POWER STEERING VANE TYPE PUMP

CONTENTS OF THIS SECTION

GENERAL DESCRIPTION

The power steering pump has an outlet capacity of (L-6) 1.25 gal. per min., (V-8) 1.75 gal. per min. at idle. It is mounted on the engine and driven by a belt from the crankshaft harmonic balancer.

The component parts of the power steering pump are encased in a reservoir, Fig. 9A-34, filled with oil used for the power steering gear. The reservoir has a filler neck with a vented cap and is fastened to the pump housing, leaving only the housing face and shaft hub exposed.

A pump housing within the reservoir houses a babbitt bushing and a shaft seal, and has two openings from the rear side. The larger of these openings has two dowel pins in the pump inner face that hold the functional parts of the pump: the thrust plate, rotor ring (which contains the rotor and vanes) and the pressure plate. The smaller opening houses a flow control valve and spring.

THRUST PLATE

The thrust plate is located adjacent to the inner face of the pump housing. One side of the thrust plate performs the function of taking the rearward shaft thrust. The other side consists of six crescent or kidney-shaped cavities and two openings at the plate sides and opposite each other (Fig. 9A-35).

Four of the crescent-shaped cavities are located around the drive shaft hole (but are not connected with each other) and are for undervane oil pressure. The other two cavities are for discharging the oil under pressure into a high pressure area that provides oil for the gear. These two cavities are in line with the two crossover holes in the pump ring which feed high pressure (discharging) oil through the pressure plate into the high pressure area to provide oil requirements as called for by the steering gear.

The two openings diametrically opposite from each other are for intake of oil from the suction part of the pump.

PUMP RING

The pump ring is a flat plate with a cam surface center opening. This ring encompasses the rotor and vanes and is located adjacent to the face of the thrust plate on the same two dowel pins that retain the thrust plate. The rotor is loosely splined to the pump drive shaft and turns with the shaft. Ten slots for vanes are evenly spaced around the rotor and extend from the rotor outer diameter inward to the center approximately 13/32" deep.

PRESSURE PLATE

The pressure plate contains six holes that extend through the plate and two cavities. Four of the holes around the drive shaft hole are connected to high pressure oil. This oil is used to supply oil pressure to the vanes to insure their following the cam surface in the pump ring. The other two holes are for discharging the oil under pressure to the high pressure area for gear use.

The two cavities are radially open to the suction part of the pump and intake oil flows through these openings.

RESERVOIR

The reservoir is an oil storage space and provides a means of directing the return oil back to the pump.

