

STEERING

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POWER STEERING

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DESCRIPTION AND OPERATION

STEERING SYSTEM

DESCRIPTION

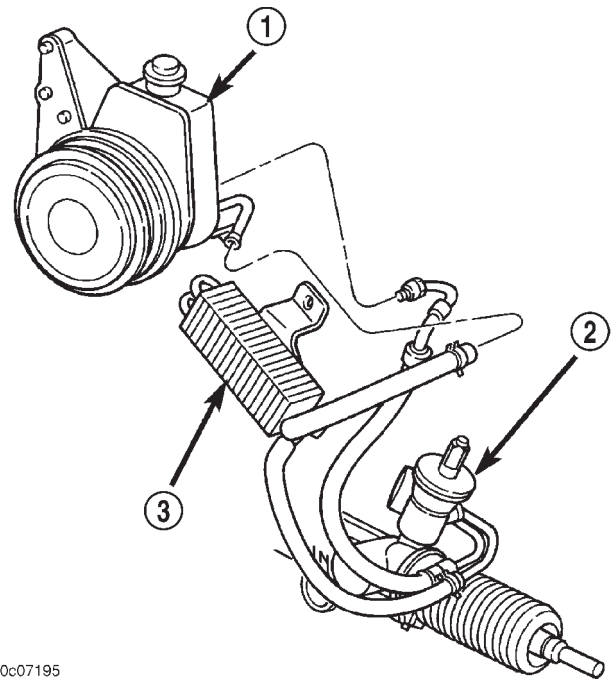
Power steering systems consist of:

- Steering column
- Rack and pinion steering gear
- Belt driven hydraulic steering pump
- Pump pressure and return hoses
- Oil Cooler

OPERATION

The steering column shaft is attached to the gear pinion. The rotation of the pinion moves the gear rack from side-to-side. This lateral action of the rack pushes and pulls the tie rods to change the direction of the front wheels.

Power assist is provided by an engine mounted hydraulic pump, (Fig. 1) and (Fig. 2) the pump supplies hydraulic fluid pressure to the steering gear. Some vehicles are equipped with an oil cooler.

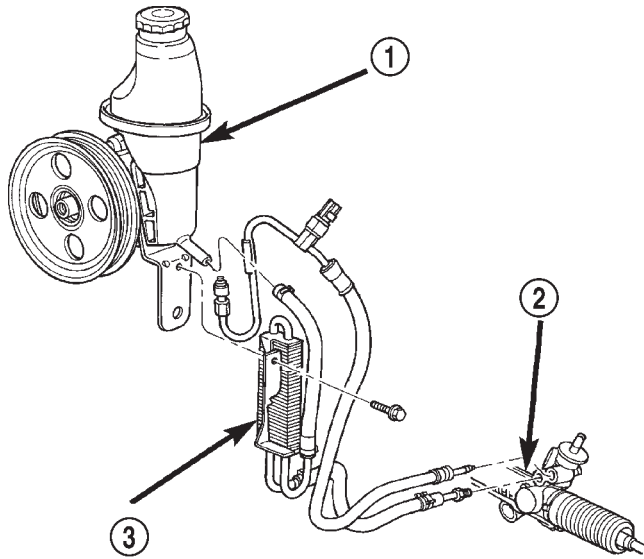


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Fig. 1 Steering Pump, Gear And Oil Cooler - 5.2L & 5.9L

- 1 - HYDRAULIC PUMP
- 2 - RACK AND PINION GEAR
- 3 - OIL COOLER

DESCRIPTION AND OPERATION (Continued)



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Fig. 2 Steering Pump, Gear And Oil Cooler - 4.7L

- 1 - HYDRAULIC PUMP
- 2 - RACK AND PINION GEAR
- 3 - OIL COOLER

DIAGNOSIS AND TESTING

POWER STEERING SYSTEM

STEERING NOISE

There is some noise in all power steering systems. One of the most common is a hissing sound evident at a standstill parking. Or when the steering wheel is at the end of it's travel. Hiss is a high frequency noise similar to that of a water tap being closed slowly. The noise is present in all valves that have a high velocity fluid passing through an orifice. There is no relationship between this noise and steering performance.

CONDITION	POSSIBLE CAUSES	CORRECTION
OBJECTIONAL HISS OR WHISTLE	<ol style="list-style-type: none"> 1. Steering intermediate shaft to dash panel seal. 2. Noisy valve in power steering gear. 	<ol style="list-style-type: none"> 1. Check and repair seal at dash panel. 2. Replace steering gear.
RATTLE OR CLUNK	<ol style="list-style-type: none"> 1. Gear mounting bolts loose. 2. Loose or damaged suspension components. 3. Internal gear noise. 4. Pressure hose in contact with other components. 5. Loose or damaged intermediate shaft or column. 	<ol style="list-style-type: none"> 1. Tighten bolts to specification. 2. Inspect and repair suspension. 3. Replace steering gear. 4. Reposition hose. 5. Inspect and repair or replace.
CHIRP OR SQUEAL	<ol style="list-style-type: none"> 1. Loose belt. 	<ol style="list-style-type: none"> 1. Adjust or replace.

