
SECTION 6A

POWER STEERING SYSTEM

TABLE OF CONTENTS

Description and Operation	6A-2	Checking and Adding Fluid	6A-6
Power Steering System	6A-2	Fluid Reservoir	6A-7
Component Locator	6A-3	Hoses and Pipes	6A-7
Power Steering System	6A-3	Power Steering Pressure Switch	6A-12
Diagnostic Information and Procedures	6A-4	Specifications	6A-13
Power Steering System Pressure Test	6A-4	Fastener Tightening Specifications	6A-13
Power Steering System Leak Test	6A-4	Special Tools and Equipment	6A-13
Power Steering Belt Tension Test	6A-5	Special Tools Table	6A-13
Repair Instructions	6A-6	Schematic and Routing Diagrams	6A-14
On-Vehicle Service	6A-6	Power Steering Pressure Switch	6A-14
Bleeding the Power Steering System	6A-6		

DESCRIPTION AND OPERATION

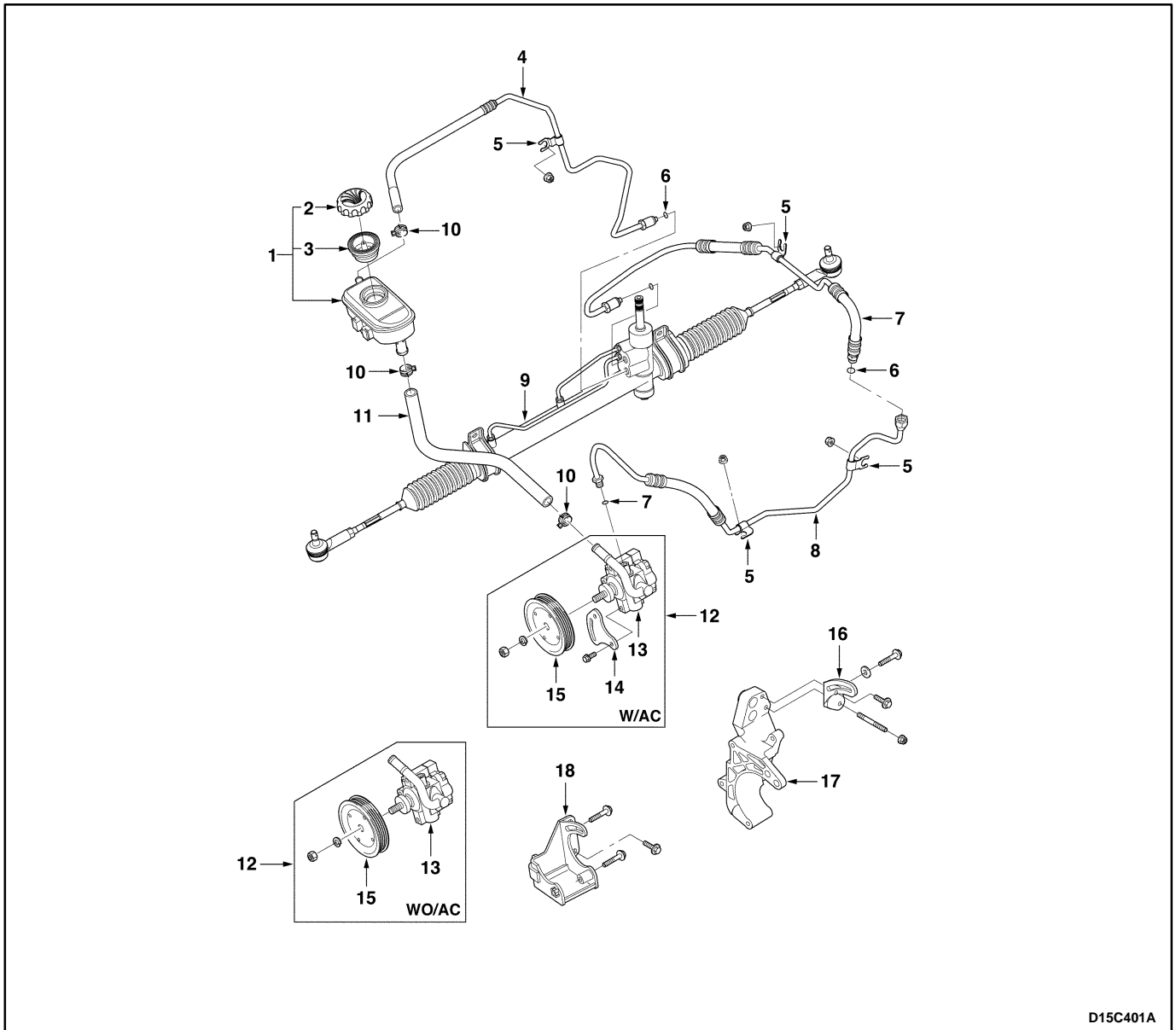
POWER STEERING SYSTEM

The power steering system consists of three components: the power steering pump, the power steering fluid reservoir and the the power steering rack and pinion gear. The power steering pump is a vane-type pump providing hydraulic pressure for the system and is powered by the engine. It draws on the power steering fluid reservoir, which in turn is connected to the power steering gear. A pressure-relief valve inside the flow control

valve limits the pump pressure. The power steering rack and pinion gear has a rotary control valve which directs hydraulic fluid coming from the power steering pump to one side or the other side of the rack piston. The integral rack piston is attached to the rack. The rack piston converts hydraulic pressure to a linear force which moves the rack to the left or the right. The force is then transmitted through the tie rods and the tie rod ends to the steering knuckles, which turn the wheels.