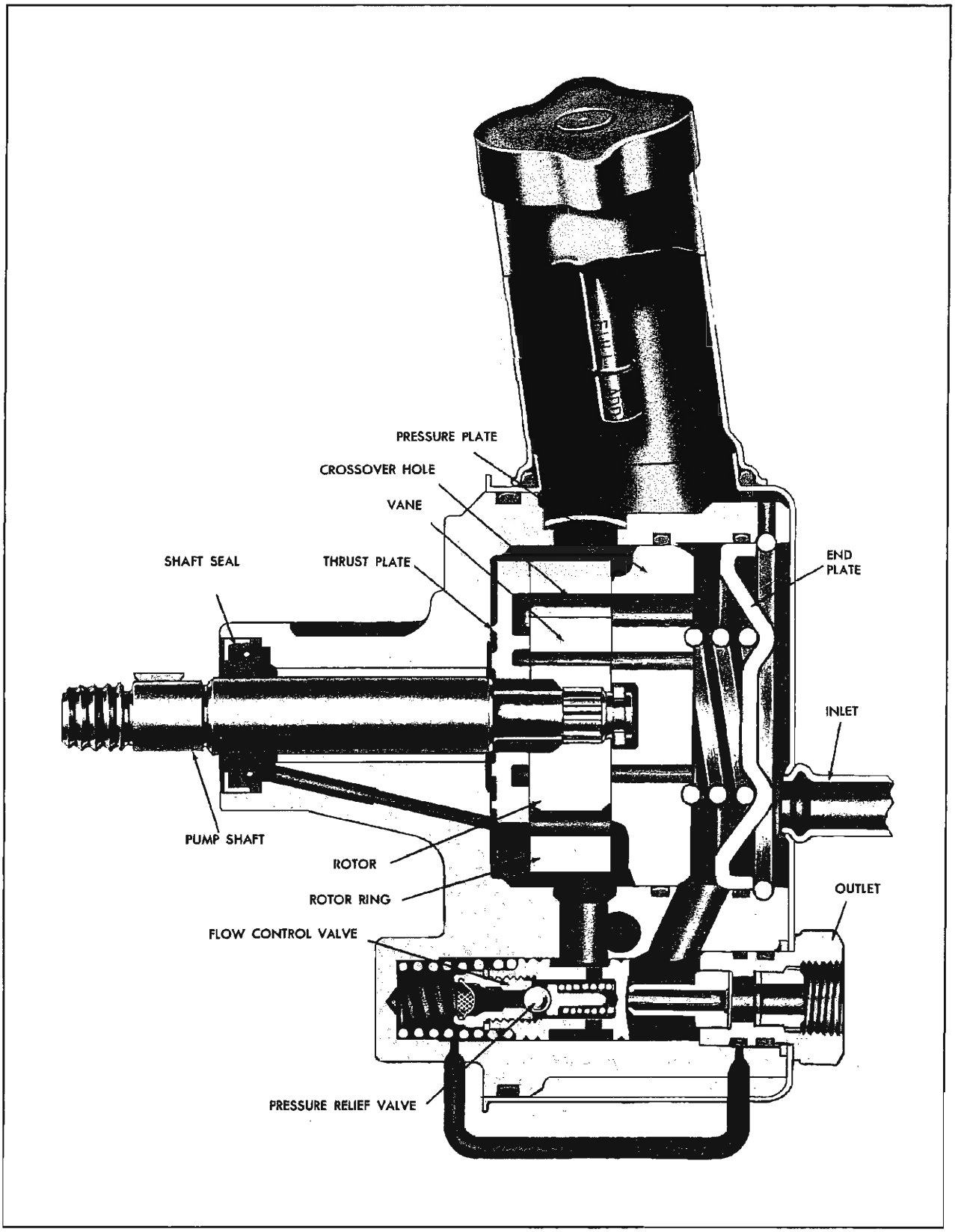


Fig. 9A-34 Power Steering Pump

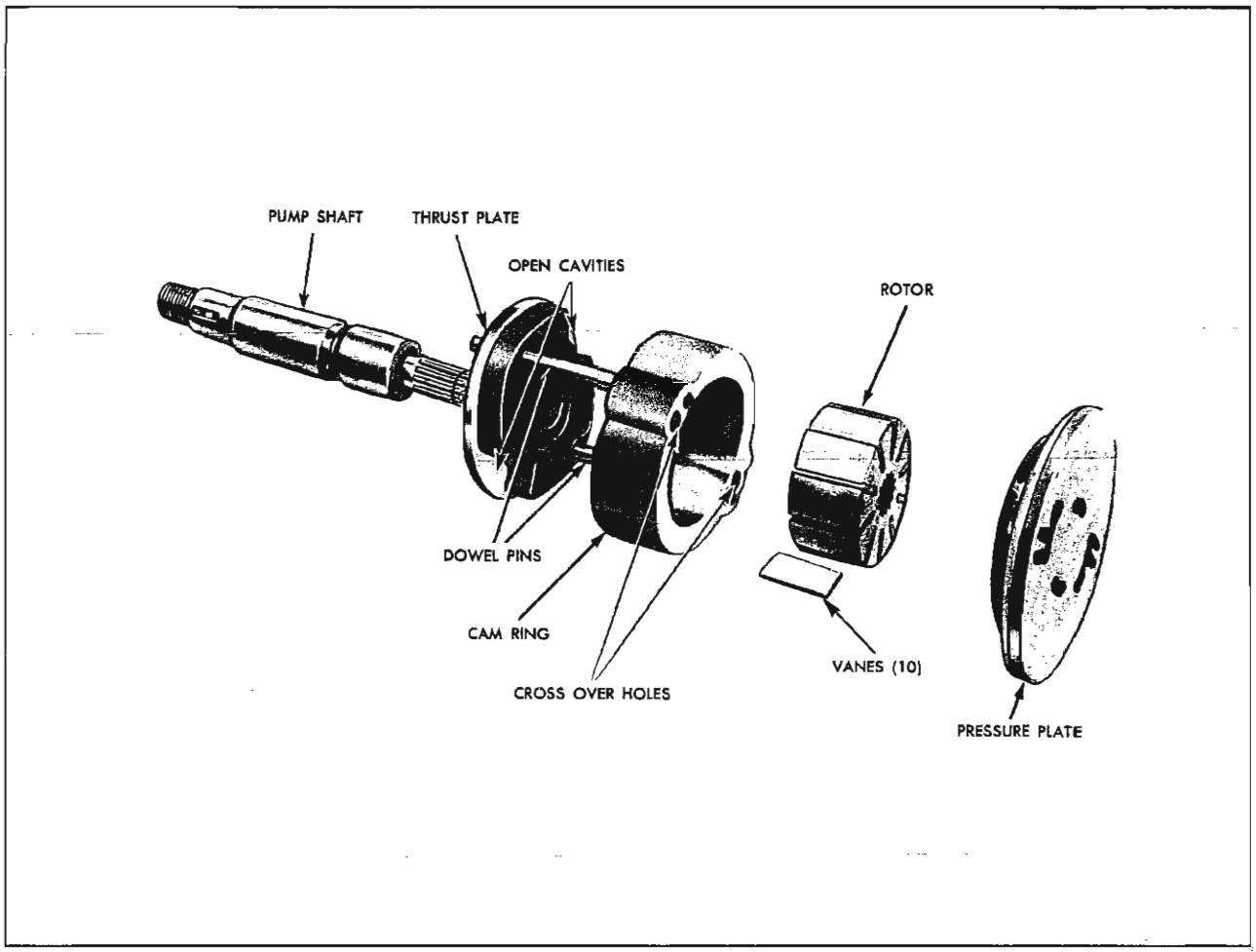


Fig. 9A-35 Power Steering Pump Components

DRIVE SHAFT

The pump drive shaft is belt-driven by the crankshaft harmonic balancer and extends through all the major parts mentioned above except the pressure plate. The pump shaft rotates at a pump to engine ratio of 1.24.

FLOW CONTROL VALVE

The purpose of the flow control valve is to control power steering system pressures and thereby oil flow to the gear as required under various operating conditions.

This valve assembly consists of a plunger, plunger screw, ball check, ball check guide and ball check guide spring. A screen in the end of the plunger screw is designed to keep dirt and foreign material out of the ball check area. Selective shims are used between the plunger screw and the valve plunger as required to calibrate the flow control valve assembly (with proper pressure in the ball check valve guide spring) to permit proper relief of pressure within the pump under high pump pressure operation.

Due to selective parts controlling calibration of this valve, the flow control valve assembly is only serviced as an assembly.

OPERATION

FILLING THE PUMP AND GEAR (Fig. 9A-36)

When the pump and power steering gear are completely void of oil, adding oil to the reservoir will completely envelope the pump housing assembly which is inside the reservoir. Oil is drawn into the intake portion of the pump by suction (and weight of

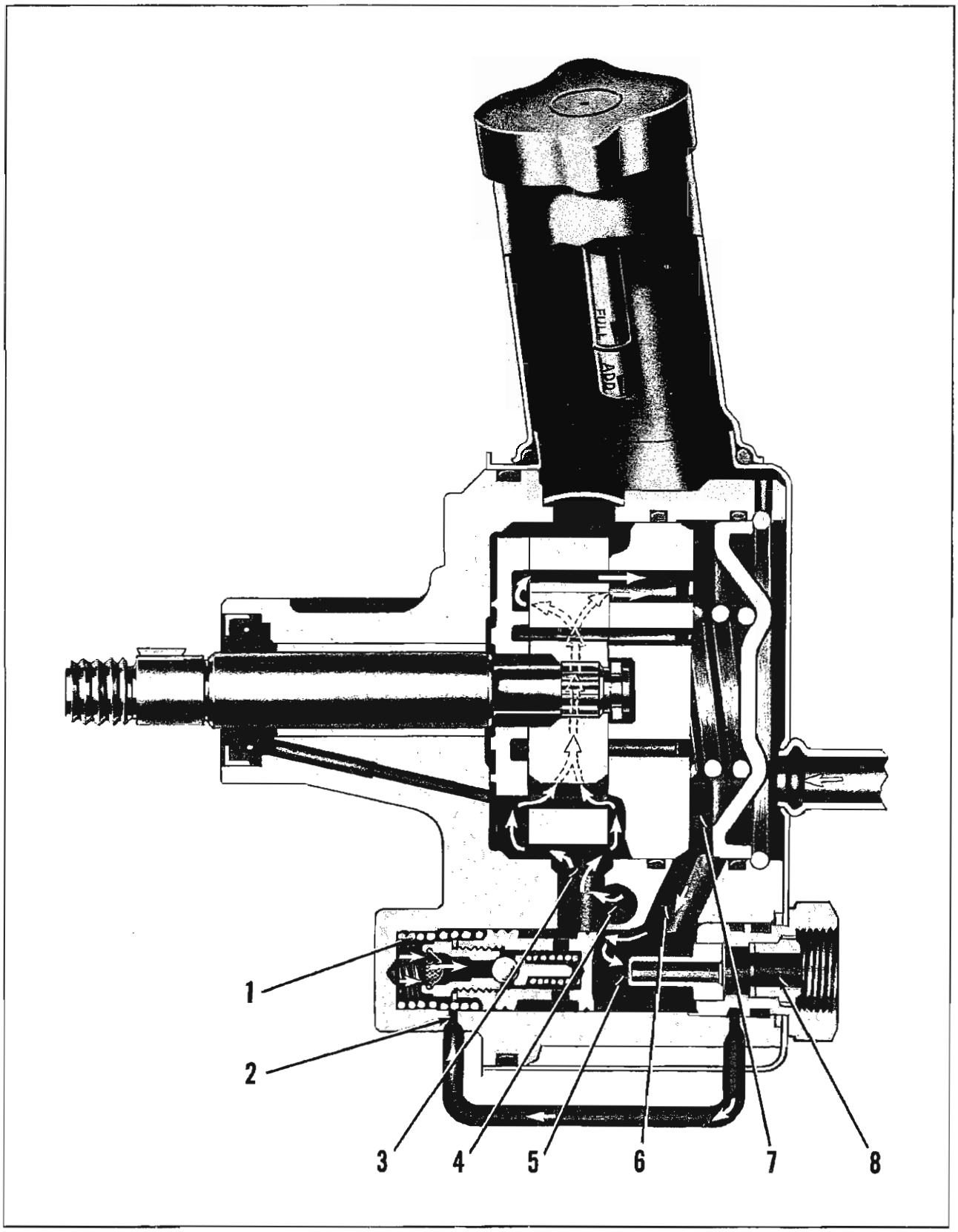


Fig. 9A-36 Oil Flow - Low Speed or Partial Turn

oil) causing it to flow through a drilled passage in the lower portion of the housing (4) to another drilled hole leading to a groove around the rotor ring (3) to tend to fill this area and also the two suction "openings" on the surfaces of the thrust plate and two suction openings in the pressure plate. Oil fills the lower opening in the thrust plate to feed the rising portion of the rotor ring. Air is pumped out of the pump through the gear oil circuit to the gear, then to return to the reservoir and out the vented cap.

As the rotor is splined to the drive shaft, it turns with the shaft and the vanes follow the cam surface machined in the pump ring. The cam is designed with two vane rising and two falling areas and, therefore causes a complete pumping cycle to occur every 180 degrees of pump drive shaft rotation. Centrifugal force throws the vanes against the ring to pick up a little oil to be forced into the high pressure area.

Some oil will leak along the pump drive shaft to the shaft seal and to the area behind the thrust plate (via drilled passages in the housing). Leakage oil past the shaft is intended for lubrication of the shaft. The bleed passage to the area behind the thrust plate prevents pressure build-up on the shaft seal.

As more and more oil is picked up by the vanes, more oil will be forced into the cavities of the thrust plate and then to flow through the two crossover holes in the rotor ring and the pressure plate, only to empty into the high pressure area of the pump between the pressure plate and the housing end plate (7).

