

STEERING

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GENERAL INFORMATION

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GENERAL INFORMATION

STEERING SYSTEM AND COMPONENT DESCRIPTION

This vehicle is available either with standard power steering or with an optional speed-sensitive variable-assist power steering system.

The power steering system consists of these six major components. Power Steering Pump, Power Steering Gear, Power Steering Reservoir, Power Steering Supply and Pressure Hoses, and Power Steering Fluid Return Hose. 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 power steering pump to either side of the integral steering rack piston.

Available as an option on this vehicle, is a speed-sensitive variable-assist power steering system. This

system is an electronically controlled, variable-assist type of power steering system. Speed-proportional, variable-assist power steering provides additional assist while the vehicle is stationary and at slow driving speeds. This additional power steering assist reduces the steering effort required by the driver for slow speed driving and parking maneuvers. Speed-proportional variable-assist power steering then provides less steering assist at highway speeds, to maintain the firm, responsive feel of the standard non speed-proportional variable-assist power steering system.

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

DIAGNOSIS AND TESTING

STEERING 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 in high velocity fluid passing valve orifice edges. There is no relationship between this noise and performance of the steering. Hiss may be expected when steering wheel at end of travel or slowly turning at 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.	1. Check for proper seal between steering column coupler and dash seal. 2. Replace steering gear assembly.
Rattle Or Clunk	1. Steering gear loose on front suspension crossmember. 2. Front suspension crossmember to frame bolts or studs loose. 3. Tie rod looseness (outer or inner). 4. Loose lower control arm to front suspension crossmember bolts. 5. Lower control arm inner pivot bushing worn. 6. Lower control arm tension strut bushing worn. 7. Loose strut assembly to body attaching bolts or nuts. 8. Power steering fluid pressure hose touching the body of the vehicle. 9. Noise internal to power steering gear. 10. Damaged front suspension crossmember.	1. Check steering gear to front suspension crossmember mounting bolts. Tighten to specified 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. Replace lower control arm pivot bushing. 6. Replace lower control arm tension strut bushing. 7. Check upper strut mount to body attaching bolts or nuts for looseness. If required tighten to the specified torques. 8. Adjust hose to proper position by loosening, repositioning, and tightening fitting to specified torque. Do not bend tubing. 9. Replace steering gear assembly. 10. Replace front suspension crossmember.
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. 2. Power steering hose touching vehicle body or frame. 3. Extreme wear of power steering pump internal parts. 4. Extremely cold temperatures of less than zero degrees Fahrenheit.	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. Reposition power steering hose. Replace hose if tube ends are bent. 3. Replace power steering pump and flush system. 4. Noise is typical when starting vehicle in extremely cold temperature. Normal duration of noisy operation is 45 seconds to 3 minutes. If noisy operation is longer, verify power steering fluid is at the correct level. If level is low perform leakage diagnosis.
Sucking Air Sound	1. Loose clamp on power steering fluid low pressure hose. 2. Missing O-Ring on power steering hose connection. 3. Low power steering fluid level 4. Air leak between power steering fluid reservoir and power steering pump.	1. Tighten or replace hose clamp. 2. Inspect connection and replace O-Ring as required. 3. Fill power steering fluid reservoir to proper level and perform leakage diagnosis. 4. Inspect and or replace power steering fluid reservoir as required.
SQUEAK OR RUBBING SOUND	1. Sound coming from steering column. 2. Sound internal to steering gear.	1. Check for squeak in steering column. Inspect for contact between shroud, intermediate shaft, column, and steering wheel. Realign if necessary. 2. Check for lack of grease on steering column dash panel to lower coupler seal. 1. Replace steering gear assembly.
SQUAWK FROM RIGHT ISOLATOR OF STEERING GEAR AT COLD TEMPERATURE START-UP. TEMPERATURES OF LESS THAN 20° F.	1. Right isolator of steering gear slipping on the steering gear or steering gear mounting bracket.	1. Replace isolator on right side of steering gear.
SCRUBBING OR KNOCKING SOUND	1. Incorrect tire size. 2. Check clearance between tires and other vehicle components, through the full travel of the suspension. 3. Check for interference between steering gear and other components.	1. Verify that tire size on vehicle is the same as originally supplied. 2. Correct as necessary. 3. Correct as necessary.

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. 2. Power steering hose touching vehicle body or frame. 3. Extreme wear of power steering pump internal parts. 4. Extremely cold temperatures of less than zero degrees Fahrenheit.	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. Reposition power steering hose. Replace hose if tube ends are bent. 3. Replace power steering pump and flush system. 4. Noise is typical when starting vehicle in extremely cold temperature. Normal duration of noisy operation is 45 seconds to 3 minutes. If noisy operation is longer, verify power steering fluid is at the correct level. If level is low perform leakage diagnosis.
Sucking Air Sound	1. Loose clamp on power steering fluid low pressure hose. 2. Missing O-Ring on power steering hose connection. 3. Low power steering fluid level 4. Air leak between power steering fluid reservoir and power steering pump.	1. Tighten or replace hose clamp. 2. Inspect connection and replace O-Ring as required. 3. Fill power steering fluid reservoir to proper level and perform leakage diagnosis. 4. Inspect and or replace power steering fluid reservoir as required.
SQUEAK OR RUBBING SOUND	1. Sound coming from steering column. 2. Sound internal to steering gear.	1. Check for squeak in steering column. Inspect for contact between shroud, intermediate shaft, column, and steering wheel. Realign if necessary. 2. Check for lack of grease on steering column dash panel to lower coupler seal. 1. Replace steering gear assembly.
SQUAWK FROM RIGHT ISOLATOR OF STEERING GEAR AT COLD TEMPERATURE START-UP. TEMPERATURES OF LESS THAN 20° F.	1. Right isolator of steering gear slipping on the steering gear or steering gear mounting bracket.	1. Replace isolator on right side of steering gear.
SCRUBBING OR KNOCKING SOUND	1. Incorrect tire size. 2. Check clearance between tires and other vehicle components, through the full travel of the suspension. 4. Incorrect steering gear supplied.	1. Verify that tire size on vehicle is the same as originally supplied. 2. Correct as necessary. 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. 2. Tires not inflated to specified pressure. 3. Lack of lubrication in front suspension control arm ball joints. 4. Worn upper or lower ball joint. 5. Lack of lubrication in front suspension outer tie rod ends. 6. Loose power steering pump drive belt. 7. Faulty power steering pump flow control. (Verify cause using Power Steering Pump Test Procedure.) 8. Excessive friction in steering column or intermediate shaft. 9. Binding upper or lower ball joint. 10. Worn front strut seat and bearing or strut pin stuck in strut seat. 11. Excessive friction in steering gear.	1. Fill power steering fluid reservoir to specified level and perform leakage diagnosis. 2. Inflate tires to the specified pressure. 3. Lubricate ball joints if ball joints are not a lubricated for life type ball joint. If ball joint is a lubricated for life ball joint, replace ball joint or control arm. 4. Replace the upper or lower control arm. 5. Lubricate tie rod ends if they are not a lubricated for life type. If tie rod end is a lubricated for life type, replace tie rod end. 6. Tighten the power steering pump drive belt to the specified tension. See accessory drive in service manual. 7. Replace power steering pump. 8. Correct condition. (See Steering Column Service Procedure) 9. Replace the upper or the lower control arm. 10. Replace front strut seat and bearing. 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. 2. Tires not properly inflated. 3. Excessive engine vibration. 4. Loose tie rod end. 5. Overcharged air conditioning 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. Inflate tires to the specified pressure. 3. Ensure that the engine is running properly. 4. Check inner and outer tie rod and jam nut for excessive free play. 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. 2. Low power steering fluid level. 3. Loose power steering pump drive belt. 4. Lack of lubrication in control arm ball joints. 5. Worn upper or lower ball joint. 6. Low power steering pump pressure. (Verify using Power Steering System Test Procedure) 7. High internal leak in steering gear assembly.	1. Inflate tires to specified pressure. 2. Add power steering fluid as required to power steering fluid reservoir to obtain proper level. Perform leakage diagnosis on power steering system. 3. Tighten the power steering pump drive belt to the specified tension. If drive belt is defective replace and correctly tension. 4. Lubricate ball joints if ball joints are not a lubricated for life type ball joint. If ball joint is a lubricated for life ball joint, replace ball joint or control arm. 5. Replace the upper and/or lower control arm. 6. Verify cause using the Power Steering System Test Procedure. Replace the power steering pump if necessary. 7. Check steering system using the Power Steering System Test Procedure. If steering gear is defective replace steering gear.

DIAGNOSIS AND TESTING (Continued)

POOR RETURN TO CENTER

CONDITION	POSSIBLE CAUSES	CORRECTION
STEERING WHEEL DOES NOT WANT TO RETURN TO CENTER POSITION.	1. Tires not inflated to specified pressure. 2. Improper front wheel alignment. 3. Lack of lubrication in front suspension control arm ball joints. 4. Mispositioned dash cover. 5. Steering wheel rubbing. 6. Damaged, mis-positioned or un-lubricated steering column coupler to dash seal. 7. Binding upper strut bearing. 8. Tight shaft bearing in steering column assembly. 9. Excessive friction in steering column coupling. 10. Excessive friction in steering gear.	1. Inflate tires to specified pressure. 2. Check and adjust as necessary. 3. Lubricate ball joints if ball joints are not a lubricated for life type of ball joint. If ball joint is a lubricated for life ball joint, replace ball joint or control arm. 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. Adjust steering column shrouds to eliminate rubbing condition. 6. Determine condition which exists and correct. 7. Correct binding condition in strut bearing. 8. Replace the steering column assembly. 9. Replace steering column coupling. 10. Replace steering gear.

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. 2. Steering gear loose on front suspension crossmember. 3. Worn steering gear isolators. 4. Worn, broken or loose steering column to steering gear coupler. 5. Free play in steering column. 6. Loose front suspension control arm ball joints. 7. Loose steering knuckle to ball joint stud pinch bolt. 8. Front wheel bearings loose or worn. 9. Loose outer tie rod ends. 10. Loose inner tie rod ends. 11. Defective steering gear rotary valve.	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. Check steering rear to front suspension crossmember mounting bolts. Tighten to specified torque if found to be loose. 3. Inspect steering gear isolators and replace if necessary. 4. Check for worn universal joint, broken isolator or loose fasteners. Replace coupling if required. 5. Check steering column and replace if required. 6. Check and or replace the ball joint or control arm as required. 7. Check pinch bolts and tighten if required to specified torque. 8. Tighten hub nut to specified torque or replace with new parts as necessary. 9. Check free play of outer tie rod ends and replace if required. 10. Replace steering gear assembly. 11. Replace steering gear assembly.

VEHICLE LEADS TO THE SIDE

CONDITION	POSSIBLE CAUSES	CORRECTION
STEERING WHEEL DOES NOT WANT RETURN TO CENTER POSITION.	1. Radial tire lead. 2. Front suspension misaligned. 3. Wheel braking. 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.	1. Rotate tires as recommended in the Tire And Wheel Group of this service manual. 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. Check for dragging brakes. Refer to the procedures in the Brake Group of this service manual. 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. 2. Steering column lower bearing spring retainer slipped on steering column shaft.	1. Tighten the retaining nut to its specified torque specification. 2. Replace steering column.

DIAGNOSIS AND TESTING (Continued)

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. LOW FLUID LEVEL WITH: VISIBLE LEAK ON STEERING GEAR, POWER STEERING PUMP, FLOOR OR ANYWHERE ELSE.	1. Overfilled power steering pump fluid reservoir. 2. Power steering hose connections at the power steering pump or steering gear. 3. Power steering pump or power steering gear leaking.	1. Adjust the power steering fluid fill to the correct level. 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. 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.

FOAMY OR MILKY POWER STEERING FLUID

CONDITION	POSSIBLE CAUSES	CORRECTION
AERATION AND OVERFLOW OF FLUID.	1. Air leaks. 2. Low fluid level. 3. Cracked power steering pump housing. 4. Water contamination.	1. Check for an air leak into the power steering system as described under Sucking Air Diagnosis and correct condition. 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. 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. 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 system is provided by a belt driven power steering pump. The power steering pump is a constant flow rate and displacement vane type pump. All vehicles, with all available engine options, use the Saginaw CB style power steering pump (Fig. 1). All vehicles use a remote mounted reservoir for the power steering fluid. The power steering fluid reservoir is mounted to the left frame rail of the vehicle just rearward on the battery tray.

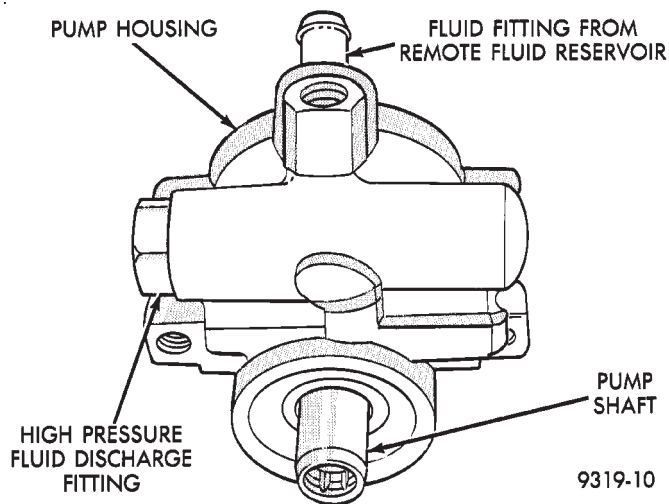


Fig. 1 Power Steering Pump

Because of unique flow control levels or pump displacements, power steering pumps may be used only on specific vehicle applications. Be sure that the pump is only replaced with a pump that is the correct replacement for that specific application.

The Saginaw CB style power steering pump (Fig. 1), consists of the pump internal components and pump housing and has no internal reservoir or sump for the power steering fluid.

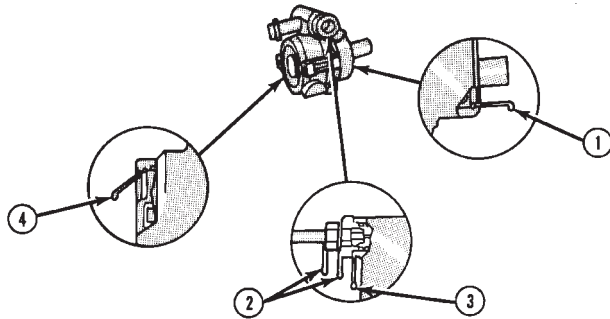
In the event of a power steering pump drive belt failure, manual steering control of the vehicle can still to be maintained. However, under these conditions, steering effort will significantly increase.

The service procedures for the Saginaw power steering pump are limited to the areas and components listed below. **No repair procedures are to be done on the internal components of the Saginaw power steering pumps.**

- Repair of power steering fluid leaks from areas of the power steering pump sealed by O-rings is allowed (Fig. 2). However power steering pump shaft seal leakage will require replacement of the power steering pump.
- Power steering fluid reservoirs, related components and attaching hardware.
- Power steering fluid reservoir filler cap/dipstick assemblies.

Rectangular pumping vanes carried by a shaft driven rotor move the fluid from the intake to the cam ring pressure cavities. As the rotor begins to turn, centrifugal force throws the vanes against the inside surface of the cam ring to pickup residual oil.

DESCRIPTION AND OPERATION (Continued)



1. BUSHING (BEARING) WORN, SEAL WORN. REPLACE PUMP.
2. TORQUE HOSE FITTING NUT TO 35 N·m (25 FT. LBS.). IF LEAKAGE PERSISTS, REPLACE O-RING SEAL.
3. TORQUE FITTING TO 75 N·m (55 FT. LBS.). IF LEAKAGE PERSISTS, REPLACE O-RING SEAL.
4. REPLACE PUMP.

9319-11

Fig. 2 Power Steering Pump Leakage Diagnosis

This oil is then forced into the high pressure area. As more oil is picked up by the vanes. That additional oil is forced into the cavities of the thrust plate through two crossover holes in the cam ring and pressure plate. The crossover holes empty into the high pressure area between the pressure plate and the housing end cover.

When the high pressure area of the power steering pump is filled with power steering fluid. Power steering fluid then flows under the vanes in the rotor slots, forcing the vanes to follow the inside oval surface of the cam ring. As the vanes reach the restricted area of the cam ring, oil is forced out from between the vanes. When excess oil flow is generated during high-speed operation. A regulated amount of oil returns to the pump intake side through a flow control valve. The flow control valve reduces the power required to drive the pump and holds down temperature build-up.

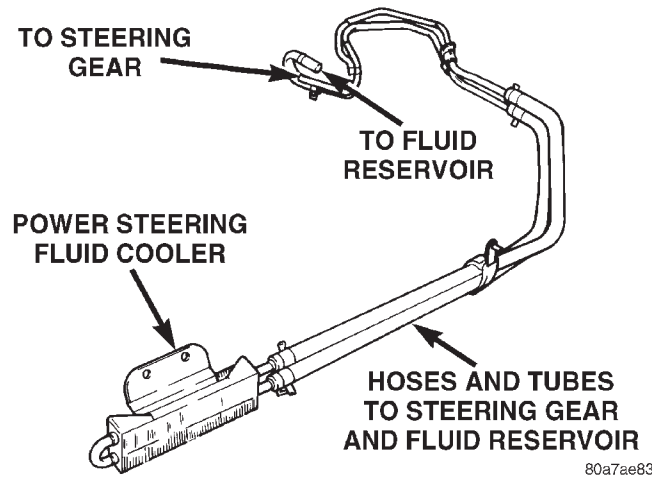
When steering conditions exceed maximum pressure requirements, such as turning the wheels against the stops. The pressure built up in the steering gear also exerts pressure on the spring end of the flow control valve. This end of the valve houses the pressure relief valve. High pressure lifts the relief valve ball from its seat and allows oil to flow through a trigger orifice located in the outlet fitting. This reduces pressure on the spring end of the flow control valve which then opens and allows the oil to return to the intake side of the pump. This action limits maximum pressure output of the pump to a safe level.

Under normal power steering pump operating conditions. The pressure requirements of the pump are below maximum, causing the pressure relief valve to remain closed.

COOLER POWER STEERING FLUID

Certain models of this vehicle are equipped with a cooler (Fig. 3) for the power steering system fluid.

The purpose of the cooler, is to keep the temperature of the power steering system fluid from rising to a level that would affect the performance of the power steering system.

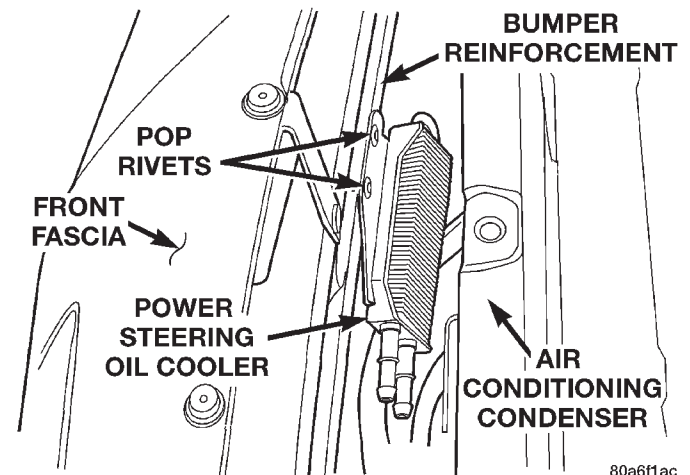


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Fig. 3 Power Steering Fluid Cooler

The cooler used on this vehicle is referred to as a fluid to air type cooler. This means that the air flow across the fins of the cooler is used to extract the heat from the cooler which it has absorbed from the power steering fluid flowing through it. The cooler is placed in series with the power steering fluid return line, (Fig. 4) between the steering gear and the power steering fluid reservoir. This lowers the temperature of the power steering fluid prior to it entering the power steering fluid reservoir where it is resupplied to the power steering pump.

The cooler for the power steering fluid is located in the front of the vehicle behind the front fascia. The cooler is positioned so it is in the direct air flow through the front fascia of the vehicle. The cooler is attached to the front bumper reinforcement using 2 pop rivets (Fig. 4).



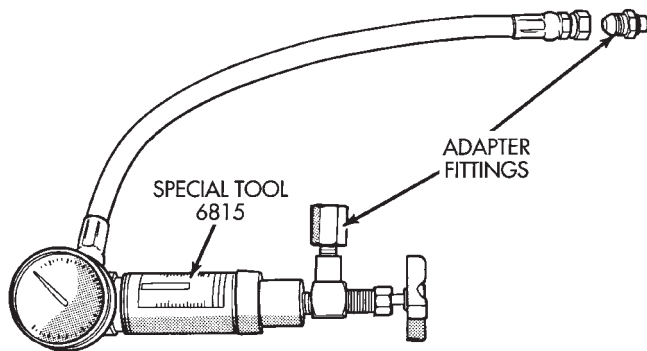
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Fig. 4 Power Steering Cooler Location In Vehicle

DIAGNOSIS AND TESTING

POWER STEERING PUMP FLOW AND PRESSURE TEST

The following procedure is to be used to test the operation of the power steering system on this 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. 5).



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Fig. 5 Power Steering Pump Flow/Pressure Tester

The following procedure can be used to test the operation of the power steering system on the vehicle.

- (1) Check belt tension and adjust as necessary.
- (2) Disconnect the high pressure power steering hose at the power steering pump.
- (3) Connect Pressure Gauge/Flow Meter Special Tool 6815 (Fig. 5) to the pressure fitting on the power steering pump and the power steering pressure hose, using the adapter fittings supplied with special tool 6815.
- (4) Open the test valve completely.
- (5) Start engine and let idle.
- (6) Check fluid level, add fluid as necessary.
- (7) Gauge should read below 862 kPa (125 psi), if above, inspect the hoses for restrictions and repair as necessary. The initial pressure should be in the range of 345-552 kPa (50-80 psi).

CAUTION: The following test procedure involves testing maximum pump pressure output and flow control valve operation. Do not leave valve closed for more than five 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 above specifications and within 345 kPa (50 psi) of each other.**

NOTE: Power steering pump maximum relief pressure is 8275 to 8975 kPa (1200 to 1300 psi.).

- Power steering pump pressures above specifications but not within 345 kPa (50 psi) of each other, replace pump.
- Pressures within 345 kPa (50 psi) of each other but below specifications, replace pump.

CAUTION: Do not force the pump to operate against the stops for more than 2 to 4 seconds at a time because, pump damage will result.

- (9) Open the valve on the power steering pump flow pressure tester (Fig. 5). Turn the steering wheel to the extreme left and right positions until it is against the stops in the steering gear. Record the highest indicated pressure at each position. Compare the recorded readings to the specifications. If the highest output pressures are not the same against either stop, the steering gear is leaking internally and must be replaced.

SERVICE PROCEDURES

POWER STEERING FLUID LEVEL CHECK

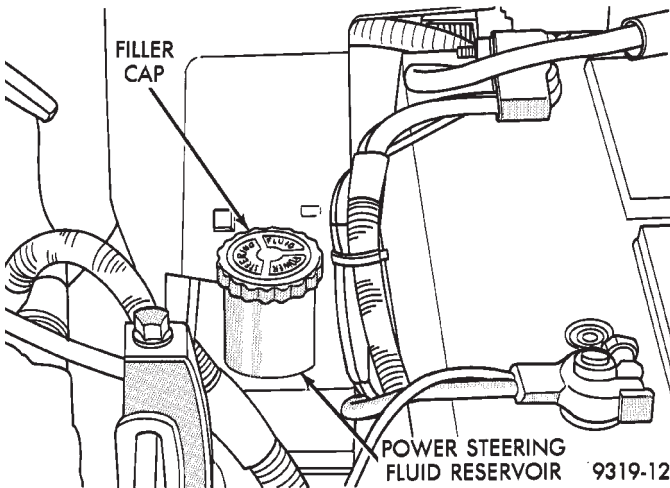
WARNING: FLUID LEVEL SHOULD BE CHECKED WITH ENGINE OFF TO PREVENT INJURY FROM MOVING PARTS. DO NOT USE AUTOMATIC TRANSMISSION FLUID IN THE POWER STEERING SYSTEM. DO NOT OVERFILL THE POWER STEERING SYSTEM.

Wipe remote power steering fluid reservoir filler cap (Fig. 6) free of dirt. Then check fluid level in remote reservoir. The dipstick should indicate FULL 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.

SERVICE PROCEDURES (Continued)

**Fig. 6 Power Steering Fluid Remote Reservoir**

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

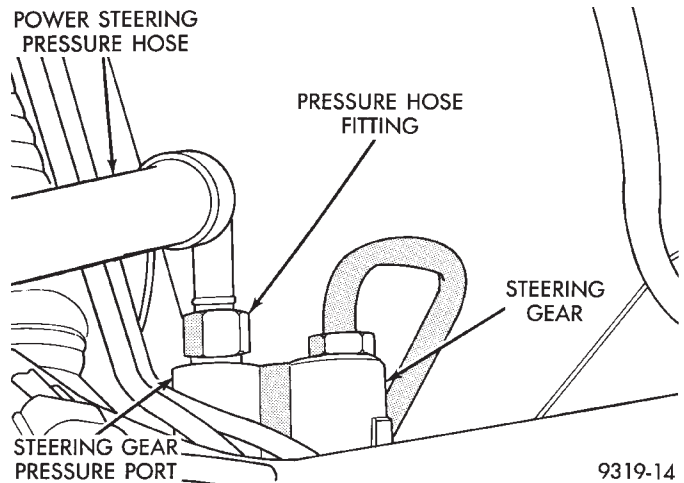
POWER STEERING FLUID PRESSURE HOSE

Cap all open ends of hoses, power steering pump fittings and steering gear ports. This will prevent entry of foreign material into the components when power steering hoses are removed from vehicle.

