SAGINAW P-SERIES PUMP INSTALLATION

WARNING

Failure to read and follow these instructions will void any warranty, can cause severe damage to power steering components and premature failure. Pump internals are metal on metal. Failure to bleed correctly can cause metal on metal contact and damage.

Removing the Old Pump

The first step to installing a new pump is to remove the old one from the vehicle.

Step 1 Begin by removing the power steering belt and disconnecting the pressure and return hoses from the pump. Fluid will drain out of the pump and lines, so have a waste oil container available.

Step 2 Remove all bolts that retain the pump and its mount brackets to the engine.

Step 3 Remove the pump assembly from the vehicle.

Removing the Pulley, Bracket, and Reservoir from the Pump

Step 1 Using a power steering pump pulley remover, remove the pulley from the pump.

CAUTION

You must use a power steering pump pulley puller. DO NOT use a three-jaw puller, this will destroy the pulley.

Step 2 Remove the mounting bracket from the pump.

Step 3 Remove the bolts or stud bolts from the back of the pump. In most applications there are two, but some only have one.

Step 4 Remove the pressure hose fitting from the pump.

Step 5 The flow control valve and spring are situated in the pump behind this fitting and can be removed by simply turning the pump up and letting them fall out into your hand. **Do not reuse the flow control valve, pressure relief valve and spring.**

Step 6 Grip the pump by its drive shaft and surrounding case, then use a soft-faced mallet and tap around the edge of the tin reservoir to remove it from the pump.

CAUTION

Be careful not to damage the reservoir.

Step 7 If you are reusing your reservoir, now is a great time to thoroughly clean it out and repaint it. Examine it for any nicks, warpage or dents. If necessary replace. It is also a good time to examine your hoses for wear, thinning or obstructions. If you have o-ring seals, replace them.

Step 8 Flush out your steering gear and hoses with fresh fluid.

Inspecting the New Pump

Inspect the new pump to make certain it is the proper one for your application. Although all P-type pumps look very similar, there are distinct differences. All 1980 and newer vehicles with Saginaw pumps were equipped with metric thread pumps with an o-ring type pressure fitting. 1979 and earlier vehicles were equipped with SAE thread pumps using a flare type fitting.

All threaded holes in a metric pump are 10 x 1.5, while SAE pumps are 3/8 x 16. You can distinguish a metric pump from the SAE pump by the last 2 digits of the number that is

cast in the side of the pump. The last 2 digits of a metric casting number are 47, while SAE pumps are 19. Be sure to check!

CAUTION

If you thread an SAE bolt into a metric pump, it will seem to start ok, but when you try to tighten it, it will crack and destroy the pump case.

The pressure hose fitting, whether o-ring or flare, will thread into either pump case.

Installing the New Pump

Once you're sure you have the correct pump, you're ready to install the pump.

Step 1 Remove the high pressure fitting from the back of the pump. This fitting holds the Flow Control Valve and Spring in the pump body. Remove the flow control valve and spring from the pump orifice.**Remove them for later installation.**

Step 2 Locate the o-rings included with the new pump and spread them out on the workbench.

Step 3 Install the large o-ring in the o-ring groove around the perimeter of the pump.

Step 4 Install the lathe cut o-rings on the back side of the pump in the recessed areas around the threaded bolt holes and the pressure line port.

TIP

The lathe cut rings can be held in place with a light coat of grease.

Step 5 Lightly lubricate the o-ring on the perimeter of the pump with power steering fluid, then install the reservoir on the pump. Slip the reservoir over the pump and lightly tap it into place with a soft-faced mallet. Be sure that the bolt holes remain lined up while tapping the reservoir into place.

CAUTION

Do not force the reservoir back onto the pump by installing and tightening the retaining bolts in the back to pull it on. This will bend the reservoir and cause leakage.

Step 6 Once the reservoir is in place, check to be sure the lathe cut o-rings remained in place.

Step 7 Install the reservoir retaining bolts into the pump.

CAUTION

Gasket sealer should NOT be used to seal the pump reservoir, this will contaminate the inside of the pump and cause pump failure.

Step 8 Reinstall the flow control valve, spring, and hose fitting that came with the new pump. The flow control spring goes first, then the flow control valve (the end with the nut goes in first toward the spring), and then thread in the line fitting.

Step 9 Install the pump mount bracket onto the pump.

Step 10 Install the pump pulley onto the pump. Always use a pump pulley installer to push the pulley back onto the pump drive shaft. The hub of the pulley should be flush with the end of the drive shaft.

CAUTION

DO NOT press the pulley back onto the pump using a press, this will destroy the pump. Use a power steering pulley installation tool.

Step 11 Install the pump on the vehicle by performing the steps in reverse order contained in the section “Removing the Old Pump” on page1.

Step 12 Install and adjust the power steering belt.

CAUTION

Be sure not to over tighten the belt. A belt that is too tight will cause premature failure of the pump. Refer to the manufacturer’s specifications for the correct amount of tension to apply to the power steering belt.

Step 13 Bleed the power steering system. Refer to Bleeding Air From Power Steering Systems in the next section for complete instructions. Failure to follow these bleeding instructions will void the warranty.

BLEEDING AIR FROM POWER STEERING SYSTEMS

IMPORTANT

When bleeding air from a power steering system, please follow AGR's bleeding Instructions only. AGR has found the following method is the only proper way to bleed a system.

Do not start the engine until system is fully bled. If on a Hydro Boost system, follow hydro boost bleeding procedures after bleeding the power steering system.

CAUTION

Failure to read and follow these instructions will void any warranty and possibly cause severe damage to your power steering and/or hydro boost brake components. If you have any questions please contact your dealer.