As the high pressure area fills (7), some oil flows under the vanes through fully open crescent-shaped slots in the pressure plate while the vanes are rising to force them to follow the cam surface of the rotor ring. The two holes drilled through the crescent-shaped slots in the pressure plate are intended to restrict oil as it is forced out from under the vanes when they are falling.

When the flow controlling rotary valve in the steering gear is in the "neutral" or straight ahead, oil flows from the pump through the open center rotary valve in the gear and back to the pump reservoir without traveling through the power cylinder of the gear. At engine idle, or slightly below, the flow control valve remains closed or nearly so, because pump output is not high enough nor is oil pressure in the pump high enough to overcome the control valve spring to open the flow control valve.

When engine speed is increased, pump output and oil pressure are also increased and the flow of oil exceeds the predetermined power steering requirements. Therefore, the increase in oil pressure overcomes opposing pressure of the control valve spring to open the valve farther, which in turn lowers system pressure and also limits temperature rise in the system.

With the increase in engine rpm, oil pressure is more than adequate to supply the system requirements and overcome the force of the flow control valve spring. This allows the valve to open and direct oil to a by-pass hole, thereby diverting oil into the pump intake chamber and oil is by-passed within the pump. The by-passing of this oil is of a high velocity, discharging past the valve into the intake chamber and picks up make-up oil from the reservoir on the jet pump principle. During the straight-ahead position, pressure should not exceed approximately 100 psi.

FLOW CONTROL VALVE PRESSURE RELIEF

When the steering gear rotary valve assembly is positioned such that it is fully actuated in either direction, the flow of oil from the pump is blocked or restricted for a quick return to the pump. (This condition would occur against the wheel stops or when movement of the wheels is restricted, resulting in higher system pressures.)

In order to keep pressures and temperatures at a minimum, the pressure relief ball check is forced off its seat, allowing a small amount of oil to flow into the intake chamber. This flow of oil, passing through the valve plunger screw and the flow control valve pressure relief orifice, causes a pressure drop and resulting lower pressure at the lower end of the control valve to provide additional control of the excessive pressure in the system under these conditions. Relief pressure under maximum conditions will control between 900 and 1000 psi, depending upon volume requirements.

The flow control valve, therefore, is designed to control the power steering pump oil flow capacity to the gear under various operating conditions. At idle speed the valve is closed and opens just above idle speed. It remains open in varying degrees depending upon engine speed, and system pressures under various operating conditions. As the system requirements approach or exceed maximum pressure within the system, the ball check within the flow control valve opens to provide additional relief of pressure and oil flow to the gear.

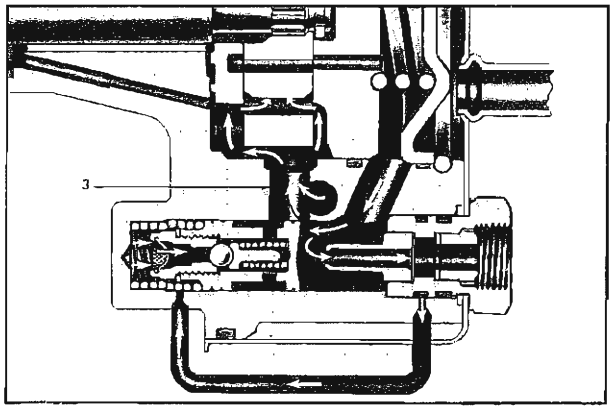


Fig. 9A-37 Oil Flow - High Speed, No Turn, Straight Ahead

OIL FLOW—LOW SPEED OR PARTIAL TURN (Fig. 9A-36)

From the high pressure chamber, the oil flows through a drilled passage (6) leading to a passage drilled through the outlet union (5). Oil is directed to the control valve through this outlet union (8). The outlet union passage also connects to the area that houses the flow control valve spring. The connecting passage is drilled in the housing and is directed to a pressure sensing orifice (2) which leads to the spring chamber behind the flow control valve (1).

When the quantity of oil displaced by the pump exceeds the predetermined steering system requirements, a pressure drop occurs and oil flows through the outlet union passage. This pressure drop is communicated to the flow control valve spring chamber. With this pressure opposing the high pressure on the face of the flow control valve and outlet union, the valve opens slightly to provide oil pressure control or relief. The external surface still allows some oil to flow through the system.

OIL FLOW—HIGH SPEED, NO TURN, STRAIGHT AHEAD (Fig. 9A-37)

When operating at moderate and high speeds it is desirable to keep oil flow to a minimum in order to limit temperature rise. Therefore, the flow control valve opens wider (due to increased oil pressure) to allow more oil to be by-passed within the pump.

The pressure unbalance between the valve spring chamber and the outlet union increases as the engine speed increases. The greater pressure on the outlet union side then pushes the flow control valve back further to open the by-pass hole wider, thereby diverting more oil into the intake chamber (3). Supercharging of the intake chamber occurs under these conditions. Oil at high velocity, discharging past the valve into the intake chamber picks up make-up oil from the reservoir on the jet pump principle. Then by reduction of velocity, velocity energy is converted into supercharge pressure.

OIL FLOW—TURN AGAINST RESISTANCE (Fig. 9A-38)

During a turn, resistance is offered to the pitman shaft and rack-piston nut, and extends to the pump high pressure chamber. It also extends through the pressure sensing orifice to the flow control valve spring chamber. Pressure in the chamber continues to build up until it overcomes the opposing spring pressure on the ball check in the flow control valve. If this pressure is slight, the ball check is sufficient to bleed off any excess pressure.

When the pressure is high, the flow control valve spring chamber pressure reduces below the opposing high pressure on the face of the outlet union and flow control valve plunger. The valve opens wide to provide oil pressure control for the gear. Oil flows through the passage leading to the suction or intake part of the pump.

Supercharging occurs when pressure oil in the area around the outlet union and flow control valve plunger discharges into the suction passage at high velocity.

PERIODIC SERVICE RECOMMENDATIONS

No periodic service of the pump is required except checking oil level in reservoir as outlined in GENERAL LUBRICATION Section.