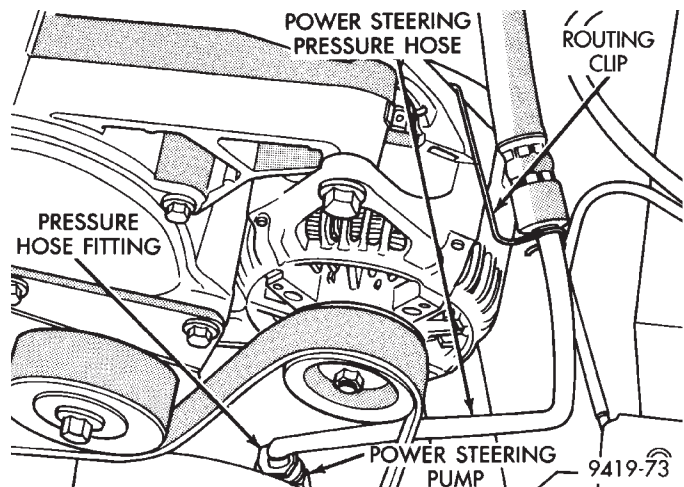
WARNING: POWER STEERING OIL, ENGINE PARTS AND THE EXHAUST SYSTEM MAY BE EXTREMELY HOT IF ENGINE HAS BEEN RUNNING. DO NOT START ENGINE WITH ANY LOOSE OR DISCONNECTED HOSES. DO NOT ALLOW HOSES TO TOUCH HOT EXHAUST MANIFOLD OR CATALYST.

REMOVE

(1) Remove the power steering fluid pressure hose (Fig. 7) from the power steering gear. Let power steering fluid drain from hose.

**Fig. 7 Power Steering Hose At Steering Gear**

(2) Remove the power steering fluid pressure hose from the outlet fitting of the power steering pump (Fig. 8). Let power steering fluid drain from hose.

**Fig. 8 Power Steering Hose At Power Steering Pump**

(3) If vehicle is equipped with a 3.5-liter engine, disconnect power steering pressure hose from routing clip at generator (Fig. 9).

(4) Remove the power steering pressure hose from the vehicle.

(5) Discard O-ring at end of tube and/or the washer seal.

INSTALL

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

REMOVAL AND INSTALLATION (Continued)

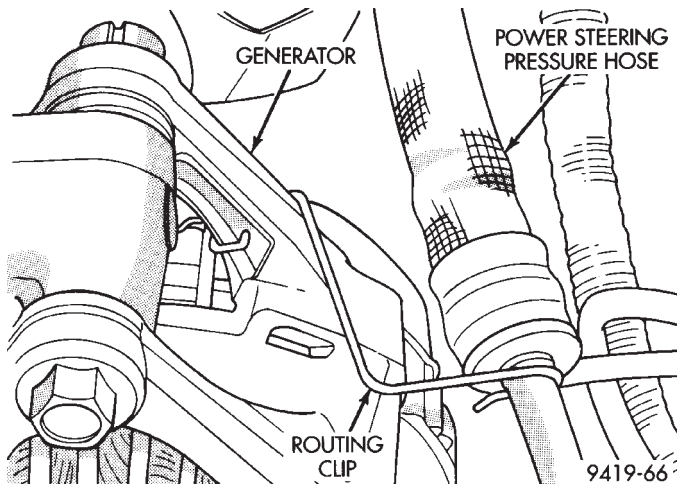


Fig. 9 Power Steering Pressure Hose Routing Clip 3.5 Ltr.

(2) Install new O-rings and/or washer seals on the ends of the power steering hoses. Lubricate O-rings or washer seals using fresh clean power steering fluid.

(3) Install the power steering fluid pressure hose into the outlet fitting of the power steering pump (Fig. 8). **Do not tighten power steering pressure hose to power steering pump fitting at this time.**

(4) Route the power steering pressure hose through the routing bracket on the engine assembly. See (Fig. 10) and (Fig. 11) for hose routing and bracket location for the 3.3 and 3.5 ltr. engine applications.

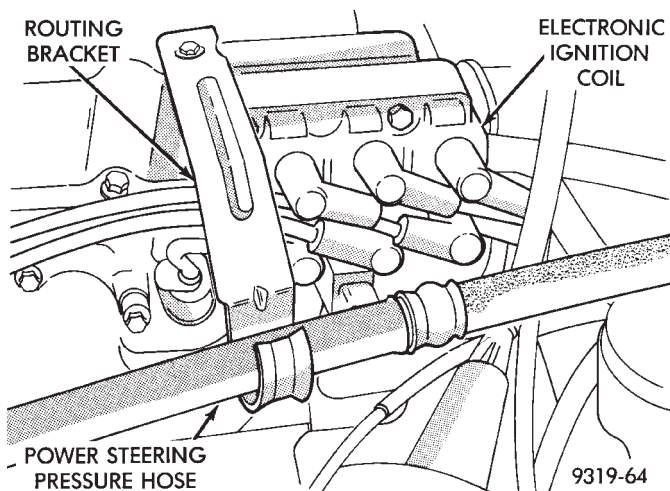


Fig. 10 3.3 Ltr. Power Steering Pressure Hose Routing And Bracket

(5) Install power steering pressure hose into pressure port of power steering gear (Fig. 7). Tighten the power steering pressure hose to steering gear fitting to a torque of 31 N·m (23 ft. lbs.).

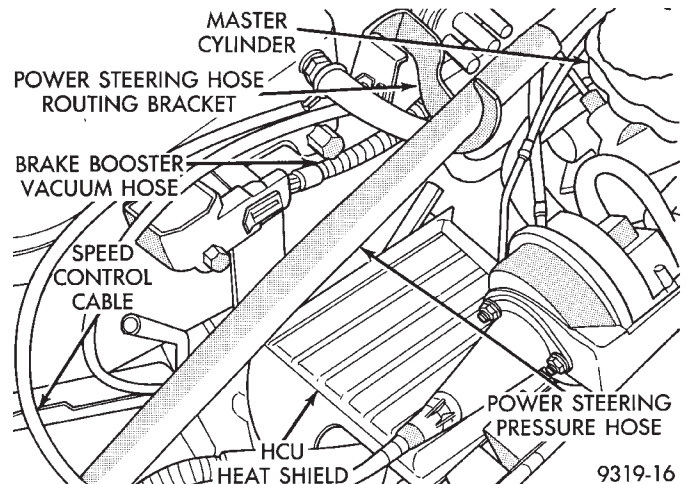


Fig. 11 3.5 Ltr. Power Steering Pressure Hose Routing And Bracket

CAUTION: On 3.5 ltr engine applications, correct orientation of power steering pressure hose at power steering pump must be maintained. Be sure power steering hose is installed in orientation clip (Fig. 9) at generator, prior to tightening tube fitting. This will maintain the required clearance between the power steering pressure hose and the cam on the throttle body.

(6) Route power steering pressure hose at power steering pump so it is not in contact with any engine or body components (Fig. 8). Tighten the power steering pressure hose fitting to a torque of 31 N·m (23 ft. lbs.).

(7) 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.

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

(8) If required fill the remote power steering pump fluid reservoir to the correct fluid level.

POWER STEERING FLUID RETURN HOSE

Cap all open ends of hoses, power steering pump fittings and steering gear ports. This will prevent entry of foreign material into the components when power steering hoses are removed from vehicle.

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

REMOVAL AND INSTALLATION (Continued)

REMOVE

(1) Remove the power steering return hose (Fig. 12) from the power steering gear. Let the power steering fluid drain from the power steering fluid reservoir and the return hose before removing the return hose from the power steering fluid reservoir.

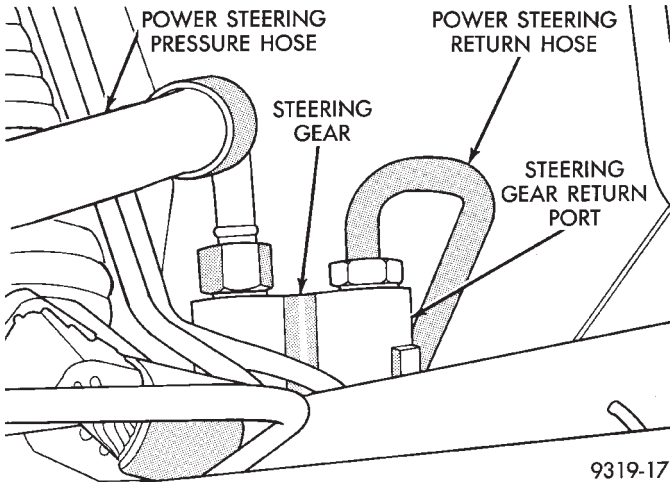


Fig. 12 Power Steering Return Hose At Steering Gear

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

(3) Unclip the power steering return hose from the routing clip on the frame rail (Fig. 13).

(4) Remove the hose clamp from the power steering return hose at the power steering fluid reservoir (Fig. 13). Let the remaining power steering fluid drain from remote reservoir.

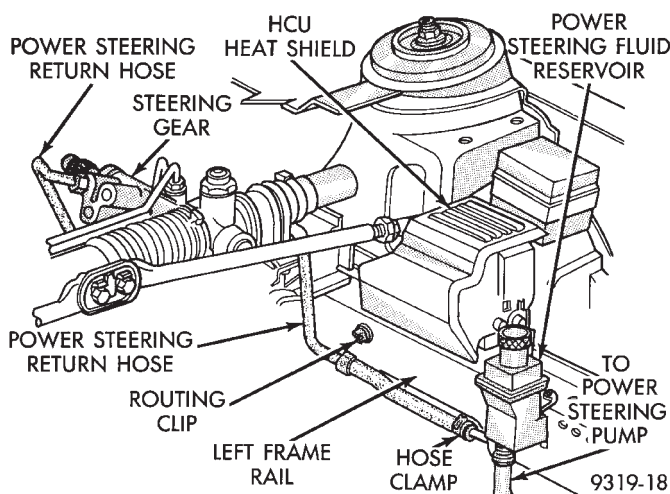


Fig. 13 Power Steering Return Hose Routing And Attaching

(5) Remove the power steering return hose from the vehicle.

INSTALL

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

(2) Install new O-ring and/or washer seal on the end of the power steering return hose to steering gear fitting. Lubricate O-rings or washer seals using fresh clean power steering fluid.

(3) Install the power steering return hose assembly back into the vehicle. Be sure hose assembly is properly routed (Fig. 13).

(4) Install power steering return hose into steering gear return port and loosely install fitting. **Do not tighten power steering return hose to steering gear fitting at this time.**

(5) Install power steering return hose, onto remote power steering fluid reservoir (Fig. 13). Install hose clamp on power steering return hose, at power steering fluid reservoir (Fig. 13). **Be sure hose clamp is installed on hose past upset bead on power steering fluid reservoir.**

(6) Route power steering return hose so it is not in contact with any engine or body components (Fig. 13). Tighten the power steering return hose to steering gear fitting to a torque of 31 N·m (23 ft. lbs.).

(7) Lower the vehicle to the ground.

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

(8) Fill the remote power steering fluid reservoir to the proper fluid level.

(9) 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.

(10) If required, again fill the remote power steering pump fluid reservoir to the correct fluid level.

POWER STEERING PUMP (ALL ENGINES)

Cap all open ends of the power steering fluid hoses. This will prevent the entry of foreign material into the components when power steering hoses are removed.

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 OR DRIVE BELTS. DO NOT ALLOW HOSES TO TOUCH HOT EXHAUST MANIFOLD OR CATALYST.

REMOVAL AND INSTALLATION (Continued)

REMOVE

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

(2) Loosen the power steering pump serpentine drive belt on 3.3-ltr engine, by loosening the alternator mounting bolt A and the adjusting bolt locknut B (Fig. 14). Then loosen adjusting bolt (Fig. 14). Loosen the power steering pump serpentine drive belt on the 3.5-ltr engine, by first loosening the adjustment pulley locking nut (Fig. 15) and then loosening the adjusting bolt (Fig. 15).

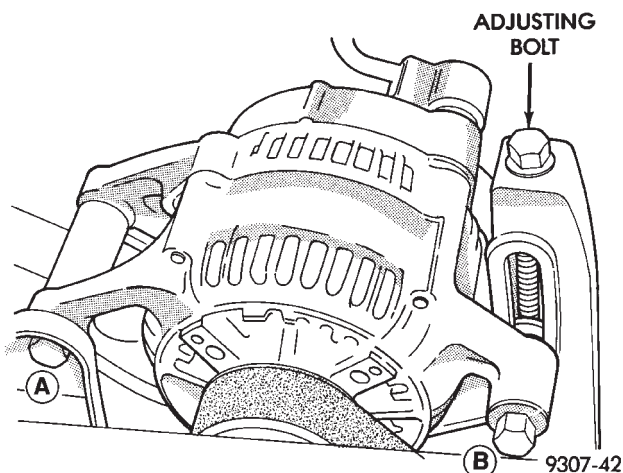


Fig. 14 Power Steering Pump Drive Belt 3.3-ltr

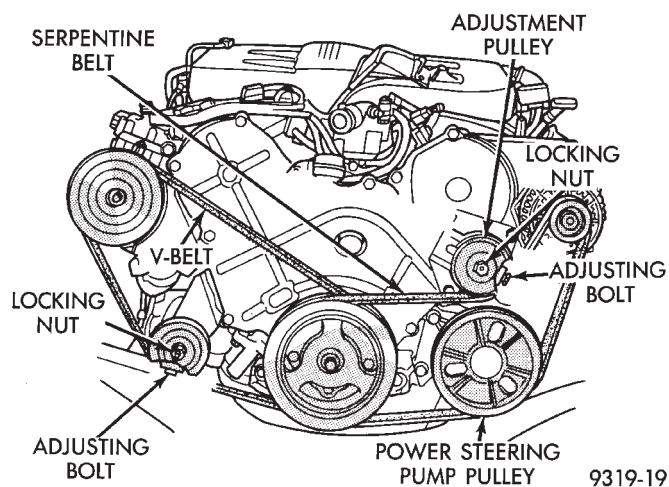


Fig. 15 Power Steering Pump Drive Belt 3.5-ltr

(3) If vehicle being serviced is equipped with a 3.5 liter engine, remove the power steering pressure hose routing clip at the generator bracket (Fig. 16).

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

(5) Remove the serpentine drive belt from the power steering pump pulley, and store out of the way.

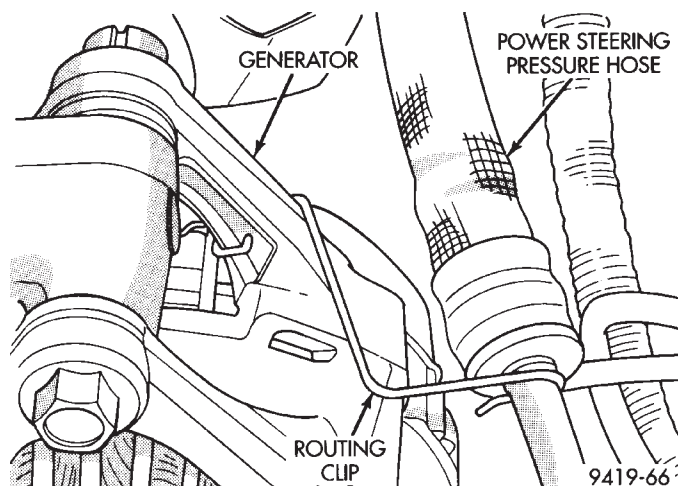


Fig. 16 Power Steering Pressure Hose Routing Clip

(6) Remove the hose clamp from the power steering fluid supply hose, at the power steering pump (Fig. 17). Then remove the hose from the power steering pump.

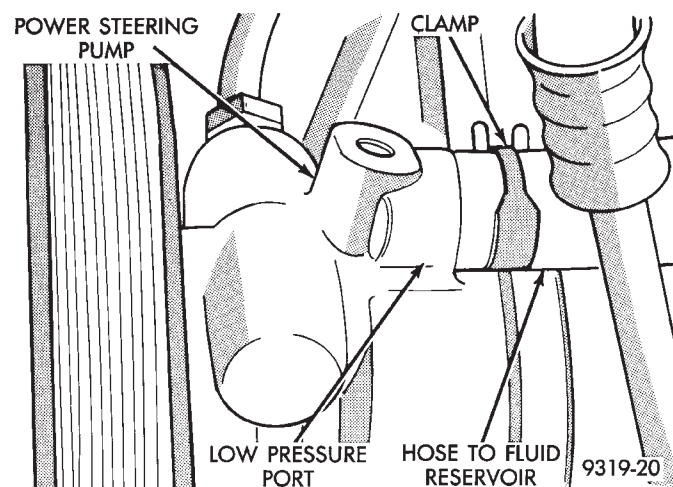


Fig. 17 Power Steering Fluid Supply Hose

(7) Remove the power steering fluid pressure hose from power steering pump discharge fitting (Fig. 18).

(8) Remove the 3 bolts attaching the power steering pump to power steering pump bracket (Fig. 19). Access to the power steering pump mounting bolts is through the holes in the power steering pump drive pulley (Fig. 19).

(9) Remove the power steering pump and the drive pulley as an assembly from the vehicle. Power steering pump is removable from the bottom of engine compartment (Fig. 20).

(10) Transfer the required parts from the removed power steering pump, to the replacement power steering pump.

REMOVAL AND INSTALLATION (Continued)

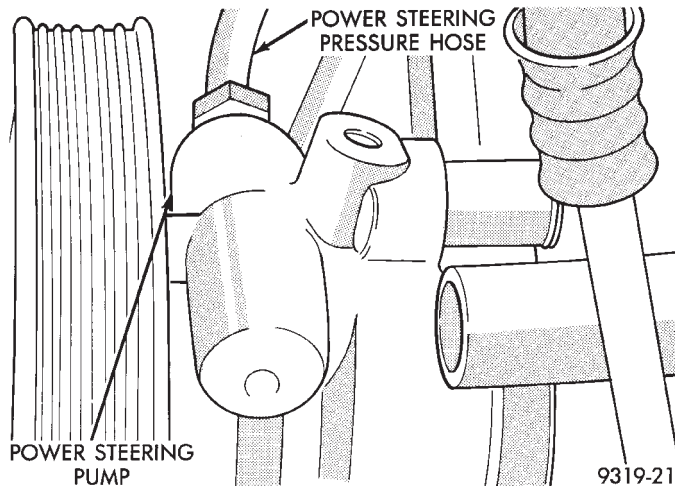


Fig. 18 Power Steering Pressure Hose

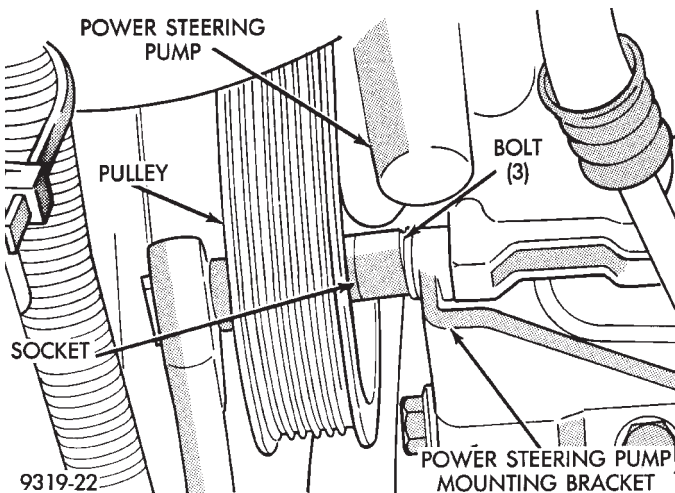


Fig. 19 Power Steering Pump Mounting Bolts

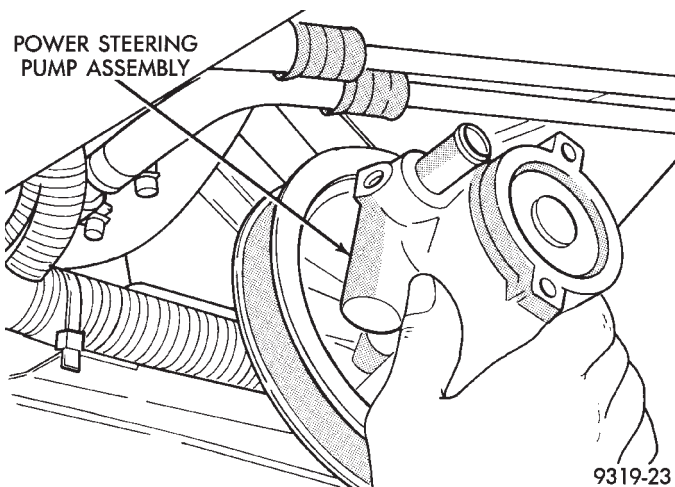


Fig. 20 Power Steering Pump Removal And Installation

INSTALL

(1) Install power steering pump back in vehicle from the bottom of the engine compartment (Fig. 20).

(2) Install power steering pump back on mounting bracket. Install the 3 bolts attaching the power steering pump to the mounting bracket (Fig. 19). Tighten the power steering pump mounting bolts to a torque of 54 N·m (40 ft. lbs.).

(3) Install hose from remote power steering fluid reservoir, on low pressure port of power steering pump (Fig. 17).

(4) Install the drive belt on the power steering pump drive pulley.

(5) Lower the vehicle to the ground.

CAUTION: On 3.5 ltr engine applications, correct orientation of power steering pressure hose at power steering pump must be maintained. Be sure power steering hose is installed in routing clip (Fig. 16) at generator, prior to tightening tube fitting. This will maintain required clearance between power steering pressure hose and throttle body cam.

(6) Install the power steering pressure hose in the outlet port of the power steering pump (Fig. 18). Tighten the power steering fluid pressure hose fitting to a torque of 34 N·m (25 ft. lbs.).

(7) Install serpentine accessory drive belt on engine. Refer to Group 7 Cooling, for required installation procedure and belt routing for the particular engine being serviced.

(8) Connect battery cable onto negative post on battery.

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

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

(10) 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.

COOLER POWER STEERING FLUID

REMOVE

(1) Remove the battery cable from the negative terminal of the battery. Properly isolate the battery cable from the negative terminal of the battery.

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

(3) Remove the hose clamps (Fig. 21) from the power steering fluid hoses. Drain power steering fluid from the hoses and the power steering fluid cooler.

REMOVAL AND INSTALLATION (Continued)

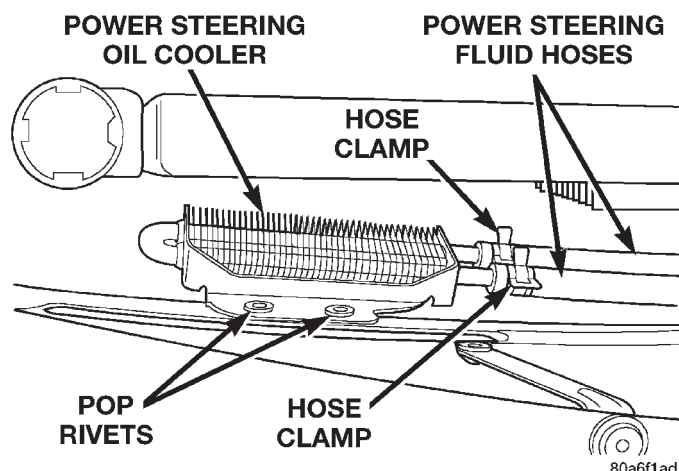


Fig. 21 Hose Clamps At Power Steering Fluid Cooler

NOTE: The rivets holding the cooler to the bumper reinforcement must be removed by cutting the heads off the rivets, using the appropriate type of grinder and cutting tool.

CAUTION: When removing the heads from the rivets, extreme care must be taken not to damage the air conditioning condenser with the cutting tool.

(4) Using an appropriate grinder and cutter, remove the heads off the 2 pop rivets (Fig. 22) attaching the power steering fluid cooler to the bumper reinforcement (Fig. 22).

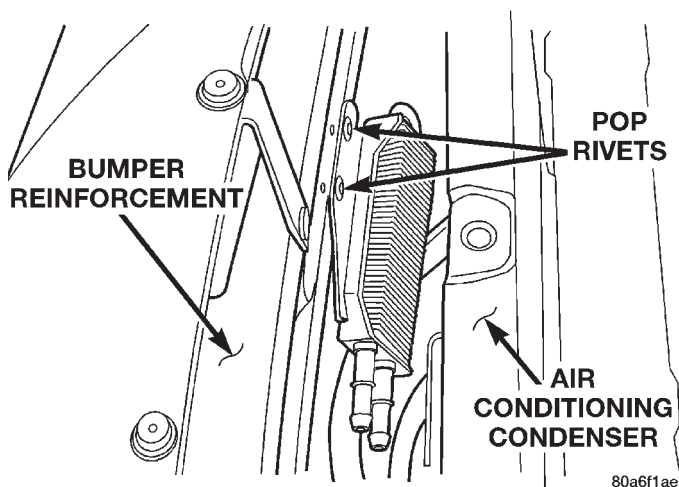


Fig. 22 Power Steering Fluid Cooler Attachment

(5) Using the appropriate size pin punch, remove the pop rivets from the oil cooler bracket and bumper reinforcement.

(6) Remove the power steering fluid cooler from the front bumper reinforcement.

INSTALL

NOTE: When installing the power steering oil cooler on the bumper reinforcement, it is not attached using pop rivets as originally installed at the factory. Attach the power steering oil cooler to the reinforcement using 1/4-20 nut and a bolt of the correct length.

(1) Position the power steering oil cooler on the bumper reinforcement. Install the 1/4-20 bolts and nuts mounting the power steering oil cooler to the bumper reinforcement (Fig. 23). Tighten both bolts to a torque of 9 N·m (7 ft. lbs.).

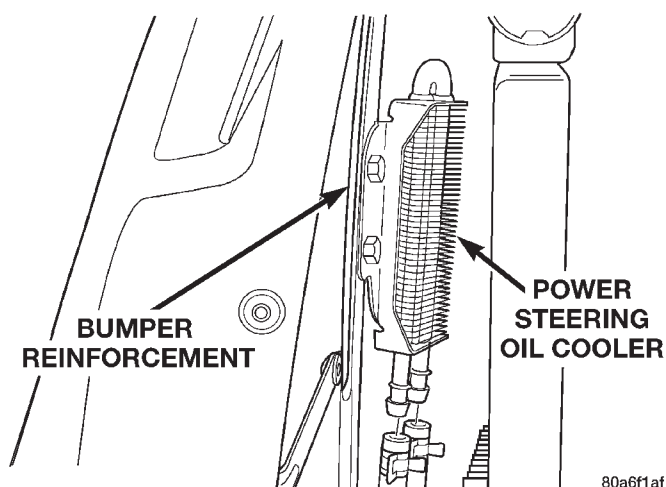


Fig. 23 Power Steering Oil Cooler Installed

(2) Install the hose clamps on the power steering fluid hoses.

(3) Install the power steering fluid hoses on the oil cooler.

(4) Install the hose clamps on the power steering fluid hoses (Fig. 21). **Be sure clamps are installed on hoses past the upset beads on the power steering oil cooler hose fittings.**

(5) Raise the vehicle to a point where the front tires are just off the ground.

