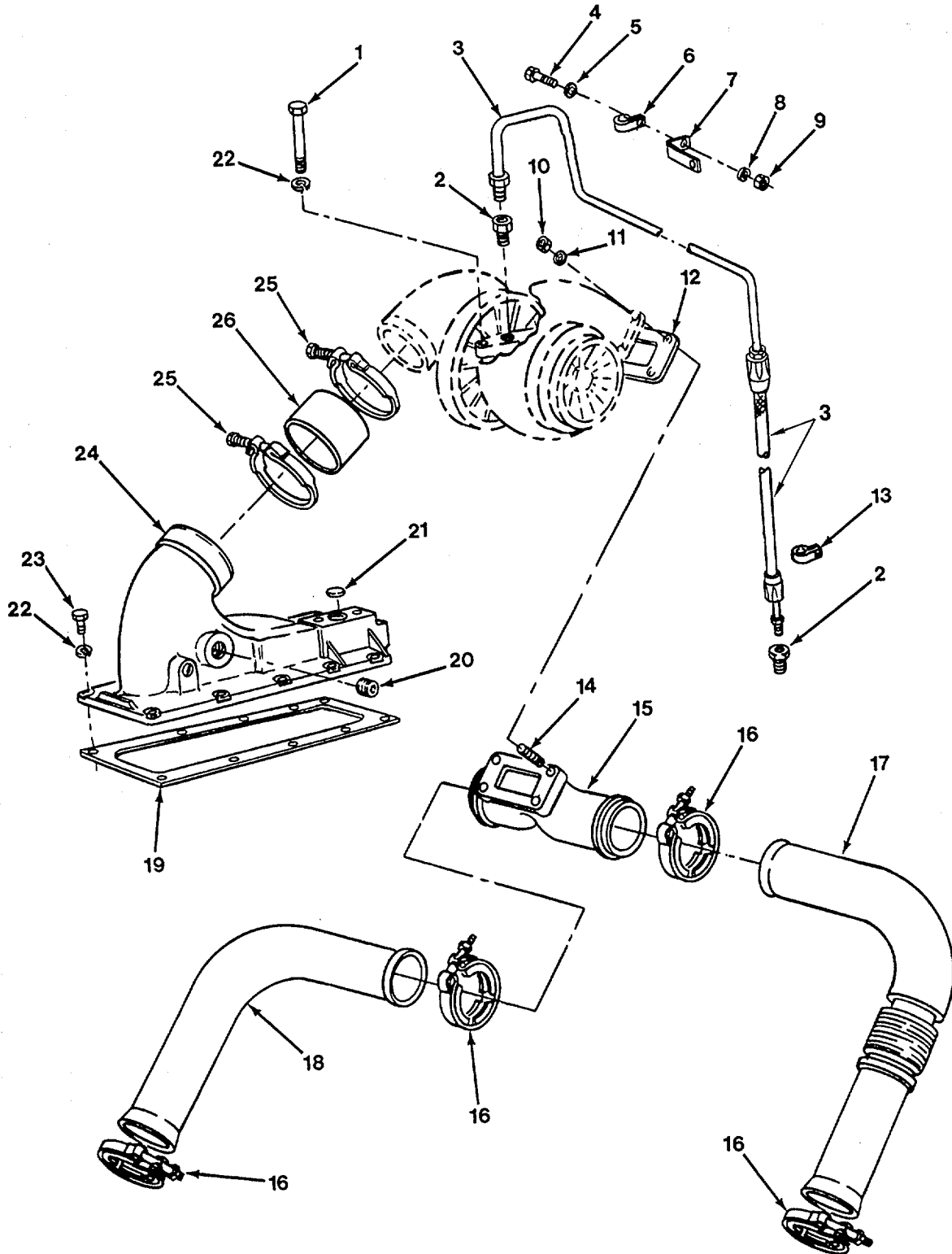


Figure F-93. Turbocharger Mounting

F-250

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-93-					TURBOCHARGER MOUNTING	
-1			72582	187425	SCREW, Cap, Hex Hd	2
-2			72582	8924171	CONNECTOR	1
-3			72582	8924060	HOSE ASSY, Nonmetallic	1
-4			96906	MS90728-61	SCREW, Cap, Hex Hd	1
-5			96906	MS27183-14	WASHER, Flat	1
-6			72582	8923312	CLIP, Retaining	1
-7			72582	5144629	BRACKET, Angle	1
-8			96906	MS35338-46	WASHER, Lock	1
-9			72582	102635	NUT, Plain, Hex	1
-10			96906	MS51922-21	NUT, self-locking, Hex	4
-11			72582	5131433	WASHER, Engine	4
-12			72582	8923492	GASKET	1
-13			72582	8923507	CLAMP, Pipe 360°	1
-14			72582	5130488	STUD	4
-15			72582	8924482	ADAPTER, Tee	1
-16			72582	5137620	CLAMP	4
-17			72582	5101413	TUBE ASSY, Metal	1
-18			72582	5101394	TUBE, Bent, Metallic	1
-19			72582	5101408	GASKET	1
-20			72582	5142549	PLUG, Pipe	1
-21			72582	8925778	GASKET	1
-22			96906	MS35338-47	WASHER, Lock	12
-23			72582	427564	BOLT, Machine	10
-24			72582	8926450	ADAPTER, Air Inlet	1
-25			72582	8927979	CLAMP	2
-26			72582	23505560	HOSE, Turbocharger	1

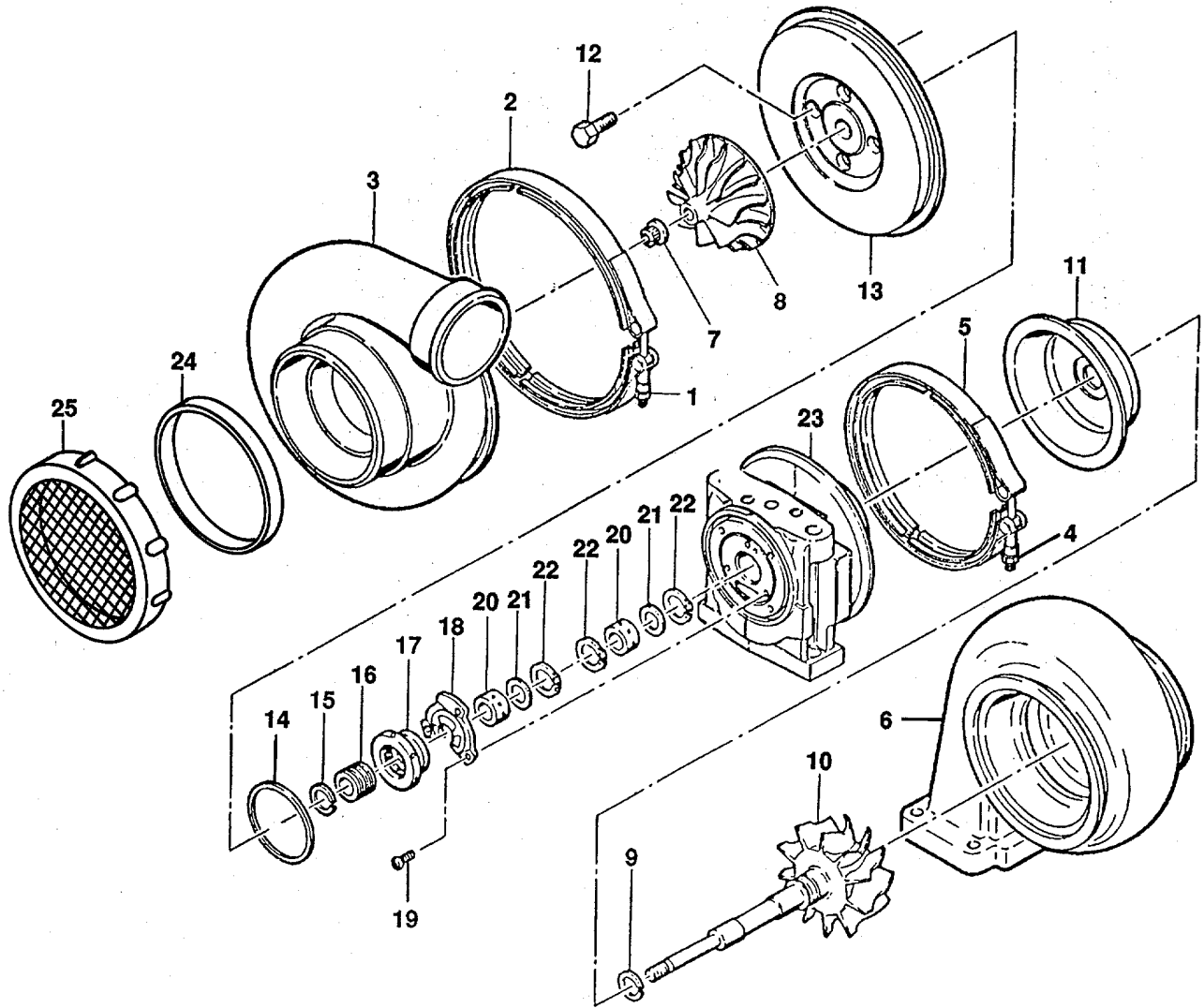


Figure F-94. Turbocharger

F-252

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-94-			72582	25503284	TURBOCHARGER ASSEMBLY	
				400580-0000	TURBOCHARGER ASSY	1
-1				400580-0000	NUT, V-band	1
-2				446401-0925	V-BAND	1
-3				442825-0002	HOUSING, Compressor	1
-4				400580-0000	NUT, V-band	1
-5				446397-0560	V-BAND ASSY	1
-6				443109-0006	HOUSING, Turbine	1
-7				400768-0013	NUT, Compressor Wheel	1
-8				441831-0001	WHEEL, Compressor	1
-9				403818-0030	RING, Piston	1
-10				444935-0002	TURBINE WHEEL ASSY	1
-11				407657-0004	WHEEL, Shroud	1
-12				400627-0620	BOLT, Backplate	4
-13				442732-0001	BACKPLATE	1
-14				400424-0000	RING, Seal	1
-15				403818-0000	RING, Piston	2
-16				441903-0002	SPACER, Thrust	1
-17				441904-0002	COLLAR, Thrust	1
-18				442030-0001	BEARING, Thrust	
-19				400872-0410	SCREW, Thrust Bearing	3
-20				441843-0001	BEARING, Journal	2
-21				407135-0000	WASHER, Wear	2
-22				400408-0000	RING, Retaining	3
-23				442022-0001	HOUSING, Center	
-24				447948-0001	SEAL, Inlet Screen	
-25				445391-0001	INLET SCREEN ASSY	

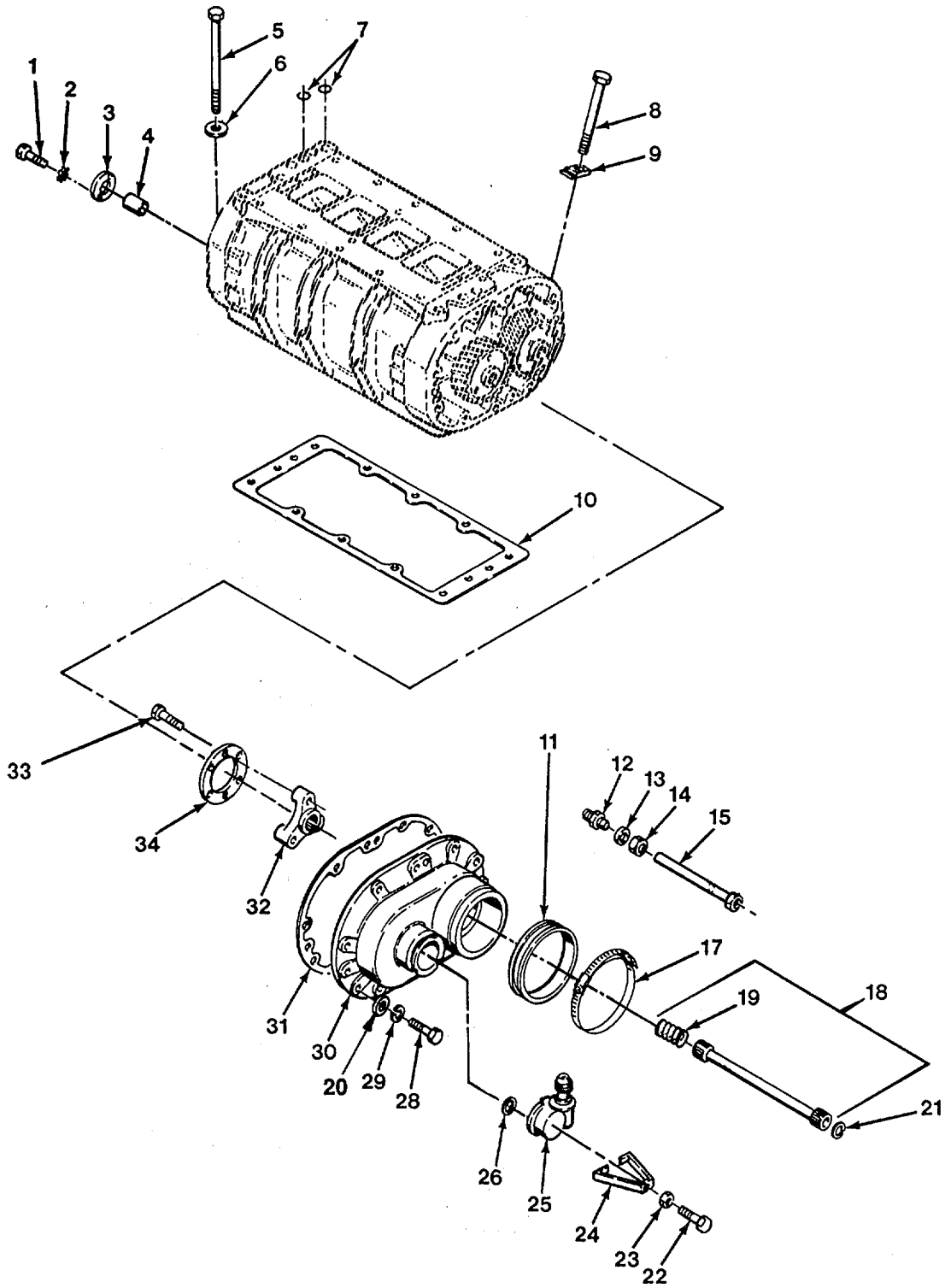


Figure F-95. Blower Assembly, Sheet 1 of 2

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-95-					BLOWER ASSEMBLY	
-1			96906	MS90727-111	SCREW, Cap, Hex Hd	1
-2			72582	5154398	WASHER, Lock	1
-3			72582	8924426	DISK, Coupling, Blower	1
-4			72582	8925674	SPACER, Special	1
-5			72582	9441614	SCREW, Cap, Hex Hd	4
-6			72582	5121905	WASHER, Rat	4
-7			72582	5101419	RING, Sea[2
-8			72582	187491	SCREW, Cap, Hex Hd	6
-9			72582	5121814	WASHER, Bolt Retainer	6
-10			72582	5141588	GASKET	1
-11			72582	8922140	PACKING, Preformed	1
-12			72582	23500499	ADAPTOR	1
-13			72582	8927414	SEAL, Ring	1
-14			72582	8927416	NUT, Tube Coupling	1
-15			72582	23500514	CONNECTOR ASSY	1
-17			72582	5106219	CLAMP ASSEMBLY	1
-18			72582	8922634	SHAFT AND SPRING ASSY	2
-19			72582	8922736	SPRING, Helical, Compression	1
-20			72582	5159714	WASHER, Rat	10
-21			72582	8922605	RING, Retaining	2
-22			72582	5179613	SCREW, Cap, Hex Hd	1
-23			96906	MS51967-2	NUT, Plain, Hex	1
-24			72582	5146410	CLAMP	1
-25			72582	5106771	ADAPTER, Tachometer	1
-26			72582	5136678	GASKET	1
-28			72582	179827	BOLT, Machine	10
-29			72582	103320	WASHER, Lock	10
-30			72582	5146521	COVER, Blower Housing	1
-31			72582	8924266	GASKET	2
-32			72582	23503682	COUPLING ASSY	1
-33			72582	9409077	BOLT, Machine	6
-34			72582	5150349	RETAINER, Blower Drive Coupling	1
-37			72582	8927041	BLOWER ASSY	1
-37A			72582	5148794	SCREW, Machine	6
-38			72582	5147147	DEFLECTOR, Dirt	2
-39			72582	23504304	BEARING, Ball, Annular	2
-40			72582	8924380	PLUG, Pipe	2
41			72582	5101037	END PLATE, Blower	1
42			72582	5110330	BEARING, Sleeve	4
43			72582	5100617	SEAL RING, Metal	4
44			72582	5150542	PIN, Straight, Headless	4
45			72582	5100727	SPACER, Sleeve	4
-46			72582	23502495	ROTOR ASSEMBLY, LH	1
47			72582	5142412	SHAFT, Rotor Assembly	1
48			96906	MS35671-57	PIN, Grooved, Headless	4
49			72582	5150216	SHAFT, Shouldered	2
-50			72582	9428477	PLUG, Expansion	6
-52			72582	23502496	ROTOR ASSEMBLY, RH	1
-53			72582	5117071	SHAFT, Blower, Rotor	1
-55			72582	9428477	PLUG, Expansion	6
-56			72582	5150216	SHAFT, Shouldered	1
-57			96906	MS35671-57	PIN, Grooved, Headless	2
-58			72582	5150829	PLUG, Expansion	1

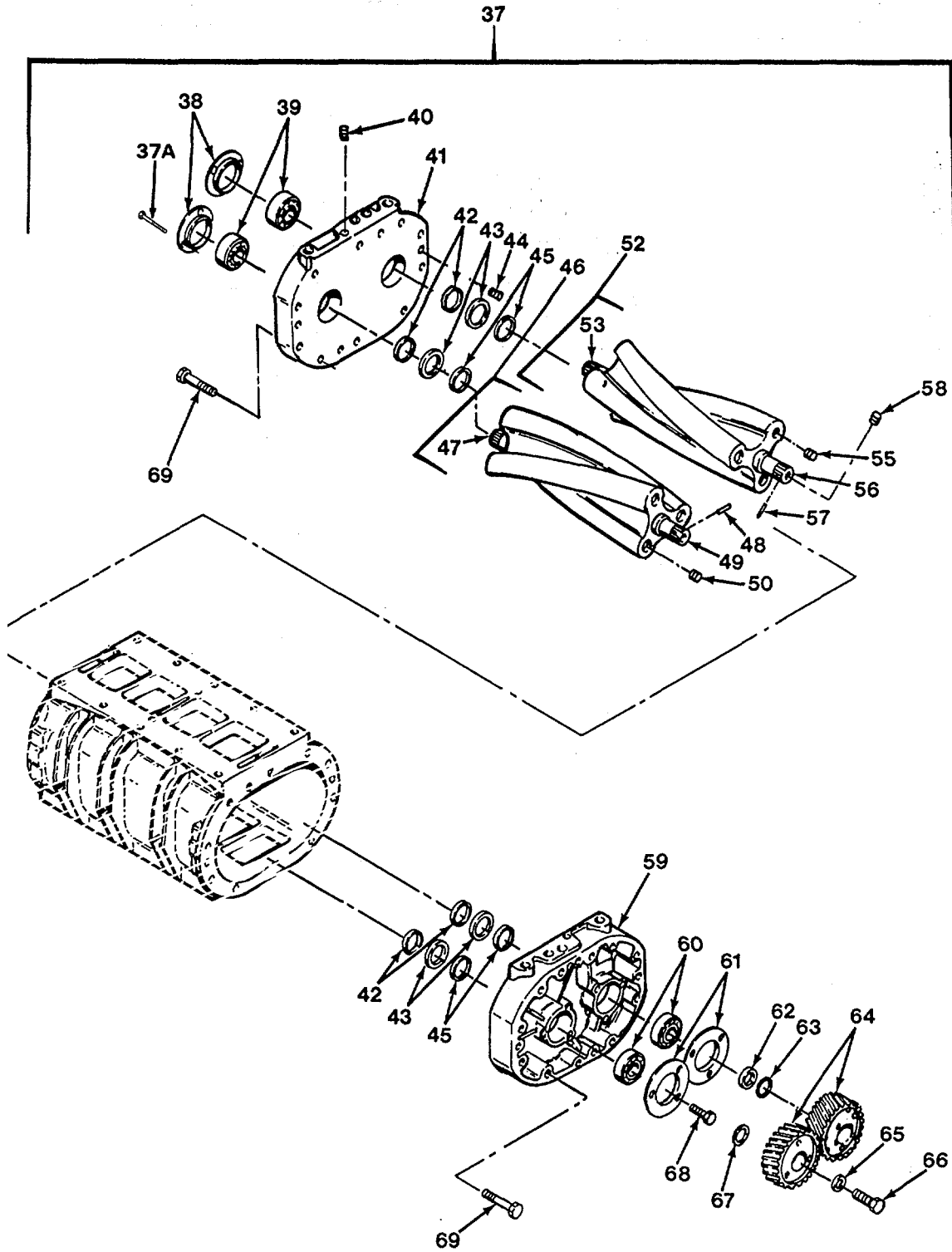


Figure F-95. Blower Assembly, Sheet 2 of 2

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-95-						
-59			72582	8927076	END PLATE, Blower	1
-60			72582	23504304	BEARING	2
-61			72582	5141605	RETAINER, Blower Hub	2
-62			72582	5150372	SHIM .002"	AR
-62			72582	5153938	SHIM .003"	AR
-62			72582	5150855	SHIM .005"	AR
-62			72582	5150856	SHIM .010"	AR
-63			72582	5141468	SPACER	2
-64			72582	5196321	GEAR SET, Helical	1
-65			72582	5127477	BUSHING, Sleeve	2
-46			72582	5103364	SCREW, Machine	2
-67			72582	5146049	SPACER	2
-68			72582	5148794	SCREW, Self-Locking	12
-69			72582	117296	SCREW, Machine	4
			72582	5108123	KIT, Blower Repair	1
			72582	5149643	KIT, Blower Installation	1

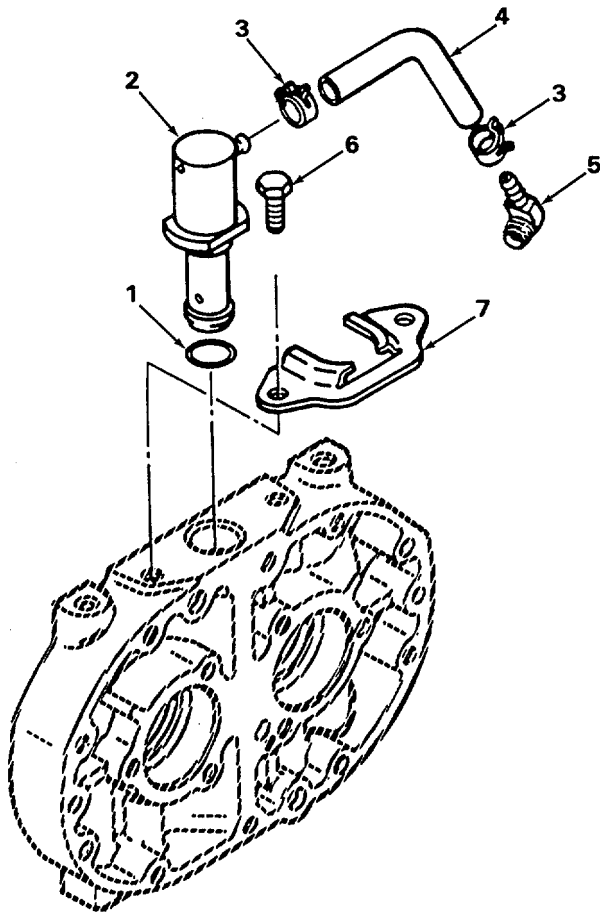


Figure F-96. Blower Bypass Valve

F-258

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-96-					BLOWER BYPASS VALVE	
-1			72582	8923959	SEAL	1
-2			72582	8927187	VALVE ASSY	1
-3			72582	8924968	CLAMP, HOSE	2
-4			72582	8924436	HOSE	1
-5			72582	8924802	ELBOW	1
-6			72582	8927579	SCREW, Cap, Hex Hd	2
-7			72582	8927183	CLAMP	1

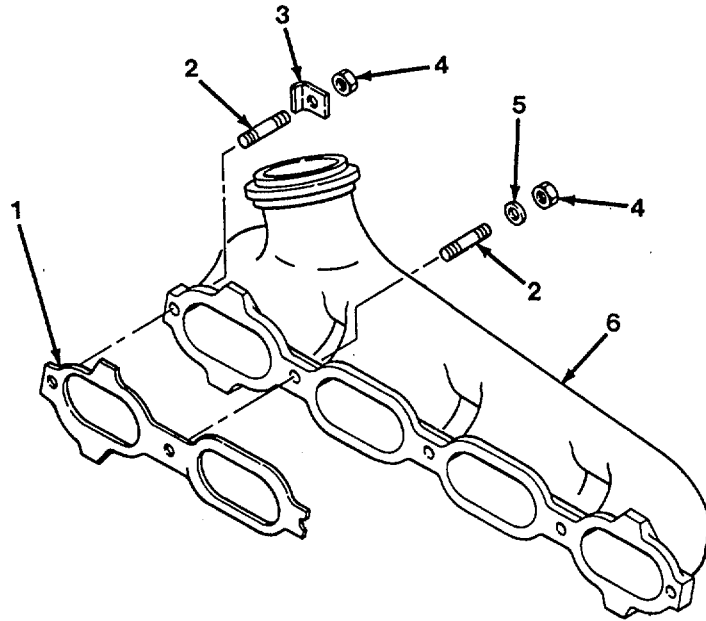


Figure F-97. Exhaust Manifold

F-260

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-97-					EXHAUST MANIFOLD	
-1			72582	5120224	GASKET	4
-2			24617	5112899	STUD, Plain	10
-3			72582	S102735	CRAB, Manifold	4
-4			96906	MS51968-11	NUT, Plain, Hex	10
-5			72582	5104439	WASHER, Spring Tension	6
-6			72582	5148429	MANIFOLD, Exhaust LH	1
-6			72582	5100756	MANIFOLD, Exhaust RH	1

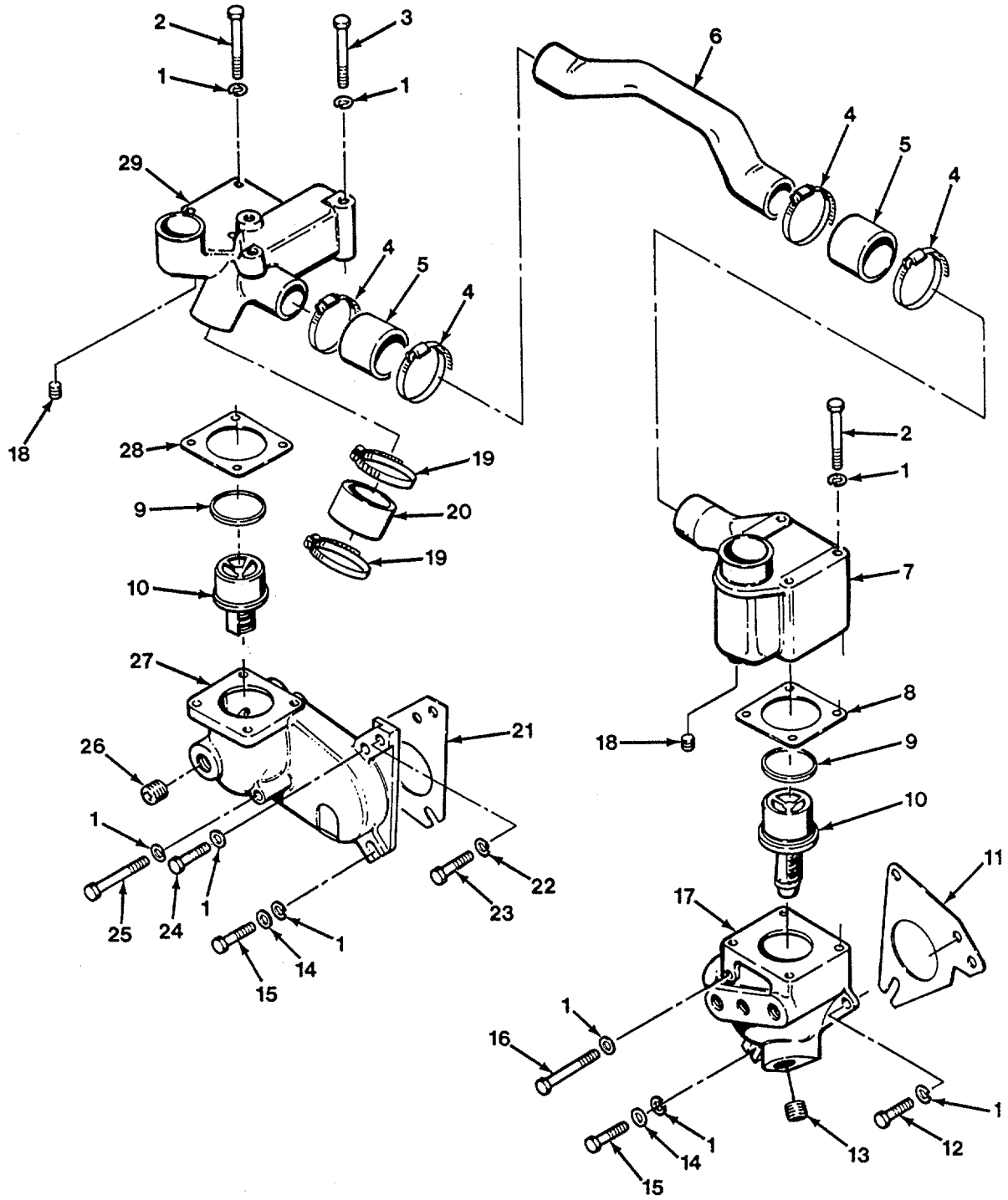


Figure F-98. Thermostats and Housings

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-98-					THERMOSTATS AND HOUSINGS	
-1			96906	MS35338-46	WASHER, Lock	15
-2			96906	MS90728-72	SCREW, Cap, Hex Hd	8
-3			72582	9418964	SCREW, Cap, Hex Hd	1
-4			72582	23503066	CLAMP, Hose	4
-5			72582	5141530	HOSE, Nonmetallic	2
-6			72582	5122424	TUBE, Bent, Metallic	1
-7			72582	5100850	COVER, Thermostat Housing	1
-8			72582	5117786	GASKET	1
-9			72582	5132155	SEAL, Plain Encased	2
-10			72582	5102651	THERMOSTAT, Flow Control	2
-11			72582	5117993	GASKET	1
-12			72582	455537	BOLT	1
-13			72582	5136241	PLUG, Pipe	1
-14			96906	MS27183-14	WASHER, Flat	2
-15			96906	MS90728-64	SCREW, Cap, Hex Hd	2
-16			72582	450517	SCREW, Cap, Hex Hd	1
-17			72582	5106003	HOUSING, Thermostat	1
-18			72582	8924380	PLUG, Pipe	2
-19			72582	9139809	CLAMP, Hose	2
-20			72582	5199780	HOSE, Nonmetallic	1
-21			72582	5123570	GASKET	1
-22			96906	MS35338-47	WASHER, Lock	1
-23			72582	5104163	BOLT, Machine	1
-24			72582	5104156	SCREW, Cap, Hex Hd	1
-25			72582	187491	SCREW, Cap, Hex Hd	1
-26			72582	8923916	PLUG, Pipe, Magnetic	1
-27			72582	5100778	HOUSING, Thermostat	1
-28			72582	5100860	GASKET	1
-29			72582	5100771	COVER, Thermostat Housing	1

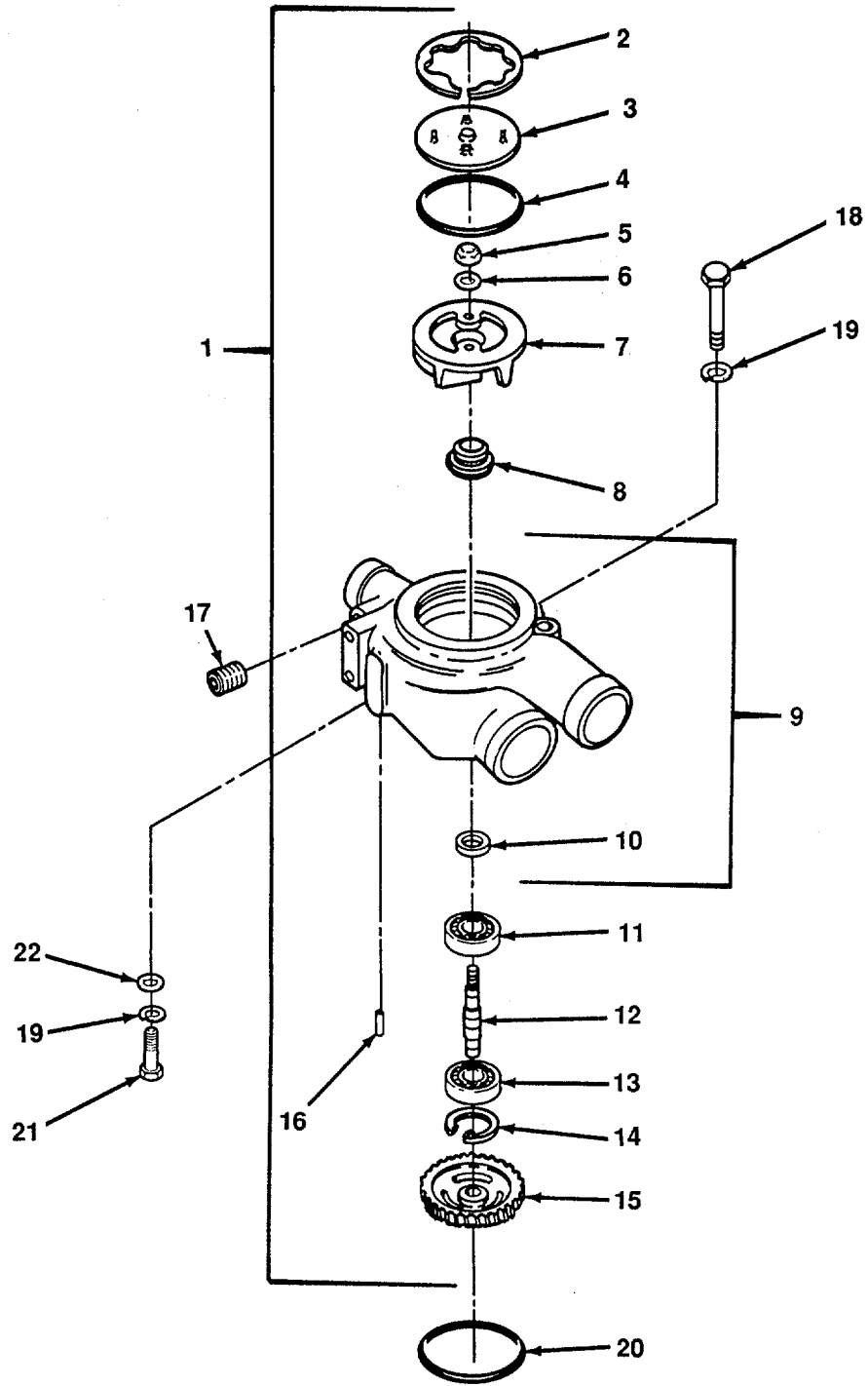


Figure F-99. Water Pump Assembly

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-99-					WATER PUMP ASSEMBLY	
-1			72582	23506019	WATER PUMP ASSEMBLY	1
-2			72582	8922407	RING, Retaining	1
-3			72582	8922383	COVER, Pump	1
-4			72582	5101160	GASKET, Cover	1
-5			72582	5117972	NUT	1
-6			72582	221436	WASHER	1
-7			72582	23505995	IMPELLER	1
-8			72582	23506248	SEAL, Unitized	1
-9			72582	8923753	BODY ASSY, Pump	1
-10			72582	8921150	SEAL, Lip Type	1
-11			72582	23503650	BEARING, Inner	1
-12			72582	23506053	SHAFT	1
-13			72582	23503649	BEARING, Outer	1
-14			72582	274746	RING, Lock	1
-15			72582	5146254	GEAR, Driven	1
-16			72582	141190	PIN, Dowel, 1/4" x 5/16"	1
-17			72582	8923313	PLUG, Pipe	2
-18			72582	186292	SCREW, Cap, Hex Hd	2
-19			72582	103322	WASHER, Lock	3
-20			72582	5103544	RING, Seal	1
-21			72582	179862	SCREW, Cap Hex Hd	1
-22			72582	103342	WASHER, Flat	1

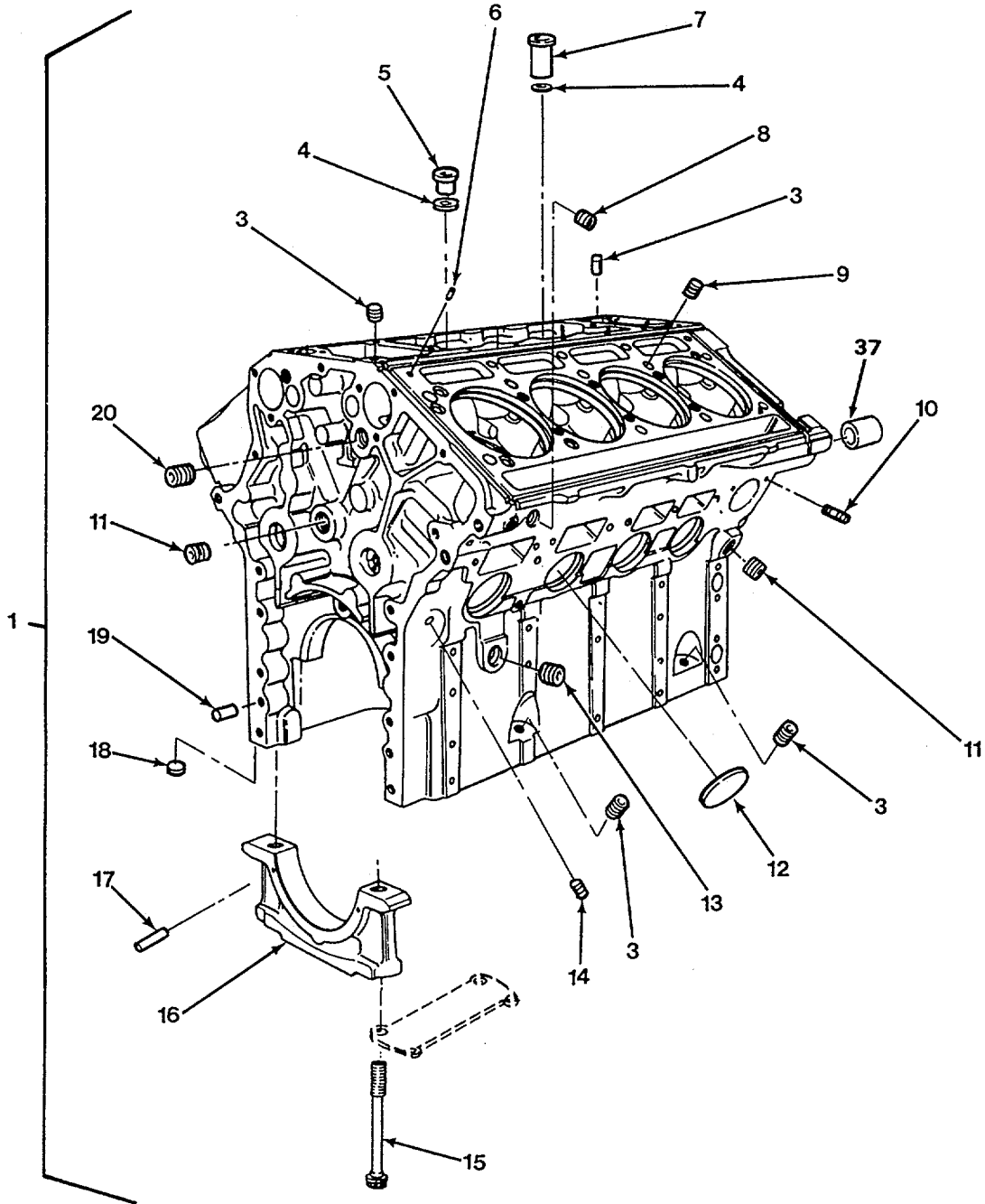


Figure F-100. Cylinder Block Assembly, Sheet 1 of 3

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-100					CYLINDER BLOCK ASSEMBLY	
-1			72582	8923317	ENGINE BLOCK ASSY	1
-3			72582	8923847	PLUG, Pipe	7
-4			72582	5138659	GASKET (Part of Kit P/N 51 99617-see below)	2
-5			72582	5101033	ADAPTER, Inlet, Cylinder	1
-6			72582	5103045	PIN	3
-7			72582	5148646	PLUG, Protective, Dust	1
-8			72582	5146913	BUSHING	2
-9			72582	8925531	PLUG	14
-10			72582	5150362	STUD, Plain	2
-11			72582	8923313	PLUG, Pipe	6
-12			72582	5139989	PLUG, Expansion	8
-13			72582	8924750	PLUG, Pipe	3
-14			72582	8924380	PLUG, Pipe	2
-15			72582	8924272	BOLT, Machine	10
-16			72582	5146497	CAP, Pillow Block, Unfinished	5
-16			72582	5149220	CAP, Pillow Block, Finished	5
-17			72582	5103045	PIN, Straight, Headless	3
-18			72582	5139988	PLUG	3
-19			72582	5151576	PIN, straight, Headless	4
-20			96105	F190038	PLUG, Pipe	2
-21			72582	9428477	PLUG, Expansion	1
-22			72582	5132410	PLUG, Expansion	2
-23			72582	8924517	PLUG	1
-24			72582	5146646	PLUG, Pipe	1
-25			72582	179838	BOLT, Machine	4
-26			96906	MS27183-14	WASHER, Flat	4
-27			72582	5117733	COVER, Access	1
-28			72582	5117734	GASKET, (Part of Kit P/N 5199617-see below)	1
-29			72582	8927189*	SEAL, Cylinder Sleeve (Part of kit P/N 23503939-see below)	16
-30			72582	5148501	INSERT, Cylinder Sleeve, Std Size (.1200"-.1205")	8
-30			72582	5148612	INSERT, Cylinder Sleeve (.1188"-.1193")	8
-30			72582	5148611	INSERT, Cylinder Sleeve (.1212"-.1217")	8
-30			72582	5101727	INSERT, Cylinder Sleeve (.1362"-.1367")	8
-31			72582	5100404	GASKET, (Part of Kit P/N 5199674 - see figure F-1 03); (Part of Kit P/N 5199617-see below)	8
-32			72582	8927464*	SLEEVE, Cylinder, (Part of Kit P/N 23503939-see below)	8
-33			72582	8923159	STABILIZER, Crankshaft Main Bearing Cap, Left Front	1
-33			72582	8923160	STABILIZER, Crankshaft Main Bearing Cap, Right Front	1
-34			77445	5125608	WASHER, FRat	7
-35			77873	9409620	BOLT, Self-Locking	7
-36			72582	8923162	STABILIZER, Crankshaft Main Bearing Cap, Left Rear	1
-36			72582	8923163	STABILIZER, Crankshaft Main Bearing Cap, Right Rear	1
-37			72582	5103930	BUSHING, Camshaft	4
			72582	23503939	CYLINDER KIT (Includes items marked* plus items 1 and 10 thru 15 in figure F-111)	8
			72582	5199617	ENGINE OVERHAUL GASKET KIT (includes all gaskets necessary for one complete engine overhaul)	1

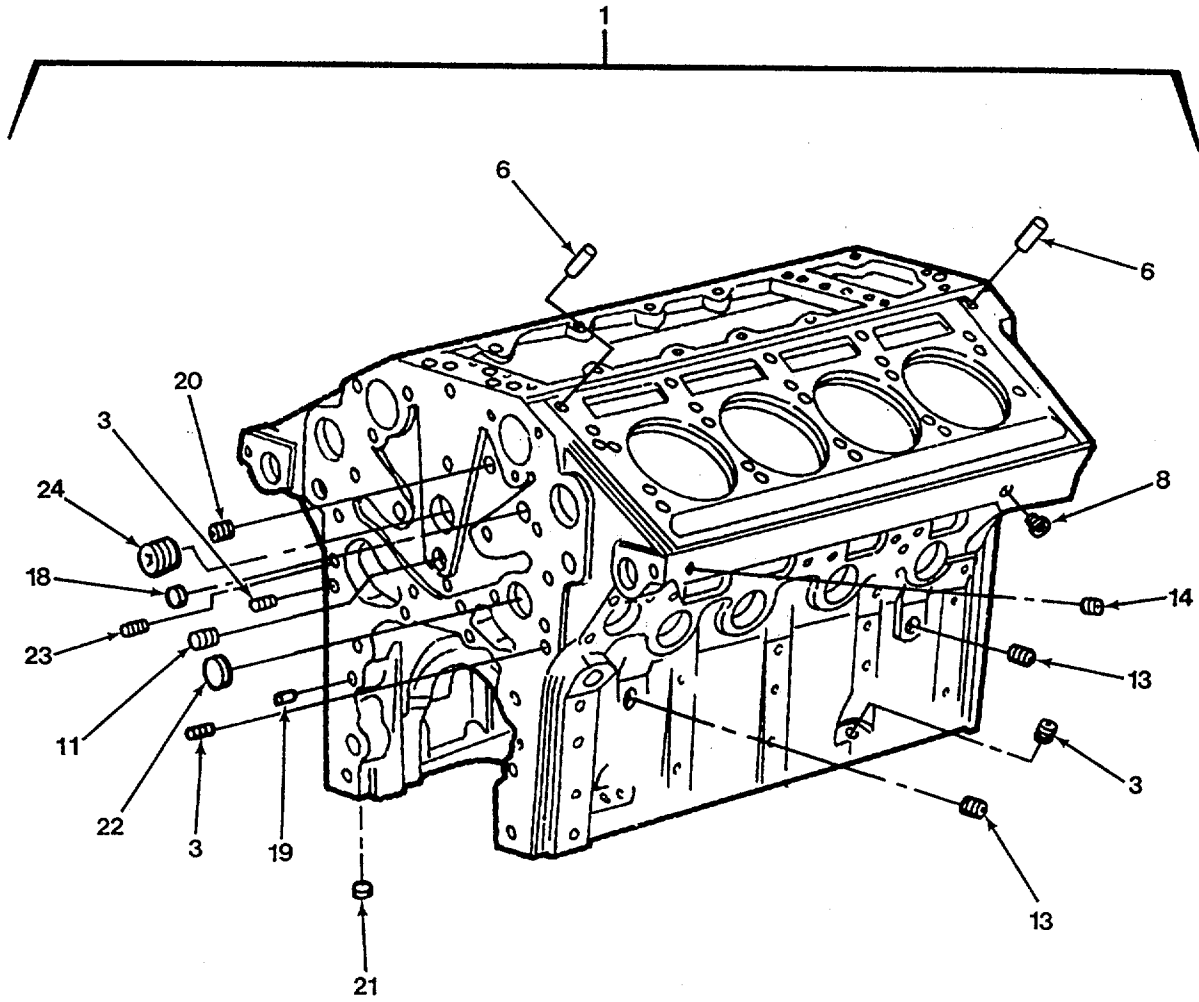


Figure F-100. Cylinder Block Assembly, Sheet 2 of 3

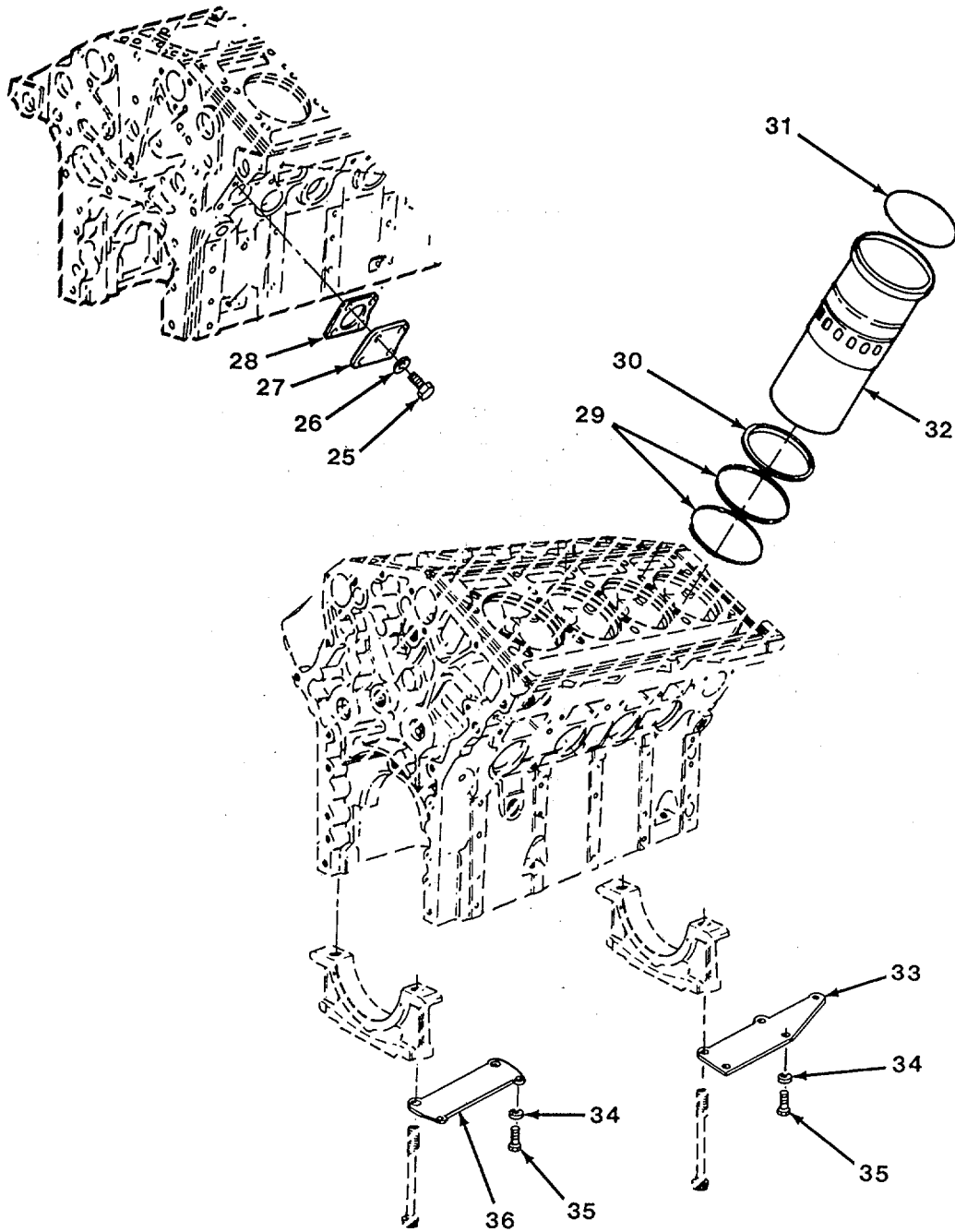


Figure F-100. Cylinder Block Assembly, Sheet 3 of 3

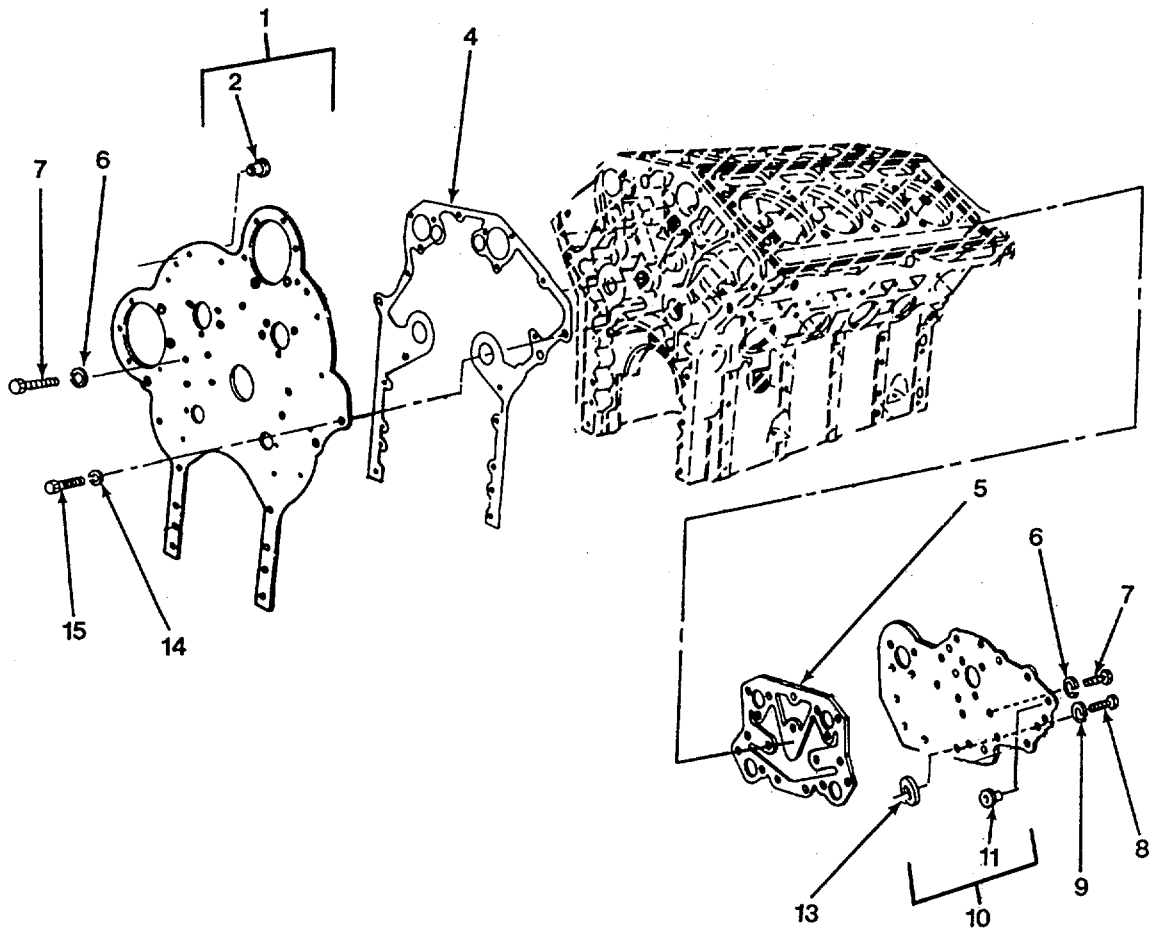


Figure F-101. Cylinder Block End Plates

F-270

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-101					CYLINDER BLOCK END PLATES	
-1			72582	5102841	PLATE ASSY, Cylinder Block End-Rear	1
-2			72582	5121459	INSERT, Screw Thread	10
-4			72582	23506157	GASKET	1
-5			72582	5144901	GASKET	1
-6			96906	MS35338-46	WASHER, Lock	9
-7			96906	MS18154-58	SCREW, Cap, Hex Hd	9
-8			24617	122408	SCREW, Cap, Hex Hd	2
-9			96906	MS35338-48	WASHER, Lock	2
-10			72582	5132422	PLATE ASSY, Cylinder Block End-Front	1
-11			72582	5121459	INSERT, Screw Thread	1
-13			72582	5121835	GASKET	1
-14			96906	MS35338-50	WASHER, Lock	1
-15			72582	428204	SCREW, Cap, Hex Hd	1

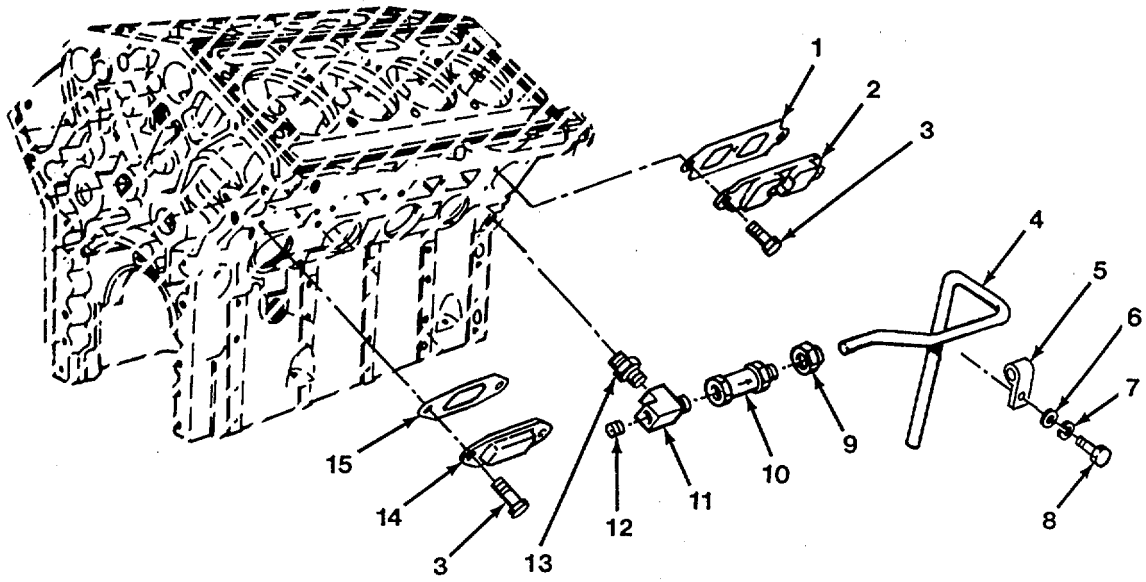


Figure F-102. Air Box Covers and Drains

F-272

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-102-					AIR BOX COVERS AND DRAINS	
-1			72582	8923792	GASKET	4
-2			72582	5144186	COVER, Access	2
-3			72582	8920631	BOLT, Machine	14
-4			45152	21C21FX24	HOSE	2
-5			72582	2488C22	CLAMP, Loop	2
-6			96906	MS27183-14	WASHER, Flat	2
-7			96906	MS35338-46	WASHER, Lock	2
-8			72582	179838	BOLT, Machine	2
-9			01276	4739-6	ADAPTER, Straight	2
-10			72582	25C42692	VALVE, Check	2
-11			72582	8924178	TEE, Pipe	2
-12			72582	8923847	PLUG, Pipe	2
-13			72582	8924180	NIPPLE, Pipe	2
-14			72582	5132458	COVER, Access	4
-15			72582	8923791	GASKET	2

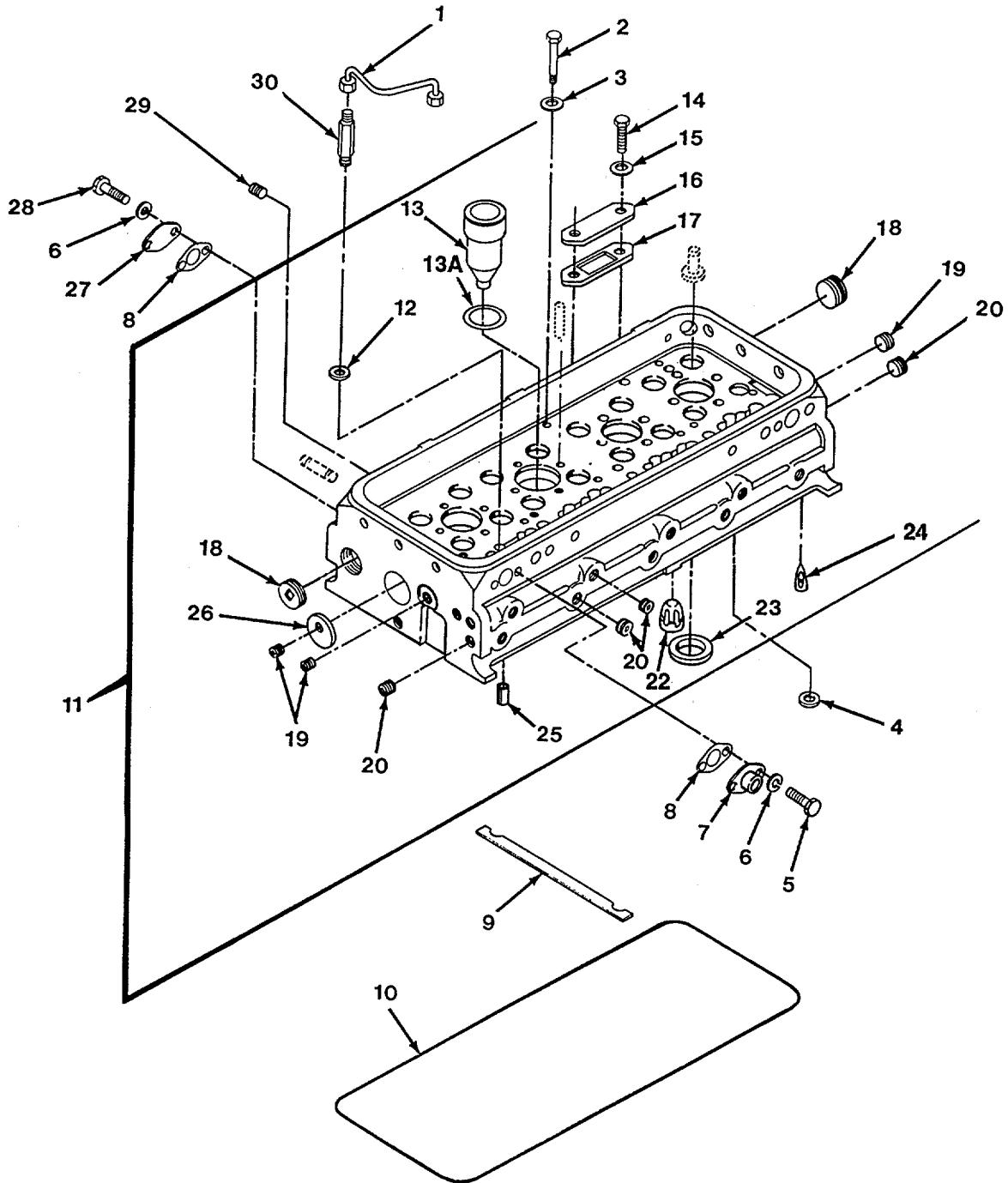


Figure F-103. Cylinder Head

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-103-					CYLINDER HEAD	
-1			75078	001294	TUBE ASSY, Metal-Short	8
-1			75078	001295	TUBE ASSY, Metal-Long	8
-2			72582	5148324	BOLT	40
-3			72582	5148310	WASHER, Flat	40
-4			72582	148502	RING, Seal	34
-5			96906	MS90728-6	SCREW, Cap, Hex Hd	4
-6			96906	MS35338-44	WASHER, Lock	12
-7			72582	5124333	ADAPTER, Straight	2
-8			72582	5123812	GASKET	6
-9			72582	5100703	SHIM	4
-10			72582	5119973	GASKET	2
-11			72582	5149878	CYLINDER HEAD ASSY	2
-12			88044	AN960-718	WASHER, Flat	8
-13			72582	8925981	TUBE KIT, Injector	4
-13A			72582	5104701	RING, Seal, Injector Tube	4
-14			72582	5104153	SCREW, Cap, Hex Hd	8
-15			10001	265850PC88	WASHER, Flat	8
-16			72582	5117344	COVER, Access	4
-17			72582	5150361	GASKET	4
-18			72582	8923313	PLUG, Pipe	2
-19			72582	5154453	PLUG, Machine Thread	6
-20			72582	8923847	PLUG, Pipe	13
-22			72582	5172874	NOZZLE, Water-Single Outlet	2
-23			72582	5148490	SEAT, Valve (Std)	16
-23			72582	5101315	SEAT, Valve (.010" O/S OD)	AR
-24			72582	8922388	NOZZLE, Water, Double Outlet	6
-25			72582	5148615	SLEEVE, Pilot	2
-26			72582	5117186	PLUG, Expansion	1
-27			72582	5150268	COVER, Access	4
-28			72582	5104089	BOLT, Self-Locking	8
-29			72582	8923847	PLUG, Pipe	10
-30			72582	5117369	ADAPTER, Straight, Tube	16
			72582	5199674	CYLINDER HEAD OVERHAUL GAS-KET KIT (includes all gaskets necessary to replace one cylinder head)	2

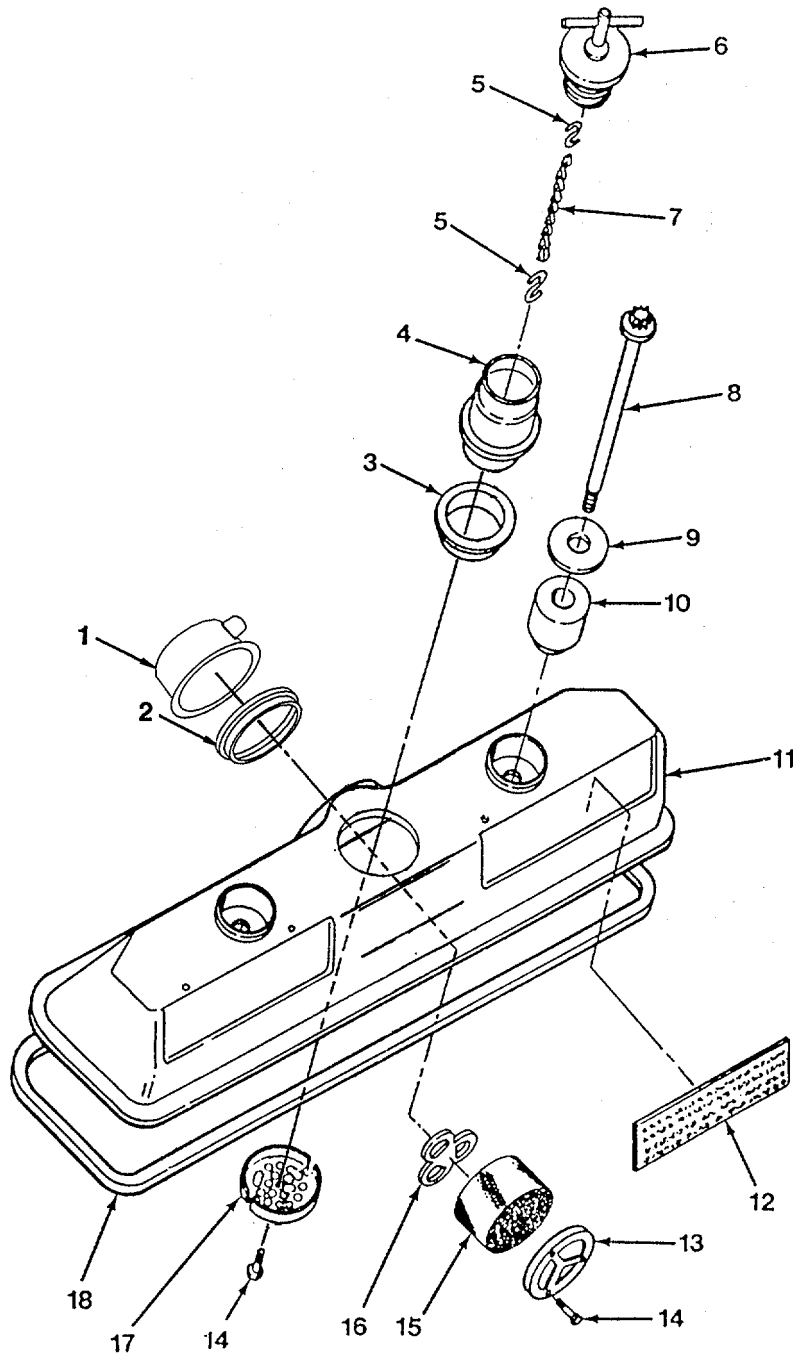


Figure F-104. Rocker Arm Cover

F-276

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-104					ROCKER ARM COVER	
-1			72582	5103648	RETAINER, Breather	2
-2			72582	5103646	SEAL, Plain	2
-3			72582	5104105	GASKET	1
-4			72582	5104406	TUBE, Oil Filter	1
-5			72582	5107979	HOOK, Chain, S	2
-6			72582	5117362	CAP, Filler Opening	1
-7			72582	5113825	CHAIN, Cap	1
-8			72582	5104020	BOLT, Shoulder	4
-9			72582	5104514	WASHER, Special	4
-10			72582	5104515	ISOLATOR	4
-11			72582	5103981	COVER, Engine, RB	1
-11			72582	5106299	COVER, Engine, LB	1
-12			72582	5104282	PLATE	2
-13			72582	5103647	RETAINER, Breather	2
-14			72582	5103642	SCREW, Cap, Hex Hd	9
-15			72582	5101760	ELEMENT, Breather	2
-16			72582	5103636	RETAINER, Breather	2
-17			72582	5106910	ELEMENT, Strainer	2
-18			72582	5104081	GASKET	2

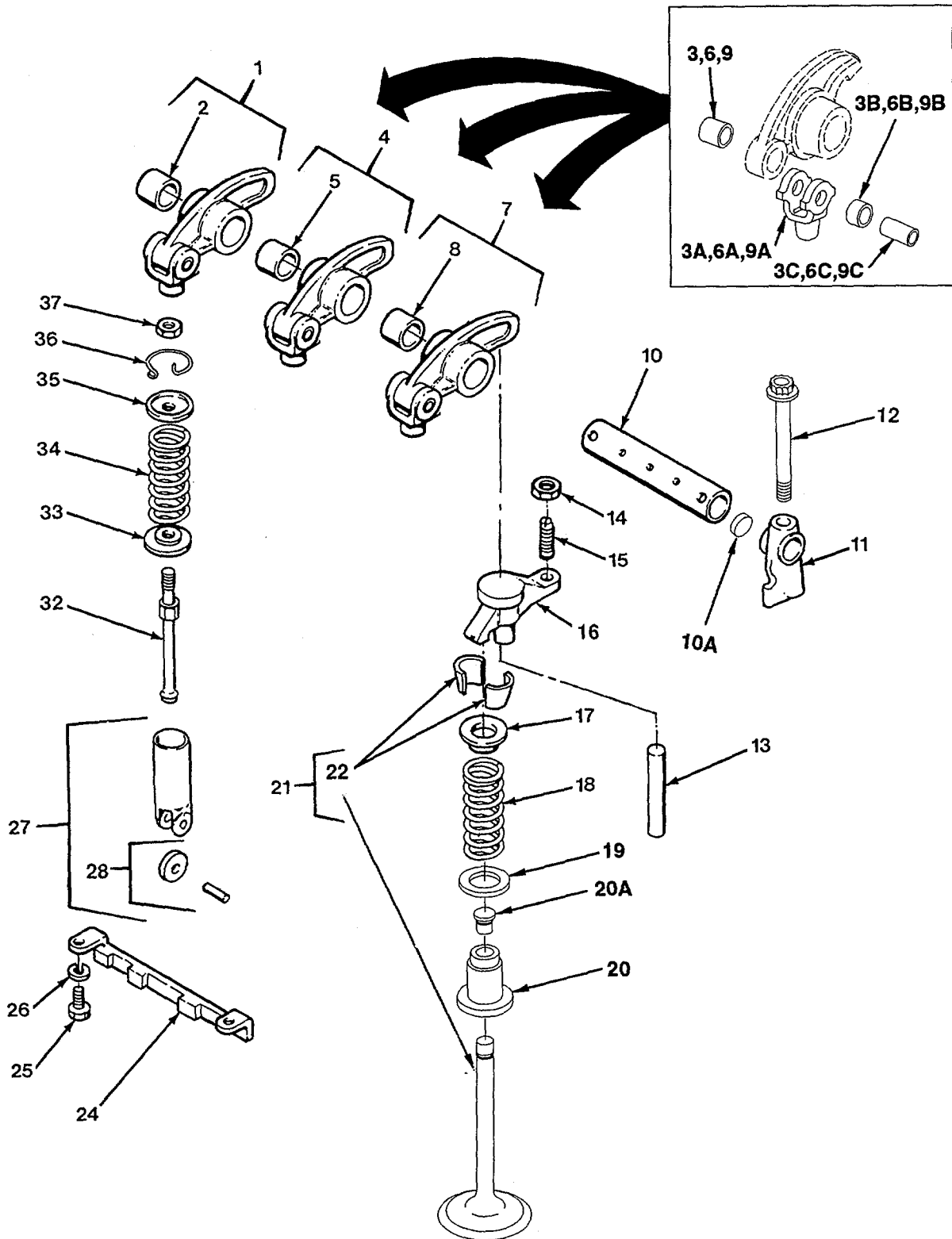


Figure F-105. Valves, Rocker Arms and Cam Followers

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-105-					VALVES, ROCKER ARMS, AND CAM FOLLOWERS	
-1			72582	5148472	ROCKER ARM ASSY, Left	8
-2			72582	5122445	BUSHING, Sleeve	1
-3			72582	5150311	BUSHING, Small, Injector and Exhaust Valve Rocker Arms	1
-3A			72852	5150312	CLEVIS, Injector and Exhaust Valve Rocker Arms	1
-3B			72582	5123700	BUSHING, Injector and Exhaust Valve Rocker Arm Clevis	1
-3C			72582	5150314	PIN, Injector and Exhaust Valve Rocker Arm Clevis	1
-4			72582	8923554	ROCKER ARM ASSY, Injector	8
-5			72582	5150318	BUSHING, Sleeve	1
-6			72582	5150311	BUSHING, Small, Injector and Exhaust Valve Rocker Arms	1
-6A			72852	5150312	CLEVIS, Injector and Exhaust Valve Rocker Arms	1
-6B			72582	5123700	BUSHING, Injector and Exhaust Valve Rocker Arm Clevis	1
-6C			72582	5150314	PIN, Injector and Exhaust Valve Rocker Arm Clevis	1
-7			72582	5148475	ROCKER ARM ASSY, Right	8
-8			72582	5122445	BUSHING, Sleeve	1
-9			72582	5150311	BUSHING, Small, Injector and Exhaust Valve Rocker Arms	1
-9A			72852	5150312	CLEVIS, Injector and Exhaust Valve Rocker Arms	1
-9B			72582	5123700	BUSHING, Injector and Exhaust Valve Rocker Arm Clevis	1
-9C			72582	5150314	PIN, Injector and Exhaust Valve Rocker Arm Clevis	1
-10			72582	23500714	SHAFT ASSY, Rocker Arm	8
-10A			72582	5151272	. PLUG, 11/32" x 1/4"	1
-11			72582	5103903	BRACKET, Rocker Shaft	16
-12			72582	5150325	BOLT, Hex Hd	16
-13			72582	5117564	GUIDE, Exhaust Valve Bridge	16
-14			72582	5151601	NUT, Lock	16
-15			72582	5129101	SCREW, Adjusting	16
-16			72582	5148491	BRIDGE, Exhaust Valve	16
-17			72582	5117563	CAP, Exhaust Valve Spring	32
-18			72582	8927794	SPRING, Exhaust Valve	32
-19			72582	5117562	SEAT, Exhaust Valve Spring	32
-20			72582	5129919	GUIDE, Exhaust Valve	16
-20A			72582	8921209	SEAL ASSY	32
-21			72582	5149771	VALVE KIT, Exhaust	32
-23			72582	511337	LOCK, Valve Spring	2
-24			72582	5106413	GUIDE, Cam Follower	8
-25			96906	MS90728-6	SCREW, Cap Hex Hd	16
-26			96906	MS35338-44	WASHER, Lock	16
-27			72582	8924439	FOLLOW ASSY, Cam	24
-28			72582	8923814	ROLLER SET, Cam Follower	1
-32			72582	5128640	ROD, Push	24
-33			72582	5123250	SEAT, Push Rod Spring-Lower	24
-34			72582	5108918	SPRING, Helical, Comp	24
-35			72582	5108919	SEAT, Push Rod Spring-Upper	24
-36			72582	5150303	RING, Retaining	24
-37			72582	5151601	NUT, Lock	24

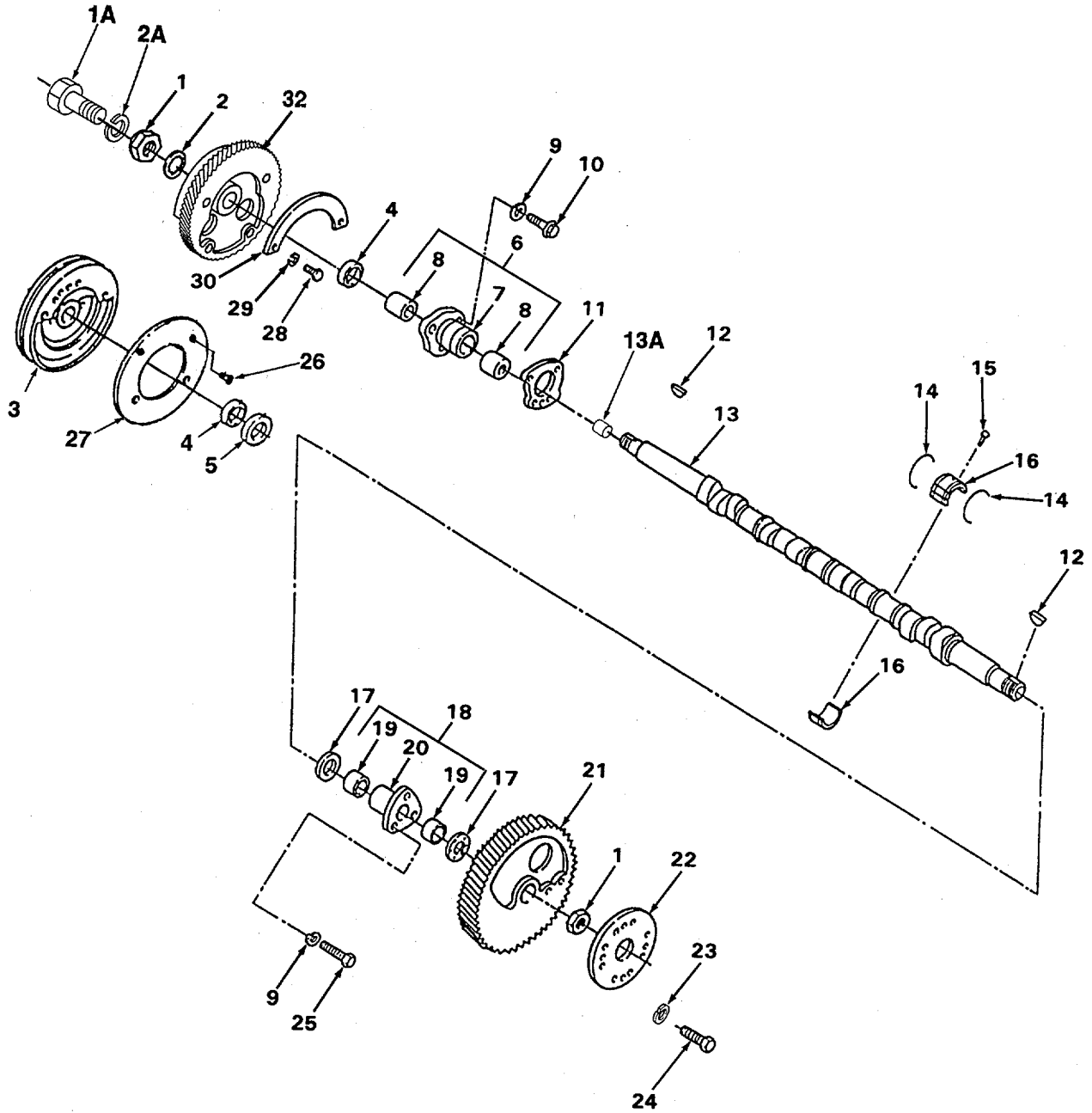


Figure F-106. Camshafts

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-106-					CAMSHAFTS	
-1			72582	5150087	NUT, Plain, Hex	4
-1A			72582	23504907	BOLT (Right Bank)	1
-2			72582	5177769	WASHER, Lock	2
-2A			72582	5141367	WASHER, Lock (Right Bank)	1
-3			72582	8928514	PULLEY, Groove (Left Bank)	1
-4			72582	5116485	SPACER, Ring	2
-5			72582	5106223	SEAL, Plain Encased (Left Bank)	1
-6			72582	5117984	BEARING ASSY, Sleeve	2
-6			72582	5197569	BEARING ASSY, Sleeve-Front (.010" u/s ID)	2
-6			72582	5197613	BEARING ASSY, Sleeve-Front (.020" u/s ID)	2
-7			72582	5117984-1	BEARING, Sleeve-Front (std size)	2
-8			72582	5111423	BUSHING, Sleeve (std size)	2
-8			72582	5194825	BUSHING, Sleeve (.020" u/s unfinished)	2
-8			72582	5197110	BUSHING, Sleeve (.020" u/s unfinished; may be finished to std or .010" u/s)	2
-9			96906	MS35338-46	WASHER, Lock	12
-10			72582	9414268	BOLT, Machine	6
-11			72582	5117243	GASKET	1
-12			72582	8926247	KEY, Woodruff	4
-13			72582	23502838	CAMSHAFT, Engine, Right Bank (w/plugs)	1
-13			72582	23502835	CAMSHAFT, Engine, Left Bank (w/plugs)	1
-13A			72582	5151277	. PLUG, Drive	3
-14			72582	5115572	RING, Retainer	12
-15			72582	8927479	BOLT	6
-16			72582	5196026	BEARING SET (std size)	6
-16			72582	5196027	BEARING SET (.010" u/s ID)	6
-16			72582	5196028	BEARING SET (.020" u/s ID)	6
-16			72582	5196029	BEARING SET (.010" o/s OD)	6
-17			72582	5111424	WASHER, Thrust (std size)	4
-17			72582	5194826	WASHER, Thrust (.005" o/s)	1
-17			72582	5194827	WASHER, Thrust (.010" o/s)	1
-18			72582	5111422	BEARING ASSY, Sleeve-Rear (std size)	2
-18			72582	5194858	BEARING ASSY, Sleeve-Rear (.010" u/s ID)	2
-18			72582	5197236	BEARING ASSY, Sleeve-Rear (.010" o/s OD)	2
-18			72582	5197237	BEARING ASSY, Sleeve-Rear (.010" o/s OD; .010" u/s, ID)	2
-18			72582	5197238	BEARING ASSY, Sleeve-Rear (.010" o/s OD; .020" u/s, ID)	2
-18			72582	5194859	BEARING ASSY, Sleeve-Rear (.020" u/s ID)	2
-19			72582	5111423	BUSHING, Sleeve (std size)	2
-19			72582	5194825	BUSHING, Sleeve (.020" u/s unfinished)	2
-19			72582	5197110	BUSHING, Sleeve (.020" u/s unfinished; may be finished to std or .010" u/s)	2
-20			72582	5111422-1	BEARING, Sleeve-Rear	2
-21			72582	23504825	GEAR, Cam Right Bank and Water Pump Drive	1
-21			72582	23500595	GEAR, Cam Left Bank	1
-22			72582	5172734	PLATE, Retaining (Left Bank)	1
-23			96906	MS35338-46	WASHER, Lock	4
-24			72582	186627	BOLT	4
-25			96906	MS90728-62	SCREW, Cap, Hex Hd	6
-26			72582	8928516	SCREW	4
-27			72582	8928511	WHEEL, Speed Sensor Pulse (Left Bank)	1
-28			72582	9409035	SCREW, Cap, Hex Hd	2
-29			72582	5177769	WASHER, Lock	2
-30			72582	5144888	WEIGHT, Front Balance (Right Bank)	1
-32			72582	5126904	GEAR, Water Pump Drive (Right Bank)	1

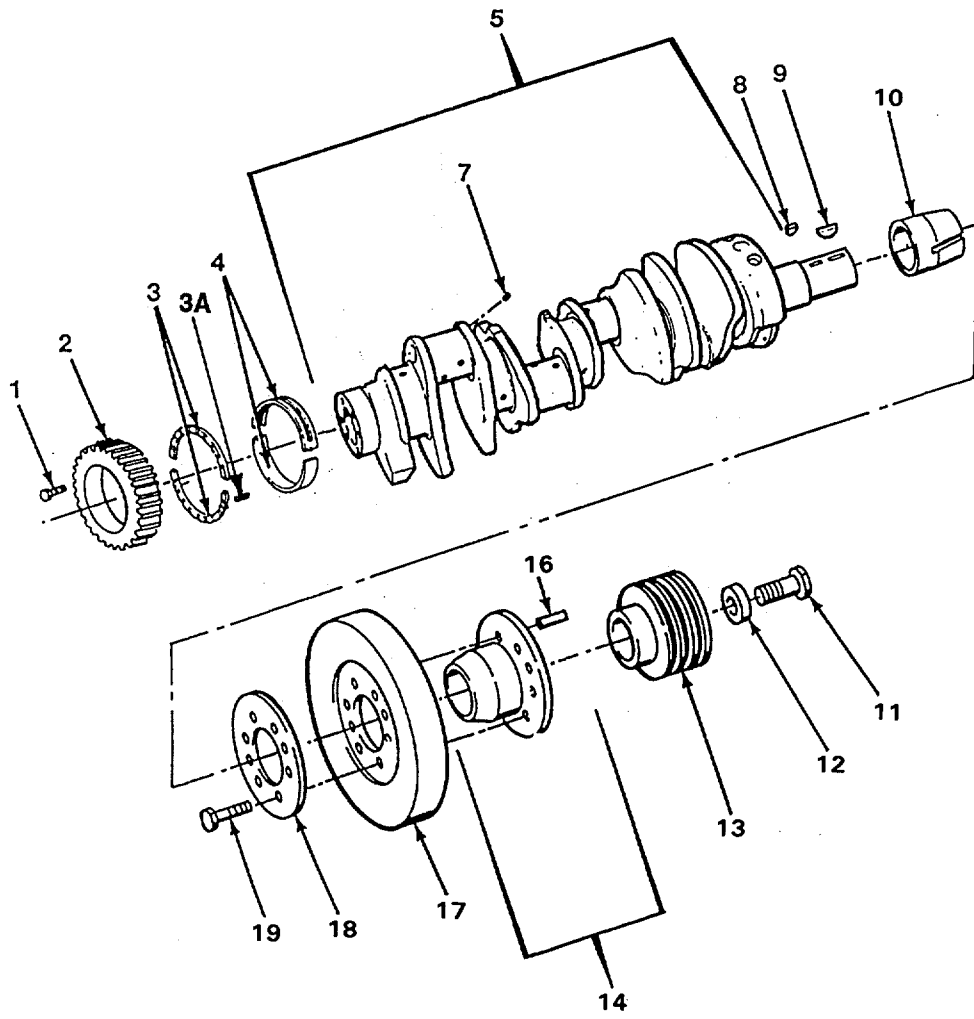


Figure F-107. Crankshaft

F-282

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-107-				CRANKSHAFT		
-1			72582	9409035	BOLT, Self-Locking	6
-2			72582	8926631	GEAR, Crankshaft	1
-3			72582	5117005	WASHER, Thrust	1
-3			72582	5196753	WASHER, Thrust (.005" o/s)	1
-3			72582	5196754	WASHER, Thrust (.010" o/s)	1
-3A			72582	141346	PIN, Dowel	4
-3A			72582	5149149	PIN, Dowel (1/32" o/s)	4
-4			72582	5149565	BEARING, Sleeve-Set	5
-4			72582	5149566	BEARING, Sleeve-Set (.002" u/s)	5
-4			72582	5149567	BEARING, Sleeve-Set (.010" u/s)	5
-4			72582	5149568	BEARING, Sleeve-Set (.020" u/s)	5
-4			72582	8922118	BEARING, Sleeve-Set (.030" u/s)	5
-5			72582	8926923	CRANKSHAFT ASSY	1
-7			73342	8924749	PLUG, Pipe	4
-8			72582	8928545	KEY, Woodruff	1
-9			72582	5131724	KEY, Woodruff	2
-10			72582	5102597	CONE	1
-11			72582	23501142	BOLT, Machine	1
-12			72582	5157930	RETAINER, Pulley	1
-13			72582	5124532	PULLEY, Groove	1
-14			72582	5104834	HUB ASSY	1
-16			72582	5175641	PIN, Straight, Headless	2
-17			72582	8922492	DAMPER, Shimmy	1
-18			72582	5100792	PLATE, Scuff	1
-19			96906	MS90726-33	BOLT, Machine	8

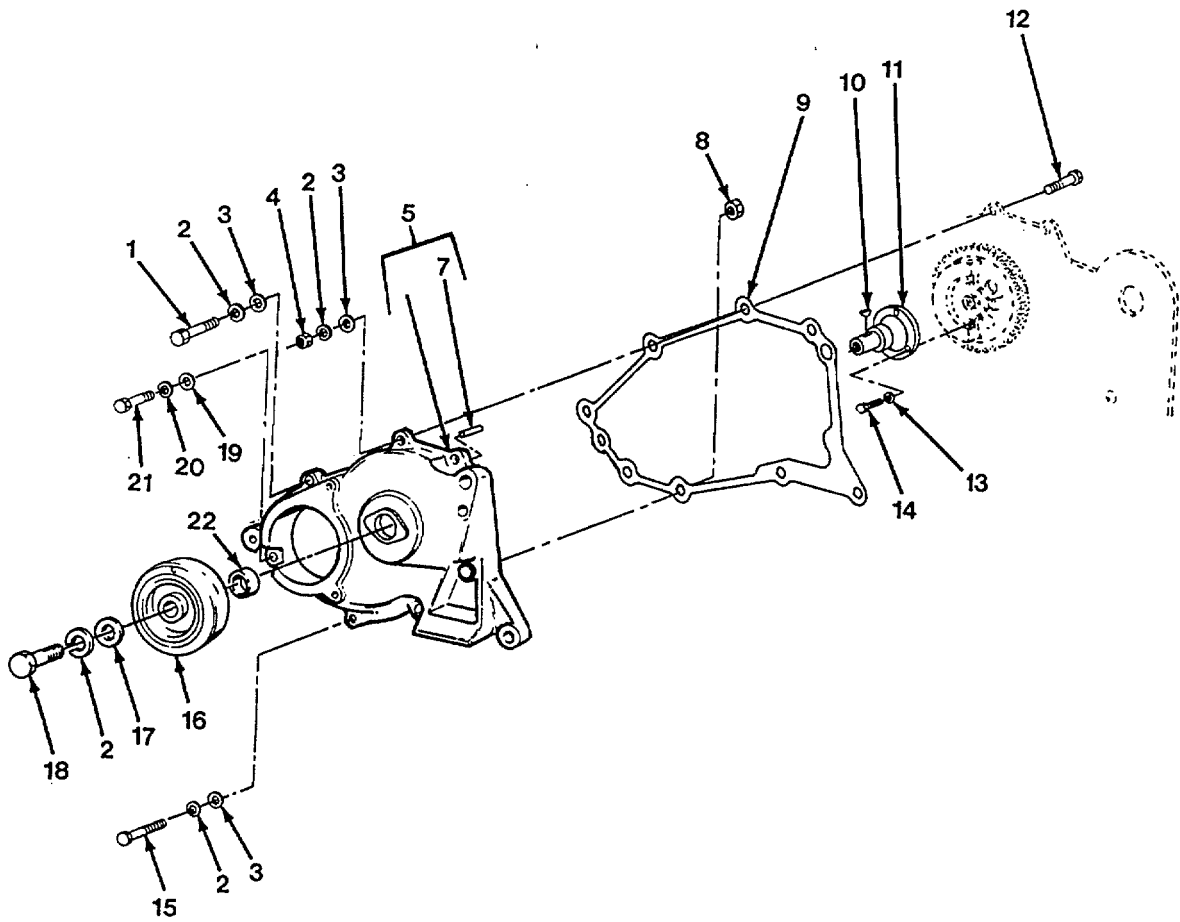


Figure F-108. Vibration Damper and Front Balance Cover

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-108-					VIBRATION DAMPERAND FRONT BALANCE COVER	
-1			96906	MS90727-62	SCREW, Cap, Hex Hd	
-2			96906	MS35338-46	WASHER, Lock	9
-3			96906	MS27183-14	WASHER, Flat	8
-4			72582	117049	NUT, Plain, Hex	3
-5			72582	5141661	COVER ASSY, Balance	1
-7			72582	141236	PIN, Straight, Headless	3
-8			72582	9413533	NUT, Self-Locking, Hex	1
-9			72582	5123638	GASKET	1
-10			96906	MS35756-5	KEY, Woodruff	1
-11			72582	5117920	SHAFT, Pulley Drive	1
-12			72582	181371	BOLT, Machine	4
-13			96906	MS35338-45	WASHER, Lock	3
-14			96906	MS90726-33	BOLT, Machine	3
-15			96906	MS90725-67	SCREW, Cap, Hex Hd	2
-16			72582	5101171	DAMPER, Vibration	1
-17			72582	5150230	WASHER, Flat	1
-18			96906	MS18154-58	SCREW, Cap, Hex Hd	1
-19			96906	MS27183-18	WASHER, Flat	1
-20			96906	MS35338-48	WASHER, Lock	1
-21			72582	179888	SCREW, Machine	1
-22			72582	5177786	SEAL, Plain Encased	1

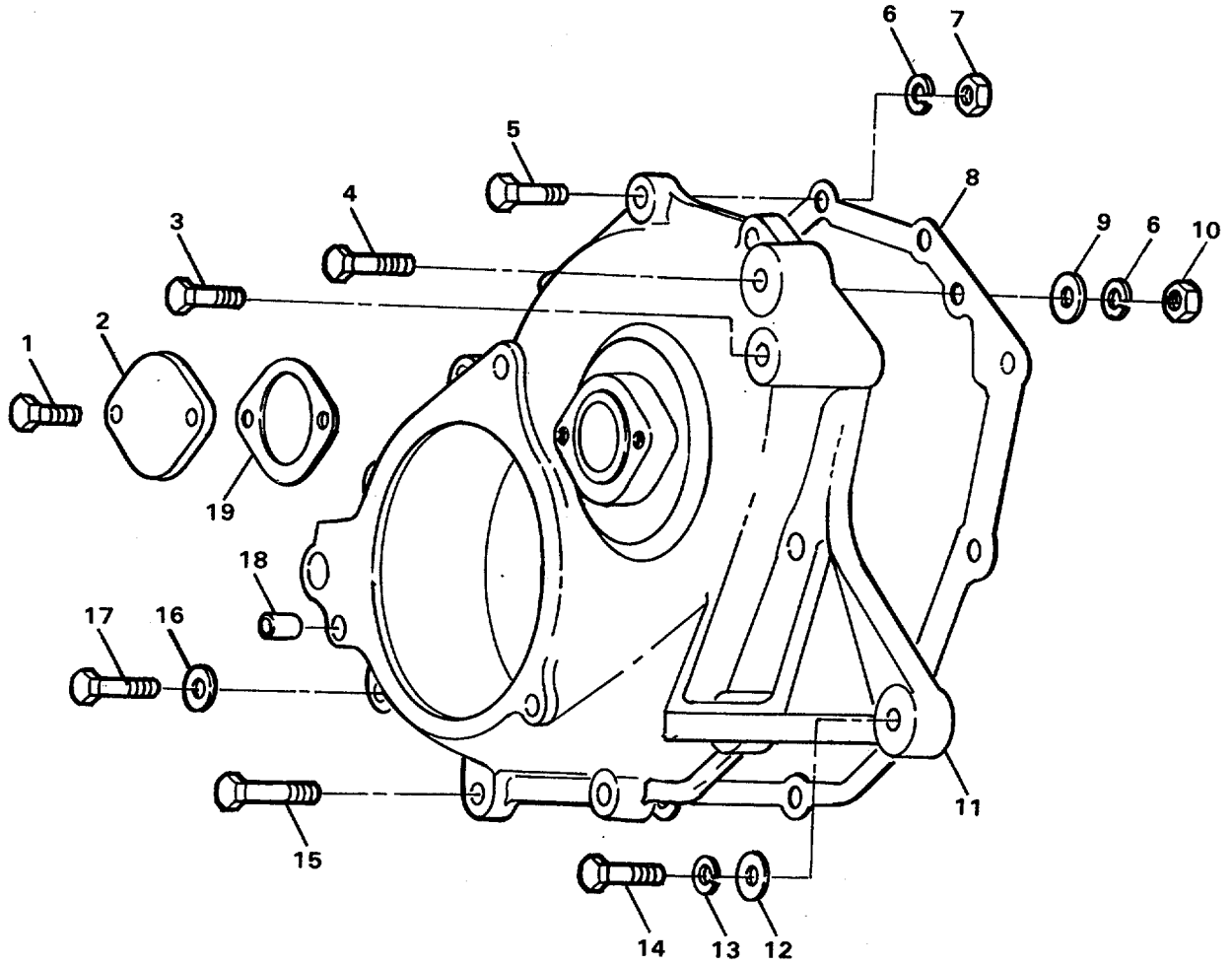


Figure F-109. Balance Weight Cover

F-286

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-109-					BALANCE WEIGHT COVER	
-1			72582	9419648	SCREW, Cap, Hex Hd	2
-2			72582	5122680	COVER	1
-3			72582	191249	SCREW, Cap, Hex Hd	2
-4			72582	179848	SCREW, Cap, Hex Hd	2
-5			72582	8925439	SCREW, Cap, Hex Hd	1
-6			72582	103321	WASHER, Lock	7
-7			72582	9413533	NUT, Plain, Hex	1
-8			72582	5123638	GASKET	1
-9			72582	103341	WASHER, Flat	8
-10			72582	117049	NUT, Plain, Hex	4
-11			72582	5108907	COVER, Balance	1
-12			72582	103343	WASHER, Flat	1
-13			72582	103323	WASHER, Lock	1
-14			72582	179888	SCREW, Cap, Hex Hd	1
-15			72582	181374	SCREW, Cap, Hex Hd	4
-16			72582	103345	WASHER, Flat	2
-17			72582	271564	SCREW, Cap, Hex Hd	2
-18			72582	141236	PIN, Dowel	3
-19			72582	5123123	GASKET	1

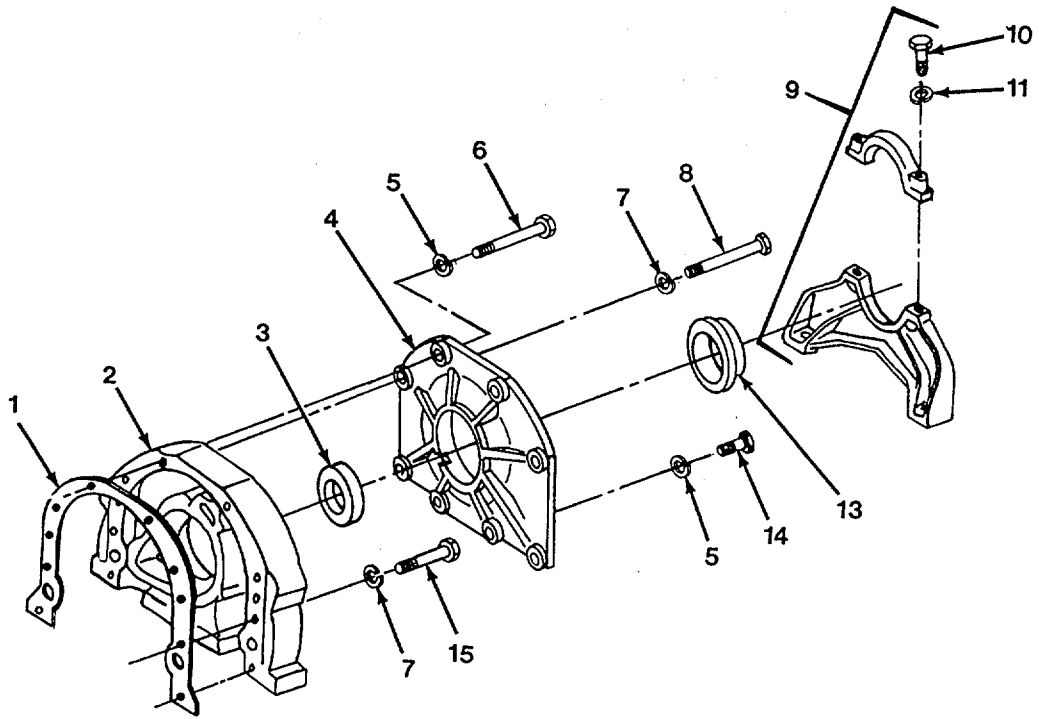


Figure F-110. Crankshaft Cover, Trunnion and Oil Seal

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-110					CRANKSHAFT COVER, TRUNNION AND OIL SEAL	
-1			72582	5121714	GASKET	1
-2			72582	5126084	COVER, Flywheel	1
-3			72582	5115454	SEAL, Plain, Encased	1
-4			72582	8920886	PLATE, Front, Trunnion	1
-5			96906	MS35338-46	WASHER, Lock	4
-6			72582	455537	BOLT, Machine	2
-7			96906	MS35338-48	WASHER, Lock	6
-8			72582	9415559	BOLT, Machine	4
-9			72582	5103957	SUPPORT ASSY, Trunnion	1
-10			72582	454934	. SCREW, Cap, Hex Hd	2
-11			96906	MS35338-47	. WASHER, Lock	2
-13			72582	5103566	RING	1
-14			96906	MS90728-62	SCREW, Cap, Hex Hd	2
-15			96906	MS51095-420	SCREW, Cap, Hex Hd	2

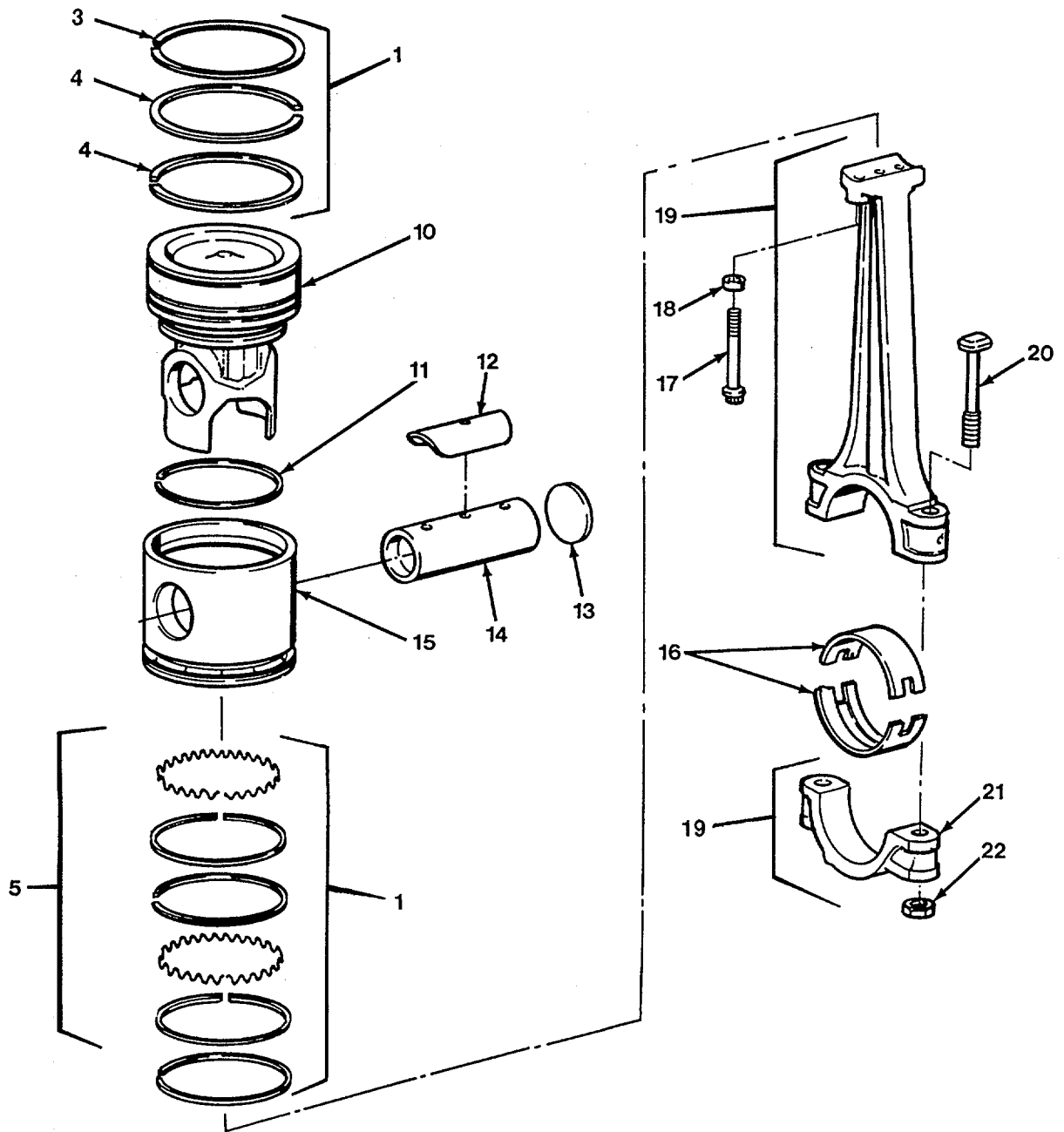


Figure F-111. Piston and Connecting Rod

F-290

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-111-					PISTON AND CONNECTING ROD	
-1			72582	23503940	RING SET, Piston	8
-3			72582	23502891	RING, Piston	1
-4			72582	8923113	RING, Piston	2
-5			72582	8924105	RING SET, Piston Oil Control	1
-10			72582	8926480*	CROWN, Piston	8
-11			72582	8923729*	RING, Piston Seal	8
-12			72582	23501687*	BEARING, Sleeve	8
-13			72582	5180250*	RETAINER, Piston Pin	16
-14			72582	5101120*	PIN ASSY, Piston (Includes nut and oil tube)	8
-15			72582	23503267	SKIRT, Piston	8
-16			72582	23501025	BEARING, Sleeve - Set (Std Size)	8
-16			72582	23501026	BEARING, Sleeve - Set (.002" u/s)	8
-16			72582	23501027	BEARING, Sleeve - Set (.010" u/s)	8
-16			72582	23501028	BEARING, Sleeve - Set (.020" u/s)	8
-16			72582	23501029	BEARING, Sleeve - Set (.030" u/s)	8
-17			72582	5148373	BOLT	16
-18			72582	5144846	SPACER	16
-19			72582	5104501	CONNECTING ROD ASSY	8
-20			72582	5132383	BOLT, Connecting Rod	2
-22			72582	5117629	NUT, Plain, Hex	2
			72582	23500883	PISTON CROWN KIT (Includes items marked *)	8
			72582	23503939	CYLINDER KIT (includes items 1 and thru 15 plus items 29 and 32 in figure F-100)	10
						8

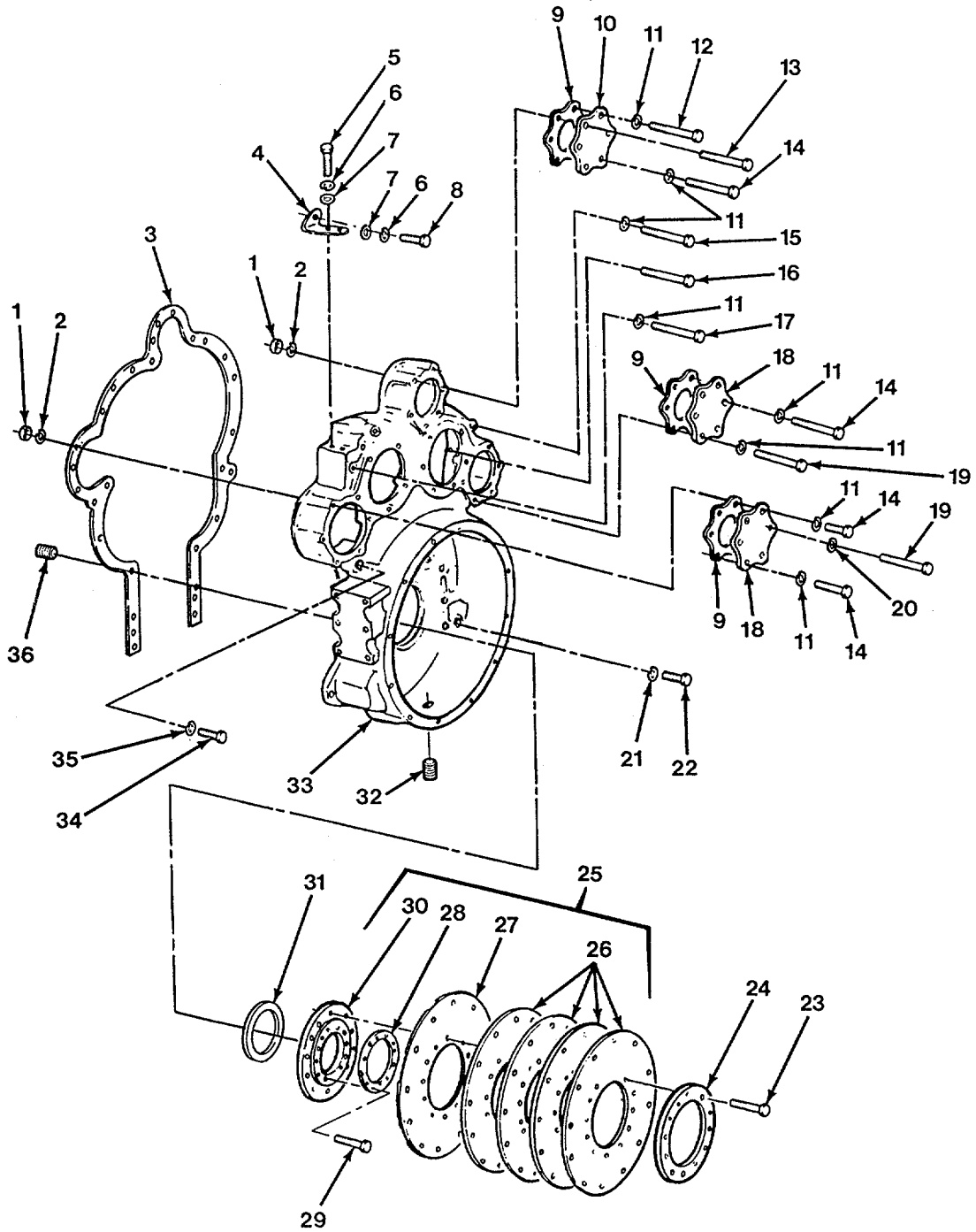


Figure F-112. Flexplate and Flywheel Housing Assembly

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-112-					FLEXPLATE AND FLYWHEEL HOUSING ASSEMBLY	
-1			72582	117049	NUT, Plain, Hex	5
-2			96906	MS35338-46	WASHER, Lock	5
-3			72582	5144875	GASKET	1
-4			72582	5146308	BRACKET, Right Bank	1
-4			72582	5146310	BRACKET, Left Bank	1
-5			72582	427564	BOLT, Machine	4
-6			96906	MS35338-47	WASHER, Lock	6
-7			72582	5108436	WASHER, Special	4
-8			72582	5104162	SCREW, Cap, Hex Hd	2
-9			72582	5104507	GASKET	3
-10			72582	5107677	COVER, Flywheel Housing	1
-11			96906	MS35338-46	WASHER, Lock	16
-12			72582	186317	SCREW, Cap, Hex Hd	1
-13			72582	186315	SCREW, Cap, Hex Hd	7
-14			96906	MS18154-58	SCREW, Cap, Hex Hd	9
-15			72582	5148499	BOLT, Machine	3
-16			72582	5103530	BOLT, Machine	1
-17			72582	5121466	BOLT, Special	4
-18			72582	5154669	COVER, Access	2
-19			72582	186288	SCREW, Cap, Hex Hd	1
-20			72582	5138619	WASHER, Lock	4
-21			72582	5131978	WASHER, Flat	6
-22			96906	MS90728-120	SCREW, Cap, Hex Hd	6
-23			72582	9412014	SCREW, Cap, Hex Hd	12
-24			72582	5100532	PLATE, Flywheel Scuff	1
-25			72582	6882610	PLATE ASSY, Flywheel	1
-26			72582	6750468	INSERT, Flexible Coupling	4
-27			73342	6751516	DISC ASSY	1
-28			73342	6753364	PLATE, Mounting	1
-29			24617	9409056	BOLT, Machine	12
-30			72582	6882609	HUB, Body	1
-31			72582	8929750	SEAL	1
-32			72582	8924750	PLUG, Pipe	2
-33			72582	8925172	HOUSING, Flywheel	1
-34			72915	8927579	BOLT, Machine	2
-35			96906	MS35338-50	WASHER, Lock	2
-36			72582	5106899	PLUG, Pipe	1

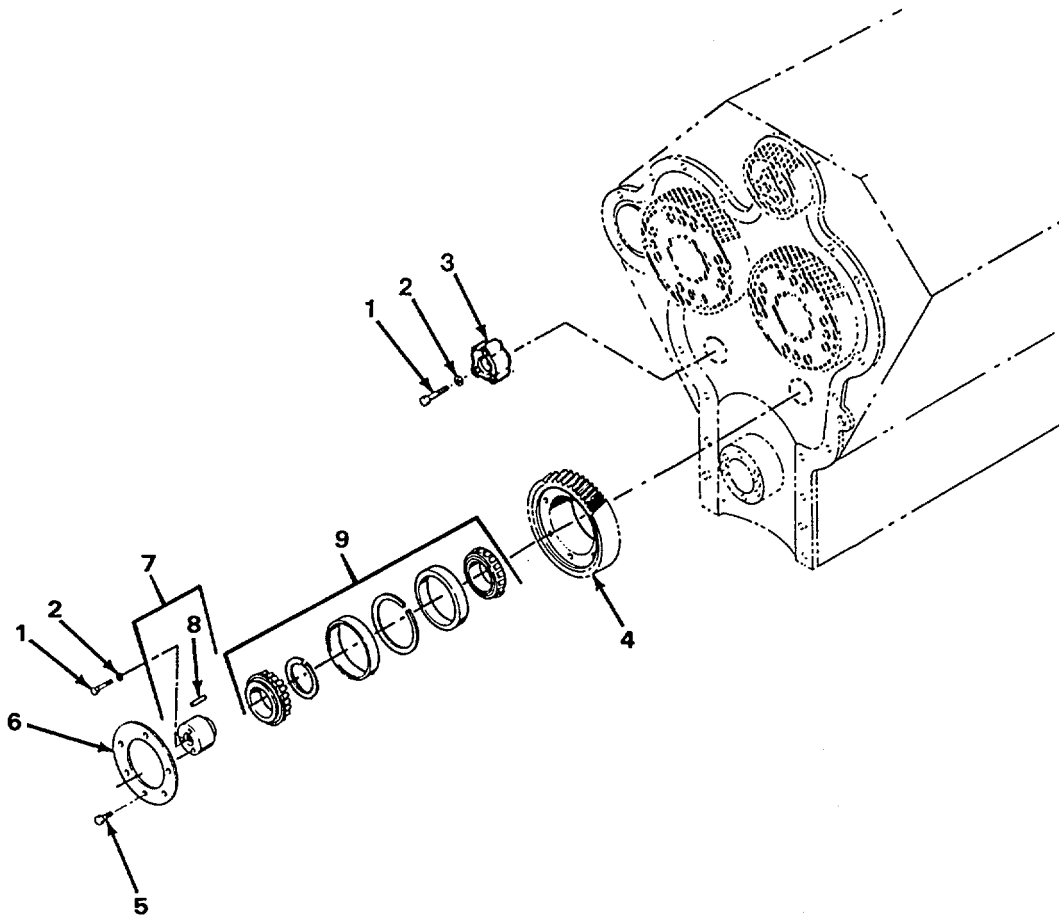


Figure F-113. Idler Gear

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-113-					IDLER GEAR	
-1			72582	454992	SCREW, Cap, Hex Hd	2
-2			72582	5167714	WASHER, Flat	2
-3			72582	5101150	SPACER	1
-4			72582	8928574	GEAR, Idler	1
-5			72582	5103534	BOLT, Special	6
-6			72582	5176998	PLATE, Retaining	1
-7			72582	5130135	HUB ASSY	1
-8			72582	5151444	. PIN, Hollow	1
-9			72582	7451948	BEARING ASSY	1

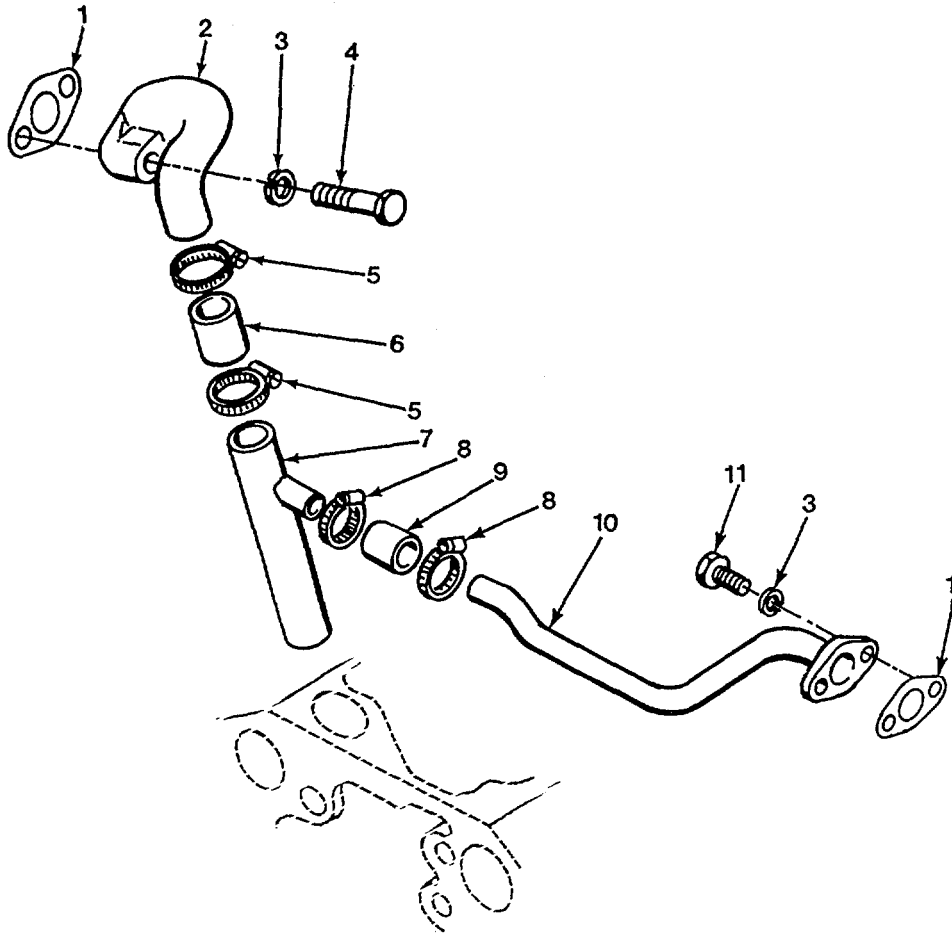


Figure F-114. Breather Tubes and Hoses

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-114-					BREATHER TUBES AND HOSES	
-1			72582	5123812	GASKET	2
-2			72582	5104591	ELBOW, Breather	1
-3			96906	MS35338-44	WASHER, Lock	4
-4			72582	5104604	SCREW, Cap, Hex Hd	2
-5			72582	5104958	CLAMP, Hose	2
-6			72582	5104960	HOSE, Nonmetallic	1
-7			72582	5104816	TUBE, Breather	1
-8			72582	5104592	CLAMP, Hose	2
-9			72582	5104959	HOSE, Nonmetallic	1
-10			72582	5104817	TUBE, Breather	1
-11			72582	8921930	BOLT, Machine	2

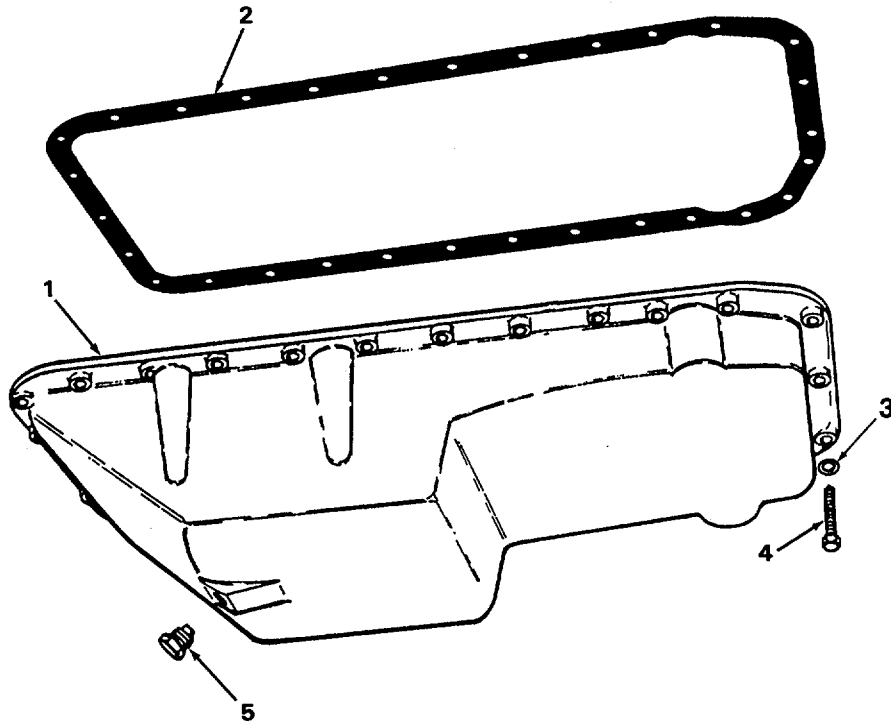


Figure F-115. Oil Pan

F-298

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-115-					OIL PAN	
-1			72582	23502939	OIL PAN	1
-2			72582	23502937	GASKET	1
-3			72582	23502934	ISOLATOR	18
-4			72582	23502935	SCREW, Cap, Hex Hd	18
-5			72582	5146891	PLUG, Pipe, Magnetic	1

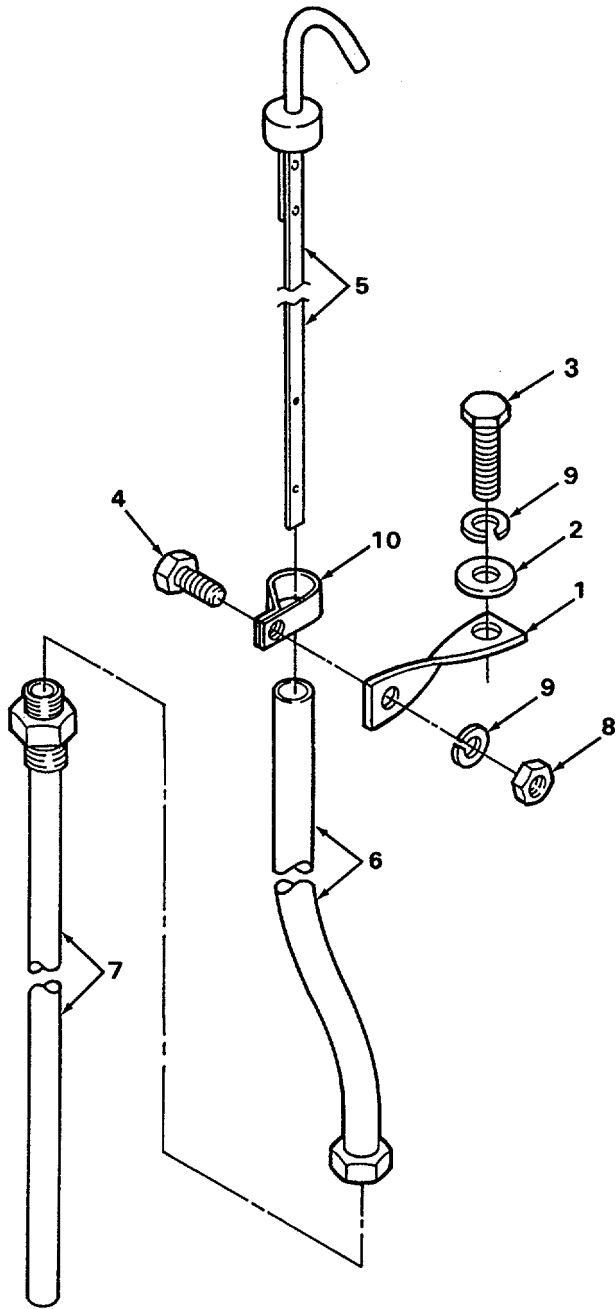


Figure F-116. Oil Dipstick

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-116-					OIL LEVEL DIPSTICK	
-1			72582	5114210	SUPPORT, Clamp	1
-2			72582	103341	WASHER, Flat	1
-3			72582	186619	SCREW, Cap, Hex Hd	1
-4			72582	179838	SCREW, Cap, Hex Hd	1
-5			72582	5146680	DIPSTICK, Oil Level	1
-6			72582	5131786	GUIDE, Dipstick w/Nut	1
-7			72582	5142271	ADAPTER, Dipstick w/Nut	1
-8			72582	102635	NUT, Plain, Hex	1
-9			72582	103321	WASHER, Lock	2
-10			72582	5109020	CLAMP	1

