INSTALLATION AND PROCEDURE FOR BLEEDING AIR FROM POWER STEERING SYSTEMS

CAREFULLY READ THESE INSTRUCTIONS BEFORE ATTEMPTING ANY MODIFICATIONS!

Proper bleeding of the power steering pump is the responsibility of the installer. Improper modification or installation will void your warranty and may result in vehicle damage or personal injury. If you have any installation questions, refer to your factory shop manual or call our Tech Service personnel at 216-961-1800 from 7am to 4pm EDT.

INSTALLING POWER STEERING PUMP

We recommend you follow Original Equipment Manufacturers Remove & Replace procedure for your specific Year, Make and Model Vehicle. Follow factory torque specifications and pressure recommendations.

BEFORE BLEEDING

Verify that the power steering hoses do not touch any part of the vehicle and that there are no leaks or loose connections. When filling the power steering pump reservoir, use only new, name brand premium quality power steering pump fluid. Do not use transmission fluid.

BLEEDING PROCEDURE

1 - Do not start the engine until the power steering system is fully bled.
2 - Raise the front end of the vehicle so that the front wheels are free to turn left and right.
3 - Turn the steering wheel fully to the left.
4 - Fill the power steering pump reservoir to full cold level. Leave the cap off the reservoir.
5 - With an assistant watching the fluid level, turn the steering wheel slowly and smoothly from lock to lock until the fluid level drops in the reservoir. Once the fluid level drops, have your assistant refill the reservoir to full cold level.
6 - If the fluid level does not drop in the reservoir after a few lock to lock cycles, there is still air in the system. On systems with an oil cooler, you may need to turn the steering wheel slowly and smoothly from lock to lock 20 to 40 times.
7 - After the reservoir fluid level drops and the reservoir is refilled, turn the steering wheel slowly and smoothly from lock to lock and verify that there are no bubbles or fluid level drops.
8 - Disable the engine from starting, then crank the engine for a few seconds. If the reservoir fluid drops, there is air trapped in the system. Continue above steps until the fluid in the reservoir remains constant and no air bubbles are seen.
9 - Lower the front wheels to the ground, start the engine and verify that the power steering fluid is at the correct level. Add fluid if necessary then reinstall reservoir cap. With the engine running, turn the steering wheel lock to lock and verify that the power steering assist is working properly, that there are no system leaks and that the reservoir is at the proper level.

NOTE

The power steering fluid level should not rise in the reservoir when the engine is turned off. If the fluid level rises, there is still air trapped in the system. Repeat the above bleeding procedure. Bubbles in the reservoir indicate a loose hose connection, a bad O-ring or a bad hose end/flare seat. A properly working power steering system has no air bubbles.

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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.

Use only clear, name brand, premium, racing or 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.

- On systems with coolers, winches, or Rock Ram assist you may need to cycle in excess of 40 times.
- 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 check.

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

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.

The pump cannot have a max volume exceeding 2 gallons per minute UNLESS **you have a system (such as Hydroboost braking systems)** that includes an additional amount of fluid over the stock amount. Why? If you run just from the pump to the rack, then back to the pump, excessive heat is the enemy. Any more than 2 gallons per minute could damage the rack. Systems with additional fluid and routing allow the fluid to cool, allowing some pumps with higher outputs. Unfortunately, higher output pumps may result in slightly less resistance in the steering wheel. This, of course, is a matter of preference for the driver.

Our power racks have standard limits for power steering pumps, however Steeroids WILL work with all stock power steering pumps. If you have an aftermarket pump that you are considering using with our kit, please refer to the following information:
The pump cannot have a max pressure exceeding 1250-1300 lbs.

All power steering systems are designed to be self-bleeding, but sometimes they need a little help. After installing new components, fill the reservoir and let it sit for a few minutes. Raise the front end of the vehicle and turn the wheels back and forth slowly with the engine off to allow the steering box to draw fluid. Keep the reservoir full. When the fluid level stops dropping, start the vehicle and continue turning the wheels. When the fluid level remains constant the system is fully bled.

IMPORTANT NOTE: All GM power steering pumps generate approximately 1,000 to 1,200 PSI of line pressure. This is compatible with GM steering boxes and GM rack and pinion units. If these pumps are used with a Mustang II rack and pinion, the steering will feel too sensitive on the highway. This can be corrected by adjusting the pump's flow control valve to generate the proper pressure for the Mustang rack.

When trying to determine what is causing a problem in your power steering, keep this in mind. If the problem occurs only in one direction, the problem is probably in the box or rack. If the problem is in both directions, it is most likely the pump, dirty fluid or hoses

This FLOW CONTROL VALVE will eliminate the "twitchy feel" of your power rack & **pinion with a GM pump. The GM pump puts out 3 gallons per minute of flow, and the optimum rate for the Mustang Power Rack is 2 gallons per minute.** This valve is the solution to that problem, it will lower the flow down to the OEM Ford approved 2 gallons per minute. This valve easily installs on the back side of the pump.