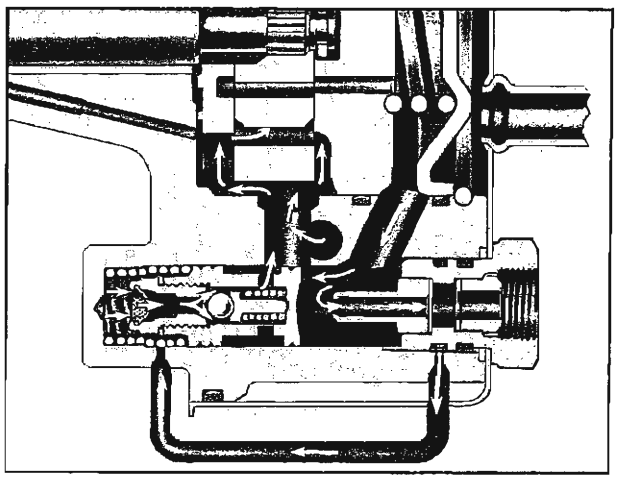


Fig. 9A-38 Oil Flow - Turn Against Resistance

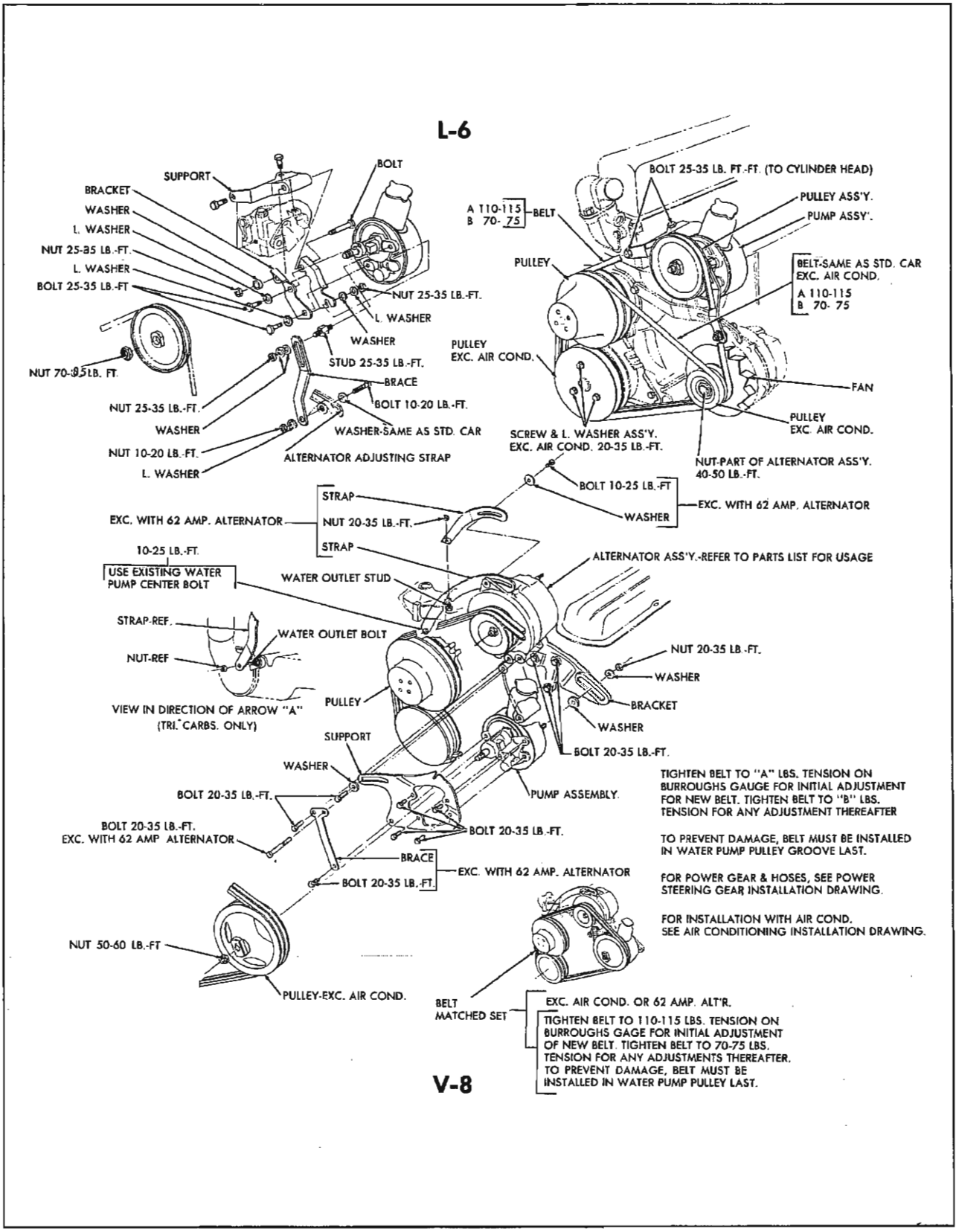


Fig. 9A-39 Power Steering Installation

ADJUSTMENTS ON CAR

PUMP BELT TENSION ADJUSTMENTS

1. Loosen pump plate (support) to bracket bolts two full turns.

2. Tighten belt with power steering pump to give 70-75 lbs. as indicated on the Burroughs gauge.

3. Holding adjustment, tighten pump plate to bracket bolts.

PUMP—REMOVE FROM CAR (Fig. 9A-39)

1. Disconnect hoses at pump. When hoses are disconnected, secure ends in a raised position to prevent drainage of oil.

2. Install two caps at pump fittings to prevent drainage of oil from pump.

3. Remove drive pulley attaching nut.

4. Loosen bracket to pump mounting bolts.

5. Remove pump belt.

6. Slide pulley from shaft. Do not hammer pulley off shaft as this will damage the pump.

7. Remove bracket to pump bolts.

8. Drain pump of oil.

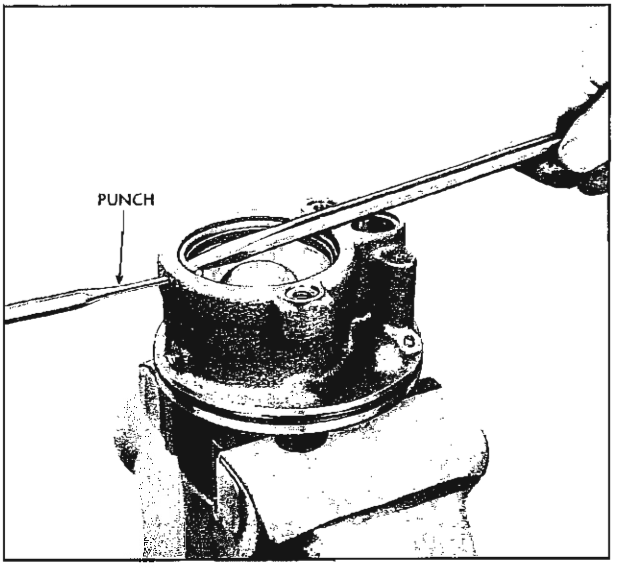


Fig. 9A-40 Removing Retaining Ring

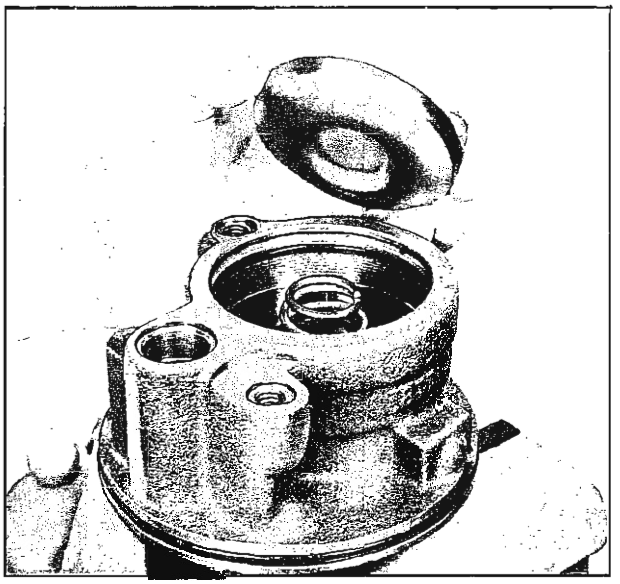


Fig. 9A-41 Removing End Plate

9. Clean exterior of pump.

DISASSEMBLE

CAUTION: In clamping pump in vise, be careful not to exert excessive force on front hub of pump as this may distort the bushing.

1. Remove union and seal.

2. Remove pump rear mounting bolts.

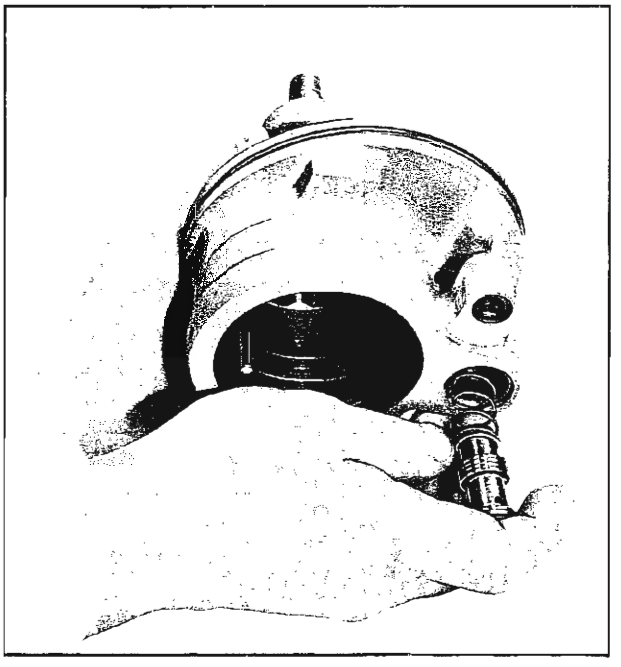


Fig. 9A-42 Removing Flow Control Valve

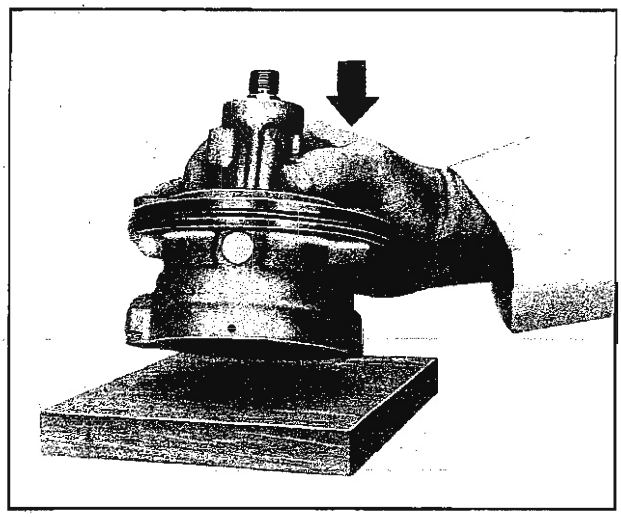


Fig. 9A-43 Removing Pressure Plate

3. Lift reservoir from housing by tapping reservoir at flange, rocking back and forth.

4. Remove mounting bolt and union "O" rings.

5. Remove end plate retaining ring. Push end plate retaining ring out of groove, using a punch through 1/8"-diameter hole in pump housing (Fig. 9A-40), and remove with screwdriver. End of retaining ring should be next to hole to ease removal.

