STEERING

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GENERAL INFORMATION

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GENERAL INFORMATION

STEERING SYSTEM AND COMPONENT DESCRIPTION

The power steering system consists of these four major components. Power Steering Pump, Power Steering Gear, Pressure Hose, and Return Line. Turning of the steering wheel is converted into linear travel through the meshing of the helical pinion teeth with the rack teeth. Power assist steering is provided by an open center, rotary type control valve. It is used to direct oil from the pump to either side of the integral steering rack piston.

Road feel is controlled by the diameter of a torsion bar which initially steers the vehicle. As required steering effort increases, as in a turn, the torsion bar twists, causing relative rotary motion between the rotary valve body and the valve spool. This movement directs oil behind the integral rack piston, which, in turn, builds up hydraulic pressure and assists in the turning effort.

Drive tangs on the power steering gear pinion shaft, mate loosely with the shaft of the steering gear. This is to allow manual steering control to be maintained, if the drive belt on the power steering pump should break. However, under these conditions, steering effort will significantly increase.

DIAGNOSIS AND TESTING

STEERING SYSTEM DIAGNOSIS CHARTS

STEERING NOISE

There is some noise in all power steering systems. One of the most common is a hissing sound evident at standstill parking. Hiss is a very high frequency noise similar to that experienced while slowly closing a water tap. The noise is present in every valve and results from high velocity fluid passing over the edges of the valve orifice. There is no relationship between this noise and the performance of the vehicles steering system. Hiss may be expected when the steering wheel is at the end of its travel or slowly turning when the vehicle is at a standstill.

CONDITION	POSSIBLE CAUSES	CORRECTION
Objectionable Hiss Or Whistle	1. Damaged or mispositioned steering column coupler to dash panel seal. 2. Noisy valve in power steering gear. 3. Mis-routed power steering hose	1. Check for proper seal between steering column coupler and dash seal. 2. Replace steering gear assembly. 3. Check for proper routing of power steering hoses and ensure they do contact other components.
Rattle Or Clunk	1. Steering gear loose on front suspension crossmember. 2. Front suspension crossmember to frame bolts or studs loose. 3. Tie rod is loose (outer or inner). 4. Loose lower control arm to front suspension crossmember bolts. 5. Loose upper control arm/ shock absorber mounting bracket to body attaching bolts. 6. Power steering fluid pressure hose touching the body of the vehicle. 7. Noise internal to power steering gear. 8. Damaged front suspension crossmember. 9. Loose stabilizer bar attaching link mounting nuts.	1. Check steering gear to front suspension crossmember mounting bolts. Tighten to specified torque if found to be loose. 2. Tighten the front suspension crossmember attaching bolts or studs to the specified torque. 3. Check tie rod pivot points for wear. Replace worn/loose parts as required. 4. Tighten control arm mounting bolts to the specified torques. 5. Check mounting bracket to body attaching bolts for looseness. If required tighten to the specified torques. 6. Adjust hose to proper position by loosening, repositioning, and tightening fitting to specified torque. Do not bend tubing. 7. Replace steering gear assembly. 8. Replace front suspension crossmember. 9. Tighten the stabilizer bar attaching link mounting nuts to the specified torque.
Chirp or squeal (in the area of the power steering pump). Particularly noticeable at full wheel travel and during standstill parking.	1. Loose power steering pump drive belt.	1. Adjust power steering pump drive belt to specified tension.

DIAGNOSIS AND TESTING (Continued)

CONDITION	POSSIBLE CAUSES	CORRECTION
Power steering pump growl results from the development of high pressure fluid flow. Normally this noise should not be high enough to be objectionable. Abnormal situations, such as a low oil level causing aeration or hose touching the vehicle body, can create a noise level that could bring complaints.		
WHINE OR GROWL (PUMP NOISE)	1. Low fluid level.	1. Fill power steering fluid reservoir to proper level and perform leakage diagnosis. (Recheck fluid level after power steering fluid is free of air.)
	2. Power steering hose touching vehicle body or frame.	2. Reposition power steering hose. Replace hose if tube ends are bent.
	3. Extreme wear of power steering pump internal parts.	3. Replace power steering pump and flush system.
SUCKING AIR SOUND	1. Loose clamp on power steering fluid low pressure hose.	1. Tighten or replace hose clamp.
	2. Missing O-Ring on power steering pressure hose connection.	2. Inspect connection and replace O-Ring as required.
	3. Low power steering fluid level	3. Fill power steering fluid reservoir to proper level and perform leakage diagnosis.
	4. Air leak between power steering fluid reservoir and power steering pump.	4. Inspect and/or replace power steering fluid reservoir or supply hose as required.
SQUEAK OR RUBBING SOUND	1. Sound coming from steering column.	1.Check for squeak in steering column. Inspect for contact between shroud, intermediate shaft, column, and steering wheel. Realign if necessary. **Note: Check steering column for noise without clockspriing installed and with the steering column shaft removed from the steering intermediate shaft. This must be done before removing the steering column for a noise complaint.**
		2. Check for lack or grease on steering column dash panel to lower coupler seal.
	2.Clockspring	3. Replace Clockspring
	3. Sound internal to steering gear.	4. Replace steering gear assembly.
SCRUBBING OR KNOCKING SOUND	1. Incorrect tire size.	1. Verify that tire size on vehicle is the same as originally supplied.
	2. Check clearance between tires and other vehicle components, through the full travel of the suspension.	2. Correct as necessary.
	3. Check for interference between steering gear and other components.	3.Correct as necessary.
	4.Incorrect steering gear supplied.	4. Replace steering gear with correct steering gear for specific vehicle.

DIAGNOSIS AND TESTING (Continued)

BINDING STICKING SEIZED

CONDITION	POSSIBLE CAUSES	CORRECTION
CATCHES, STICKS IN CERTAIN POSITIONS OR IS DIFFICULT TO TURN.	1. Low power steering fluid level.	1. Fill power steering fluid reservoir to specified level and perform leakage diagnosis.
	2. Tires not inflated to specified pressure.	2. Inflate tires to the specified pressure.
	3. Lack of lubrication in front suspension lower control arm ball joints.	3. Replace lower ball joint.
	4. Worn lower ball joint.	4. Replace the lower ball joint.
	5. Lack of lubrication in steering gear outer tie rod ends.	5. Replace tie rod end.
	6. Loose power steering pump drive belt.	6. Tighten the power steering pump drive belt to the specified tension. See accessory drive in service manual.
	7. Faulty power steering pump flow control. (Verify cause using Power Steering Pump Test Procedure.)	7. Replace power steering pump.
	8. Excessive friction in steering column or intermediate shaft.	8. Correct condition. (See Steering Column Service Procedure)
	9. Steering column coupler binding.	9. Realign the steering column to eliminate the binding condition.
	10. Binding lower ball joint.	10. Replace the lower ball joint.
	11. Excessive friction in steering gear.	11. Replace steering gear assembly.

SHAKE SHUDDER VIBRATION

CONDITION	POSSIBLE CAUSES	CORRECTION
VIBRATION OF THE STEERING WHEEL AND/OR DASH DURING DRY PARK OR LOW SPEED STEERING MANEUVERS.	1. Air in the fluid of the power steering system.	1. Steering shudder can be expected in new vehicles and vehicles with recent steering system repairs. Shudder should improve after the vehicle has been driven several weeks.
	2. Tires not properly inflated.	2. Inflate tires to the specified pressure.
	3. Excessive engine vibration.	3. Ensure that the engine is running properly.
	4. Loose tie rod end.	4. Check the inner to outer tie rod jam nut for looseness. If loose tighten to the specified torque. Inspect inner tie rod for looseness at steering gear. Inspect outer tie rod ball for excessive wear/looseness. If inner tie rod is loose replace steering gear, if outer tie has excessive wear replace tie rod end.
	5.Overcharged air conditioning system.	5.Check air conditioning pump head pressure. (See Air Conditioning Refrigerant System Diagnosis)

DIAGNOSIS AND TESTING (Continued)

LOW ASSIST, NO ASSIST, HARD STEERING

CONDITION	POSSIBLE CAUSES	CORRECTION
STIFF, HARD TO TURN, SURGES, MOMENTARY INCREASE IN EFFORT WHEN TURNING.	1. Tires not properly inflated.	1. Inflate tires to specified pressure.
	2. Low power steering fluid level.	2. Add power steering fluid as required to power steering fluid reservoir to obtain proper level. Perform leakage diagnosis on power steering system.
	3. Loose power steering pump drive belt.	3. Tighten the power steering pump drive belt to the specified tension. If drive belt is defective, replace and correctly tension.
	4. Lack of lubrication in lower control arm ball joint.	4. Replace lower ball joint.
	5. Worn lower ball joint.	5. Replace lower ball joint.
	6. Low power steering pump pressure. (Verify using Power Steering System Test Procedure)	6. Verify cause using the Power Steering System Test Procedure. Replace the power steering pump if necessary.
	7. High internal leak in steering gear assembly.	7. Check steering system using the Power Steering System Test Procedure. If steering gear is defective replace steering gear.

POOR RETURN TO CENTER

CONDITION	POSSIBLE CAUSES	CORRECTION
STEERING WHEEL DOES NOT RETURN TO CENTER POSITION.	1. Tires not inflated to specified pressure.	1. Inflate tires to specified pressure.
	2. Improper front wheel alignment.	2. Check and adjust as necessary.
	3. Steering column U-joints misaligned.	3. Realign steering column U-joints.
	4. Mispositioned dash cover.	4. Reposition dash cover.
		To evaluate items 6 and 7, disconnect the intermediate shaft. Turn the steering wheel and feel or listen for internal rubbing in steering column.
	5. Steering wheel rubbing.	5. Adjust steering column shrouds to eliminate rubbing condition.
	6. Damaged, mis-positioned or un-lubricated steering column coupler to dash seal.	6. Determine condition which exists and correct.
	7. Binding shaft bearing in steering column assembly.	7. Replace the steering column. **Note: Before replacing steering column, disconnect intermediate steering coupler from steering column shaft and remove steering wheel, clockspring and shrouds from steering column. This must be done to verify a binding shaft bearing in the steering column before replacing the steering column.**
	8. Excessive friction in steering column coupler.	8. Replace steering column coupler.
	9. Excessive friction in steering gear.	9. Replace steering gear.
	10. Excessive friction in front strut mount bearing	10. Replace the strut mount or strut mount pivot bearing.

DIAGNOSIS AND TESTING (Continued)

LOOSE STEERING

CONDITION	POSSIBLE CAUSES	CORRECTION
EXCESSIVE STEERING WHEEL KICKBACK OR TOO MUCH STEERING WHEEL FREE PLAY.	1. Air in the fluid of the power steering system.	1. Fill power steering fluid reservoir to the specified level. Perform procedure to bleed the air out of the power steering system. Perform leakage diagnosis.
	2. Steering gear loose on front suspension crossmember.	2. Check steering gear to front suspension crossmember mounting bolt torque. Tighten to specified torque if found to be loose.
	3. Worn, broken or loose steering column to steering gear coupler.	3. Check for worn universal joint, broken isolator or loose fasteners.
	4. Free play in steering column.	4.Check components of steering system and repair or replace as required. Note: Inspect steering column with steering wheel installed and steering column shaft disconnected from intermediate coupler. Verify that steering wheel attaching nut is tightened to the specified torque. Verify that the 4 mounting nuts for the steering column are tightened to the specified torque.
	5. Loose lower control arm ball joint.	5. Check and or replace the ball joint or control arm as required.
	6. Loose steering knuckle to lower ball joint stud attaching nut.	6. Check attaching nut and tighten if required to specified torque.
	7. Front wheel bearings loose or worn.	7. Tighten hub nut to specified torque or replace with new parts as necessary.
	8. Loose outer tie rod ends.	8. Check free play of outer tie rod ends and replace if required.
	9. Loose inner tie rod ends.	9. Replace steering gear assembly.
	10. Defective steering gear rotary valve.	10. Replace steering gear assembly.
	11. Intermediate steering shaft coupler flex joint binding.	11. Replace intermediate steering shaft/coupler.

DIAGNOSIS AND TESTING (Continued)

VEHICLE LEADS TO THE SIDE

CONDITION	POSSIBLE CAUSES	CORRECTION
STEERING WHEEL DOES NOT WANT RETURN TO CENTER POSITION.	1. Radial tire lead.	1.Rotate tires as recommended in the Tire And Wheel Group of this service manual.
	2. Front suspension misaligned.	2. Align the front suspension as required. Refer to the Wheel Alignment Procedure in the Suspension Group of this service manual for the required wheel alignment procedure.
	3. Wheel braking.	3. Check for dragging brakes. Refer to the procedures in the Brake Group of this service manual.
	4. Unbalanced steering gear valve. (If this is the cause, the steering efforts will be very light in direction of lead and heavier in the opposite direction.	4. Replace steering gear.
STEERING WHEEL HAS FORE AND AFT LOOSENESS.	1. Steering wheel to steering column shaft retaining nut not properly tightened and torqued.	1. Tighten the retaining nut to its specified torque specification.
	2. Steering column lower bearing spring retainer slipped on steering column shaft.	2. Replace steering column.
	3. Loose steering column to instrument panel mounting nuts.	3. Verify that the 4 mounting nuts for the steering column are tightened to the specified torque.
	4. Binding intermediate steering shaft coupler.	4. Disconnect intermediate steering coupler and see if looseness no longer exists. If yes replace intermendiate steering coupler.

POWER STEERING FLUID LEAK

CONDITION	POSSIBLE CAUSES	CORRECTION
LOW FLUID LEVEL WITH: NO VISIBLE SIGNS OF A LEAK ON THE STEERING GEAR, POWER STEERING PUMP, FLOOR OR ANYWHERE ELSE.	1. Overfilled power steering pump fluid reservoir.	1. Adjust the power steering fluid fill to the correct level.
LOW FLUID LEVEL WITH: VISIBLE LEAK ON STEERING GEAR, POWER STEERING PUMP, FLOOR OR ANYWHERE ELSE.	2. Power steering hose connections at the power steering pump or steering gear.	2. Check for loose fittings and if found, tighten the fitting to its specified torque. If fittings are tight examine the fittings for damaged or missing O-ring seals and replace as required.
	3. Power steering pump or power steering gear leaking.	3. Identify the location of the leak and repair or replace the component as required. Refer to Power Steering Pump and/or Power Steering Gear in this group of the service manual for required procedures.

DIAGNOSIS AND TESTING (Continued)

FOAMY OR MILKY POWER STEERING FLUID

CONDITION	POSSIBLE CAUSES	CORRECTION
AERATION AND OVERFLOW OF FLUID.	1. Air leaks.	1. Check for air leaking into the power steering system as described under Sucking Air Diagnosis and correct condition.
	2. Low fluid level.	2. Extremely cold temperatures may cause power steering fluid aeration if the power steering fluid is low. Add power steering fluid as required to bring level up to specification.
	3. Cracked power steering pump housing.	3. Remove power steering pump from vehicle and inspect the power steering pump housing for cracks. If a defect in the housing is found, replace the power steering pump.
	4. Water contamination.	4. Drain the power steering fluid from the system if there is evidence of contamination. Then refill the system with fresh clean power steering fluid.

POWER STEERING PUMP

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DESCRIPTION AND OPERATION

POWER STEERING PUMP OPERATION

Hydraulic pressure for the operation of the power steering gear is provided by a belt driven power steering pump (Fig. 1). The power steering pump is a constant flow rate and displacement vane type pump. The power steering pump used on all applications is the Vane-Submerged remote reservoir style power steering pump.

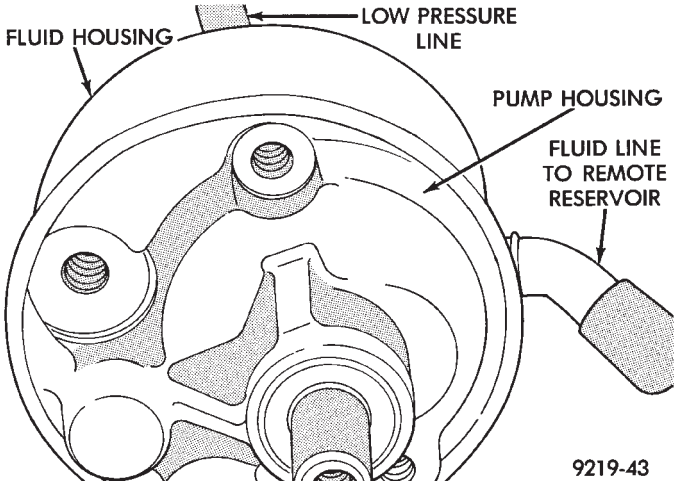


Fig. 1 Vane Submerged Remote Reservoir Power

The remote reservoir type pump (Fig. 1) has the pump housing and internal components combined with the fluid housing. But it has a remote reservoir for the power steering fluid supply.

DIAGNOSIS AND TESTING

POWER STEERING PUMP FLOW RATE AND PRESSURE TEST

The following procedure can be used to test the operation of the power steering system on the vehicle. This test will provide the flow rate of the power steering pump along with the maximum relief pressure. This test is to be performed any time a power steering system problem is present to determine if the power steering pump or power steering gear is not functioning properly. The following pressure and flow test is performed using Pressure/Flow Tester, Special Tool 6815 (Fig. 2).

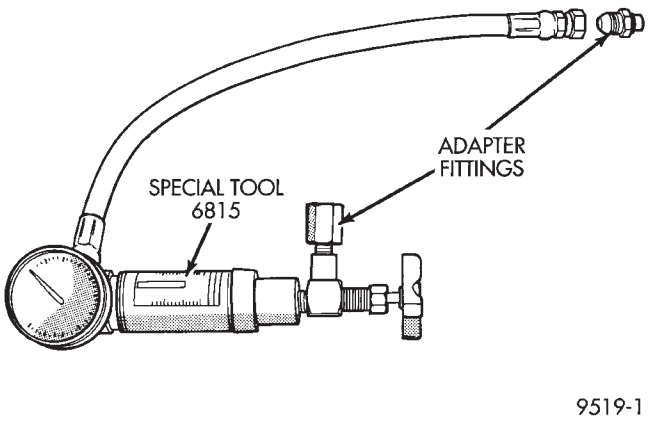


Fig. 2 Power Steering Pump Flow/Pressure Tester

DIAGNOSIS AND TESTING (Continued)

POWER STEERING PUMP FLOW AND PRESSURE TEST PROCEDURE

(1) Check power steering pump drive belt tension and adjust as necessary.

(2) Disconnect power steering fluid pressure hose, at power steering pump. Use a container for dripping fluid.

(3) Connect Pressure Gauge, Special Tool from kit 6815 to both hoses using adapter fittings. Connect spare pressure hose, to power steering pump pressure hose fitting.

(4) Completely open valve on Special Tool 6815.

(5) Start engine and let idle long enough to circulate power steering fluid through flow/pressure test and get air out of fluid. Then shut off engine.

(6) Check power steering fluid level, and add fluid as necessary. Start engine again and let idle.

(7) Pressure gauge should read below 862 kPa (125 psi), if above, inspect the hoses for restrictions and repair as necessary. The initial pressure reading should be in the range of 345-552 kPa (50-80 psi). The flow meter should read between 1.3 and 1.9 GPM

CAUTION: The following test procedure involves testing power steering pump maximum pressure output and flow control valve operation. Do not leave valve closed for more than 5 seconds as the pump could be damaged.

(8) Close valve fully three times and record highest pressure indicated each time. **All three readings must be within specifications and within 345 kPa (50 psi) of each other.**

NOTE: Power steering pump maximum relief pressure is 9653 to 10342 kPa (1400 to 1500 psi.).

- If power steering pump pressures are within the specifications but not within 345 kPa (50 psi) of each other, then replace power steering pump.
- If pressures are within 345 kPa (50 psi) of each other but below specifications, then replace power steering pump.

CAUTION: Do not force the pump to operate against the stops for more than 5 seconds at a time because, pump damage will result.

(9) Open test valve. Turn steering wheel to the extreme left and right positions until against the stops, recording the highest indicated pressure at each position. Compare pressure gauge readings to power steering pump specifications. If highest output pressures are not the same against either stop, the steering gear is leaking internally and must be replaced.

SERVICE PROCEDURES

POWER STEERING SYSTEM FLUID LEVEL CHECK

WARNING: FLUID LEVEL SHOULD BE CHECKED WITH ENGINE OFF TO PREVENT INJURY FROM MOVING PARTS. DO NOT USE AUTOMATIC TRANSMISSION FLUID IN THE POWER STEERING SYSTEM. DO NOT OVERFILL THE POWER STEERING SYSTEM.

Wipe reservoir filler cap free of dirt. Then check fluid level. The dipstick should indicate COLD when fluid is at normal ambient temperature, approximately 21°C to 27°C (70°F to 80°F). In all pumps add fluid as necessary, use only **Mopar Power Steering Fluid, or equivalent. DO NOT USE ANY TYPE OF AUTOMATIC TRANSMISSION FLUID.**

POWER STEERING PUMP INITIAL OPERATION

CAUTION: The fluid level should be checked with engine off to prevent injury from moving components. Use only Mopar® Power Steering Fluid. Do not use automatic transmission fluid. Do not overfill.

Wipe filler cap clean, then check the fluid level. The dipstick should indicate **FULL COLD** when the fluid is at normal temperature of approximately 21°C to 27°C (70°F to 80°F).

(1) Fill the pump fluid reservoir to the proper level and let the fluid settle for at least two (2) minutes.

(2) Start the engine and let run for a few seconds. Then turn the engine off.

(3) Add fluid if necessary. Repeat the above procedure until the fluid level remains constant after running the engine.

(4) Raise the front wheels off the ground.

(5) Start the engine. Slowly turn the steering wheel right and left, lightly contacting the wheel stops.

(6) Add power steering fluid if necessary.

(7) Lower the vehicle and turn the steering wheel slowly from lock to lock.

(8) Stop the engine. Check the fluid level and refill as required.

(9) If the fluid is extremely foamy, allow the vehicle to stand a few minutes and repeat the above procedure.

REMOVAL AND INSTALLATION

2.4 LITER POWER STEERING PUMP

REMOVE

WARNING: POWER STEERING OIL, ENGINE COMPONENTS AND THE EXHAUST SYSTEM MAY BE EXTREMELY HOT IF ENGINE HAS BEEN RUNNING. DO NOT START ENGINE WITH ANY LOOSE OR DISCONNECTED HOSES. DO NOT ALLOW HOSES TO TOUCH HOT EXHAUST MANIFOLD OR CATALYST.

(1) Remove cap from power steering fluid reservoir.

(2) Using a siphon pump, remove as much power steering fluid as possible from the power steering fluid reservoir.

(3) Remove the (-) negative battery cable from the battery and isolate cable.

(4) Remove the drive belt from the power steering pump pulley. See Cooling, Group 7 for detailed removal procedure.

(5) Loosen **but do not remove** the nut attaching the front bracket for the power steering pump (Fig. 3) to the aluminum mounting bracket.

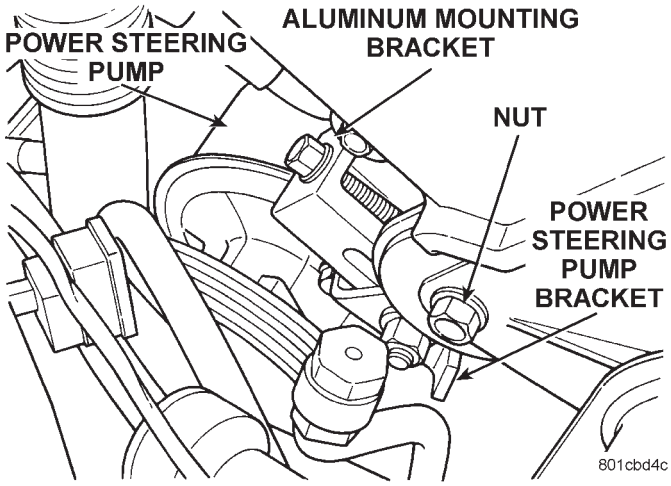


Fig. 3 Power Steering Pump Bracket Attaching Nut

(6) Raise vehicle on jack stands or centered on a frame contact type hoist. See Hoisting, in the Lubrication and Maintenance section of this service manual for the required lifting procedure.

(7) Disconnect the oxygen sensor wiring harness from the vehicle wiring harness. Access to connection at vehicle wiring harness is through the oxygen sensor wiring harness grommet in the floor pan of the vehicle.