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

(7) Add power steering fluid to the reservoir as necessary to bring it up to the proper FULL level when cold. Repeat the above procedure until the fluid level remains constant after running the engine.

(8) Start the engine.

(9) Slowly turn the steering wheel to the right and left, until lightly contacting the stops.

(10) Turn off the engine. Check the fluid level and refill as required.

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

REMOVAL AND INSTALLATION (Continued)

POWER STEERING FLUID COOLER LINES

REMOVE

- (1) Remove the positive and negative cables from the terminals on the battery.
- (2) Remove the cover from the battery.
- (3) Remove battery from battery tray.
- (4) Remove the battery tray. The battery tray is mounted using the 3 bolts and nut as shown in (Fig. 24).

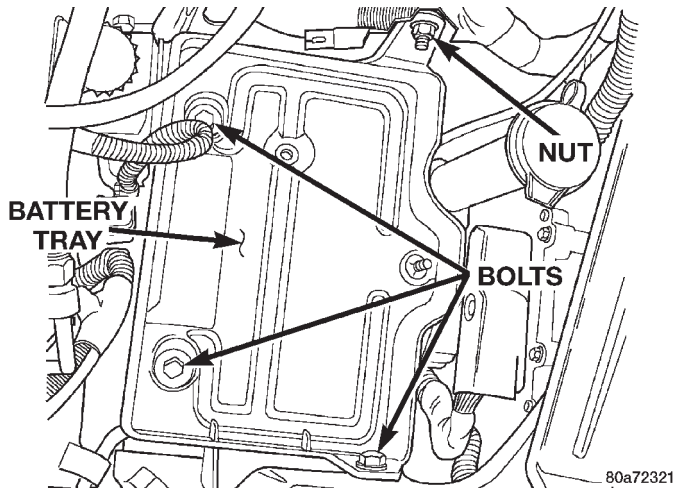


Fig. 24 Battery Tray Mounting

- (5) Remove the bolt (Fig. 25) attaching the power steering fluid reservoir to the left frame rail.

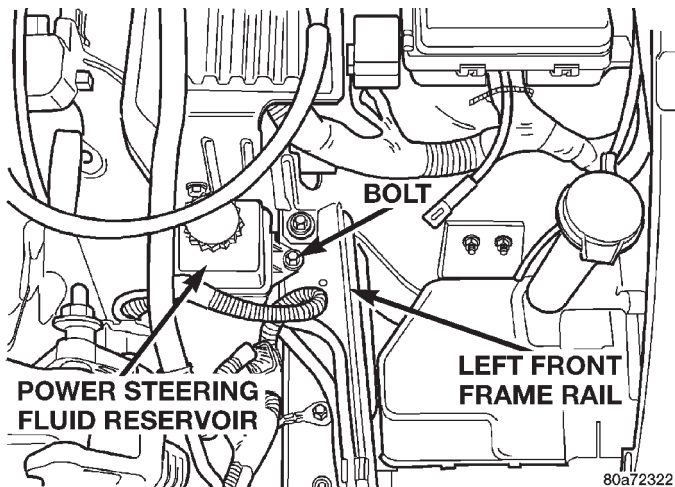


Fig. 25 Power Steering Fluid Reservoir

- (6) Remove the 2 bolts (Fig. 26) mounting the heat shield for the hydraulic control unit (HCU) to the HCU mounting bracket.

- (7) Remove the power steering cooler line hose (Fig. 27) from the power steering fluid reservoir.

- (8) Move the power steering fluid reservoir forward (Fig. 28). This will allow access to the power steering fluid cooler lines located under the power steering fluid reservoir.

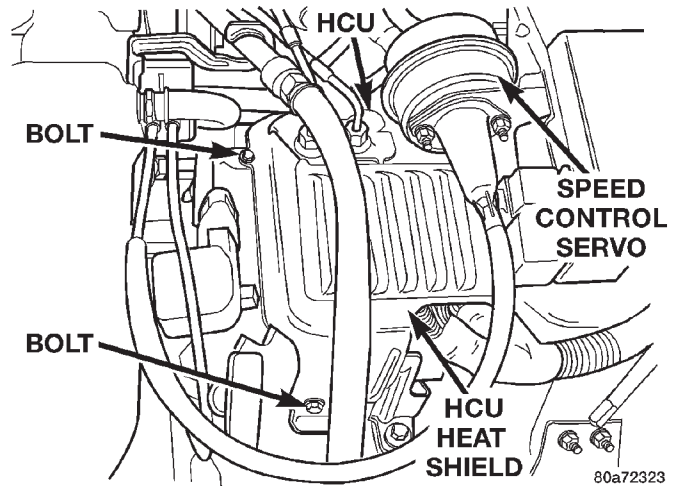


Fig. 26 HCU Heat Shield Attachment

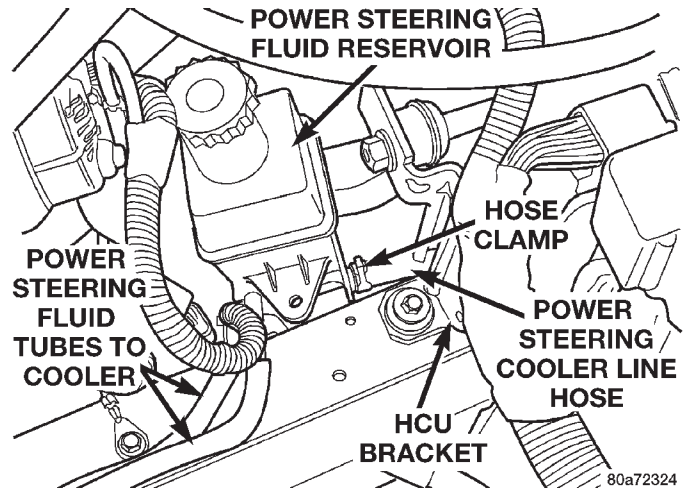


Fig. 27 Cooler Line Attachment To Reservoir

- (9) Remove power steering fluid hose going to steering gear, (Fig. 28) from power steering fluid tube going to power steering fluid cooler.

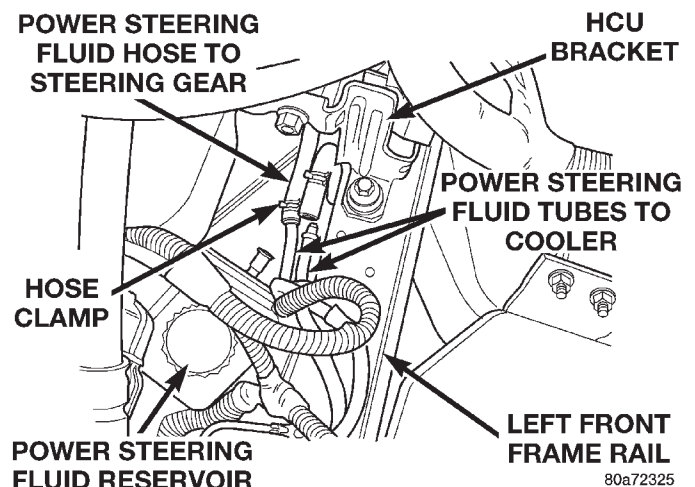


Fig. 28 Hose Attachment To Power Steering Cooler Tube

REMOVAL AND INSTALLATION (Continued)

(10) Remove the hose clamps (Fig. 29) from the power steering fluid hoses. Remove the power steering fluid hoses from the power steering oil cooler. Drain power steering fluid from the hoses and the power steering fluid cooler.

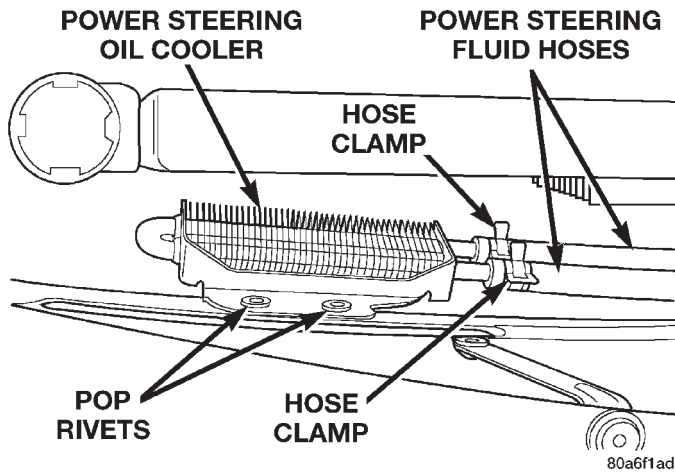


Fig. 29 Hose Clamps At Power Steering Fluid Cooler

(11) Remove the routing clip (Fig. 30) attaching the power steering fluid cooler hoses (Fig. 30) to the front bumper reinforcement.

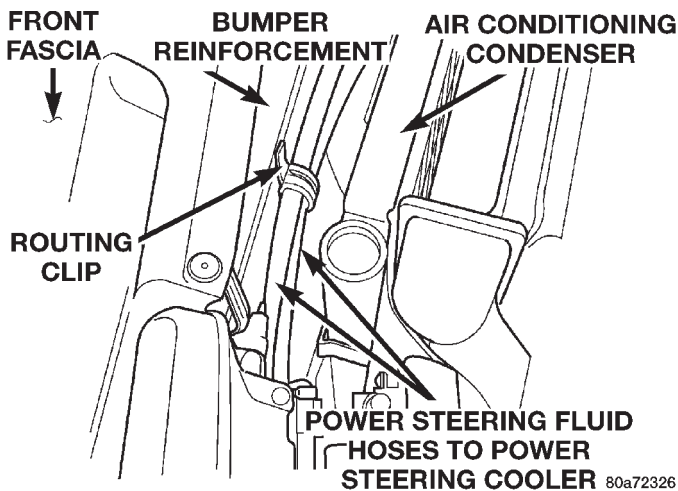


Fig. 30 Power Steering Fluid Hose Attachment

(12) Remove the power steering fluid to cooler tubes (Fig. 31) and the routing clip (Fig. 31) as an assembly from the left front frame rail. Pull the hose section of the cooler tubes through hole in radiator closure panel and into the engine compartment to remove the cooler tube/hose assembly from the vehicle.

INSTALL

(1) Install the power steering fluid to cooler tube assembly in vehicle using the reverse order of removal. Install the cooler line assembly routing clip (Fig. 31) on the left front frame rail.

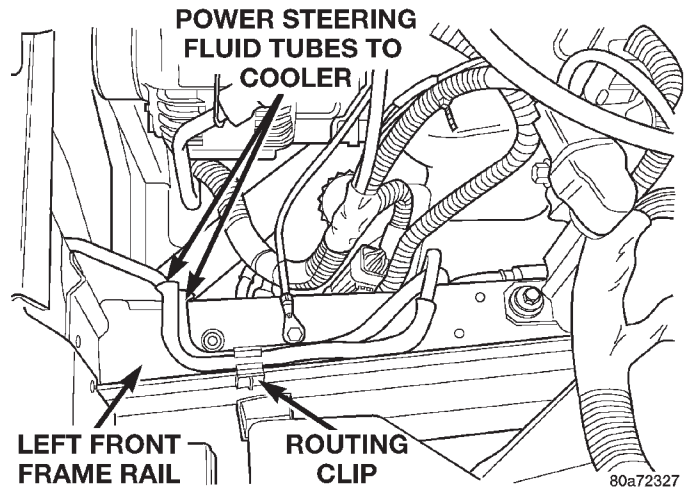


Fig. 31 Power Steering Fluid Cooler Tube Assembly

(2) Route the hose section of the power steering cooler lines to the power steering oil cooler. Install the routing clip (Fig. 30) on the front bumper reinforcement.

(3) Install the hose clamps on the power steering cooler line hoses.

(4) Install the hoses from the power steering cooler lines on the power steering oil cooler. Install the hose clamps (Fig. 29) on the power steering fluid hoses. **Be sure clamps are installed on hoses past the upset beads on the power steering oil cooler hose fittings.**

(5) Install the hose coming from the power steering gear (Fig. 28) on the power steering fluid cooler tube going to the power steering oil cooler (Fig. 28).

(6) Move the power steering fluid reservoir back into position. Install the power steering cooler line hose (Fig. 27) on the nipple of the power steering fluid reservoir. Install the hose clamp (Fig. 27) on the hose. **Be sure clamp is installed on power steering fluid hose past the upset bead on the hose fitting.**

(7) Position the power steering fluid reservoir on the frame rail. Install the mounting bolt for the power steering fluid reservoir (Fig. 25). Tighten the mounting bolt to a torque of 12 N·m (106 in. lbs.).

(8) Install the heat shield for the HCU (Fig. 26) on the HCU mounting bracket. Install the 2 bolts (Fig. 26) attaching the heat shield to the HCU mounting bracket.

(9) Install the battery tray. Install and securely tighten the 3 bolts and the nut, (Fig. 24) mounting the battery tray.

(10) Install the battery.

(11) Install the cover on the battery.

(12) Install the positive and negative cables on the terminals of the battery.

(13) Raise the vehicle to a point where the front tires are just off the ground.

REMOVAL AND INSTALLATION (Continued)

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

(15) Add power steering fluid to the reservoir as necessary to bring it up to the proper FULL level when cold. Repeat the above procedure until the fluid level remains constant after running the engine.

(16) Start the engine.

(17) Slowly turn the steering wheel to the right and left, until lightly contacting the stops.

(18) Turn off the engine. Check the fluid level and refill as required.

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

POWER STEERING FLUID RESERVOIR

The power steering pump fluid reservoir on this vehicle is remotely mounted from the power steering pump. The reservoir is located on the left front frame rail rearward of the battery (Fig. 32).

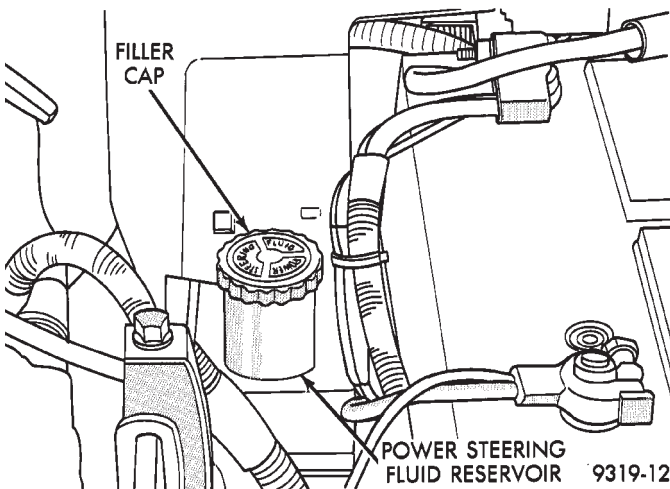


Fig. 32 Power Steering Fluid Reservoir Location

REMOVE

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

(2) Remove the power steering return hose (Fig. 33) from the side of the power steering fluid reservoir. Remove hose from bottom of power steering fluid reservoir going to power steering pump (Fig. 33). Let power steering fluid drain from hoses and reservoir.

(3) Lower the vehicle to the ground.

(4) Remove battery.

(5) Remove the 4 fasteners (Fig. 34) attaching the battery tray to the body and frame of the vehicle. Then remove the battery tray from the vehicle.

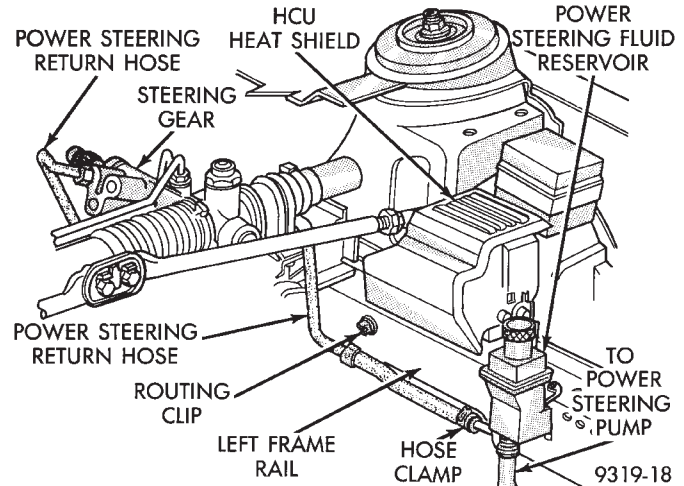


Fig. 33 Power Steering Fluid Reservoir Hoses

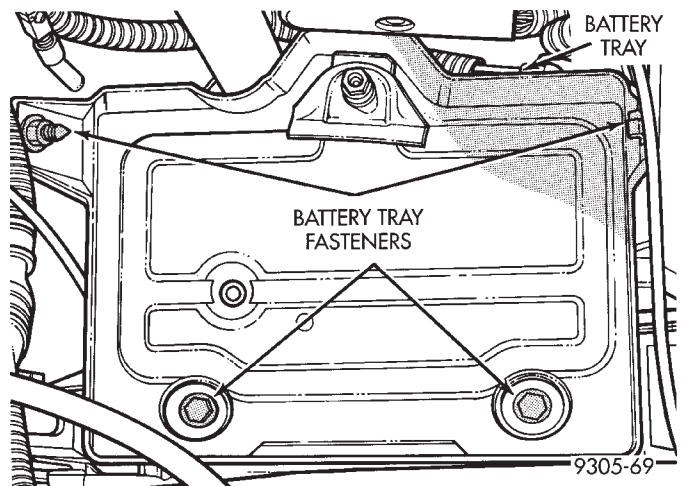


Fig. 34 Battery Tray Mounting

(6) Remove the screw attaching the power steering fluid reservoir to the frame rail (Fig. 35). Then remove the power steering fluid reservoir from the frame rail.

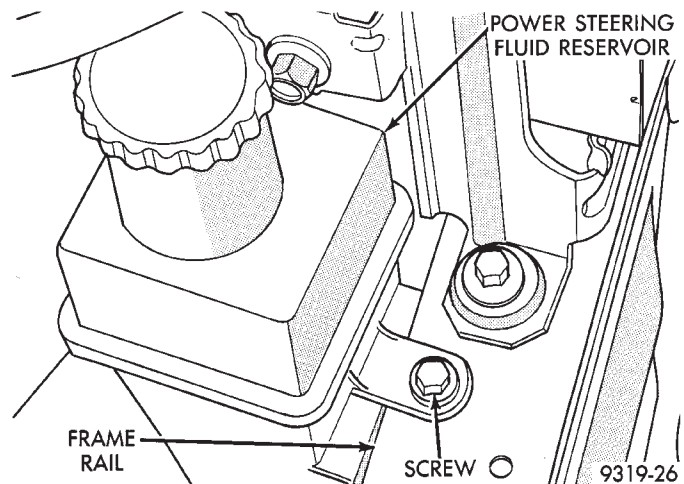


Fig. 35 Power Steering Fluid Reservoir Attaching

REMOVAL AND INSTALLATION (Continued)

INSTALL

(1) Install power steering fluid reservoir on frame rail. Be sure tab on bottom of fluid reservoir is inserted in hole on frame rail. Install screw (Fig. 35) attaching the power steering fluid reservoir to the frame rail. Tighten the attaching screw (Fig. 35) to a torque of 7 N·m (60 in. lbs.).

(2) Install battery tray back in vehicle. Install and securely tighten the 4 fasteners attaching the battery tray to the frame rail and body.

(3) Raise vehicle.

(4) Install the power steering return hose onto the nipple on the side of the power steering fluid reservoir (Fig. 33). Install the hose going to the power steering pump, on the bottom nipple of the power steering fluid reservoir (Fig. 33). Install the hose clamps, being sure they are past hose retention beads on reservoir nipples.

(5) Lower vehicle.

(6) Install battery.

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

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

(8) 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.

DISASSEMBLY AND ASSEMBLY

POWER STEERING PUMP DRIVE PULLEY

DISASSEMBLE

(1) Mount the power steering pump in a vise using one of the pump mounting bosses (Fig. 36). **Do not clamp the body of the power steering pump in vise.**

NOTE: Do not press or hammer on the shaft of the power steering pump in an attempt to remove the pulley. This will damage the internal components of the power steering pump.

(2) Remove the power steering pump pulley from the power steering pump shaft using Puller, Special Tool C-4333 (Fig. 37).

ASSEMBLE

NOTE: Do not press or hammer on the shaft of the power steering pump in an attempt to install the pulley. This will damage the internal components of the power steering pump.

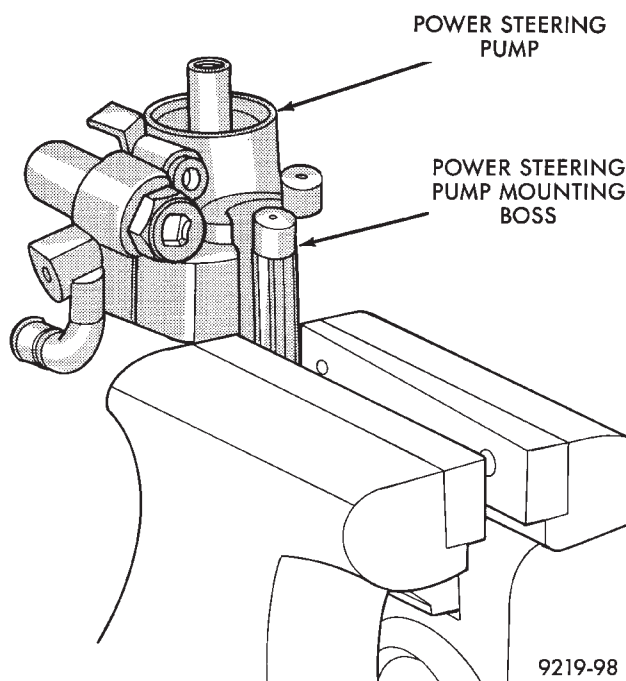


Fig. 36 Correctly Mounted Power Steering

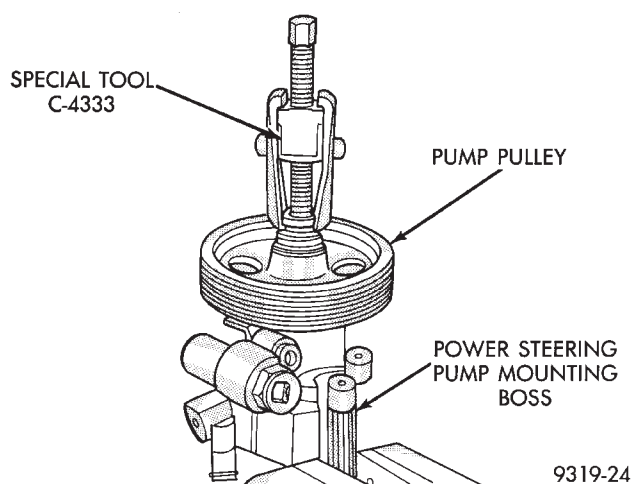


Fig. 37 Removing Power Steering Pump Pulley

(1) Place the power steering pump pulley on the end of the power steering pump shaft. Make sure the pulley is installed squarely on the end of the shaft (Fig. 38).

CAUTION: When installing the pulley on the power steering pump, the spacer provided with either the replacement power steering pump or pulley **MUST** be used when pulley is installed on the pump. The spacer provides for the correct pulley location on the power steering pump to provide correct accessory drive belt alignment. The alignment is critical in controlling accessory drive belt noise. It also prevents the pulley from contacting the power steering pump when it is installed, causing power steering pump or pulley damage.

DISASSEMBLY AND ASSEMBLY (Continued)

(2) Install the spacer provided with the replacement power steering pump or power steering pulley into the hub of the power steering pump pulley (Fig. 38).

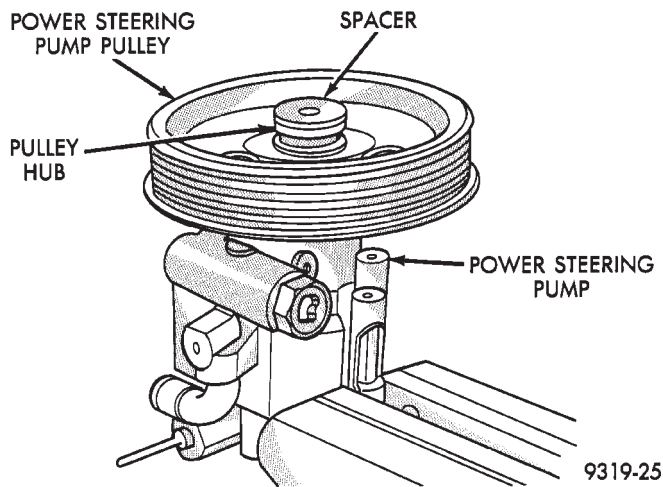


Fig. 38 Pulley And Spacer Installed On Pump

(3) Insert the Pulley Installer, Special Tool C-4063, (without adapters) through hole in spacer. Thread the Installer, Special Tool C-4063, into the end of the power steering pump shaft (Fig. 39). Tighten the installer into shaft.

(4) Holding the Pulley Installer with one wrench so it will not rotate, turn hex (Fig. 39) down threaded rod of installer pushing the pulley onto the shaft of the power steering pump (Fig. 39). Ensure that the tool and the pulley remain aligned with the pump shaft so pulley does not become cocked on shaft.

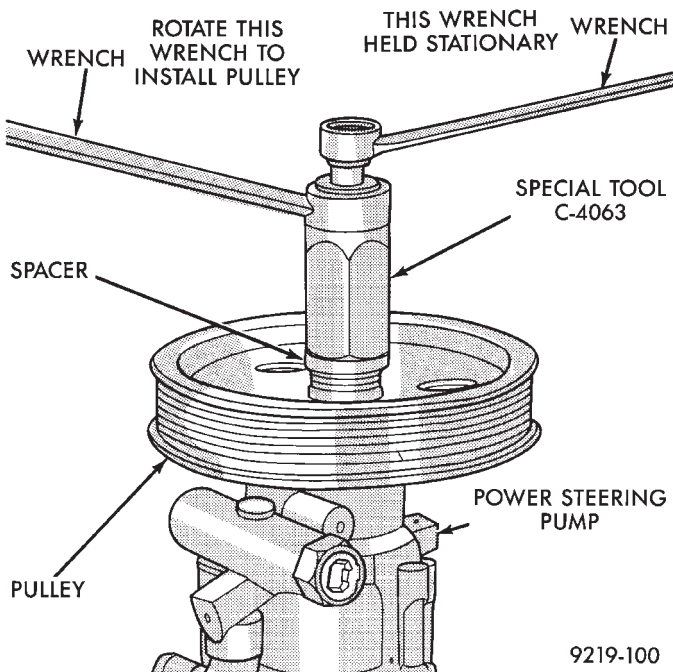


Fig. 39 Installing Power Steering Pump Pulley

(5) Continue to push pulley onto shaft of power steering pump until Pulley Installer, Special Tool C-4063 will no longer turn. This will ensure the spacer provided is fully seated against the front of the power steering pump shaft (Fig. 40).