DIAGNOSIS AND TESTING (Continued)

CONDITION	POSSIBLE CAUSES	CORRECTION
WHINE OR GROWL	<ol style="list-style-type: none"> 1. Low fluid level. 2. Pressure hose in contact with other components. 3. Internal pump noise. 	<ol style="list-style-type: none"> 1. Fill to proper level. 2. Reposition hose. 3. Replace pump.
SUCKING AIR SOUND	<ol style="list-style-type: none"> 1. Loose return line clamp. 2. O-ring missing or damaged on hose fitting. 3. Low fluid level. 4. Air leak between pump and reservoir. 5. Reservoir cap not installed correctly. 	<ol style="list-style-type: none"> 1. Replace clamp. 2. Replace o-ring. 3. Fill to proper level. 4. Repair as necessary. 5. Install reservoir cap correctly.
SCRUBBING OR KNOCKING	<ol style="list-style-type: none"> 1. Wrong tire size. 2. Wrong gear. 	<ol style="list-style-type: none"> 1. Verify tire size. 2. Verify gear.

BINDING AND STICKING

CONDITION	POSSIBLE CAUSE	CORRECTION
DIFFICULT TO TURN WHEEL STICKS OR BINDS	<ol style="list-style-type: none"> 1. Low fluid level. 2. Tire pressure. 3. Steering components (ball joints/tie rod ends). 4. Loose belt. 5. Low pump pressure. 6. Column shaft coupler binding. 7. Steering gear worn. 	<ol style="list-style-type: none"> 1. Fill to proper level. 2. Adjust tire pressure. 3. Inspect and repair as necessary. 4. Adjust or replace. 5. Pressure test and replace if necessary. 6. Replace coupler. 7. Replace gear.

INSUFFICIENT ASST. OR POOR RETURN TO CENTER

CONDITION	POSSIBLE CAUSE	CORRECTION
HARD TURNING OR MOMENTARY INCREASE IN TURNING EFFORT	<ol style="list-style-type: none"> 1. Tire pressure. 2. Low fluid level. 3. Loose belt. 4. Low pump pressure. 5. Internal gear leak. 	<ol style="list-style-type: none"> 1. Adjust tire pressure. 2. Fill to proper level. 3. Adjust or replace. 4. Pressure test and repair as necessary. 5. Replace gear.
STEERING WHEEL DOES NOT WANT TO RETURN TO CENTER POSITION	<ol style="list-style-type: none"> 1. Tire pressure. 2. Wheel alignment. 3. Lack of lubrication. 4. High friction in steering gear. 	<ol style="list-style-type: none"> 1. Adjust tire pressure. 2. Align front end. 3. Inspect and lubricate suspension compnents. 4. Replace gear.

DIAGNOSIS AND TESTING (Continued)

LOOSE STEERING AND VEHICLE LEAD

CONDITION	POSSIBLE CAUSE	CORRECTION
EXCESSIVE PLAY IN STEERING WHEEL	<ol style="list-style-type: none"> 1. Worn or loose suspension or steering components. 2. Worn or loose wheel bearings. 3. Steering gear mounting. 4. Gear out of adjustment. 5. Worn or loose steering coupler. 	<ol style="list-style-type: none"> 1. Inspect and repair as necessary. 2. Inspect and repair or adjust bearings. 3. Tighten gear mounting bolts to specification. 4. Replace gear. 5. Inspect and replace as necessary.
VEHICLE PULLS OR LEADS TO ONE SIDE.	<ol style="list-style-type: none"> 1. Tire Pressure. 2. Radial tire lead. 3. Brakes dragging. 4. Wheel alignment. 	<ol style="list-style-type: none"> 1. Adjust tire pressure. 2. Rotate tires. 3. Repair as necessary. 4. Align front end.

POWER STEERING FLOW AND PRESSURE

The following procedure is used to test the operation of the power steering system on the vehicle. This test will provide the gallons per minute (GPM) or flow rate of the power steering pump along with the maximum relief pressure. Perform test any time a power steering system problem is present. This test will determine if the power steering pump or power steering gear is not functioning properly. The following pressure and flow test is performed using Power Steering Analyzer Tool kit 6815 (Fig. 3) and (Fig. 4) Adapter Kit 6893.

FLOW AND PRESSURE TEST

- (1) Check the power steering belt to ensure it is in good condition and adjusted properly.
- (2) Connect pressure gauge hose from the Power Steering Analyzer to Tube 6844.
- (3) Connect Adapter 6826 to Power Steering Analyzer test valve end.
- (4) Disconnect the high pressure hose from the power steering pump.
- (5) Connect the tube to the pump hose fitting.
- (6) Connect the power steering hose from the steering gear to the adapter.
- (7) Open the test valve completely.
- (8) Start engine and let idle long enough to circulate power steering fluid through flow/pressure test gauge and to get air out of the fluid. Then shut off engine.
- (9) Check fluid level, add fluid as necessary. Start engine again and let idle.

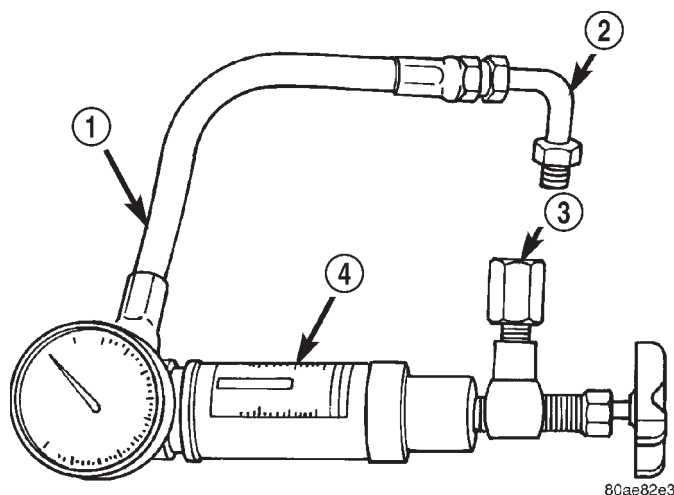


Fig. 3 Analyzer With Tube and Adapter For 5.2L & 5.9L

- 1 - GAUGE HOSE
- 2 - TUBE
- 3 - ADAPTER FITTINGS
- 4 - ANALYZER

(10) Gauge should read below 862 kPa (125 psi), if above, inspect the hoses for restrictions and repair as necessary. The initial pressure reading should be in the range of 345-552 kPa (50-80 psi).