NOTE: The exhaust system needs to be removed from the engine to allow for an area to remove the power steering pump from the vehicle.

(8) Remove the catalytic converter from the exhaust manifold. Then remove all the exhaust system hangers/isolators from the brackets on the exhaust system.

(9) Move the exhaust system as far rearward and to the left side of the vehicle as possible (Fig. 4).

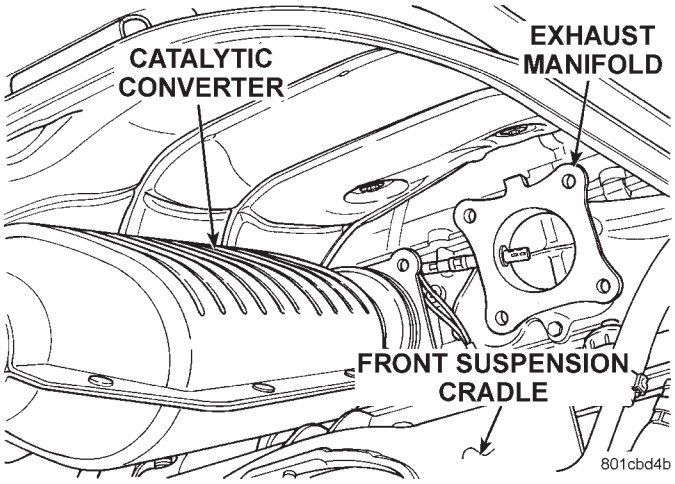


Fig. 4 Exhaust Positioned For Removing Power Steering Pump

(10) Raise the heat sleeve on the power steering return hose to expose the hose to steel tube connection (Fig. 5). Remove the hose from the power steering fluid return line on the front suspension cradle (Fig. 5). Allow the remaining power steering fluid to drain from the power steering pump and reservoir through the removed return hose.

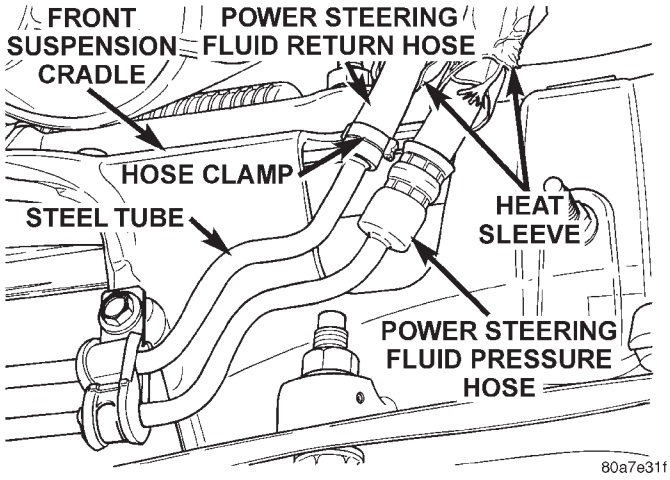


Fig. 5 Power Steering Return Hose At Return Line

REMOVAL AND INSTALLATION (Continued)

(11) Remove the accessory drive splash shield (Fig. 6).

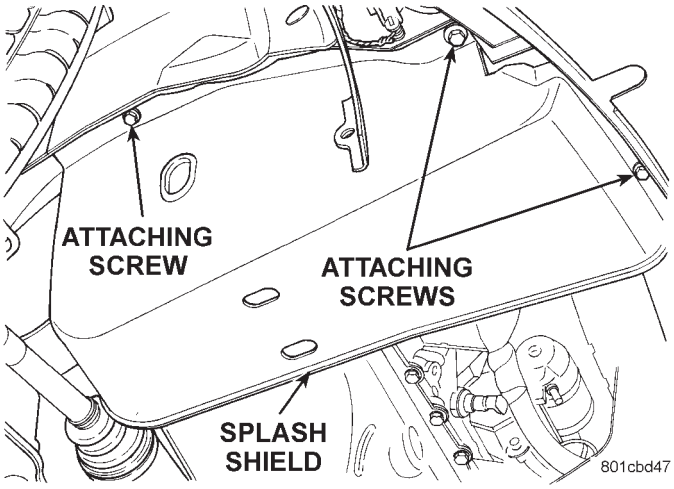


Fig. 6 Accessory Drive Splash Shield

(12) Remove the power steering fluid supply hose coming from the remote fluid reservoir, from the fitting on the power steering pump (Fig. 7). Drain off excess power steering fluid from hose.

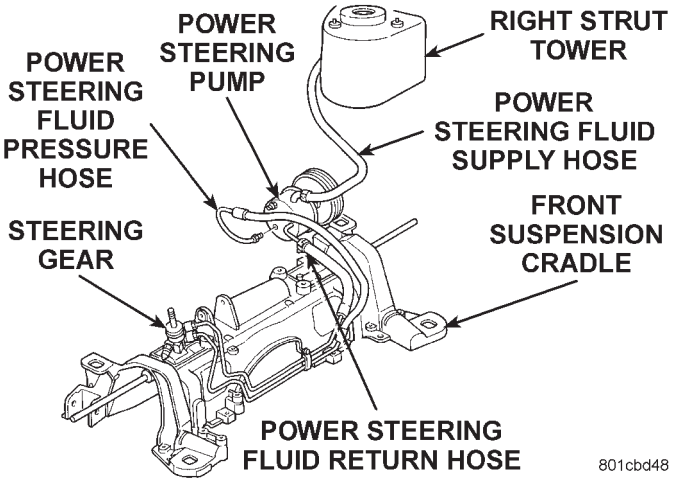


Fig. 7 Power Steering Hoses At Power Steering Pump

(13) Remove the power steering fluid pressure line (Fig. 8) from the power steering pump. Drain excess power steering fluid from tube.

(14) Remove the power steering fluid return hose (Fig. 8) from the power steering pump. Drain excess power steering fluid from tube.

(15) Remove the nut attaching rear of power steering pump to the cast mounting bracket. (Fig. 9)

(16) Loosen the 3 bolts (Fig. 10) attaching the power steering pump to its front mounting bracket. Then remove the nut and the bolt (Fig. 10), attaching the power steering pump front to the cast bracket.

(17) Remove the power steering pump and the front bracket from the cast bracket as an assembly.

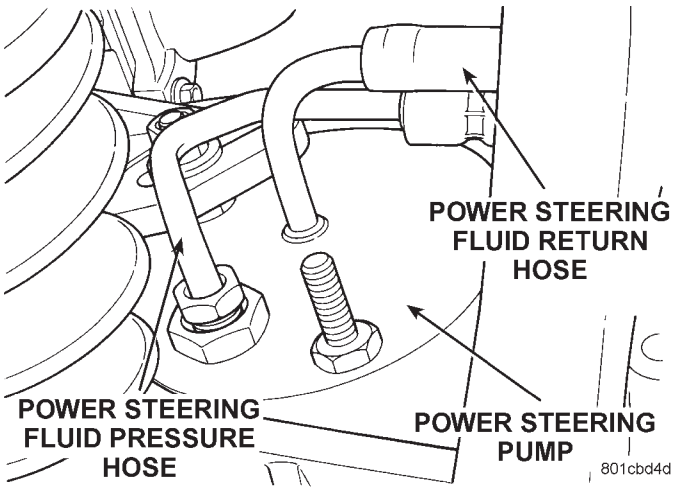


Fig. 8 Power Steering Fluid Pressure And Return Hose

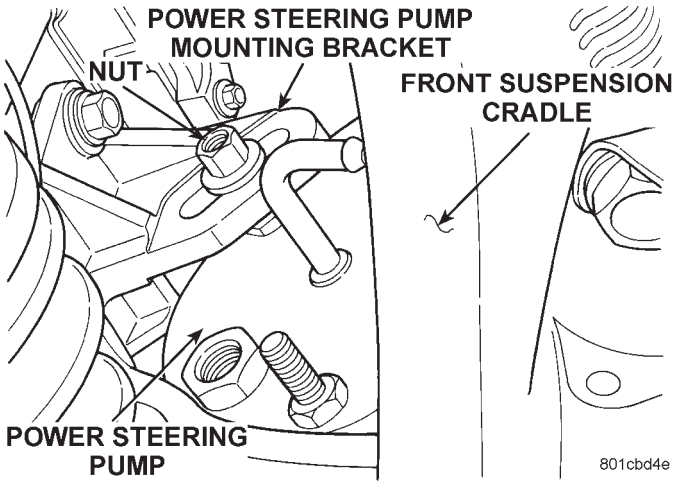


Fig. 9 Power Steering Pump Attaching Nut

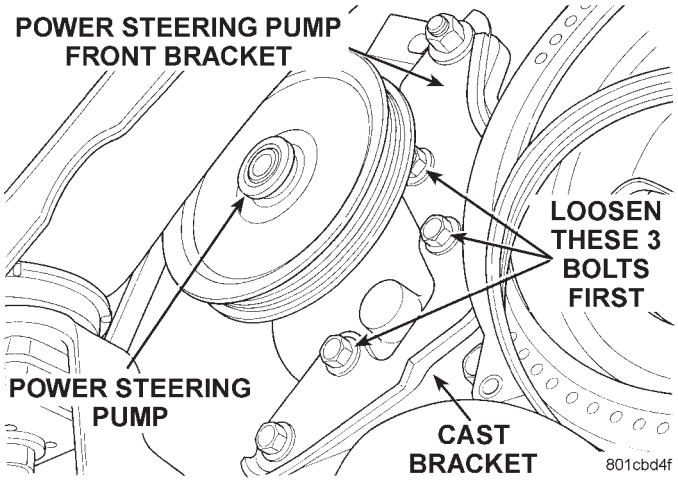


Fig. 10 Power Steering Pump Mounting To Front Bracket

REMOVAL AND INSTALLATION (Continued)

(18) Remove the 3 previously loosened bolts attaching the front bracket to the power steering pump and separate the power steering pump from the front bracket prior to removing the pump from the vehicle.

(19) The power steering pump is removed from the vehicle by pulling it out through the exhaust tunnel area in the floor pan of the vehicle.

INSTALL

(1) Install power steering pump back in vehicle using the reverse order of its removal through the exhaust tunnel are of the vehicle.

(2) Install the power steering pump on its cast mounting bracket and loosely install nut to hold pump in place (Fig. 9).

(3) Install the front bracket on the power steering pump and loosely install the 3 mounting bolts (Fig. 10). Then install the nut and bolt attaching the front bracket to the cast bracket (Fig. 10).

(4) Tighten the 3 power steering pump mounting bolts (Fig. 10) to a torque of 54 N·m (40 ft. lbs.).

NOTE: Before installing power steering fluid pressure hose on power steering pump, inspect the O-ring on the pressure hose for damage and replace if necessary.

(5) Install the power steering fluid pressure line onto the output fitting of the power steering pump (Fig. 8). Tighten the pressure line to pump fitting tube nut to a torque of 31 N·m (275 in. lbs.).

(6) Install the power steering fluid, low pressure return hose on the power steering pump low pressure fitting (Fig. 8). **Be sure hose clamps are properly reinstalled.**

(7) Install the power steering fluid supply hose from the power steering fluid reservoir, on the power steering pump fluid fitting (Fig. 7). **Be sure hose is clear of accessory drive belts all hose clamps are properly reinstalled.**

(8) Install the power steering pump drive belt on pulley. See Cooling, Group 7 for detailed installation procedure.

(9) Install the accessory drive splash shield (Fig. 6).

(10) Install the power steering fluid return hose on the steel tube at the front suspension cradle (Fig. 5).

(11) Install a screw type hose clamp on the power steering hose to steel tube connection. **Be sure hose clamps are properly reinstalled.**Tighten the screw clamp to a torque of 2 N·m (18 in. lbs.).

CAUTION: The protective heat shield sleeves must cover the entire rubber hose and hose to tube connection portion of both the power steering fluid pressure and return hoses (Fig. 5). This is required to prevent the overheating of the power steering hoses.

(12) When used, properly position the protective heat sleeves on the power steering hoses (Fig. 5). Then, tie strap the heat sleeves to the power steering hoses to keep them in their proper position.

(13) Install the exhaust pipe on the exhaust manifold. Install all exhaust system hangers/isolators on the exhaust system brackets.

(14) Connect the oxygen sensor wiring harness to the vehicle wiring harness. Install wiring harness grommet in the floor pan of the vehicle.

(15) Lower vehicle.

(16) Adjust the power steering pump drive belt. See Cooling, Group 7 for detailed adjustment procedure.

(17) Tighten the top nut and bottom bolt on the power steering pump front mounting bracket (Fig. 3) to a torque of 54 N·m (40 ft. lbs.).

CAUTION: Do not use automatic transmission fluid in power steering system. Only use Mopar®, Power Steering Fluid, or equivalent.

(18) Fill the remote power steering pump fluid reservoir to correct fluid level.

(19) Install cap on power steering fluid reservoir.

(20) Connect the negative battery cable on the negative battery post.

(21) Start engine and turn steering wheel several times from stop to stop to bleed air from fluid in system. Stop engine, check fluid level, and inspect system for leaks. See Checking Fluid Level.

3.0 LITER POWER STEERING PUMP

REMOVE

WARNING: POWER STEERING OIL, ENGINE COMPONENTS AND THE EXHAUST SYSTEM MAY BE EXTREMELY HOT IF ENGINE HAS BEEN RUNNING. DO NOT START ENGINE WITH ANY LOOSE OR DISCONNECTED HOSES. DO NOT ALLOW HOSES TO TOUCH HOT EXHAUST MANIFOLD OR CATALYST.

(1) Remove the (-) negative battery cable from the battery and isolate cable.

(2) Remove cap from power steering fluid reservoir.

(3) Using a siphon pump, remove as much power steering fluid as possible from the power steering fluid reservoir.

REMOVAL AND INSTALLATION (Continued)

(4) Remove the serpentine accessory drive belt from the engine (Fig. 11). See Cooling, Group 7 for detailed removal procedure.

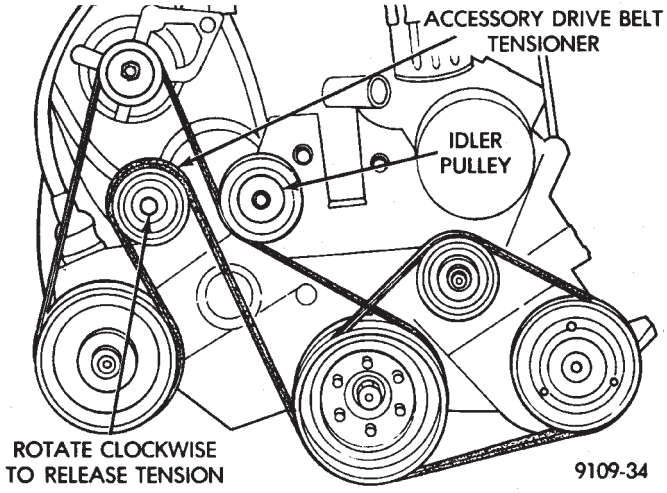


Fig. 11 3.0L Serpentine Drive Belt And Routing

(5) Raise vehicle on jack stands or centered on a frame contact type hoist. See Hoisting, in the Lubrication and Maintenance section of this service manual for the required lifting procedure.

(6) Disconnect the oxygen sensor wiring harness from the vehicle wiring harness. Access to connection at vehicle wiring harness is through the oxygen sensor wiring harness grommet in the floor pan of the vehicle.

NOTE: The exhaust system needs to be removed from the engine to allow for an area to remove the power steering pump from the vehicle.

(7) Remove the catalytic converter from the exhaust manifold. Then remove all the exhaust system hangers/isolators from the brackets on the exhaust system.

(8) Move the exhaust system as far rearward and to the left side of the vehicle as possible (Fig. 12).

(9) Raise the heat sleeve on the power steering return hose to expose the return hose to steel tube connection. Remove the hose from the power steering fluid return line on the front suspension cradle (Fig. 13). Allow the remaining power steering fluid to drain from the power steering pump and reservoir through the removed hose.

(10) Remove the accessory drive splash shield (Fig. 14).

(11) Remove the power steering fluid supply hose coming from the remote fluid reservoir, from the fitting on the power steering pump (Fig. 15). Drain off excess power steering fluid from hose.

(12) Remove the power steering fluid pressure line (Fig. 15) from the power steering pump. Drain excess power steering fluid from tube.

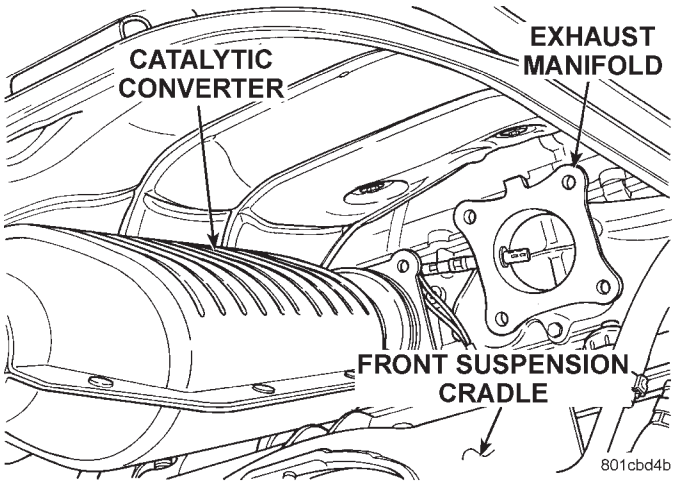


Fig. 12 Exhaust Position For Removing Power Steering Pump

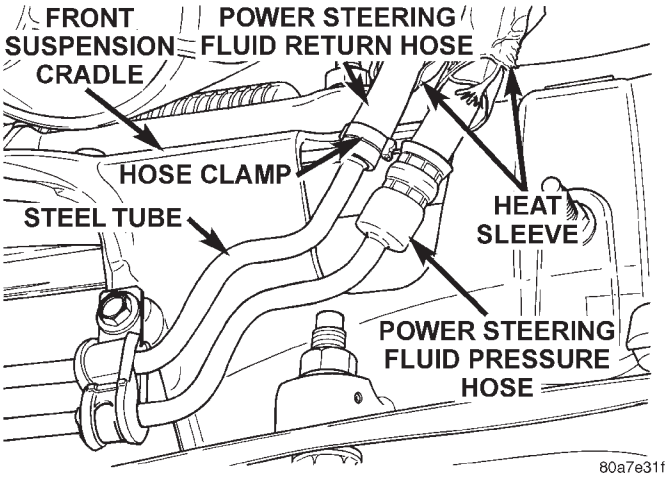


Fig. 13 Power Steering Return Hose At Return Line

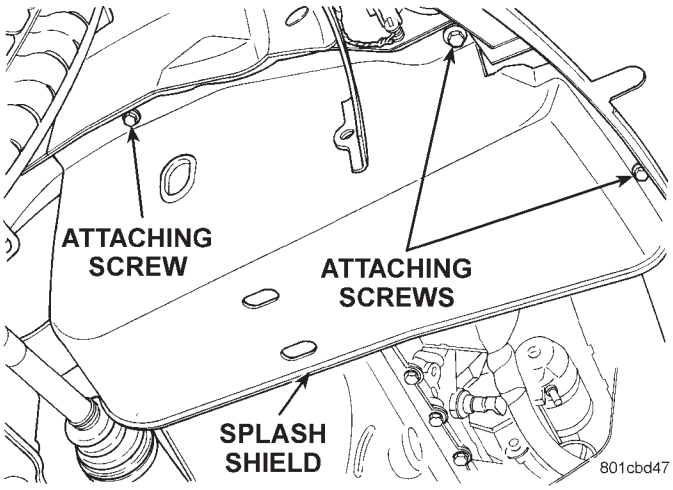


Fig. 14 Accessory Drive Splash Shield

NOTE: If the return hose is not removed from the power steering pump, it is very difficult to remove the power steering pump from the vehicle.

REMOVAL AND INSTALLATION (Continued)

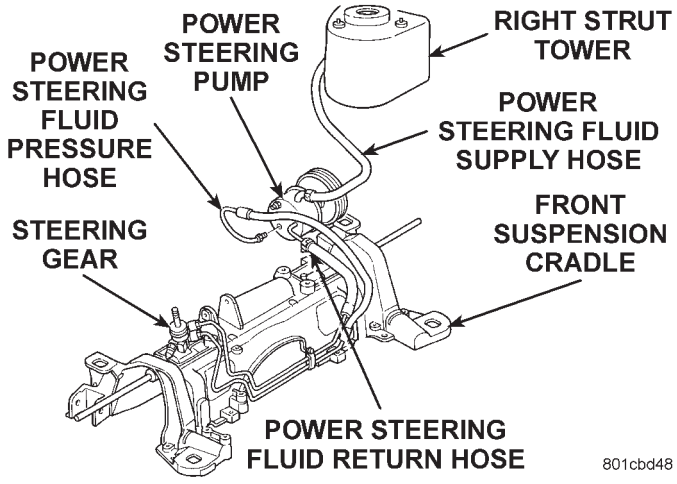


Fig. 15 Power Steering Hoses At Power Steering Pump

(13) Remove the power steering fluid return hose (Fig. 15) from the power steering pump.

(14) Remove the support bracket at the rear of the power steering pump attaching the pump to the rear of the engine (Fig. 16).

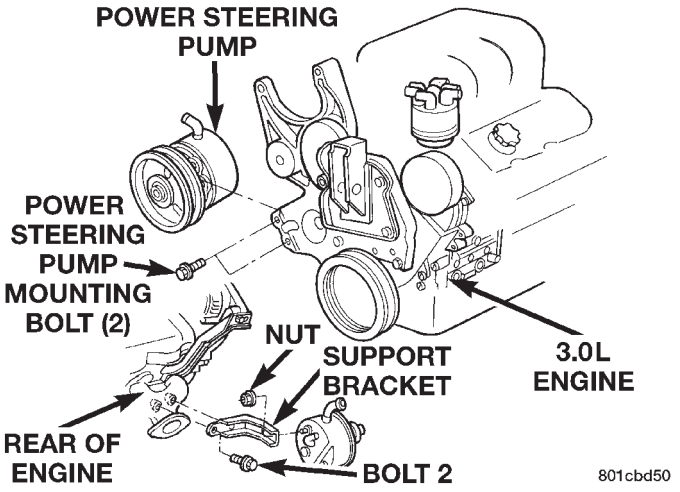


Fig. 16 Power Steering Pump Mounting

(15) Remove the 2 bolts mounting the power steering pump to the alternator/power steering pump and belt tensioner mounting bracket (Fig. 16).

(16) Remove the power steering pump from its mounting bracket.

(17) The power steering pump is removed from the vehicle by pulling it out through the exhaust tunnel area in the floor pan of the vehicle.

INSTALL

(1) Install power steering pump back in vehicle using the reverse order of its removal through the exhaust tunnel are of the vehicle.

(2) Install the power steering pump on its mounting bracket. Install the 2 power steering pump mounting bolts (Fig. 16). Tighten the power steering pump mounting bolts to a torque of 54 N·m (40 ft. lbs.).

(3) Install the support bracket attaching rear of power steering pump to engine (Fig. 16). Tighten the nut and bolts to a torque of 54 N·m (40 ft. lbs).

NOTE: Before connecting the power steering pressure line to the power steering pump, inspect the O-ring on the pressure line for damage and replace if damaged.

(4) Install the power steering fluid pressure line onto the output fitting of the power steering pump (Fig. 15). Tighten the pressure line to pump fitting tube nut to a torque of 31 N·m (275 in. lbs.).

(5) Install the power steering fluid low pressure return hose on the power steering pump low pressure fitting (Fig. 15). **Be sure hose clamps are properly reinstalled and return hose is clear of all accessory drive belts.**

(6) Install the power steering fluid supply hose from the power steering fluid reservoir, on the power steering pump fluid fitting (Fig. 15). **Be sure all hose clamps are properly reinstalled.**

(7) Install the serpentine drive belt (Fig. 11). See Cooling, Group 7 for detailed installation procedure.

(8) Install the power steering fluid return hose on the steel tube at the front suspension cradle (Fig. 13).

(9) Install a screw type hose clamp on the power steering hose to steel tube connection. Tighten the screw clamp to a torque of 2 N·m (18 in. lbs.).

CAUTION: The protective heat shield sleeves must cover the entire rubber hose and hose to tube connection portion of both the power steering fluid pressure and return hoses (Fig. 13). This is required to prevent overheating of the power steering hoses.