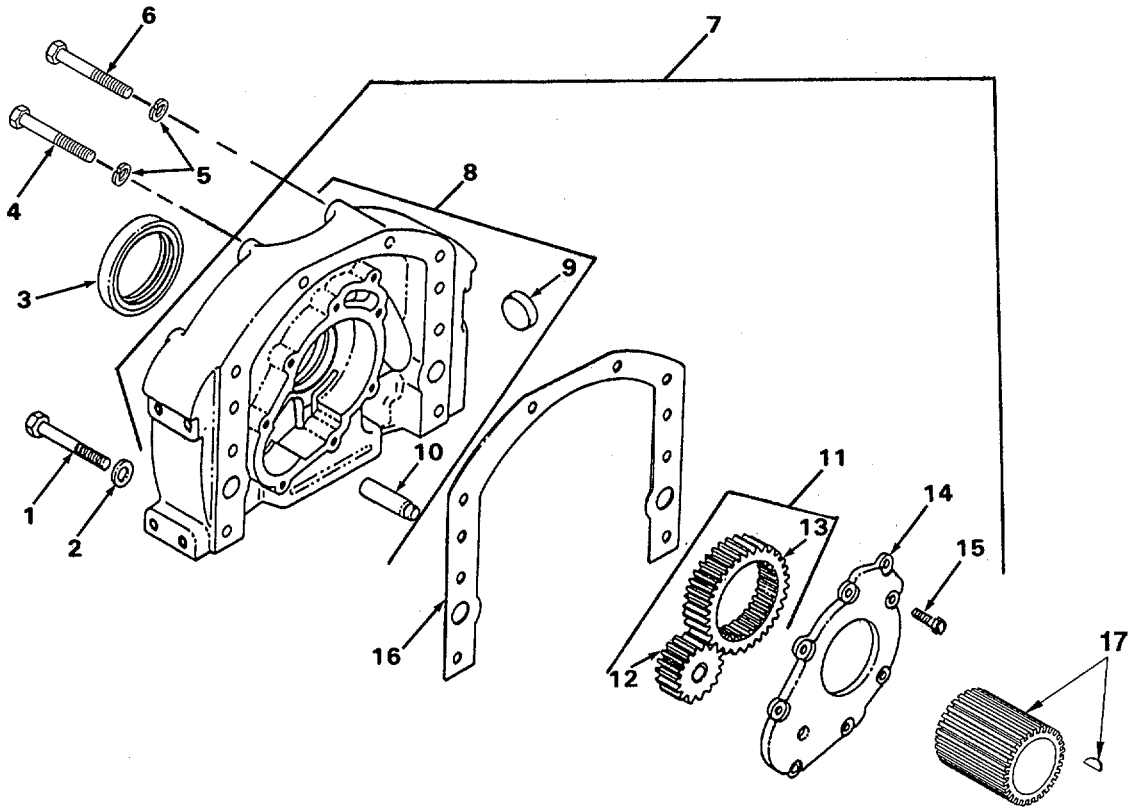


Figure F-117. Oil Pump Assembly

F-302

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-117-					OIL PUMP ASSEMBLY	
-1			72582	186283	SCREW, Cap, Hex Hd	2
-2			72582	103321	WASHER, Lock	2
-3			72582	5115454	SEAL, Oil	1
-4			72582	186659	SCREW, Cap, Hex	4
-5			72582	103323	WASHER, Lock	6
-6			72582	179893	SCREW, Cap, Hex Hd	2
-7			72582	5102019	PUMP, Oil	1
-8			72582	5146585	BODY ASSY, Oil Pump	1
-9			72582	5150014	PLUG, Expansion	1
-10			72582	5117466	SHAFT, Gear	1
-11			72582	5196602	GEAR SET	1
-12			72582	5117588	GEAR, Driven	1
-13			72582	5117587	GEAR, Drive	1
-14			72582	5117599	COVER, Oil Pump	1
-15			72582	9409011	SCREW, Cap, Hex Hd	8
-16			72582	5121714	GASKET	1
-17			72582	8927135	GEAR, Oil Pump Drive, w/Key	1

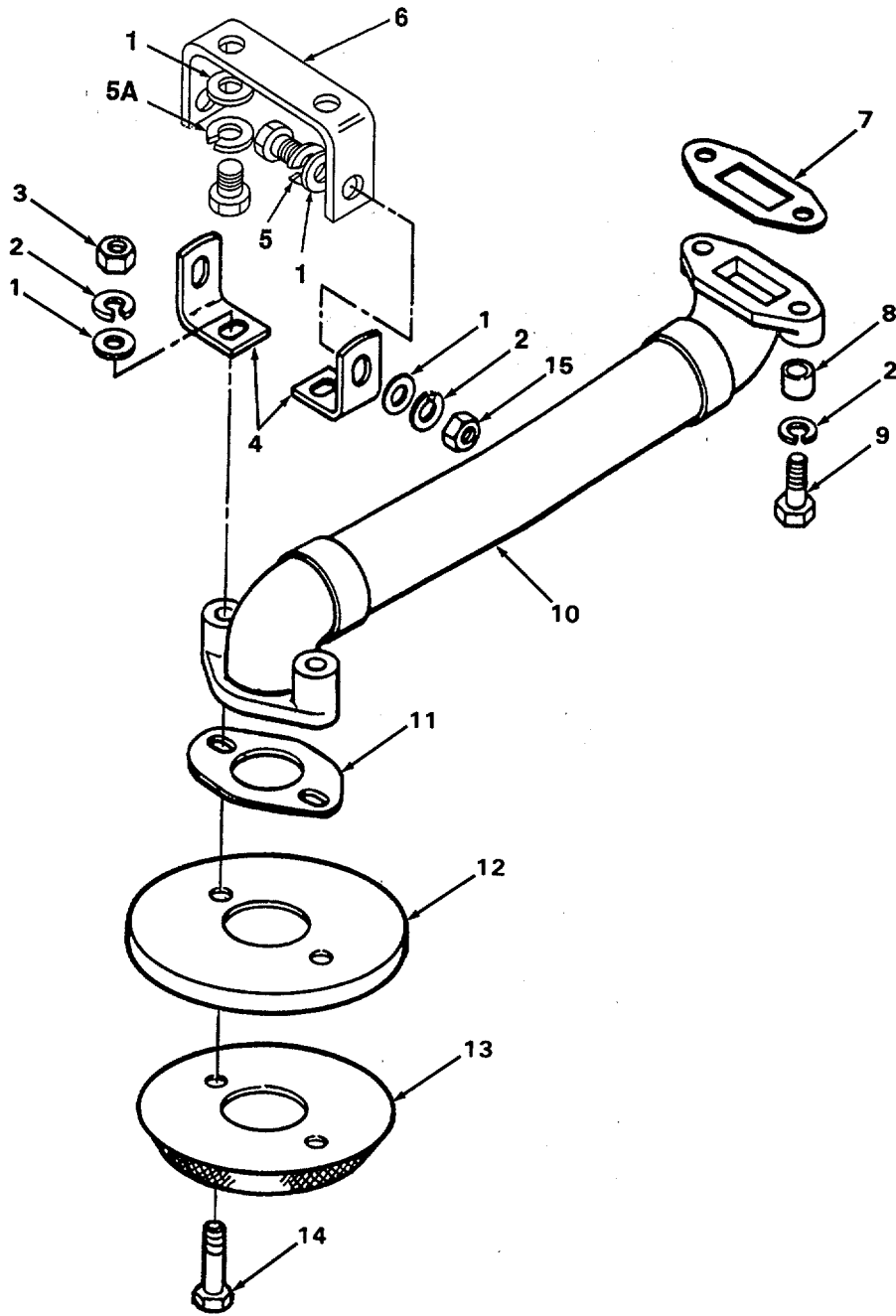
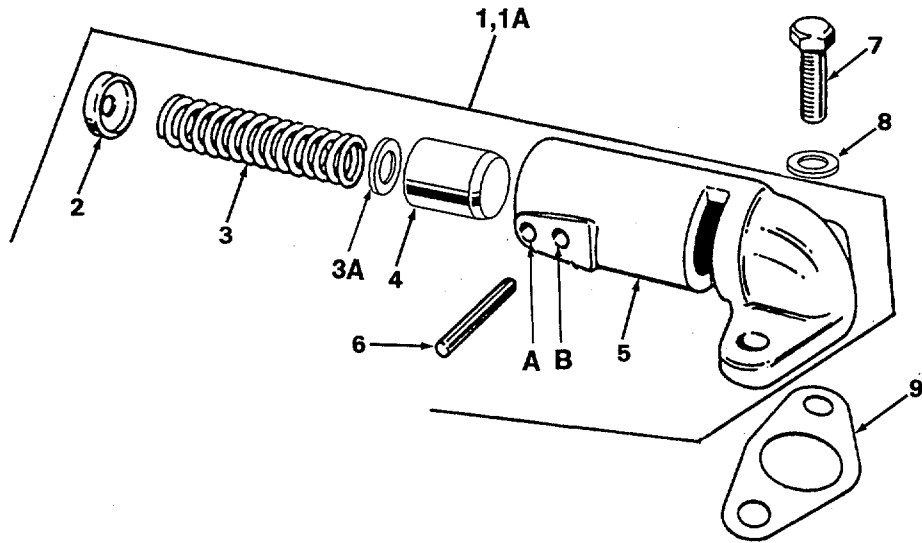


Figure F-118. Oil Pump Intake

F-304

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-118-					OIL PUMP INTAKE	
-1			72582	103341	WASHER, Flat	8
-2			72582	103321	WASHER, Lock	4
-3			72582	123221	NUT, Plain, Hex	2
-4			72582	5130334	BRACKET, Lower	2
-5			72582	181365	SCREW, Cap, Hex Hd, w/Lens	2
-5A			72582	5148480	SCREW, Cap, Hex Hd, w/Lens	2
-6			72582	8922250	BRACKET, Upper	1
-7			72582	5117242	GASKET	1
-8			72582	5175705	SPACER	2
-9			72582	186622	SCREW, Cap, Hex Hd	2
-10			72582	5125695	PIPE, Oil Pump Inlet	1
-11			72582	5167380	GASKET	1
-12			72582	5118302	COVER, Screen	1
-13			72582	5101176	SCREEN, Inlet	1
-14			72582	179848	SCREW, Cap, Hex Hd	2
-15			72582	192481	NUT, Lock	2



NOTE: PIN LOCATION
A- PRESSURE REGULATOR VALVE
B- PRESSURE RELIEF VALVE
(DOES NOT USE WASHER NO. 3A)

Figure F-119. Oil Pressure Regulator and Relief Valves

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-119-					OIL PRESSURE REGULATOR AND RELIEF VALVES	
-1			72582	8924505	REGULATOR VALVE ASSY, Oil Pressure	1
-1A			72582	8921086	RELIEF VALVE ASSY, Oil Pressure	1
-2			72582	5117957	SEAT, Spring	1
-3			72582	5126327	SPRING, Helical, Compression	1
-3A			72582	103341	WASHER, Flat (Part of 8924505 only)	1
-4			72582	8922740	PLUNGER	1
-5			72582	8924503	BODY	1
-6			72582	457008	PIN, Spring	1
-7			72582	8921933	SCREW, Sealing	4
-8			72582	5131433	WASHER, Flat	4
-9			72582	5117269	GASKET	2

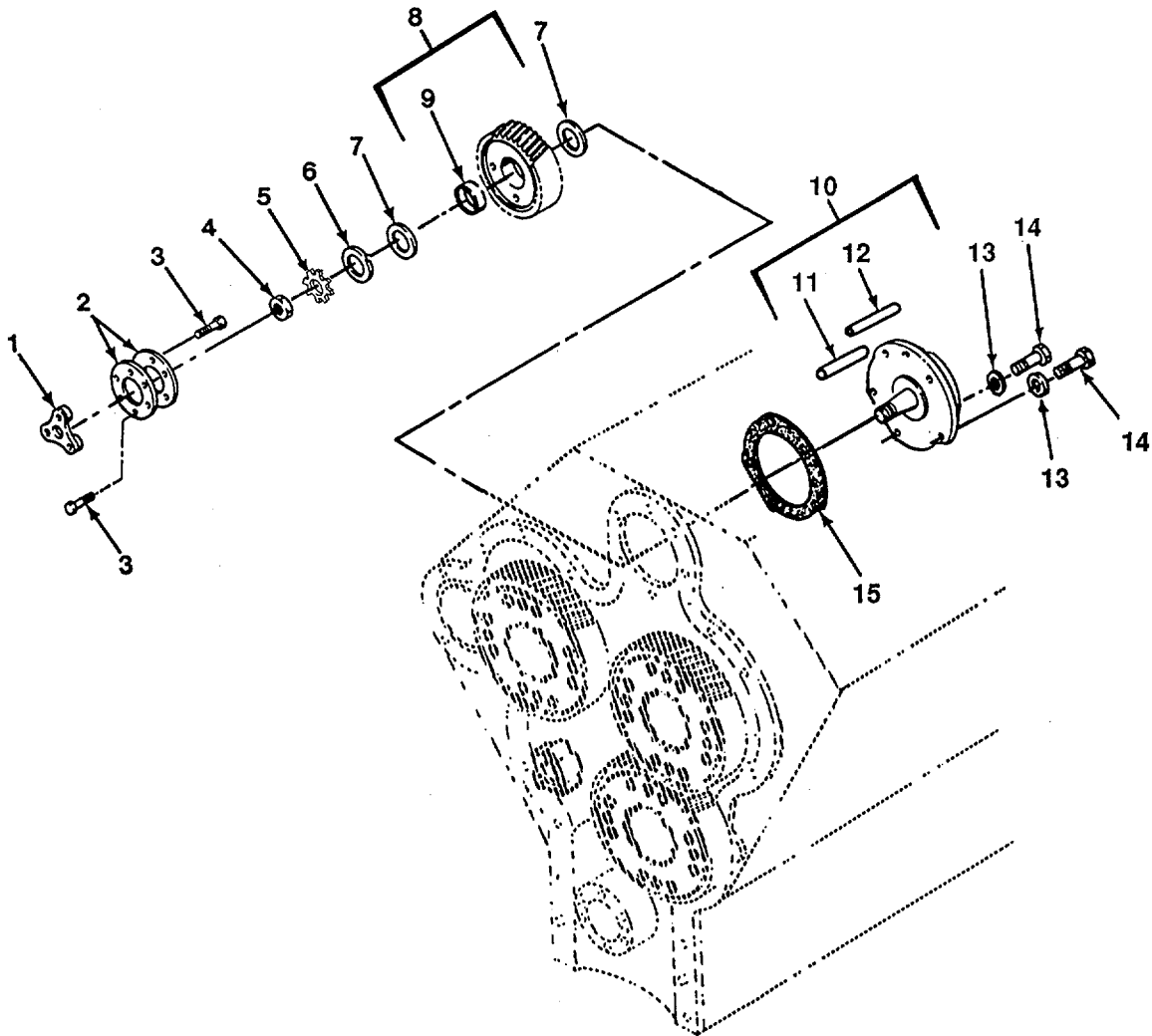


Figure F-120. Blower Drive

F-308

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-120-					BLOWER DRIVE	
-1			72582	8922519	HUB, Blower Driver Gear	1
-2			72582	8920764	PLATE, Spring	2
-3			72582	8923571	BOLT, Machine	6
-4			72582	5117727	NUT, Plain Hex	1
-5			72582	8926285	WASHER, Lock, Ext Tooth	1
-6			72582	8926293	BEARING, Washer, Thrust	1
-7			72582	5117700	BEARING, Washer, Thrust	2
-8			72582	8928596	GEAR ASSY, Blower Drive	1
-9			72582	5120501	BEARING, Sleeve	2
-10			72582	8922770	SUPPORT ASSY	1
-11			72582	274889	PIN, Spring	1
-12			72582	5106909	PIN, Dowel	2
-13			72582	5152148	WASHER, Flap - Copper	2
-14			72582	8925438	SCREW, Cap, Hex Hd	2
-15			72582	5148810	GASKET	1

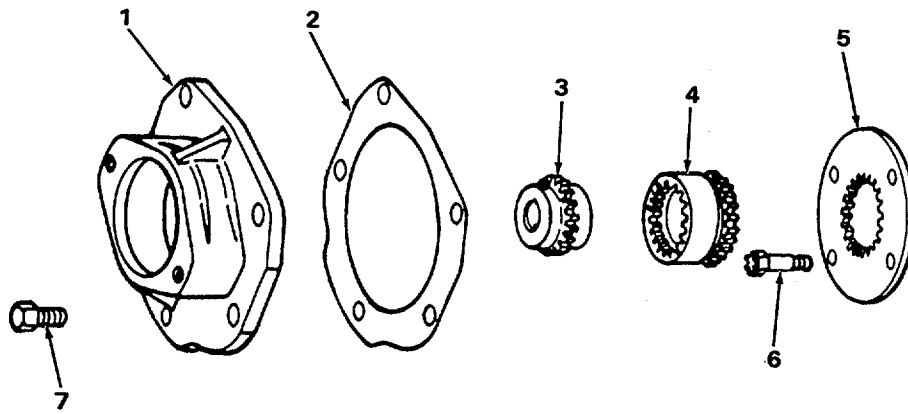


Figure F-121. Accessory Drive

F-310

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-121-					ACCESSORY DRIVE	
-1			72582	5137422	ADAPTER, Drive	1
-2			72582	5188755	GASKET	1
-3			72582	5138079	GEAR, Spur	1
-4			72582	5139545	COUPLING, Drive	1
-5			72582	5170450	PLATE	1
-6			72582	5145092	SCREW, Self-Locking	4
-7			72582	179882	SCREW, Cap, Hex Hd	4

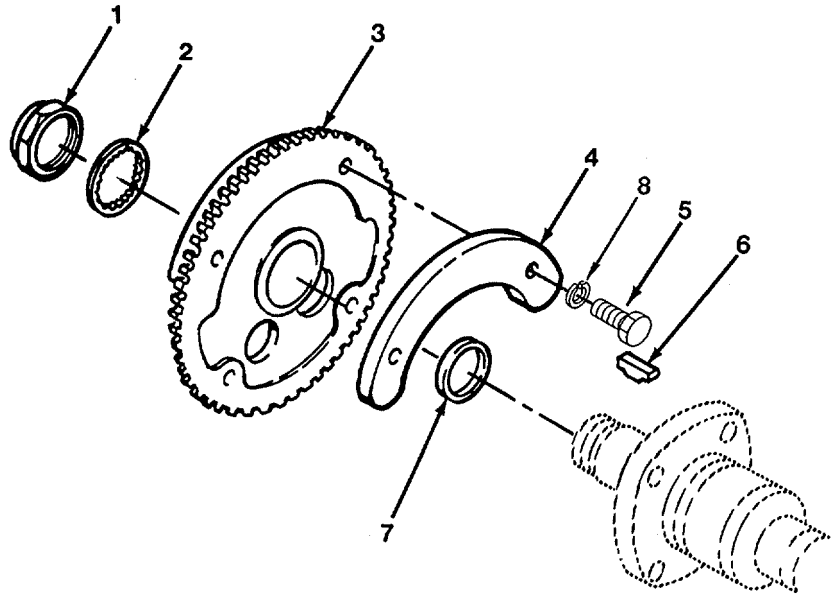


Figure F-122. Water Pump Drive

F-312

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-122-					WATER PUMP DRIVE	
-1			72582	5150087	NUT, Self-Locking	1
-2			72582	5177769	WASHER, Special	1
-3			72582	5126904	GEAR, Water Pump Drive	1
-4			72582	5144888	WEIGHT, Front Balance	1
-5			72582	9409035	BOLT, Self-Locking	2
-6			72582	8926247	KEY, Woodruff	1
-7			72582	5116485	SPACER, Ring	1
-8			72582	5177769	WASHER, Lock	2

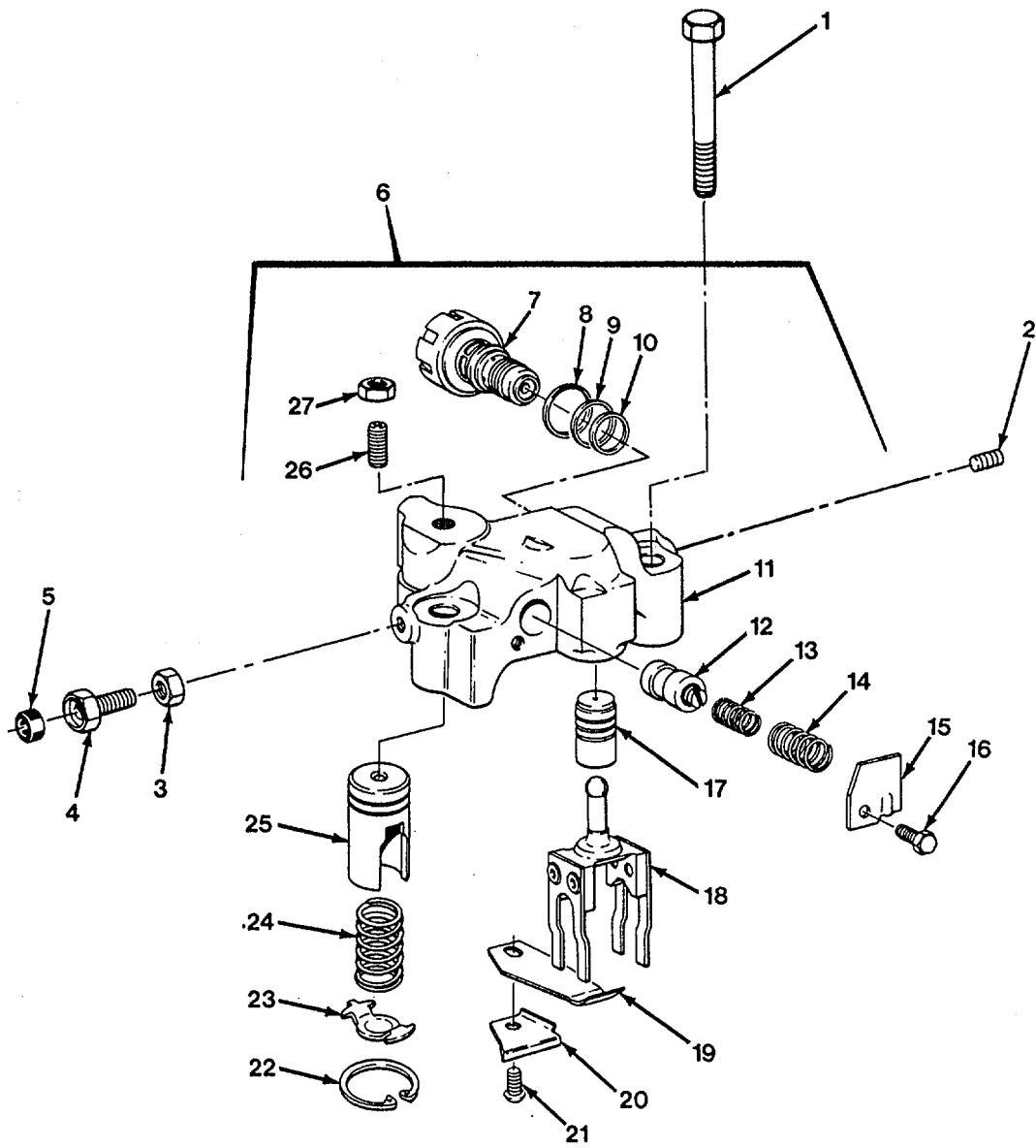


Figure F-123. Jake Brake

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-123-					JAKE BRAKE	
-1			75078	001318	BOLT, Fluid Passage	16
-2			96906	MS51964-136	SETSCREW	8
-3			96906	MS35691-7	NUT, Plain, Hex	4
-4			75078	001287	BOLT, Machine	4
-5			75078	001332	PACKING, Preformed	4
-6			61038	013592	HOUSING ASSY, Supply	4
-6			75078	012474	HOUSING ASSY, Drone	4
-7			75078	008674	VALVE ASSY	1
-8			75078	001081	PACKING, Preformed	1
-9			75078	001082	PACKING, Preformed	1
-10			75078	001083	PACKING, Preformed	1
-11			75078	007076	HOUSING, Drone	1
-11			75078	007075	CARTRIDGE, Check Valve	1
-13			75078	011434	SPRING, Helical, Compression	1
-14			75078	007500	SPRING, Helical, Compression	1
-15			75078	002221	COVER, Valve	1
-16			75078	001492	SCREW, Cap, Hex Hd	1
-17			75078	003329	PISTON	1
-18			75078	003337	FORK ASSY, Piston	1
-19			75078	009505	SPRING, Flat	1
-20			75078	003669	RETAINER, Valve Spring	1
-21			75078	001265	SCREW, Self-Locking	1
-22			75078	001023	RING, Retaining	1
-23			75078	007620	RETAINER, Spring	1
-24			75078	001288	SPRING, Helical, Compression	1
-25			75078	009442	PISTON, Linear Actuator	1
-26			75078	001031	SETSCREW	1
-27			75078	001026	NUT, Plain, Hex	1

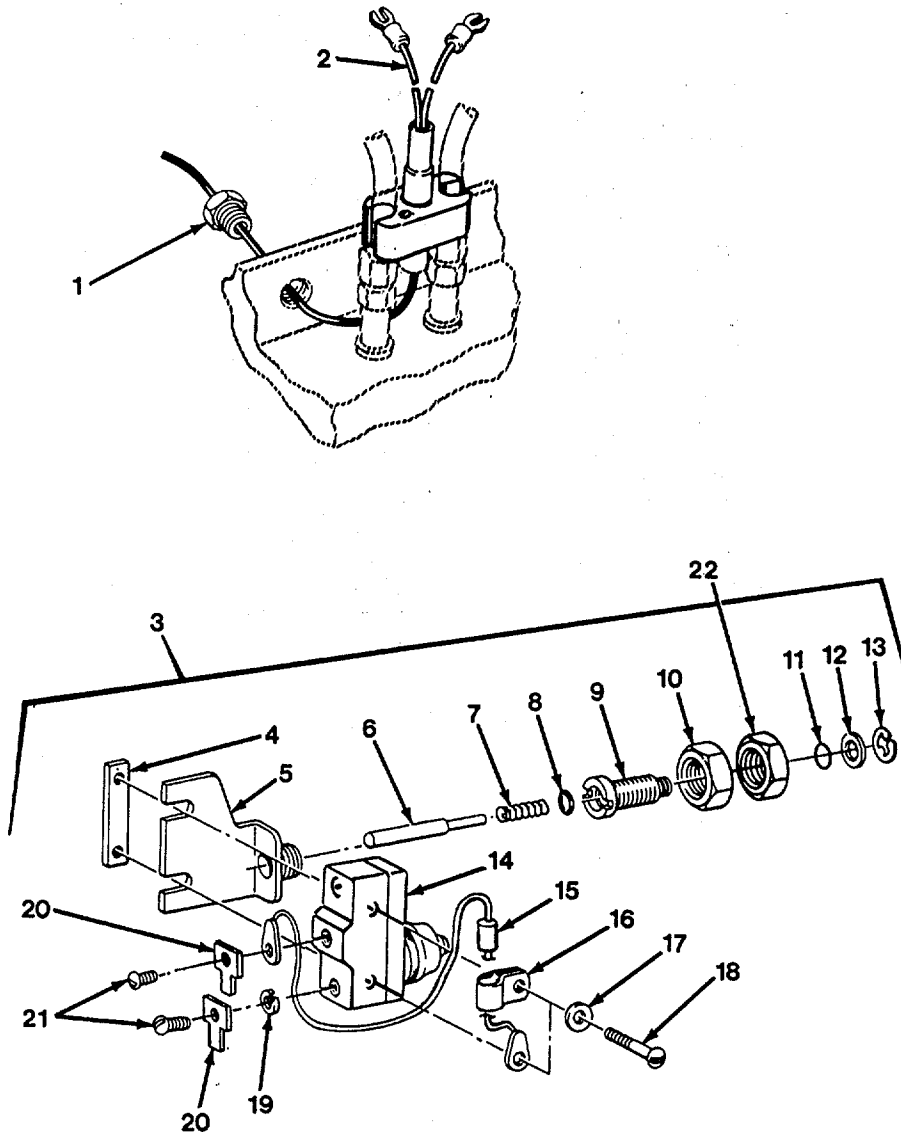


Figure F-124. Jake Brake Buffer Switch

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-124-					JAKE BRAKE BUFFER SWITCH	
-1			75078	004653	BOLT, Internally Released	2
-2			75078	004665	HARNESS, Wiring	2
-3			75078	012601	SWITCH ASSY	1
-4			75078	001531	BRACKET, Flat	1
-5			75078	002729	BRACKET, Angle	1
-6			75078	004635	PLUNGER	1
-7			75078	004634	SPRING, Helical, Compression	1
-8			75078	002017	PACKING, Preformed	1
-9			75078	002725	SCREW, Special	1
-10			75078	002724	NUT, Plain, Hex	1
-11			75078	009877	RETAINER, Packing	2
-12			75078	004636	WASHER, Flat	1
-13			75078	004637	RING, Retaining	1
-14			75078	001218	SWITCH, Micro	1
-15			34623	MA207-21362	SEMICONDUCTOR	1
-16			75078	002769	CLAMP, Loop	1
-17			75078	001538	WASHER, Flat	2
-18			75078	002744	SCREW, Machine	2
-19			75078	001559	WASHER, Lock	1
-20			75078	001040	TERMINAL, Quick Disconnect	1
-21			75078	001558	SCREW, Machine	2
-22			72582	5174286	NUT, Plain, Hex	1

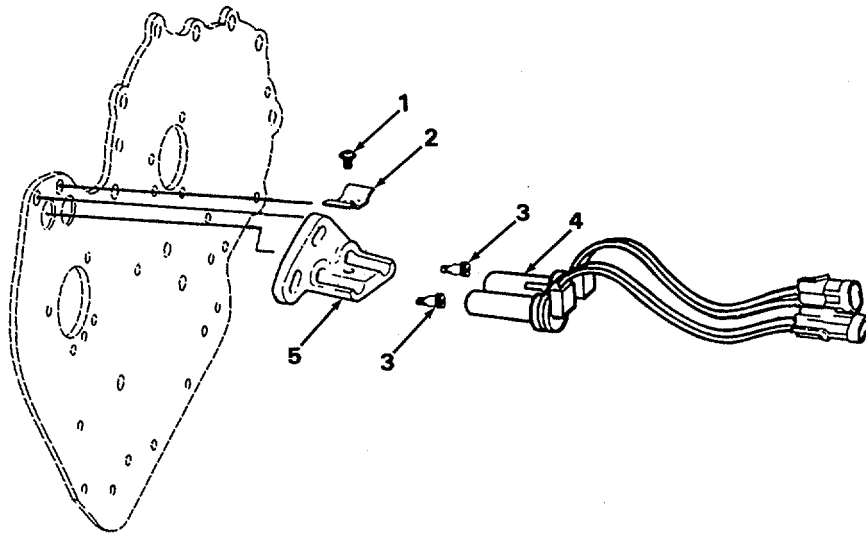


Figure F-125. Electronic Sensors

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-125					ELECTRONIC SENSORS	
-1			72582	8928801	SCREW, Machine	1
-2			72582	8928742	RETAINER	1
-3			72582	8928623	SCREW, Machine	2
-4			72582	23503240	SENSOR ASSY, Reference and Timing	1
-5			72582	8928741	BRACKET	1

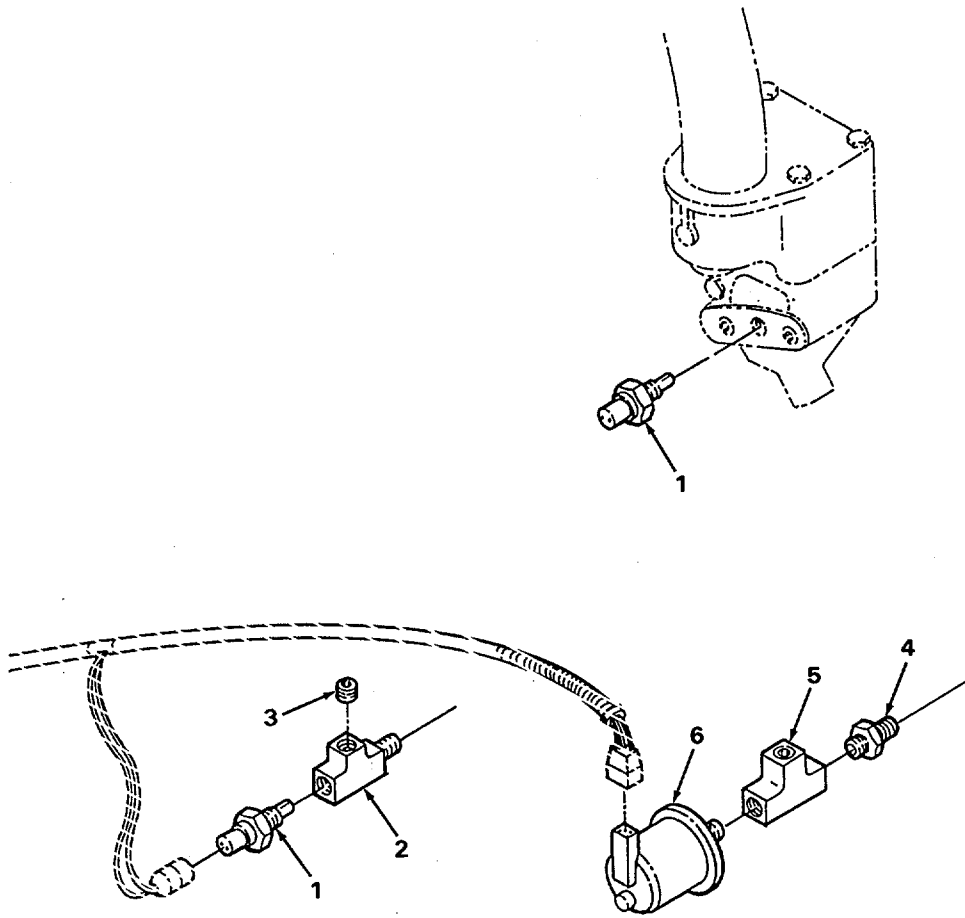


Figure F-126. Electronic Control Sensors

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-126-					ELECTRONIC CONTROL SENSORS	
-1			72582	25036693	SENSOR, Oil Temp and Coolant Temp	2
-2			72582	8928669	TEE, Pipe	1
-3			72582	8923847	PLUG, Pipe	1
-4			72582	8924172	ADAPTER	1
-5			72582	8924178	TEE, Pipe	1
-6			72582	8929184	SENSOR, Oil Press	1

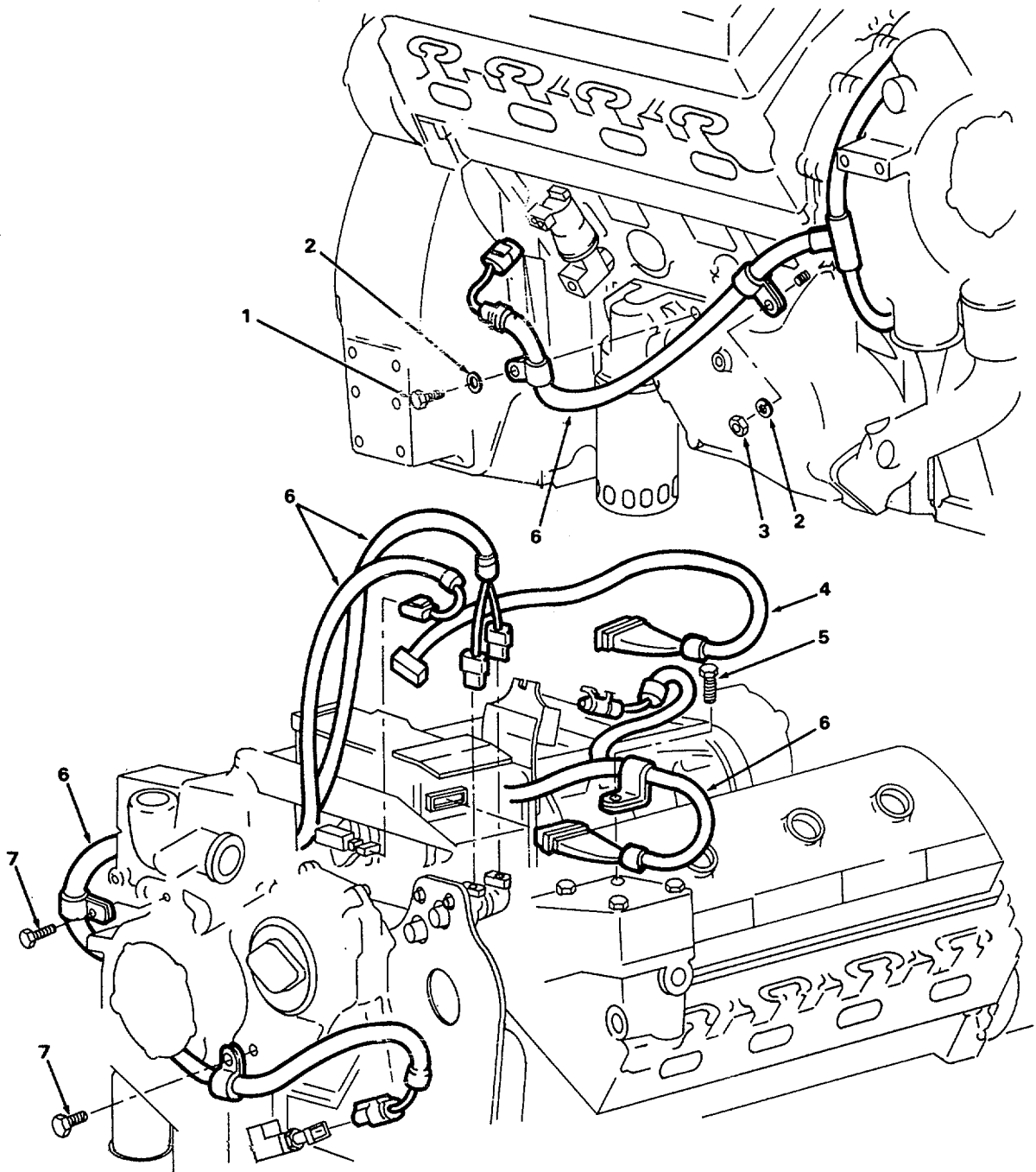


Figure F-127. Electronic Control Wiring Harness, Sheet 1 of 2

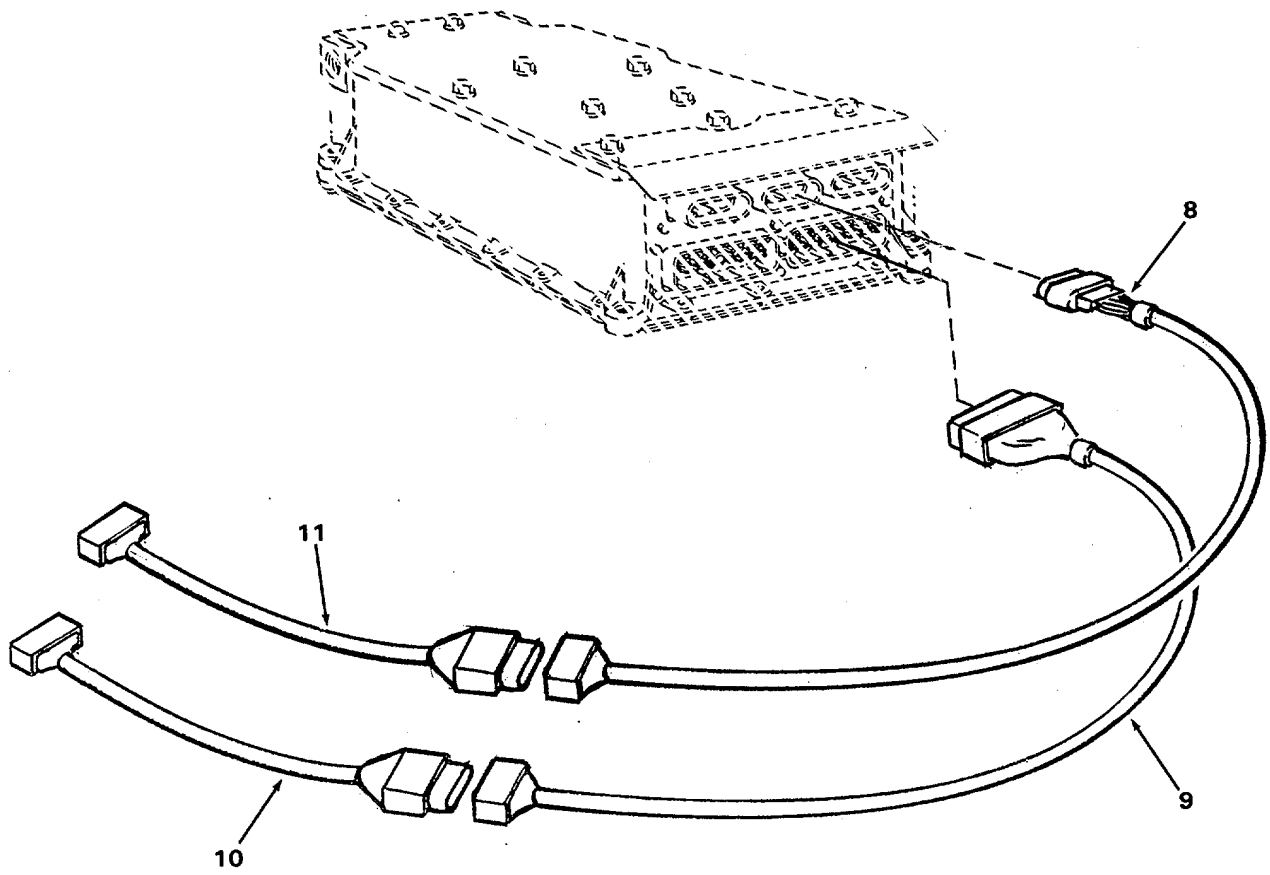


Figure F-127. Electronic Control Wiring Harness, Sheet 2 of 2

(F-323 Blank) / F-324

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-127-					ELECTRONIC CONTROL WIRING HARNESES	
-1			72582	8923389	SCREW, Cap, Hex Hd	REF
-2			72582	103321	WASHER, Lock	REF
-3			72582	102635	NUT, Plain, Hex	REF
-4			72582	23505067	WIRING HARNESS, RB	1
-5			72582	186283	SCREW, Cap, Hex Hd	REF
-6			72582	23502686	WIRING HARNESS, Disconnect	1
-7			72582	186292	SCREW, Cap, Hex Hd	1
-8	04664	64-0082			WIRING HARNESS	1
-9	04664	64-0884			WIRING HARNESS	1
-10	04664	64-1121-0001			WIRING HARNESS	1
-11	04664	64-0881			WIRING HARNESS	1

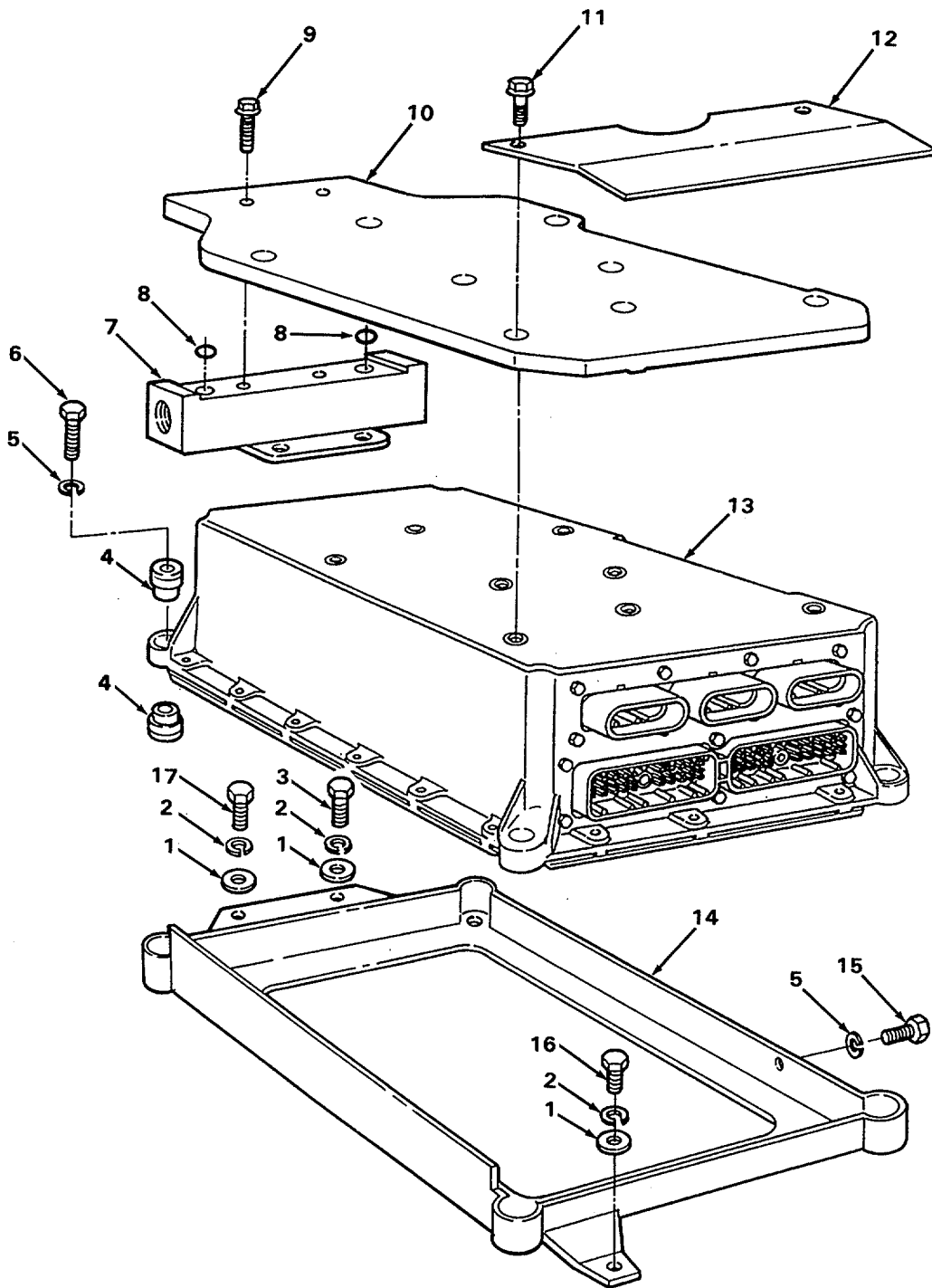


Figure F-128. Electronic Injector Controls

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-128-					ELECTRONIC INJECTOR CONTROLS	
-1			72582	103341	WASHER, Flat	3
-2			72582	103321	WASHER, Lock	3
-3			72582	187491	SCREW, Cap, Hex Hd	1
-4			72582	2350879	ISOLATOR, Mount	8
-5			72582	103320	WASHER, Lock	6
-6			72582	179822	SCREW, Cap, Hex Hd	4
-7			72582	23504640	FITTING, Block	1
-8			72582	235025858	SEAL	2
-9			72582	11504972	SCREW, w/Washer	2
-10			72582	23502860	PLATE, Module	1
-11			72582	11504603	SCREW, Machine	8
-12			72582	23502894	SHIELD, Heat	1
-13			72582	7570050	MODULE, Control	1
-14			72582	23502893	BRACKET	1
-15			72582	179819	SCREW, Cap, Hex Hd	2
-16			72582	186285	SCREW, Cap, Hex Hd	1
-17			72582	179845	SCREW, Cap, Hex Hd	1

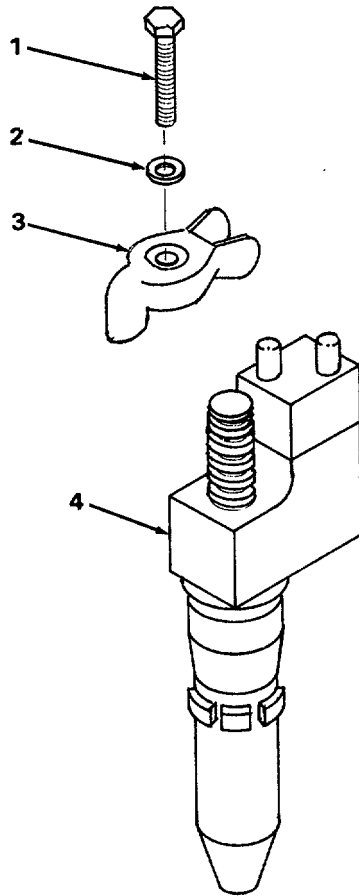


Figure F-129. Fuel Injector

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-129-					FUEL INJECTOR	
-1			96906	179847	BOLT, Hex Hd 3/8"-16 x 2"	8
-2			24617	5150250	WASHER, Convex	8
-3			72582	5121259	CLAMP, Fuel Injector	8
-4			72582	5234775	FUEL INJECTOR ASSY	8

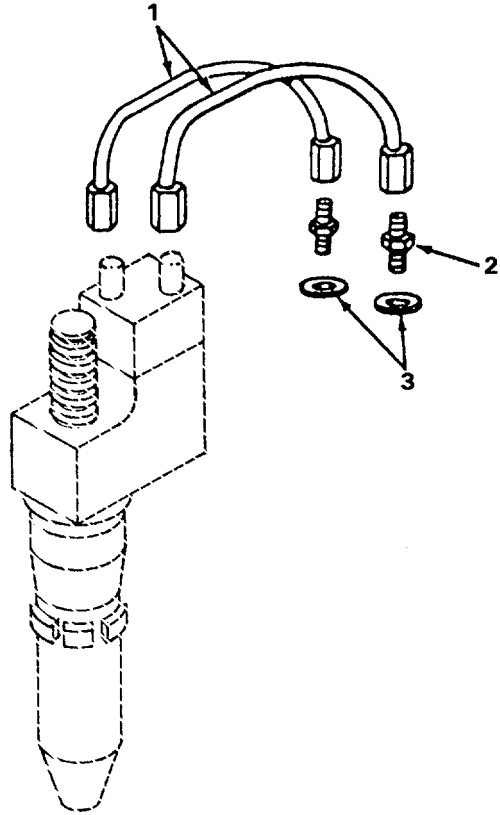


Figure F-130. Injector Fuel Connections

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-130-					INJECTOR FUEL CONNECTIONS	
-1			72582	8928628	TUBE, Fuel Supply	16
-2			72582	8928631	ADAPTER, Fuel	16
-3			72582	5125108	WASHER	16

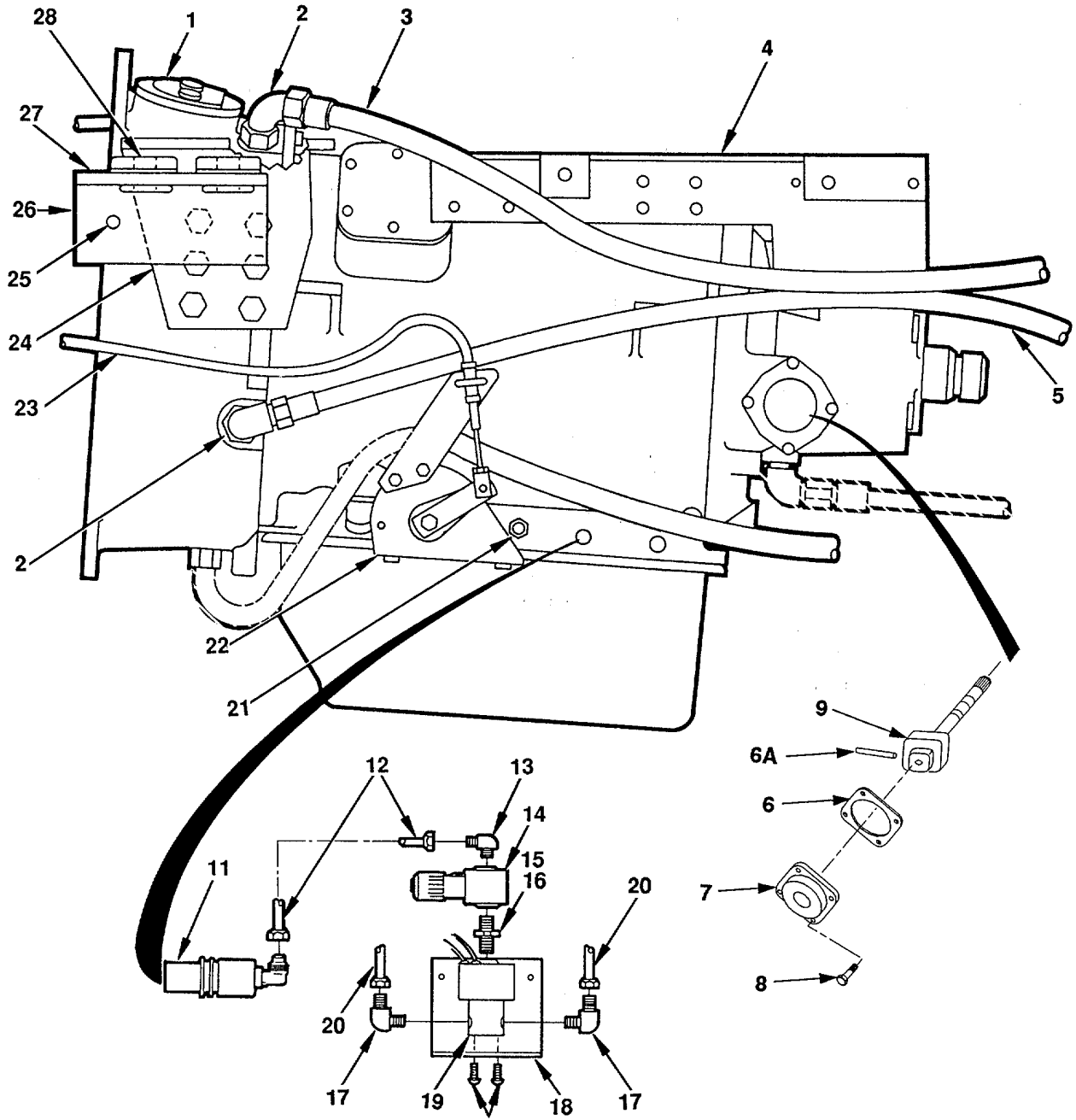


Figure F-131. Transmission Installation, Sheet 1 of 3

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-131					TRANSMISSION INSTALLATION	1
-1	04664	43-0189	73342	23040673	TRANSMISSION ASSY (See figures F-132 thru F-144 and F-148 for details)	1
-2	04664	53-4020-022	92003	16-C50X-S	FITTING, SAE O-Ring/37° Flare 90°	2
-3	04664	53-0014			HOSE ASSY., Hydraulic	1
4	04664	43-0042			BRACKET, Mounting, Fuel Filter	1
-5	04664	53-0014			HOSE ASSY., Hydraulic	1
			73342	6880353	KIT, Governor	1
-6	04664		73342	23018625	GASKET, Governor Cover	1
-6A			73342	23017556	PIN, Governor	2
-7	04664		73342	8623262	COVER, Governor	1
					(ATTACHING PARTS)	
-8			73342	115658	SCREW, Cap, Hex Hd, 5/16"-1 8 x 9116"	4
-9			73342	6885570	GOVERNOR ASSY.	1
-11	04664	43-0590	11331	117830	MODULATOR	1
-12	04664	944034			TUBING, Air Brake, 1/4", Black	AR
	04664	55-0348			CONTROL ASSY., Modulator, Air Solenoid	
-13	04664	56-0490-002	0CME1	4-469-F-04X04	FITTING	1
-14	04664	55-0072		4R113F	REGULATOR, Modulation Control	1
-15	04664	56-0492-001	0CME1	245A-02	FITTING, Straight	1
-16	04664	56-0493-001	0CME1	110-B-04-02	REDUCER	1
-17	04664	56-0490-001	0CME1	4-469-F-04X02	FITTING, 90°	2
-18	04664	42-1772			BRACKET, Mounting	1
-19	04664	43-0591	81978	C5DK1175-12VDC	SOLENOID, NO (w/screws)	1
-20	04664	944034			TUBING, Air Brake	AR
-21	04664	44-0817	73342	2301922	SWITCH, Neutral Safety	1
-22	04664	44-0217	60602	000-59004-0002	KIT, Connector, Transmission	1
-23	04664	44-0216	04710	4703GG2A-1 60	CABLE, Shifter, 160" Lg	1
-24	04664	43-0008			PLATE, Transmission, LH	1
-25	04664	82-2019			BOLT, Flange Hd, 3/4"-1 0, G-8	1
-26	04664	43-0225			MOUNT, Transmission, LH	1
-27	04664	44-0521			WASHER	8
-28	04664	44-0518	30676	CBA-281050	BISCUIT	4

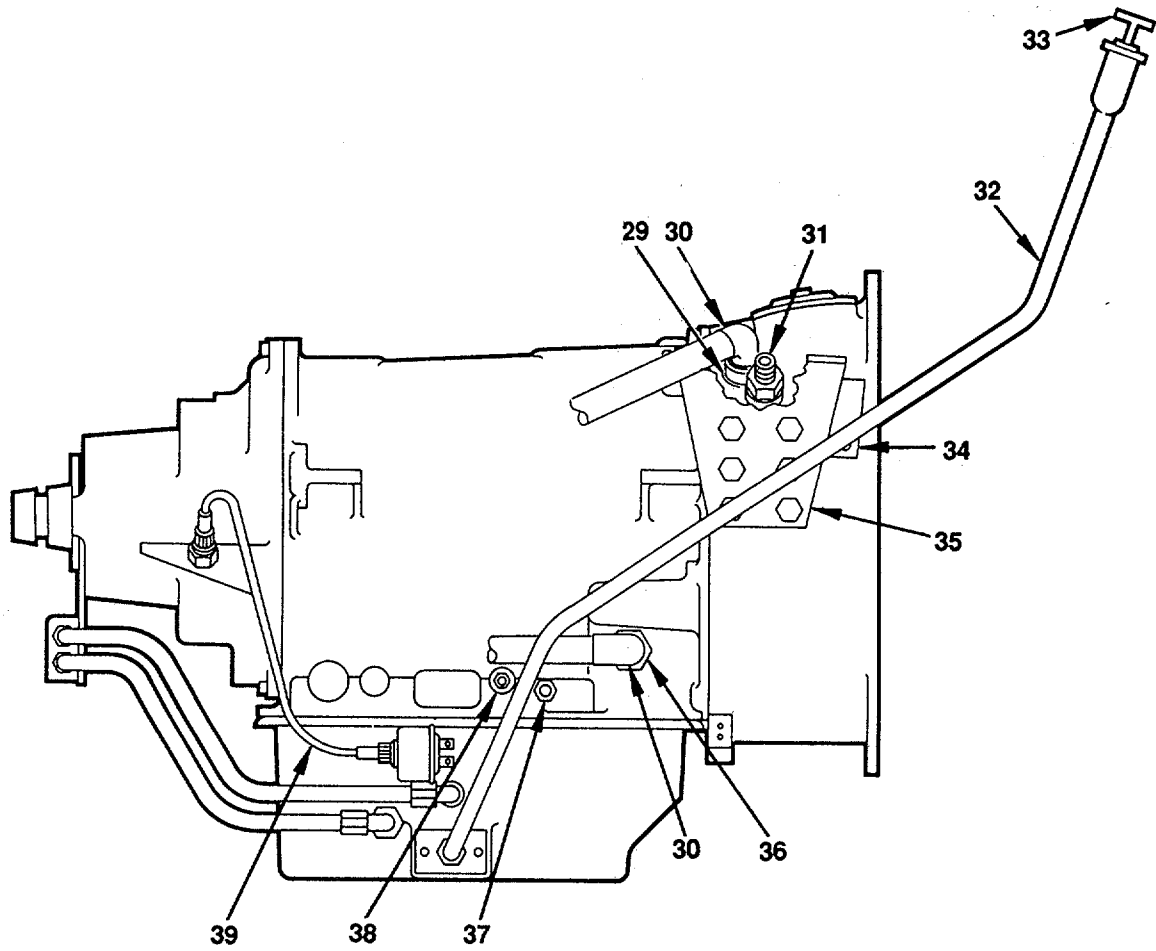


Figure F-131. Transmission Installation, Sheet 2 of 3

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-131-						
-29	04664	53-0161			O-RING, 1"	6
-30	04664	53-4025-026	92003	16-CTS-X	FITTING, Ext. Pipe/370 Flare 90°	1
-31	04664	64-0121			SWITCH, Temp, 2850, 1/2" NPT, HT	1
-32	04664	43-0794-001			TUBE, Dipstick	1
-33	04664	43-0795			DIPSTICK, Transmission	1
-34	04664	43-0226			MOUNT, Transmission, RH	1
-35	04664	43-0009			PLATE, Transmission, RH	1
-36	04664	53-4020-022	92003	16-C50X-S	FITTING, SAE O-Ring/37° Flare	1
-37	04664	56-0498-002	92003	01HP-2	PLUG, Hex	1
-38	04664	44-0818	58723	S-1773-500	SWITCH, Back-Up	1
-39	04664	52-0126			CABLE ASSY., Speedometer (See figure F-146 for details)	1

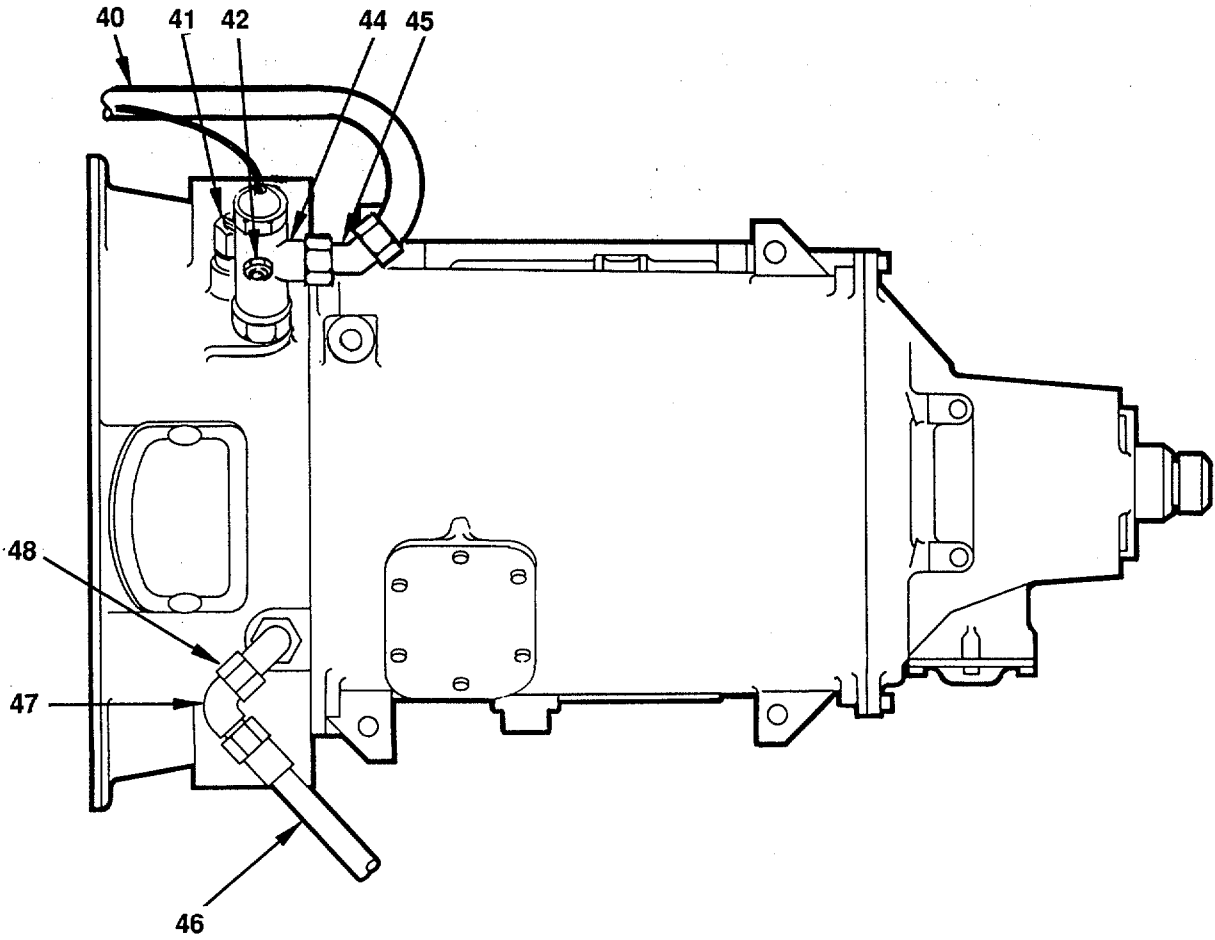


Figure F-131. Transmission Installation, Sheet 3 of 3

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-131-						
-40	04664	53-0011			HOSE, Hydraulic, 1" Dia. x 40" Lg	1
-41	04664	64-0121			SWITCH, Temperature (285°F), 1/2" NPT	1
-42	04664	63-0690	59197	323-086	SENDER, Temperature (400°F)	1
-44	04664	53-4021-004	OCME1	25VK-08	FITTING, Street Tee, Stl Pipe, M-F 12-125	1
-45	04664	53-4033-010	92003	0502-20-16	FITTING, 370 Flare, Seal 37° Flare, 45°	1
-46	04664	53-0014			HOSE, Hydraulic, 1" Dia. x 84" Lg	1
-47	04664	53-4019-008	92003	16-C6X-S	FITTING, 37°F Flare Sw/370 Flare 90°	1
-48	04664	53-4020-022	92003	16-C50X-S	FITTING, SAE O-Ring/370 Flare	1
	04664	43-0853			FITTING, 90°, Trans Temp HT	
	04664	53-4023-009	6V142	0502-16-16	FITTING, Int. Pipe/SAE O-Ring	

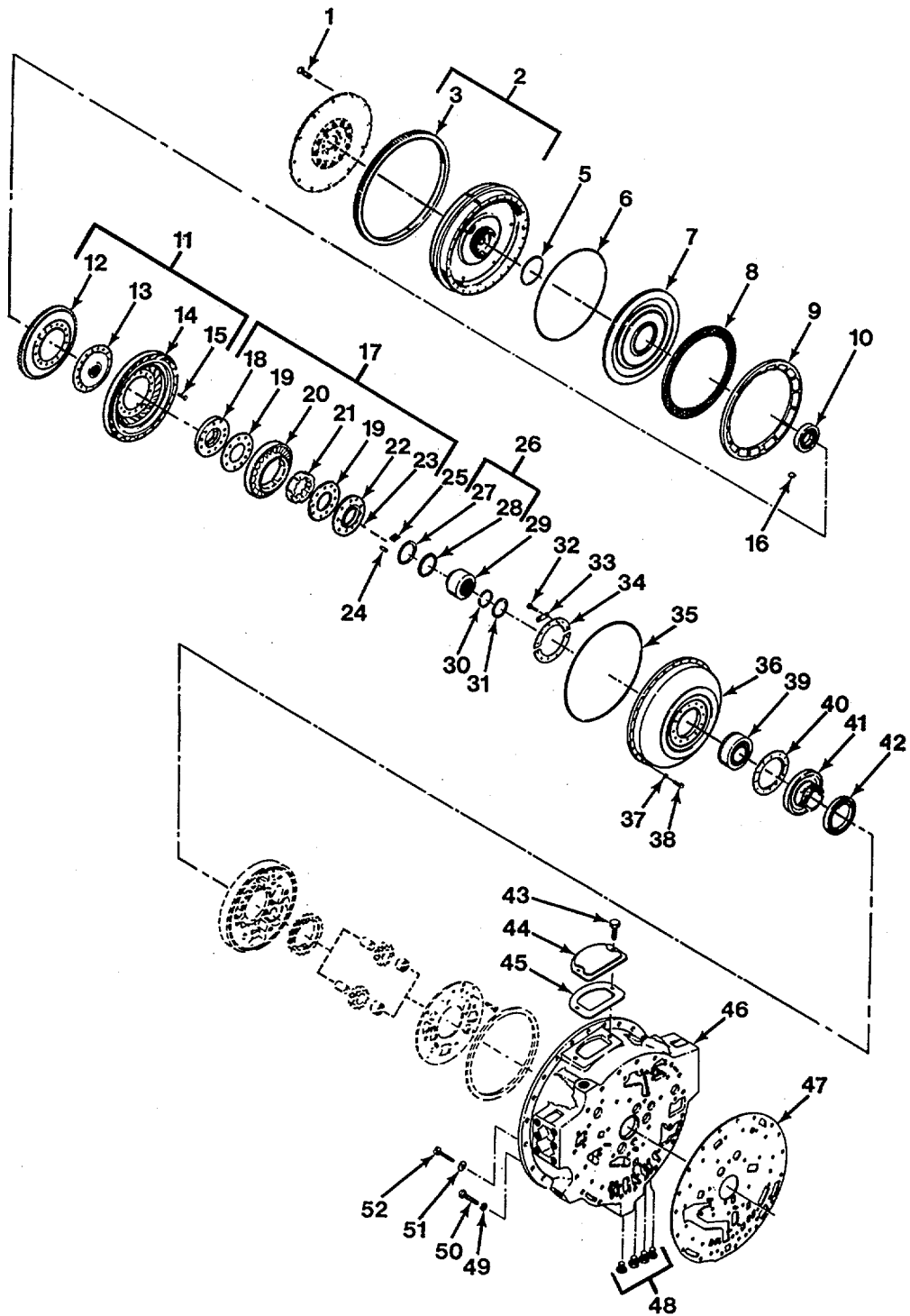


Figure F-132. Torque Converter

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-132					TORQUE CONVERTER	
-1			63005	9409058	SCREW, Cap, Hex Hd	REF
-2			73342	6885673	FLYWHEEL ASSY	REF
-3			72582	5166664	. GEAR, Ring	REF
-5			73342	67770492	PACKING, Preformed	1
-6			73342	6758740	GASKET	1
-7			73342	23011093	PISTON, Linear Actuator	1
-8			79370	HPC3970	DISK, Clutch	1
-9			73342	23010300	PLATE, Lockup Clutch	1
-10			43334	NDH3211XR1A	BEARING, Ball	1
-11			73342	6883524	TURBINE ASSY	1
-12			73342	6770476	HUB, Body	1
-13			73342	6837034	. HUB, Body	1
-14			73342	6779930	. TURBINE, Torque Converter	1
-15			73342	104268	. RIVET, Solid	16
-16			73342	6772552	KEY, Lockup Backing	2
-17			73342	6838360	STATOR ASSY	1
-18			73342	6772295	. RETAINER, Oil Seal	1
-19			73342	6771017	. SEAL, Plain	2
-20			73342	6837233	. STATOR, Torque Converter	1
-21			73342	6771496	. CAM, Stator	1
-22			73342	23017442	. RETAINER, Oil Seal	1
-23			73342	6771018	. RIVET, Solid	10
-24			73342	6837976	ROLLER, Bearing	10
-25			72582	23018535	SPRING, Flat	10
-26			73342	6839820	PARTS KIT, Transmission	1
-27			73342	9417722	. SEAT, Bearing	1
-28			80657	NTA 4860	. RETAINER AND ROLLER	1
-29			73342	6772293	RACE, Stator, Free Wheeling	1
-30			73342	6758779	RING, Retaining	1
-31			73342	6771851	SPACER	1
-32			96906	MS90727-62	SCREW, Cap, Hex Hd	12
-33			73342	6880899	STRIP	6
-34			73342	6771070	PLATE, Retaining, Bearing	1
-35			73342	6880389	GASKET	1
-36			73342	6884445	PUMP ASSY, Torque Converter	1
-37			73342	679636	WASHER, Flat	30
-38			73342	9409037	BOLT, Self-Locking	30
-39			73342	9438064	BEARING UNIT, Ball	1
-40			73342	6771366	GASKET	1
-41			73342	6834741	HUB, Converter Pump	1
-42			73342	23014631	SEAL, Plain	1
-43			96906	MS18154-58	SCREW, Cap,. Hex Hd	2
-44			73342	6703138	COVER	1
-45			73342	6750186	GASKET	1
-46			73342	23045468	HOUSING, Converter	1
-47			73342	6880973	GASKET	1
-48			73342	23012036	PLUG, Pipe	4
-49			96906	MS35338-48	WASHER, Lock	7
-50			96906	MS51095-416	SCREW, Cap, Hex Hd	7
-51			73342	6837102	WASHER, Flat	2
-52			73342	100670	SCREW	2

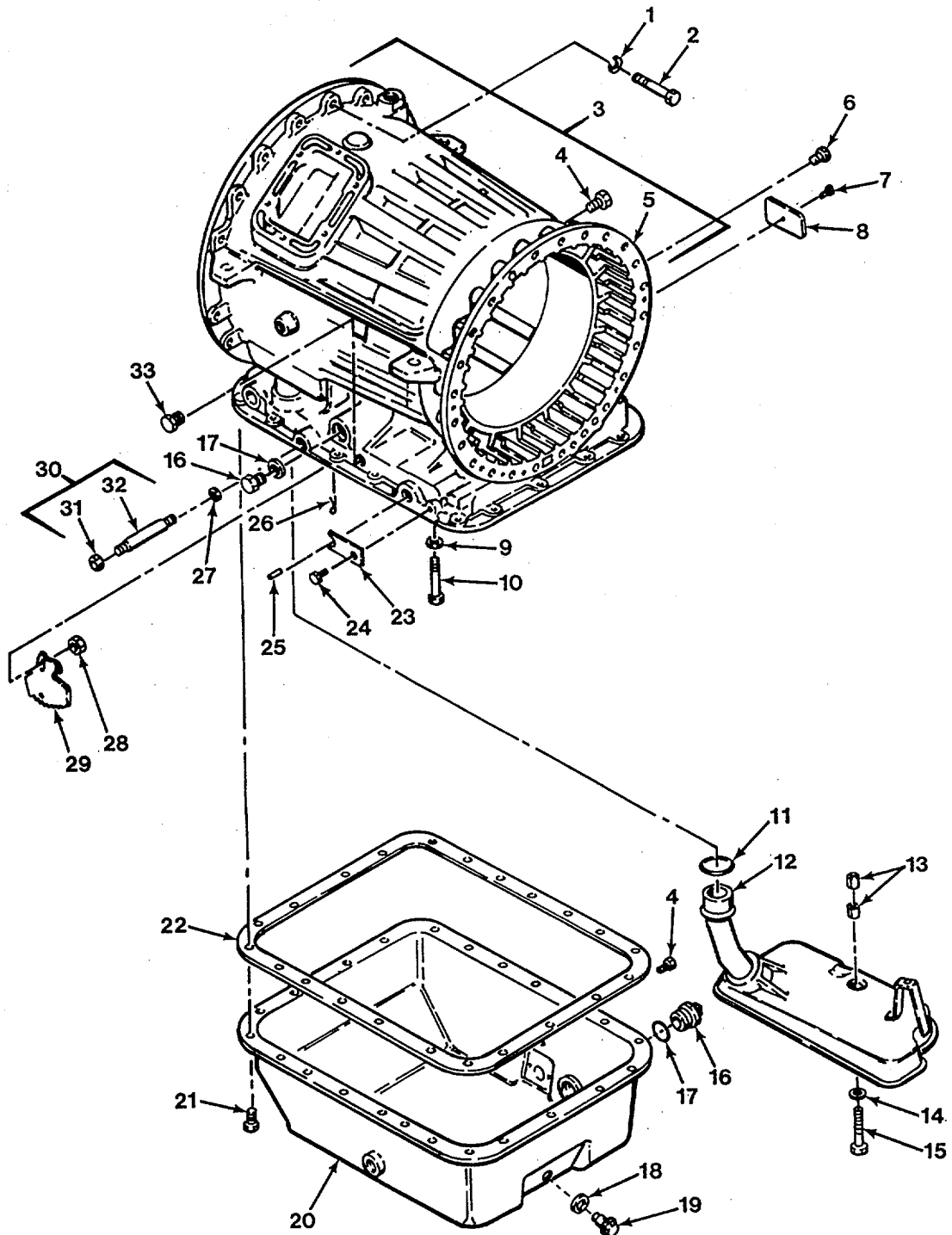


Figure F-133. Transmission Housing, Oil Filter and Oil Pan

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-133-					TRANSMISSION HOUSING, OIL FILTER AND OIL PAN	
-1			96906	MS35338-48	WASHER, Lock	11
-2			96906	MS51095-416	SCREW, Cap, Hex Hd	11
-3			73342	6882764	TRANSMISSION HOUSING ASSY	1
-4			73342	23012036	PLUG, Pipe	1
-5			73342	6881746	HOUSING, Transmission	1
-6			73342	230120036	PLUG, Pipe	1
-7			73342	23045804	SCREW, Drive	1
-8			73342	6838494	PLATE, Identification	1
-9			73342	23013841	WASHER, Flat	1
-10			73342	23016997	BOLT, Machine	1
-11			73342	23013114	PACKING, Preformed	1
-12			73342	23013625	FILTER, Fluid	1
-13			73342	23013623	SPACER, Sleeve	2
-14			73342	9420759	WASHER	1
-15			73342	9431456	BOLT, Self-Locking	1
-16			73342	445090	PLUG, Shipping	2
-17			73342	6839761	WASHER	2
-18			73342	3921989	GASKET	1
-19			73342	23011240	PLUG, Drain	1
-20			73342	6885148	OIL PAN	1
-21			73342	3829139	BOLT, Self-Locking	23
-22			63005	23016681	GASKET	1
-23			73342	8627650	RETAINER, Modulator	1
-24			96906	MS90728-32	BOLT, Machine	1
-25			73342	6834918	SPACER, Valve	1
-26			73342	6831774	PIN, Retaining	1
-27			73342	23010610	SEAL	1
-28			73342	117212	NUT, Plain, Hex	1
-29			73342	6836467	LEVER ASSY	1
-30			73342	6885213	PARTS KIT, Manual SE	1
-31			73342	11501033	NUT	1
-32			73342	8629481	SHAFT, Shouldered	1
-33			73342	23012036	PLUG, Pipe	1

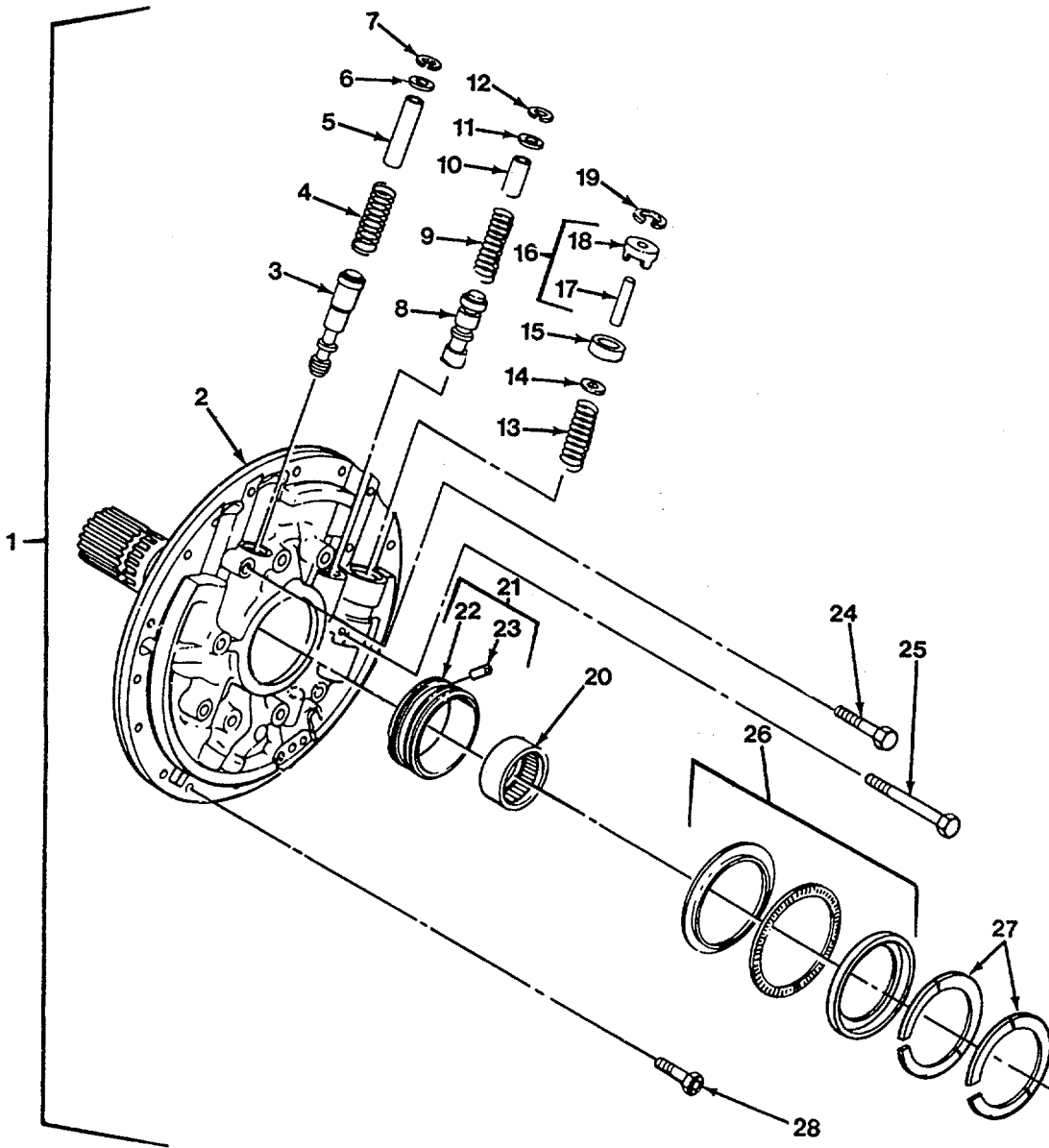


Figure F-134 Front Support Assembly

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-134-					FRONT SUPPORT ASSEMBLY	
-1			73342	6839559	FRONT SUPPORT ASSY	1
-2			73342	6883950	SUPPORT, Front	1
-3			73342	6834453	VALVE, Regulating Flow	1
-4			73342	6839209	SPRING, Helical, Compression	1
-5			73342	6834936	STOP, Valve	1
-6			73342	6834938	WASHER	1
-7			73342	274613	RING, Snap	1
-8			73342	6839010	SLIDE, Directional Control	1
-9			73342	6839010	SPRING, Helical Compression	1
-10			73342	6834456	STOP, Valve	1
-11			73342	6834946	WASHER	1
-12			73342	9414876	RING, Retaining	1
-13			73342	6769252	SPRING, Helical, Compression	1
-14			73342	6834568	VALVE, Converter By-pass	1
-15			73342	6834666	SEAT, Valve	1
-16			73342	6834463	SUPPORT ASSY, Valve	1
-17			73342	6834665	GUIDE, Valve	1
-18			73342	6834462	SUPPORT, Valve	1
-19			73342	9420905	RING, Retaining	1
-20			60380	J 3216	BEARING, Roller, Needle	1
-21			73342	23011446	SLEEVE ASSY, Bearing	1
-22			73342	23011621	SLEEVE	1
-23			72582	274889	PIN, Spring	1
-24			24617	9414215	BOLT, Self-Locking	3
-25			72582	186285	SCREW, Cap, Hex Hd	6
-26			73342	6839821	BEARING ASSY	1
-27			73342	23014441	SEAL ASSY, Special	2
-28			96906	MS35764-1297	BOLT, Self-Locking	16

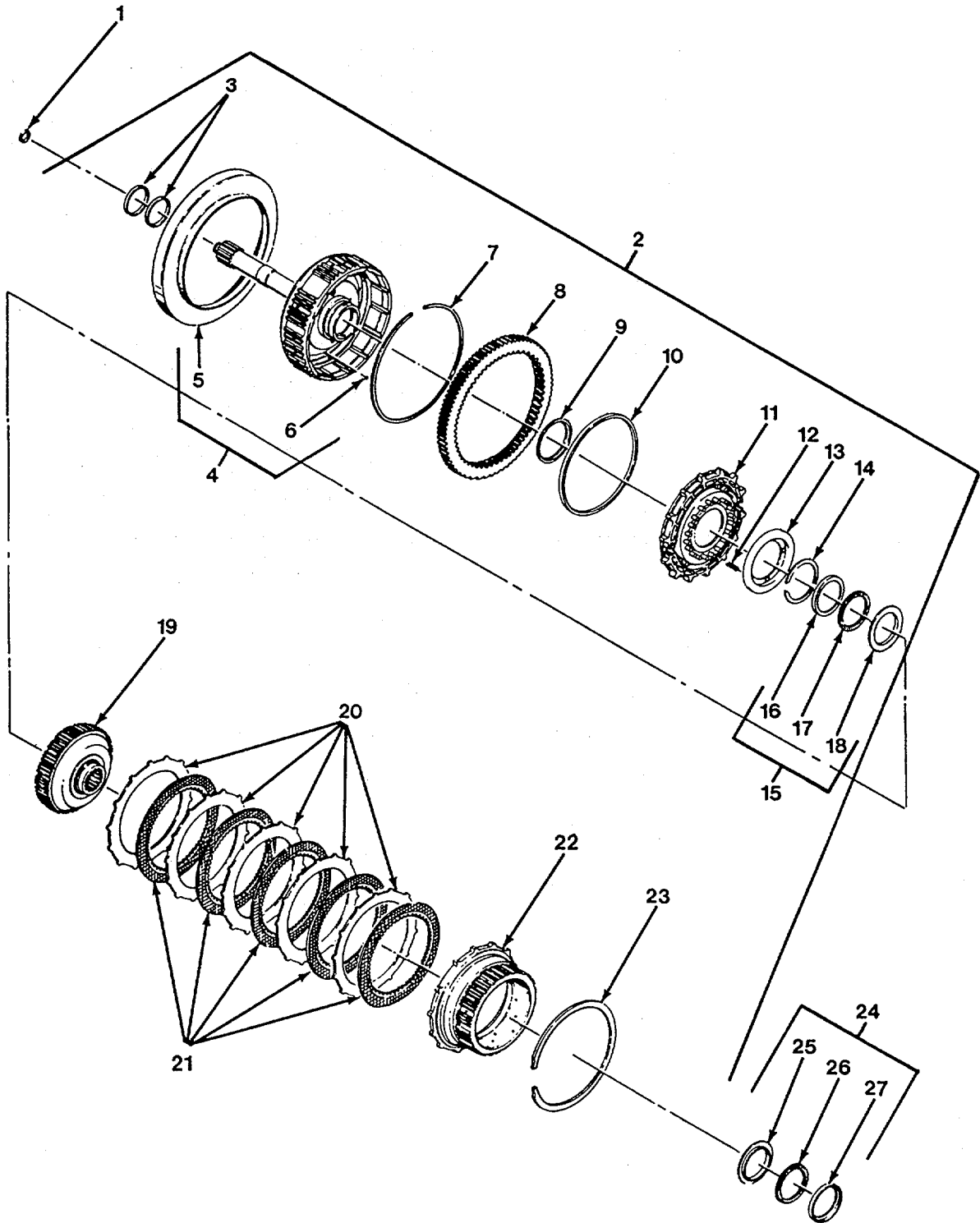


Figure F-135. Input Shaft and Forward Clutch

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-135-					INPUT SHAFT AND FORWARD CLUTCH	
-1			73342	23016657	SEAL RING, Metal	1
-2			73342	2301367	CLUTCH ASSY	1
-3			73342	23013937	PACKING, Preformed	2
-4			73342	2301724	CLUTCH HOUSING AND SHAFT	1
-5			73342	23011130	RING, Power Takeoff	1
-6			73342	8622757	BALL	4
-7			73342	6838923	RING, Retaining	1
-8			73342	6885168	GEAR, Internal-External	1
-9			73342	6833980	GASKET	1
-10			73342	6836799	SEAL, Plain	1
-11			73342	6885129	CLUTCH PISTON, 1.110 to 1.120 Thick for Use w/Clutch Hsg & Shaft w/Seal Ring Groove Only	1
-11			73342	23016569	CLUTCH PISTON, 1.110 to 1.120 Thick, for Use w/Clutch Hsg & Shaft w/out Seal Ring Groove Only	1
-11			73342	6885130	PISTON, Linear Actuator, 1.137 to 1.147 Thick, for Use w/Clutch Hsg & Shaft w/Seal Ring Groove Only	1
-11			73342	23016568	PISTON, Linear Actuator, 1.137 to 1.147 Thick, for Use w/Clutch Hsg & Shaft w/out Seal Ring Groove Only	1
-11			73342	6885128	PISTON, Linear Actuator, 1.164 to 1.174 Thick, for Use w/Clutch Hsg & Shaft w/Seal Ring Groove	1
-11			73342	23016567	PISTON, Linear Actuator, 1.164 to 1.174 Thick, for Use w/Clutch Hsg & Shaft w/out Seal Ring Groove Only	1
-12			73342	6836138	SPRING	20
-13			73342	6883192	SPRING RETAINER	1
-14			73342	6831704	RING, Retaining	1
-15			73342	6839819	BEARING ASSY, Roller, Thrust	1
-16			60380	JK44446	SEAT, Bearing	1
-17			80657	4458	BEARING, Roller	1
-18			19207	11669543	RING, Bearing, Inner	1
-19			73342	6839021	HUB, Forward Clutch	1
-20			73342	6834679	DISK, Clutch	5
-21			73342	6835687	DISK, Clutch	5
-22			73342	6835605	HUB, Body	1
-23			73342	6834594	RING, Retaining	1
-24			73342	6839819	BEARING ASSY, Roller, Thrust	1
-25			19207	11669543	RING, Bearing, Inner	1
-26			80657	4458	BEARING, Roller	1
-27			60380	JK4446	SEAT, Bearing	1

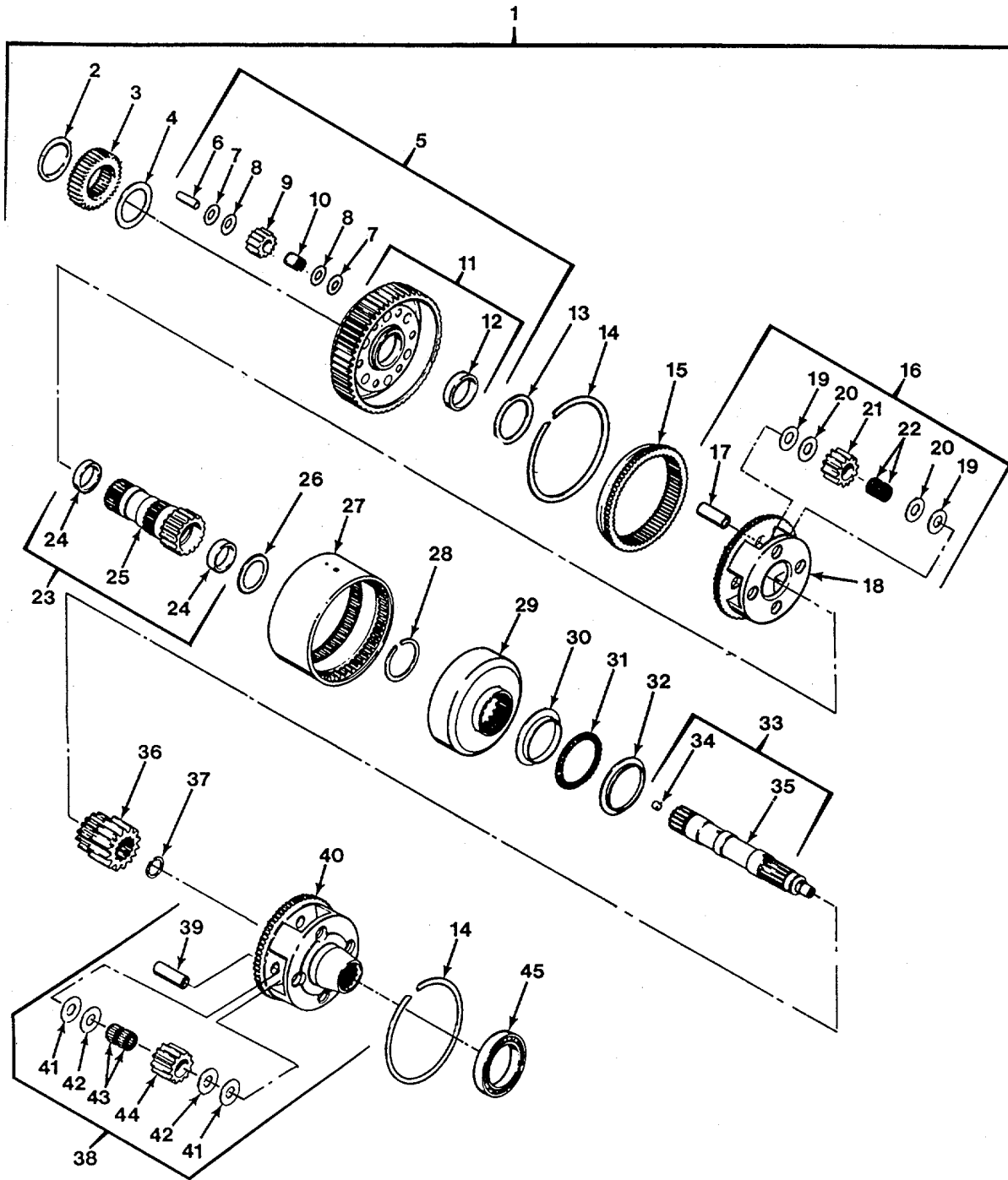


Figure F-136. Gear Unit and Main Shaft Assembly

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-136-					GEAR UNIT AND MAIN SHAFT ASSEMBLY	
-1			73342	6835578	GEAR UNIT AND MAIN SHAFT ASSY	1
-2			73342	6881352	BEARING, Washer, Thrust	1
-3			73342	6835183	GEAR, Spur	1
-4			73342	6881638	BEARING, Washer, Thrust	1
-5			73342	6835579	CARRIER ASSY	1
-6			73342	6831679	PIN	6
-7			73342	6839376	BEARING, Washer, Thrust	12
-8			73342	6831680	SEAT, Bearing	12
-9			73342	6838418	GEAR SET, Spur, Matched	1
-10			73342	9429635	CONE	6
-11			73342	6835580	GEAR ASSY, Spur	1
-12			73342	6835322	BUSHING, Sleeve	1
-13			73342	6835321	BEARING, Washer, Thrust	1
-14			73342	6834575	RING, Retaining	2
-15			73342	6834327	GEAR, Spur	1
-16			73342	6835073	CARRIER ASSY	1
-17			73342	6835182	PIN, Straight, Headless	4
-18			73342	6835074	CARRIER, Center Planetary	1
-19			73342	6839511	BEARING, washer, Thrust	8
-20			73342	6837630	BEARING, Washer, Thrust	8
-21			73342	6838417	GEAR SET, Spur, Matched	1
-22			73342	9422966	RETAINER AND ROLLER	8
-23			73342	6883935	SUN GEAR AND SHAFT ASSY	1
-24			73342	6835323	BUSHING, Sleeve	2
-25			73342	6883702	SHAFT, Sun gear	1
-26			73342	6883492	BEARING, Washer, Thrust	1
-27			73342	6834333	DRUM, Transmission	1
-28			73342	6777231	RING, Retaining	1
-29			73342	6883703	GEAR, Internal	1
-30			73342	9432124	RING, Bearing, Inner	1
-31			73342	9424098	RETAINER AND ROLLER ASSY	1
-32			73342	9432125	RACE	1
-33			73342	6834684	MAIN SHAFT ASSY	1
-34			73342	6758391	PLUG, Orifice	1
-35			73342	6834323	SHAFT, Main	1
-36			73342	6835179	GEARSHAFT, Spur	1
-37			73342	6834574	RING, Retaining	1
-38			73342	6835628	CARRIER ASSY	1
-39			73342	6834662	PIN	4
-40			73342	6835627	CARRIER	1
-41			73342	6839512	BEARING, washer, Thrust	8
-42			73342	6837629	WASHER	8
-43			73342	9423442	ROLLER ASSY	8
-44			73342	6838419	GEAR, Spur	1
-45			73342	9432185	BEARING, Ball, Annular	1

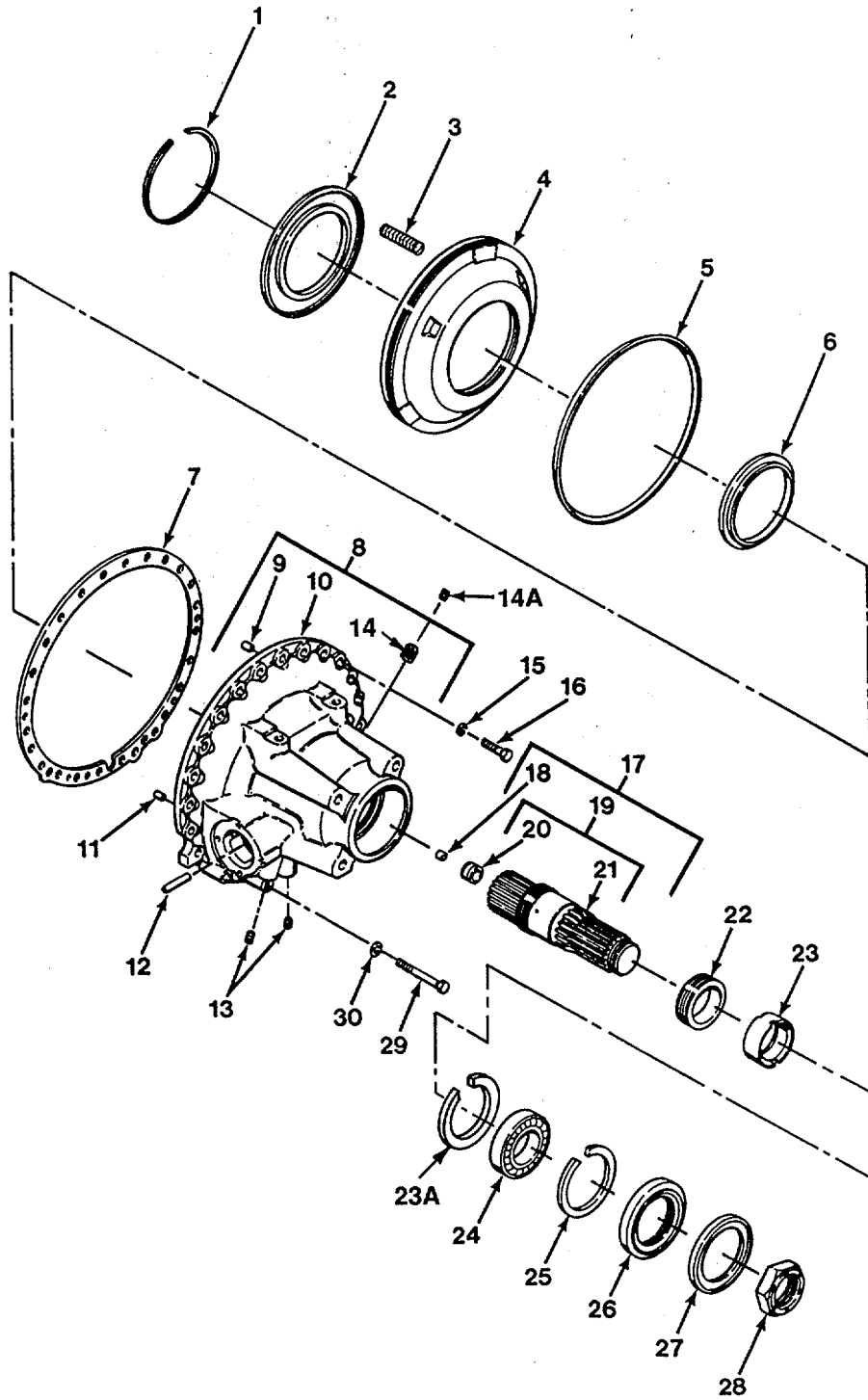


Figure F-137. Rear Cover Assembly

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-137-					REAR COVER ASSEMBLY	
-1			73342	6835369	RING, Retaining	1
-2			73342	6880432	RETAINER, Spring	1
-3			73342	6880418	SPRING, Helical, Compression	30
-4			73342	6835439	PISTON, Rear Cover	1
-5			73342	23011454	RING	1
-6			73342	23011458	SEAL, Plain	1
-7			73342	6839213	GASKET	1
-8			73342	23016886	REAR COVER ASSY	1
-9			73342	141260	PIN, Straight, Headless	1
-10			73342	23016853	COVER, Rear	1
-11			24617	141240	PIN, Straight, Headless	1
-12			73342	23016140	PIN, Straight, Headless	1
-13			73342	23012036	PLUG, Pipe	2
-14			73342	6834570	BUSHING	1
-14A			73342	6839091	PLUG, Machine Thread	1
-15			96906	MS35338-48	WASHER, Lock	21
-16			96906	MS51095-416	SCREW, Cap, Hex Hd	21
-17			73342	6835755	OUTPUT SHAFT ASSY	1
-18			73342	8623484	PLUG, Cup	1
-19			73342	6835756	SHAFT & BUSHING, Output	1
-20			73342	6836272	BUSHING, Sleeve	1
-21			73342	6835690	SHAFT, Output	1
-22			73342	6835455	GEAR, Speedometer Drive	1
-23			73342	23010144	SPACER, Sleeve	1
-23A			73342	6769576	RING, Retaining	1
-24			43334	3212BAXR1A	BEARING, Ball, Annular	1
-25			73342	6881649	RING, Retaining	1
-26			73342	6773311	SEAL, Plain Encased	1
-27			73342	6757563	RETAINER, Sea[1
-28			73342	6771144	NUT, self-locking, Hex	1
-29			96906	MS90728-120	SCREW, Cap, Hex Hd	3
-30			96906	MS35338-48	WASHER, Lock	3

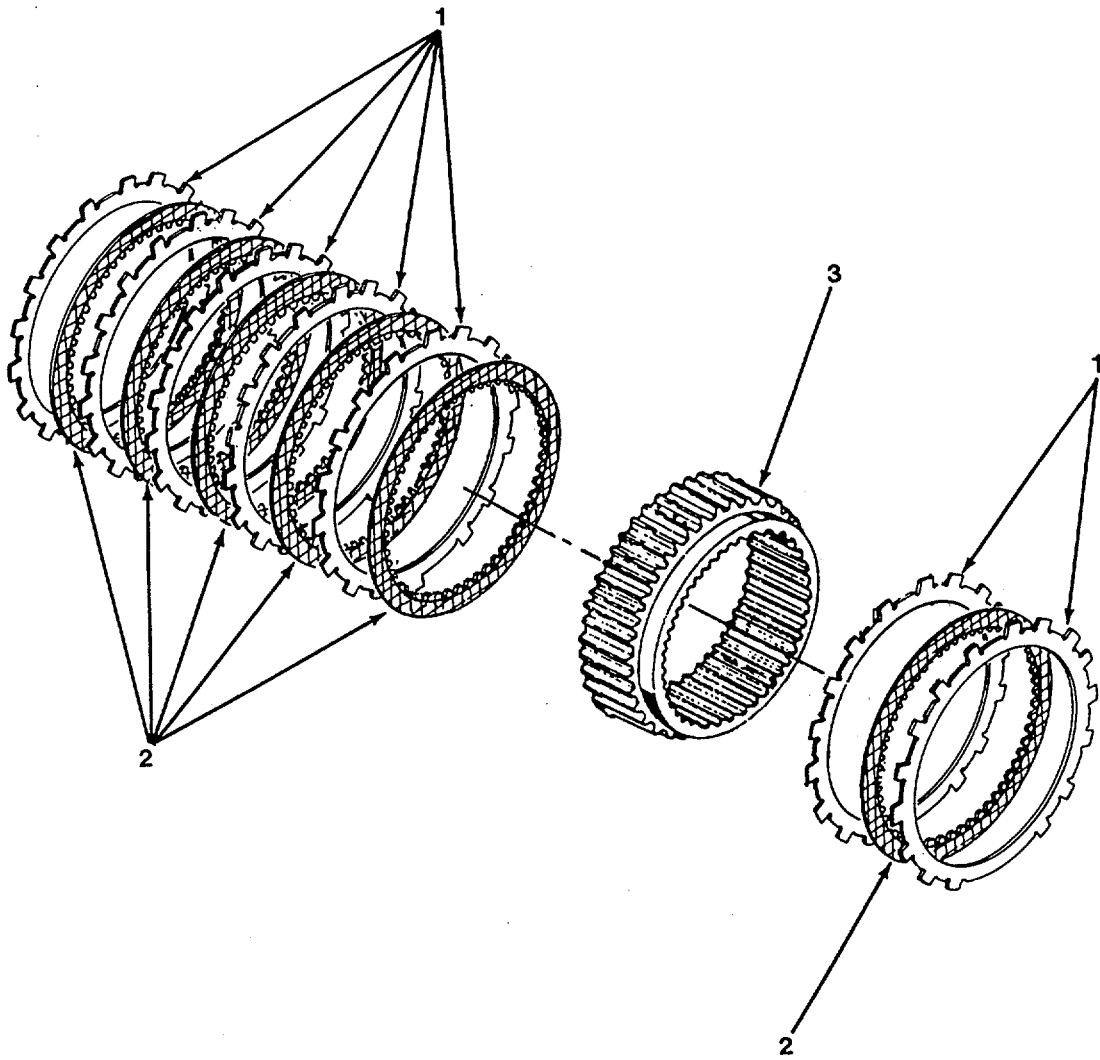


Figure F-138. First and Reverse Clutch

F-350

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-138-					FIRST AND REVERSE CLUTCH	
-1			73342	6834680	PLATE, Transmission, .0955 to .1025 Thick	AR
-1			73342	6834766	PLATE, Transmission, .1161 to .1231 Thick	AR
-2			73342	6834487	DISK, Clutch	6
-3			73342	6835606	RING GEAR	1

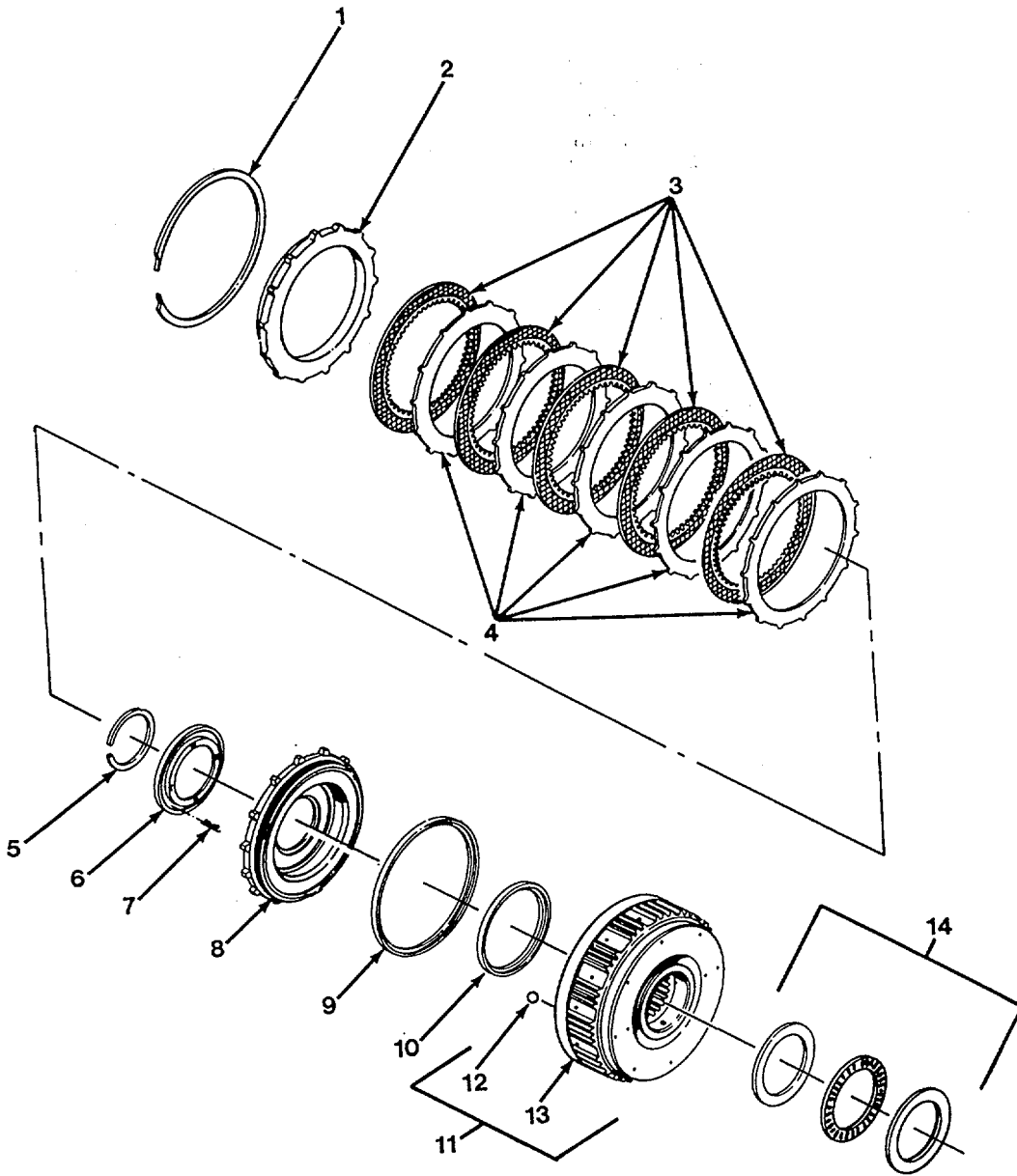


Figure F-139. Fourth Clutch Assembly

F-352

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-139-					FOURTH CLUTCH ASSEMBLY	
-1			73342	6834594	RING, Retaining	1
-2			73342	23011235	DISK, Clutch	1
-3			73342	6835687	DISK, Clutch	5
-4			73342	6834679	DISK, Clutch	5
-5			73342	6831704	RING, Retaining	1
-6			73342	6883192	SPRING RETAINER	1
-7			73342	6836138	SPRING	20
-8			73342	6885133	PISTON, Fourth Clutch, 1.110 to 1.120 Thick, Identified w/Letter M	1
-8			73342	6885132	PISTON, Fourth Clutch, 1.137 to 1.147 Thick, Identified w/Letter S	1
-8			73342	6885131	PISTON, Fourth Clutch, 1.164 to 1.174 Thick, Identified w/Letter T	1
-9			73342	6836799	SEAL	1
-10			73342	32013262	PACKING, Preformed	1
-11			73342	6834486	HOUSING ASSY, Fourth Clutch	1
-12			73342	8622757	BALL	8
-13			73342	6834314	HOUSING, Fourth Clutch	1
-14			73342	6839821	BEARING ASSY	1

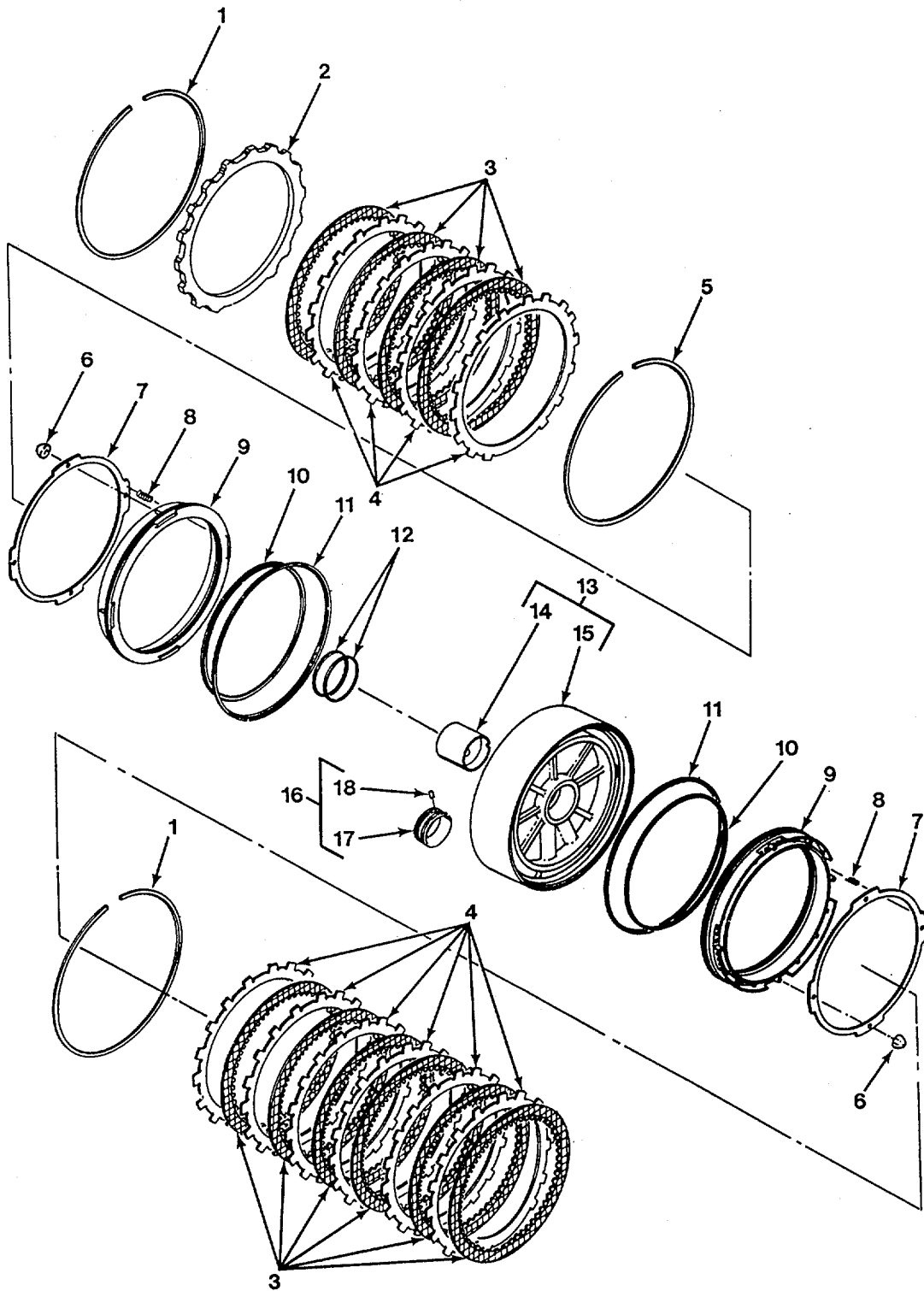


Figure F-140. Second Clutch, Center Support and Third Clutch

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-140-					SECOND CLUTCH, CENTER SUPPORT AND THIRD CLUTCH	
-1			73342	6882794	RING, Retaining	2
-2			73342	6834319	BACKING PLATE	1
-3			73342	6834487	DISK, Clutch	10
-4			73342	6834488	DISK, Clutch, .0993 to .1063 Thick	AR
-4			73342	6834720	DISK, Clutch, .1161 to .1231 Thick	AR
-5			73342	6882794	RING, Retaining, .155 to .157 Thick, Color Code White	AR
-5			73342	6882795	RING, Retaining, .148 to .150 Thick, Color Code Blue	AR
-5			73342	6882796	RING, Retaining, .152 to .154 Thick, Color Code Yellow	AR
-5			73342	6882797	RING, Retaining, .158 to .160 Thick, Color Code Red	AR
-6			73342	3909063	NUT, Push-On	8
-7			73342	6836419	RING, Clutch	2
-8			73342	6831656	SPRING, Helical, Compression	40
-9			73342	6836418	PISTON, Third Clutch	2
-10			73342	23011453	SEAL	2
-11			73342	23011454	RING	2
-12			73342	23014441	SEAL, Special	2
-13			73342	6880079	SUPPORT HOUSING ASSY	1
-14			73342	6883005	BUSHING, Sleeve	1
-15			73342	6836182	HOUSING, Support	1
-16			73342	23011446	SLEEVE ASSY, Bearing	1
-17			73342	23011621	SLEEVE, Bearing	1
-18			72582	274889	PIN, Spring	1

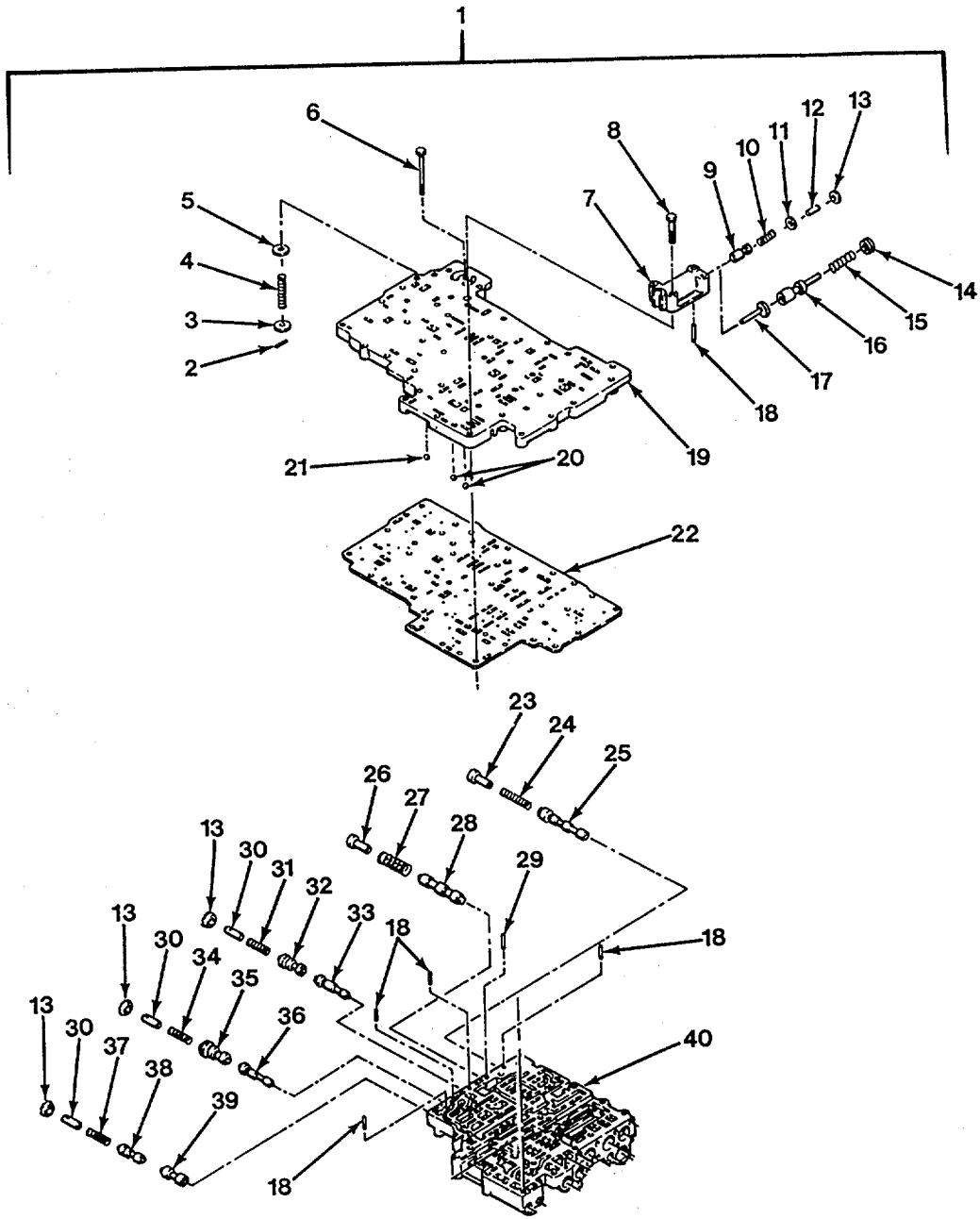


Figure F-141. Control Valve Assembly, Sheet 1 of 3

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-141-					CONTROL VALVE ASSEMBLY	
-1			73342	23018878	CONTROL VALVE ASSY	1
-2			73342	141114	PIN	1
-3			73342	6836955	WASHER	1
-4			73342	23018455	SPRING	1
-5			73342	6834713	VALVE, Lubricator	1
-6			73342	6836953	PIN	1
-7			73342	6833878	BODY, Valve (Interchangeable w/P/N 23015348)	1
-7			73342	23015348	BODY, Valve (Interchangeable w/P/N 6833878)	1
-8			96906	MS90728-16	SCREW, Cap, Hex Hd	3
-9			73342	6835003	VALVE (Use Only w/P/N 6833878)	1
-10			73342	23012948	SPRING, Helical, Compression (Use Only w/P/N 6833878)	1
-11			73342	6833949	WASHER, Flat (Use Only w/P/N 6833878)	2
-12			73342	6880158	STOP, Valve (Use Only w/P/N 6833878)	1
-13			73342	6833891	RING, Spring (Use Only w/P/N 6833878)	5
-14			73342	23014098	RING, Spring Adjusting (Use Only w/P/N 23015348)	1
-15			73342	6880980	SPRING (Use Only w/P/N 23015348)	1
-16			73342	23013764	VALVE, Modulator (Use Only w/P/N 23015348)	1
-17			73342	6839085	PIN, Valve (Use Only w/P/N 23015348)	1
-18			73342	9428493	BEARING, Roller, Needle	5
-19			73342	23018645	PLATE, Oil Transfer	1
-20			73342	23045388	BALL, Bearing	2
-21			73342	6880187	BALL, Bearing	1
-22			73342	23016512	PLATE	1
-23			73342	6880188	STOP, Valve (Use Only w/Valve Body P/N 6885199 & Valve Spool P/N 6833889)	1
-23			73342	23017752	STOP, Valve (Use Only w/Valve Body P/N 23017825 & Valve Spool P/N 23017751)	1
-24			73342	23018423	SPRING	1
-25			73342	6833889	SPOOL, Valve (Use Only w/Valve Body P/N 6885199 & Valve Stop P/N 6880188)	1
-25			73342	23017751	VALVE, Linear, Direct (Use Only w/Valve Body P/N 23017825 & Valve Stop P/N 23017752)	1
-26			73342	6839829	STOP, Valve	2
-27			73342	6832462	SPRING, Helical, Compression	2
-28			73342	6833888	VALVE, Transmission	2
-29			73342	6703169	ROLLER, Bearing	3
-30			73342	6833896	STOP, Valve	3
-31			73342	23013269	SPRING, Helical, Compression	1
-32			73342	6836372	MODULATOR, Valve	1
-33			73342	6880988	VALVE	1
-34			73342	23012954	SPRING, Helical, Compression	1
-35			73342	6836370	SPOOL, Valve	1
-36			73342	6836854	VALVE, Two-Three Shift	1
-37			73342	6884943	SPRING, Helical, Compression	1
-38			73342	6836368	VALVE, One-Two Modulator	1
-39			73342	6836853	VALVE, Linear, Direct	1
-40			73342	6885199	BODY, Valve (Use Only w/Trimmer Valve P/N 6833889 & Valve Stop P/N 6880188)	1
-40			73342	23017825	BODY, Valve (Use Only w/Trimmer Valve P/N 23017751 & Valve Stop P/N 23017752)	1