COMPONENT LOCATOR**POWER STEERING SYSTEM**

(Left-Hand Drive Shown, Right-Hand Drive Similar)



D15C401A

- | | |
|--|--|
| 1. Power Steering Oil Reservoir | 11. Supply Line Hose |
| 2. Power Steering Oil Reservoir Cap | 12. Power Steering Pump Assembly |
| 3. Power Steering Oil Reservoir Shield | 13. Power Steering Pump |
| 4. Return Line | 14. Front Bracket |
| 5. Clamp | 15. Power Steering Pump Pulley |
| 6. O-Ring | 16. Rear Bracket |
| 7. Gear Pressure Pipe | 17. Main Bracket (A/C & P/S) |
| 8. Pump Pressure Pipe | 18. Power Steering Pump Bracket
(Non A/C) |
| 9. Power Steering Gear | |
| 10. Clip | |

DIAGNOSTIC INFORMATION AND PROCEDURES

POWER STEERING SYSTEM PRESSURE TEST

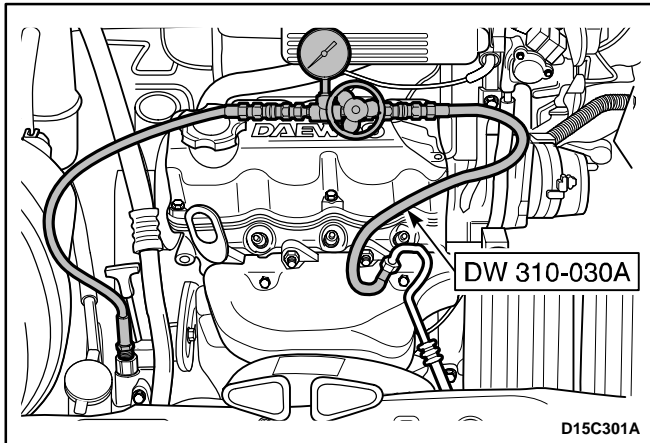
Check the fluid pressure as follows to determine whether the trouble is in the pump or the gear unit.

Tools Required

DW310-030A Pressure Test Gauge Kit

Test Procedure

1. Check the power steering fluid level and the pump drive belt tension. Refer to "Checking and Adding Fluid" in this section and *Section 5B, Power Steering Pump*.
2. Disconnect the high pressure line at the pump. Use a small container to catch any fluid.
3. Connect the hose of the pressure test gauge kit DW310-030A to the power steering pressure hose from the power steering pump.



4. Place the gear selector lever in NEUTRAL. Set the parking brake.
5. Open the gauge valve fully.
6. Start the engine and let it idle.
7. Turn the steering wheel from lock-to-lock several times to warm the fluid to keep the normal operating temperature.

Notice: The power steering pump could be damaged if the valve is fully closed for more than 10 seconds.

8. Close the gauge valve fully, and read the pressure.

Pump Relief Valve Pressure	5,197.7 – 5,688.1 kPa (754.1 – 825.2 psi)
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9. Immediately open the gauge valve fully and read pressure.

Pump Pressure (Pre-Load)	294.1 – 490.3 kPa (42.64 – 71.09 psi)
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10. If the pressure is within the specified limits, the problem is not in the pump. If not, replace the power steering pump.

POWER STEERING SYSTEM LEAK TEST

General Procedure

Inspect the following:

- The fluid reservoir for overflow.
- Fluid for aeration and overflow.
- The hoses for loose connections.
- The torsion bar, stub shaft and adjuster seals for leaks.
- The component sealing surfaces for damage.

Important: Verify the exact point of the leak. The point from which the fluid is dripping is not necessarily the point at which the system is leaking. When service is required, clean the leak area upon disassembly, replace the leaking seal, check the component sealing surfaces for damage and reset the torque bolt to specifications, where required.

External Leak Check

The purpose of this procedure is to pinpoint the location of the leak. In some cases, the leak can be easily located, but seepage-type leaks may be harder to find. To locate seepage leaks, use the following method:

1. With the engine off, wipe dry the complete power steering system.
2. Check the power steering fluid level in the pump's reservoir. Adjust the fluid level as necessary. Refer to "Checking and Adding Fluid" in this section.

Notice: Do not hold the steering wheel at a stop for any length of time as this can damage the power steering pump.

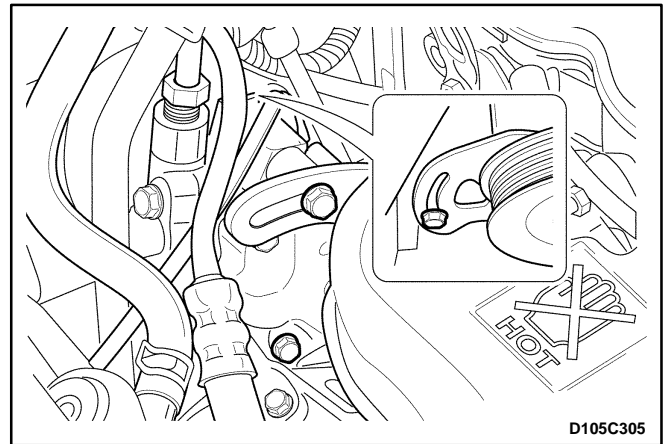
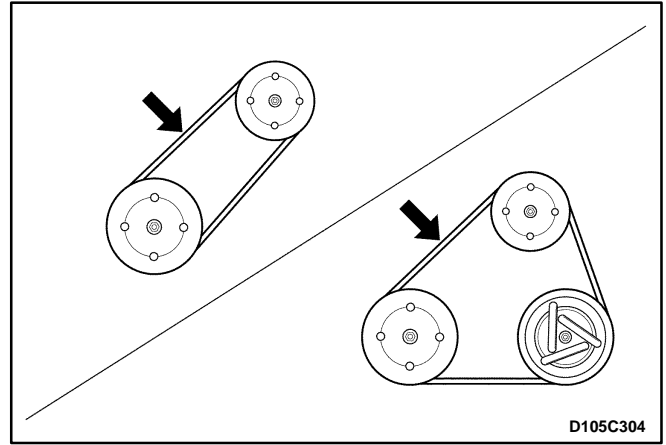
3. Start the engine. Turn the steering wheel counter-clockwise and clockwise from stop to stop several times.
4. Find the exact area of the leak and repair it.