(10) When used, properly position the protective heat sleeves on the power steering hoses. Then, tie strap the heat sleeves to the power steering hoses to keep them in their proper position.

(11) Install the exhaust pipe on the exhaust manifold. Install all exhaust system hangers/isolators on the exhaust system brackets.

(12) Connect the oxygen sensor wiring harness to the vehicle wiring harness. Install wiring harness grommet in the floor pan of the vehicle.

(13) Install the accessory drive splash shield (Fig. 14).

(14) Lower vehicle.

CAUTION: Do not use automatic transmission fluid in power steering system. Only use Mopar®, Power Steering Fluid, or equivalent.

REMOVAL AND INSTALLATION (Continued)

(15) Fill the remote power steering pump fluid reservoir to correct fluid level.

(16) Install cap on power steering fluid reservoir.

(17) Connect the negative battery cable on the negative battery post.

(18) Start engine and turn steering wheel several times from stop to stop to bleed air from fluid in system. Stop engine, check fluid level, and inspect system for leaks. See Checking Fluid Level.

3.3/3.8 LITER POWER STEERING PUMP

REMOVE

WARNING: POWER STEERING OIL, ENGINE COMPONENTS AND THE EXHAUST SYSTEM MAY BE EXTREMELY HOT IF ENGINE HAS BEEN RUNNING. DO NOT START ENGINE WITH ANY LOOSE OR DISCONNECTED HOSES. DO NOT ALLOW HOSES TO TOUCH HOT EXHAUST MANIFOLD OR CATALYST.

(1) Remove the (-) negative battery cable from the battery and isolate cable.

(2) Remove cap from power steering fluid reservoir.

(3) Using a siphon pump, remove as much power steering fluid as possible from the power steering fluid reservoir.

(4) Raise vehicle on jack stands or centered on a frame contact type hoist. See Hoisting, in the Lubrication and Maintenance section of this service manual for the required lifting procedure.

(5) Disconnect the oxygen sensor wiring harness from the vehicle wiring harness. Access to connection at vehicle wiring harness is through the oxygen sensor wiring harness grommet in the floor pan of the vehicle.

NOTE: The exhaust system needs to be removed from the engine to allow for an area to remove the power steering pump from the vehicle.

(6) Remove the catalytic converter from the exhaust manifold. Then remove all the exhaust system hangers/isolators from the brackets on the exhaust system.

(7) Move the exhaust system as far rearward and to the left side of the vehicle as possible (Fig. 17).

(8) Raise the heat sleeve on the power steering hoses to expose the hose to steel tube connection. Remove the hose from the power steering fluid return line on the front suspension cradle (Fig. 18). Allow the remaining power steering fluid to drain from the pump and fluid reservoir through the removed return hose.

(9) Remove the accessory drive splash shield (Fig. 19).

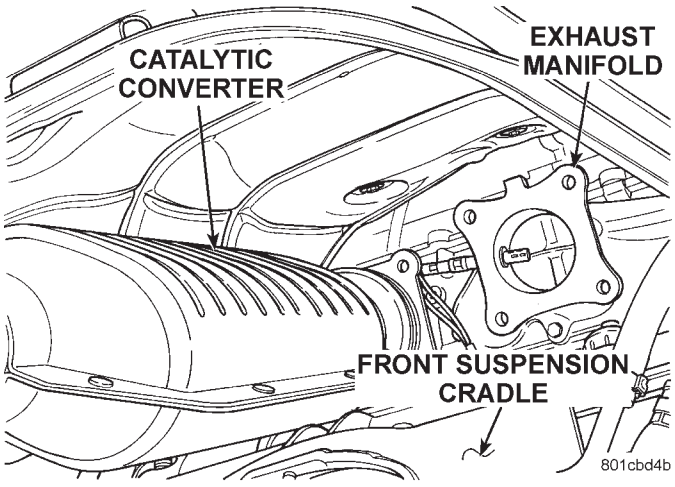


Fig. 17 Exhaust Position For Removing Power Steering Pump

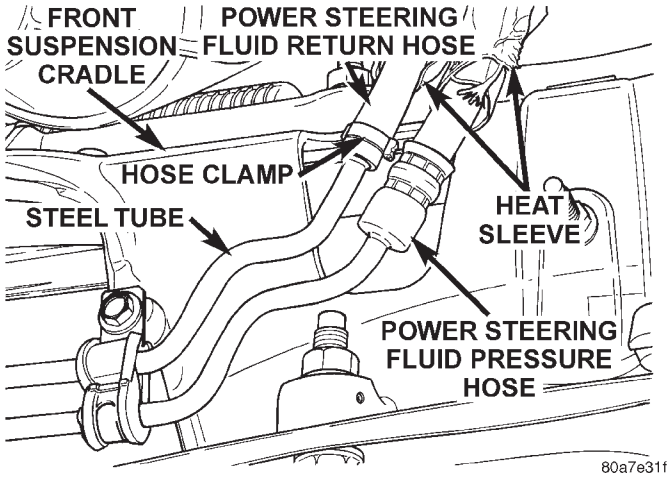


Fig. 18 Power Steering Return Hose At Return Line

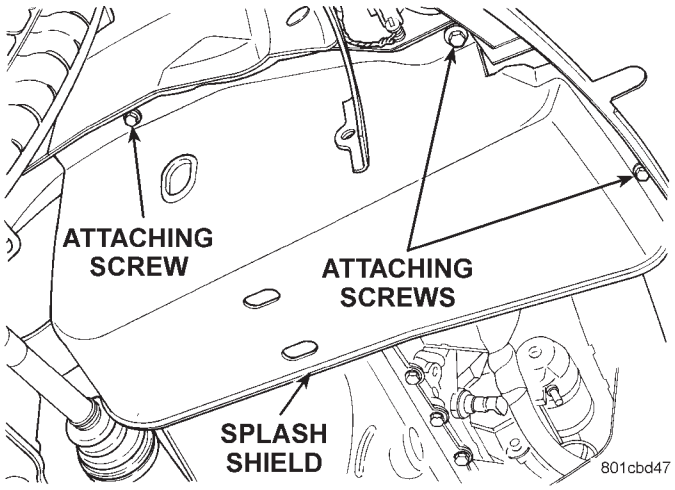


Fig. 19 Accessory Drive Splash Shield

REMOVAL AND INSTALLATION (Continued)

(10) Remove the serpentine accessory drive belt from the engine (Fig. 20). See Cooling, Group 7 for detailed removal procedure.

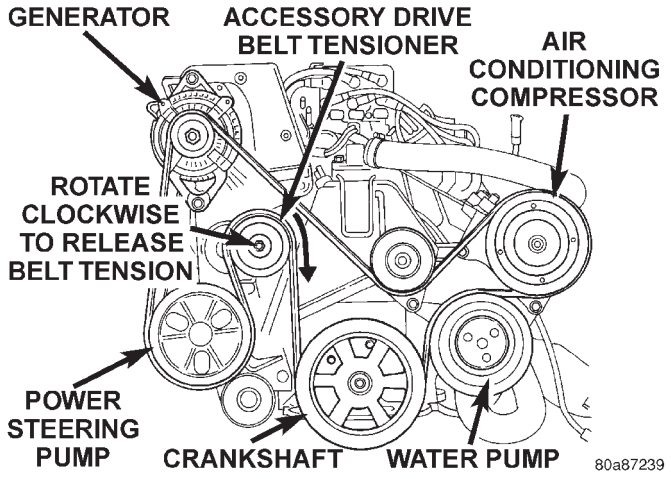


Fig. 20 Serpentine Drive Belt And Routing

(11) Remove the power steering fluid supply hose coming from the remote fluid reservoir, from the fitting on the power steering pump (Fig. 21). Drain off excess power steering fluid from hose.

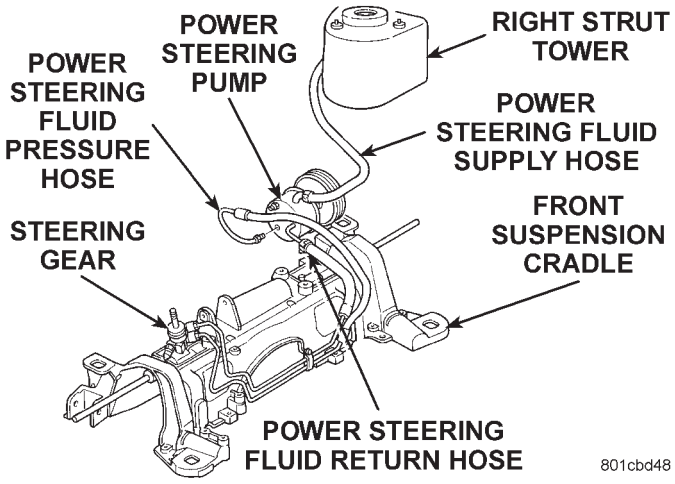


Fig. 21 Power Steering Hoses At Power Steering Pump

(12) Remove the power steering fluid pressure line (Fig. 21) from the power steering pump. Drain excess power steering fluid from tube.

(13) Remove the power steering fluid return hose (Fig. 21) from the power steering pump. Drain excess power steering fluid from tube.

(14) Remove the support bracket at the rear of the power steering pump attaching the pump to the rear of the engine (Fig. 22).

(15) Remove the 3 bolts mounting the power steering pump to the alternator/power steering pump and belt tensioner mounting bracket (Fig. 23).

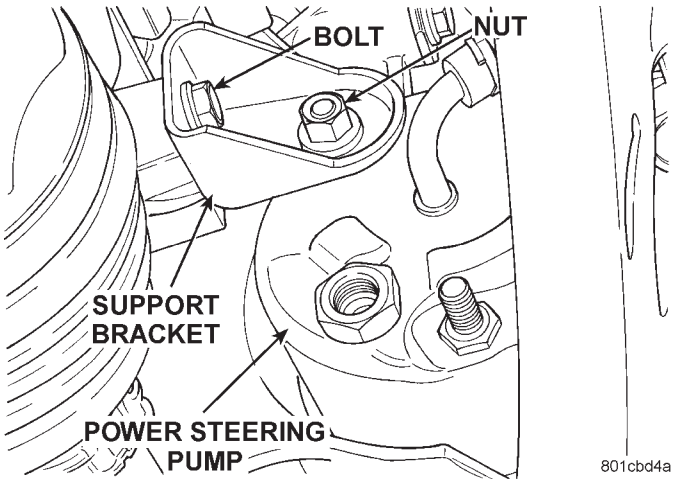


Fig. 22 Power Steering Pump Support Bracket

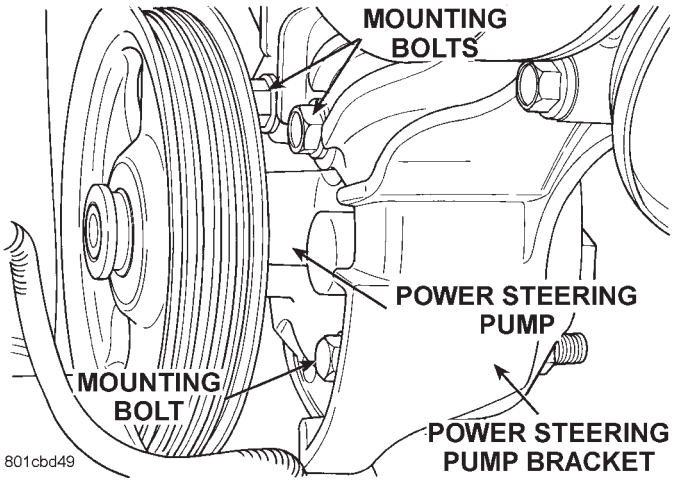


Fig. 23 Power Steering Pump Mounting Bolts

(16) Remove the power steering pump from its mounting bracket.

(17) The power steering pump is removed from the vehicle by pulling it out through the exhaust tunnel area in the floor pan of the vehicle.

INSTALL

(1) Install power steering pump back in vehicle using the reverse order of its removal through the exhaust tunnel are of the vehicle.

(2) Install the power steering pump on its mounting bracket. Install the 3 power steering pump mounting bolts (Fig. 23). Tighten the power steering pump mounting bolts to a torque of 54 N·m (40 ft. lbs.).

(3) Install the support bracket attaching rear of power steering pump to engine (Fig. 22). Tighten the nut and bolt holding the strut assembly to bracket and the intake manifold stud to a torque of 54 N·m (40 ft. lbs).

REMOVAL AND INSTALLATION (Continued)

NOTE: Before installing power steering pressure hose on power steering pump, inspect the O-ring on the power steering pressure hose for damage and replace if required.

(4) Install the power steering fluid pressure line onto the output fitting of the power steering pump (Fig. 21). Tighten the pressure line to pump fitting tube nut to a torque of 31 N·m (275 in. lbs.).

(5) Install the power steering fluid, low pressure return hose on the power steering pump low pressure fitting (Fig. 21). **Be sure hose clamps are properly reinstalled.**

(6) Install the power steering fluid supply hose from the power steering fluid reservoir, on the power steering pump fluid fitting (Fig. 21). **Be sure hose is clear of accessory drive belts and all hose clamps are properly reinstalled.**

(7) Install the serpentine drive belt (Fig. 20). See Cooling, Group 7 for detailed installation procedure.

(8) Install the power steering fluid return hose on the steel tube at the front suspension cradle (Fig. 18).

(9) Install a screw type hose clamp on the power steering hose to steel tube connection. **Be sure hose clamps are properly reinstalled.**Tighten the screw clamp to a torque of 2 N·m (18 in. lbs.).

CAUTION: The protective heat shield sleeves must cover the entire rubber hose and hose to tube connection portion of both the power steering fluid pressure and return hoses (Fig. 18). This is required to keep the power steering hoses from becoming overheated.

(10) When used, properly position the protective heat sleeves on the power steering hoses (Fig. 18). Then, tie strap the heat sleeves to the power steering hoses to keep them in their proper position.

(11) Install the exhaust pipe on the exhaust manifold. Install all exhaust system hangers/isolators on the exhaust system brackets.

(12) Connect the oxygen sensor wiring harness to the vehicle wiring harness. Install wiring harness grommet in the floor pan of the vehicle.

(13) Install the accessory drive splash shield (Fig. 19).

(14) Lower vehicle.

CAUTION: Do not use automatic transmission fluid in power steering system. Only use Mopar®, Power Steering Fluid, or equivalent.

(15) Fill the remote power steering pump fluid reservoir to correct fluid level.

(16) Install cap on power steering fluid reservoir.

(17) Connect the negative battery cable on the negative battery post.

(18) Start engine and turn steering wheel several times from stop to stop to bleed air from fluid in system. Stop engine, check fluid level, and inspect system for leaks. See Checking Fluid Level.

POWER STEERING FLUID RESERVOIR TO PUMP SUPPLY HOSE

REMOVE

(1) Remove the filler cap from remote power steering fluid reservoir (Fig. 24).

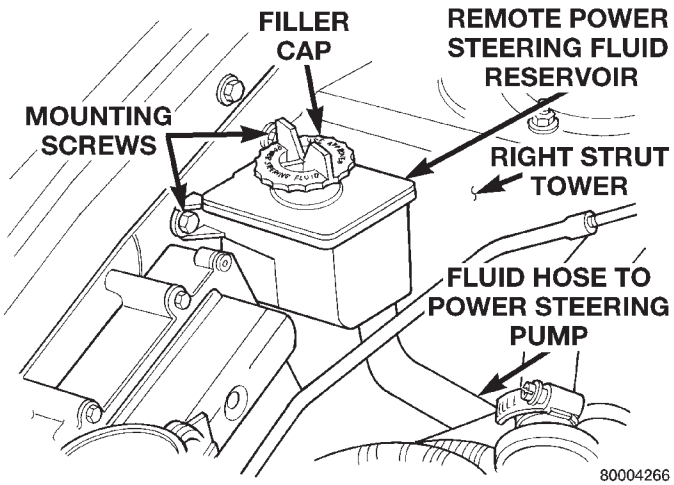


Fig. 24 Fluid Supply Hose At Power Steering Fluid Reservoir

(2) Using a siphon pump, remove as much power steering fluid as possible from the power steering fluid reservoir.

(3) Remove power steering fluid supply hose routing clip (Fig. 25) from stud in strut tower.

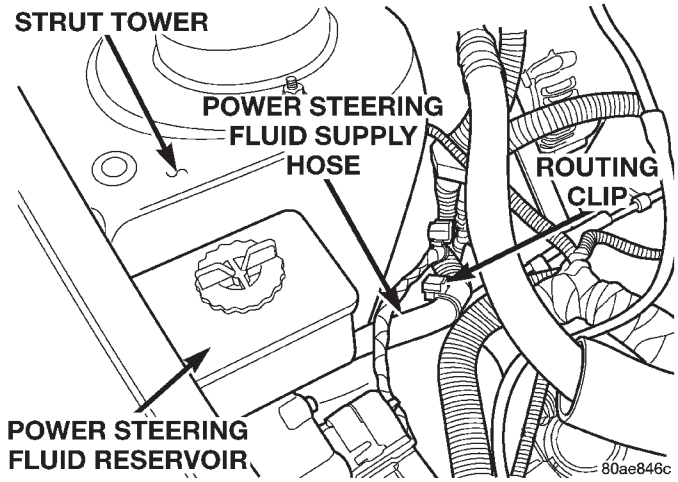


Fig. 25 Power Steering Fluid Hose Routing Clip

(4) Raise vehicle on jack stands or centered on a frame contact type hoist. See Hoisting in the Lubri-

REMOVAL AND INSTALLATION (Continued)

cation and Maintenance section of this service manual, for the required lifting procedure to be used for this vehicle.

(5) Remove at power steering pump, the power steering fluid hose coming from the power steering fluid reservoir. Let the power steering fluid drain out of the reservoir and hose.

(6) Lower vehicle.

(7) Remove hose clamp attaching the power steering fluid supply hose to the power steering fluid reservoir (Fig. 24).

(8) Remove the power steering fluid supply hose from the vehicle. Hose is removed from the top of the engine compartment.

INSTALL

CAUTION: On V-6 engine applications, the power steering fluid reservoir to power steering hose must be routed tightly against the strut tower and parallel to the dash panel. It must also be routed under the wiring harness and below the drip tube. This routing will prevent the power steering fluid supply hose from coming in contact with the accessory drive belt.

(1) Install and correctly route the power steering fluid supply hose from remote fluid reservoir down to power steering pump.

(2) Install the fluid supply hose onto the power steering fluid reservoir (Fig. 24). Install the hose clamp on the fluid supply hose. **Be sure hose clamp is installed past bead on fluid reservoir fitting.**

(3) Raise vehicle on jack stands or centered on a frame contact type hoist. See Hoisting in the Lubrication and Maintenance section of this service manual, for the required lifting procedure to be used for this vehicle.

(4) Install power steering fluid supply hose on power steering pump. Install the hose clamp on the fluid supply hose. **Be sure hose clamp is installed past bead on pump fitting.**

(5) Lower vehicle.

(6) Install routing clip on power steering fluid supply hose. Be sure routing clip is installed in a position to correctly align with stud in strut tower.

(7) Install routing clip for power steering fluid supply hose on stud in strut tower (Fig. 25).

(8) Fill the remote fluid reservoir to the proper level and let the fluid settle for at least two (2) minutes.

(9) Start the engine and let run for a few seconds. Then turn the engine off.

(10) Add fluid if necessary. Repeat the above procedure until the fluid level remains constant after running the engine.

(11) Raise the front wheels off the ground.

(12) Start the engine. Slowly turn the steering wheel right and left, lightly contacting the wheel stops.

(13) Add power steering fluid if necessary.

(14) Lower the vehicle and turn the steering wheel slowly from lock to lock.

(15) Stop the engine. Check the fluid level and refill as required.

(16) If the fluid is extremely foamy, allow the vehicle to stand a few minutes and repeat the above procedure.

POWER STEERING FLUID PRESSURE HOSE

Service all power steering hoses with vehicle raised on hoist. Cap all open ends of hoses, power steering pump fittings and steering gear ports to prevent entry of foreign material into the components.

WARNING: POWER STEERING OIL, ENGINE PARTS AND THE EXHAUST SYSTEM MAY BE EXTREMELY HOT IF ENGINE HAS BEEN RUNNING. DO NOT START ENGINE WITH ANY LOOSE OR DISCONNECTED HOSES. DO NOT ALLOW HOSES TO TOUCH HOT EXHAUST MANIFOLD OR CATALYST.

For part reference and part location for the vehicle that is being serviced, refer to the following figure numbers. These show the hose bracket locations, hose routings and fitting locations by the engine application of the vehicle. Use these figure numbers when referring to the removal or installation procedures for the power steering hoses listed below.

REMOVE

(1) Remove cap from power steering fluid reservoir.

(2) Using a siphon pump, remove as much power steering fluid as possible from the power steering fluid reservoir.

(3) Raise vehicle See Hoisting, Group 0. Put oil drain pan under vehicle to catch power steering fluid.

(4) Raise the heat sleeve on the power steering fluid return hose (Fig. 26) to expose the return hose to steel tube connection. Remove the hose clamp from the power steering fluid return hose (Fig. 26). Remove power steering fluid return hose from steel tube and allow power steering fluid to drain from pump.

REMOVAL AND INSTALLATION (Continued)

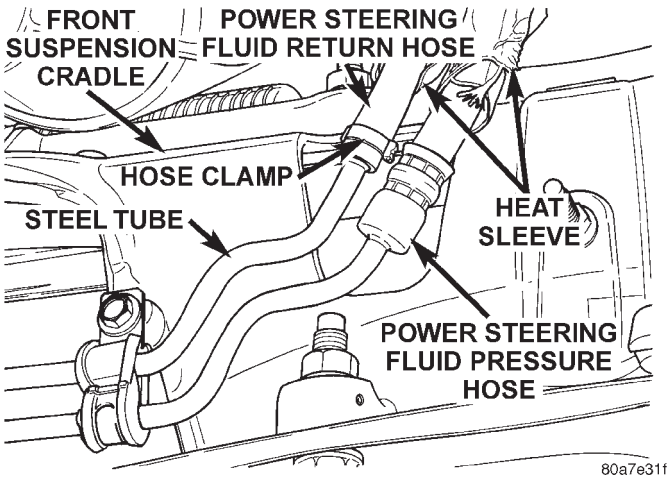


Fig. 26 Return Hose Connection To Steel Tube

(5) Remove the power steering fluid pressure line from the power steering pump pressure fitting (Fig. 27). Drain excess power steering fluid from hose.

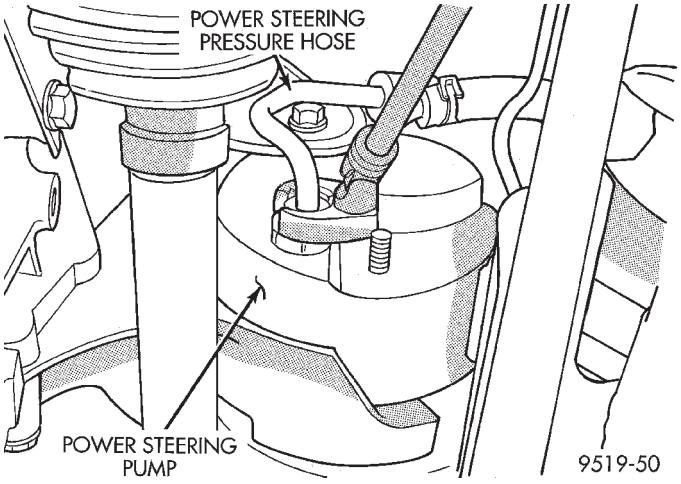


Fig. 27 Pressure Hose Connection To Power Steering Pump

(6) Remove bolt, attaching power steering hose routing bracket to front suspension cradle (Fig. 28).

(7) Disconnect power steering hose at power steering gear assembly (Fig. 29). Drain the power steering fluid from power steering pump and hose.

(8) Discard the O-rings on the ends of power steering fluid pressure hose.

INSTALL

(1) Using a lint free towel, wipe clean the open power steering hose ends, power steering pump pressure fitting and steering gear ports.

(2) Install new O-rings on the ends of the power steering fluid pressure hose. Lubricate O-rings using clean power steering fluid.

(3) Attach the power steering pressure hose to the fittings on the power steering pump and steering gear. Route hose avoiding tight bends or kinking. Do not bend tube ends of the power steering hoses when installing.

