

**PRIOR TO REPLACEMENT OF A LEAKING STEERING UNIT, CHECK FOR THE FOLLOWING CONDITIONS:**

Most R&P steering units are replaced because they have developed leaks.

- In many cases the pump has been run out of oil several times before the steering unit is serviced.
- All lubrication of the pump comes from the power steering fluid. Just like your car engine, the pump will begin to destroy itself when the lubrication is lost. This will cause the pump to distribute steel and aluminum shavings throughout the entire system.

Before you install the new steering unit:

- Obtain a large sample of oil from the reservoir and pour it through a coffee filter or a clean napkin. If any metal debris is found, the pump must be replaced and the system flushed before the new R&P is installed. **FAILURE TO DO THIS WILL VOID THE WARRANTY AND CAUSE THE STEERING UNIT TO PERFORM IMPROPERLY!!!**
- If the oil is discolored and/or there is a brown residue inside the pump reservoir, this is an indication of overheating. This burnt oil will flake off and find its way into the R&P unit causing a leak. In this case, the pump, reservoir and lines need to be replaced. **FAILURE TO DO THIS WILL VOID THE WARRANTY AND CAUSE THE STEERING UNIT TO PERFORM IMPROPERLY!!!**

**CAUTION: PLEASE READ AND UNDERSTAND PRIOR TO SERVICE**

- Flush the entire hydraulic system per the attached instructions.
- If the hydraulic lines between the steering unit and the power steering pump are more than two years old, it is recommended that they be replaced.
- Bleed the entire hydraulic system per the attached instructions.

If, after following the procedures outlined, the problem of no power assist at idle persists, then contamination is still present in the system. Please follow the procedures outlined below to remove the remaining contamination:

1. On the steering unit, remove the solenoid assembly and clean the plastic screen. Reinstall the solenoid assembly.
2. On the power steering pump, please perform the following:
  - Remove pressure line from the pump
  - Remove 27 mm pressure line fitting from the pump.
  - Remove spring-loaded valve and spring.
  - Clean the valve and spring with solvent. Inspect valve bore for contamination and clean as required. Blow dry the valve with compressed air.
  - Coat the valve with the recommended power steering fluid and reinstall the valve and spring in the same manner as they were taken out.
  - Use a screwdriver or pick to push on the valve to check for free movement in the bore. If the valve still sticks, repeat the cleaning procedure until the valve moves freely.
  - Reinstall the 27 mm pressure line fitting and pressure line.

**IMPORTANT INSTRUCTIONS/WARRANTY INFORMATION: PLEASE READ**

FAILURE TO PROPERLY FLUSH THE POWER STEERING SYSTEM WILL VOID YOUR WARRANTY

**FLUSHING PROCEDURE:**

Disable the ignition system to guard against an accidental start-up of the vehicle. For diesel applications, this will not be possible and it may be necessary to turn the pump over by hand in order to flush the system.

Next, disconnect the return line from the reservoir and place it in a drain pan. Fill the reservoir with new, CLEAN fluid and crank the engine over while slowly turning the steering wheel from left to right making sure not to let the reservoir run dry. Fill the reservoir several times with clean fluid in order to insure the system has been flushed and is now clean.

After flushing the system, fill with clean fluid ONLY.

Proof that this procedure has been followed and performed must be noted on the repair order for any warranty to be valid. All port threads were in good condition after assembly and testing. Use proper torque specifications when tightening the power steering hose fittings. NO WARRANTY WILL BE ISSUED FOR STRIPPED THREADS.

To complete the installation, reconnect the ignition system. Top off the reservoir and start the engine. Slowly turn the wheel from left to right making sure not to run the pump dry. Finish the job by checking for leaks in the system.

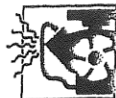
# INSTRUCTION SHEET

FOR EFFECTIVE REPAIR, USE ALL PARTS IN KIT REGARDLESS OF ORIGINAL CONDITION

## Bleeding Air from Power Steering Systems

Read instructions carefully before proceeding.