POWER STEERING BELT TENSION TEST

1. Check the worn or damaged power steering belt. (If needed, replace it).
2. Check the tension as the looseness of belt in pushing the portion marked as an arrow in the picture on the power of about 10 kg (22 lb).

Power Steering Belt Looseness	New	8.0-9.0mm (0.31-0.35 in.)
	Old	9.0-10.0mm (0.35-0.39 in.)

3. If the looseness is not within the specified limits, loosen the power steering bolt and adjust the belt tension (If equipped with the air-conditioner).



REPAIR INSTRUCTIONS

ON-VEHICLE SERVICE

BLEEDING THE POWER STEERING SYSTEM

If the power steering hydraulic system has been serviced, an accurate fluid level reading cannot be obtained until the air is bled from the system.

Follow these steps to bleed the air from the system.

1. Turn the wheels all the way to the left and add the power steering fluid to the MIN mark on the fluid level indicator.

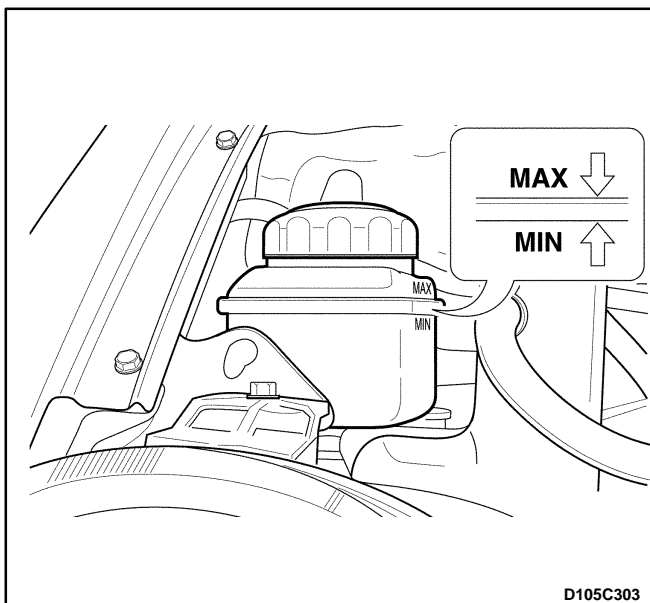
Notice: When adding fluid or making a complete fluid change, always use DEXRON®-II or DEXRON®-III power steering fluid. Failure to use the proper fluid will cause hose and seal damage and fluid leaks.

2. Start the engine. With the engine running at fast idle, recheck the fluid level. If necessary, add fluid to bring the level up to the MIN mark.
3. Bleed the system by turning the wheels from side to side without reaching the stop at either end. Keep the fluid level at the MIN mark. The air must be eliminated from the fluid before normal steering action can be obtained.
4. Return the wheels to the center position. Continue running the engine for 2 to 3 minutes.
5. Road test the car to be sure the steering functions normally and is free from noise.
6. Recheck the fluid level as described in step 1 and 2. Make sure the fluid level is at the MAX mark after the system has stabilized at its normal operating temperature. Add fluid as needed.

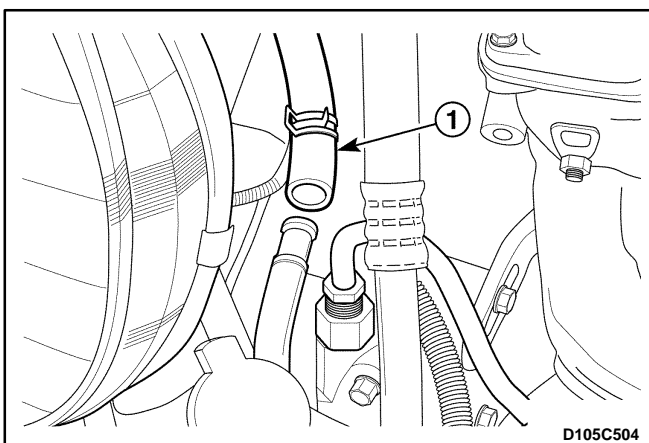
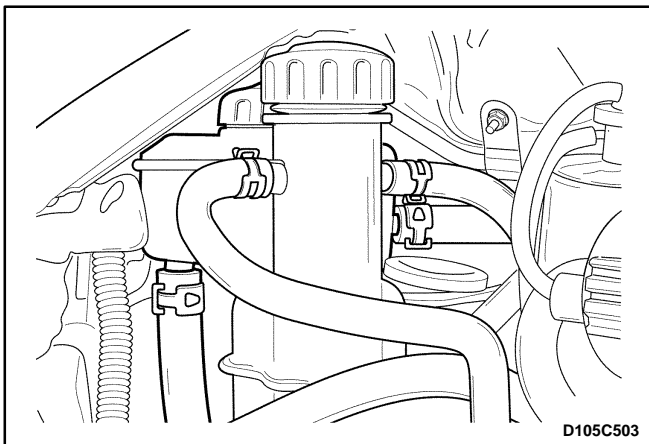
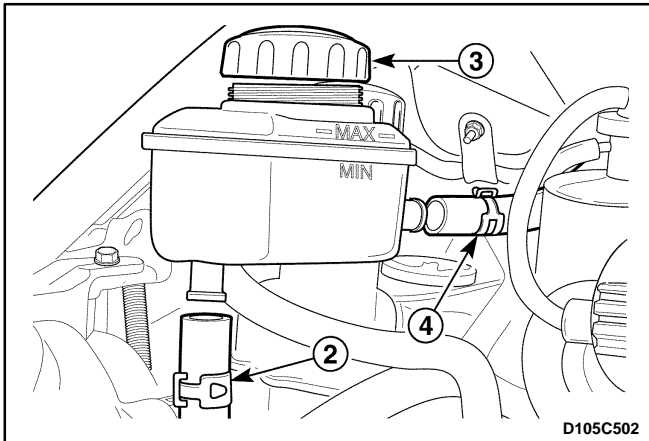
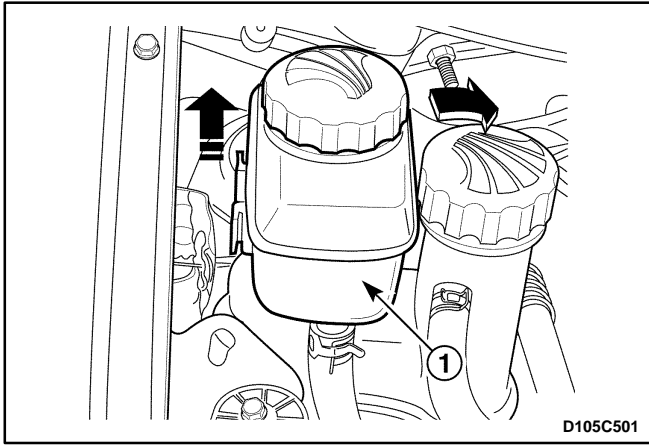
CHECKING AND ADDING FLUID