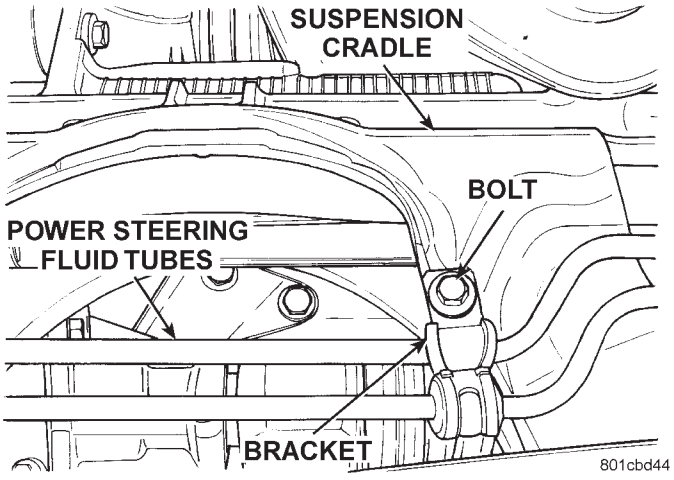


Fig. 28 Power Steering Hose Attachment To Suspension Cradle

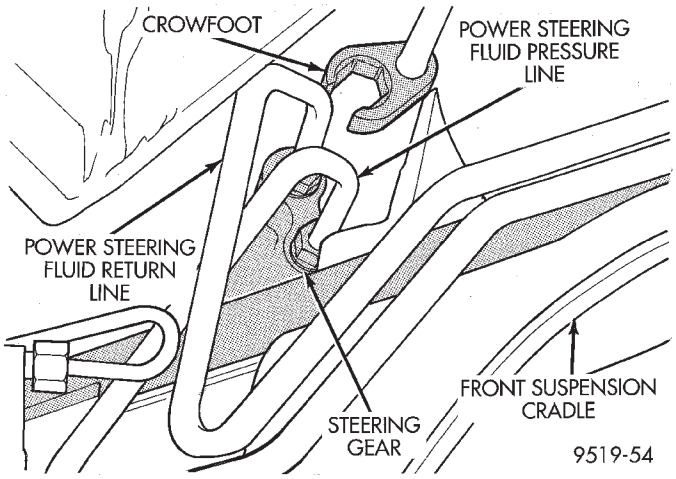


Fig. 29 Power Steering Pressure Hose At Steering Gear

(4) Install the power steering fluid hoses to suspension cradle routing bracket (Fig. 28). Power steering fluid hoses must remain away from the exhaust system and **must not** come in contact with any unfriendly surfaces of the vehicle.

CAUTION: When tightening and torquing the pressure hose at the power steering pump, the pressure hose is to be rotated against the fluid return hose fitting on the pump.

(5) Tighten all fasteners shown for specific applications to their correct torques listed below:

- Pump End Tube Nut 34 N·m (25 ft. lbs.)
- Gear End Tube Nut 34 N·m (25 ft. lbs.)
- Pump Bracket Nut 40 N·m (30 ft. lbs.)

REMOVAL AND INSTALLATION (Continued)

(6) Install the power steering fluid return hose on the steel tube at the front suspension cradle (Fig. 26).

(7) Install a screw type hose clamp on the power steering hose to steel tube connection. Tighten the screw clamp to a torque of 2 N·m (18 in. lbs.).

CAUTION: The protective heat sleeves must cover the entire rubber hose and hose to tube connection portion of both the power steering fluid pressure and return hoses (Fig. 26).

(8) When used, properly position the protective heat sleeves on the power steering hoses. Then, tie strap the heat sleeves to the power steering hoses to keep them in their proper position.

(9) After hoses are installed and power steering system is filled with fluid and cap is installed on reservoir. Start the engine and check for leaks. (See Pump Installation).

POWER STEERING FLUID RETURN HOSE

Service all power steering hoses with vehicle raised on hoist. Cap all open ends of hoses, power steering pump fittings and steering gear ports to prevent entry of foreign material into the components.

WARNING: POWER STEERING OIL, ENGINE PARTS AND THE EXHAUST SYSTEM MAY BE EXTREMELY HOT IF ENGINE HAS BEEN RUNNING. DO NOT START ENGINE WITH ANY LOOSE OR DISCONNECTED HOSES. DO NOT ALLOW HOSES TO TOUCH HOT EXHAUST MANIFOLD OR CATALYST.

For part reference and part location for the vehicle that is being serviced, refer to the following figure numbers. These show the hose bracket locations, hose routings and fitting locations by the engine application of the vehicle. Use these figure numbers when referring to the removal or installation procedures for the power steering hoses listed below.

REMOVE

(1) Remove cap from power steering fluid reservoir.

(2) Using a siphon pump, remove as much power steering fluid as possible from the power steering fluid reservoir.

(3) Raise vehicle See Hoisting, Group 0. Put oil drain pan under vehicle to catch power steering fluid.

(4) Raise the insulating heat sleeve on the power steering hoses to expose the hose to steel tube connection. Remove hose clamp where rubber portion of power steering fluid return hose attaches to steel tube on suspension cradle (Fig. 30). Remove rubber hose from steel tube and allow power steering fluid to drain from pump.

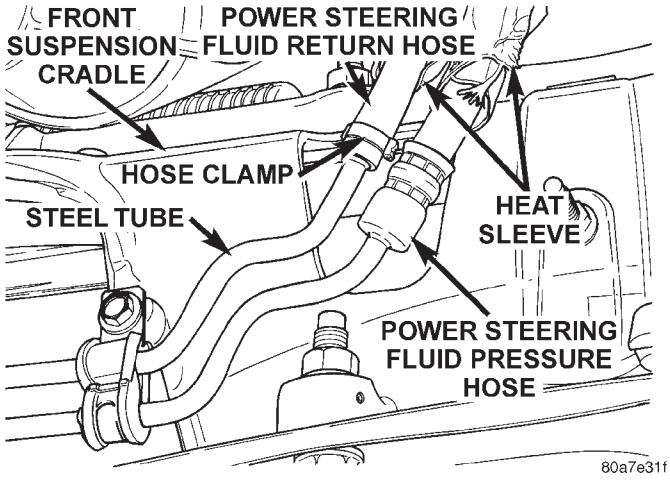


Fig. 30 Power Steering Return Hose At Steel Tube

(5) Remove the power steering fluid return hose from the power steering pump return hose fitting.

INSTALL

(1) Using a lint free towel, wipe clean the open power steering hose ends and power steering pump fitting.

(2) Attach the power steering return hose to the fitting on the power steering pump. Route hose smoothly avoiding tight bends or kinking. Hose must remain away from the exhaust system and not come in contact with any unfriendly surfaces of the vehicle.

(3) Install the power steering fluid return hose on the steel tube at the front suspension cradle (Fig. 30).

(4) Install a screw type hose clamp on the power steering hose to steel tube connection. Tighten the screw clamp to a torque of 2 N·m (18 in. lbs.).

CAUTION: The protective heat shield sleeves must cover the entire rubber hose and hose to tube connection portion of both the power steering fluid pressure and return hoses (Fig. 30). This is to prevent overheating of the power steering fluid hoses.

(5) When used, position the protective heat sleeves on the power steering hoses so they cover the connection to the power steering pump. Then, tie strap the heat sleeves to the power steering hoses to keep them in their proper position.

(6) After hoses are installed and power steering system is filled with fluid and cap is installed on reservoir. Start the engine and check for leaks. (See Pump Installation).

REMOVAL AND INSTALLATION (Continued)

REMOTE POWER STEERING FLUID RESERVOIR

REMOVE

(1) Remove the filler cap from remote power steering fluid reservoir (Fig. 31).

(2) Raise vehicle on jack stands or centered on a frame contact type hoist. See Hoisting in the Lubrication and Maintenance section of this service manual, for the required lifting procedure to be used for this vehicle.

(3) Remove at power steering pump, the power steering fluid hose coming from the power steering fluid reservoir. Let the power steering fluid drain out of the reservoir and hose.

(4) Lower vehicle.

(5) Remove the fluid supply hose (Fig. 31) from the remote power steering fluid reservoir.

(6) Remove the 2 mounting screws (Fig. 31) attaching the remote fluid reservoir to the inner fender.

(7) Remove remote reservoir from inner fender.

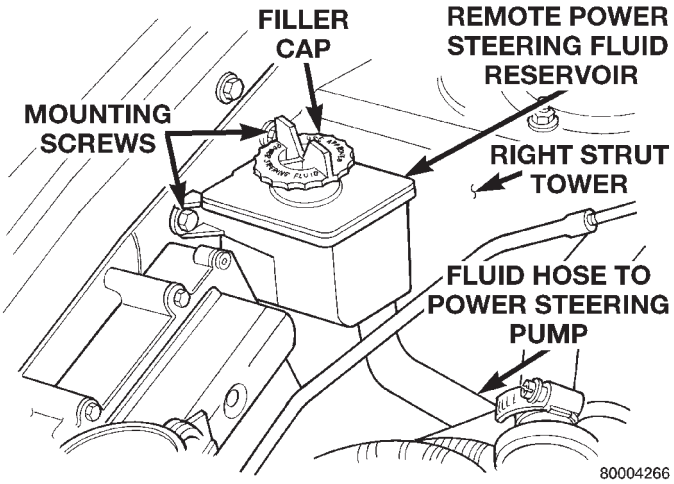


Fig. 31 Remote Power Steering Fluid Reservoir

INSTALL

(1) Install remote power steering fluid reservoir on inner fender, by first inserting tab on reservoir into hole in inner fender. Then rotate reservoir so mounting tabs are against inner fender.

(2) Install and securely tighten the 2 reservoir mounting screws (Fig. 31).

CAUTION: The power steering fluid reservoir to power steering pump supply hose must be routed tightly against the strut tower and parallel to the dash panel. It must also be routed under the wiring harness and below the drip tube. This will prevent the hose from coming in contact with the accessory drive belt. The power steering fluid supply hose must be located in its correct position by clipping it to the stud in the strut tower (Fig. 32).

(3) Install the fluid supply hose onto the power steering fluid reservoir fitting (Fig. 31). Install the hose clamp on the fluid supply hose at the fluid reservoir. **Be sure hose clamp in installed past bead on fluid reservoir fitting.**

(4) Raise vehicle on jack stands or centered on a frame contact type hoist. See Hoisting in the Lubrication and Maintenance section of this service manual, for the required lifting procedure to be used for this vehicle.

(5) Install power steering fluid supply hose on power steering pump. Install the hose clamp on the fluid supply hose at the power steering pump. **Be sure hose clamp in installed past bead on pump fitting.**

(6) Lower vehicle.

(7) Install routing clip for power steering fluid supply hose on stud in strut tower (Fig. 32).

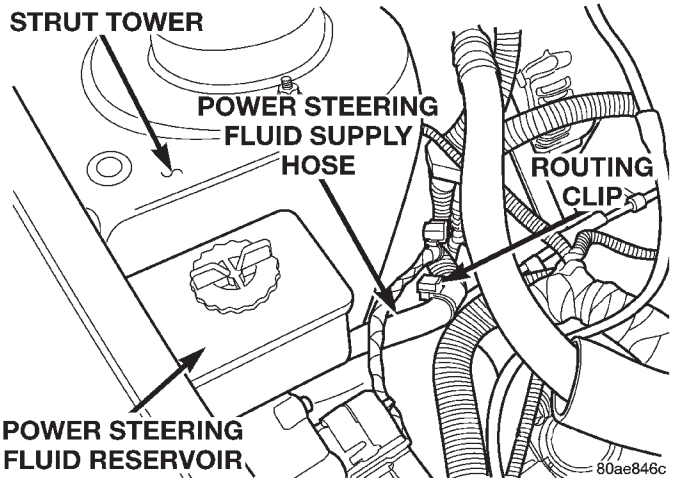


Fig. 32 Power Steering Fluid Hose Routing Clip

(8) Fill the remote fluid reservoir to the proper level and let the fluid settle for at least two (2) minutes.

(9) Start the engine and let run for a few seconds. Then turn the engine off.

(10) Add fluid if necessary. Repeat the above procedure until the fluid level remains constant after running the engine.

(11) Raise the front wheels off the ground.

(12) Start the engine. Slowly turn the steering wheel right and left, lightly contacting the wheel stops.

(13) Add power steering fluid if necessary.

(14) Lower the vehicle and turn the steering wheel slowly from lock to lock.

(15) Stop the engine. Check the fluid level and refill as required.

(16) If the fluid is extremely foamy, allow the vehicle to stand a few minutes and repeat the above procedure.

DISASSEMBLY AND ASSEMBLY

POWER STEERING PUMP PULLEY

DISASSEMBLY

(1) Remove the pulley from the shaft of the power steering pump using Puller C-4333 or C-4068 (Fig. 33).

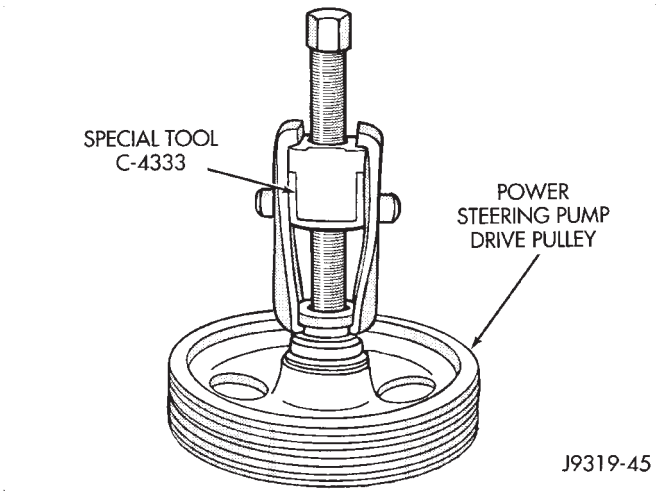


Fig. 33 Pulley Removal

CAUTION: Do not hammer on power steering pump pulley. This will damage the pulley and the power steering pump.

(2) Replace pulley if it is found to be bent, cracked, or loose.

ASSEMBLY

(1) Install the pulley with Installer C-4063 (Fig. 34). Do not use the tool adapters.

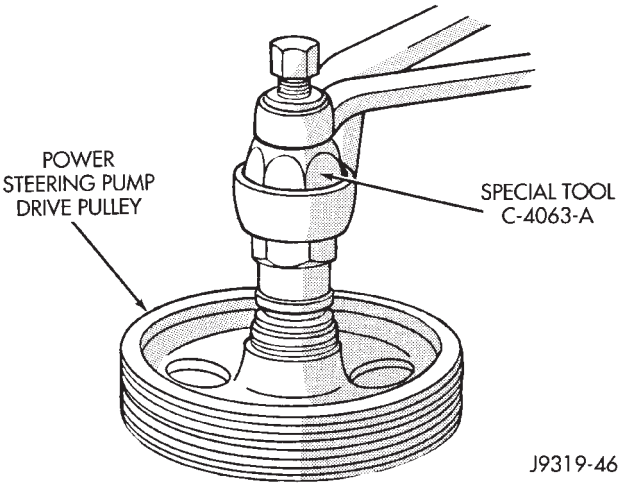


Fig. 34 Pulley Installation

(2) Ensure that the tool and the pulley remain aligned with the pump shaft. Prevent the pulley from being cocked on the shaft.

(3) Force pulley flush with the end of the power steering pump shaft (Fig. 35).

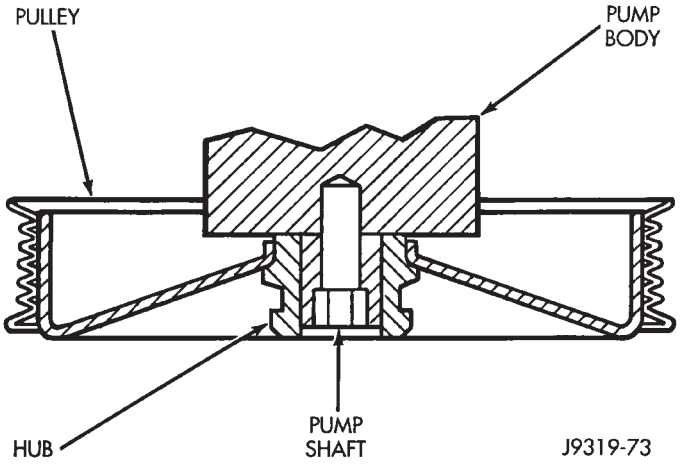


Fig. 35 Pulley To Pump Shaft Location

(4) With serpentine belts, run engine until warm (5 min.) and note any belt chirp. If chirp exists, move pulley outward approximately 0.5 mm (0.020 in.). If noise increases, press on 1.0 mm (0.040 in.). **Be careful that pulley does not contact mounting bolts.**

POWER STEERING PUMP FLOW CONTROL VALVE SEAL

DISASSEMBLE

WARNING: POWER STEERING OIL, ENGINE PARTS AND THE EXHAUST SYSTEM MAY BE EXTREMELY HOT IF ENGINE HAS BEEN RUNNING. DO NOT START ENGINE WITH ANY LOOSE OR DISCONNECTED HOSES. DO NOT ALLOW HOSES TO TOUCH HOT EXHAUST MANIFOLD OR CATALYST.

(1) Remove cap from power steering fluid reservoir.

(2) Using a siphon pump, remove as much power steering fluid as possible from the power steering fluid reservoir.

(3) Raise vehicle See Hoisting, Group 0. Put oil drain pan under vehicle to catch power steering fluid.

(4) Raise the heat sleeve (Fig. 36) on the power steering return hose to expose the return hose to steel tube connection. Remove hose clamp from power steering fluid return hose (Fig. 36). Remove power steering return hose from steel tube and allow remaining power steering fluid to drain from power steering pump and reservoir.

(5) Remove the power steering fluid pressure line from the power steering pump pressure fitting (Fig. 37). Drain excess power steering fluid from hose.

DISASSEMBLY AND ASSEMBLY (Continued)

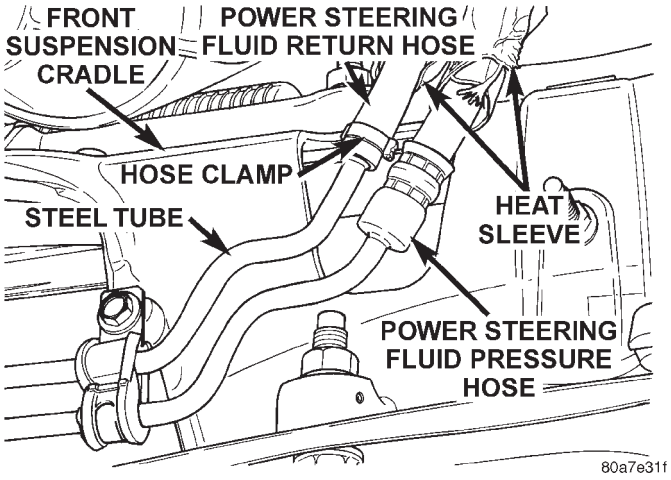


Fig. 36 Return Hose At Steel Tube

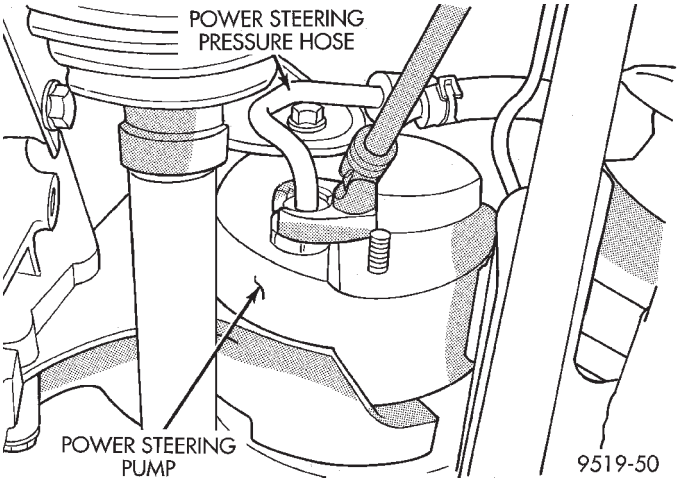


Fig. 37 Pressure Hose Connection To Power Steering Pump

(6) Remove the pressure fitting/flow control valve from the power steering pump and remove and discard the O-Ring seal.

ASSEMBLE

(1) Install a new O-Ring seal on the pressure fitting/flow control valve, and wet the O-Ring with clean fresh power steering fluid.

(2) Install the pressure fitting/flow control valve in the power steering pump. Tighten the pressure fitting/flow control valve to a torque of 75 N·m (55 ft. lbs.).

CAUTION: When tightening and torquing the pressure hose at the power steering pump, the hose should be rotated against the fluid return hose fitting on the pump.

(3) Install the power steering fluid pressure hose in the pressure fitting/flow control valve (Fig. 37). Tighten the tube nut to a torque of 34 N·m (25 ft. lbs.)

(4) Install the power steering fluid return hose on the steel tube at the front suspension cradle (Fig. 36).

(5) Install a screw type hose clamp on the power steering hose to steel tube connection. Tighten the screw clamp to a torque of 2 N·m (18 in. lbs.).

CAUTION: The protective heat shield sleeves must cover the entire rubber hose and hose to tube connection portion of both the power steering fluid pressure and return hoses (Fig. 36). This is required to keep the power steering hoses from becoming overheated.

(6) When used, properly position the protective heat sleeves (Fig. 36) on the power steering hoses. Then, tie strap the heat sleeves to the power steering hoses to keep them in their proper position.

(7) Fill the power steering system with fluid, bleed air from system and check that power steering fluid is at correct level.

SPECIFICATIONS

POWER STEERING SYSTEM SPECIFICATIONS

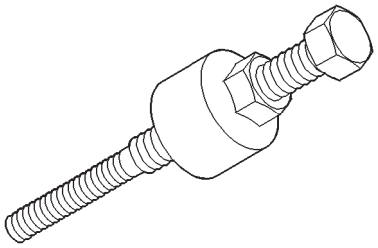
Flow At 1500 RPM And Minimum Pressure.5.0 to 7.0 Liters/Min (1.3 to 1.9 GPM)
Control Valve Pressure Relief. 9653 to 10342 kPa (1400 to 1500psi)

POWER STEERING PUMP FASTENER TORQUE SPECIFICATIONS

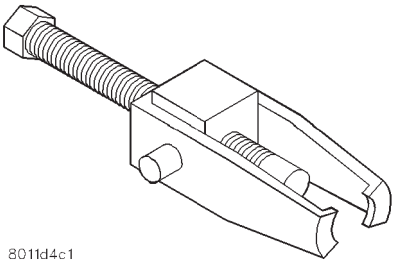
DESCRIPTION	TORQUE
POWER STEERING PUMP:	
Flow Control Valve Fitting	75 N·m (55 ft. lbs.)
Mounting Bolts	54 N·m (40 ft. lbs.)
Rear Bracket To Engine Mounting Bolts	54 N·m (40 ft. lbs.)
POWER STEERING FLUID HOSES:	
Hose Tube Nuts	34 N·m (25 ft. lbs.)
Routing Bracket To Suspension Cradle	28 N·m (21 ft. lbs.)

SPECIAL TOOLS

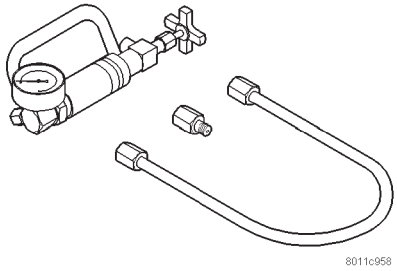
POWER STEERING PUMP



Installer C-4063B



Puller C-4333



P/S System Analyzer 6815

POWER STEERING GEAR

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DESCRIPTION AND OPERATION

STEERING GEAR OPERATION DESCRIPTION

NOTE: The power steering gear (Fig. 1) should NOT be serviced or adjusted. If a malfunction or oil leak occurs, the complete steering gear should be replaced.

If a steering gear boot needs to be replaced due to damage, refer to the power steering gear service section in this manual for proper procedure.

The power steering system consists of these four major components. Power Steering Gear, Power Steering Pump, Pressure Hose, and Return Line. Turning of the steering wheel is converted into linear travel through the meshing of the helical pinion teeth with the rack teeth. Power assist steering is provided by an open center, rotary type control valve which directs oil from the pump to either side of the integral rack piston.

Road feel is controlled by the diameter of a torsion bar which initially steers the vehicle. As required steering effort increases, as in a turn, the torsion bar twists, causing relative rotary motion between the rotary valve body and the valve spool. This movement directs oil behind the integral rack piston, which, in turn, builds up hydraulic pressure and assists in the turning effort.