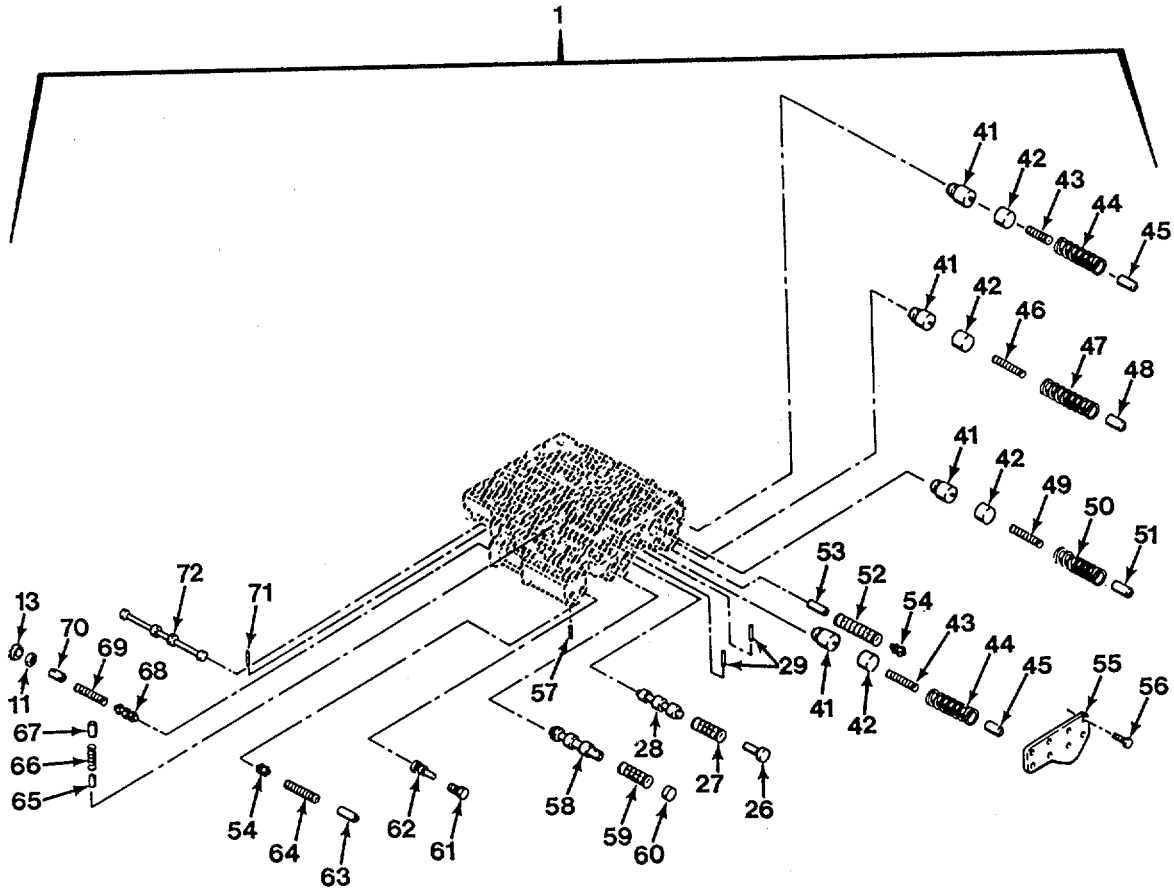


Figure F-141. Control Valve Assembly, Sheet 2 of 3

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-141-						
-41			73342	23014097	PISTON, Valve	3
-42			73342	6835921	PLUG, Trimmer	4
-43			73342	6880118	SPRING, Helical, Compression	2
-44			73342	23012937	SPRING, Helical, Compression	2
-45			73342	6837122	STOP, Valve	2
-46			73342	6885166	SPRING, Helical Compression	1
-47			73342	23018733	SPRING	1
-48			73342	6839122	STOP, Valve	2
-49			73342	6883300	SPRING, Helical Compression	1
-50			73342	6839271	SPRING, Helical Compression	1
-51			73342	6835734	STOP, Valve	1
-52			73342	6838989	SPRING, Helical Compression	1
-53			73342	9436084	VALVE, Accumulator	2
-54			73342	23014097	PLUG, Valve	1
-55			73342	6881018	COVER	1
-56			96906	MS90728-6	SCREW, Cap, Hex Hd	8
-57			96906	MS1 6562-39	PIN, Spring	1
-58			73342	6835928	PISTON, Servo Valve	1
-59			73342	6834528	SPRING, Helical Compression	1
-60			73342	6835930	SPACER	1
-61			73342	23012036	PLUG, Pipe	1
-62			73342	23045247	STRAINER ELEMENT	1
-63			73342	6838987	PLUG, Valve	1
-64			73342	6838988	SPRING, Helical, Compression	1
-65			73342	6838429	PIN, Valve	1
-66			73342	6835729	SPRING, Helical, Compression	1
-67			73342	6835929	PISTON, Priority Valve	1
-68			73342	6831737	SLIDE, Directional Control	1
-69			73342	6837541	SPRING, Helical, Compression	1
-70			73342	6884905	PIN	1
-71			73342	9426920	PIN	1
-72			73342	6881013	SELECTOR, Valve Manual	1

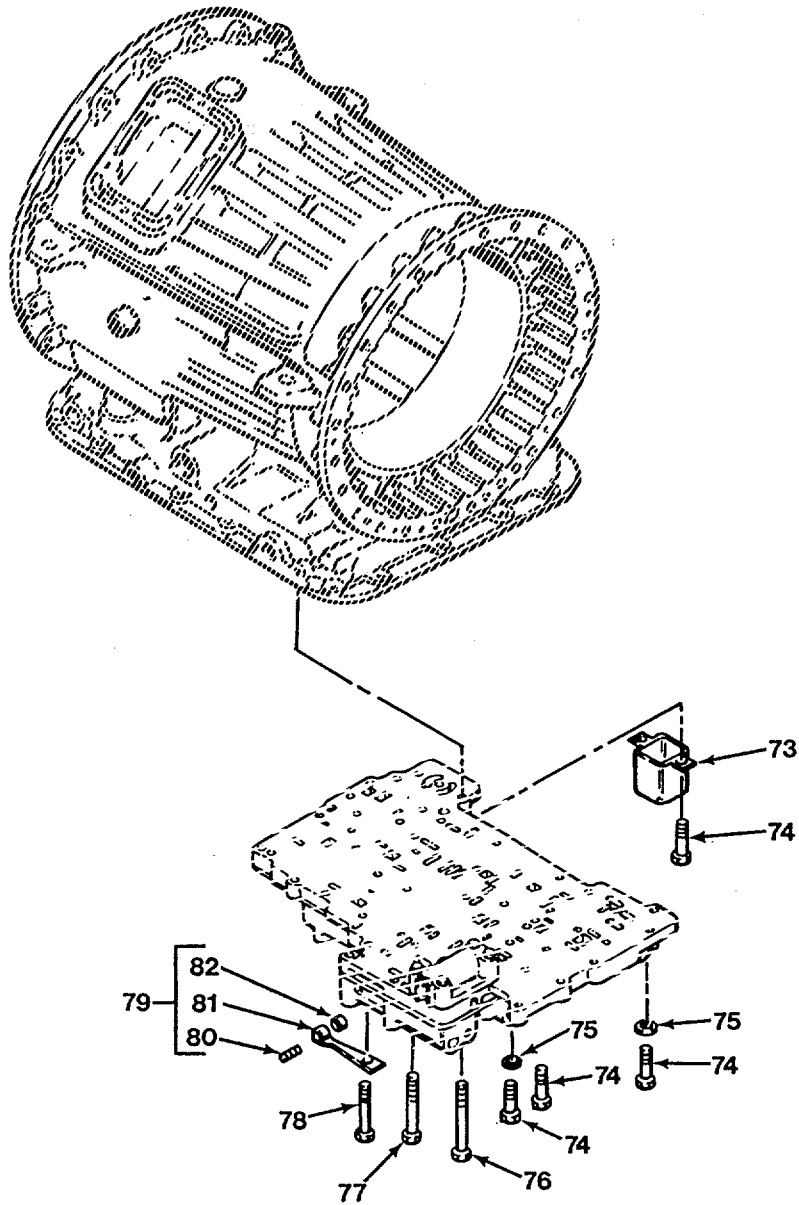


Figure F-141. Control Valve Assembly, Sheet 3 of 3

F-360

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-141-						
-73			73342	6839289	BAFFLE, Oil	1
-74			63005	454815	SCREW, Cap, Hex Hd	11
-75			96906	MS27183-10	WASHER, Flat	2
-76			73342	273340	BOLT, Machine	3
-77			96906	MS90728-18	SCREW, Cap, Hex Hd	15
-78			96906	MS90728-16	SCREW, Cap, Hex Hd	1
-79			73342	8625431	ROLLER AND SPRING ASSY	1
-80			73342	8625430	SPRING, Manual Detent	1
-81			73342	8619322	PIN, Retainer	1
-82			73342	8623681	ROLLER, Manual Detent	1

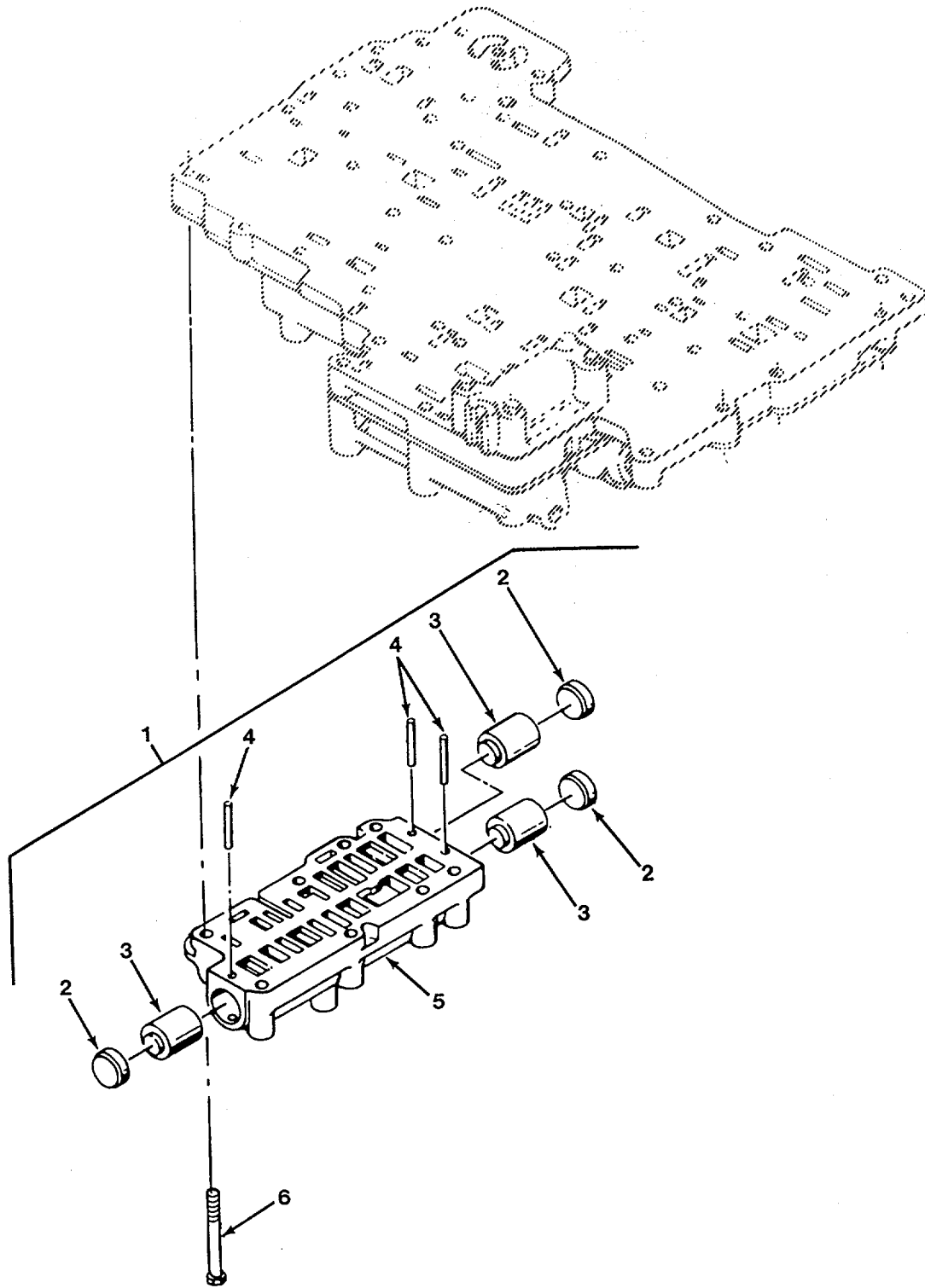


Figure F-142. Lock-Up Cutoff Valve Assembly

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-142-					LOCK-UP CUTOFF VALVE ASSEMBLY	
-1			73342	6881719	VALVE BODYASSEMBLY	1
-2			73342	6834509	DISK, Solid, Plain	3
-3			73342	6834407	VALVE, Lockup Cutoff	3
-4			73342	9423346	PIN	3
-5			73342	6881720	BODY, Valve, Lockup	1
-6			96906	MS90728-18	SCREW, Cap, Hex Hd	8

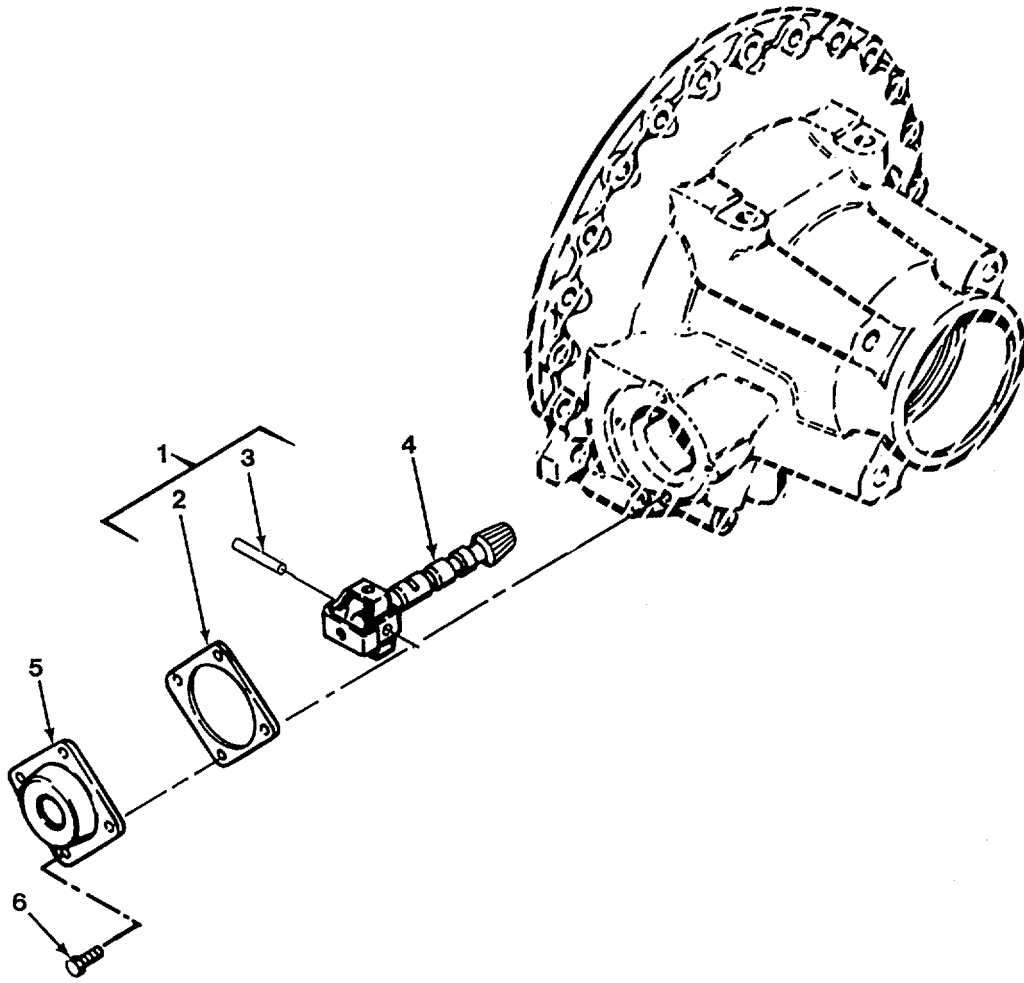


Figure F-143. Governor Assembly

F-364

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-143-						
-1			73342	6880353	GOVERNOR ASSEMBLY KIT, Governor	1
-2			73342	23018625	GASKET	1
-3			73342	23017556	PIN, Governor	2
-4			73342	6885570	GOVERNOR ASSY	1
-5			73342	8623262	COVER, Governor	1
-6			73342	115658	BOLT, Machine	4

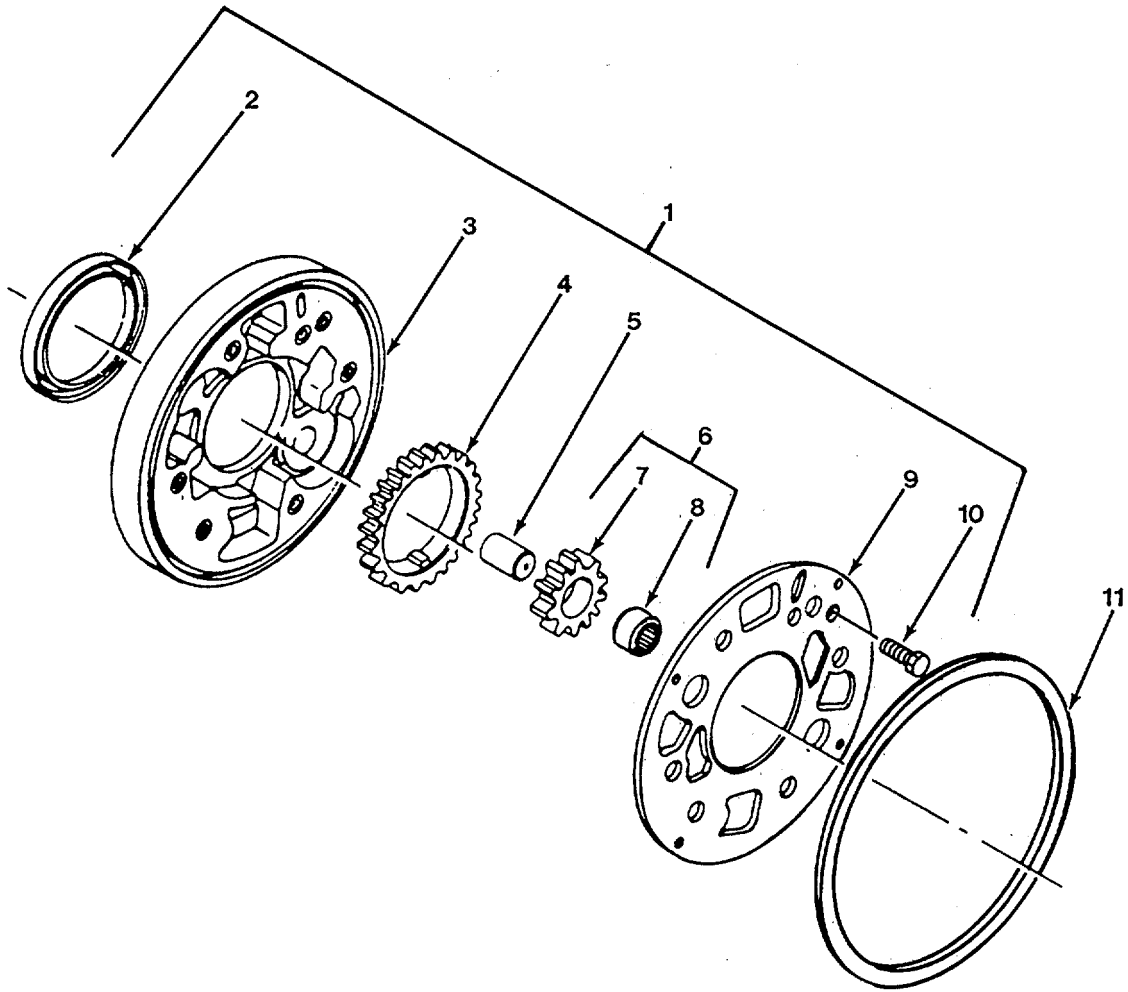


Figure F-144. Oil Pump Assembly

F-366

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-144-					OIL PUMP ASSEMBLY	
-1			73342	6834749	PUMP ASSEMBLY, Oil	1
-2			73342	23016947	SEAL	1
-3			73342	6839665	BODY, Oil Pump	1
-4			73342	6771084	GEAR, Spur	1
-5			73342	6834888	SHAFT, Pump, Driven	1
-6			73342	6834979	GEAR ASSY, Pump	1
-7			73342	6834976	GEAR, Spur	1
-8			73342	23012921	BEARING ASSY	1
-9			73342	6834739	COVER, Pump	1
-10			96906	MS35190-288	SCREW, Machine	1
-11			73342	6837255	PACKING, Preformed	1

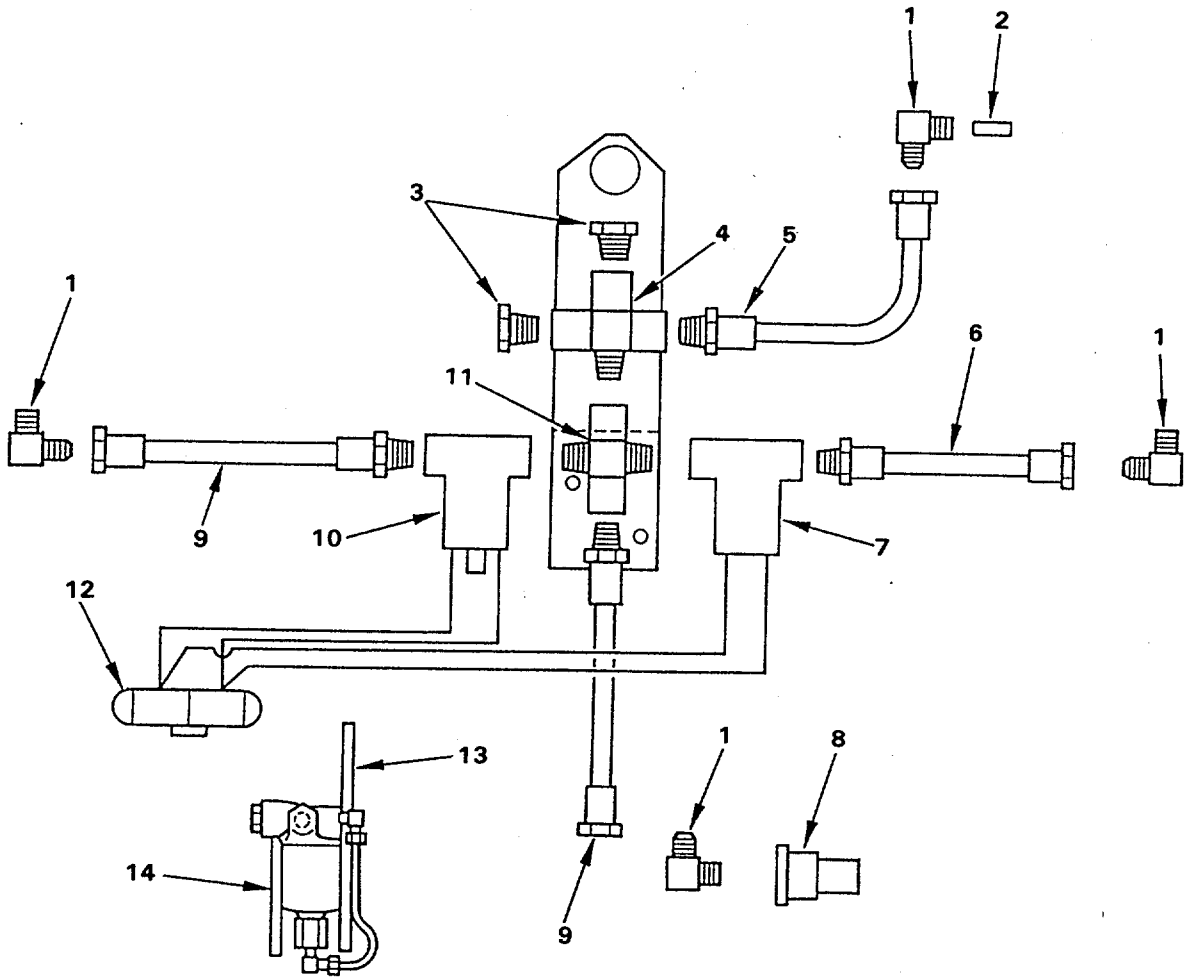


Figure F-145. Transmission Lock-Up Assembly

F-368

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-145-	04664	41-0014			TRANSMISSION LOCK-UP ASSEMBLY	1
-1	04664	53-4025-003	0CME1	849FS-06X02	FITTING, Ext. Pipe/370 Flare 900	4
-2	04664	51-0355	73342	6882811	VALVE, Check	1
-3	04664	56-0095			PLUG, 1/4"	2
-4	04664	51-0358	0CME1	5655-4-4S	CROSS, 4-4S, 1/4"-18	1
-5	04664	41-0119			HOSE ASSY, Lock-Up, 9" Lg	1
-6	04664	41-0189			HOSE ASSY, Lock-Up, 42" Lg	1
-7	04664	51-0039	8K266	R-2H-X-52 12VT	VALVE, Air Solenoid, NC, 12VDC	1
-8	04664	41-0018			TUBE, Pilot	1
-9	04664	41-0015			HOSE ASSY, Lock-Up, 20" Lg	2
-10	04664	51-0354	8K266	RP1HX29	VALVE, Air Solenoid, 12 VDC	1
-11	04664	51-0360			CROSS, 4-4S, 1/4"-18	1
-12	04664	64-0543	1JB11	12010717	BODY, Connector	1
-12	04664	64-0550	1JB11	12010182	TERMINAL, Female	2
-12	04664	64-0552	1JB11	12015193	SEAL	2
-13	04664	41-0187			HANGER	1
-14	04664	41-0124			PLATE, Hanger	1

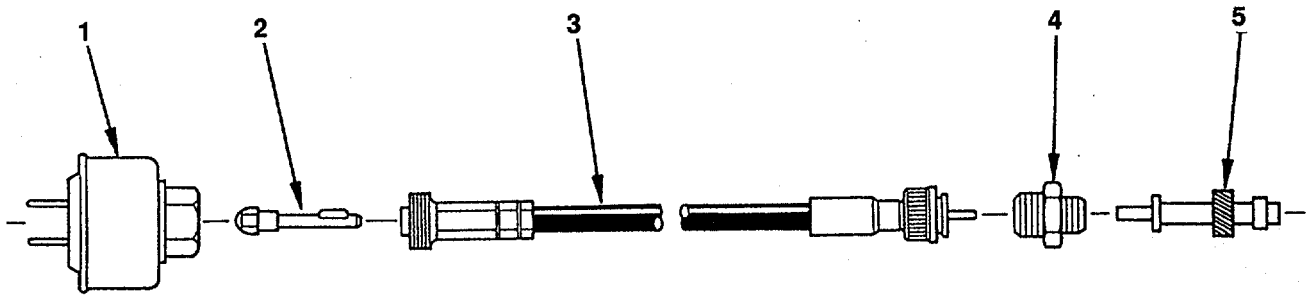


Figure F-146. Speedometer Cable Assembly

F-370

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-146-					SPEEDOMETER CABLE ASSEMBLY (See figure F-131 for NHA)	REF
-1	04664	44-0785	78388	SA-2650A	SENDER, Pulse Generator	1
-2	04664	44-2448	78388	SA-2679	KEY, Drive, .203	1
-3	04664	52-0126			CABLE, 24" Lg	1
-4	04664	44-0820	73342	2337439	SLEEVE, Gear, Speedometer	1
-5	04664	44-0258	5A691	SW-890203	GEAR, Speedometer	1

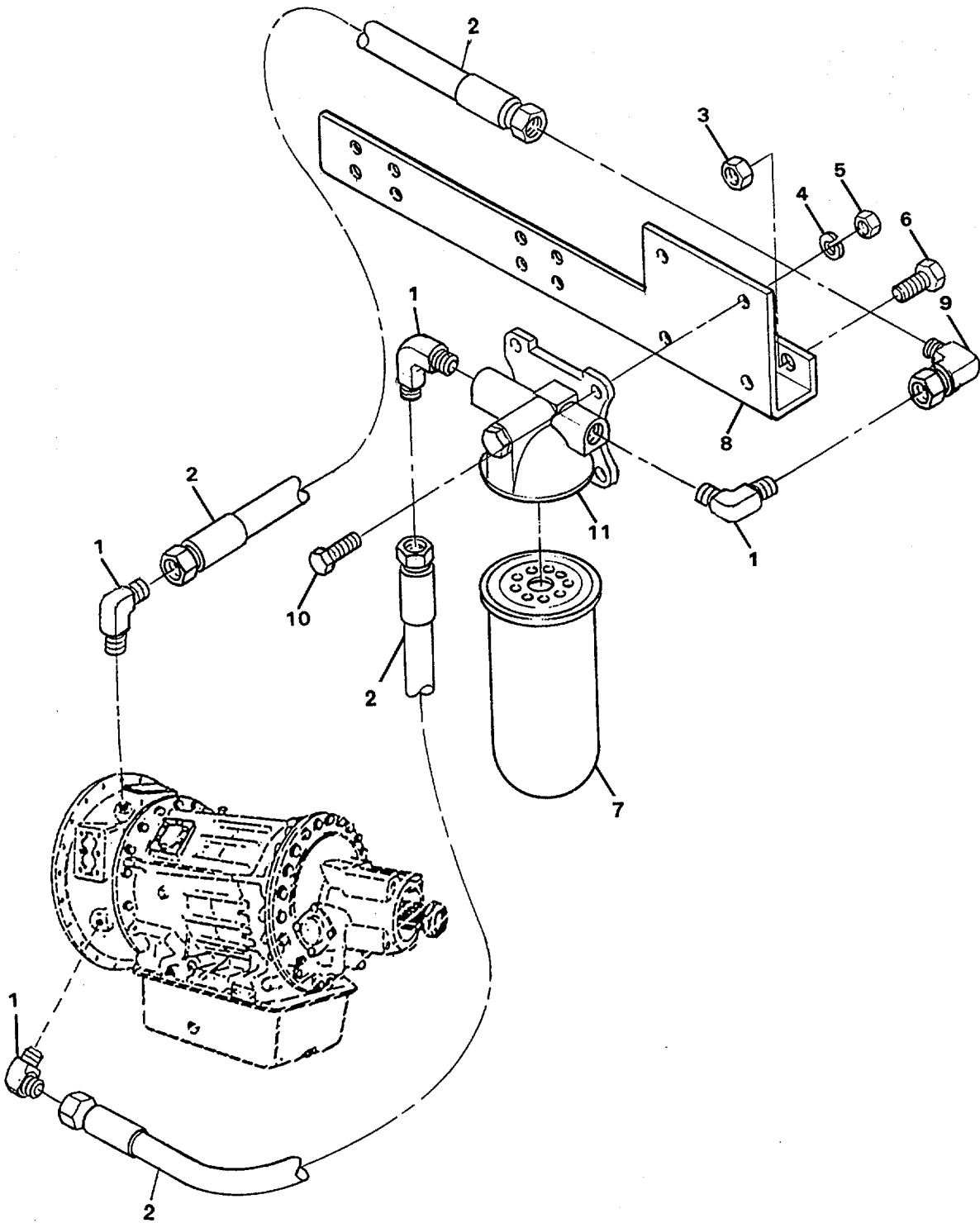


Figure F-147. Transmission Hoses

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-147-					TRANSMISSION HOSES	
-1	04664	53-4020-022	92003	16C50X-S	ELBOW	4
-2	04664	53-0014			HOSE ASSY	2
-3	04664	82-3009			NUT, Lock	2
-4			96906	MS35338-46	WASHER, Lock	4
-5			96906	MS51967-8	NUT, Plain, Hex	4
-6	04664	82-2017-0150			SCREW, Flange Hd	2
-7	04664	43-0019	70040	25010335	CARTRIDGE, Filter	1
-8	04664	43-0042			BRACKET, Filter	1
-9	04664	53-4019-008	92003	16C6X-S	ELBOW	1
-10			96906	MS90725-62	SCREW, Cap, Hex Hd	4
-11	04664	43-0021	70040	2501801	HEAD, Filter	1

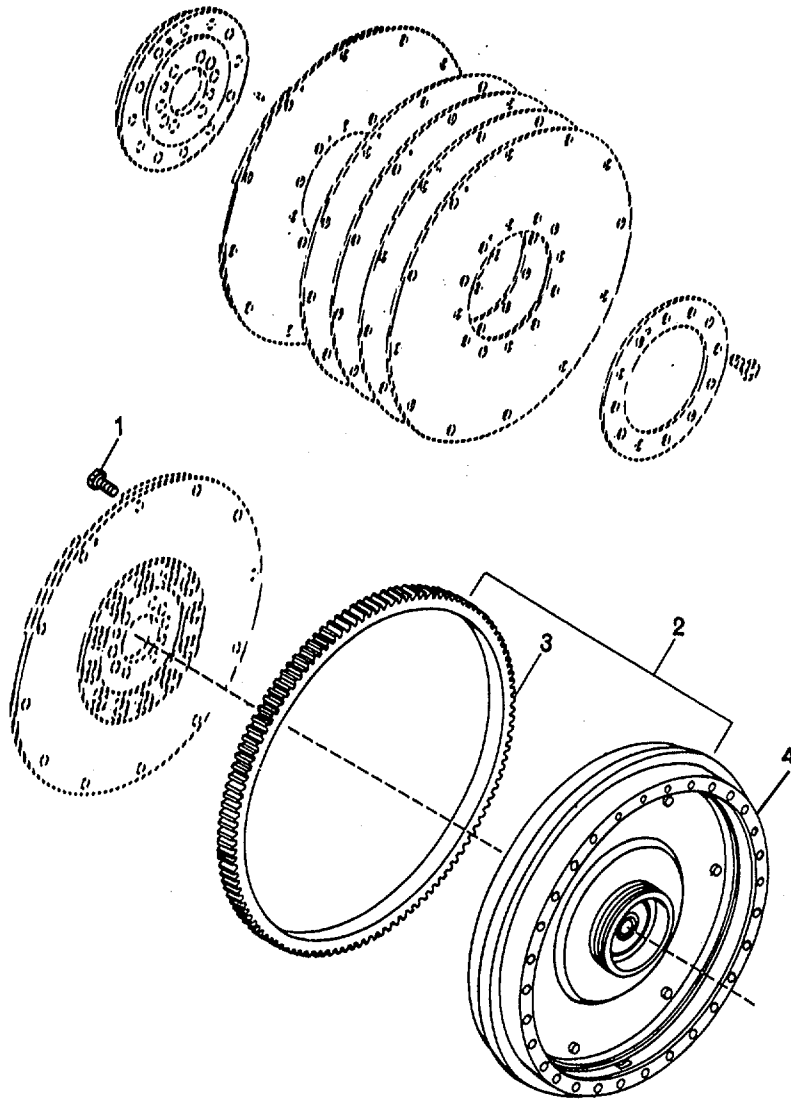


Figure F-148. Flywheel Assembly

F-374

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-148-					FLYWHEEL ASSEMBLY	
-1			73442	9409058	SCREW, Cap, Hex Hd	12
-2			73342	6885673	FLYWHEEL ASSY	1
-3			73342	5166664	GEAR, Ring*	1
-4			73342	6885672	FLYWHEEL*	1
* Serviced as an Assembly - not as a detail part.						

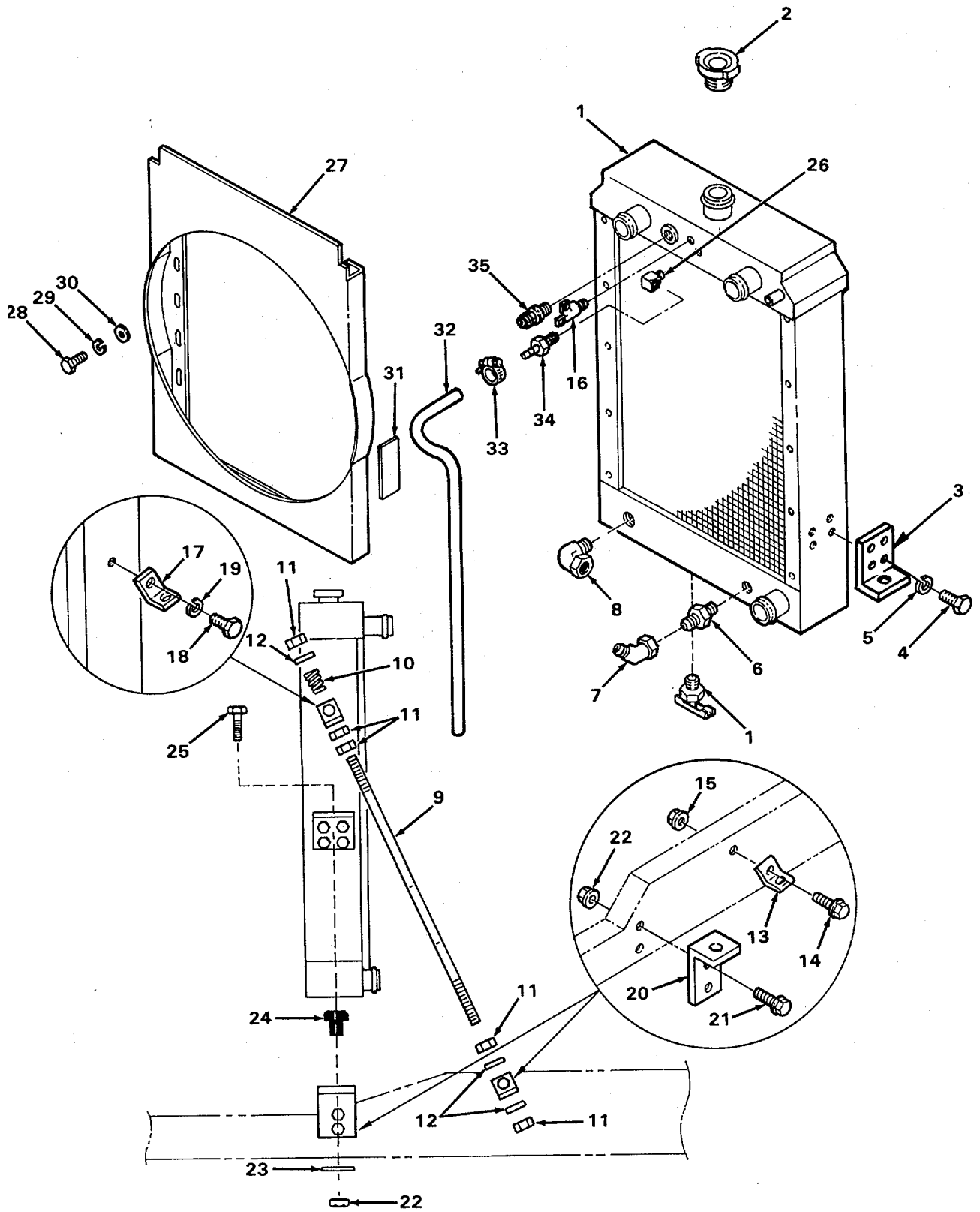


Figure F-149. Radiator Assembly, Sheet 1 of 2

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-149-					RADIATOR ASSEMBLY	
-1	04664	42-1466			RADIATOR	1
-2	04664	42-0183	8L359	31310	CAP, Radiator, 9 Lbs.	1
-3	04664	42-2135			BRACKET, Radiator Mounting, Upper (ATTACHING PARTS)	2
-4	04664	82-2065-0100			SCREW, Hex Hd, 7/16"-14 x 1", Zn, Gr-8	8
-5	04664	82-1011-0044			WASHER, Lock, 7/16", Zn ----*----	8
-6	04664	53-4024-025	OCME1	849FS 16x12	FITTING, Ext. Pipe/37° Flare, 45°	1
-7	04664	53-4033-010	OCME1	849FS 06x06	FITTING, 37° Flare, Swivel/37° Fl, 45°	2
-8	04664	53-4025-026	OCME1	849FS 16x16	FITTING, Ext. Pipe/37° Flare, 90°	1
-9	04664	42-0226			STABILIZER ROD, Radiator (ATTACHING PARTS)	2
-10	04664	81-0026			SPRING, Compression, Radiator	2
-11	04664	82-3015-005			NUT, Hex, 1/2"-13, ZN, Gr-8	10
-12	04664	82-1013-010			WASHER, Flat, SAE, 1/2", Zn ----*----	6
-13	04664	42-0231			RADIATOR STABILIZER END, Lower (ATTACHING PARTS)	2
-14	04664	82-2017-0100			SCREW, Flanged Hex Hd, 1/2"-13 x 1-1/2", Zn, Gr-8	2
-15	04664	82-3009			NUT, Hex, Flanged, 1/2"-13, Gr-8 ----*----	2
-16	04664	42-1436	8S377	5022-01185-01	SENDER, Low Coolant Probe	1
-17	04664	42-0955			RADIATOR STABILIZER END, Top (ATTACHING PARTS)	2
-18	04664	82-2065-0100			SCREW, Hex Hd, 7/16"-14 x 1", Zn, Gr-8	2
-19	04664	82-1011-0044			WASHER, Lock, 7/16", Zn ----*----	2
-20	04664	42-2235			BRACKET, Radiator Mounting, Lower (ATTACHING PARTS)	2
-21	04664	82-2017-0150			SCREW, Flanged, Hex Hd, 1/2"-13 x 1-1/2"	4
-22	04664	82-3009			NUT, Hex, Flanged, 1/2"-13, Gr-8	6
-23	04664	44-0522			WASHER, Biscuit, Small	2
-24	04664	44-0519	30676	CRA20-300	BISCUIT	2
-25	04664	82-2017-0250			SCREW, Flanged, Hex Hd, 1/2"-13 x 2-1/2", Gr-8 ----*----	2
-26	04664	56-0494-001			ELBOW, 1/8" NPT, M-F, 90°, Brass	1
-27	04664	42-1450			SHROUD, Fan (ATTACHING PARTS)	1
-28	04664	82-2062-0050			SCREW, Hex Hd, 5/16"-18 x 1/2", Zn	10
-29	04664	82-1011-0031			WASHER, Lock, 5/16", Zn	10
-30	04664	82-1013-007			WASHER, Flat, SAE, 5/16", Zn ----*----	10
-31	04664	91-0061			LABEL, Fan Warning	2
-32	04664	940055-06300			HOSE, Radiator Overflow, 1/4" I.D. (ATTACHING PARTS)	1
-33	04664	80-6033-002	OCME1	WITTEK M5	CLAMP, Hose, .31" TO .88" Dia. ----*----	1
-34	04664	53-0107-006	OCME1	KF06-02PS	FITTING, Hose End, Male to Barb.	1
-35	04664	42-0264	0BZH0	5A33428A	GAUGE, Sight, w/O-Ring	1

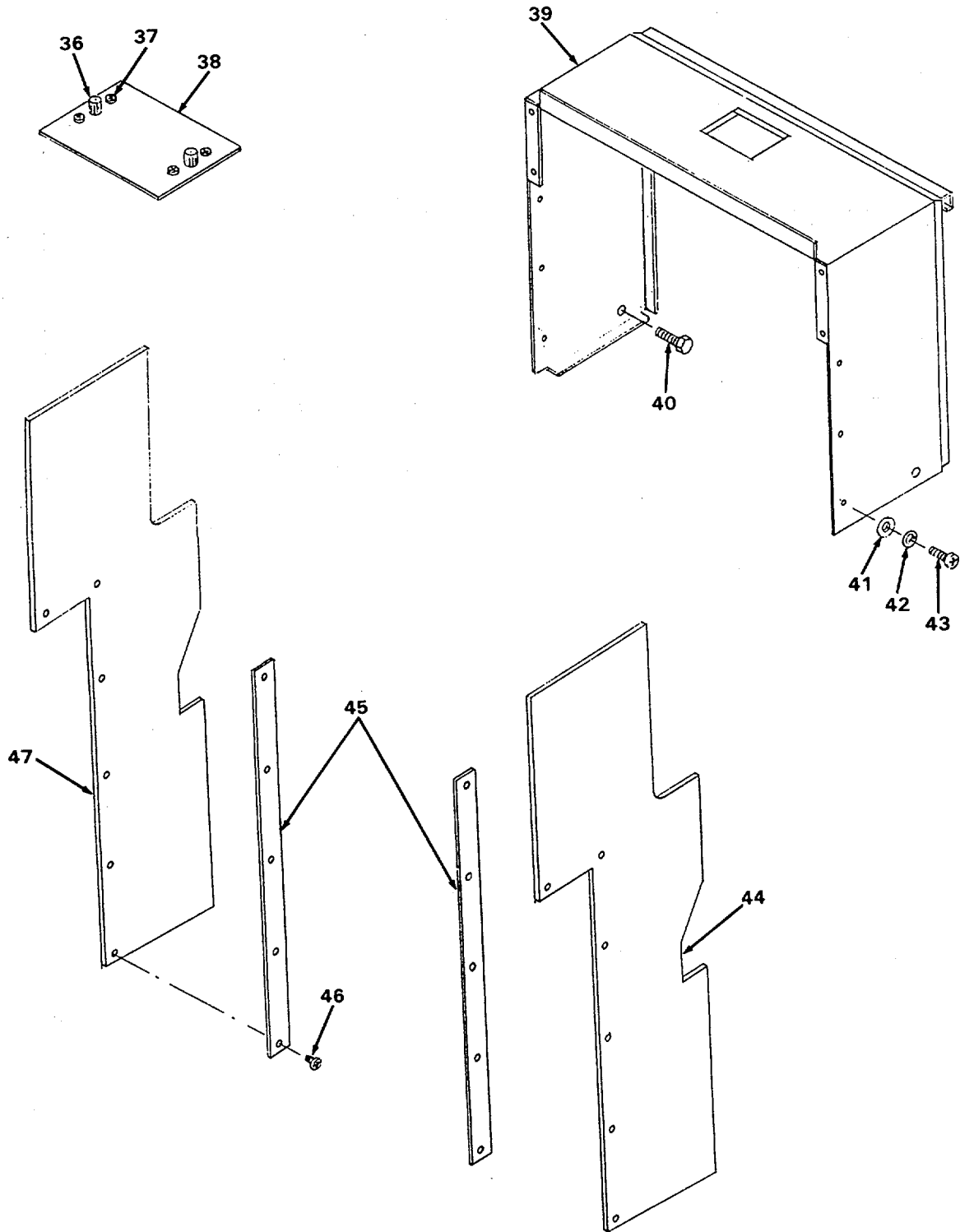


Figure F-149. Radiator Assembly, Sheet 2 of 2

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-149-						
-36	04664	82-0842			LATCH (ATTACHING PARTS)	2
-37	04664	82-2039-001			SCREW, T410, Ph Pn Hd, Taptite No. 10-24 x 1/2" -----*	4
-38	04664	44-4904			COVER, Radiator Access	1
-39	04664	44-5175			SHROUD ASSY, Radiator (ATTACHING PARTS)	1
-40	04664	82-2035-0100			SCREW, Hex, 1/4"-20 x 1", EP	2
-41	04664	82-1013-004			WASHER, Flat, No. 10	6
-42	04664	82-1012-007			WASHER, Lock, No. 10, Zn	6
-43	04664	82-2039-002			SCREW, T410, Ph Pn Hd, Taptite No. 10-24 x 3/4" -----*	6
-44	04664	42-0207			BAFFLE, Radiator, P.S.	1
-45	04664	42-0208			BAFFLE, Reinforcement, Radiator (ATTACHING PARTS)	2
-46	04664	82-2116-0075			SCREW, Ph Pn Hd, Tapping, No. 10-24 x 3/4", Zn -----*	10
-47	04664	42-0320			BAFFLE, Radiator, D.S.	1

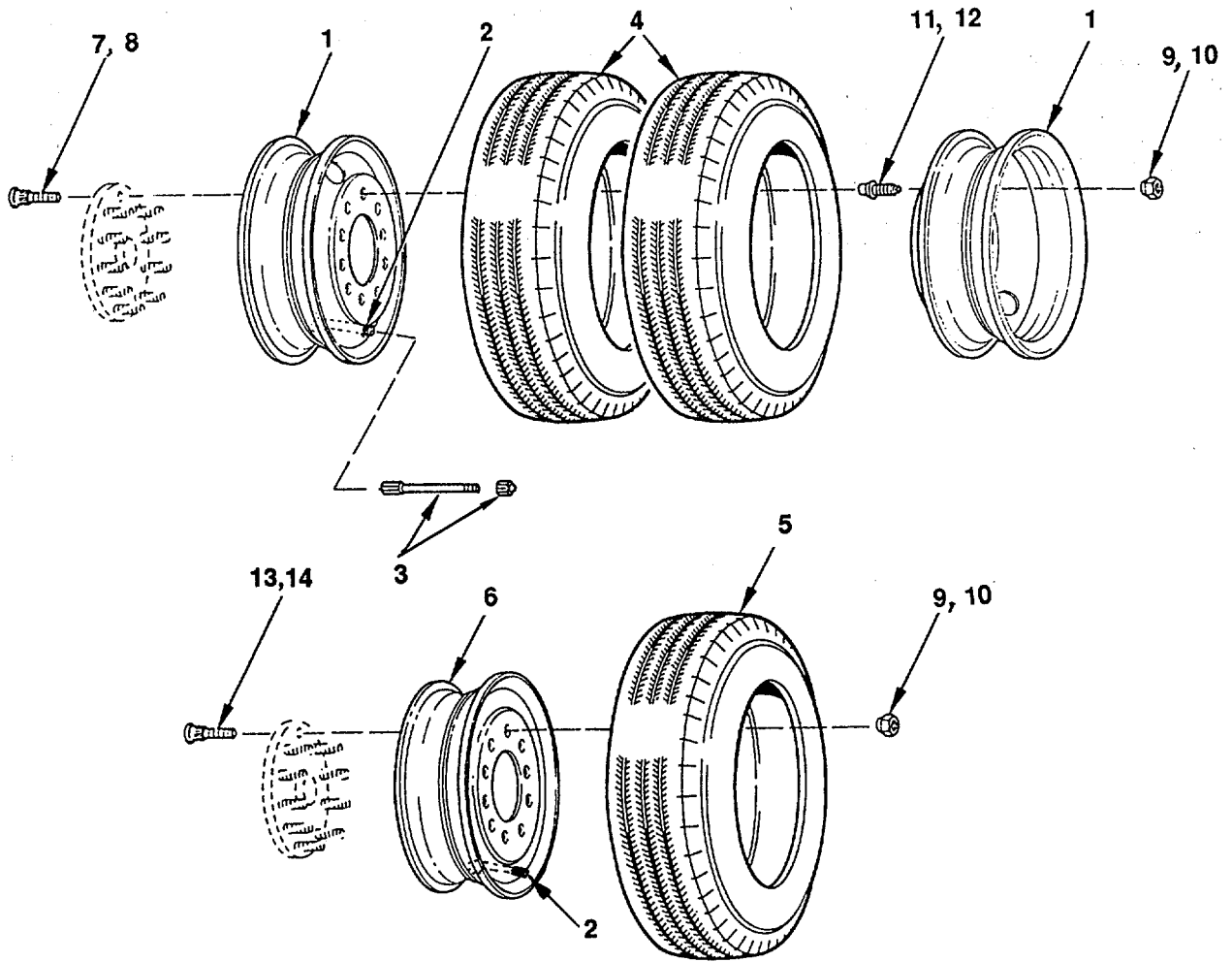


Figure F-150. Tires and Rims

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-150-					TIRES AND RIMS	1
-1	04664	40-0955	73195	27404N	RIM, Steel, 22.5 x 8.25 (Note: 1 Required for Spare Tire)	9
-2	04664	40-1702-573			VALVE STEM, Tubeless Tire	9
-3	04664	40-0575			EXTENSION, Valve Stem	4
-4	04664	40-3592			TIRE, Goodyear, 11R22.5, Unisteel TD, 16 Ply (Note: 1 Used as Spare)	9
-5	04664	40-2990			TIRE, Goodyear, 315/80R22.5, G291, 18 Ply, 65 MPH	2
-1						
-6	04664	40-2981	73195	28510	RIM, Steel, 22.5 x 9.0 (Front Wheels) ATTACHING PARTS)	2
-7	04664	40-4522	42259	20X-1811	LUG, Wheel, L.H.	20
-8	04664	40-4523	42259	20X-1812	LUG, Wheel, R.H.	20
-9	04664	40-4524	42259	1199-M-117	NUT, Lug, L.H.	60
-10	04664	40-4525	42259	1199-N-118	NUT, Lug, R.H.	60
-11	04664	40-4526	42259	1199-J-114	NUT, Inner Cap, R.H.	20
-12	04664	40-4527	42259	1199-K-115	NUT, Inner Cap, L.H. -----*	20
-13			42259	20X-1848RH	LUG, Wheel, R.H.	10
-14			42259	20X-1847LH	LUG, Wheel, L.H.	10

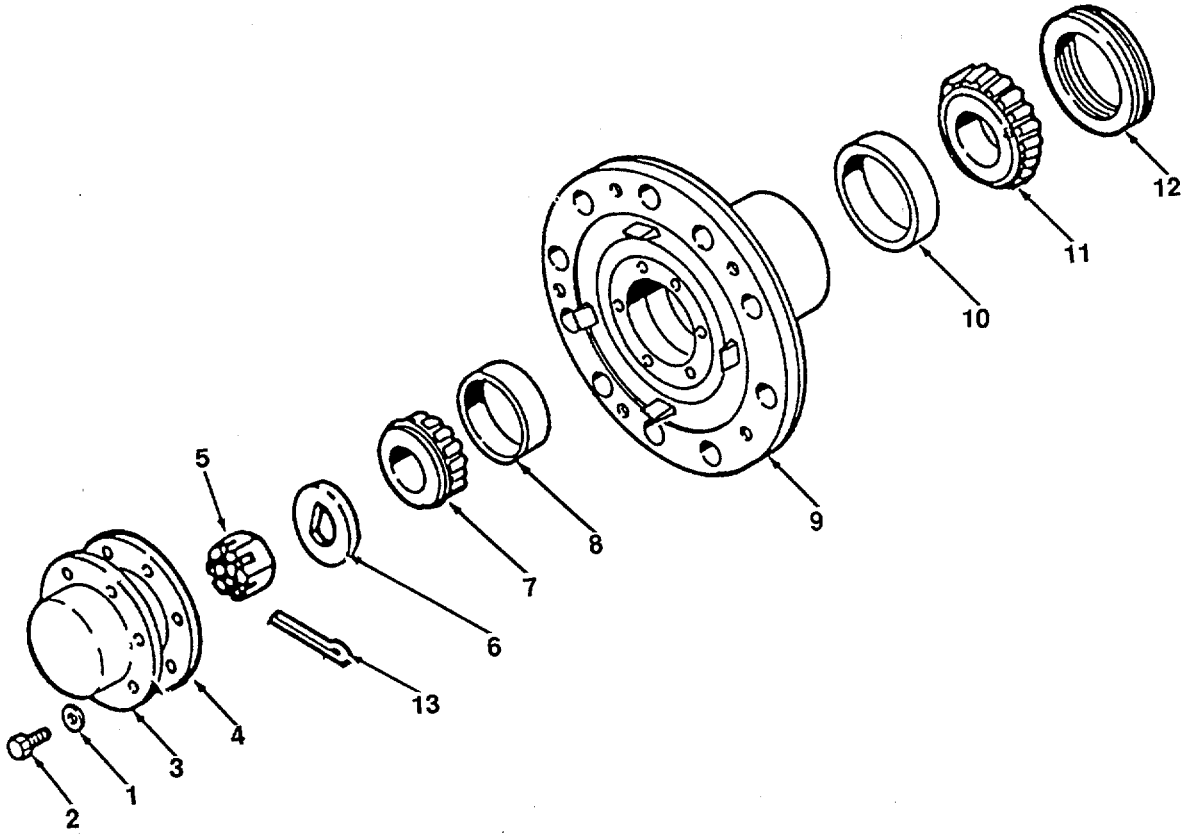


Figure F-150A. Hubs, Bearings & Seals

F-382

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-150A-					HUBS, BEARINGS AND SEALS	
-1			3E158	A3262F318	CAP, Hub (ATTACHING PARTS)	2
-2			3E158	F-255-1	SCREW, Cap, Hex Head	12
-3			3E158	1229-E-1669	WASHER, Flat	12
					-----*	
-4			3E158	2208-N-820	GASKET, Hub Cap	2
-5			3E158	1229-H-476	NUT, Castle	2
-6			3E158	1227-Y-571	NUT, Wheel Bearing Adjuster	2
-7			3E158	555-S	CONE, Bearing-Outer	2
-8			3E158	552-A	CUP, Bearing-Outer	2
-9			3E158	HFLF-OCT-1	HUB AND STUD ASSY., L.H.	1
-9			3E158	HFLF-OCT-2	HUB AND STUD ASSY., R.H.	1
-10			3E158	6420	CUP, Bearing-Inner	2
-11			3E158	6461-A	CONE, Bearing-Inner	2
-12			3E158	A-1205-D-1070	SEAL ASSY., Wheel Bearing	2
-13			3E158	K-2824	PIN, Cotter	2

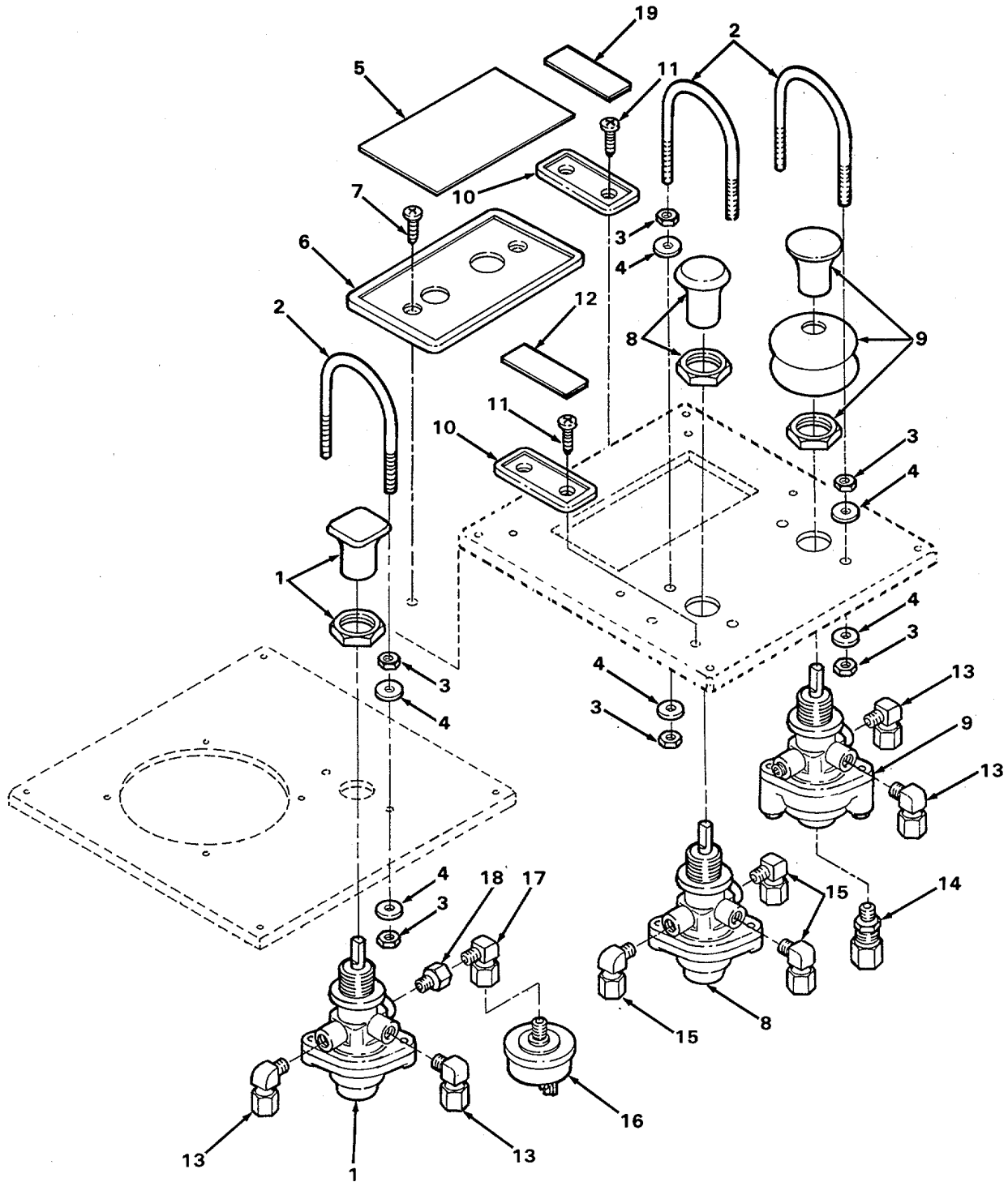


Figure F-151. Parking Brake Control Valves

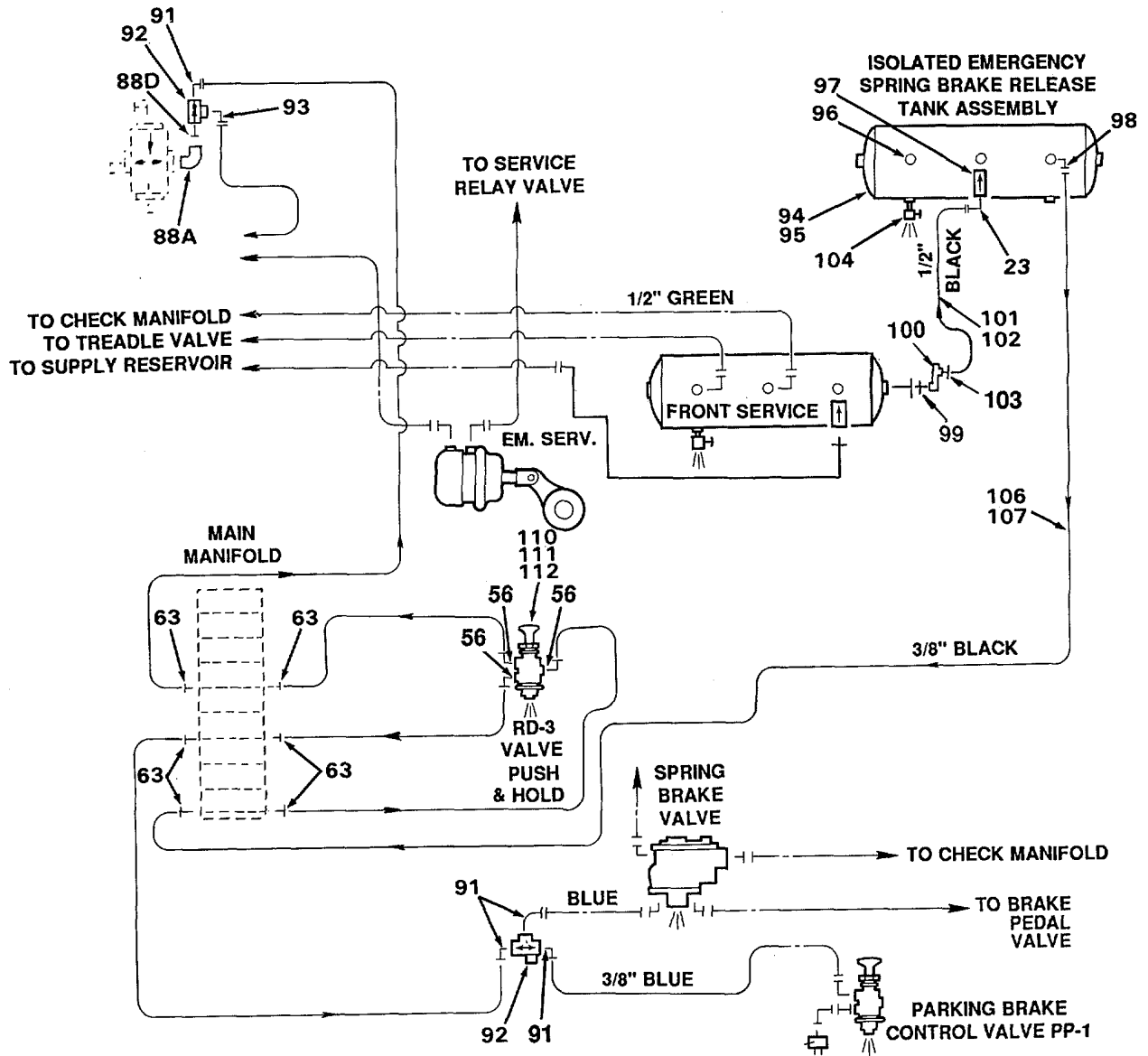
FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-151					PARKING BRAKE CONTROL VALVES	1
-1	04664	44-0338	06853	284726	VALVE, Parking Brake	1
-2	04664	44-0543			U-BOLT (ATTACHING PARTS)	3
-3	04664	82-3014-001			NUT, Hex, 1/4"-20, Zn	12
-4	04664	82-1013-006			WASHER, Flat, 1/4", Zn * - - - *	12
-5	04664	91-0137			TAG, Instruction, Front Wheel Lock	1
-6	04664	52-0116			BEZEL, Tag Style D w/Holes (ATTACHING PARTS)	1
-7	04664	82-2003			SCREW, Self-Tap, No. 10-24 x 1/2" * - - - *	2
-8	04664	55-0075	06853	284727	VALVE, isolated Emergency Brake Release	1
-9	04664	55-0115	06853	281947	VALVE, Front Brake Lock	1
-10	04664	52-0162			BEZEL, Tag Style B w/Holes (ATTACHING PARTS)	2
-11	04664	82-2003			SCREW, Self-Tap, No. 10-24 x 1/2"	4
-12	04664	91-0137			TAG, Name, Front Wheel Lock	1
-13	04664	56-0490-004	0CME1	269NTA4-2	FITTING, Male, 3/8" Tube to 1/8" Pipe, 90°	4
-14	04664	56-0489-001	0CME1	4469-F-04X02	FITTING, Male, 1/4" Tube to 1/8" Pipe, Straight	1
-15	04664	56-0490-006	0CME1	4469-F-06X00	FITTING, 3/8" Tube to 3/8" Pipe, 90°	3
-16	04664	64-0122	8S377	1042-33110-10	SWITCH, Parking Brake	1
-17	04664	56-0281	92003	1200P-2-2	FITTING, 1/8" Pipe, Brass, 90°	1
-18	04664	56-0500-001	92003	215PN-2	NIPPLE, Pipe, Close, 1/8" Brass, 90°	1
-19	04664	91-0359			TAG, Name, SAE 40 Engine Oil	1

Figure F-152, Sheet 1 of 3, can be found at the rear of this manual as page FO-3.

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FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-152-					BRAKE SYSTEM	1
-1	04664	55-0061	14145	107594	MANIFOLD, Comp. Ext.	1
-2	04664	56-0490-012	92003	VS269NTA-10-8	FITTING, Male Elbow, 10-8	8
-3	04664	55-0054	06853	278500	AIR STRAINER KIT, Compressor	1
-4	04664	55-0053	06853	284358	GOVERNOR, Air Compressor D-2	REF
-5	04664	55-0150	06853	288277	VALVE, Press Protect PR4-45 PSI	2
-6	04664	55-0050	92003	K9093461101010B	HOSE, Comp. Dis. 36" Lg.	1
-7	04664	56-0499-001	92003	30182-2-4	FITTING, Push-Lok	2
-8	04664	944031			HOSE, Push-Lok, 1/4", 350 PSI (ft)	AR
-9	04664	944006			TUBING, Copper 5/8" OD (ft)	AR
-10	04664	55-0434	06853	065041	DRYER, Air BW AD-9 (See Figure F-153 for details)	1
-11	04664	55-0131			BRACKET, Air Dryer	1
-12	04664	56-0496-001	92003	VS129HB-4-4	FITTING, Hose Barb/M-Pipe, 90°	1
-13	04664	56-0489-012	92003	VS68NTA-10-8	FITTING, Male Connector, 10-8	5
-14	04664	55-0033	06853	227918	TANK, Air 7" x 24" 836 Cu. In.	1
-15	04664	55-0034	06853	205267	BRACKET, Air Tank 7" Dia.	2
-16	04664	56-0292	92003	VS211 P-4	PLUG, Brass Pipe, 1/4"	8
-17	04664	51-0358	OCME1	5655-4-4S	CROSS, 4-4S, 1/4"-18	1
-18	04664	51-0137			COCK, Drain	5
-19	04664	55-0019	27783	645E6	VALVE, Schrader	1
-20	04664	56-0492-007	OCME1	24SA-08X04	FITTING, Hex Nipple (Steel)	4
-21	04664	56-0489-008	92003	VS68NTA-8-4	FITTING, Male Connector, 8-4	1
-22	04664	945007	92003	PFT-8B-SIL-500	TUBING, Air Brake, 1/2", OD, Silver (ft)	AR
-23	04664	56-0489-010	92003	VS68NTA-8-8	FITTING, Male Connector, 8-8	3
-24	04664	55-0194	06853	238051	MANIFOLD	1
-25	04664	56-0493-005	92003	209P-8-4	BUSHING, Reducer (Brass), 8-4	1
-26	04664	55-0043	06853	284142	VALVE, Safety ST-3 150 PSI	1
-27	04664	53-4021-004	92003	012T-8-8	FITTING, Ext. Pipe/ Int. Pipe-Tee	2
-28	04664	56-0490-010	92003	VS269NTA-8-8	FITTING, Male Elbow, 8-8	8
-29	04664	640265			TUBING, Split, 7/16" OD (ft)	AR
-30	04664	56-0489-008	92003	VS68NTA-8-8	FITTING, Male Connector, 8-8	5
-31	04664	53-4034-004			ELBOW, Street 90°	4
-32	04664	944062	92003	PFT-10D-ORG-250	TUBING, Air Brake, 5/8" OD, Orange (ft)	AR
-33	04664	640292			TUBING, Split, 5/8" OD (ft)	AR
-34	04664	56-0490-007	92003	VS269NTA-6-8	FITTING, Male Elbow, 6-8	2
-35	04664	55-0035	06853	282886	TANK, Air 8" x 30.5" 1488 Cu. In.	4
-36	04664	55-0036	06853	205093	BRACKET, Air Tank 8.0" Dia.	8
-37	04664	55-0353			SPACER, Air Tank	2
-38	04664	55-0093			CHANNEL, Mounting, Air Tank	6
-39	04664	944064	92003	PFT-6B-ORG-500	TUBING, Air Brake, 3/8" OD, Orange (ft)	AR
-40	04664	55-0038	06853	227871	VALVE, Single Check SC1, 1/2" NPT	3
-41	04664	944069	92003	PFT-8B-ORG-500	TUBING, Air Brake 1/2" OD, Orange (ft)	AR
-42	04664	944037	92003	PFT-10B-BLK-500	TUBING, Air Brake, 5/8", OD, Black (ft)	AR
-43	04664	56-0490-008	92003	VS269NTA-8-4	FITTING, Male Elbow, 8-4	4
-44	04664	55-0151	06853	286500	VALVE, Press Protect PR4-85 PSI	2
-45	04664	56-0498-005	92003	01HP-8	PLUG, Brass Pipe, 1/2"	12
-46	04664	80-6033-002			CLAMP, Hose, 5/16" to 7/8"	4
-47	04664	55-0077	79146	146030	HOSE, Air, 3/8"D, 30"L, 3/8" NPT	4
-48	04664	55-0040	06853	229860	VALVE, Quick Release QR-1	3
-49	04664	55-0274			BRACKET, Quick Release Valve	2
-50	04664	55-0049	79146	146028	HOSE, Air, 3/8"D, 28"L, 3/8" NPT	4
-51	04664	55-0042	06853	102166	VALVE, Relay R-12	2
-52	04664	56-0490-005	92003	VS269NTA-6-4	FITTING, Male Elbow, 6-4	7
-53	04664	55-0120	79146	29H-41-149041-8	HOSE, Air, 1/2"D, 41"L, 1/2" 3/8" NPT	2
-54	04664	55-0078	79146	149018	HOSE, Air, 1/2"D, 18"L, 1/2" 3/8" NPT	2
-55	04664	55-0082			TEE ASSY, 3/8" NPT	2
-56	04664	56-0490-004	92003	VS269NTA-6-2	FITTING, Male Elbow, 6-2	1
-57	04664	944035	92003	PFT-63-BLK-500	TUBING, Air Brake, 3/8" OD, Black (ft)	AR
-58	04664	944036	92003	PFT-8B-BLK-500	TUBING, Air Brake, 1/2" OD, Black (ft)	AR

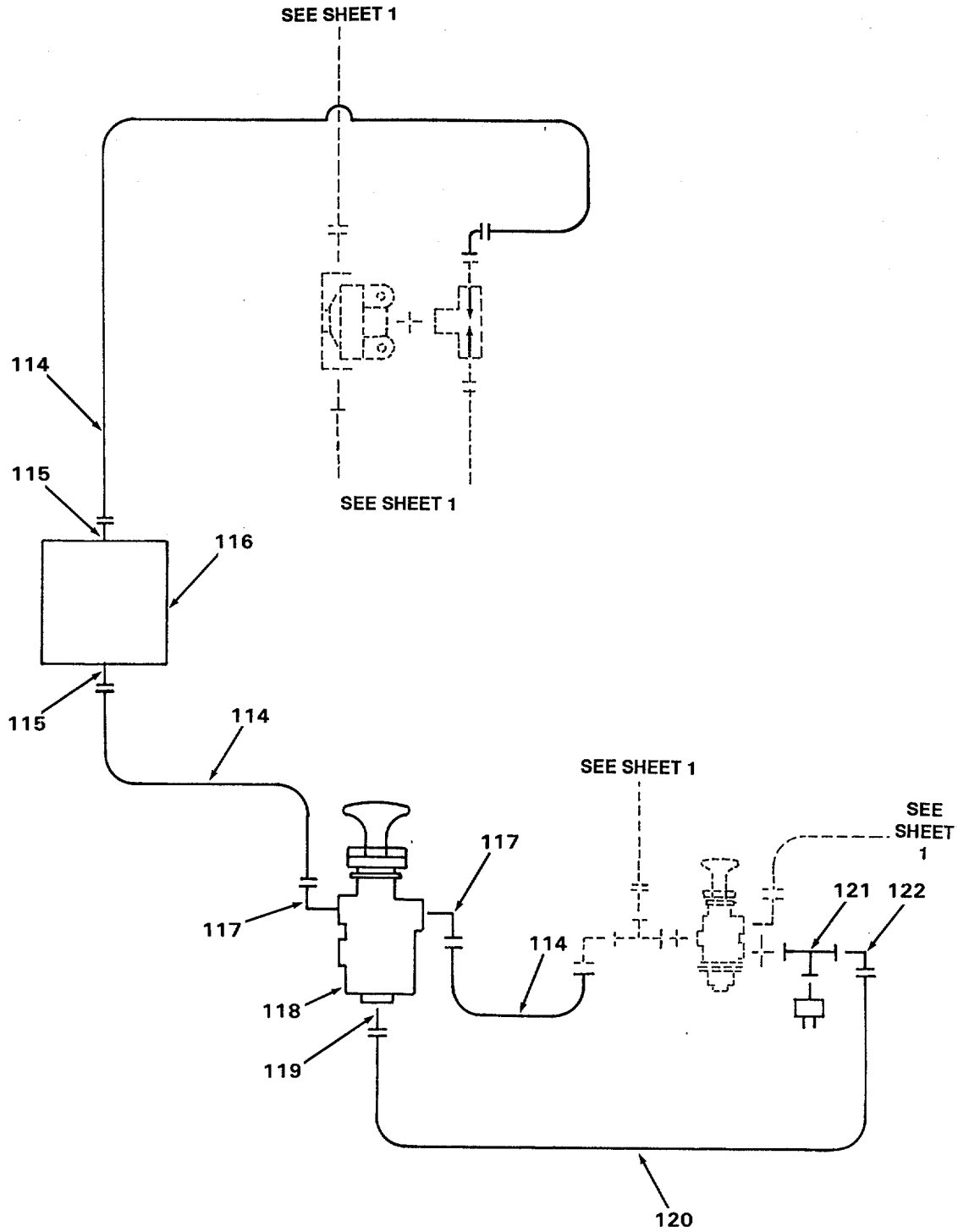
FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-152-						
-59	04664	56-0491-007	92003	VS271NTA-10-8	FITTING, Male Run Tee, 10-8	1
-60	04664	55-0212	14145	1650700	VALVE, Double Check, 1/2"	1
-61	04664	44-0335	06853	279164	SWITCH, Pressure, 60 PSI N.C.	REF
-62	04664	56-0489-009	92003	VS68NTA-8-6	FITTING, Male connector, 8-6	2
-63	04664	56-0489-005	92003	VS68NTA-6-4	FITTING, Male Connector, 6-4	17
-64	04664	55-0489-008	92003	VS6NTA-8-4	FITTING, Male Connector, 8-4	2
-65	04664	55-0219			MANIFOLD, Train	1
-66	04664	55-0091			BRAKE PEDAL VALVE ASSY (See figure F-155 for detail parts)	1
-67	04664	55-0039	06853	278614	VALVE, Double Check DC-4	3
-68	04664	56-0490-009	92003	VS269NTA-8-6	FITTING, Male Elbow, 8-6	2
-69	04664	55-0045	06853	217709	COUPLING, Anchor, 3/8" x 3/8" NPT	2
-70	04664	55-0060	79146	146022-8	HOSE, Air, 3/8"D, 22"L, 3/8" NPT	2
-71	04664	56-0490-004	92003	VS269NTA-6-2	FITTING, Male Elbow, 6-2	3
-72	04664	56-0280	92003	1203P-2	TEE, Brass Pipe, 1/8"	2
-73	04664	56-0492-001	92003	1/8 FFS	FITTING, Hex Nipple, Steel	2
-74	04664	944066	92003	PFT-6B-RED-500	TUBING, Air Brake, 3/8" OD, Red (ft)	AR
-75	04664	944067	92003	PFT-6B-BLU-500	TUBING, Air Brake, 3/8" OD, Blue (ft)	AR
-76	04664	944065	92003	PFT-6B-GRN-500	TUBING, Air Brake, 3/8" OD, Green (ft)	AR
-77	04664	55-0004	1GD33	68253	VALVE, Shut-Off	1
-78	04664	55-0041	06853	286364	VALVE, Spring Brake SR-1	1
-79	04664	944036	92003	PFT-8B-BLK-500	TUBING, Air Brake, 1/2" OD, Black (ft)	AR
-80	04664	944063	92003	PFT-10B-GRN-250	TUBING, Air Brake, 5/8" OD, Green (ft)	AR
-81	04664	944070	92003	PFT-8B-GRN-500	TUBING, Air Brake, 1/2" OD, Silver (ft)	AR
-82					VALVE ASSY, Parking, PP-1	REF
-84	04664	55-0094			CONTROL ASSY, Diff Lock	REF
-85	04664	56-0499-002	92003	30182-4-4	FITTING, Push-Lok	1
-86	04664	56-0493-006	92003	VS209P-8-6	BUSHING, Reducer (Brass)	2
-87	04664	55-0046	06853	201010	ELBOW, Anchor, 1/4" x 1/4", NPT, 90°	2
-88	04664	44-0334	06853	286404	SWITCH, Pressure, Stoplight	REF
-88A	04664	56-0494-004	92003	1202P-4-4	ELBOW STREET, 90°, Brass	2
-88B	04664	56-0494-006	92003	1202P-6-6	ELBOW STREET, 90°, Brass	6
-88C	04664	56-0492-003	92003	245A-04X04	FITTING, Hex Nipple, Steel	2
-88D	04664	56-0492-005	92003	245A-06X04	FITTING, Hex Nipple, Steel	1
-88E	04664	56-0492-006	92003	245A-06X06	FITTING, Hex Nipple, Steel	1
-88F	04664	56-0289	92003	1203P-4	TEE, Brass Pipe, 1/4"	2
-88G	04664	56-0490-002	92003	VS269NTA-4-4	FITTING, Male Elbow, 4-4	1



ISOLATED EMERGENCY SPRING BRAKE RELEASE

Figure F-152. Brake System, Sheet 2 of 3

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-152-						
-90	04664	56-0492-006	92003	0101-6-6	FITTING, Hex Nipple	1
-91	04664	56-0490-006	92003	VS269NTA-6-6	FITTING, Male Elbow	3
-92	04664	55-0039	06853	278614	VALVE, Check, Double, 3/8" NPT	1
-93	04664	56-0490-009	92003	VS269NTA-8-6	FITTING, Male Elbow	1
-94	04664	55-0035	06853	227918	TANK, Air	1
-95	04664	55-0036	06853	205267	BRACKET, Air Tank	2
-96	04664	56-0498-005	92003	01HP-8	PLUG, Hex-8	3
-97	04664	55-0038	06853	227871	VALVE, Check, Single, 1/2" NPT	1
-98	04664	56-0490-007	92003	VS269NTA-6-8	FITTING, Male Elbow	1
-99	04664	56-0492-007	92003	0101-4-8	FITTING, Hex Nipple	1
-100	04664	55-0151	06853	286500	VALVE, Pressure	1
-101	04664	944036	0CME1	C-608-100	TUBE, Air Brake, 1/2" (Black) (ft)	AR
-102	04664	640292			TUBE, Split, 5/8" (ft)	AR
-103	04664	56-0489-008	92003	VS68NTA-8-4	FITTING, Male Connector	1
-104	04664	51-0137	79218	5393	COCK, Drain	1
-105	04664	56-0489-010	92003	VS68NTA-8-8	FITTING, Male Connector	1
-106	04664	944035	0CME1	C-606-100	TUBE, Air Brake, 3/8" (Black) (ft)	AR
-107	04664	640265	58961	LCP-413	TUBE, Split, 7/16" (ft)	AR
-110	04664	55-0075	06853	284727	VALVE, Air Control, RD3	1
-111	04664	52-0117			BEZEL, Tag, Style B w/Pins	1
-112	04664	44-0543			U-BOLT, Zn	1



FRONT WHEEL LOCK CIRCUIT

Figure F-152. Brake System, Sheet 3 of 3

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-152-						
-114	04664	944035	92003	PFT-6B-BLK-500	TUBING, Air Brake, 3/8", OD, Black (ft)	AR
-115	04664	56-0489-005	92003	VS68NTA-6-4	FITTING, Male Connector, 6-4	2
-116	04664	55-0303	06853	277144	VALVE, Pressure Reducing, RV-1	1
-117	04664	56-0490-004	92003	VS269NTA-6-2	FITTING, Male Elbow, 6-2	2
-118	04664	55-0115	06853	281947	VALVE, Control w/Pilot, PP-5	1
-119	04664	56-0489-001	92003	VS68NTA-4-2	FITTING, Male Connector, 4-2	1
-120	04664	944034	92003	PFT-4A-BLK-250	TUBING, Air Brake, 1/4", OD, Black (ft)	AR
-121	04664	56-0280	92003	1203P-2	TEE, Brass, Pipe, 1/8"	1
-122	04664	56-0490-001	92003	VS269NTA-4-2	FITTING, Male Elbow, 4-2	1

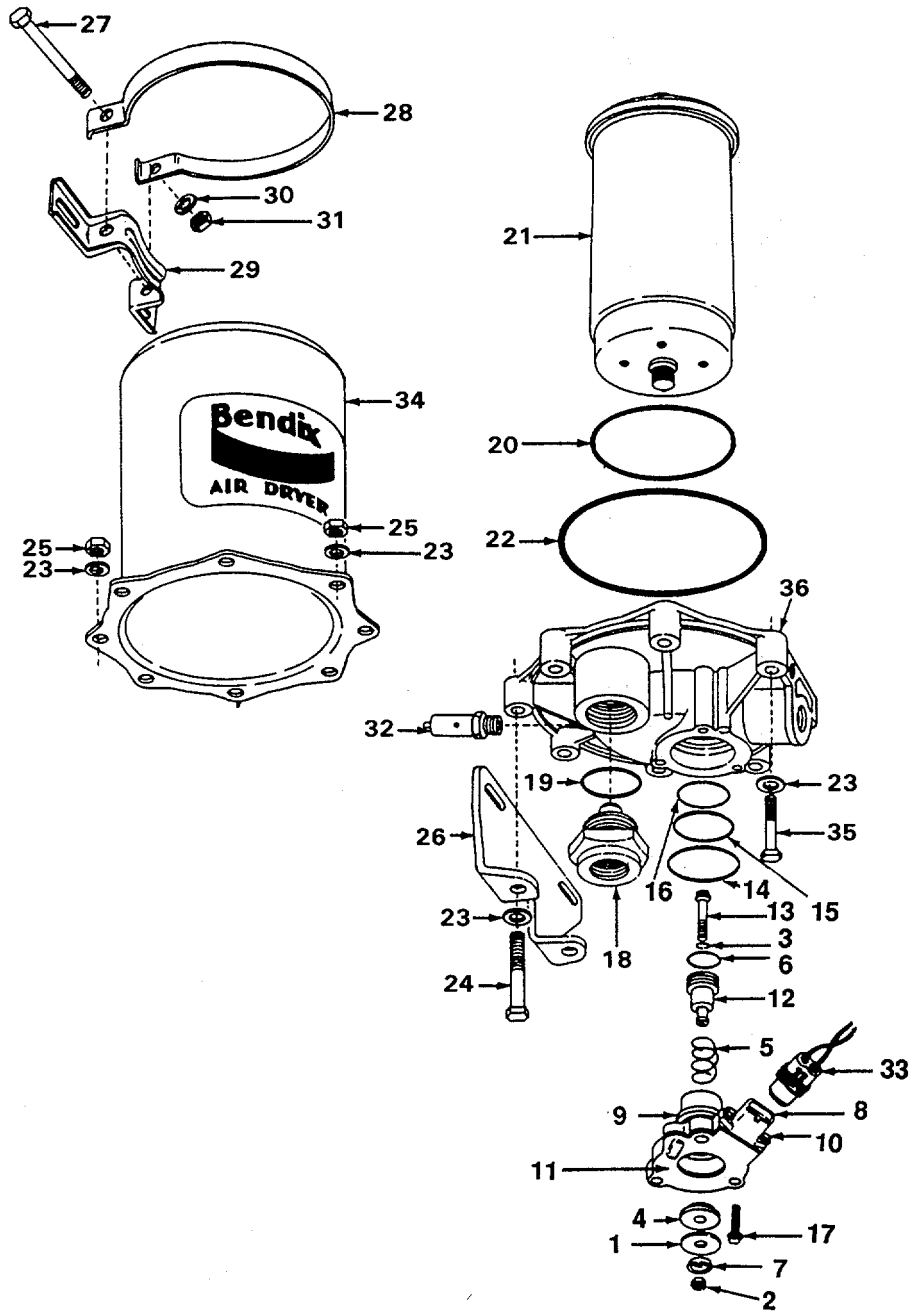


Figure F-153. Air Dryer (BW AD-9)

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FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-153	04664	55-0434	06853	065041	AIR DRYER (BW AD-9) (See figure F-152 for NHA)	REF
-1			06853	107904	VALVE ASSY, Purge	1
-2			06853	298929	DIAPHRAGM, Exhaust	1
-3			06853	230401	NUT, Lock, Purge Valve, 1/4"	1
-4			06853	298906	O-RING	1
-5			06853	297218	VALVE, Purge	1
-6			06853	298905	SPRING, Piston Return	1
-7			06853	230543	O-RING	1
-8			06853	296372	WASHER, Exhaust Diaphragm	1
-9			06853	107418	HEATER & THERMOSTAT ASSY	1
-10			06853	298902	HOUSING, Purge Valve	1
-11			06853	298911	SCREW, Self-Tapping, No. 8	2
-12			06853	298949	COVER, Exhaust	1
-13			06853	110519	PISTON, Purge	1
-14			06853	298904	BOLT, Torx Hd	1
-15			06853	110246	O-RING	1
-16			06853	298912	O-RING	1
-17			06853	298913	O-RING	1
-18			06853	111491	SCREW, Cap w/Washer, 1/4", TRX	3
-19			06853	107525	CHECK VALVE ASSY	1
-20			06853	298928	O-RING	1
-21			06853	298922	O-RING	1
-22			06853	107413	CARTRIDGE, Desiccant	1
-23			06853	298927	O-RING	1
-24			06853	230240	WASHER, Lock, Special, 3/8"	2
-25			06853	298477	SCREW, Cap, 3/8" x 2-3/8"	2
-26			06853	298476	NUT, Lock	2
-27			06853	296807	BRACKET, Mounting	1
-28			06853	296165	SCREW, Cap, 5/16" x 4-1/2"	1
-29			06853	296800	STRAP	1
-30			06853	298947	BRACKET, Mounting	1
-31			06853	202982	WASHER, Lock, 5/16"	1
-32			06853	204214	NUT, 5/16"	1
-33			06853	285849	VALVE, Safety	1
-34			06853	298948	HARNESS, Wire, w/Connector	1
-35	04664	82-2031-0212			HOUSING (NSS)	1
-36					SCREW, Cap, 3/8"-1 6 x 2-1/8", Zn, G-8	6
					CASTING, End Cover (NSS)	1
			06853	107896	KIT, Replacement Purge Valve Assy (Includes items 1 thru 17)	1
			06853	107798	KIT, Purge Valve Maintenance (Includes items 1 thru 7, 14, 15 & 16)	1
			06853	107800	KIT, Check Valve Maintenance (Includes items 18 and 19)	1
			06853	107794	KIT, Desiccant Cartridge Service (Includes items 20, 21 and 22)	1
			06853	107695	KIT, Mounting Bracket (Includes items 23 thru 31) NOTE: NSS parts are not serviced separately but only as part of their NHA.	1

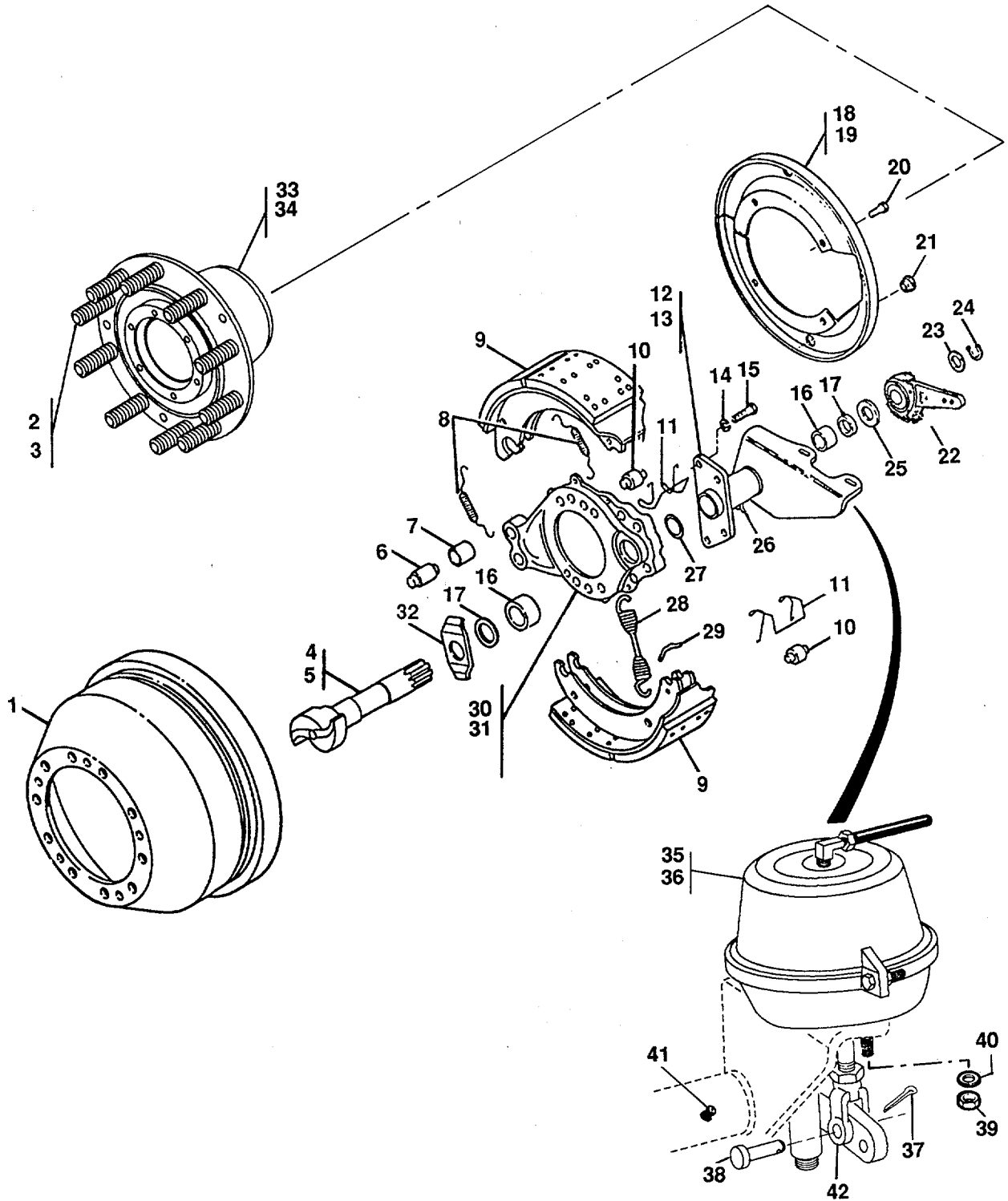


Figure F-154. Front Brake Shoes, Drums, Chambers, and Slack Adjusters

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-154					FRONT BRAKE SHOES, DRUMS, CHAMBERS, AND SLACK ADJUSTERS	
-1			3E158	3219-C-3981-P	DRUM, Brake - Front	2
-2			3E158	20X-1848 RH	LUG, Wheel, RH	10
-3			42259	20X-1847 LH	LUG, Wheel, LH	10
-4			42259	2210-Y-6031	CAMSHAFT, "S" Head - Right Front Wheel	1
-5			42259	2210-Z-6032	CAMSHAFT, "S" Head - Left Front Wheel	1
-6			42259	1259-N-274	PIN Anchor	4
-7			42259	1225-B-496	BUSHING, Anchor Pin	4
-8			42259	2258-Q-815	SPRING, Retaining, Brake Shoe	4
-9			42259	A2-3222-V-1348	BRAKE SHOE AND LINING ASSY.	4
-10			42259	1779-R-18	ROLLER, Brake Shoe	2
-11			42259	3105-B-210	RETAINER, Shoe Roller	2
-12			42259	A35-3299-K-2013	BRACKET, Camshaft and Chamber - Right Front Wheel	1
-13			42259	A35-3299-L-2014	BRACKET, Camshaft and Chamber - Left Front Wheel	1
-14			42259	1229-W-1505	(ATTACHING PARTS) WASHER, Lock	8
-15			42259	S-2812-2	SCREW, Cap, Hex Head	8
-16			42259	1225-N-378	BUSHING, Camshaft, Spider and Bracket	2
-17			42259	A-1205-V-1556	SEAL, Grease, Camshaft	2
-18			42259	3264-S-227	SHIELD, Dust	1
-19			42259	3264-T-228	SHIELD, Dust	1
-20			42259	10X-1176	(ATTACHING PARTS) SCREW, Cap, Hex Head	8
-21			42259	1250-C-226	PLUG	4
-22			42259	A-5-3275-X-596	ADJUSTER ASSY., Slack, Manual - Front Wheel	2
-23			42259	1229-G-2971	(ATTACHING PARTS) WASHER, Camshaft	AR
-24			42259	1229-D-2942	LOCKRING, Camshaft	2
-25			42259	1229-S-2697	(---*---) WASHER, Camshaft, Thick	AR
-26			42259	1199-N-1860	FITTING, Grease	2
-27			42259	1779-J-1024	GASKET, Chamber Bracket	2
-28			42259	2258-Q-615	SPRING, Return, Brake Shoe	2
-29			42259	1259-N-274	PIN, Brake Shoe Return Spring	4
-30			42259	A-3211-R-3424	SPIDER, Brake, Front - Right Side	1
-31			42259	A-3211Q3423	SPIDER, Brake, Front - Left Side	1
-32			42259	1229-N-2250	WASHER, Camhead, Fiat	2
-33			42259	HFLF 00T-1	HUB & LUG ASSY, RH	1
-34			42259	HFLF 00T-2	HUB & LUG ASSY, LH	1
-35			42259	V-143276-D-30	CHAMBER ASSY, Brake, LH	1
-36			42259	V-133276-D-30	CHAMBER ASSY, Brake, RH	1
-37			42259	K248	(ATTACHING PARTS) COTTER	2
-38			42259	19X60	PIN	2
-39			42259	N3101	NUT, Chamber	4
-40			42259	1229-N-1626	WASHER, Hardened	4
-41			42259	1199-N-1860	GREASE, Zerk	2
-42			42259	1245-C-185	YOKE, Push Rod, FEN	1
					(---*---)	

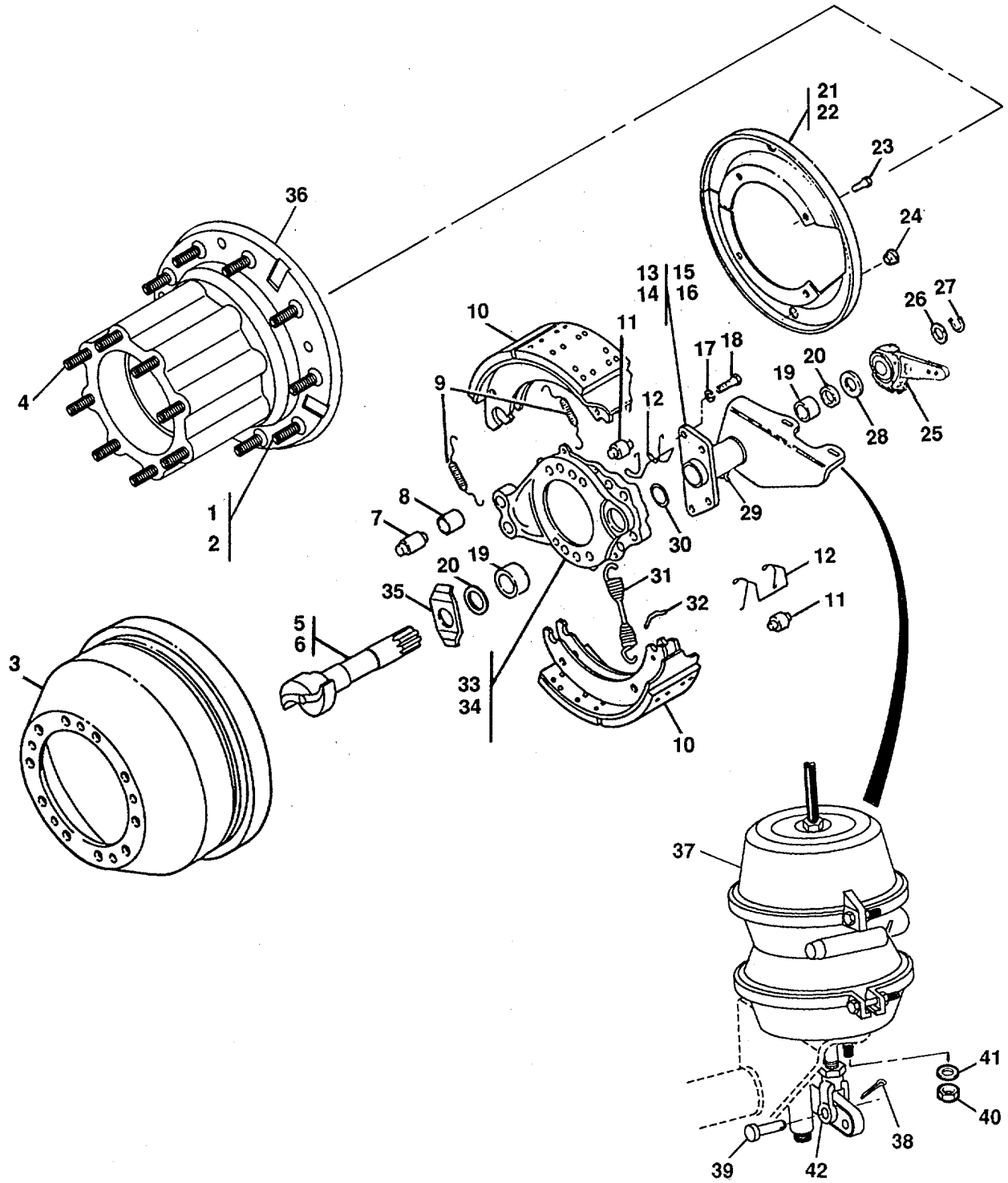


Figure F-154A. Rear Brake Shoes, Drums, Chambers, and Slack Adjusters

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-154A-					REAR BRAKE SHOES, DRUMS, CHAMBERS, AND SLACK ADJUSTERS	
-1	04664	40-4522	42259	20X1811	LUB, Wheel, RH	20
-2	04664	40-4523	42259	20X1 812	LUG, Wheel, LH	20
-3			42259	3219-T-4544	DRUM, Brake - Rear (ATTACHING PARTS)	4
-4			42259	SC10241	STUD, Short	32
-5			42259	2210-B-5332	CAMSHAFT, "S" Head - Right Front Tandem, Left Rear Tandem	2
-6			42259	2210-A-5331	CAMSHAFT, "S" Head - Left Front Tandem, Right Rear Tandem	2
-7			42259	1259-N-274	PIN Anchor	-8
-8			42259	1225-B-496	BUSHING, Anchor Pin	8
-9			42259	2258-Q-615	SPRING, Retaining, Brake Shoe	8
-10			42259	A1-3222-S-1293	BRAKE SHOE AND LINING ASSY.	8
-11			42259	1779-R-18	ROLLER, Brake Shoe	2
-12			42259	3105-B-210	RETAINER, Shoe Roller	2
-13			42259	A13-3299-T-1554	BRACKET, Camshaft and Chamber - Left Rear Tandem	1
-14			42259	B-31-3299-T-1554	BRACKET, Camshaft and Chamber - Left Front Tandem	1
-15			42259	A13-3299-U-1555	BRACKET, Camshaft and Chamber - Right Rear Tandem	1
-16			42259	B-31-3299-U-1555	BRACKET, Camshaft and Chamber - Right Front Tandem (ATTACHING PARTS)	1
-17			42259	1229-W-1505	WASHER, Lock	16
-18			42259	S-2812-2	SCREW, Cap, Hex Head	16
-19			42259	1225-N-378	BUSHING, Camshaft, Spider and Bracket	2
-20			42259	A-1205-V-1556	SEAL, Grease, Camshaft	2
-21			42259	3236-Q-2123	SHIELD, Dust	2
-22			42259	3236-R-2124	SHIELD, Dust (ATTACHING PARTS)	2
-23			42259	10X-1176	SCREW, Cap, Hex Head	16
-24			42259	1250-C-226	PLUG	8
-25			42259	A-6-3275-J-1050	ADJUSTER ASSY., Slack, Manual - Rear Wheel (ATTACHING PARTS)	4
-26			42259	1229-G-2971	WASHER, Camshaft	AR
-27			42259	1229-D-2942	LOCKRING, Camshaft	4
-28			42259	1229-S-2697	WASHER, Camshaft, Thick	AR
-29			42259	1199-N-1860	FITTING, Grease	4
-30			42259	1779-J-1024	GASKET, Chamber Bracket	4
-31			42259	2258-U-619	SPRING, Return, Brake Shoe	4
-32			42259	1259-N-274	PIN, Brake Shoe Return Spring	8
-33			42259	A-3211-P-3656	SPIDER, Brake, Rear - Right Side Forward/Left Side Rear	2
-34			42259	A-3211-P-3655	SPIDER, Brake, Rear - Right Side Rear/Left Side Forward	2
-35			42259	1229-N-2250	WASHER, Camhead, Flat	4
-36			42259	A333-B-33694	HUB & LUG ASSY	4
-37			42259	U-153276-D-30	CHAMBER ASSY, Brake (ATTACHING PARTS)	4
-38			42259	K248	COTTER	4
-39			42259	19X61	PIN	4
-40			42259	NL3101	NUT, Lock	8
-41			42259	1229-N-1626	WASHER, Hardened	8
-42			42259	1245-D-1 86	YOKE, Push Rod, FEN	

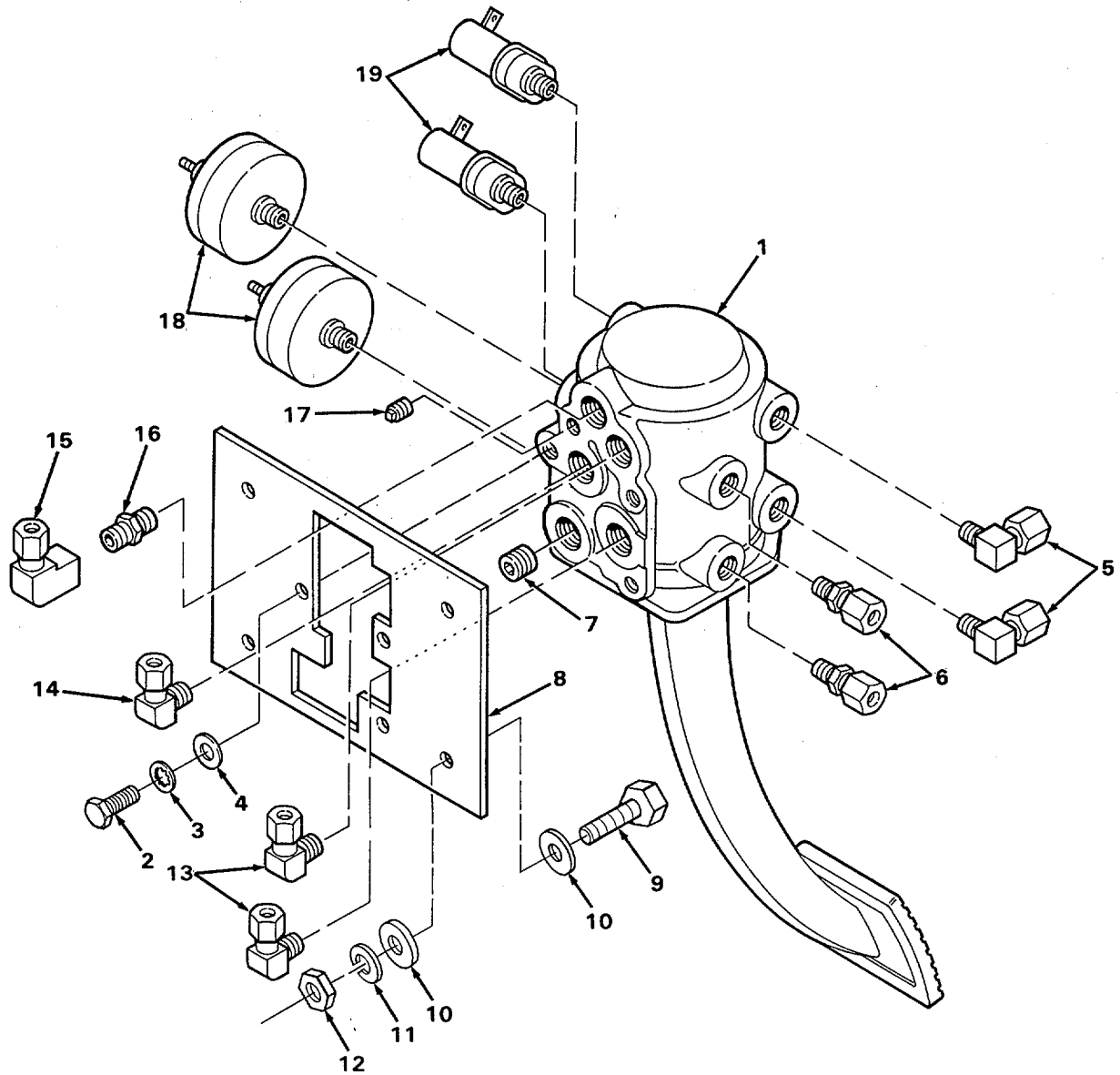


Figure F-155. Brake Pedal Valve Assembly

F-400

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-155	04664	55-0091			BRAKE PEDAL VALVE ASSEMBLY	1
-1	04664	44-0337	06853	283866	VALVE, Dual Brake (ATTACHING PARTS)	1
-2	04664	82-2031-0100			SCREW, Hex Hd, 3/8"-16 x 1, Gr 8, Zn	3
-3	04664	82-1010-011			WASHER, Lock, Internal Tooth, 3/8", Zn	3
-4	04664	82-1013-008			WASHER, Flat, 3/8", Zn	3
					---*---	
-5	04664	56-0490-002	92003	VS269NTA-4-4	FITTING, Male Elbow	2
-6	04664	56-0489-005	92003	VS68NTA-6-4	FITTING, Male Connector	2
-7	04664	56-0498-005	92003	01HP-8	PLUG, Hollow Hex, 1/2"-14	1
-8	04664	44-0431			MOUNT, Brake Pedal (ATTACHING PARTS)	1
-9	04664	82-2062-0200			SCREW, Hex Hd, 5/16"-1 8 x 2", Zn	4
-10	04664	82-1009-007			WASHER, Fender, 5/16" x 1-1/2", Zn	8
-11	04664	82-1011-0031			WASHER, Lock, 5/16", Zn	4
-12	04664	82-3014-002			NUT, Hex, 5/16"-18, Zn	4
					---*---	
-13	04664	56-0490-012	92003	VS269NTA-10-8	FITTING, Male Elbow	2
-14	04664	56-0490-010	92003	VS269NTA-8-8	FITTING, Male Elbow	1
-15	04664	56-0508-008	92003	270NTA-10-8	FITTING, Female Elbow	1
-16	04664	56-0509			NIPPLE, 1/2"	1
-17	04664	56-0283	92003	VS211P-2	PLUG, 1/8", Brass	1
-18	04664	44-0334	06853	286404	SWITCH, Pressure	2
-19	04664	44-0335	06853	279164	SWITCH, Pressure	2

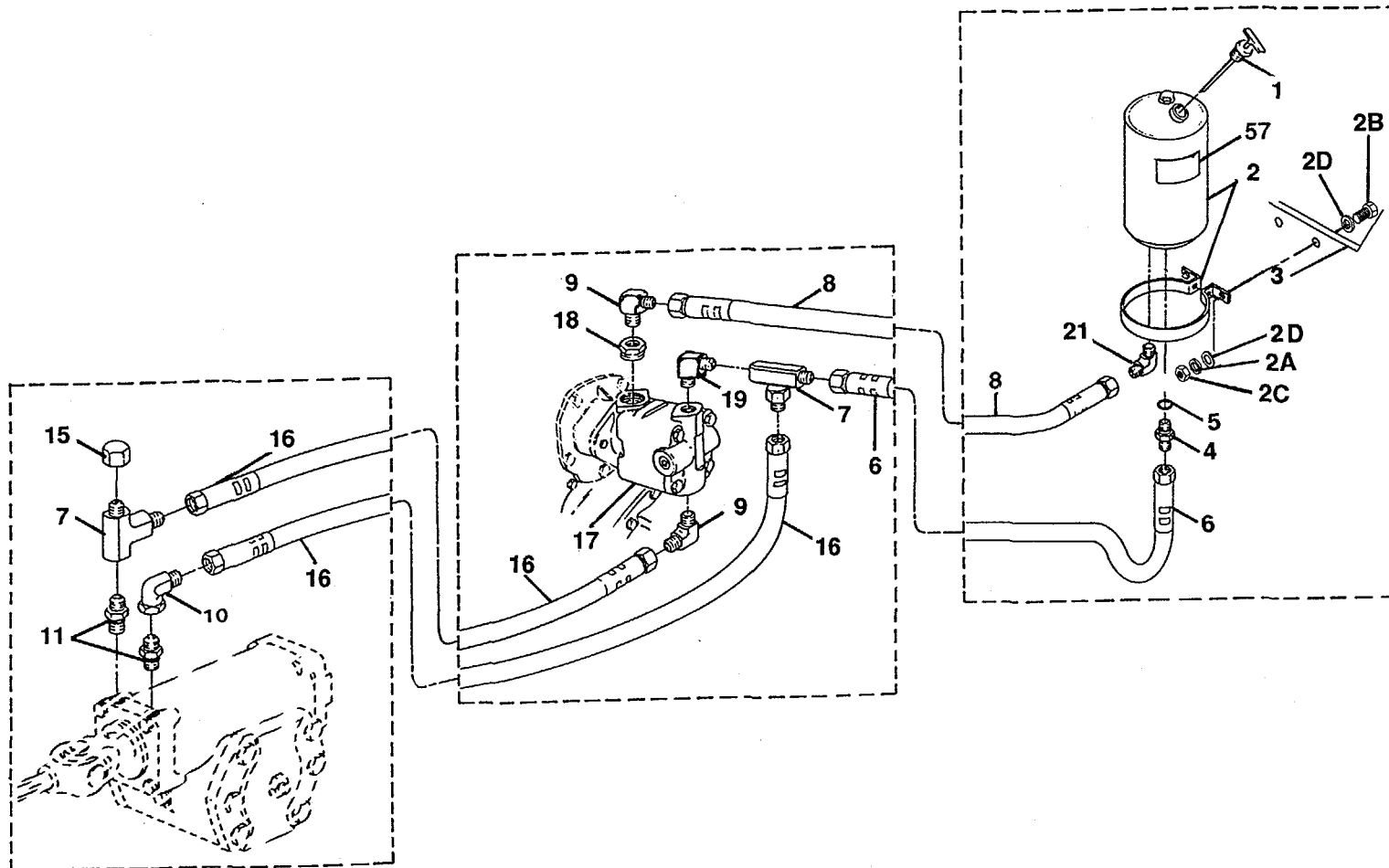


Figure F-156. Steering Assembly, Sheet 1 of 2

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-156-					STEERING ASSEMBLY	1
-1	04664	42-4034	01943	042284	DIPSTICK, Steering Reservoir	1
-2	04664	42-0322	76700	91358AJ	RESERVOIR, Power Steering (ATTACHING PARTS)	1
-2A	04664	82-1011-0038			WASHER, Lock	4
-2B	04664	82-2031-0125			SCREW, Hex Hd, 3/8"-16 x 1-1/4", ZN, G-8	4
-2C	04664	82-3015-003			NUT, Hex, 3/8"-16, Zn, G-8	4
-2D	04664	82-1013-008			WASHER, Flat	8
					---*---	
-3	04664	42-1890			PLATE, Mount, Racor & Steering Reservoir	1
-4	04664	53-4020-013	0CME1	849FSO 12X10	FITTING, SAE O-ring/37° Flare	1
-5	04664	53-4040-002	92003	711509-6	O-RING	1
-6	04664	53-0376-03600			HOSE, Hydraulic, 1/2" Dia. x 36" Lg.	1
-7	04664	53-4014-004	0CME1	871 FS-08	FITTING, 37°FI/37°FI/37°FI, Sw-Tee	2
-8	04664	53-0010			HOSE, Hydraulic, 1/2" Dia. x 26" Lg.	1
-9	04664	53-4025-022	0CME1	849FS-12X12	FITTING, Ext Pipe/37° FI 90°	2
-10	04664	53-4019-004	0CME1	879FS-08	FITTING, 37° FI Sw/37° Flare, 90°	1
-11	04664	53-4038-006	0CME1	848FSO-08X08	FITTING, 37° Male St. Thrd O-Ring	2
-12	04664	40-3246	77640	HFB-70119	GEAR, Steering (See figure F-158 for details)	1
					(ATTACHING PARTS)	
-13	04664	82-2091-0200			BOLT, 3/4"-16 X 2" Lg. Hex Hd, Zn, Gr 8	6
-14	04664	82-1011-0075			WASHER, Lock, 3/4", Zn	6
					---*---	
-15	04664	56-0234-006	0CME1	830FS-08	FITTING, Cap, 1/2", 37° Stl Flare	1
-16	04664	530376-11300			HOSE, Hydraulic, 1/2" (Dia. x 113") Lg.	2
-17	04664	42-0567	62983	V20F1P8P1A6H11L	PUMP, Power Steering (See figure F-157 for details)	1
-18	04664	56-0208-013	0CME1	24SB-20X12	FITTING, 1-1/4" to 3/4" Reducer	1
-19	04664	53-4025-016	0CME1	849FS-08X08	FITTING, Ext Pipe/37° Flare 90°	1
-21	04664	53-4025-025	0CME1	849FS-16X12	FITTING, Ext Pipe/37° Flare 90	1

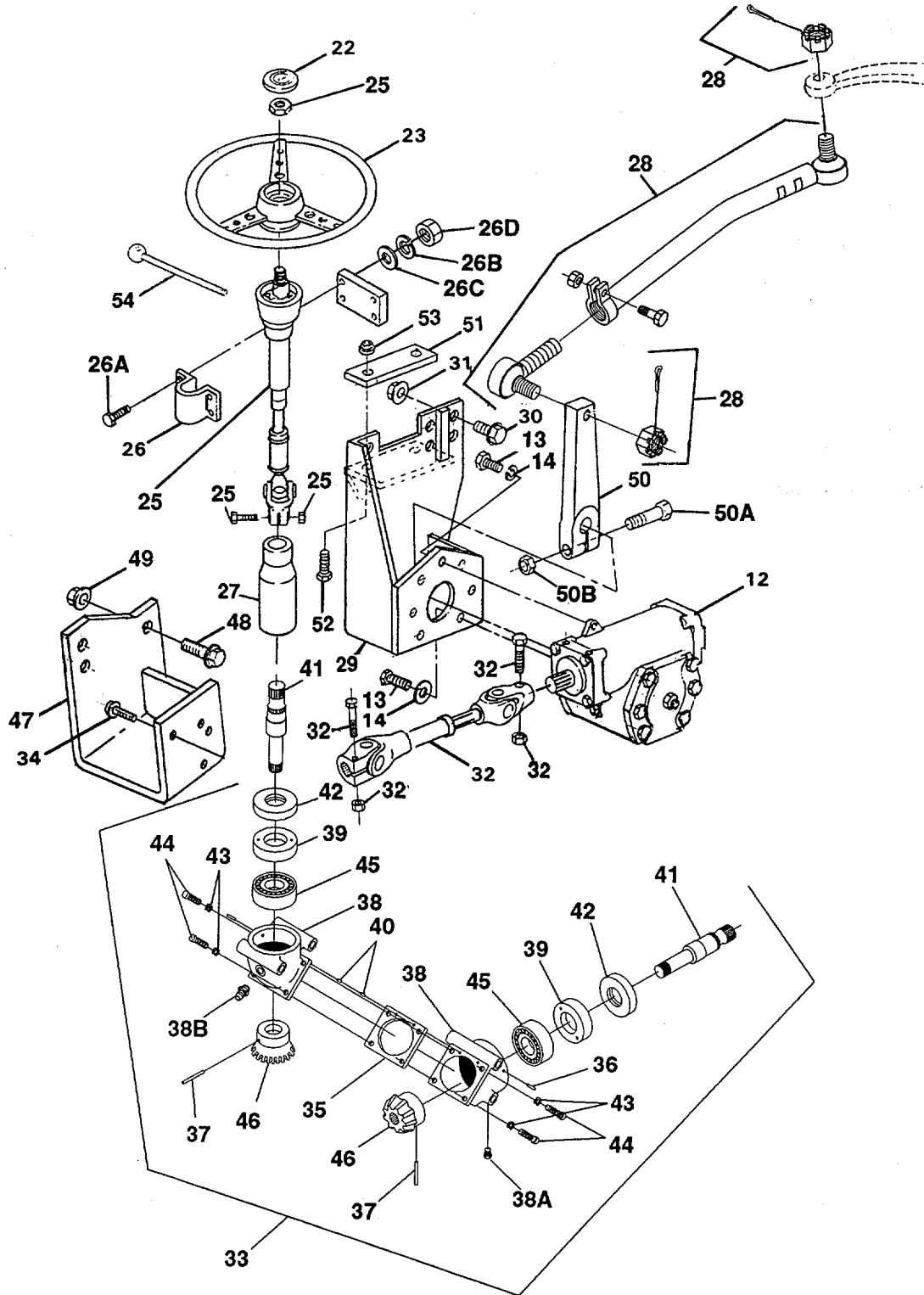


Figure F-156. Steering Assembly, Sheet 2 of 2

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-156						
-22	04664	44-0347	77640	HB2B1PE	BUTTON, Horn	1
-23	04664	44-0531	77640	BHBL20332SS	WHEEL, Steering	1
-24	04664	44-0863			SPACER, Steering Column	1
-25	04664	44-0633	77640	UC35017	CCOLUMN, Steering	1
-26	04664	44-0562			CLAMP (ATTACHING PARTS)	
-26A	04664	82-2062-0250			SCREW, Hex Hd, 5/16"-1 8 x 2-1/2", Zn	4
-26B	04664	82-1011-0031			WASHER, Lock, 5/16", Zn	4
-26C	04664	82-1013-007			WASHER, Flat, 5/16", Zn	4
-26D	04664	82-3014-004			NUT, Hex, 5/16"-18, Zn	4
					-----*	
-27	04664	44-0572	8Z274	44-0572	BOOT, Steering Column	1
-28	04664	40-3663	77640	L28VT5752A11	DRAG LINK, 30" Lg., Ball Studs	1
-29	04664	40-3309			BRACKET, Steering Gear (ATTACHING PARTS)	1
-30	04664	82-2018-0225			BOLT, 5/8"-11 x 2-1/4", Hex Range Hd, Gr 8	6
-31	04664	82-3010			LOCKNUT, 5/8"-11, Flanged	6
					-----*	
-32	04664	44-4463			COLUMN, Lower Steering	1
-33	04664	40-1674	78222	7524553	MITER BOX (ATTACHING PARTS)	1
-34	04664	82-2038-0125			BOLT, 3/8"-24 x 1-1/4", Hex Hd	4
					-----*	
-35			78222	1711361	GASKET/SHIM, .015	AR
-35			78222	1711381	GASKET/SHIM, .010	AR
-35			78222	1711881	GASKET/SHIM, .003	AR
-36			78222	0855911	PIN, Locking	2
-37			78222	2452661	ROLL PIN, .188" Dia. x 1.50" Lg (Included in Shaft Assembly Kit)	2
			78222	5517671	KIT, Shaft Assy (Includes Item No. 37, 41, & 46)	1
-38			78222	1131973	HOUSING, 90° Miter	2
-38A	04664	82-0089-008			FITTING, Grease, 1/8"-27 NPT	1
-38B			78222	1/8-27	FITTING RELIEF	1
-39			78222	2411451	NUT, Bearing Retainer	2
-40			78222	0800361	PIN, Dowel .25" Dia. x .50" Lg	2
-41						
					SHAFT, Actuating, (Included in Shaft Assembly Kit) (NSS)	2
-42			78222	2351021	SEAL, Oil	2
-43			78222	2368783	LOCKWASHER, Medium Spring, .25", Steel	4
-44			78222	2368782	CAPSCREW, Socket Head, .25"-28 UNF-2A x .75" Lg	4
-45			78222	2000951	BEARING, Ball	2
-46					MITER GEAR (Included in Shaft Assembly Kit) (NSS)	2
-47	04664	40-2392			BRACKET, Miter Box (ATTACHING PARTS)	1
-48	04664	82-2018-0275			BOLT, 5/8"-11 x 2-3/4", Hex Flange Hd	3
-49	04664	82-3010			LOCKNUT, 5/8"-11, Flanged	3
					-----*	
-50	04664	40-2942	77640	844172-02	PITMAN ARM, 10-1/2" Straight (ATTACHING PARTS)	1
-50A	04664	82-2143-0200			BOLT, 7/8"-14 x 2, Hex Hd, Zn, Gr 8	1
-50B	04664	82-1011-0088			WASHER, Lock, 7/8", Zn	1
					-----*	
-51	04664	40-1872			SPACER, Steering Gear Bracket (ATTACHING PARTS)	1
-52	04664	82-2017-0300			BOLT, 5/8"-11 x 3", Hex Flange Hd, G-8	2
-53	04664	82-3010			LOCKNUT, 5/8"-11, Flanged, G-8	2
-54	04664	44-1971	77640	452212	LEVER, Turn Signal Switch	1
					-----*	
-57	04664	91-0263			LABEL, Power Steering	1

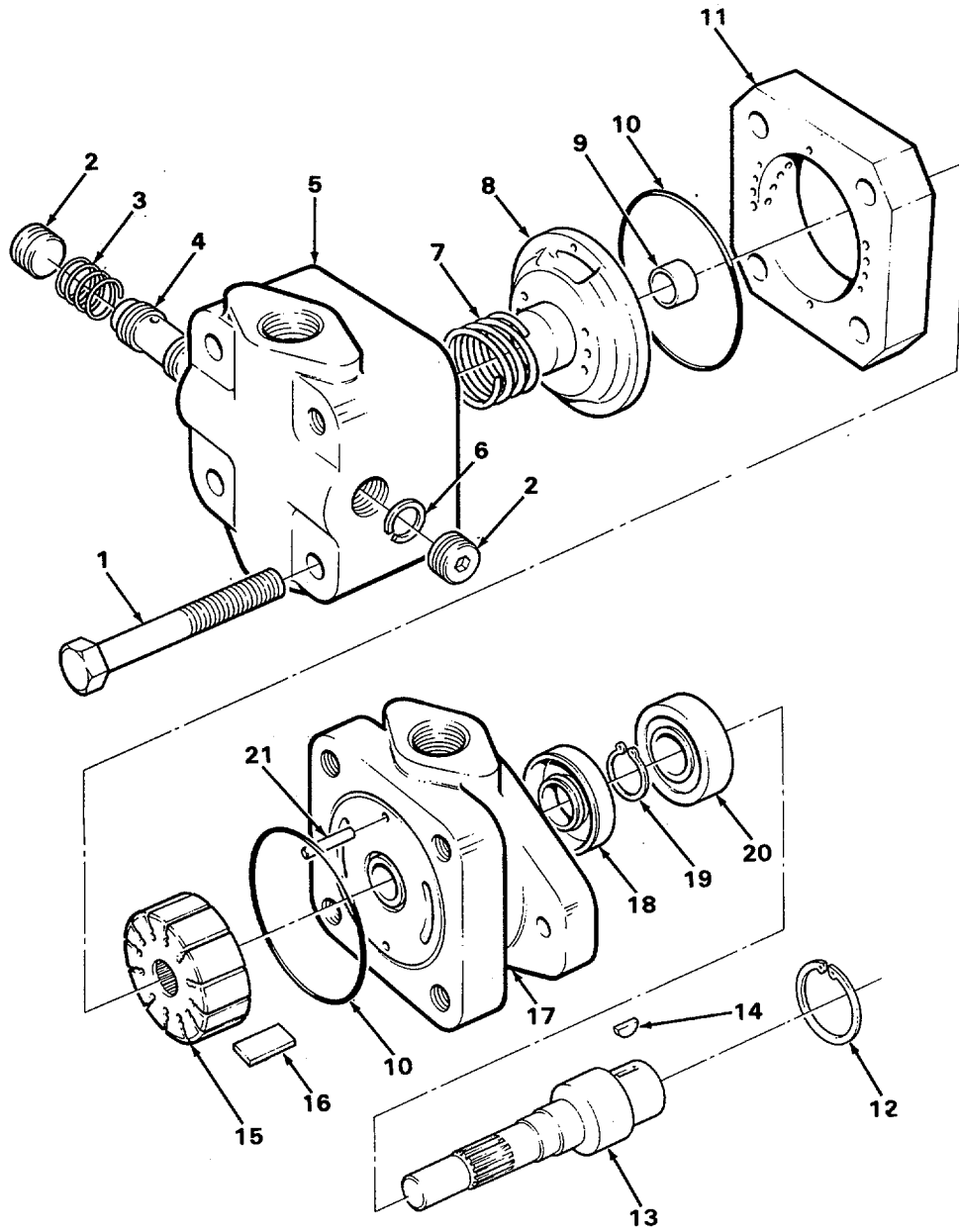


Figure F-157. Power Steering Pump

F-406

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-157	04664	42-0567	62983	V20FIP8PIA6H11L	POWER STEERING PUMP (See figure F-156 for NHA)	
-1			62983	9431	SCREW, Cap Hex, 1/2"	4
-2			62983	7077	PLUG	2
-3			62983	239766	SPRING	1
-4			62983	232799	CONTROL VALVE ASSY	1
-5			62983	316090	COVER, Flow Control	1
-6			62983	155023	RING, Snap	1
-7			62983	28422	SPRING	1
-8			62983	359287	PLATE, Pressure	1
-9			62983	280267	BUSHING	1
-10			62983	154090*	O-RING	2
-11			62983	331791**	RING, Rotor	1
-12			62983	109975	RING, Retaining	1
-13			62983	297330	SHAFT	1
-14			62983	1609	KEY	1
-15			62983	502256**	ROTOR	1
-16			62983	923493**	VANE, Rotary, Set (12 Vanes)	1
-17			62983	280689	BODY	1
-18			62983	229235*	SEAL	1
-19			62983	98653	RING, Snap	1
-20			62983	98574	BEARING	1
-21			62983	2478	PIN, Locating	2
			62983	922733	KIT, Seal (Includes items marked *)	1
			62983	923483	KIT, Cartridge (Includes items marked **)	1
					NOTE: Item 10, O-RING, is in both SEAL and CARTRIDGE KITS.	