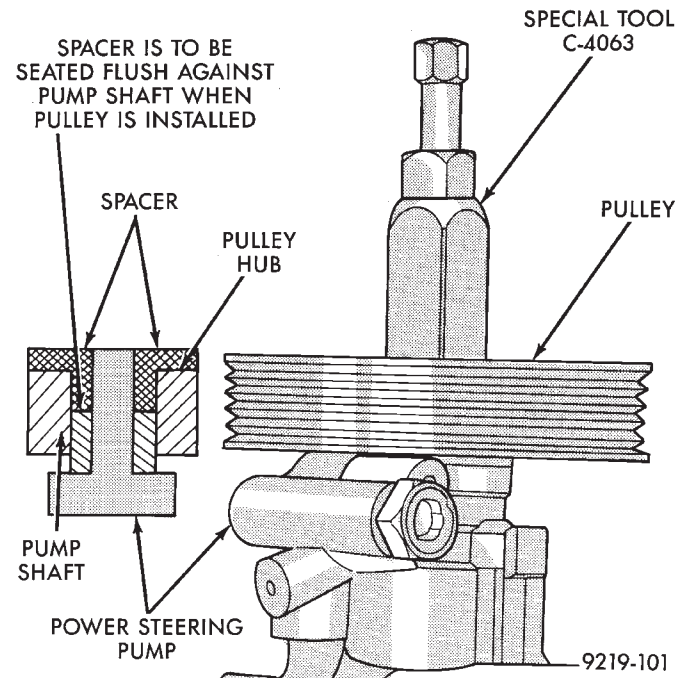


Fig. 40 Power Steering Pump Pulley Installed

(6) Remove the Pulley Installer, Special Tool C-4063 from the shaft of the power steering pump. Remove the supplied spacer from the hub of the power steering pump pulley and discard.

POWER STEERING PUMP FLOW CONTROL VALVE

DISASSEMBLE

(1) Remove power steering pressure hose from power steering pump pressure fitting. Remove pump and pulley if necessary.

(2) Remove fitting from pump housing (Fig. 41). **Prevent flow control valve and spring from sliding out of housing bore.**

(3) Remove and discard the O-ring seal on the power steering pump discharge fitting (Fig. 41).

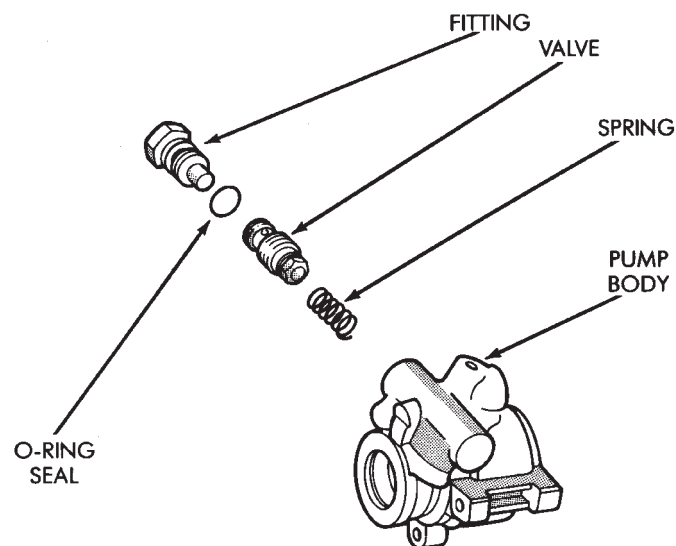
ASSEMBLE

(1) If necessary, clean and install flow control valve and spring in pump housing bore (Fig. 41). **Be sure the hex nut end of the valve is facing in toward the pump.**

(2) Install O-ring seal onto power steering pump discharge fitting (Fig. 41).

(3) Install the power steering pump discharge fitting in the power steering pump. Tighten the power steering pump discharge fitting to a torque of 75 N·m (55 ft. lbs.).

DISASSEMBLY AND ASSEMBLY (Continued)



J8919-86

Fig. 41 Flow Control Valve Fitting Removal/Installation

(4) Install pump and pulley if necessary. Install pressure hose to fitting.

SPECIFICATIONS

POWER STEERING PUMP FLOW SPECIFICATIONS

Flow At 1500 RPM And

Minimum Pressure 6.4 Liters/Min (1.7 GPM)

Control Valve Pressure

Relief 8275 to 8975 kPa (1200 to 1300 psi)

POWER STEERING PUMP FASTENER TORQUE SPECIFICATIONS**DESCRIPTION****TORQUE****POWER STEERING PUMP:**

Discharge Fitting 75 N·m (55 ft. lbs.)

To Bracket Mounting Bolts 48 N·m (35 ft. lbs.)

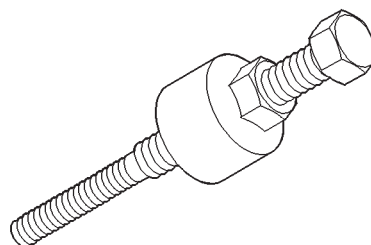
POWER STEERING FLUID HOSES:

Hose Tube Nuts 31 N·m (275 in. lbs.)

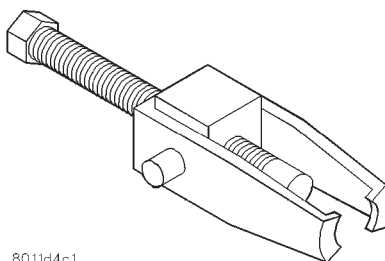
POWER STEERING FLUID RESERVOIR:

Reservoir Mounting Screw 7 N·m (60 in. lbs.)

SPECIAL TOOLS

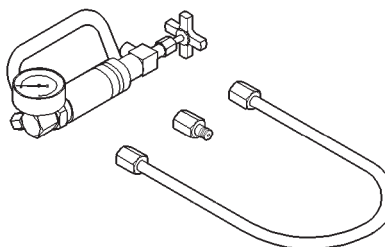
POWER STEERING PUMP

Installer C-4063B



8011d4c1

Puller C-4333



8011c958

P/S System Analyzer 6815

POWER STEERING GEAR

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DESCRIPTION AND OPERATION

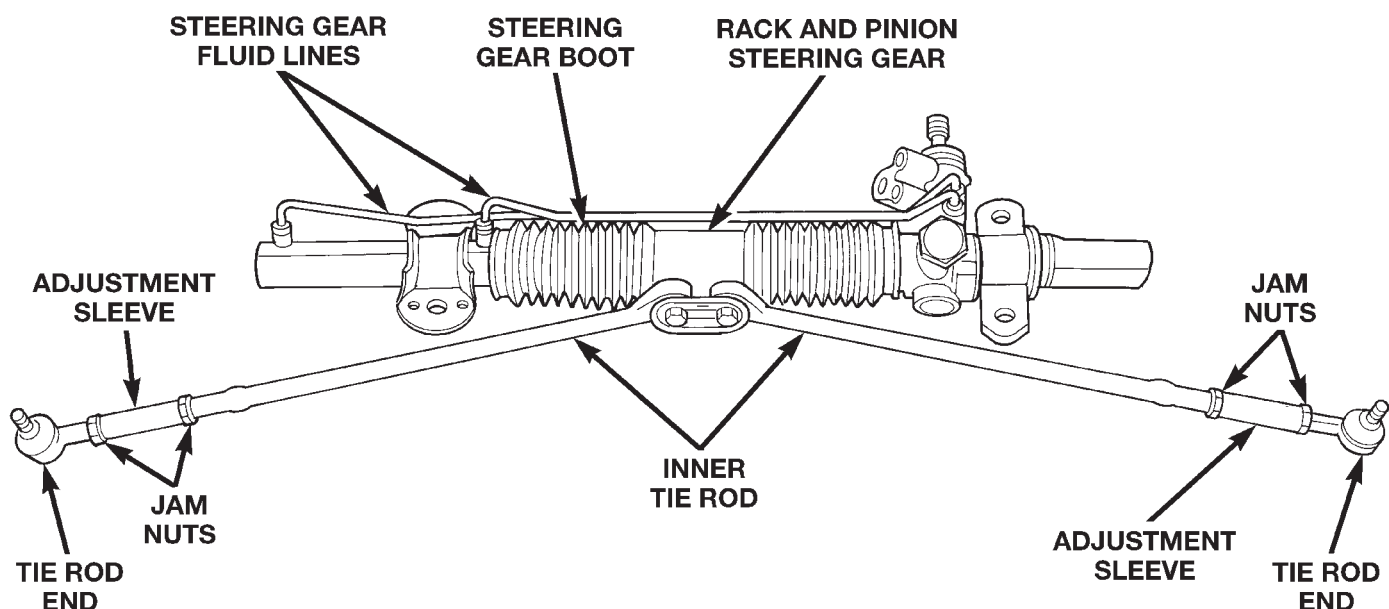
POWER STEERING GEAR

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.

The power steering system consists of these five major components. Power Steering Gear, (Fig. 1) Power Steering Pump, Pressure Hose, Return Hose and Remote Power Steering Fluid Reservoir. 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.



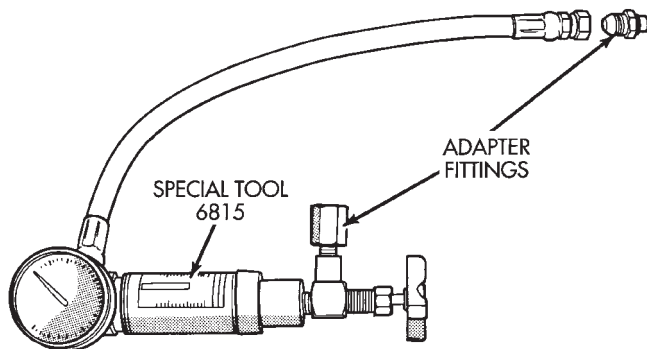
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Fig. 1 Power Steering Gear Assembly

DIAGNOSIS AND TESTING

POWER STEERING PUMP FLOW AND PRESSURE TEST

The following procedure is to be used to test the operation of the power steering system on this 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. 5).



9519-1

Fig. 2 Power Steering Pump Flow/Pressure Tester

The following procedure can be used to test the operation of the power steering system on the vehicle.

- (1) Check belt tension and adjust as necessary.
- (2) Disconnect the high pressure power steering hose at the power steering pump.
- (3) Connect Pressure Gauge/Flow Meter Special Tool 6815 (Fig. 5) to the pressure fitting on the power steering pump and the power steering pressure hose, using the adapter fittings supplied with special tool 6815.
- (4) Open the test valve completely.
- (5) Start engine and let idle.
- (6) Check fluid level, add fluid as necessary.
- (7) Gauge should read below 862 kPa (125 psi), if above, inspect the hoses for restrictions and repair as necessary. The initial pressure should be in the range of 345-552 kPa (50-80 psi).

CAUTION: The following test procedure involves testing maximum pump pressure output and flow control valve operation. Do not leave valve closed for more than five 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 above specifications and within 345 kPa (50 psi) of each other.**

NOTE: Power steering pump maximum relief pressure is 8275 to 8975 kPa (1200 to 1300 psi.).

- Power steering pump pressures above specifications but not within 345 kPa (50 psi) of each other, replace pump.
- Pressures within 345 kPa (50 psi) of each other but below specifications, replace pump.

CAUTION: Do not force the pump to operate against the stops for more than 2 to 4 seconds at a time because, pump damage will result.

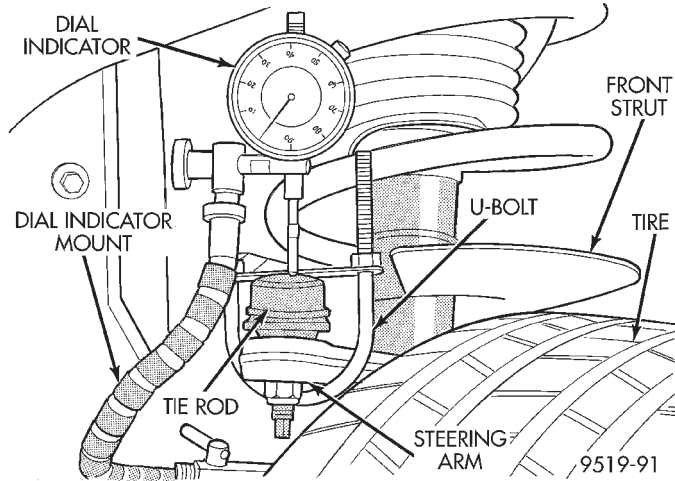
- (9) Open the valve on the power steering pump flow pressure tester (Fig. 5). Turn the steering wheel to the extreme left and right positions until it is against the stops in the steering gear. Record the highest indicated pressure at each position. Compare the recorded readings to the specifications. If the highest output pressures are not the same against either stop, the steering gear is leaking internally and must be replaced.

OUTER TIE ROD SOCKET END PLAY MEASUREMENT

NOTE: When measuring tie rod socket end play the total weight of the vehicle must be supported by the tires and suspension of the vehicle. Do not support the vehicle by other than a drive on hoist or an alignment rack.

- (1) Position the vehicle on a drive on hoist or an alignment rack so that the tires are supporting the total weight of the vehicle.
- (2) Raise hoist or alignment rack so that the tie rod is positioned at eye level.
- (3) Mount a dial indicator to the front strut assembly (Fig. 3).
- (4) Install a U-bolt having an inside dimension of 2 inches and a length of 3 inches (minimum) on the tie rod end and steering arm of strut as shown in (Fig. 3). Hand tighten nuts on U-bolt enough to just hold U-bolt in place.
- (5) Position dial indicator in center of tie rod as shown in (Fig. 3). Zero the dial indicator gauge.
- (6) Equally tighten both nuts on the U-bolt until a torque of 2.7 N·m (24 in. lbs.) is achieved on each nut. Listed is the allowable tie rod socket end play. New ball joint end play should not be greater than 0.100 inches. Ball joint in service end play should not be greater than 0.190.

DIAGNOSIS AND TESTING (Continued)

**Fig. 3 Checking Tie Rod Socket End Play**

(7) If end play for a ball joint in service is greater than the specification listed in Step 6 the ball joint will require replacement.

REMOVAL AND INSTALLATION

STEERING GEAR

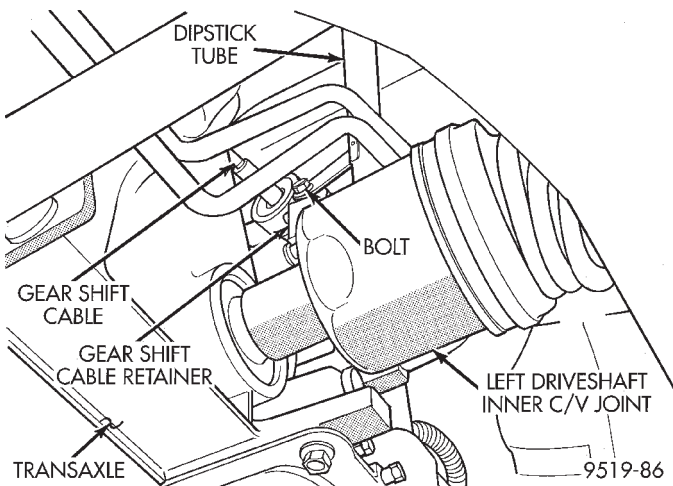
REMOVE

(1) Disconnect and isolate the (-) negative battery cable from the negative post on the battery.

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

(3) Remove gear shift cable, from shift lever on transaxle.

(4) Remove the bolt (Fig. 4) attaching the gear shift cable retainer and transaxle dipstick tube to the transaxle. Remove gear shift cable from transaxle.

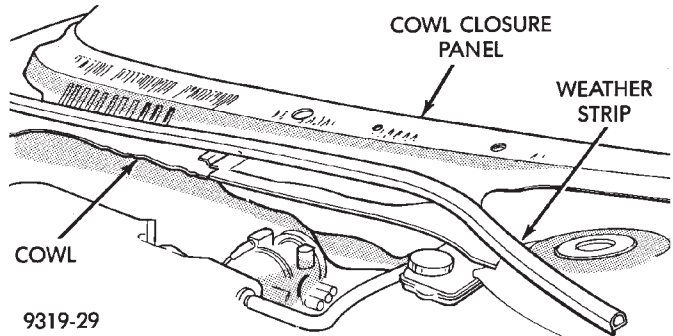
**Fig. 4 Gear Shift Cable Attachment To Transaxle**

(5) Lower vehicle.

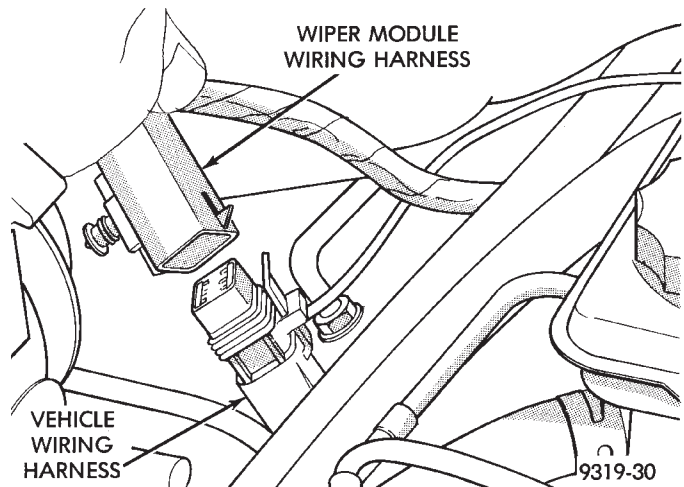
(6) If vehicle is equipped with a 3.5 ltr engine, disconnect the throttle cable from the throttle body and remove the cable from the throttle cable bracket.

(7) Remove both wiper arm assemblies from wiper arm pivots.

(8) Remove the 6 screws attaching the cowl closure panel to the cowl. Remove the cowl closure panel and weatherstrip (Fig. 5) as an assembly from the cowl.

**Fig. 5 Cowl Closure Panel And Weatherstrip**

(9) Disconnect the wiper module wiring harness connector from the vehicle wiring harness (Fig. 6).

**Fig. 6 Wiper Module Wiring Harness Connector**

(10) Remove the 5 screws attaching the wiper module to the cowl panel of the vehicle (Fig. 7). Then remove wiper module from cowl panel.

(11) If vehicle is equipped with a 3.5 ltr. engine, disconnect the air plenum from throttle bodies, PCV make up air tube and idle air control motor. Then remove the air plenum from the left side of the vehicle through wiper module area (Fig. 8).

(12) Remove vacuum supply hose for power brake booster at intake manifold, and position hose out of the way.

REMOVAL AND INSTALLATION (Continued)

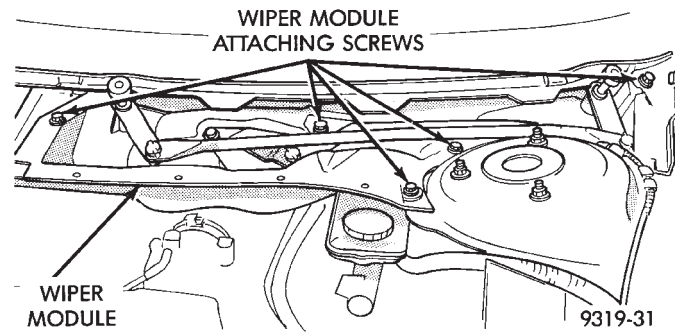


Fig. 7 Wiper Module Assembly Attaching Screws

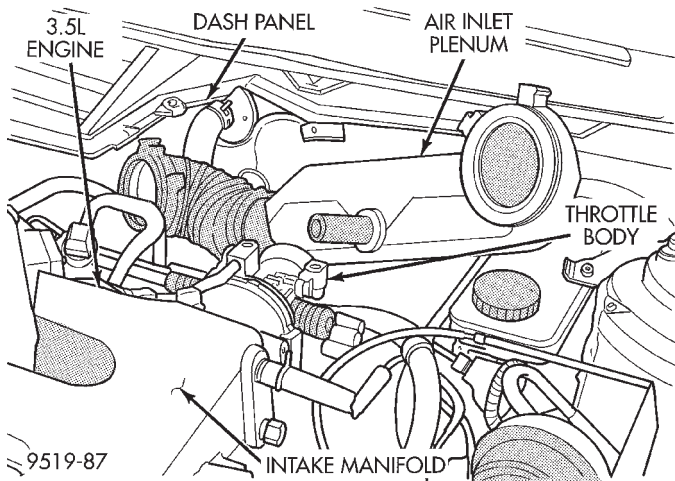


Fig. 8 Air Intake Plenum

(13) Remove the 2 nuts attaching the master cylinder assembly to the vacuum booster. Remove the master cylinder with the brake tubes connected, from the vacuum booster. Carefully position the master cylinder assembly against left shock tower.

(14) Remove the power steering pressure hose and return hose (Fig. 9) from the power steering gear

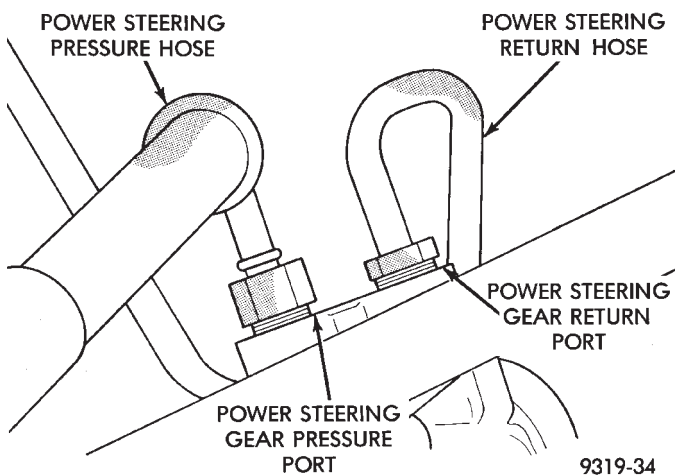


Fig. 9 Power Steering Hose Connections At Steering Gear

(15) Position the front tires of the vehicle so that they are facing straight ahead. Bend back retaining tabs on bolts attaching tie rods to steering gear. Loosen and remove bolts attaching tie rods to steering gear (Fig. 10). Lay tie rods, bolts and plate as an assembly on bell housing of transaxle.

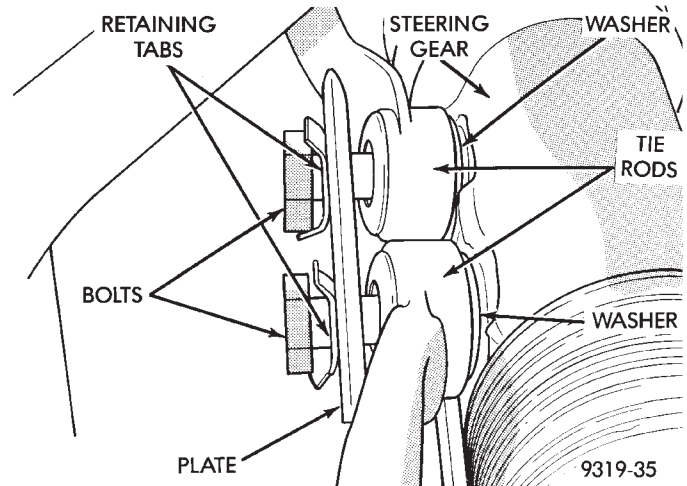


Fig. 10 Tie Rod Attachment To Steering Gear

(16) If the steering gear being removed from the vehicle is a speed proportional steering gear, remove the wiring harness connector, coming from the vehicle wiring harness, from the solenoid control module (Fig. 11).

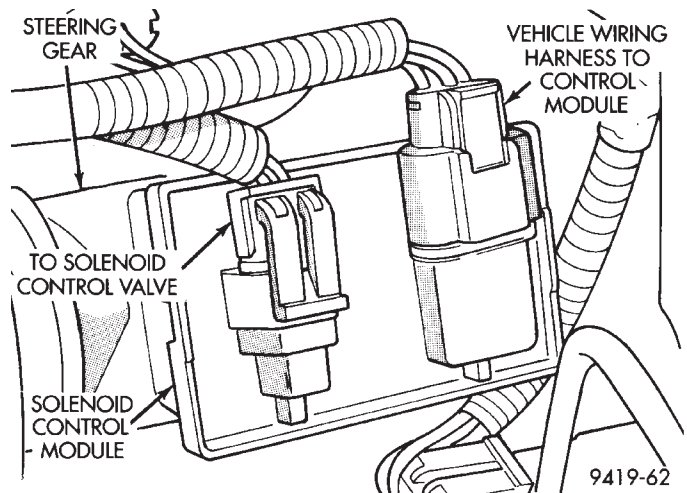


Fig. 11 Wiring Harness Connections To Solenoid Control Module

CAUTION: Prior to separating the intermediate shaft coupler from the steering column shaft, position the key in the lock position and remove the key from the lock cylinder. This will eliminate the possibility of the steering wheel rotating more than its half turn to the locked position. Thus, preventing damage to the clockspring from rotating it beyond its normal number of turns in either direction.

REMOVAL AND INSTALLATION (Continued)

(17) Remove the retaining pin and pinch bolt from the coupler on the intermediate shaft (Fig. 12). Then separate the intermediate shaft coupler from the steering column shaft.

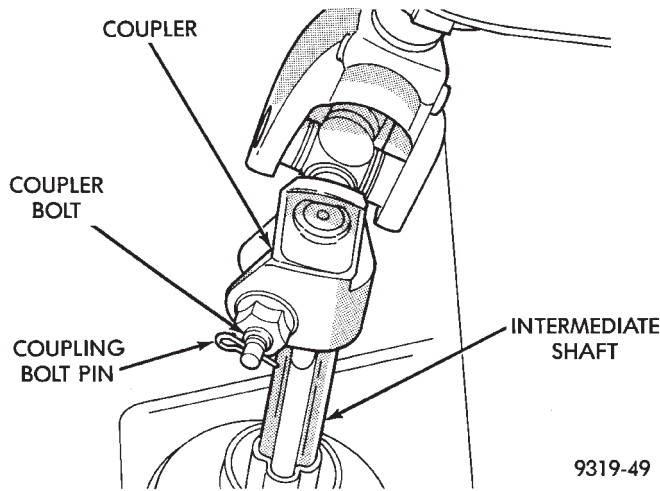


Fig. 12 Pinch Bolt And Retaining Pin

(18) Remove the 4 bolts attaching the steering gear assembly to the crossmember (Fig. 13).