Notice: When adding fluid or making a complete fluid change, always use DEXRON®-II or DEXRON®-III power steering fluid. Failure to use the proper fluid will cause hose and seal damage and fluid leaks.

1. The power steering fluid level is indicated either by marks on a see-through fluid reservoir or by marks on a fluid level indicator on the fluid reservoir cap.
2. If the fluid is warmed up, the fluid level should be between the MAX and MIN marks. Add fluid as needed.
3. If the fluid is cool, the fluid level should be at the MIN mark. Add fluid as needed.
4. If the fluid level change is within 5mm (0.20 in.), the fluid level should be between the MAX and MIN marks. If the fluid level change is over 5mm (0.20 in.), bleed the power steering system.



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FLUID RESERVOIR

Removal Procedure

1. Remove the fluid reservoir.
 - Remove the fluid reservoir by pulling it upward (1).
 - Disconnect the supply line hose by loosening the hose clamp (2).
 - Remove the reservoir cap (3).
 - Catch the escaping fluid in a drain pan.
 - Disconnect the fluid return hose by loosening the hose clamp (4).

2. Plug the openings of both hoses to prevent the fluid loss and contamination.

Installation Procedure

1. Connect both hoses and secure the hose clamps.

Notice: When adding fluid or making a complete fluid change, always use DEXRON®-II or DEXRON®-III power steering fluid. Failure to use the proper fluid will cause hose and seal damage and fluid leaks.

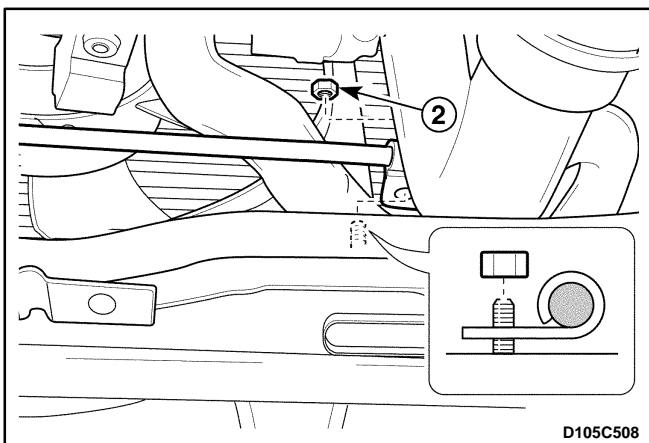
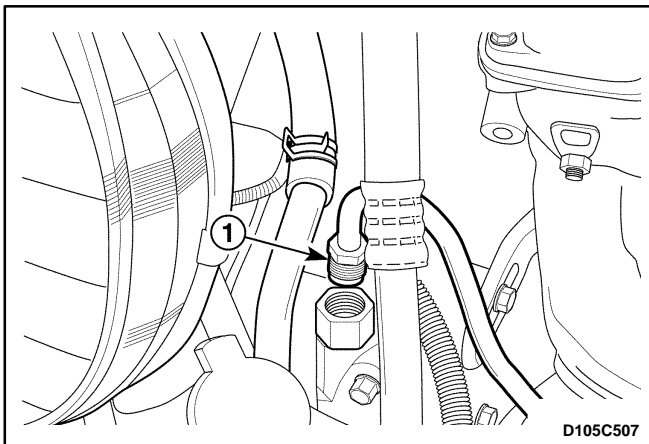
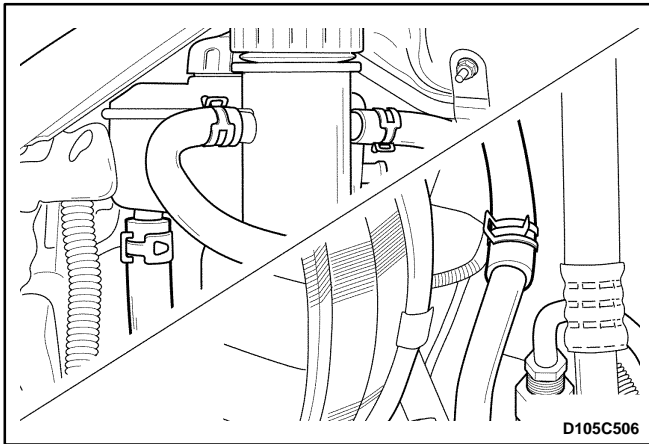
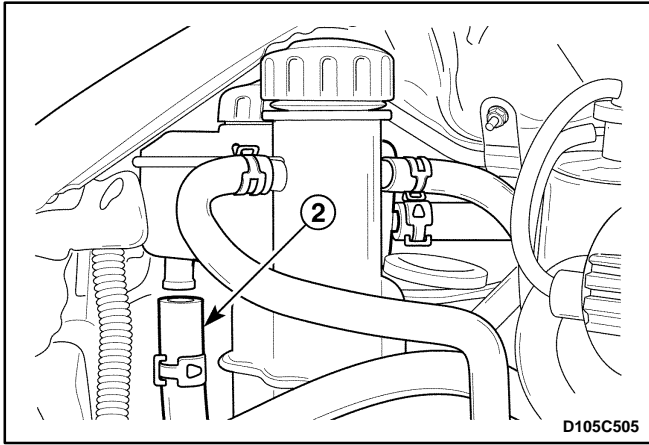
2. Fill the fluid reservoir with power steering fluid.
3. Inspect for leaks. If there are leaks, correct the cause of the leaks and bleed the system. Refer to "Bleeding the Power Steering System" in this section.