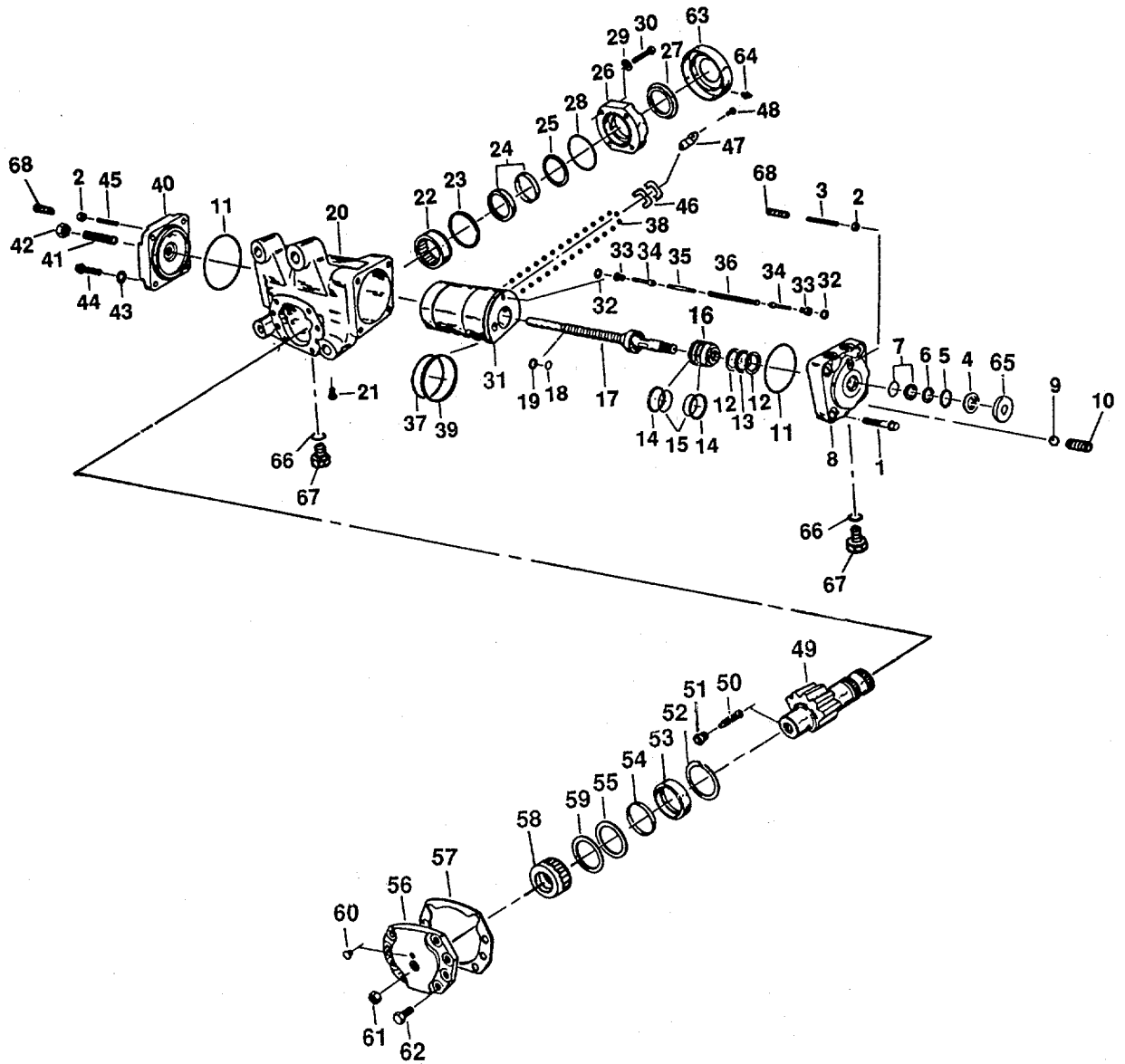


Figure F-158. Steering Gear

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-158	04664	40-3246	77640	HFB-70119	STEERING GEAR (See figure F-156 for NHA)	REF
-1			77640	G9430271	BOLT, Valve Housing	4
-2			77640	025121	NUTS, Poppet Screw Sealing	2
-3			77640	021315	SCREW, Poppet Adjusting	1
-4			77640	032539	SEAL, Dirt & Water	1
-5			77640	401382	RING, Retaining	1
-6			77640	028425	WASHER, Backup, Steel	1
-7			77640	03264719	SEAL, Input Shaft (Two Piece)	1
-8			77640	HFB706002	HOUSING, Valve	1
-9			77640	213684	BALL	1
-10			77640	036153	PLUG	1
-11			77640	032557	RING, Seal, End Cover & Valve Housing	2
-12			77640	038421	WASHER, Thrust	2
-13			77640	068022	BEARING, Thrust	1
			77640	HFB70300152	WORM AND VALVE ASSY	1
-14			77640	032548	RING, Teflon Seal	2
-15			77640	032554	O-RING, Backup	2
-16			77640	HFB703001A2	SLEEVE, Valve	1
-17			77640	089196A1	SHAFT, Input, Worm	1
-18			77640	4032561	O-RING, Backup, Worm Shaft	1
-19			77640	032560	SEAL, Worm, Shaft	1
			77640	HFB202105A1	HOUSING ASSY	1
-20			77640	HFB-70215	HOUSING	1
-21			77640	213705	SCREW, BLEED	1
-22			77640	072001	BEARING, Housing	1
-23			77640	401381	RING, Retaining	1
			77640	40237A1	TRUNNION COVER ASSY	1
-24			77640	03278A1	SEAL, Sector Shaft (Two Piece)	1
-25			77640	028424	WASHER, Backup, Teflon	1
-26			77640	402357	COVER, Trunnion	1
-27			77640	032546	SEAL, Dirt & Water	1
-28			77640	03284	RING, Seal Trunnion Cover	1
-29			77640	G9424321	WASHERS, Trunnion Cover	4
-30			77640	G9429710	BOLTS, Trunnion Cover	4
			77640	HFB70701751	BALL AND RACK ASSY	1
			77640	HFB70701741	RACK ASSY	1
-31			77640	HFB707017	PISTON, Rack	1
-32			77640	401379	RING, Retaining	2
-33			77640	415442	SEAT, Poppet	2
-34			77640	040124	POPPET	2
-35			77640	040137	ROD, Spacer	1
-36			77640	401404	SPRING	1
-37			77640	032556	O-RING, Rack Piston Backup	1
-38			77640	216191X1	BALL, Service Assy (Matched Set of 34)	1
-39			77640	032547	SEAL, Rack Piston, Teflon	1
-40			77640	402386	COVER, End	1
-41			77640	021333	SCREW, Adjusting, Worm Shaft, Preload	1
-42			77640	025122	NUT, Sealing, Adjusting Screw, Worm Shaft	1
-43			77640	G9420422	WASHER, End Cover	4
-44			77640	G455076	BOLT, End Cover	4
-45			77640	02134	SCREW, Adjust Poppet	1
-46			77640	400124	GUIDES, Ball Return	2
-47			77640	402434	CLIP, Ball Return Guide	1
-48			77640	G179810	SCREW, Hex	2
			77640	HFB704100T20559	SHAFT AND COVER ASSY	1
			77640	HFB70410A20559	SECTOR SHAFT ASSY	1
-49			77640	HFB7041000559	SHAFT, Sector	1

F-4091(F-410 Blank)

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-158-						
-50			77640	021200	SCREW, Adjusting, Sector Shaft	1
-51			77640	062005	RETAINER	1
-52			77640	401380	RING, Retaining	1
			77640	03278641	SEAL RING ASSY	1
-53			77640	032786	SEAL, Side Cover	1
-54			77640	032786	RING, Seal	1
-55			77640	028422	WASHER, Backup, Steel	1
			77640	HFB705000A1	COVER ASSY	1
-56			77640	HFB705000	COVER, Side	1
-57			77640	HFB709000	GASKET, Side Cover	1
-58			77640	07201	BEARING, Cover	1
-59			77640	028423	WASHER	1
-60			77640	036201	PLUG, Vent	1
-61			77640	G9419666	NUT, Jam	1
-62			77640	021277	BOLT, Special Ring	8
			77640	032806A1	SEAL AND FITTING ASSY	1
-63			77640	032806	BOOT, Seal Protector	1
-64			77640	037010	FITTING, Grease	1
-65			77640	032810	PROTECTOR, Seal	1
			77640	415437A1	PLUG AND O-RING ASSY	2
-66			77640	032229	O-RING	1
-67			77640	G9410358	PLUG, Hex Hd	1
-68			77640	036155	CAP, Protective	2

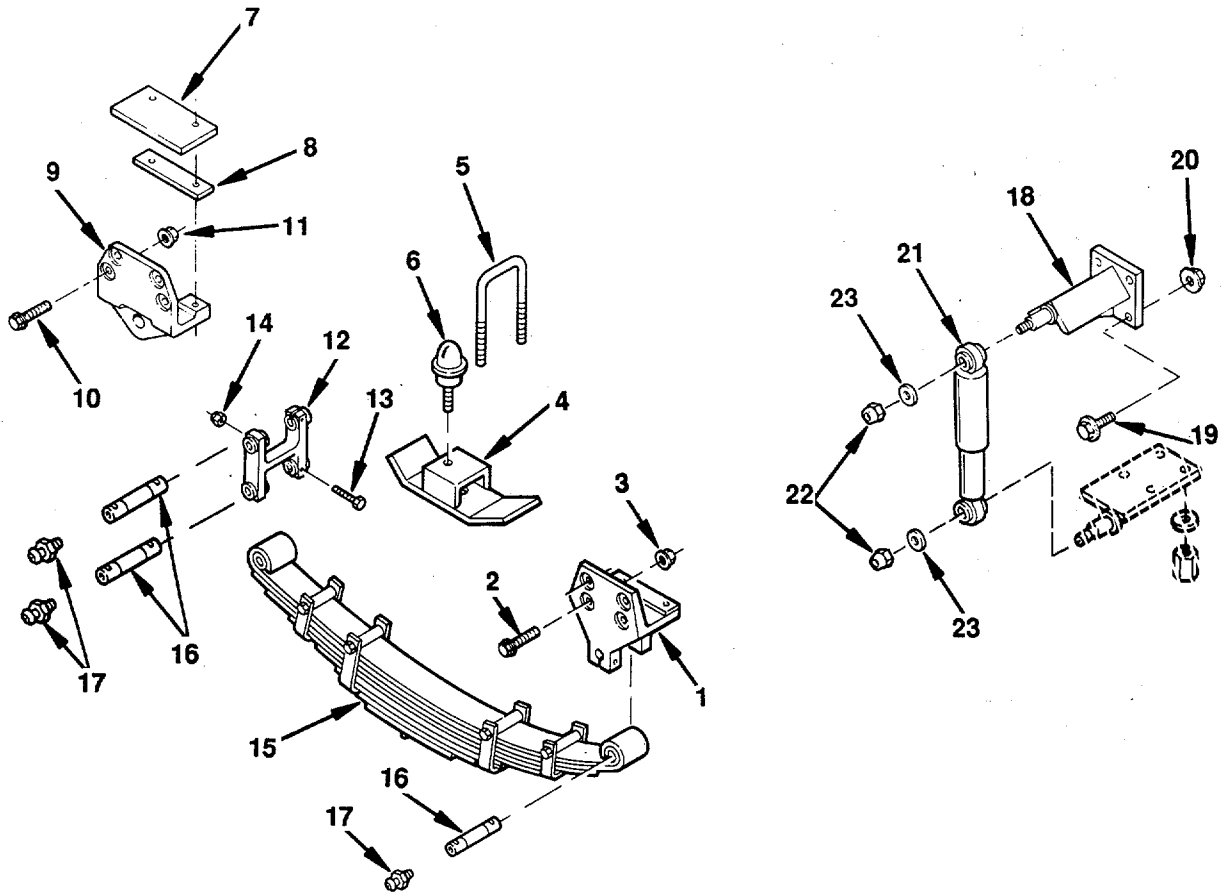


Figure F-159. Front Suspension System

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-159-					FRONT SUSPENSION SYSTEM	1
-1	04664	40-0187			HANGER, Spring (ATTACHING PARTS)	2
-2	04664	82-2018-0225			BOLT, Flange Hd, 5/8"-11 x 2½" Lg	12
-3	04664	82-3010			LOCKNUT, Flanged, 5/8"-11, G-8 ---*---	8
-4	04664	40-0381			RETAINER, Spring (ATTACHING PARTS)	2
-5	04664	40-0323			U-BOLT, 7/8" x 3-9/16" x 9-1/4" Lg	4
-6	04664	40-0383	23040	C7TZ3020A	STOP, Frame	2
-7	04664	40-0854			SUPPORT, Shackle Pivot	2
-8	04664	40-0855			SPACER, Shackle Pivot	AR
-9	04664	40-0824			PIVOT, Shackle (ATTACHING PARTS)	2
-10	04664	82-2018-0275			BOLT, Flange Hd, 5/8"-11 x 2-3/4 " Lg, G-8	6
-11	04664	82-3010			LOCKNUT, Flanged, 5/8"-11, G-8 ---*---	8
-12	04664	40-0194			SHACKLE, Spring (ATTACHING PARTS)	2
-13	04664	82-2031-0275			BOLT, Hex Hd, 3/8"-16 x 2-3/4" Lg, Zn, G-8	4
-14	04664	82-3015-003			NUT, Hex, 3/8"-16, Zn, G-8	4
-15	04664	40-3346			SPRING, 9100 Lbs (ATTACHING PARTS)	2
-16	04664	40-0190			PIN, Spring ---*---	6
-17	04664	82-0089-012			FITTING, Grease	6
-18	04664	40-0826			MOUNT, Upper, Shock (ATTACHING PARTS)	2
-19	04664	82-2017-0175			BOLT, Flange Hd, 1/2"-13 x 1-3/4", G-8	8
-20	04664	82-3009			LOCKNUT, Flanged, 1/2"-13 --*---	8
-21	04664	40-0242	76445	6811	SHOCK ABSORBER (ATTACHING PARTS)	2
-22	04664	82-3019-007			NUT, Oval Toplock, 5/8"-11, Zn	4
-23	04664	82-1007-0062			WASHER, Flat, 5/8", Structural ---*---	4

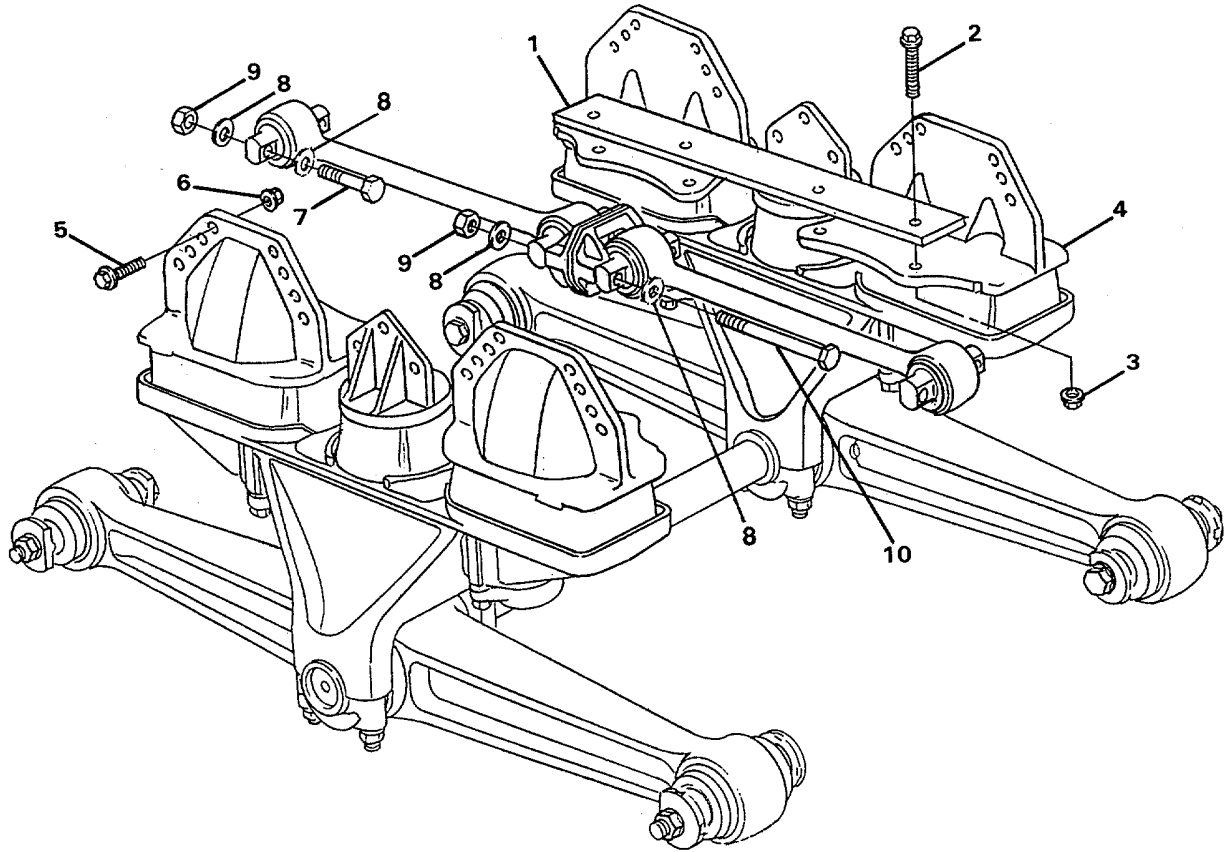


Figure F-160. Rear Axle Suspension System

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-160					REAR AXLE SUSPENSION SYSTEM	1
-1	04664	40-0520			BAR, Spacer (ATTACHING PARTS)	2
-2	04664	82-2018-0275			BOLT, Flange Hd, 5/8"-11 x 2-3/4" Lg. Zn, G-8	8
-3	04664	82-3010			NUT, Lock, Flanged, 5/8"-11, Zn, G-8 ---*---	8
-4	04664	40-3649	6N039	49096-185	SUSPENSION, Rear, RS-460 (See figure F-161 for details) (ATTACHING PARTS)	1
-5	04664	82-2018-0200			BOLT, Flange Hd, 5/8"-11 x 2" Lg. Zn, G-8	26
-6	04664	82-3010			NUT, Lock, Flanged, 5/8"-11, Zn, G-8	24
-7	04664	82-2064-0400			BOLT, Hex Hd, 5/8"-11 x 4" Lg, Zn, G-8	4
-8	04664	82-1008-0062			WASHER, Flat, 5/8", Structural, Zn	12
-9	04664	82-3019-007			NUT, Oval Toplock, 5/8"-11, Zn	6
-10	04664	82-0015			BOLT, Hex Hd, 5/8"-11 x 8" Lg, G-8 ---*---	2

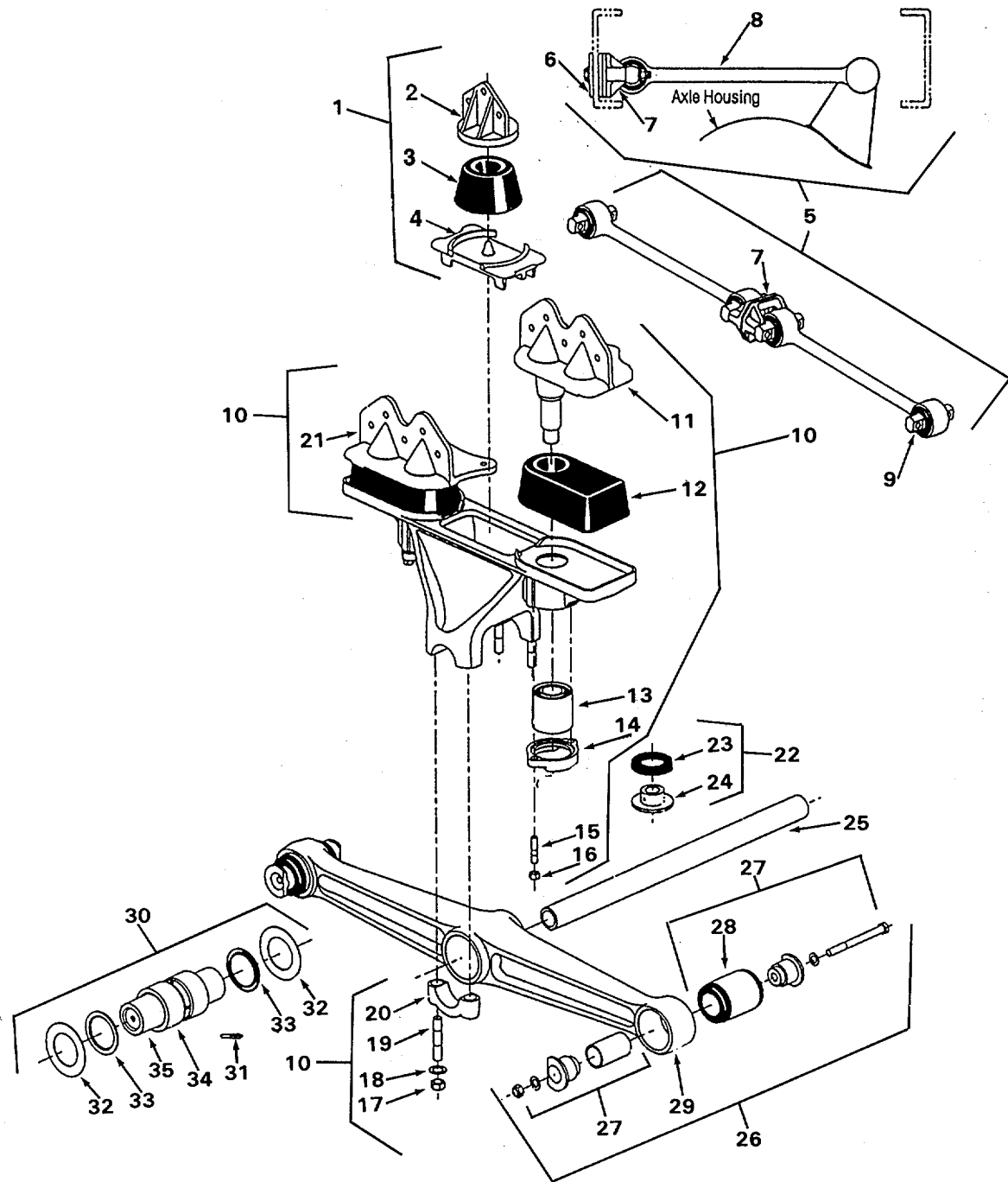


Figure F-161. Rear Axle Suspension

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-161	04664	40-3649	6N039	49096-185	REAR AXLE SUSPENSION	REF
-1			6N039	20681-73	CUSHION KIT	2
-2			6N039	20781	PLATE	1
-3			6N039	24209	CUSHION	1
-4			6N039	48523-1	FRAME	1
-5			6N039	52271	TORQUE ROD ASSY	2
-6			6N039	45045-3	PLATE, Backup	1
-7			6N039	22186	BRACKET, Frame	1
-8			6N039	50234-A	ROD, Torque	1
-9			6N039	44694	BUSHING	4
-10			6N039	8606-67	SADDLE ASSY	2
-11			6N039	48220-2	HANGER, LHF/RHR	1
-12			6N039	26953	CUSHION	2
-13			6N039	19279	BUSHING	2
-14			6N039	5917	CAP	2
-15			6N039	19111-1	STUD	4
-16			6N039	19114	NUT, Saddle	4
-17			6N039	4842	NUT, Cap	4
-18			6N039	22962-2	WASHER	4
-19			6N039	9030	STUD	4
-20			6N039	48545	CAP, Saddle	2
-21			6N039	48222-2	HANGER, RHF/LHR	1
-22			6N039	31005-2	REBOUND STOP KIT	4
-23			6N039	30208	BUMPER, Rebound	1
-24			6N039	30251	NUT, Stop	1
-25			6N039	44643-9	TUBE, Cross	1
-26			6N039	30247-138	EQUALIZING BEAM ASSY	2
-27			6N039	27425-90	ADAPTER ASSY	2
-28			6N039	45900	BUSHING	2
-29			6N039	49225	BEAM	1
-30			6N039	30437	BUSHING KIT, Center	2
-31			6N039	30087	FITTING, Lube	1
-32			6N039	32365	WASHER, Thrust	AR
-33			6N039	30334	SEAL	2
-34			6N039	30240-2	BUSHING, Bronze	1
-35			6N039	14685	SLEEVE	1

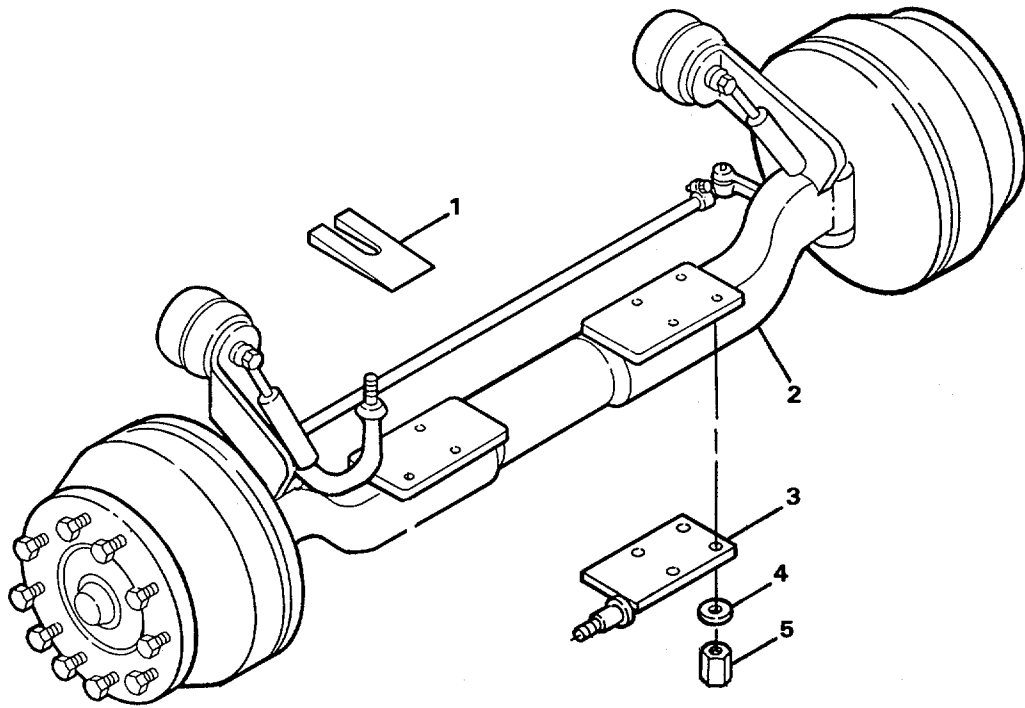


Figure F-162. Front Axle Installation

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-162	04664				FRONT AXLE INSTALLATION	1
-1	04664	40-0565-004			WEDGE, Front Axle Caster	2
-2	04664	40-3011	42259	FL 941QX 256	FRONT AXLE, FL941, 20,000 Lbs.	
-3	04664		40-2956		(See figure F-163 for details)	1
-3	04664	40-2956			MOUNT, Lower, Shock, LH	1
-3	04664	40-2957			MOUNT, Lower, Shock, RH	1
					(ATTACHING PARTS)	
-4	04664	82-1007-0088			WASHER, Flat, 7/8", Structural	8
-5	04664	82-3012			NUT, Hex, UNJF-3B, 7/8"-14	8
					---*---	

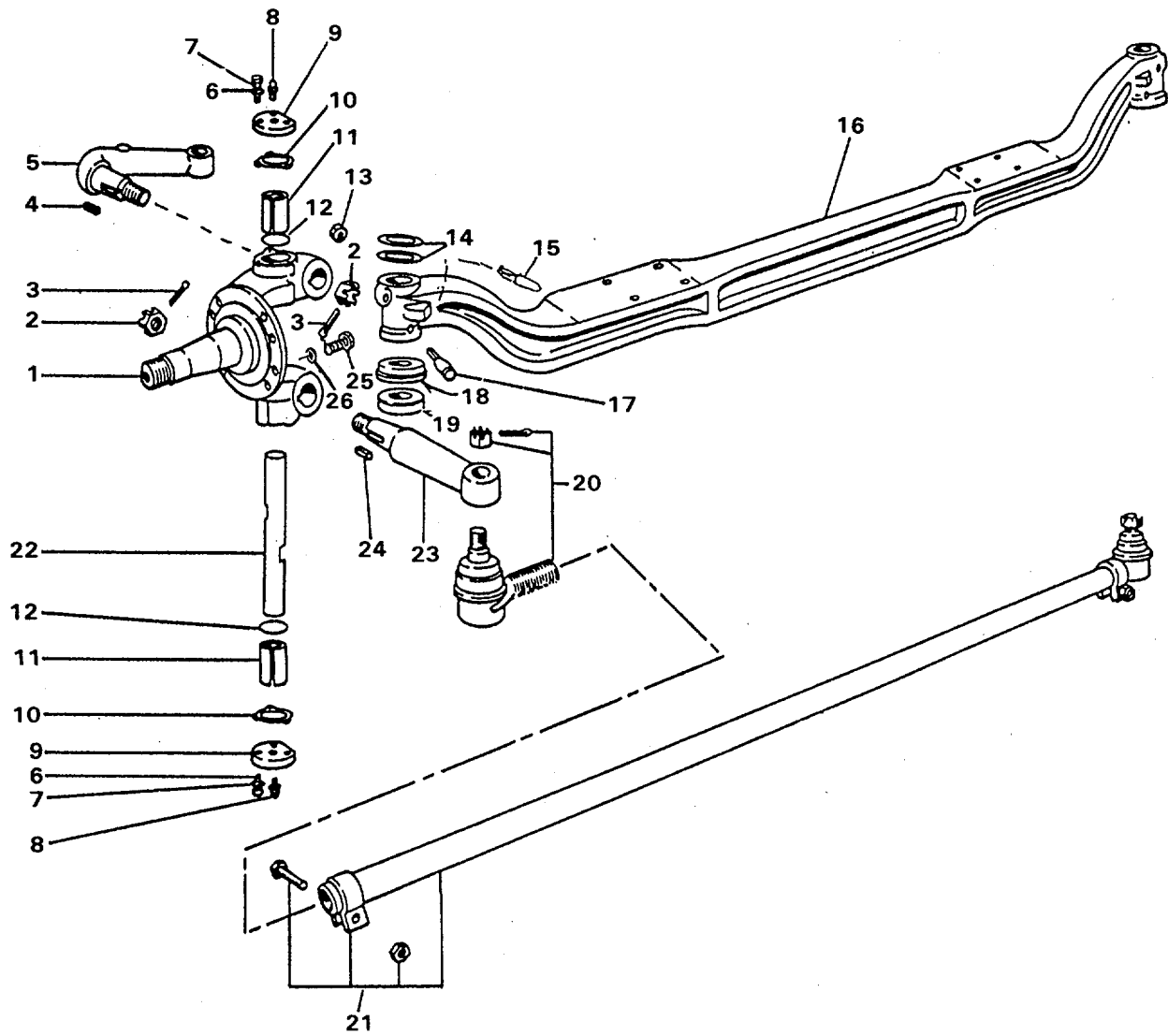


Figure F-163. Front Axle Assembly

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-1 63-		04664	40-3011	42259 FL-941 QX-256	FRONT AXLE ASSEMBLY (See figure F-1 62 for NHA)	REF
-1			42259	A-30-3111-K2299	KNUCKLE, Strg, LH I	
-1			42259	A-21-3111-J-2298	KNUCKLE, Strg, RH	1
-2			42259	13X-159	NUT, Castellated	3
-3			42259	K-2618	PIN, Cotter	3
-4			42259	16X-202	KEY	2
-5			42259	3133-B-4942	ARM, Steering	1
-6			42259	1229-E-1669	WASHER, Flat	12
-7			42259	S-259-1	SCREW, Cap, Hexagon Hd	12
-8			42259	1199-N-1860	FITTING, Lubrication	4
-9			42259	1199-M-3237	CAP, Knuckle	4
-10			42259	3208-N-1028	GASKET, Cap	4
-11			42259	1225-A-1041	BUSHING, Kingpin	4
-12			42259	A-1205-Y-1429	SEAL, Kingpin	4
-13			42259	1227-Z-780	NUT, Draw Key	4
-14			42259	2203-N-3004	SHIM, 0.005 Thk	AR
-14			42259	2203-N-3003	SHIM, 0.010 Thk	AR
-14			42259	2203A2835	SHIM, 0.030 Thk, 3.26" O.D., 2.02" I.D.	AR
-14			42259	2203B2836	SHIM, 0.010 Thk, 3.26" O.D., 2.02" I.D.	AR
-15			42259	7X-113	KEY, Draw, Upper	2
-16			42259	3100-E-6219	BEAM, Axle	1
-17			42259	7X-114	KEY, Draw, Lower	2
-18			42259	A-1205-C-1433	SEAL, Thrust Bearing	2
-19			42259	T-208	BEARING, Thrust	2
-20			42259	A-3144-G-449	TIE ROD, LH	1
-20			42259	A-3144-F-448	TIE ROD, RH	1
-21			42259	A-1-3102-X-4288	TUBE, Cross	1
-22			42259	3101-V-178	KINGPIN	2
-23			42259	3133-F-5180	ARM, Tube	2
-24			42259	16X-202	KEY	2

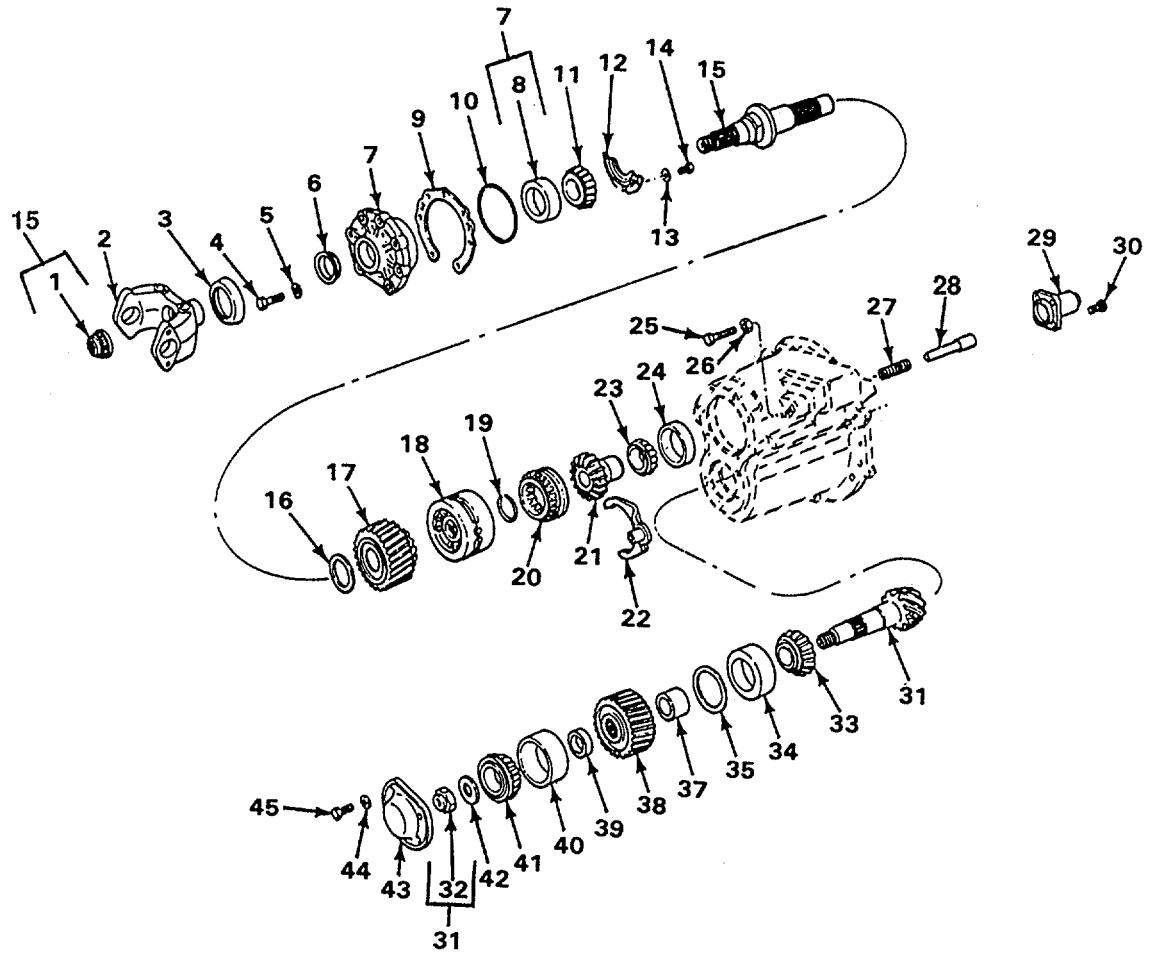


Figure F-164. Forward Tandem Axle and Drive Unit, Sheet 1 of 2

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-164	04664		3E158	RR22145NFQF42	FORWARD TANDEM AXLE AND DRIVE UNIT	1
			3E158	A16-3200-G-1645	DIFFERENTIALASSY	1
-1			3E158	40X-1026	NUT, Shaft	2
-2			3E158	A-3260-L-116	YOKE, Input	1
-3			3E1 58	2997-M-3029	DEFLECTOR	1
-4			3E158	MS-212045-1	SCREW, Cap, Hex Hd	7
-5			3E158	MWA-152	WASHER	7
-6			3E158	A-1205-W-1895	SEAL, Bearing	1
-7			3E158	A-3226-Q-1135	CAGE ASSY	1
-8			3E158	JM-511910	CUP, Bearing	1
-9			3E158	2203-K-9241	SHIM, 0.003Thk	AR
-9			3E158	2203-L-9242	SHIM, 0.005 Thk	AR
-9			3E158	2203-M-9243	SHIM, 0.010 Thk	AR
-10			3E158	5X-1034	PACKING, Preformed	1
-11			3E158	JM-511946	CONE, Bearing	1
-12			3E158	3221-P-1004	BAFFLE, Oil	1
-13			3E158	1229-S-2931	WASHER	3
-14			3E158	MS-208016-1	SCREW, Cap, Hex Hd	3
-15			3E158	A-3297-N-1 028	SHAFT ASSY (Incl item 1)	1
-16			3E158	1229-P-4072	WASHER	1
-17			3E158	3892-R-4932	GEAR, Helical	1
-18			3E158	A-3235-W-2025	DIFFERENTIAL CASE ASSY	1
-19			3E158	2297-E-5335	RING, Retaining	1
-20			3E158	3107-S-1059	COLLAR, Differential	1
-21			3E158	2234-R-1188	GEAR, Side	1
-22			3E158	A-3296-1093	FORK, Shift	1
-23			3E158	JLM-710949C	CONE, Bearing	1
-24			3E158	JLM-710910	CUP, Bearing	1
-25			3E158	41X-1208	SCREW, Adjusting	1
-26			3E158	MN-312-1	NUT, Jam, Hex	1
-27			3E158	2258-U-411	SPRING, Helical, Comp	1
-28			3E158	2244-K-1025	SHAFT, Shift	1
-29			3E158	A-3261-L-350	SHIFTASSY, Air	1
-30			3E158	41X-1209	SCREW, Cap, Hex Hd	4
-31			3E158	A-40294-3	PINION ASSY	1
-32			3E158	40X-1145	NUT, Pinion	1
-33			3E158	H-715334	CONE, Bearing	1
-34			3E158	H-715311	CUP, Bearing	1
-35			3E158	2203-F-2788	SHIM, 0.003 Thk	AR
-35			3E158	2203-G-2789	SHIM, 0.005 Thk	AR
-35			3E158	2203-H-2790	SHIM, 0.010 Thk	AR
-37			3E158	1244-V-1764	SPACER, Bearing	6
-38			3E158	892-N-4902	GEAR, Helical, Driven	1
-39			3E158	2203-D-9806	SPACER, 0.209 Thk	AR
-39			3E158	2203-E-9807	SPACER, 0.210 Thk	AR
-39			3E158	2203-F-9808	SPACER, 0.211 Thk	AR
-39			3E158	2203-G-9809	SPACER, 0.212 Thk	AR
-39			3E158	2203-H-9810	SPACER, 0.213 Thk	AR
-39			3E158	2203-J-9812	SPACER, 0.217 Thk	AR
-39			3E158	2203-K-9813	SPACER, 0.220 Thk	AR
-39			3E158	2203-L-9814	SPACER, 0.224 Thk	AR
-39			3E158	2203-M-9815	SPACER, 0.228 Thk	AR
-39			3E158	2203-N-9816	SPACER, 0.232 Thk	AR
-39			3E158	2203-P-9818	SPACER, 0.236 Thk	AR
-39			3E158	2203-Q-9819	SPACER, 0.240 Thk	AR
-39			3E158	2203-R-9820	SPACER, 0.241 Thk	AR
-39			3E158	2203-S-9821	SPACER, 0.242 Thk	AR
-39			3E158	2203-T-9822	SPACER, 0.243 Thk	AR

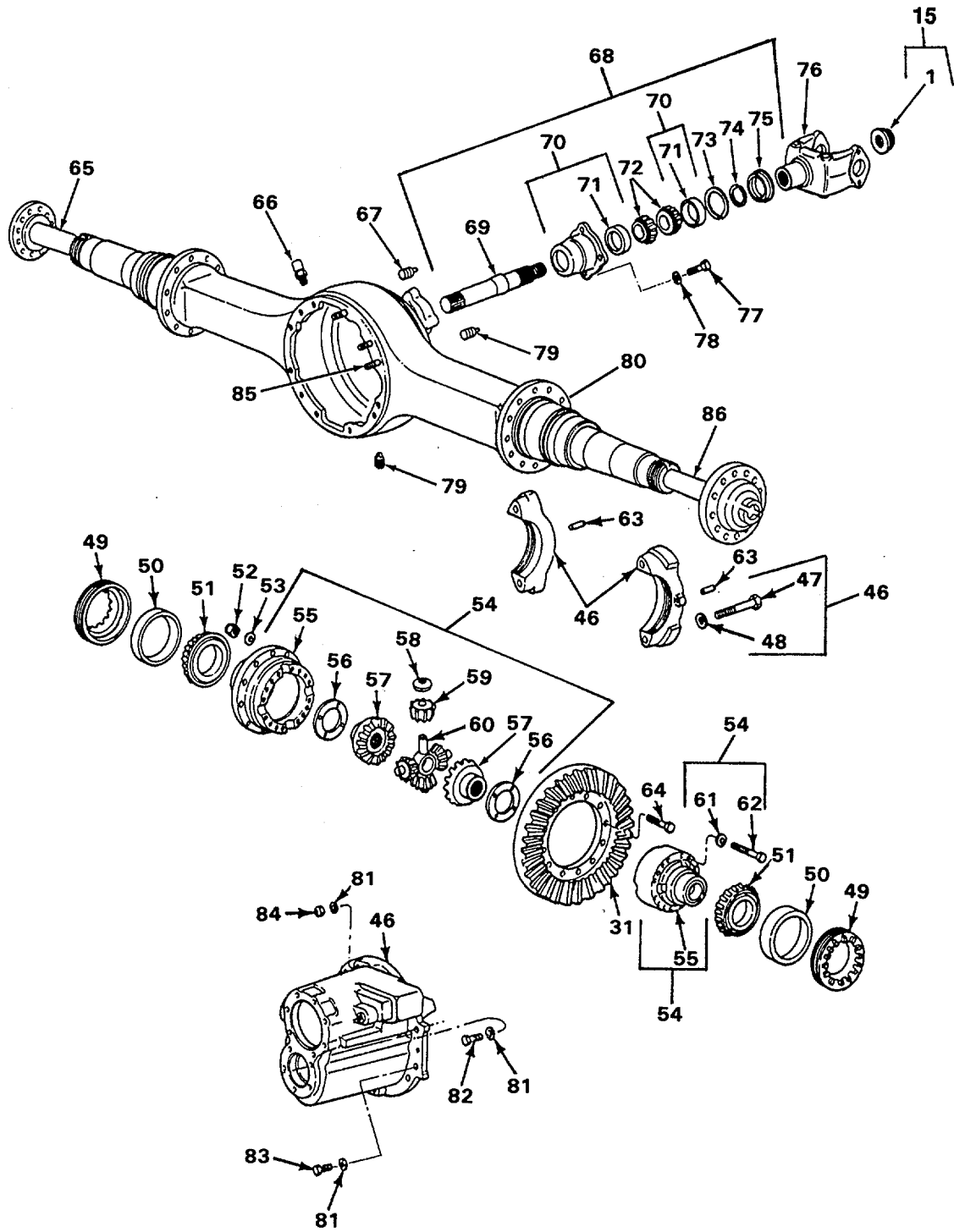


Figure F-164. Forward Tandem Axle and Drive Unit, Sheet 2 of 2

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-164-						
-39			3E158	2203-U-9823	SPACER, 0.244 Thk	AR
-40			3E158	72487	CUP, Bearing	1
-41			3E158	72212-C	CONE, Bearing	1
-42			3E158	1229-G-4063	WASHER I	
-43			3E158	3266-C-1095	COVER, Pinion	1
-44			3E158	MWA-510	WASHER	5
-45			3E158	MS-210020-1	SCREW, Cap, Hex Hd	5
-46			3E158	A2-2300-G-1645	CARRIER ASSY	1
-47			3E158	MS-220120-1	SCREW, Cap, Hex Hd	4
-48			3E158	42X-1021	WASHER	4
-49			3E158	2214-C-1095	RING, Adjusting	2
-50			3E158	JM-716610	CUP, Bearing	2
-51			3E158	JM-716649	CONE, Bearing	2
-52			3E158	40X-1150	NUT, Plain, Hex	12
-53			3E158	MWA-516	WASHER	12
-54			3E158	A9-3235-U-1841	CASE ASSY	1
-55			3E158	A8-3235-U-1841	CASE, Universal	1
-56			3E158	1229-Y-3015	WASHER, Thrust	2
-57			3E158	2234-M-1183	GEAR, Side	2
-58			3E158	1229-R-1032	WASHER, Thrust	2
-59			3E158	2233-J-1024	GEAR, Pinion	4
-60			3E158	3278-S-305	SPIDER	1
-61			3E158	MWA-512	WASHER	12
-62			3E158	MS-212090-1	SCREW, Cap, Hex Hd	12
-63			3E158	1246-P-1134	PIN, Adjusting	2
-64			3E158	41X-1216	BOLT, Gear	12
-65			3E158	3202-F-9340	SHAFT, Axle	1
-66			3E158	A-1199-P-1394	BREATHER	3
-67			3E158	A-1199-P-1394	PLUG, Heat Indicator	1
-68			3E158	A1-3226-T-1112	CAGE AND SEAL ASSY	1
-69			3E158	3297-E-1019	SHAFT, Output	1
-70			3E158	A-3226-T-1112	CAGE ASSY	1
-71			3E158	JLM-104910	CUP, Brg	2
-72			3E158	LM-104949	CONE, Bearing	2
-73			3E158	1229-P-2590	RING, Spacer, 0.155 Thk	1
-73			3E158	1229-Q-2591	RING, Spacer, 0.158Thk	1
-73			3E158	1229-R-2592	RING, Spacer, 0.161 Thk	1
-73			3E158	1229-S-2593	RING, Spacer, 0.164Thk	1
-73			3E158	1229-T-2594	RING, Spacer, 0.167 Thk	1
-73			3E158	1229-U-2595	RING, Spacer, 0.170 Thk	1
-73			3E158	1229-V-2596	RING, Spacer, 0.173Thk	1
-73			3E158	1229-W-2597	RING, Spacer, 0.176Thk	1
-73			3E158	1229-X-2598	RING, Spacer, 0.179Thk	1
-73			3E158	1229-Y-2599	RING, Spacer, 0.182 Thk	1
-74			3E158	1229-W-4131	RING, Retaining	1
-75			3E158	A-1205-W-1895	SEAL, Cage	1
-76			3E158	3260-Q-121	YOKE, Companion	1
-77			3E158	15X-387	SCREW, Cap, Hex Hd	4
-78			3E158	1229-K-1597	WASHER	4
-79			3E158	1250-E-473	PLUG, Magnetic	2
-80			3E158	C1-3121-K-1649	HOUSING, Axle	1
-81			3E158	1229-U-1503	WASHER	12
-82			3E158	S-21014-1	SCREW, Cap, Hex Hd	6
-83			3E158	S-21022-1	SCREW, Cap, Hex Hd	3
-84			3E158	N-110-1	NUT, Plain, Hex	3
-85			3E158	SN-1018-1	STUD, Plain	3
-86			3E158	3202-G-9341	SHAFT, Axle	1

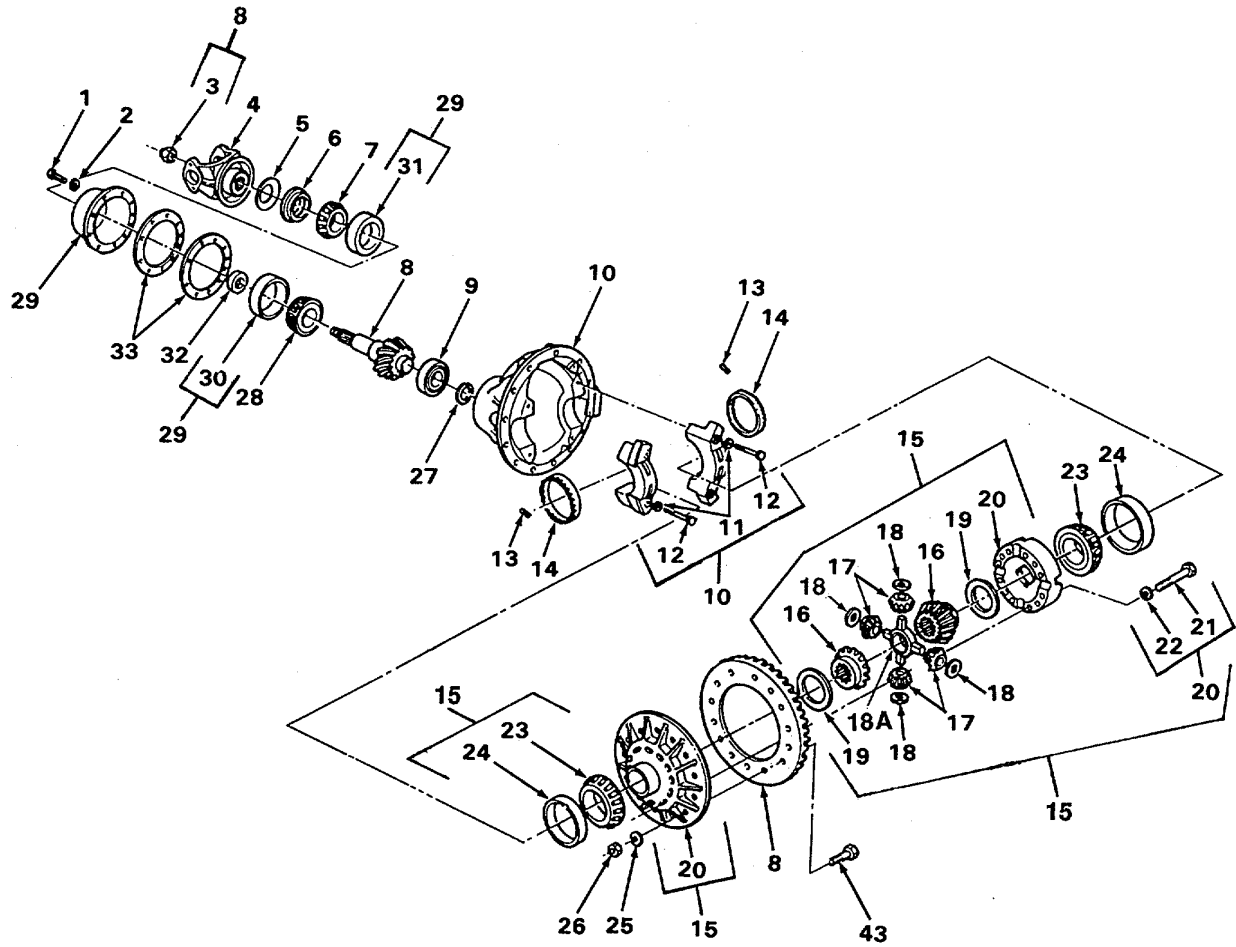


Figure F-165. Rear Tandem Axle and Differential, Sheet 1 of 2

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-165	04664	40-3383-4.56	42259	RR22145NFQF-39	REAR TANDEM AXLE AND DIFFERENTIAL	1
			42259	A19-3200-L-1676	DIFFERENTIAL ASSY	1
-1			42259	MS-212040-1	SCREW, Cap, Hex Hd	8
-2			42259	MWA-512	WASHER	8
-3			42259	40X-1026	NUT, Pinion	1
-4			42259	A1-3260-Q-121	YOKE, Flange	1
-5			42259	2297-N-3888	DEFLECTOR	1
-6			42259	A-1 205-Y-1897	SEAL, Oil	1
-7			42259	55206C	CONE, Bearing	1
-8			42259	A-40084-1	GEAR SET, Pinion (Incl. item 3)	1
-9			42259	1228-F-552	BEARING, Pinion	1
-10			42259	A2-3200-L-1676	CARRIER, Differential	1
-11			42259	42X-1021	WASHER	4
-12			42259	MS-220120-1	SCREW, Cap, Hex Hd	4
-13			42259	1246-P-1134	PIN, Lock, Adjusting	2
-14			42259	2214-C-1095	RING, Adjusting	2
-15			42259	A9-3235-W-1843	CASE ASSY, Differential	1
-16			42259	2234-M-1183	GEAR, Side	2
-17			42259	2233-J-1024	GEAR, Pinion	4
-18			42259	1229-R-1032	WASHER, Thrust	4
-18A			42259	3278-S-305	SPIDER	1
-19			42259	1229-Y-3015	WASHER, Thrust	2
-20			42259	A8-3235-1843	CASE ASSY	1
-21			42259	1229-C-1511	WASHER	16
-22			42259	41X-1327	SCREW, Cap, Hex Hd	16
-23			42259	JM716649	CONE, Bearing	2
-24			42259	JM716610	CUP, Bearing	2
-25			42259	1229-11-1503	WASHER	12
-26			42259	40X-1150	NUT, Plain, Hex	12
-27			42259	1229-A-1301	RING, Retaining	1
-28			42259	72212C	CONE, Bearing	1
-29			42259	A-3226-M-1053	CAGE ASSY, Differential	1
-30			42259	72487	CUP, Bearing	1
-31			42259	55437	CUP, Bearing	1
-32			42259	2203-J-9474	SPACER, 0.345 Thk	2
-32			42259	2203-K-9475	SPACER, 0.346 Thk	2
-32			42259	2203-K-9476	SPACER, 0.347 Thk	2
-32			42259	2203-M-9477	SPACER, 0.348 Thk	2
-32			42259	2203-N-9478	SPACER, 0.349 Thk	2
-32			42259	2203-P-9480	SPACER, 0.354 Thk	2
-32			42259	2203-Q-9481	SPACER, 0.358 Thk	2
-32			42259	2203-R-9482	SPACER, 0.359 Thk	2
-32			42259	2203-S-9483	SPACER, 0.360 Thk	2
-32			42259	2203-T-9484	SPACER, 0.361 Thk	2
-32			42259	2203-U-9485	SPACER, 0.362 Thk	2
-33			42259	2203-W-9175	SHIM, 0.003 Thk	AR
-33			42259	2203-X-9176	SHIM, 0.005 Thk	AR
-33			42259	2203-Y-9177	SHIM, 0.008 Thk	AR
-33			42259	2203-Z-9178	SHIM, 0.020 Thk	AR

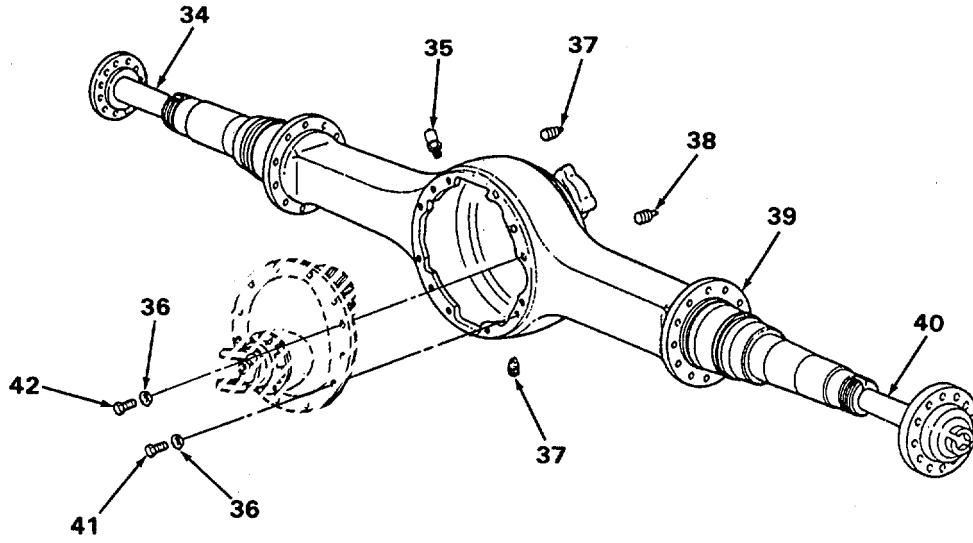


Figure F-165. Rear Tandem Axle and Differential, Sheet 2 of 2

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FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-165-						
-34			42259	3202-G-9341	SHAFT, Axle, RH	1
-35			42259	A-1199-P-1394	BREATHER	3
-36			42259	1229-U-1503	WASHER	12
-37			42259	A-1199-S-1709	PLUG, Heat Indicator	1
-38			42259	1250-E-473	PLUG, Fill and Drain	2
-39			42259	C1-3121-L-1650	HOUSING, Axle	1
-40			42259	3202-F-9340	SHAFT, Axle, LH	1
-41			42259	S-21020-1	SCREW, Cap, Hex Hd	4
-42			42259	S-21022-1	SCREW, Cap, Hex Hd	8
-43			42259	41X-1216	SCREW, Cap, Hex Hd	12

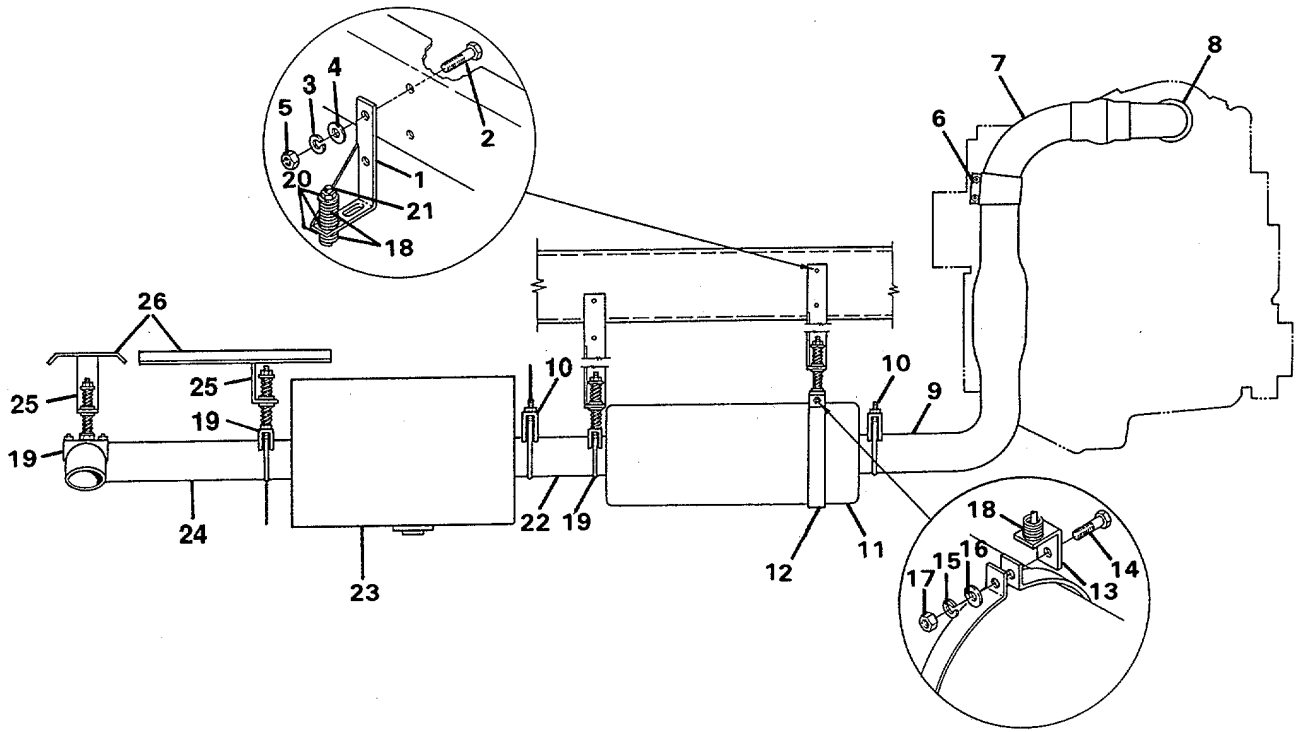


Figure F-166. Exhaust System

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-166-					EXHAUSTSYSTEM	1
-1	04664	42-0069			HANGER, Muffler (ATTACHING PARTS)	2
-2	04664	82-2031-0125			SCREW, Hex Hd, 3/8"-16 x 1-1/4" Zn	2
-3	04664	82-1011-0038			WASHER, Lock, 3/8", Zn	2
-4	04664	82-1013-008			WASHER, Flat, 3/8", Zn	2
-5	04664	82-3015-003			NUT, Hex, 3/8"-1 6, Zn	2
-6	04664	42-0198	01652	TSC-500	CLAMP, Tru-Seal, 5" Dia.	1
-7	04664	42-0080			OUTLET, Exhaust	1
-8	04664	42-0234	76700	89510K	CLAMP, V-Band, 5" Dia.	1
-9	04664	42-0570			PIPE, Exhaust	1
-10	04664	80-6010			CLAMP, Muffler, 5" Dia.	2
-11	04664	42-0039	76700	86102MK	MUFFLER	1
-12	04664	42-0365	01652	SP1791	RING, Mounting, Muffler	1
-13	04664	42-1198			BRACKET, Exhaust Hanger (ATTACHING PARTS)	1
-14	04664	82-2031-0125			SCREW, Hex Hd, 3/8"-16 x 1-1/4" , Zn	1
-15	04664	82-1011-0038			WASHER, Lock, 3/8", Zn	1
-16	04664	82-1013-008			WASHER, Flat, 3/8", Zn	1
-17	04664	82-3015-003			NUT, Hex, 3/8"-16, Zn	2
-18	04664	81-1015			SPRING, Compression	8
-19	04664	42-0161			BRACKET, Exhaust (ATTACHING PARTS)	3
-20	04664	82-1013-008			WASHER, Flat, 3/8", Zn	12
-21	04664	82-3015-003			NUT, Hex, 3/8"-16, Zn	3
-22	04664	931006-01200			TUBING, Exhaust, Steel	1
-23	04664	SD-13041			ARRESTER, Spark	1
-24	04664	42-0056			PIPE, Tail	1
-25	04664	42-0026			BRACKET, Exhaust, Hanger	2
-26	04664	42-0001			SHIELD, Heat, Exhaust	2

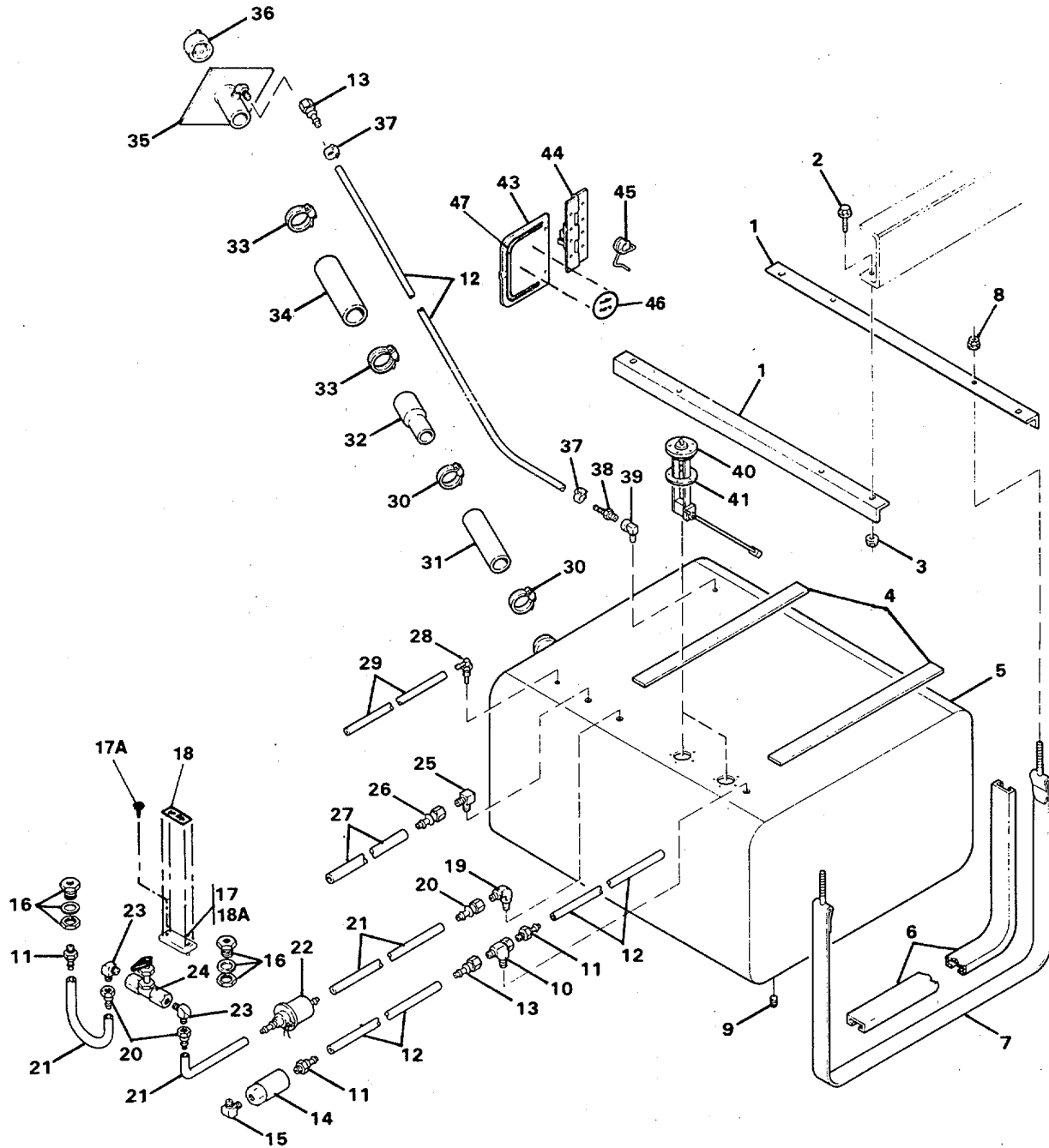


Figure F-167. Fuel Tank Assembly

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-167					FUEL TANK ASSEMBLY	1
-1	04664	50-0530			SUPPORT, Fuel Tank (ATTACHING PARTS)	2
-2	04664	82-2017-0175			BOLT, Flange Hd, 1/2"-13	4
-3	04664	82-3009			NUT, Lock, Flanged, 1/2"-13	4
-4	04664	943089-02600			RUBBER, 1/8" x 1-1/2"	2
-5	04664	50-0685			TANK, Fuel (65 Gallon)	1
-6	04664	932142-05200			EXTRUSION, Rubber	2
-7	04664	50-0648	8L740	906979	STRAP, Mounting (ATTACHING PARTS)	2
-8	04664	82-3001			NUT, Hex, 1/2"-20	4
-9	04664	53-0127-004			FITTING, Plug, Pipe, Sq Hd, 3/4"	1
-10	04664	53-4014-004	92003	8R6X-5	FITTING, 37° F1/370 F1/370 FI , Sw-Tee	1
-11	04664	53-0107-007	92003	VS125HBL-6-4	FITTING, Hose End, Male to Barb	3
-12	04664	54-4016	92003	821-8	HOSE, Push-Lok, 1/2"	AR
-13	04664	54-4017	92003	30682-8-8	FITTING, Push-Lok, 1/2" H, 1/2" JIC	1
-14	04664	51-0194	30327	81-C-04	VALVE, Check, 1/4"	1
-15	04664	53-4025-016	92003	8-8 CTX-S	FITTING, Ext. Pipe/370 Flare, 900	1
-16	04664	56-0486	30327	129B-114x15/16	FITTING, Bulkhead, Stl 1/4" NPT	2
-17	04664	52-0162			BEZEL, Tag Style B, w/Holes (ATTACHING PARTS)	1
-17A	04664	82-2003			SCREW, Self-Tapping, No. 10-24 x 1/2"	2
-18	04664	91-0232			TAG, Generator Fuel Valve	1
-19	04664	53-4025-020	OCME1	849-FS-08X12	FITTING, Pipe/370 Flare 900	1
-20	04664	544025	OCME1	KA06X04MB	FITTING, Push-Lok, 3/8" H, 1/4" NPT	3
-21	04664	544026	92003	821-6	HOSE, Push-Lok, 3/8" Fuel	AR
-22	04664	544006	80463	6472382	PUMP, Fuel EP425 AC	1
-23	04664	56-0495-003	92003	1200P-4-4	FITTING, Union El 900, Brass	2
-24	04664	51-0035	54938	4F-6BLJ-BP	VALVE, Ball, .25"	1
-25	04664	53-4025-021	92003	10-12 CTS-X	FITTING, Ext Pipe/370 Flare 900	1
-26	04664	544037	92003	30682-10-10	FITTING, Push-Lok, 5/8"	1
-27	04664	544036	92003	821-10	HOSE, Push-Lok, 5/8"	AR
-28	04664	540054	78528	GT262-3	VENT, Tank Valve, 1/2"	1
-29	04664	944056-02100	OCME1	65126	HOSE, Fuel, 1/4"	1
-30	04664	80-6029-008	81646	6426	CLAMP, Hose	2
-31	04664	54-0059	8L359	23932	HOSE, Fuel Fill, 2" I.D.	1
-32	04664	54-0070			ADAPTER, Filler	1
-33	04664	80-6029-013	81646	6448	CLAMP, Hose	2
-34	04664	940002-00600	8L359	4663-K	HOSE, Fuel Fill, 2-1/2" I.D.	1
-35	04664	54-0023			SPOUT, Filler	1
-36	04664	54-0003	78225	ACO-1 501	CAP, Filler	1
-37	04664	80-6033-002	OCME1	WITTEK M5	CLAMP, Hose	2
-38	04664	53-0107-011	92003	VS125HBL-8-8	FITTING, Hose End, Male To Barb	1
-39	04664	53-4034-004	92003	1/2 CDS	FITTING, Elbow, 900 Street, NPT-8	1
-40	04664	44-1086	59197	226-001	SENDER, Fuel Level	2
-41	04664	44-0251	70040	1516395	GASKET, Fuel Sender	2
-43	04664	15-0002			DOOR, Fuel	1
-44	04664	15-0003			HINGE, Fuel Door	1
-45	04664	81-0038	94222	23-1-11-12	SPRING, Door	1
-46	04664	100-004C			TAG, Name, Diesel Fuel Only	1
-47	04664	943064	56329	1085-3017	SEAL, Door, "D" Section, Black	AR

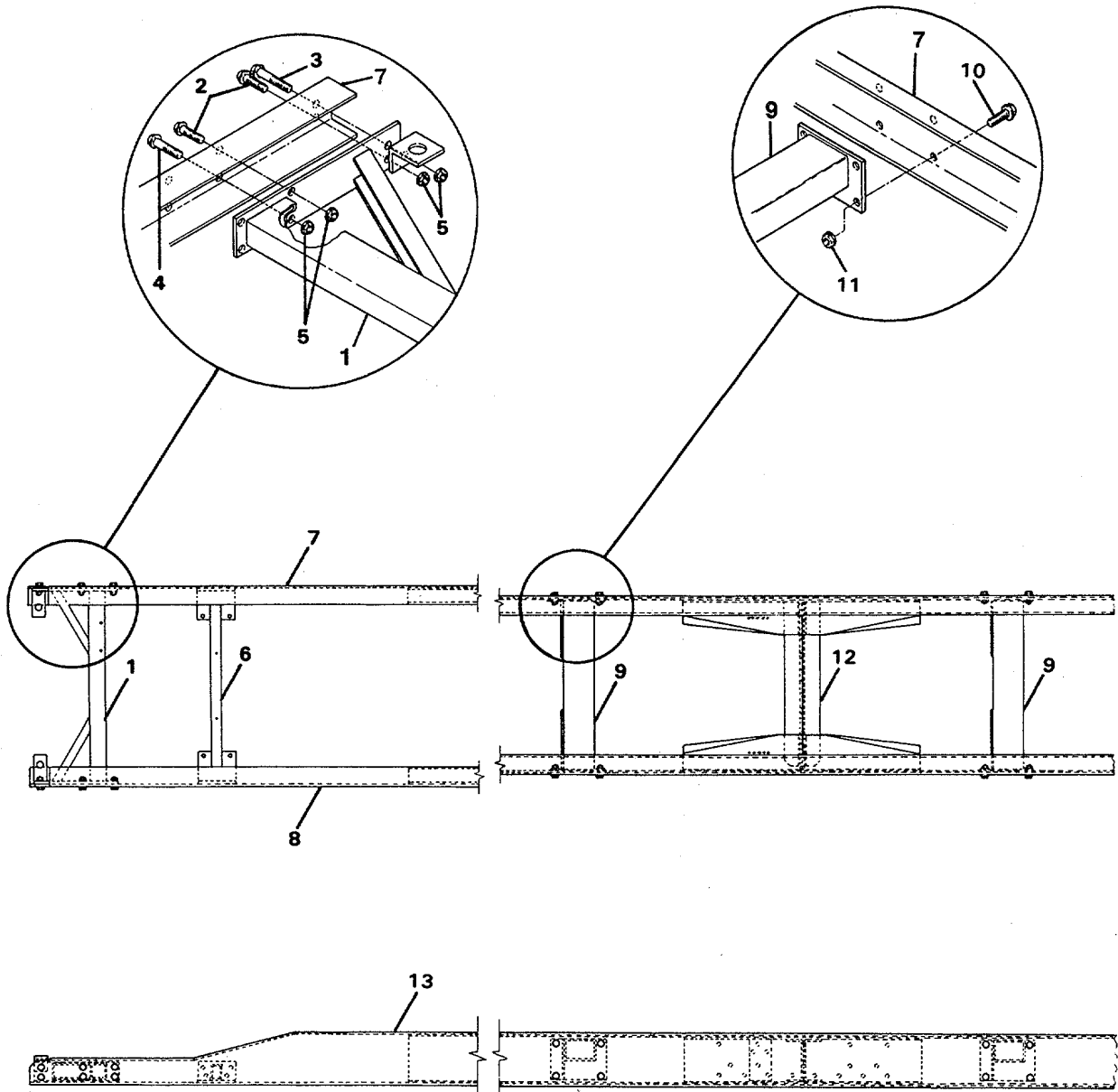


Figure F-168. Frame Assembly

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-168-					FRAME ASSEMBLY	1
-1	04664	40-0841			CROSSMEMBER, Front (ATTACHING PARTS)	1
-2	04664	82-2018-0175			SCREW, Flange Hd, 5/8"-11 x 1-3/4" Lg, Zn, G-8	8
-3	04664	82-2018-0275			SCREW, Flange Hd, 5/8"-11 x 2-3/4" Lg, Zn, G-8	2
-4	04664	82-2018-0225			SCREW, Flange Hd, 5/8"-11 x 2-1/4" Lg, Zn, G-8	2
-5	04664	82-3010			NUT, Flange, 5/8"-11, G-8	12
-6	04664	40-0839			CROSSMEMBER	1
-7	04664	40-2492-004			RAIL, Frame, RH	1
-8	04664	40-2492-003			RAIL, Frame, LH	1
-9	04664	40-0403			CROSSMEMBER, Outer (ATTACHING PARTS)	2
-10	04664	82-2018-0150			SCREW, Flange Hd, 5/8"-11 x 1-1/2" Lg, Zn, G-8	16
-11	04664	82-3010			NUT, Flange Hd, 5/8"-11, G-8	16
-12	04664	40-0400			CROSSMEMBER, Center, (Tandem Axle)	1
-13	04664	40-2499-002			LINER, Frame	2

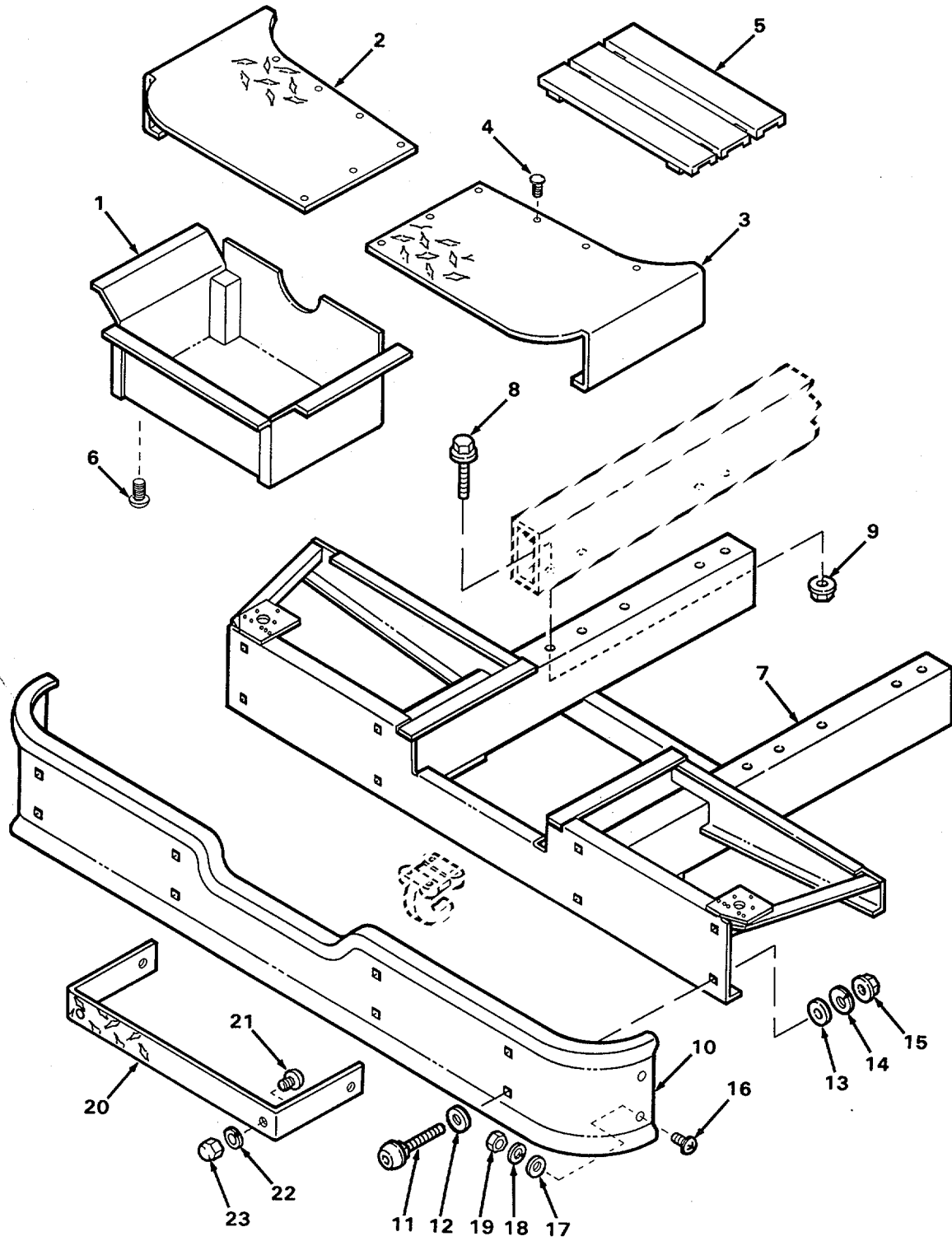


Figure F-169. Front Bumper and Front Frame Extension

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-169-					FRONT BUMPER AND FRONT FRAME EXTENSION	1
-1	04664	44-0537			SUCTION BOX, 10" Extension	1
-2	04664	44-3446-1000			PLATE, Deck, 4-Way (Passenger Side)	1
-3	04664	44-3447-1000			PLATE, Deck, 4-Way (Driver Side)	1
-4	04664	82-2039-002			(ATTACHING PARTS)	
-5	04664	25-0918			SCREW, T410 Ph Pn Hd, Taptite, No. 10-24 x 3/4"	22
-6	04664	82-2039-002			GRATING, Suction box (ATTACHING PARTS)	1
-7	04664	44-1433			SCREW, T410 Ph Pn Hd, Taptite, No. 10-24x3/4"	2
-8	04664	82-2018-0200			EXTENSION, Front Bumper, 10" (ATTACHING PARTS)	1
-9	04664	82-3019-007			BOLT, 5/8"-11 x 2" Lg, Zn	10
-10	04664	44-0632	11714	10563	NUT, Oval Toplock, 5/8"-11, Zn	10
-11	04664	82-2060			BUMPER w/Notch, Stainless Steel (ATTACHING PARTS)	1
-12	04664	82-4017-006			BOLT, 1/2"-13, Stainless Steel	8
-13	04664	82-1013-010			WASHER, Flat, Nylon	8
-14	04664	82-1011-0050			WASHER, Flat, 1/2", Zn	8
-15	04664	82-3015-005			WASHER, Lock, 1/2", Zn	8
-16	04664	82-2034-0100			NUT, Hex, 1/2"-13, Zn	8
-17	04664	82-1013-006			SCREW, Ph Tr Hd, 1/4"-20 x 1, SS	4
-18	04664	82-1011-0025			WASHER, Flat, 1/4", Zn	4
-19	04664	82-3015-001			WASHER, Lock, 1/4", Zn	4
-20	04664	44-2197			NUT, Hex, 1/4"-20, Zri, Gr 8	4
-21	04664	82-2039-001			SCUFFPLATE, Suction Box, 10" (ATTACHING PARTS)	1
-22	04664	82-1012-007			SCREW, T410 Ph Pn Hd, Taptite, No. 10-24 x 1/2"	4
-23	04664	82-3018-003			WASHER, Lock, No. 10, Zn	4
					NUT, Acorn, Crown High, Ch, No. 10-24	4

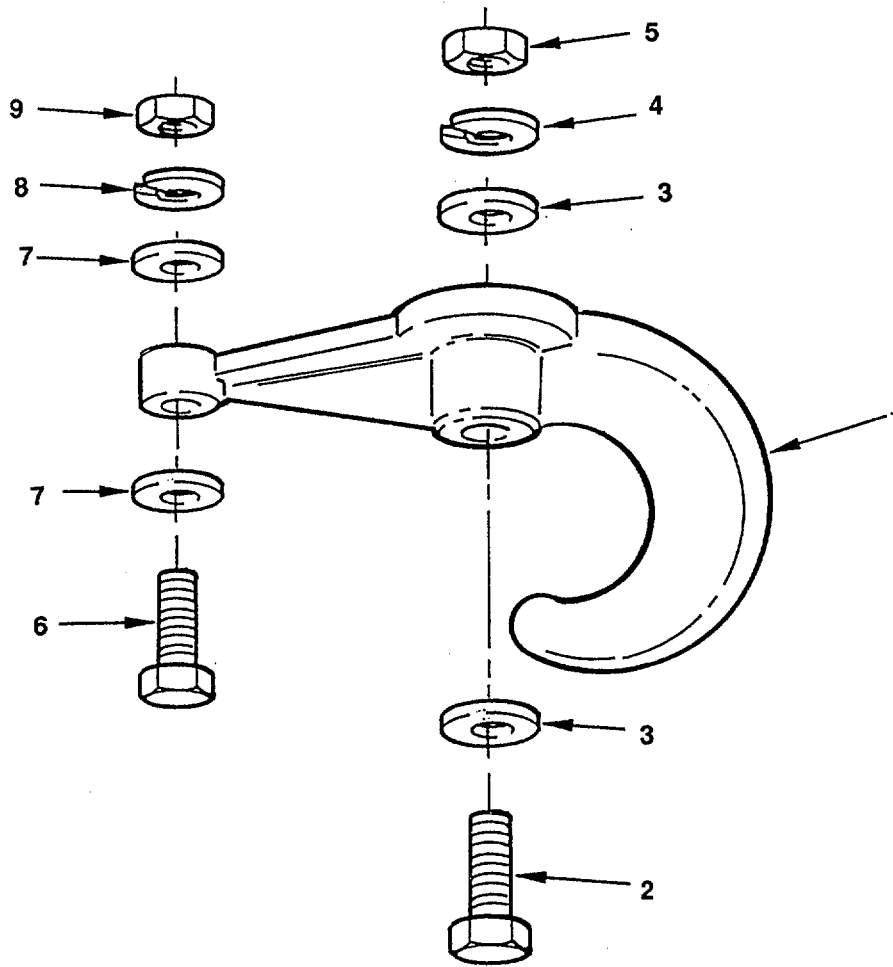


Figure F-170. Tow Hooks

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FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-170-					TOW HOOKS	1
-1	04664	40-1398			HOOK, Tow, Plain, LH	1
-1	04664	40-1399			HOOK, Tow, Plain, RH	1
-2	04664	82-2086-0350			(ATTACHING PARTS)	
-3	04664	82-1008-0075			SCREW, Hex Hd, 3/4"-10 x 3-1/2" Lg, Zn	2
-4	04664	82-1011-0075			WASHER, Structural, 3/4", Zn	4
-5	04664	82-3015-008			WASHER, Lock, 3/4", Zn	
-6	04664	82-2064-0200			NUT, Hex, 3/4"-10, Zn	2
-7	04664	82-1008-0062			SCREW, Hex Hd, 5/8"-10 x 2" Lg, Zn	2
-8	04664	82-1011-0062			WASHER, Structural, 5/8", Zn	2
-9	04664	82-3015-007			WASHER, Lock, 5/8", Zn	4
					NUT, Hex, 5/8"-11, Zn	2
						2

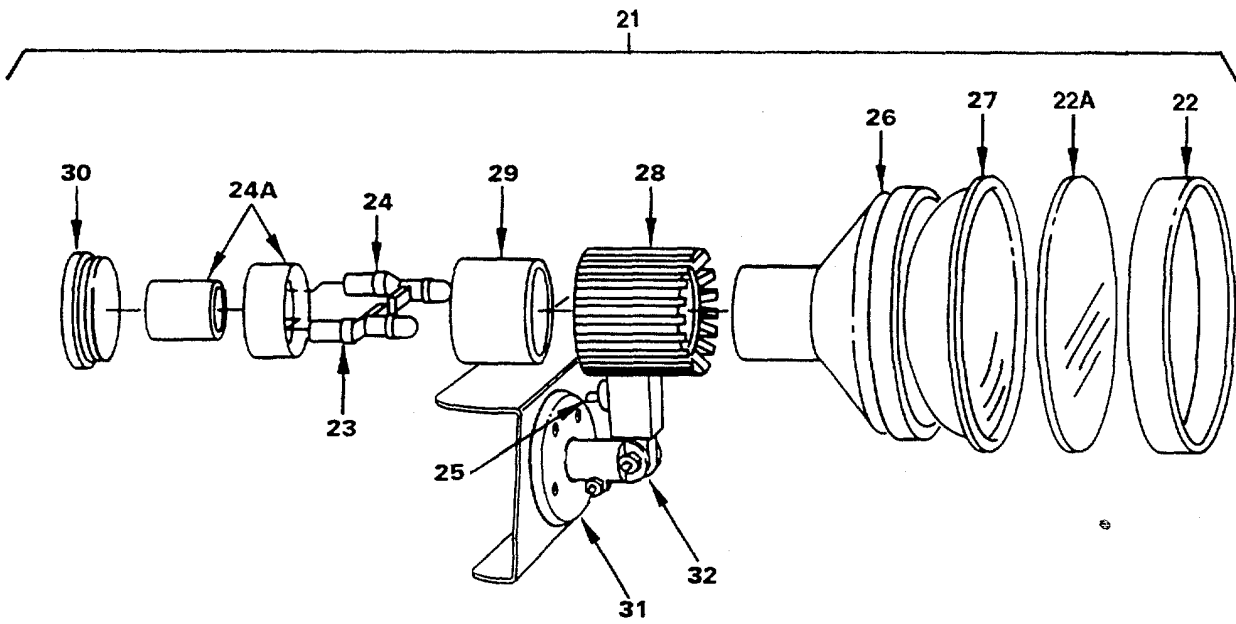
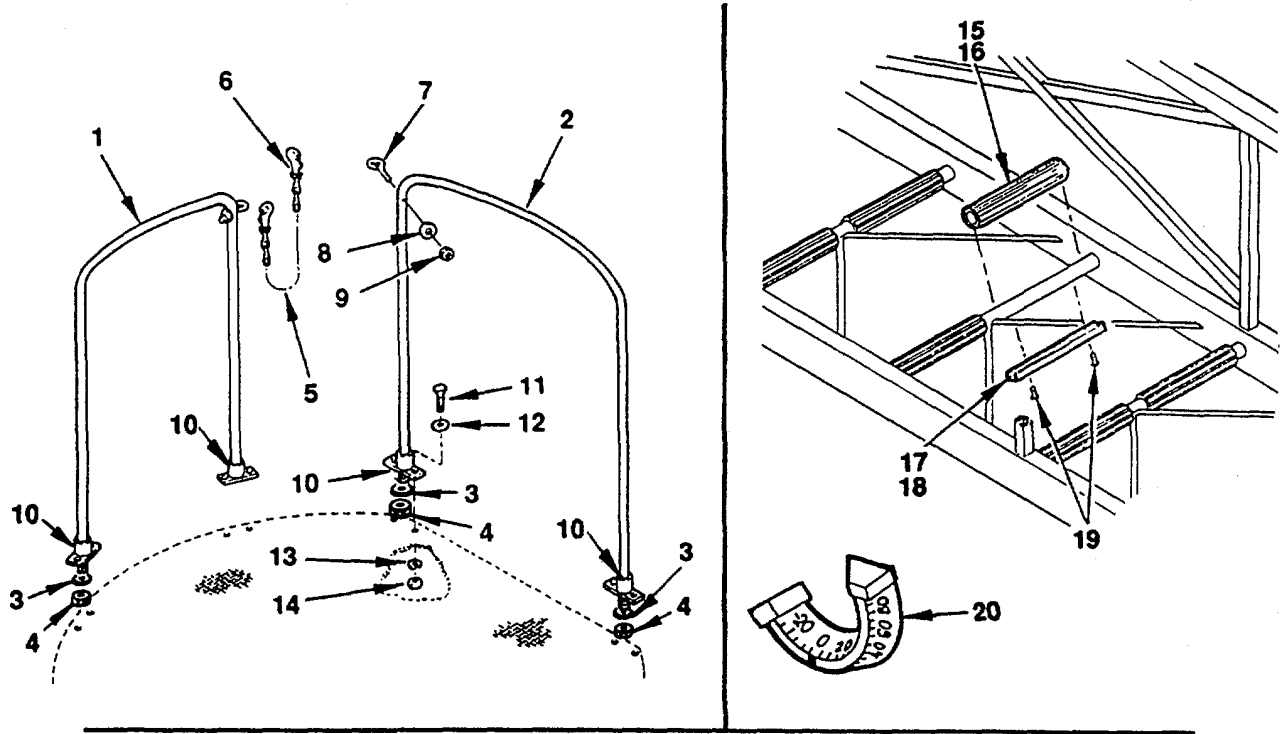


Figure F-171. Aerial Ladder Treads, Safety Railings & Spot Lights

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-171-					AERIAL LADDER TREADS, SAFETY	1
					RAILINGS & SPOT LIGHTS	
-1	04664	10-1200-30			HANDRAIL, Platform, S/S - Left	1
-1	04664	10-1200-31			HANDRAIL, Platform, S/S - Right	1
-2	04664	10-1200-32			HANDRAIL, Platform, S/S - Rear	1
					(ATTACHING PARTS)	
-3	04664	10-1200-2A			WASHER, Flat, 5/8"	6
-4	04664	10-1200-2B			NUT, Hex, 5/8"	6
-5	04664	80-4123			CHAIN, Safety	2
-6	04664	80-3017			SNAP, Open Eye, 1/2"	4
-7	04664	82-0006			BOLT, Eye	4
					(ATTACHING PARTS)	
-8	04664	82-1013-007			WASHER, Flat, 5/16" Zn	4
-9	04664	82-3029-002			NUT, Lock, 5/16" Nylon Inst, Zn	4
-10	04664	10-1200-37			PLATE, Handrail Base	6
					(ATTACHING PARTS)	
-11	04664	10-1200-33			SCREW, Thread Cutting, Type F, 5/8"-11 x 3/4"	12
-12	04664	10-120034			WASHER, Flat, 5/8"	12
-13	04664	10-1200-35			WASHER, Lock, External Tooth, 5/8"	12
-14	04664	10-1200-36			NUT, Hex, 5/8"-11	12
-15	04664	10-100-13			TREAD, Rung, Corrugated Rubber 8-1/2"	168
-16	04664	10-400-5			TREAD, Rung, Corrugated Rubber - 7 (Fly Section)	4
					(ATTACHING PARTS)	
-17	04664	10-100-14			CLIP, Rung Tread, S/S - 8-1/2"	168
-18	04664	100-400-7			CLIP, Rung Tread, S/S - 7" (Fly Section)	4
-19	04664	10-100-15			SCREW, Thread Cutting, No. 10-24 x 3/4"	
-20	04664	70-0167	50926	41206	INDICATOR, Angle, Base Section	1
-21		61-0412	0CVC2	FX-12	LIGHT, Spot/Flood	4
-22			0CVC2	122101	RING, Retaining	1
-22A			0CVC2	120100	LENS	1
-23			0CVC2	6001	BULB, Stem Assy., (Right)	1
-24			0CVC2	6002	BULB, Stem Assy., (Left)	1
-24A			0CVC2	140151	MOUNT, Bulb	2
-25			0CVC2	100005	PLATE, Switch	1
-25			0CVC2	120170	GASKET, Switch	1
-25			0CVC2	250033	BOOT, Switch	1
-25			0CVC2	121097	C-CLIP	1
-25			0CVC2	245088	SWITCH	1
-25			0CVC2	144154	SWITCH BOX	
-25			0CVC2	258039	O-RING	
-25			0CVC2	258043	GROMMET, Switch Box	
-26			0CVC2	144166	HOUSING, Chromed	
-27			0CVC2	145140	REFLECTOR, Metalized	
-27			0CVC2	100088	GASKET, U-Channel	
-28			0CVC2	142138	HEATSINK, Black Anodized	1
-29			0CVC2	121122	SLEEVE	1
-30			0CVC2	258041	SPRING, End Cap	1
-30			0CVC2	258040	O-RING, End Cap	1
-30			0CVC2	122099	CAP, End, Black Anodized	1
-31	04664	10-100-17			PIVOT, Unity	4
-32	04664	10-100-18			BASE, Unity - Round	4

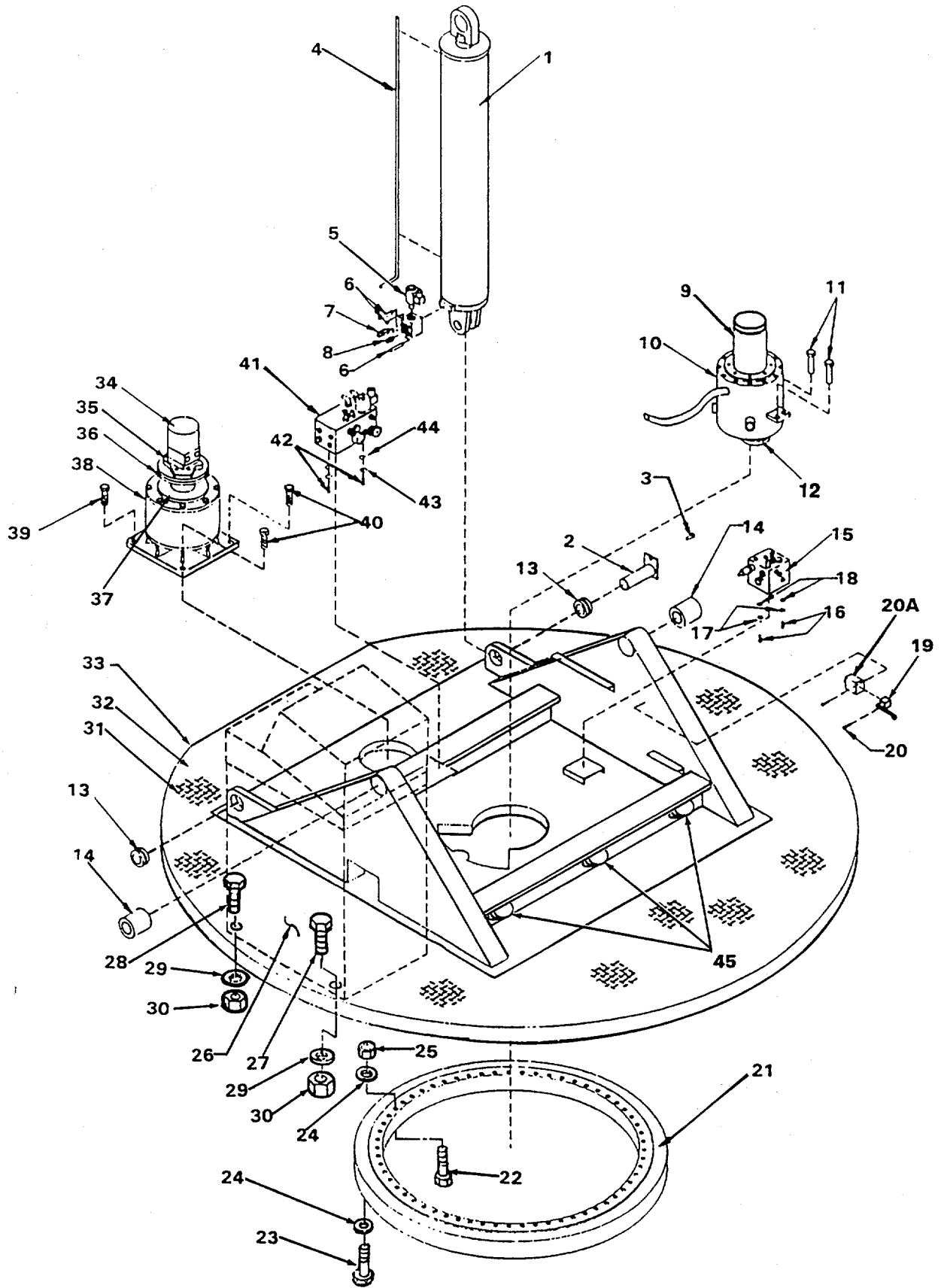


Figure F-172. Aerial Ladder Turntable Assembly

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-172	04664	M10-1200			AERIAL LADDER TURNTABLE ASSEMBLY	1
-1	04664	M10-1200-1			CYLINDER, Hoist (See figure F-173 for details)	2
-2	04664	M10-1200-18			(ATTACHING PARTS)	
-3	04664	M10-1200-17			PIN, Hoist Cylinder	4
-4	04664	M10-1200-2			BOLT, Socket Shoulder, 3/8" x 1", B7 Alloy Steel	4
-5	04664	M10-1200-2	54846	SV3-10-C-0-12DG	TUBE ASSY, Oil	2
-6	04664	M10-1200-4			VALVE, Solenoid	2
-7	04664	M10-1200-4	54846	28110-2	(ATTACHING PARTS)	
-8	04664	M10-1200-4	92003	6400-6	SCREW, Cap, Socket Hd, 5/16" x 2-1/2"	6
-9	04664	M10-1200-7			FUSE, Hy-Comp Velocity	2
-10	04664	M10-1200-7	34687	03-005-007	FITTING, 90° No. 6 M. SAE - No. 6 M. JIC	2
-11	04664	M10-1200-9			ADAPTER, Swivel to Joint	1
-12	04664	M10-1200-10			SWIVEL, Hydromatation	1
-13	04664	M10-1200-10	9E485	155F24-TT	(ATTACHING PARTS)	
-14	04664	M10-1200-20			BOLT, Hex Hd, 3/4"-10 x 2"	4
-15	04664	M10-1210			ADAPTER, Swivel	1
-16	04664	M10-1200-26			BEARING, Torrington	4
-17	04664	M10-1200-29			BUSHING, Pivot	2
-18	04664	M10-1200-28			BLOCK ASSY, Manifold, Swing Crossover	
-19	04664	M10-1200-22			Relief (See figure F-1 74 for details)	1
-20	04664	M10-1200-27			(ATTACHING PARTS)	
-20A	04664	M10-1200-26			SCREW, Cap, Hex Hd, 5/16"-18 x 1/2"	2
-20A	04664	M10-1200-29			WASHER, Lock, Internal Tooth, 5/16"	2
-20A	04664	M10-1200-28			WASHER, Fat, 5/16"	2
-20A	04664	M10-1200-22			SWITCH, Limit	1
-21	04664	M10-1200-27	OE252	ZCK-L1	(ATTACHING PARTS)	
-21	04664	M10-1200-27	OE252	XES-P2051	SCREW, Ph Tr Hd, 3/16", w/Washer	2
-21	04664	M10-1200-27	OE252	ZCK-G00	BODY, Switch	1
-21	04664	M10-1200-27	OE252	ZCK-Y41	BLOCK, Contact	1
-21	04664	M10-1200-27	28666	AS39E5A	HEAD, Switch	1
-21	04664	M10-1200-27	28666	AS39E5A	LEVER, Switch	1
-21	04664	M10-1200-27	28666	AS39E5A	BEARING, Turntable	1
-22	04664	M10-1200-30			(ATTACHING PARTS)	
-23	04664	M10-1200-31			BOLT, Hex Hd, 5/8"-11 x 5", Gr 8	40
-24	04664	M10-1200-33			BOLT, Hex Hd, 5/8"-11 x 2, Gr 8	60
-25	04664	M10-1200-32			WASHER, A325 Structural, 5/8"	100
-26	04664	M10-1400			NUT, Hex, 5/8"-11, Gr 8	40
-27	04664	82-2031-0225			STATION, Turntable Control	
-28	04664	82-2031-0250			(See figure F-175 for details)	1
-29	04664	82-1010-011			(ATTACHING PARTS)	
-30	04664	82-3015-003			SCREW, Hex Hd, 3/8"-16 x 2-1/4", Zn, G-8	2
-31	04664	M10-1200-34			SCREW, Hex Hd, 3/8"-16 x 2-1/2", Zn, G-8	2
-31	04664	M10-1200-35			WASHER, Lock, Internal Tooth, 3/8", Zn	4
-31	04664	M10-1200-36			NUT, Hex, 3/8"-16, Zn, G-8	4
-32	04664	82-2039-00			COVER, 4-Way, Circular	1
-33	04664	M10-1200-23			COVER, 4-Way, Upper Center	1
-33	04664	M10-1200-23			COVER, 4-Way, Lower Center	1
-33	04664	M10-1200-23			(ATTACHING PARTS)	
-33	04664	M10-1200-23			SCREW, T410 Ph Pn Hd, Taptite, No. 10-24 x 1/2"	48
-33	04664	M10-1200-23			TURNTABLE	1

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-172-						
-34			96151	101 -1077-007	MOTOR, Hydraulic (See figure F-178 for details) (ATTACHING PARTS)	1
-35	04664	82-2033-0100			SCREW, Hex Hd, 1/2"-13 x 1", Zn, G-8	2
-36			62854	90-002-0333	BRAKE, Swing (See figure F-179 for details) (ATTACHING PARTS)	1
-37	04664	M10-1200-37			SCREW, 12 pt Hd, 1/2"-13 x 1", G-8	2
-38			62854	Model 240H	REDUCER, Speed (See figure F-180 for details) (ATTACHING PARTS)	1
-39	04664	M10-1200-15			SCREW, Hex Hd, 5/8"-11 x 1-1/2"	2
-40	04664	M10-1200-16			SCREW, Hex Hd, 3/4"-10 x 2"	2
-41	04664	M10-1205			BLOCK ASSY, Manifold, Hoist (See figure F-181 for details) (ATTACHING PARTS)	1
-42	04664	M10-1200-26			SCREW, Cap, Hex Hd, 5/16"-18 x 1/2"	2
-43	04664	M10-1200-38			WASHER, Lock, 5/16"	2
-44	04664	M10-1200-28			WASHER, Flat, 5/16"	2
-45	04664	60-0615	4L810	96196-79	LIGHT ASSY, Step/Work, w/Gasket	3

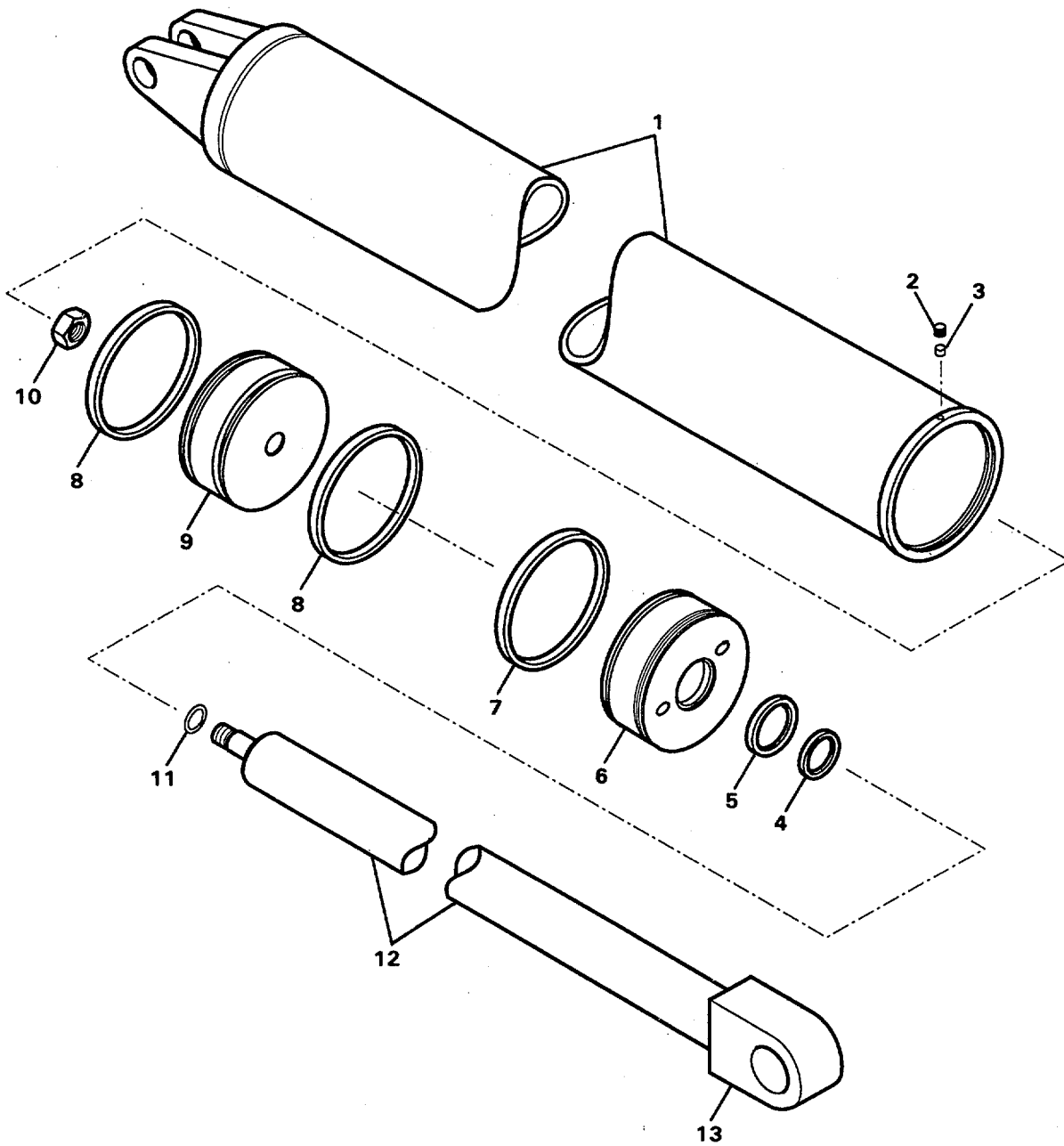


Figure F-173. Hoist Cylinder

F-446

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-173-	04664	M10-1200-1			HOIST CYLIND REF	
					(See figure F-172 for NHA)	
-1	04664	M10-1200-1-3			TUBE ASSY	1
-2	04664	M10-1200-1-5			SETSCREW, Hex Socket, 1/4"-20 x 1/4"	1
-3	04664	M10-1200-1-6			PLUG, Nylon	1
-4			92003	959-25*	SEAL, Wiper	1
-5			92003	2500-2500-375B*	SEAL, Rod	1
-6			29260	082300182	GLAND	1
-7			92003	2-358*	O-RING, Gland	1
-8			92003	3750-5250*	SEAL, Piston - Poly Pak	2
-9			29260	072300157	PISTON	1
-10	04664	M10-1200-1-7			NUT	1
-11			92003	2-214*	O-RING, Rod	2
-12			29260	011300327	ROD	1
-13	04664	M10-1200-1-8			ROD LUG	1
	04664	M10-1200-1-14			KIT, Seal (Includes items marked *)	1

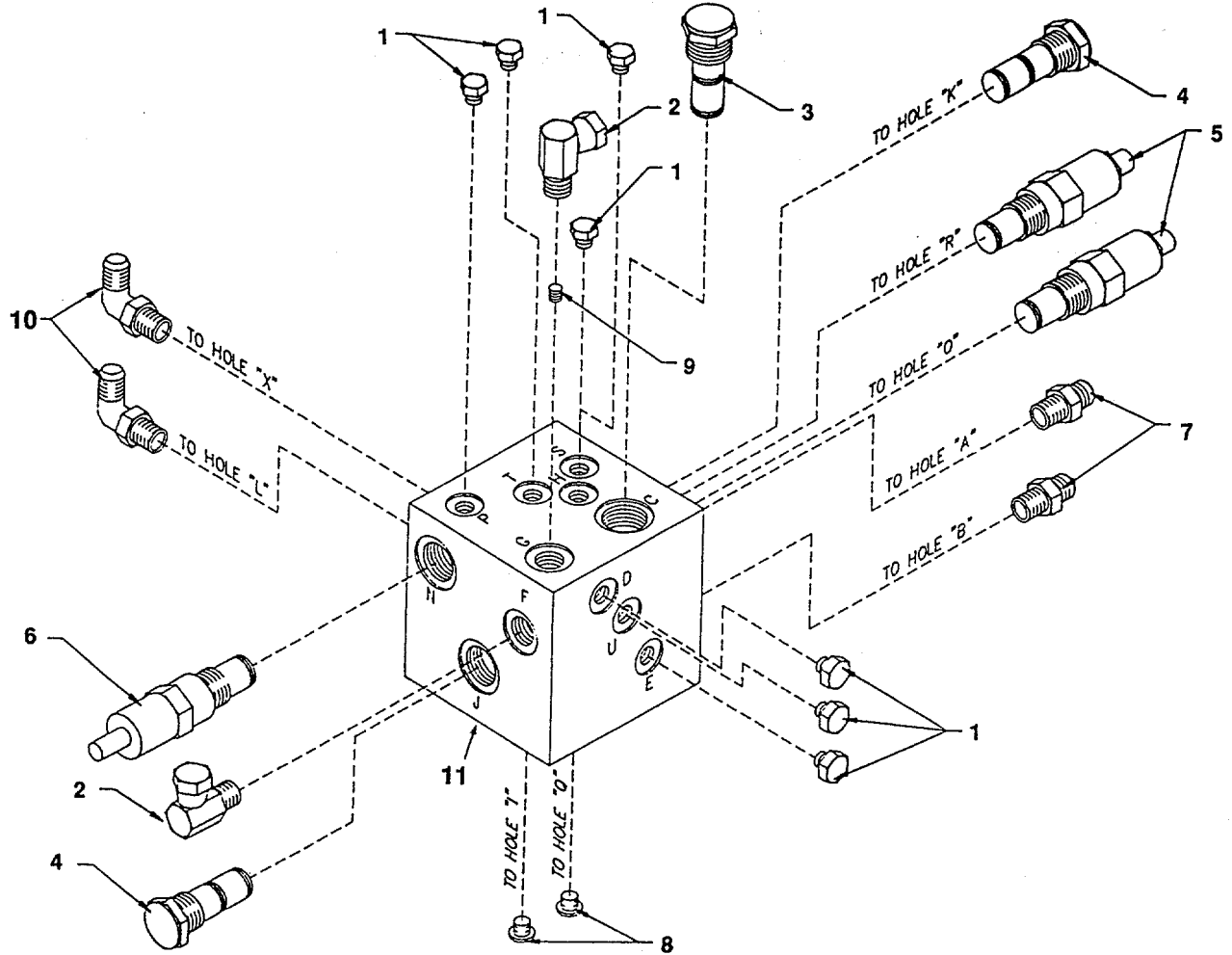


Figure F-174. Swing Crossover Relief Manifold Block Assembly

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-174-	04664	M10-1210			SWING CROSSOVER RELIEF MANIFOLD	REF
-1			92003	6408-3	BLOCK ASSY (See figure F-172 for NHA) PLUG, Hex, No. 3 SAE	7
-2	04664	M10-1210-2			FITTING, 90°, No. 6M.SAE - No. 6F.NPT	2
-3			54846	DV1-10-B-0	VALVE, Shuttle	1
-3			54846	SK-10-3	KIT, Seal (Buna "N")	1
-3			54846	SK-10V-3	KIT, Seal (Viton)	1
-4			54846	SPC2-10-P-0-25	VALVE, Check, Single Pilot	2
-4			54846	SK-10-3	KIT, Seal (Buna "N")	1
-4			54846	SK-10V-3	KIT, Seal (Viton)	1
-5			54846	RV3-10-S-0-36-2100 .	VALVE, Relief, 2100 psi	2
-5			54846	SK-10-2	KIT, Seal (Buna "N")	1
-5			54846	SK-10V-2	KIT, Seal (Viton)	1
-6			54846	RV3-10-S-036-2400	VALVE, Relief, 2400 psi	1
-6			54846	SK-10-2	KIT, Seal (Buna "N")	1
-6			54846	SK-10V-2	KIT, Seal (Viton)	1
-7			92003	6400-6	ADAPTER, No. 6 M.SAE to No. 6M.JIC	2
-8			92003	6408-HHP-3	PLUG, Hollow Hex, No. 3	2
-9			92003	5604-HHP-2	PLUG, Pipe, 1/8" NPT w/.030" Dia. Restrictor	1
-10	04664	M10-1210-3			FITTING, Elbow, 90°	2
-11	04664	M10-1210-1			BLOCK, Swing Crossover Relief Manifold	1

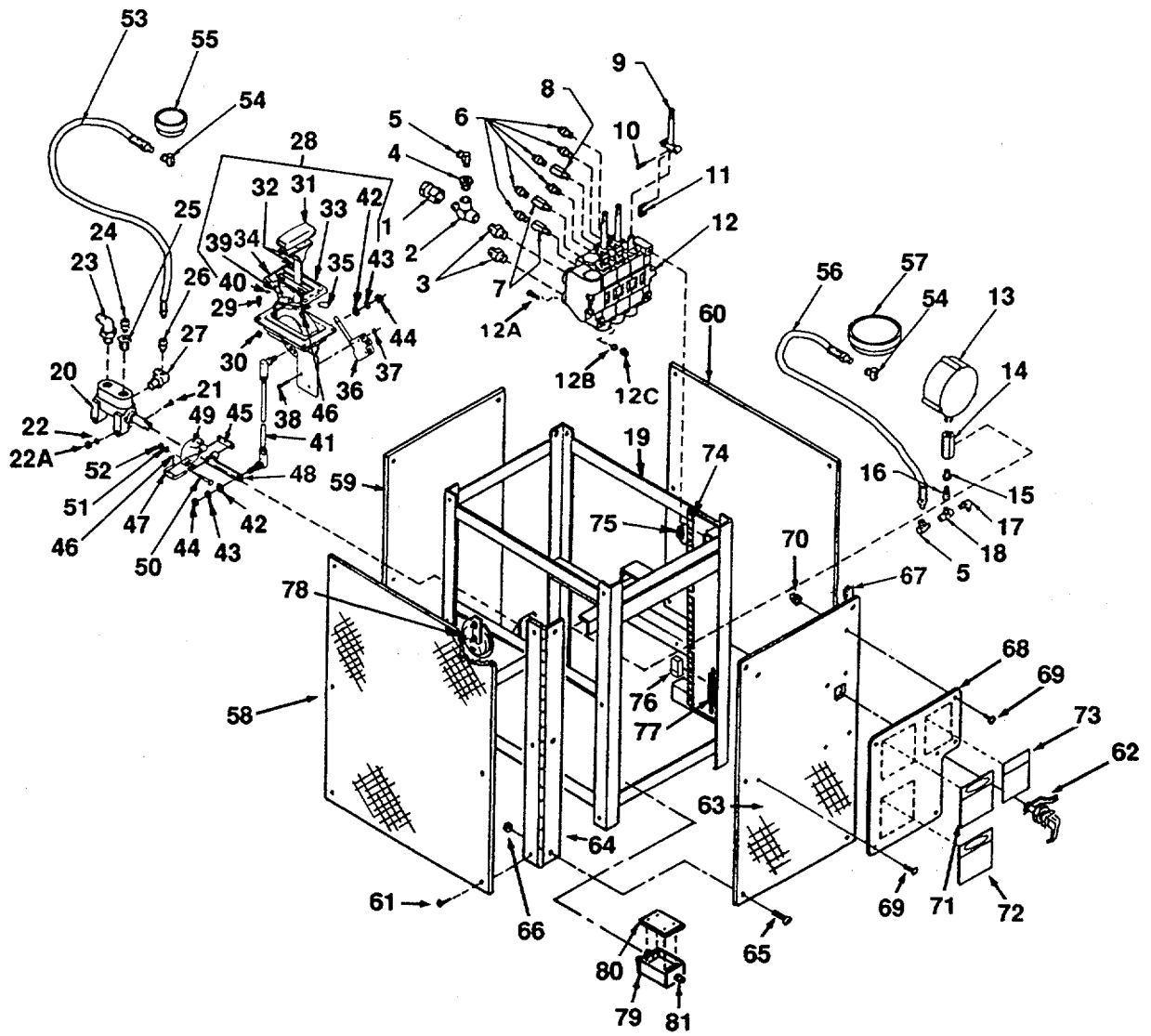


Figure F-175. Turntable Control Station

F-450

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-175	04664	M10-1400			TURNTABLE CONTROL STATION	REF
-1			92003	1405-12-12	(See figure F-172 for NHA) FITTING, Straight, Swivel, 3/4" F.-3/4" F.NPT	1
-2			92003	5602-12-12	FITTING, Tee, Male Run, 3/4" M.3/4" F. to 3/4"F.	1
-3			92003	5404-12-12	FITTING, Straight, 3/4" M.NPT to 3/4" M.NPT	2
-4			92003	5406-12-4	BUSHING, Reducing, 3/4"M. to 1/4"F.NPT	2
-5			92003	6901-6	FITTING, 900, Swivel, 1/4"M.NPT to 1/4"F.NPT	2
-6			92003	6400-8	FITTING, Union, No. 8 M.SAE - 8 F.JIC	6
-7			0B8K7	LT50-9	VALVE, Restrictor (Color Code Red)	2
-8			0B8K7	LT50-18B	VALVE, Restrictor (Color Code Black)	1
-9	04664	M10-1400-9			HANDLE, Valve (ATTACHING PARTS)	3
-10	04664	M10-1400-10			PIN, Handle to Valve	3
-11	04664	M10-1400-11			LINKAGE, Handle to Valve	3
-12			02249	V-20P-3	VALVE ASSY, Directional Control (See figure F-176 for NHA) (ATTACHING PARTS)	1
-12A	04664	M10-1400-52			SCREW, Cap, Hex Hd, 5/16"-18 x 2-1/4"	2
-12B	04664	M10-1400-53			WASHER, Lock, Internal Tooth, 5/16"	2
-12C	04664	M10-1400-54			NUT, Hex, 5/16"-18	2
-13			03479	OPL-FC3000	GAUGE, Pressure Sensor	1
-14			92003	5000-8	COUPLER, 1/2"	1
-15			92003	5406-8-6	BUSHING, Reducing, 1/2" M.NPT to 3/8" F.NPT	1
-16			0B8K7	602	SNUBBER, w/10 Micron Restrictor	1
-17	04664	M10-1400-17			FITTING, 90°, No. 6 M.NPT - No. 6 M.JIC	1
-18			92003	5604-4	FITTING, Tee, Male Branch, 1/4" NPT	1
-19	04664	M10-1400-19			STAND, Turntable Control Station	1
-20			02249	S-75	VALVE, Run-Lock Selector (See figure F-177 for details) (ATTACHING PARTS)	1
-21	04664	M10-1400-55			SCREW, Cap, Hex Hd, 5/16"-18 x 1-1/2"	2
-22	04664	M10-1400-56			WASHER, Lock, Internal Tooth, 5/16"	2
-22A	04664	M10-1400-57			NUT, Hex, 5/16"-18	2
-23			92003	5500-12	FITTING, 90°, No. 12 M.JIC - 3/4" M.NPT	1
-24			92003	1404-4-4	FITTING, Straight, Swivel, 1/4" M.NPT - 1/4" F.NPT	1
-25			92003	5406-12-4	BUSHING, Reducing, 3/4" M.NPT to 1/4" F.NPT	1
-26			92003	1404-4-4	FITTING, Straight, Swivel, 1/4" M.NPT - 1/4" F.NPT	1
-27	04664	M10-1400-27			FITTING, 90°, 3/4" M.NPT - No. 12 M.JIC w/1/4" F.NPT Tap	1
-28	04664	M10-1400-28	60602	055447	HANDLE ASSY, T, Lock-Run Control (ATTACHING PARTS)	1
-29	04664	M10-1400-41			SCREW, Ph Hd	4
-30	04664	M10-1400-42			NUT, Hex	4
-31			60602	59228	KIT, Cover, Knob (Includes Screw, Nut, Support, and Insert)	1
-32			60602	59193	KIT, Finger (Includes Roll Pin)	1
-33			60602	59139	KIT, Cover Plate/Seal (Includes Screws)	1
-34					SCREW, Machine (NSS)	4
-35			1P787	10N144	BULB, 12VDC	1

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-175-36			6J488	BZ-2RW80-A2	SWITCH, Micro (ATTACHING PARTS)	1
-37	04664	M10-1400-58			NUT, Hex	2
-38	04664	M10-1400-59			SCREW, Machine	2
-39			83783	44F1326	HOUSING, Light Socket (ATTACHING PARTS)	1
-40	04664	M10-1400-43			SCREW, Self-Tapping	2
-41	04664	M10-1400-20			ROD ASSY, Lock-Run Control (ATTACHING PARTS)	1
-42	04664	M10-1400-44			WASHER, Flat	2
-43	04664	M10-1400-45			WASHER, Lock, Int. Tooth	2
-44	04664	M10-1400-46			NUT, Hex	2
-45	04664	M10-1400-47			STRAP (ATTACHING PARTS)	1
-46	04664	M10-1400-48			PIN, Cotter	2
-47	04664	M10-1400-10			PIN, Connector	1
-48	04664	M10-1400-21			LEVER, Actuating, Selector Valve	1
-49	04664	M10-1400-48			FLANGE, Pivot Selector Valve Actuator (ATTACHING PARTS)	1
-50	04664	M10-1400-49			SCREW, Hex Hd	2
-51	04664	M10-1400-50			WASHER, Lock, Internal Tooth	2
-52	04664	M10-1400-51			NUT, Hex	2
-53	04664	M10-1400-29			HOSE ASSY, Hydraulic, 1/4"	1
-54			92003	1502-4-4	FITTING, 900, Swivel, 1/4"F.NPT - 1/4"F.NPT	2
-55			57273	LFP224	GAUGE, System Pressure	1
-56	04664	M10-1400-32			HOSE ASSY, Hydraulic, 1/4"	1
-57			57273	LFP414	GAUGE, Ladder Load	1
-58	04664	M10-1400-34			COVER, Left Side, 4-Way	1
-59	04664	M10-1400-35			COVER, Back, 4-Way	1
-60	04664	M10-1400-36			COVER, Right Side, 4-Way (ATTACHING PARTS)	1
-61	04664	82-2039-002			SCREW, T410 Ph Pn Hd, Taptite, No. 10-24 x 3/4"	15
-62	04664	80-3002	6M181	62-10-103-10	LATCH, Lift and Turn, Straight	1
-63	04664	M10-1400-37			DOOR, Control Stand	1
-64	04664	M10-1400-38			HINGE (ATTACHING PARTS)	1
-65	04664	82-2039-002			SCREW, T410 Ph Pn Hd, Taptite, No 10-24 x 3/4"	6
-66	04664	M10-1400-60			NUT, Lock, Nylon Insert, No. 10-24, Zn	3
-67	04664	M10-1400-39			TAPE, Sponge	AR
-68	04664	M10-1400-40			PLATE, Tag Mounting (ATTACHING PARTS)	1
-69	04664	82-2039-002			SCREW, T410 Ph Pn Hd, Taptite, No. 10-24 x 3/4"	6
-70	04664	82-3018-003			NUT, Acorn, Crown High, No. 10-24, Ch	6
-71	04664	91-0115-004			TAG, Danger, Must Not Operate Unless	1
-72	04664	91-0115-002			TAG, Danger, Electrocutation Hazard	1
-73	04664	91-0115-003			TAG, Caution, Inspection	1
-74			83783	65F1191	BOARD, Terminal	3

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-175-						
-75			31211	MR751	DIODE	1
-76	04664	64-0803-001			FUSE, 1 AMP	1
-77	04664	64-1292			FUSEHOLDER	1
-78			7E570	14VA5596W	HORN, Warning	1
-79			89963	BWF-BL5	BOX, Outlet, 3-Hole Cable Gang	1
-80			89963	FSBC	COVER, Outlet Box	1
-81			89963	SR-504	CONNECTION, Strain Relief	3
NOTE: NSS parts are not serviced separately but must be purchased as part of their NHA.						