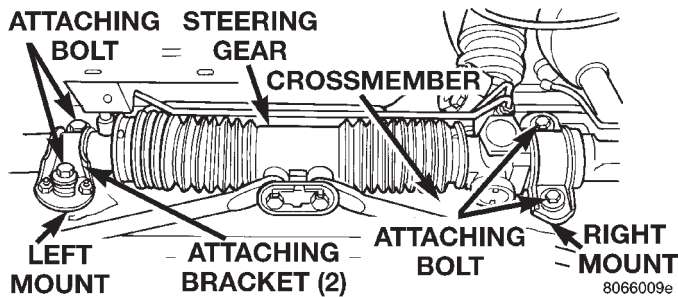


Fig. 13 Steering Gear Attachment To Crossmember

(19) Slide steering gear and intermediate shaft forward into the engine compartment to allow access to the roll pin retaining the flex coupler to the steering gear shaft.

(20) Using roll pin remover, Special Tool 6831A, remove roll pin from flex joint of intermediate shaft (Fig. 14). Roll pin is removed from coupler using following procedure. Remove knurled nut from small end of removal tool. Insert small end of removal tool through center of roll pin and then install and hand tighten knurled nut. Position sleeve of removal tool on flex joint as shown in (Fig. 14). Holding threaded shaft of tool from turning tighten nut (Fig. 14) pulling roll pin out of flex joint.

(21) Remove steering gear assembly from vehicle through area in cowl that the windshield wiper module was previously removed from (Fig. 15).

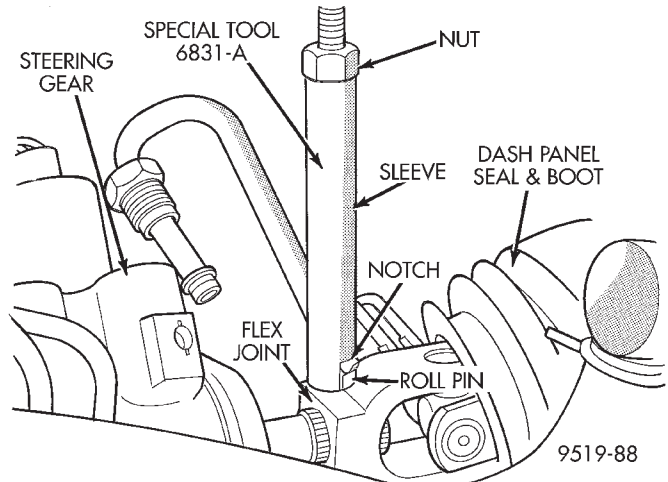


Fig. 14 Steering Coupler Roll Pin Removal

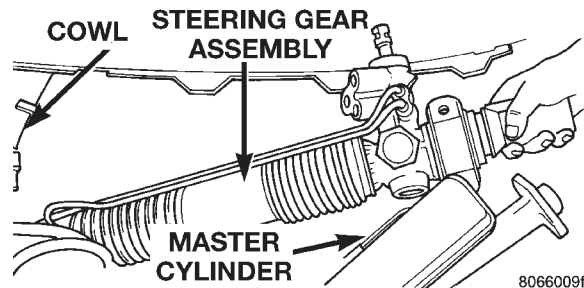


Fig. 15 Steering Gear Assembly Removal And Installation

INSTALL

NOTE: If original steering gear assembly is being installed back in vehicle, be sure the tie rod attachment at steering gear is in center of steering gear travel. If a replacement steering gear assembly is being installed in the vehicle, be sure the tie rod attachment at steering gear is in center of steering gear travel. Then install steering gear shaft into steering coupler.

(1) Install steering gear assembly back in vehicle through windshield wiper module opening in cowl (Fig. 15).

(2) Using roll pin installer, Special Tool 6831A, install the roll pin in the flex joint of the intermediate shaft (Fig. 16). Roll pin is installed in coupler using the following procedure. Remove knurled nut from small end of removal tool. Insert small end of removal tool through center of roll pin and then install and hand tighten knurled nut. Position sleeve of removal tool on flex joint as shown in (Fig. 16). Holding threaded shaft of tool from turning tighten nut (Fig. 16) pulling roll pin into flex joint. Roll pin must be equally spaced in flex joint.

(3) Slide steering gear and intermediate shaft back into dash panel sealing boot (Fig. 16). Align the steering gear mounting holes with its mounting holes in crossmember.

REMOVAL AND INSTALLATION (Continued)

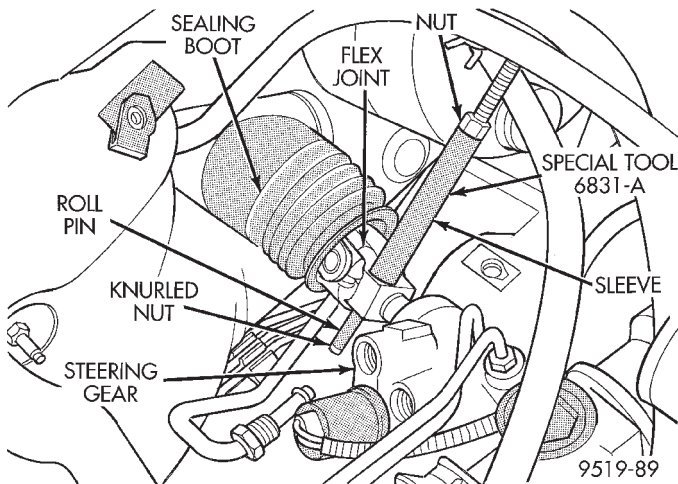


Fig. 16 Steering Coupler Roll Pin Installation

CAUTION: Tightening the steering gear to crossmember mounting bolts to the proper torque is very important. Be sure to observe the torque specifications in step 5.

(4) Install the 4 bolts attaching the steering gear brackets and steering gear to the crossmember. **If equipped, be sure brake line routing clip is installed under left steering gear mounting bracket.** Tighten the 4 steering gear assembly to crossmember attaching bolts to a torque of 61 N·m (45 ft. lbs.).

(5) Install the intermediate shaft onto the steering column shaft. Install steering column coupler pinch bolt (Fig. 12) and tighten to a torque of 28 N·m (21 ft. lbs.). Install the pinch bolt nut retaining pin in pinch bolt (Fig. 12).

CAUTION: On 3.5 ltr engine applications, correct orientation of power steering pressure hose at power steering pump must be maintained. Be sure power steering hose is installed in orientation clip at generator (Fig. 17), prior to tightening the tube nut. This will maintain required clearance between power steering pressure hose and throttle body cam.

(6) Attach power steering fluid, pressure and return lines into proper ports of the steering gear (Fig. 9). Tighten both power steering hose tube nuts to a torque of 31 N·m (23 ft. lbs.).

(7) Align center take off on steering gear with the tie rod assemblies. Install tie rod attaching bolts and washers into steering gear assembly. **Be sure washers are installed between tie rods and steering gear (Fig. 18).** Tighten the tie rod to steering gear bolts to a torque of 90 N·m (66 ft. lbs.).

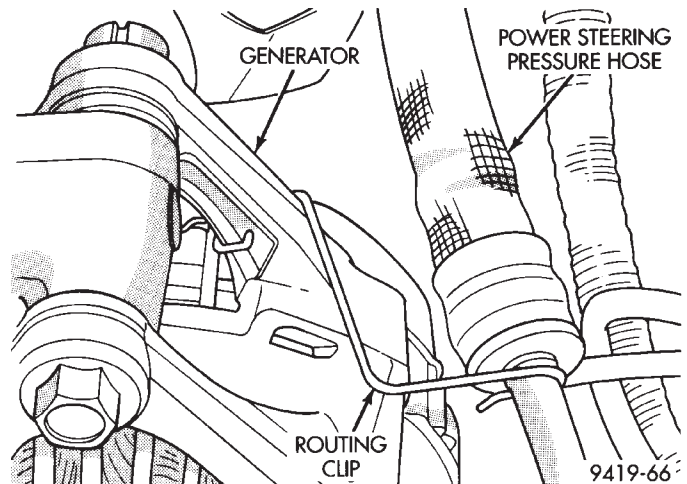


Fig. 17 Power Steering Hose Routing Clip

CAUTION: After tie rod attaching bolts are torqued, bend attaching bolt retaining tabs against heads of attaching bolts (Fig. 19).

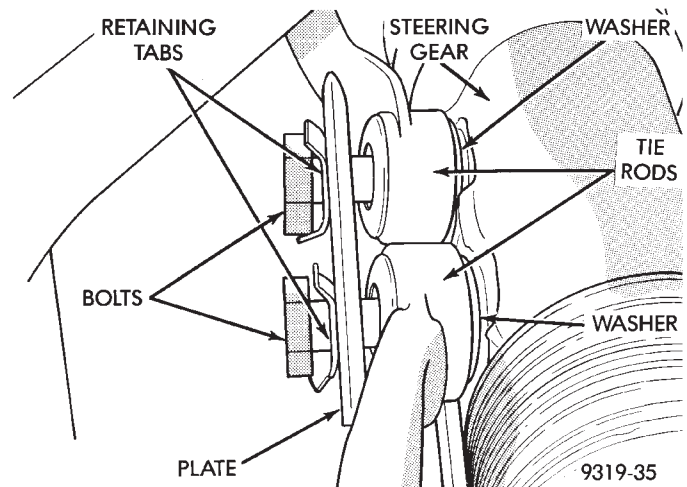


Fig. 18 Tie Rod Attachment To Steering Gear

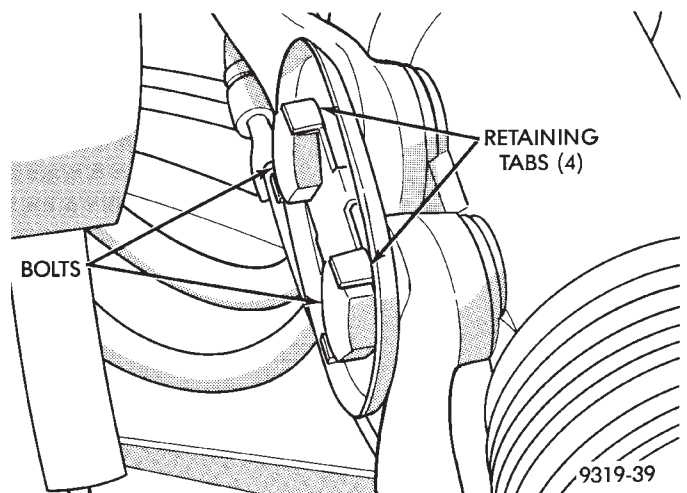


Fig. 19 Attaching Bolt Retaining Tabs

REMOVAL AND INSTALLATION (Continued)

(8) Install the master cylinder on the vacuum booster. Install the 2 nuts attaching the master cylinder to the vacuum booster. Tighten the master cylinder mounting nuts to a torque of 28 N·m (250 in. lbs.).

(9) Install the vacuum hose for the vacuum booster on intake manifold vacuum port. Install hose clamp on vacuum hose.

(10) If the vehicle is equipped with a 3.5ltr engine, install the air intake plenum through the left side of the vehicle through the wiper module area in the cowl (Fig. 8). Then connect air intake plenum to throttle bodies, PCV make up air tube and idle air control motor.

(11) Install windshield wiper module assembly into cowl of vehicle. Install and securely tighten the 5 screws attaching windshield wiper module to cowl (Fig. 7).

(12) Connect wiring harness connector from windshield wiper module into vehicle wiring harness (Fig. 6).

(13) Install cowl closure panel on cowl and windshield wiper module. Install and securely tighten the 6 screws attaching cowl closure to vehicle. Install weather strip on shock towers and the clips securing cowl closure panel to windshield wiper module.

(14) Install windshield washer hoses on wiper arms first, then install both windshield wiper arms on windshield wiper arm pivots and lock arms in place.

(15) If vehicle is equipped with a 3.5 ltr engine, install throttle cable in throttle cable bracket and install cable throttle cable on throttle body.

(16) Connect wiring harness connector from solenoid control valve onto solenoid control module (Fig. 11). **Be sure wiring harness connector seal are on connector is in good condition before installing connector on control module.**

(17) Raise vehicle

(18) Install gear shift cable onto shift lever on transaxle. Install gear shift cable on cable mounting bracket of transaxle and securely tighten bolt (Fig. 4).

(19) Lower vehicle.

(20) Install the wheel and tire assemblies.

(21) Install and tighten wheel mounting stud nuts in proper sequence until all nuts are torqued to half specification. Then repeat the tightening sequence to the full specified torque of 129 N·m (95 ft. lbs.).

CAUTION: The clockspring centering procedure MUST be done prior to turning the steering wheel or moving the vehicle if the steering wheel was rotated while the steering gear was removed from the vehicle. If clockspring is not centered it may be overextended, causing the clockspring to become inoperative.

(22) Center the clock spring using the following procedure.

- Remove the steering wheel from the steering column. Refer to Steering Column in the Removal And Installation section in this group of the service manual for the require procedure.

- Depress the 2 plastic locking pins to disengage clockspring locking mechanism.

- Keeping locking mechanism disengaged, rotate the clockspring rotor in the **CLOCKWISE DIRECTION** to the end of the travel. Do not apply excessive torque.

- From the end of clockwise travel, slowly rotate the rotor in the counterclockwise direction 2 and a half turns. The horn wire should located at the top and the air bag wire and speed control switch wires at the bottom.

- Engage the 2 clockspring locking pins.

- Install the steering wheel. Refer to Steering Column in the Removal And Installation section in this group of the service manual for the require procedure.

(23) Connect battery cable back on negative post of battery.

CAUTION: Do not use automatic transmission fluid.

(24) 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. **Fill pump reservoir to correct level with Mopar, Power Steering Fluid, or equivalent.** See Checking Fluid Level.

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

OUTER TIE ROD

REMOVE

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

(2) Remove tire and wheel assembly.

(3) Loosen the outer tie rod to adjustment sleeve jam nut (Fig. 20).

(4) Loosen but do not remove outer tie rod to strut assembly steering arm attaching nut (Fig. 21). Then remove outer tie rod from steering arm using Puller, Special Tool MB-990635 or equivalent (Fig. 21).

(5) Remove outer tie rod from adjustment sleeve.

INSTALL

(1) Install replacement outer tie rod into adjustment sleeve. **Make sure jam nut is on outer tie rod.**

REMOVAL AND INSTALLATION (Continued)

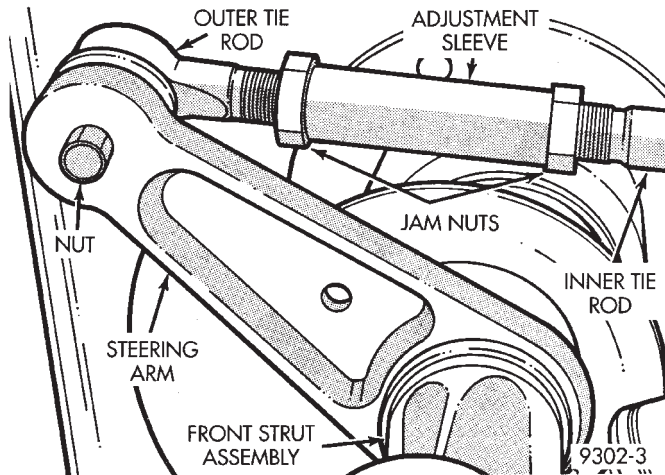


Fig. 20 Outer Tie Rod Jam Nut And Adjustment Sleeve

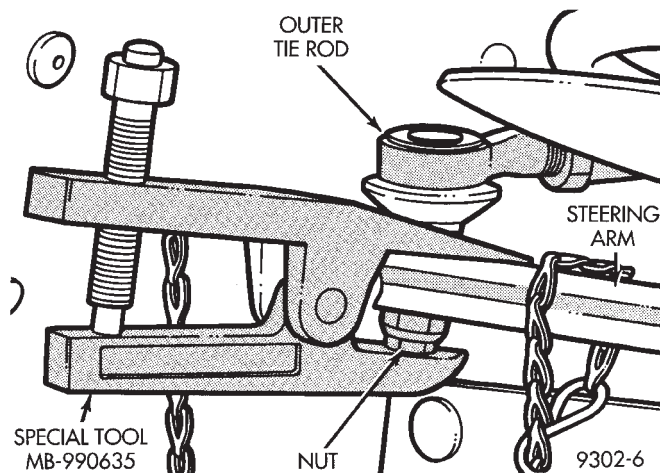


Fig. 21 Removing Outer Tie Rod From Steering Arm

- (2) Do not tighten jam nut.
- (3) Install outer tie rod into steering arm on front strut assembly. Install tie rod to steering arm attaching nut and tighten to a torque of 37 N·m (27 ft. lbs.).
- (4) Install and tighten the wheel mounting stud nuts in proper sequence until all nuts are torqued to half specification. Then repeat the tightening sequence to the full specified torque of 129 N·m (95 ft. lbs.).

CAUTION: When setting Toe on vehicle, the maximum dimension of exposed threads allowed on inner and outer tie rod can not exceed the distance shown in (Fig. 22). If the maximum distance is exceeded, inadequate retention of either inner or outer tie rod can result. This condition can cause separation of the inner or outer tie rod end from the adjusting sleeve. Ensure that adjustment sleeve jam nuts are torqued to required specification when Toe setting procedure is completed.

- (5) Check the front wheel TOE setting on vehicle and make required changes. **When making front wheel TOE adjustments be sure the maximum exposed thread requirements (Fig. 22) are not exceeded.**

ALLOWABLE THREADS EXPOSED PAST EDGE OF THE TIE ROD JAM NUTS IS, A MAXIMUM OF 20 MILLIMETERS ON EITHER SIDE OR A COMBINED MAXIMUM OF 35 MILLIMETERS ON BOTH SIDES.

NOTE: DISTANCE IS MEASURED FROM OF TIE ROD THREADS OUTSIDE EDGE OF JAM NUT TO END

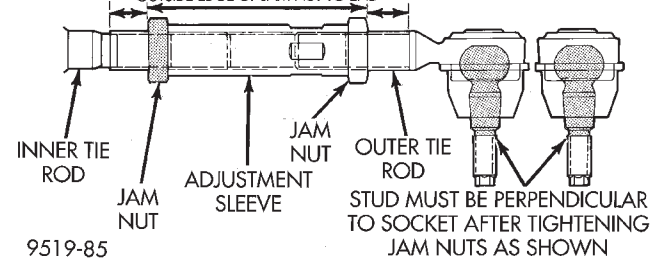


Fig. 22 Tie Rod Thread Engagement Requirements

CAUTION: When torquing adjustment sleeve jam nuts. The following procedure must be followed to ensure adequate torquing and retention of the adjustment sleeve jam nuts is obtained. Not following this procedure, could result in the Toe Setting Adjustment changing and/or separation of the inner or outer tie rod ends.

- (6) After completion of tie rod end installation and to Toe adjustment procedure, tighten inner tie rod adjusting sleeve jam nut (Fig. 22) to a torque of 75 N·m (55 ft. lbs.). When tightening jam nut, use a 27mm crow foot and a clicker type torque wrench to obtain required torque. **To avoid losing Toe set adjustment and prevent adjusting sleeve from turning, a 23mm wrench of sufficient size to resist the tightening torque of the jam nut must be used to hold adjusting sleeve.**

- (7) Use an appropriate tool on neck area of outer tie rod to maintain the correct perpendicular orientation of the tie rod end stud within the tie rod end (Fig. 22).

CAUTION: While tightening and torquing the outer tie rod jam nut, the adjusting sleeve must not be allowed to turn. Any turning movement of the adjusting sleeve can cause the inner tie rod jam nut to loosen. This condition is most likely to occur if jam nut is not tightened to the specified torque.

- (8) Tighten the outer tie rod jam nut (Fig. 22) to a torque of 75 N·m (55 ft. lbs.). When tightening jam nut, use a 27mm crow foot and a clicker type torque wrench to obtain required torque. **To avoid losing Toe set adjustment and prevent adjusting sleeve from turning, a 23mm wrench of sufficient size to resist the tightening torque of the jam nut must be used to hold adjusting sleeve.**

- (9) Lower vehicle.

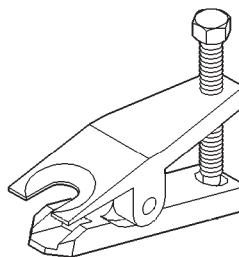
SPECIFICATIONS

STEERING GEAR FASTENER TORQUE SPECIFICATIONS

DESCRIPTION	TORQUE
STEERING GEAR:	
To Crossmember Bolts	61 N·m (45 ft. lbs.)
Tie Rod To Strut Steering Arm Nut	37 N·m (27 ft. lbs.)
Tie Rod To Steering Gear Bolt . .	90 N·m (66 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.)

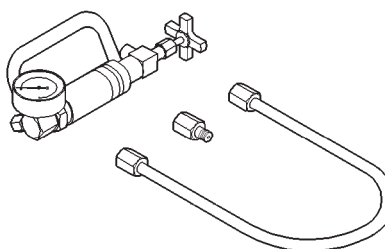
SPECIAL TOOLS

POWER STEERING GEAR



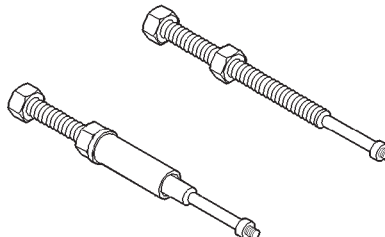
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Remover Tie Rod End MB-990635



8011c958

P/S System Analyzer 6815



Remover / Installer, Steering Shaft Roll Pin 6831A

SPEED PROPORTIONAL POWER STEERING GEAR

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DESCRIPTION AND OPERATION

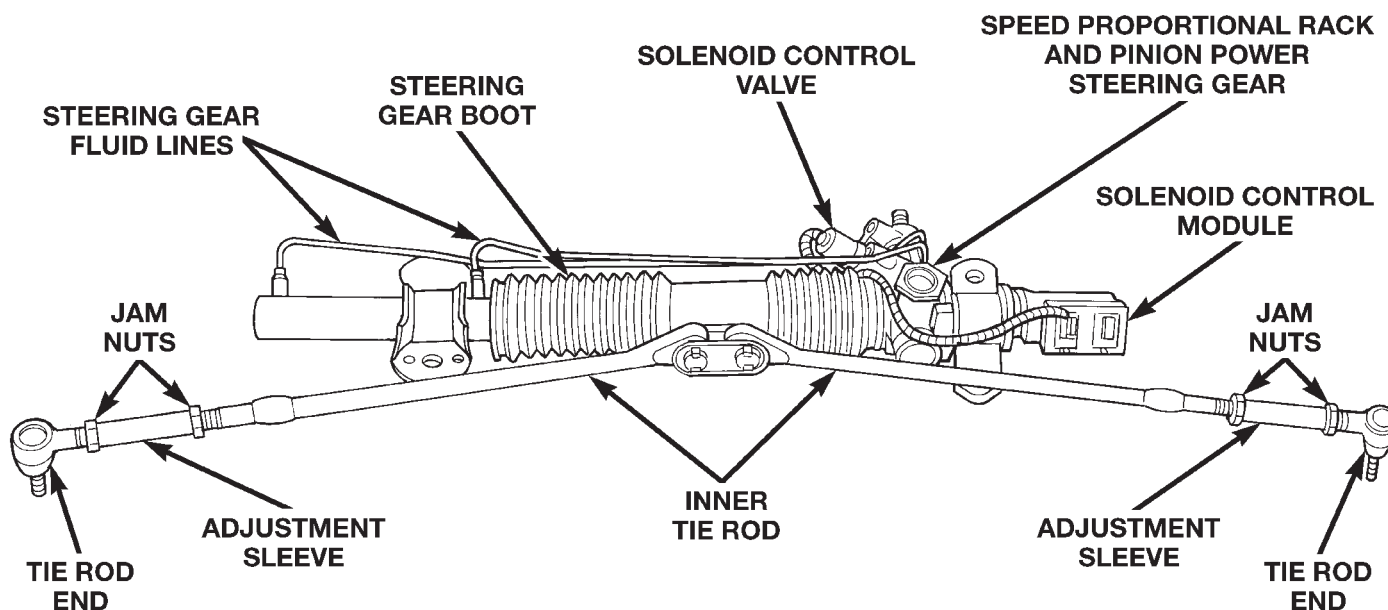
SPEED PROPORTIONAL POWER STEERING GEAR

Available on certain models of this vehicle is an electronically controlled, variable-assist speed-proportional power steering system. Variable-assist speed-proportional power steering, provides additional steering assist while the vehicle is stationary and at slow driving speeds. This additional power steering assist reduces the steering effort required by the driver for low speed driving and parking maneuvers. Variable-assist speed-proportional power steering, then provides less power steering assist at highway speeds, to maintain the firm, responsive feel of the existing non variable-assist speed-proportional power steering system.

The operational range of the variable-assist speed-proportional power steering system, is from between

approximately 25 to 60 mph. Maximum available power steering assist is provided between 0 and a vehicle speed of 25 mph. Power steering assist is then gradually reduced from vehicle speeds of between approximately 25 to 60 mph, with the minimum power steering assist available, reached at approximately 60 mph.

Variable-assist power steering, is provided by controlling power steering fluid pressure at the power steering gear. The pressure is controlled, by regulating power steering fluid flow from the steering gear back to the power steering pump. A solenoid valve located on the steering gear (Fig. 1) is used to control power steering system fluid pressure. The pressure is controlled by varying the size of an orifice which the power steering fluid must flow through, from the steering gear back to the power steering pump.



80500560

Fig. 1 Variable-Assist Speed-Proportional Power Steering Gear

DESCRIPTION AND OPERATION (Continued)

The variable-assist speed-proportional solenoid control valve (Fig. 1) is controlled by the steering gear mounted electronic solenoid control module SCM (Fig. 1). The SCM receives the vehicle speed signal sent from the transmission control module TCM. Upon receiving the vehicle speed signal from the TCM, the SCM converts that speed signal into an electrical current usable by the solenoid control valve for controlling the variable assist of the power steering system.