(11) Increase the engine speed to 1500 RPM and read the flow meter. If the flow rate (GPM) is below specification, (refer to pump specification chart for GPM) the pump should be replaced.

DIAGNOSIS AND TESTING (Continued)

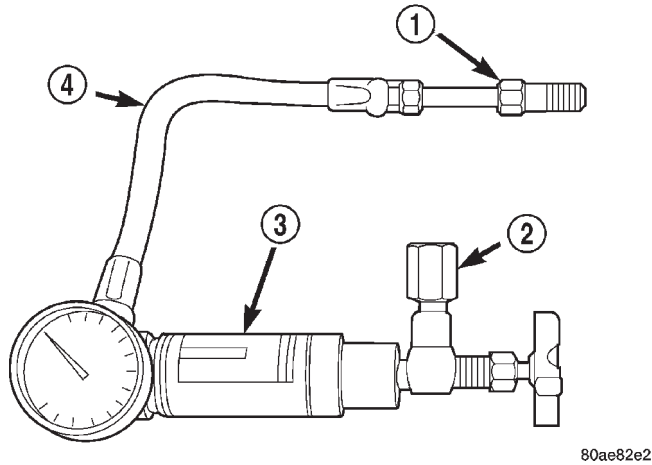


Fig. 4 Analyzer With Tube and Adapter For 4.7L

- 1 - TUBE
- 2 - ADAPTER FITTINGS
- 3 - ANALYZER
- 4 - GAUGE HOSE

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

(12) 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.**

- 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.

(13) Open the test valve and turn the steering wheel to the extreme left and right positions three times against the stops. Record the highest pressure reading at each position. Compare readings to the pump specifications chart. If pressures readings are not within 50 psi of each other, the gear is leaking internally and must be replaced.

CAUTION: Do not force the pump to operate against the stops for more than 2 to 3 seconds at a time because, pump damage will result.

PUMP SPECIFICATION

ENGINE	RELIEF PRESSURE ± 50	FLOW RATE (GPM) AT 1500 RPM
5.2L	10342 kPa (1500 psi)	2.4 - 2.8
4.7L	10342 kPa (1450 psi)	2.4 - 2.8
5.9L	10342 kPa (1500 psi)	2.4 - 2.8

POWER STEERING PUMP

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DESCRIPTION AND OPERATION

POWER STEERING PUMP

DESCRIPTION

The pump is connected to the steering gear via the pressure hose and the return hose. The pump shaft has a pressed-on pulley that is belt driven by the crankshaft pulley.

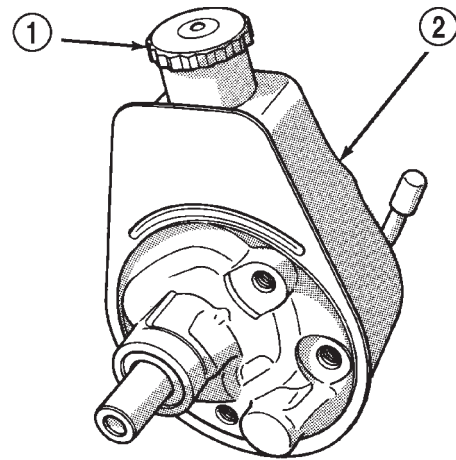
Trailer tow option vehicles are equipped with a power steering pump oil cooler. On the 5.2L and 5.9L the oil cooler is mounted to the engine block. On the 4.7L the oil cooler is mounted to the power steering pump.

NOTE: Power steering pumps are not interchangeable with pumps installed on other vehicles.

OPERATION

Hydraulic pressure is provided for the power steering gear by the belt driven power steering pump (Fig. 1) and (Fig. 2). The power steering pumps are con-

stant flow rate and displacement, vane-type pumps.



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Fig. 1 Power Steering Pump - 5.2L & 5.9L

- 1 - RESERVOIR CAP AND DIPSTICK
- 2 - RESERVOIR

DESCRIPTION AND OPERATION (Continued)

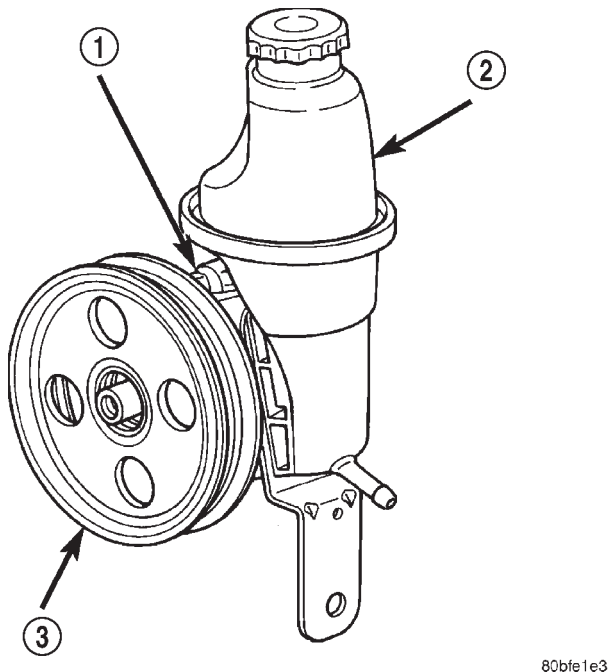


Fig. 2 Power Steering Pump - 4.7L

- 1 - PUMP
- 2 - RESERVOIR
- 3 - PULLEY

DIAGNOSIS AND TESTING

PUMP LEAKAGE

The pump is serviced as an assembly and should not be disassembled. Plastic pump reservoirs can be replaced and the reservoir O-ring.