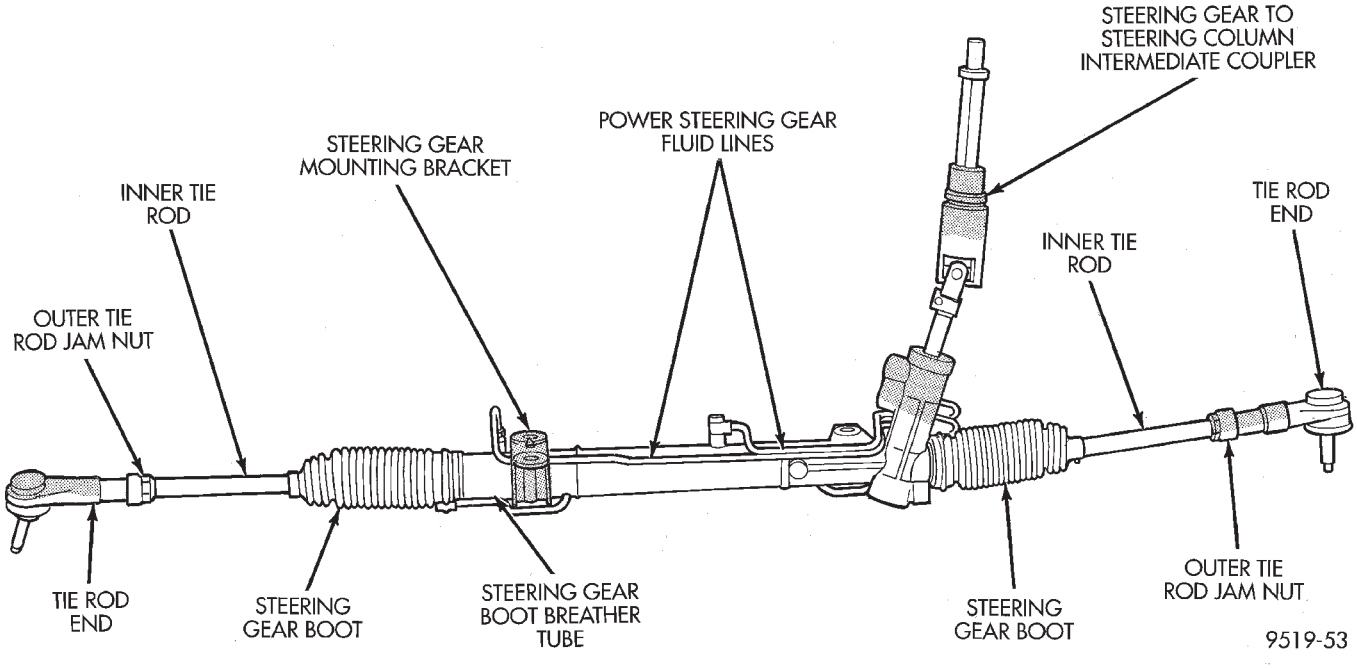


Fig. 1 Power Steering Gear Assembly

DESCRIPTION AND OPERATION (Continued)

The drive tangs on the pinion mate loosely with a stub shaft to permit manual steering control to be maintained if the drive belt on the power steering pump should break. However, under these conditions, steering effort will be increased.

DIAGNOSIS AND TESTING

POWER STEERING GEAR

The following procedure can be used to test the operation of the power steering system on this vehicle. This test will provide the flow rate for the power steering system along with the maximum relief pressure of the power steering pump. This test is to be performed any time a power steering system problem is present to determine if the power steering pump or power steering gear is not functioning properly. The following pressure and flow test is performed using Pressure/Flow Tester, Special Tool 6815 (Fig. 2).

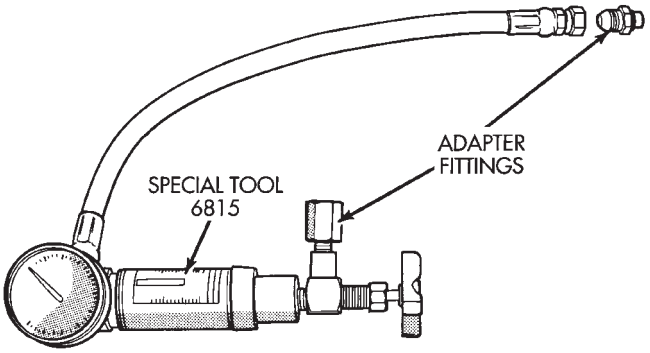


Fig. 2 Power Steering Pump Flow/Pressure Tester

POWER STEERING PUMP FLOW AND PRESSURE TEST PROCEDURE

(1) Check power steering pump drive belt tension and adjust as necessary.

(2) Disconnect power steering fluid pressure hose, at power steering pump. Use a container for dripping fluid.

(3) Connect Pressure Gauge, Special Tool from kit 6815 to both hoses using adapter fittings. Connect spare pressure hose, to power steering pump pressure hose fitting.

(4) Completely open valve on Special Tool 6815.

(5) Start engine and let idle long enough to circulate power steering fluid through flow/pressure test and get air out of fluid. Then shut off engine.

(6) Check power steering fluid level, and add fluid as necessary. Start engine again and let idle.

(7) Pressure gauge should read below 862 kPa (125 psi), if above, inspect the hoses for restrictions and repair as necessary. The initial pressure reading should be in the range of 345-552 kPa (50-80 psi). The flow meter should read between 1.3 and 1.9 GPM

CAUTION: The following test procedure involves testing power steering pump maximum pressure output and flow control valve operation. Do not leave valve closed for more than 5 seconds as the pump could be damaged.

(8) Close valve fully three times and record highest pressure indicated each time. **All three readings must be within the specifications and within 345 kPa (50 psi) of each other.**

NOTE: Power steering pump maximum relief pressure is 9653 to 10342 kPa (1400 to 1500 psi.).

- If power steering pump pressures are within specifications but not within 345 kPa (50 psi) of each other, then replace power steering pump.
- If pressures are within 345 kPa (50 psi) of each other but below specifications, then replace power steering pump.

CAUTION: Do not force the pump to operate against the stops for more than 5 seconds at a time because, pump damage will result.

(9) Open test valve. Turn steering wheel to the extreme left and right positions until against the stops, recording the highest indicated pressure at each position. Compare pressure gauge readings to power steering pump specifications. If highest output pressures are not the same against either stop, the steering gear is leaking internally and must be replaced.

REMOVAL AND INSTALLATION

STEERING GEAR

NOTE: The power steering gear should NOT be serviced or adjusted. If a malfunction or oil leak occurs, the complete steering gear assembly must be replaced.

REMOVE

CAUTION: Positioning the steering column in the locked position will prevent the clockspring from being accidentally over-extended when the steering column is disconnected from the intermediate steering coupler.

REMOVAL AND INSTALLATION (Continued)

(1) Remove cap from power steering fluid reservoir.

(2) Using a siphon pump, remove as much power steering fluid as possible from the power steering fluid reservoir.

(3) With the ignition key in the locked position turn the steering wheel to the left until the steering wheel is in the locked position.

(4) With the vehicle on the ground, disconnect the steering column shaft coupler from the steering gear intermediate coupler (Fig. 3).

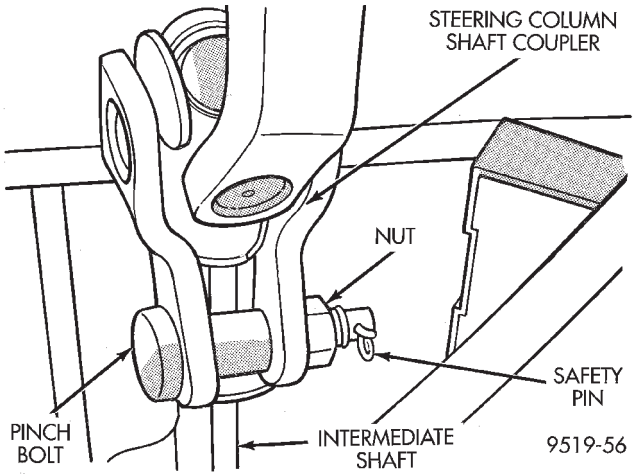


Fig. 3 Steering Column Shaft To Intermediate Shaft Attachment

(5) Raise vehicle on jack stands or centered on a frame contact type hoist. See Hoisting in the Lubrication and Maintenance section of this service manual, for the required lifting procedure to be used for this vehicle.

(6) Remove the front tires.

(7) Raise the heat sleeve (Fig. 4) on the power steering return hose to expose the return hose to steel tube connection. Remove the return hose from the metal tube of the power steering fluid return line (Fig. 4). Then allow the remaining power steering fluid to drain from the system through the hose and metal tube.

(8) Remove nut attaching outer tie rod end to steering knuckle (Fig. 5). **Nut is to be removed from tie rod end using the following procedure, hold tie rod end stud with a 11/32 socket while loosening and removing nut with wrench.**

(9) Remove both tie rod ends from steering knuckles, using Puller Special Tool MB-990635 or MB-991113 (Fig. 6).

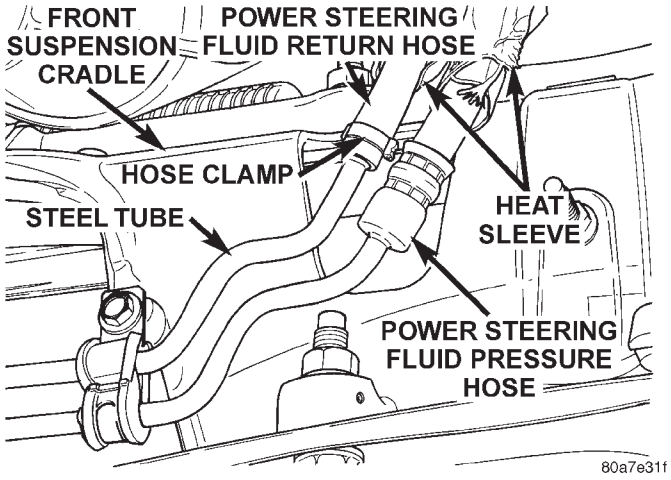


Fig. 4 Power Steering Fluid Return Hose Connection

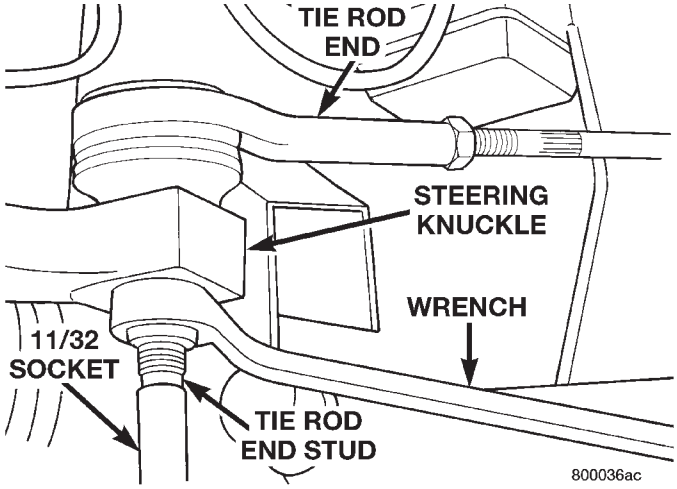


Fig. 5 Removing/Installing Tie Rod End Attaching Nut

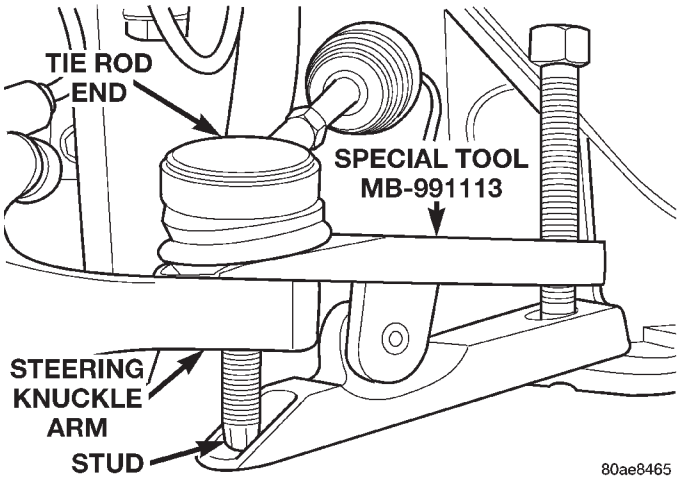


Fig. 6 Tie Rod End Removal From Steering Knuckle

REMOVAL AND INSTALLATION (Continued)

(10) Remove the 2 bolts and loosen the third (Fig. 7) attaching the antilock brakes hydraulic control unit (HCU) to the front suspension cradle. Then rotate the HCU rearward to allow access to the cradle plate attaching nut and bolt just forward of the HCU.

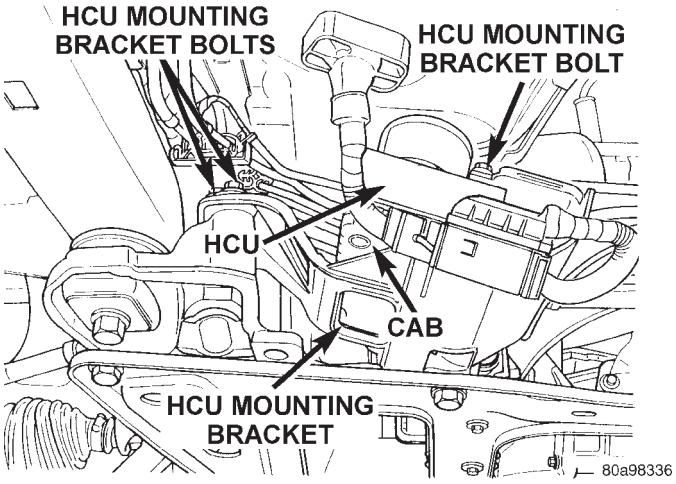


Fig. 7 HCU Bracket Attaching Bolts

(11) Remove the 10 nuts and bolts (Fig. 8) attaching the cradle plate to the bottom of the front suspension cradle. Then remove the cradle plate from the cradle.

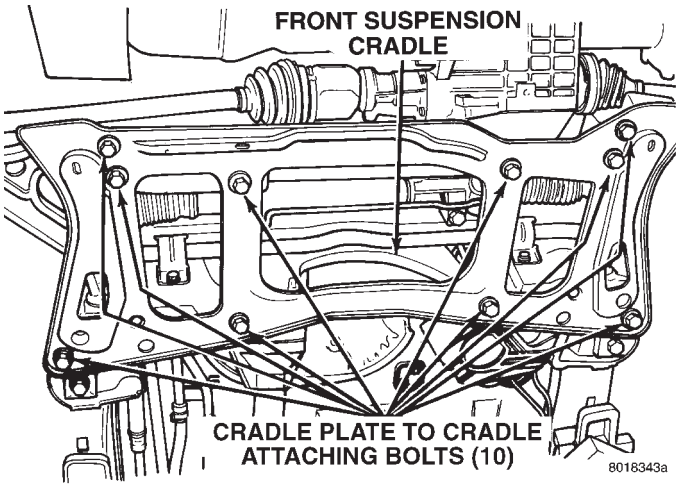


Fig. 8 Front Suspension Cradle Plate And Attaching Bolts

(12) Remove the bracket (Fig. 9) attaching the power steering fluid tubes to the front suspension cradle.

(13) Using a 18mm crowfoot, (Fig. 10) remove the power steering fluid pressure and return lines (Fig. 10) from the power steering gear.

(14) Remove the 3 bolts and nuts (Fig. 11) mounting the steering gear to the front suspension cradle.

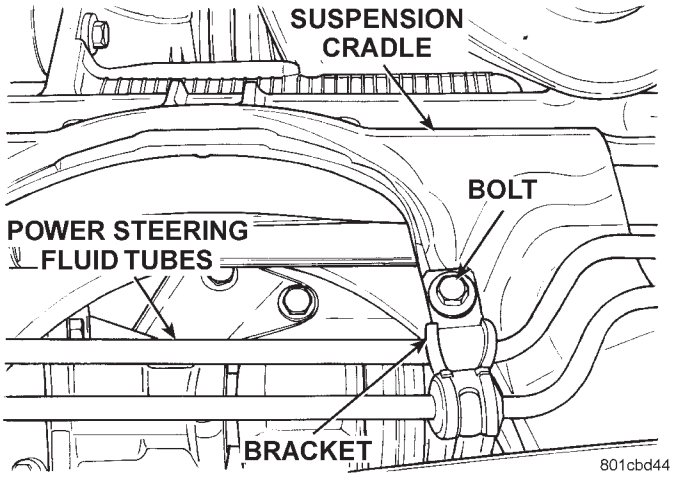


Fig. 9 Power Steering Tube Bracket

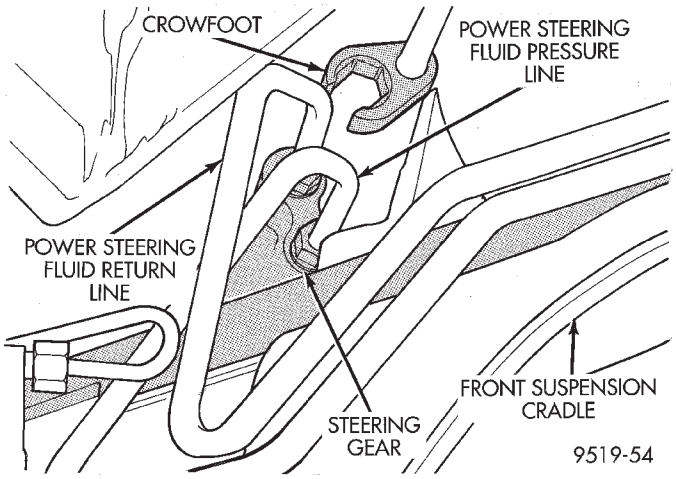


Fig. 10 Power Steering Fluid Pressure And Return Hoses At Steering Gear

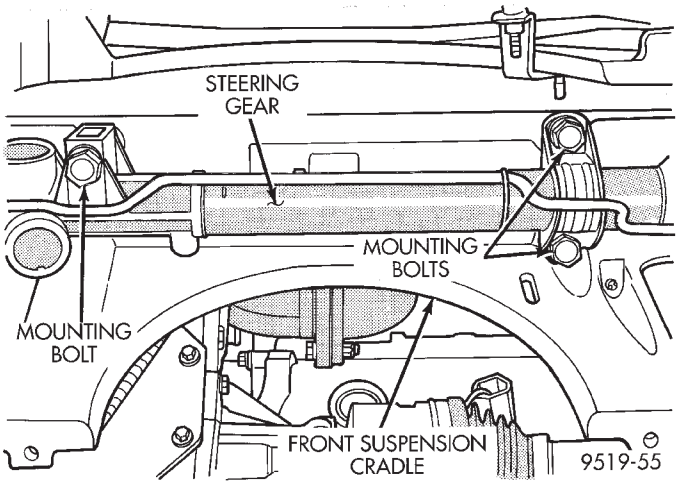


Fig. 11 Steering Gear Mounting To Suspension Cradle

REMOVAL AND INSTALLATION (Continued)

NOTE: The next step must be done to allow the removal of the steering gear from the front suspension cradle. The steering gear can not be removed from the vehicle with the intermediate coupler attached to the steering gear.

(15) Lower steering gear from suspension cradle enough to allow access to the intermediate coupler roll pin (Fig. 12). Install Remover/Installer Special Tool 6831A through the center of the roll pin, securing with the knurled nut (Fig. 12). Hold threaded rod stationary while turning nut, this will pull the roll pin out of the intermediate coupler.

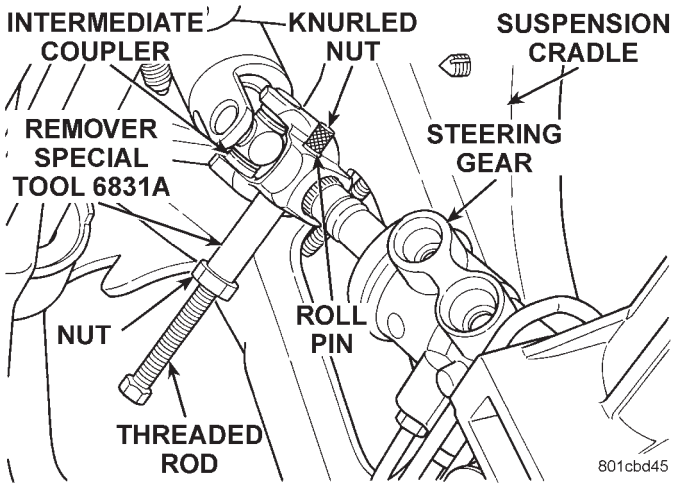


Fig. 12 Removing Roll Pin From Intermediate Coupler

(16) Separate the intermediate coupler from the shaft of the steering gear.

(17) Remove the steering gear assembly from the front suspension cradle.

INSTALL

(1) Install the steering gear up in the front suspension cradle, leaving room to install intermediate coupler.

(2) Start the roll pin into the intermediate coupler before installing coupler on steering gear shaft. Start roll pin into coupler, using a hammer and tapping it into the coupler. Then install the intermediate coupler on the shaft of the steering gear.

(3) Install Remover/Installer Special Tool 6831A through the center of the roll pin, securing it with the knurled nut (Fig. 13). Hold threaded rod stationary while turning nut, this will pull the roll pin into the intermediate coupler.

(4) Install steering gear assembly on the front suspension cradle. Install the 3 steering gear to front suspension cradle mounting bolts and nuts (Fig. 11).

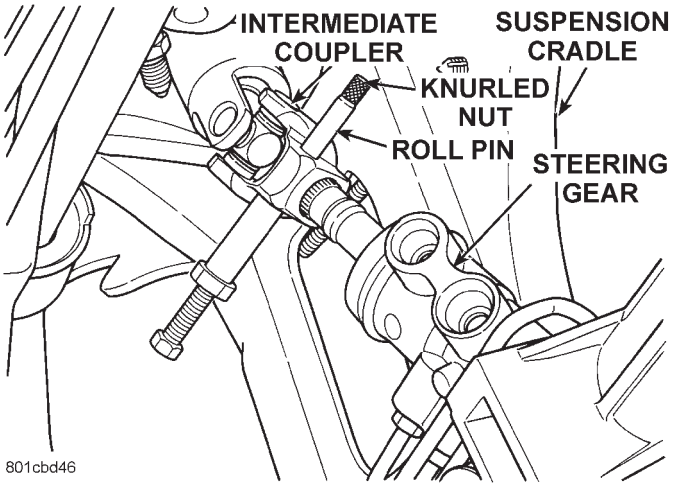


Fig. 13 Installing Roll Pin In Intermediate Coupler

CAUTION: Proper torque on the steering gear to suspension cradle mounting bolts is very important.

(5) Tighten the 3 steering gear to suspension cradle mounting bolts to a torque of 183 N·m (135 ft. lbs.).

(6) Attach the power steering fluid pressure and return lines (Fig. 10) to the proper fittings on the steering gear. Tighten the power steering fluid line tube nuts to a torque of 31 N·m (275 in. lbs.).

(7) Install tie rod end into steering knuckle. Start tie rod end to steering knuckle attaching nut onto stud of tie rod end. While holding stud of tie rod end stationary using a 11/32 socket, (Fig. 5) tighten tie rod end to steering knuckle attaching nut. Then using a crowfoot and 11/32 socket (Fig. 14), tighten the tie rod end attaching nut to a torque of 54 N·m (40 ft. lbs.).

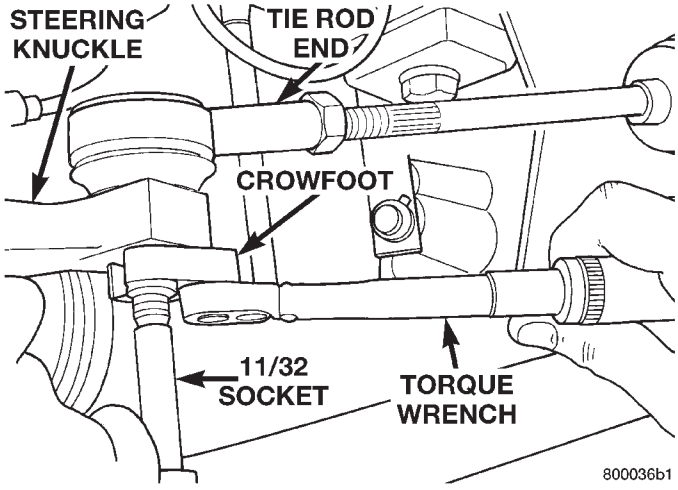


Fig. 14 Torquing Tie Rod End Attaching Nut

REMOVAL AND INSTALLATION (Continued)

CAUTION: Proper torque on the cradle plate to suspension cradle mounting bolts is very important.