The solenoid control valve and solenoid control module are both serviceable components of the variable-assist speed-proportional power steering gear assembly. Both components are replaceable without requiring removal of the steering gear from the vehicle. Refer to the specific component service in the section for the required replacement procedures.

DIAGNOSIS AND TESTING

SPEED PROPORTIONAL STEERING SYSTEM

The variable-assist speed-proportional power steering system, is diagnosed if suspected of not functioning properly, using the DRB scan tool. The test consists of checking available power steering assist, using the DRB scan tool, to create an electronically simulated vehicle speed of 0 and 60 mph. Refer to the 1996 M.Y. 41 TE Transaxle Diagnostic Procedures Manual for the specific testing procedure.

The solenoid control valve and solenoid control module are both serviceable components of the variable-assist speed-proportional power steering gear assembly. Both components are replaceable without requiring removal of the steering gear from the vehicle. Refer to the specific component service in the section for the required replacement procedures.

REMOVAL AND INSTALLATION

SPEED PROPORTIONAL POWER STEERING GEAR

If the variable-assist speed-proportional power steering gear requires removal from the vehicle for servicing or replacement, refer to the standard power steering gear removal procedure in this section of the service manual.

SOLENOID CONTROL VALVE CONTROL MODULE

The solenoid control module (Fig. 2) is mounted on the steering gear assembly end cap (Fig. 2). The solenoid control module is removable from the steering gear for servicing, without removing steering gear from vehicle.

If the variable-assist speed-proportional power steering system is not functioning properly, refer to the 1996 M.Y. 41 TE Diagnostic Procedures Manual

for the specific testing procedure, to properly determine a failed component.

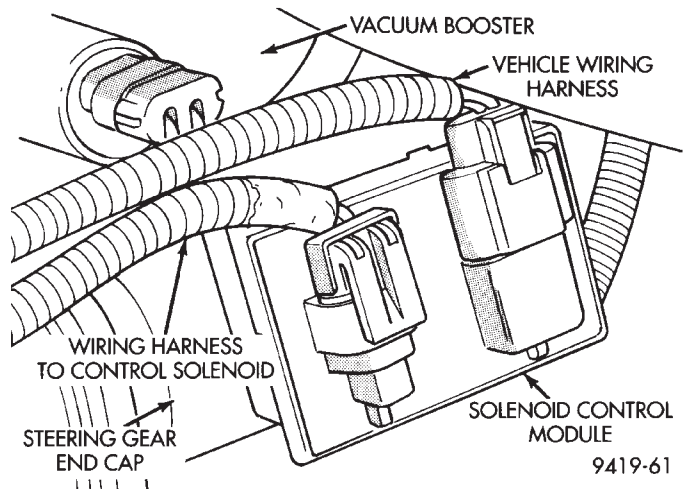


Fig. 2 Solenoid Control Module Location On Steering Gear

REMOVE

(1) Remove the wiring harness connectors (Fig. 3) from the solenoid control module.

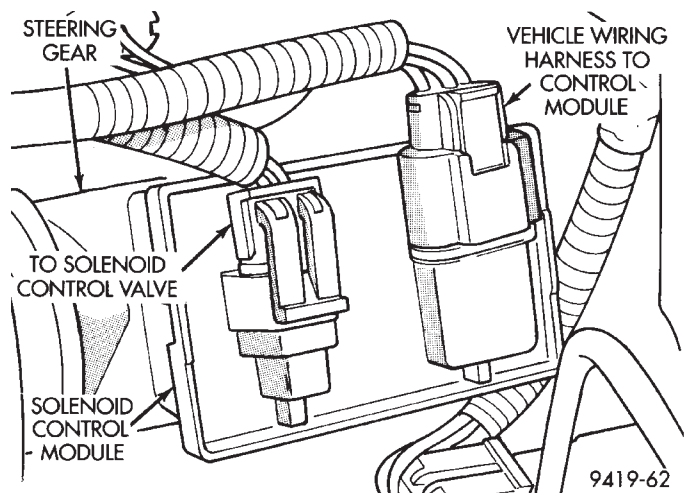


Fig. 3 Wiring Harness Connections To Solenoid Control Module

(2) Depress the 2 locking tabs (Fig. 4) on the bottom side of the solenoid control module, unlocking the control module from steering gear end cap.

(3) Rotate the solenoid control module upward, until retaining tabs (Fig. 5) can be removed from the steering gear end cap. Then remove the control module from the steering gear.

INSTALL

(1) Insert tabs on solenoid control module (Fig. 5) into steering gear end cap. Then rotate module downward until locking tabs on module (Fig. 4) are engaged with steering gear end cap.

REMOVAL AND INSTALLATION (Continued)

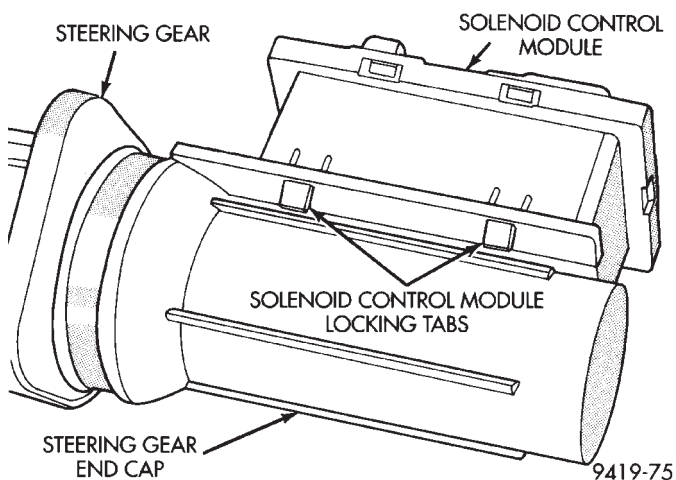


Fig. 4 Solenoid Control Module To End Cap Locking Tabs

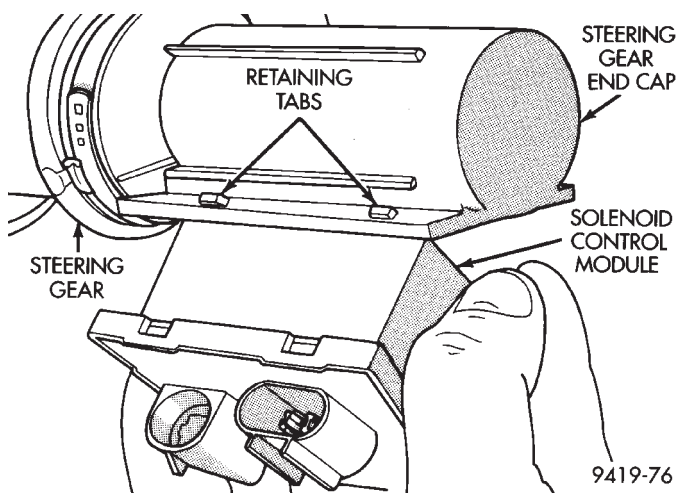


Fig. 5 Solenoid Control Module Mounting To End Cap

(2) Connect wiring harness connectors onto solenoid control module (Fig. 3). **Be sure wiring harness connector seals are on connectors and in good condition before installing connectors on control module.**

SOLENOID CONTROL VALVE

If removing a solenoid control valve on a vehicle equipped with a 3.5 liter engine, removal of the air intake plenum, will allow improved access to the solenoid control valve.

When removing air intake plenum, disconnect plenum from the following components: air cleaner, throttle bodies, PCV make up air tube and idle air control motor. Then remove air intake plenum from right side of vehicle (Fig. 6).

REMOVE

(1) Remove the electrical connector to the solenoid control valve, at the solenoid control module (Fig. 7).

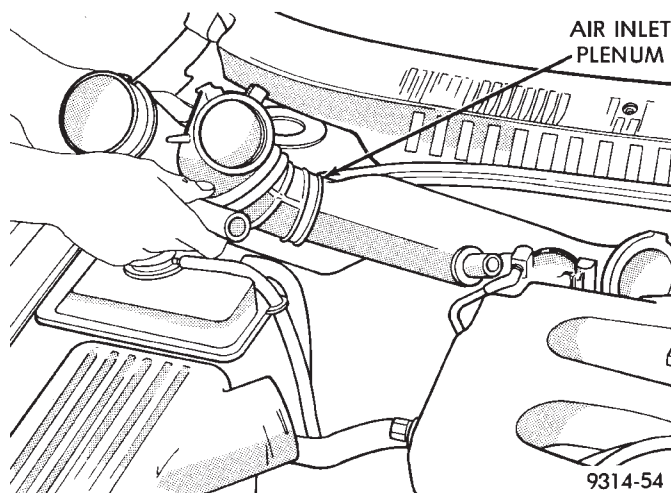


Fig. 6 Air Intake Plenum Removal From Vehicle

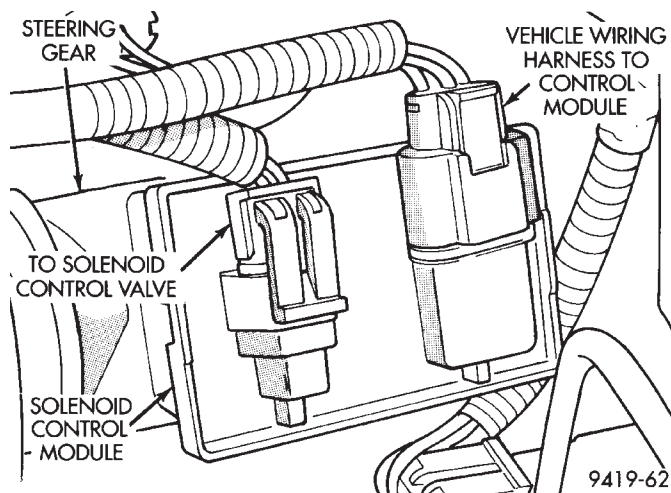


Fig. 7 Wiring Harness Connections To Solenoid Control Module

(2) Remove the power steering pressure hose (Fig. 8) from the power steering gear.

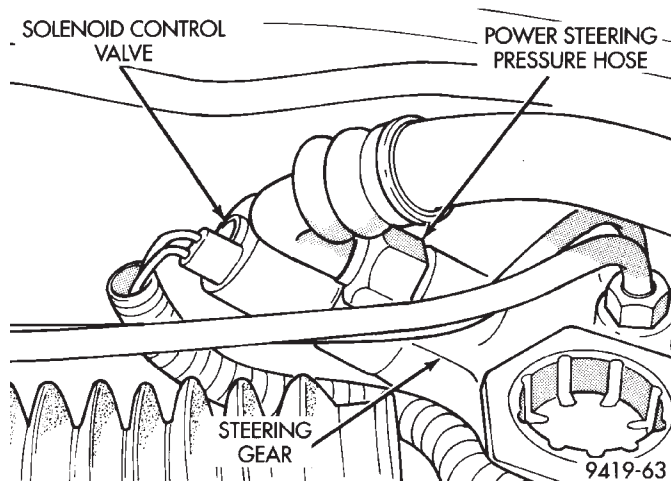


Fig. 8 Power Steering Pressure Hose At Steering Gear

REMOVAL AND INSTALLATION (Continued)

- (3) Remove the power steering return hose (Fig. 9) from the power steering gear.

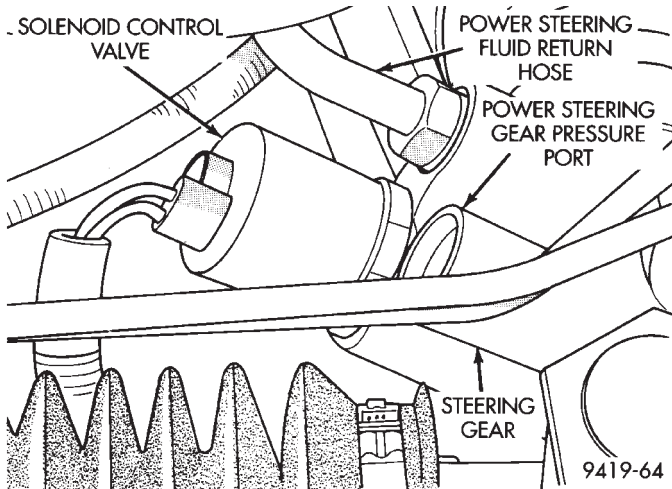


Fig. 9 Power Steering Return Hose At Steering Gear

- (4) Using a 1 5/16 inch crow foot, (Fig. 10) loosen the solenoid control valve. Then by hand, remove the solenoid control valve from the power steering gear.

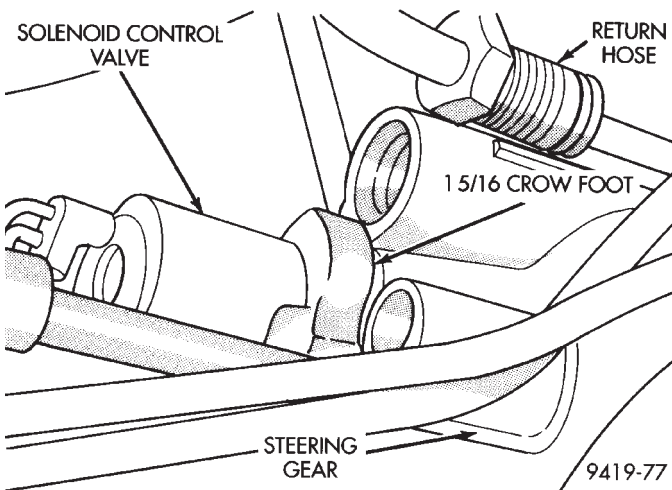


Fig. 10 Loosening Solenoid Control Valve

INSTALL

- (1) Inspect the O-ring seals on the solenoid control valve to be sure they are not damaged. If the O-rings are not damaged, moisten the O-rings using **only** fresh clean Mopar, Power Steering Fluid or equivalent.

- (2) Install the solenoid control valve into the steering gear by hand, until it is fully seated into the steering gear.

- (3) Using the 1 5/16 inch crow foot as shown in (Fig. 11) tighten the solenoid control valve to a torque of 14 N·m (124 in. lbs.).

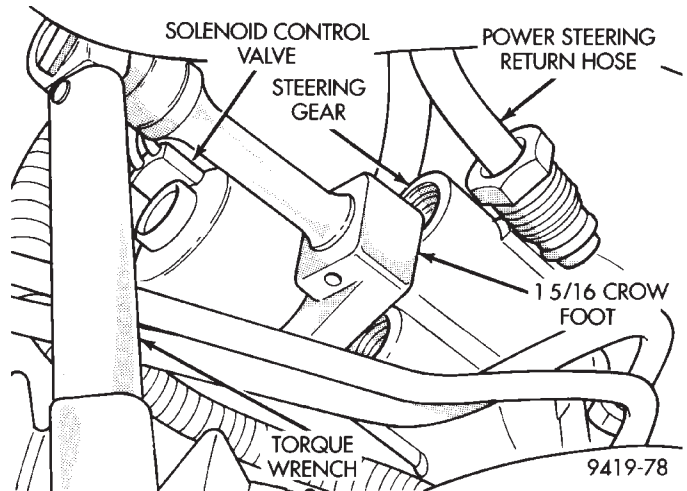


Fig. 11 Torquing Solenoid Control Valve Into Steering Gear

- (4) Route the wiring harness from the solenoid control valve, under the power steering lines and around the front of the steering gear (Fig. 12).

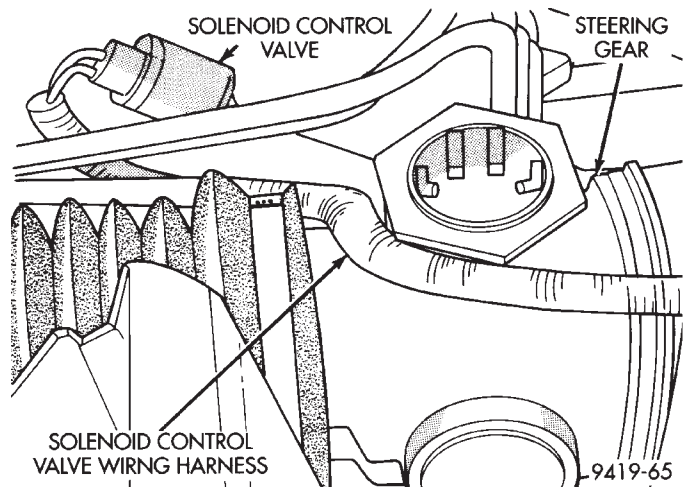


Fig. 12 Solenoid Control Valve Wiring Harness Routing

- (5) Connect the wiring harness connector onto the solenoid control module (Fig. 7). **Be sure the wiring harness connector seal is in good condition before installing the connector in the control module.**

- (6) Road test vehicle or refer to the test using the DRB scan tool, to confirm correct operation of the variable-assist speed-proportional power steering gear.

STEERING COLUMN

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DESCRIPTION AND OPERATION

STEERING COLUMN

The Saginaw tilt steering column (Fig. 1) used on this vehicle, has been designed to be serviced as an

assembly; less wiring, switches, shifter assembly, ignition park interlock, shrouds and steering wheel, etc. Also, most steering column components can be serviced without removing the steering column from the vehicle.

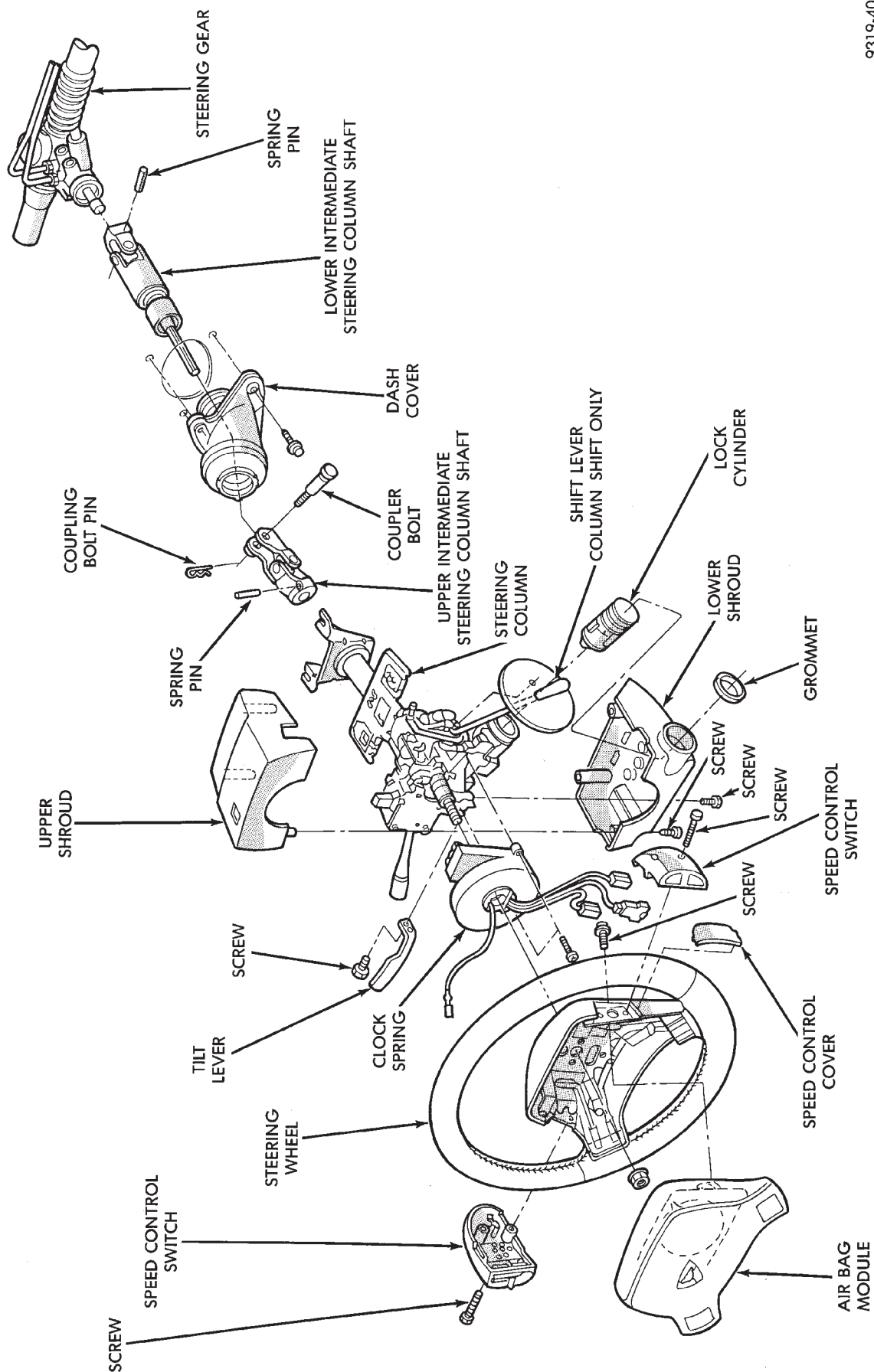


Fig. 1 Saginaw Tilt Steering Column

DIAGNOSIS AND TESTING

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.

STEERING GEAR TO STEERING COLUMN INTERMEDIATE COUPLER

The steering column coupler **MUST** be inspected whenever a vehicle is involved in an impact or whenever any of the following conditions exist.

(1) The steering column coupler must be inspected whenever a vehicle is involved in a collision which deploys the air bag, regardless of the extent of damage done to the vehicle.

(2) If a vehicle is involved in an impact of the vehicle's front suspension or under carriage, which results in any type of damage to the front suspension cross-member.

(3) Under any conditions which result in the steering column assembly or steering column shaft receiving a force great enough to move the steering column or shaft forward or rearward in a vehicle.

STEERING COLUMN SHAFT FLEX COUPLER

If the steering column shaft flex coupler is diagnosed to be defective due to any of the following conditions: seized bearing, loose bearing stake or a bearing not fully seated in the yoke of the coupler assembly, the coupler can be serviced as a separate component of the steering column assembly.

The steering column assembly needs to be removed from the vehicle for replacement of the steering column shaft flex coupler assembly.

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.

SHIFTER/IGNITION INTERLOCK

For servicing and or adjustment of the shifter/ignition interlock system on either a floor or column shift vehicle. Refer to the Ignition Switch And Interlock Section of Group 8 for the required operation check and adjustment of the interlock system.

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.

CAUTION: The steering column must be positioned and locked to prevent uncontrolled rotation of the steering column shaft, after steering column removal from vehicle. Use procedure below to correctly position and lock steering column prior to its removal. If steering column is not locked prior to its removal, damage to the clock spring assembly will occur.

REMOVAL AND INSTALLATION (Continued)

NOTE: NOTE: If vehicle being serviced is equipped with a floor shift and center console, center console will need to be removed before proceeding with steering column removal procedure. Refer to Group 23, Body in this service manual for required removal procedure.

REMOVE

(1) Lock the steering column by turning the steering wheel 1/2 turn (180°) clockwise from the straight ahead position of the front wheels (Fig. 2). Turn the key to the lock position and remove the key from the lock cylinder. This will ensure that no damage occurs to clock spring when steering column is removed from vehicle.

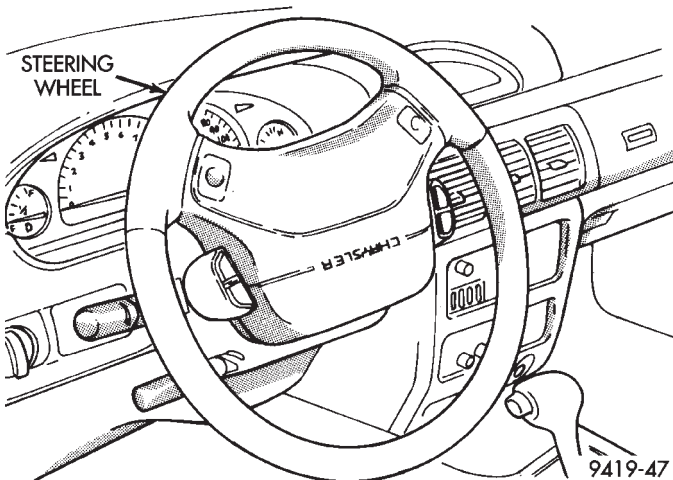


Fig. 2 Steering Wheel In Locked Position

(2) Disconnect negative (ground) cable from battery, isolating cable from battery.

(3) Remove the 2 speed control switches from the steering wheel, (Fig. 3) to gain access to the air bag module attaching screws. If the vehicle is not equipped with speed control, pry out the covers on sides of steering wheel for access.

(4) Remove the 2 bolts attaching the air bag module to the steering wheel (Fig. 4).

(5) Lift the air bag module out of the steering wheel. Disconnect the wiring harness connections (Fig. 5) from the rear of the air bag. Remove the air bag module from the steering wheel.

(6) Remove the steering wheel retaining nut from the steering column shaft (Fig. 6).

(7) Remove the steering wheel from the steering column shaft using Puller, Special Tool C- 3428-B or an equivalent (Fig. 7). **Do not bump or hammer on the steering column shaft to remove the steering wheel.**

(8) Remove instrument panel left and right end covers (Fig. 8). Refer to Group 8 Electrical in this service manual for the required removal procedure.