Check for leaks in the following areas:

- Pump shaft seal behind the pulley
- Pump to reservoir O-ring
- Reservoir cap
- Pressure and return lines
- Flow control valve fitting

SERVICE PROCEDURES

POWER STEERING PUMP - INITIAL OPERATION

WARNING: THE FLUID LEVEL SHOULD BE CHECKED WITH ENGINE OFF TO PREVENT INJURY FROM MOVING COMPONENTS.

CAUTION: Use MOPAR Power Steering Fluid or equivalent. Do not use automatic transmission fluid and do not overfill.

Wipe filler cap clean, then check the fluid level. The dipstick should indicate **COLD** when the fluid is at normal temperature.

- (1) Turn steering wheel all the way to the left
- (2) Fill the pump fluid reservoir to the proper level and let the fluid settle for at least two (2) minutes.
- (3) Raise the front wheels off the ground.
- (4) Slowly turn the steering wheel lock-to-lock 20 times with the engine off while checking the fluid level.

NOTE: Vehicles with long return lines or oil coolers turn wheel 40 times.

(5) Start the engine. With the engine idling maintain the fluid level.

(6) Lower the front wheels and let the engine idle for two minutes.

(7) Turn the steering wheel in both direction and verify power assist and quiet operation of the pump.

If the fluid is extremely foamy or milky looking, allow the vehicle to stand a few minutes and repeat the procedure.

CAUTION: Do not run a vehicle with foamy fluid for an extended period. This may cause pump damage.

REMOVAL AND INSTALLATION

POWER STEERING PUMP - 5.2L & 5.9L

REMOVAL

(1) Remove the serpentine drive belt, refer to Group 7 Cooling.

(2) Clamp the fluid return hose and disconnect the hoses from the power steering pump. Cap the fittings.

(3) Remove battery ground cable and bracket bolts.

(4) Remove the pump assembly (Fig. 3).

(5) Remove the pump pulley, refer to Pump Pulley Removal. This will allow access to the pump attaching screws.

(6) Remove the pump bracket bolts (Fig. 4) and remove the bracket.

INSTALLATION

(1) Install the bracket on the pump and tighten bolts to 41 N·m (30 ft. lbs.).

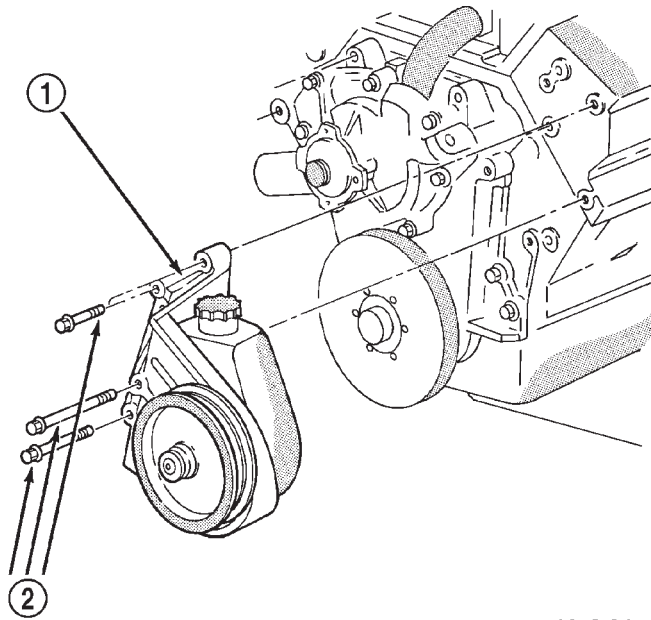
(2) Install the pump pulley, refer to Pump Pulley Installation.

(3) Install pump assembly on the engine block and tighten the bolts to 41 N·m (30 ft. lbs.).

(4) Install the battery ground wire and tighten nut to 41 N·m (30 ft. lbs.).

(5) Connect the fluid hoses to the pump.

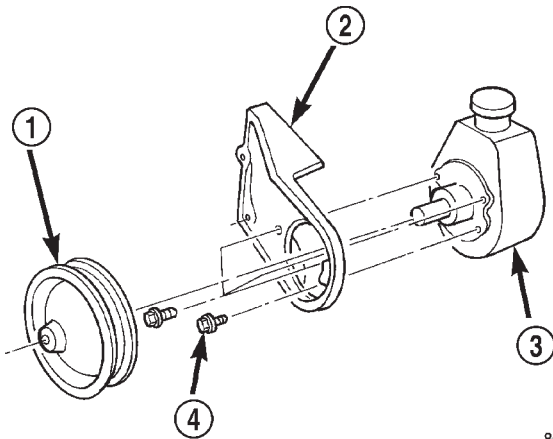
REMOVAL AND INSTALLATION (Continued)



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Fig. 3 Pump Assembly

- 1 - PUMP ASSEMBLY
2 - BOLTS



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Fig. 4 Pump Mounting Bracket

- 1 - PULLEY
2 - PUMP BRACKET
3 - STEERING PUMP
4 - BOLT

(6) Install the serpentine drive belt refer to Group 7 Cooling.