HOSES AND PIPES

Power Steering Supply Line Hose

Removal Procedure

1. Remove the power steering supply line hoses.
 - Disconnect the supply line hose from the inlet connection on the power steering pump and drain the power steering fluid (1).
 - Catch the escaping fluid in a drain pan.
 - Disconnect the supply line hose from the power steering fluid reservoir (2).



2. Plug the openings in the power steering pump and the fluid reservoir to prevent fluid loss and contamination.

Installation Procedure

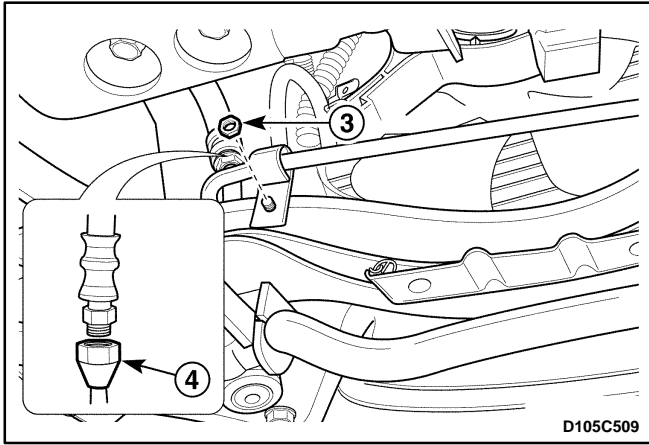
Notice: When adding fluid or making a complete fluid change, always use DEXRON®-II or DEXRON®-III power steering fluid. Failure to use the proper fluid will cause hose and seal damage and fluid leaks.

1. Connect the supply line hose to the power steering fluid reservoir.
2. Connect the supply line hose to the inlet connection on the power steering pump.
3. Fill the fluid reservoir with power steering fluid.
4. Inspect for leaks. If there are leaks, correct the cause of the leaks and bleed the system. Refer to "Bleeding the Power Steering System" in this section.

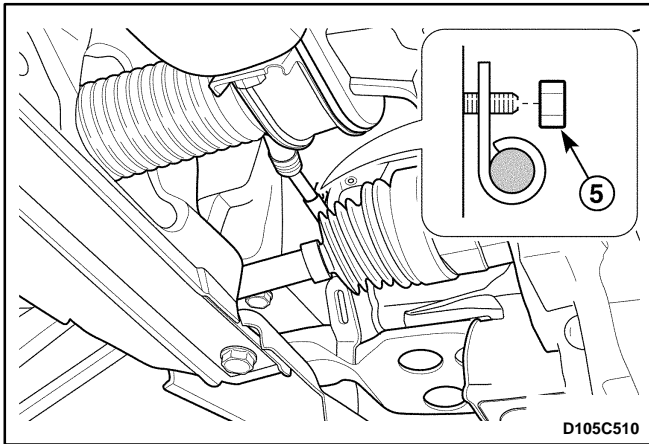
Power Steering Pressure Line (Left-Hand Drive Shown, Right-Hand Drive Similar)

Removal Procedure

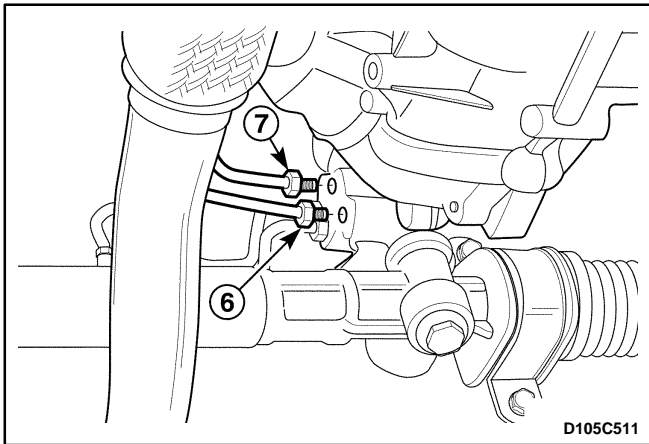
1. Remove the power steering pressure line.
 - Disconnect the pressure line pipe fitting from the outlet connection on the power steering pump (1).
- Raise and suitably support the vehicle.
- Loosen the clamp nut of the pressure line pipe (2).



- Loosen the clamp nut of the pressure line pipe (3).
- Loosen the coupling nut which is connected with the pressure line pipe (4).