6. Remove end plate and spring. End plate is spring-loaded and will generally sit above the housing level. If sticking should occur, a slight tapping action will free the plate (Fig. 9A-41).

7. Remove end plate "O" ring.

8. With pump housing turned over, remove flow control valve and spring (Fig. 9A-42) and tap housing on wood block until pressure plate falls free (Fig. 9A-43).

9. Remove pressure plate, pump ring and vanes, being careful not to drop parts (Fig. 9A-44).

10. Remount housing in vise. Using a suitable tool, remove shaft retainer on end of drive shaft.

11. Remove rotor and thrust plate.

12. Remove shaft through front of housing (Fig. 9A-45).

CLEAN PARTS

Carefully clean all parts, except "O" ring seals which are to be replaced and should not be immersed in cleaning solvent. Lubricate all "O" ring seals and the drive shaft seal with vaseline and install in proper location. Be sure not to immerse the drive shaft seal in the cleaning solvent as this could damage it. Fig. 9A-46 shows an exploded view of the pump.

ASSEMBLE

Be sure all parts are clean during reassembly.

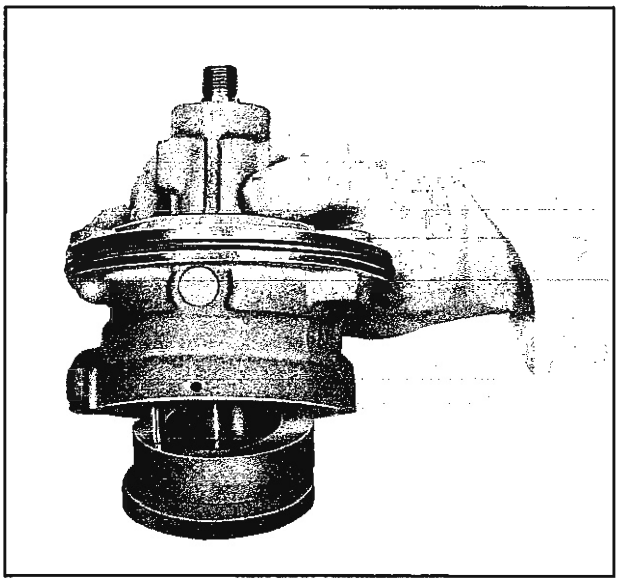


Fig. 9A-44 Pressure Plate and Rotor Ring Removed

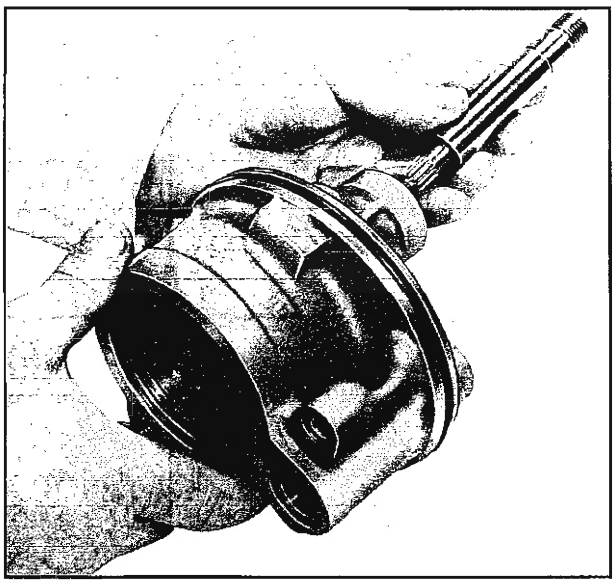
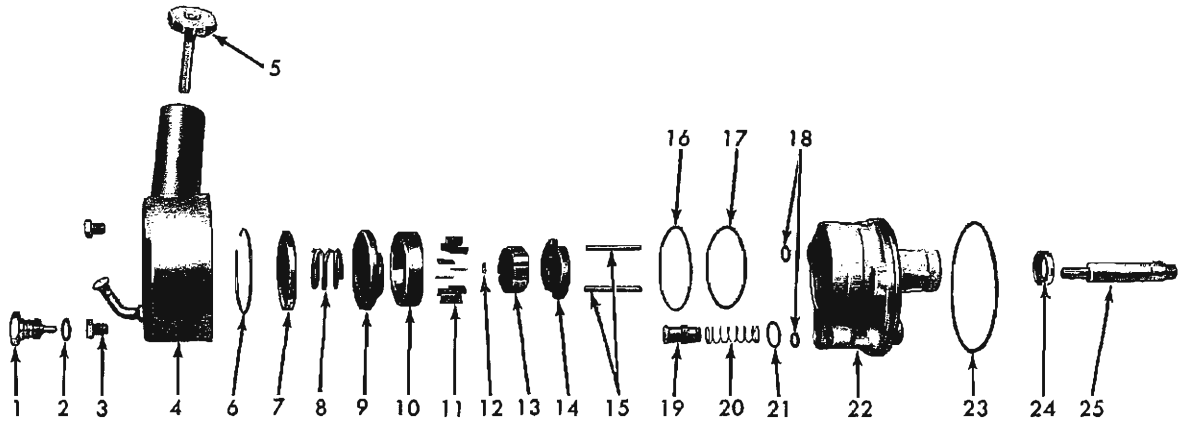


Fig. 9A-45 Removing Pump Shaft



1. Union
2. Seal
3. Mounting Bolts
4. Reservoir
5. Dip Stick and Cover
6. End Plate Retaining Ring
7. End Plate
8. Spring
9. Pressure Plate
10. Pump Ring
11. Vanes
12. C-Washer
13. Rotor
14. Thrust Plate
15. Dowel Pins
16. End Plate "O" Ring
17. Pressure Plate "O" Ring
18. Mounting Bolt "O" Ring Seals
19. Flow Control Valve
20. Flow Control Valve Spring
21. Flow Control Valve "O" Ring Seal
22. Pump Housing
23. Reservoir "O" Ring Seal
24. Shaft Seal
25. Drive Shaft

Fig. 9A-46 Power Steering Pump Exploded View

1. Insert shaft at hub end of housing, spline end entering mounting face side (Fig. 9A-47).

2. Install thrust plate on dowel pins with ported face to rear of pump housing (Fig. 9A-48).

3. Install rotor (must be free on splines) on pump shaft at splined end.

NOTE: Assemble rotor with flat side toward rear of pump (Fig. 9A-49).