(7) Fill the reservoir with power steering fluid, refer to Power Steering Pump Initial-Operation.

POWER STEERING PUMP - 4.7L**REMOVAL**

(1) Remove the serpentine drive belt, refer to Group 7 Cooling.

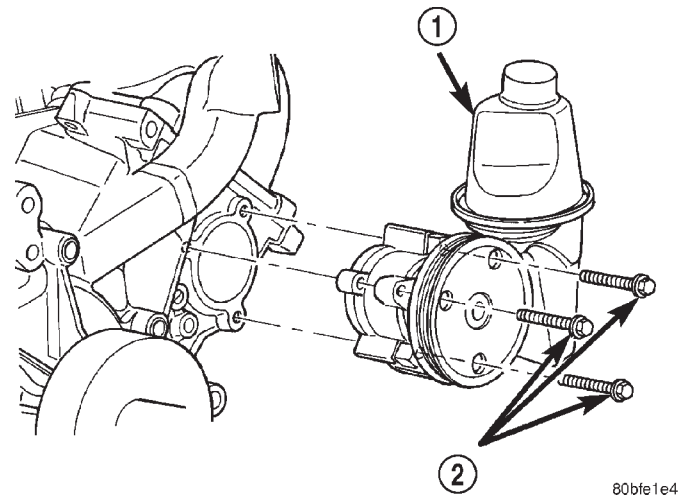
(2) Remove return hose from the pump reservoir and drain the pump.

(3) Remove power steering pressure switch connector and remove pressure line from the bottom of the pump.

(4) Remove the oil cooler mounting bolt from the pump bracket if equipped.

(5) Remove 3 pump mounting bolts (Fig. 5) through pulley access holes.

(6) Remove the pump from the left cylinder head.



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Fig. 5 Power Steering Pump - 4.7L

- 1 - PUMP
2 - MOUNTING BOLTS

INSTALLATION

(1) Align the pump with the mounting holes in the left cylinder head.

(2) Install 3 pump mounting bolts through the pulley access holes. Tighten the bolts to 28 N·m (21 ft. lbs.).

(3) Install the oil cooler to the pump bracket if equipped. Install the oil cooler mounting bolt.

(4) Install the pressure line and return hose to the pump. Tighten the pressure line to 35 N·m (25 ft. lbs.).

(5) Install power steering pressure switch connector.

(6) Install the serpentine drive belt, refer to Group 7 Cooling.

(7) Fill the power steering pump and perform Power Steering Pump Initial Operation.

DISASSEMBLY AND ASSEMBLY

PUMP PULLEY

DISASSEMBLY

- (1) Remove pump assembly.
- (2) Remove pulley from pump with Puller C-4333 (Fig. 6).

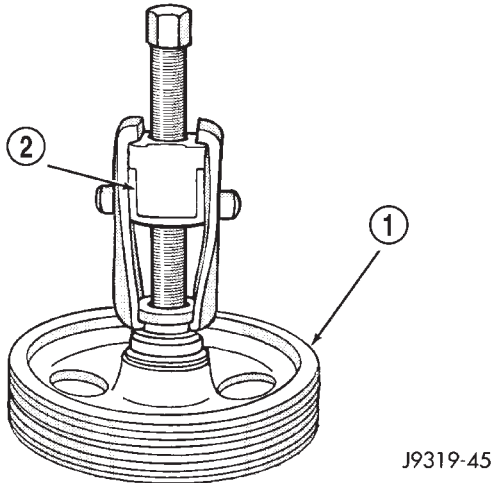


Fig. 6 Pulley Removal

- 1 - POWER STEERING PUMP DRIVE PULLEY
- 2 - SPECIAL TOOL C-4333

ASSEMBLY

- (1) Replace pulley if bent, cracked, or loose.
- (2) Install pulley on pump with Installer C-4063-B (Fig. 7) flush with the end of the shaft. Ensure the tool and pulley remain aligned with the pump shaft.

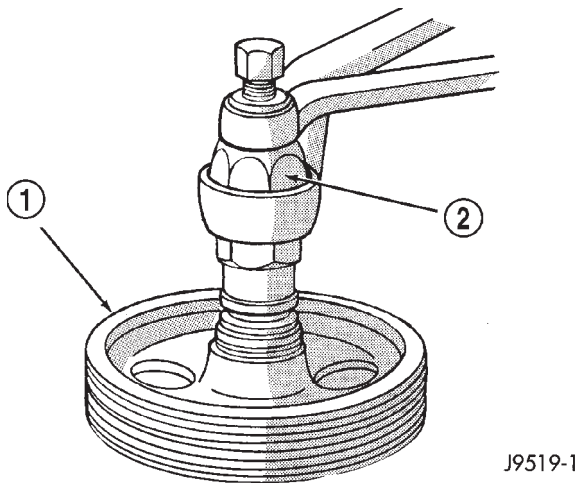


Fig. 7 Pulley Installation

- 1 - POWER STEERING PUMP DRIVE PULLEY
- 2 - SPECIAL TOOL C-4063-B

- (3) Install pump assembly.
- (4) With Serpentine Belts; Run engine until warm (5 min.) and note any belt chirp. If chirp exists, move pulley outward approximately 0.5 mm (0.020 in.). If noise increases, press on 1.0 mm (0.040 in.). **Be careful that pulley does not contact mounting bolts.**

