

SR51—Power Steering



1. Description

This procedure describes replacement, and inspection requirements for collision-damaged power steering systems. Requirements for hydraulically powered, electrically powered, and electrically powered hydraulic steering systems are included.



2. Purpose

The purpose of this procedure is to provide industry-accepted requirements for performing high-quality repair of power steering systems. This procedure is intended for use by professionals who are qualified through training and experience.



3. Referenced Documents

The following documents are considered part of this procedure by reference.

3.1 Procedures

- HM01 Hazardous Materials
- PS01 Personnel Safety
- SR01 Steering, Gearbox
- SR11 Steering, Rack-And-Pinion
- SR21 Steering Column
- SR41 Knuckle And Spindle
- WA01 Wheel Alignment, Front
- WA11 Wheel Alignment, Rear

3.2 Other Information

- Equipment-specific information
- Vehicle-specific diagnostic information
- Vehicle-specific repair information



4. Equipment And Material Requirements

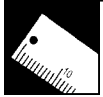
4.1 Equipment

The use of this equipment is included in this procedure:

- belt-tension gauge
- power steering pressure-test gauge, with adapters
- vehicle-specific power steering hose-removal tools
- fluid recovery or containment equipment
- pulley removal and installation tools

Electrically powered and electrically powered hydraulic steering systems may require these additional items:

- digital volt-ohmmeter (DVOM)
- jumper wires
- vehicle-specific scan tools



5. Damage Analysis

5.1 General Damage

Inspect power steering system parts for these conditions:

- visible damage or misalignment
- fluid contamination
- corrosion on sealing and wear surfaces
- improper previous repairs
- fluid leaks
- worn or damaged mounting bushings
- unusual noises
- improper operation
- belt wear or misalignment
- pulley misalignment
- damaged hoses, lines, or fittings

Plan to replace any damaged or worn parts. For replacement of the gearbox on systems using a hydraulically powered gearbox, see **SR01**. For replacement of a **rack-and-pinion assembly**, see **SR11**.

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5. Damage Analysis (cont'd)

5.2 Power Steering Pump

Inspect a power steering pump for these conditions:

- visible damage
- corrosion on sealing or wear surfaces
- improper previous repairs
- low or contaminated fluid
- damaged, worn, or misaligned belt
- pulley damage or misalignment
- improper belt routing, or tension if applicable
- fluid leaks
- unusual noises
- binding of pump
- binding of electrical motors
- vibration
- damaged or loose mounts

5.3 Power Steering Gear Assembly

Inspect power steering gearbox or rack-and-pinion assemblies for visible leaks, damage, or misalignment.

5.4 Electrical Diagnosis

Inspect electrically powered and electrically powered hydraulic steering systems for these conditions:

- visible damage or misalignment of electric motors, pumps, mounting brackets, and other related electrical parts
- damaged electrical wiring or connectors
- blown fuses
- proper operation of the power steering system warning lamp

Perform the vehicle maker's electronic power steering diagnostic tests to identify system damage. Replace any parts that fail the diagnostic tests.



6. Personnel Safety

6.1 General Safety

General safety information is in **PS01**.

6.2 Safety With Steering Systems

To prevent injury when working with steering systems:

- Check fluid levels and add fluid only when the engine is not running.
- Use the proper tools, and follow the equipment and vehicle makers' recommendations.



7. Environmental Safety

7.1 Hazardous Materials

Hazardous material safety information is in **HM01**.



8. Vehicle Protection

8.1 Steering System

To protect the power steering system from damage:

- Make sure the vehicle is properly supported during service.
- Do not use steering parts that have been heated, damaged, bent, or straightened.
- Torque fasteners to the vehicle maker's recommendations.
- Do not overtighten pressure lines.
- Do not pry against the pump when adjusting the belt.
- Do not start the engine without the proper amount of power steering fluid in the system.
- Use the recommended power steering fluid to fill the pump. Do not overfill.
- Replace any worn parts and one-time fasteners, as required.
- Make sure cotter pins are the proper size and properly locked. Do not reuse cotter pins.

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8. Vehicle Protection (cont'd)

8.2 Electronic Parts

To protect computers and other sensitive parts from damage in electrically powered and electrically powered hydraulic steering systems:

- Follow the vehicle maker's recommendations for recording and resetting **electronic memories**.
- Disconnect and isolate the negative battery cable, and disarm the **passive restraint system**. Follow the vehicle maker's recommendations.
- Protect modules, connectors, and wiring from dirt, heat, static electricity, and moisture.
- Loosen or remove any wiring harnesses or electrical parts that could be damaged during the repair process.



9. Repair Procedure

9.1 Power Steering Hydraulic Pump Replacement

To replace a power steering pump:

- 1. Disconnect and cap all hoses. Replace damaged or worn hoses.
- 2. Loosen adjustment brackets, if required.
- 3. Remove the pump drive belt.
- 4. Disconnect and remove the pump assembly.
- 5. Transfer the pump pulley to the replacement pump.
- 6. Position and install the replacement pump assembly, duplicating the original mounting method.
- 7. Reinstall and tighten the belt. Replace the belt if it is damaged or worn. Torque fasteners to the vehicle maker's recommendations.
- 8. Reconnect the hoses. Replace damaged or worn O-ring seals.
- 9. Drain and flush the power steering system, if required. Follow the vehicle maker's recommendations.
- 10. Fill the system with the recommended power steering fluid.
- 11. Bleed the pump system. Recheck and fill the power steering fluid to the proper level.
- 12. Perform a pump pressure test, following the vehicle maker's recommendations.
- 13. Check the pump and hoses for fluid leaks.
- 14. Continue vehicle reassembly.
- 15. Road-test the vehicle. See **11.2**.
- 16. Refill the power steering fluid to the proper level.

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9. Repair Procedure (cont'd)

9.2 Electrically Powered And Electrically Powered Hydraulic Steering System Parts Replacement

Depending on the system design, electrically powered and electrically powered hydraulic steering systems may consist of one part, integrated with other steering parts, or separate parts. Refer to the vehicle maker's recommendations for parts replacement.



10. Use Of Recycled (Salvage) Parts

10.1 Condition Of Salvage Parts

Use care in selecting and using salvage steering parts. Compare salvage parts to the original parts. Inspect salvage parts for any defects. Use **magnaflux** or a **dye penetrant** if necessary.

Do not install salvage power steering parts with these defects:

- visible damage
- evidence of improper previous repairs
- fluid leaks
- evidence of flood or water damage
- excessive wear
- evidence of fluid contamination

Do not install salvage bushings or fasteners.



11. Inspection And Testing

11.1 Power Steering System Inspection

When repairs are completed, inspect a power steering system for these conditions:

- proper installation of all fasteners, brackets, clamps, and retaining clips
- proper wire harness routing, if applicable
- no fluid leaks
- proper power steering fluid level
- proper lubrication of parts
- proper routing and tension of belts
- proper routing of hoses
- proper operation of the power steering warning lamp, if applicable

Correct any defects.

11.2 Road-Test

Road-test the vehicle after repairs to inspect for these conditions:

- power steering system noises
- abnormal steering effort
- poor steering control
- fluid leaks
- evidence of foam in the fluid reservoir
- proper operation of the power steering warning lamp, if applicable

Correct any defects.