4. Using suitable tool, install shaft retainer.

5. Install pump ring on dowel pins with rotation arrow facing to the rear of pump housing (Fig. 9A-50).

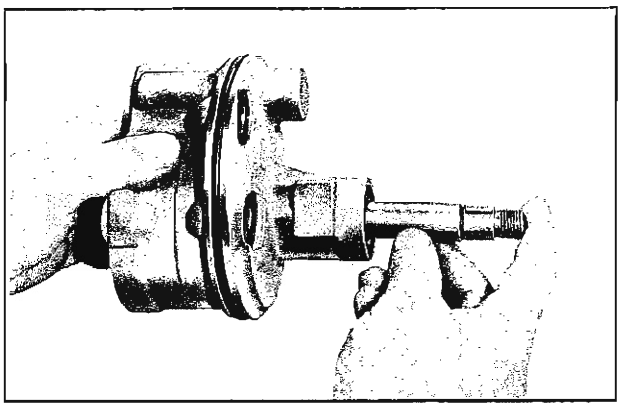


Fig. 9A-47 Installing Pump Shaft

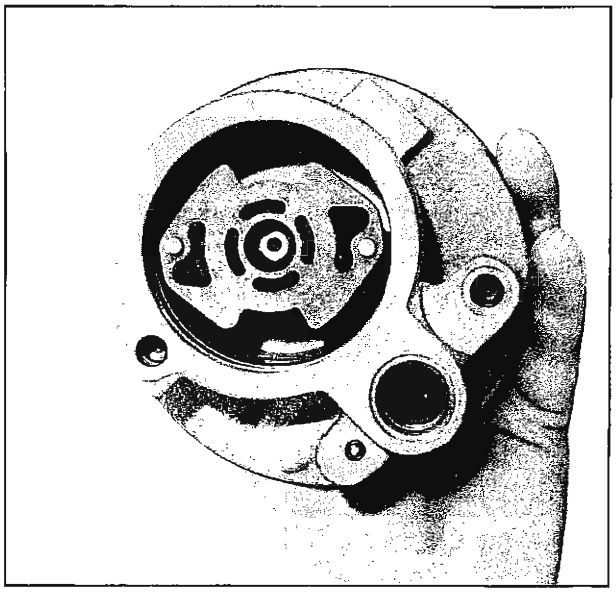


Fig. 9A-48 Thrust Plate Installed

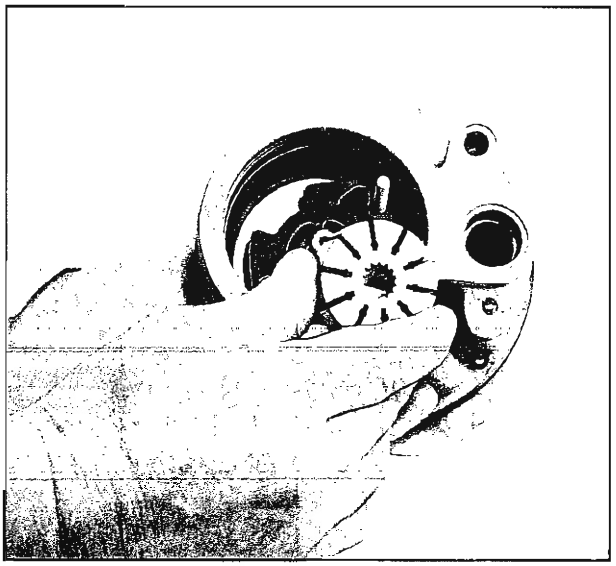


Fig. 9A-49 Installing Rotor

6. Install vanes in rotor slots with radius edge towards outside (Figs. 9A-51 and 9A-52).

7. Lubricate outside diameter and chamfer of pressure plate with vaseline to insure against damaging "O" ring and install on dowel pins with ported face toward the pump ring. Applying pressure to outer edge only, seat pressure plate. Never press or hammer on the center of the pressure plate as this will cause permanent distortion with resulting pump failure. (Pressure plate will travel about 1/16" to seat.)

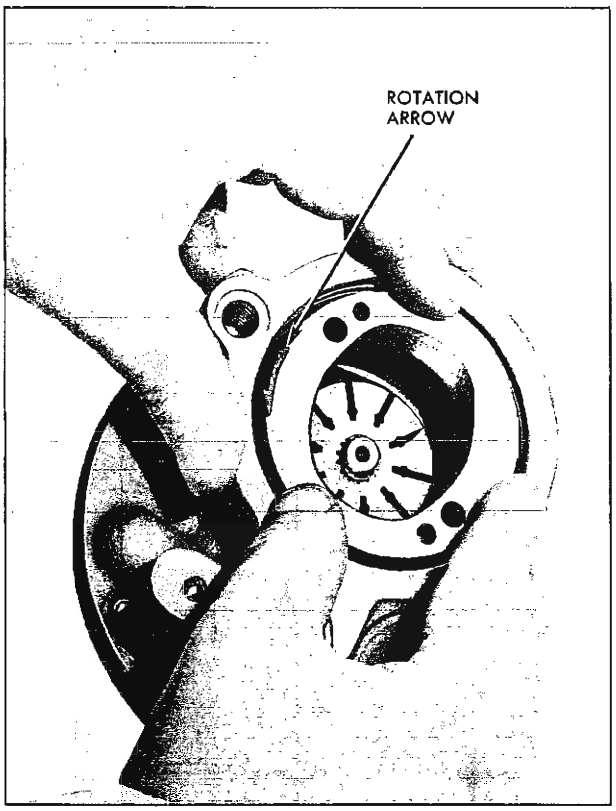


Fig. 9A-50 Installing Pump Ring

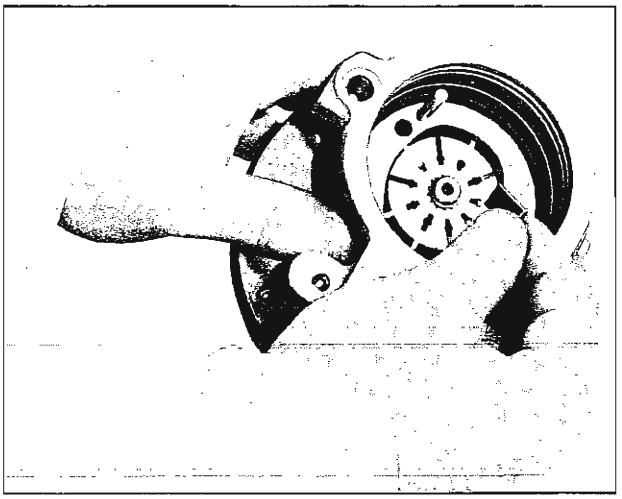


Fig. 9A-51 Installing Pump Vanes

8. Install end plate "O" ring.

9. Install pressure plate spring in center groove of pressure plate (Fig. 9A-53).

10. Lubricate outside diameter of end plate with vaseline to insure against damaging "O" ring and install in housing, using an arbor press.

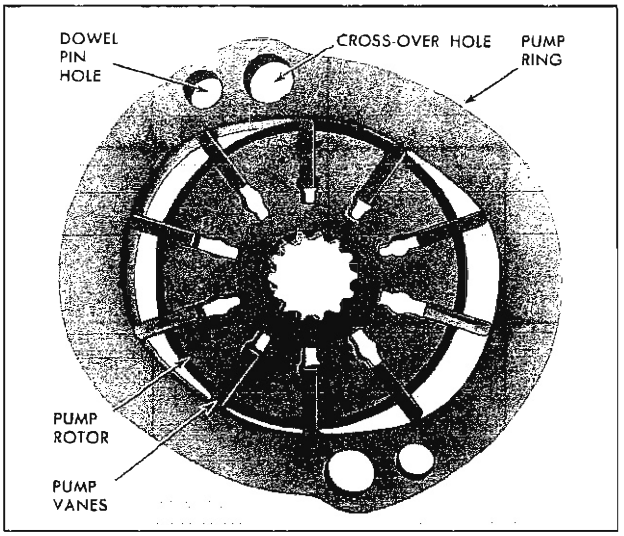


Fig. 9A-52 Pump Vanes Installed

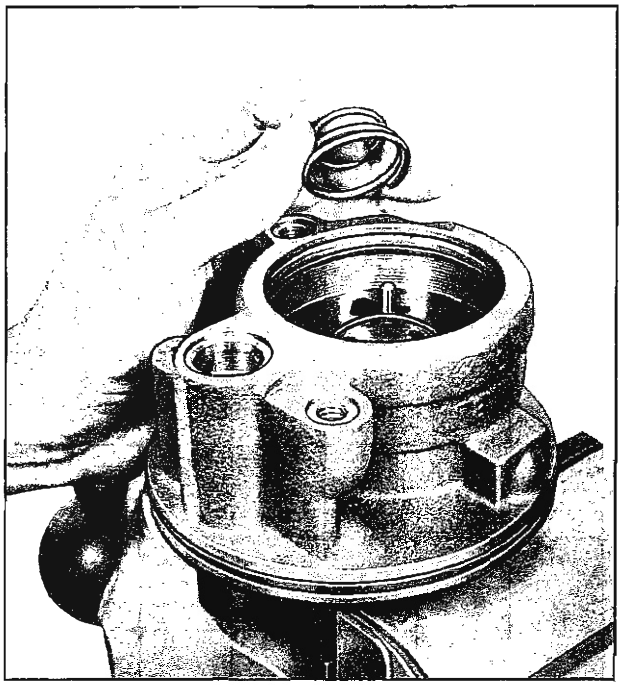


Fig. 9A-53 Installing Pressure Plate Spring

11. Install end plate retaining ring while pump is in arbor press. Be sure it is completely seated in the groove of the housing (Fig. 9A-54).