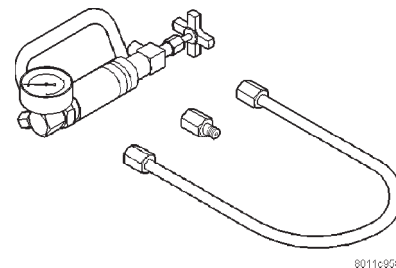
SPECIFICATIONS

TORQUE CHART

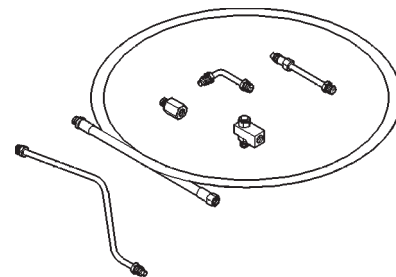
DESCRIPTION	TORQUE
5.2L/5.9L Power Steering Pump	
Pump Bracket Bolts	41 N·m (30 ft. lbs.)
Pump Mounting Bolts	41 N·m (30 ft. lbs.)
Flow Control Valve	75 N·m (55 ft. lbs.)
Pressure Line	35 N·m (25 ft. lbs.)
4.7L Power Steering Pump	
Pump Mounting Bolts	28 N·m (21 ft. lbs.)
Flow Control Valve	81 N·m (60 ft. lbs.)
Pressure Line	35 N·m (25 ft. lbs.)

SPECIAL TOOLS

POWER STEERING PUMP

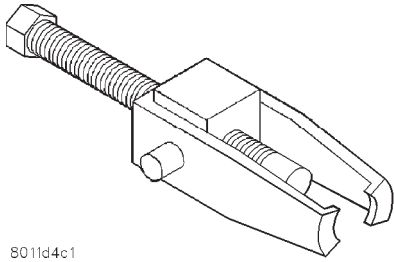


Analyzer Set, Power Steering Flow/Pressure 6815



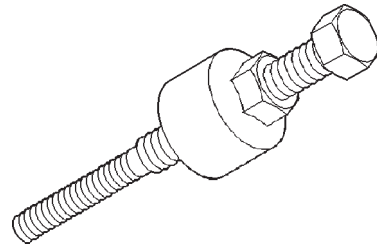
Adapters, Power Steering Flow/Pressure Tester 6893

SPECIAL TOOLS (Continued)



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Puller C-4333



Installer, Power Steering Pulley C-4063-B

RACK & PINION STEERING GEAR

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DESCRIPTION AND OPERATION

RACK & PINION STEERING GEAR

DESCRIPTION

A rack and pinion steering gears (Fig. 1) is made up of two main components, the pinion shaft and the rack. The gear cannot be adjusted or internally serviced. If a malfunction or a fluid leak occurs, the gear must be replaced as an assembly. If a boot seal becomes damaged, the steering gear must be removed to replace the boot seal.

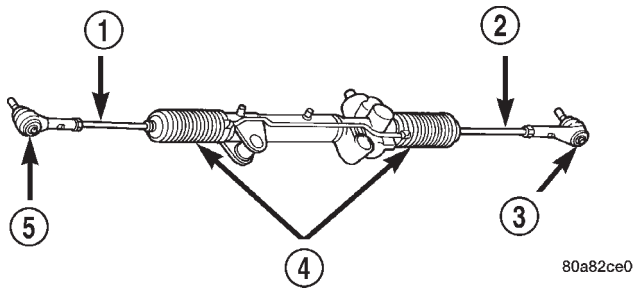


Fig. 1 Rack & Pinion Steering Gear

- 1 - TIE ROD
- 2 - TIE ROD
- 3 - TIE ROD END
- 4 - BOOTS
- 5 - TIE ROD END

OPERATION

The steering column shaft is attached to the gear pinion. The rotation of the pinion moves the gear rack from side-to-side. This lateral action of the rack pushes and pulls the tie rods to change the direction of the front wheels.

REMOVAL AND INSTALLATION

TIE ROD END

REMOVAL

- (1) Raise and support the vehicle.
- (2) Remove the nut from the tie rod end.
- (3) Separate the tie rod end from the steering knuckle with Puller C-3894-A.
- (4) Loosen the jam nut (Fig. 2) and unthread the tie rod end.

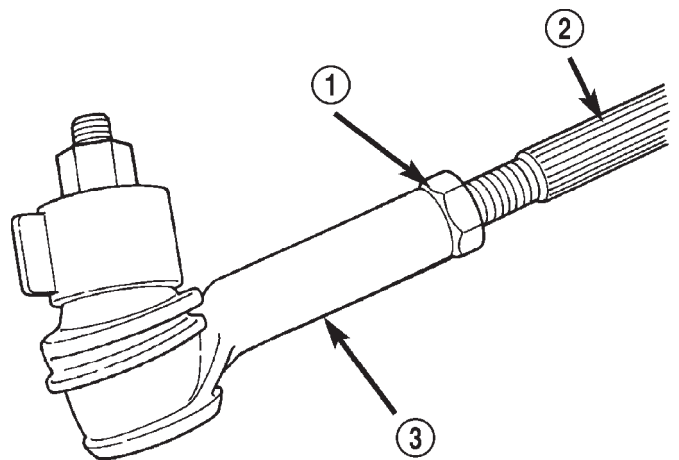


Fig. 2 Tie Rod End

- 1 - JAM NUT
- 2 - TIE ROD
- 3 - TIE ROD END

INSTALLATION

- (1) Thread the tie rod end onto the tie rod.
- (2) Clean the tie rod end stud and knuckle taper.
- (3) Install the tie rod end stud into the steering knuckle and tighten the nut to 108 N·m (80 ft. lbs.).
- (4) Tighten the jam nut to 75 N·m (55 ft. lbs.).