**Before bleeding:** Inspect steering system. Check, and correct as needed:



Hoses must not touch any other part of vehicle.

- Steering system noise could be caused by hose touching frame, body, or engine.



All hose connections must be tight.

- Loose connections might not leak but could allow air into system.

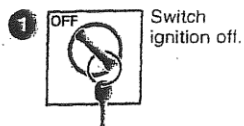
### When to bleed:

After any component replacement  
After disconnecting fluid line  
In case of steering system noise

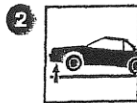
### Why bleed?

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

### How to bleed:



1 OFF Switch ignition off.



2 Raise front wheels off ground.



3 Turn steering wheel full left.



4 Fill fluid reservoir to "FULL COLD" level. Leave cap off.



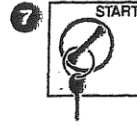
5 With assistant checking fluid level and condition, turn steering wheel lock-to-lock at least 20 times. Engine remains off.

- On systems with long return lines or fluid coolers, turn steering wheel lock-to-lock at least 40 times.
- Trapped air may cause fluid to overflow. Thoroughly clean any spilled fluid to allow for leak check.
- Keep fluid level at "FULL COLD."

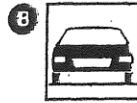


6 While turning wheel, check fluid constantly.

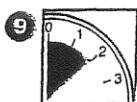
- No bubbles are allowed.
- For any sign of bubbles, recheck connections. Repeat step 5.



7 START Start engine. With engine idling, maintain fluid level. Reinstall cap.



8 Return wheels to center. Lower front wheels to ground.



9 Keep engine running for two minutes.



10 Turn steering wheel in both directions.

### Verify:

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

11 If all proper conditions apply, procedure is complete.

12 If any problem remains, see "Special Conditions."

### Special Conditions:

#### Fluid



- Foam or bubbles in fluid  
Fluid must be completely free of bubbles. In step 5, be alert to periodic bubbles that could indicate a loose connection or leaky O-ring seal in either the return hose or pressure hose.
- Discolored fluid  
(milky, opaque, or light tan color)

Switch ignition off. Wait two minutes. Recheck hose connections. Repeat steps 7-10. If condition still exists, replace and check a possible cause:

- Return hose clamps
- Return hose O-ring
- Pressure hose O-rings
- Gear cylinder line O-rings

Fill system and repeat bleed procedure for each possible cause. Repeat steps 7-10 to verify whether noise has been eliminated.

#### Noise



- Pump whine or groan

With engine running, recheck hoses for possible contact with frame body or engine. If no contact is found, follow either method below to cool down fluid and repressurize system.

#### Method 1: Normal Cool Down

Switch engine off. Wait for system to cool. Install reservoir cap.

#### Method 2: Partial Fluid Replacement

Switch engine off. Use a suction device to remove fluid from reservoir. Refill with cool, clean fluid. Install reservoir cap.

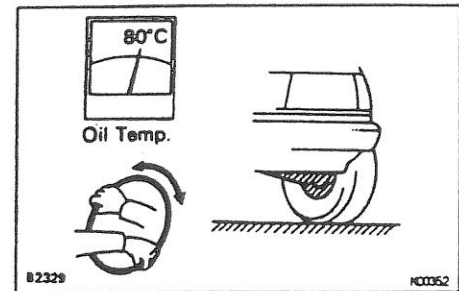
After either method of cooling, start engine and allow engine to come up to operating temperature. If noise persists, remove and replace power steering pump. Repeat bleed procedure following pump replacement.