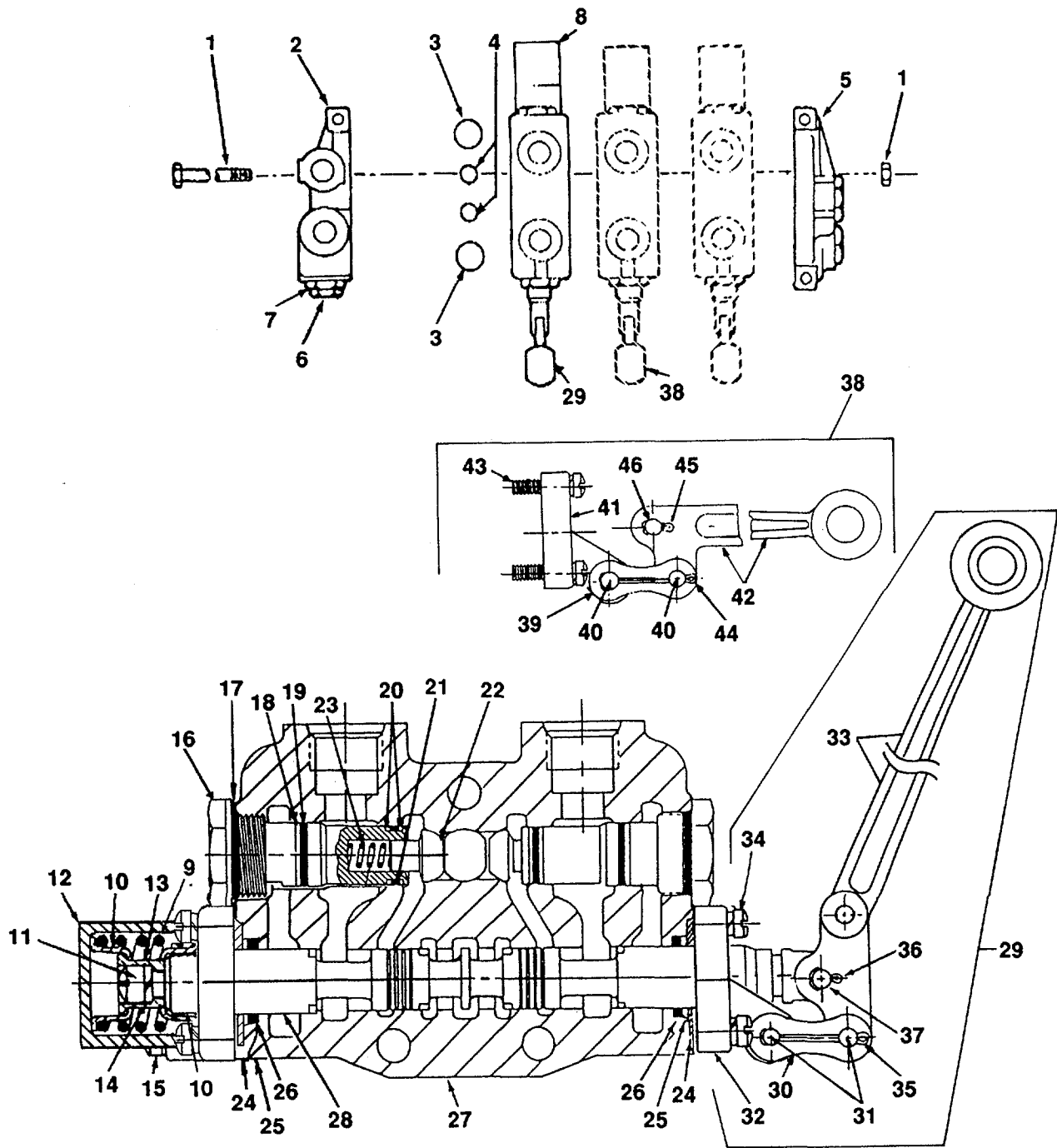


Figure F-176. Outrigger and Ladder Directional Control Valve Assemblies

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-176-			02249	V20P-2H & -2V	OUTRIGGER DIRECTIONAL CONTROL VALVE ASSEMBLIES (See figure F-192 for NHA)	REF
			02249	V20P-3	LADDER DIRECTIONAL CONTROL VALVE ASSEMBLY (See figure F-175 for NHA)	REF
-1			02249	K-6105-A	KIT, Stud (V20P-2H and V20P-2V)	1
-1			02249	K-6106-A	KIT, Stud (V20P-3)	1
-2			02249	8398	COVER ASSY, Left	1
-3			02249	6815-001	O-RING, Exhaust, Large - Buna "N" (V20P-3)	8
-3			02249	6815-001	O-RING, Exhaust, Large - Buna "N" (V20P-2H & -2V)	6
-3			02249	7450-001	O-RING, Pressure, Large - Viton	6/8
-4			02249	6814-001	O-RING, Pressure, Small - Buna "N" (V20P-3)	8
-4			02249	6814-001	O-RING, Pressure, Small - Buna "N" (V20P-2H & -2V)	6
-4			02249	7451-001	O-RING, Pressure, Small - Viton	6/8
-5			02249	6770	COVER ASSY, Right	1
			02249	K-6132	PLUG ASSY., Main Relief	1
-6			02249	6760-001	PLUG, Relief	1
-7			02249	K-28062	KIT, Seal	1
-8			02249	8072	VALVE SECTION, 4-Way, 3-Posibon (V20P-2H & -2V)	2
-8			02249	8072	VALVE SECTION, 4Way, 3-Position (V20P4)	3
			02249	K-6125	POSITIONER ASSY, Spool	1
-9			02249	7433-001	SPRING, Return	1
-10			02249	1809-001	COLLAR, Spring	2
-11			02249	1812-001	SCREW, Fill Hd, 5/16"-18 x 3/4"	1
-12			02249	1811-001	BONNET	1
-13			02249	1810-001	COLLAR, Spool	1
-14			02249	1813-001	WASHER, Lock	1
-15			02249	1808-001	SCREW, Fill Hd, 1/4"-20 x 7/8", w/Lock Washer	2
			02249	K-6030-A	PLUG ASSY, Load, Check	2
-16			02249	3411 -001	PLUG, Load, Check	1
-17			02249	2707-001*	SEAL, O-Ring - Buna "N" (NSS)	1
-17			02249	7448-001 *	SEAL, O-Ring - Viton (NSS)	1
-18			02249	1821 -001 *	WASHER, Back-Up, Outer (NSS)	1
-19			02249	1819-001 *	SEAL, O-Ring, Outer - Buna "N" (NSS)	1
-19			02249	7445-001 *	SEAL, O-Ring, Outer - Viton (NSS)	1
-20			02249	1820-001 *	WASHER, Back-Up, Inner (NSS)	2
-21			02249	1818-001*	SEAL, O-Ring - Buna "N" (NSS)	1
-21			02249	7444-001 *	SEAL, O-Ring - Viton	2
-22			02249	2781-001	POPPET, Lift Check	1
-23			02249	1868-001	SPRING, Lift Check	1
-24			02249	6752-001	RETAINER, Plate Washer	2
-25			02249	3265-001 *	WASHER, Back-Up (NSS)	2
-26			02249	7700-001 *	SEAL, O-Ring - Buna "N" (NSS)	2
-26			02249	7449-001 *	SEAL, O-Ring - Viton	2
-27			02249	8072	HOUSING (NSS)	1
-28			02249	8084-001	SPOOL, 4-Way (NSS)	1
-29			02249	K-6004-A	HANDLE ASSY, Vertical (V20P-2V)	2
-30			02249	3453-001	PLATE, Link	1
-31			02249	3453-001-P	PIN, Link Plate	2
-32			02249	1801-001	BRACKET	1
-33			02249	1802-001	HANDLE, Vertical	1
-34			02249	1808-001	SCREW, Fill Hd, 1/4"-20 x 7/8", w/Lock Washer	2

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-176-						
-35			02249	0929-001	PIN, Cotter	1
-36			02249	0086-001	PIN, Cotter	1
-37			02249	1857-001	PIN	1
-38			02249	K-6007-A	HANDLE ASSY, Horizontal (V20P-2H)	2
-39			02249	3453-001	PLATE, Link	1
-40			02249	3453-001 -P	PIN, Link Plate	2
-41			02249	1801-001	BRACKET	1
-42			02249	3249-001	HANDLE, Horizontal	1
-43			02249	1808-001	SCREW, Fill Hd, 1/4"-20 x 7/8" w/Look Washer	2
-44			02249	0929-001	PIN, Cotter	1
-45			02249	0086-001	PIN, Cotter	1
-46			02249	1857-001	PIN	1
			02249	K-6032	KIT, Seal - Buna "N" (Includes all items marked *)	1
			02249	K-6041	KIT, Seal - Viton (Includes all items marked *)	1
NOTE: NSS parts are not serviced separately but must be ordered as part of their NHA						

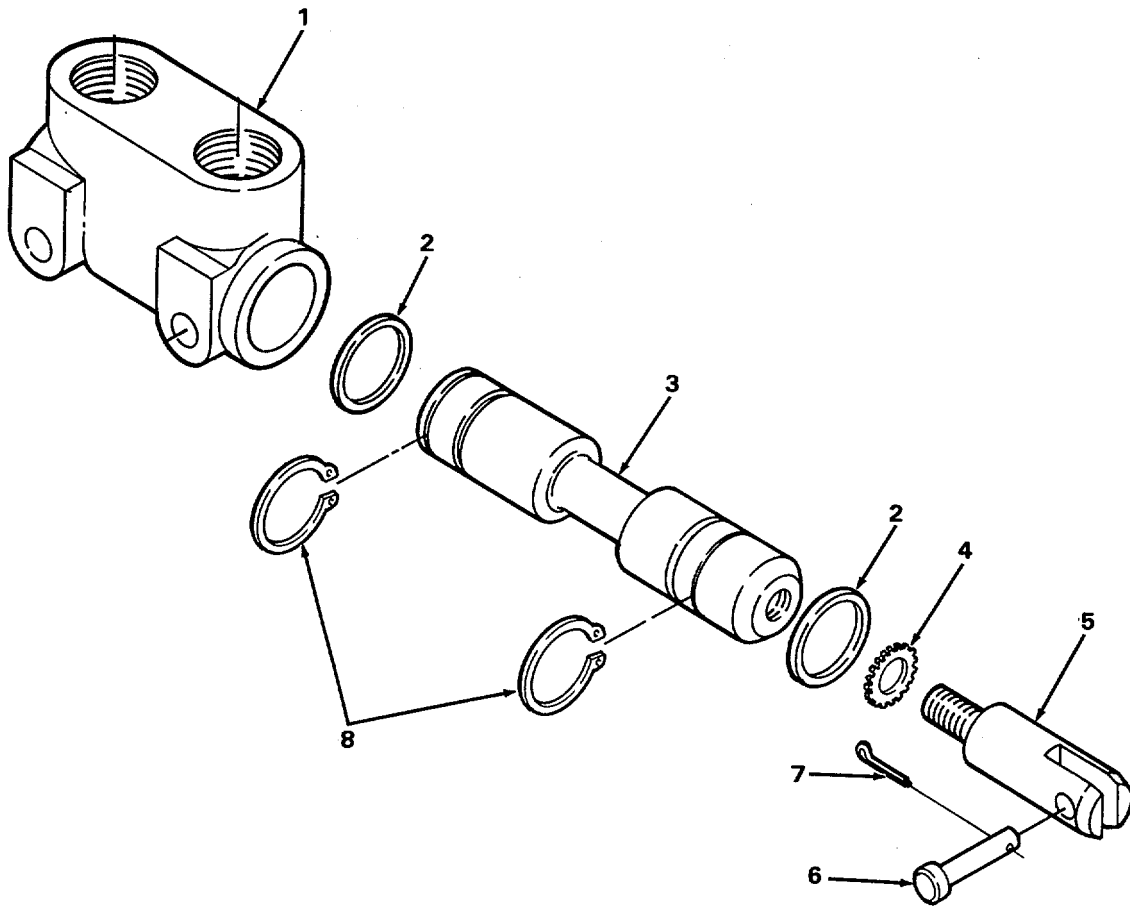


Figure F-177. Run-Lock Selector Valve

F-458

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-177-			02249	S-75	RUN-LOCK SELECTOR VALVE (See figure F-175 for NHA)	REF
-1			02249	1120-001	HOUSING, Valve (NSS)	1
-2			02249	7700-001*	SEAL, Spool	2
-3			02249	1130-001	SPOOL, Valve (NSS)	1
-4			02249	603-001**	WASHER, Lock	1
-5			02249	1478-001**	ADAPTER, Handle	1
-6			02249	085-001	PIN, Handle (ATTACHING PARTS)	1
-7			02249	086-001	PIN, Cotter	1
-8			02249	1127-001*	RING, Retaining	2
			02249	K-1 4001	KIT, Seal (Includes items marked *)	1
			02249	K-13003	KIT, Clevis Adapter (Includes items marked **)	1

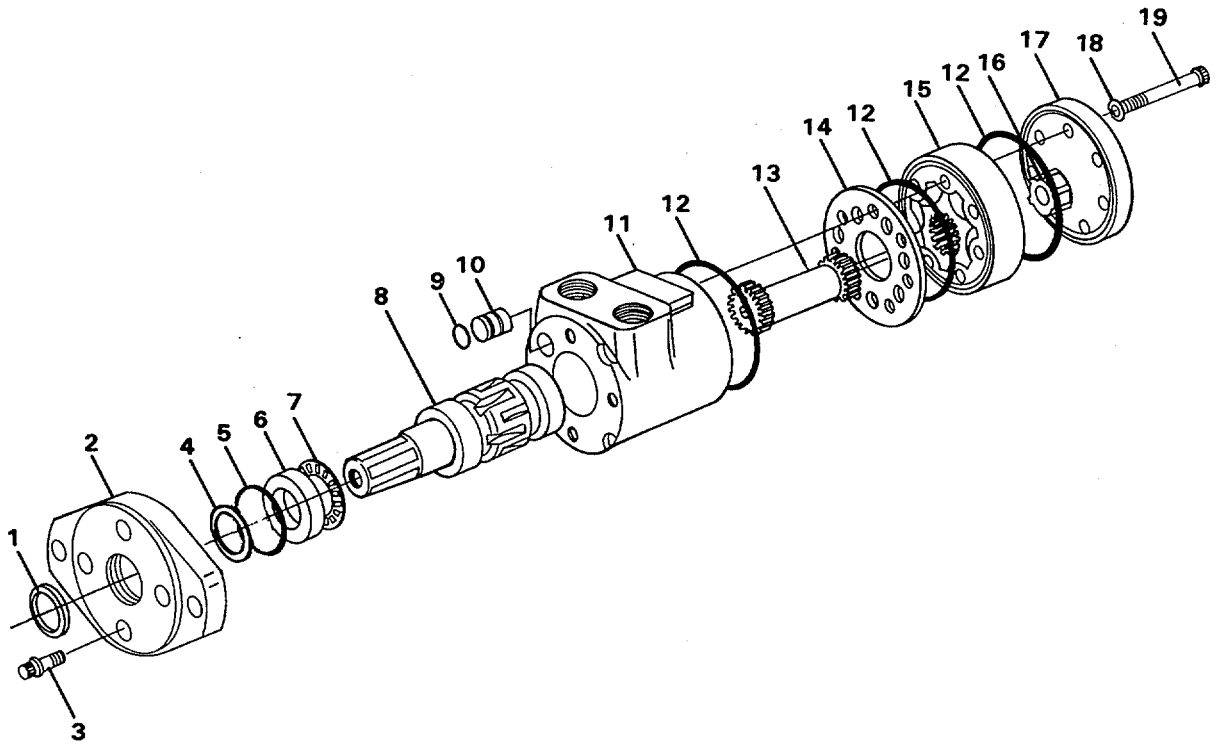


Figure F-178. Hydraulic Motor

F-460

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-178-			96151	101-1077-007	HYDRAULIC MOTOR (See figure F-172 for NHA)	REF
-1			96151	9121-2*	SEAL, Dust	1
-2			96151	7463	FLANGE, Mounting (ATTACHING PARTS)	1
-3			96151	5777	SCREW, 12 Pt, 5/16"-24x7/8"	4
-4			96151	9057-1*	SEAL, Shaft Pressure	1
-5			96151	909-1	SEAL	1
-6			96151	7462	RACE, Bearing	1
-7			96151	7537	BEARING, Thrust Needle	1
-8			96151	7360-2	SHAFT, Output	1
-9			96151	15007*	O-RING	1
-10			96151	8985	PLUG	1
-11			96151	7359-2	HOUSING	1
-12			96151	9086-2*	SEAL	3
-13			96151	616	DRIVE	1
-14			96151	7358	PLATE, Spacer	1
-15			96151	8277-5	GEROTER SET	1
-16			96151	6901-3	SPACER	1
-17			96151	7461	CAP, End (ATTACHING PARTS)	1
-18			96151	6049*	WASHER, Seal	7
-19			96151	5389-5	SCREW, 12Pt,5/16"-24x2-1/4"	7
			96151	60023	KIT, Seal (Buna N) (Includes items marked *)	1
			96151	60032	KIT, Seal (Viton) (Includes items marked *)	1

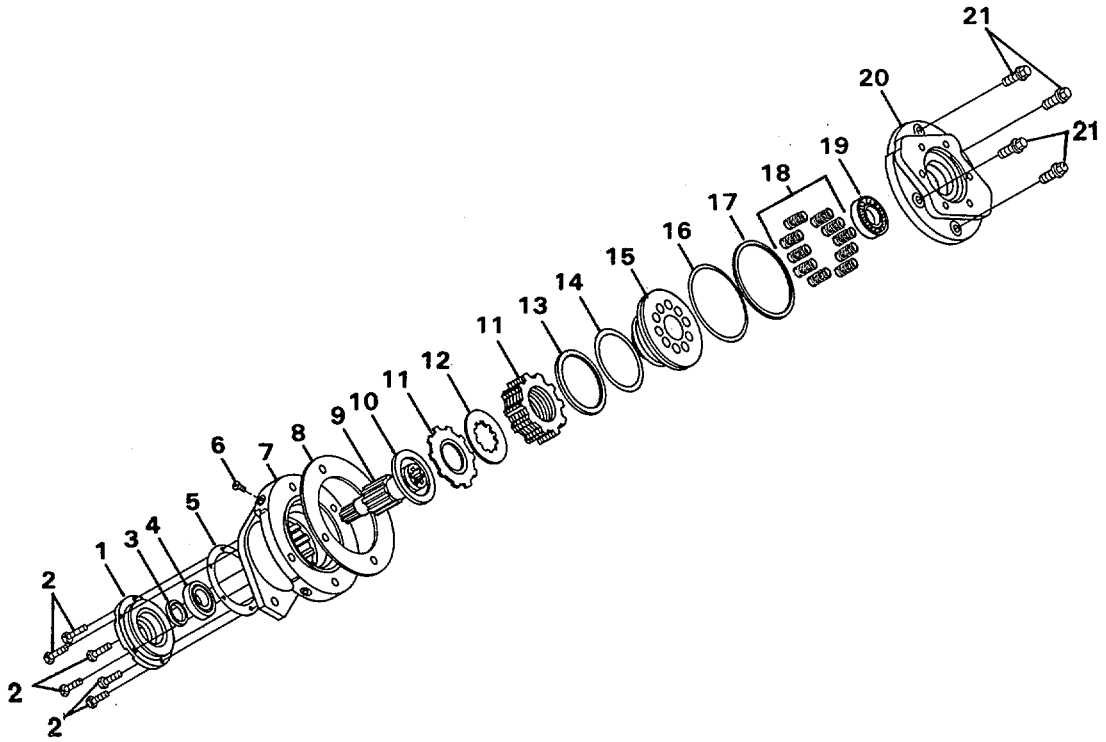


Figure F-179. Swing Brake

F-462

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-179			62854	90-002-0333	SWING BRAKE (See figure F-172 for NHA)	REF
-1			62854	90-004-1052	BASE (ATTACHING PARTS)	1
-2			62854	01-150-1030	SCREW, Cap, Socket Hd, 3/8"-16	6
-3			62854	01-405-0340	SEAL	1
-4			62854	01-100-0110	BEARING	1
-5			62854	90-004-111	GASKET, Base	1
-6			62854	01-208-0020	PLUG, Hollow Hex	1
-7			62854	90-004-1194	CASE	1
-8			62854	90-004-1101	GASKET, Cover	1
-9			62854	90-004-1043	SHAFT	1
-10			62854	90-004-1031	SPACER	AR
-11			62854	01-288-0010	DISC, Friction	AR
-12			62854	01 -288-0020	PLATE, Separator	AR
-13			62854	01-400-0120	RING, Back-up	1
-14			62854	01-402-0450	O-RING	1
-15			62854	90-004-1182	PISTON	1
-16			62854	01-402-0470	O-RING	1
-17			62854	01-400-0140	RING, Back-up	1
-18			62854	01-261-0333	SPRING	10
-19			62854	01-100-0120	BEARING	1
-20			62854	90-004-1143	COVER (ATTACHING PARTS)	1
-21			62854	01-150-1040	SCREW, Cap, 12-Point, 1/2"-13	4

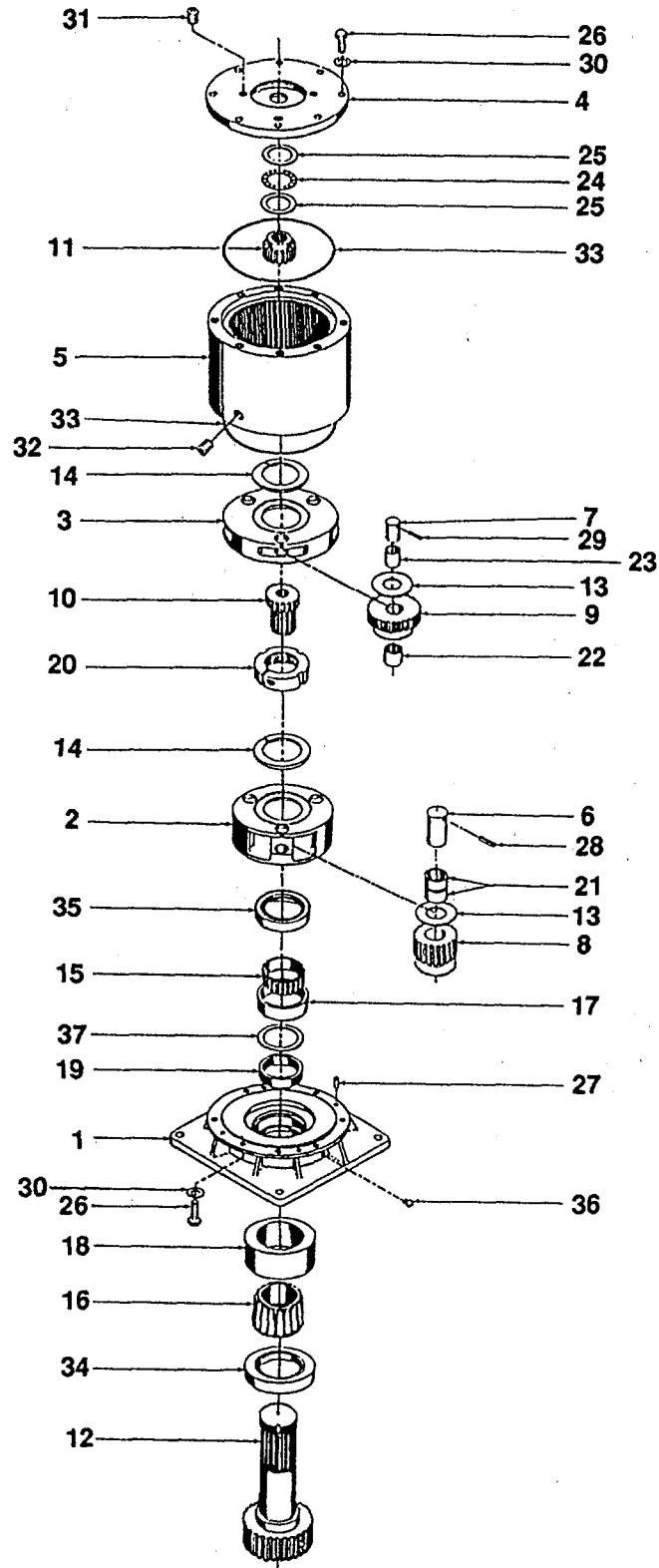


Figure F-180. Speed Reducer

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-180-			62854	MODEL 240H	SPEED REDUCER (See figure F-172 for NHA)	REF
-1			62854	81-004-0692	CASE	1
-2			62854	83-004-2033	CARRIER (Sec.)	1
-3			62854	81-004-1742	CARRIER (Pri.)	1
-4			62854	81-004-Z	COVER	1
-5			62854	81-004-0032	GEAR, Ring	1
-6			62854	83-004-1031	PIN, Planet (Sec.)	3
-7			62854	81-004-0071	PIN, Planet (Pri.)	3
-8			62854	84-004-1782	GEAR, Planet (Sec.)	3
-9			62854	81-004-1782	GEAR, Planet (Pri.)	3
-10			62854	81-004-0122	GEAR, Sun	1
-11			62854	81-004-A	GEAR, Input	1
-12			62854	ABC	SHAFT, Output	1
-13			62854	81-004-1561	WASHER, Planet	12
-14			62854	80-004-1051	WASHER, Thrust-Carrier	2
-15			62854	01-102-0030	CONE, Bearing	1
-16			62854	01-102-0020	CONE, Bearing	1
-17			62854	01-103-0020	CUP, Bearing	1
-18			62854	01-103-0030	CUP, Bearing	1
-19			62854	81-004-2051	SPACER	1
-20			62854	01-104-0090	NUT, Clamp	1
-21			62854	01-105-0480	BEARING, w/Inner Race	6
-22			62854	01-105-0460	BEARING	3
-23			62854	01-105-0470	RACE, Inner	3
-24			62854	01-112-0220	BEARING, Thrust	1
-25			62854	01-112-0230	RACE, Thrust	2
-26			62854	01-150-1020	SCREW, Cap, Hex Hd	16
-27			62854	01-152-0070	PIN, Dowel	4
-28			62854	01-153-0020	PIN, Roll	3
-29			62854	01-153-0180	PIN, Roll	3
-30			62854	01-166-0010	WASHER, Lock	16
-31			62854	01-207-0070	PLUG, Pipe, Magnetic	1
-32			62854	01-207-0041	PLUG, Pipe, Magnetic	2
-33			62854	01-402-0420*	O-RING	2
-34			62854	01-405-0270*	SEAL	1
-35			62854	01-406-0250*	SEAL	1
-36			62854	01-216-0040	FITTING, Grease	1
-37			62854	81-004-2051	SHIM	AR
			62854	83-016-0311	KIT, Seal (Includes items marked *)	1

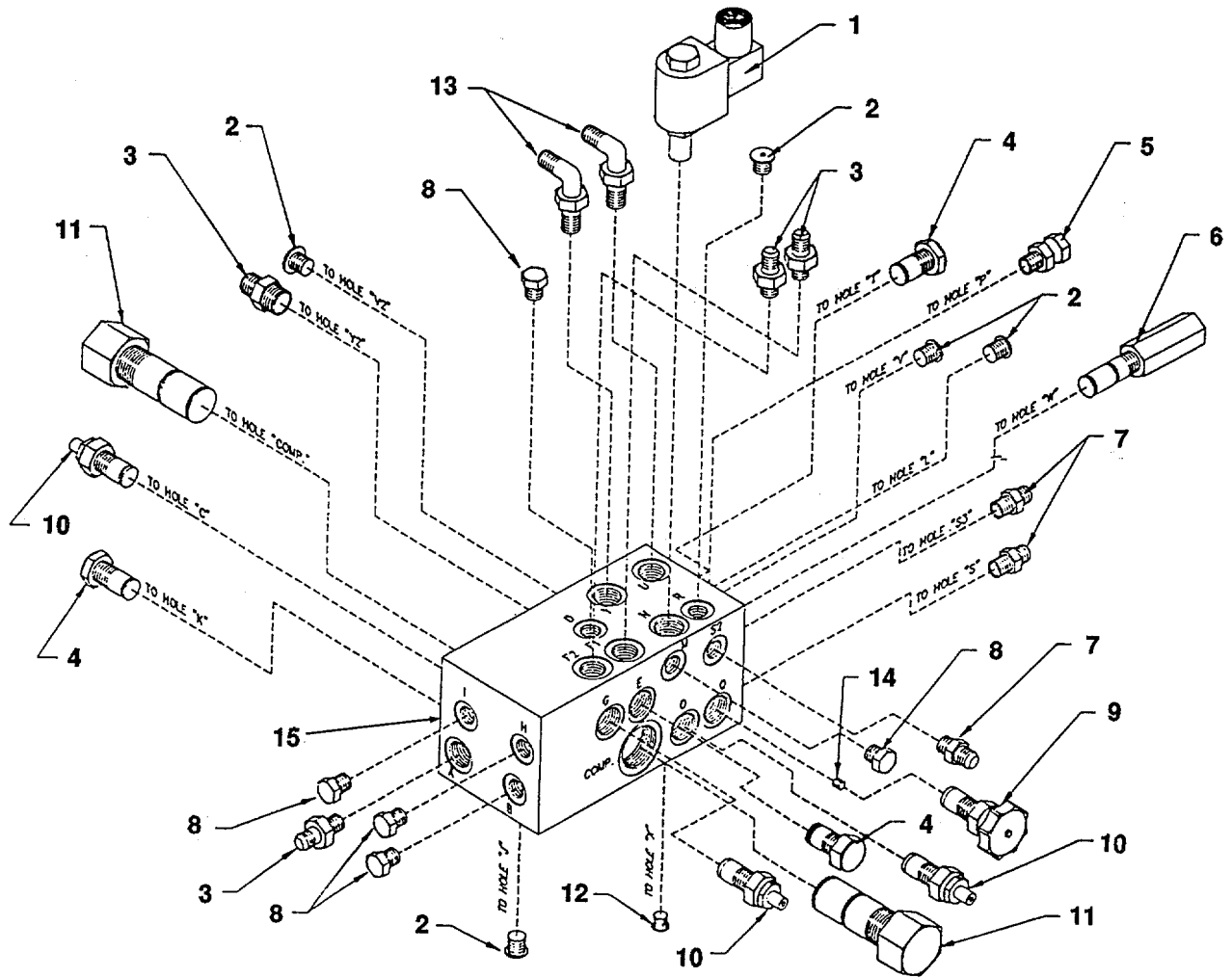


Figure F-181. Hoist Manifold Block Assembly

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-181	04664	M10-1205			HOIST MANIFOLD, BLOCK ASSY (See figure F-172 for NHA)	REF
-1			54846	SV3-10-C-0-12DG	VALVE, Solenoid	1
-1			54846	SK-10-2	KIT, Seal (Buna "N")	1
-1			54846	SK-10V-2	KIT, Seal (Viton)	1
-2			92003	6408-HHP-6	PLUG, Hollow Hex, No. 6	5
-3			92003	6400-8	ADAPTER, No. 8 M. SAE to No. 8 M. JIC	4
-4			54846	CV3-10-P-0-3	VALVE, Check (NSS)	3
-4			54846	SK-10-2	KIT, Seal (Buna "N")	1
-4			54846	SK-10V-2	KIT, Seal (Viton)	1
-5			92003	6900-6-4	ADAPTER, Swivel, No. 6 M. SAE to 1/4" F. NPT	1
-6			54846	PRV2-10-S-1-20/3	VALVE, Pressure Reducing (NSS)	1
-6			54846	SK-10-3	KIT, Seal (Buna "N")	1
-6			54846	SK-10V-3	KIT, Seal (Viton)	1
-7			92003	6400-6	ADAPTER, No. 6 M. SAE to No. 6 M. JIC	3
-8			92003	6408-6	PLUG, Hex Hd, No. 6	5
-9			54846	NV1-10-K-0	VALVE, Needle (NSS)	1
-9			54846	SK2-10-2	KIT, Seal (Buna "N")	1
-9			54846	SK-1 0V-2	KIT, Seal (Viton)	1
-10			54846	FCV6-1 0-S0-NV	VALVE, Flow Control (NSS)	3
-10			54846	SK2-10-2	KIT, Seal (Buna "N")	1
-10			54846	SK-10V-2	KIT, Seal (Viton)	1
-11			54846	PCS3-16-0-160	COMPENSATOR, Pressure (NSS)	2
-11			54846	SK-16-3	KIT, Seal (Buna "N")	1
-11			54846	SK-16V-3	KIT, Seal (Viton)	1
-12			92003	6408-HHP-3	PLUG, Hollow Hex, No. 3	1
-13			92003	6408-8	FITTING, 900, No. 8 M. SAE - No. 8 M. JIC	2
-14			92003	5604-HHP-2	PLUG, Pipe, 1t8" NPT w/.030" Dia. Restrictor	1
-15	04664	M10-1205-1			BLOCK, Hoist Manifold (NSS)	1
NOTE: NSS parts are not serviced separately-only as part of hoist manifold block assembly.						

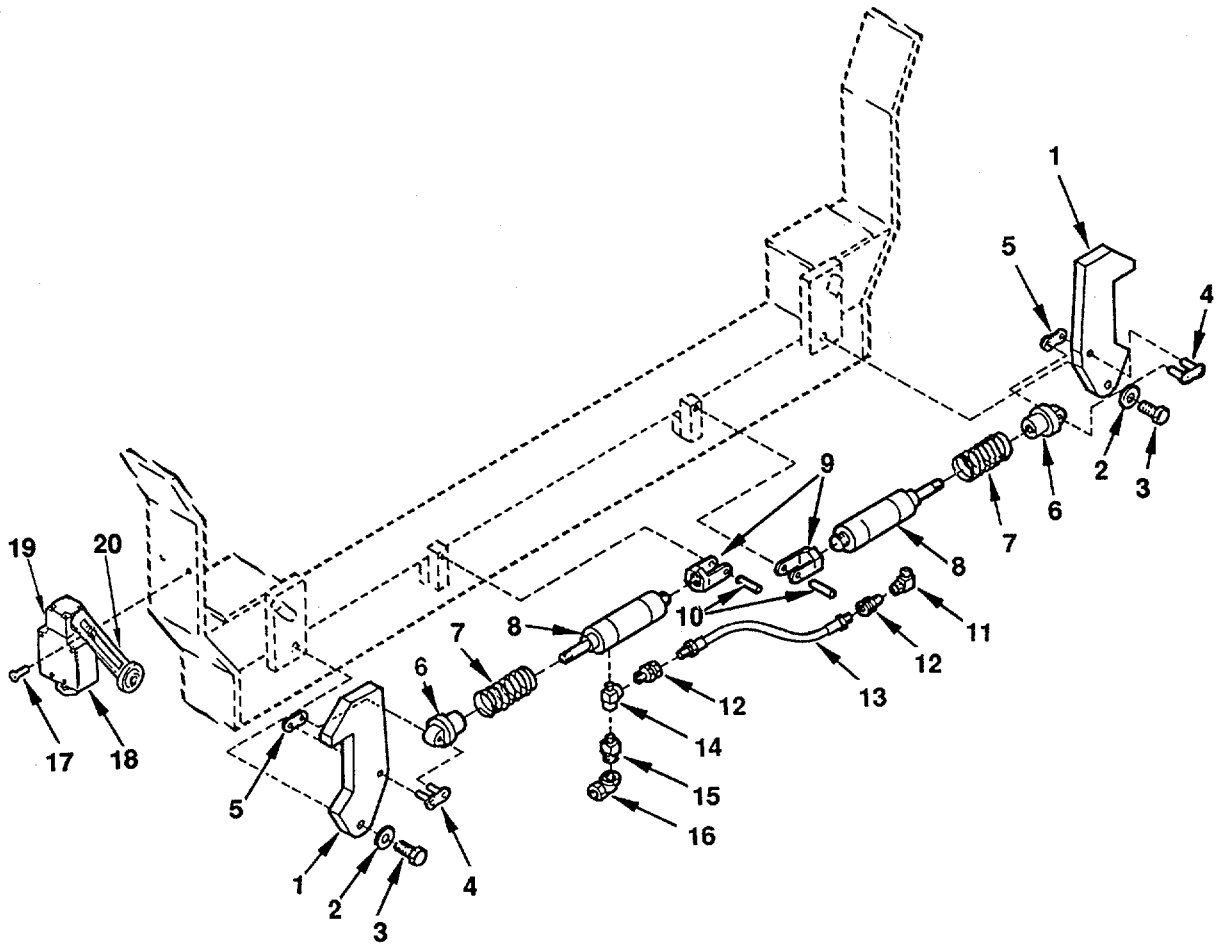


Figure F-182. Ladder Bed Locks

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-182	04664	M10-110			LADDER BED LOCKS	1
-1	04664	M10-110-1			HOOK, Ladder Lock Down (ATTACHING PARTS)	2
-2	04664	M10-110-2			WASHER, Flat, 3/8"	2
-3	04664	M10-110-3			BOLT, Hex Hd, 3/8"-1 6 x 1-5/8"	2
-4	04664	M10-110-4			LINK, Connecting (ATTACHING PARTS)	2
-5	04664	M10-110-5			PLATE, Connecting Link	2
-6	04664	M10-110-6			CAP, Cylinder	2
-7	04664	M10-110-7			SPRING, Compression	2
-8			19541	D30072A1	CYLINDER, Hydraulic	2
-9	04664	M10-110-14			BUTT ASSY, Cylinder (ATTACHING PARTS)	2
-10	04664	M10-110-15			PIN, Cylinder Butt	2
-11			92003	550244	FITTING, 1/4" M. Pipe/1/4" F. Pipe, 900	1
-12			92003	140444	FITTING, 370 Flare Swivel/1/4", Male Pipe, Straight	2
-13	04664	M10-110-13			HOSE ASSY, Hydraulic	1
-14			92003	56024-4	FITTING, 1/4" M. Pipe/1/4" F. Pipe, 1/4" F. Pipe, Tee	1
-15			92003	5404-4-8	FITTING, 1/2" to 1/4" Reducer	1
-16			92003	1502-8-8	FITTING, 1/2" Tube, 1/2" F. Pipe, Swivel, 90'	1
			0ET52	XCK-L141	SWITCH, Aerial Nested (ATTACHING PARTS)	1
-17	04664	82-2039-001			SCREW, No. 10-24 x 1/2", T410, Ph Pan Hd, Taptite	2
-18			0ET52	ZCK-L1	BODY	1
-18			0ET52	XES-P2051	BLOCK, Contact	1
-19			0ET52	ZCK-G00	HEAD	1
-20			0ET52	ZCK-Y11	LEVER	1

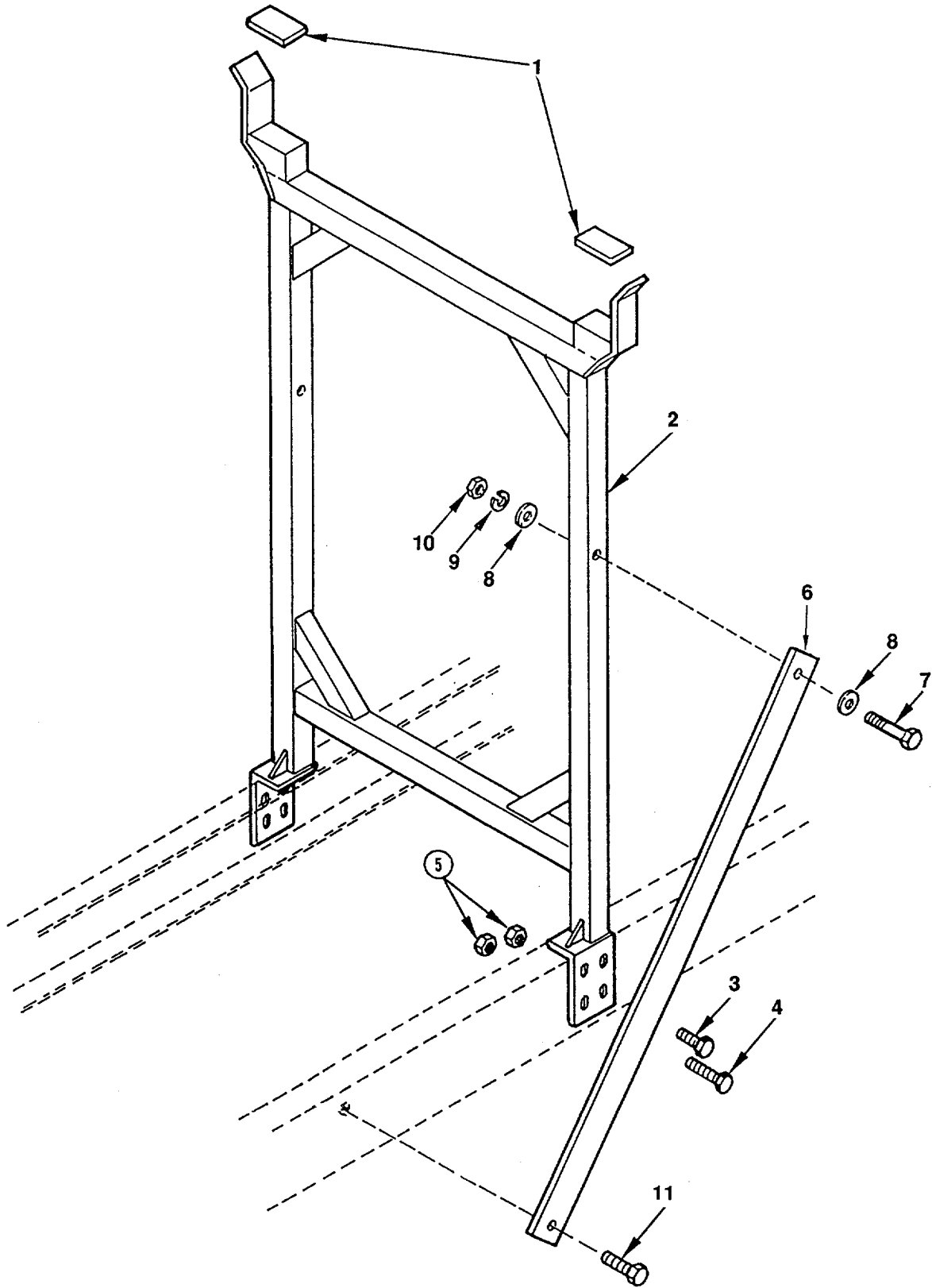


Figure F-183. Aerial Ladder Boom Support

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-183					AERIAL LADDER BOOM SUPPORT	1
-1	04664	70-0029			PAD, Nylon	2
-2	04664	70-0056			BOOM SUPPORT (ATTACHING PARTS)	
-3	04664	82-2017-0175			BOLT, 1/2"-13 x 1-3/4" Lg, Hex Hd, G-8	2
-4	04664	82-2017-0225			BOLT, 1/2"-13 x 2-1/4" Lg, Hex Hd, G-8	2
-5	04664	82-3009			NUT, Lock, Flanged, *1/2"-113	4
-6	04664	70-0012			BRACE, Boom Support (ATTACHING PARTS)	2
-7	04664	82-2033-0450			BOLT, 1/2"-13 x 4-1/2" Lg, Hex Hd, G-8	2
-8	04664	82-1013-010			WASHER, Flat, 1/2", Zn	4
-9	04664	82-1011-0050			WASHER, Lock, 1/2", Zn	2
-10	04664	82-3001			LOCKNUT, 1/2"-13, Hex	2
-11	04664	82-2017-0175			BOLT, 1/2"-13 x 1-3/4" Lg, Hex Hd, G-8	2

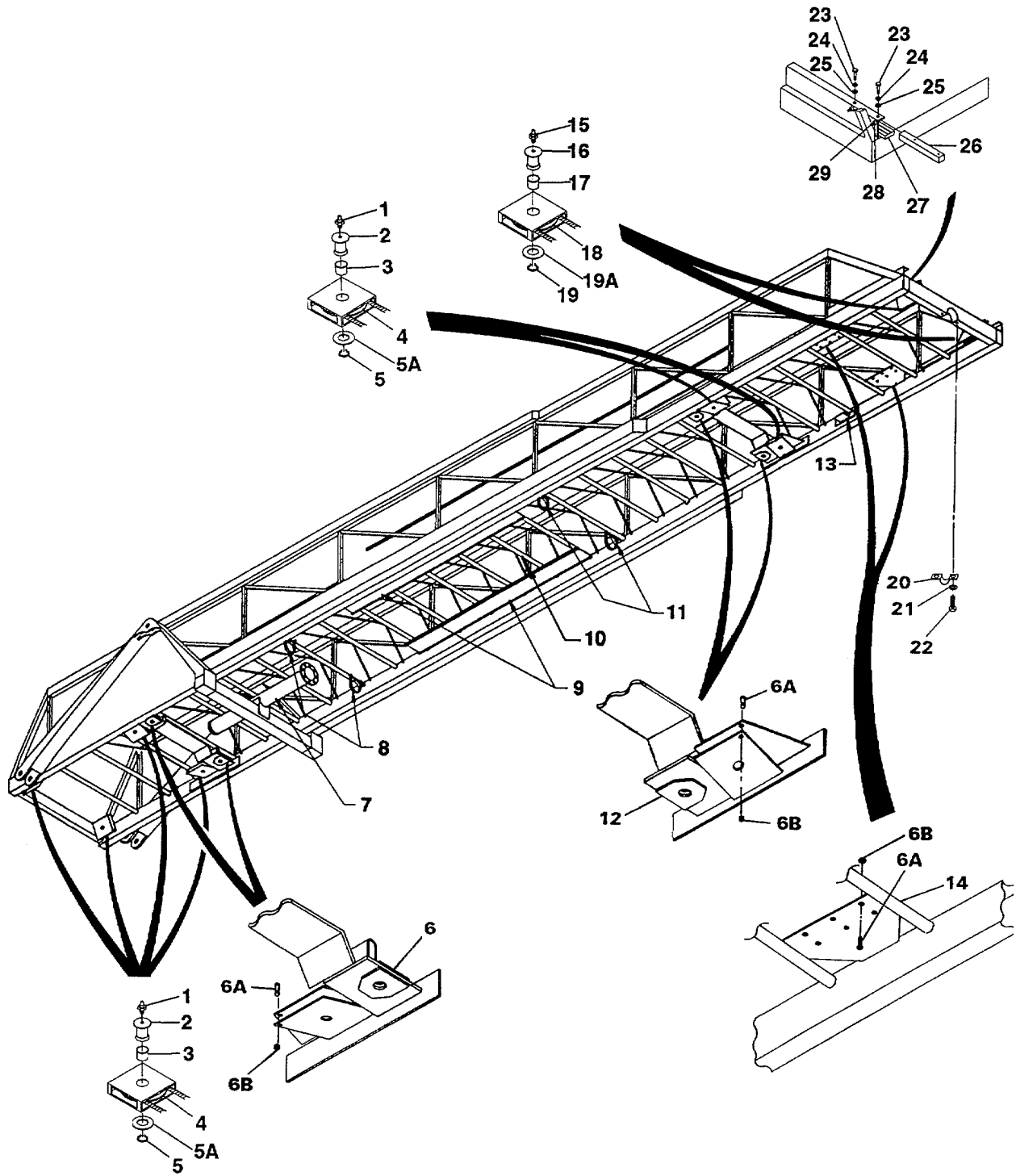


Figure F-184. Aerial Ladder Base Section

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-184-	04664	M10-100			AERIAL LADDER-BASE SECTION	1
-1	04664	M10-100-1			FITTING, Grease, 1/8"	6
-2	04664	M10-100-2			PIN, Sheave, 1-1/2" O.D.	6
-3	04664	M10-100-3			BUSHING, Bronze, 1-1/2" I.D.	6
-4	04664	M10-100-4			SHEAVES, 6" O.D.	6
-5	04664	M10-100-5			SNAP RING	6
-5A	04664	M10-100-5A			WASHER, Flat	6
-6	04664	M10-100-6			PLATES, Rear Extension Cylinder Dead End	2
-6A	04664	M10-100-6A			BOLT, Hex Head	36
-6B	04664	M10-100-6B			NUT, Lock	36
-7	04664	M10-100-7			TUBE, Water Pipe Base	1
-8	04664	M10-100-8			CLAMP, Rear Extension Cylinder	2
-9	04664	M10-100-9			GUIDE, Extension Cable Traveling Block	2
-10	04664				SWITCH, Rung Alignment (See figure F-221 for details)	1
-11	04664	M10-100-11			CLAMP, Front Extension Cylinder	2
-12	04664	M10-100-12			PLATE, Front Extension Cylinder Dead End	2
-13	04664	M10-100-13			LOOP, Extension Cable Dead End	2
-14	04664	M10-100-14			PLATE, Extension Cable Dead End	2
-15	04664	M10-100-1			FITTING, Grease, 1/8"	2
-16	04664	M10-100-2			PIN, Sheave, 1-1/2" O.D.	2
-17	04664	M10-100-3			BUSHING, Bronze, 1-1/2" I.D.	2
-18	04664	M10-100-18			SHEAVES, 6-1/2" O.D.	2
-19	04664	M10-100-5			SNAP RING	2
-19A	04664	M10-100-5A			WASHER, Flat	2
-20	04664	M10-100-20			RETAINER, Water Pipe	2
-21	04664	M10-100-21			WASHER, Internal Tooth, 1/2"	2
-22	04664	M10-100-22			SCREW, Hex Hd, 1/2" x 1"	2
-23	04664	M10-100-23			SCREW, Hex Hd, 3/8" x 1"	4
-24	04664	M10-100-24			WASHER, Internal Tooth, 3/8"	4
-25	04664	M10-100-25			WASHER, Flat, 3/8"	4
-26	04664	M10-100-26			WEAR BLOCK, Side Thrust, Vertical	2
-27	04664	M10-100-27			WEAR PAD, Horizontal	2
-28	04664	M10-100-28			NUT, Hex, 3/8"-16	4
-29	04664	M10-100-29			SCREW, Socket Set, 3/8" x 1-1/4"	4

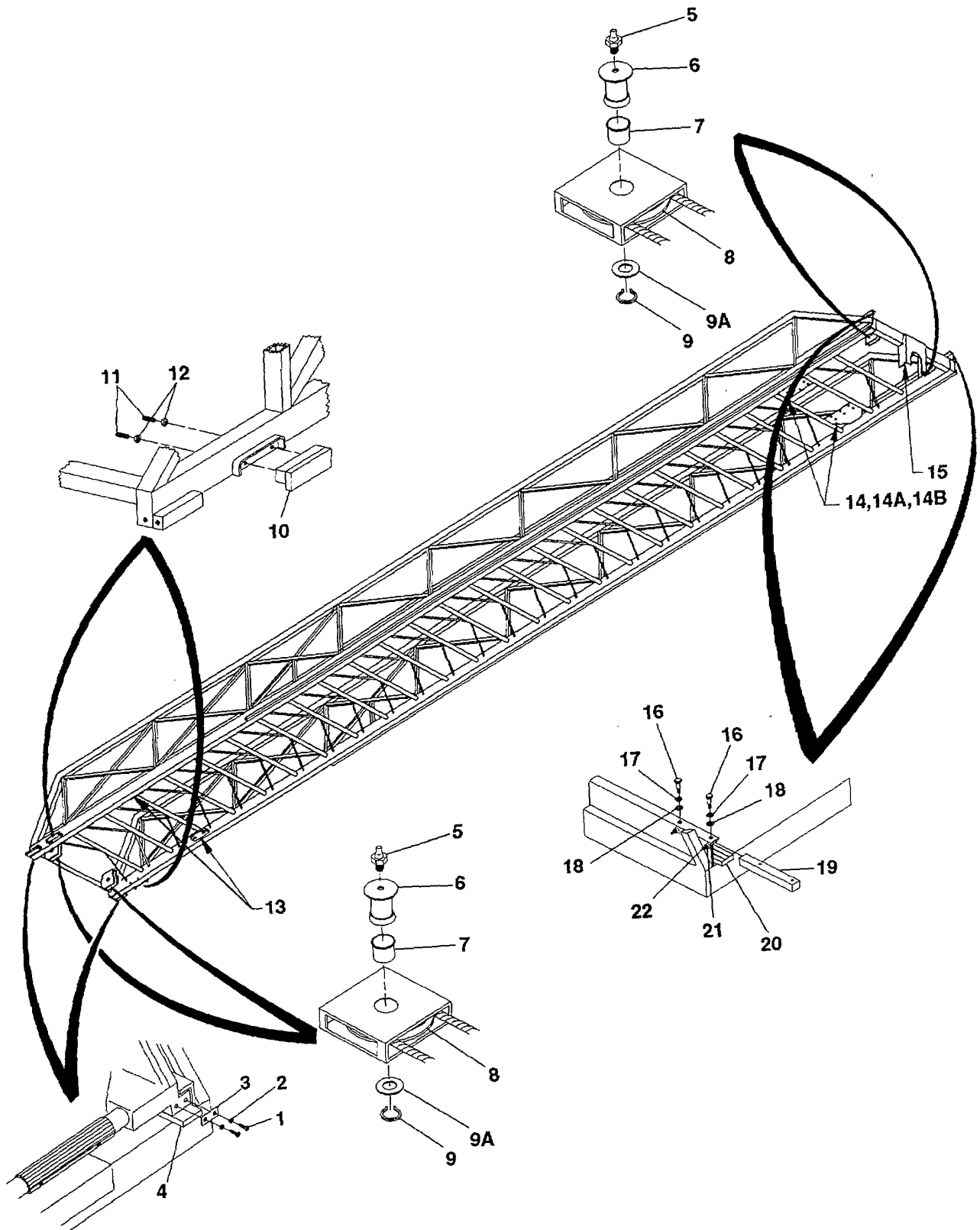


Figure F-185. Aerial Ladder-Lower Mid Section

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-185-	04664	M10-200			AERIAL LADDER-LOWER MID SECTION	1
-1	04664	M10-200-1			SCREW, Hex Hd, 3/8" x 1"	4
-2	04664	M10-200-2			WASHER, Lock, Internal Tooth, 3/8"	4
-3	04664	M10-200-3			RETAINER, Wear Pad	2
-4	04664	M10-200-4			WEAR PAD, Horizontal	2
-5	04664	M10-110-1			FITTING, Grease, 1/8"	4
-6	04664	M10-200-6			PIN, Sheave, 1-1/4" O.D.	4
-7	04664	M10-200-7			BUSHING, Bronze, 1-1/4" I.D.	4
-8	04664	M10-200-8			SHEAVES, 5" O.D.	4
-9	04664	M10-200-9			SNAP RING	4
-9A	04664	M10-200-9A			WASHER, Flat	4
-10	04664	M10-200-10			WEAR BLOCK, Vertical	2
-11	04664	M10-200-11			SCREW, Socket Set, 3/8" x 2"	4
-12	04664	M10-200-12			NUT, Hex, 3/8"-16	4
-13	04664	M10-200-13			LUG, Extension Cable Dead End	2
-14	04664	M10-200-14			PLATE, Extension Cable Dead End	2
-14A	04664	M10-200-14A			BOLT, Hex Head	12
-14B	04664	M10-200-14B			NUT, Lock	12
-15	04664	M10-200-15			BRACKET, Water Pipe Mounting	1
-16	04664	M10-200-16			SCREW, Hex Hd, 3/8" x 1"	4
-17	04664	M10-200-17			WASHER, Internal Tooth, 3/8"	4
-18	04664	M10-200-18			WASHER, Flat, 3/8"	4
-19	04664	M10-200-19			WEAR BLOCK, Side Thrust, Vertical	2
-20	04664	M10-200-20			WEAR PAD, Horizontal	2
-21	04664	M10-200-21			NUT, Hex, 3/8"-16	4
-22	04664	M10-200-22			SCREW, Socket Set, 3/8" x 1-1/4"	4

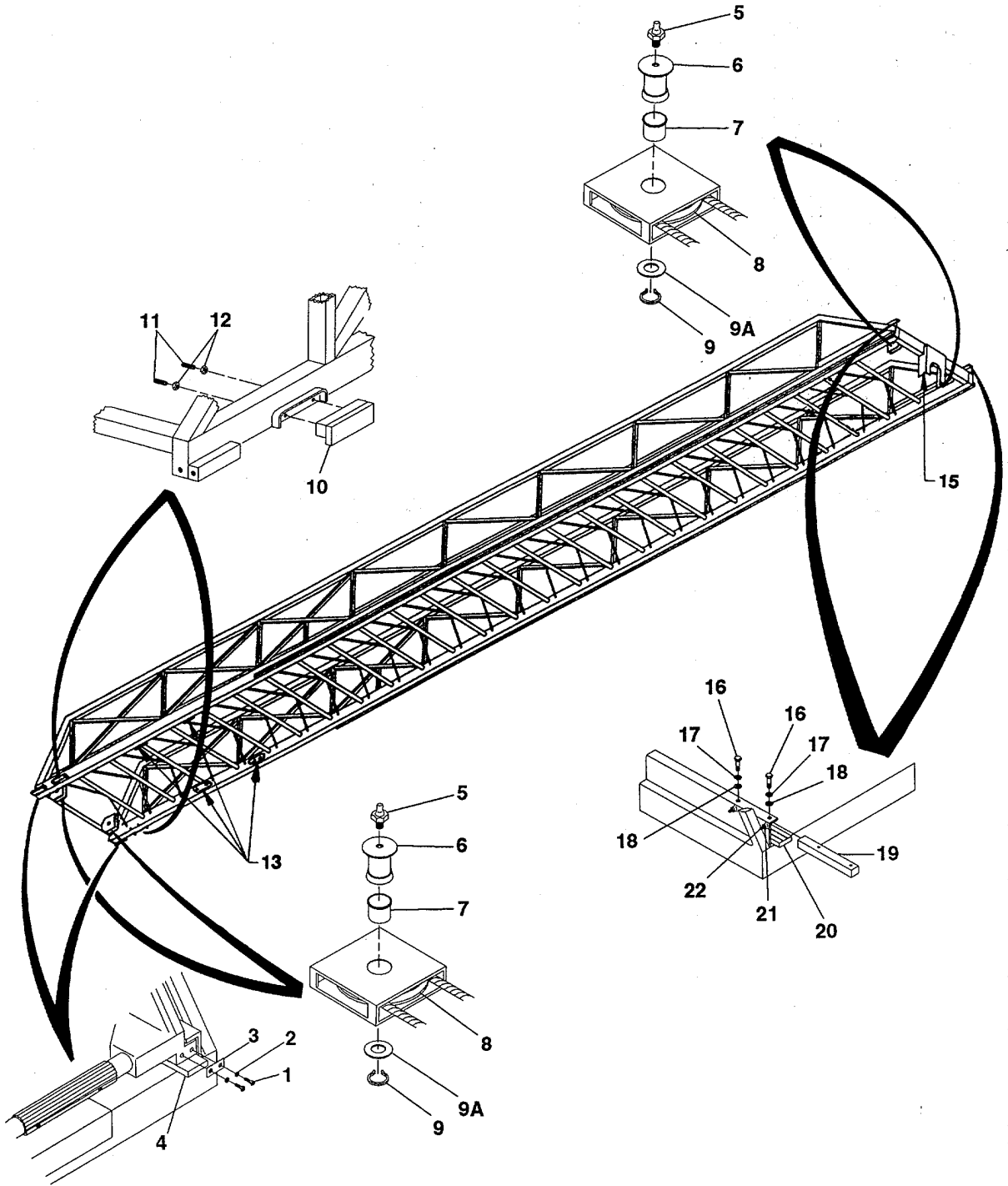


Figure F-186. Aerial Ladder-Upper Mid Section

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-186	04664	M10-300			AERIAL LADDER-UPPER MID SECTION	1
-1	04664	M10-300-1			SCREW, Hex Hd, 3/8" x 1"	4
-2	04664	M10-300-2			WASHER, Lock, Internal Tooth, 3/8"	4
-3	04664	M10-300-3			RETAINER, Wear Pad	2
-4	04664	M10-300-4			WEAR PAD, Horizontal	2
-5	04664	M10-300-5			FITTING, Grease, 1/8"	4
-6	04664	M10-300-6			PIN, Sheave, 1-1/4" O.D.	4
-7	04664	M10-300-7			BUSHING, Bronze, 1-1/4" I.D.	4
-8	04664	M10-300-8			SHEAVES, 4"O.D.	4
-9	04664	M10-300-9			SNAP RING	4
-9A	04664	M10-300-9A			WASHER, Flat	4
-10	04664	M10-300-10			WEAR BLOCK, Vertical	2
-11	04664	M10-300-11			SCREW, Socket Set, 3/8" x 2"	4
-12	04664	M10-300-12			NUT, Hex, 3/8"-16	4
-13	04664	M10-300-13			LOOP, Cable take-up	4
-15	04664	M10-300-15			BRACKET, Water Pipe Mounting	1
-16	04664	M10-300-16			SCREW, Hex Hd, 3/8" x 1"	4
-17	04664	M10-300-17			WASHER, Internal Tooth, 3/8"	4
-18	04664	M10-300-18			WASHER, Flat, 3/8"	4
-19	04664	M10-300-19			WEAR BLOCK, Side Thrust, Vertical	2
-20	04664	M10-300-20			WEAR PAD, Horizontal	2
-21	04664	M10-300-21			NUT, Hex Hd, 3/8"-16	4
-22	04664	M10-300-22			SCREW, Socket Set, 3/8" x 1-1/4"	4

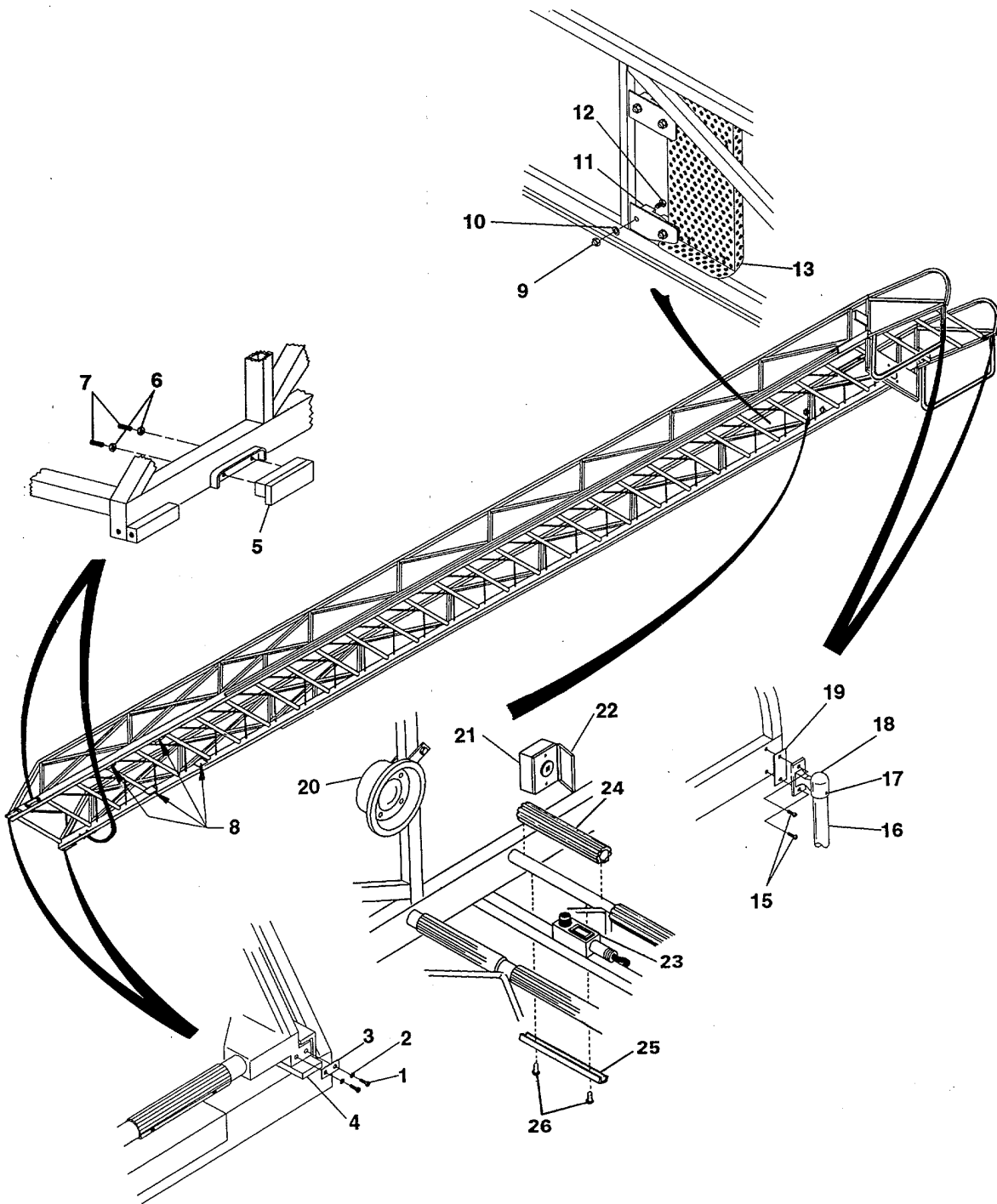


Figure F-187. Aerial Ladder-Fly Section

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-187	04664	M10-400			AERIAL LADDER-FLY SECTION	1
-1	04664	M10-400-1			SCREW, Hex Hd, 3/8" x 1"	4
-2	04664	M10-400-2			WASHER, Lock, Internal Tooth, 3/8"	4
-3	04664	M10-400-3			RETAINER, Wear Pad	2
-4	04664	M10-400-4			WEAR PAD, Horizontal	2
-5	04664	M10-400-5			WEAR BLOCK, Vertical	2
-6	04664	M10-400-6			NUT, Hex, 3/8"-16	4
-7	04664	M10-400-7			SCREW, Socket Set, 3/8" x 2"	4
-8	04664	M10-400-8			LOOPS, Extension Cable Take-Up	4
-9	04664	M10-400-9			NUT, Acorn, Crown High, 5/16"-18	8
-10	04664	M10-400-10			WASHER, Flat, 5/16"	8
-11	04664	M10-400-11			BRACKET, L.H.	2
	04664	M10-400-12			BRACKET, R.H.	2
-12	04664	M10-400-13			SCREW, Hex Hd, 5/16"-18 x 1-1/2"	8
-13	04664	K-H20FRD			STEP, Folding	2
-15	04664	82-2034-0100			SCREW, Machine	8
-16	04664	SD-09195			TUBING	2
-17	04664	82-2039-001			SCREW, Machine	4
-18	04664	80-0024			STANCHION, End	4
-19	04664	94-4043			GASKET, Stanchion	4
-20			27589	MM-2	SPEAKER, Intercom Talk-Back	1
-21			89963	4747	RECEPTACLE, 110V AC	1
-22	04664		89963	PO-16	COVER, Receptacle	1
-23	04664	M10-400-14			ALERT, Audio	1
-24	04664	10-400-5			THREAD, Rung, Corrugated Rubber-7" (Fly Section)	4
					(ATTACHING PARTS)	
-25	04664	100-400-7			CLIP, Rung Thread, S/S-7" (Fly Section)	4
-26	04664	10-100-15			SCREW, Thread Cutting, No. 10-24 x 3/4"	4

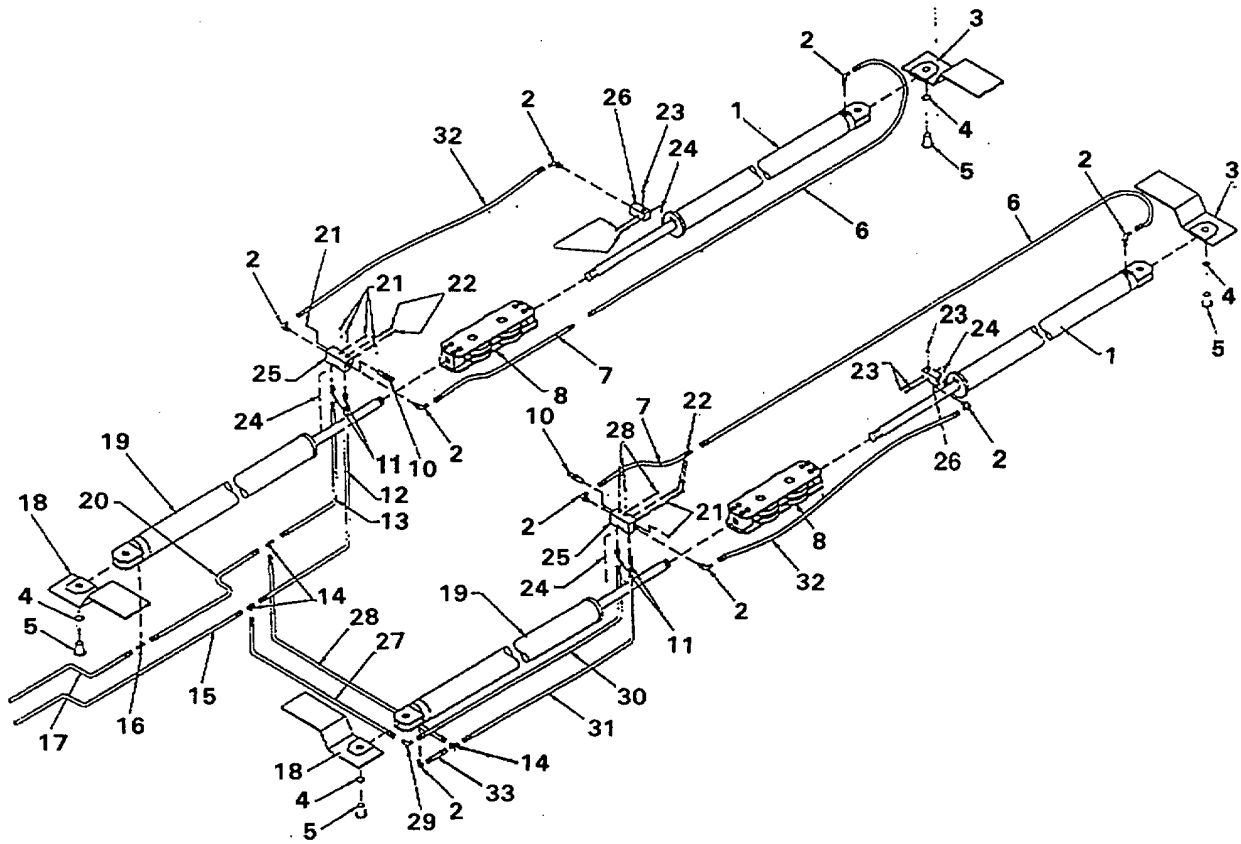


Figure F-188. Ladder Extension and Retraction System

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-188	04664	M10-1700			LADDER EXTENSION & RETRACTION SYSTEM	1
-1	04664	M10-1700-1			CYLINDER, Hydraulic, Ladder Extension - Front (See figure F-189 for details)	2
-2			92003	#8-F5BU-S	ELBOW, Ferulok Straight Thread	8
-3	04664	M10-1700-3			PLATE, Front Extension Cylinder Dead End	2
-4			92003	#S-125	RING, Snap, 1-1/4"	4
-5	04664	M10-1700-5			PIN, Cylinder	4
-6	04664	M10-1700-6			TUBE, Hydraulic 1/2" (Tube-A)	2
-7	04664	M10-1700-7			HOSE, Hydraulic 1/2" (Hose-A)	2
-8	04664	M10-1700-8			TRAVELING BLOCK ASSY (See figure F-190 for details)	2
-10			55484	MCV3-10-C050-301	VALVE	2
-11			92003	#8-F5BU-S	CONNECTOR, Straight, Thread, Ferulok	4
-12	04664	M10-1700-12			TUBE, Hydraulic 1/2" (Tube-B)	1
-13	04664	M10-1700-13			TUBE, Hydraulic, 1/2" (Tube-C)	1
-14			92003	#8-JBU-S	TEE, Union Ferulok	3
-15	04664	M10-1700-15			TUBE, Hydraulic 1/2" (Tube-D)	1
-16	04664	M10-1700-16			TEE, Branch, Straight Thread, Ferulok	1
-17	04664	M10-1700-17			TUBE, Hydraulic, 1/2" (Tube-E)	1
-18	04664	M10-1700-18			PLATE, End Dead Rear Extension Cylinder (1 Left & 1 Right)	2
-19	04664	M10-1700-19			CYLINDER, Hydraulic, Ladder Extension - Rear (See figure F-191 for details)	2
-20	04664	M10-1700-20			TUBE, Hydraulic, 1/2" (Tube-F)	1
-21			92003	#6408-HHP-3	PLUG, Hex Hd, Hollow, #3	12
-22	04664	M10-1700-22			CAPSCREW, Socket Hd, 5/16" x 2-1/2"	4
-23	04664	M10-1700-23			CAPSCREW, Socket Hd, 5/16" x 2"	4
-24			92003	#2-210	O-RING	4
-25	04664	M10-1700-25			BLOCK, Valve, Counter Balance	2
-26	04664	M10-1700-26			BLOCK, Front Cylinder	2
-27	04664	M10-1700-27			TUBE, Hydraulic, 1/2" (Tube-G)	1
-28	04664	M10-1700-28			TUBE, Hydraulic, 1/2" (Tube-H)	1
-29			92003	#8-EBU-S	ELBOW, Union, Ferulok	1
-30	04664	M10-1700-30			TUBE, Hydraulic, 1/2" (Tube-I)	1
-31	04664	M10-1700-31			TUBE, Hydraulic, 1/2" (Tube-J)	1
-32	04664	M10-1700-32			TUBE, Hydraulic, 1/2" (Tube-B)	1
-33	04664	M10-1700-33			TUBE, Hydraulic, 1/2" (Tube-K)	1

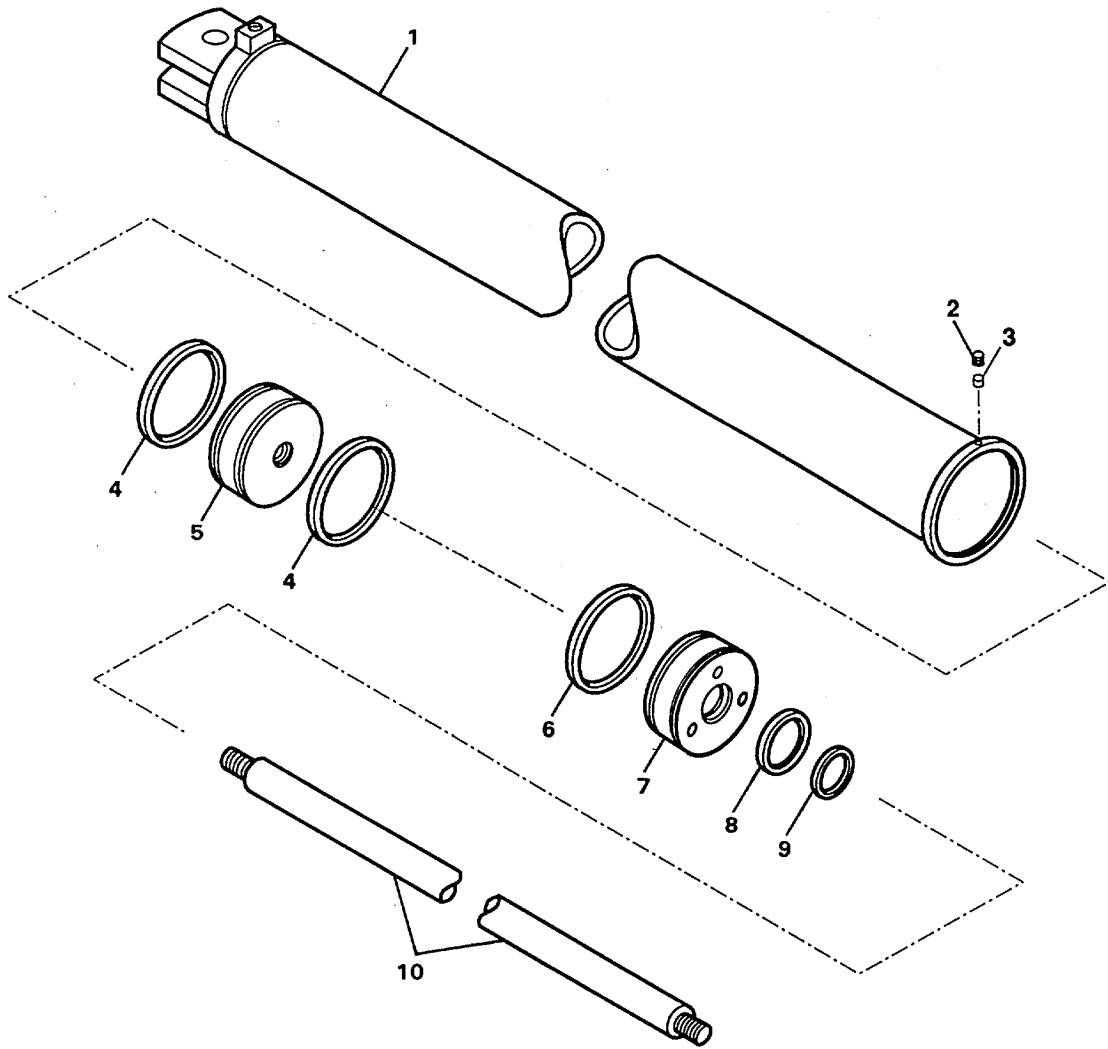


Figure F-189. Ladder Extension Hydraulic Cylinder-Front

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-189	04664	M10-1700-1			LADDER EXTENSION HYDRAULIC CYLINDER-FRONT (See figure F-188 for NHA)	REF
-1	04664	M10-1700-1-3			TUBE ASSY	1
-2	04664	M10-1700-19-5			SETSCREW, Hex Socket, 1/4"-20 x 1/4"	1
-3	04664	M10-1700-19-6			PLUG, Nylon	1
-4			92003	2500-3000*	SEAL, Piston, Poly Pak	2
-5			29260	071700152	PISTON	1
-6			92003	2-338*	O-RING, Gland	1
-7			29260	081700206	GLAND	1
-8			92003	1250-1500-250B*	SEAL, Rod, Poly Pak	1
-9			92003	959-17*	SEAL, Wiper	1
-10	04664	M10-1700-1-4			ROD	1
	04664	M10-1700-19-11			KIT, Seal (Includes items marked*)	1

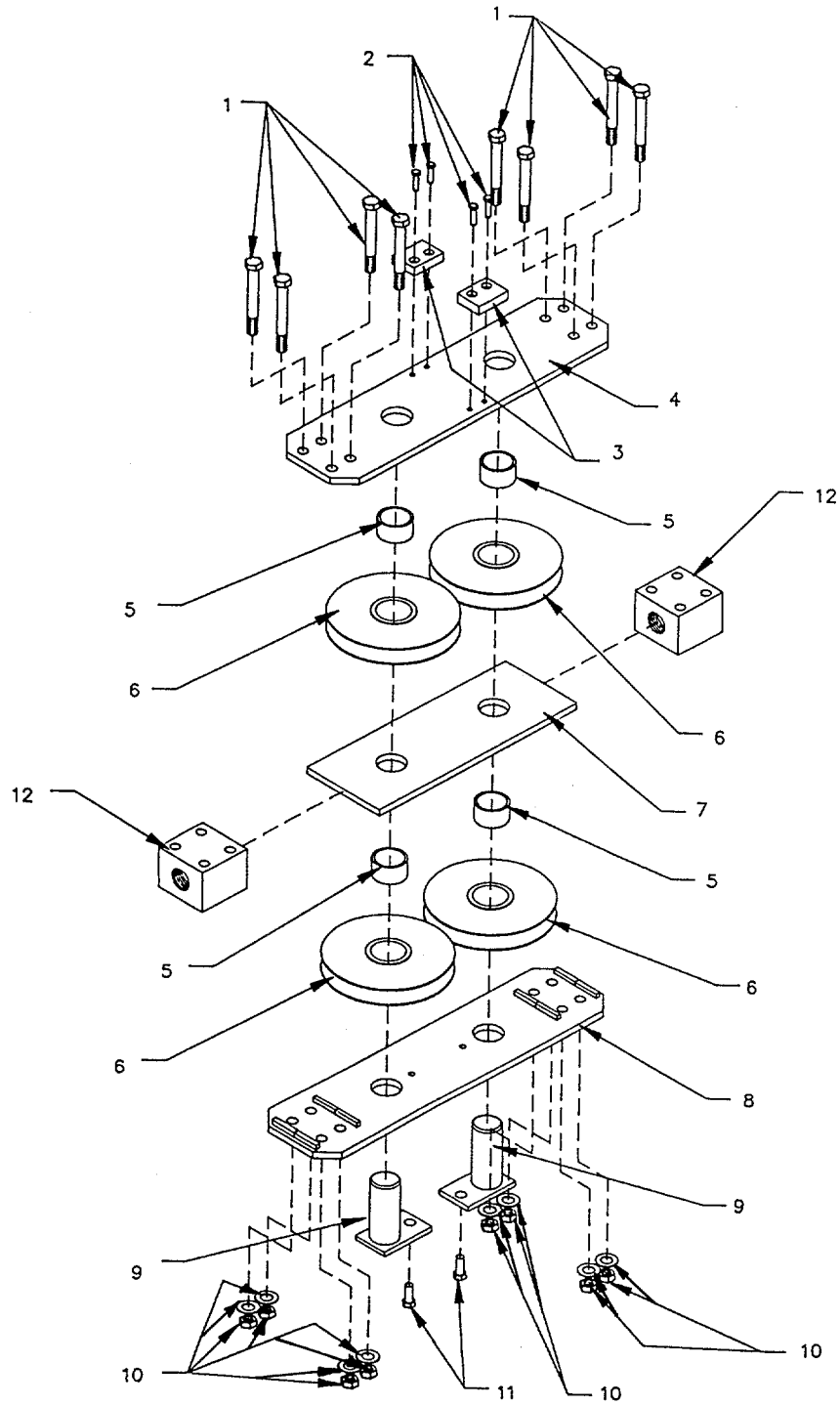


Figure F-190. Traveling Block Assembly

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-190	04664	M10-1700-0			TRAVELING BLOCK ASSEMBLY (See figure F-188 for details)	1
-1	04664	M10-1705-1			BOLT, ½" X 4", Gr 5	8
-2	04664	M10-1705-2			SCREW, Flat Hd Socket, ¼" x 1"	4
-3	04664	M10-1705-3			PAD, Wear GSM, Nylatron, ½" x 1-½", 2" Lg	2
-4	04664	M10-1705-4			PLATE, Top Block Extension System Traveling	1
-5	04664	M10-1705-5			BUSHING, Bronze, 1-½" I.D. x ¾" O.D., 1" Long	4
-6	04664	M10-1705-6			SHEAVE, Cable, Extension, 6-½" O.D.	4
-7	04664	M10-1705-7			CENTERPLATE, Block, Extension System Traveling	1
-8	04664	M10-1705-8			PLATE, Bottom, Extension System Traveling	1
-9	04664	M10-1705-9			PIN, Sheave, Extension System Traveling	2
-10	04664	M10-1705-10			NUTS & WASHERS, ½"	8
-11	04664	M10-1705-11			BOLT, Socket Shoulder, ¾" x 1"	2
-12	04664	M10-1705-12			CONNECTOR, Cylinder Pad	2

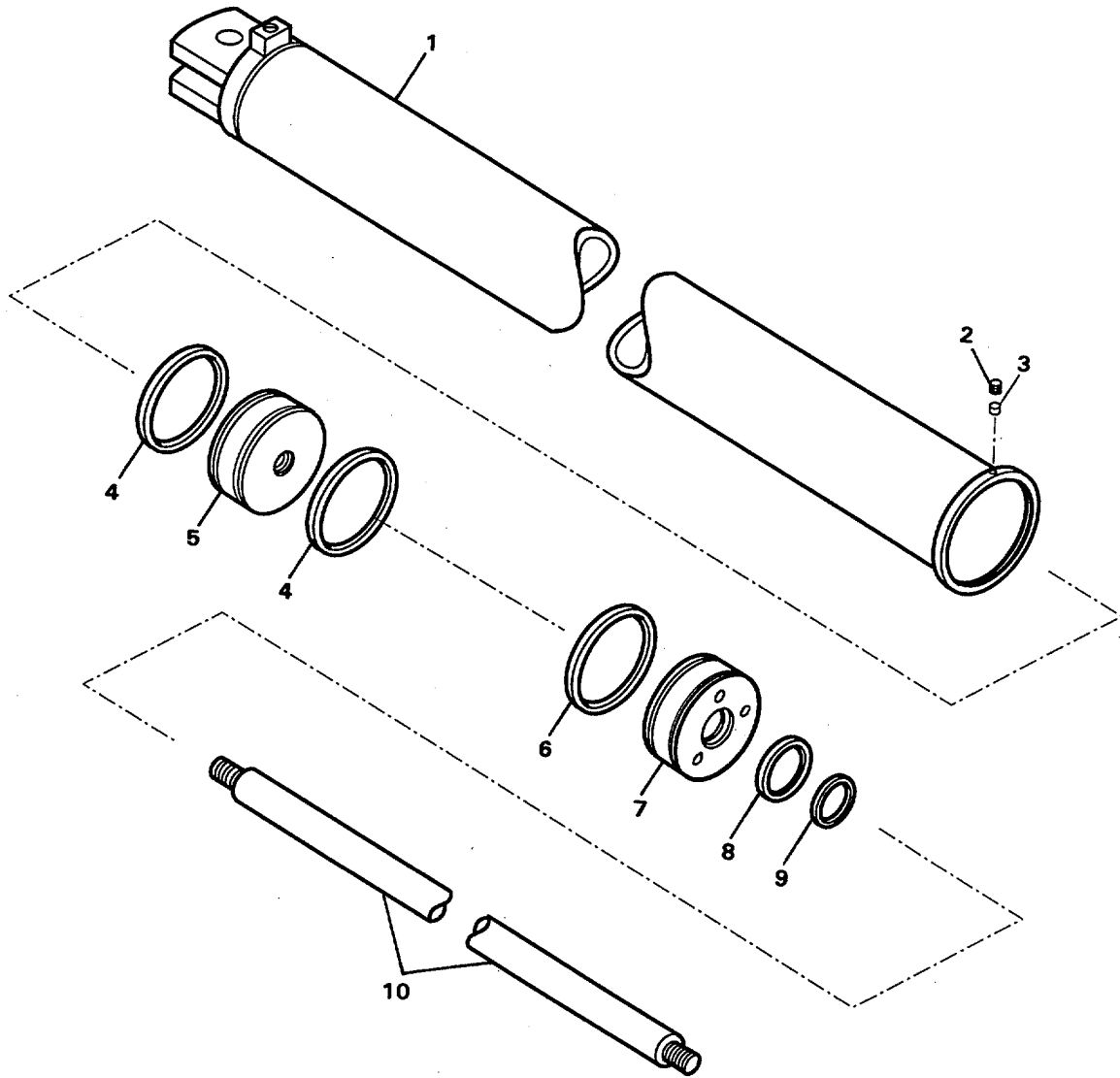


Figure F-191. Ladder Extension Hydraulic Cylinder-Rear

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-191	04664	M10-1700-19			LADDER EXTENSION HYDRAULIC CYLINDER-REAR (See figure F-188 for NHA)	REF
-1	04664	M10-1700-19-3			TUBE ASSY	1
-2	04664	M10-1700-19-5			SETSCREW, Hex Socket, 1/4"-20 x 1/4"	1
-3	04664	M10-1700-19-6			PLUG, Nylon	1
-4			92003	2500-3000*	SEAL, Piston, Poly Pak	2
-5			29260	071700152	PISTON	1
-6			92003	2-338*	O-RING, Gland	1
-7			29260	081700206	GLAND	1
-8			92003	1250-1500-250B*	SEAL, Rod, Poly Pak	1
-9			92003	959-17*	SEAL, Wiper	1
-10	04664	M10-1700-19-4			ROD	1
	04664	M10-1700-19-11			KIT, Seal (Includes items marked *)	1

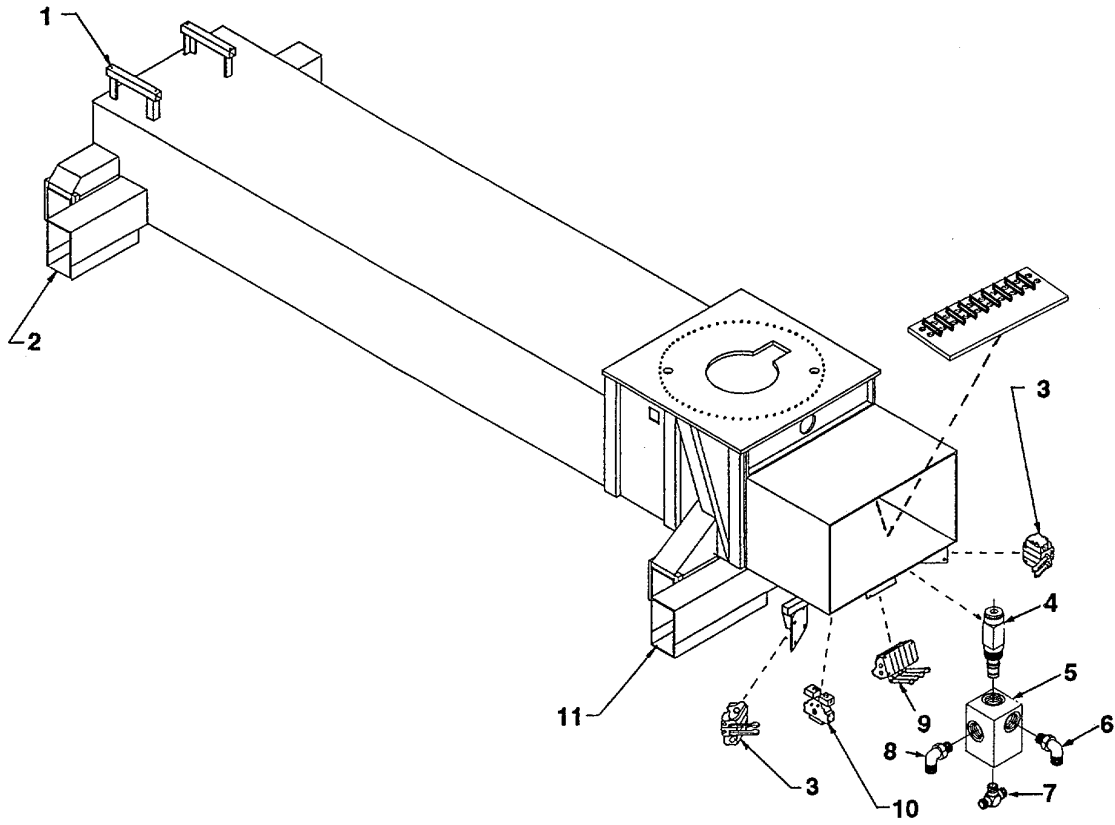


Figure F-192. Torque Box Assembly

F-488

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-192	04664	M10-600			TORQUE BOX ASSEMBLY	1
-1	04664	M10-600-1			STAND, Oil Tank Mounting	2
-2	04664	M10-600-2			TUBE, Outrigger Box-Front	2
-3	02249	V-20P-24			VALVE, Outrigger Extension & Retraction (See figure F-176 for details)	2
	04664	M10-600-3			VALVE ASSY, Pressure Reducing and Relieving	1
-4			54842	RR0-32H	VALVE, Pressure Reducing and Relieving	1
-5	04664	M10-600-4			BLOCK	1
-6			92003	6801-8-8	ELBOW, 90°	1
-7			92003	6803-8	TEE	1
-8			92003	6801-12-8	ELBOW, 90°	1
-9			02249	V-20P-2V	VALVE, Outrigger Jack (See figure F-176 for details)	2
-10	04664	M10-600-6			VALVE, Diverter, Solenoid Operated	1
-11	04664	M10-600-8			TUBE, Outrigger Box-Rear	2

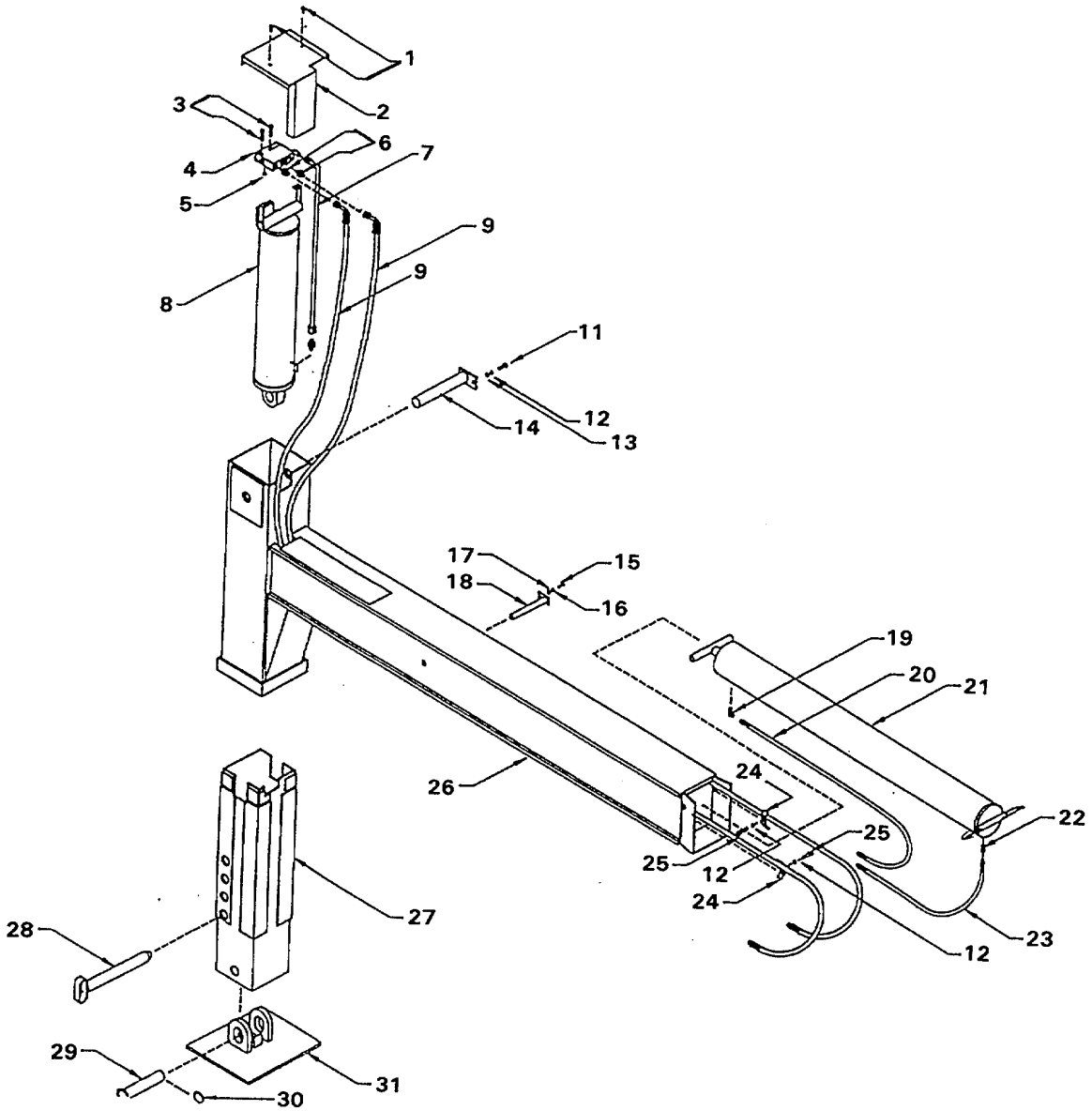


Figure F-193. Outrigger Assembly, Sheet 1 of 2

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-193	04664	M10-900			OUTRIGGER ASSEMBLY	2
-1	04664	M10-900-1			BOLT, 1/4" X 3/4", Gr 5	2
-2	04664	M10-900-2			COVER, Outrigger	1
-3	04664	M10-900-3			SCREW, Socket Hc 5/16" x 1-1/2"	2
-4	04664	M10-900-4			BLOCK ASSY, Manifold, Jack Hydraulic Cylinder (See figure F-194 for details)	1
-5	04664	M10-900-5			O-RING	1
-6			92003	#6400-6	FITTING, #6 M.S.A.E.-#6 M. J.I.C. Straight	2
-7	04664	M10-900-7			TUBE, Oil, 3/8" w/90° & Straight Fittings	1
-8	04664	M10-900-8			CYLINDER, Outrigger Jack (See figure F-195 for details)	1
-9	04664	M10-900-9			HOSE, Hydraulic, 3/8"	2
-11	04664	M10-900-11			BOLT, 3/8"-24 x 3/4", Gr 5	1
-12	04664	M10-900-12			WASHER, Int tooth 3/8"	1
-13	04664	M10-900-13			WASHER, Flat, 3/8"	1
-14	04664	M10-900-14			PIN, Outrigger, Jack Cylinder	1
-15	04664	M10-900-15			BOLT, 1/4"-20 x 1/2"	1
-16	04664	M10-900-16			WASHER, nt tooth, 1/4"	1
-17	04664	M10-900-17			WASHER, Flat, Int tooth, 1/4"	1
-18	04664	M10-900-18			PIN Outrigger Extension Cylinder	1
-19			92003	#6901-6	SWIVEL, 1/4" M. NPT-1/4" F. NPT 90°	1
-20	04664	M10-900-20			HOSE, Hydraulic, 1/4"	1
-21	04664	M10-900-21			CYLINDER, Outrigger Extend/Retract (See figure F-196 for details)	1
-22			92003	#1501-4	SWIVEL, 1/4" M. NPT- 1/4"F. NPT Straight	1
-23	04664	M10-900-23			HOSE, Hydraulic, 1/4"	1
-24	04664	M10-900-24			CLAMP, Hose Hydraulic, 1/4"	2
-25	04664	M10-900-25			BOLT 3/8" x 1-1/2"	2
-26	04664	M10-900-26			BEAM,, Outrigger	1
-27	04664	M10-900-27			TUBE, Outrigger Jack	1
-28	04664	M10-900-28			PIN, Outrigger Safety	1
-29	04664	M10-900-29			PIN, Outrigger Pad	1
-30	04664	M10-900-30			RING, Snap, 1-1/2"	1
-31	04664	M10-900-31			PAD, Outrigger	1

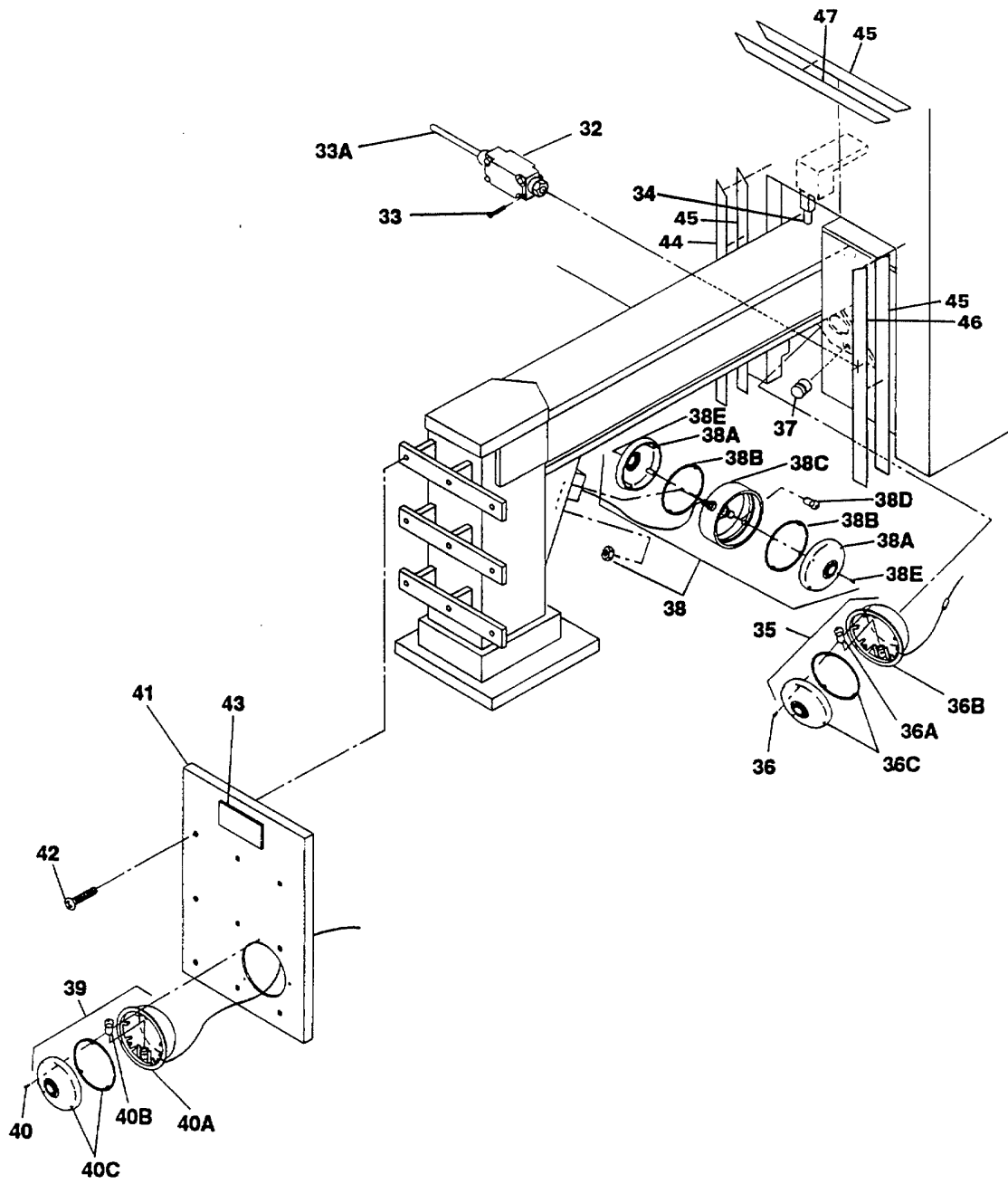


Figure F-193. Outrigger Assembly, Sheet 2 of 2

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-193-						
-32	04664	63-0108	MCRSW	8LS-152	SWITCH, Micro, Outrigger Extended, NC (ATTACHING PARTS)	4
-33	04664	82-2075-0200			SCREW, Ph Pn Hd, No. 10-24 x 2", Zn	8
-33A				9PA54	ACTUATOR	4
-34			83783	23F361	SWITCH, Micro, Outrigger Down, NO	4
-35	04664	61-0166	OD5S3	4-930-CL	LIGHT ASSY, 4" Clear (ATTACHING PARTS)	4
-36	04664	82-2039-001			SCREW, T410 Ph Pn Hd, Taptite, No. 10-24 x 1/2"	12
-36A			1P787	1156	BULB	1
-36B					BASE (NSS)	1
-36C			00553	9029W	LENS KIT	1
-37	04664	63-0172	6G238	SC616NP6A	ALARM, Fast Pulse Audible	2
-38	04664	61-0428	81834	78152-2	LIGHT ASSY, Flashing, 7", Two Face, Red	4
-38A			81834	90092	LENS	2
-38B			81834	51-9140-01	GASKET	2
-38C			81834	68080	BODY	1
-38D			1P787	1156	BULB	1
-38E			81834	23-0133-17	SCREW	8
-39	04664	61-0016	77977	3613194069	LIGHT ASSY, Flashing, 4" Red (ATTACHING PARTS)	4
-40	04664	82-2039-001			SCREW, T410 Ph Pn Hd, Taptite, No. 10-24 x 1/2"	12
-40A					BASE (NSS)	1
-40B			1P787	1156	BULB	1
-40C			77977	9021	LENS KIT	1
-41	04664	25-0982			COVER, Outrigger, S/S (ATTACHING PARTS)	4
-42	04664	82-2039-001			SCREW, T410 Ph Pn Hd, Taptite, No. 10-24 x 1/2"	36
-43	04664	91-0168			LABEL, Caution, Stand Clear of Outrigger	4
-44	04664	25-3461			TRIM, Outrigger-Side RH	4
-45	04664	943097		4950-VHB	TAPE, Foam, Two-sided, 3/4" Wide (ft)	AR
-46	04664	25-3460			TRIM, Outrigger-Side LH	4
-47	04664	25-3462-0002			TRIM, Outrigger-Top	4

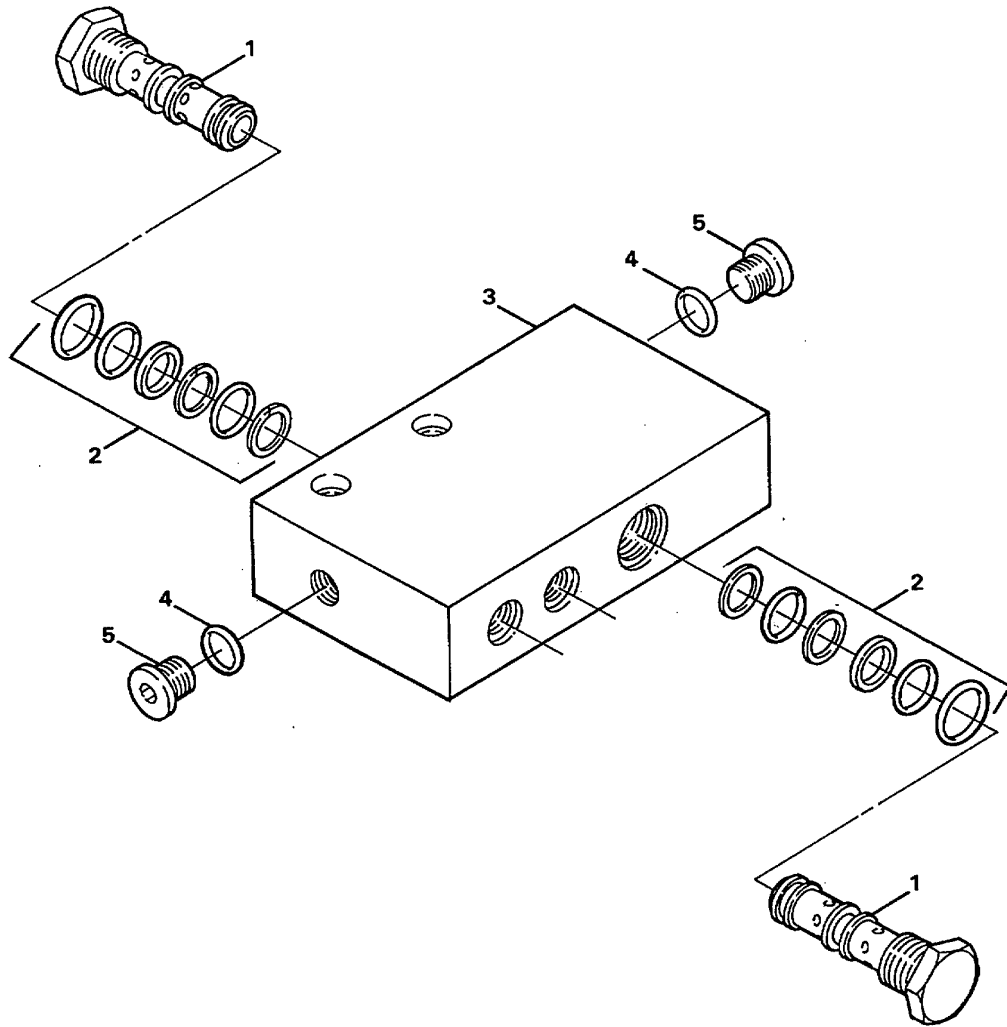


Figure F-194. Jack Cylinder Check Valve

F-494

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-194	04664	M10-900-4			JACK HYDRAULIC CYLINDER CHECK VALVE MANIFOLD BLOCK ASSEMBLY (See figure F-193 for NHA)	REF
-1	04664	M10-900-4-1			VALVE, Single Pilot Check	2
-2			54846	SK-10-3	KIT, Seal (Buna "N")	1
-2			54846	SK-10V-3	KIT, Seal (Viton)	1
-3	04664	M10-900-4-3			BLOCK, Manifold	1
-4	04664	M10-900-4-4			O-RING	2
-5	04664	M10-900-4-5			PLUG, Pipe, Hollow Hex	2

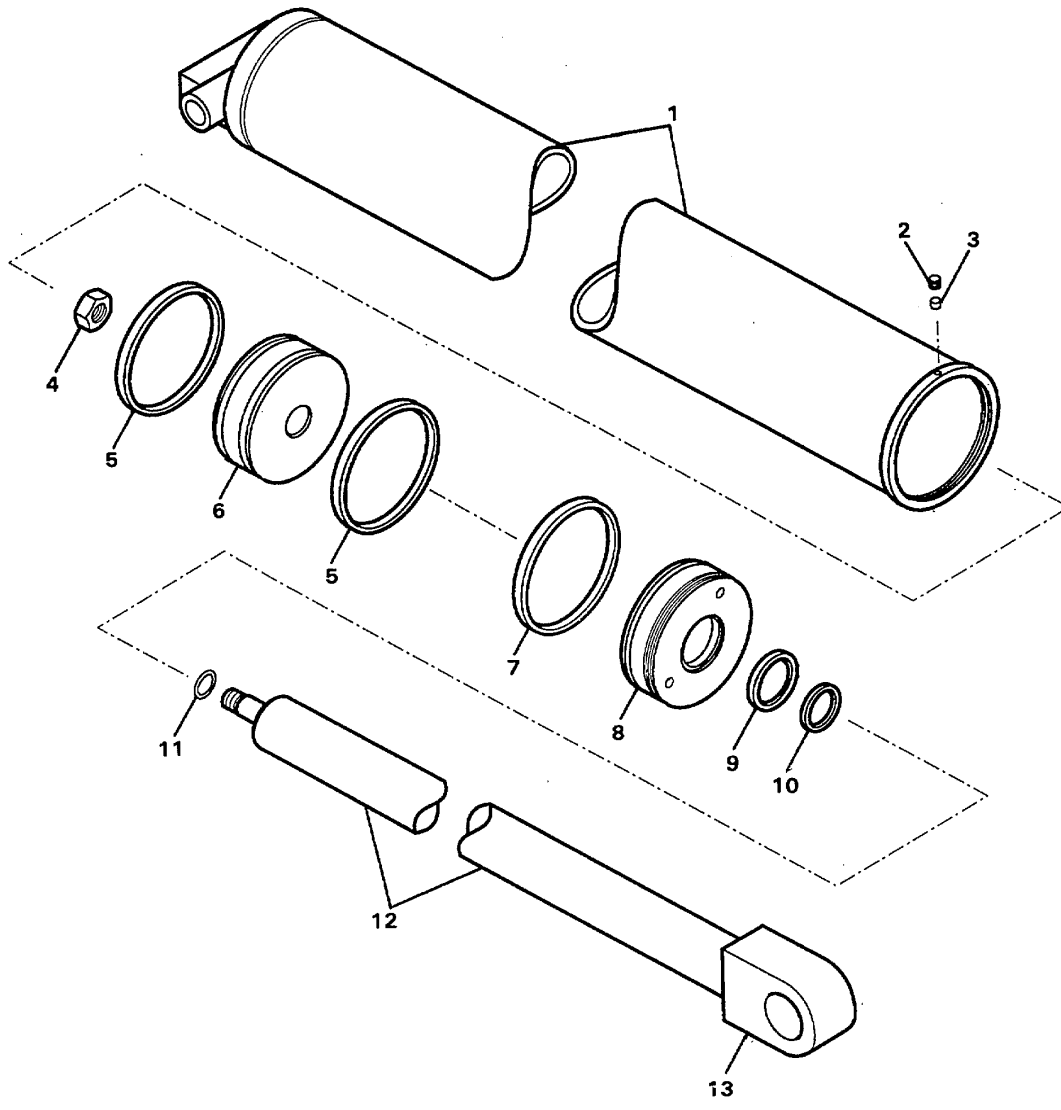


Figure F-195. Outrigger Jack Cylinder

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-195	04664	M10-900-8			OUTRIGGER JACK HYDRAULIC CYLINDER (See figure F-193 for NHA)	
						REF
-1	04664	M10-900-8-3			TUBE ASSY	1
-2	04664	M10-900-8-5			SETSCREW, Hex Socket, 1/4"-20 x 1/4"	1
-3	04664	M10-900-8-6			PLUG, Nylon	1
-4	04664	M10-900-8-7			NUT	1
-5			92003	3750-4250*	SEAL, Piston, Poly Perk	2
-6			29260	072100186	PISTON	1
-7			92003	2-350*	O-RING, Gland	1
-8			29260	082100217	GLAND	1
-9			92003	2500-2500-357B*	SEAL, Rod, Poly Pak	1
-10			92003	959-25*	SEAL, Wiper	1
-11			92003	2-214*	O-RING, Rod	1
-12			29260	011300357	ROD	1
-13	04664	M10-900-8-8			LUG, Rod	1
	04664	M10-900-8-14			KIT, Seal (Includes items marked *)	1

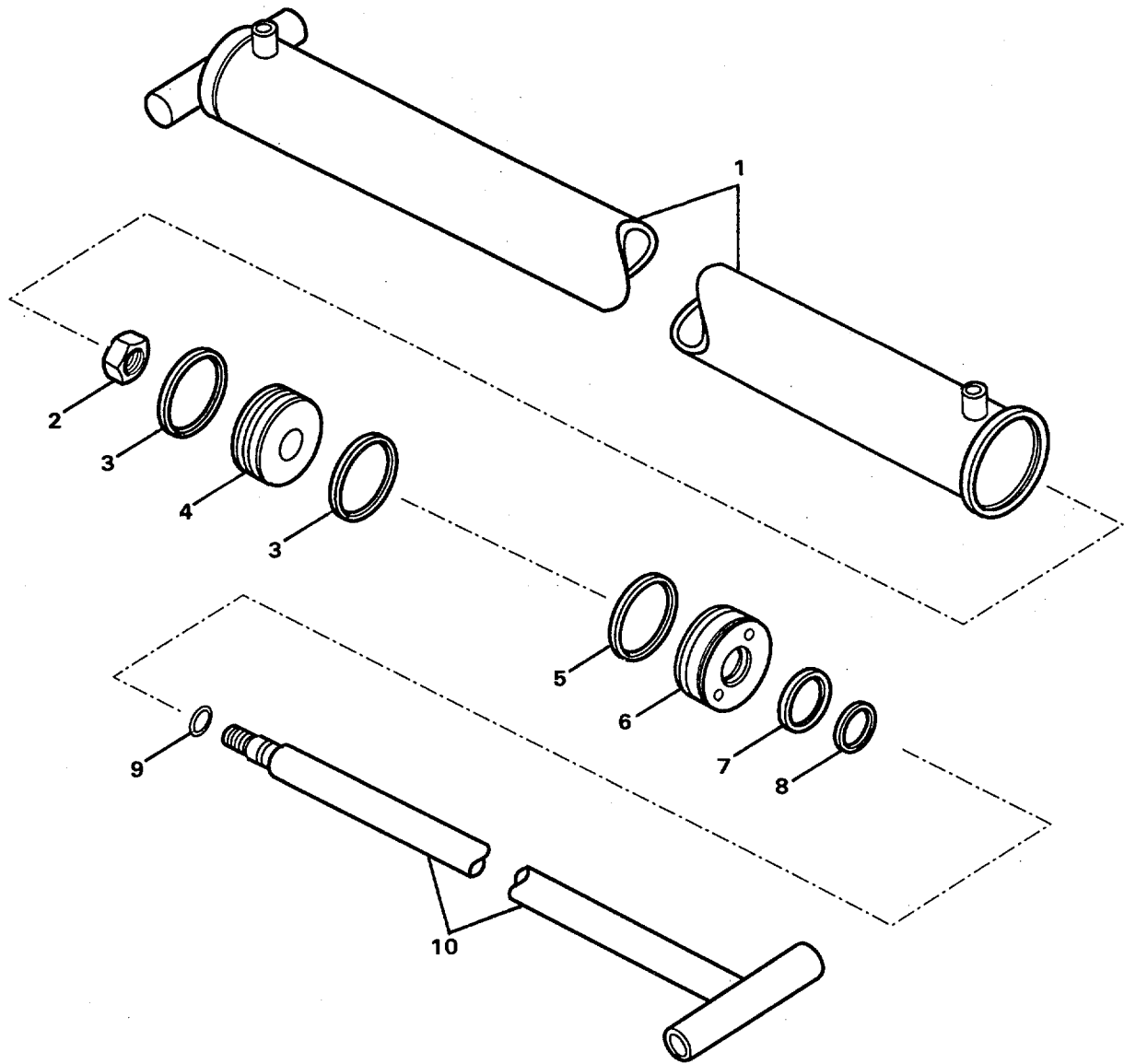


Figure F-196. Outrigger Extend/Retract Hydraulic Cylinder

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-196	04664	M10-900-21			OUTRIGGER EXTEND/RETRACT HYDRAULIC CYLINDER (See figure F-193 for NHA)	REF
-1	04664	M10-900-21-3			TUBE ASSY	1
-2	04664	M1 0-900-21-5			NUT	1
-3			92003	2500-1500*	SEAL, Piston	2
-4			29260	071100090	PISTON	1
-5			92003	2-326*	O-RING, Gland	1
-6			29260	081100118	.GLAND	1
-7			92003	1250-1250-250B*	SEAL, Rod	1
-8			92003	959-13*	SEAL, Wiper	1
-9			92003	2-21o*	O-RING, Rod	1
-10			29260	010600229	ROD ASSY	1
	04664	M10-900-21-11			KIT, Seal (Includes items marked *)	1