(8) Install cradle plate on front suspension cradle and install the 10 cradle plate to cradle attaching bolts and nuts (Fig. 8). Tighten all attaching bolts to a torque of 165 N·m (123 ft. lbs.).

(9) Install the bracket (Fig. 9) attaching the power steering fluid tubes to the front suspension cradle.

CAUTION:

(10) Install the power steering fluid return hose on the steel tube at the front suspension cradle (Fig. 4).

(11) Install a screw type hose clamp on the power steering hose to steel tube connection. **Be sure hose clamp is installed on return tube past the upset bead on the tube.** Tighten the screw clamp to a torque of 2 N·m (18 in. lbs.).

CAUTION: The protective heat shield sleeves must cover the entire rubber hose and hose to tube connection portion of both the power steering fluid pressure and return hoses (Fig. 4). This is required to prevent the power steering hoses from being overheated.

(12) When used, properly position the protective heat sleeves on the power steering hoses. Then, tie strap the heat sleeves to the power steering hoses to keep them in their proper position.

(13) Install the front tire and wheel assemblies on vehicle. Install the wheel lug nuts and torque to 129 N·m (95 ft. lbs.).

(14) Lower the vehicle to a level were the interior of vehicle is accessible.

(15) Using the intermediate coupler, turn the front wheels of the vehicle to the left until the intermediate coupler shaft is properly aligned with the steering column coupler. Assemble the steering column shaft coupler (Fig. 3) onto the steering gear intermediate coupler. Install steering column coupler to intermediate shaft retaining pinch bolt (Fig. 3). Tighten the pinch bolt nut to a torque of 28 N·m (250 in. lbs.).

CAUTION: Do not use automatic transmission fluid in the power steering system. Only use Mopar, Power Steering Fluid or an exact equivalent product.

(16) Fill power steering pump fluid reservoir to the proper level.

(17) Start the engine and let run for a few seconds. Then turn the engine off.

(18) Add fluid if necessary. Repeat the above procedure until the fluid level remains constant after running the engine.

(19) Raise front wheels of vehicle off the ground.

(20) Start the engine. Slowly turn the steering wheel right and left, lightly contacting the wheel stops. Then turn the engine off.

(21) Add power steering fluid if necessary.

(22) Lower the vehicle and turn the steering wheel slowly from lock to lock.

(23) Stop the engine. Check the fluid level and refill as required.

(24) If the fluid is extremely foamy, allow the vehicle to stand a few minutes and repeat the above procedure.

(25) Fill power steering reservoir to correct level with Mopar®, Power Steering Fluid, or equivalent.

(26) Adjust toe (Refer to Group 2 Suspension).

DISASSEMBLY AND ASSEMBLY

STEERING GEAR INNER TIE ROD BOOT

DISASSEMBLE

NOTE: The removal and installation of the inner tie rod boot must be performed with the steering gear assembly removed from the vehicle.

(1) Loosen the inner to outer tie rod jam nut (Fig. 15). Remove the outer tie rod from the inner tie rod.

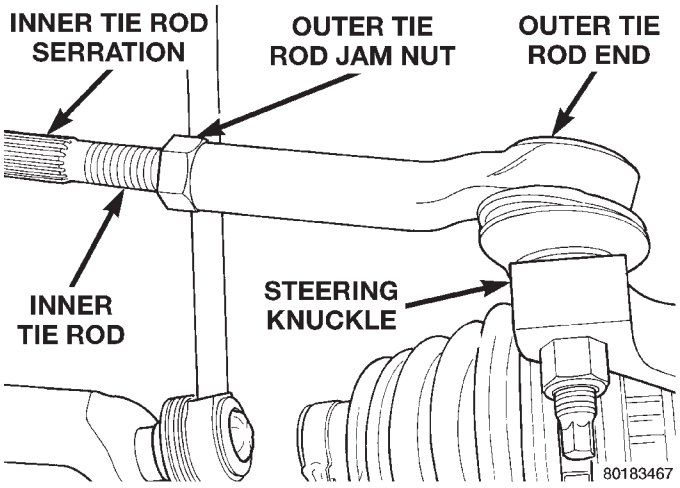


Fig. 15 Inner To Outer Tie Rod Jam Nut

(2) Remove nut attaching the outer tie rod end to the steering knuckle (Fig. 16). **Nut is to be removed from tie rod end using the following procedure, hold tie rod end stud with an 11/32 socket, while loosening and removing nut with wrench.**

DISASSEMBLY AND ASSEMBLY (Continued)

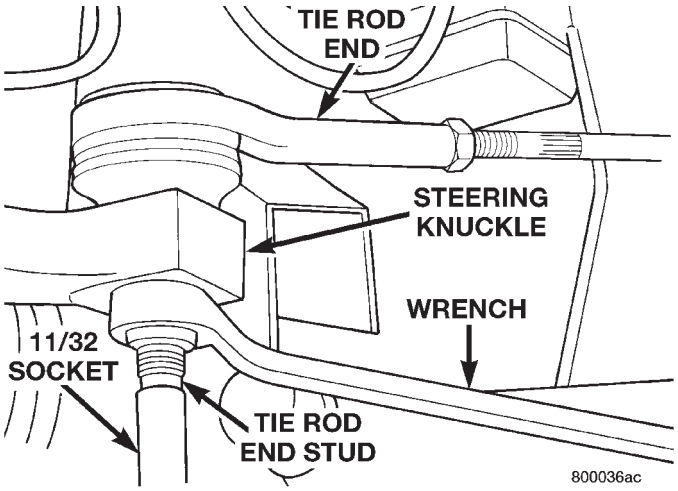


Fig. 16 Removing Tie Rod End Attaching Nut

(3) Remove the tie rod end from the steering knuckle using Remover, Special Tool MB-991113 (Fig. 17) or MB-990635.

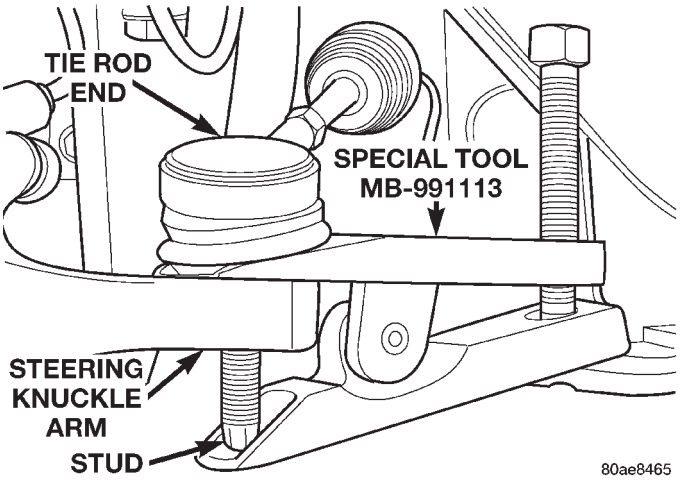


Fig. 17 Tie Rod End Removal From Steering Knuckle

(4) Remove jam nut (Fig. 15) from inner tie rod.

(5) Using pliers expand tie rod boot, to inner tie rod clamp (Fig. 18) and remove from steering gear boot.

(6) Remove inner tie rod boot to steering gear clamp (Fig. 19).

NOTE: After removing inner boot clamps. Use a very small screwdriver to lift boot from its retaining groove in steering gear. Then the boot can be removed from steering gear.

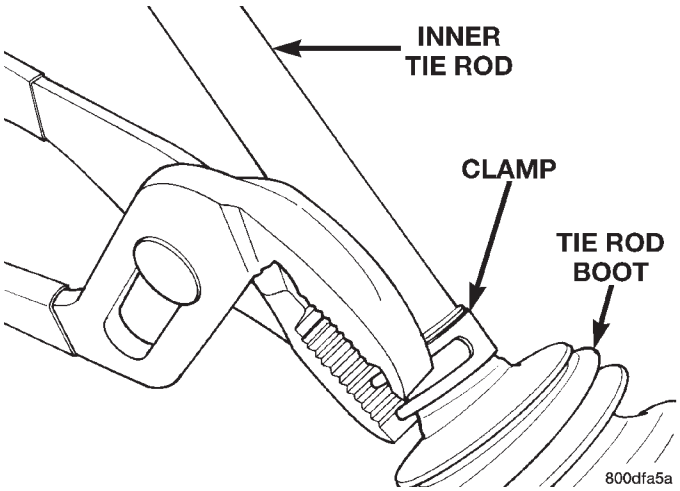


Fig. 18 Tie Rod Boot To Tie Rod Clamp

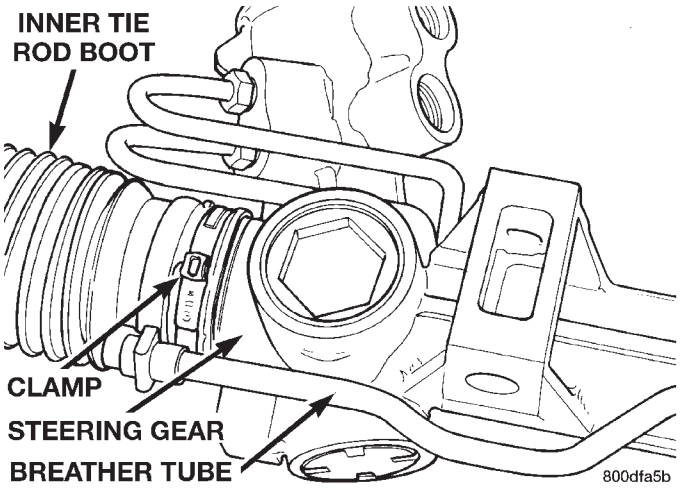


Fig. 19 Tie Rod Boot To Steering Gear Clamp

ASSEMBLE

(1) Install tie rod boot to steering gear clamp on tie rod boot.

(2) Install tie rod boot and clamp on inner tie rod.

(3) Install tie rod boot over steering gear housing and onto the end of the breather tube (Fig. 19).

(4) Crimp inner tie rod boot to steering gear clamp using Crimper, Special Tool C4975A (Fig. 20). When installing clamp, Special Tool C4975A must have bottom bolt tightened until their is no gap between the 2 bars of the tool (Fig. 20)

(5) Lubricate inner tie rod boot groove with silicone type lubricant, then install outer boot seal to inner tie rod clamp (Fig. 18). (Clamp will have to be loosened for toe adjustment.)

(6) Install inner to outer tie rod jam nut (Fig. 15) on inner tie rod.

(7) Install outer tie rod on inner tie rod. Do not tighten jam nut.

(8) Install tie rod end into the steering knuckle. Start tie rod end to steering knuckle attaching nut onto stud of tie rod end. While holding stud of tie rod

DISASSEMBLY AND ASSEMBLY (Continued)

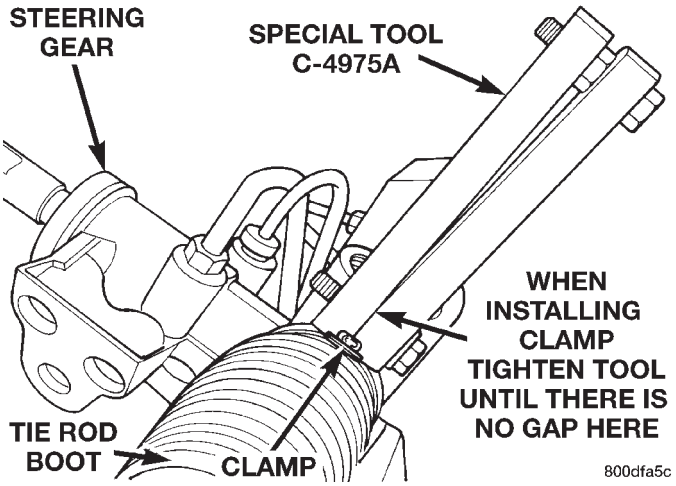


Fig. 20 Installing Tie Rod Boot To Steering Gear Clamp

end stationary, tighten tie rod end to steering knuckle attaching nut (Fig. 17). Then using a crowfoot and 11/32 socket (Fig. 21), torque tie rod end attaching nut to 54 N·m (40 ft. lbs.).

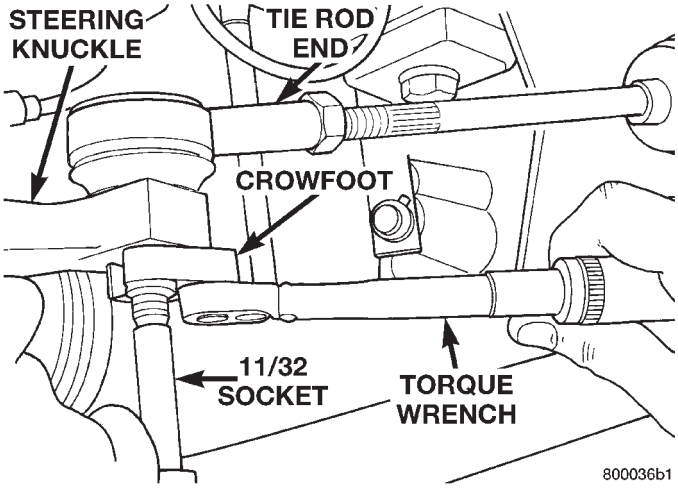


Fig. 21 Torquing Tie Rod End Attaching Nut

CAUTION: During this procedure do not allow the steering gear boot to become twisted. (See Wheel Alignment in the suspension section of this service manual).

(9) Make toe adjustment by turning inner tie rod.

(10) Tighten the inner to outer tie rod jam nut to 75 N·m (55 ft. lbs.) torque. Lubricate tie rod boot groove with silicone type lubricant, before installing outer boot clamp, making sure boot is not twisted.

OUTER TIE ROD END

DISASSEMBLE

(1) Loosen inner tie rod to outer tie rod jam nut (Fig. 22).

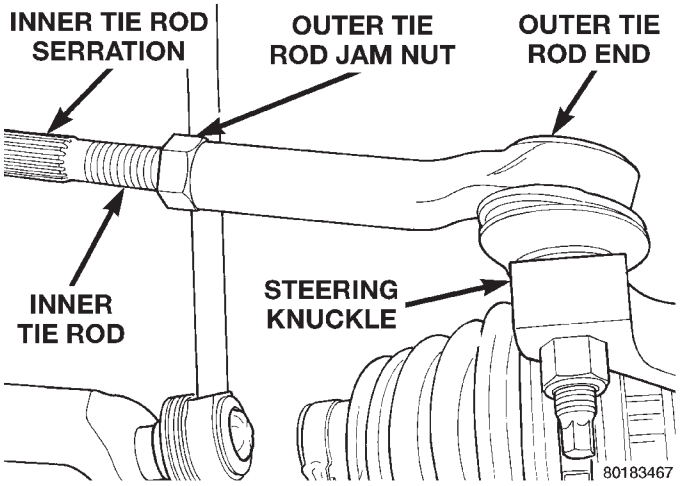


Fig. 22 Inner To Outer Tie Rod Jam Nut

(2) Remove nut attaching outer tie rod end to steering knuckle (Fig. 23). **Nut is to be removed from tie rod end using the following procedure, hold tie rod end stud with a 11/32 socket while loosening and removing nut with wrench.**

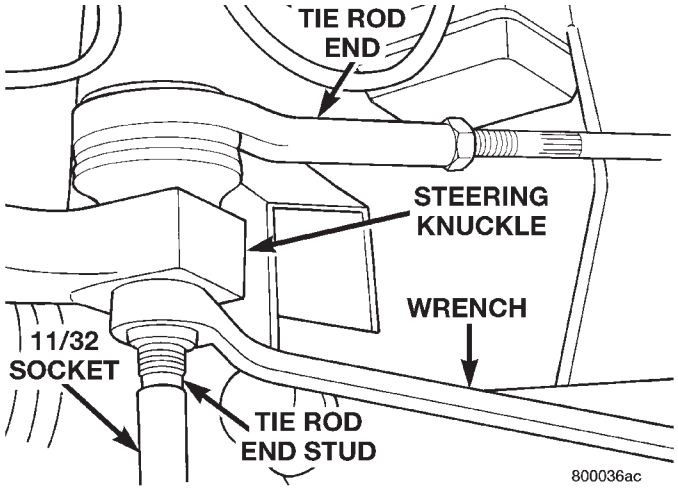


Fig. 23 Tie Rod End Attaching Nut

(3) Remove the tie rod end stud from steering knuckle arm, using Remover, Special Tool, MB-991113 (Fig. 24) or MB-990635.

(4) Remove outer tie rod end from inner tie rod by un-threading it from the inner tie rod.

DISASSEMBLY AND ASSEMBLY (Continued)

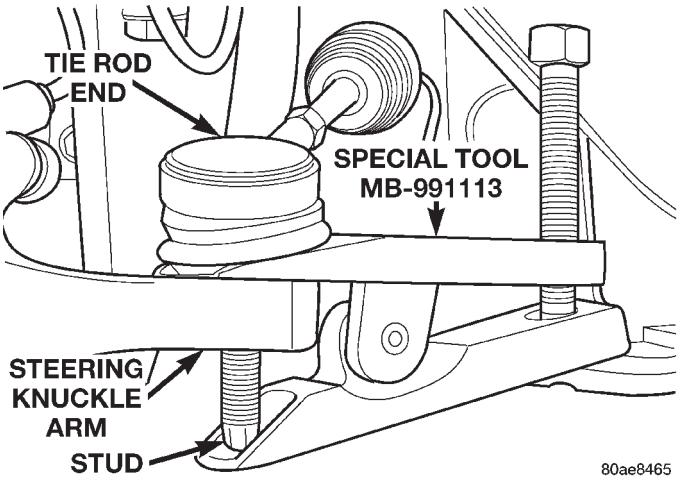


Fig. 24 Tie Rod End Removal From Steering Knuckle

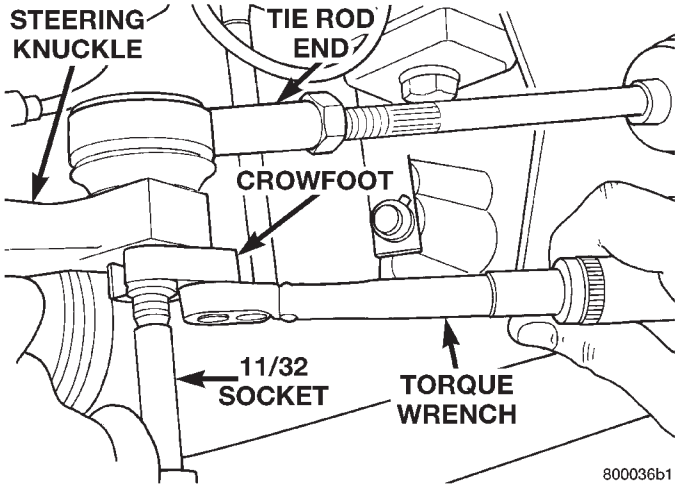


Fig. 25 Torquing Tie Rod End Attaching Nut

ASSEMBLE

(1) Install outer tie rod onto inner tie rod. **Make sure jam nut (Fig. 22) is on inner tie rod.**

(2) Do not tighten jam nut.

(3) Install tie rod end into the steering knuckle. Start tie rod end to steering knuckle attaching nut onto stud of tie rod end. While holding stud of tie rod end stationary, tighten tie rod end to steering knuckle attaching nut (Fig. 23). Then using a crowfoot and 11/32 socket (Fig. 25), torque tie rod end attaching nut to 54 N·m (40 ft. lbs.).

CAUTION: During this procedure do not allow the steering gear boot to become twisted. (See Wheel Alignment in the suspension section of this service manual).

(4) Adjust the front Toe setting on the vehicle. Refer to the Toe Setting Procedure in Front Suspension Service Procedures in this group of the service manual. Refer to the Specifications Section at the end of this group for the desired front Toe specification.

(5) Tighten tie rod jam nut (Fig. 22) to 55 N·m (75 ft. lbs.) torque.

(6) Adjust the steering gear to inner tie rod boots at inner tie rod if they became twisted during Toe adjustment.

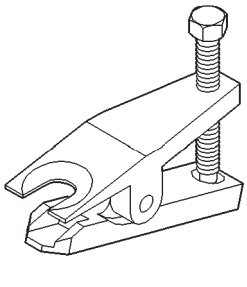
SPECIFICATIONS

STEERING GEAR FASTENER TORQUE SPECIFICATIONS

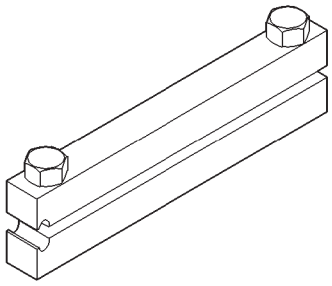
DESCRIPTION	TORQUE
STEERING GEAR:	
To Suspension Cradle Bolts	183 N·m (135 ft. lbs.)
Tie Rod To Steering Knuckle Nut	54 N·m (40 ft. lbs.)
Outer To Inner Tie Rod Jam Nut	75 N·m (55 ft. lbs.)
Power Steering Hose Tube Nuts	31 N·m (275 in. lbs.)
Coupler Pinch Bolt	28 N·m (250 in. lbs.)
SUSPENSION CRADLE:	
Cradle Plate To Cradle Attaching Bolts	165 N·m (123 ft. lbs.)

SPECIAL TOOLS

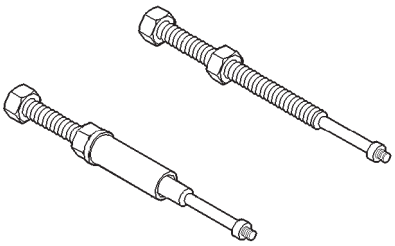
POWER STEERING GEAR



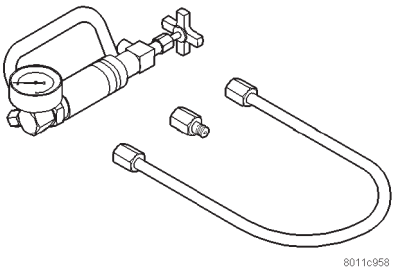
Remover Tie Rod End MB–991113



Installer Boot Clamp C-4975A



Remover/Installer Steering Shaft Roll Pin 6831A



P/S System Analyzer 6815

STEERING COLUMN

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DESCRIPTION AND OPERATION

STEERING COLUMN DESCRIPTION

The steering column (Fig. 1) has been designed to be serviced only as a complete assembly, if a component of the steering column is defective. The only replaceable components of the steering column assembly are the key cylinder, ignition switch, multifunction switch, clockspring, halo lamp, speed control switches, driver airbag, trim shrouds and steering wheel. These replaceable components of the steering column can be serviced without requiring removal of the steering column from the vehicle.

