

SAGINAW VANE TYPE

Chevrolet
Dodge
Ford ("E" Models Only)
GMC
International Harvester
Jeep
Plymouth

DESCRIPTION

The Saginaw vane type power steering pump can be identified by the "ham can" shape of the fluid reservoir. Internally, rectangular pumping vanes carried by a shaft driven rotor move fluid from intake to pressure cavities of cam ring. As rotor begins to rotate, centrifugal force throws vanes against inside surface of cam ring to pick up residual oil, which is then forced into high pressure area. As more oil is picked up by the vanes, oil is forced into the cavities of the thrust plate and through two cross-over holes in the cam ring and pressure plate (which empty into high pressure area between pressure plate and housing end plate). Filling high pressure area causes oil to flow under vanes in slots of rotor, forcing vanes to follow inside oval surface of cam ring. As vanes rotate to small area of cam ring, oil is forced out from between vanes.

LUBRICATION

Check fluid level on dipstick with fluid at normal operating temperature. Maintain level at indicated mark on dipstick, using only Power Steering Fluid.

ADJUSTMENT

DRIVE BELT

See appropriate article in TUNE-UP Section.

BLEEDING HYDRAULIC SYSTEM

International Harvester — Fill reservoir to mark on dipstick, and turn pump pulley backwards until all air is expelled from system. Recheck fluid level in pump.

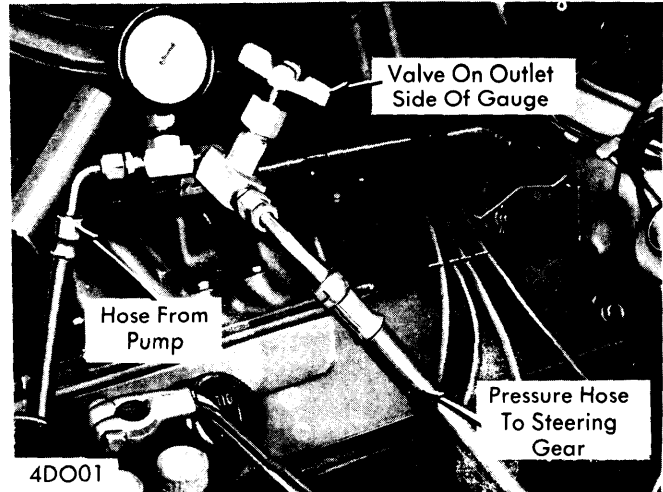
All Others — Fill reservoir to proper level, and let oil remain undisturbed for at least two minutes. Start engine and run at idle speed for a short time, adding fluid as necessary to maintain proper level in pump. Turn wheels to left and right, contacting steering stops lightly. Check oil level and refill as necessary. Continue process as long as necessary to expell all air from system.

TESTING

HYDRAULIC PRESSURE

Make sure belt tension is properly adjusted, power steering fluid is at proper level in reservoir, and fluid is at normal operating temperature. Install a suitable pressure gauge and valve assembly in pressure line between power steering pump and steering gear. With engine at curb idle, turn steering wheel from stop to stop and note gauge reading (with gauge valve open). Pressure should be at least 900 psi; if not, momentarily close valve. **CAUTION** — Do not keep valve

closed longer than five seconds. If pressure does not increase with valve closed, power steering pump is at fault. If pressure increases (and power steering is malfunctioning) steering gear is at fault.



HYDRAULIC PRESSURE TEST SETUP

REMOVAL & INSTALLATION

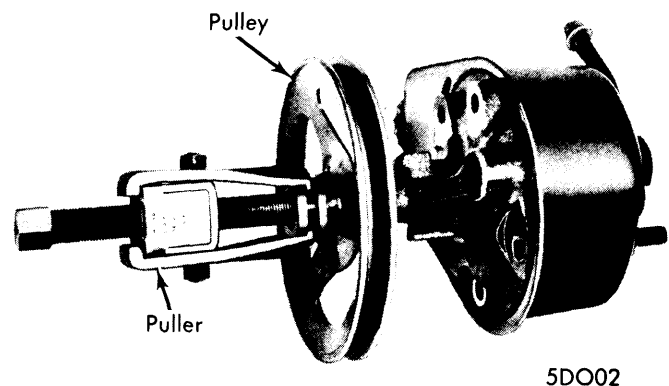
POWER STEERING PUMP

Loosen pump adjusting bolt (or nut) and pump mounting bolts, then withdraw pump drive belt. Disconnect pressure and return hoses from pump and cap ends to prevent loss of fluid and entry of dirt. Remove bolts attaching pump mounting bracket to engine, and withdraw pump, pulley, and mounting bracket as an assembly. To install, reverse removal procedure and bleed hydraulic system.