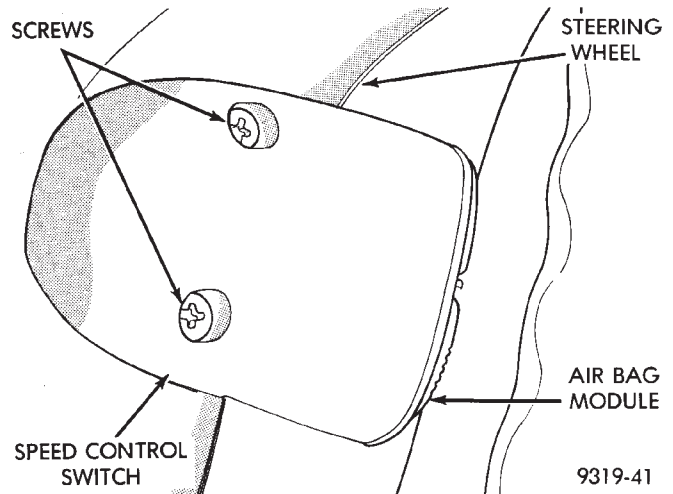


Fig. 3 Speed Control Switches

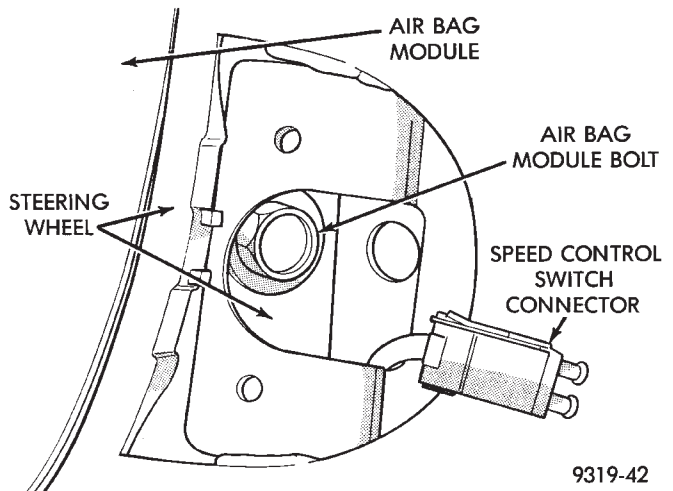


Fig. 4 Air Bag Module Attaching Bolts

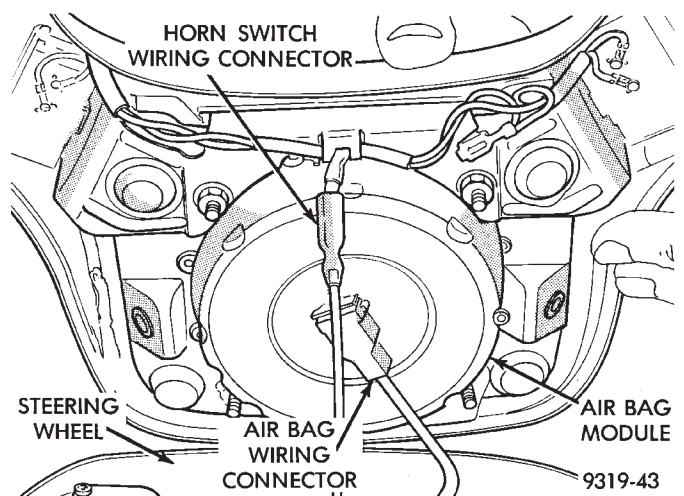
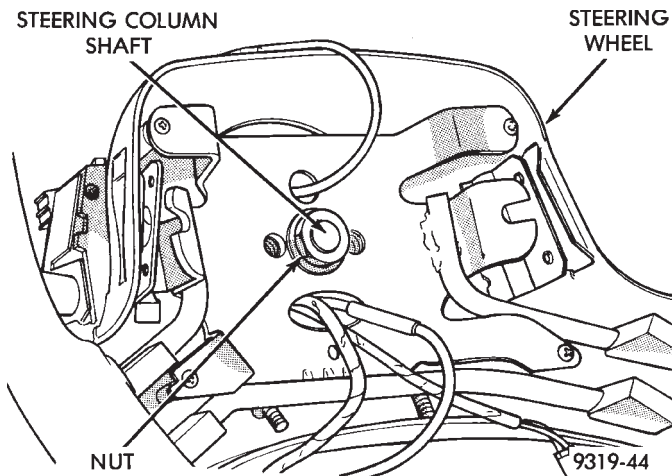
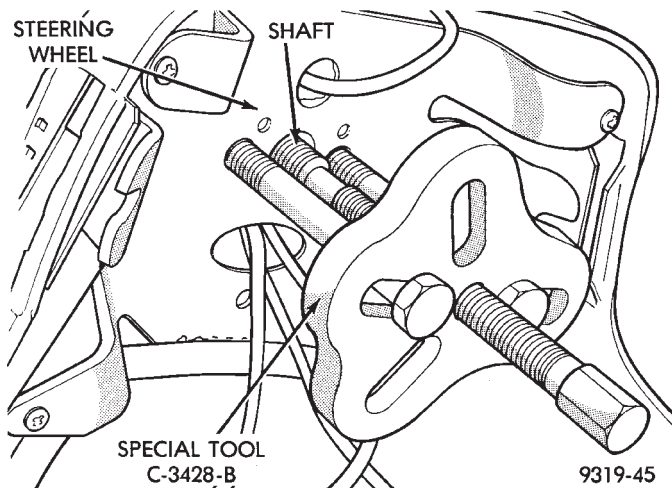
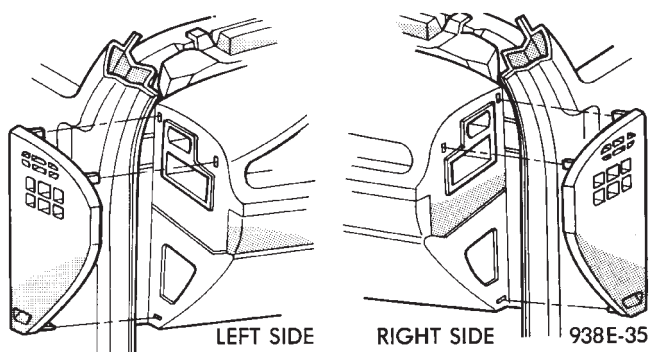


Fig. 5 Wiring Harness Connections At Air Bag Module

(9) Remove the 2 air bag fuses from the fuse panel (Fig. 9).

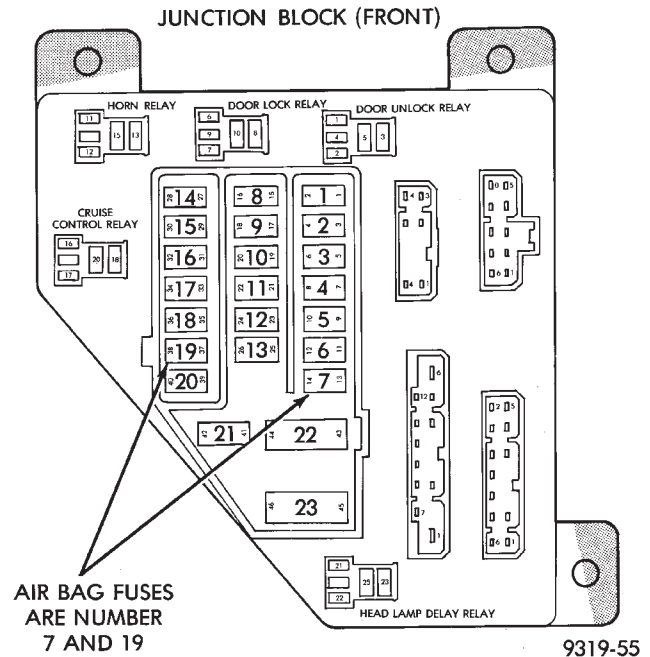
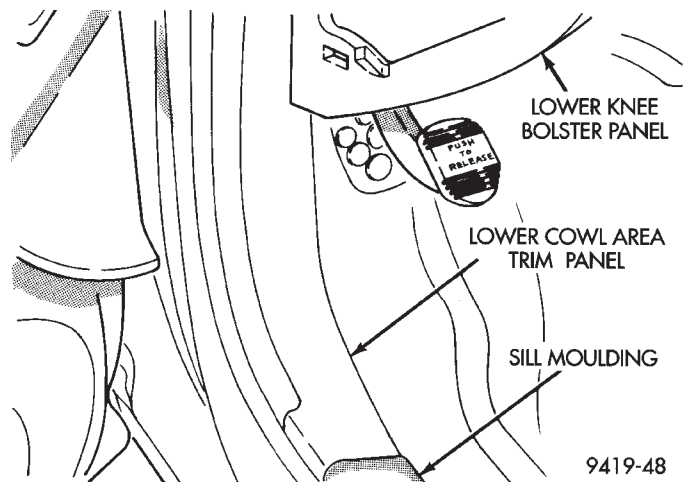
REMOVAL AND INSTALLATION (Continued)

**Fig. 6 Steering Wheel Retaining Nut****Fig. 7 Removing Steering Wheel****Fig. 8 Instrument Panel EndCovers**

(10) Remove the left and right lower cowl area trim panels (Fig. 10).

(11) Remove the ash receiver (Fig. 11) from the center console.

(12) Remove the lower center bezel (Fig. 12) from the lower knee bolster panel. Center bezel is removed from lower knee bolster panel, by carefully prying along edge of Bezel. Use care so as not to scratch lower knee bolster when removing bezel.

**Fig. 9 Air Bag Fuse Locations****Fig. 10 Lower Cowl Area Trim Panels (Left Side Shown)**

(13) Remove the 5 screws attaching the radio and the heater A/C control to the lower knee bolster panel (Fig. 13). Remove the radio and the heater A/C control assemblies.

(14) Remove the center upper outlet bezel (Fig. 14) from the upper instrument panel. Bezel is removed by carefully prying right side of bezel out from upper instrument panel until bezel can be grasped by hand. Then pull bezel out from upper instrument panel by hand, until the 2 retaining clips are disengaged. If vehicle is equipped with traction control, disconnect electrical connector from traction control switch.

(15) Remove the screw, attaching the lower knee bolster panel to the upper instrument panel (Fig. 15).

REMOVAL AND INSTALLATION (Continued)

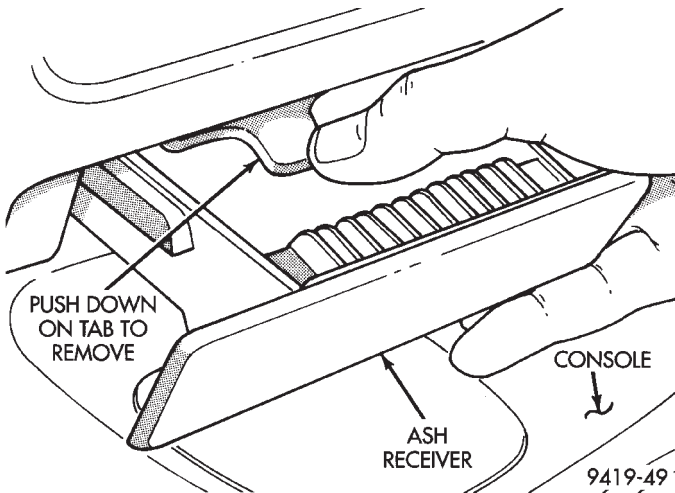


Fig. 11 Ash Receiver Removal

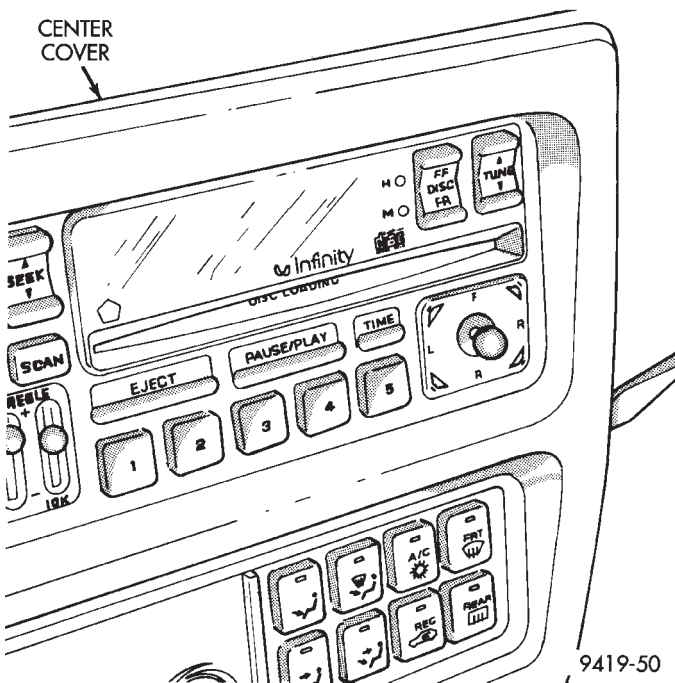


Fig. 12 Center Bezel

(16) Remove the vehicle wiring harness connectors from the cigar lighter and ash receiver assembly (Fig. 16).

(17) Remove the 2 nuts located at the rear of the ash receiver, (Fig. 16) attaching the lower knee bolster panel to the floor pan support bracket.

(18) Remove 6 screws inside glove box (Fig. 17) attaching lower knee bolster panel to cowl panel. Access attaching screws by opening glove box and pushing sides inward allowing door bumper to pass lower knee bolster panel, allowing glove box door to open fully.

(19) Remove the 6 bolts (3 each side) attaching the lower knee bolster panel to the cowl panel (Fig. 18).

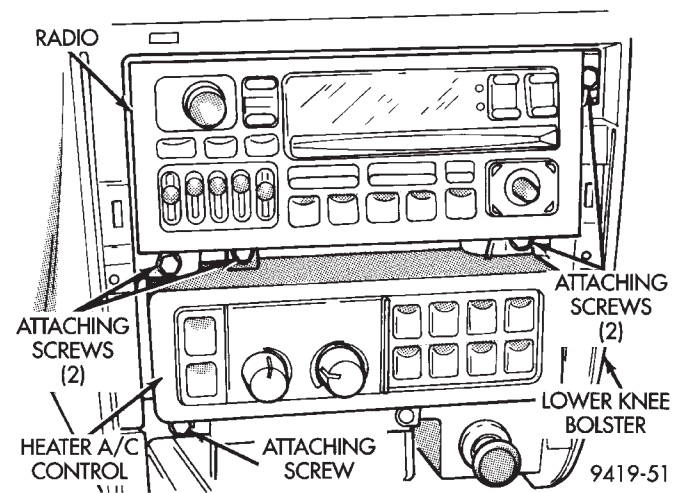


Fig. 13 Radio And Heater A/C Control Attachment

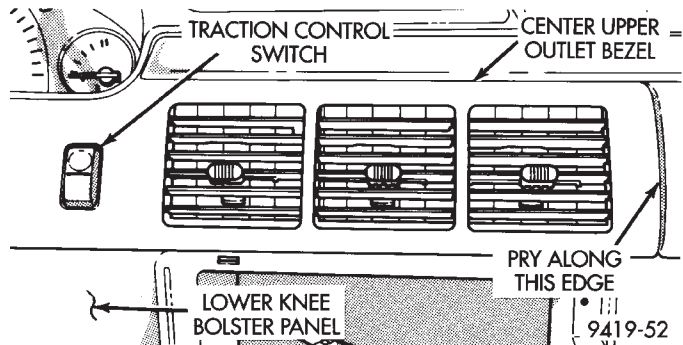


Fig. 14 Center Upper Outlet Bezel

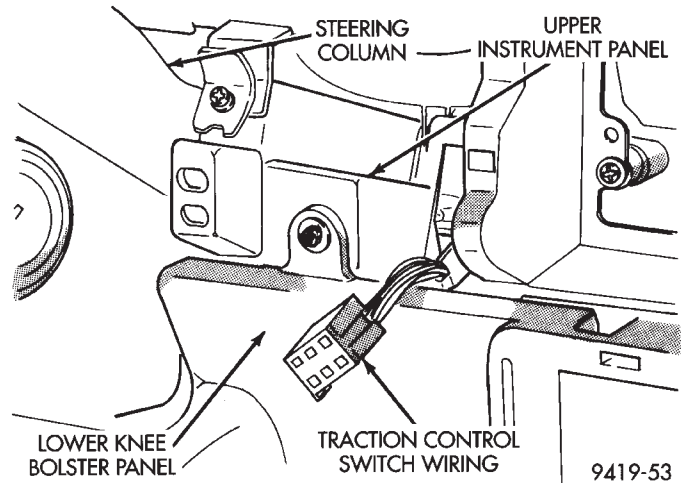


Fig. 15 Lower Knee Bolster To Upper Instrument Panel Attachment

(20) Carefully remove the lower knee bolster panel, from the upper instrument panel. Lower the knee bolster panel until the wiring connectors for the glove box light and trunk release button (Fig. 19) are accessible. Then disconnect the connectors from the light and switch.

REMOVAL AND INSTALLATION (Continued)

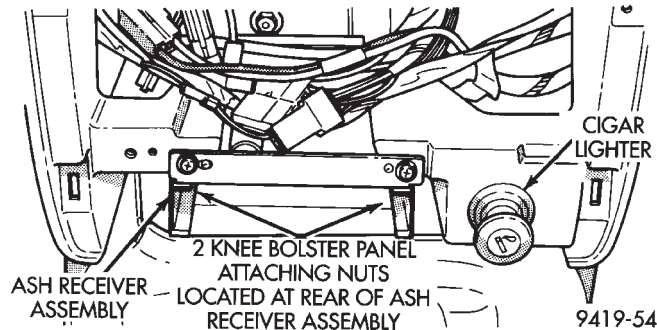


Fig. 16 Wiring Harness Connections To CigarLighter And Ash Receiver

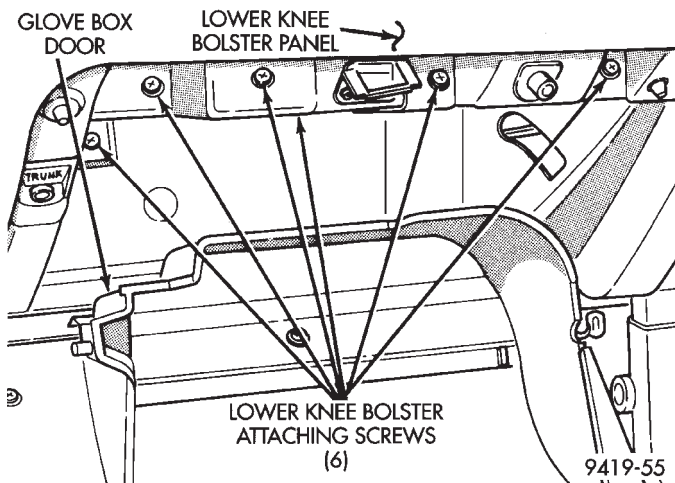


Fig. 17 Lower Knee Bolster Attaching Screws At Glove Box

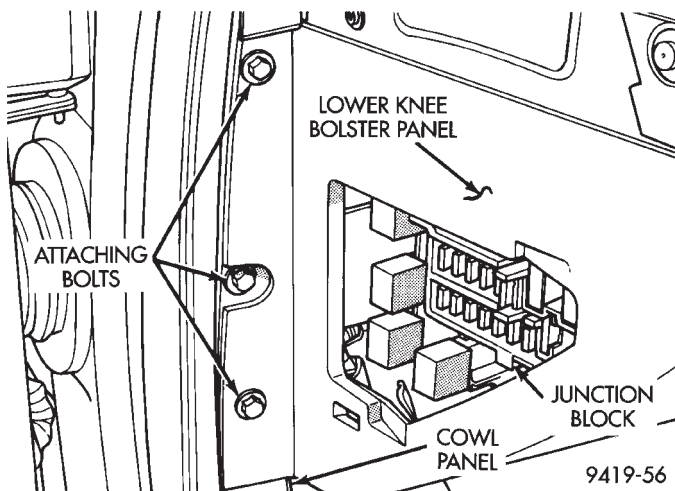


Fig. 18 Lower Knee Bolster To Cowl Attaching Bolts (Left Side Shown)

(21) Remove the complete lower knee bolster panel assembly from the interior of the vehicle. For ease of removal, the lower knee bolster panel should be removed from the passenger side door of the vehicle.

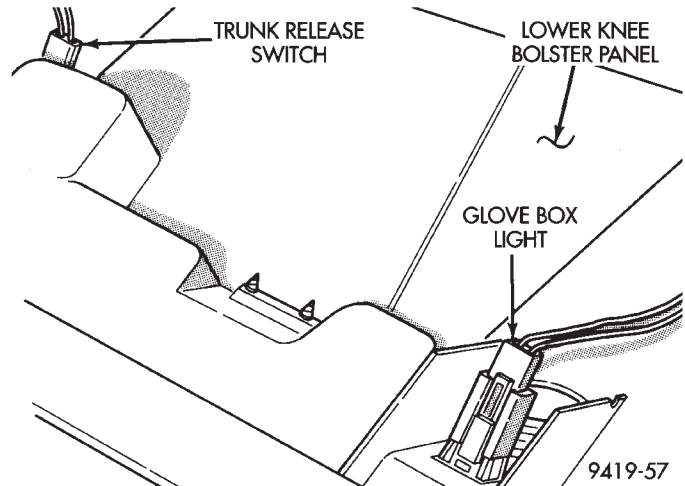


Fig. 19 Trunk Release Switch And Glove Box Light Wiring Connections

(22) Remove the 2 under steering column, heat and A/C ducts (Fig. 20).

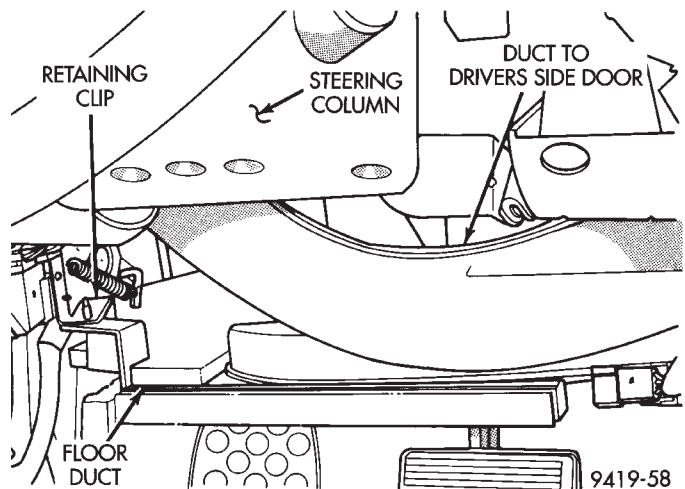


Fig. 20 Under Steering Column Heat And A/C Ducts

(23) Tilt steering column to its full up position to allow access to the shroud attaching screws. Then remove the 3 shroud to shroud attaching screws (Fig. 21).

(24) Tilt steering column to its full down position. This allows upper shroud to be removed easier thus avoiding damage to the upper shroud during removal.

(25) Remove upper steering column shroud from steering column assembly.

(26) Tilt the steering column to the full up position. Then remove the tilt lever, and the 3 lower steering column shroud to steering column attaching screws (Fig. 22).

(27) **If the vehicle is equipped with a column shifter, the shift cable is removed from steering column using the following procedure.** Ensure tilt steering column is in the full up position. Then

REMOVAL AND INSTALLATION (Continued)

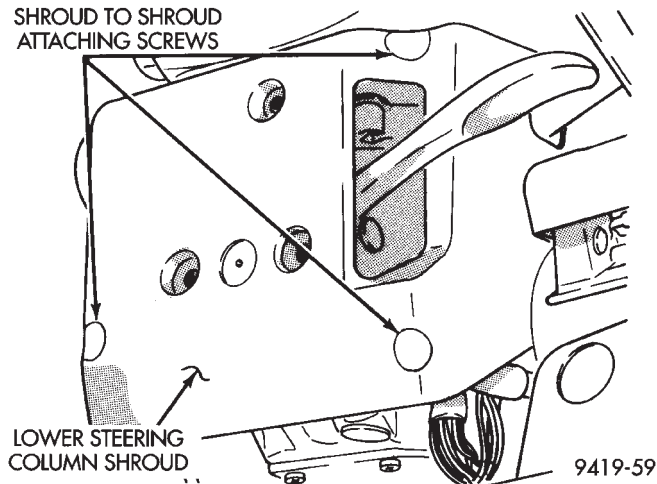


Fig. 21 Steering Column Shroud To Shroud Attaching Screws

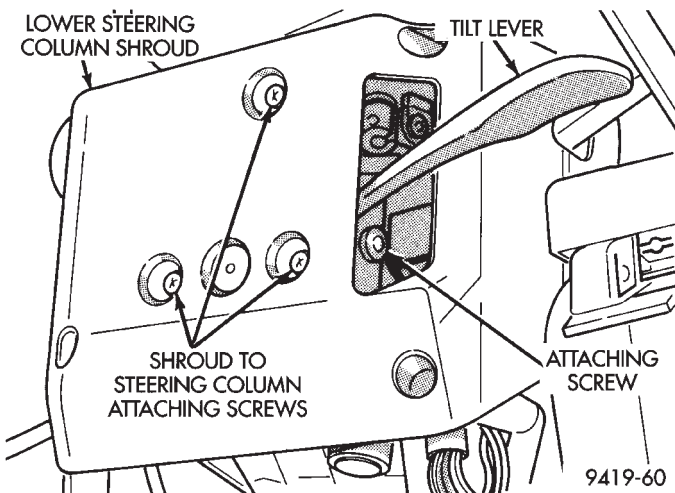


Fig. 22 Shroud To Steering Column Attaching Screws

remove the shift cable from shifter assembly by prying shift cable off attaching pin on shifter mechanism (Fig. 23). Then remove shift cable retaining clip at shift cable support bracket, (Fig. 24) being careful not to bend cable bracket.

CAUTION: When ignition key is turned to the run position, do not rotate steering column shaft. If steering shaft is turned, damage to the clock spring will occur.

(28) **If the vehicle is equipped with a floor shifter,** turn the ignition key to the run position unlocking the steering column. Depress tab and remove the floor shift interlock cable from the socket on the steering column (Fig. 25).

(29) Remove the retaining pin and the bolt from the coupler (Fig. 26). Then separate the coupler from the intermediate shaft.