12. Install flow control spring and flow control plunger. Be sure end with screen goes into bore first.

13. Install mounting bolt and union "O" rings.

14. Drop reservoir into place and press down until reservoir seats on housing.

15. Install studs, torque to 25-35 lb. ft., and outlet union, and torque to 25-35 lb. ft. Install drive shaft key. Support the shaft on the opposite side of key when installing key.

STEERING PUMP—INSTALL

1. Position pump assembly on mounting bracket with holes lined up and install bolts loosely.

2. Slide pulley on shaft. DO NOT hammer on pulley.

3. Install pulley nut finger tight.

4. Connect and tighten hose fittings. Tighten outlet fitting to 20-30 lb. ft. torque.

5. Fill reservoir. Bleed pump by turning pulley backward (counterclockwise as viewed from front) until air bubbles cease to appear.

6. Install pump belt over pulley.

7. Move pump until belt has 70-75 lb. as indicated on the Burroughs gauge. Tighten mounting screws.

8. Tighten pulley nut to 70-85 lb. ft. torque.

TROUBLE DIAGNOSIS

PUMP NOISE:

The power steering pump is not completely noiseless. Some noise will be present at standstill parking, particularly when the wheels are against the wheel stops. Power steering pump noise can be confused with many other noises, such as, transmission, rear axle, generator, etc. If it is determined that excessive noise is present, remove the pump drive belt, determining if the pump is at fault. If it is determined that excessive pump noise is present, the following steps should be taken.

a. Check belt tightness.

b. Check oil level, filling if necessary.

c. Check to make sure hoses are not touching any other parts of the car, particularly sheet metal.

d. Check the presence of air in the oil. Air will show up as bubbles or the oil will appear milky. Small amounts of air cause extremely noisy operation. If air is present:

1. Tighten all fittings and bolts.

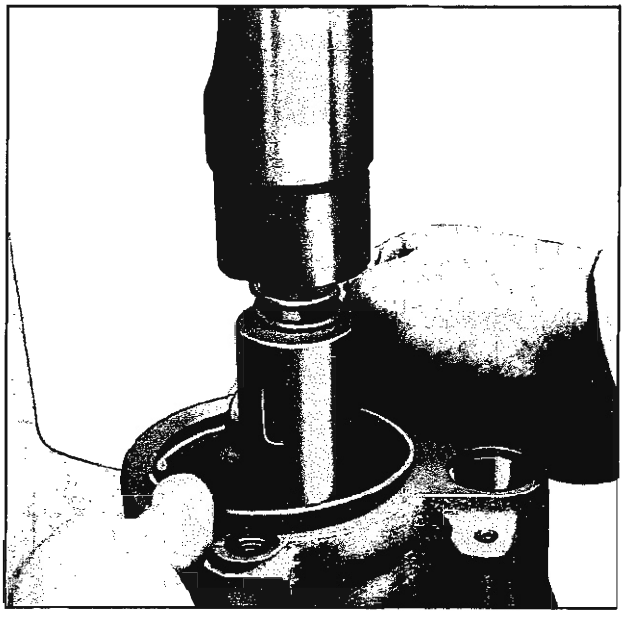


Fig. 9A-54 Installing End Plate

2. Check the entire system for source of air leak. Air can leak into the system where oil passes through at high velocity such as hose connections or at the drive shaft seal.

After each step in attempting to eliminate air, pump should be operated for a few minutes at idle speed while turning steering wheel between extreme positions to allow air to bleed out of oil.

e. If after Step d there is no air present, install pressure gauge in the pressure line between the pump and gear. If, when operating the engine to about 1000 rpm and without turning the steering wheel, the pressure exceeds 125 psi, the hoses and/or steering gear are restricting the oil flow and these parts should be examined to determine the cause of restriction.

f. If the pressure in Step e is less than 125 psi, it will be necessary to remove the pump from the car and disassemble, or partially disassemble, following the steps outlined under "Disassemble Power Steering Pump."

g. Check the pressure plate for scoring.

NOTE: A high polish is always present on the face as a result of normal wear. Do not confuse this with scoring. Light scoring can be cleaned up by carefully lapping on a flat surface. Be sure to thoroughly wash away all lapping compound.

h. Check the vanes to insure that radius edge is toward outside and that they operate freely in rotor slots.

i. Check the contour surface of the pump ring for extreme wear. Normally there may be some scuff marks and uniform wear. This is not detrimental to pump function. However, if the wear consists of chatter marks or gouges, both the ring and vanes should be replaced.

j. Check the face of the thrust plate for scoring. Light scoring or pick-up can be cleaned by lapping (see g above).

k. Check rotor faces for metal pick-up or scoring. Light scoring or pick-up can be cleaned by lapping (see g above).

l. The pump bushing is rarely responsible for noisy operation.

m. Some pump noise is caused by the flow control valve assembly. Install a new plunger and spring if noise is at objectionable level.

n. A swish noise that is present when cornering at slow speed or a growl that cannot be corrected by bleeding system of air, can be eliminated by replacing flow control valve only if smoothing edges of valve with fine hone does not reduce noise.

PUMP LEAKS:

a. Tighten all fittings and bolts.

b. Possible sources of pump leakage are as follows:

LEAK SOURCE	CAUSE	REMEDY
Top of reservoir	Reservoir too full	Fill to proper level
	Excessive air present in oil	Proceed as in 1-d above to determine cause of air
At reservoir	"O" ring out or improperly installed	Replace "O" ring or install properly
	Reservoir damaged	Replace reservoir
At the pressure fitting or stud	Not tightened sufficiently	Torque to 25-35 lb. ft.
	Cross threaded or defective seat on fittings or hose or damaged seals	Correct as necessary
At shaft seal	Defective seal or damaged shaft	Replace seal and/or shaft
Leaks in metal parts	Defective castings	Replace

INOPERATIVE, POOR OR NO ASSIST:

a. Check for loose drive belt.

b. Check and fill reservoir, bleed steering gear.

c. Determine source; pump, steering gear or hoses.

Test No. 1-Oil Circuit Open:

1. Install a pressure gauge in the pressure line between the pump and gear.

2. Turn the steering wheel from one end to the other and note the pressure on the gauge while holding the wheel momentarily against each end. This maximum pressure reading should not be less than 900 psi with the engine idling at 500 rpm, the selector in the "D" range, and the oil temperature in the reservoir between 150°F. to 170°F.

NOTE: To obtain temperatures of 150°F. to 170°F. desired for testing, turn wheels through normal operating range several times.

CAUTION: Do not hold the steering wheel against the stop for any extended period of time.

If the maximum pressure is below specification, it indicates there is some trouble in the hydraulic circuit. However, it does not indicate whether the pump or the gear is at fault. To determine if the pump, or the gear, or both, are at fault proceed with Test No. 2. It will not be necessary to proceed with Test No. 2 if the pressure as read at each end of wheel travel differs by more than 40 psi. In this case the steering gear is at fault.

Test No. 2-Oil Circuit Closed:

1. Set engine idle to 500 rpm; selector lever in "D" range (in neutral, if synchro-mesh).

2. Turn the shut-off valve of gauge to the closed position.

NOTE: Shut-off valve must be installed between gauge and steering gear.

3. Observe and compare the maximum pump pressure at idle. It should not be less than 9000 psi.

NOTE: By comparing this reading with Test No. 1 (testing complete circuit), it is possible to determine whether the fault is with the pump or the steering gear, or both.

Diagnosis-Test Results

1. If first test is below specifications and second test is equal to or greater than specifications, steering gear is at fault.

2. If first test is below specification and second test is not more than 50 psi greater, pump is at fault.

d. If pump is determined to be at fault, proceed as follows:

1. Remove reservoir and flow control valve. Be sure the flow control valve operates freely in the pump housing bore. If stuck, dislodge and check for burrs or dirt that may cause a sticky valve.

2. Check the small screw in the end of the flow control valve for looseness. If loose, tighten, being careful not to damage machined surfaces.