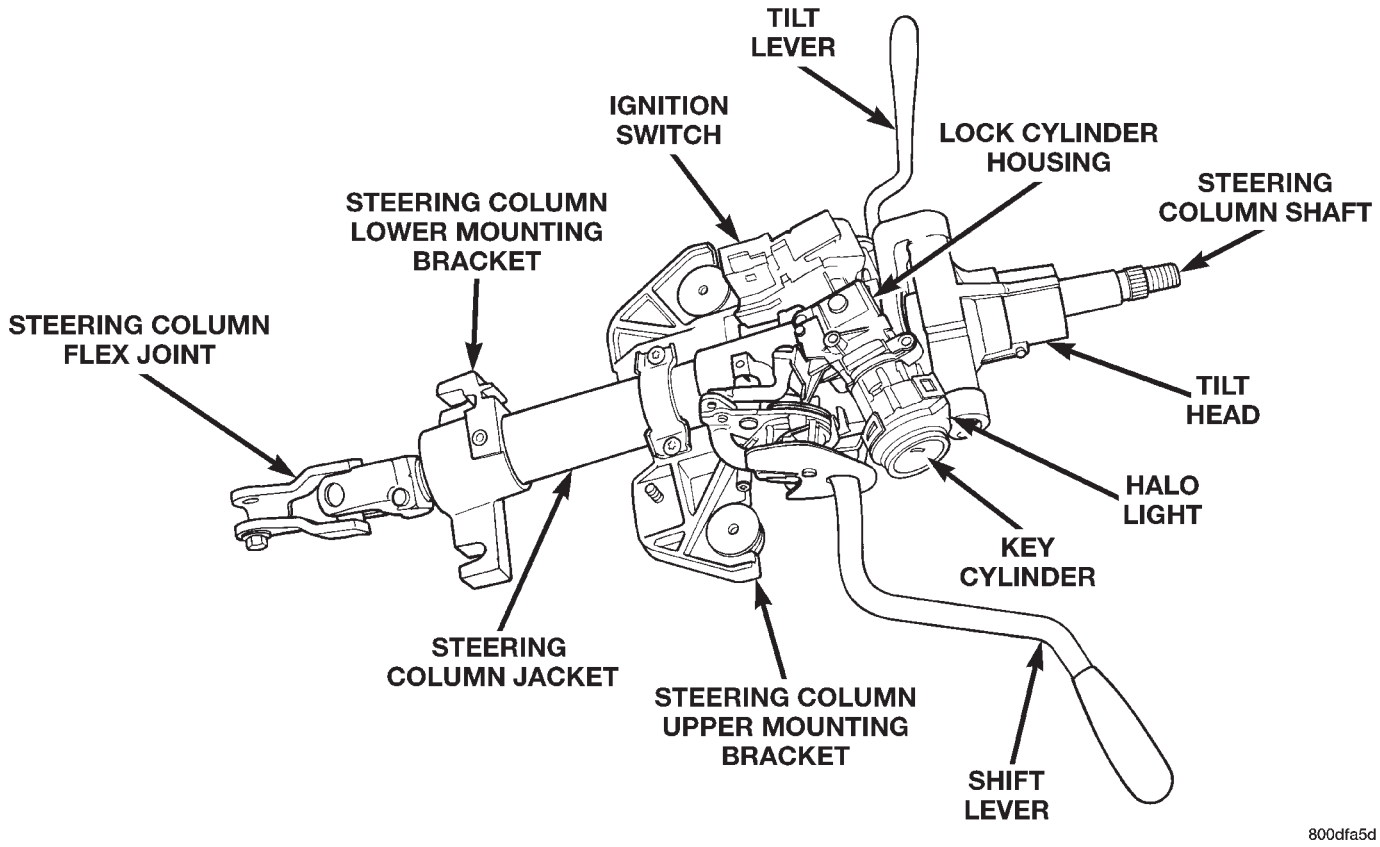
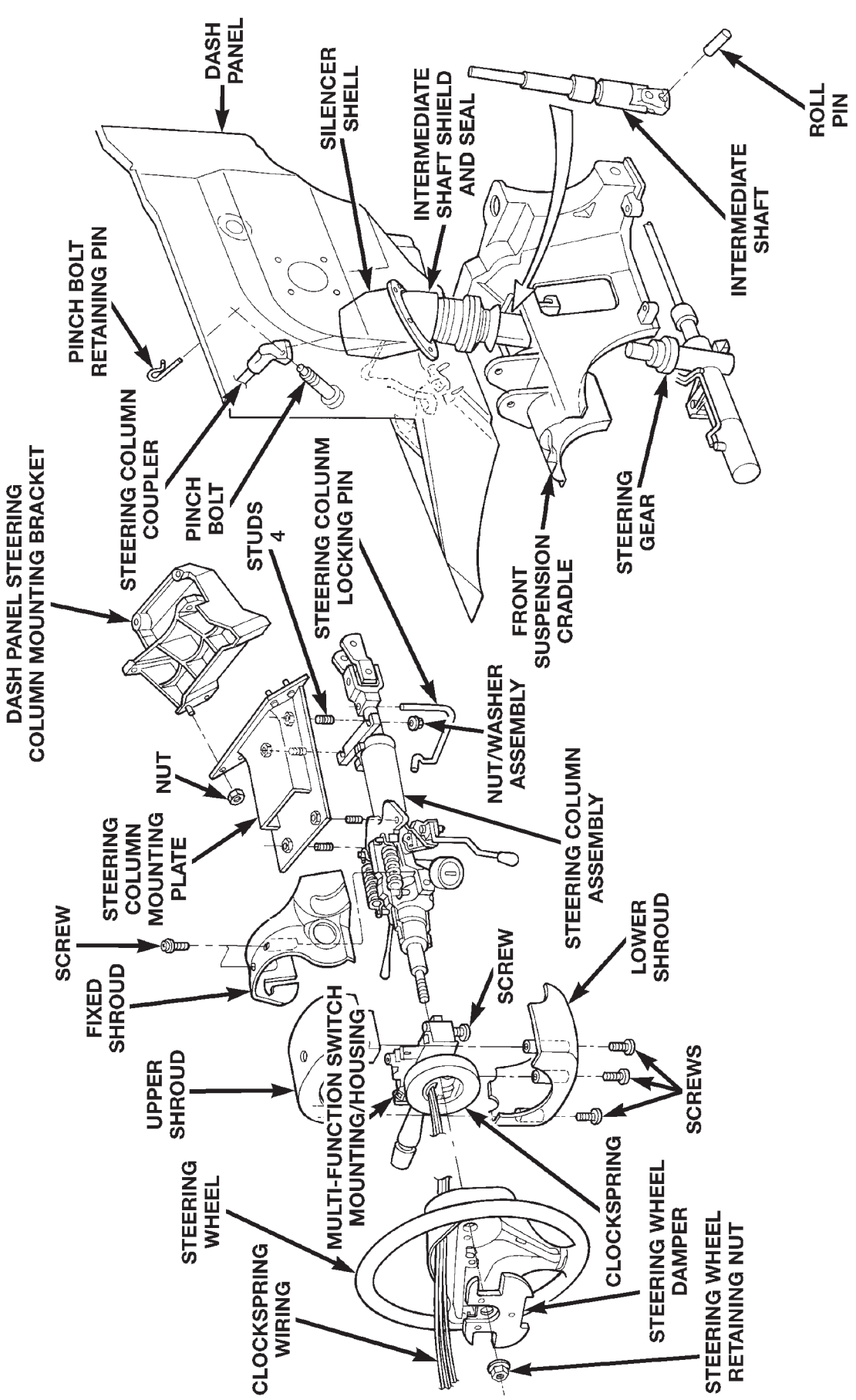


Fig. 1 Steering Column Assembly Components

DESCRIPTION AND OPERATION (Continued)



Steering Column And Steering System Components

DIAGNOSIS AND TESTING

STEERING COLUMN

For diagnosis of conditions relating to the steering column, refer to the steering system diagnosis charts, in the diagnosis and testing section at the beginning of this group.

SERVICE PROCEDURES

STEERING COLUMN SERVICE PROCEDURE WARNINGS

WARNING: BEFORE BEGINNING ANY SERVICE PROCEDURES THAT INVOLVES REMOVING THE AIR BAG. REMOVE AND ISOLATE THE NEGATIVE (-) BATTERY CABLE (GROUND) FROM THE VEHICLE BATTERY. THIS IS THE ONLY SURE WAY TO DISABLE THE AIR BAG SYSTEM. FAILURE TO DO THIS COULD RESULT IN ACCIDENTAL AIR BAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

WARNING: THE AIR BAG SYSTEM IS A SENSITIVE, COMPLEX ELECTRO-MECHANICAL UNIT. BEFORE ATTEMPTING TO DIAGNOSE, REMOVE OR INSTALL THE AIR BAG SYSTEM COMPONENTS YOU MUST FIRST DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE. FAILURE TO DO SO COULD RESULT IN ACCIDENTAL DEPLOYMENT OF THE AIR BAG AND POSSIBLE PERSONAL INJURY. THE FASTENERS, SCREWS, AND BOLTS, ORIGINALLY USED FOR THE AIR BAG COMPONENTS, HAVE SPECIAL COATINGS AND ARE SPECIFICALLY DESIGNED FOR THE AIR BAG SYSTEM. THEY MUST NEVER BE REPLACED WITH ANY SUBSTITUTES. ANYTIME A NEW FASTENER IS NEEDED, REPLACE WITH THE CORRECT FASTENERS PROVIDED IN THE SERVICE PACKAGE OR FASTENERS LISTED IN THE PARTS BOOKS. BEFORE SERVICING A STEERING COLUMN EQUIPPED WITH AN AIR BAG, REFER TO GROUP 8M, ELECTRICAL FOR PROPER AND SAFE SERVICE PROCEDURES.

NOTE: Safety goggles should be worn at all times when working on steering columns.

CAUTION: Disconnect negative (ground) cable from the battery, before servicing any column component.

CAUTION: Do not attempt to remove the pivot pins to disassemble the tilting mechanism. Damage will occur.

REMOVAL AND INSTALLATION

STEERING COLUMN ASSEMBLY

To service the steering wheel and its components or the air bag, refer to Group 8M, Restraint Systems. Follow all WARNINGS.

To service the switches, refer to the appropriate section of Group 8, Electrical.

To replace the steering column assembly, refer to the steering column removal procedure.

REMOVE

(1) Make sure the front wheels of the vehicle are in the **straight ahead** position before beginning the column removal procedure.

(2) Disconnect negative (ground) cable from the battery and isolate cable from battery terminal.

(3) Remove the screws attaching the lower steering column cover to the instrument panel (Fig. 2). Remove the lower trim panel from the lower instrument panel.

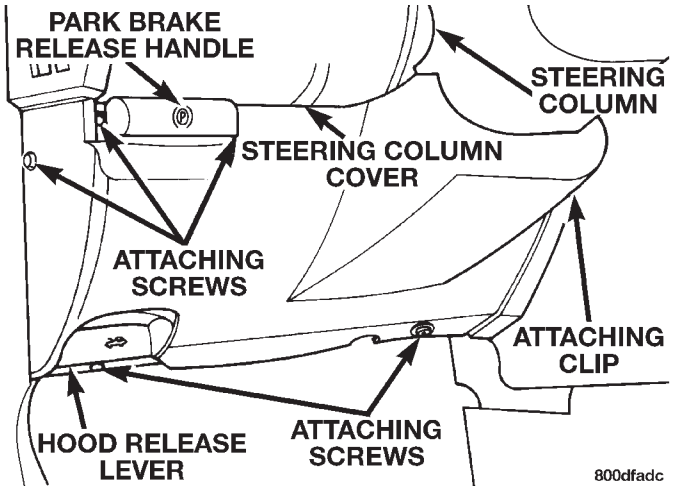


Fig. 2 Lower Steering Column Cover Attachment Locations

(4) Remove the park brake pedal release cable from the park brake release lever (Fig. 3).

(5) Remove the 10 bolts attaching the steering column cover liner (Fig. 4) to the instrument panel. Remove the steering column cover liner from the lower instrument panel.

(6) Rotate key cylinder to the lock position and remove key. Rotate the steering wheel a half turn to the left until the steering column lock engages keeping the steering column in the locked position (Fig. 5).

REMOVAL AND INSTALLATION (Continued)

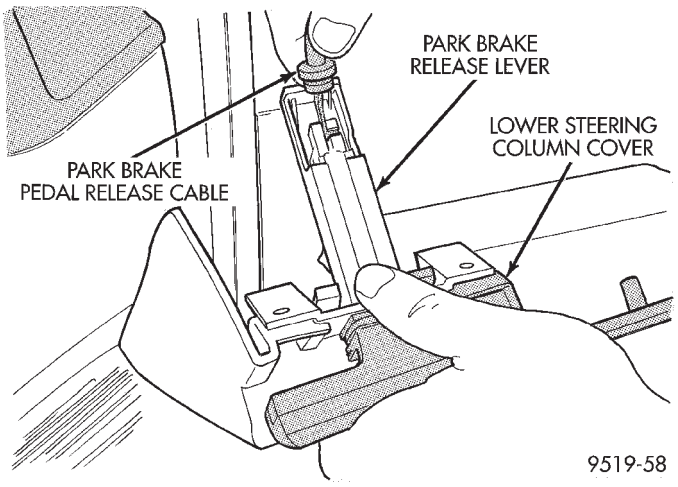


Fig. 3 Park Brake Release Cable Attachment To Release Lever

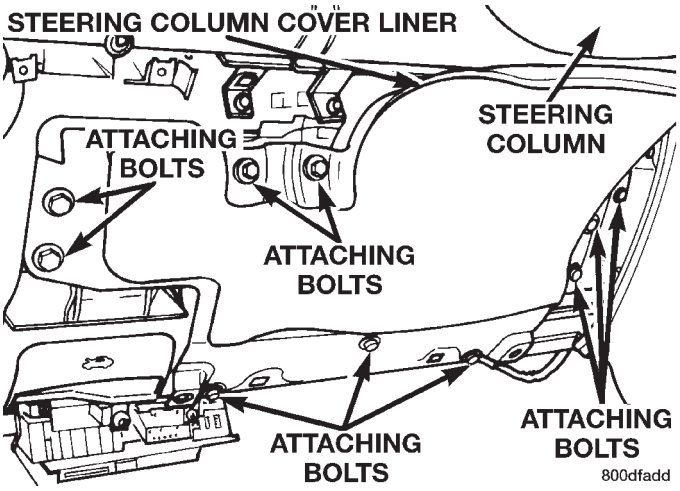


Fig. 4 Lower Steering Column Cover Attachment

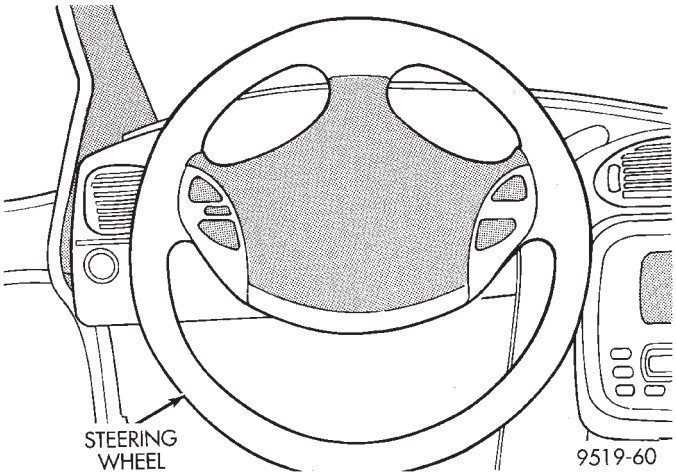


Fig. 5 Steering Wheel In Locked Position

(7) Remove the 3 bolts (1 in each spoke of the steering wheel) attaching the air bag module to the steering wheel. Remove air bag module from steering wheel.

(8) Remove wiring harness connectors from air bag, horn switch wire, and speed control switches (Fig. 6). Remove the wiring harness routing clip (Fig. 6) from the air bag module studs.

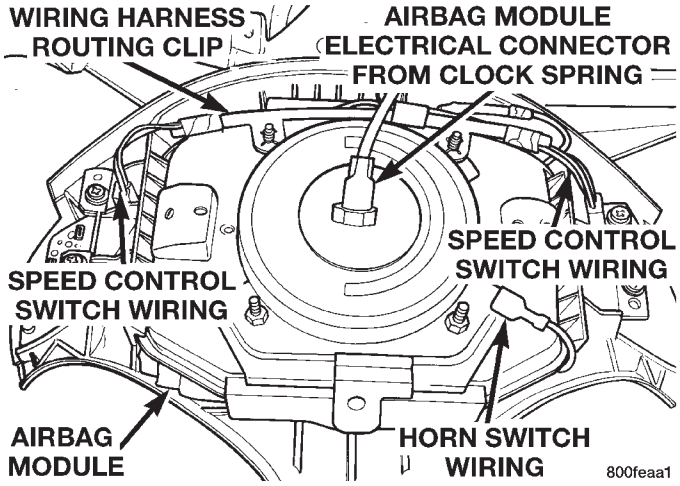


Fig. 6 Air Bag Module Wiring Connections

(9) Remove the steering wheel retaining nut (Fig. 7) from the steering column shaft.

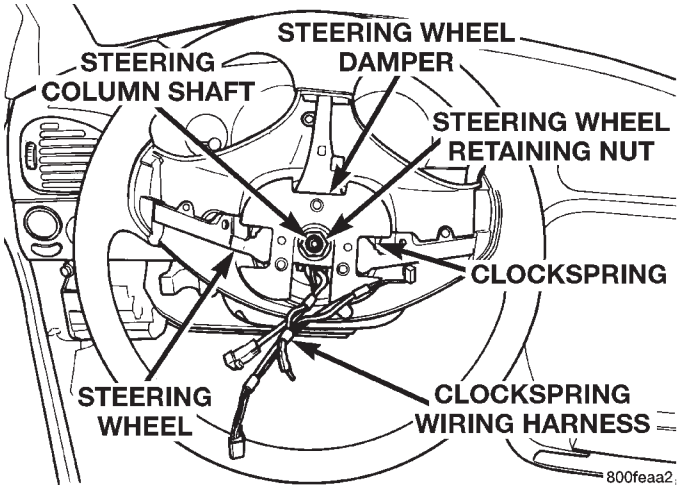


Fig. 7 Steering Wheel Retaining Nut

(10) Remove the steering wheel damper (Fig. 7) from the steering wheel.

CAUTION: Do not bump or hammer on steering column or steering column shaft when removing steering wheel from steering column shaft.

REMOVAL AND INSTALLATION (Continued)

CAUTION: When installing steering wheel puller bolts in steering wheel, (Fig. 8) do not thread bolt into steering wheel more than a half inch. If bolts are threaded into the steering wheel more than a half inch they will contact and damage the clock-spring.

(11) Remove the steering wheel from steering column shaft using Puller, Special Tool, Snap-On CJ2001JP or an equivalent (Fig. 8).

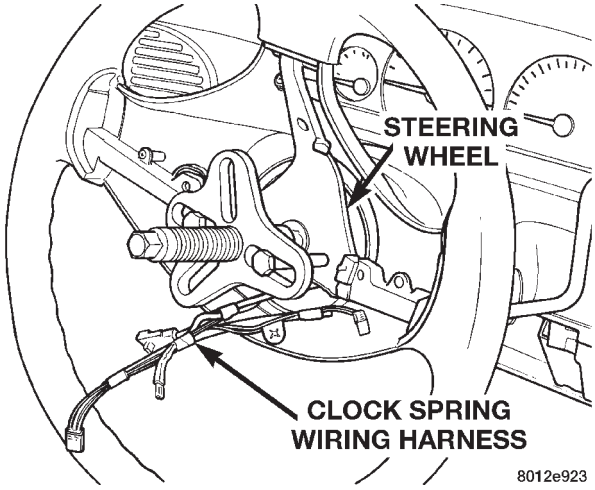


Fig. 8 Removing Steering Wheel From Steering Column Shaft

CAUTION: The upper and lower steering column shrouds are held together using retaining clips. When separating and removing the shrouds from the steering column be careful not to break the retaining clips off the shrouds

(12) Remove the 3 screws (Fig. 9) attaching the upper and lower shrouds to the steering column. Then remove the upper and lower shrouds (Fig. 9) from the steering column.

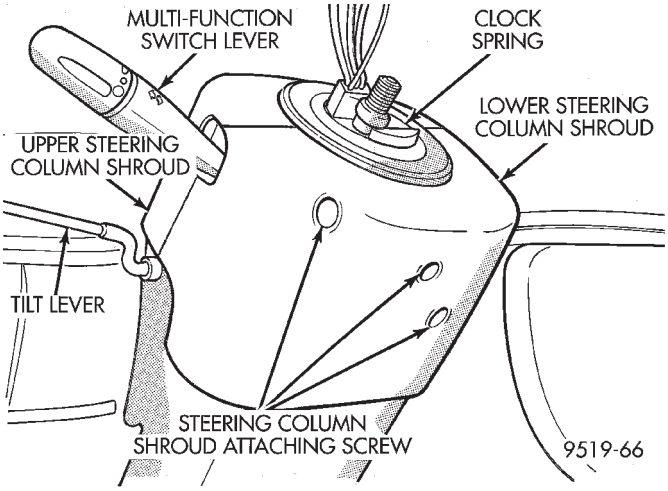


Fig. 9 Steering Column Shrouds

(13) Remove the vehicle wiring harness connectors (Fig. 10) from the clock spring assembly.

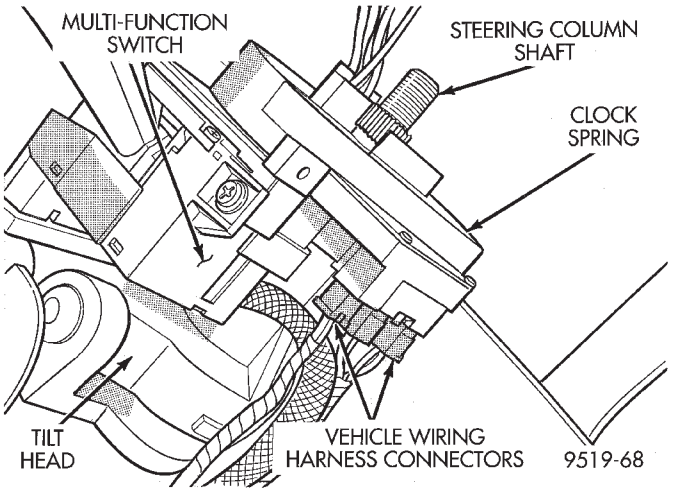


Fig. 10 Wiring Harness Connections To Clock Spring

CAUTION: Do not rotate the clock spring after it is removed from the multifunction switch.

(14) Remove the clock spring from the multi-function switch.

(15) Remove the vehicle wiring harness connector from the top of the multi-function switch (Fig. 11).

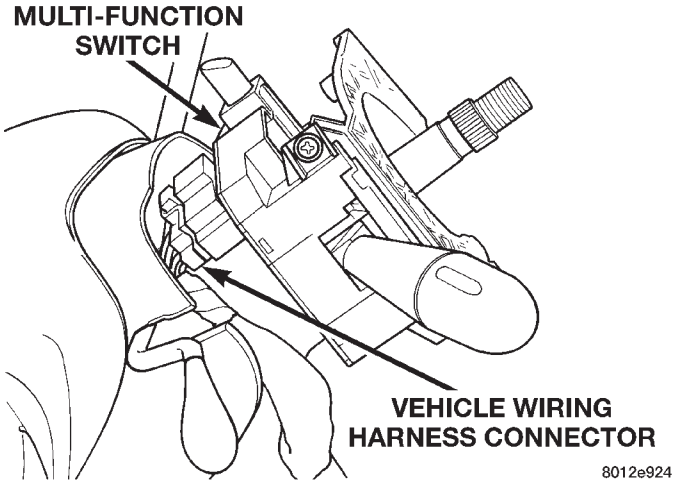


Fig. 11 Wiring Harness Connection To Multi-Function Switch

(16) Remove the screw (Fig. 12) attaching the multi-function switch housing to the tilt head of the steering column assembly.

(17) Remove the multi-function switch (Fig. 12) from the tilt head of the steering column assembly.

(18) Remove the vehicle wiring harness connector from the key cylinder halo light (Fig. 13).

(19) Remove the 3 wiring harness connectors from the ignition switch (Fig. 14).