NOTE: Do not twist boot while tighten the jam nut.

REMOVAL AND INSTALLATION (Continued)

(5) Remove support and lower vehicle.

(6) Adjust the wheel toe position, Refer to Group 2 Suspension.

RACK & PINION STEERING GEAR - 4x2

REMOVAL

(1) Raise and support the vehicle.

(2) Remove the nuts from the tie rod ends.

(3) Separate tie rod ends from the knuckles with Puller C-3894-A (Fig. 3).

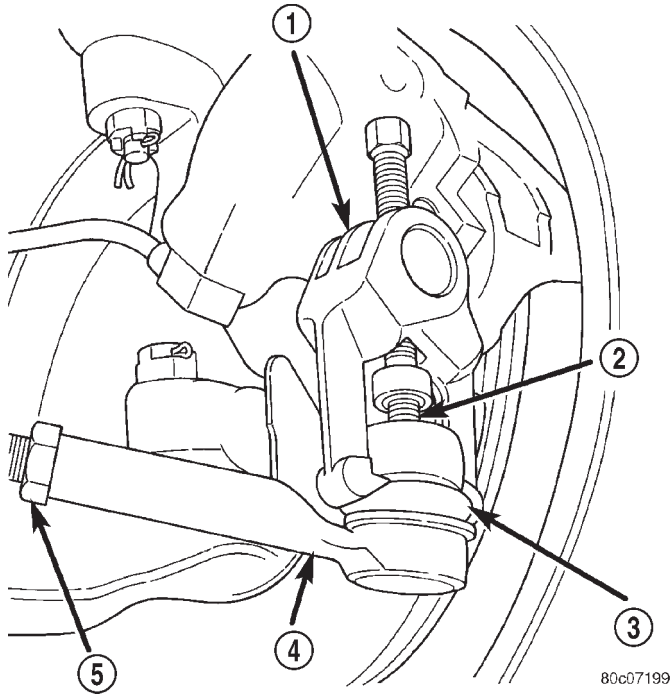


Fig. 3 Tie Rod End Puller

- 1 - TOOL C-3894-A
- 2 - BALL STUD
- 3 - SEAL
- 4 - TIE-ROD END
- 5 - LOCKNUT

(4) Remove the power steering lines from the gear.

(5) Remove the lower coupler bolt and slide the coupler off the gear (Fig. 4).

(6) Remove the mounting bolts from the gear to the front crossmember and remove the gear (Fig. 5).

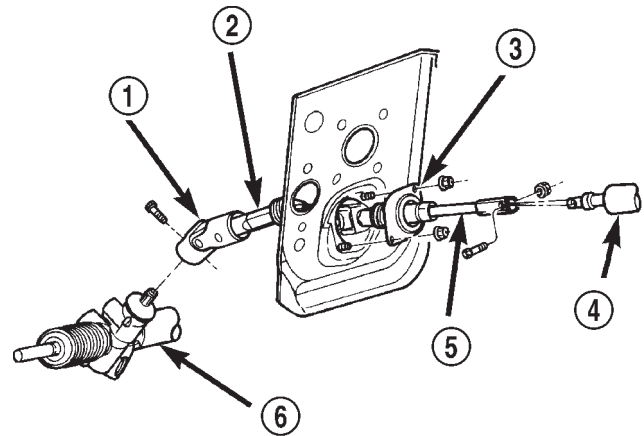
INSTALLATION

NOTE: Before installing gear inspect bushings and replace if worn or damaged.

(1) Install gear on front crossmember and tighten mounting bolts to 258 N·m (190 ft. lbs.).

(2) Slide shaft coupler onto gear. Install **new** bolt and tighten to 49 N·m (36 ft. lbs.).

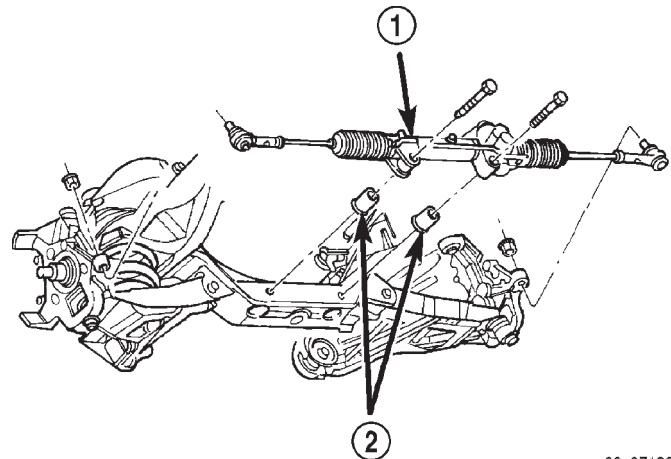
(3) Clean tie rod end studs and knuckle tapers.



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Fig. 4 Gear Coupler

- 1 - COUPLER
- 2 - LOWER SHAFT
- 3 - TOE PLATE
- 4 - STEERING COLUMN
- 5 - UPPER SHAFT
- 6 - RACK AND PINION STEERING GEAR



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Fig. 5 Rack & Pinion Steering Gear - 4x2

- 1 - RACK AND PINION STEERING GEAR
- 2 - BUSHING

(4) Install tie rod ends into the steering knuckles and tighten the nuts to 108 N·m (80 ft. lbs.).