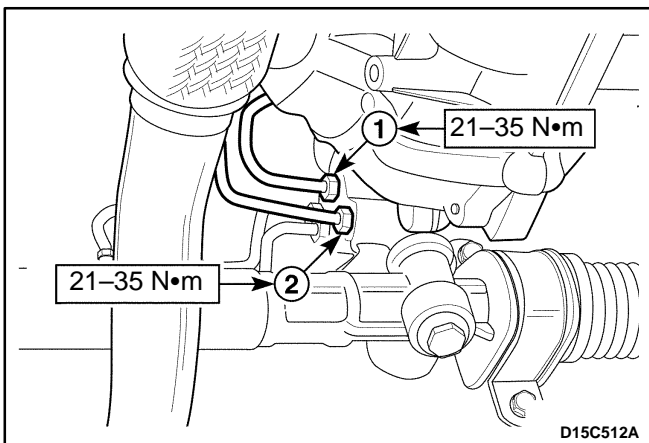


- Loosen the clamp nut of the pressure line pipe (5).



- Disconnect the return line pipe fitting from the power steering gear (6).
- Disconnect the pressure line pipe from the power steering gear (7).

2. Remove the power steering pump pressure line.
3. Plug the openings in the power steering pump and the steering gear to prevent fluid loss and contamination.



Installation Procedure

1. Install the power steering pump pressure line and the supply line.

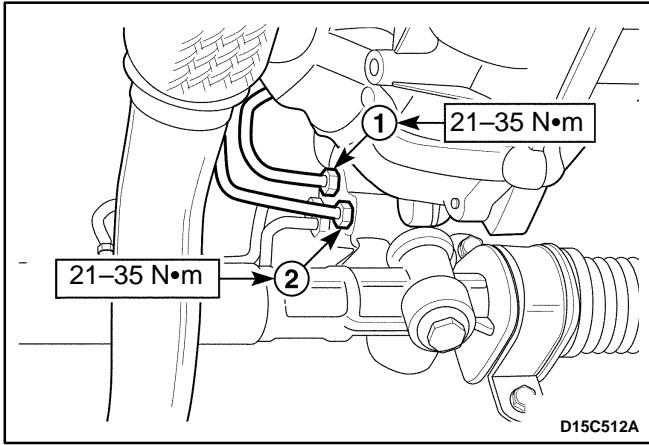
Notice: When adding fluid or making a complete fluid change, always use DEXRON®-II or DEXRON®-III power steering fluid. Failure to use the proper fluid will cause hose and seal damage and fluid leaks.

2. Connect the pressure line inlet pipe to the steering gear with the fitting (1).

Tighten

Tighten the steering gear inlet pipe fitting to 21-35 N•m (16-26 lb-ft).

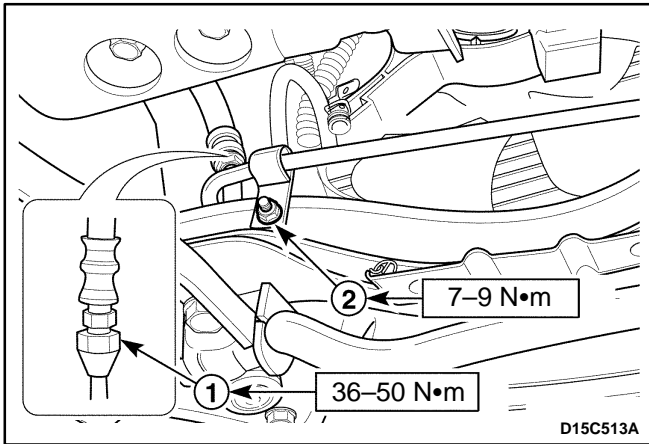
6A – 10 POWER STEERING SYSTEM



3. Connect the return line pipe to the steering gear (2).

Tighten

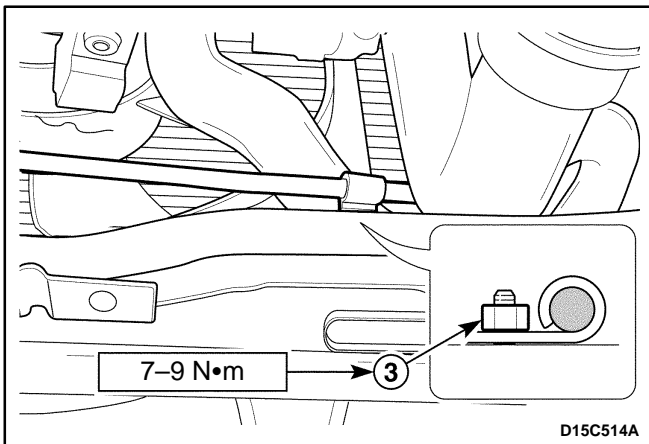
Tighten the return line pipe fitting to 21–35 N•m (16–26 lb-ft).



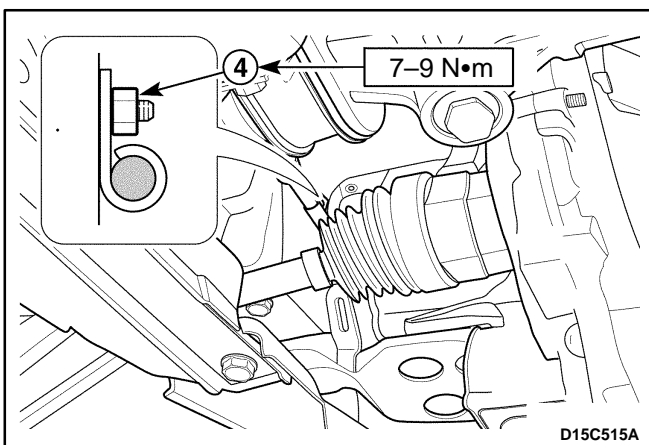
4. Connect the pressure lines with couplings and clamp nuts.