REMOVAL AND INSTALLATION (Continued)

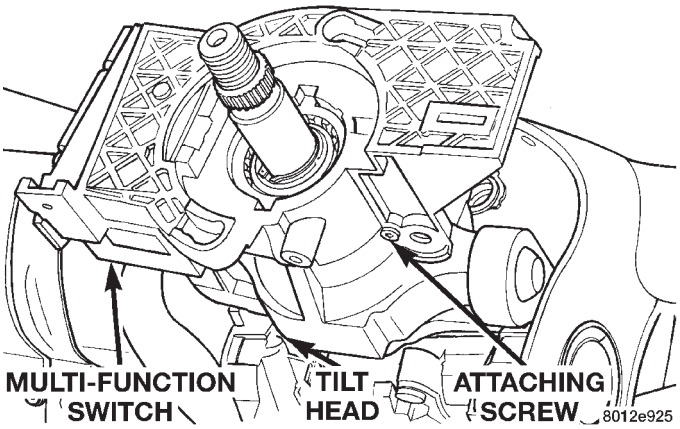


Fig. 12 Multi-Function Switch Mounting Housing Attaching Screw

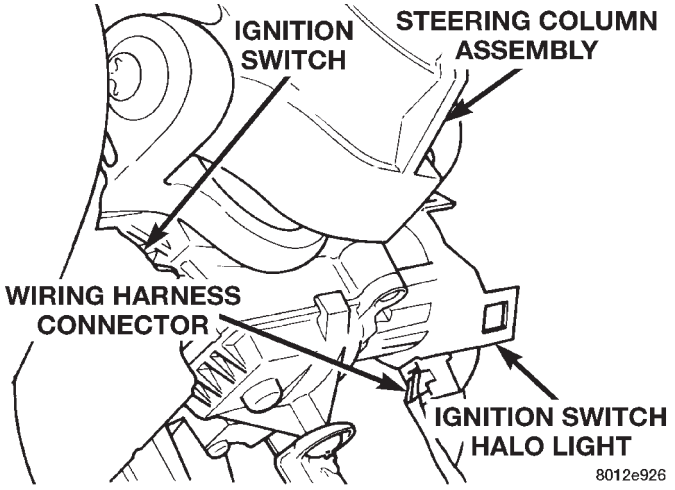


Fig. 13 Wiring Harness Connection To Halo Light

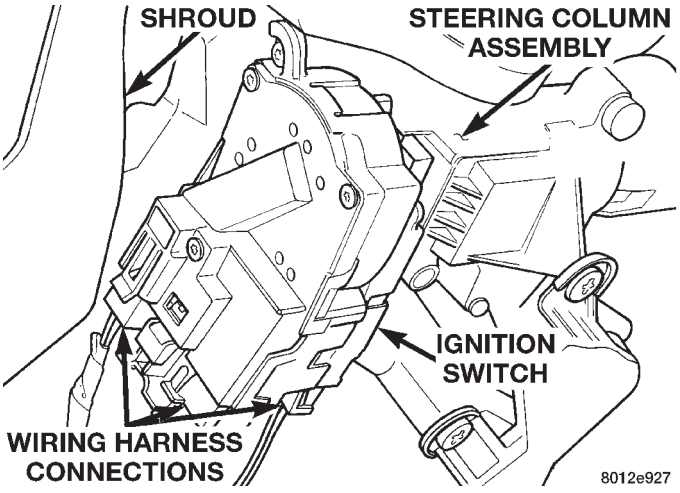


Fig. 14 Ignition Switch Wiring Harness Connections

(20) If the vehicle is equipped with a 3 speed non-electronic transmission, remove the PRNDL actuating cable from the pin on the gear shifter (Fig. 15).

PRNDL actuating cable MUST be removed from the pin on the gear shifter prior to removing the gear selector cable from the gear shifter.

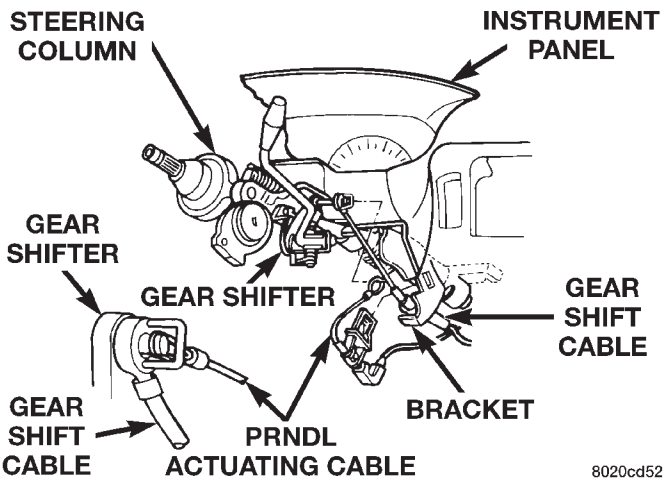


Fig. 15 PRNDL Actuating Cable At Steering Column

(21) Remove the attaching clip (Fig. 15) for the PRNDL actuating cable from the steering column/shift cable bracket.

(22) Remove the gear selector cable from the gear shifter the steering column (Fig. 16). Gear selector cable is removed from pin on shift module by **carefully** prying it off with a screw driver (Fig. 16).

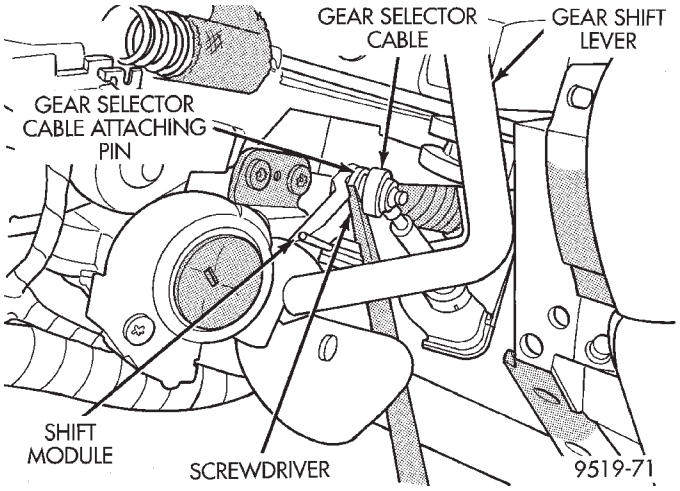


Fig. 16 Gear Selector Cable Removal From Shift Module

(23) Remove the gear selector cable and its mounting bracket as an assembly, from the upper mounting bracket for the steering column (Fig. 17).

(24) Remove the instrument cluster trim bezel (Fig. 18) from the instrument panel. The trim bezel is mounted to the instrument panel using 2 attaching screws and retaining clips.

(25) Remove the steering column fixed shroud from the steering column assembly (Fig. 19). Shroud

REMOVAL AND INSTALLATION (Continued)

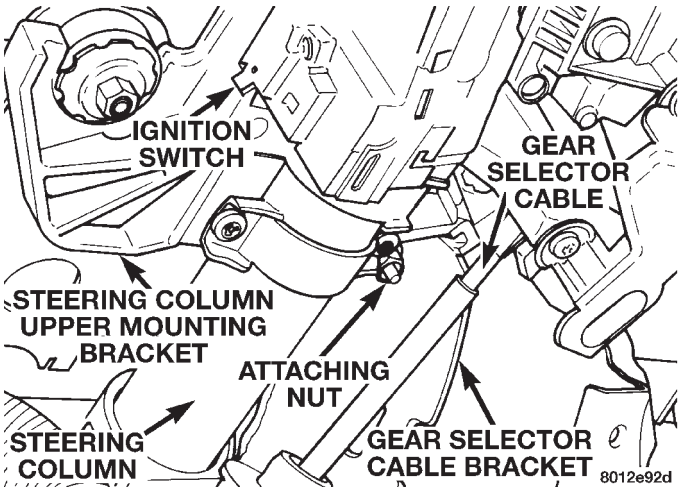


Fig. 17 Gear Selector Cable Mounting Bracket

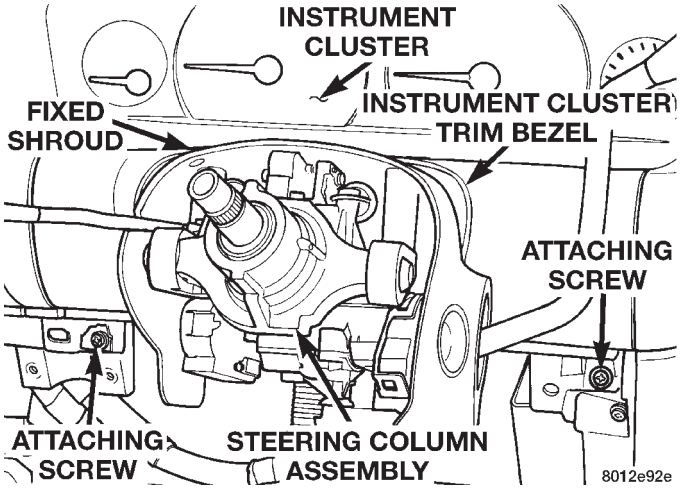


Fig. 18 Instrument Cluster Trim Bezel

is mounted to steering column using 2 attaching screws accessed from top of fixed shroud.

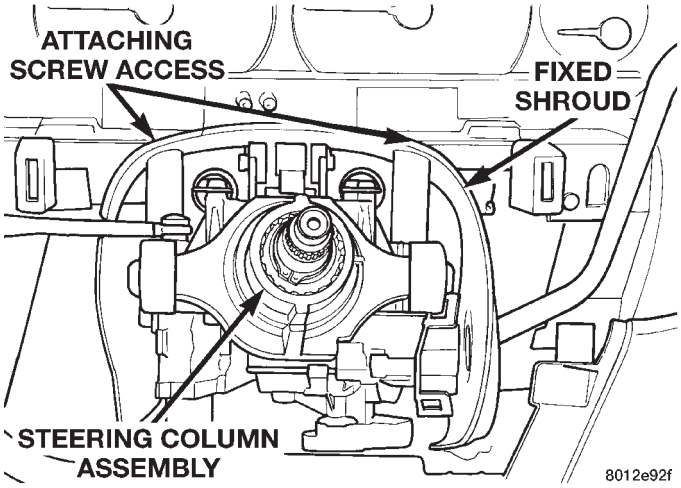


Fig. 19 Steering Column Fixed Shroud

(26) Disconnect the steering column shaft coupler, from the steering gear intermediate steering coupler (Fig. 20).

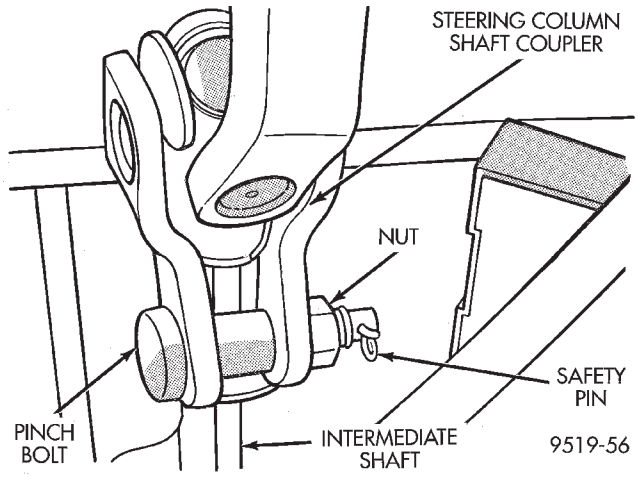


Fig. 20 Steering Column Shaft To Intermediate Coupler Attachment

(27) Loosen but do not fully remove the 2 nut/washer assemblies attaching the steering column lower mounting bracket (Fig. 21). Then remove the 2 nut/washer assemblies attaching the steering column upper mounting bracket (Fig. 21).

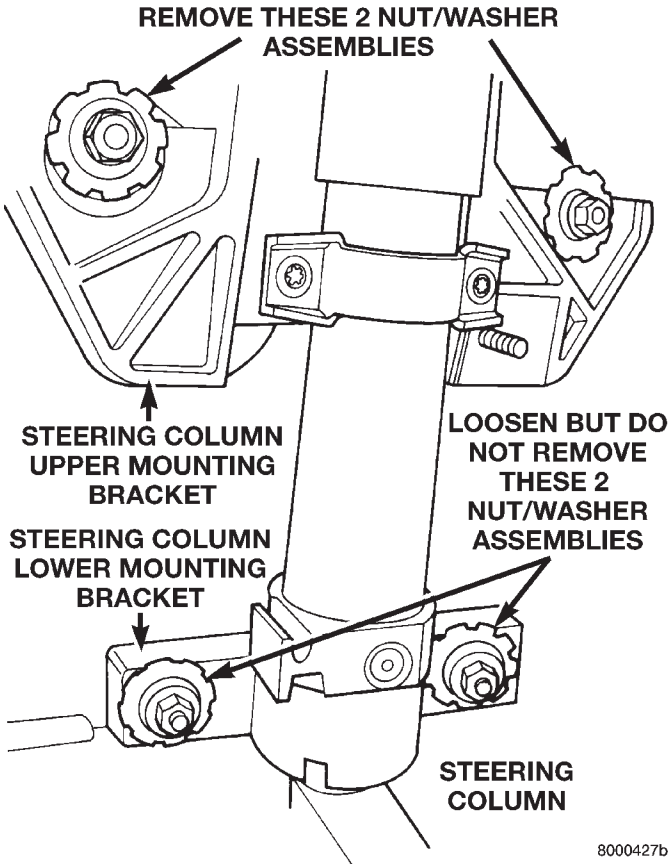


Fig. 21 Steering Column Upper And Lower Mounting Brackets

REMOVAL AND INSTALLATION (Continued)

(28) Remove steering column assembly from vehicle. Use care to avoid damage to paint or interior trim.

INSTALL

(1) Ensure the plastic mounting capsules (Fig. 22) are installed in the upper mounting bracket of the steering column. Mounting capsules must be installed as shown in (Fig. 22) with the thicker edge of the capsule facing the top of the steering column.

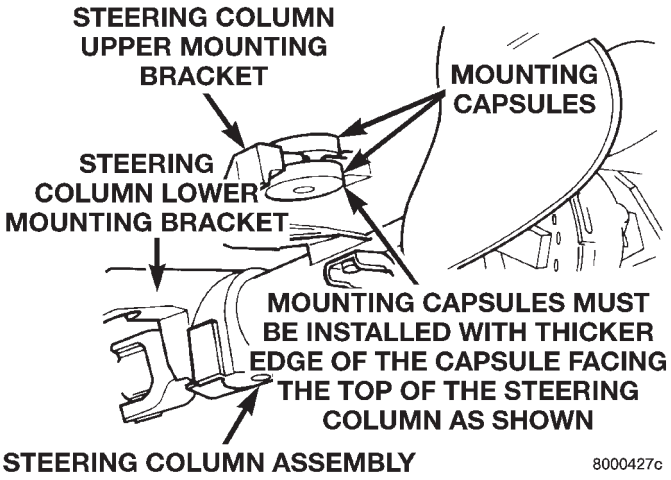


Fig. 22 Mounting Capsules Correctly Installed On Steering Column

(2) Install steering column assembly into its opening in instrument panel. Install the steering column lower bracket so the bracket is squarely installed on its mounting studs (Fig. 21). Then align and install steering column upper bracket on its mounting studs (Fig. 21). Tighten the 4 steering column assembly mounting nut/washer assemblies to a torque of 12 N·m (105 in. lbs.).

(3) Assemble the steering column shaft coupler (Fig. 20) onto the steering gear intermediate coupler. Install steering column coupler to intermediate shaft retaining pinch bolt (Fig. 20). Tighten the pinch bolt nut to a torque of 28 N·m (250 in. lbs.). Install safety pin (Fig. 20) in steering column shaft coupler pinch bolt.

(4) Install the gear slector cable and its mounting bracket on the upper mounting bracket of the steering column (Fig. 17). Install and securely tighten the mounting bracket attaching bolt.

(5) Install the gear selector cable on the pin of the gear shifter (Fig. 16).

(6) If the vehicle is equipped with a 3 speed non-electronic transmission, install the PRNDL actuating cable on the gear shifter pin after the gear selector cable is installing (Fig. 15).

(7) If the vehicle is equipped with a 3 speed non-electronic transmission, install the attaching clip (Fig. 15) for the PRNDL actuating cable on the steering column/shift cable bracket. Cable guide tube will bow toward passenger side of vehicle. Verify that actuating cable is operating correctly, then slip the loop on the end of the cable over end of pin on shift lever and install in groove (Fig. 15).

(8) Install the steering column fixed shroud on the steering column assembly (Fig. 19). Shroud is mounted to steering column using 2 attaching screws accessed from top of fixed shroud.

(9) Install the instrument cluster trim bezel (Fig. 18) on the instrument panel. The trim bezel is mounted to the instrument panel using 2 attaching screws (Fig. 18) and retaining clips.

(10) Install the 3 wiring harness connectors on the ignition switch (Fig. 14).

(11) Install the vehicle wiring harness connector into the key cylinder halo light (Fig. 13).

(12) Install the multi-function switch (Fig. 12) on the tilt head of the steering column assembly. Then install screw (Fig. 12) attaching multi-function switch to tilt head of steering column.

(13) Install the vehicle wiring harness connector on the multi-function switch (Fig. 11). Be sure latch on connector is fully engaged with tab on switch.

(14) Install the clock spring on the multi-function switch.

(15) Install the vehicle wiring harness connector (Fig. 10) on the clock spring assembly.

(16) Install the lower steering column shroud on the tilt head of the steering column (Fig. 23). Install and securely tighten the screw attaching the lower shroud to the tilt head.

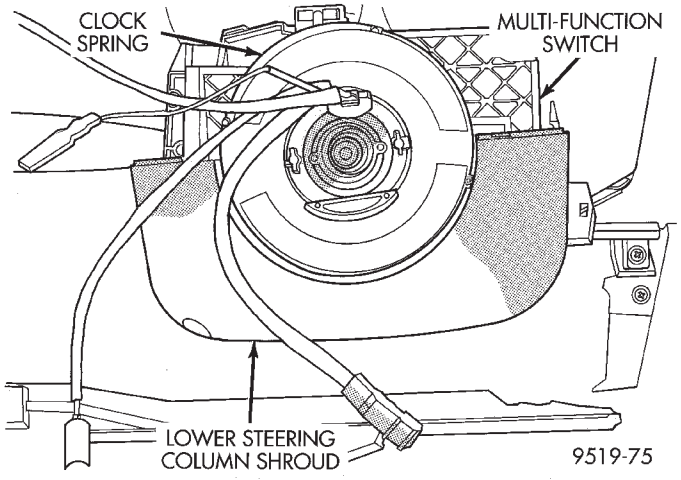


Fig. 23 Lower Steering Column Shroud Installed

(17) Install the upper steering column shroud on the tilt head of the steering column (Fig. 24). Install and securely tighten the 2 screws attaching the upper shroud to the lower shroud.

REMOVAL AND INSTALLATION (Continued)

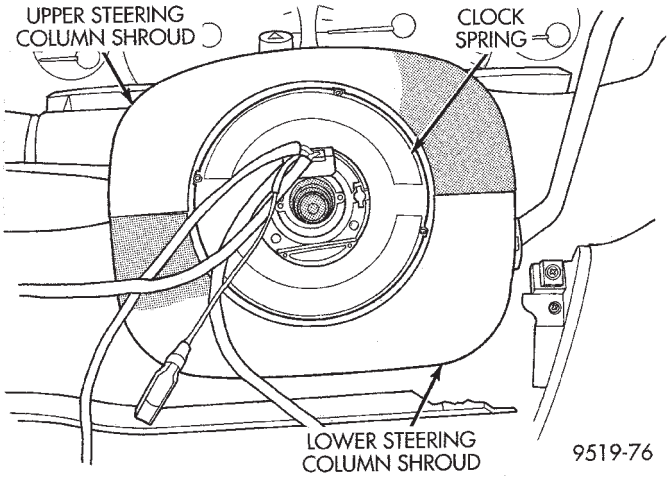


Fig. 24 Upper And Lower Steering Column Shroud Installed

CAUTION: Before installing the steering wheel the clockspring must be centered. If clockspring is not centered, the wiring in the clockspring may be over-extended and break when the steering wheel is rotated. Use the following procedure to center the clockspring.

CLOCKSPRING CENTERING PROCEDURE

- Depress the 2 plastic locking pins to disengage the lock mechanism (Fig. 25).
- With the lock mechanism disengaged, rotate the clockspring rotor clockwise until the rotor stops. **Do not apply excessive force.**
- From the end of the clockwise travel, rotate the rotor three turns counterclockwise. The clockspring wires should be at the top. Engage clockspring locking pins.
- From the center locked position, rotate the clockspring one-half additional turn counterclockwise. The clockspring wiring should now be at the bottom. The clockspring is now correctly positioned for installation of the steering wheel.

CAUTION: Do not force steering wheel onto steering column shaft by driving it on. Pull steering wheel down onto shaft using ONLY the steering wheel retaining nut.

(18) Align master splines on steering wheel and steering shaft, and flats on steering wheel with formations on clock spring. Install the steering wheel on the steering column shaft (Fig. 26). All wiring leads from the clock spring **must** be routed as shown in (Fig. 26).

NOTE: Before installing the damper on the steering wheel, inspect the damper to ensure the rubber isolator on the damper is not deteriorated or damaged.

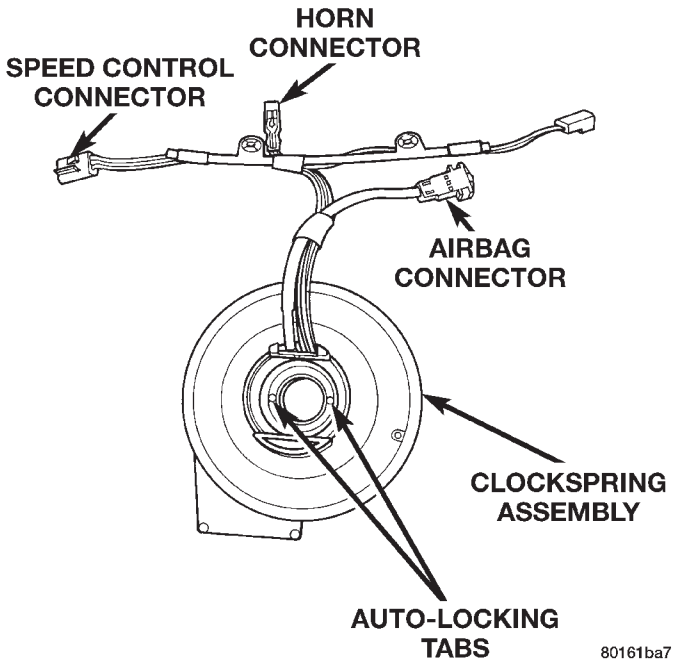


Fig. 25 Clockspring Assembly

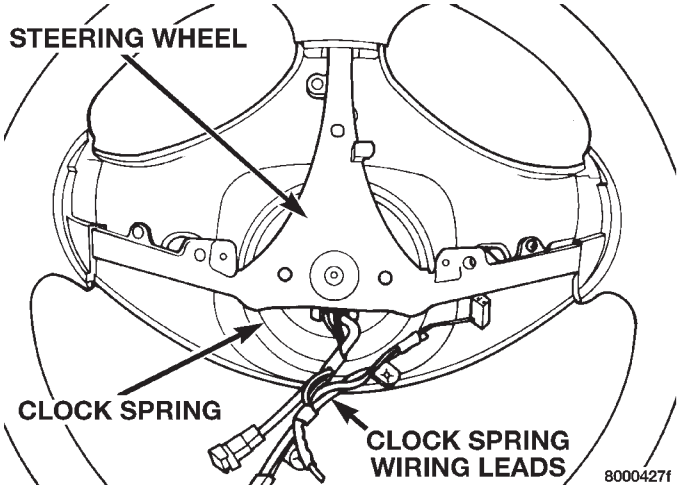


Fig. 26 Steering Wheel And Clock Spring Wire Routing

If the damper is installed with a damaged isolator a buzz, squeak or rattle condition may develop.

(19) Install the steering wheel damper on the steering wheel. When damper is installed, it **must** be positioned on the steering wheel as shown in (Fig. 7).

(20) Install the steering wheel to steering shaft retaining nut. Tighten the steering wheel retaining nut to a torque of 61 N·m (45 ft. lbs.).

(21) Install the wiring leads from the clock spring on the air bag, horn switch wire, and speed control switches (Fig. 6). Attach the wire routing clip (Fig. 6) to the studs on the air bag module.

(22) Install the air bag module in the steering wheel.

REMOVAL AND INSTALLATION (Continued)

(23) Install the 3 bolts (1 in each spoke of the steering wheel) attaching the air bag module to the steering wheel. Tighten the 3 air bag module attaching nuts to a torque of 11 N·m (100 in. lbs.).

(24) Install the steering column cover liner (Fig. 4) on the lower instrument panel. Install and securely tighten the 10 bolts (Fig. 4) attaching the steering column cover liner to the instrument panel.

(25) Install the park brake pedal release cable on the park brake release lever in the lower steering column cover (Fig. 3).

(26) Install the lower steering column trim panel on the lower instrument panel. Install and securely the screws attaching the lower steering column cover to the instrument panel (Fig. 2).

(27) Connect negative (ground) cable on the battery terminal.

SPECIFICATIONS

STEERING COLUMN FASTENER TORQUE SPECIFICATIONS

DESCRIPTION	TORQUE
STEERING WHEEL:	
Retaining Nut	61 N·m (45 ft. lbs.)
STEERING COLUMN ASSEMBLY:	
Mounting Bracket Attaching Nuts	12 N·m (105 in. lbs.)
Flex Coupler Pinch Bolt	27 N·m (240 in. lbs.)
Airbag Module Attaching Nuts	11 N·m (100 in. lbs.)