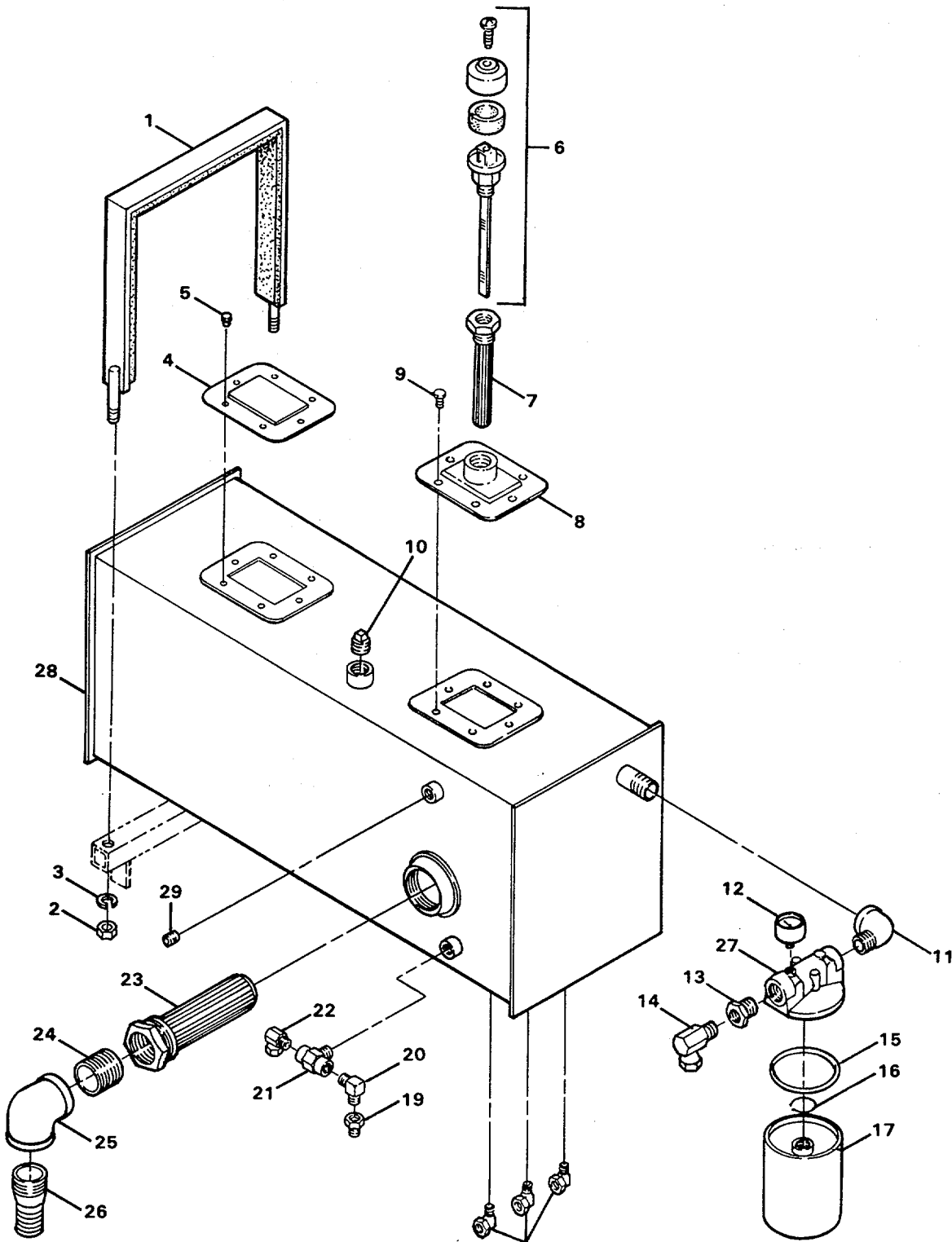


Figure F-197. Hydraulic Tank Assembly

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-197	04664	M10-1905			HYDRAULIC TANK ASSEMBLY	1
-1	04664	M10-1905-21			STRAP, Hydraulic Tank (ATTACHING PARTS)	2
-2	04664	M10-1905-22			NUT, Hex	4
-3	04664	M10-1905-23			WASHER, Lock	4
-4	04664	M10-1905-19			CAP, Inspection (ATTACHING PARTS)	1
-5	04664	M10-1905-20			BOLT, 3/8" X 1/2"	6
-6	04664	M10-1905-1			FILL CAP & DIPSTICK ASSY	1
-7			55524	S50-100	FILTER, Fill, Flow-Ezy	1
-8	04664	M10-1905-24			CAP, Adapter (ATTACHING PARTS)	1
-9	04664	M10-1905-30			BOLT, 3/8" x 1/2"	6
-10	04664	M10-1905-25			PLUG, Pipe	1
-11	04664	M10-1905-4			ELBOW, Street, 1-1/4"	1
-12	04664	M10-1905-5			GAUGE, Return Pressure	1
-13			92003	5406-20-16	BUSHING, Reducing 1-1/4" to 1"	1
-14			92003	6906-16	FITTING, 900, Swivel	1
-15	04664	M10-1905-6			O-RING	1
-16	04664	M10-1905-7			RING, Retaining	1
-17			60827	SSE-10	FILTER, Return, 10 Micron	1
-18			92003	6901-8	FITTING, Swivel, 900, 1/2"	3
-19	04664	M10-1905-26			BUSHING, Reducing	1
-20	04664	M10-1905-27			ELBOW	1
-21	04664	M10-1905-28			TEE	1
-22	04664	M10-1905-29			FITTING, 900, Swivel	1
-23			55524	S50-100	FILTER, Suction, Flow-Ezy	1
-24	04664	M10-1905-14			NIPPLE, Close, 2"	1
-25	04664	M10-1905-15			ELBOW, 90°, 2"	1
-26			55524	8-SHP		
-27			55524	SF120-15-0	CONNECTOR, Flow-Ezy HEAD, Spin-On Filter	1
-28	04664	M10-1905-2			TANK, Hydraulic	1
-29	04664	M10-1905-17			PLUG, Pipe, 1/4"	1

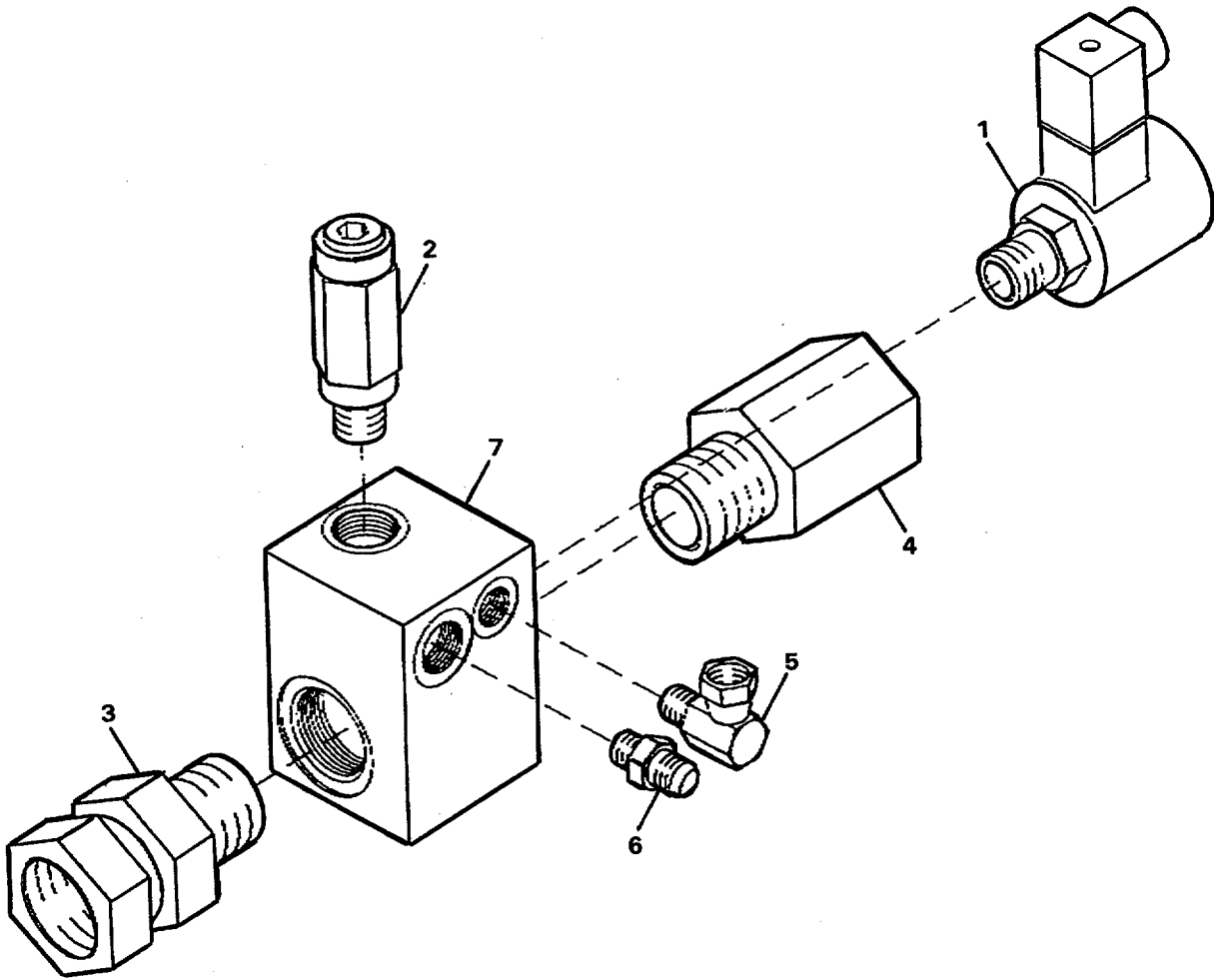


Figure F-198. System Relief Valve Block Assembly

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-198	04664	M10-2904			SYSTEM RELIEF VALVE BLOCK ASSEMBLY	1
-1			54846	SV3-10-C-0-1206	VALVE, Solenoid	1
-1			54846	SK-10-2	KIT, Seal (Buna "N")	1
-1			54846	SK-10V-2	KIT, Seal (Viton)	1
-2			54846	RV3-1 O-P-0-25	VALVE, Relief	1
-2			54846	SK-10-2	KIT, Seal (Buna "N")	1
-2			54846	SK-1 O-V-2	KIT, Seal (Viton)	1
-3			92003	6405-16-16	FITTING, Adapter, 1" F. NPT to M., No. 16 SAE	1
-4			92003	16GBV-S	FITTING, Adapter, 1" F. NPT to 1" Tube	1
-5			92003	6901-6-4	FITTING, 900 Adapter, M., No. 6 SAE to 1/4" F. NPT	1
-6			92003	6400-8-	FITTING, Adapter, M., No. 8 SAE to M. No. 8 JIC	1
-7	04664	M10-2904-			BLOCK, Valve	1

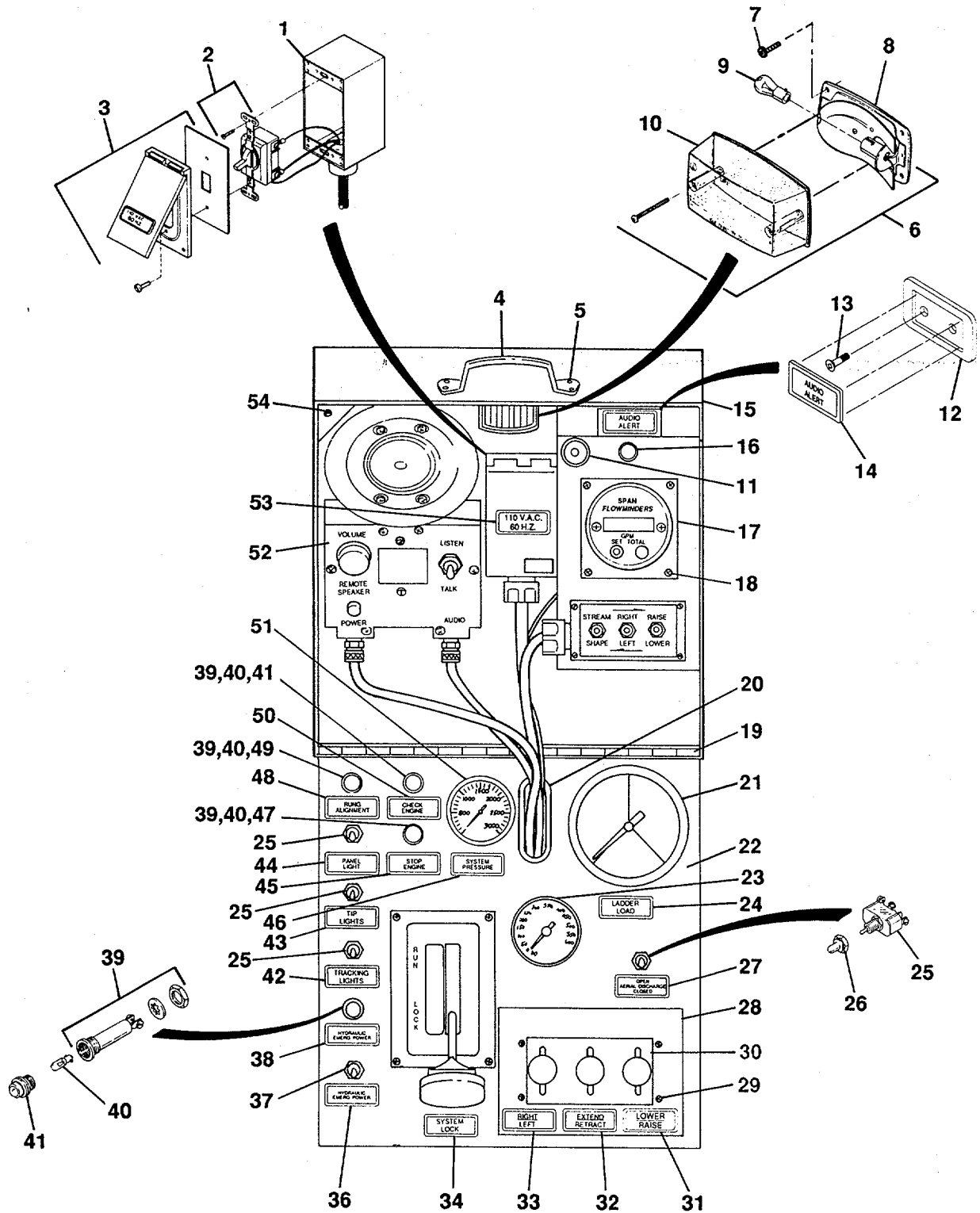


Figure F-1 99. Aerial Control Panel

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-199-	04664	M10-1906			AERIAL CONTROL PANEL	1
-1			5R984	BWF-BL5	BOX, Outlet, Single Gang - 3 Hole	1
-2	04664	20 AC1 -I			SWITCH, 1 10V AC Outlet, 20 Amp	1
-3		81865		PO-16	COVER, Vaportight	2
-4	04664	M10-1906-1			HANDLE, Control Panel Cover	1
-5	04664	82-2039-			(ATTACHING PARTS) SCREW, T410, Ph Pn Hd, Taptite, No. 10-24 x 1/2"	4
-6			27589	3936	LIGHT ASSY, Panel	1
-7	04664	82-2039-001			(ATTACHING PARTS) SCREW, t410, Ph Pn Hd, Taptite, No. 10-24 x 1/2"	4
-8			27589	393-991	BASE	1
-9			1P787	3156	BULB	1
-10			27589	306-25C	LENS, Clear	1
-11	04664	63-0700	78505	SC616NPV	ALARM	1
-12	04664	52-0162			BEZEL, Tag Stvle B w/Holes	17
-13	04664	82-2039-001			(ATTACHING PARTS) SCREW, Self Tap, No. 10-24 x 1/2" 34	
-14	04664	SD-09163			TAG, Audio Alert	
-15	04664	M10-1906-2			COVER, Control Panel	1
-16	04664		13445	23F361	SWITCH, Pushbutton	1
-17	04664	M10-1906-5			GAUGE, Water Flow	1
-18	04664	82-2039-002			(ATTACHING PARTS)	
-19	04664	M10-1906-3			SCREW, Self Tap, No. 10-24 x 3/4"	4
-20	04664	2804			HINGE, Control Panel Cover	1
-21	04664	M10-1906-7			GROMMET	1
-22	04664	M10-1906			GAUGE, Ladder Load	1
-23	04664	M10-1906-6			PANEL, Control	1
-24	04664	SD-09175			GAUGE, Water Pressure	1
-25			44447	2X464	TAG, Ladder Load	1
-26			13445	81255	SWITCH, Toggle	4
-27	04664	SD-09176			BOOT	5
-28	04664	M1 0-1 906-8			TAG, Aerial Discharge Open/Closed	1
-29	04664	82-2039-			BEZEL, Cover	1
-30	04664	M10-1906-9			(ATTACHING PARTS) SCREW, 410, Ph Pn Hd, Taptite, No. 10-24 x 1/2"	4
-31	04664	91-0149			SEAL, Boot	1
-32	04664	91-0150			TAG, Lower/Raise	1
-33	04664	91-0151			TAG, Extend/Retract	1
-34	04664	SD-09178			TAG, Right, Left	1
-36	04664	SD-09177			TAG, System Lock	1
-37	45059		4X200		TAG, Hydraulic Emerg. Power	1
-38	04664	91-0106			SWITCH, Toggle	1
-39			44447	44F1326	TAG, Hydraulic Emerg. Power	
-40			44447	10N144	SOCKET, Lamp	4
-41			44447	35F2794	LAMP, Mini Bayonet Base	4
-42	04664	91-0092			LENS, Green	2
-43	04664	91-0093			TAG, Tracking Lights	1
-44	04664	91-0005			TAG, Tip Lights	1
-45	04664	91-0199			TAG, Panel Light	1
-46	04664	91-0091			TAG, Stop Engine	1
-47	04664	91-0092	44447	35F2792	TAG, System Pressure	1
-48	04664	91-0087			LENS, Red	1
-49	44447	35F2792			TAG, Rung Alignment	1
-50	04664	91-0197			LENS, Amber	1
-51	04664	M10-1906-10			TAG, Check Engine	1
-52	27589	AD-26-8M44			GAUGE, System Pressure	1
-53	04664	SD-09162			INTERCOM	1
-54	04664	SJ-5009			AG, 110 VAC 60 HZ BUMPER, Rubber	1

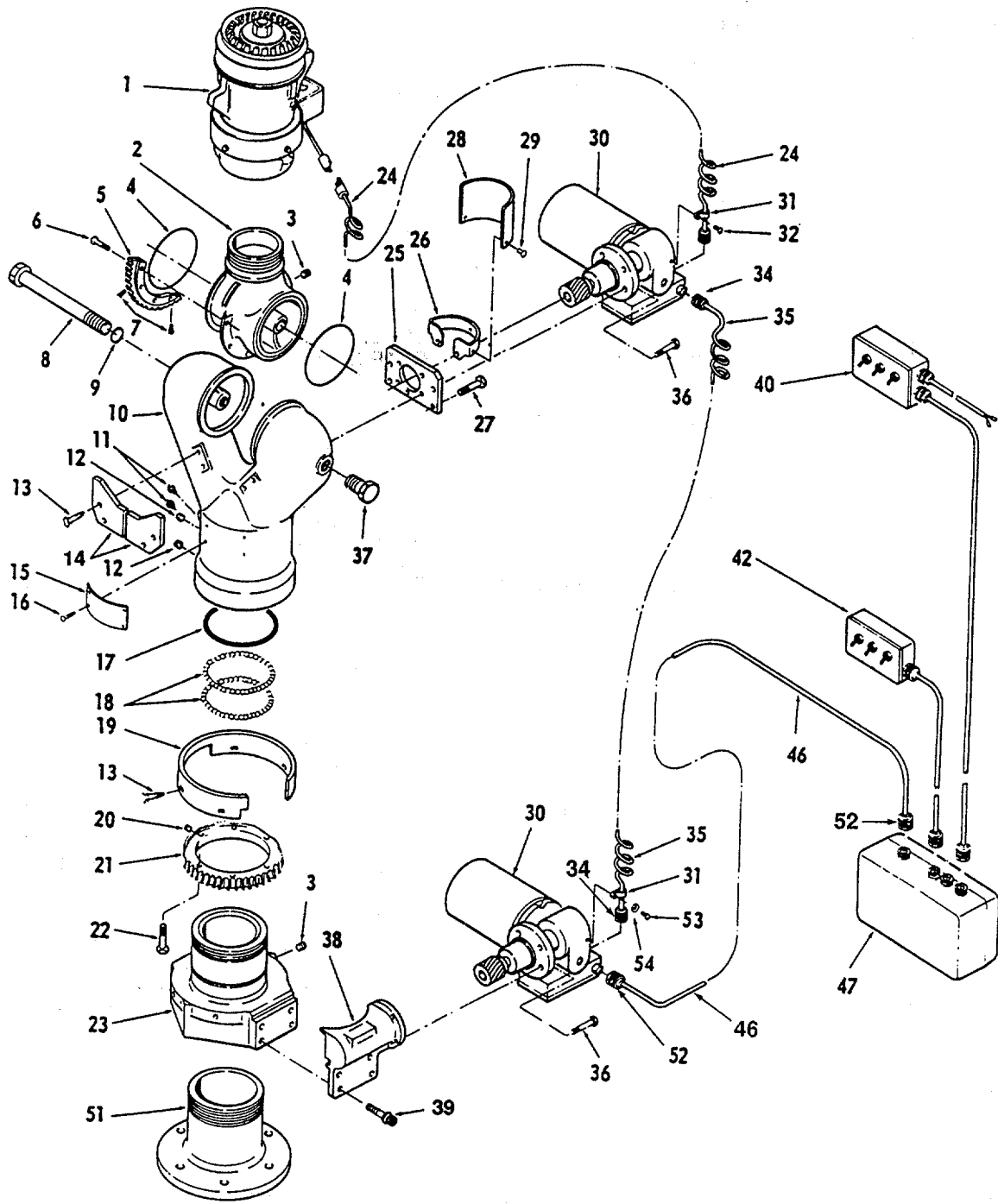


Figure F-200. Monitor and Nozzle Assembly

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-200-			00912	3478-00-0-0-010	MONITOR AND NOZOLE ASSEMBLY	
-1			00912	5058-00-7-7-56-001	AKROMATIC, Electric, 1000	1
-2			00912	3475-00-7-0-88-001	TEE, Outlet	1
-3			00912	7-44-009	PLUG, Pipe, Soc Hd	5
-4			00912	7-57-121	O-RING	2
-5			00912	40007656	GEAR, Elevation	1
-6			00912	7-65-030	SCREW, Cap, Hex Hd	4
-7			00912	7-65-014	SCREW, Cap, Soc Hd	2
-8			00912	7-65-097	SCREW, Cap, Soc Hd	1
-9			00912	7-57-170	O-RING	1
-10			00912	3475-007-0-83-001	SIAMESE	1
-11			00912	7-13-036	FITTING, Grease	2
-12			00912	7-42-023	PLUG, Swivel	2
-13			00912	7-67-092	SCREW, Self Tapping	2
-14			00912	7-18-085	GUARD, Gear	2
-15			00912	7-73-116	NAMEPLATE	1
-16			00912	7-67-006	SCREW, Drive	4
-17			00912	7-57-172	O-RING	1
-18			00912	7-03-117	BALL, Bearing	112
-19			00912	7-18-086	GUARD, Gear, Rotational	1
-20			00912	7-65-084	SCREW, Set	1
-21			00912	40007667	GEAR, Rotational	1
-22			00912	7-61-064	SCREW, Cap, Hex Hd	6
-23			00912	3470-00-7-0-09-001	BASE, Standard, 4" NPT	1
-24			00912	3478-00-2-16-001	CABLE ASSY, Nozzle	1
-25			00912	3475-00-7-0-62-001	PLATE, Mounting	1
-26			00912	7-04-143	BRACKET, Gear Guard	1
-27			00912	7-61-017	SCREW, Cap, Hex Hd	4
-28			00912	7-18-084	GUARD, Gear, Upper	1
-29			00912	7-54-042	RIVET	3
-30			00912	3478-00-7-2-39-010	MOTOR AND GEAR ASSY	2
-31			00912	7-07-124	CLAMP, Cable	2
-32			00912	7-61-051	SCREW, Round Hd	1
-33			00912	7-18-047	GRIP, Cable	1
-34			00912	7-18-018	GRIP, Cable	2
-35			00912	3478-00-2-16-002	CABLE ASSY	1
-36			00912	7-61-070	SCREW, Cap, Hex Hd	10
-37			00912	7-65-098	SCREW, Cap, Hex Hd	1
-38			00912	3475-00-7-0-14-001	BRACKET, Mounting	1
-39			00912	7-67-043	SCREW, Cap, Soc Hd	4
-40			00912	3478-00-2-25-032	CONTROL ASSY, Lower w/Diode and Toggle Switches	1
-41			00912	7-08-084	DIODE, for item 40 (not shown)	1
-42			00912	3475-00-2-25-031	CONTROL ASSY, Upper w/Toggle Switches	1
-43			00912	7-69-314	SWITCH, Toggle for items 40 & 42 (not shown)	6
-44			00912	7-04-218	BOOTS, Toggle for items 40 & 42 (not shown)	6
-46			00912	3478-00-0-2-16-003	CABLE ASSY	1
-47			00912	3478-00-0-2-72-031	RELAY BOX ASSY, w/Automatic Override	1
-47			00912	7-04-215	BOARD, PC, w/Automatic Override for item 47 (not shown)	1
-47			00912	7-58-141	RELAYS, for item 47 (not shown)	1
-51			00912	3470-00-0-35-002	INLET, Fig 150#, 3"	1
-52			00912	7-18-105	GRIP, Cable	2
-53			00912	7-61-041	SCREW, Round Hd	1
-54			00912	7-84-041	WASHER	1

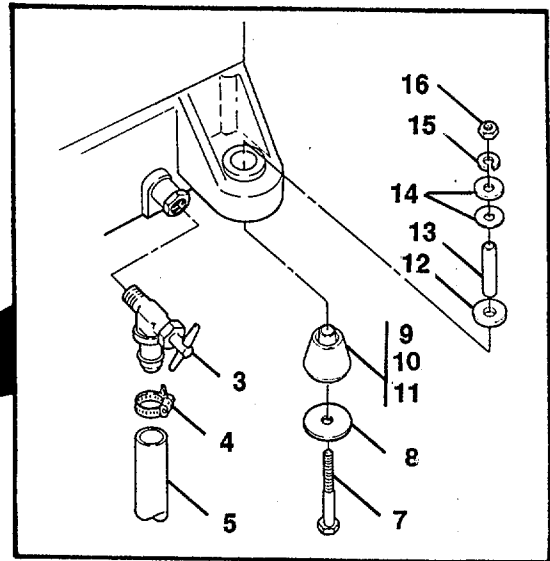
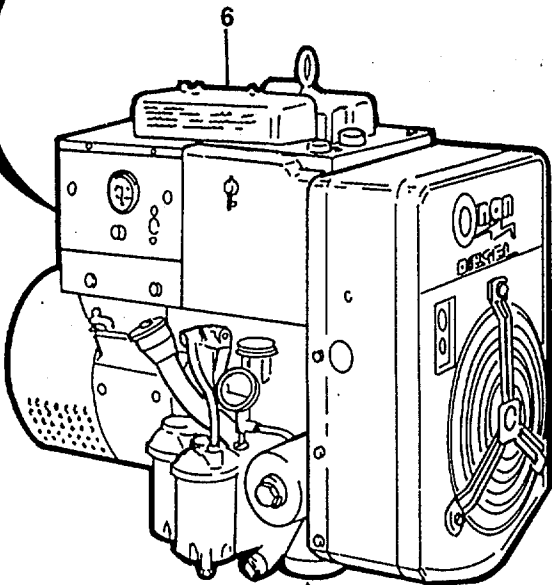
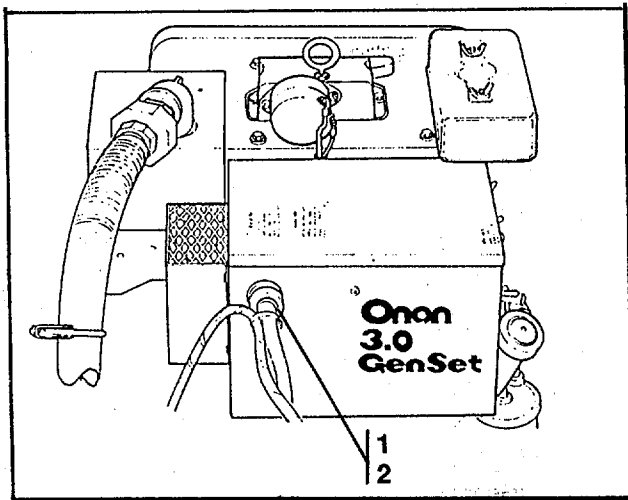


Figure F-201. Auxiliary Power Unit (APU)

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-201						
-1	04664	64-0183	5S327	SCH-1037	AUXILIARY POWER UNIT (APU) CONNECTOR, Cable, Strain Relief, 3/4"	1
-2	04664	64-0344-002			LOCKNUT, Cable Connector, 3/4"	2
-3	04664	42-0173	92003	V404PH-10-6	VALVE, Shutoff	1
-4	04664	80-2029-003	70523	31670	CLAMP, Hose	1
-5	04664	940003	OCME1	20R3	HOSE, Rubber, 5/8"	AR
-6	04664	63-0563	44940	3.ODJA-3CR	GENIERATING SET, Electric (See figures F-202 thru F-216 for details, (ATTACHING PARTS)	1
-7			44940	816-0212	BOLT, Carriage, 7/16"- 14 x 5-1/2"	4
-8			44940	526-0198	WASHER, Flat, 5/8" x 1-1/2"	4
-9			44940	402-0284	CUSHION, Vibration - Cone Shaped (Engine End)	2
-10	44940	402-0285			CUSHION, Vibration - Cone Shaped (Generator End)	2
-11			44940	402-0300	CUT, Cushion Retaining	4
-12			44940	402-0282	SNUBBER, Shock Mounting	4
-13			44940	402-0328	BUSHING, Spacer, Vibration Mount	4
-14			44940	526-0014	WASHER, 29/64" x 1-1/2" x 1/8"	4
-15			44940	850-0055	WASHER, Lock, 7/16"	4
-16			44940	862-0004	NUT, Hex, 7/16" - 14	4
			44940	168-0085	GASKET KIT, Generating Set	1
			44940	522-0249	OVERHAUL KIT, Generating Set	1

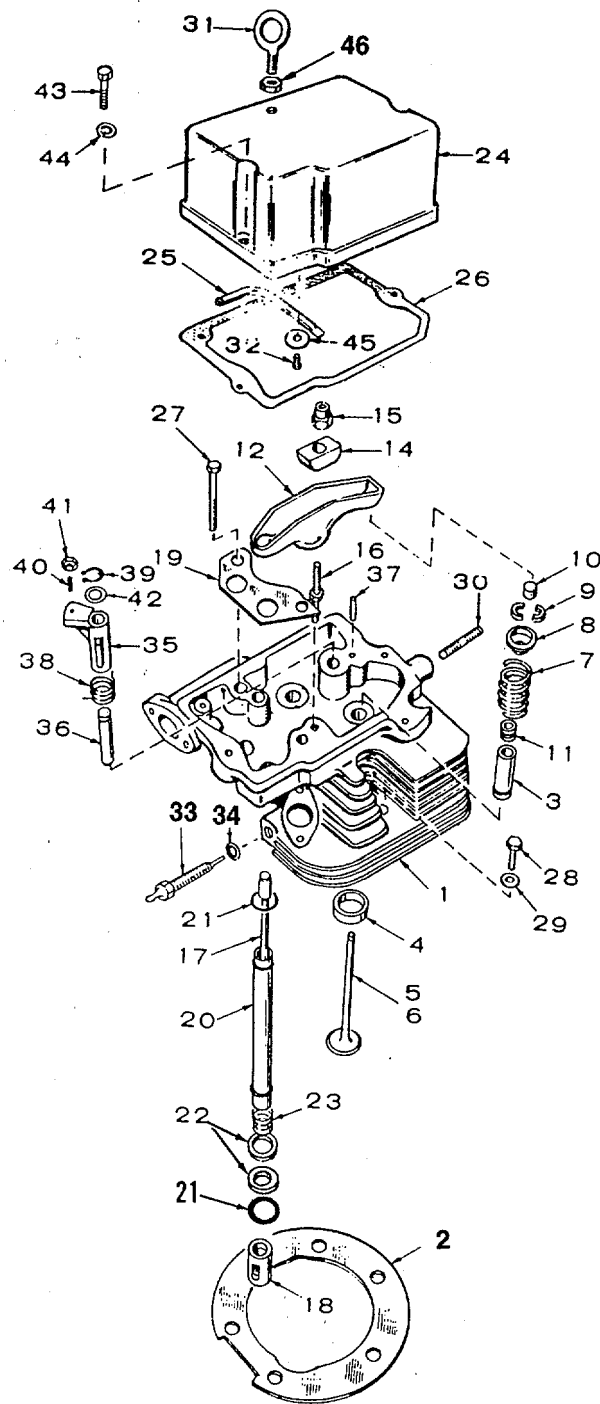


Figure F-202. Cylinder Head Assembly

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-202-					CYLINDER HEAD ASSEMBLY, (See figure F-201 for NHA)	
-1			44940		CYLINDER ASSY, Head	1
-1			44940	110-1695	CYLINDER, Less Valves	1
-1			44940	110-2963	CYLINDER, w/Valves	1
-2			44940	110-1267	GASKET, Head	1
-3			44940	110-1501	GUIDE, Valve	1
-4			44940	110-1268	INSERT, Valve Seat, Standard	2
-4			44940	110-1268-02	INSERT, Valve Seat, .002" Oversize	2
-4			44940	110-1268-05	INSERT, Valve Seat, .005" Oversize	2
-4			44940	110-1268-10	INSERT, Valve Seat, .010" Oversize	2
-4			44940	110-1268-25	INSERT, Valve Seat, .025" Oversize	2
-5			44940	110-1320	VALVE, Intake	1
-6			44940	110-1278	VALVE, Exhaust, Stellite	1
-7			44940	110-1221	SPRING, Valve	2
-8			44940	110-1220	RETAINER, Valve Spring	2
-9			44940	110-0858	LOCK, Valve Spring Retainer	4
-10			44940	110-0859	CAP, Valve Stem	2
-11			44940	509-0090	SEAL, Oil - Intake Valve	1
-12			44940	115-0128	ARM, Rocker, Exhaust	1
-12			44940	115-0129	ARM, Rocker, Intake	1
-14			44940	115-0127	BALL, Rocker Arm	2
-15			44940	115-0150	NUT, Lock, Rocker Arm	2
-16			44940	115-0152	STUD, Rocker Arm	2
-17			44940	115-0149	ROD, Valve Push	2
-18			44940	115-0195	TAPPET, Valve	2
-19			44940	115-0147	GUIDE, Push Rod	1
-20			44940	115-0151	SHIELD, Push Rod	2
-21			44940	509-0084	SEAL, Push Rod Shield	4
-22			44940	115-0155	WASHER, Spring Retaining	4
-23			44940	115-0146	SPRING, Shield Retainer	2
-24			44940	115-0188	COVER, Rocker	1
-25			44940	120-0595	LINE, Oil - Rocker Cover	1
-26			44940	115-0160	GASKET, Rocker Cover	1
-27			44940	110-1264	SCREW, Cylinder Head, 3/8"-16 x 4-1/4"	2
-28			44940	110-0814	SCREW, Cylinder Head, 3/8"-16 x 1-1/2"	4
-29			44940	526-0174	WASHER, Cylinder Head	4
-30			44940	520-0608	STUD, Exhaust Manifold	2
-31			44940	403-0671	BOLT, Lifting	1
-32			44940	809-0042	SCREW, Oil Line - Rocker Cover	1
-33			44940	333-0106	PLUG, Glow	1
-34			44940	110-0546	GASKET, Glow Plug	1
-35			44940	110-1512	ARM, Decompression Release	1
-36			44940	110-1444	PIN, Decompression Release	1
-37			44940	516-0090	PIN, Roll, 3/8" x 1-3/8"	1
-38			44940	110-1356	SPRING, Compression	1
-39			44940	518-0207	RING, Retainer	1
-40			44940	815-0252	SCREW, Set	1
-41			44940	870-0134	PALNUT	1
-42			44940	110-1511	WASHER, Decompression Release	1
-43			44940	110-0879	SCREW, Hex Cap, 5/16"-18 x 1-1/4"	2
-44			44940	850-0045	WASHER, Lock	2
-45			44940	526-0130	WASHER, Flat, 5/16"	1
-46			44940	862-0003	NUT, Hex, 3/8"-1 6	1

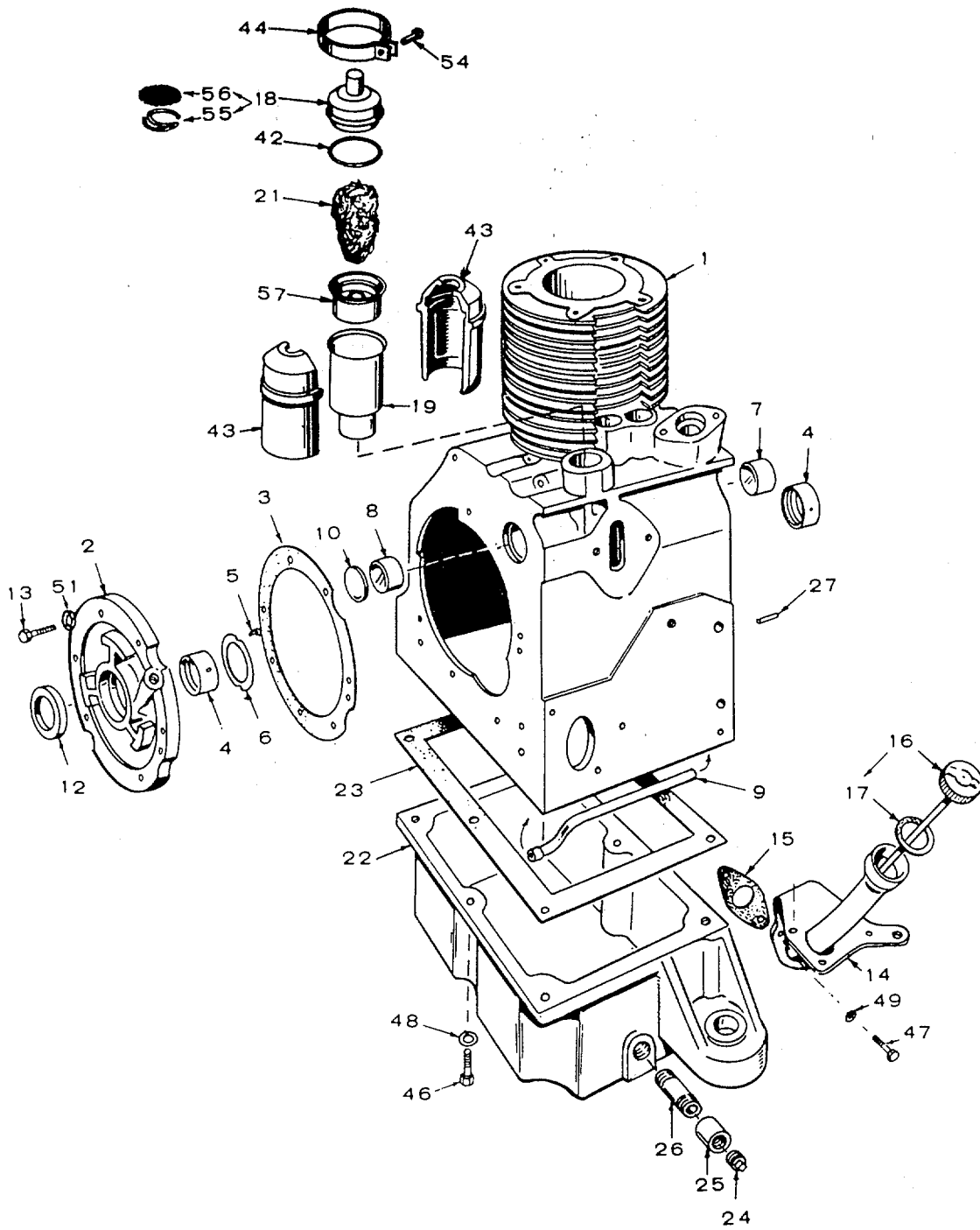


Figure F-203. Cylinder Block and Oil Base

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-203-					CYLINDER BLOCK AND OIL BASE ASSY(See figure F-201 for NHA)	
-1			44940	110-1335	BLOCK ASSY, Cylinder	1
-2			44940	101-0337	PLATE, Bearing (Less Bearing and Pins)	
1						
-3			44940	101-0386	GASKET KIT, Bearing Plate (Includes Steel Shim)	1
-4			44940	101-0359	BEARING, Precision, Standard	2
-4			44940	101-0359-02	BEARING, Precision, .002" Undersize	2
-4			44940	101-0359-10	BEARING, Precision, .101" Undersize	2
-4			44940	101-0359-20	BEARING, Precision, .020" Undersize	2
-4			44940	101-0359-30	BEARING, Precision, .030" Undersize	2
-5			44940	516-0072	PIN, Thrust Washer	2
-6			44940	104-0420	WASHER, Crankshaft Thrust	2
-7			44940	101-0363	BEARING, Precision Cam, Front Standard Only	1
-8			44940	101-0365	BEARING, Precision Cam Rear, Standard Only	1
-9			44940	120-0572	TUBE, Crankcase Oil	1
-10			44940	517-0053	PLUG, Camshaft Opening	1
-12			44940	509-0086	SEAL, Crankshaft Rear	1
-13			44940	805-0019	BOLT, Place, 3/8"-16 x 1-1/4"	6
-14			44940	123-1084	TUBE, Oil Fill	1
-15			44940	123-0667	GASKET, Oil Fill Tube	1
-16			44940	123-0716	DIPSTICK	1
-17			44940	123-0191	GASKET, Cap	1
-18			44940	123-0787	CAP, Breather	1
-18			44940	123-1203	CAP & VALVE ASSY, Breather	1
-19			44940	123-0952	TUBE, Breather	1
-21			44940	1213-0865	BAFFLE, Breather	1
-22			44940	102-0541	BASE, Oil	1
-23			44940	102-0459	GASKET, Base	1
-24			44940	505-0056	PLUG, 1/2"	1
-25			44940	505-0014	COUPLING, 1/2"	1
-26			44940	505-0002	NIPPLE, 1/2" x 3"	1
-27			44940	516-0141	PIN, Dowel - Gear Cover Locating (Part of Cylinder Block Assy)	1
-42			44940	509-0117	O-RING	1
-43			44940	123-0998	INSULATOR HALVES - Breather Tube	2
-44			44940	518-0268	CLAMP, Breather Tube Insulator Halves	1
-46			44940	800-0050	SCREW, Hex Hd, 3/8"-16 x 1"	6
-47			44940	800-0026	SCREW, Hex Hd, 5/16"-18 x 3/4"	2
-48			44940	850-0050	WASHER, Lock, 3/8"	6
-49			44940	850-0045	WASHER, Lock, 5/16"	2
-51			44940	526-0245	WASHER, Flat, 3/8"	6
-54			44940	809-0035	SCREW, Machine - Round Head, No. 8 x 3/4"	1
-55			44940	123-1201	RETAINER, Breather Screen	1
-56			44940	123-1202	SCREEN, Breather	1
-57			44940	123-1153	CUP, Baffle	1

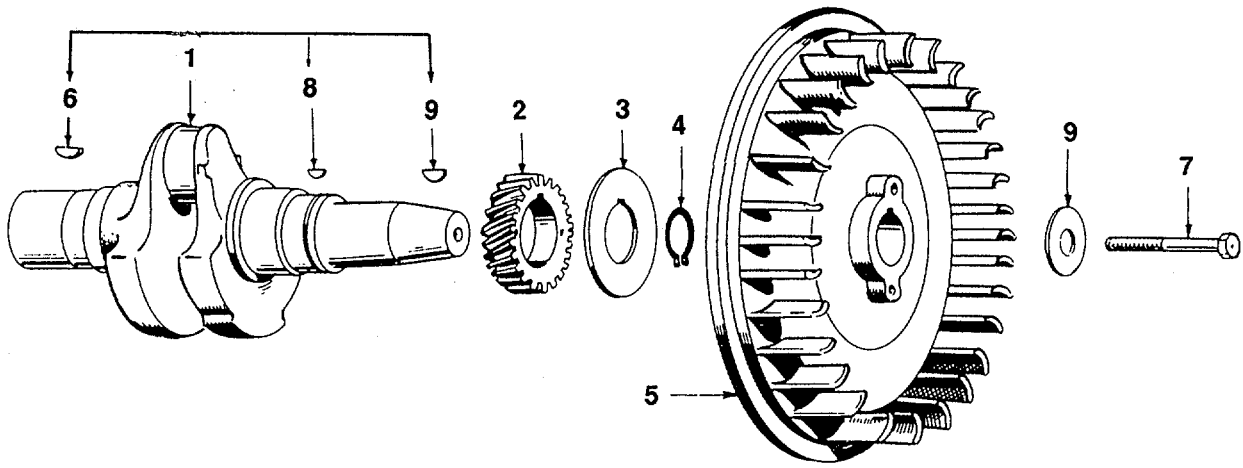


Figure F-204. Crankshaft and Flywheel

F-514

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-204					CRANKSHAFT AND FLYWHEEL (See figure F-201 for NHA)	
-1			44940	104-0462	CRANKSHAFT KIT (Includes Items 1, 6, 8, and 19)	1
-2			44940	104-0418	GEAR	1
-3			44940	104-0416	WASHER, Retainer	1
-4			44940	518-0188	RING, Lock	1
-5			44940	104-0529	FLYWHEEL	1
-6			44940	515-0006	KEY, Blower to Crankshaft	1
-7			44940	800-0500	SCREW, Flywheel, 7/16" x 5-1/2'	1
-8			44940	515-0001	KEY, Gear	1
-9			44940	515-0153	KEY, Woodruff	1
-10			44940	104-0529W	WASHER	1

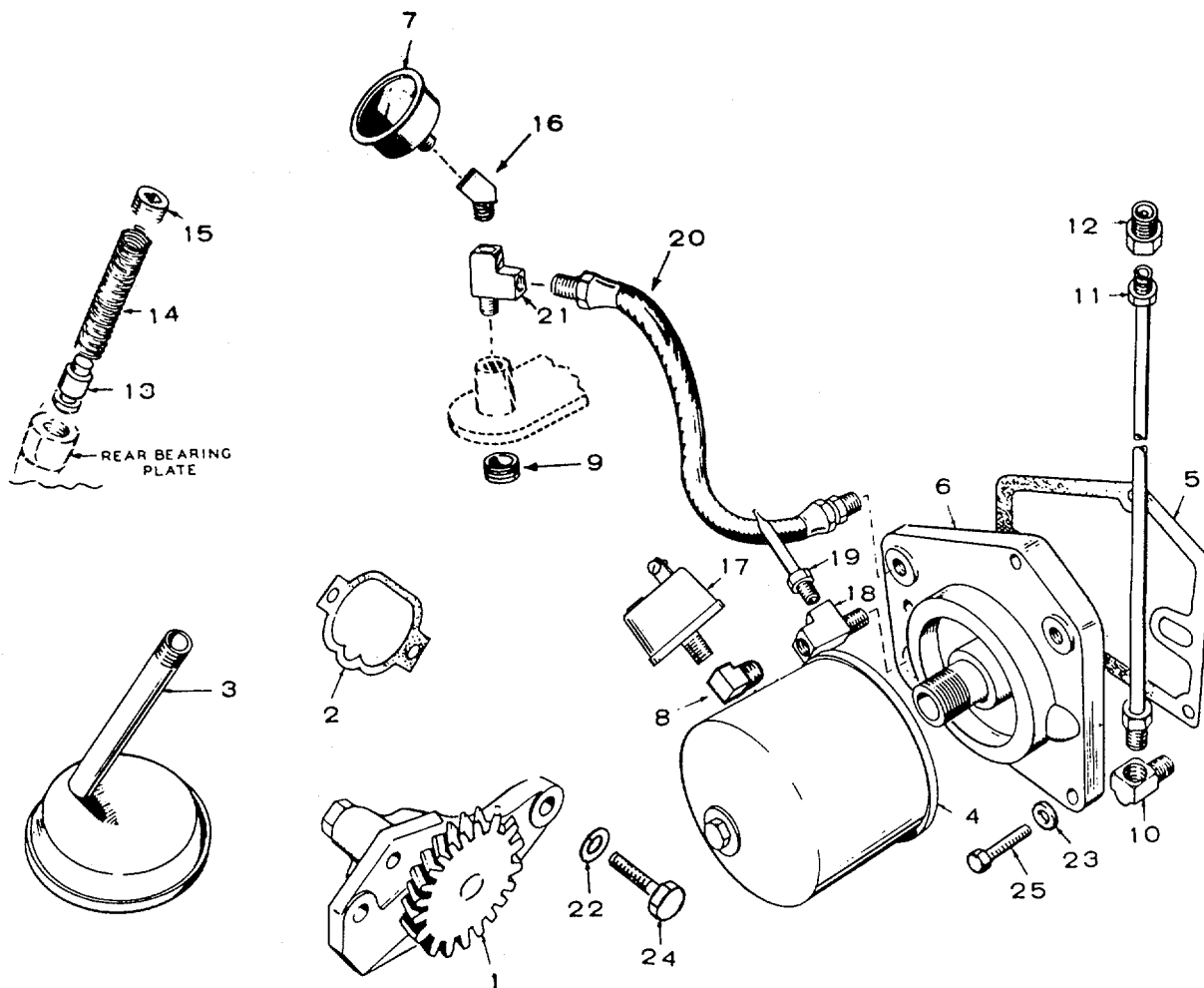


Figure F-205. Oil System

F-516

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-205-					OIL SYSTEM (See figure F-201 for NHA)	
-1			44940	120-0547	PUMP ASSY, Oil	1
-2			44940	120-0580	GASKET	1
-3			44940	120-0551	CUP, Oil Intake	1
-4			44940	122-0185	FILTER, Oil	1
-5			44940	122-0188	GASKET, Adapter	1
-6			44940	122-0182	ADAPTER, Oil Filter	1
-7			44940	193-0006	GAUGE, Oil Pressure	1
-8			44940	502-0020	ELBOW, Street - 900	1
-9			44940	505-0274	PLUG, 1/8" Adapter	1
-10			44940	502-0037	ELBOW, Adapter	1
-11			44940	120-0622	LINE, Adapter to Cylinder Head	1
-12			44940	502-0281	CONNECTOR, Restricted Cylinder Head	1
-13			44940	120-0539	VALVE, Oil By-Pass	1
-14			44940	120-0555	SPRING, By-Pass Valve	1
-15			44940	505-0274	PLUG, 1/8"	2
-16			44940	502-0053	ELBOW, Oil Gauge Mounting, 450	1
-17			44940	309-0104	SWITCH, Low Oil Pressure Cut-Off	1
-18			44940	502-0255	TEE, Restricted, Air Trap Tube	1
-19			44940	120-0598	TUBE, Air Trap - Switch	1
-20			44940	501-0003	LINE, Oil Gauge	1
-21			44940	502-0001	TEE, Oil Gauge Mounting	1
-22			44940	850-0045	WASHER, Lock, 5/16"	2
-23			44940	850-1045	WASHER, Lock, 5/16"	3
-24			44940	800-0030	SCREW, Hex Hd, 5/16"-1 8 x 1" 2	2
-25			44940	800-0026	SCREW, Hex Hd, 5/16" x 3/4"	3

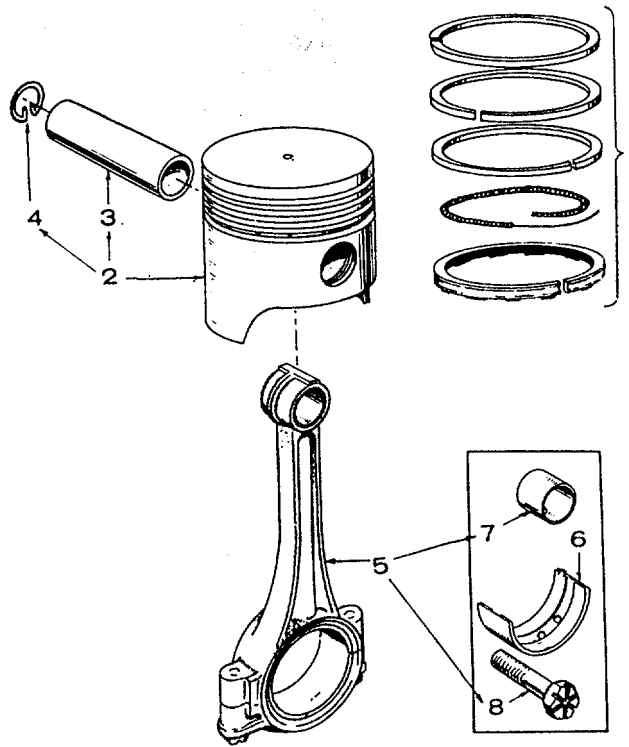


Figure F-206. Piston and Rod Assembly

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-206-					PISTON AND ROD ASSEMBLY (See figure F-201 for NHA)	
-1			44940	113-0130	RINGSET, Piston, Standard	1
-1			44940	113-0130-05	RING SET, Piston, .005" Oversize	1
-1			44940	113-0130-10	RINGSET, Piston, .010"Oversize	1
-1			44940	113-0130-20	RING SET, Piston, .020" Oversize	1
-1			44940	113-0130-30	RING SET, Piston,.030" Oversize	1
-1			44940	113-0130-40	RING SET, Piston, .040" Oversize	1
-2			44940	112-0109	PISTON & PIN (Includes Pin Retain- ing Rings) Standard	1
-2			44940	112-0109-05	PISTON & PIN, .005" Oversize	1
-2			44940	112-0109-10	PISTON & PIN,.010" Oversize	1
-2			44940	112-0109-20	PISTON & PIN, .020" Oversize	1
-2			44940	112-0109-30	PISTON & PIN, .030" Oversize	1
-2			44940	112-0109-40	PISTON & PIN, .040" Oversize	1
-3			44940	112-0093	PIN, Piston	1
-4			44940	112-0085	RING, Retaining- Pin	2
-5			44940	114-0168	ROD ASSY, Connecting	1
-6			44940	114-0164	BEARING HALF, Connecting Rod, Standard	2
-6			44940	114-0164-10	BEARING HALF, Connecting Rod, .010" Undersize	2
-6			44940	114-0164-20	BEARING HALF, Connecting Rod, .020" Undersize	2
-6			44940	114-0164-30	BEARING HALF, Connecting Rod, .030"	2
-7			44940	114-0170	BUSHING, Piston Pin	2
-8			44940	805-0012	BOLT, 5/16"-24 x 1-13/16"	2

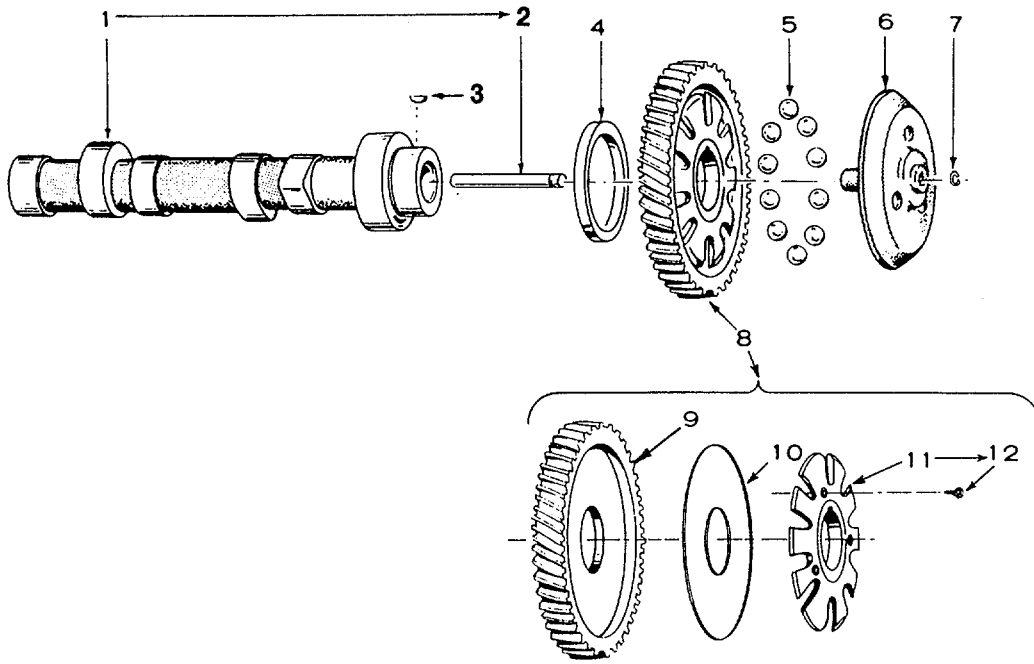


Figure F-207. Camshaft

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-207-					CAMSHAFT (See figure F-201 for NHA)	
-1			44940	105-0299	CAMSHAFTASSY	1
-2			44940	150-0075	PIN, Center	1
-3			44940	515-001	KEY, Woodruff	1
-4			44940	105-0205	WASHER, Thrust	1
-5			44940	510-0046	BALL, Fly - Governor	10
-6			44940	150-0775	CUP, Governor	1
-7			44940	150-0078	RING, Retaining	1
-8			44940	105-0218	GEAR ASSY, Camshaft	1
-9			44940	105-0465	GEAR, Camshaft	1
-10			44940	150-0773	PLATE, Governor Flyball	1
-11			44940	150-1842	KIT, Governor Spacer	1
-12			44940	815-0506	SCREW, Spacer Mounting	3

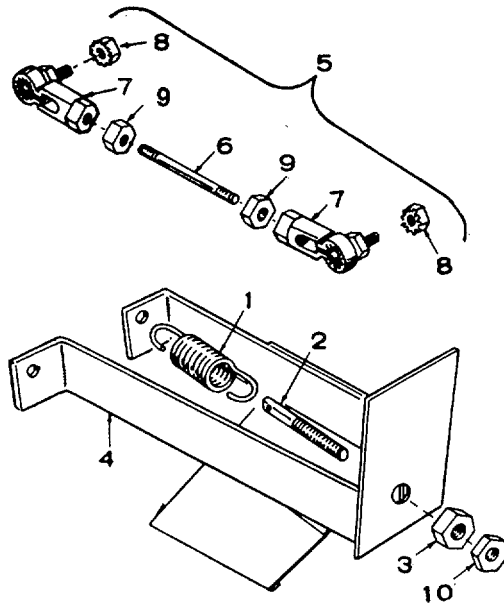


Figure F-208. Governor Assembly

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY
F-208-					GOVERNOR ASSEMBLY (See figure F-201 for NHA)	
-1			44940	150-1084	SPRING, Governor	1
-2			44940	150-1082	STUD, Adjusting	1
-3			44940	862-0003	NUT, Adjusting Stud	1
-4			44940	150-1107	BRACKET ASSY	1
-5			44940	150-1202	LINKAGE ASSY, Governor	1
-6			44940	150-1201	LINK	1
-7			44940	150-0939	JOINT, Ball	2
-8			44940	870-0130	NUT, Keps, Joint Arm	2
-9			44940	870-0053	NUT, Lock - Governor Link	2
-10			44940	870-0133	NUT, Lock	1

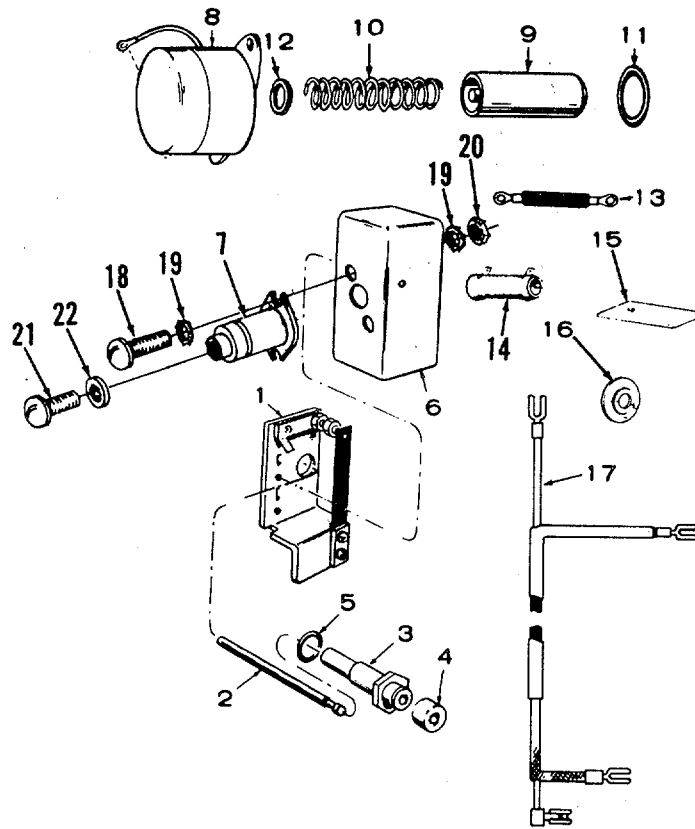


Figure F-209. Anti-Flicker & Stop Solenoid and Resistor Assembly

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-209-					ANTI-FLICKER & STOP SOLENOID AND RESISTOR ASSEMBLY (See figure F-201 for NHA)	
-1			44940	166-0316	POINT SET, Anti-Flicker	1
-2			44940	160-0800	PLUNGER, Breaker	1
-3			44940	160-0799	GUIDE, Breaker Plunger	1
-4			44940	160-0382	DIAPHRAGM, Breaker Plunger	1
-5			44940	509-0091	SEAL, O-Ring	1
-6			44940	160-0796	COVER, Anti-Flicker	1
-7			44940	312-0083	CONDENSER, 1.75 Mfd, Feed Thru (Mounts in Control Box)	1
-8			44940	307-1098	SOLENOID, Decompression Release	1
-9			44940	306-0167	PLUNGER, Solenoid - Includes Pin	1
-10			44940	306-0166	SPRING, Solenoid Plunger I	
-11			44940	509-0018	SEAL, O-Ring, Stop Solenoid	1
-12			44940	307-0736	GASKET, Solenoid Mounting	1
-13			44940	337-0051	STRAP, Ground Solenoid to Engine	1
-14			44940	304-0003	RESISTOR, Decompression Release Solenoid	1
-15			44940	304-0292	INSULATOR, Resistor	2
-16			44940	304-0427	WASHER, Resistor Centering	2
-17			44940	336-1366	LEAD, Control to Anti-Flicker	1
-18			44940	812-0059	SCREW, Rnd Hd, No. 6-32 x 1/4"	4
-19			44940	853-0003	WASHER, Lock, Ext Tooth, No. 6	2
-20			44940	860-0006	NUT, Hex, No. 6-32	2
-21			44940	811 -0096	SCREW, Rnd Hd, No. 10-32 x 1/4"	
22			44940	854-0010	WASHER, Lock, int Tooth, No. 10	2

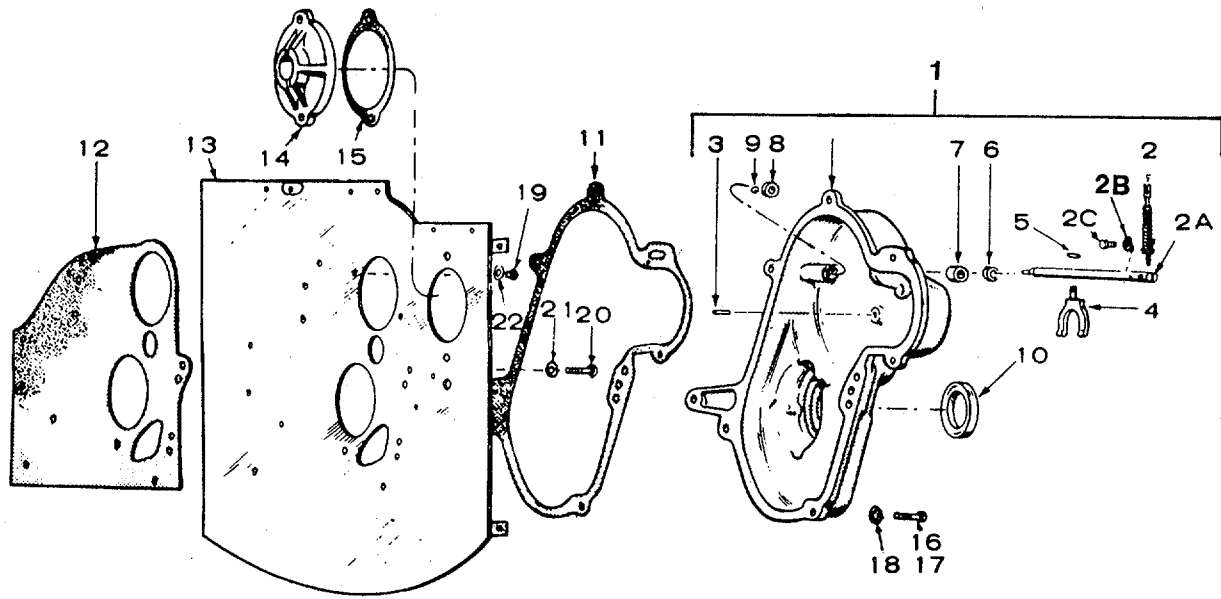


Figure F-210. Gearcase Assembly

FIG. ITEM	CAGE CODE	OEM PART NO.	CAGE CODE	VENDOR PART NO.	DESCRIPTION	QTY.
F-222-						
-50			11757	379193-1*	VALVE, Solenoid	1
-51			11757	378978*	LIGHT, Indicator	1
-52			11757	378966	TEE, Street	1
-53			11757	378301	SWITCH, Pressure	1
-54			11757	378307	TERMINAL, Wire	2
-55			11757	378884	HOLDER, Fuse, 9 Amp	1
-56			11757	378965	ADAPTER	1
			11757	328170-101X	KIT, Mounting Parts (Includes items marked *)	1

PART NUMBER	FIG/ITEM NO.	PART NUMBER	FIG/ITEM NO.
#S-125	F-188-4	AL-1522	F-45-36
#1501-4	F-193-22	AN960-718	F-103-12
#2-210	F-188-24	AN960-816L	F-79-5
#6400-6	F-193-6	AP0800-01500	F-41-16
#6408-HHP-3	F-188-21	AP6	F-1-4
#6901-6	F-193-19	ATC	F-57-210
#8-EBU-S	F-188-29	ATC-03	F-57-125
#8-F5BU-S	F-188-11	ATC-03	F-70-16
#8-F5BU-S	F-188-2	ATC-05	F-57-216
#8-JBU-S	F-188-14	ATC-20	F-57-211
A-1-3102-X-4288	F-163-21	ATC-7.5	F-57-214
A-1199-P-1394	F-164-66	AUV10109	F-66-9
A-1199-P-1394	F-164-67	AVM-28904	F-52-10
A-1199-P-1394	F-165-35	AVM-28904	F-54-7
A-1199-S-1709	F-165-37	AVM-28905	F-52-1i0
A-1205-0-1433	F-163-18	AVM-28905	F-54-7
A-1205-D-1070	F-150A-12	AVM-31670	F-52-13
A-1205-V-1556	F-154-17	AVM-31670	F-54-6
A-1205-V-1556	F-154A-20	AVM-34931	F-52-15
A-1205-W-1895	F-164-6	AVM-34931	F-54-5
A-1205-W-1895	F-164-75	AVM-34932	F-52- 1 5
A-1205-Y-1429	F-163-12	AVM-34932	F-54-5
A-1205-Y-1897	F-165-6	AY0325-01650	F-3-23
A-21-3111 -J-2298	F-163-1	AY0550-01400	F-219-1
A-30-3111 -K2299	F-163-1	AY0675-04000	F-3-13
A-3144-F-448	F-163-20	AY0744-02731	F-69-12
A-3144-G-449	F-163-20	AY0788-01388	F-217-6
A-3211-P-3655	F-154A-34	AY1 288-02000	F-219-3
A-32111-P-3656	F-154A-33	AY1 288-03200	F-219-26
A-3211-R-3424	F-154-30	AY1 400-02200	F-219-5
A-3211Q3423	F-154-31	AY1 850-04500	F-56-64
A-3226-M-1053	F-165-29	AY2275-03875	F-43-20
A-3226-Q-1135	F-164-7	AY2450-061 00	F-217-1
A-3226-T-1i1 12	F-164-70	Ai-3222-S-1293	F-154A-10
A-3235-W-2025	F-164-18	A1-3226-T- 1112	F-164-68
A-3260-L-1 16	F-164-2	A1-3260-Q-121	F-165-4
A-3261 -L-350	F-164-29	A13-3299-T-1554	F-154A-13
A-3296-1093	F-164-22	AI 3-3299-U-1 555	F-154A-15
A-3297-N-1028	F-164-15	A16-3200-G-1645	F-164-0
A-37	F-13-20	A19-3200-L-1676	F-165-0
A-40084-1	F-165-8	A2-2300-G-1 645	F-164-46
A-40294-3	F-164-31	A2-3200-L-1676	F-165-10
A-5-3275-X-596	F-154-22	A2-3222-V-1 348	F-154-9
A-6-3275-J-1050	F-154A-25	A3262F318	F-150A-1
A-6655-1A	F-5-15	A333-B-33694	F-154A-36
ABC	F-180-12	A35-3299-K-2013	F-154-12
AC-500	F-80-2	A35-3299-L-2014	F-154-13
AC-700	F-80-15	A6655-001	F-39-19
ACO-1501	F-167-36	A8-3235-U-1841	F-164-55
AD-26-8M44	F-199-52	A8-3235-1843	F-165-20
AD2200-02600	F-43-11	A8-39E5A	F-172-21
AEI/12308	F-52-64	A9-3235-U-1841	F-164-54
AEI/12308	F-54-51	A9-3235-W-1 843	F-165-15

PART NUMBER	FIG/ITEM NO.	PART NUMBER	FIG/ITEM NO.
B-31-3299-T-1 554	F-154A-14	F-498A	F-57-225
B-31-3299-U-1555	F-154A-16	FB-1210C	F-48-13
BF-2043	F-28-6	FCV6-10-S0-NV	F-181-10
BHBL20332SS	F-156-23	FC7369	F-4-30
BP-5A	F-16-25	FC7369NB	F-5-42
BS-45	F-1-11	FC7369NB	F-7-1SA
BWF-BL5	F-175-79	FC7389	F-4-31
BWF-BL5	F-199-1	FC7389	F-5-42
BZ-ZRW80-AZ	F-175-36	FC7389	F-7-15B
B16009-12-LP	F-60-6	FD41608S61	F-57-21
C-606-1 00	F-152-106	FL-941 QX-256	F-163-0
C-608-100	F-152-101	FL941QX 256	F-162-2
CBA-281050	F-131-28	FP6	F-1-8
CBA28-1050	F-67-7	FS-46	F-220-12
CBA28-1050	F-74-24	FSBC	F-175-80
CFF-012R	F-48-31	FS2	F-71-2
CFF-012R	F-50-0	FX-12	F-171-21
CH-90047	F-57-83	F02525	F-61-9
CH11S	F-70-10	F190038	F-100-20
CH120	F-70-10	F190038	F-82-1S
CH85	F-70-1	GT262-3	F-167-28
COML	F-45-65	G179810	F-158-48
COML	F-63-18	G455076	F-158-44
COML	F-64-10	G9410358	F-158-67
COML	F-65-16	G9419666	F-158-61
COML	F-65-19	G9420422	F-158-43
COML	F-65-21	G9424321	F-158-29
COML	F-67-13	G9429710	F-158-30
COML	F-67-18	G9430271	F-158-1
COML	F-72-19	H-715311	F-164-34
COML	F-72-2	H-715334	F-164-33
COML	F-72-3	HB2B1PE	F-156-22
CP100*S	F-48-38	HFB-70119	F-156-12
CP100*S	F-51-13	HFB-70119	F-158-0
CRA20-300	F-149-24	HFB-70215	F-158-20
CRA20-300	F-67-2	HFB202105A1	F-158-19
CRA28-1050	F-16-7	HFB703001A2	F-158-16
CSYB-46477001	F-30-1	HFB70300152	F-158-13
CT300L	F-74-4	HFB70410A20559	F-158-48
CV3-10-P-0-3	F-181-4	HFB704100T20559	F-158-48
C1-3121-K-1649	F-164-80	HFB7041000559	F-158-49
C1-3121-L-1650	F-165-39	HFB705000	F-158-56
C300A422-02-0090	F-50-41	HFB705000A1	F-158-55
C5DK 1175-12VDC	F-131-19	HFB706002	F-158-8
C7TZ3020A	F-159-6	HFB707017	F-158-31
DV1-10-B-0	F-174-3	HFB70701741	F-158-30
D275	F-48-65	HFB70701751	F-158-30
D30072A1	F-182-8	HFB709000	F-158-57
ECG5814	F-57-124	HFLF 00T-1	F-154-33
ES433.031	F-16-18	HFLF 00T-2	F-154-34
ES433.031	F-18-9	HFLF-0CT-1	F-150A-9
E3675-210070	F-19-3	HFLF-0CT-2	F-150A-9
F-255-1	F-150A-2	HPC3970	F-132-8

PART NUMBER	FIG/ITEM NO.	PART NUMBER	FIG/ITEM NO.
HS35338-46	F-81-2	M-11177	F-68-16
HV14540	F-45-21	M-705	F-68-31
HV206354	F-45-22	MA207-21362	F-124-15
HV207321	F-45-11	MCV3-10-C050-301	F-188-10
HV209496	F-45-16	M10-1700-19-4	F-191-10
HV209819	F-45-13	M10-400-11	F-187-11
HV210022	F-45-15	MM-2	F-187-20
HV3841	F-45-20	MN-312-1	F-164-26
H4651	F-48-53	Model 240H	F-172-38
H4656	F-48-54	Model 240H	F-180-0
H4850-12-APR	F-59-1	MR751	F-175-75
H4850-12-APR	F-60-0	MS-208016-1	F-164-14
H5205-02	F-49-34	MS-210020-1	F-164-45
H7148-0A	F-49-14	MS-212040-1	F-165-1
H7149-0A	F-49-16	MS-212045-1	F-164-4
IC870.XS48175	F-41-110	MS-212090-1	F-164-62
JK44446	F-135-16	MS-220120-1	F-164-47
JK4446	F-135-27	MS-220120-1	F-165-12
JLM-104910	F-164-71	MS16562-39	F-141-57
JLM-710910	F-164-24	MS16997-82	F-79-61
JLM-710949C	F-164-23	MS16997-85	F-79-55
JM-511910	F-164-8	MS18154-58	F-101-7
JM-511946	F-164-11	MS18154-58	F-108-18
JM-716610	F-164-50	MS18154-58	F-112-14
JM-716649	F-164-51	MS18154-58	F-132-43
JM716610	F-165-24	MS27183-1i0	F-141-75
JM716649	F-165-23	MS27183-14	F-100-26
JOXBALP-B5XK	F-222-0	MS27183-14	F-102-6
J3216	F-134-20	MS27183-14	F-108-3
K-H20FRD	F-187-13	MS27183-14	F-93-5
K-2618	F-163-3	MS27183-14	F-98-14
K-28062	F-176-7	MS27183-17	F-90-16
K-2824	F-150A-13	MS27183-18	F-108-19
K-6004-A	F-176-29	MS35190-288	F-144-10
K-6007-A	F-176-38	MS35338-44	F-103-6
K-6030-A	F-176-15	MS35338-44	F-105-26
K-6105-A	F-176-1	MS35338-44	F-114-3
K-6106-A	F-176-1	MS35338-45	F-108-13
K-6125	F-176-8	MS35338-45	F-82-29
K-6132	F-176-5	MS35338-45	F-86-22
KA06XO4MB	F-167-20	MS35338-46	F-101-6
KF06-02PS	F-149-34	MS35338-46	F-102-7
KUL1IDISD-12V	F-57-222	MS35338-46	F-106-23
K248	F-154-37	MS35338-46	F-106-9
K248	F-154A-38	MS35338-46	F-108-2
K9093461101010B	F-152-6	MS35338-46	F-110-5
LCP-413	F-152-107	MS35338-46	F-112-11
LFP224	F-175-55	MS35338-46	F-1 12-2
LFP414	F-175-57	MS35338-46	F-147-4
LM-104949	F-164-72	MS35338-46	F-82-2
LT50-1 8B	F-175-8	MS35338-46	F-83-1
LT50-9	F-175-7	MS35338-46	F-91-8
L28VT5752AI1	F-156-28	MS35338-46	F-93-8

PART NUMBER	FIG/ITEM NO.	PART NUMBER	FIG/ITEM NO.
MS35338-46	F-98-1	MS90728-62	F-110-14
MS35338-47	F-110-11	MS90728-64	F-98-15
MS35338-47	F-112-6	MS90728-72	F-98-2
MS35338-47	F-93-22	MWA-152	F-164-5
MS35338-47	F-98-22	MWA-510	F-164-44
MS35338-48	F-101-9	MWA-512	F-164-61
MS35338-48	F-108-20	MWA-512	F-165-2
MS35338-48	F-110-7	MWA-516	F-1 64-53
MS35338-48	F-132-49	M10-100	F-184-0
MS35338-48	F-133-1	M10-100-1	F-184-1
MS35338-48	F-137-15	M10-100-1	F-184-15
MS35338-48	F-137-30	M10-100-11	F-184-11
MS35338-48	F-90-7	M10-100-12	F-184-12
MS35338-50	F-101-14	M10-100-13	F-184-13
MS35338-50	F-112-35	M10-100-14	F-184-14
MS35671-57	F-95-48	M10-100-1 8	F-184-18
MS35671-57	F-95-57	M10-100-2	F-184-16
MS35691-7	F-123-3	M10-100-2	F-184-2
MS35756-5	F-108-1i0	M10-100-20	F-184-20
MS35764-1297	F-134-28	M10-100-21	F-184-21
MS39254	F-92-5	M10-100-22	F-184-22
MS51095-416	F-132-50	M10-100-23	F-184-23
MS51095-416	F-133-2	M10-100-24	F-184-24
MS51095-416	F-137-16	M10-100-25	F-184-25
MS51095-420	F-110-15	M10-100-26	F-184-26
MS51922-21	F-93-10	M10-100-27	F-1 84-27
MS51964-136	F-123-2	M10-100-28	F-184-28
MS51967-14	F-79-3	M10-100-29	F-184-29
MS51967-14	F-90-3	M10-100-3	F-184-17
MS51967-2	F-95-23	M10-100-3	F-184-3
MS51967-8	F-147-5	M10-100-4	F-184-4
MS51968-11	F-97-4	M10-100-5	F-184-19
MS90725-62	F-147-10	M10-100-5	F-184-5
MS90725-62	F-83-2	M10-100-5A	F-184-19A
MS90725-67	F-108-15	M10-100-5A	F-184-5A
MS90726-33	F-107-19	M10-100-6	F-184-6
MS90726-33	F-108-14	M10-100-6A	F-184-6A
MS90727-111	F-95-1	M10-100-6B	F-184-6B
MS90727-62	F-108-1	M10-100-7	F-184-7
MS90727-62	F-132-32	M10-100-8	F-184-8
MS90728-120	F-112-22	M10-100-9	F-1 84-9
MS90728-120	F-137-29	M10-110	F-182-0
MS90728-16	F-141-78	M10-110-1	F-182-1
MS90728-16	F-141-8	M10-110-1	F-185-5
MS90728-18	F-141-77	M10-110-13	F-182-13
MS90728-18	F-142-6	M10-110-14	F-182-9
MS90728-32	F-133-24	M10-110-15	F-182-10
MS90728-33	F-82-30	M10-110-2	F-182-2
MS90728-6	F-103-5	M10-110-3	F-182-3
MS90728-6	F-105-25	M10-110-4	F-182-4
MS90728-6	F-141-56	M10-110-5	F-182-5
MS90728-61	F-93-4	M10-110-6	F-1 82-6
MS90728-62	F-106-25	M10-110-7	F-182-7

PART NUMBER	FIG/ITEM NO.	PART NUMBER	FIG/ITEM NO.
M10-1200	F-172-0	M10-1400-28	F-175-28
M10-1200-1	F-172-1	M10-1400-29	F-175-53
M10-1200-1	F-173-0	M10-1400-32	F-175-56
M10-1200-1-3	F-173-1	M10-1400-34	F-175-58
M10-1200-1-5	F-173-2	M10-1400-35	F-175-59
M10-1200-1-6	F-173-3	M10-1400-36	F-175-60
M10-1200-1-7	F-173-10	M10-1400-37	F-175-63
M10-1200-1-8	F-173-13	M10-1400-38	F-175-64
M10-1200-10	F-172-12	M10-1400-39	F-175-67
M10-1200-15	F-172-39	M10-1400-40	F-175-68
M10-1200-16	F-172-40	M10-1400-41	F-175-29
M10-1200-17	F-172-3	M10-1400-42	F-175-30
M10-1200-18	F-172-2	M10-1400-43	F-175-40
M10-1200-2	F-172-4	M10-1400-44	F-175-42
M10-1200-20	F-172-14	M10-1400-45	F-175-43
M10-1200-22	F-172-19	M10-1400-46	F-175-44
M10-1200-23	F-172-33	M10-1400-47	F-175-45
M10-1200-26	F-172-16	M10-1400-48	F-175-46
M10-1200-26	F-172-42	M10-1400-48	F-175-49
M10-1200-27	F-172-20	M10-1400-49	F-175-50
M10-1200-28	F-172-18	M10-1400-50	F-175-51
M10-1 200-28	F-172-44	M10-1400-51	F-175-52
M10-1200-29	F-172-17	M10-1400-52	F-175-12A
M10-1200-30	F-172-22	M10-1400-53	F-175-12B
M10-1200-31	F-172-23	M10-1400-54	F-175-12C
M10-1200-32	F-172-25	M10-1400-55	F-175-21
M10-1200-33	F-172-24	M10-1400-56	F-175-22
M10-1200-34	F-172-31	M10-1400-57	F-175-22A
M10-1200-35	F-172-31	M10-1400-58	F-175-37
M10-1200-36	F-172-31	M10-1400-59	F-175-38
M10-1200-37	F-172-37	M10-1400-60	F-175-66
M10-1200-38	F-172-43	M10-1400-9	F-175-9
M10-1200-4	F-172-6	M10-1700	F-188-0
M10-1200-7	F-172-9	M10-1700-0	F-190-0
M10-1200-9	F-172-11	M10-1700-1	F-188-1
M10-1205	F-172-41	M10-1700-1	F-189-0
M10-1205	F-181-	M10-1700-1-3	F-189-1
M10-1205-1	F-181-15	M10-1700-1-4	F-189-10
M10-1210	F-172-15	M10-1700-12	F-188-12
M10-1210	F-174-0	M10-1700-13	F-188-13
M10-1210-1	F-174-11	M10-1700-15	F-188-15
M10-1210-2	F-174-2	M10-1700-16	F-188-16
M10-1210-3	F-174-10	M10-1700-17	F-188-17
M10-1400	F-172-26	M10-1700-18	F-188-18
M10-1400	F-175-0	M10-1700-19	F-188-19
M10-1400-10	F-175-10	M10-1700-19	F-191-0
M10-1400-10	F-175-47	M10-1700-19-3	F-191-1
M10-1400-11	F-175-11	M10-1700-19-5	F-189-2
M10-1400-17	F-175-17	M10-1700-19-5	F-191-2
M10-1400-19	F-175-19	M10-1700-19-6	F-189-3
M10-1400-20	F-175-41	M10-1700-19-6	F-191-3
M10-1400-21	F-175-48	M10-1700-20	F-188-20
M10-1400-27	F-175-27	M10-1700-22	F-188-22

PART NUMBER	FIG/ITEM NO.	PART NUMBER	FIG/ITEM NO.
M10-1700-23	F-188-23	M10-1715-35	F-23-35
M10-1700-25	F-188-25	M10-1715-36	F-23-36
M10-1700-26	F-188-26	M10-1715-37	F-23-69
M10-1700-27	F-188-27	M10-1715-39	F-23-72
M10-1700-28	F-188-28	M10-1715-4	F-23-3
M10-1700-3	F-188-3	M10-1715-40	F-23-73
M10-1700-30	F-188-30	M10-1715-41	F-23-74
M10-1700-31	F-188-31	M10-1715-42	F-23-62
M10-1700-32	F-188-32	M10-1715-43	F-23-65
M10-1700-33	F-188-33	M10-1715-44	F-23-66
M10-1700-5	F-188-5	M10-1715-45	F-23-67
M10-1700-6	F-188-6	M10-1715-46	F-23-68
M10-1700-7	F-188-7	M10-1715-5	F-23-6
M10-1700-8	F-188-8	M10-1715-6	F-23-12
M10-1705-1	F-190-1	M10-1715-7	F-23-11
M10-1705-10	F-190-10	M10-1715-8	F-23-10
M10-1705-11	F-190-11	M10-1715-9	F-23-14
M10-1705-12	F-190-12	M10-1717-38	F-23-70
M10-1705-2	F-190-2	M10-1905	F-197-0
M10-1705-3	F-190-3	M10-1905-1	F-197-6
M10-1705-4	F-190-4	M10-1905-14	F-197-24
M10-1705-5	F-190-5	M10-1905-15	F-197-25
M10-1705-6	F-190-6	M10-1905-17	F-197-29
M10-1705-7	F-190-7	M10-1905-19	F-197-4
M10-1705-8	F-190-8	M10-1905-2	F-197-28
M10-1705-9	F-190-9	M10-1905-20	F-197-5
M10-1715-10	F-23-17	M10-1905-21	F-197-1
M10-1715-11	F-23-16	M10-1905-22	F-197-2
M10-1715-12	F-23-18	M10-1905-23	F-197-3
M10-1715-13	F-23-15	M10-1905-24	F-197-8
M10-1715-14	F-23-21	M10-1905-25	F-197-10
M10-1715-15	F-23-14A	M10-1905-26	F-197-19
M10-1715-16	F-23-23	M10-1905-27	F-197-20
M10-1715-17	F-23-25	M10-1 905-28	F-197-21
M10-1715-18	F-23-26	M10-1905-29	F-197-22
M10-1715-19	F-23-28	M10-1 905-30	F-197-9
M10-1715-2	F-23-5	M10-1905-4	F-197-11
M10-1715-20	F-23-30	M10-1905-5	F-197-12
M10-1715-21	F-23-33	M10-1905-6	F-197-15
M10-1715-22	F-23-32	M10-1 905-7	F-197-16
M10-1715-23	F-23-31	M10-1906	F-199-0
M10-1715-24	F-23-13	M10-1906	F-199-22
M10-1715-25	F-23-22	M10-1906-1	F-199-4
M10-1715-25	F-23-29	M10-1906-10	F-199-51
M10-1715-27	F-23-24	M10-1906-2	F-199-15
M10-1715-28	F-23-27	M10-1906-3	F-199-19
M10-1715-29	F-23-7	M10-1906-5	F-199-17
M10-1715-3G	F-23-4	M10-1906-5A	F-23-6A
M10-1715-30	F-23-8	M10-1906-5B	F-23-6B
M10-1715-31	F-23-9	M10-1906-5C	F-23-6C
M10-1715-32	F-23-20	M10-1906-6	F-199-23
M10-1715-33	F-23-19	M10-1906-7	F-199-21
M10-1715-34	F-23-34	M10-1906-8	F-199-28

PART NUMBER	FIG/ITEM NO.	PART NUMBER	FIG/ITEM NO.
M10-1906-9	F-199-30	M10-400-10	F-187-10
M10-200	F-185-0	M10-400-12	F-187-11
M10-200-1	F-185-1	M10-400-13	F-187-12
M10-200-10	F-185-10	M10-400-14	F-187-23
M10-200-11	F-185-11	M10-400-2	F-187-2
M10-200-12	F-185-12	M10-400-3	F-187-3
M10-200-13	F-185-13	M10-400-4	F-187-4
M10-200-14	F-185-14	M10-400-5	F-187-5
M10-200-14A	F-185-14A	M10-400-6	F-187-6
M10-200-14B	F-185-14B	M10-400-7	F-187-7
M10-200-15	F-185-15	M10-400-8	F-187-8
M10-200-16	F-185-16	M10-400-9	F-187-9
M10-200-17	F-185-17	M10-600	F-192-0
M10-200-18	F-185-18	M10-600-1	F-192-1
M10-200-19	F-185-19	M10-600-2	F-192-2
M10-200-2	F-185-2	M10-600-3	F-192-3
M10-200-20	F-185-20	M10-600-4	F-192-5
M1 0-200-21	F-185-21	M10-600-6	F-192-1i0
MI 0-200-22	F-185-22	M10-600-8	F-192-1 1
M1 0-200-3	F-185-3	M10-900	F-193-0
MI 0-200-4	F-185-4	M10-900-1	F-193-1
M10-200-6	F-185-6	M10-900-11	F-193-11
MIO-200-7	F-185-7	M10-900-12	F-193-12
M10-200-8	F-185-8	M10-900-13	F-193-13
MIO-200-9	F-185-9	M10-900-14	F-193-14
MIO-200-9A	F-185-9A	M10-900-15	F-193-15
M10-2904	F-198-0	M10-900-16	F-193-16
MI 0-2904-7	F-198-7	M10-900-17	F-193-17
M10-300	F-186-0	M10-900-18	F-193-18
M10-300-1	F-186-1	M10-900-2	F-193-2
MIO-300-10	F-186-10	M10-900-20	F-193-20
MIO-300-11	F-186-11	M10-900-21	F-193-21
M10-300-12	F-186-12	M10-900-21	F-196-0
MIO-300-13	F-186-13	M10-900-21-3	F-196-1
M10-300-15	F-186-15	M10-900-21-5	F-196-2
M1 0-300-16	F-186-16	M10-900-23	F-193-23
M10-300-17	F-186-17	M10-900-24	F-193-24
MI 0-300-18	F-186-18	M10-900-25	F-193-25
M10-300-19	F-186-19	M10-900-26	F-193-26
MI 0-300-2	F-186-2	M10-900-27	F-193-27
M 1 0-300-20	F-186-20	M10-900-28	F-193-28
M10-300-21	F-186-21	M10-900-29	F-193-29
MI 0-300-22	F-186-22	M10-900-3	F-193-3
M 1 0-300-3	F-186-3	M10-900-30	F-193-30
MI 0-300-4	F-186-4	M10-900-31	F-193-31
MI 0-300-5	F-186-5	M10-900-4	F-193-4
M10-300-6	F-186-6	M10-900-4	F-194-0
M10-300-7	F-186-7	M10-900-4-1	F-194-1
M 1 0-300-8	F-186-8	M10-900-4-3	F-194-3
MI 0-300-9	F-186-9	M10-900-4-4	F-194-4
M1 0-300-9A	F-186-9A	M10-900-4-5	F-194-5
M10-400	F-187-0	M10-900-5	F-193-5
M M10-400-1	F-187-1	M10-900-7	F-193-7

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M10-900-8	F-193-8	PH60Z	F-13-4
M10-900-8	F-195-0	PH60Z	F-19-10
M10-900-8-3	F-195-1	PH60Z	F-23-37
MI 0-900-8-5	F-195-2	PH60Z	F-28-37
MI 0-900-8-6	F-195-3	PO-16	F-1 87-22
MI0-900-8-7	F-195-4	PO-16	F-199-3
M 1 0-900-8-8	F-195-13	PRV2-1 -S-1 -20/3	F-181-6
M10-900-9	F-193-9	P10-5168	F-80-7
N-110-1	F-164-84	Q2B-012NN	F-48-8
NBL	F-57-150	Q2B-012NN	F-49-0
NDH3211XRIA	F-132-10	R-2H-X-52 12VT	F-145-7
NH-PS-1207	F-28-5	R-400	F-72-13
NL31i01	F-154A-40	RAXOO-2320	F-80-9
NTA4860	F-132-28	RNT26C	F-87-26
NT721 OE	F-87-26	RNT26D	F-87-26
NVA250B	F-4-29	RN26ED	F-87-26
NVA250BNB	F-5-42	RN26EE	F-87-26
NV1-10-K-0	F-181-9	RP1HX29	F-145-10
NYA250BNB	F-7-15	RRO-32H	F-192-4
N07	F-32-31	RR22145NFQF-39	F-165-o
N3101	F-154-39	RR22145NFQF42	F-1 64-0
OPL-FC3000	F-175-13	RV3-10-P-0-25	F-198-2
P-1 5	F-72-1 0	RV3-10-S-0-36-21 00	F- 1 74-5
P-21	F-72-9	RV3-10-S-036-2400	F-174-6
P-23	F-72-1	RV4LAYSAL 03A	F-57-221
P-313-DD	F-46-5	R2001465-50H	F-48-3
P-35	F-72-11	R60877-1	F-38-4
P-426	F-56-45	R61708	F-36-45
P-6	F-72-6	R71466	F-14-19
P-7	F-72-7	R71466	F-15-19
P-8	F-72-8	R80859	F-32-11
PA-1 900-17	F-59-8	R81324	F-36-65
PA60Z	F-39-12	S-1773-500	F-131-38
PCS3-16-0-160	F-181-11	S-21014-1	F-164-82
PFT-IOB-BLK-500	F-152-42	S-21020-1	F-165-41
PFT-10B-GRN-250	F-152-80	S-21022-1	F-164-83
PFT-1 OD-ORG-250	F-152-32	S-21022-1	F-165-42
PFT-4A-BLK-250	F-152-120	S-259-1	F-163-7
PFT-4A-BLK-250	F-57-28	S-2812-2	F-1 54-15
PFT-4A-BLK-250	F-61-17	S-2812-2	F-154A-18
PFT-6B-BLK-500	F-152-114	S-319	F-1-16
PFT-6B-BLU-500	F-152-75	S-320	F-1-17
PFT-6B-GRN-500	F-152-76	S-75	F-175-20
PFT-6B-ORG-500	F-152-39	S-75	F-177-0
PFT-6B-RED-500	F-152-74	SA-2650A	F-146-1
PFT-63-BLK-500	F-152-57	SA-2679	F-146-2
PFT-8B-BLK-500	F-152-58	SAE2OR3	F-59-9
PFT-8B-BLK-500	F-152-79	SAE2OR3	F-74-11
PFT-8B-GRN-500	F-152-81	SA2650A	F-74-18
PFT-8B-ORG-500	F-152-41	SCH-1017	F-70-6
PFT-8B-SIL-500	F-152-22	SCH-1037	F-201-1
PH60Z	F-10-8	SCOTCHFOAM4714	F-73-30
PH60Z	F-11-13	SCIO241	F-154A-4

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SC C181-10.5-12E	F-9-2	SD-00232	F-44-1
SC616NPU	F-4-38	SD-00242	F-44-12
SC616NPV	F-199-11	SD-00374	F-57-151
SC616NP6A	F-193-37	SD-00374	F-57-54
SD-00002	F-67-1	SD-00374	F-70-3
SD-00007	F-56-6	SD-00514	F-16-23
SD-00009	F-56-61	SD-00516	F-16-2
SD-00016	F-28-3	SD-00519	F-16-3
SD-00021	F-219-7	SD-00520	F-16-17
SD-00025	F-218-20	SD-06200	F-23-58
SD-00026	F-218-20	SD-06201	F-23-57
SD-00033	F-6-2	SD-06202	F-23-53
SD-00034	F-218-28	SD-06204	F-23-52
SD-00035	F-218-7	SD-07364	F-28-27
SD-00038	F-219-23	SD-07365	F-28-31
SD-00039	F-219-23	SD-07366	F-28-34
SD-00041	F-8-9	SD-07367	F-28-35
SD-00042	F-8-19	SD-07368	F-10-19
SD-00043	F-217-8	SD-07369	F-11-23
SD-00059	F-44-6	SD-07370	F-11-21
SD-00060	F-3-6	SD-07497	F-42-14
SD-00061	F-218-3	SD-07538	F-42-16
SD-00062	F-218-2	SD-07866	F-3-28
SD-00063	F-218-1	SD-07867	F-3-28
SD-00064	F-218-4	SD-08072	F-28-60
SD-00065	F-3-7	SD-08511	F-5-7
SD-00068	F-3-3	SD-08512	F-5-45
SD-00094	F-6-8	SD-08513	F-5-17
SD-00102	F-41-18	SD-08514	F-5-44
SD-00108	F-42-19	SD-08917	F-51-1
SD-00123	F-4-61	SD-09022	F-52-0
SD-00143	F-8-3	SD-09023	F-52-0
SD-00145	F-217-4	SD-09024	F-54-0
SD-001 46	F-219-29	SD-09025	F-54-0
SD-00147	F-219-29	SD-09162	F-199-53
SD-00148	F-218-8	SD-09163	F-199-14
SD-00149	F-218-29	SD-09175	F-199-24
SD-00150	F-6-3	SD-09176	F-199-27
SD-00151	F-219-18	SD-09177	F-199-36
SD-001 52	F-217-3	SD-09178	F-199-34
SD-00153	F-7-26	SD-09195	F-187-16
SD-00191	F-42-1	SD-13006	F-44-4
SD-00193	F-44-28	SD-13041	F-166-23
SD-001 94	F-43-1	SD-13256	F-57-121
SD-00203	F-41-15	SE-FD	F-65-20
SD-00206	F-41-23	SE-401	F-57-237
SD-00209	F-41-15	SF120-15-0	F-197-27
SD-00212	F-219-7	SJ-5009	F-199-54
SD-00213	F-41-15	SK-10-V-2	F-198-2
SD-00216	F-41-23	SK-10-2	F-174-5
SD-00219	F-41-23	SK-10-2	F-174-6
SD-00223	F-41-23	SK-10-2	F-181-1
SD-00225	F-3-32	SK-10-2	F-181-4

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SK-10-2	F-198-1	T7901580	F-48-78
SK-10-2	F-198-2	T7901580	F-48-79
SK-10-3	F-174-3	U-153276-D-30	F-154A-37
SK-10-3	F-174-4	UC35017	F-156-25
SK-1i0-3	F-181-6	UN-6-30-3-FPHS	F-63-15
SK-10-3	F-194-2	UN-6-30-3-FPHS	F-64-12
SK-1 0V-2	F-174-5	V-1 33276-D-30	F-154-36
SK-1 0V-2	F-174-6	V-1 43276-D-30	F-154-35
SK-10V-2	F-181-1	V-20P-2V	F-192-9
SK-1 0V-2	F-181-10	V-20P-24	F-192-3
SK-1 0V-2	F-181-4	V-20P-3	F-175-12
SK-1 0V-2	F-181 -9	VD350-A	F-216-2
SK-1 0V-2	F-198-1	VS125HBL-4-2	F-80-4
SK-1 0V-3	F-174-3	VS125HBL-6-4	F-167-11
SK-1 0V-3	F-174-4	VS125HBL-8-8	F-167-38
SK-1 0V-3	F-181-6	VS129HB-4-4	F-152-12
SK-10V-3	F-194-2	VS209P-4-2	F-57-119
SK-16-3	F-181-11	VS209P-8-6	F-152-86
SK-16V-3	F-181-11	VS21 IP-2	F-155-17
SK2-10-2	F-181-10	VS21iP-4	F-152-16
SK2-10-2	F-181-9	VS269NTA-10-8	F-152-2
SL-2-10	F-28-8	VS269NTA-10-8	F-155-13
SL-2-10	F-69-8	VS269NTA-4-2	F-152-122
SMoo1 0	F-17-15	VS269NTA-4-4	F-152-88G
SM0038	F-17-0	VS269NTA-4-4	F-155-5
SM0518	F-23-63	VS269NTA-6-2	F-152-117
SM0518	F-25-0	VS269NTA-6-2	F-152-56
SN-1018-1	F-164-85	VS269NTA-6-2	F-152-71
SP-491 -S60	F-56-51	VS269NTA-6-4	F-152-52
SPC2-1 O-P-0-25	F-174-4	VS269NTA-6-6	F-152-91
SP1791	F-166-12	VS269NTA-6-8	F-152-34
SR-504	F-175-81	VS269NTA-6-8	F-152-98
SSE-10	F-197-17	VS269NTA-8-4	F-152-43
Style77	F-16-9	VS269NTA-8-6	F-152-68
Style77-G	F-16-9A	VS269NTA-8-6	F-152-93
SV3-10-C-0-12DG	F-172-5	VS269NTA-8-8	F-152-28
SV3-10-C-0-12DG	F-181-1	VS269NTA-8-8	F-155-14
SV3-10-C-0-1206	F-198-1	VS269NTA4-2	F-57-116
SW-890203	F-146-5	VS271NTA-10-8	F-152-59
SY-401	F-72-12	VS6NTA-8-4	F-152-64
Si 396-001	F-5-16	VS68NTA-10-8	F-1 52-13
S50-100	F-197-23	VS68NTA-4-2	F-152-119
S50-1 00	F-197-7	VS68NTA-6-4	F-152-115
T-208	F-163-19	VS68NTA-6-4	F-152-63
T-413Y	F-28-16	VS68NTA-6-4	F-155-6
TSC-500	F-166-6	VS68NTA-8-4	F-152-103
T300A218-02-0135	F-50-17	VS68NTA-8-4	F-152-21
T300A218-10-0150	F-50-15	VS68NTA-8-6	F-152-62
T300A422-10-0061	F-50-40	VS68NTA-8-8	F-152-105
T300A422-10-0062	F-50-39	VS68NTA-8-8	F-152-23
T7806630	F-48-70	VS68NTA-8-8	F-152-30
T7901180	F-48-74	V1026	F-36-38
T7901510	F-48-72	V1085	F-38-12

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V1 088	F-32-54	V404PH-10-6	F-74-8
VI 148	F-33-27	WB16009-12-LP	F-60-7
Vi148	F-35-15	WITTEKM5	F-167-37
Vi164	F-32-76	WITTEKM5	F-149-33
V1 165	F-32-74	WS3752-4	F-36-20
VI 168	F-32-25	W07	F-32-30
V1332	F-35-26	W1004-10	F-37-16
V1340	F-35-16	W1005-10	F-33-31
VI 340*	F-37-8	W1005-52	F-32-82
VI 351	F-36-83	W1005-8CA	F-14-15
V1352	F-36-21 A	W1005-8CA	F-15-15
V1352	F-36-84	W1005-8CA	F-24-14
V1368	F-57-57	W1006-12CA	F-24-12
VI 369	F-57-58	W1006-14CA	F-24-21
VI 371	F-35-27	W1006-16	F-32-94
V1417	F-35-28	W1006-16	F-36-66
V1463	F-36-14	W1006-16	F-38-25
V1 463	F-36-86	W1006-20	F-32-16
VI 484	F-24-17	W1006-20	F-34-2
VI 548	F-24-6	W1006-20HT	F-31-23
V1 815	F-36-11	W1006-88	F-36-39
V1889	F-34-27	W1006-9CA	F-14-9
V1891	F-34-28	W1006-9CA	F-15-9
V1903-B*	F-36-54	W1007-16	F-14-25
VI 903-R*	F-36-55	W1007-16	F-33-4
V2OFIP8P1A6HIIL	F-1 56-17	W1007-80	F-34-3
V2OFIP8PIA6HI1L	F-157-0	W1008-20CA	F-24-26
V20P-2H & -2V	F-176-0	W1008-20HT	F-31-17
V20P-3	F-1 76-0	W1008-20HT	F-32-48
V2002	F-32-6	W1008-20HT	F-32-66
V2061	F-32-32	W1008-20HT	F-38-13
V2062	F-32-71	W1008-24HT	F-31-14
V2066	F-32-61	W1008-24HT	F-32-65
V2067*	F-37-4	W1008-28HTCA	F-32-101
V2076	F-32-75	W1008-76HT	F-31-7
V2105	F-33-23	W10105-12SS	F-36-57
V2106	F-33-24	W1012-32HT	F-31-18
V220S	F-32-93	W10304-10SS	F-34-19
V2231	F-34-21	W10606-18	F-32-8
V2315	F-33-30	W10607-20	F-36-12
V2329	F-32-95	W10825-16	F-33-17
V2406	F-38-16	W1108-28HT	F-32-78
V2411	F-32-19	W1108-28HT*	F-24-28
V2499	F-32-39	W1108-36HT	F-32-63
V2523	F-33-1	W1108-96	F-36-10
V2531	F-36-87	W1504-10	F-33-12
V2566	F-38-22	WS504-12	F-36-51
V2572	F-32-98	W1504-24	F-36-46
V2630	F-32-77	W1505-22	F-36-92
V2644	F-33-32	W1508-20	F-36-90
V2645	F-33-33	W1508-24	F-31-26
V404PH-1 0-6	F-201 -3	W1510-36	F-31-10
V404PH-10-6	F-59-11	W16112	F-32-1

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W16212	F-32-15	W3926-275	F-38-21
WI 6306	F-32-3	W3944-350	F-32-41
W1 6307	F-32-23	W40204-6	F-34-24
W16307	F-38-2	W4104	F-33-18
W2108	F-24-29	W4104	F-35-19
W2108	F-32-64	W4104	F-36-3
W2505-CA	F-34-29	W4104	F-37-14
W31004-16SS*	F-36-29	W4105	F-14-14
W31004-6SS	F-36-28	W4105	F-15-14
W31004-6SS	F-38-7	W4105	F-24-15
W3225-SS	F-33-28	W4105	F-32-20
W3225-SS	F-36-2	W4106	F-32-9
W3225-SS	F-37-15	W4106	F-34-25
W33002-4SS	F-32-90	W4106	F-38-24
W33008-20SM	F-32-56	W4107	F-33-3
W33008-20SM	F-33-16	W4107	F-36-13
W33010-22SM	F-32-47	W4108	F-32-49
W33012-28	F-32-50	W4108	F-38-14
W3319-CA	F-34-30	W4206	F-36-75
W3503-X8SS	F-33-13	W4305	F-31-12
W3504-28SS	F-32-12	W4500-125CA	F-35-20
W3506-20SS*	F-37-10	W4510-100	F-14-11
W3704-2	F-32-35	W4510-100	F-15-11
W3704-2*	F-36-49	W4510-137	F-38-23
W3704-2**	F-36-74	W4510-162SM	F-38-9
W3706-2*	F-36-47	W4510-237	F-32-89
W3706-2**	F-36-88	W4905-37	F-32-97
W3709-3*	F-14-17	W4905-44SS	F-38-11
W3709-3*	F-15-17	W5008-10	F-33-14
W3712-3*	F-14-5	W5008-8	F-24-10
W3712-3*	F-15-5	W5012-16	F-32-92
W3712-3*	F-36-53	W5014-20	F-31-8
W3712-4D	F-33-21	W5016-24	F-32-87
W3712-4D	F-35-18	W5304-20CA	F-33-15
W3712-4D*	F-37-9	W5404-10SS	F-36-76
W3714-2	F-32-45	W5404-10SS*	F-36-48
W3716-4UH*	F-24-3	W5404-14SS	F-35-17
W3719-4*	F-36-50	W5404-14SS*	F-37-11
W3734-4*	F-14-6	W5405-10SS*	F-36-27
W3734-4*	F-15-6	W5408-16*	F-36-40
W3740-4*	F-14-3	W55404-10SS	F-35-21
W3740-4*	F-15-3	W5806-20SS	F-14-16
W3744-4	F-15-27	W5806-20SS	F-15-16
W3744-4*	F-14-27	W5806-20SS	F-24-7
W3746-4*	F-24-5	W5808-11SS	F-14-29
W3748-4**	F-36-67	W5808-18SS	F-15-29
W3754-4	F-36-19	W5808-18SS	F-24-30
W3754-4*	F-14-2	W5808-18SS	F-34-17
W3754-4*	F-15-2	W6004-14G	F-31-2
W3754-4*	F-24-2	W6006-32	F-35-29
W3754-4**	F-36-91	W6008-40	F-32-85
W3760-2*	F-34-20	W6304-G	F-31 -1
W3776-4*	F-24-25	W6308	F-32-86

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W6502-B	F-36-52	000-59004-0002	F-131-22
W6504-G	F-38-20	001023	F-123-22
W6504-S	F-31-3	001026	F-123-27
W6504-S	F-36-68	001031	F-123-26
W6506-B	F-35-22	001040	F-124-20
W6508	F-32-83	001081	F-123-8
W6512	F-32-67	001082	F-123-9
W6602	F-31-24	001083	F-123-10
W6604	F-14-20	001218	F-124-14
W6604	F-15-20	001265	F-123-21
W6604	F-24-19	001287	F-123-4
W6612	F-14-21	001288	F-123-24
W6612	F-15-21	001294	F-103-1
W6612	F-24-22	001295	F-103-1
W7004	F-34-23	001318	F-123-1
W7008	F-32-53	001332	F-123-5
W8606	F-34-11	001492	F-123-16
W8606	F-36-77	001531	F-124-4
W8804-6	F-36-78	001538	F-124-17
W8806-6	F-35-25	001558	F-124-21
W9006-4	F-31-19	001559	F-124-19
W9006-4	F-32-100	002017	F-124-8
W925-20SS	F-36-4	002221	F-123-15
W9519-6TCA	F-35-33	00253530	F-28-2
W9525-10CA	F-33-29	00256523	F-28-1
W9525-IOCA	F-35-24	002724	F-124-10
W9525-8SS	F-37-5	002725	F-124-9
W9619-6SS	F-35-23	002729	F-124-5
W9744-12CA	F-14-24	002744	F-124-18
W9744-12CA	F-15-24	002769	F-124-16
W9920	F-32-79	00329120	F-5-48
XCK-L1 41	F-182-16	003329	F-123-17
XCK-L141	F-221-1	003337	F-123-18
XES-P2051	F-172-20A	003669	F-123-20
XES-P2051	F-182-18	004634	F-124-7
XES-P2051	F-221 -6	004635	F-124-6
X0070-0012	F-60-110	004636	F-124-12
YSi81-8.875	F-9-5	004637	F-124-13
ZAH-51	F-1-6	004653	F-124-1
ZAH-51	F-1-9	004665	F-124-2
ZCK-G00	F-172-20A	0061-0043	F-60-17
ZCK-G00	F-182-19	007075	F-123-11
ZCK-G00	F-221-4	007076	F-123-11
ZCK-L1	F-172-20A	007500	F-123-14
ZCK-L1	F-182-18	007620	F-123-23
ZCK-L1	F-221-5	0086-001	F-176-36
ZCK-Y11	F-182-20	0086-001	F-176-45
ZCK-Y41	F-172-20A	008674	F-123-7
ZCK-Y43	F-221-7	009442	F-123-25
ZRB-5	F-219-10	009505	F-123-19
ZRB-57	F-48-90	009877	F-124-11
ZRB-57C	F-219-11	01-100-0110	F-179-4
000-59002-0000	F-58-51	01-100-0120	F-179-19

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01-102-0020	F-180-16	021333	F-158-41
01-102-0030	F-180-15	02134	F-158-45
01-103-0020	F-180-17	025121	F-158-2
01-103-0030	F-180-18	025122	F-158-42
01-104-0090	F-180-20	028422	F-158-55
01-105-0460	F-180-22	028423	F-1 58-59
01-105-0470	F-180-23	028424	F-158-25
01-105-0480	F-180-21	028425	F-158-6
01-112-0220	F-180-24	03-005-007	F-172-10
01-112-0230	F-180-25	03-005-007	F-23-71
01-150-1020	F-180-26	032229	F-158-66
01-150-1030	F-179-2	032539	F-1 58-4
01-150-1040	F-179-21	032546	F-158-27
01-152-0070	F-180-27	032547	F-158-39
01-153-0020	F-180-28	032548	F-1 58-14
01-153-0180	F-180-29	032554	F-158-15
01-166-0010	F-180-30	032556	F-158-37
01-207-0041	F-180-32	032557	F-158-11
01-207-0070	F-180-31	032560	F-158-19
01-208-0020	F-179-6	03264719	F-158-7
01-216-0040	F-180-36	03278A1	F-158-24
01-261-0333	F-179-18	032786	F-158-53
01-288-0010	F-179-11	032786	F-158-54
01-288-0020	F-179-12	03278641	F-158-52
01-400-0120	F-179-13	032806	F-158-63
01-400-0140	F-179-17	032806AI	F-158-62
01 -402-0420*	F-180-33	032810	F-158-65
01-402-0450	F-179-14	03284	F-158-28
01-402-0470	F-179-16	036153	F-158-10
01 -405-0270*	F-180-34	036155	F-158-68
01-405-0340	F-179-3	036201	F-158-60
01-406-0250*	F-180-35	037010	F-158-64
01HP-2	F-131-37	038421	F-158-12
01HP-8	F-152-45	0390241318	F-66-13
01 HP-8	F-152-96	04F7921024-79	F-6-3
01 HP-8	F-155-7	04F7921024-79	F-69-13
0101-4-8	F-152-99	04F7921024-79	F-73-13
0101-6-6	F-152-90	040124	F-158-34
010600229	F-196-10	040137	F-158-35
011300327	F-173-12	042284	F-156-1
011300357	F-195-12	0500-021	F-60-19
011434	F-123-13	0500-022	F-60-22
011930	F-123-12	0502-16-16	F-131-48
01 2T-8-8	F-152-27	0502-20-16	F-131-45
012474	F-123-6	055447	F-175-28
012601	F-124-3	055734-000001	F-58-0
013592	F-123-6	062005	F-158-51
018-025-01002	F-52-29	063351	F-66-4
020-79X-200	F-21 -0	0650-00-71-29-001	F-23-1
020-79X-200	F-23-64	065041	F-1 52-1 0
021200	F-158-50	065041	F-153-0
021277	F-158-62	065400	F-66-1
021315	F-158-3	06601	F-66-5

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068022	F-158-13	10X-1176	F-154-20
0700CS-052	F-60-14	10X-1176	F-154A-23
071100090	F-196-4	100-003H	F-5-31
071700152	F-189-5	100-004C	F-1 67-46
071700152	F-191-5	100-005	F-5-13
072001	F-158-22	100-006C	F-7-3
07201	F-158-58	100-008H	F-5-51
072100186	F-195-6	100-oliv	F-5-1
072300157	F-173-9	100-060	F-16-1
0800-005	F-60-15	100-060	F-17-0
0800361	F-156-40	100-060-SCR	F-17-29
081100118	F-196-6	100-400-7	F-171-18
081700206	F-189-7	100005	F-171-25
081700206	F-191-7	100088	F-171-27
082100217	F-195-8	10011	F-70-7
082300182	F-173-6	100670	F-132-52
085-001	F-177-6	1007-22CA	F-31-36
0855911	F-156-36	101-0337	F-203-2
086-001	F-177-7	101-0359	F-203-4
089196AI	F-158-17	101-0359-02	F-203-4
0929-001	F-176-35	101-0359-10	F-203-4
0929-001	F-176-44	101-0359-20	F-203-4
1 -P437	F-222-1	101 -0359-30	F-203-4
1/16420	F-52-66	101 -0363	F-203-7
1/16420	F-54-53	101 -0365	F-203-8
1/2 CDS	F-167-39	101-0386	F-203-3
1/8-27	F-156-38B	101-1077-007	F-172-34
1/8FFS	F-152-73	101-1077-007	F-178-0
1 P787	F-36-85	"1016-D,BOSTON"	F-3-1
1 W1 007-16	F-15-25	102-0459	F-203-23
1 W1 008-20HT	F-23-46	102-0541	F-203-22
10-100-13	F-171-15	102-904-015-790-001	F-21-1 0
10-100-14	F-171-17	102-913-020-735-068	F-21-20
10-100-15	F-171 -19	102-924-006-790-200	F-21-18
10-100-17	F-171-31	102166	F-152-51
10-100-18	F-171-32	102635	F-116-8
10-1 2CTS-X	F-167-25	102635	F-127-3
10-12CTS-X	F-83-18	102635	F-93-9
10-1200-2A	F-171 -3	103-0218	F-21 0-11
10-1 200-2B	F-171 -4	103-0221	F-210-13
10-1200-30	F-171-1	103-0226	F-210-12
10-1200-31	F-171-1	103-0251	F-21 0-1 0
10-1200-32	F-171-2	103-0277	F-210-1
10-1200-33	F-171-11	103026	F-82-4
10-1200-34	F-171-12	103320	F-128-5
10-1200-35	F-171-13	103320	F-85-6
10-1200-36	F-171-14	103320	F-95-29
10-1200-37	F-171-10	103321	F-109-6
10-400-5	F-171-16	103321	F-116-9
IOH	F-13-12	103321	F-117-2
10H	F-23-80	103321	F-118-2
10N144	F-175-35	103321	F-127-2
10N144	F-199-40	103321	F-128-2

PART NUABER	FIG/ITEM NO.	PART NUABER	FIG/ITEM NO.
103321	F-76-5	1065579-002	F-62-28
103321	F-77-5	1065662-002	F-62-47
103321	F-78-5	1067276-002	F-62-29
103322	F-77-8	1068864-002	F-62-55
103322	F-99-19	107413	F- 153-21
103323	F-109-1S	107418	F-153-8
103323	F-117-5	107525	F-153-18
103323	F-77-9	107594	F-152-1
103323	F-86-18	1076	F-2-3
103323	F-87-15	1076	F-56-42
103325	F-78-10	107904	F-153-0
103325	F-86-15	1085-3017	F-167-47
103341	F-109-9	1085-3017	F-41-24
103341	F-116-2	1085-3017	F-52-2
103341	F-118-1	1085-3017	F-54-2
103341	F-119-3A	1085-3017	F-6-13
103341	F-128-1	10973-148	F-57-228
103342	F-99-22	10973-174	F-57-202
103343	F-109-12	110	F-16-22
103345	F-109-16	110	F-18-0
103375	F-87-4	110	F-7-14
103709	F-84-16	11-B-04-02	F-131-16
104-0416	F-204-3	110-0419	F-211 -21
104-0418	F-204-2	110-0445	F-216-10
104-0420	F-203-6	110-0546	F-202-34
104-0462	F-204-1	110-0814	F-202-28
104-0529	F-204-5	110-0858	F-202-9
104-0529W	F-204-10	110-0859	F-202-1 0
1042-33110-10	F-151-16	110-0879	F-202-43
104268	F-132-15	110-0879	F-210-16
10456487	F-89-12	110-1220	F-202-8
10467267	F-89-20	110-1221	F-202-7
10467271	F-89-18	110-1264	F-202-27
10467272	F-89-21	110-1267	F-202-2
10467629	F-89-9	110-1268	F-202-4
10467934	F-89-5	110-1268-02	F-202-4
10467935	F-89-4	110-1268-05	F-202-4
10468945	F-89-27	110-1268-10	F-202-4
10469559	F-89-30	110-1268-25	F-202-4
10470606	F-89-16	110-1278	F-202-6
10470609	F-89-31	110-1320	F-202-5
10470886	F-89-8	110-1335	F-203-1
10471065	F-89-1	110-1356	F-202-38
10479701	F-89-14	110-1444	F-202-36
105	F-13-19	110-1501	F-202-3
105-0205	F-207-4	110-1511	F-202-42
105-0218	F-207-8	110-1512	F-202-35
105-0299	F-207-1	110-1695	F-202-1
105-0465	F-207-9	110-2963	F-202-1
10563	F-169-1 0	1100-3	F-57-220
1063016-002	F-62-37	1100-3A	F-57-227
1063248-801	F-62-34	1100640-001	F-62-49
1063248-801	F-62-56	1100642-001	F-62-36

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1100645-001	F-62-59	1114-RED	F-57-106
110246	F-153-14	1114-RED	F-57-93
1102650-001	F-62-57	111491	F-153-17
1102659-001	F-62-58	1115563	F-79-45
1102757-001	F-62-61	1117899	F-89-0
1102760-001	F-62-53	1117899	F-90-8
1102769-001	F-62-71	1118	F-57-107
1102769-001	F-62-9	1118	F-57-86
1102810-001	F-62-60	1118	F-57-94
1102812-001	F-62-70	1118-W	F-57-108
1102815-001	F-62-62	1118-W	F-57-87
1102815-001	F-62-68	1118-W	F-57-95
1102816-001	F-62-50	1119865	F-68-26
1102816-001	F-62-69	112-0085	F-206-4
1103565-002	F-62-30	112-0093	F-206-3
1103566-002	F-62-31	112-0109	F-206-2
110365-003	F-62-6	112-0109-05	F-206-2
1104385-002	F-62-1 0	112-0109-10	F-206-2
110519	F-153-12	112-0109-20	F-206-2
1105957-002	F-62-22	112-0109-30	F-206-2
1105995-002	F-62-18	112-0109-40	F-206-2
1105999-002	F-62-17	1120-001	F-177-1
1106001-002	F-62-19	11 27-001*	F-177-8
1106049-002	F-62-12	113-0130	F-206-1
1106065-002	F-62-14	113-0130-05	F-206-1
1106079-002	F-62-25	113-0130-10	F-206-1
1106214-002	F-62-15	113-0130-20	F-206-1
1106226-002	F-62-16	113-0130-30	F-206-1
1106404-002	F-62-48	113-0130-40	F-206-1
1106501-002	F-62-20	1130-001	F-177-3
1106523-002	F-62-4	1131973	F-156-38
1106527-004	F-62-45	114-0164	F-206-6
1106528-004	F-62-46	114-0164-10	F-206-6
1106529-002	F-62-13	114-0164-20	F-206-6
1106536-527	F-62-3	114-0164-30	F-206-6
1106537-357	F-62-2	114-0168	F-206-5
1106617-002	F-62-33	114-0170	F-206-7
1106702-004	F-62-8	1141	F-4-68
1106706-002	F-62-21	1141	F-48-25
1106713-002	F-62-23	1141	F-56-35
1106729-001	F-62-38	115	F-13-10
1106731-001	F-62-32	115	F-18-0
1106747-001	F-62-26	115	F-23-78
1106748-001	F-62-52	115	F-5-55
1106750-001	F-62-27	115	F-7-32
1106803-001	F-62-5	115-0127	F-202-14
1107030-001	F-62-7	115-0128	F-202-12
1107031-001	F-61-16	115-0129	F-202-12
1107031-001	F-62-24	115-0146	F-202-23
1107519-013	F-62-1	115-0147	F-202-19
1107790-002	F-62-72	115-0149	F-202-17
1110	F-45-41	115-0150	F-202-15
11114-A7B	F-57-85	115-0151	F-202-20

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115-0152	F-202-16	1200P-2-2	F-151-17
115-0155	F-202-22	1200P-4-4	F-167-23
115-0160	F-202-26	1200P-4-4	F-57-117
115-0166	F-211 -13	12004563	F-57-212
115-0188	F-202-24	12004564	F-57-215
115-0195	F-202-18	120100	F-171-22
11501033	F-133-31	12010182	F-145-12
11504248	F-79-4	12010182	F-92-12
11504603	F-128-11	12010300	F-92-12
11504972	F-128-9	12010717	F-145-12
11514	F-12-4	12015193	F-145-12
11514	F-27-7	12015193	F-92-12
11514	F-29-4	120170	F-171-25
1155	F-2-7	1202P-4-4	F-152-88A
1156	F-193-36A	1202P-6-6	F-152-88B
1156	F-193-38D	1202P-6-6	F-83-5
1156	F-193-40B	12020321	F-57-217
1156	F-48-43	12020400	F-57-213
1156	F-56-20	1203P-2	F-152-121
115658	F-131-8	1203P-2	F-152-72
115658	F-143-6	1203P-4	F-152-88F
11669543	F-135-18	120392	F-85-27
11669543	F-135-25	1205797	F-92-12
117049	F-108-4	121-979-100-735-002	F-21-9
117049	F-109-10	121097	F-171-25
117049	F-112-1	121122	F-171-29
117212	F-133-28	1213-0865	F-203-21
117296	F-95-69	12144	F-56-39
117830	F-131-11	1215	F-57-112
1183-1	F-57-109	1215	F-57-91
1183-1	F-57-88	1215	F-57-99
1183-1	F-57-96	122-0182	F-205-6
119595	F-56-47	122-0185	F-205-4
1199-J-114	F-150-11	122-0188	F-205-5
11 99-K-1 15	F-150-12	122-0325	F-212-21
1199-M-117	F-150-9	122-0326	F-212-22
1199-M-3237	F-163-9	122099	F-171-30
1199-N-118	F-150-10	122101	F-171-30
1199-N-1860	F-154-26	12220112-001	F-62-63
1199-N-1860	F-154-41	1222014-001	F-62-73
1199-N-1860	F-154A-29	122408	F-101-8
1199-N-1860	F-163-8	1225-A-1041	F-163-11
12A35-00	F-57-231	1225-B-496	F-154-7
12BI 0-00	F-57-203	1225-B-496	F-154A-8
120-0539	F-205-13	1225-N-378	F-154-16
120-0547	F-205-1	1225-N-378	F-154A-19
120-0551	F-205-3	1227-Y-571	F-150A-6
120-0555	F-205-14	1227-Z-780	F-163-13
120-0572	F-203-9	1228-F-552	F-165-9
120-0580	F-205-2	1229-A-1301	F-165-27
120-0595	F-202-25	1229-CG1511	F-165-21
120-0598	F-205-19	1229-D-2942	F-154-24
120-0622	F-205-11	1229-D-2942	F-154A-27