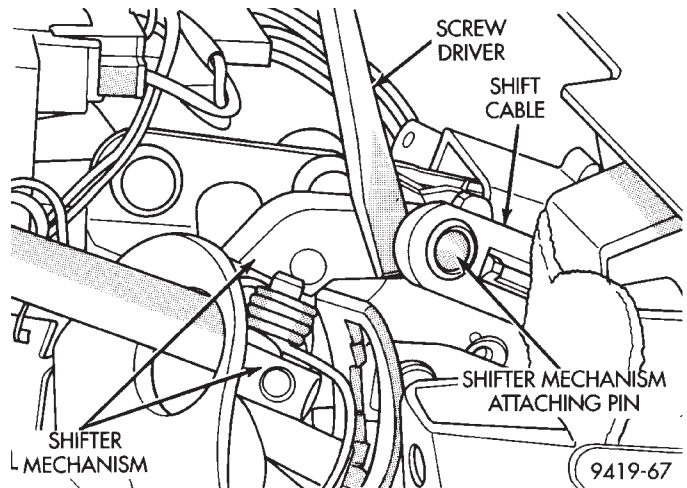


Fig. 23 Shift Cable Removal From Shifter Assembly

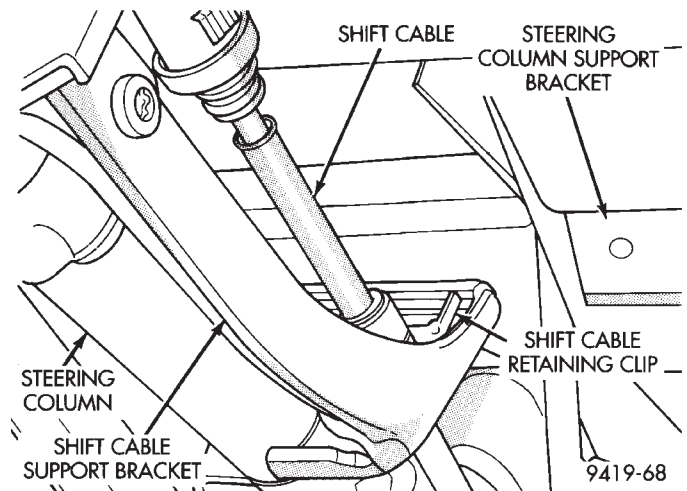


Fig. 24 Shift Cable Bracket And Retaining Clip

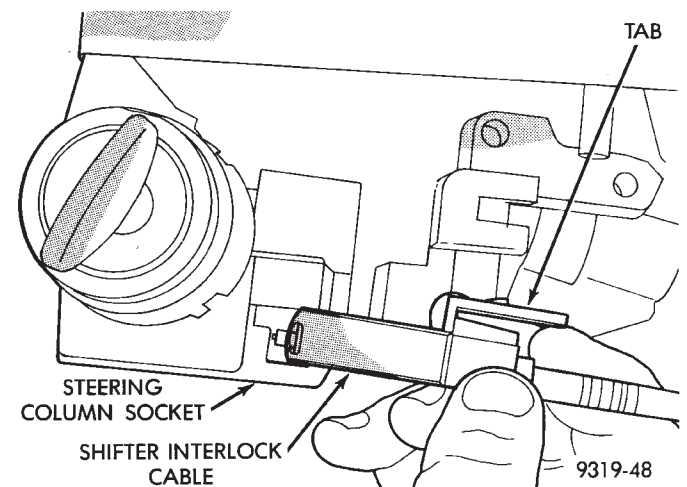


Fig. 25 Shifter Interlock Cable

(30) Loosen but do not remove the 2 bolts (Fig. 27) attaching lower steering column assembly bracket, to steering column mounting bracket.

REMOVAL AND INSTALLATION (Continued)

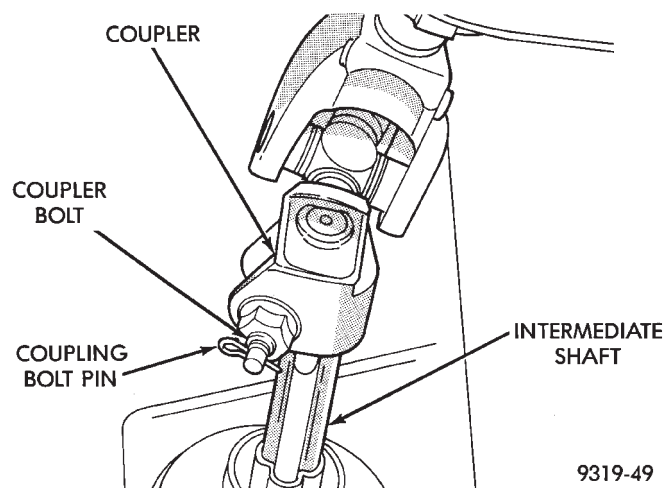


Fig. 26 Retaining Pin And Coupler Bolt

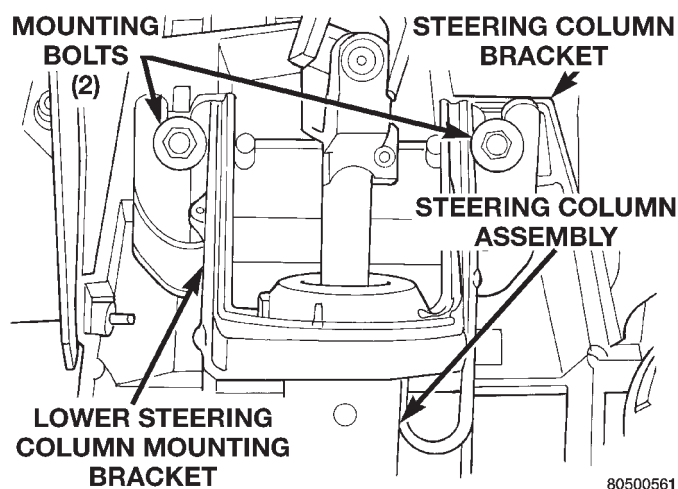


Fig. 27 Steering Column Lower Mounting BracketBolts

(31) Support the weight of the steering column, to prevent damage to the lower bracket and the plastic adapter tabs. Then remove the 2 nut/washer assemblies, attaching the upper steering column assembly bracket (Fig. 28) to the steering column mounting bracket.

(32) Remove the steering column assembly from the mounting brackets and lay it on the floor of the vehicle (Fig. 29).

(33) Remove wiring harness connectors from the turn signal/multi- function switch and ignition switch (Fig. 29).

(34) Remove the wiring harness connectors from the halo light and clock spring (Fig. 30). Carefully remove the steering column clip from the lower steering column mounting bracket.

(35) Remove steering column assembly from the passenger compartment of the vehicle. Use care when removing steering column to avoid damaging the paint or interior trim.

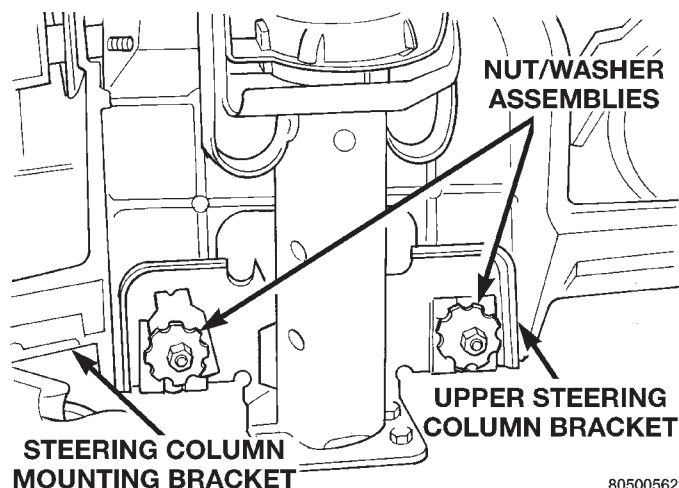


Fig. 28 Upper Steering Column Assembly Mounting

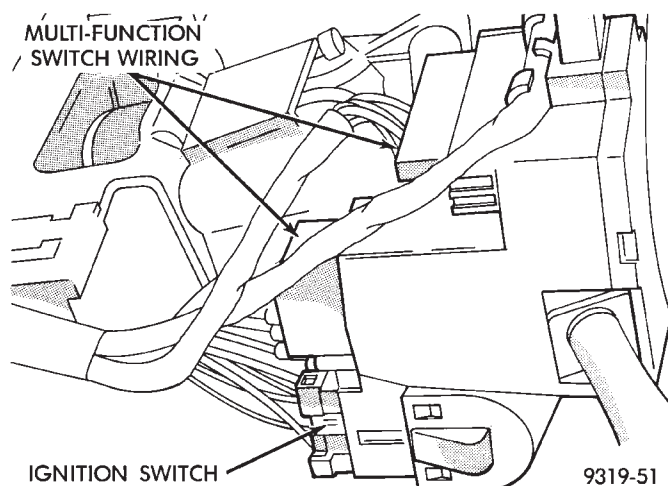


Fig. 29 Steering Column Assembly RemovedFrom Bracket

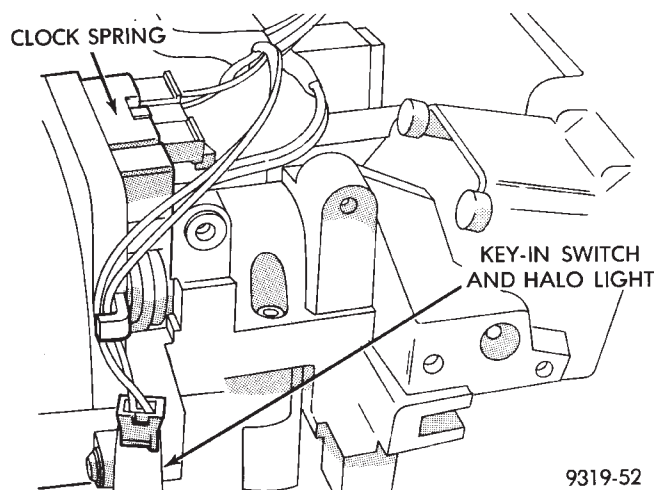


Fig. 30 Halo Light And Clock Spring WiringConnections

REMOVAL AND INSTALLATION (Continued)

INSTALL

(1) Ensure ground clip is installed on left capsule slot of the steering column upper mounting bracket. The plastic capsules should be pre-assembled in the bracket slots prior to installing steering column.

(2) Position steering column assembly on floor of vehicle. Install wiring harness trough on steering column. **Note: Yellow (paint marked) connector mates to air bag clock spring connector.** Connect vehicle wiring harness connectors to turn signal/multi function switch, ignition switch, halo light and clock spring (Fig. 29) and (Fig. 30). **Be sure to route wiring through clips on multi function switch and on side of clock spring. Be sure wiring is taut and free of interference with column shifter assembly actuator in low gear.**

(3) Install steering column assembly back on mounting bracket, by first sliding lower steering column bracket onto bolts in mounting bracket (Fig. 31). **Do not tighten mounting bolts at this time.**

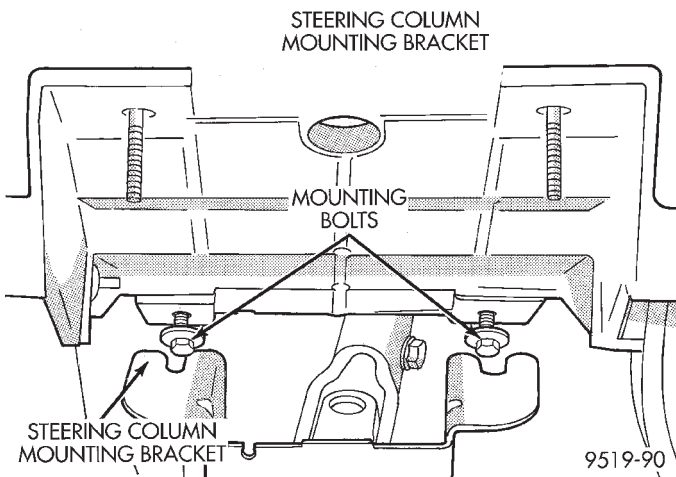


Fig. 31 Installation Of Steering Column On Bracket

(4) Raise steering column, until upper steering column bracket, is installed on studs in steering column mounting bracket (Fig. 28). Install but do not tighten the 2 nuts attaching the steering column assembly to the mounting bracket.

(5) Position steering column, so lower steering column mounting bracket is resting against the 2 lower steering column mounting bolts. This will determine for-and-aft position of steering column in vehicle. Temporarily install upper and lower steering column shrouds and the center instrument panel outlet bezel. Visually center steering column shrouds in instrument panel opening with steering column tilted full up. When centered, tighten upper and lower steering column assembly fasteners to hold the steering column in place. Then again remove the upper and lower steering column shrouds and the center instrument panel bezel.

(6) **Be sure both breakaway capsules are fully seated in the slots of the steering column upper support bracket. Then tighten the 2 upper steering column assembly to support bracket nuts and the 2 lower steering column assembly to mounting bracket bolts to a torque of 12 N·m (105 in. lbs.).**

(7) Install the steering column coupler onto the intermediate shaft (Fig. 26). Install coupler bolt (Fig. 26) into steering coupler and torque bolt to 28 N·m (21 ft. lbs.). **Be sure to install coupler retaining pin into coupler bolt (Fig. 26).**

CAUTION: When ignition key is turned to the run position, do not rotate steering column shaft. If steering shaft is turned, damage to the clock spring will occur.

(8) If vehicle is equipped with a floor shifter, turn ignition key to the run position and install the shift interlock cable into steering column socket (Fig. 32). Be sure locking tab on interlock cable (Fig. 32) is fully engaged with steering column socket.

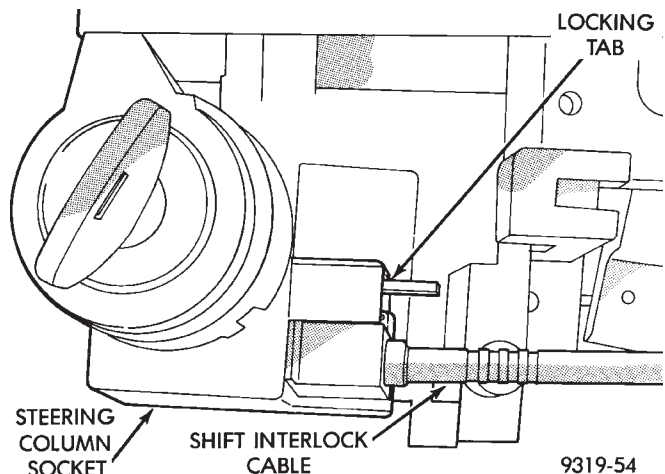


Fig. 32 Shift Interlock Cable Installed

(9) **If vehicle being serviced is equipped with a column shifter. A new interlock cassette must always be installed in the replacement steering column at the time of installation.** Refer to the Ignition Switch And Interlock Section of Group 8 for the required interlock cassette installation and adjustment procedures.

(10) If vehicle is equipped with a column shifter. Correctly route shift cable to cable support bracket and install attaching clip. When installing clip, be sure clip is fully seated and cable support bracket does not get bent. Verify clearance to steering column jacket by tilting steering column. Then install shift cable on shift mechanism. Refer to the Ignition Switch And Interlock Section of Group 8 for the

REMOVAL AND INSTALLATION (Continued)

required operational check and adjustment of the interlock system.

(11) Install lower steering column assembly shroud (Fig. 22) on steering column. Install and securely tighten the 3 screws attaching lower shroud to steering column. Install tilt lever (Fig. 22) on steering column and securely tighten tilt lever attaching screw. **Be carefull not to cross thread the tilt lever attaching screw.**

(12) Tilt steering column to the full down position. Then install upper steering column shroud on steering column.

(13) Install and securely tighten the 3 screws (Fig. 21) attaching the upper shroud to the lower shroud.

(14) Install the 2 under steering column heat and A/C ducts (Fig. 20).

(15) Install lower knee bolster panel back in the interior of the vehicle. Feed wiring for radio, A/C control, cigar lighter and ash receiver through center hole of bolster panel.

(16) Install wiring harness connectors back on trunk release switch and glove box light (Fig. 19).

(17) Install lower knee bolster panel onto upper instrument panel. Ensure the 3 tabs on the knee bolster panel are installed into the 3 mating slots in the upper instrument panel.

(18) Install **but do not tighten**, the 6 bolts (3 each side) attaching lower knee bolster panel to cowl panel (Fig. 18). **Bolts should be tight enough to correctly position knee bolster, but still allow for movement to align remaining attaching holes.**

(19) Install and securely tighten the 6 screws inside the glove box (Fig. 17), attaching the lower knee bolster panel to the cowl.

(20) Install and securely tighten the 2 nuts at rear of ash receiver, attaching the lower knee bolster panel to the floor pan support bracket (Fig. 16).

(21) Install the screw (Fig. 15) attaching the center of the lower knee bolster to the upper instrument panel.

(22) Securely tighten the 6 bolts (Fig. 18) attaching lower knee bolster panel to vehicle cowl panel.

(23) Connect vehicle wiring to the ash receiver light and the cigar lighter.

(24) Install the center upper air outlet bezel, back on the upper instrument panel. If vehicle is equipped with traction control, connect wiring harness connector onto the traction control switch (Fig. 14).

(25) Install the radio and the heater A/C control, in the lower knee bolster. Then install and securely tighten the 5 screws (Fig. 13) attaching the radio and the heater A/C control to the knee bolster.

(26) Install bezel (Fig. 12) surrounding the radio and the A/C heater control.

(27) Install ash receiver (Fig. 11).

(28) Install the left and right lower cowl area trim panels (Fig. 10). Then install and securely tighten all fasteners attaching trim panels to cowl.

CAUTION: Do not hammer on steering wheel or steering column shaft during the installation of the steering wheel. Use steering wheel retaining nut to install steering wheel on steering column shaft.

(29) Align master splines on steering wheel and steering column shaft. Then install steering wheel on steering column shaft routing wiring through steering wheel as shown in (Fig. 33). Install steering wheel to steering column retaining nut, tighten nut to draw steering wheel onto steering column shaft. Then tighten the steering wheel to steering column retaining nut to a torque of 61 N·m (45 ft. lbs).

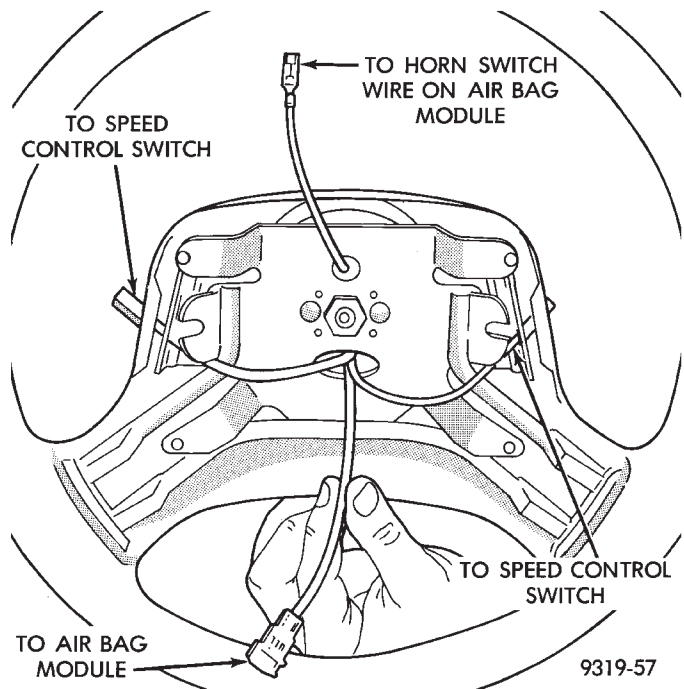


Fig. 33 Wire Routing Through Steering Wheel

(30) Connect the vehicle wiring harness connectors to the air bag module (Fig. 5).

(31) Install air bag module into steering wheel, being sure no wiring is pinched. Then loosely install the 2 air bag module to steering wheel attaching bolts (Fig. 4). Center air bag module to steering wheel spokes and tighten bolts to hold air bag module in place. Then tighten both air bag module attaching bolts to a torque of 10 N·m (8 ft. lbs.).

(32) Connect speed control switches to vehicle wiring harness. Install speed control switches into steering wheel and install and securely tighten screws attaching each speed control switch to steering

REMOVAL AND INSTALLATION (Continued)

wheel. If vehicle is not equipped with speed control install the 2 speed control switch covers.

(33) Install the 2 air bag fuses back in junction block. Refer to (Fig. 9) for proper fuse locations.

(34) Install instrument panel left and right end covers (Fig. 8).

(35) Connect the negative (ground) cable onto the negative post of the battery.

(36) Check operation of all steering column operated components for their correct function. Then road test vehicle to ensure proper operation of steering column and speed control.

GEARSHIFT LEVER ASSEMBLY

The gear shift lever assembly (if equipped) is a replaceable component of the steering column assembly.

The steering column assembly does not require removal from the vehicle to allow replacement of the shifter assembly.

REMOVE

(1) Remove the tilt lever and the upper and lower steering column shrouds from steering column assembly (Fig. 34). Then remove center outlet bezel.

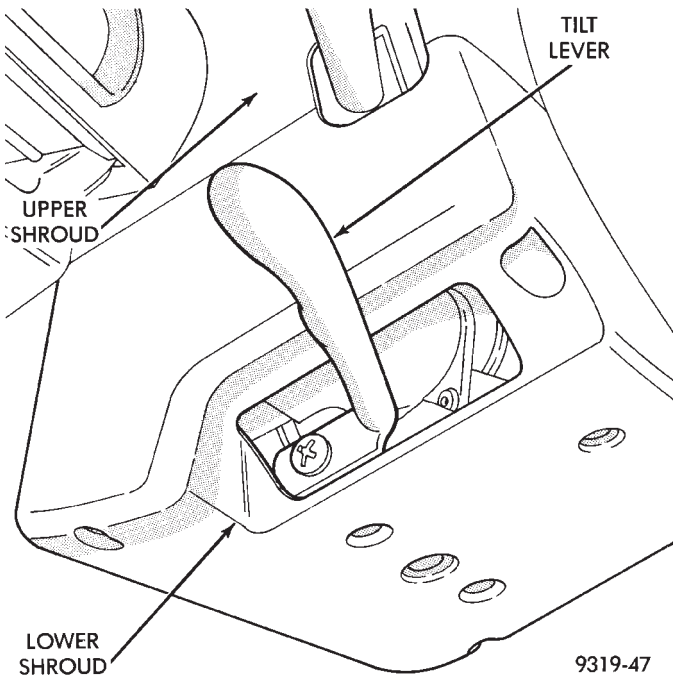
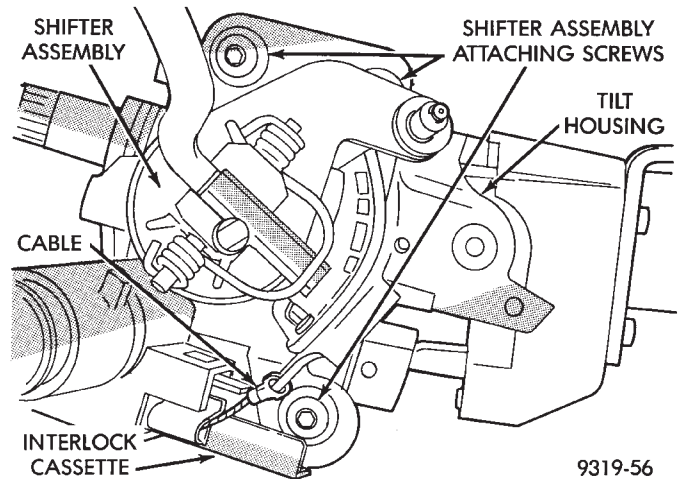


Fig. 34 Tilt Lever And Upper And Lower Shrouds

(2) Remove the gear shift cable from the attaching pin on the gear shift assembly.

(3) Unlock shift cable adjuster.

(4) Remove the 3 Torx head screws attaching the shifter assembly to the steering wheel tilt housing (Fig. 35). Then remove shifter assembly from tilt housing and unhook interlock cable from shifter assembly (Fig. 35).



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Fig. 35 Shifter Assembly Attachment To Tilt Housing

(5) Remove the interlock cassette from the steering column and discard. **A new interlock cassette must be installed when a new shifter assembly is installed.**

INSTALL

(1) Install new shifter assembly on tilt housing of steering column. Install and securely tighten the 3 Torx head screws attaching shifter assembly to tilt housing.

(2) Install cable from the **NEW** interlock cassette, onto the interlock lever of the shifter assembly (Fig. 35).

(3) With shifter assembly in the park position and ignition key extracted from ignition switch. Install the new **NEW** interlock cassette into steering column. Be sure interlock cassette locking tab is securely latched.

(4) Install the gear shift cable onto the cable attaching pin on shifter assembly.

(5) Adjust interlock cassette. Refer to the Ignition Switch And Interlock Section of Group 8 for the required operation check and adjustment procedure of the interlock system.

(6) Lock the gear shift cable adjuster.

(7) Install upper and lower shroud on steering column assembly and tilt lever (Fig. 34).

STEERING COLUMN SHAFT FLEX COUPLER

If diagnosed to be defective, the steering column coupler assembly (Fig. 3) can be serviced as a separate component of the steering column. Thus not requiring replacement of the entire steering column assembly.

The steering column assembly will need to be removed from the vehicle to replacement the steering column coupler assembly.

REMOVAL AND INSTALLATION (Continued)

REMOVE

(1) Remove the steering column assembly from the vehicle. Refer to the Steering Column Removal Section in this group of the service manual for the required removal procedure.

CAUTION: Steering column shaft must be supported during removal of spring pin (Fig. 36). This is required to prevent damage to the steering column bearings.

(2) Remove the steering column shaft flex coupler from steering shaft (Fig. 36) by removing the spring pin from the coupler and sliding coupler off end of shaft.

INSTALL

CAUTION: Steering column shaft must be supported during installation of the coupler spring pin (Fig. 36). This is required to prevent damage to the steering column bearings.

(1) Install steering coupler on steering shaft until correctly positioned to allow spring pin to be installed in coupler. Then install spring pin into coupler, until flush with surface of steering coupler (Fig. 36).

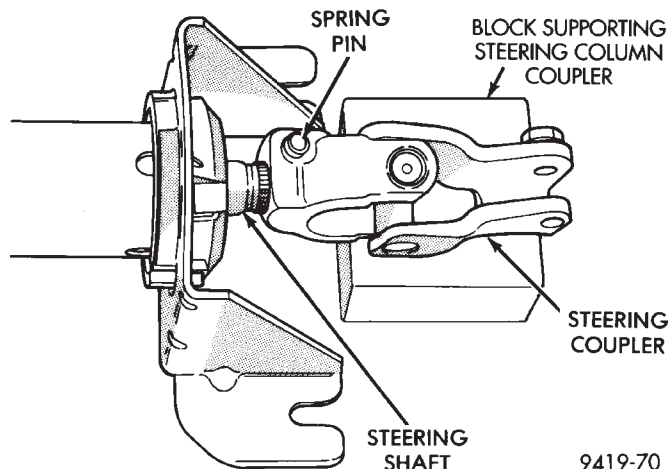


Fig. 36 Coupler Removal And Installation on Steering Column Shaft

SPECIFICATIONS

STEERING COLUMN FASTENER TORQUE SPECIFICATIONS

DESCRIPTION	TORQUE
STEERING WHEEL:	
Retaining Nut	61 N·m (45 ft. lbs.)
STEERING COLUMN ASSEMBLY:	
Attaching Nuts	12 N·m (105 in. lbs.)
Attaching Bolts	12 N·m (105 in. lbs.)
Flex Coupler Pinch Bolt	27 N·m (240 in. lbs.)
Airbag Module Attaching Nuts	10 N·m (8 ft. lbs.)