Tighten

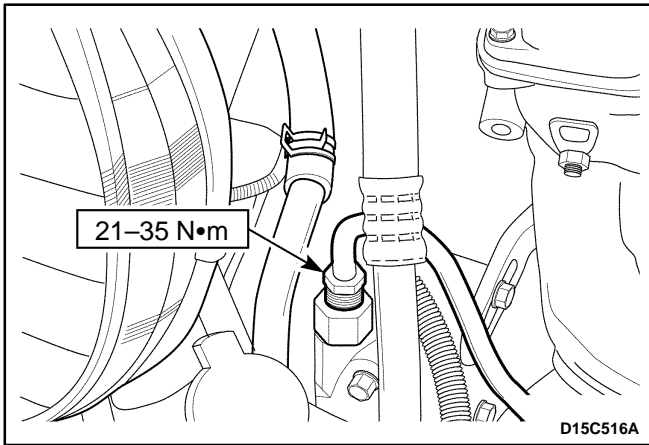
- Tighten the coupling which is connected with the pressure line pipe to 36–50 N•m (27–37 lb-ft) (1).
- Tighten the pressure line clamp nut (gear-side) to 7–9 N•m (62–80 lb-in) (2).



- Tighten the pressure line clamp nut (gear-side) to 7–9 N•m (62–80 lb-in) (3).



- Tighten the pressure line clamp nut (pump-side) to 7–9 N•m (62–80 lb-in) (4).

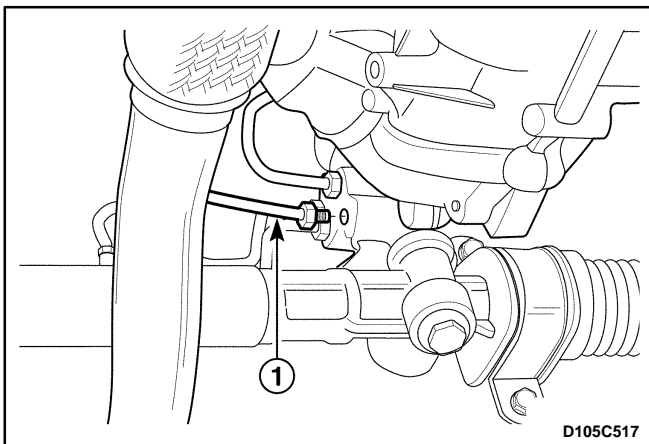


5. Connect the pressure line pipe to the outlet connection on the power steering pump.

Tighten

Tighten the power steering pump outlet pipe fitting to 21-35 N•m (16-26 lb-ft).

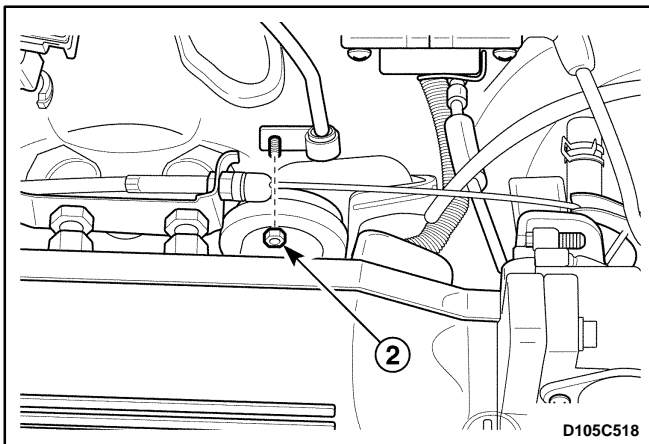
6. Fill the fluid reservoir with power steering fluid.
7. Inspect for leaks. If there are leaks, correct the cause of the leaks and bleed system. Refer to "Bleeding the Power Steering System" in this section.



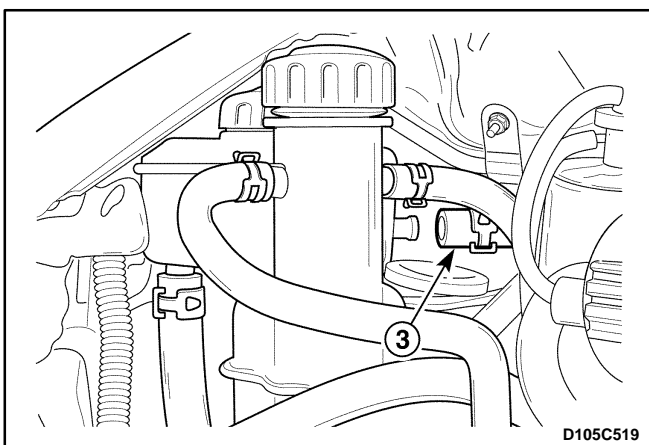
**Power Steering Return Line
(Left-Hand Drive Shown, Right-Hand Drive Similar)**

Removal Procedure

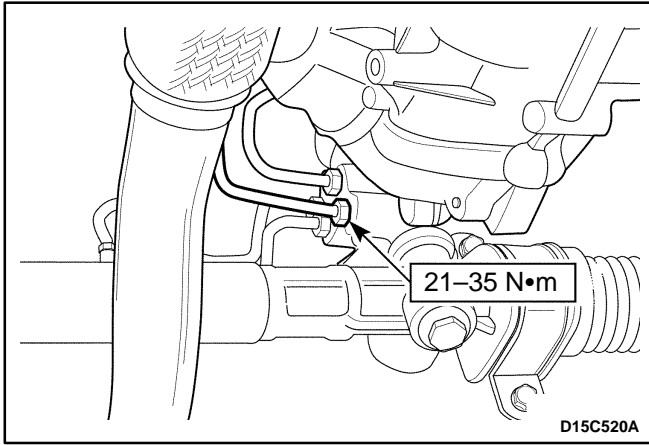
1. Remove the power steering supply line pipe.
 - Raise and suitably support the vehicle.
 - Disconnect the return line pipe from the steering gear (1).
 - Catch the escaping fluid in a drain pan.