## IMPORTANT INSTRUCTIONS AND WARRANTY INFORMATION

### FAILURE TO CHECK THE POWER STEERING SYSTEM FOR LOW OIL PRESSURE WILL VOID YOUR WARRANTY

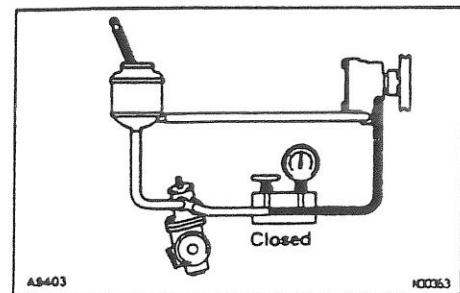
If low pressure is suspected as the cause of steering concern, perform the Oil Pressure Check. Before replacing parts, it is necessary to determine if the trouble with the steering system lies with the Power Steering Pump or with the Rack and Pinion Gear Housing.

- 1) Disconnect the pump pressure line from the steering rack control valve housing.
- 2) Connect the gauge side of the pressure tester to the line.
- 3) Connect the valve side of the tester to the rack control valve.
- 4) **MAKE SURE THE TESTER VALVE IS OPEN.**
- 5) Bleed the system (refer to repair manual).
- 6) Check for proper fluid level.
- 7) Start engine and run at idle speed.
- 8) Turn lock to lock several times to boost fluid temp. to 80°C (176°F).



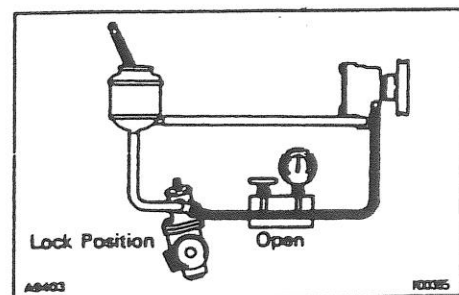
- 9) Briefly (max of 10 seconds) close test valve and record pressure.

- ✓ Compare "valve closed" readings with specs (repair manual); if readings are low then the power steering pump should be replaced.



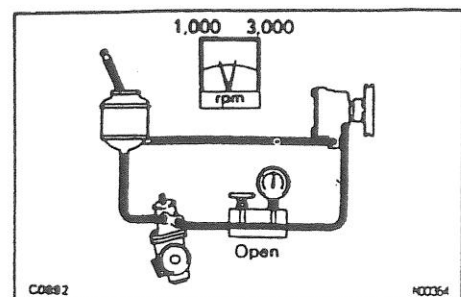
- 10) With the valve open, record pressure readings with steering wheel at full lock.

- ✓ Compare the "full lock" reading to specs. If the reading is low the steering gear valve has an internal leak and the rack should be replaced.



- 11) With the valve open, check and record the pressure reading at 1000 rpm and then again at 3000 rpm.

- ✓ If pressure difference between the readings at 1000 and 3000 rpm exceeds the max pressure listed in the repair manual then the power steering pump needs to be replaced or repaired.



## TO INSURE PROPER INSTALLATION AND OPERATION OF

### **Pulley:**

**Never hammer on the shaft in order to free the pulley.**

Use a suitable puller to remove the pulley from the pump shaft.

If the pulley is pressed on, use the proper installation tools to reinstall the pulley back on the shaft.

**Caution: Never use a press or hammer to remove or install the pulley onto pump shaft.**

**Using any other method to install the pulley will damage the pump and void the warranty.**

### **Hoses:**

**Always inspect hoses that are more than two years old and replace them if they show wear or lack of flexibility.**

Old hoses contain residue that can harm the new pump and void the warranty.

Worn hoses cannot always be detected by outside inspection, since they can go bad from the inside out.

**It is very important to replace all bad hoses before starting the car.**

### **Reservoir:**

All reservoirs must be cleaned. Some reservoirs have a screen inside. Use a flashlight to make sure the screen inside of the reservoir is not blocked.

Failure to thoroughly clean and flush the reservoir with clean power steering fluid will allow contamination from the reservoir to enter into the steering system, causing system malfunction.

**All original hardware from the reservoir supplied with the new pump needs to be included in the core box for full core credit.**

### **Sensor:**

If your pump has a sensor it is necessary to transfer the original sensor and its components to the replacement pump. If these components are not transferred correctly, shaft seal failure results due to excessive pressure. Be sure to thoroughly clean the sensor and its components.