OVERHAUL

CAUTION — When clamping pump in vise, be careful not to exert excessive force on front hub of pump as bushing may become distorted.

Disassembly — 1) Using a suitable puller, withdraw pulley from shaft. **CAUTION** — Do not hammer pulley off shaft or internal damage may occur. Drain pump reservoir, clean exterior of unit, and remove mounting bracket(s). Clamp



REMOVING PUMP PULLEY

SAGINAW VANE TYPE (Cont.)

pump (with shaft pointing downward) in a soft jawed vise, making sure vise grips pump at square boss and shaft housing. Remove pressure line union and "O" ring seal. Remove reservoir retaining stud(s), then tap against filler tube to loosen reservoir on pump body. Remove reservoir from body, then withdraw and discard all "O" ring seals.

2) Using a 1/8" diameter punch, tap end plate retaining ring around until one end of ring is near hole in pump body. Insert punch in hole far enough to disengage ring from groove in pump bore, then use a screwdriver and pry ring out of body. Tap end plate with a soft faced hammer to break it loose; the spring located under the end plate should push plate up. Remove pump body from vise.

3) Place pump in inverted position on flat surface, and tap end of drive shaft with soft-faced hammer to loosen pressure plate, rotor, and thrust plate assembly from body. Lift pump body off rotor assembly (flow control valve and spring should also slide out of bore). Remove and discard end plate and pressure plate "O" rings. Pry drive shaft oil seal from body using a screwdriver.

4) Inspect seal bore in housing for burrs, nicks, or score marks that would allow oil to by-pass outer seal surface. Lift pressure plate and cam ring from rotor, then remove rotor vanes. Clamp drive shaft in soft-jawed vise, with rotor and thrust plate facing up, and remove rotor lock ring from shaft, using care not to nick shaft or rotor. Slide rotor and thrust plate off shaft, and remove shaft from vise.

Cleaning & Inspection — Clean all pump parts in suitable solvent. *NOTE* — Do not immerse drive shaft seal in solvent. Replace any damaged or worn parts. Inspect flow control valve assembly for wear or damage. Inspect castings for cracks or other damage. Check all parts for score marks or burrs. *NOTE* — Cam ring is treated with "Lubrite" which leaves a dull gray-black finish on wear surface. Wavy grain appearance inside cam ring is normal.

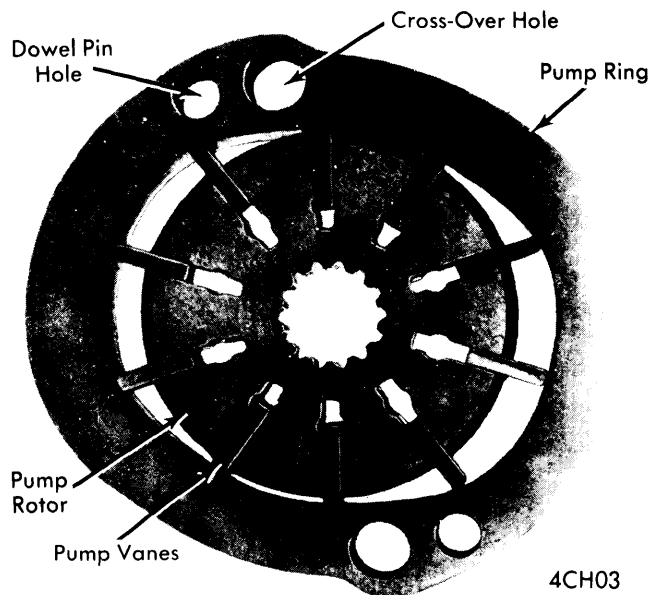
Reassembly — 1) *NOTE* — Lubricate all "O" rings and seal areas with power steering fluid bore assembly. Place pump body on a flat surface and drive a new shaft seal into bore using a 7/8" or 15/16" socket. Drive in until seal bottoms on shoulder in bore. *CAUTION* — Excessive force will distort seal. Lubricate seal with power steering fluid, then clamp body in vise with shaft pointing downward. Install end plate and pressure plate "O" rings in grooves of body.