When to Bleed

- After any steering component replacement.
- If any part of the power steering system is opened for any reason.

Why Bleed

- To prevent pump damage.
- To ensure proper system operation.
- To stop steering system noise.

Before Bleeding

Carefully inspect the steering system.

- Hoses must not touch any other part of vehicle. Steering system noise could be caused by the hose touching the frame, body, or engine.
- All hose connections must be tight. Loose connections might not leak but could allow air into the system. Do not over tighten o-ring hoses as the o-ring might be crushed. Check flare seat type connections for exact fit.

How to Bleed

Step 1 Do not start the engine until the system is fully bled. Doing so may cause damage to the power steering components. Pump internals are metal on metal. Any air in the system can cause metal to metal contact and damage.

Step 2 Raise the front wheels off the ground, or remove the pitman arm or tie rod.

Step 3 Turn steering wheel fully to the left.

Step 4 Fill fluid reservoir to “full cold” level. Leave cap off.

IMPORTANT

Use only clear, name brand, premium, racing synthetic power steering fluid, such as Royal Purple or Red Line. Do not use transmission fluid, as transmission fluid does not contain the same friction inhibitors/additives and tends to breakdown and overheat. Use of transmission fluid will void the warranty.

Step 5 Whith an assistant checking the fluid level and condition, turn the steering wheel slowly and smoothly lock to lock until fluid level drops in pump reservoir. If fluid level has not dropped, no fluid has moved through the system. This normally indicates a large bubble in the reservoir or pump. Until this bubble passes, no fluid will circulate through the system.

- Do not turn the steering wheel fast as this will cause the fluid to overflow the reservoir. Trapped air may cause fluid to overflow. Thoroughly clean any spilled fluid to allow for leak checks.
- On systems with coolers, winches, or Rock Ram assist you may need to cycle in excess of 40 times.

Step 6 Check fluid constantly to ensure proper level and that no bubbles exist.

- If you see any signs of bubbles, recheck all connections then repeat the steps above.
- Fluid level should be steady (Rock Ram’s level will vary slightly).

Step 7 Disable engine from starting. (*Non Hydro Boost Brake Systems*)

- Crank engine several revolutions. If fluid level drops, there is compressed air trapped in the system. Repeat above steps until fluid level is stable.
- If fluid foams while cranking, wait 10 minutes or more until dispersed air has time to accumulate and purge through the reservoir.

Step 8 Continue above steps until fluid level remains constant and no air bubbles are visible.

Step 9 If you have a hydro boost brake system continue, if not skip to **Step 11**.

Hydro Boost Systems Only

WARNING

These Hydro Boost specific instructions must be followed. Failure to follow these procedures can cause your new high volume pump to become damaged or fail completely. Do not turn the steering wheel while performing these procedures.

- Discharge the Hydro Boost brake unit by performing three full presses on the brake pedal.
- Watch power steering reservoir for any bubbling, foaming or burping.
- Once foam clears, crank engine until it just catches and shut off.
- Discharge Hydro Boost unit with three full presses of the brake pedal.
- Repeat these steps until no air or foam is seen in the reservoir.
- If brake pedal feels soft, spongy or funny, system is not fully bled.

— Repeat above steps.


TIP

It is recommended on Ford Super Dutys with Hydro Boost Brakes, that the original pressure line from the Hydro Boost Unit to the pump be replaced with the updated line. Also that the Ball Joints be checked for lubrication, stiffness or wear.

If you have excessive metal in the fluid, the hydro boost will not bleed, is noisy or the brake pedal feels funny, call AGR Technical Support.


NOTE

If you need to replace your hydro boost brake unit, AGR recommends replacing with a ported unit and not an OEM unit.

Step 10 Enable engine to start. With engine idling, maintain fluid level.

Step 11 Reinstall reservoir cap.

Step 12 Return wheels to center.

Step 13 Lower front wheels to ground or reinstall pitman arm or tie rod if removed in Step 2.

Step 14 Run engine for two minutes. Turn steering wheel in both directions.

Step 15 Do not hold steering wheel against the stops.

Step 16 Verify the following conditions:

- — Smooth power assist
- — Noiseless operation
- — Proper fluid level
- — No system leaks
- — Proper fluid condition
- — No bubbles, foam, or discoloration

Step 17 If all conditions are satisfied, the bleeding procedure is complete.

Step 18 If any problem exists, turn off engine and see Special Conditions below.

Special Conditions

If you experience any of the conditions listed below, there is still air in the system.

- Foam or bubbles in fluid (fluid must be completely free of bubbles).
- Power steering fluid should not rise in the reservoir when the engine is turned off. If this occurs, there is trapped air in the system.
- Be alert to periodic bubbles that could indicate a loose connection, leaky o-ring, or a bad flare seat in either the pressure or return hose.
- Discolored fluid (milky, opaque, or light tan color).

Eliminating Air in the Power Steering System

Follow the steps below to eliminate air in the power steering system.

Step 1 Turn ignition off. Wait thirty minutes. Recheck hose connections. Repeat start up procedures. If problem still exists, replace or check for possible causes including:

- — Return hose clamps
- — Return hose o-ring or flare seat
- — Pressure hose o-ring or flare seat
- — All other connections

Step 2 Fill system and repeat bleeding procedure for each possible cause.

Eliminating Noise in the Power Steering System

If you hear a whining or groaning noise originating from the pump after all air is out of the system (if air is not out, see Special Conditions), then do the following:

Step 1 Check belts for slippage.

Step 2 Mark pulley and make sure it is not slipping on the shaft.

Step 3 With the engine running, recheck hoses for possible contact with frame, body, or engine. If no contact is found, cool fluid and repressurize system.

Step 4 After cooling fluid, start engine to come up to operating temperature and recheck.