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1229-E-1669	F-150A-3	1246-P-1134	F-165-13
1229-E-1669	F-163-6	1250-C-226	F-154-21
1229-G-2971	F-1 54-23	1250-G226	F-154A-24
1229-G-2971	F-154A-26	1250-E-473	F-164-79
1229-G-4063	F-164-42	1250-E-473	F-165-38
1229-H-476	F-150A-5	1250-1250-250B*	F-196-7
1229-K-1597	F-1 64-78	1250-1500-250B*	F-189-8
1229-N-1626	F-1 54-40	1250-1500-250B*	F-191-8
1229-N-1626	F-154A-41	125048	F-92-10
1229-N-2250	F-154-32	1259-N-274	F-154-29
1229-N-2250	F-154A-35	1259-N-274	F-154-6
1229-P-2590	F-164-73	1259-N-274	F-1 54A-32
1229-P-4072	F-164-16	1259-N-274	F-154A-7
1229-Q-2591	F-164-73	129B-114x15/16	F-167-16
1229-R-1032	F-164-58	13X-159	F-163-2
1229-R-1032	F-165-18	1300-010	F-60-16
1229-R-2592	F-164-73	132BB1 202-00-00	F-3-33
1229-S-2593	F-164-73	134-1048	F-213-2
1229-S-2697	F-154-25	134-1050	F-213-1
1229-S-2697	F-154A-28	134-1082	F-213-8
1229-S-2931	F-164-13	134-1085	F-213-13
1229-T-2594	F-164-73	134-1092	F-213-15
1229-U-1503	F-164-81	134-1102	F-213-4
1229-U-1503	F-165-36	134-1117	F-213-7
1229-U-2595	F-164-73	134-1127	F-213-3
1229-V-2596	F-164-73	134-1130	F-213-5
1229-W-1505	F-154-14	134-1131	F-213-6
1229-W-1505	F-154A-17	134-1178	F-213-14
1229-W-2597	F-164-73	134-1179	F-213-10
1229-W-4131	F-164-74	134-1180	F-213-11
1229-X-2598	F-164-73	134-1373	F-213-9
1229-Y-2599	F-164-73	1349236-002	F-62-11
1229-Y-3015	F-164-56	1349236-002	F-62-35
1229-Y-3015	F-165-19	1353024-801	F-62-54
1229-11-1503	F-165-25	13641	F-51-12A
123-0191	F-203-17	13641	F-57-160
123-0667	F-203-15	1376C	F-1-5
123-0716	F-203-16	13903-75	F-56-38
123-0787	F-203-18	14-P-49	F-222-16
123-0952	F-203-19	14-P-54	F-222-1 0
123-0998	F-203-43	14R113F	F-131-14
123-1084	F-203-14	14VA5596W	F-175-78
123-1153	F-203-57	140-0576	F-212-4
123-1201	F-203-55	140-058	F-212-6
123-1202	F-203-56	140-0594	F-212-10
123-1203	F-203-18	140-0595	F-212-8
1232	F-68-12	140-0636	F-212-9
123221	F-118-3	14004-6X12YX	F-1-3
1244-V-1764	F-164-37	140151	F-171-24A
1245-C-185	F-154-42	1404-4-4	F-175-24
1245-D-186	F-1 54A-42	1404-4-4	F-175-26
124543	F-91-4	1404-4-4	F-182-12
1246-P-1 134	F-164-63	1405-12-12	F-175-1

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141-0281	F-212-3	150-0773	F-207- 10
141114	F-141-2	150-0775	F-207-6
141190	F-99-16	150-0777	F-210-3
141195	F-84-7	150-0939	F-208-7
141236	F-108-7	150-1082	F-208-2
141236	F-109-18	150-1084	F-208-1
141240	F-137-11	150-1089	F-210-2
141260	F-1 37-9	150-1089S	F-210-2B
141346	F-107-3A	150-1107	F-208-4
142138	F-171-28	150-1201	F-208-6
144154	F-171-25	150-1202	F-208-5
144166	F-171-26	150-1842	F-207-11
145140	F-171-27	150-513	F-57-23
146022-8	F-152-70	15007*	F-178-9
146028	F-152-50	15016	F-27-31
146030	F-152-47	1502-4-4	F-175-54
14685	F-161-35	1502-8-8	F-182-16
147-0043	F-211-20	15050	F-27-15
147-0044	F-211-19	15076	F-22-11
147-0133	F-211-24	15077	F-29-12
147-0134	F-211-16	15080	F-20-13
147-0134	F-211-17	1510	F-45-32
147-0141	F-211-18	1516395	F-167-41
147-0172	F-211-14	154-0463	F-216-11
147-0180	F-211-11	154-0712	F-212-14
147-0183	F-211-25	154-0725	F-216-8
147-0243	F-211 -31	154-165	F-216-9
147481	F-84-19	155-0330	F-216-3
1478-001 **	F-177-5	155-0492	F-216-7
148502	F-103-4	155F24-111	F-172-13
149-0463	F-211 -5	15788	F-20-4
149-0517	F-211 -4	15807	F-27-9
149-0792	F-211-3	16-CTS-X	F-131-30
149-0852	F-211-2	16-C50X-S	F-131-2
149-0925	F-211-15	16-C50X-S	F-131-36
149-0947	F-211-22	16-C50X-S	F-131-48
149-1047	F-211-3	16-C6X-S	F-131-47
149-1168	F-211 -6	16-C6X-S	F-83-110
149-1169	F-211-7	16C50X-S	F-147-1
149-1185	F-212-23	16C6X-S	F-147-9
149-1191	F-212-1	16GBV-S	F-198-4
149-1307	F-211-9	16X-202	F-1 63-24
149018	F-1 52-54	16X-202	F-1 63-4
15-0002	F-1 67-43	160-0382	F-209-4
15-0003	F-167-44	160-0721	F-210-14
15-0390-024	F-41 -8	160-0796	F-209-6
15-0390-026	F-41 -8	160-0799	F-209-3
15-0864	F-41 -27	160-0800	F-209-2
15X-387	F-164-77	1602	F-68-22
150	F-72-8A	160221	F-81 -6
150-G-2	F-72-0	16070629	F-88-2
150-0075	F-207-2	161294	F-1 5-26
150-0078	F-207-7	16270	F-27-26

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16272	F-18-5	1800221	F-57-92
16287	F-8-24	1801-001	F-176-32
16288	F-20-7	1801-001	F-176-41
16327	F-22-12	1802-001	F-176-33
16375	F-20-11	1808-001	F-176-15
16375	F-27-21	1808-001	F-176-34
16406	F-20-16	1808-001	F-176-43
16507	F-20-5	1809-001	F-176-10
1650700	F-152-60	1810-001	F-176-13
16534	F-12-6	1811-001	F-176-12
16534	F-27-10	1812-001	F-176-11
16534	F-29-6	1813-001	F-176-14
166-0316	F-209-1	181365	F-i18-5
168	F-45-54	181371	F-108-12
16959	F-18-6	181374	F-109-15
16960	F-29-20	1815	F-4-11
16961	F-12-20	1815	F-4-25
1700	F-57-123	1815	F-4-33
1700-69	F-59-4	1818-001 *	F-176-21
1711361	F-156-35	1819-001*	F-176-19
1711381	F-156-35	1820-001*	F-176-20
1711881	F-156-35	1821-001*	F-176-18
17305	F-12-12	1834	F-46-6
173213	F-48-28	1836	F-46-7
1779-J-1024	F-154-27	184	F-45-25
1779-J-1024	F-154A-30	184	F-47-0
1779-R-1 8	F-154-10	1847807	F-79-30
1779-R-18	F-154A-11	1851603	F-79-8
179816	F-85-5	1851632	F-79-6
179819	F-128-15	1851808	F-89-6
179822	F-128-6	1852888	F-79-29
179827	F-95-28	1857-001	F-176-37
179830	F-86-23	1857-001	F-176-46
179838	F-100-25	186283	F-117-1
179838	F-102-8	186283	F-127-5
179838	F-116-4	186285	F-128-16
179838	F-91-12	186285	F-134-25
179839	F-78-6	186288	F-112-19
179839	F-91-13	186292	F-127-7
179845	F-128-17	186292	F-99-18
179847	F-129-1	186315	F-112-13
179848	F-109-4	186317	F-112-12
179848	F-118-14	186318	F-91-14
179850	F-81-10	186619	F-116-3
179862	F-99-21	186622	F-118-9
179882	F-121-7	186627	F-106-24
179884	F-87-14	186628	F-78-1
179888	F-108-21	186659	F-117-4
179888	F-109-14	186725	F-77-2
179893	F-117-6	1868-001	F-176-23
1800-044	F-60-11	1869747	F-79-35
1800059	F-57-84	187425	F-93-1
1800221	F-57-105	187491	F-128-3

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187491	F-95-8	1950561	F-79-39
187491	F-98-25	1953237	F-79-43
1876681	F-89-2	1953238	F-79-31
1891	F-57-70	1955989	F-79-41
1892765	F-89-15	1957846	F-79-56
1893	F-57-110	1964294	F-79-36
1893	F-57-89	1964402	F-79-72
1893	F-57-97	1964516	F-79-16
1894458	F-89-26	1964857	F-79-34
1894458	F-89-7	1965093	F-79-27
1894635	F-79-59	1965472	F-79-40
1894637	F-79-71	19679-1	F-56-36
1894638	F-79-12	1968998	F-79-18
1894641	F-89-17	1972977	F-79-13
1894642	F-79-64	1976513	F-89-10
1894643	F-79-68	1976884	F-79-62
1895	F-48-97	1978754	F-79-58
19X60	F-154-38	1978754	F-79-74
19X61	F-154A-39	1978756	F-79-14
1905406	F-89-22	1 978756	F-79-57
19111-1	F-161-15	1978756	F-79-73
19114	F-161-16	1979388	F-79-26
1911644	F-79-70	1979389	F-79-22
191249	F-109-3	1979391	F-79-25
1913027	F-79-7	1979451	F-79-2
1913080	F-79-28	1979600	F-79-44
1913084	F-79-9	1979727	F-89-3
1914869	F-79-10	1979870	F-79-69
1914873	F-79-37	1984979	F-79-23
191758	F-86-20	1984980	F-79-24
1918047	F-79-75	1984981	F-79-19
1922457	F-79-32	1984981	F-79-20
192481	F-118-15	1985066	F-79-17
19279	F-161-13	1985067	F-79-21
193-0006	F-205-7	1988970	F-89-28
1930611	F-79-46	1988972	F-89-29
1936466	F-79-76	1988985	F-89-25
1939567	F-89-23	1989690	F-89-11
194	F-4-23	1990277	F-78-8
1945356	F-79-33	1990277	F-79-1
1945476	F-79-63	2-P-458	F-222-20
1945484	F-79-66	2-P-481	F-222-13
1945840	F-79-42	2-210*	F-1 96-9
1945848	F-79-11	2-214*	F-173-11
1945853	F-79-38	2-214*	F-195-11
1945860	F-79-15	2-326*	F-196-5
1948519	F-79-48	2-338*	F-189-6
1948520	F-79-50	2-338*	F-191-6
1948521	F-79-51	2-350*	F-195-7
1948522	F-79-47	2-358*	F-173-7
1948526	F-79-52	2-54204	F-48-93
1948529	F-79-67	2-85004	F-45-51
1949619	F-79-60	2B41950501	F-57-137

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2RST-10	F-28-14	211-0097	F-214-15
2X464	F-199-25	212-0350	F-214-11
2OAC1-1	F-199-2	212-1105	F-214-12
"20C247,P&B"	F-57-224	212-2	F-56-29
20R3	F-201-5	213684	F-158-9
20X-1811	F-150-7	213705	F-158-21
20X-1812	F-150-8	214-0050	F-214-14
20X-1847LH	F-150-14	214-0061	F-214-13
20X-1847LH	F-154-3	214-360	F-25-15
20X-1848RH	F-150-13	215PN-2	F-151-18
20X-1848RH	F-154-2	215PN-2	F-57-118
20X1811	F-154A-1	2161 91 X1	F-158-38
20X1812	F-154A-2	217709	F-152-69
2000951	F-156-45	218-421	F-17-2
20055	F-29-19	219-423	F-17-6
20060	F-12-19	219759	F-85-13
20073	F-27-22	22-P-53	F-222-32
20076	F-22-8	2200-14	F-59-2
20086	F-20-10	2203-D-9806	F-164-39
201-1236	F-214-4	2203-E-9807	F-164-39
201010	F-152-87	2203-F-2788	F-164-35
20172	F-74-IA	2203-F-9808	F-164-39
2028	F-46-13	2203-G-2789	F-164-35
202982	F-153-30	2203-G-9809	F-164-39
203-0127	F-214-22	2203-H-2790	F-164-35
203-100	F-17-23	2203-H-981i0	F-164-39
20301	F-57-205	2203-J-9474	F-165-32
20301	F-68-1	2203-J-9812	F-164-39
204-0092	F-214-23	2203-K-9241	F-164-9
204-100	F-17-20	2203-K-9475	F-165-32
204214	F-153-31	2203-K-9476	F-165-32
205-0065	F-214-2	2203-K-9813	F-164-39
205-100	F-17-17	2203-L-9242	F-164-9
205093	F-152-36	2203-L-9814	F-164-39
205267	F-152-15	2203-M-9243	F-164-9
205267	F-152-95	2203-M-9477	F-165-32
2056	F-218-34	2203-M-9815	F-164-39
206-100	F-17-24	2203-N-3003	F-163-14
206-360	F-25-13	2203-N-3004	F-163-14
20681-73	F-161-1	2203-N-9478	F-165-32
207-100	F-17-18	2203-N-9816	F-164-39
20781	F-161-2	2203-P-9480	F-165-32
209P-4-2	F-45-46	2203-P-9818	F-164-39
209P-8-4	F-152-25	2203-Q-9481	F-165-32
2090390	F-85-15	2203-Q-9819	F-164-39
21-P-293	F-222-30	2203-R-9482	F-165-32
21-P-293-CE	F-222-33	2203-R-9820	F-164-39
21-0035	F-218-12	2203-S-9483	F-165-32
21-0074	F-218-14	2203-S-9821	F-164-39
21-0183-002	F-218-13	2203-T-9484	F-165-32
21C21 FX24	F-102-4	2203-T-9822	F-164-39
210-0348	F-214-7	2203-U-9485	F-165-32
21042	F-74-28	2203-U-9823	F-164-39

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2203-W-9175	F-165-33	230-927-022-730-000	F-21-11
2203-X-9176	F-165-33	230-927-024-730-000	F-21-13
2203-Y-9177	F-165-33	230-927-200-790-000	F-21-15
2203-Z-9178	F-165-33	230-927-234-730-000	F-21-4
2203A2835	F-163-14	230-927-333-730-000	F-21-16
2203B2836	F-163-14	23010144	F-137-23
22077	F-56-37	23010300	F-1 32-9
2208-N-820	F-150A-4	23010610	F-1 33-27
2209-1	F-45-64	23011093	F-132-7
221-0091	F-214-8	23011130	F-135-5
2210-A-5331	F-154A-6	23011235	F-139-2
2210-B-5332	F-154A-5	23011240	F-133-19
2210-Y-6031	F-154-4	23011446	F-134-21
2210-Z-6032	F-154-5	23011446	F-140-16
2214-C-1095	F-164-49	23011453	F-140-10
2214-C-1095	F-165-14	23011454	F-137-5
221436	F-99-6	23011454	F-140-11
22186	F-161-7	23011458	F-137-6
222-1593	F-214-9	23011621	F-134-22
2226	F-45-57	23011621	F-140-17
2233-J-1024	F-164-59	230120036	F-133-6
2233-J-1 024	F-165- 17	23012036	F-132-48
2234-M-1183	F-164-57	23012036	F-133-33
2234-M-1183	F-165-16	23012036	F-133-4
2234-R-1188	F-164-21	23012036	F-137-13
224A216-03L	F-50-42	23012036	F-141-61
2244-K-1025	F-164-28	23012921	F-144-8
225-L	F-57-238	23012937	F-141-44
225-S	F-73-26	23012948	F-141-10
225A-H763	F-45-55	23012954	F-141-34
225A-H763	F-46-0	23013114	F-133-11
2258-Q-615	F-154-28	23013269	F-141-31
2258-Q-615	F-154A-9	23013623	F-133-13
2258-Q-815	F-154-8	23013625	F-133-12
2258-U-411	F-164-27	2301367	F-135-2
2258-U-619	F-154A-31	23013764	F-141-16
226-001	F-167-40	23013841	F-133-9
227871	F-152-40	23013937	F-135-3
227871	F-152-97	23014097	F-141-41
227918	F-152-14	23014097	F-141-54
227918	F-152-94	23014098	F-141-14
229213	F-50-23	23014441	F-134-27
22962-2	F-161-18	23014441	F-140-12
229635	F-57-113	23014631	F-132-42
2297-E-5335	F-164-19	23015348	F-141-7
2297-N-3888	F-165-5	23016140	F-137-12
229860	F-152-48	23016512	F-141-22
23-0029	F-43-6	23016567	F-135-11
23-0133-17	F-193-38E	23016568	F-135-11
23-0650	F-43-17	23016569	F-135-11
23-1-11-12	F-167-45	23016657	F-135-1
23F361	F-193-34	23016681	F-133-22
23F361	F-199-16	23016853	F-137-10

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23016886	F-137-8	23502686	F-127-6
23016947	F-144-2	23502835	F-106-13
23016997	F-133-10	23502838	F-106-13
2301724	F-135-4	23502860	F-128-10
23017442	F-132-22	23502891	F-111-3
23017556	F-131-6A	23502893	F-128-14
23017556	F-143-3	23502894	F-128-12
23017751	F-141-25	23502895	F-88-1
23017752	F-141-23	23502923	F-88-6
23017825	F-141-40	23502934	F-115-3
23018423	F-141-24	23502935	F-115-4
23018455	F-141-4	23502937	F-115-2
23018535	F-132-25	23502939	F-115-1
23018625	F-131-6	23503066	F-98-4
23018625	F-143-2	23503240	F-125-4
23018645	F-141-19	23503267	F-111-15
23018733	F-141-47	23503535	F-86-7
23018878	F-141-1	23503649	F-99-13
2301922	F-131-21	23503650	F-99-11
230240	F-153-23	23503682	F-95-32
230323	F-9-1	23503727	F-91-6
230401	F-153-2	23503940	F-111-1
23040673	F-131-1	23504304	F-95-39
23045247	F-141-62	23504304	F-95-60
23045388	F-141-20	23504640	F-128-7
23045468	F-132-46	23504825	F-106-21
23045804	F-133-7	23504907	F-106-1 A
230543	F-153-6	23505066	F-85-25
2305526	F-85-29	23505067	F-127-4
231 -0113	F-214-1	23505067	F-85-25
231A148	F-50-16	23505265	F-57-233
23103-013(3DM3)	F-5-41	23505480	F-86-9
232-0596	F-214-6	23505560	F-93-26
232-1256	F-214-18	23505995	F-99-7
2337439	F-146-4	23506019	F-99-1
234-0002	F-214-19	23506053	F-99-12
234-0229	F-214-20	23506157	F-101-4
23500499	F-95-12	23506248	F-99-8
23500514	F-95-15	2350879	F-128-4
23500595	F-106-21	2351021	F-156-42
23500714	F-105-10	236-360	F-25-7
23501025	F-111-16	2368782	F-156-44
23501026	F-111-16	2368783	F-156-43
23501027	F-111-16	238051	F-152-24
23501028	F-111-16	23932	F-167-31
23501029	F-111-16	24SA-08X04	F-152-20
23501142	F-107-11	24SB-16X06	F-74-10
23501587	F-82-11	24SB-20X12	F-156-18
23501687*	F-11-12	2411451	F-156-39
23502283	F-85-20	24209	F-161-3
23502495	F-95-46	24216	F-74-2
23502496	F-95-52	24216	F-74-33
235025858	F-128-8	24236	F-74-5

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24248	F-74-29	265850PC88	F-103-15
24248	F-74-32	26651-73	F-57-132
245A-02	F-131-15	269HB-10-8	F-74-15
245A-04X04	F-152-880	269HB-6-6	F-74-19
245A-06X04	F-152-88D	269NTA4-2	F-151-13
245A-06X06	F-152-88E	26953	F-161-12
245088	F-171-25	270NTA-10-8	F-155-15
2452661	F-1 56-37	2700-009	F-60-12
2488C22	F-102-5	27042	F-66-8
25-0017	F-48-88	2707-001*	F-176-17
25-0063	F-44-2	271564	F-109-17
25-0918	F-1 69-5	271574	F-86-16
25-0982	F-1 93-41	272906	F-91-11
25-3171	F-220-11	273340	F-141-76
25-3460	F-193-46	27404N	F-1 50-1
25-3461	F-193-44	27425-90	F-161-27
25-3463-0001	F-220-7	274613	F-134-7
25C42692	F-102-10	274621	F-91-3
25VK-08	F-131-44	274746	F-99-14
250-240-LSNT	F-4-9	274889	F-120-11
250-24OLSNT	F-57-162	274889	F-134-23
250-24OLSNT	F-71-7	274889	F-140-18
250-244RXRX	F-4-8	277144	F-152-116
250-244RXRX	F-57-161	278-360	F-25-11
250-244RXRX	F-71-6	2781-001	F-176-22
2500-1500*	F-196-3	278500	F-152-3
2500-2500-357B*	F-195-9	278614	F-152-67
2500-2500-375B*	F-173-5	278614	F-152-92
2500-3000*	F-189-4	279164	F-152-61
2500-3000*	F-191-4	279164	F-155-19
250033	F-171-25	28-P-101	F-222-31
25010335	F-147-7	28-P-119	F-222-34
25010776	F-83-20	28-P-120	F-222-26
25010778	F-83-13	28-P-121	F-222-27
25013192	F-81-11	28-P-171	F-222-38
2501801	F-147-11	2804	F-199-20
25036693	F-126-1	28110-2	F-172-7
25036693	F-85-21	281947	F-151-9
25036693	F-85-24	281947	F-152-118
25074	F-27-6	282886	F-152-35
251-423	F-17-10	283866	F-155-1
253-360	F-25-5	284142	F-152-26
2550-00714	F-40-4	2841950501	F-57-22
25503284	F-94-0	284358	F-152-4
257	F-57-63	284726	F-151-1
258039	F-171-25	284727	F-151-8
258040	F-171-30	284727	F-152-110
258041	F-171-30	28510	F-150-6
258043	F-171-25	285849	F-153-32
259-360	F-25-1	286364	F-152-78
259-423	F-17-12	286404	F-152-88
2600-20	F-59-3	286404	F-155-18
2650	F-83-14	286404	F-57-115

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286500	F-152-100	3TF6LRB4	F-57-13
286500	F-152-44	30-0012-010	F-1-14
2871	F-45-62	30-0056-014	F-1-15
288277	F-i 52-5	30-0112-024	F-1-15
2890KKD	F-22-0	30087	F-161-31
2890KKD	F-28-15	301-163	F-215-2
2891 KKD	F-28-18	301-2008	F-215-1
2891 KKD	F-29-0	301-2009	F-215-3
2892KKD	F-10-1	301-2012	F-215-14
2892KKD	F-11-1	301-2424	F-215-5
2892KKD	F-12-0	301-2425	F-215-6
2893KKD	F-19-15	301-2426	F-215-7
2893KKD	F-20-0	301-501	F-57-32
2896PKF	F-26-4	3015-52	F-45-60
2896PKF	F-27-0	30182-2-4	F-152-7
29H-41-149041-8	F-152-53	30182-4-4	F-1 52-85
2915012009	F-66-17	302-0446	F-215-13
2915012009	F-66-20	30208	F-161-23
2916069025	F-66-16	30240-2	F-161-34
296165	F-153-27	30247-138	F-161-26
296372	F-153-7	30251	F-161-24
296800	F-153-28	3031-0	F-57-126
296807	F-153-26	3031-0	F-70-16
297218	F-153-4	30334	F-161-33
298476	F-153-25	304-0003	F-209-14
298477	F-153-24	304-0006	F-215-20
298902	F-153-9	304-0032	F-215-15
298904	F-153-13	304-0175	F-215-16
298905	F-153-5	304-0292	F-209-15
298906	F-153-3	304-0427	F-209-16
298911	F-153-10	3041-H	F-45-63
298912	F-153-15	30437	F-161-30
298913	F-153-16	306-0166	F-209-10
298922	F-153-20	306-0167	F-209-9
298927	F-153-22	306-25C	F-199-10
298928	F-153-19	3062	F-46-20
298929	F-153-1	30682-10-10	F-167-26
298947	F-153-29	30682-8-8	F-167-13
298948	F-153-33	307-0004	F-215-8
298949	F-153-11	307-0180	F-215-9
2997-M-3029	F-1 64-3	307-0736	F-209-12
3-P-679	F-222-14	307-1046	F-215-10
3-078-001-32	F-57-24	307-1098	F-209-8
3-078-001-32	F-57-39	308-0037	F-215-12
3-090-002-0	F-57-25	308-0154	F-215-11
3-090-002-0	F-57-40	309-0104	F-205-17
3-206-U	F-41-1	31 -P-57	F-222-18
3-398-110-517	F-66-29	31-P-61	F-222-6
3-398-699-133	F-66-30	31 -P-62	F-222-8
3-5556	F-41-25	31-0027	F-63-12
3.0DJA-3CR	F-201-6	31-0027	F-64-14
3C	F-45-61	31-0336	F-64-1
3CT15-BI8551	F-70-11	31-0337	F-64-2

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31-0338	F-63-1	3200	F-7-1
31-0367	F-65-13	3200	F-73-17
31-0429	F-65-18	3200-CH	F-53-1
31-0430	F-65-18	3200-CH	F-55-1
31-0443	F-61-5	32013262	F-139-10
31-0443	F-63-8	3202-F-9340	F-164-65
31-0443	F-65-9	3202-F-9340	F-165-40
31-0447	F-65-2	3202-G-9341	F-164-86
31-0476	F-61-16	3202-G-9341	F-165-34
31-0498	F-65-1	3208-N-1028	F-163-10
31-0518	F-65-20	321-0146	F-215-28
31-0559-0010	F-63-17	321-0175	F-215-27
31-0559-0010	F-64-9	321029	F-92-8
31-0560-0010	F-63-20	3212BAXRIA	F-137-24
31-0562-0010	F-64-17	3218-00	F-48-47
31-0564-0010	F-65-15	3219-C-3981 -P	F-154-1
31-0565-0010	F-65-17	3219-T-4544	F-154A-3
31-0566-0010	F-65-1 7	3221-P-1004	F-164- 12
31-0567-0010	F-61-12	323-086	F-131-42
31-0567-0010	F-62-0	323-099	F-74-21
31-0582	F-64-5	3236-Q-2123	F-154A-21
31-0613	F-61-1	3236-R-2124	F-154A-22
31-0615	F-65-5	32365	F-161-32
31-0616	F-63-4	3249-001	F-176-42
31-1032	F-61-9	325017325	F-90-10
310-501	F-57-14	3260-Q-121	F-164-76
310-513	F-57-33	3264-S-227	F-154-18
310C/P	F-1 3-21	3264-T-228	F-154-19
310C/P	F-5-33	3265-001*	F-176-25
310C/P	F-7-21	3266-C-1095	F-164-43
3100-E-6219	F-163-16	3278-S-305	F-164-60
31005-2	F-161-22	3278-S-305	F-165-18
3101-V-178	F-163-22	328676X	F-222-23
3105-B-210	F-154-11	328934-6X	F-222-42
3105-B-210	F-154A-12	3294-1-5	F-39-8
3107-5-1059	F-164-20	3297-E-1019	F-164-69
311	F-26-5	33-0013	F-1-1
31106-001	F-48-49	330-26-04	F-43-16
3111-04/897396	F-48-23	33083	F-27-28
312-0057	F-215-21	331-501	F-57-38
312-0058	F-214-21	331-503	F-57-135
312-0083	F-209-7	332-0537	F-215-17
31310	F-149-2	332-0592	F-215-25
3133-B-4942	F-163-5	332-0602	F-215-26
3133-F-5180	F-163-23	332-0609	F-215-18
3156	F-199-9	332-0616	F-215-19
31670	F-201-4	332-204-125	F-57-206
32-0101	F-8-15	332-501	F-57-37
32-0607-0011	F-8-1	333-0106	F-202-33
32-2110	F-8-21	336-1366	F-209-17
32-2114	F-8-8	336-1418	F-212-16
32-30-52-10800	F-9-12	336-1505	F-212-15
32-30-52-10800	F-9-20	337-0036	F-215-24

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337-0051	F-209-13	3613194069	F-1 93-39
338-0939	F-215-23	36158	F-12-5
3390102000	F-66-24	36158	F-29-5
3390150026	F-66-21	3692W/MIC	F-51-6
3390522037	F-66-22	3692W/MIC	F-57-153
3391098159	F-66-18	37-P-39	F-222-21
3391901417	F-66-15	3700-024	F-60-13
3393300019	F-66-23	3719219	F-84-10
3393429005	F-66-19	3741-011	F-48-46
3393433003	F-66-14	3750-4250*	F-195-5
3398000881	F-66-26	3750-5250*	F-173-8
3398003547	F-66-25	37742	F-56-32
3411-001	F-176-16	378018*	F-222-45
3453-001	F-176-30	378108	F-222-24
3453-001	F-176-39	378301	F-222-53
3453-001-P	F-176-31	378307	F-222-54
3453-001-P	F-176-40	378422	F-222-3
3470-00-0-35-002	F-200-51	378430-10	F-222-37
3470-00-7-0-09-001	F-200-23	378452-7	F-222-12
3475-00-2-25-031	F-200-42	378478-10*	F-222-43
3475-00-7-0-14-001	F-200-38	378478-12*	F-222-44
3475-00-7-0-62-001	F-200-25	378480-9*	F-222-43
3475-00-7-0-88-001	F-200-2	378576	F-222-29
3475-007-0-83-001	F-200-1i0	378608	F-222-15
3478-00-0-0-010	F-200-0	378683	F-222-22
3478-00-0-2-16-003	F-200-46	378684	F-222-23
3478-00-0-2-72-031	F-200-47	378760	F-222-28
3478-00-2-16-001	F-200-24	378811	F-222-35
3478-00-2-16-002	F-200-35	378849	F-222-36
3478-00-2-25-032	F-200-40	378856	F-222-25
3478-00-7-2-39-010	F-200-30	378884	F-222-55
348-L	F-10-21	378935*	F-222-47
348-L	F-11-16	378965	F-222-56
350-515	F-57-12	378966	F-222-52
35-0026	F-45-8	378978*	F-222-51
35-0027	F-45-9	379133	F-222-24
35-0027-16000	F-48-84	379193-1*	F-222-50
35-0030	F-48-86	379231	F-222-11
35-0031	F-48-87	379231	F-222-41
35-0061	F-52-71	379242	F-222-40
35-0110	F-56-9	38-204-05-13	F-52-4
35-0148	F-54-57	38-204-05-13	F-54-4
35-0236-004	F-45-10	3829139	F-133-21
35-060/SPD6	F-1-12	3830	F-39-1
35-080/SPD8	F-1-12	3892-N-4902	F-164-38
35-120/SPD12	F-1 -12	3892-R-4932	F-164-17
35-2000-1/4"CB-XO-AP-TS-VH	F-4-2	3900-002	F-60-25
35F2792	F-199-47	3900-002B	F-60-23
35F2792	F-1 99-49	3900-009B	F-60-18
35F2794	F-199-41	3900-015	F-60-21
360009	F-75-2	3900-015B	F-60-20
36004	F-22-3	3900-037	F-60-24
3613	F-56-17	390007/SALEM	F-1-1

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3909063	F-140-6	40-3246	F-158-0
3921989	F-133-18	40-3309	F-156-29
393-991	F-199-8	40-3346	F-159-15
3936	F-199-6	40-3383-4.56	F-165-0
4-1156	F-57-223	40-3592	F-150-4
4-469-F-04X02	F-131-17	40-3649	F-160-4
4-469-F-04X02	F-151-14	40-3649	F-161-0
4-469-F-04X04	F-131-13	40-3663	F-156-28
4-469-F-06X00	F-151-15	40-4522	F-150-7
4-601-TTL	F-57-19	40-4522	F-154A-1
4-801	F-57-20	40-4523	F-150-8
4-930-CL	F-193-35	40-4523	F-154A-2
4F-6BU-BP	F-167-24	40-4524	F-150-9
4F-6BLJ-BP	F-5-14	40-4525	F-150-10
4X200	F-199-37	40-4526	F-150-11
40-0187	F-159-1	40-4527	F-150-12
40-0190	F-159-16	40X-1026	F-164-1
40-0194	F-159-12	40X-1026	F-165-3
40-0242	F-159-21	40X-1145	F-164-32
40-0323	F-159-5	40X-1150	F-164-52
40-0381	F-159-4	40X-1150	F-165-26
40-0383	F-159-6	4000	F-75-8
40-0400	F-168-12	40007656	F-200-5
40-0403	F-168-9	40007667	F-200-21
40-0520	F-160-1	400124	F-158-46
40-0565-004	F-162-1	400408-0000	F-94-22
40-0575	F-150-3	400424-0000	F-94-14
40-0824	F-159-9	400580-0000	F-94-1
40-0826	F-159-18	400580-0000	F-94-4
40-0839	F-168-6	400627-0620	F-94-12
40-0841	F-168-1	400768-0013	F-94-7
40-0854	F-159-7	400872-0410	F-94-19
40-0855	F-159-8	4010	F-16-30
40-0897	F-69-6	4010120	F-48-75
40-0955	F-150-1	4010200	F-48-81
40-1398	F-170-1	4010200F	F-48-81A
40-1399	F-170-1	401379	F-158-32
40-1674	F-156-33	401380	F-158-52
40-1702-573	F-150-2	401381	F-158-23
40-1719	F-69-3	401382	F-158-5
40-1872	F-156-51	401404	F-158-36
40-2392	F-156-47	402-0078	F-215-22
40-2492-003	F-168-8	402-0282	F-201-12
40-2492-004	F-168-7	402-0284	F-201-9
40-2499-002	F-168-13	402-0285	F-201-10
40-2942	F-156-50	402-0300	F-201-11
40-2956	F-162-3	402-0328	F-201-13
40-2957	F-162-3	402357	F-158-26
40-2981	F-150-6	40237A1	F-158-23
40-2990	F-150-5	402386	F-158-40
40-3011	F-162-2	402434	F-158-47
40-3011	F-163-0	403-0671	F-202-31
40-3246	F-156-12	4032561	F-158-18

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403818-0000	F-94-15	42-0001	F-166-26
403818-0030	F-94-9	42-0003	F-80-6
4050110	F-48-77	42-0026	F-166-25
407135-0000	F-94-21	42-0039	F-166-11
40735-001	F-48-58	42-0056	F-166-24
40735-301	F-48-56	42-0069	F-166-1
407657-0004	F-94-11	42-0080	F-166-7
4080650	F-48-76	42-0132	F-80-17
4080650	F-48-80	42-0134	F-80-16
4080660	F-48-71	42-0161	F-166-19
41-0014	F-145-0	42-0162	F-80-7
41-0015	F-145-9	42-0163	F-80-9
41-0018	F-145-8	42-0173	F-201-3
41-0049	F-9-17	42-0173	F-59-11
41-0050	F-9-3	42-0173	F-74-8
41-0050	F-9-9	42-0175	F-80-18
41-0063	F-9-11	42-0176	F-80-1
41-0064	F-9-10	42-0183	F-149-2
41-0119	F-145-5	42-0198	F-166-6
41-0124	F-145-14	42-0205	F-74-1A
41-0125	F-9-19	42-0207	F-149-44
41-0126	F-9-18	42-0208	F-149-45
41-0127	F-9-12	42-0226	F-149-9
41-0127	F-9-20	42-0231	F-149-13
41-0134	F-9-14	42-0234	F-166-8
41-0135	F-9-13	42-0252	F-75-3
41-0136	F-9-21	42-0254	F-74-3
41-016Z	F-9-4	42-0264	F-149-35
41-0169	F-9-6	42-0265	F-74-31
41-0187	F-145-13	42-0311	F-90-1
41-0189	F-145-6	42-0320	F-149-47
41-0196	F-9-5	42-0322	F-156-2
41-0199	F-9-16	42-0365	F-166-12
41-0199	F-9-2	42-0471	F-92-0
41-0238	F-9-8	42-0472	F-92-11
41X-1208	F-164-25	42-0567	F-156-17
41X-1209	F-164-30	42-0567	F-157-0
41X-1216	F-1 64-64	42-0570	F-1 66-9
41X-1216	F-165-43	42-0611	F-74-28
41X-1327	F-165-22	42-0646	F-74-27
4100	F-53-25	42-0795	F-74-25
4100	F-55-11	42-0955	F-149-17
41098-00	F-56-30	42-0964	F-90-6
41099-00	F-56-27	42-1101	F-74-13
411-HG	F-45-59	42-1136	F-86-21
41104-051	F-56-31	42-1146	F-57-233
411769	F-86-21	42-1147	F-56-47
41206	F-171-20	42-1188	F-80-3
413733	F-80-10	42-1198	F-166-13
415437A1	F-158-65	42-1436	F-149-16
415442	F-158-33	42-1450	F-149-27
418	F-16-11	42-1466	F-149-1
4181	F-13-17	42-1647-3150	F-90-10

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42-1772	F-131-18	44-0303	F-56-1
42-1890	F-156-3	44-0329	F-48-65
42-1933	F-74-7	44-0330	F-52-37
42-2135	F-149-3	44-0330	F-54-34
42-2188	F-74-1	44-0334	F-152-88
42-2235	F-149-20	44-0334	F-155-18
42-3063	F-80-11	44-0334	F-57-115
42-4034	F-1 56-1	44-0335	F-152-61
42X-1021	F-164-48	44-0335	F-155-19
42X-1021	F-165-11	44-0337	F-155-1
42023	F-27-1	44-0338	F-151-1
42026	F-16-20	44-0347	F-156-22
42026	F-18-7	44-0386	F-56-15
42127-001	F-48-57	44-0387	F-56-15
42432-30	F-48-44	44-0388	F-53-23
42432-30-S	F-48-45	44-0431	F-155-8
42600	F-57-71	44-0492	F-52-70
42620	F-57-75	44-0493	F-52-70
427564	F-112-5	44-0518	F-131-28
427564	F-93-23	44-0518	F-16-7
428204	F-101-15	44-0518	F-67-7
43-0008	F-131-24	44-0518	F-74-24
43-0009	F-131-35	44-0519	F-149-24
43-0019	F-147-7	44-0519	F-67-2
43-0021	F-147-11	44-0520	F-67-19
43-0042	F-131-4	44-0521	F-131-27
43-0042	F-147-8	44-0521	F-67-6
43-0155	F-67-9	44-0521	F-74-23
43-0189	F-131-1	44-0522	F-149-23
43-0225	F-131-26	44-0522	F-16-6
43-0226	F-131-34	44-0522	F-67-3
43-0590	F-131-11	44-0531	F-156-23
43-0591	F-131-19	44-0537	F-169-1
43-0794-001	F-131-32	44-0543	F-151-2
43-0795	F-131-33	44-0543	F-152-112
43-0853	F-131-48	44-0562	F-156-26
4300	F-42-6	44-0572	F-156-27
43029-301	F-48-55	44-0572	F-156-27
437-99025	F-56-33	44-0632	F-169-10
44-0116	F-52-43	44-0633	F-156-25
44-0117	F-52-43	44-0634	F-52-14
44-0122	F-57-2	44-0634	F-54-10
44-0122	F-57-42	44-0637	F-52-33
44-0214	F-58-51	44-0638	F-52-33
44-0215	F-58-0	44-0642	F-52-39
44-0216	F-131-23	44-0642	F-54-36
44-0217	F-131-22	44-0664	F-48-85
44-0244	F-57-15	44-0680	F-52-3
44-0245	F-57-133	44-0680	F-54-3
44-0245	F-57-30	44-0747	F-52-38
44-0246	F-57-10	44-0747	F-54-35
44-0251	F-167-41	44-0785	F-146-1
44-0258	F-146-5	44-0785	F-74-18

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44-0800	F-59-1	44-2182	F-52-8
44-0800	F-60-0	44-2197	F-169-20
44-0817	F-131-21	44-2212	F-16-6
44-0818	F-131-38	44-2216	F-54-44
44-0820	F-146-4	44-2247	F-59-10
44-0863	F-156-24	44-2249	F-66-10
44-0935	F-59-8	44-2250	F-66-27
44-0956	F-45-4	44-2251	F-57-120
44-0956	F-45-6	44-2390	F-57-64
44-0969	F-56-11	44-2448	F-146-2
44-0970	F-56-13	44-2548	F-54-14
44-0991	F-52-64	44-2562	F-57-34
44-0991	F-54-51	44-2627	F-59-3
44-0992	F-52-66	44-2628	F-59-2
44-0992	F-54-53	44-2666	F-67-22
44-1086	F-167-40	44-2684	F-67-23
44-1089	F-74-21	44-2792	F-69-17
44-1091	F-75-2	44-3050	F-59-5
44-1211	F-67-14	44-3167	F-57-3
44-1213	F-67-17	44-3168	F-57-44
44-1270	F-54-54	44-3169	F-57-43
44-1270	F-55-0	44-3183	F-67-12
44-1271	F-54-54	44-3267	F-4-37
44-1271	F-55-0	44-3267	F-57-19
44-1272	F-55-9	44-3270	F-57-20
44-1372	F-60-15	44-3402	F-53-9
44-1433	F-169-7	44-3402	F-55-21
44-1467	F-57-188	44-3404	F-67-19A
44-1468	F-57-197	44-3446-1000	F-169-2
44-1603	F-57-32	44-3447-1000	F-169-3
44-1604	F-57-37	44-3655	F-45-1
44-1605	F-57-14	44-3660	F-80-23
44-1606	F-57-12	44-3951	F-48-4
44-1608	F-57-38	44-4248-0010	F-57-1
44-1609	F-57-135	44-4249-0010	F-57-170
44-1971	F-156-54	44-4250-0010	F-57-192
44-1981	F-57-23	44-4251-0010	F-57-183
44-2002	F-52-49	44-4287-0010	F-58-54
44-2003	F-52-49	44-4288-0010	F-68-36
44-2107	F-54-48	44-4306	F-56-5
44-2108	F-54-48	44-4307	F-56-3
44-2114	F-52-23	44-4308-0010	F-52-67
44-2114	F-54-16	44-4308-0010	F-53-0
44-2115	F-52-28	44-4309-0010	F-52-67
44-2135	F-52-5	44-4309-0010	F-53-0
44-2135	F-54-11	44-4396	F-56-4
44-2152	F-69-17	44-4456-0010	F-73-46
44-2164	F-52-55	44-4463	F-156-32
44-2165	F-52-55	44-4898	F-73-34
44-2166	F-52-27	44-4899	F-73-34
44-2174	F-54-40	44-4904	F-149-38
44-2175	F-54-40	44-4905	F-73-40
44-2176	F-54-33	44-4960	F-73-6

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44-4961	F-73-12	48220-2	F-161-11
44-5172	F-73-11	48222-2	F-161-21
44-5175	F-149-39	4842	F-161-17
44-5176	F-73-24	48523-1	F-161-4
44-5178	F-73-26	48545	F-161-20
44-5302	F-73-1	49096-185	F-160-4
44F1326	F-175-39	49096-185	F-161-0
44F1326	F-199-39	49Z5	F-161-29
4416	F-47-9	4943005	F-41-22
441831-0001	F-94-8	4950-VHB	F-193-45
441843-0001	F-94-20	4968-7	F-8-23
441903-0002	F-94-16	5-P-568	F-222-4
441904-0002	F-94-17	5-280X	F-9-17
442022-0001	F-94-23	5-281X	F-9-3
442030-0001	F-94-18	5-281X	F-9-9
442732-0001	F-94-13	5A33428A	F-149-35
442825-0002	F-94-3	SX-1034	F-164-10
443-10-6	F-57-207	50-0020	F-44-13
443109-0006	F-94-6	50-0069	F-19-25
443321	F-78-7	50-0074	F-44-17
4435	F-46-14	50-0199	F-44-20
444-0664	F-48-85	50-0530	F-167-1
444935-0002	F-94-10	50-0648	F-167-7
445090	F-133-16	50-0685	F-167-5
445391-0001	F-94-25	50-0762-0003	F-44-11
4458	F-135-17	50-0762-0005	F-28-4
4458	F-135-26	50-7062-0006	F-28-9
446397-0560	F-94-5	5000-8	F-175-14
446401 -0925	F-94-2	50030	F-58-12
44643-9	F-161-25	50048	F-36-32
44694	F-161-9	501-0003	F-205-20
447948-0001	F-94-24	501-0103	F-212-2
45-1009A-114	F-4-28	501096-01	F-92-9
45045-3	F-161-6	501146-3*	F-222-46
450517	F-98-16	50152	F-34-4
452212	F-156-54	502-0001	F-205-21
453996	F-89-24	502-0002	F-211-1
454815	F-141-74	502-0003	F-212-20
454934	F-110-10	502-0020	F-205-8
454992	F-113-1	502-0033	F-211-10
455322	F-86-2	502-0037	F-205-10
455537	F-110-6	502-0053	F-205-16
455537	F-76-6	502-0065	F-211-23
455537	F-98-12	502-0065	F-211-8
455971	F-82-33	502-0080	F-212-19
457008	F-1 19-6	502-0255	F-205-18
45900	F-161-28	502-0281	F-205-12
4663-K	F-167-34	5022-01185-01	F-149-16
4703GG2A-160	F-131-23	50234-A	F-161-8
472-0123	F-57-181	50234-0002	F-52-43
4739-6	F-102-9	50235-0002	F-52-43
474	F-73-33	50264-0004	F-52-70
4747	F-187-21	50265-0004	F-52-70

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503-0171	F-212-13	51-0036	F-5-42
503-0560	F-212-7	51-0036	F-7-15
50319	F-35-5	51-0039	F-145-7
50353	F-33-26	51-0040	F-16-22
50353	F-35-6	51-0040	F-18-0
5036	F-31-13	51-0040	F-7-14
5037	F-31-11	51-0041	F-42-2
505-0002	F-203-26	51-0067	F-13-17
505-0014	F-203-25	51-0069	F-13-20
505-0056	F-203-24	51-0084	F-1-16
505-0180	F-212-5	51-0085	F-13-19
505-0274	F-205-15	51-0093	F-57-57
505-0274	F-205-9	51-0094	F-57-58
5058-00-7-7-56-001	F-200-1	51-0095	F-57-232
5066	F-32-57	51-0097	F-4-10
50774	F-37-7	51-0098	F-4-32
50780*	F-32-52	51-0124	F-16-31
50788-26	F-35-2	51-0124	F-23-42
508-0002	F-213-16	51-0126	F-16-30A
50867	F-38-19	51-0130	F-44-25
50875	F-35-10	51-0133	F-40-1
509-0018	F-209-11	51-0134-0350	F-10-25
509-0084	F-202-21	51-0136	F-39-19
509-0086	F-203-12	51-0136	F-5-15
509-0087	F-210-9	51-0137	F-152-104
509-0088	F-210-5	51-0137	F-1 52-18
509-0090	F-202-11	51-0137	F-26-6
509-0091	F-209-5	51-0137	F-27-32
509-0101	F-211-12	51-0171	F-39-11
509-0117	F-203-42	51-0182	F-13-5
50904	F-33-5	51-0182	F-16-30
50905	F-33-6	51-0182	F-23-43
50907	F-33-7	51-0184	F-16-30B
50912	F-32-55	51-0194	F-16-24
50915	F-32-72	51-0194	F-167-14
50941	F-35-11	51-0196	F-16-1
50970	F-57-76	51-0196	F-17-0
51-0014	F-39-1	51-0202	F-10-21
51-0016	F-26-4	51-0202	F-11-16
51-0016	F-27-0	51-0223	F-39-6
51-0022	F-22-0	51-0239	F-19-2
51-0022	F-28-15	51-0252	F-16-12
51-0023	F-28-18	51-0258	F-10-15
51-0023	F-29-0	51-0258	F-11-18
51-0024	F-10-1	51-0258	F-23-54
51-0024	F-11-1	51-0259	F-16-13
51-0024	F-12-0	51-0259	F-19-18
51-0026	F-19-15	51-0260	F-16-19
51-0026	F-20-0	51-0354	F-145-10
51-0031	F-28-16	51-0355	F-145-2
51-0034	F-4-29	51-0358	F-145-4
51-0035	F-167-24	51-0358	F-152-17
51-0035	F-5-14	51-0360	F-145-11

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51-0419	F-39-8	5102098	F-82-8
51-0498	F-4-24	51022	F-14-7
51-0627	F-30-12	51022	F-15-7
51-0628	F-30-11	5102257	F-84-2
51-0632	F-40-2	51023	F-14-18
51-0739	F-30-1	51023	F-15-18
51-0761	F-16-11	5102364	F-85-12
51-0883	F-16-4	5102597	F-107-10
51-0952	F-23-56	5102651	F-98-10
51-0968	F-13-10	5102735	F-97-3
51-0968	F-18-0	5102793	F-82-23
51-0968	F-23-78	5102841	F-101-1
51-0968	F-5-55	5102853	F-82-22
51-0968	F-7-32	5103045	F-100-17
51-1007	F-40-3	5103045	F-100-6
51-9140-01	F-193-38B	5103307	F-82-31
510-0043	F-210-8	5103364	F-95-66
510-0046	F-207-5	5103530	F-112-16
510-0047	F-214-5	5103534	F-113-5
510-0048	F-210-6	5103544	F-99-20
510-0082	F-210-7	5103566	F-110-13
510-923-006-790-200	F-21-12	5103566	F-76-2
5100313	F-84-12	5103636	F-104-16
5100404	F-100-31	5103642	F-104-14
5100532	F-112-24	5103646	F-104-2
5100617	F-95-43	5103647	F-104-13
5100638	F-82-17	5103648	F-104-1
5100703	F-103-9	5103663	F-82-5
5100727	F-95-45	5103676	F-86-1
5100756	F-97-6	5103862	F-86-8
5100771	F-98-29	5103868	F-86-11
5100778	F-98-27	5103903	F-105-11
5100792	F-107-18	5103930	F-100-37
5100850	F-98-7	5103951	F-86-10
5100860	F-98-28	5103957	F-110-9
5100890	F-86-3	5103957	F-76-1
5101033	F-100-5	5103981	F-104-11
5101037	F-95-41	5104020	F-104-8
5101120*	F-111-14	5104081	F-104-18
5101150	F-113-3	5104089	F-103-28
5101160	F-99-4	5104089	F-85-26
S101171	F-108-16	5104089	F-85-30
5101173	F-82-14	5104105	F-104-3
5101176	F-118-13	5104153	F-103-14
5101315	F-103-23	5104156	F-82-32
5101377	F-77-6	5104156	F-98-24
5101394	F-93-18	5104162	F-112-8
5101408	F-93-19	5104163	F-98-23
5101413	F-93-17	5104282	F-104-12
5101419	F-95-7	5104317	F-86-5
5101727	F-100-30	5104406	F-104-4
5101760	F-104-15	5104420	F-81-4
5102019	F-117-7	5104439	F-97-5

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5104501	F-111-19	5117005	F-107-3
5104507	F-112-9	5117071	F-95-53
5104514	F-104-9	5117186	F-103-26
5104515	F-104-10	5117242	F-118-7
5104591	F-114-2	5117243	F-106-11
5104592	F-114-8	5117254	F-82-6
5104604	F-114-4	5117269	F-119-9
5104701	F-103-13A	5117344	F-103-16
5104816	F-114-7	5117362	F-104-6
5104817	F-114-10	5117369	F-103-30
5104834	F-107-14	5117466	F-117-10
5104958	F-114-5	5117535	F-82-24
5104959	F-114-9	5117562	F-105-19
5104960	F-114-6	5117563	F-105-17
51057	F-13-5	5117564	F-105-13
51057	F-15-30	5117587	F-117-13
51057	F-23-43	5117588	F-117-12
51057	F-24-31	5117599	F-117-14
5106003	F-98-17	5117629	F-111-22
5106219	F-95-17	5117700	F-120-7
5106223	F-106-5	5117727	F-120-4
5106299	F-104-11	5117733	F-100-27
5106413	F-105-24	5117734	F-100-28
51065*	F-32-22	5117786	F-98-8
5106771	F-95-25	5117920	F-108-11
5106909	F-120-12	5117957	F-119-2
5106910	F-104-17	5117972	F-99-5
5107223	F-84-4	5117984	F-1 06-6
5107607	F-82-13	5117984-1	F-106-7
5107677	F-112-10	5117993	F-98-11
5107979	F-104-5	5118302	F-118-12
5108436	F-1i2-7	51185	F-36-71
5108907	F-109-11	51186	F-36-72
5108918	F-105-34	51187-4	F-36-80
5108919	F-105-35	51190	F-36-81
5109020	F-116-10	51195	F-23-47
5110330	F-95-42	51195*	F-24-27
51111	F-37-6	5119973	F-103-10
5111422	F-106-18	5120020	F-87-9
5111422-1	F-106-20	5120224	F-97-1
5111423	F-106-19	5120501	F-120-9
5111423	F-106-8	5121259	F-129-3
5111424	F-106-17	5121459	F-101-11
5112899	F-97-2	5121459	F-101-2
511337	F-105-23	5121466	F-112-17
5113825	F-104-7	51215	F-35-30
5114210	F-116-1	51216	F-35-31
5115454	F-110-3	51217	F-31-29
5115454	F-117-3	5121714	F-110-1
5115572	F-106-14	5121714	F-117-16
5116485	F-106-4	51218	F-31-30
5116485	F-122-7	5121814	F-95-9
5116863	F-82-34	5121835	F-101-13

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5121905	F-95-6	5132410	F-100-22
5121957	F-87-8A	5132422	F-101-10
5122424	F-98-6	5132458	F-102-14
5122445	F-105-2	51326	F-33-8
5122445	F-105-8	51327	F-33-9
5122680	F-109-2	5132715	F-87-16
5123123	F-109-19	51329	F-32-99
5123250	F-105-33	5133163	F-87-18
5123570	F-98-21	5133354	F-77-4
5123638	F-108-9	5133377	F-91-10
5123638	F-109-8	5133431	F-81-9
5123700	F-105-3B	513383	F-91-15
5123700	F-105-6B	51340	F-18-4
5123700	F-105-9B	5134477	F-81-8
5123812	F-103-8	51346	F-33-19
5123812	F-114-1	51347*	F-36-41
5123847	F-87-13	51361	F-36-44
5124203	F-86-12	5136241	F-98-13
5124203	F-86-13	51363*	F-36-42
5124333	F-103-7	5136678	F-95-26
5124532	F-107-13	513682	F-91-7
51246	F-27-3	5137422	F-121-1
51246*	F-12-9	5137620	F-93-16
51246*	F-29-9	5137761	F-77-3
5125108	F-130-3	5138079	F-121-3
5125608	F-100-34	5138336	F-82-12
5125695	F-118-10	51384**	F-36-63
5126084	F-110-2	5138619	F-112-20
5126327	F-119-3	5138659	F-100-4
5126686	F-81-7	5139545	F-121-4
5126904	F-106-32	5139545	F-91-1
5126904	F-122-3	5139988	F-100-18
5127477	F-95-65	5139989	F-100-12
5127797	F-82-18	5141367	F-106-2A
5128217	F-84-20	5141468	F-95-63
5128640	F-105-32	5141530	F-98-5
5129101	F-105-15	5141588	F-95-10
5129157	F-87-8	5141605	F-95-61
5129867	F-88-5	5141661	F-108-5
5129919	F-105-20	5141773	F-87-3
5130031	F-84-9	5142271	F-116-7
5130135	F-113-7	5142412	F-95-47
5130334	F-118-4	5142549	F-93-20
5130488	F-93-14	51429	F-14-13
5130995	F-78-9	51429	F-15-13
5131433	F-119-8	5143233	F-91-5
5131433	F-93-11	5143234	F-91-2
5131724	F-107-9	5143999	F-82-7
5131786	F-116-6	5144186	F-102-2
5131978	F-112-21	5144629	F-93-7
5131978	F-86-17	5144846	F-111-18
5132155	F-98-9	5144866	F-87-5
5132383	F-111-20	5144875	F-112-3

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5144888	F-106-30	515-0006	F-204-6
5144888	F-122-4	515-001	F-207-3
5144901	F-101-5	515-0122	F-214-33
5145091	F-87-2	515-0153	F-204-9
5145092	F-121-6	5150014	F-117-9
51454	F-36-35	5150087	F-106-1
51456*	F-36-43	5150087	F-122-1
5146049	F-95-67	5150193	F-84-5
5146254	F-99-15	5150216	F-95-49
5146308	F-112-4	5150216	F-95-56
5146310	F-112-4	5150230	F-108-17
5146339	F-84-6	5150250	F-129-2
5146410	F-95-24	5150268	F-103-27
5146497	F-100-16	5150268	F-85-28
5146521	F-95-30	5150303	F-105-36
5146585	F-117-8	5150311	F-105-3
51466	F-36-31	5150311	F-105-6
5146646	F-100-24	5150311	F-105-9
5146680	F-116-5	5150312	F-105-3A
5146705	F-84-8	5150312	F-105-6A
5146891	F-115-5	5150312	F-105-9A
5146913	F-100-8	5150314	F-105-3C
5147147	F-95-38	5150314	F-105-6C
51473	F-36-26	5150314	F-105-9C
5148023	F-83-4	5150318	F-105-5
5148171	F-83-12	5150325	F-105-12
5148310	F-103-3	5150349	F-95-34
5148324	F-103-2	5150361	F-103-17
5148373	F-111-17	5150362	F-100-10
5148429	F-97-6	5150372	F-95-62
5148472	F-105-1	5150542	F-95-44
5148475	F-105-7	5150829	F-95-58
5148480	F-118-5A	5150855	F-95-62
5148490	F-103-23	5150856	F-95-62
5148491	F-105-16	51509	F-36-34
5148499	F-112-15	5151189	F-87-6
5148501	F-100-30	5151272	F-105-10A
5148611	F-100-30	5151277	F-106-13A
5148612	F-100-30	5151444	F-113-8
5148615	F-103-25	5151576	F-100-19
5148646	F-100-7	5151601	F-105-14
5148794	F-95-37A	5151601	F-105-37
5148794	F-95-68	5152148	F-120-13
5148810	F-120-15	5153473	F-87-19
5149149	F-107-3A	5153938	F-95-62
5149220	F-100-16	5154398	F-95-2
5149565	F-107-4	5154453	F-103-19
5149566	F-107-4	5154669	F-112-18
5149567	F-107-4	5157930	F-107-12
5149568	F-107-4	5159714	F-95-20
5149771	F-105-21	516-0072	F-203-5
5149878	F-103-11	516-0090	F-202-37
515-0001	F-204-8	516-0103	F-214-32

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516-0111	F-210-2C	5177773	F-82-19
516-0141	F-203-27	5177777	F-82-21
51601	F-33-20	5177786	F-108-22
5161003	F-84-14	51778	F-35-4
51630	F-31-20	51779	F-35-14
51633-10*	F-32-37	5179613	F-95-22
51633-5*	F-32-37	518-0129	F-210-4
51633-7*	F-32-37	518-0188	F-204-4
51638	F-32-69	518-0207	F-202-39
51639	F-32-36	518-0268	F-203-44
51639	F-32-68	5180250*	F-111-13
51640	F-32-73	51803	F-38-6
51650*	F-34-9	51813	F-22-5
51653	F-34-13	51813	F-27-8
51665*	F-31-4	5182	F-36-30
5166664	F-132-3	5184530	F-84-15
5166664	F-148-3	51862	F-36-79
51672	F-32-7	51873	F-37-1
5167380	F-118-11	5188755	F-121-2
51676	F-32-80	51890	F-20-14
51677	F-32-27	51890	F-27-25
5167714	F-113-2	51890	F-38-5
51694	F-32-46	5189292	F-88-3
51698	F-32-44	51915	F-33-25
517-0035	F-213-17	51944	F-36-58
517-0053	F-203-10	5194825	F-106-19
5170450	F-121-5	5194825	F-106-8
5170450	F-87-1	5194826	F-106-17
51706-94	F-32-18	5194827	F-106-17
51716-1	F-32-59	5194858	F-106-18
51716-6	F-32-62	5194859	F-106-18
5172	F-36-61	51949	F-38-15
51724	F-32-2	5196026	F-106-16
51725	F-32-88	5196027	F-106-16
51727*	F-32-81	5196028	F-106-16
5172734	F-106-22	5196029	F-106-16
51728-10*	F-34-6	5196321	F-95-64
51728-5	F-34-6	5196602	F-117-11
51728-7	F-34-6	5196753	F-107-3
5172874	F-103-22	5196754	F-107-3
51729-10*	F-32-28	5197110	F-106-19
51729-5*	F-32-28	5197110	F-106-8
51742-1	F-35-1	5197236	F-106-18
5174286	F-124-22	5197237	F-106-18
5174973	F-84-17	5197238	F-106-18
5175641	F-107-16	5197569	F-106-6
5175705	F-118-8	5197613	F-106-6
5176998	F-113-6	5198558	F-84-11
51777	F-32-91	5199575	F-85-10
5177769	F-106-2	5199575	F-85-11
5177769	F-106-29	5199575	F-85-16
5177769	F-122-2	5199575	F-85-17
5177769	F-122-8	5199575	F-85-9

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5199579	F-85-10	52-0075	F-5-33
5199579	F-85-11	52-0075	F-7-21
5199579	F-85-16	52-0077	F-5-32
5199579	F-85-17	52-0077	F-7-22
5199579	F-85-9	52-0115	F-4-1
5199588	F-85-10	52-0116	F-151-6
5199588	F-85-11	52-0116	F-7-17
5199588	F-85-16	52-0116	F-70-4
5199588	F-85-17	52-0117	F-13-18
5199588	F-85-9	52-0117	F-152-111
5199735	F-84-3	52-0117	F-4-59
5199780	F-98-20	52-0117	F-40-9
52-0017	F-26-3	52-0117	F-56-58
52-0021	F-40-4	52-0117	F-57-122
52-0029	F-7-2	52-0117	F-7-9
52-0030	F-7-4	52-0126	F-131-39
52-0036	F-10-4	52-0126	F-146-3
52-0036	F-11-9	52-0144	F-16-18
52-0036	F-19-6	52-0144	F-18-9
52-0036	F-28-42	52-0149	F-7-28
52-0037	F-13-1	52-0150	F-39-2
52-0037	F-23-44	52-0162	F-151-10
52-0038	F-13-1	52-0162	F-167-17
52-0046	F-10-5	52-0162	F-199-12
52-0046	F-11-10	52-0162	F-3-25
52-0046	F-13-2	52-0207	F-5-8
52-0046	F-16-27	52-0273	F-11-2
52-0046	F-19-7	52-0284	F-28-47
52-0046	F-23-39	52-0288	F-28-46
52-0046	F-28-39	52-0290	F-28-45
52-0047	F-13-2	52-0292	F-10-10
52-0048	F-16-21	52-0448-001	F-4-2
52-0048	F-18-8	52-0448-002	F-4-28
52-0056	F-48-98	52-307	F-57-201
52-0057	F-13-15	52-400	F-57-226
52-0057	F-26-1	52B	F-45-58
52-0060	F-5-23	52L	F-45-56
52-0061	F-5-11	52R	F-45-56
52-0063	F-57-127	520-0011	F-212-17
52-0064	F-10-8	520-0491	F-214-17
52-0064	F-11-13	520-0502	F-214-16
52-0064	F-13-4	520-0608	F-202-30
52-0064	F-19-10	520-0621	F-212-11
52-0064	F-23-37	520117	F-68-17
52-0064	F-28-37	52055	F-36-69
52-0064	F-39-12	52056	F-38-17
52-0065	F-10-2	5206WO	F-71-3
52-0065	F-11-7	52088	F-32-14
52-0065	F-1 9-4	52089	F-32-10
52-0065	F-28-43	521-11-B4	F-57-149
52-0066	F-5-3	521-275-006-790-200	F-21-14
52-0067	F-13-21	52108*	F-31-27
52-0069	F-26-5	52184	F-38-5

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522-21-B4	F-57-56	53-0125-034	F-11-24
52246	F-14-10	53-0125-037	F-10-28
52246	F-15-10	53-0127-004	F-167-9
52263	F-35-9	53-0131-004	F-16-22B
52264	F-35-8	53-0131-005	F-28-12
52265	F-35-7	53-0131-006	F-216-6
52271	F-161-5	53-0131-007	F-10-20
5234775	F-129-4	53-0131-007	F-11-17
525590	F-17-30	53-0131-007	F-28-25
526-0014	F-201-14	53-0131-010	F-10-26
526-0021	F-213-29	53-0134-0350	F-11-15
526-0032	F-214-27	53-0135-0600	F-10-24
526-0066	F-212-26	53-0154-002	F-28-13
526-0068	F-212-24	53-0154-003	F-28-36
526-0115	F-210-21	53-0156-008	F-28-10
526-0115	F-213-30	53-0157-006	F-28-24
526-0122	F-211-30	53-0157-008	F-28-52
526-0130	F-202-45	53-0161	F-131-29
526-0174	F-202-29	53-0165-015	F-28-19
526-0198	F-201-8	53-0166-008	F-216-4
526-0245	F-203-51	53-0169-002	F-19-22
5266C	F-72-14	53-0259-0600	F-28-32
526710	F-17-25	53-0376-03600	F-156-6
53	F-57-152	53-4005	F-28-6
53	F-57-18	53-4014-004	F-156-7
53	F-57-51	53-4014-004	F-167-10
53-0010	F-156-8	53-4019-004	F-156-10
53-0011	F-131-40	53-4019-004	F-74-20
53-0014	F-131-3	53-4019-004	F-83-11
53-0014	F-131-46	53-4019-008	F-131-47
53-0014	F-131-5	53-4019-008	F-147-9
53-0014	F-147-2	53-4020-013	F-156-4
53-0056-016	F-28-30	53-4020-022	F-131-2
53-0056-019	F-28-26	53-4020-022	F-131-36
53-0107-001	F-80-4	53-4020-022	F-131-48
53-0107-006	F-149-34	53-4020-022	F-147-1
53-0107-007	F-167-11	53-4021-004	F-131-44
53-0107-011	F-167-38	53-4021-004	F-152-27
53-0114-005	F-28-22	53-4023-009	F-131-48
53-0114-007	F-28-11	53-4024-001	F-75-5
53-0114-009	F-10-23	53-4024-008	F-74-12
53-0121-005	F-16-22C	53-4024-008	F-83-10
53-0121-006	F-28-23	53-4024-012	F-83-6
53-0121-009	F-10-18	53-4024-013	F-83-15
53-0121-009	F-11-22	53-4024-025	F-149-6
53-0121-009	F-28-28	53-4025-003	F-145-1
53-0121-010	F-10-27	53-4025-007	F-83-8
53-0122-007	F-216-5	53-4025-016	F-156-19
53-0124-006	F-216-1	53-4025-016	F-167-15
53-0124-008	F-28-33	53-4025-020	F-167-19
53-0125-022	F-28-20	53-4025-020	F-83-19
53-0125-029	F-28-29	53-4025-021	F-167-25
53-0125-034	F-10-22	53-4025-021	F-83-18

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53-4025-022	F-156-9	544016	F-83-9
53-4025-025	F-156-21	544025	F-1 67-20
53-4025-026	F-131-30	544026	F-167-21
53-4025-026	F-149-8	544036	F-167-27
53-4028-001	F-75-7	544037	F-167-26
53-4033-010	F-131-45	55-0001	F-45-32
53-4033-010	F-149-7	55-0002	F-45-41
53-4034-004	F-152-31	55-0004	F-152-77
53-4034-004	F-167-39	55-0016	F-1-20
53-4038-006	F-156-11	55-0019	F-152- 19
53-4040-002	F-156-5	55-0020	F-1-21
"53/64", 2863"	F-48-19	55-0021	F-5-41
530332-01800	F-75-6	55-0022	F-1-22
530376-11300	F-156-16	55-0023	F-1-23
534-2544	F-56-25	55-0024	F-1-24
5352	F-71-1	55-0033	F-152-14
537	F-57-218	55-0034	F-152-15
537-904-132-732-010	F-21-3	55-0035	F-152-35
537-905-006-790-002	F-21-2	55-0035	F-152-94
5389-5	F-178-19	55-0036	F-152-36
5393	F-152-104	55-0036	F-152-95
5393	F-26-6	55-0038	F-152-40
5393	F-27-32	55-0038	F-152-97
5393	F-36-23	55-0039	F-152-67
5393	F-36-60	55-0039	F-152-92
54-0003	F-167-36	55-0040	F-152-48
54-0010	F-83-14	55-0041	F-152-78
54-0023	F-167-35	55-0042	F-152-51
54-0059	F-167-31	55-0043	F-152-26
54-0070	F-167-32	55-0045	F-152-69
54-120	F-57-204	55-0046	F-152-87
54-120	F-57-229	55-0049	F-152-50
54-130	F-57-230	55-0050	F-152-6
54-130	F-57-234	55-0053	F-152-4
54-215	F-57-232	55-0054	F-152-3
54-220	F-57-235	55-0060	F-152-70
54-230	F-68-20	55-0061	F-152-1
54-4016	F-167-12	55-0069	F-57-113
54-4017	F-167-13	55-0072	F-131-14
54-4017	F-83-7	55-0075	F-151-8
54-4036	F-83-17	55-0075	F-152-110
54-4037	F-83-16	55-0077	F-152-47
540-251-006-790-200	F-21-8	55-0078	F-152-54
540-277-006-790-200	F-21-5	55-0082	F-152-55
540054	F-167-28	55-0091	F-152-66
5404-12-12	F-175-3	55-0091	F-155-0
5404-4-8	F-182-15	55-0093	F-152-38
5406-12-4	F-175-25	55-0094	F-152-84
5406-12-4	F-175-4	55-0094	F-57-101
5406-20-16	F-197-13	55-0115	F-151-9
5406-8-6	F-175-15	55-0115	F-152-118
5423*	F-34-7	55-0118	F-45-49
544006	F-167-22	55-0120	F-152-53

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55-0131	F-152-11	56-0289	F-152-88F
55-0150	F-152-5	56-0292	F-152-16
55-0151	F-152-100	56-0314	F-57-29
55-0151	F-152-44	56-0483	F-44-18
55-0166	F-45-37	56-0486	F-167-16
55-0194	F-152-24	56-0489-001	F-151-14
55-0212	F-152-60	56-0489-001	F-152-119
55-0219	F-152-65	56-0489-005	F-152-115
55-0274	F-152-49	56-0489-005	F-152-63
55-0303	F-152-116	56-0489-005	F-155-6
55-0315	F-45-43	56-0489-008	F-152-103
55-0344-0011	F-1-25	56-0489-008	F-152-21
55-0348	F-131-12	56-0489-008	F-152-30
55-0353	F-152-37	56-0489-009	F-152-62
55-0434	F-152-10	56-0489-010	F-152-105
55-0434	F-153-0	56-0489-010	F-152-23
55-0489-008	F-152-64	56-0489-012	F-152-13
5500-12	F-175-23	56-0490-001	F-131-17
550010	F-222-19	56-0490-001	F-152-122
5502-4-4	F-182-11	56-0490-002	F-131-13
55020	F-4-16	56-0490-002	F-152-88G
55021	F-4-14	56-0490-002	F-155-5
55021	F-57-209	56-0490-004	F-151-13
550886	F-222-9	56-0490-004	F-152-117
5517671	F-156-37	56-0490-004	F-152-56
552	F-57-219	56-0490-004	F-152-71
552-A	F-150A-8	56-0490-004	F-45-40
55206C	F-165-7	56-0490-004	F-45-47
5528	F-34-16	56-0490-004	F-57-116
55437	F-165-31	56-0490-005	F-152-52
555-S	F-150A-7	56-0490-006	F-151-15
55711	F-57-81	56-0490-006	F-152-91
5584-06	F-4-36	56-0490-007	F-152-34
55840	F-57-77	56-0490-007	F-152-98
56-0006	F-23-2	56-0490-008	F-152-43
56-0008	F-16-9	56-0490-009	F-152-68
56-0095	F-145-3	56-0490-009	F-152-93
56-0103	F-44-23	56-0490-010	F-152-28
56-0127	F-74-16	56-0490-010	F-155-14
56-0146	F-19-23	56-0490-012	F-152-2
56-0147	F-19-17	56-0490-012	F-155-13
56-0175-001	F-75-4	56-0491-007	F-152-59
56-0208-010	F-74-10	56-0492-001	F-131-15
56-0208-013	F-156-18	56-0492-001	F-152-73
56-0215-003	F-28-14	56-0492-003	F-152-88C
56-0215-005	F-28-21	56-0492-005	F-152-88D
56-0222	F-74-14	56-0492-006	F-152-88E
56-0234-006	F-156-15	56-0492-006	F-152-90
56-0235	F-74-17	56-0492-007	F-152-20
56-0280	F-152-121	56-0492-007	F-152-99
56-0280	F-152-72	56-0493-001	F-131-16
56-0281	F-151-17	56-0493-001	F-45-46
56-0283	F-155-17	56-0493-001	F-57-119

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56-0493-005	F-152-25	57295*	F-27-13
56-0493-006	F-152-86	57296*	F-12-17
56-0494-001	F-149-26	57297*	F-22-18
56-0494-004	F-152-88A	57307*	F-20-18
56-0494-006	F-152-88B	57308*	F-20-20
56-0494-006	F-83-5	57313*	F-27-20
56-0495-003	F-167-23	57318*	F-29-17
56-0495-003	F-57-117	57319*	F-22-10
56-0496-001	F-152-12	57321*	F-12-10
56-0497-002	F-74-15	57321 *	F-12-21
56-0497-004	F-74-19	57321 *	F-22-6
56-0498-002	F-131-37	57321 *	F-27-23
56-0498-002	F-75-1	57321 *	F-29-10
56-0498-005	F-152-45	57338*	F-12-15
56-0498-005	F-152-96	57338*	F-29-13
56-0498-005	F-155-7	57341	F-18-3
56-0499-001	F-152-7	57348*	F-22-13
56-0499-002	F-152-85	57348*	F-29-21
56-0500-001	F-151-18	57351	F-59-10
56-0500-001	F-57-118	57363*	F-20-12
56-0508-008	F-155-15	57378*	F-27-16
56-0509	F-155-16	57394*	F-22-16
56-0538-0400	F-19-24	57395*	F-22-4
56-0538-1800	F-19-21	57414*	F-27-18
56-0545-0017	F-16-22A	57416*	F-12-13
56-0550-0004	F-5-12	57421*	F-29-15
56-0569-0001	F-13-7	57542	F-57-73
56-0569-0001	F-23-75	57591	F-18-2
56-0573	F-66-9	5777	F-178-3
5602-12-12	F-175-2	57793	F-57-79
5602-4-4	F-82-14	585-A	F-1-14
5604-HHP-2	F-174-9	58551	F-57-79
5604-HHP-2	F-181-14	588-2	F-57-111
5604-4	F-175-18	588-2	F-57-90
560918	F-222-17	588-2	F-57-98
560920	F-222-7	58880*	F-22-17
56201	F-57-82	58881	F-27-19
5655-4-4S	F-145-4	58882*	F-29-16
5655-4-4S	F-152-17	58883*	F-12-16
5658931	F-57-15	58885*	F-20-19
56880	F-57-72	59-0096	F-59-13
56949-1016D	F-3-16	59030-11	F-58-19
57	F-57-17	59139	F-175-33
57	F-57-41	59139	F-58-9
57	F-57-62	5917	F-161-14
57-10-201-40	F-73-41	59193	F-175-32
57050	F-57-80	59193	F-58-7
571-974-006-790-200	F-21-17	59228	F-175-31
5716	F-28-56	59228	F-58-2
572-227-006-790-200	F-21-1	5936117	F-48-26
572-237-003-790-200	F-21-21	5936265	F-48-30
57295*	F-20-15	5941610	F-48-29
57295*	F-20-8	59473	F-90-9

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5972*	F-14-23	6002	F-171-24
5972*	F-1 5-23	6002	F-46-2
5972*	F-24-24	602	F-175-16
5975*	F-14-22	6023	F-72-15
5975*	F-15-22	603-001**	F-177-4
6-26-347	F-9-21	6030	F-46-3
6-3-2651KX	F-9-18	60470-44	F-35-3
6-4-521	F-9-19	6049*	F-178-18
6-73-220	F-9-2	6051-A	F-46-9
6.5-28-117	F-9-13	60708	F-36-36
6.5-3-1-1451KX	F-9-4	60900	F-57-78
6.5-3-1371KX	F-9-10	60943	F-38-18
6.5-4-2541	F-9-6	60985	F-35-12
6.5-4-2581	F-9-14	61-0007	F-2-1
6.5-40-191	F-9-111	61-0007	F-56-40
6M121913	F-45-17	61-0010	F-45-51
6M121914	F-45-18	61-0016	F-193-39
6M144888	F-45-14	61-0016	F-56-17
6M271178	F-45-19	61-0029	F-45-25
6M445573	F-45-23	61-0029	F-47-0
60-0015	F-4-20	61-0044	F-45-55
60-0017	F-4-18	61-0044	F-46-0
60-0018	F-4-54	61-0047	F-45-55
60-0030	F-2-12	61-0074	F-48-27
60-0037	F-4-22	61-0079	F-2-4
60-0046	F-4-21	61-0080	F-48-23
60-0048	F-68-6	61-0143	F-72-0
60-0076	F-68-11	61-0145	F-72-1
60-0255	F-44-30	61-0147	F-56-25
60-0436	F-70-8	61-0166	F-193-35
60-0518	F-4-23A	61-0179	F-48-93
60-0519	F-4-17	61-0255	F-4-19
60-0548	F-44-24	61-0261	F-57-84
60-0615	F-2-5	61-0319	F-48-62
60-0759	F-69-1	61-0374	F-48-41
60-0883	F-69-2	61-0375	F-48-51
60-1602	F-4-8	61-0376	F-48-51
60-1602	F-57-161	61-0385	F-48-60
60-1602	F-71-6	61-0397	F-72-17
60-1764	F-57-176	61-0417	F-4-66
60-1858-008	F-57-144	61-0428	F-193-38
60-1861-008	F-57-139	61-0559	F-48-31
60-2023	F-57-236	61-0559	F-50-0
60-2083	F-218-18	61-0565-001	F-57-149
60-2206	F-4-9	61-0565-002	F-57-56
60-2206	F-57-162	61-0592-257	F-57-63
60-2206	F-71-7	61-0592-53	F-57-152
60-2207	F-70-11	61-0592-53	F-57-18
60-2686	F-57-163	61-0592-53	F-57-51
60-2687	F-44-19	61-0592-57	F-57-17
60-2689	F-57-168	61-0592-57	F-57-41-
60-520	F-44-31	61-0592-57	F-57-62
6001	F-171-23	61-0644	F-56-33

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61-2043-01	F-72-17	62-10-113-10	F-57-177
61-501-81	F-16-24	62-10-401-10	F-73-6
61023-2	F-32-58	62-3009	F-30-17
61030	F-12-18	62001	F-34-8
61036	F-12-1	62049	F-32-33
61036	F-20-1	62051	F-24-4
61036	F-22-1	62062	F-24-20
61036	F-27-4	62105	F-34-10
61036	F-29-1	62110	F-57-77
61046	F-12-7	62112	F-32-29
61046	F-20-6	62113	F-34-1
61046	F-27-11	62126	F-32-38
61046	F-29-7	62184	F-32-42
61144	F-22-9	62345	F-36-56
61144	F-29-18	62557	F-32-34
61192	F-27-24	62571	F-33-22
61201	F-32-21	62588-96	F-36-82
61222	F-27-30	62598	F-24-16
61294	F-14-26	62628	F-37-13
61357	F-36-15	62643	F-37-17
61357	F-36-73	62717	F-27-27
61399*	F-22-15	62746	F-36-25
61403	F-31-31	62747	F-36-24
61476	F-14-12	62752	F-14-28
61476	F-15-12	62752	F-15-28
61476	F-22-7	62752	F-24-18
61476	F-24-13	62767*	F-37-3
61478	F-27-14	62771	F-36-21
6151-A	F-46-8	62919	F-27-29
61528	F-27-2	62983	F-157-1
61535	F-33-10	62983	F-157-10
61537	F-33-11	62983	F-157-11
61550	F-57-77	62983	F-157-12
61551	F-18-1	62983	F-157-13
616	F-178-13	62983	F-157-14
616-0788-B	F-56-9	62983	F-157-15
61629-1	F-36-62	62983	F-157-16
61634-1	F-36-64	62983	F-157-17
61660	F-57-81	62983	F-157-18
61691	F-14-4	62983	F-157-19
61691	F-15-4	62983	F-157-2
61712	F-36-8	62983	F-157-20
61718	F-31-22	62983	F-157-21
61767	F-36-33	62983	F-157-3
61793	F-12-8	62983	F-157-4
61793	F-27-12	62983	F-157-5
61793	F-29-8	62983	F-157-6
61924	F-36-70	62983	F-157-7
61987	F-32-43	62983	F-157-8
62-10-103-10	F-175-62	62983	F-157-9
62-10-103-10	F-218-6	63-0004	F-48-8
62-10-103-10	F-57-171	63-0004	F-49-0
62-10-10410	F-6-1	63-0006	F-49-34

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63-0021	F-90-9	63702	F-22-14
63-0022	F-57-226	63703	F-12-22
63-0031	F-68-10	63704	F-29-22
63-0038	F-71-2	63752	F-20-9
63-0065	F-45-11	63758*	F-29-11
63-0072	F-57-207	63760*	F-12-11
63-0108	F-193-32	63820	F-27-17
63-0113	F-48-1	63821*	F-29-14
63-0114	F-48-2	63822*	F-12-14
63-0120	F-57-205	63823*	F-20-17
63-0120	F-68-1	64-0005	F-57-223
63-0171	F-68-22	64-0008	F-57-201
63-0172	F-193-37	64-0009	F-57-225
63-0173	F-48-38	64-0010	F-68-26
63-0173	F-51-13	64-0013	F-68-31
63-0196	F-49-35	64-0018	F-4-36
63-0214	F-75-8	64-0023	F-56-51
63-0284	F-57-132	64-0024	F-56-32
63-0342	F-71-1	64-0026	F-57-218
63-0343	F-71-3	64-0027	F-57-219
63-0389	F-72-14	64-0032	F-57-204
63-0422	F-72-15	64-0032	F-57-229
63-0509	F-57-222	64-0034	F-70-10
63-0511	F-57-224	64-0041	F-70-1
63-0513	F-57-123	64-0069	F-70-10
63-0559	F-51-6	64-0071	F-70-16
63-0559	F-57-153	64-0082	F-127-8
63-0563	F-201-6	64-0085	F-57-228
63-0601	F-218-26	64-0088	F-57-227
63-0640	F-57-237	64-0089	F-57-220
63-0688	F-57-33	64-0090	F-57-105
63-0690	F-131-42	64-0090	F-57-92
63-0698	F-66-1	64-0115	F-56-55
63-0699	F-66-6	64-0118	F-68-7
63-0700	F-199-11	64-0120	F-57-13
63-0700	F-4-38	64-0121	F-131-31
63-0714	F-4-3	64-0121	F-131-41
63-0739	F-4-4	64-0122	F-151-16
63-0742	F-4-7	64-0126	F-57-235
63-0744	F-4-5	64-0175	F-57-203
63-0745	F-4-6	64-0177	F-70-6
63-0750	F-68-12	64-0183	F-201-1
63-0752	F-68-16	64-0190	F-4-15
63-0781	F-90-8	64-0214	F-57-83
63-0800	F-48-34	64-0216	F-57-129
63-0806	F-5-21	64-0239	F-57-231
63-0807	F-90-12	64-0242	F-57-150
63-0822	F-68-39	64-0265	F-74-35
63-0823	F-68-39	64-0278	F-4-16
6300	F-31-6	64-0279	F-4-14
63592	F-12-3	64-0279	F-57-209
63592	F-20-3	64-0318	F-57-100
63592	F-29-3	64-0329	F-57-202

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64-0344-001	F-70-7	640292	F-152-33
64-0344-002	F-201-2	6405-16-16	F-198-3
64-0364	F-57-206	6408-HHP-3	F-174-8
64-0425	F-57-124	6408-HHP-3	F-181-12
64-0460	F-57-230	6408-HHP-6	F-181-2
64-0460	F-57-234	6408-3	F-174-1
64-0539	F-92-12	6408-6	F-181-8
64-0543	F-145-12	6408-8	F-181-13
64-0550	F-145-12	6410	F-59-7
64-0550	F-92-12	6416	F-74-9
64-0552	F-145-12	6420	F-150A-10
64-0552	F-92-12	6424	F-46-18
64-0554	F-92-12	6426	F-167-30
64-0584	F-57-130	6432379	F-57-133
64-0603	F-68-25	6432379	F-57-30
64-0657	F-57-221	6432380	F-57-10
64-0712-010	F-57-26	6441	F-46-19
64-0803-0003	F-57-125	6444	F-74-6
64-0803-0003	F-70-16	6448	F-167-33
64-0803-0005	F-57-216	645E6	F-152-19
64-0803-001	F-175-76	6453-001	F-46-4
64-0803-0020	F-57-211	6456	F-59-12
64-0803-07.5	F-57-214	6456	F-74-30
64-0804	F-57-210	6461-A	F-150A-11
64-0805-0001	F-57-217	6471	F-46-16
64-0805-0002	F-57-215	6472382	F-167-22
64-0806-0001	F-57-213	65F1191	F-175-74
64-0806-0002	F-57-212	65126	F-167-29
64-0881	F-127-11	6565-U	F-46-15
64-0884	F-127-9	6570-003	F-46-10
64-0907-0709	F-56-53	6578-0001	F-46-12
64-0907-0713	F-39-14	6598	F-46-11
64-1105-0002	F-57-52	668230	F-17-26
64-1105-0003	F-57-146	669310	F-17-27
64-1105-0003	F-57-50	669350	F-17-28
64-1105-0004	F-57-147	6701-001	F-46-1
64-1105-0004	F-57-55	6703138	F-132-44
64-1105-0005	F-57-148	6703169	F-141-29
64-1105-0005	F-57-53	6710	F-46-17
64-1121-0001	F-127-10	6750186	F-132-45
64-1192	F-68-20	6750468	F-112-26
64-1292	F-175-77	6751516	F-112-27
64-1292	F-57-126	6752-001	F-176-24
6400-6	F-172-8	6753364	F-112-28
6400-6	F-174-7	6757563	F-137-27
6400-6	F-181-7	6758391	F-136-34
6400-8	F-175-6	6758740	F-132-6
6400-8	F-181-3	6758779	F-132-30
6400-8-8	F-1 98-6	6760-001	F-176-6
640049	F-72-16	6769252	F-134- 13
640265	F-152-107	6769576	F-137-23A
640265	F-152-29	6770	F-176-5
640292	F-152-102	6770476	F-132-12

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6771017	F-132-19	6834487	F-138-2
6771018	F-132-23	6834487	F-140-3
6771070	F-132-34	6834488	F-140-4
6771084	F-144-4	6834509	F-142-2
6771144	F-137-28	6834528	F-141-59
6771366	F-132-40	6834568	F-134-14
6771496	F-132-21	6834570	F-137-14
6771851	F-132-31	6834574	F-136-37
6772293	F-132-29	6834575	F-136-14
6772295	F-132-18	6834594	F-135-23
6772552	F-132-16	6834594	F-139-1
6773311	F-137-26	6834662	F-136-39
67770492	F-132-5	6834665	F-134-17
6777231	F-136-28	6834666	F-134-15
6779930	F-132-14	6834679	F-135-20
679636	F-132-37	6834679	F-139-4
68-P-2	F-222-2	6834680	F-138-1
6801-12-8	F-192-8	6834684	F-136-33
6801-8-8	F-192-6	6834713	F-141-5
6803-8	F-192-7	6834720	F-140-4
68080	F-193-38C	6834739	F-144-9
6811	F-159-21	6834741	F-132-41
6814-001	F-176-4	6834749	F-144-1
6814-001	F-176-4	6834766	F-138-1
6815-001	F-176-3	6834888	F-144-5
6815-001	F-176-3	6834918	F-133-25
68253	F-152-77	6834936	F-134-5
6831656	F-140-8	6834938	F-134-6
6831679	F-136-6	6834946	F-134-11
6831680	F-136-8	6834976	F-144-7
6831704	F-135-14	6834979	F-144-6
6831704	F-139-5	6835003	F-141-9
6831737	F-141-68	6835073	F-136-16
6831774	F-133-26	6835074	F-136-18
6832462	F-141-27	6835179	F-136-36
6833878	F-141-7	6835182	F-136-17
6833888	F-141-28	6835183	F-136-3
6833889	F-1441-25	6835321	F-136-13
6833891	F-141-13	6835322	F-136-12
6833896	F-141-30	6835323	F-136-24
6833949	F-141-11	6835369	F-137-1
6833980	F-135-9	6835439	F-137-4
6834314	F-139-13	6835455	F-137-22
6834319	F-140-2	6835578	F-136-1
6834323	F-136-35	6835579	F-136-5
6834327	F-136-15	6835580	F-136-11
6834333	F-136-27	6835605	F-135-22
6834407	F-142-3	6835606	F-138-3
6834453	F-134-3	6835627	F-136-40
6834456	F-134-10	6835628	F-136-38
6834462	F-134-18	6835687	F-135-21
6834463	F-134-16	6835687	F-139-3
6834486	F-139-11	6835690	F-137-21

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6835729	F-141-66	6839376	F-136-7
6835734	F-141-51	6839511	F-136-19
6835755	F-137-17	6839512	F-136-41
6835756	F-137-19	6839559	F-134-1
6835921	F-141-42	6839665	F-144-3
6835928	F-141-58	6839761	F-133-17
6835929	F-141-67	6839819	F-135-15
6835930	F-141-60	6839819	F-135-24
6836138	F-135-12	6839820	F-132-26
6836138	F-139-7	6839821	F-134-26
6836182	F-140-15	6839821	F-139-14
6836272	F-137-20	6839829	F-141-26
6836368	F-141-38	6880079	F-140-13
6836370	F-141-35	6880118	F-141-43
6836372	F-141-32	6880158	F-141-12
6836418	F-140-9	6880187	F-141-21
6836419	F-140-7	6880188	F-141-23
6836467	F-133-29	6880353	F-131-5
6836799	F-135-10	6880353	F-143-1
6836799	F-139-9	6880389	F-132-35
6836853	F-141-39	6880418	F-137-3
6836854	F-141-36	6880432	F-137-2
6836953	F-141-6	6880899	F-132-33
6836955	F-141-3	6880973	F-132-47
6837034	F-132-13	6880980	F-141-15
6837102	F-132-51	6880988	F-141-33
6837122	F-141-45	6881013	F-141-72
6837233	F-132-20	6881018	F-141-55
6837255	F-144-11	6881352	F-136-2
6837541	F-141-69	6881638	F-136-4
6837629	F-136-42	6881649	F-137-25
6837630	F-136-20	6881719	F-142-1
6837976	F-132-24	6881720	F-142-5
6838360	F-132-17	6881746	F-133-5
6838417	F-136-21	6882609	F-112-30
6838418	F-136-9	6882610	F-112-25
6838419	F-136-44	6882764	F-133-3
6838429	F-141-65	6882794	F-140-1
6838494	F-133-8	6882794	F-140-5
6838923	F-135-7	6882795	F-140-5
6838987	F-141-63	6882796	F-140-5
6838988	F-141-64	6882797	F-140-5
6838989	F-141-52	6882811	F-145-2
6839010	F-134-8	6883005	F-140-14
6839010	F-134-9	6883192	F-135-13
6839021	F-135-19	6883192	F-139-6
6839085	F-141-17	6883300	F-141-49
6839091	F-137-14A	6883492	F-136-26
6839122	F-141-48	6883524	F-132-11
6839209	F-134-4	6883702	F-136-25
6839213	F-137-7	6883703	F-136-29
6839271	F-141-50	6883935	F-136-23
6839289	F-141-73	6883950	F-134-2

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6884445	F-132-36	7-61-070	F-200-36
6884905	F-141-70	7-65-014	F-200-7
6884943	F-141-37	7-65-030	F-200-6
6885128	F-135-11	7-65-084	F-200-20
6885129	F-135-11	7-65-097	F-200-8
6885130	F-135-11	7-65-098	F-200-37
6885131	F-1 39-8	7-67-006	F-200-16
6885132	F-139-8	7-67-043	F-200-39
6885133	F-139-8	7-67-092	F-200-13
6885148	F-133-20	7-69-314	F-200-43
6885166	F-141-46	7-73-116	F-200-15
6885168	F-135-8	7-73-122	F-9-16
6885199	F-141-40	7-73-122	F-9-8
6885213	F-133-30	7-84-041	F-200-54
6885570	F-131-9	7D41608561	F-57-136
6885570	F-143-4	7X-113	F-163-15
6885673	F-132-2	7X-114	F-163-17
6885673	F-148-2	70-0012	F-183-6
6900-6-4	F-181-5	70-0029	F-183-1
6901-3	F-178-16	70-0056	F-183-2
6901-6	F-175-5	70-0167	F-171-20
6901-6-4	F-198-5	7000A00-03	F-49-33
6901-8	F-197-18	7000A068-08	F-50-18
6906-16	F-197-14	7000A230-32	F-49-25
691-BJ	F-4-4	7000A464-06	F-50-7
692-AM-144	F-4-3	7006A016-03	F-50-31
692-AN-144	F-4-6	7006A031-05	F-49-24
695-E	F-4-5	7011A061-06	F-50-3
69774	F-42-3	7011A062-08	F-50-22
7-03-117	F-200-18	70332-1TT	F-31-32
7-04-143	F-200-26	70354	F-38-1
7-04-215	F-200-47	70358	F-35-13
7-04-218	F-200-44	7040390	F-48-82
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7-08-084	F-200-41	705E	F-61-12
7-13-036	F-200-11	705E	F-62-0
7-18-018	F-200-34	70550	F-57-74
7-18-047	F-200-33	7058A036A	F-49-3
7-18-084	F-200-28	7059A014	F-50-35
7-18-085	F-200-14	7059A014	F-50-9
7-18-086	F-200-19	70601	F-14-1
7-18-105	F-200-52	70601	F-15-1
7-42-023	F-200-12	7072A014	F-50-10
7-44-009	F-200-3	7072A014	F-50-28
7-54-042	F-200-29	7072A020	F-50-36
7-57-121	F-200-4	7072A137	F-51-17
7-57-170	F-200-9	7072A139A	F-47-12
7-57-172	F-200-17	7072A140A	F-49-5
7-58-141	F-200-47	7072A143A	F-49-15
7-61-017	F-200-27	7072A158A	F-49-11
7-61-041	F-200-53	7074A009	F-50-21
7-61-051	F-200-32	7074A054A	F-49-4
7-61-064	F-200-22	7097A111-12	F-50-26

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71082	F-12-2	72-0123	F-57-181
71082	F-20-2	72-0123	F-73-22
71082	F-22-2	72010	F-36-89
71082	F-27-5	72069	F-24-11
71082	F-29-2	72100	F-57-100
711509-6	F-156-5	72126	F-14-8
71318	F-31-15	72126	F-15-8
71337*	F-31 -21	72212-C	F-164-41
71338-002	F-80-17	72212C	F-165-28
71375	F-37-2	72218	F-32-96
71441-11	F-31-33	72302	F-37-12
71442-13	F-31-34	72487	F-164-40
71522	F-36-37	72487	F-165-30
71539-1	F-32-70	7358	F-178-14
71540-2	F-32-4	7359-2	F-178-11
71578	F-32-24	7360-2	F-178-8
71592	F-24-8	7393C	F-4-66
71597	F-23-48	7433-001	F-176-9
71634-1	F-34-5	7444-001*	F-176-21
71638*	F-32-17	7445-001*	F-176-19
71656-002	F-80-16	7448-001*	F-176-17
71799	F-38-3	7449-001*	F-176-26
71800	F-38-10	7450-001	F-176-3
71803-3	F-30-8	7451-001	F-176-4
71803-3	F-37-0	7451948	F-113-9
71803-3BR	F-37-17	74601-01	F-57-130
719	F-218-22	7461	F-178-17
71908*	F-24-23	7462	F-178-6
71921-002	F-80-18	7463	F-178-2
72-0004	F-1-12	75000420	F-52-9
72-0005	F-1-12	75000420	F-54-15
72-0007	F-1-12	75000532	F-45-8
72-0011	F-1-13	75000723	F-45-9
72-0022	F-1-4	75000723	F-48-84
72-0023	F-1-8	75000808	F-52-3
72-0033	F-48-13	75000808	F-54-3
72-0034	F-1-5	75000987(Y691P)	F-54-1
72-0036	F-1-6	75000987(Y961P)	F-52-1
72-0036	F-1-9	752-218-006-790-200	F-21-19
72-0038	F-220-12	752-912-006-790-200	F-21-6
72-0049	F-1-17	75228-03	F-57-120
72-0055	F-1-11	7524553	F-156-33
72-0067	F-63-15	7537	F-178-7
72-0067	F-64-12	7570050	F-128-13
72-0073	F-1-10	76280-110	F-56-10A
72-0073	F-1-7	76281-110	F-56-10B
72-0074	F-16-25	77-77800	F-45-53
72-0120	F-57-238	7700-001*	F-176-26
72-0123	F-220-6	7700-001*	F-177-2
72-0123	F-53-5	775A	F-1-15
72-0123	F-53-5	7769	F-56-55
72-0123	F-55-5	78152-2	F-193-38
72-0123	F-55-5	785230470	F-4-37

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79L	F-41-11	80-2122	F-54-20
7901520	F-48-73	80-2123	F-54-24
79350	F-2-1	80-2136	F-52-20
79350	F-56-40	80-2138	F-54-24
8-SHP	F-197-26	80-2140	F-42-18
8-8CTX-S	F-167-15	80-2140	F-42-4
8D3	F-68-10	80-2163-001	F-8-25
8LS-152	F-193-32	80-2165	F-53-21
8R6X-5	F-167-10	80-2165	F-55-15
8V92TA	F-74-1	80-2166	F-53-17
80-0001	F-28-5	80-2166	F-55-11
80-0002	F-42-6	80-2167	F-53-17
80-0003	F-220-1	80-2167	F-55-11
80-0003	F-53-1	80-2221	F-8-22
80-0003	F-55-1	80-2251	F-41-11
80-0003	F-57-177	80-2264-2200	F-8-5
80-0003	F-7-1	80-3002	F-175-62
80-0003	F-73-17	80-3002	F-218-6
80-0005	F-219-11	80-3002	F-57-171
80-0016	F-13-14	80-3002	F-6-1
80-0016	F-16-20	80-3006	F-28-8
80-0016	F-18-7	80-3006	F-69-8
80-0016	F-23-82	80-3017	F-171-6
80-0024	F-187-18	80-3052-0044	F-64-8
80-0024	F-219-10	80-3056	F-73-6
80-0024	F-48-90	80-4012	F-41-30
80-004-1051	F-180-14	80-4030	F-41-38
80-0041	F-56-66	80-4036	F-41-37
80-1006	F-52-9	80-4037	F-41-36
80-1006	F-54-15	80-4038	F-41-31
80-1013-010	F-28-51	80-4039	F-41-32
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80-2025	F-54-5	80-5035	F-52-58
80-2026	F-52-15	80-5037	F-54-27
80-2026	F-54-5	80-6006	F-28-57
80-2027	F-52-10	80-6007	F-216-2
80-2027	F-54-7	80-6010	F-166-10
80-2028	F-52-10	80-6017	F-19-1
80-2028	F-54-7	80-6017	F-44-26
80-2029	F-52-13	80-6018	F-80-2
80-2029	F-54-6	80-6026	F-80-15
80-2029-003	F-201-4	80-6029-003	F-59-7
80-2032	F-8-23	80-6029-005	F-13-12
80-2033	F-8-24	80-6029-005	F-23-80
80-2043	F-41-25	80-6029-005	F-28-56
80-2069	F-53-20	80-6029-005	F-74-9
80-2069	F-55-14	80-6029-008	F-1 67-30
80-2075	F-52-16	80-6029-012	F-74-6
80-2076	F-52-20	80-6029-013	F-167-33
80-2080-0125	F-65-10	80-6029-015	F-59-12
80-2080-0125	F-65-3	80-6029-015	F-74-30
80-2080-0125	F-65-6	80-6030	F-44-22
80-2115	F-41-1	80-6033-002	F-149-33

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80-6033-002	F-152-46	80326	F-27-32
80-6033-002	F-167-37	80454	F-27-16
80-6039-0001	F-13-8	80455*	F-20-16
80-6039-0001	F-23-76	80456*	F-12-13
80-8020-004	F-74-4	80457*	F-29-13
80-9002	F-43-16	80478*	F-22-14
80-9011	F-42-3	80489-2M	F-13-6
80-9012-0075	F-41-40	80489-2M	F-14-0
80-9058	F-218-34	80489-2M	F-30-6
80-9068	F-10-11	80489-2R	F-13-6
80-9068	F-11-3	80489-2R	F-15-0
80-9068	F-19-12	80489-2R	F-30-4
80-9068	F-28-48	80500012	F-206-8
80-9101-0100	F-12-13	805-0019	F-203-13
80-9101-0100	F-1-1-5	80539-1TTE	F-31-35
80-9101-0100	F-89-14	80553	F-31-5
80-9101-0100	F-28-50	80554	F-31-16
80-9104-0200	F-41-10	8072	F-176-27
80-9120	F-42-11	8072	F-176-8
80-9128	F-51-3	8072	F-176-8
80-9128	F-56-16A	80744-4	F-36-22
80-9128	F-57-103	80799	F-32-5
80-9128	F-57-185	808191	F-32-26
80-9128	F-57-194	80818	F-24-9
80-9128	F-57-46	80821	F-24-1
80-9128	F-57-5	8084-001	F-176-28
80-9128	F-58-56	80841	F-34-0
80-9128	F-68-38	80841-40	F-30-10
80-9129	F-52-69	80841-5A	F-30-9
80-9129	F-54-56	8088A001	F-49-27
80-9129	F-56-8	809-0035	F-203-54
80-9129	F-73-5	809-0042	F-202-32
80-9134	F-218-22	81-0-04	F-167-11i4
800-0004	F-213-18	81-0002	F-44-8
800-0007	F-213-22	81-0026	F-149-10
800-0024	F-213-21	81-0029	F-8-12
800-0026	F-203-47	81-0038	F-67-45
800-0026	F-205-25	81-004-A	F-80-11
800-0026	F-210-19	81-004-Z	F-180-4
800-0027	F-211-26	81-004-0032	F-180-5
800-0028	F-210-15	81-004-0071	F-180-7
800-0030	F-205-24	81-004-0122	F-180-10
800-0031	F-211-27	81-004-0692	F-180-1
800-0032	F-214-31	81-004- 1561	F-180-13
800-0050	F-203-46	81-004-1742	F-180-3
800-0050	F-214-24	81-004-1782	F-180-9
800-0500	F-204-7	81-004-2051	F-180-19
800-0508	F-211-28	81-004-2051	F-180-37
801-0053	F-212-27	81-1002	F-13-2B
801-0074	F-212-25	81-1002	F-23-40
801077	F-79-49	81-1002	F-3-1
801078	F-79-54	81-1010	F-3-16
80278	F-33-2	81-1011	F-3-18

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81-1015	F-166-18	82-0035	F-70-5
81-1025-0075	F-45-48	82-0042	F-73-41
81-1025-0075	F-48-19	82-0043	F-52-19
8107A119A	F-50-12	82-0043	F-54-23
8107A119A	F-50-30	82-0044-0075	F-41 -39
8108A014	F-50-13	82-0054	F-53-22
8108A014	F-50-37	82-0054	F-55-16
811-0096	F-209-21	82-0060	F-48-20
812-0059	F-209-18	82-0063-0150	F-63-21
81255	F-199-26	82-0069	F-52-4
8126A017	F-49-12	82-0069	F-54-4
81262-10R	F-36-92	82-0078-0075	F-10-9
81262-7	F-36-58	82-0078-0075	F-11-14
81262-7	F-36-9	82-0078-0075	F-13-3
81264	F-4-15	82-0078-0075	F-19-11
81274	F-32-13	82-0078-0075	F-23-38
81277	F-32-40	82-0078-0075	F-28-38
813-0097	F-213-24	82-0078-0075	F-39-13
813-0098	F-213-25	82-0078-0100	F-16-26
81330-7	F-32-60	82-0082-0137	F-10-12
81355	F-33-0	82-0082-0137	F-11-4
81356-1R	F-23-45	82-0082-0137	F-19-13
81356-1R	F-24-0	82-0082-0137	F-28-49
81356-1R	F-30-5	82-0089-008	F-156-38A
8146A507-09	F-51-24	82-0089-012	F-159-17
815-0176	F-210-2A	82-0113-01200	F-90-4
815-0235	F-213-19	82-0127-0003	F-41-7
815-0235	F-213-20	82-0142	F-73-32
815-0235	F-213-23	82-0147-0015	F-28-7
815-0252	F-202-40	82-0148-0009	F-48-37
815-0347	F-210-18	82-015 4-0050	F-52-17
815-0506	F-207-12	82-0154-0050	F-54-21
81506	F-38-8	82-0166	F-90-2
8159B	F-1-23	82-0842	F-149-36
816-0212	F-201-7	82-1A007-01	F-45-31
81602	F-35-0	82-1002	F-10-7
81608	F-31-0	82-1002	F-11-12
81609	F-38-0	82-1002	F-16-29
81617-55	F-32-51	82-1002	F-19-9
81617-99*	F-32-84	82-1002	F-28-40
81635	F-31-9	82-1007-0050	F-44-9
81657	F-34-12	82-1007-0062	F-159-23
82-0006	F-171-7	82-1007-0075	F-16-32
82-0009	F-41-28	82-1007-0088	F-162-4
82-0010	F-8-13	82-1008-0062	F-160-8
82-0015	F-160-10	82-1008-0062	F-170-7
82-0025	F-61-15	82-1008-0075	F-170-3
82-0035	F-4-60	82-1009-001	F-56-63
82-0035	F-40-10	82-1009-001	F-63-19
82-0035	F-5-2	82-1009-001	F-64-11
82-0035	F-68-18	82-1009-003	F-52-45
82-0035	F-7-10	82-1009-004	F-63-22
82-0035	F-7-18	82-1009-005	F-219-13

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82-1009-005	F-220-4	82-1011-0025	F-68-4
82-1009-007	F-155-10	82-1011-0025	F-7-30
82-1009-007	F-80-14	82-1011-0025	F-70-14
82-1009-008	F-39-4	82-1011-0025	F-72-4
82-1010-009	F-52-60	82-1011-0025	F-73-20
82-1010-009	F-54-29	82-1011-0025	F-73-9
82-1010-011	F-1 55-3	82-1011-0031	F-1 49-29
82-1010-011	F-172-29	82-1011-0031	F-155-11
82-1011-0025	F-169-18	82-1011-0031	F-156-26B
82-1011 -0025	F-219-14	82-1011-0031	F-48-11
82-1011-0025	F-220-15	82-1011-0031	F-65-25
82-1011-0025	F-220-3	82-1011-0031	F-80-13
82-1011 -0025	F-3-11	82-1011 -0038	F-i 56-2A
82-1011-0025	F-39-17	82-1011-0038	F-16-16
82-1011-0025	F-4-64	82-1011-0038	F-16-34
82-1011-0025	F-41-3	82-1011-0038	F-166-15
82-1011-0025	F-41-34	82-1011-0038	F-166-3
82-1011-0025	F-43-14	82-1011-0038	F-220-9
82-1011-0025	F-43-4	82-1011-0038	F-28-58
82-1011-0025	F-43-9	82-1011-0038	F-28-62
82-1011-0025	F-45-28	82-1011-0038	F-3-21
82-1011-0025	F-45-35	82-1011-0038	F-44-14
82-1011-0025	F-48-16	82-1011-0038	F-92-3
82-1011-0025	F-48-36	82-1011 -0044	F-149-19
82-1011-0025	F-48-40	82-1011 -0044	F-149-5
82-1011-0025	F-48-6	82-1011 -0044	F-61 -7
82-1011-0025	F-48-67	82-1011 -0044	F-63-10
82-1011-0025	F-5-10	82-1011-0044	F-65-11
82-1011-0025	F-51-9	82-1011-0044	F-80-21
82-1011-0025	F-52-35	82-1011-0044	F-90-14
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82-1011-0025	F-54-31	82-1011-0075	F-156-14
82-1011-0025	F-54-38	82-1011-0075	F-170-4
82-1011-0025	F-54-42	82-1011-0088	F-156-50B
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82-1011-0025	F-56-49	82-1011-0125	F-36-6
82-1011-0025	F-56-57	82-1011 -0125	F-40-5
82-1011-0025	F-57-142	82-1012-005	F-57-174
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82-1011-0025	F-6-11	82-1012-007	F-219-21
82-1011-0025	F-65-22	82-1012-007	F-42-9
82-1011-0025	F-68-14	82-1012-007	F-57-186
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82-1012-007	F-57-48	82-1013-006	F-51-8
82-1012-007	F-57-67	82-1013-006	F-52-30
82-1012-007	F-57-7	82-1013-006	F-52-36
82-1012-007	F-6-6	82-1013-006	F-52-42
82-1012-007	F-68-34	82-1013-006	F-52-47
82-1012-007	F-7-6	82-1013-006	F-52-52
82-1012-007	F-73-15	82-1013-006	F-52-61
82-1012-007	F-73-28	82-1013-006	F-54-30
82-1012-007	F-73-43	82-1013-006	F-54-39
82-1013-002	F-71-5	82-1013-006	F-54-43
82-1013-004	F-149-41	82-1013-006	F-54-46
82-1013-004	F-41-13	82-1013-006	F-56-50
82-1013-004	F-42-8	82-1013-006	F-57-141
82-1013-004	F-45-39	82-1013-006	F-57-165
82-1013-004	F-48-21	82-1013-006	F-59-1C
82-1013-004	F-51-12	82-1013-006	F-6-10
82-1013-004	F-51-4	82-1013-006	F-65-23
82-1013-004	F-52-18	82-1013-006	F-66-12
82-1013-004	F-53-12	82-1013-006	F-68-15
82-1013-004	F-53-15	82-1013-006	F-68-28
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82-1013-004	F-57-155	82-1013-006	F-73-38
82-1013-004	F-57-158	82-1013-006	F-73-8
82-1013-004	F-57-36	82-1013-007	F-149-30
82-1013-004	F-57-66	82-1013-007	F-156-26C
82-1013-004	F-57-8	82-1013-007	F-171-8
82-1013-004	F-58-53	82-1013-007	F-218-15
82-1013-004	F-66-3	82-1013-007	F-48-10
82-1013-004	F-66-7A	82-1013-007	F-65-26
82-1013-004	F-68-24	82-1013-008	F-10-16
82-1013-004	F-68-33	82-1013-008	F-11-19
82-1013-004	F-73-3	82-1013-008	F-155-4
82-1013-004	F-73-44	82-1013-008	F-156-2D
82-1013-004	F-8-17	82-1013-008	F-16-15
82-1013-006	F-1-19	82-1013-008	F-166-16
82-1013-006	F-151-4	82-1013-008	F-166-20
82-1013-006	F-169-17	82-1013-008	F-166-4
82-1013-006	F-220-14	82-1013-008	F-19-19
82-1013-006	F-3-10	82-1013-008	F-220-10
82-1013-006	F-39-16	82-1013-008	F-3-20
82-1013-006	F-4-63	82-1013-008	F-3-5
82-1013-006	F-41-35	82-1013-008	F-39-3
82-1013-006	F-41-6	82-1013-008	F-92-2
82-1013-006	F-43-13	82-1013-009	F-41-29
82-1013-006	F-43-3	82-1013-009	F-61-11
82-1013-006	F-43-8	82-1013-009	F-61-3
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82-1013-006	F-45-34	82-1013-009	F-63-11
82-1013-006	F-48-15	82-1013-009	F-63-3

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82-1013-009	F-64-7	82-2018-0200	F-169-8
82-1013-009	F-65-12	82-2018-0225	F-156-30
82-1013-009	F-65-4	82-2018-0225	F-159-2
82-1013-009	F-65-7	82-2018-0225	F-168-4
82-1013-009	F-80-20	82-2018-0275	F-156-48
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82-1013-010	F-149-12	82-2018-0275	F-168-3
82-1013-010	F-169-13	82-2019	F-131-25
82-1013-010	F-183-8	82-2021-0075	F-57-102
82-1013-010	F-39-6	82-2021-0075	F-57-4
82-1014-003	F-68-8	82-2021-0075	F-57-69
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82-1016-0019	F-45-3	82-2022-0050	F-57-184
82-1016-0019	F-53-8	82-2022-0050	F-57-193
82-1016-0019	F-55-8	82-2022-0050	F-57-65
82-1016-0019	F-63-14	82-2022-0075	F-57-6
82-1016-0019	F-64-16	82-2031-0075	F-28-61
82-1016-0050	F-52-32	82-2031-0088	F-220-8
82-1017	F-219-20	82-2031-0088	F-92-1
82-1017-001	F-42-13	82-2031-0100	F-155-2
82-1017-001	F-48-33	82-2031-0100	F-16-33
82-1017-004	F-52-25	82-2031-0125	F-156-2B
82-1017-004	F-54-18	82-2031-0125	F-166-14
82-1017-007	F-69-10	82-2031-0125	F-166-2
82-1017-007	F-69-15	82-2031-0125	F-3-19
82-102-007	F-218-24	82-2031-0212	F-153-35
82-1039-0004	F-90-13	82-2031-0225	F-172-27
82-2003	F-151-11	82-2031-0250	F-172-28
82-2003	F-151-7	82-2031-0275	F-159-13
82-2003	F-167-17A	82-2032-0200	F-90-5
82-2003	F-3-26	82-2032-0650	F-90-11
82-2016-0025	F-41-26	82-2033-0100	F-172-35
82-2017-0100	F-149-14	82-2033-0100	F-39-6
82-2017-0150	F-147-6	82-2033-0175	F-90-17
82-2017-0150	F-149-21	82-2033-0225	F-23-49
82-2017-0150	F-67-10	82-2033-0450	F-16-5
82-2017-0150	F-67-15	82-2033-0450	F-183-7
82-2017-0150	F-69-5	82-2033-0450	F-44-7
82-2017-0150	F-69-7	82-2034-0075	F-3-8
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82-2017-0250	F-30-16	82-2034-0100	F-52-40
82-2017-0250	F-30-2	82-2034-0100	F-54-37
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82-2017-0300	F-156-52	82-2035-0050	F-52-56
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82-2035-0062	F-4-62	82-2039-001	F-26-2
82-2035-0062	F-66-11	82-2039-001	F-41-17
82-2035-0075	F-41-5	82-2039-001	F-41-19
82-2035-0075	F-43-2	82-2039-001	F-41-9
82-2035-0075	F-52-59	82-2039-001	F-42-12
82-2035-0075	F-54-28	82-2039-001	F-42-15
82-2035-0100	F-149-40	82-2039-001	F-43-18
82-2035-0100	F-52-54	82-2039-001	F-44-29
82-2035-0100	F-56-12	82-2039-001	F-44-3
82-2035-0100	F-56-56	82-2039-001	F-44-5
82-2035-0100	F-7-29	82-2039-001	F-45-12
82-2035-0125	F-41-2	82-2039-001	F-45-2
82-2035-0125	F-57-178	82-2039-001	F-45-5
82-2035-062	F-221-2	82-2039-001	F-45-7
82-2036-0125	F-63-16	82-2039-001	F-48-24
82-2036-0125	F-64-13	82-2039-001	F-48-42
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82-2037-005	F-6-5	82-2039-001	F-48-94
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82-2037-0062	F-53-14	82-2039-001	F-51-11
82-2037-0062	F-55-17	82-2039-001	F-51-2
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82-2037-0075	F-55-23	82-2039-001	F-56-2
82-2037-0125	F-8-16	82-2039-001	F-56-34
82-2038-0125	F-156-34	82-2039-001	F-56-41
82-2039	F-58-52	82-2039-001	F-56-52
82-2039-00	F-172-32	82-2039-001	F-56-54
82-2039-001	F-13-16	82-2039-001	F-56-59
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82-2039-001	F-169-21	82-2039-001	F-57-154
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82-2039-001	F-187-17	82-2039-001	F-57-35
82-2039-001	F-193-36	82-2039-001	F-59-6
82-2039-001	F-193-40	82-2039-001	F-6-4
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82-2039-001	F-199-13	82-2039-001	F-66-7
82-2039-001	F-199-29	82-2039-001	F-69-14
82-2039-001	F-199-5	82-2039-001	F-69-9
82-2039-001	F-199-7	82-2039-001	F-7-23
82-2039-001	F-2-2	82-2039-001	F-7-8
82-2039-001	F-2-6	82-2039-001	F-70-2
82-2039-001	F-217-5	82-2039-001	F-70-9
82-2039-001	F-218-21	82-2039-001	F-8-20
82-2039-001	F-218-23	82-2039-001	F-80-24
82-2039-001	F-218-27	82-2039-002	F-149-43
82-2039-001	F-218-30	82-2039-002	F-169-4
82-2039-001	F-218-35	82-2039-002	F-169-6
82-2039-001	F-218-5	82-2039-002	F-175-61

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82-2039-002	F-199-18	82-2047-0500	F-217-7
82-2039-002	F-217-2	82-2049-0062	F-48-32
82-2039-002	F-218-5	82-2055-0100	F-5-9
82-2039-002	F-219-19	82-2060	F-169-11
82-2039-002	F-219-2	82-2062-0050	F-149-28
82-2039-002	F-219-24	82-2062-0100	F-48-9
82-2039-002	F-219-27	82-2062-0125	F-80-12
82-2039-002	F-219-30	82-2062-0150	F-65-24
82-2039-002	F-219-4	82-2062-0200	F-155-9
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82-2039-002	F-3-14	82-2063-0050	F-45-44
82-2039-002	F-3-24	82-2063-0050	F-48-39
82-2039-002	F-4-40	82-2063-0050	F-48-5
82-2039-002	F-4-67	82-2063-0050	F-52-34
82-2039-002	F-43-21	82-2063-0062	F-41-33
82-2039-002	F-44-19A	82-2063-0075	F-1-18
82-2039-002	F-45-38	82-2063-0075	F-39-15
82-2039-002	F-45-52	82-2063-0075	F-51-7
82-2039-002	F-5-54	82-2063-0075	F-52-44
82-2039-002	F-52-68	82-2063-0075	F-56-48
82-2039-002	F-54-55	82-2063-0075	F-57-140
82-2039-002	F-56-62	82-2063-0075	F-57-164
82-2039-002	F-56-65	82-2063-0075	F-59-1A
82-2039-002	F-56-67	82-2063-0075	F-68-27
82-2039-002	F-56-7	82-2063-0100	F-220-13
82-2039-002	F-59-14	82-2063-0100	F-43-7
82-2039-002	F-63-13	82-2063-0100	F-45-33
82-2039-002	F-64-15	82-2063-0100	F-48-35
82-2039-002	F-65-14	82-2063-0100	F-68-13
82-2039-002	F-68-21	82-2063-0100	F-68-2
82-2039-002	F-68-23	82-2063-0100	F-70-12
82-2039-002	F-7-27	82-2063-0125	F-48-14
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82-2039-002	F-73-4	82-2063-0125	F-73-36
82-2039-002	F-73-42	82-2063-0150	F-16-31A
82-2039-002	F-8-2	82-2063-0150	F-73-7
82-2039-002	F-8-4	82-2063-0225	F-73-37
82-2039-02	F-219-8	82-2063-0300	F-73-35
82-2039001	F-8-14	82-2064-0200	F-170-6
82-2044-0050	F-57-189	82-2064-0400	F-160-7
82-2044-0050	F-57-198	82-2064-0500	F-23-59
82-2044-0075	F-57-47	82-2065-0100	F-149-18
82-2046-0075	F-52-50	82-2065-0100	F-149-4
82-2046-0075	F-54-49	82-2065-0125	F-80-19
82-2046-0075	F-73-18	82-2065-0150	F-90-15
82-2046-0100	F-52-11	82-2067-0100	F-52-24
82-2046-0100	F-54-8	82-2067-0100	F-54-17
82-2047-0075	F-218-5	82-2067-0150	F-61-13
82-2047-0075	F-48-63	82-2074-0025	F-218-19
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82-2075-0100	F-54-12	82-3009	F-69-4
82-2075-0200	F-193-33	82-3009	F-69-7A
82-2075-0200	F-68-32	82-3010	F-156-31
82-2077-0125	F-53-2	82-3010	F-156-49
82-2077-0125	F-55-2	82-3010	F-156-53
82-2080-0125	F-61-10	82-3010	F-159-11
82-2080-0125	F-61-2	82-3010	F-159-3
82-2080-0125	F-61-6	82-3010	F-160-3
82-2080-0125	F-63-2	82-3010	F-160-6
82-2080-0125	F-63-5	82-3010	F-168-11
82-2080-0125	F-63-9	82-3010	F-168-5
82-2080-0125	F-64-3	82-3012	F-162-5
82-2080-0125	F-64-6	82-3012-012	F-28-41
82-2086-0350	F-170-2	82-3014-001	F-151-3
82-2086-0350	F-67-8	82-3014-001	F-219-15
82-2086-0400	F-67-4	82-3014-001	F-220-16
82-2086-300	F-74-22	82-3014-001	F-3-12
82-2091-0200	F-156-13	82-3014-001	F-39-18
82-2091-0250	F-16-23A	82-3014-001	F-41-4
82-2096-0050	F-80-8	82-3014-001	F-43-10
82-2103-0037	F-36-18	82-3014-001	F-43-15
82-2103-0037	F-36-5	82-3014-001	F-43-5
82-2104-0050	F-57-59	82-3014-001	F-45-45
82-2111-0100	F-42-5	82-3014-001	F-48-17
82-2115-0075	F-45-50	82-3014-001	F-51-10
82-2116-0075	F-149-46	82-3014-001	F-57-143
82-2116-0075	F-56-16	82-3014-001	F-57-156
82-2116-0075	F-58-55	82-3014-001	F-57-167
82-2125-004	F-57-16	82-3014-001	F-59-1D
82-2125-007	F-57-11	82-3014-001	F-68-30
82-2125-007	F-57-134	82-3014-001	F-68-5
82-2125-007	F-57-31	82-3014-001	F-7-31
82-2126-0075	F-57-45	82-3014-001	F-73-10
82-2130-0050	F-73-2	82-3014-001	F-73-21
82-2136-0200	F-30-13	82-3014-001	F-73-39
82-2142-0001	F-13-11	82-3014-002	F-155-12
82-2142-0001	F-23-79	82-3014-002	F-48-12
82-2143-0200	F-156-50A	82-3014-003	F-10-17
82-2157-007	F-57-145	82-3014-003	F-11-20
82-2157-007	F-57-169	82-3014-003	F-16-14
82-3001	F-167-8	82-3014-003	F-19-20
82-3001	F-183-10	82-3014-003	F-220-10A
82-3009	F-147-3	82-3014-003	F-23-55
82-3009	F-149-15	82-3014-003	F-28-59
82-3009	F-149-22	82-3014-003	F-28-63
82-3009	F-159-20	82-3014-003	F-3-22
82-3009	F-167-3	82-3014-003	F-39-5
82-3009	F-183-5	82-3014-003	F-44-15
82-3009	F-30-3	82-3014-003	F-92-4
82-3009	F-44-10	82-3014-004	F-156-26D
82-3009	F-67-11	82-3014-004	F-80-22