2) With drive shaft clamped, splined end up, in a soft-jawed vise, install thrust plate on shaft with smooth, ported side up. Slide rotor over splines with counter bore of rotor facing down. Install rotor lock ring making sure it is seated in groove. Install two dowel pins in holes in pump cavity. Carefully insert drive shaft, rotor, and thrust plate assembly in pump cavity, indexing location holes with dowel pins.

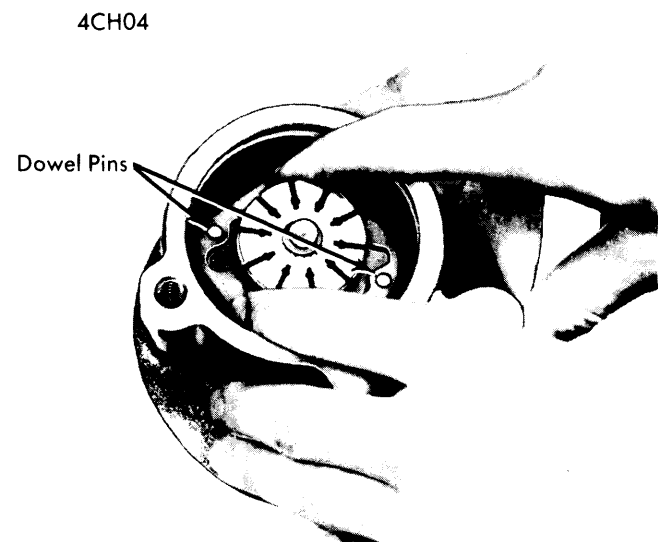
3) Slide cam ring over rotor and onto dowel pins, with arrow on ring facing up. Install vanes in rotor slots with radius edge facing out towards cam ring inner surface. Position pressure plate on dowel pins. Place a 1 1/4" socket in groove of pressure plate, and seat entire assembly on "O" ring in pump cavity by pressing down on socket with both thumbs.

4) Place spring in groove in pressure plate and position end cover lip edge up over spring. Press end cover down below retaining ring groove with thumb, and install retaining ring, making sure ring is seated in groove. Care should be taken to prevent cocking end cover in bore or distorting assembly.

5) Using a punch, tap retaining ring ends around in groove until opening is opposite flow control valve bore. This is necessary for maximum retention of retaining ring. Install new reservoir "O" ring, mounting stud "O" rings, and flow control valve "O" ring on pump body, then carefully position reservoir on pump body. Align mounting stud holes until studs can be started in threads.



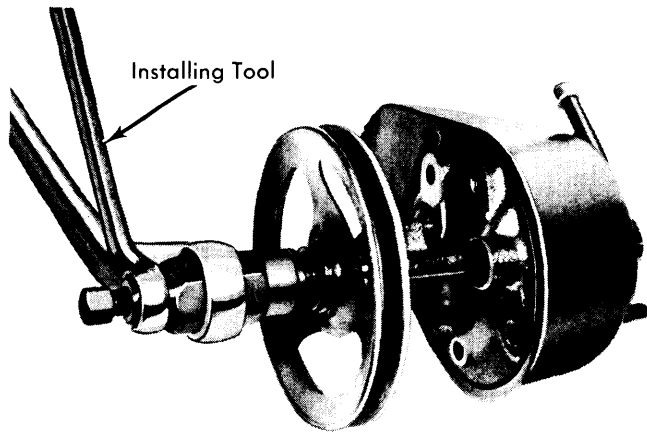
PUMP ROTOR & RING



INSTALLING DRIVE SHAFT ASSEMBLY

Power Steering Pumps

SAGINAW VANE TYPE (Cont.)