- Lower the vehicle.
- Remove the nut (2).



- Disconnect the return line pipe house (3).
2. Plug the openings in the steering gear and the fluid reservoir to prevent fluid loss and contamination.



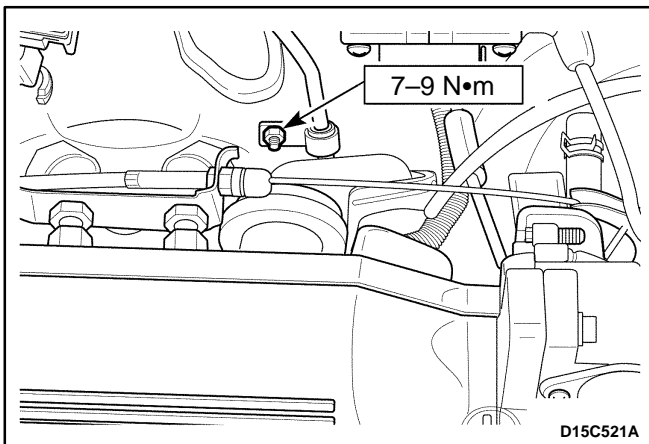
Installation Procedure

1. Raise and suitably support the vehicle.
2. Connect the return line pipe to the steering gear.

Tighten

Tighten the return line pipe fitting to 21–35 N•m (16–26 lb-ft).

3. Lower the vehicle.



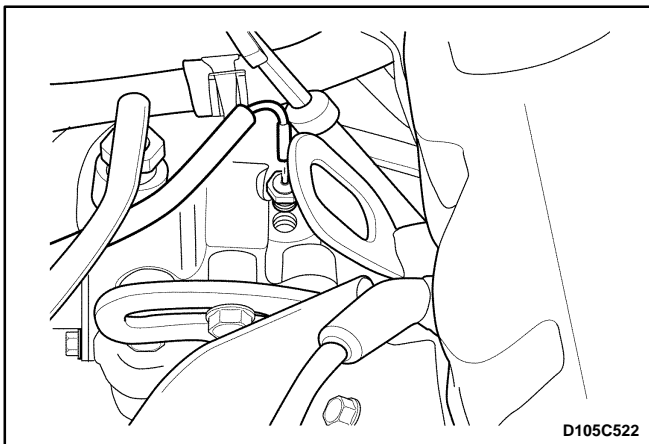
4. Connect the return line pipe hose with the clamp.

Tighten

Tighten the clamp nut to 7–9 N•m (62–80 lb-in).

Notice: When adding fluid or making a complete fluid change, always use DEXRON®-II or DEXRON®-III power steering fluid. Failure to use the proper fluid will cause hose and seal damage and fluid leaks.

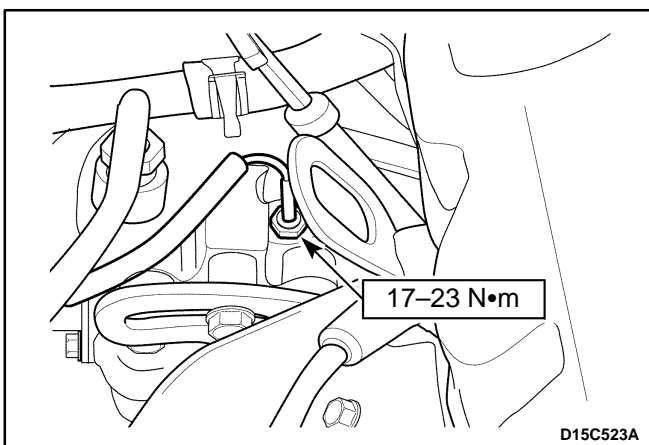
5. Fill the fluid reservoir with power steering fluid.
6. Inspect for leaks. If there are leaks, correct the cause of the leaks and bleed the system. Refer to “Bleeding the Power Steering System” in this section.



POWER STEERING PRESSURE SWITCH

Removal Procedure

1. Disconnect the electrical connector.
2. Remove the pressure switch.
3. Plug the opening in the steering pump.



Installation Procedure

1. Install the pressure switch.

Tighten

Tighten the pressure switch to 17–23 N•m (13–17 lb-ft).

2. Connect the electrical connector.
3. Inspect for leaks. If there are leaks, correct the cause of the leaks and bleed the system. Refer to “Bleeding the Power Steering System” in this section.

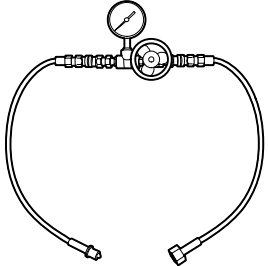
SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Application	N•m	Lb-Ft	Lb-In
Power Steering Pressure Switch	17 – 23	13 – 17	–
Power Steering Pump Pressure Line Fitting	21 – 35	16 – 26	–
Power Steering Gear Pressure Line Fitting	21 – 35	16 – 26	–
Power Steering Gear Return Line Fitting	21 – 35	16 – 26	–
Power Steering Pressure Line Coupling	36 – 50	27 – 37	–
Power Steering Pressure Line Clamp Nut	7 – 9	–	62 – 80
Power Steering Return Line Clamp Nut	7 – 9	–	62 – 80

SPECIAL TOOLS AND EQUIPMENT

SPECIAL TOOLS TABLE

 <p>D15C102A</p>	<p>DW310-030A Pressure Test Gauge Kit</p>
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SCHEMATIC AND ROUTING DIAGRAM

POWER STEERING PRESSURE SWITCH