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82-3014-006	F-19-5	82-3018-003	F-218-11
82-3014-006	F-28-44	82-3018-003	F-218-25
82-3014-006	F-39-6	82-3018-003	F-218-32
82-3014-006	F-42-17	82-3018-003	F-3-15
82-3014-006	F-90-18	82-3018-003	F-4-67A
82-3014-011	F-30-15	82-3018-003	F-48-64
82-3015-001	F-169-19	82-3018-003	F-56-19
82-3015-001	F-45-26	82-3018-003	F-57-191
82-3015-001	F-45-36	82-3018-003	F-57-200
82-3015-001	F-52-48	82-3018-003	F-57-36A
82-3015-001	F-52-53	82-3018-003	F-6-7
82-3015-001	F-52-63	82-3018-003	F-73-16
82-3015-001	F-53-3	82-3018-003	F-73-29
82-3015-001	F-54-32	82-3018-004	F-219-22
82-3015-001	F-55-3	82-3018-004	F-57-68
82-3015-001	F-70-15	82-3018-005	F-220-5
82-3015-002	F-68-9	82-3018-005	F-221-3
82-3015-003	F-156-2C	82-3018-005	F-4-65
82-3015-003	F-159-14	82-3018-005	F-57-180
82-3015-003	F-166-17	82-3018-005	F-6-12
82-3015-003	F-166-21	82-3018-005	F-72-18
82-3015-003	F-166-5	82-3018-005	F-72-5
82-3015-003	F-172-30	82-3018-007	F-3-4
82-3015-005	F-149-11	82-3019-001	F-16-31B
82-3015-005	F-169-15	82-3019-002	F-54-19
82-3015-005	F-23-51	82-3019-007	F-159-22
82-3015-007	F-170-9	82-3019-007	F-160-9
82-3015-007	F-23-61	82-3019-007	F-169-9
82-3015-008	F-170-5	82-3019-008	F-67-5
82-3015-008	F-74-26	82-3021-006	F-90-3
82-3017-005	F-57-175	82-3021-010	F-10-6
82-3017-005	F-57-61	82-3021-010	F-11-11
82-3017-006	F-36-16	82-3021-010	F-13-2A
82-3017-006	F-36-7	82-3021-010	F-16-28
82-3017-006	F-40-6	82-3021-010	F-19-8
82-3017-006	F-52-22	82-3021-010	F-23-41
82-3017-006	F-54-26	82-3029-001	F-52-12
82-3017-007	F-42-10	82-3029-001	F-52-31
82-3017-007	F-48-22	82-3029-001	F-54-50
82-3017-007	F-51-5	82-3029-001	F-54-9
82-3017-007	F-53-19	82-3029-002	F-171-9
82-3017-007	F-55-13	82-3029-002	F-218-16
82-3017-007	F-57-187	82-3029-003	F-73-25
82-3017-007	F-57-196	82-3029-005	F-16-8
82-3017-007	F-57-49	82-3030-007	F-52-21
82-3017-007	F-57-9	82-3030-007	F-54-25
82-3017-007	F-68-35	82-3030-008	F-52-7
82-3017-007	F-69-11	82-3030-008	F-53-13
82-3017-007	F-69-16	82-3030-008	F-53-16
82-3017-007	F-7-7	82-3030-008	F-54-13
82-3017-007	F-73-45	82-3030-008	F-55-19

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82-3030-008	F-55-25	8280080A	F-49-31
82-3030-008	F-8-18	8283A451	F-51-18
82-3037-0025	F-8-11	8283A452	F-51-21
82-3037-0025	F-8-7	8283A453	F-51-22
82-3050	F-48-69	8283A531	F-51-20
82-3051	F-48-3	8283A714	F-49-20
82-3052-0044	F-61-4	8283A830	F-51-14
82-3052-0044	F-63-7	8283BA430-01	F-51-23
82-3052-0044	F-65-8	8283B527	F-51-19
82-3053-0063	F-41-12	8283C526	F-51-13A
82-3060-0075	F-8-10	8284A024D	F-50-27
82-3060-0075	F-8-6	8287B321A	F-51-15
82-3097	F-219-25	8287D137	F-51-16
82-3097	F-219-28	83-004-1031	F-180-6
82-3097	F-219-9	83-004-2033	F-180-2
82-4001	F-52-65	83-1013-007	F-61-14
82-4001	F-54-52	830FS-08	F-156-15
82-4017-006	F-169-12	8398	F-176-2
820-2958	F-92-11	84-004-1782	F-180-8
820-3237	F-92-0	84-24A015	F-45-30
821-10	F-167-27	8422A010	F-47-11
821-4	F-80-5	8422A114	F-47-18
821-6	F-167-21	8422B016	F-47-5
821-8	F-167-12	8422B399A-01	F-50-43
822039-002	F-48-89	8424A002	F-47-14
823019-002	F-52-26	8424A004	F-47-10
8240A009	F-47-26	8424A006	F-47-6
8240A021	F-47-24	8424A014	F-47-17
8240A022	F-45-29	8424A065A	F-47-22
8240A031-01	F-47-8	8424B012	F-47-4
8240A032	F-47-7	8424C010	F-47-2
8240A034-01	F-47-13	8424C052	F-47-3
8240A034-02	F-47-19	8424C055A-01	F-47-15
8240A072	F-49-18	8427A002	F-49-6
8240A130	F-47-23	8427A003	F-49-7
8240A631A	F-47-21	8427A005	F-49-8
8240B010	F-47-25	8427A011	F-49-2
8240B39	F-47-16	8427A016	F-49-9
8240C008	F-47-20	8431A033A	F-50-45
8277-5	F-178-15	8431B002A	F-50-34
8280A006	F-49-23	8431B007A	F-50-29
8280A007-01	F-49-19	8431B012A	F-50-46
8280A008	F-49-30	8431B016A	F-50-25
8280A009	F-49-17	8431B018A	F-50-24
8280A010	F-49-21	8431C001A-03	F-50-11
8280A016-OC	F-49-26	8431C001A-03	F-50-23
8280A017	F-49-22	8431C006A	F-50-44
8280A043	F-49-32	8434D101-01	F-47-1
8280B003A-02	F-49-13	844172-02	F-156-50
8280C076A	F-49-1	8444A017-02	F-50-32
8280C077A	F-49-35	8444A017-03	F-50-33
8280D020	F-49-10	8458C047A	F-50-8
8280D069A-OC	F-49-28	8459A028	F-49-29

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848FS-04X02	F-75-5	860-0006	F-209-20
848FS-06X08	F-83-6	860-0015	F-214-29
848FS-08X04	F-74-12	8606-67	F-161-10
848FSO-08X08	F-156-11	861-22-1-1- $\frac{1}{2}$ "	F-28-17
849-FS-08X12	F-167-19	86102MK	F-166-11
849FS-06x06	F-149-7	8619322	F-141-81
849FS-16x12	F-149-6	862-0003	F-202-46
849FS-16x16	F-149-8	862-0003	F-208-3
849FS-06X02	F-145-1	862-0004	F-201-16
849FS-08X08	F-156-19	862-0004	F-214-28
849FS-08X12	F-83-19	8622757	F-135-6
849FS-12X12	F-156-9	8622757	F-139-12
849FS-16X12	F-156-21	8623262	F-131-7
849FSO-12X10	F-156-4	8623262	F-143-5
849FSO-12X10	F-83-15	8623484	F-137-18
849LL-FS04X02	F-75-7	8623681	F-141-82
850-0025	F-210-22	8625430	F-141-80
850-0040	F-213-26	8625431	F-141-79
850-0040	F-213-28	8627650	F-133-23
850-0045	F-202-44	8629481	F-133-32
850-0045	F-203-49	865-0020	F-212-12
850-0045	F-205-22	8683-E1	F-35-32
850-0045	F-210-17	870-0053	F-208-9
850-0045	F-210-20	870-0130	F-208-8
850-0045	F-211-29	870-0133	F-208-10
850-0045	F-213-27	870-0134	F-202-41
850-0045	F-214-26	870-0137	F-212-18
850-0050	F-203-48	870-0194	F-213-12
850-0050	F-214-25	871FS-08	F-156-7
850-0055	F-201-15	878073	F-4-7
850-0055	F-214-30	879FS-08	F-156-10
850-1045	F-205-23	879FS-08	F-74-20
853-0003	F-209-19	879FS-08	F-83-11
853-0008	F-213-35	8920631	F-102-3
853-0013	F-213-32	8920764	F-120-2
8540010	F-209-22	8920886	F-110-4
8540010	F-213-31	8920886	F-76-4
8540013	F-213-34	8921086	F-119-1A
8540014	F-213-33	8921150	F-99-10
854D049A	F-50-5	8921209	F-105-20A
8547552	F-82-10	8921312	F-81-5
8548A054A	F-50-4	8921930	F-114-11
8548C035A	F-50-20	8921933	F-119-7
8548C050A	F-50-6	8921935	F-77-7
8548D038A	F-50-1	8922118	F-107-4
8548D043A	F-50-2	8922140	F-95-11
8548066A	F-50-19	8922250	F-118-6
8559A088A	F-50-14	8922295	F-78-3
8559A088A	F-50-38	8922298	F-78-4
856-31055	F-48-41	8922383	F-99-3
856-31055-B	F-48-48	8922388	F-103-24
8562	F-41-30	8922407	F-99-2
85903	F-57-64	8922492	F-107-17

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8922519	F-120-1	8924178	F-102-11
8922605	F-95-21	8924178	F-126-5
8922634	F-95-18	8924178	F-85-18
8922736	F-95-19	8924180	F-102-13
8922740	F-119-4	8924185	F-85-4
8922770	F-120-10	8924200	F-85-2
8922795	F-78-2	8924200	F-87-21
8923113	F-111-4	8924220	F-87-11
8923159	F-100-33	8924266	F-95-31
8923160	F-100-33	8924272	F-100-15
8923162	F-100-36	8924380	F-100-14
8923163	F-100-36	8924380	F-84-13
8923176	F-82-20	8924380	F-84-18
8923312	F-93-6	8924380	F-95-40
8923313	F-100-11	8924380	F-98-18
8923313	F-103-18	8924426	F-95-3
8923313	F-82-3	8924436	F-96-4
8923313	F-99-17	8924439	F-105-27
8923317	F-100-1	8924482	F-93-15
8923389	F-127-1	8924503	F-119-5
8923389	F-81-1	8924505	F-119-1
8923492	F-93-12	8924517	F-100-23
8923507	F-93-13	8924517	F-83-3
8923512	F-82-28	8924749	F-107-7
8923554	F-105-4	8924750	F-100-13
8923571	F-120-3	8924750	F-112-32
8923729*	F-111-11	8924802	F-96-5
8923753	F-99-9	8924968	F-96-3
8923791	F-102-15	8925030	F-85-8
8923792	F-102-1	8925172	F-112-33
8923814	F-105-28	8925325	F-85-7
8923847	F-100-3	8925411	F-82-25
8923847	F-102-12	8925438	F-120-14
8923847	F-103-20	8925439	F-109-5
8923847	F-103-29	8925531	F-100-9
8923847	F-126-3	8925674	F-95-4
8923847	F-81-3	8925710	F-87-25
8923847	F-85-22	8925778	F-93-21
8923847	F-87-20	8925981	F-103-13
8923916	F-98-26	8926247	F-106-12
8923959	F-96-1	8926247	F-122-6
8924060	F-93-3	8926285	F-120-5
8924105	F-111-5	8926293	F-120-6
8924148	F-87-10	8926450	F-93-24
8924159	F-87-24	8926480*	F-111-10
8924161	F-85-1	8926631	F-107-2
8924168	F-87-17	8926782	F-82-9
8924171	F-85-3	8926923	F-107-5
8924171	F-93-2	8927041	F-95-37
8924172	F-126-4	8927076	F-95-59
8924172	F-85-19	8927135	F-117-17
8924172	F-87-22	8927183	F-96-7
8924177	F-87-12	8927187	F-96-2

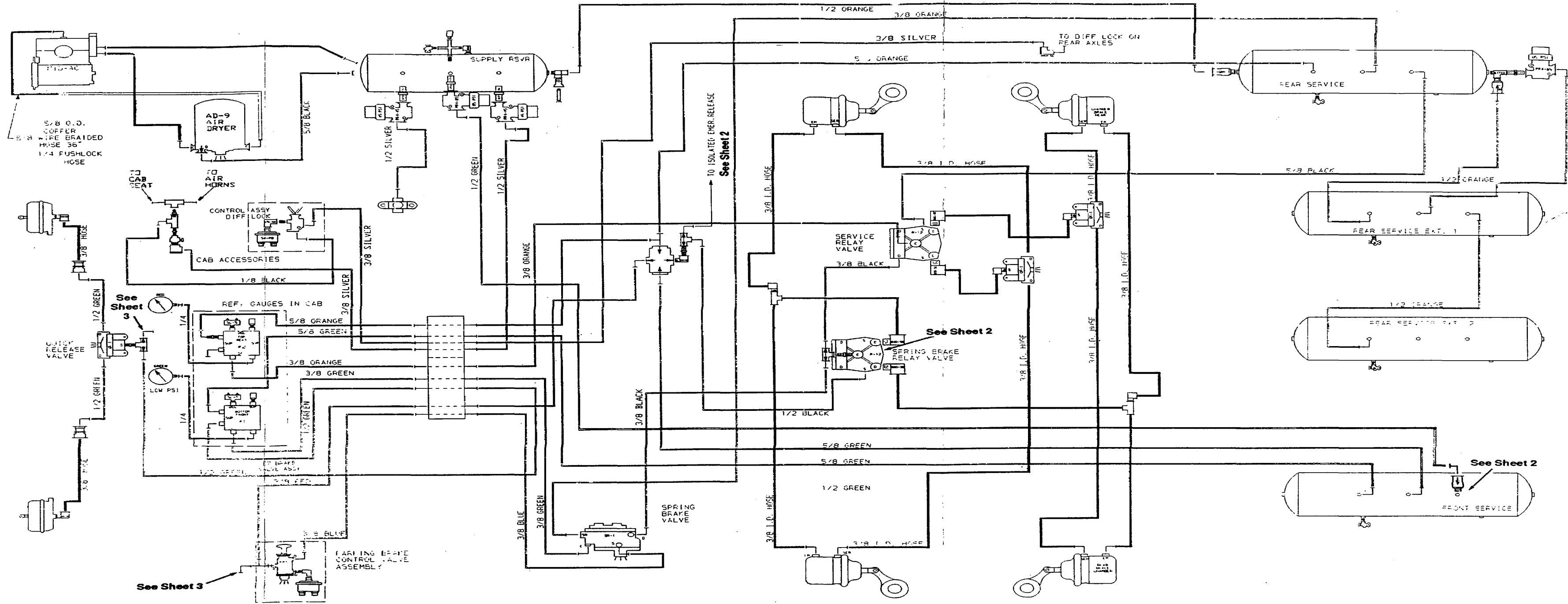
PART NUMBER	FIG/ITEM NO.	PART NUMBER	FIG/ITEM NO.
8927189*	F-100-29	90-004-1031	F-179-10
8927414	F-95-13	90-004-1043	F-179-9
8927416	F-95-14	90-004-1052	F-179-1
8927464*	F-100-32	90-004-1101	F-179-8
8927479	F-106-15	90-004-111	F-179-5
8927579	F-112-34	90-004-1143	F-179-20
8927579	F-85-14	90-004-1182	F-179-15
8927579	F-96-6	90-004-1194	F-179-7
8927580	F-82-1	90HL-5	F-80-6
8927581	F-82-16	90HL70R50	F-80-1
8927581	F-82-27	90PC20B	F-68-25
8927581	F-87-7	900A	F-1-15
8927589	F-82-26	9000130	F-48-1
8927794	F-105-18	9000131	F-48-2
8927979	F-93-25	90092	F-193-38A
8928511	F-106-27	9016	F-56-22
8928514	F-106-3	902-905-236-735-002	F-21-7
8928516	F-106-26	9021	F-193-40C
8928545	F-107-8	9021	F-56-20A
8928574	F-113-4	9029W	F-193-36C
8928581	F-86-14	9030	F-161-19
8928583	F-77-1	9035-4	F-36-58
8928596	F-120-8	904-735	F-25-3
8928623	F-125-3	904-735N	F-25-10
8928628	F-130-1	904-735S	F-25-8
8928631	F-130-2	904-735W	F-25-9
8928651	F-88-4	9042-1	F-14-0
8928669	F-126-2	9042-1	F-15-0
8928669	F-85-23	905-100	F-17-21
8928741	F-125-5	905-735	F-17-11
8928742	F-125-2	905-735	F-17-8
8928801	F-125-1	905-735	F-17-9
8929184	F-126-6	905-735	F-25-12
8929750	F-112-31	905-735	F-25-2
894AN	F-4-34	9057-1*	F-178-4
894GN	F-4-12	906979	F-167-7
894RD	F-4-26	908-733	F-17-4
894198	F-87-23	9086-2*	F-178-12
8946A	F-48-96	909-1*	F-178-5
89510K	F-166-8	91-0001	F-3-29
895603	F-84-1	91-0002	F-3-27
8985	F-178-10	91-0005	F-199-44
9-P-54	F-222-5	91-0018	F-5-27
9-397-232-023	F-66-10	91-0025	F-5-18
9-397-238-002	F-66-28	91-0041	F-7-20
9-397-238-003	F-66-27	91-0060	F-57-128
9-398-239-003	F-66-31	91-0061	F-149-31
9J-480-9068	F-10-11	91-0063	F-57-182
9J-480-9068	F-11-3	91-0070	F-57-104
9J-480-9068	F-19-12	91-0071	F-57-172
9PA54	F-193-33A	91-0087	F-199-48
90-002-0333	F-172-36	91-0091	F-199-46
90-002-0333	F-179-0	91-0092	F-199-42

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91-0092	F-199-47	91-0245-094A	F-5-5
91-0093	F-199-43	91-0247-099A	F-5-46
91-0106	F-199-38	91-0257-002	F-7-19
91-0113	F-57-138	91-0263	F-156-57
91-0115-002	F-175-72	91-0344	F-73-23
91-0115-003	F-175-73	91-0359	F-151-19
91-0115-004	F-175-71	91-0365	F-5-26
91-0126	F-56-60	91-0366	F-5-29
91-0137	F-151-12	91-0367	F-5-35
91-0137	F-151-5	91-0368	F-5-36
91-0140	F-55-6	91-0369	F-5-47
91-0149	F-199-31	91-0371	F-5-50
91-0150	F-199-32	91-0756	F-5-20
91-0151	F-199-33	91-20-5329-0-C	F-60-4
91-0165	F-53-6	91-20-5336-0-C	F-60-5
91-0168	F-193-43	91-370	F-5-49
91-0179	F-67-131	91-50-5309-0-C	F-60-3
91-0197	F-199-50	91-50-5956-0-BT	F-60-1
91-0197	F-4-56	91-50-5957-0-BT	F-60-2
91-0199	F-199-45	9114-1A	F-24-0
91-0199	F-455	912	F-56-28
91-0207	F-40-8	9121-2*	F-178-1
91-0224	F-57-208	913020	F-92-6
91-0232	F-167-18	913100-02	F-92-7
91-0233-004B	F-4-57	91358AJ	F-156-2
91-0233-006A	F-5-25	9139809	F-98-19
91-0233-009B	F-4-43	9179	F-31-25
91-0233-018B	F-5-38	921-3-3-480	F-48-51
91-0233-039A	F-5-37	921-360	F-25-14
91-0233-041	F-7-13	921-360	F-25-4
91-0233-049B	F-4-53	921-423	F-17-14
91-0233-050B	F-4-52	922-421	F-17-7
91-0233-051B	F-4-51	923-421	F-17-1
91-0233-053B	F-4-58	9231	F-57-127
91-0233-062B	F-5-40	924-421	F-17-3
91-0233-064B	F-5-43	924-423	F-17-16
91-0233-077C	F-4-48	927-730	F-17-15
91-0233-081C	F-4-50	927-730	F-17-22
91-0233-086C	F-4-46	928-100	F-17-19
91-0233-087C	F-4-49	930-527X-797AN	F-4-32
91-0233-088C	F-4-47	930-527X-797GN	F-4-10
91-0233-091C	F-4-45	930-527X-797RD	F-4-24
91-0233-094C	F-444	930001-02400	F-44-16
91-0233-104B	F-5-34	930047-00500	F-19-16
91-0233-116B	F-68-19	930434R	F-4-13
91-0236-088B	F-5-30	930434R	F-4-27
91-0237-081A	F-5-19	930434R	F-4-35
91-0237-081B	F-5-39	931-3-3-490	F-48-51
91-0240-086B	F-5-28	931006-01200	F-166-22
91-0241-077B	F-7-12	931007-01268	F-3-30
91-0242-091A	F-5-4	931007-01644	F-3-2
91-0244-077A	F-5-6	931007-14200	F-219-16
91-0244-087B	F-7-11	932-421	F-17-5

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932106-01400	F-3-31	9409620	F-100-35
932106-01725	F-3-17	941001-02718	F-69-13
932142-05200	F-167-6	941001-04225	F-73-13
934104-0010	F-55-10	9412014	F-112-23
94	F-5-22	9412305	F-79-65
94-10871-1	F-5-21	9413533	F-108-8
94-2022	F-4-39	9413533	F-109-7
94-2022	F-7-25	9414215	F-134-24
94-2023	F-441	9414268	F-106-10
94-2023	F-7-24	9414876	F-134-12
94-2027	F-3-33	9415559	F-110-8
94-3087	F-48-61	9415559	F-76-3
94-4041	F-41-14	9416374	F-79-53
94-4043	F-187-19	9417722	F-132-27
94-4043	F-219-15A	9418228	F-78-11
94-4043	F-48-92	9418964	F-98-3
94-4055	F-218-17	9419648	F-109-1
94-5004	F-48-18	942009	F-52-1
940002-00600	F-167-34	942009	F-54-1
940003	F-201-5	942022	F-5-53
940003	F-59-9	942024	F-5-52
940003	F-74-11	9420759	F-133-14
940004	F-13-13	9420905	F-134-19
940004	F-23-81	9422755	F-86-6
940009-3000	F-1-26	9422966	F-136-22
940024	F-44-21	9423346	F-142-4
940029-03000	F-80-10	9423442	F-136-43
940036	F-59-4	9424098	F-136-31
940037-0400	F-74-5	9426920	F-141-71
940038	F-74-2	9428477	F-100-21
940038	F-74-33	9428477	F-95-50
940051-00500	F-74-32	9428477	F-95-55
940051-01000	F-74-29	9428493	F-141-18
940054	F-66-8	9429635	F-136-10
940054-00075	F-53-17	943005	F-41-22
940054-00075	F-55-20	943021	F-53-25
940055-06300	F-149-32	943021	F-55-11
940056	F-28-53	9430221	F-91-9
940056	F-28-55	943030	F-73-47
940076	F-28-54	943031	F-73-48
940093	F-13-9	943054	F-44-27
940093	F-23-77	943059	F-73-30
9409011	F-117-15	943064	F-167-47
9409035	F-106-28	943064	F-218-33
9409035	F-107-1	943064	F-41-24
9409035	F-122-5	943064	F-52-2
9409037	F-132-38	943064	F-54-2
9409053	F-86-19	943064	F-6-13
9409056	F-112-29	943089-02200	F-43-19
9409058	F-132-1	943089-02600	F-167-4
9409058	F-148-1	943092	F-41-30
9409060	F-86-4	943097	F-193-45
9409077	F-95-33	943098	F-41-21

PART NUMBER	FIG/ITEM NO.	PART NUMBER	FIG/ITEM NO.
943098	F-41-21	944064	F-152-39
943104-0010	F-53-24	944065	F-152-76
943116	F-73-39A	944066	F-152-74
9431456	F-133-15	944067	F-152-75
9432124	F-136-30	944069	F-152-41
9432125	F-136-32	944070	F-152-81
9432185	F-136-45	9441614	F-95-5
9436084	F-141-53	94417-05	F-48-50
9438064	F-132-39	945007	F-152-22
9439542	F-89-13	946017	F-73-31
9439751	F-89-19	956-3124	F-57-129
944004	F-16-10	9575H2632-106	F-70-8
944004	F-39-7	959-13*	F-196-8
944006	F-152-9	959-17*	F-189-9
944008	F-39-10	959-17*	F-191-9
944023	F-39-9	959-25*	F-173-4
944023	F-5-12A	959-25*	F-195-10
944031	F-152-8	9612144	F-2-11
944031	F-80-5	9613903-75	F-2-10
944034	F-131-12	96196-79	F-2-5
944034	F-131-20	9619678-76	F-2-8
944034	F-152-120	9622077-0	F-2-9
944034	F-40-7	97-3842-1-B	F-60-8
944034	F-61-17	97-4101-0-A	F-60-9
944034	F-7-16	98-743	F-9-15
944034-0260	F-57-28	98-743	F-9-7
944035	F-152-106	98039R	F-218-17
944035	F-152-114	99-2003	F-56-44
944035	F-152-57	99-2049	F-56-10
944035	F-45-42	99-2076	F-45-36
944036	F-152-101	99-2091	F-1-2
944036	F-152-58	99-3023	F-66-29
944036	F-152-79	99-3024	F-66-30
944037	F-162-42	99-3029	F-66-28
944056-02100	F-167-29	99-3031	F-66-31
944062	F-152-32	99092C	F-2-4
944063	F-152-80	9940.000YEH650	F-3-18

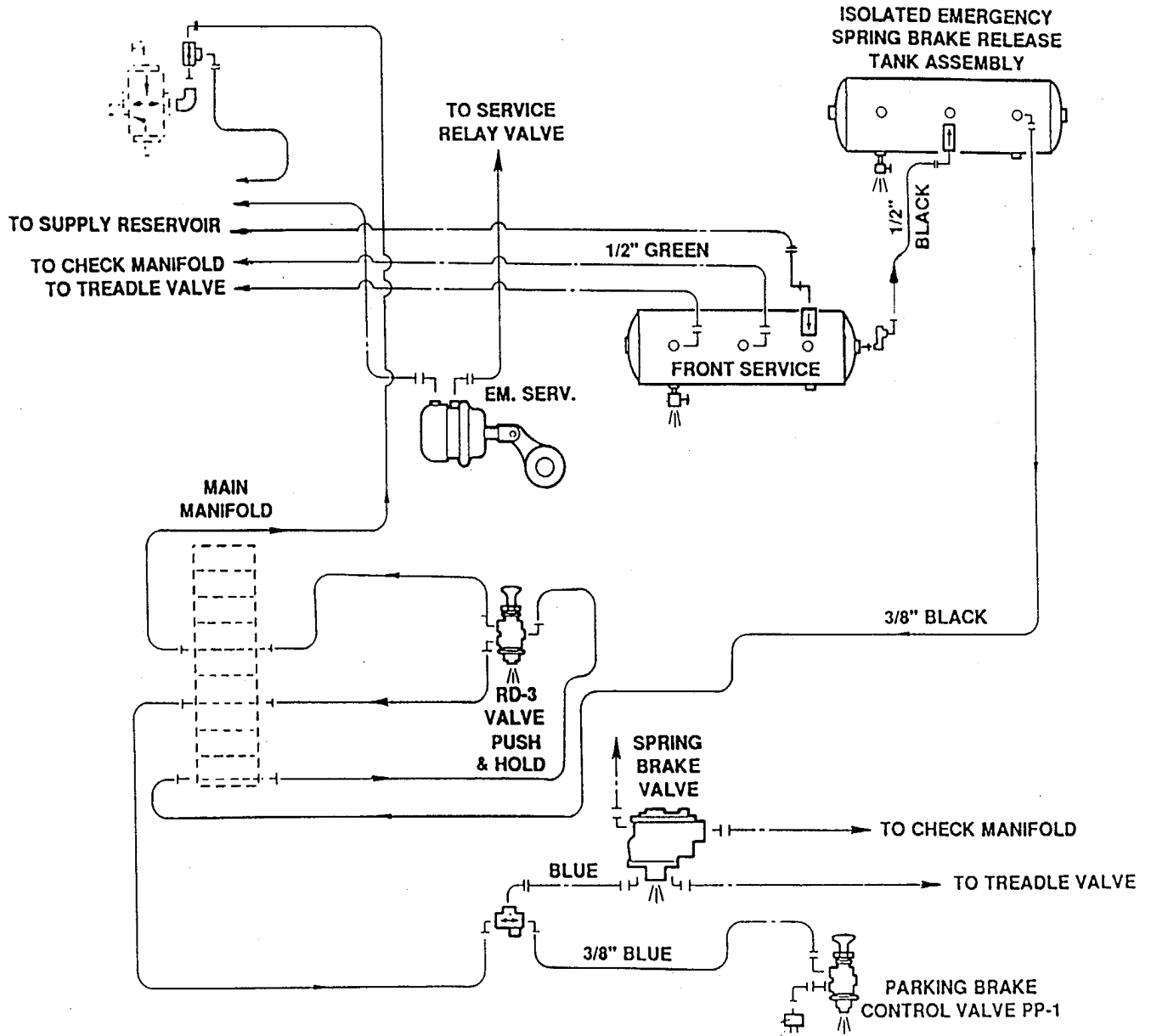
**APPENDIX G
AIR SYSTEM SCHEMATICS**



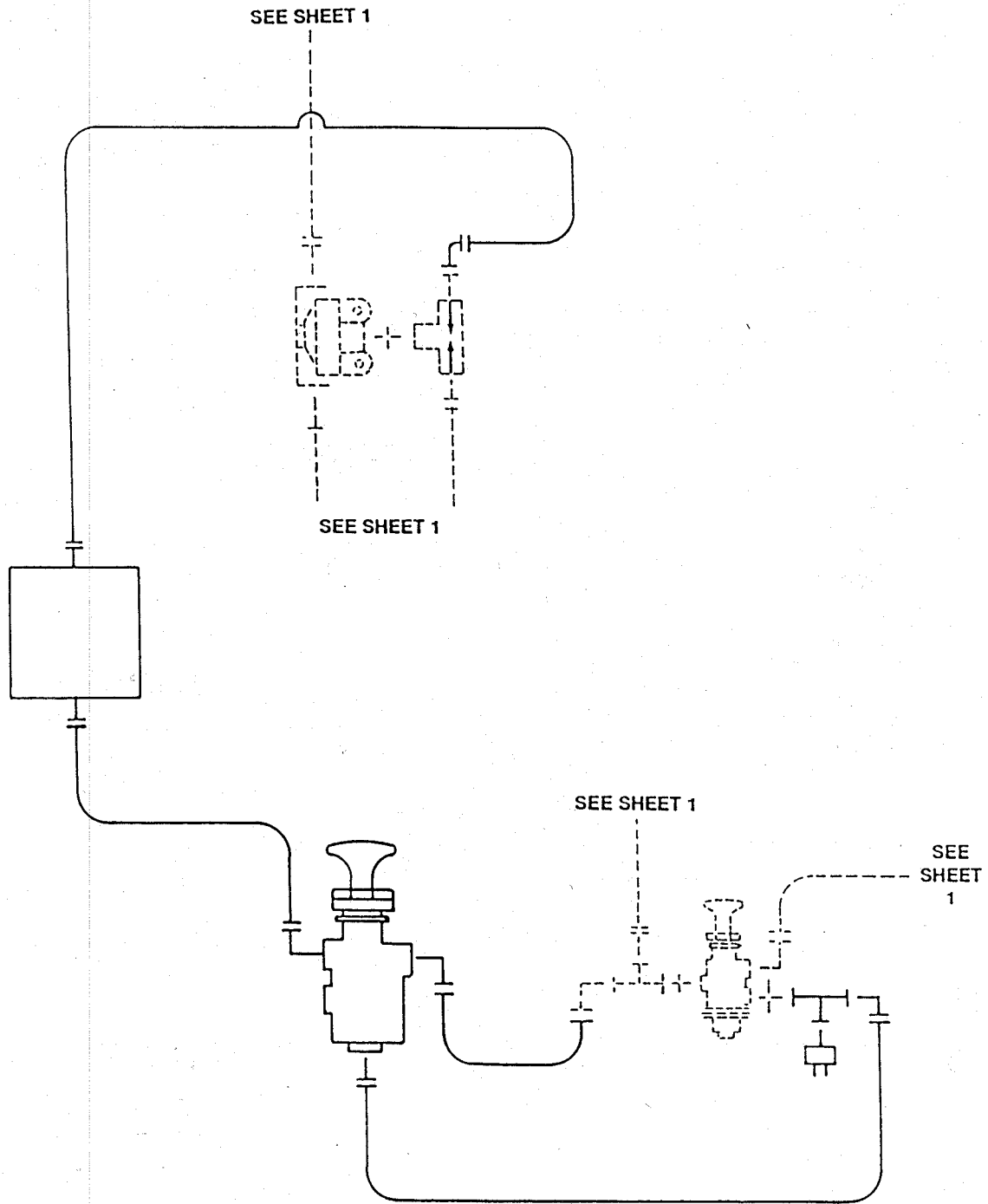
LEGEND
 NYLON TUBE & COPPER TUBE
 HOSE, TEXTILE BRAID,
 STAINLESS BRAID, PUSHLOCK

Air System Schematic (Sheet 1 of 3)

G-1/(G-2 BLANK)



Air System Schematic (Sheet 2 of 3)



Air System Schematic (Sheet 3 of 3)

**APPENDIX H
WIRING DIAGRAMS**

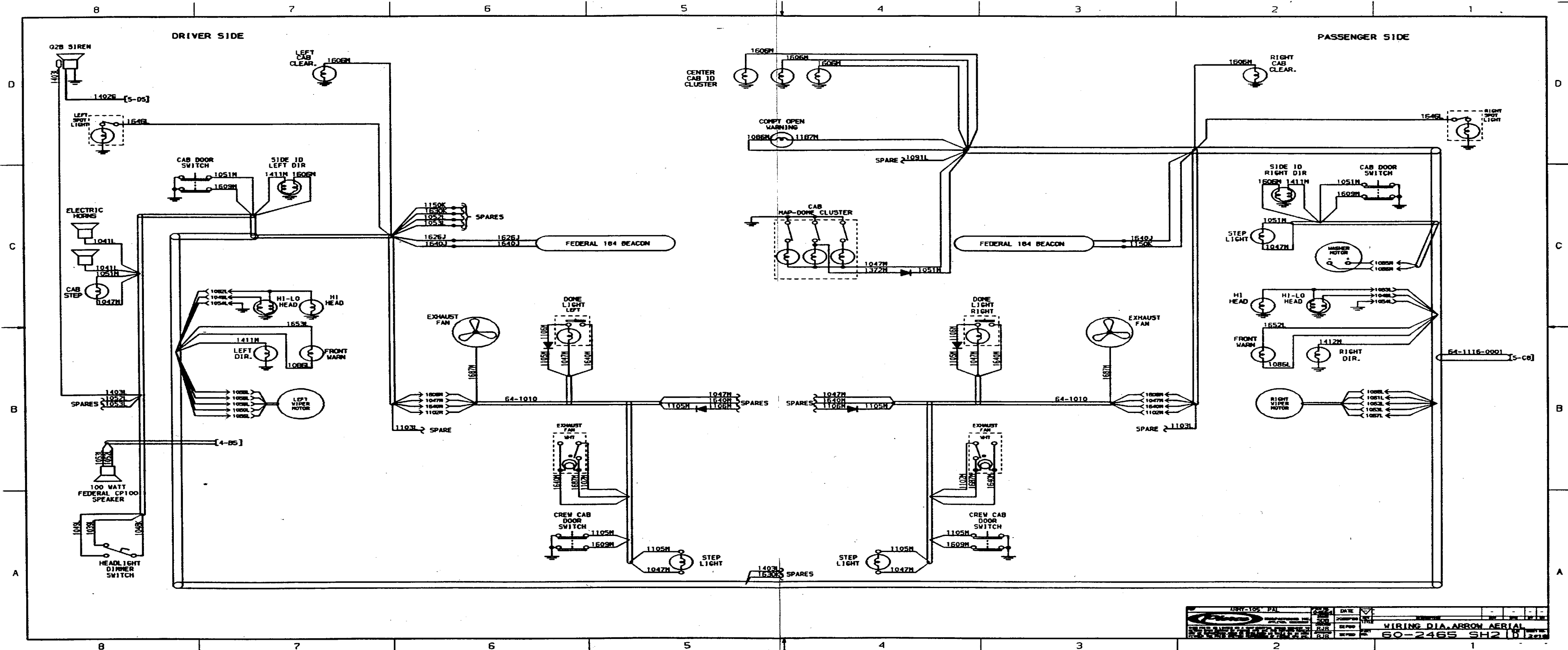


Figure H-1. Electrical Wiring Diagrams (Sheet 2 of 17)

H-5/(H-6 Blank)

48H-105-PA	DATE	
WIRING DIA. ARROW AERIAL	60-2465 SH2	

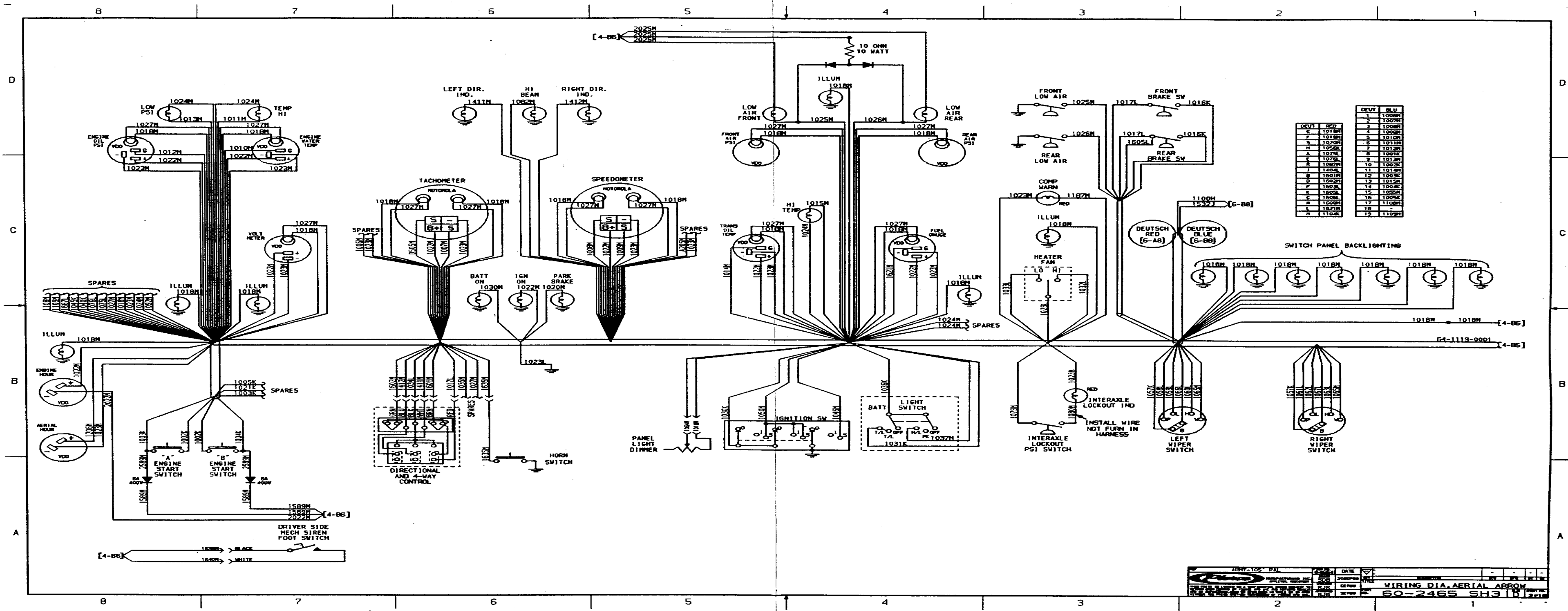


Figure H-1. Electrical Wiring Diagrams (Sheet 3 of 17)

H-7/(H-8 Blank)

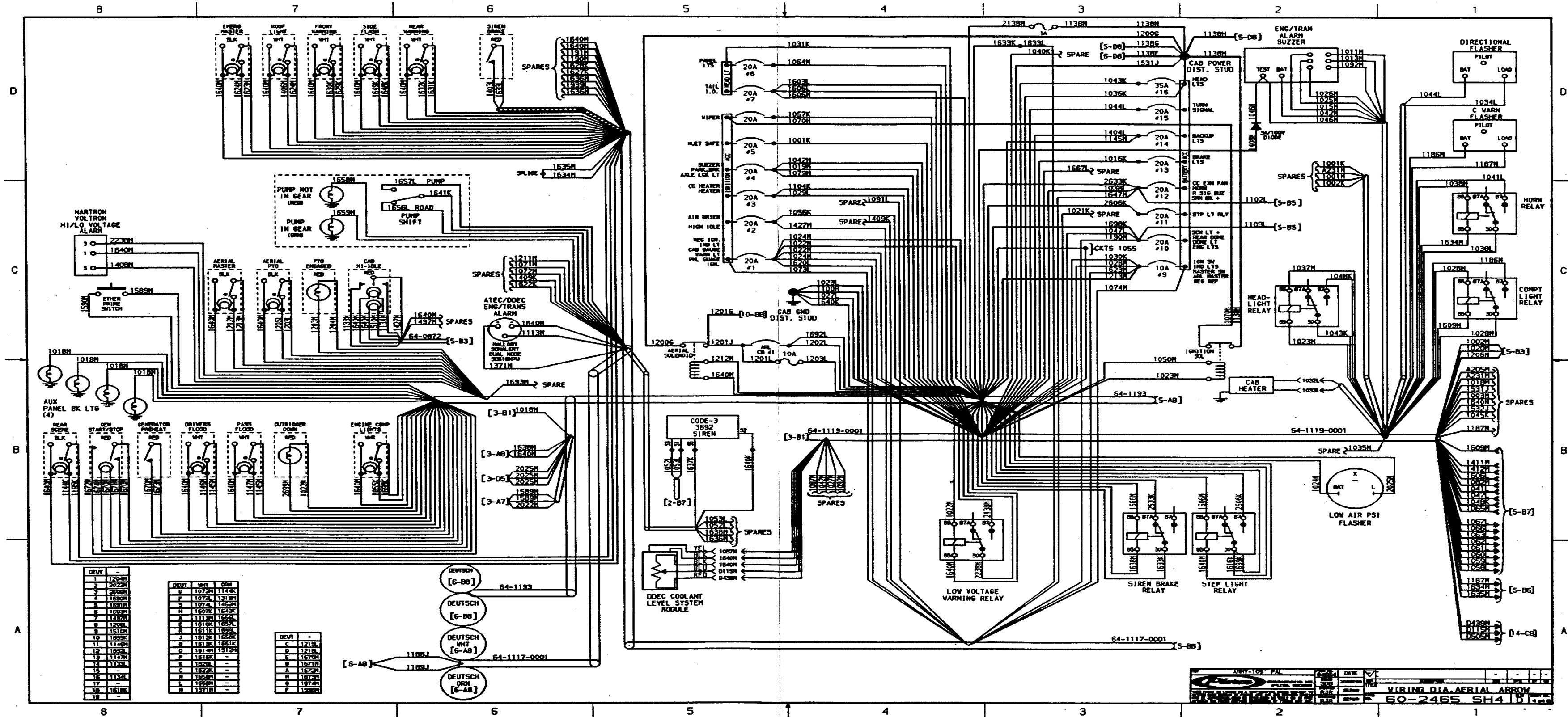


Figure H-1. Electrical Wiring Diagrams (Sheet 4 of 17)

H-9/(H-10 Blank)

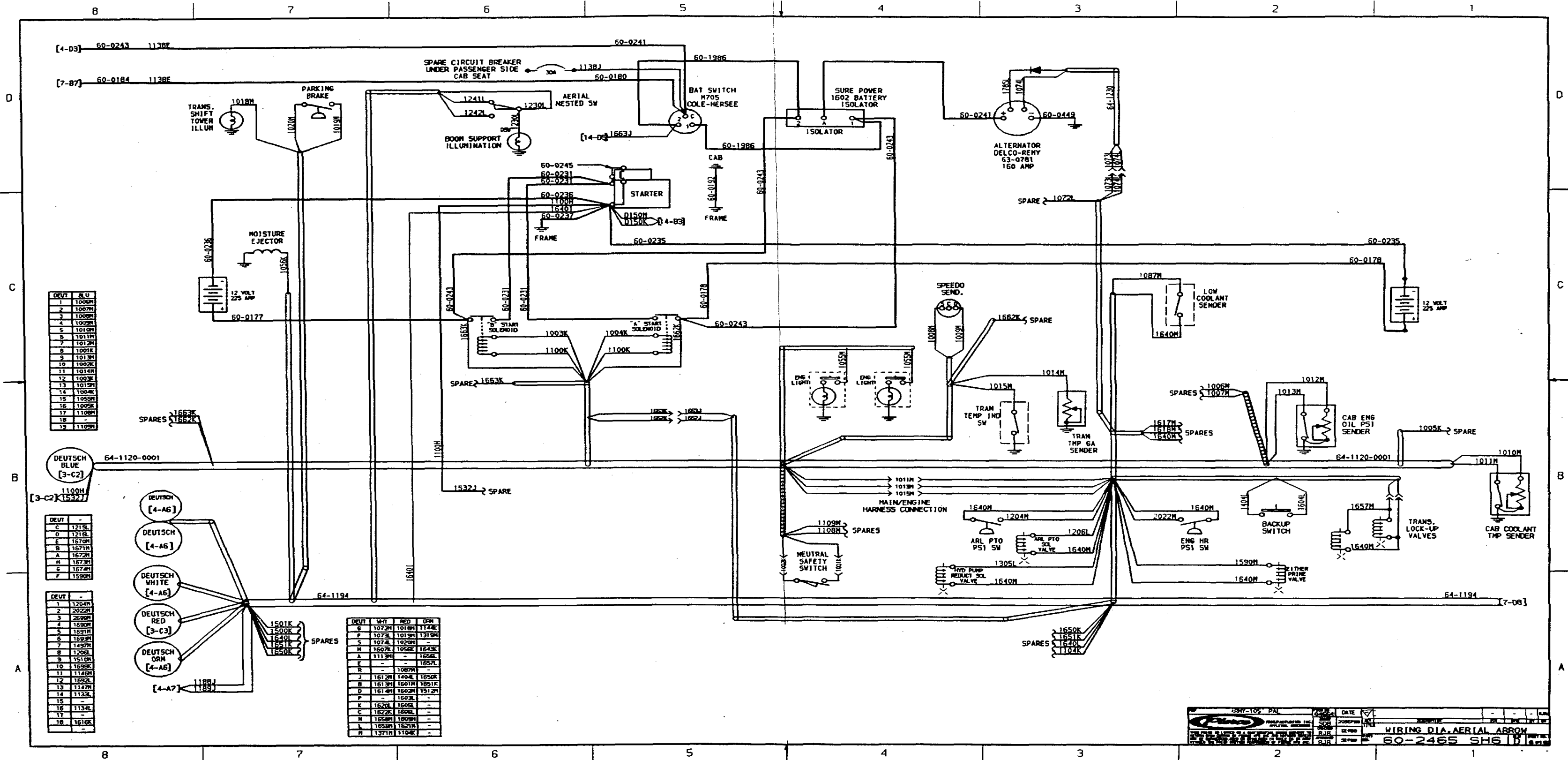


Figure H-1. Electrical Wiring Diagrams (Sheet 6 of 17)

H-13/(H-14 Blank)

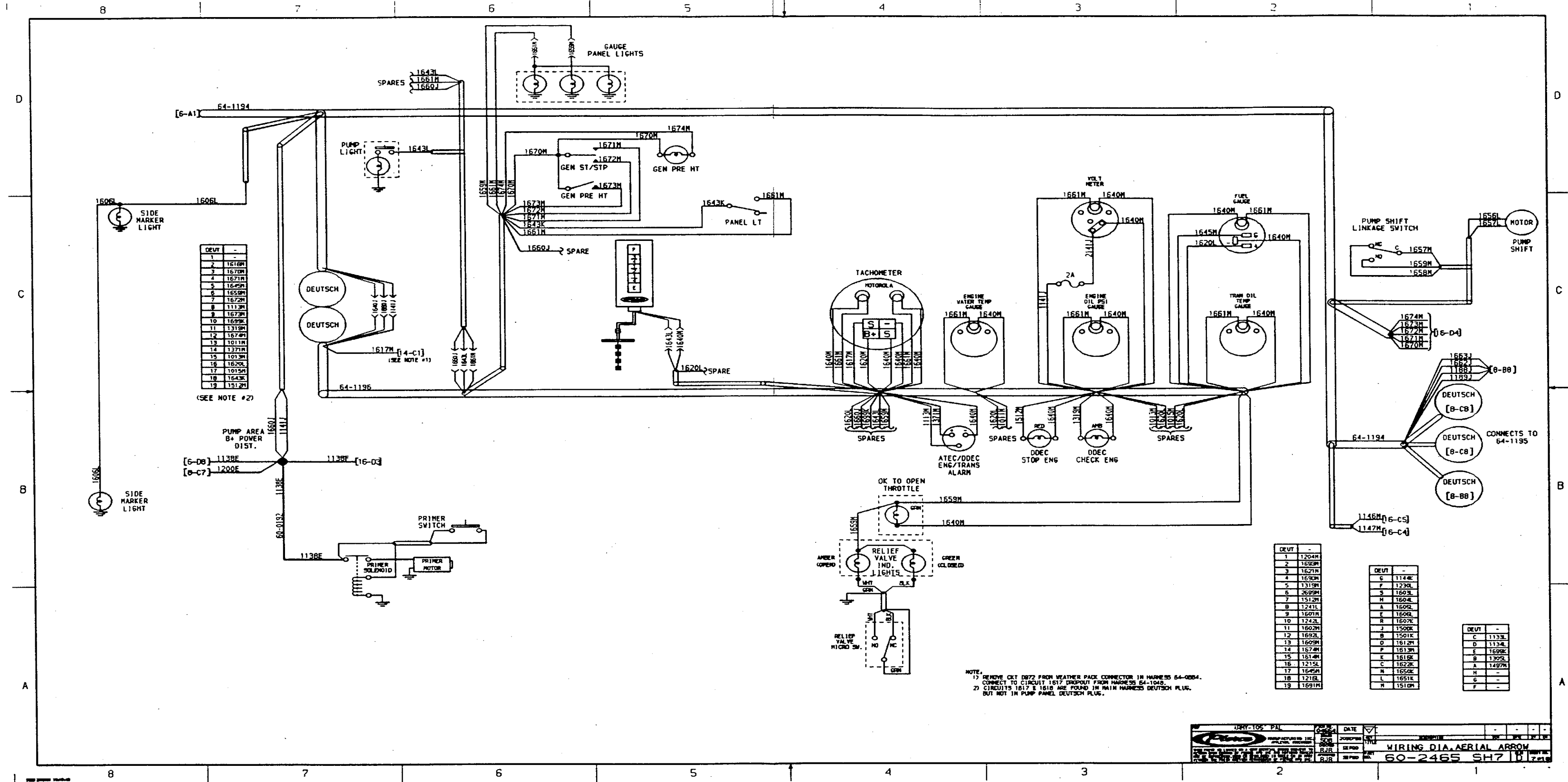


Figure H-1. Electrical Wiring Diagrams (Sheet 7 of 17)

H-15/(H-16 Blank)

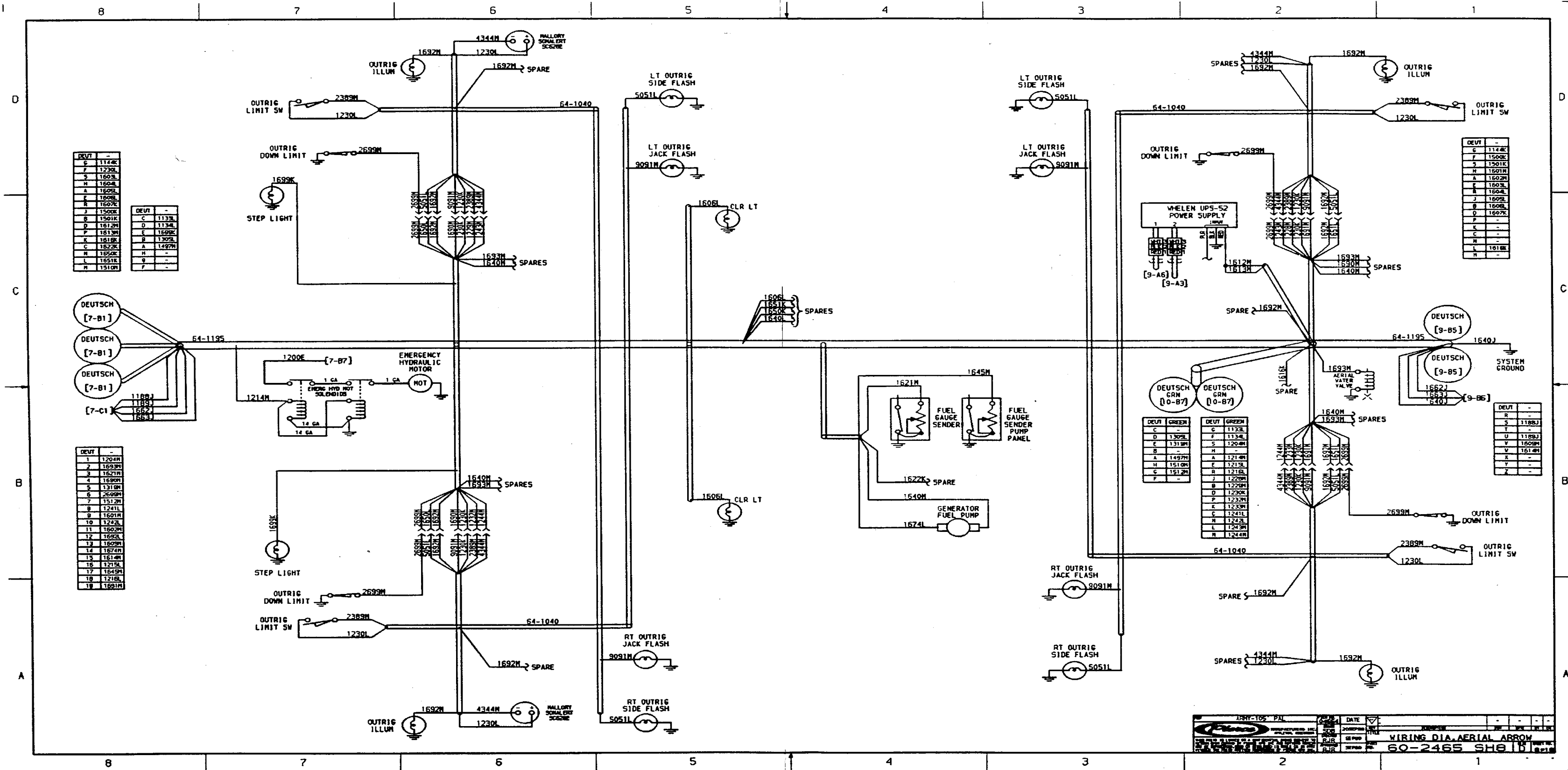


Figure H-1. Electrical Wiring Diagrams (Sheet 8 of 17)

H-17/(H-18 Blank)

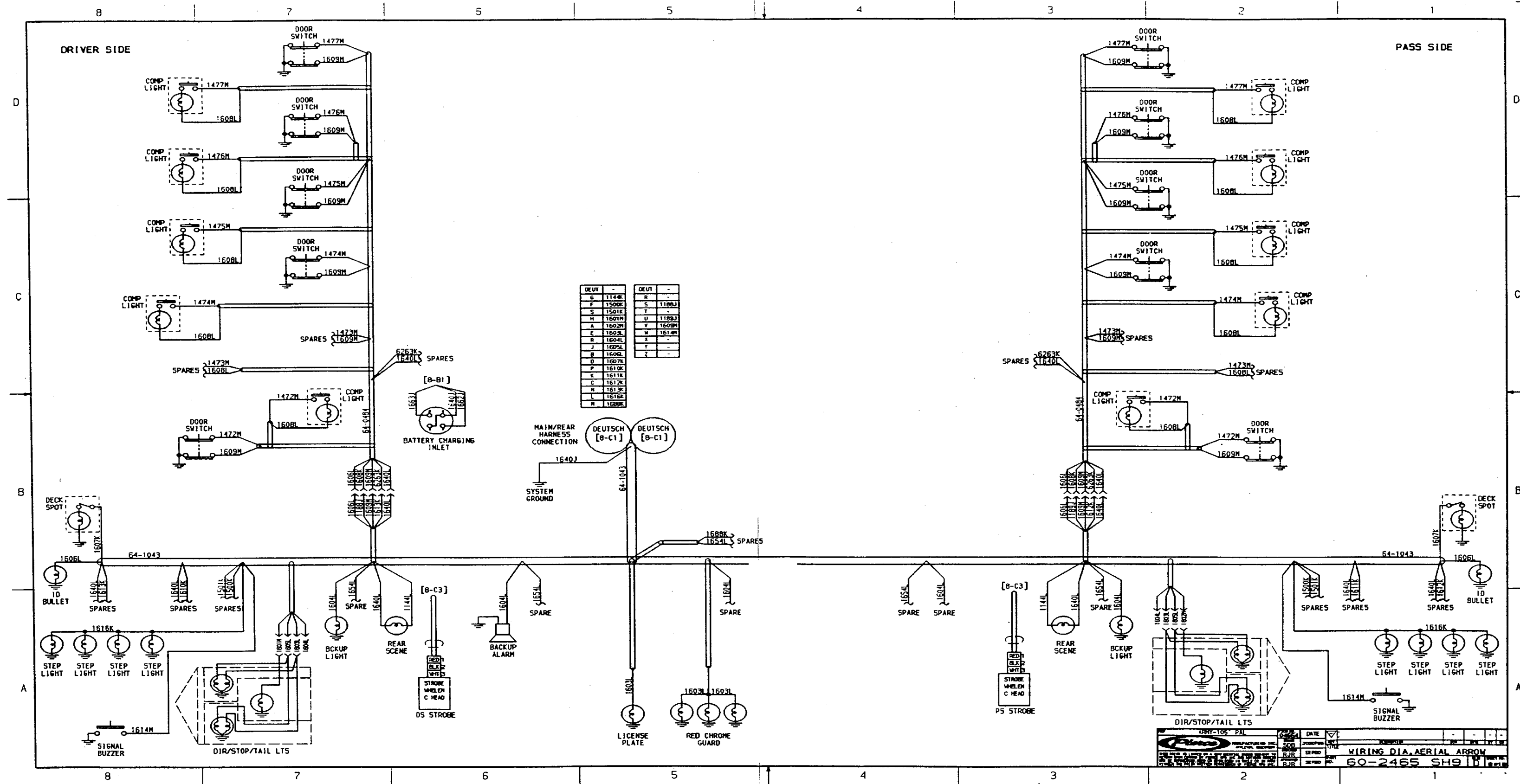


Figure H-1. Electrical Wiring Diagrams (Sheet 9 of 17)

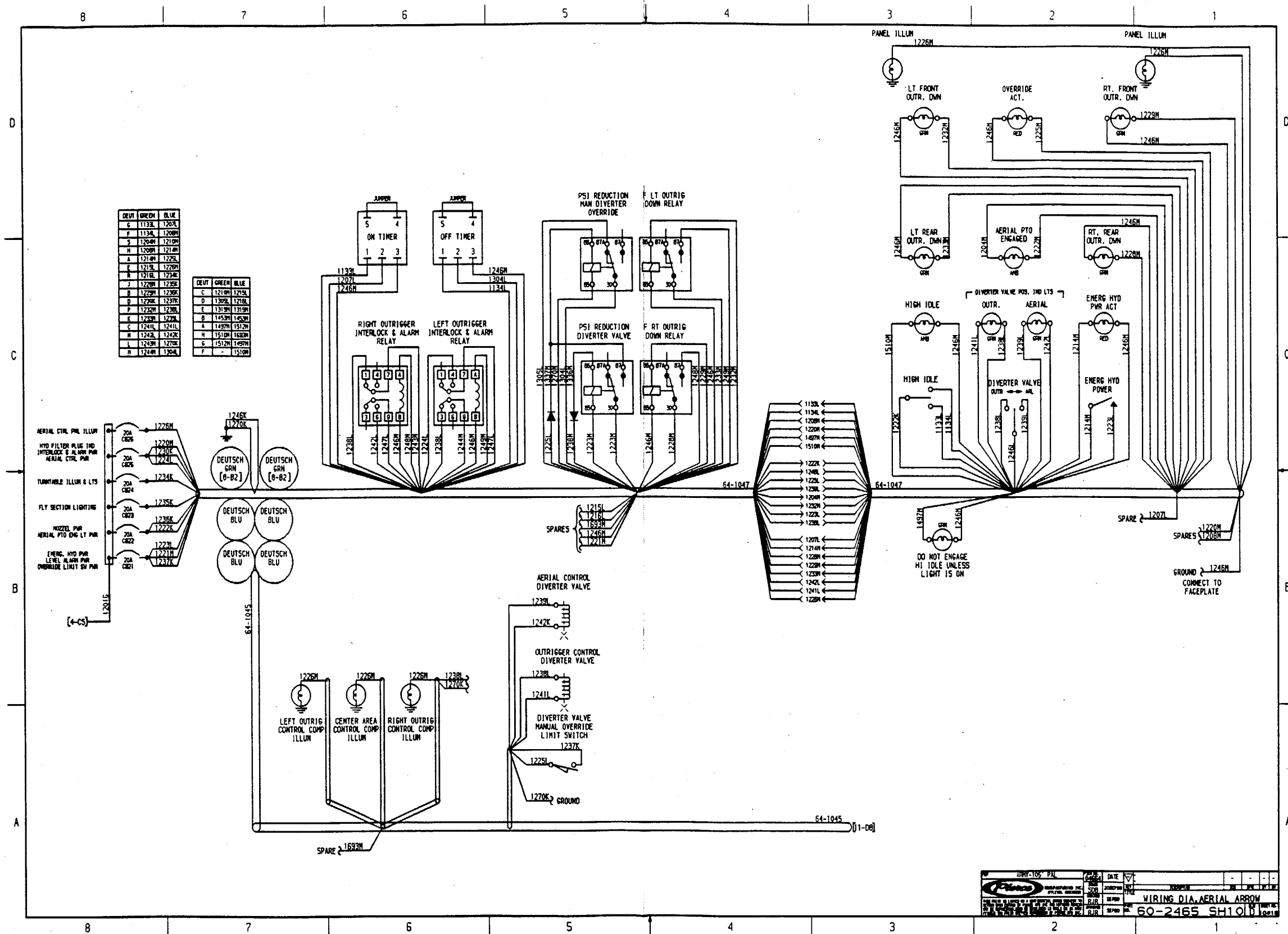
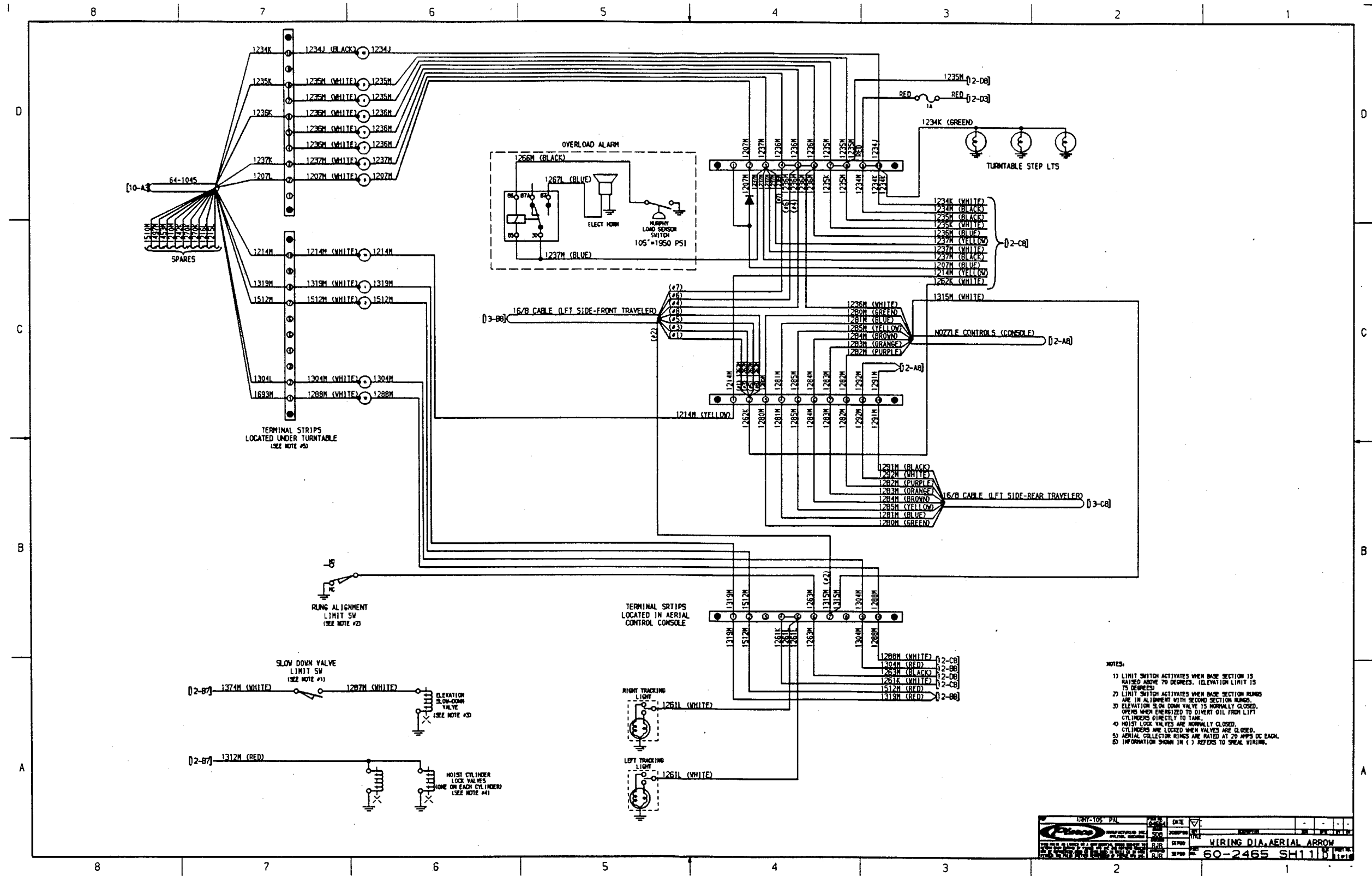
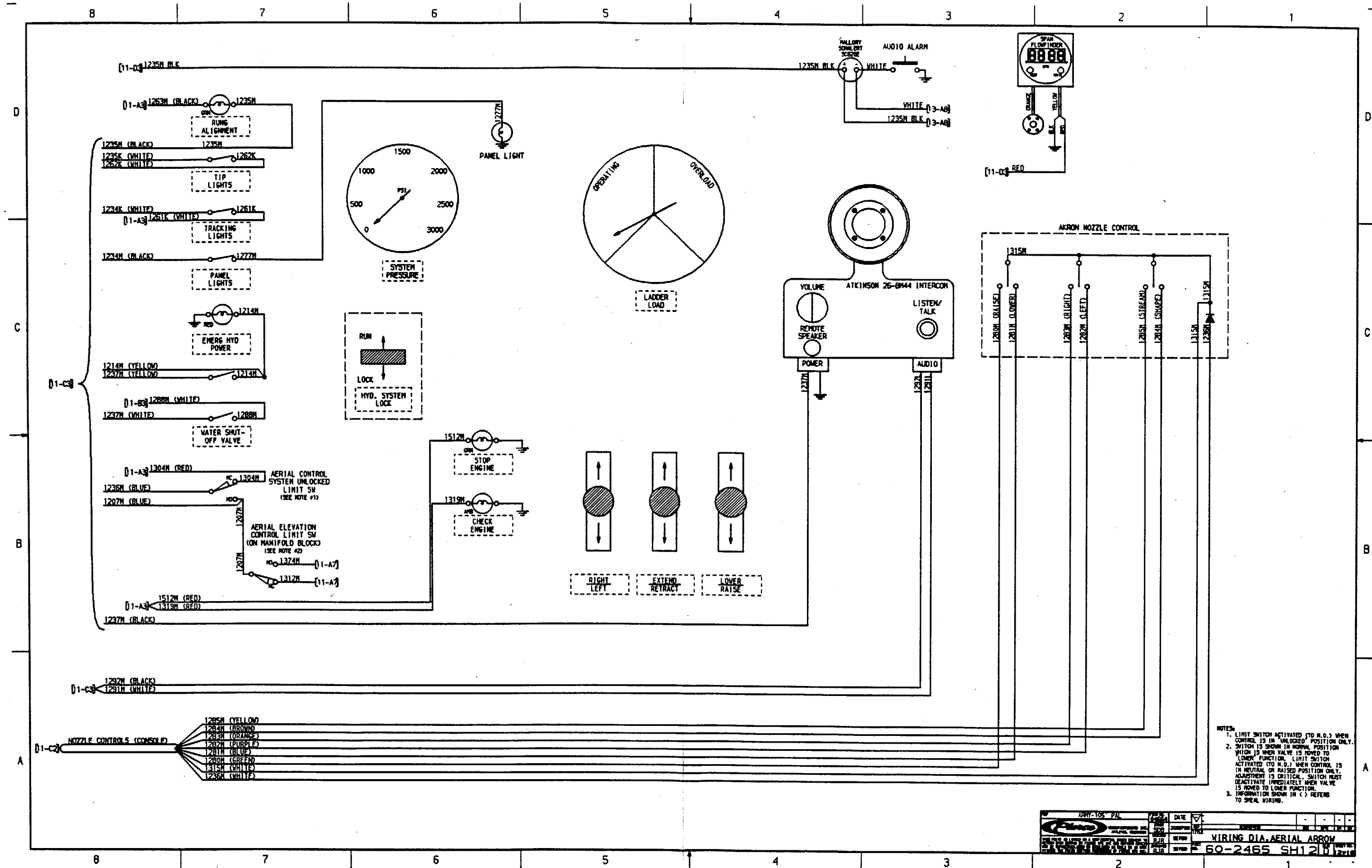


Figure H-1. Electrical Wiring Diagrams (Sheet 10 of 17)

H-21/(H-22 Blank)

FORM 105-PL	DATE	7/
WIRING DIA. AERIAL ARROW	60-2465 SH10	





NOTES:
 1. LIMIT SWITCH ACTIVATED (TO N.O.) WHEN CONTROL IS IN 'UNLOCKED' POSITION ONLY.
 2. SWITCH IS SHOWN IN NORMAL POSITION WHICH IS WHEN VALVE IS TOWED TO LOWER FUNCTION. LIMIT SWITCH ACTIVATED (TO N.O.) WHEN CONTROL IS IN NEUTRAL OR RAISED POSITION ONLY. ADJUSTMENT IS CRITICAL. SWITCH MUST DEACTIVATE IMMEDIATELY WHEN VALVE IS TOWED TO LOWER FUNCTION.
 3. INFORMATION SHOWN IN () REFERS TO SPECIAL WIRING.

APP'D	DATE	REV	DATE	REV
WIRING DIA. AERIAL ARROW				
60-2465 SH121				

Figure H-1. Electrical Wiring Diagrams (Sheet 12 of 17)

H-25/(H-26 Blank)

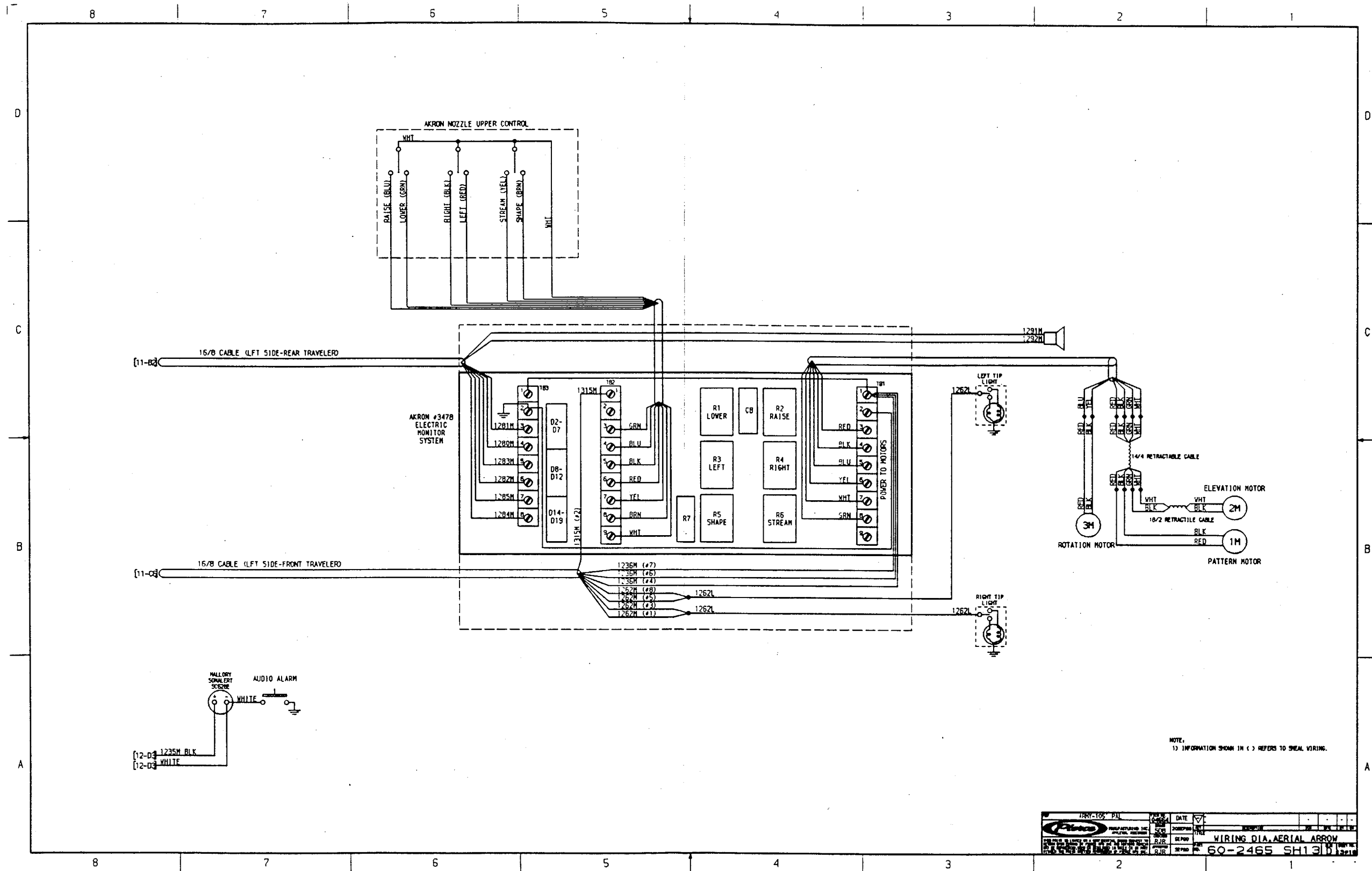


Figure H-1. Electrical Wiring Diagrams (Sheet 13 of 17)

H-27/(H-28 Blank)

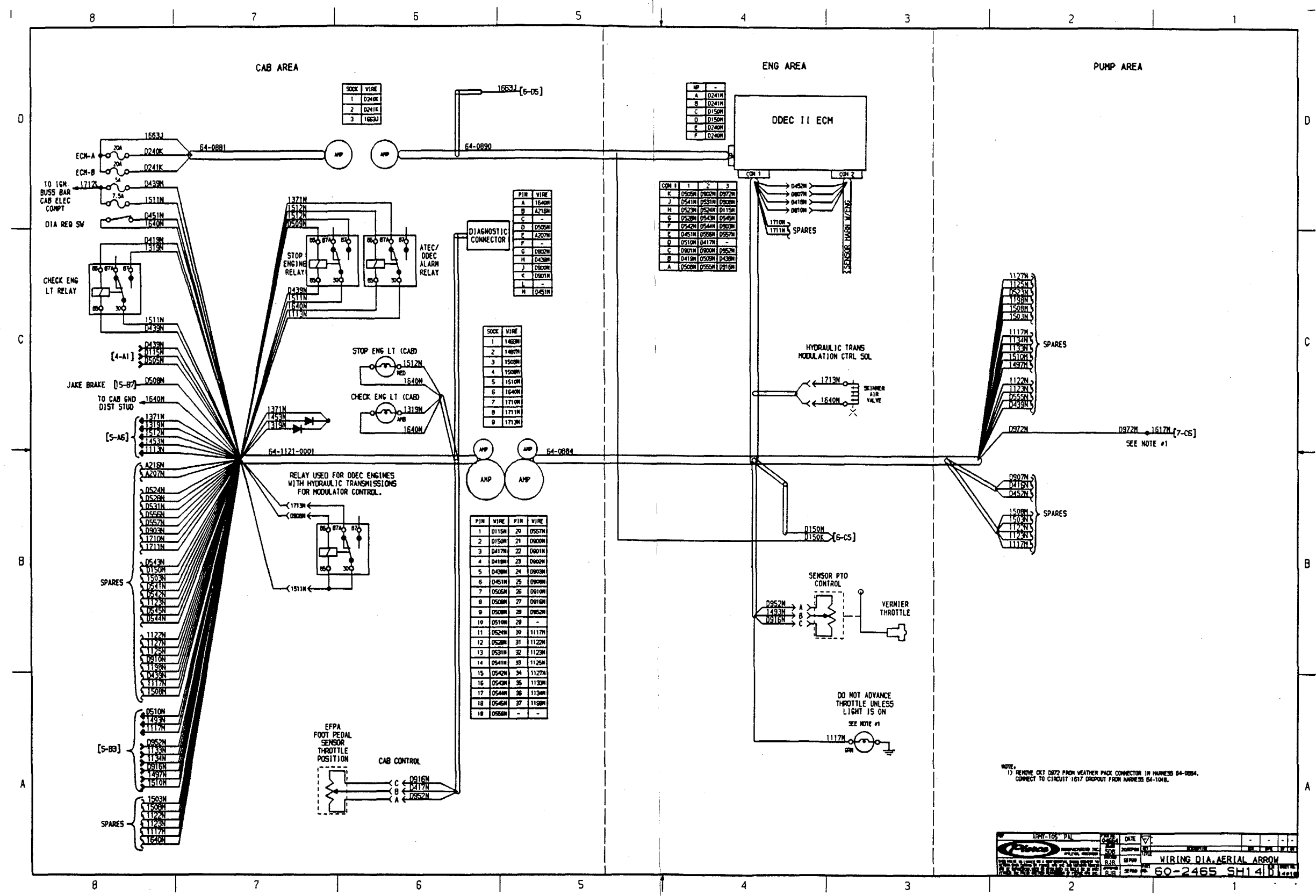


Figure H-1. Electrical Wiring Diagrams (Sheet 14 of 17)

DATE	1947-10-21	BY	W. J. ...
REVISION		BY	
WIRING DIA. AERIAL ARROW			
60-2465 SH1410			

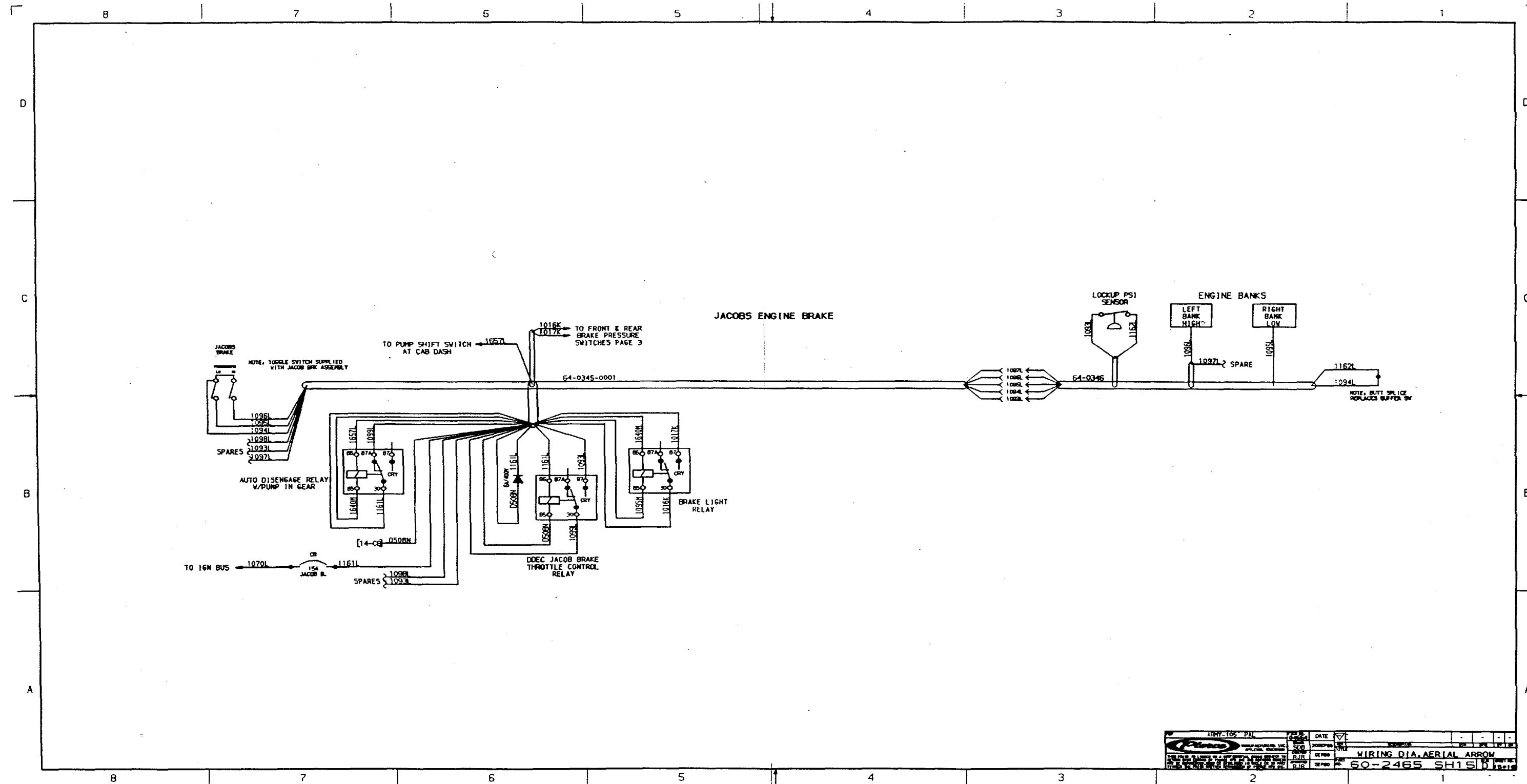


Figure H-1. Electrical Wiring Diagrams (Sheet 15 of 17)

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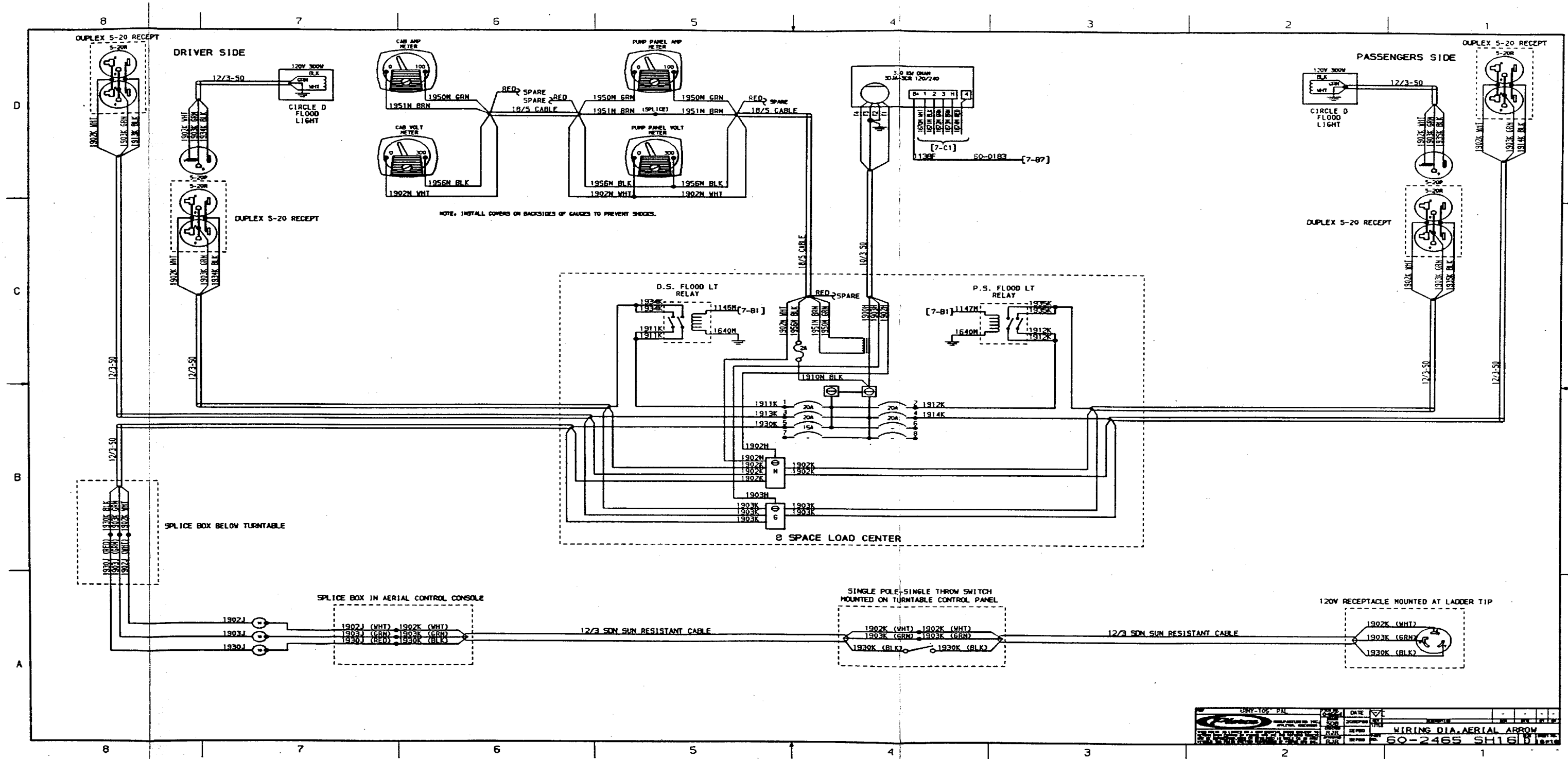


Figure H-1. Electrical Wiring Diagrams (Sheet 16 of 17)

H-33/(H-34 Blank)

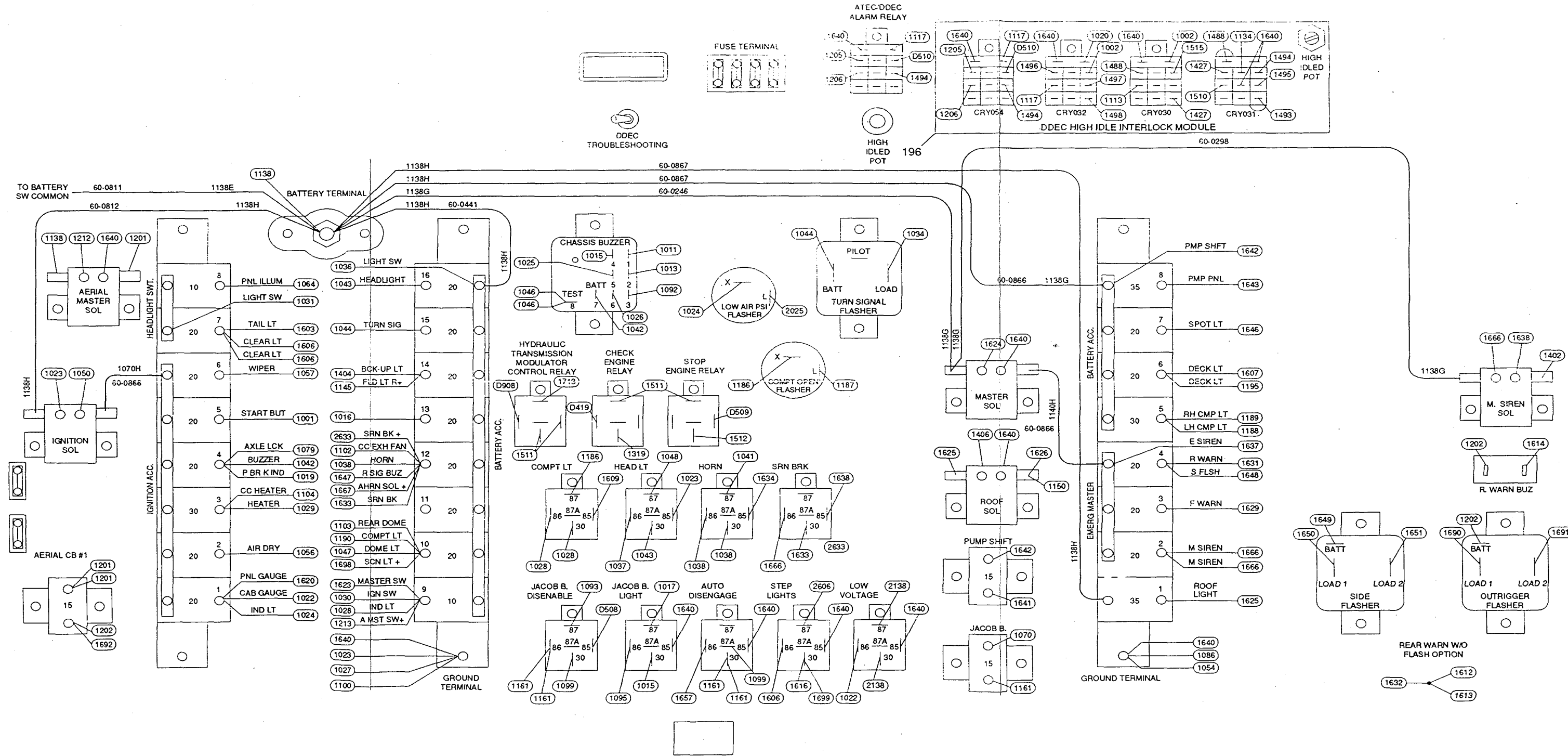
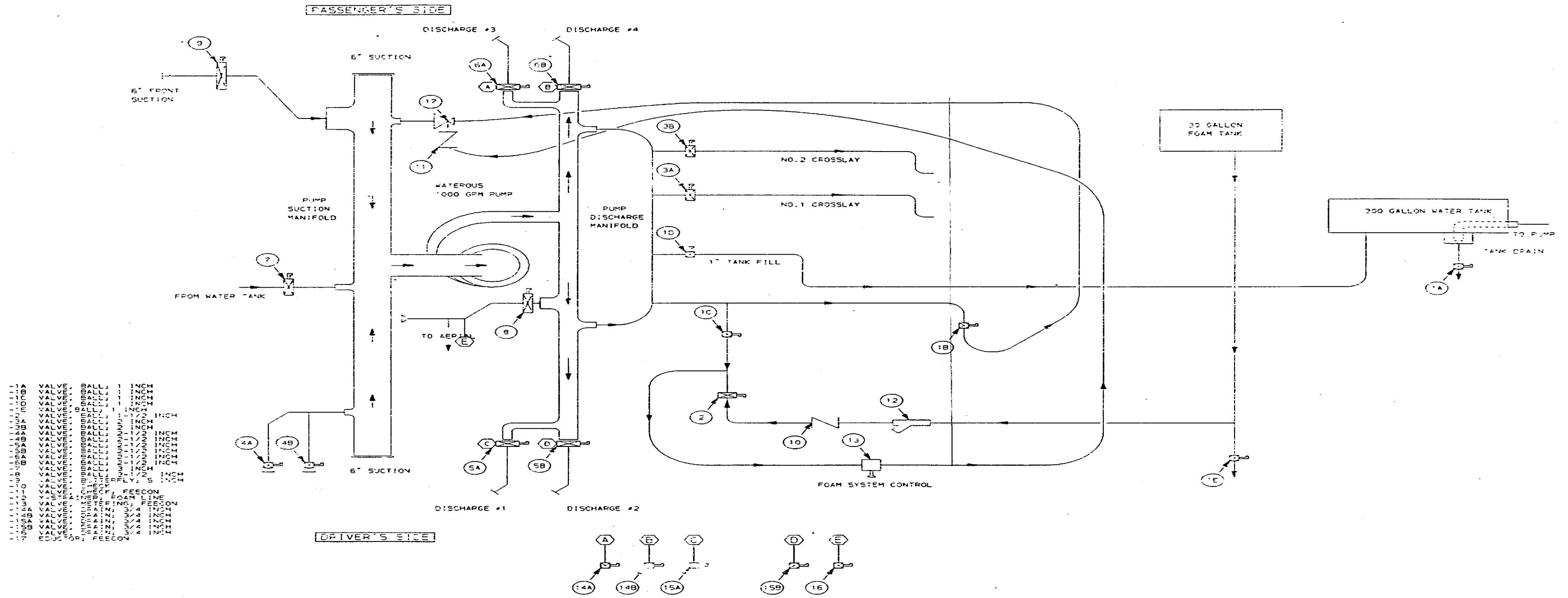


Figure H-1. Electrical Wiring Diagrams (Sheet 17 of 17)

H-35/(H-36 Blank)

APPENDIX I
WATER/FOAM SYSTEM PIPING

I-1(I-2 Blank)



1	VALVE	BALL	1	INCH
1A	VALVE	BALL	1	INCH
1B	VALVE	BALL	1	INCH
1C	VALVE	BALL	1	INCH
1D	VALVE	BALL	1	INCH
1E	VALVE	BALL	1	INCH
2	VALVE	BALL	1	INCH
3A	VALVE	BALL	1	INCH
3B	VALVE	BALL	1	INCH
4A	VALVE	BALL	1	INCH
4B	VALVE	BALL	1	INCH
5A	VALVE	BALL	1	INCH
5B	VALVE	BALL	1	INCH
6A	VALVE	BALL	1	INCH
6B	VALVE	BALL	1	INCH
7	VALVE	BALL	1	INCH
8	VALVE	BALL	1	INCH
9	VALVE	BALL	1	INCH
10	VALVE	BALL	1	INCH
11	VALVE	BALL	1	INCH
12	VALVE	BALL	1	INCH
13	VALVE	BALL	1	INCH
14A	VALVE	BALL	1	INCH
14B	VALVE	BALL	1	INCH
15A	VALVE	BALL	1	INCH
15B	VALVE	BALL	1	INCH
16	VALVE	BALL	1	INCH
17	VALVE	BALL	1	INCH

Figure I-1. Water Foam Piping

I-31/(I-4 Blank)

APPENDIX J
HYDRAULIC SYSTEM SCHEMATICS

J-1/(J-2 Blank)

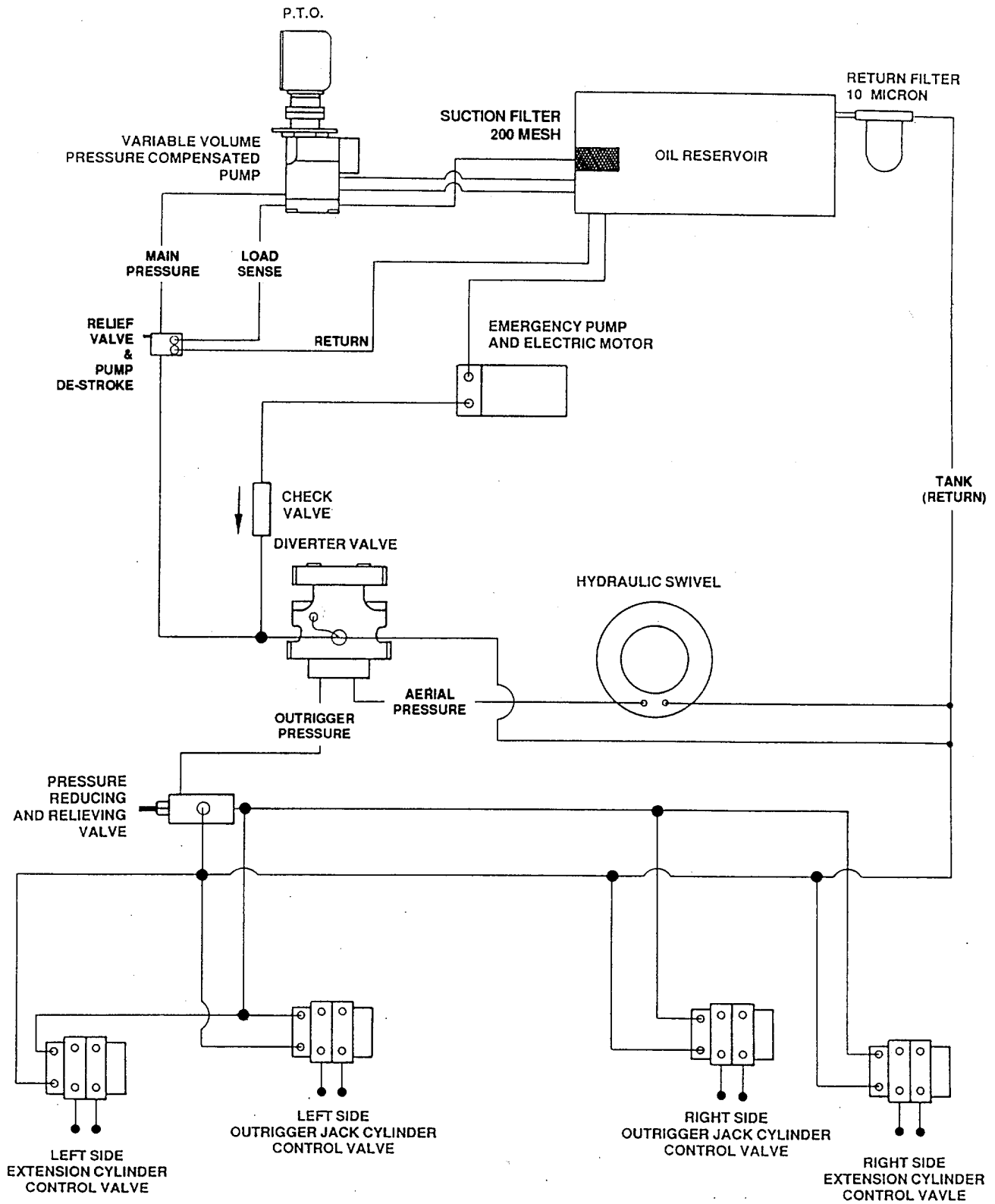


Figure J-1. Aerial Ladder Main Pump and Emergency Pump Hydraulic System

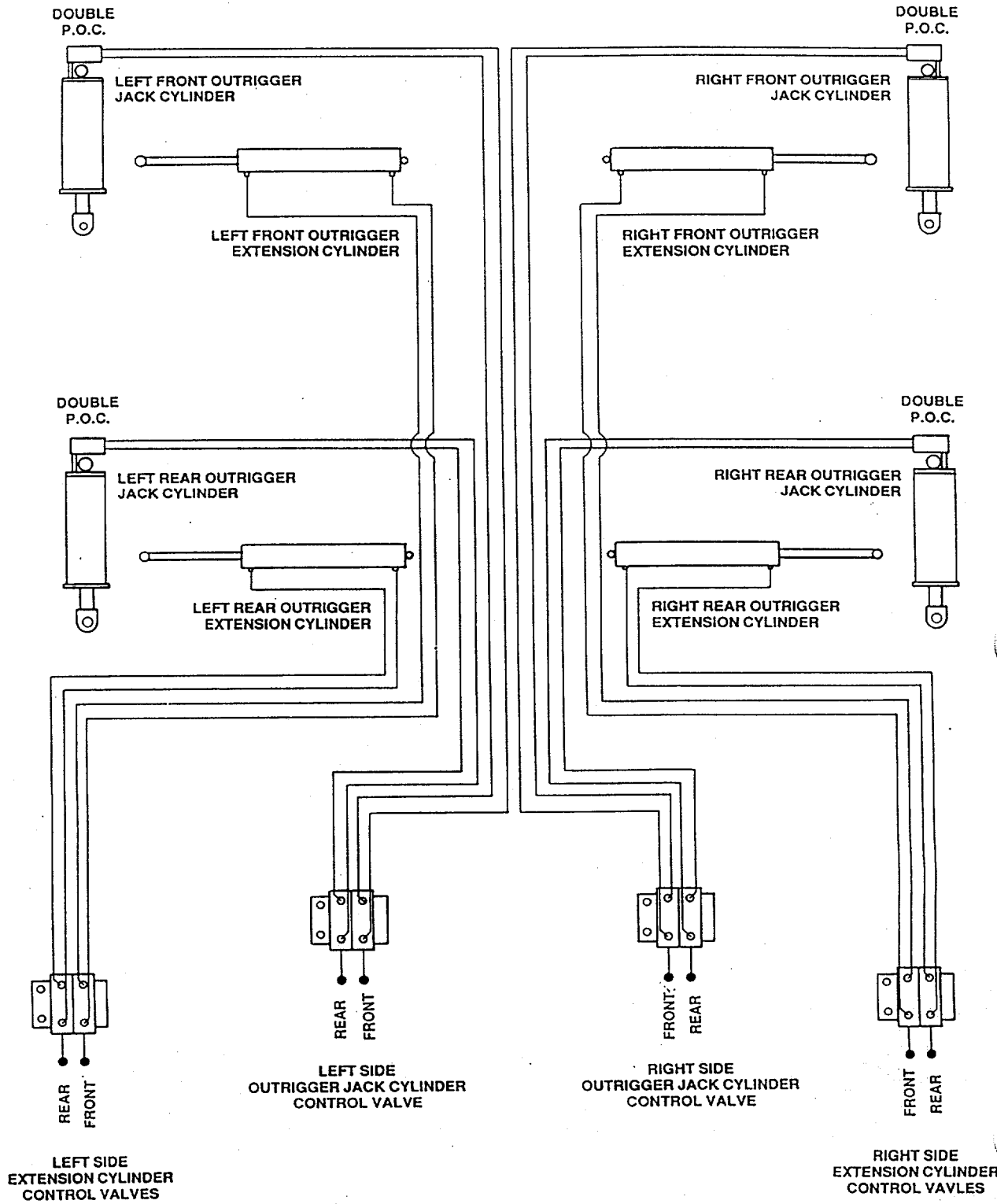


Figure J-2. Aerial Ladder Outrigger Control valve Hydraulic System

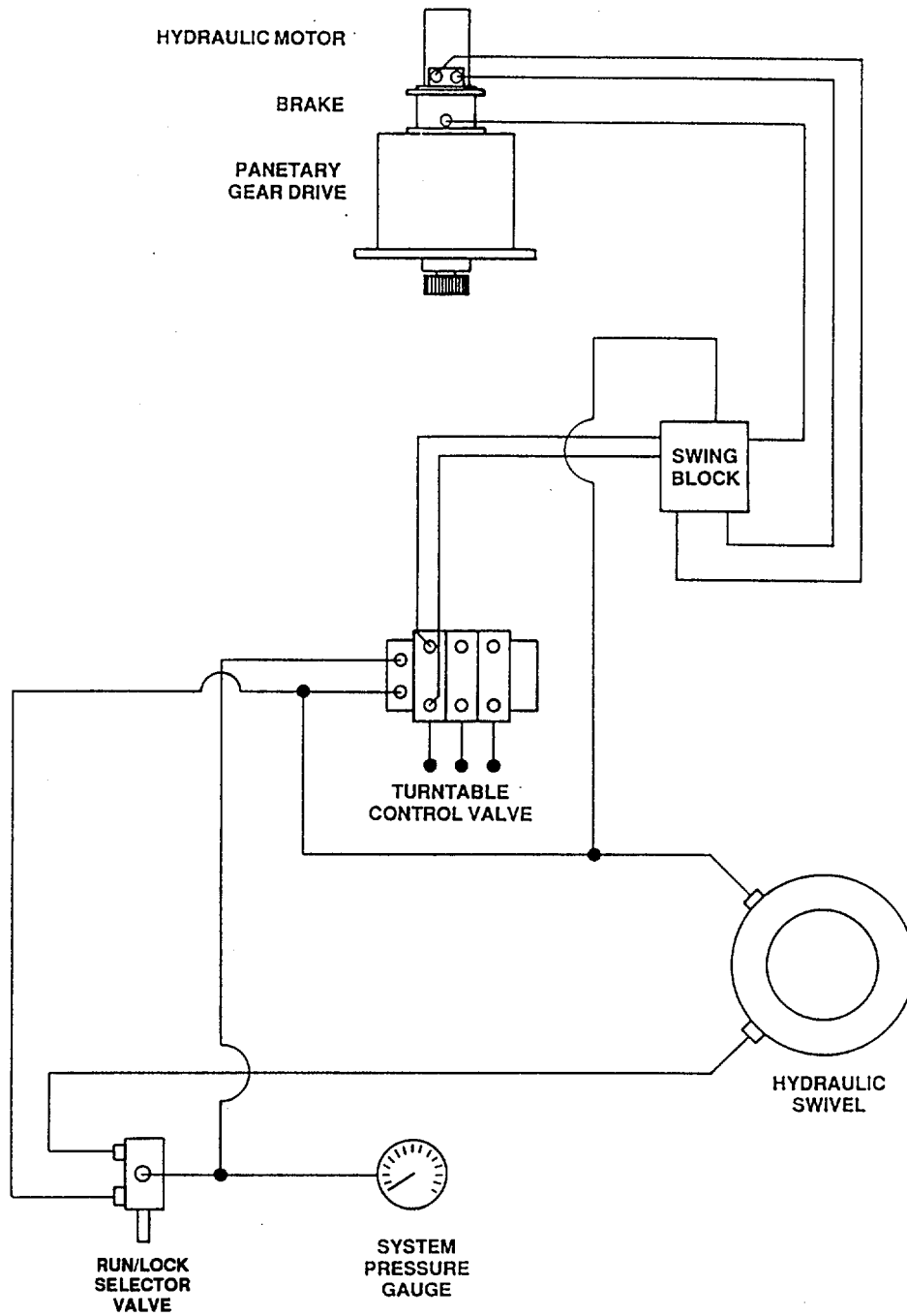


Figure J-3. Aerial Ladder Turntable Controls Hydraulic Rotation System

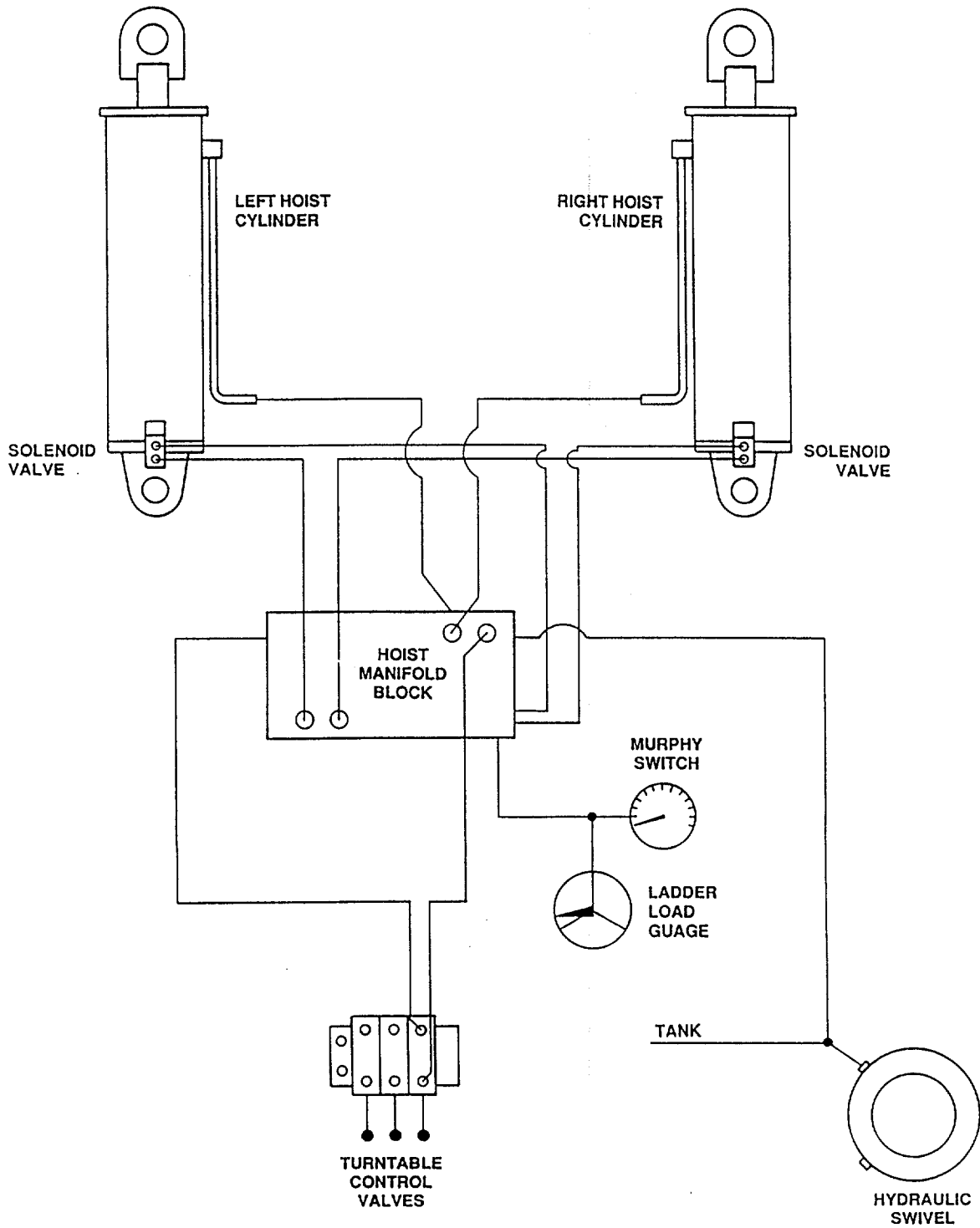


Figure J-4. Aerial Ladder Turntable Controls Ladder Elevation System

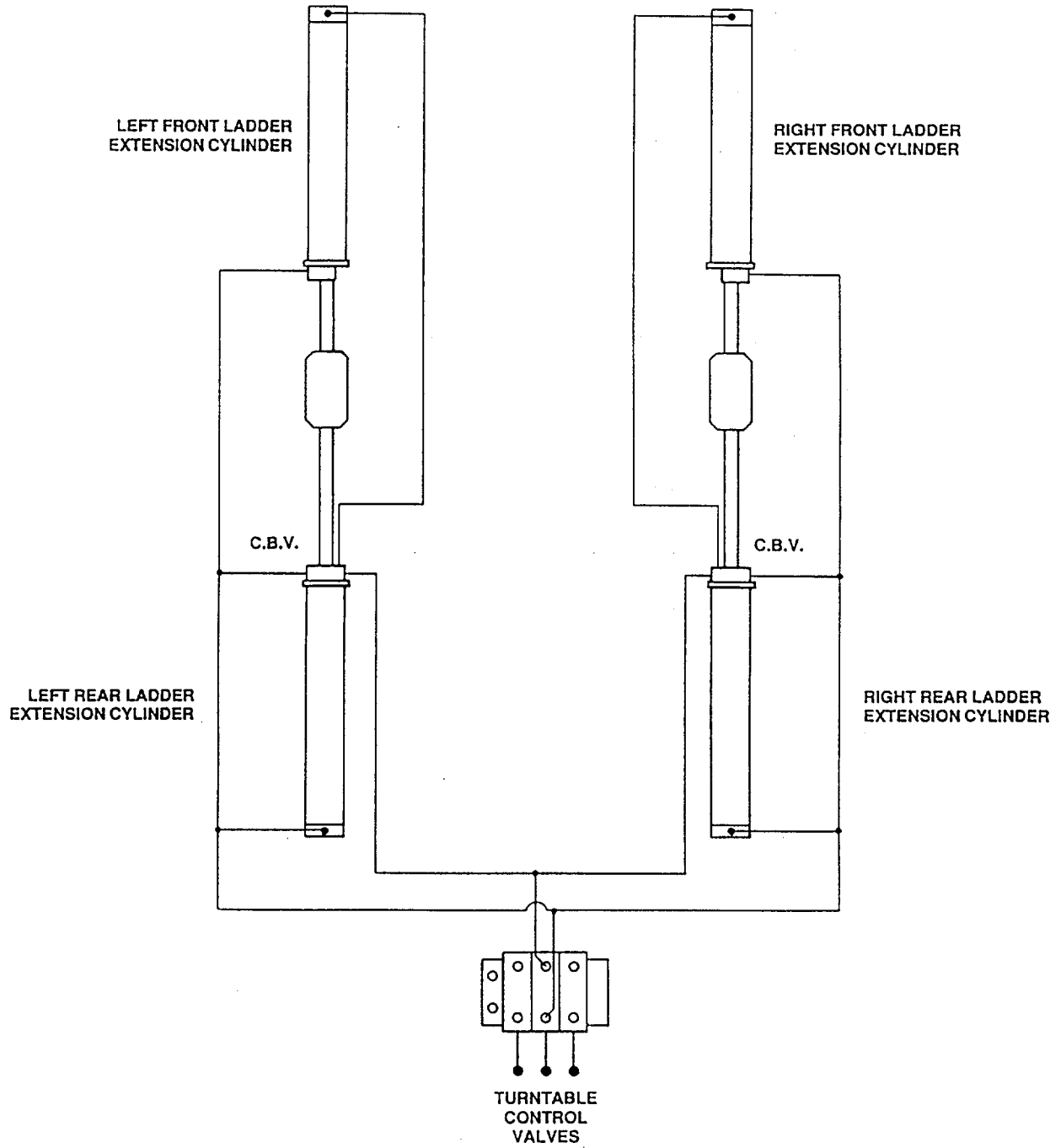


Figure J-5. Aerial Ladder Turntable Controls Ladder Extension System

J-7/(J-8 Blank)

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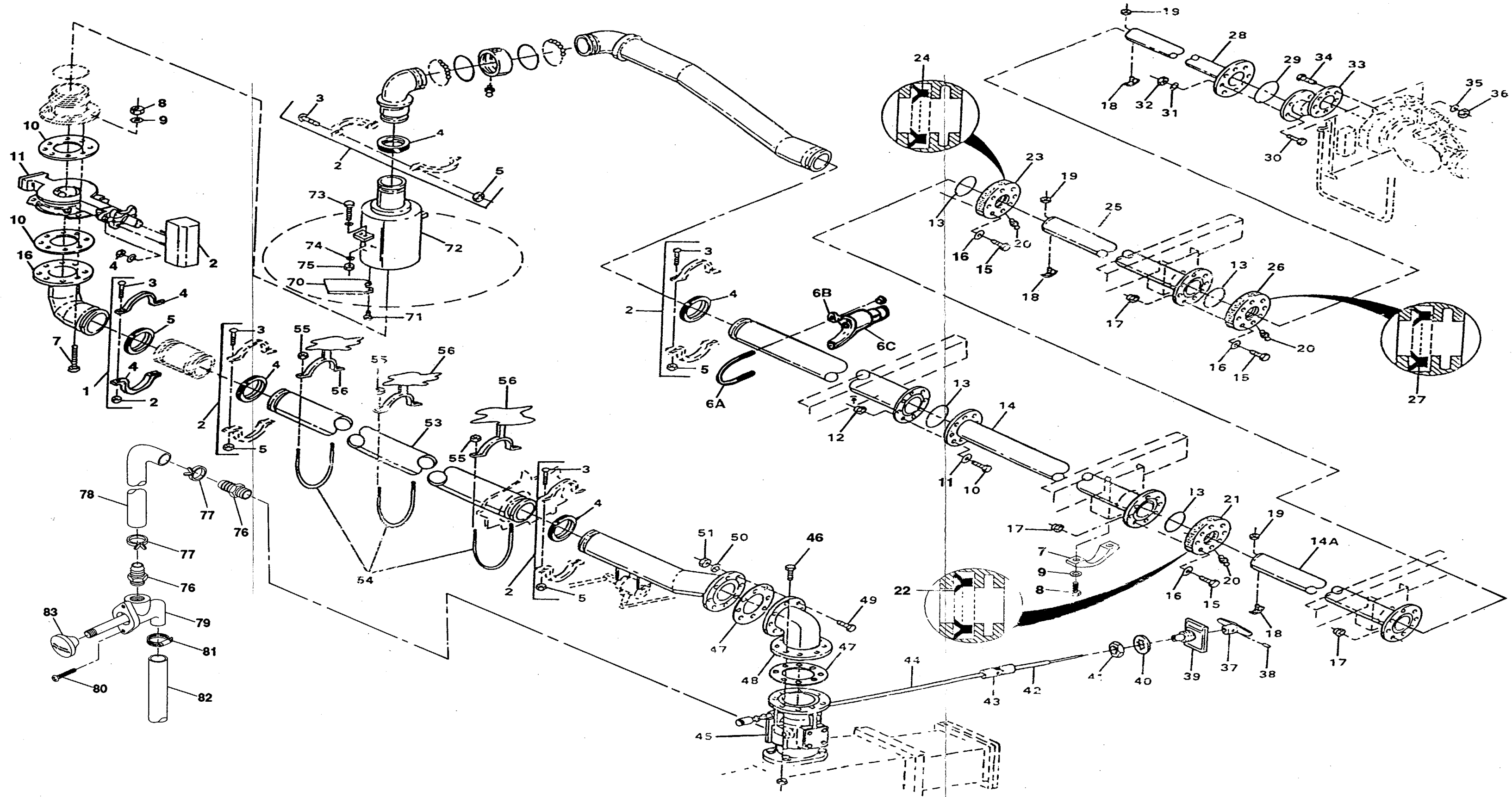


FIGURE F-23. AERIAL WATERWAY PIPING

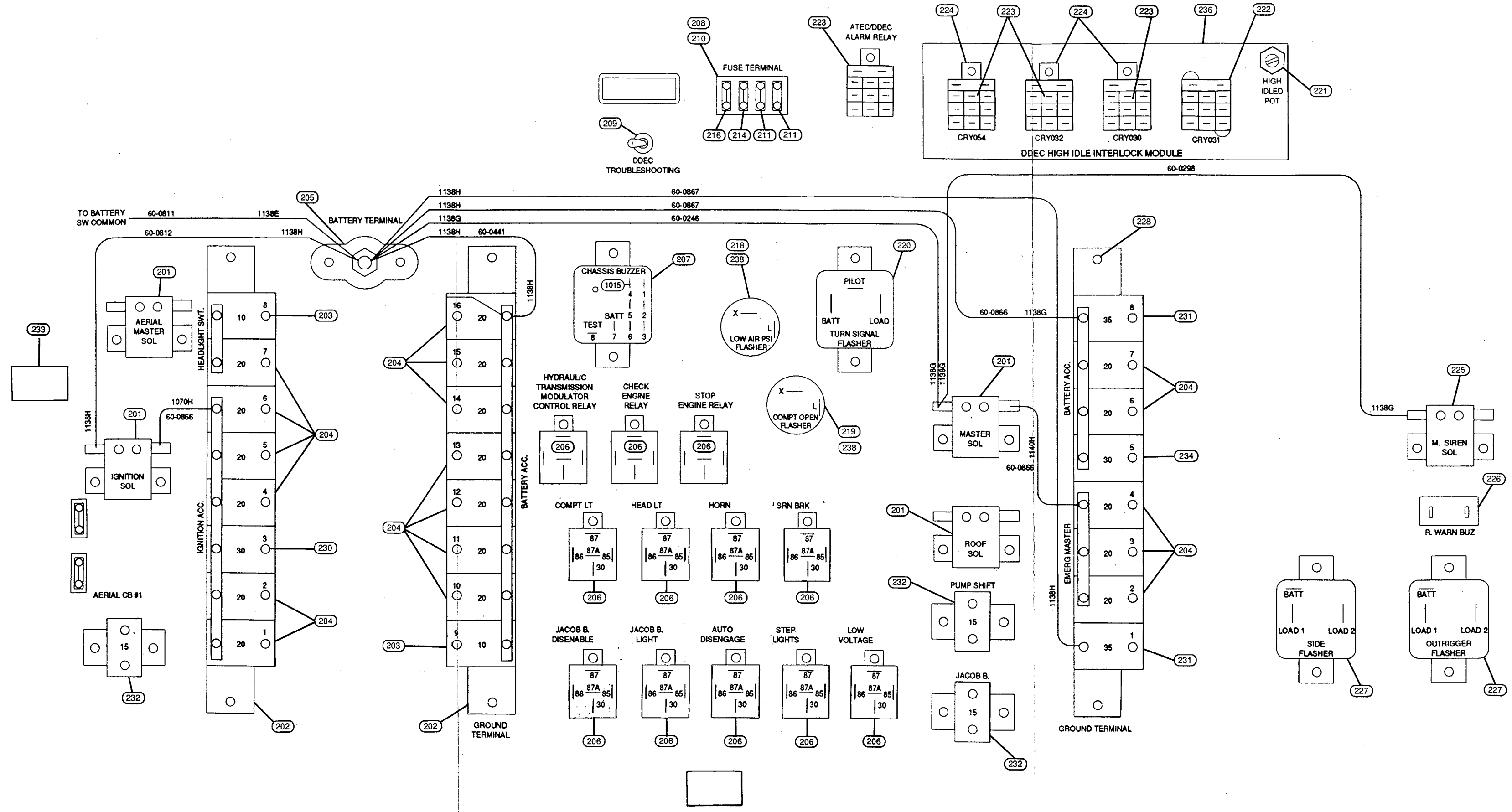


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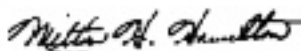
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<p>PAGE NO.</p>	<p>PARA-GRAPH</p>	<p>FIGURE NO.</p>	<p>TABLE NO.</p>
<p>IN THIS SPACE, TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT.</p>			
<p>PRINTED NAME, GRADE OR TITLE AND TELEPHONE NUMBER</p>			<p>SIGN HERE</p>

TEAR ALONG PERFORATED LINE

DA FORM 1 JUL 79 2028-2

PREVIOUS EDITIONS ARE OBSOLETE.

P.S.--IF YOUR OUTFIT WANTS TO KNOW ABOUT YOUR RECOMMENDATION MAKE A CARBON COPY OF THIS AND GIVE IT TO YOUR HEADQUARTERS.

The Metric System and Equivalents

Linear Measure

1 centimeter = 10 millimeters = .39 inch
 1 decimeter = 10 centimeters = 3.94 inches
 1 meter = 10 decimeters = 39.37 inches
 1 dekameter = 10 meters = 32.8 feet
 1 hectometer = 10 dekameters = 328.08 feet
 1 kilometer = 10 hectometers = 3,280.8 feet

Weights

1 centigram = 10 milligrams = .15 grain
 1 decigram = 10 centigrams = 1.54 grains
 1 gram = 10 decigrams = .035 ounce
 1 dekagram = 10 grams = .35 ounce
 1 hectogram = 10 dekagrams = 3.52 ounces
 1 kilogram = 10 hectograms = 2.2 pounds
 1 quintal = 100 kilograms = 220.46 pounds
 1 metric ton = 10 quintals = 1.1 short tons

Liquid Measure

1 centiliter = 10 milliliters = .34 fl. ounce
 1 deciliter = 10 centiliters = 3.38 fl. ounces
 1 liter = 10 deciliters = 33.81 fl. ounces
 1 dekaliter = 10 liters = 2.64 gallons
 1 hectoliter = 10 dekaliters = 26.42 gallons
 1 kiloliter = 10 hectoliters = 264.18 gallons

Square Measure

1 sq. centimeter = 100 sq. millimeters = .155 sq. inch
 1 sq. decimeter = 100 sq. centimeters = 15.5 sq. inches
 1 sq. meter (centare) = 100 sq. decimeters = 10.76 sq. feet
 1 sq. dekameter (are) = 100 sq. meters = 1,076.4 sq. feet
 1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47 acres
 1 sq. kilometer = 100 sq. hectometers = .386 sq. mile

Cubic Measure

1 cu. centimeter = 1000 cu. millimeters = .06 cu. inch
 1 cu. decimeter = 1000 cu. centimeters = 61.02 cu. inches
 1 cu. meter = 1000 cu. decimeters = 35.31 cu. feet

Approximate Conversion Factors

To change	To	Multiply by	To change	To	Multiply by
inches	centimeters	2.540	ounce-inches	newton-meters	.007062
feet	meters	.305	centimeters	inches	.394
yards	meters	.914	meters	feet	3.280
miles	kilometers	1.609	meters	yards	1.094
square inches	square centimeters	6.451	kilometers	miles	.621
square feet	square meters	.093	square centimeters	square inches	.155
square yards	square meters	.836	square meters	square feet	10.764
square miles	square kilometers	2.590	square meters	square yards	1.196
acres	square hectometers	.405	square kilometers	square miles	.386
cubic feet	cubic meters	.028	square hectometers	acres	2.471
cubic yards	cubic meters	.765	cubic meters	cubic feet	35.315
fluid ounces	milliliters	29.573	cubic meters	cubic yards	1.308
pints	liters	.473	milliliters	fluid ounces	.034
quarts	liters	.946	liters	pints	2.113
gallons	liters	3.785	liters	quarts	1.057
ounces	grams	28.349	liters	gallons	.264
pounds	kilograms	.454	grams	ounces	.035
short tons	metric tons	.907	kilograms	pounds	2.205
pound-feet	newton-meters	1.356	metric tons	short tons	1.102
pound-inches	newton-meters	.11296			

Temperature (Exact)

°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C
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