3. Insure that the pressure plate is flat against the pump ring.

4. Check the pressure plate, thrust plate, rotor and ring for scoring as described under "Pump Noise".

5. Check the vanes as described under PUMP NOISE.

6. The internal parts of the flow control valve may be at fault. Try a new assembly. Do not attempt to service parts as this assembly is properly calibrated at the factory.

e. If steering gear is at fault, see section on POWER STEERING GEAR.

PUMP NOISE

CAUSE	REMEDY
a. Loose belt	Tighten belt
b. Hoses touching other parts of car	Adjust hose positions
c. Oil level low	Fill reservoir

PUMP NOISE (Continued)

CAUSE	REMEDY
d. Air in the oil	Locate source of air leak and correct
e. Excessive back pressure caused by hoses or steering gear	Locate restriction and correct
f. Scored pressure plate (may have been caused by installing the pressure plate by applying force to the center of the plate).	Lap away light scoring. Replace heavily scored or galled part
g. Vanes not installed properly	Install properly
h. Vanes sticking in rotor slots	Free up by removing burrs or dirt
i. Defective flow control valve	Replace flow control valve assembly
j. Extreme wear of pump ring	Replace pump ring
k. Face of thrust plate scored	Lap away light scoring. Replace heavily scored part
l. Scored rotor	Lap away light scoring. Replace heavily scored part
m. Vibration or buzz	Check pump mounting and torque on all attaching nuts and bolts

PUMP LEAKS:

LOCATION	CAUSE	REMEDY
a. Top of reservoir	Reservoir too full	Fill to proper level
b. At reservoir	Air in the oil	Locate source of air leak and correct
	"O" ring cut	Replace "O" ring
	"O" ring improperly installed	Install properly; if damaged, replace
c. At pressure fitting or studs	Not tightened sufficiently	Tighten to 25-35 lb. ft. torque
	Cross threaded or damaged seat	Replace damaged parts
	Defective seat on hose end	Replace hose
	Damaged seals	Replace seals
d. At the shaft seal	Defective seal and/or shaft	Replace seal and/or shaft
e. Leaks in metal parts	Damaged or defective parts	Replace parts as necessary

INOPERATIVE, POOR OR NO ASSIST:

CAUSE	REMEDY
a. Loose drive belt	Tighten belt
b. Low oil level	Fill reservoir
c. Air in the oil	Locate source of air leak and correct
d. Defective hoses or steering gear as determined by tests	Correct. See "Power Steering Gear" section
e. Flow control valve stuck	Remove burrs or dirt. If bore damaged beyond repair, replace pump housing
f. Loose screw in end of flow control valve	Tighten
g. Pressure plate not flat against ring	Correct by lapping or replace
h. Extreme wear of pump ring	Replace part
i. Scored pressure plate, thrust plate and/or rotor	Lap away light scoring. Replace heavily scored parts
j. Vanes not installed properly	Install properly
k. Vanes sticking in rotor slots	Free up by removing burrs or dirt
l. Faulty flow control valve assembly	Replace assembly

POWER STEERING PUMP SPECIFICATIONS

Power Steering System Fluid Capacity. . . . 2.5 pints

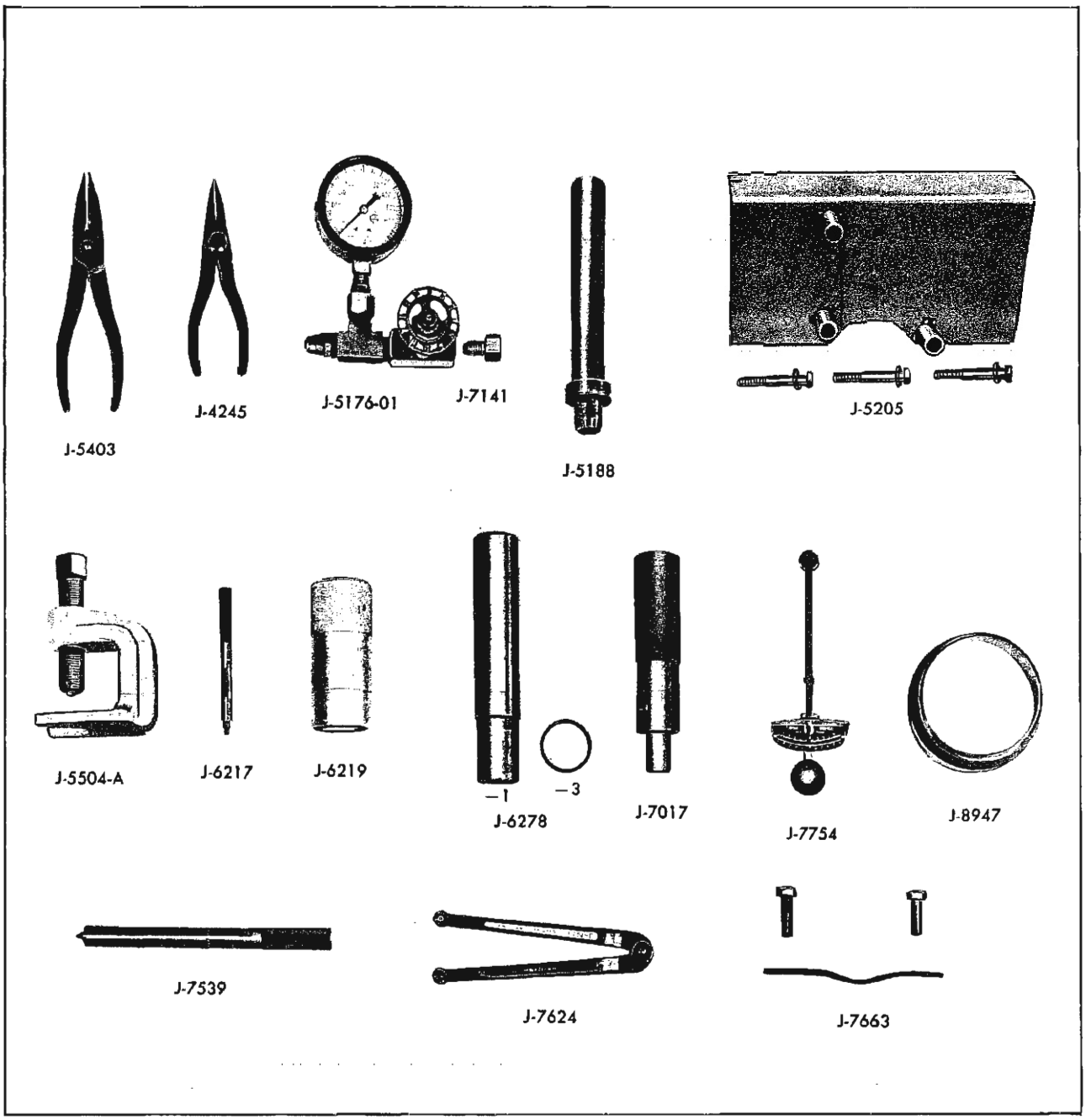
Pump Output

Minimum.	L-6 1.25 gpm at Idle Speed V-8 1.75 gpm at Idle Speed
Maximum (against 50 psi pressure).	L-6 2.15 gpm at 1500 rpm V-8 2.3 gpm at 1500 rpm

Torque

Fitting and Plunger Assembly	25-35 lb. ft.
Hose Connector at Fitting.	20-30 lb. ft.
Mounting Stud	25-35 lb. ft.
Pulley Nut	70-85 lb. ft.

SPECIAL TOOLS



J-4245	Truarc Pliers #3 Internal	J-5205	Steering Gear Holding Fixture
J-5176-01	Pressure Checking Gauge (0-2000 lbs.)	J-7017	Oil Pump Seal Installer
J-5188	Valve Cover Seal Installer	J-7141	Gauge Adapter (For J-5176-01)
J-5403	Truarc Pliers #1 Internal	J-7539	Ball Nut Loading Arbor
J-5504-A	Pitman Arm Puller	J-8947	Piston Installer
J-6217	Valve Connector Installer	J-7624	Adjustable Spanner Wrench
J-6219	Pitman Shaft Seal Installer	J-7663	Pump Cover Installing Clamp
J-6278	Pitman Shaft Bushing Remover and Replacer	J-7754	Torque Wrench (0-25 in. lb.)

Fig. 9A-55 Power Steering Pump and Gear Special Tools