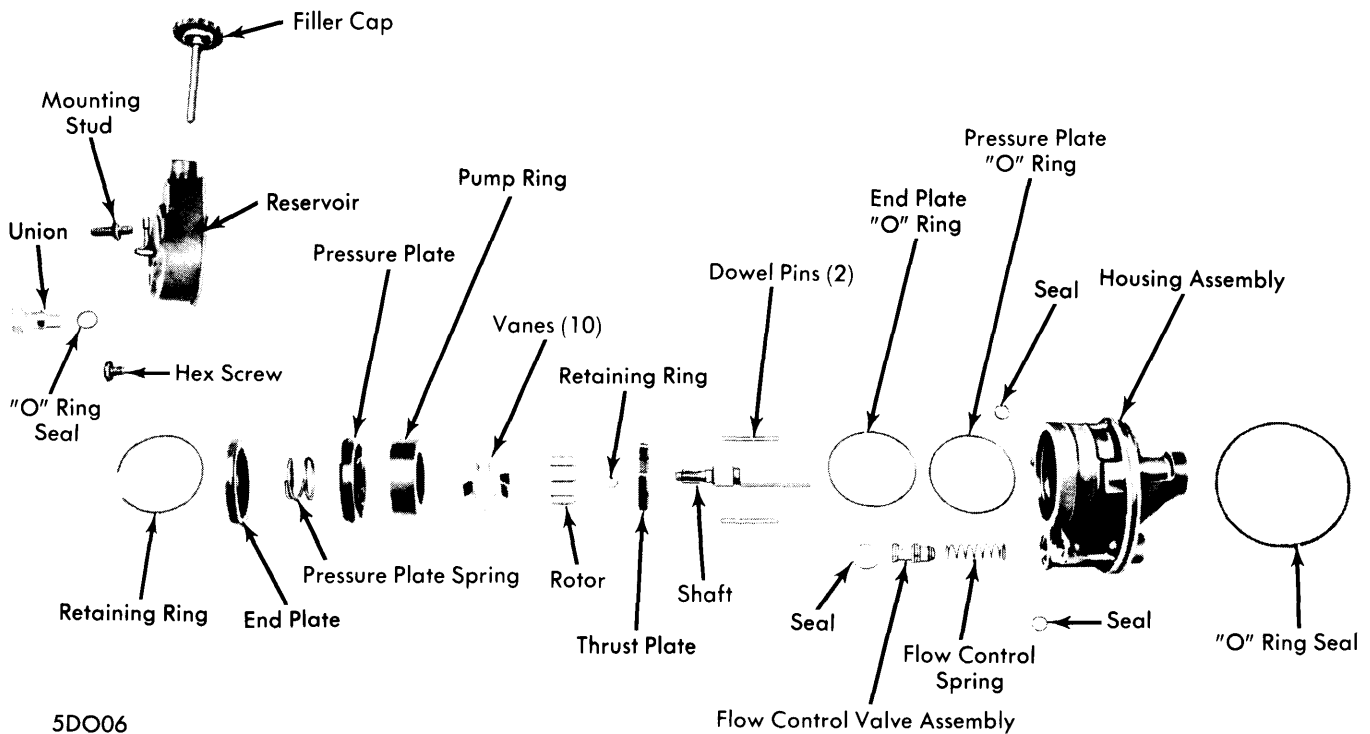
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INSTALLING PUMP PULLEY

6) Using a soft-faced hammer, tap reservoir down on pump and install flow control valve spring and valve assembly. Install new "O" ring seal on pressure hose fitting. **CAUTION** — Be sure "O" ring is installed on upper groove. Install pressure hose fitting and tighten mounting studs. Tighten hose fitting and rear mounting stud(s). Remove pump assembly from vise, and install mounting bracket(s) and drive pulley. **CAUTION** — Do not hammer pulley on shaft.

TIGHTENING SPECIFICATIONS

Application	Ft. Lbs.
Bracket Bolts	30
Flow Control Valve Fitting	35
Reservoir-to-Pump Body	35
Pressure Hose Fitting	
Dodge & Plymouth	20
All Others	35



5DO06

SAGINAW POWER STEERING PUMP ASSEMBLY