(5) Install power steering lines to steering gear.

(6) Remove support and lower vehicle.

(7) Fill system with fluid and perform Power Steering Pump Initial Operation.

(8) Adjust the toe position. Refer to Group 2 Suspension.

RACK & PINION STEERING GEAR - 4x4

REMOVAL

(1) Raise and support the vehicle.

REMOVAL AND INSTALLATION (Continued)

- (2) Remove the splash shield from under the front end to gain access to the gear.
- (3) Remove the nuts from the tie rod ends.
- (4) Separate tie rod ends from the knuckles with Puller C-3894-A (Fig. 6).

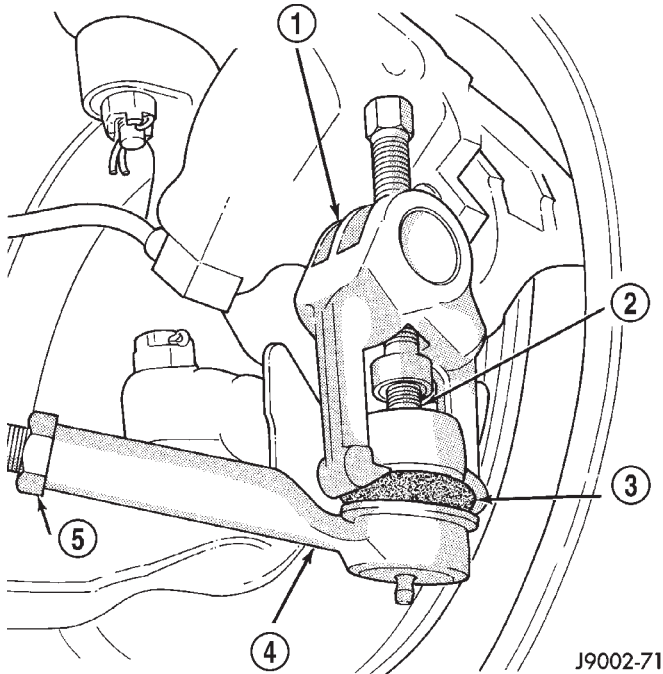


Fig. 6 Tie Rod End Puller

- 1 - TOOL C-3894-A
- 2 - BALL STUD
- 3 - SEAL
- 4 - TIE-ROD END
- 5 - LOCK NUT

- (5) Remove the power steering lines from the gear.
- (6) Remove the lower coupler bolt and slide the coupler off the gear (Fig. 7).
- (7) Remove the mounting bolts (Fig. 8) from the gear to the front crossmember. Slide the gear to the right side of the vehicle. Then tilt the left end of the gear down and remove the gear.

INSTALLATION

NOTE: Before installing gear inspect bushings and replace if worn or damaged.

- (1) Install gear on front crossmember and tighten mounting bolts to 230 N·m (170 ft. lbs.).
- (2) Slide shaft coupler onto gear. Install **new** bolt and tighten to 49 N·m (36 ft. lbs.).
- (3) Clean tie rod end studs and knuckle tapers.

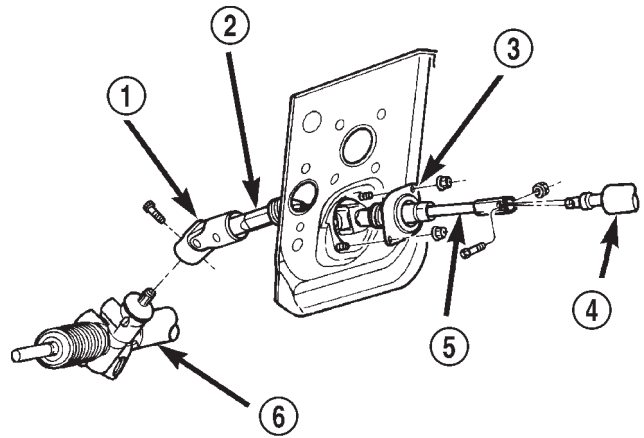


Fig. 7 Gear Coupler

- 1 - COUPLER
- 2 - LOWER SHAFT
- 3 - TOE PLATE
- 4 - STEERING COLUMN
- 5 - UPPER SHAFT
- 6 - RACK AND PINION STEERING GEAR

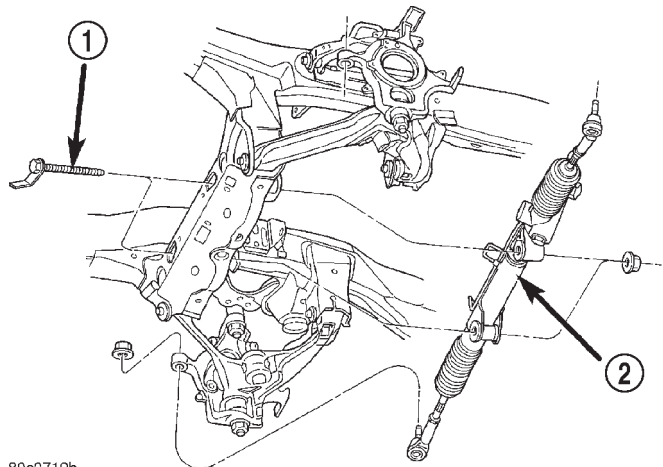


Fig. 8 Rack & Pinion Steering Gear - 4x4

- 1 - MOUNTING BOLT
- 2 - RACK AND PINION STEERING GEAR

- (4) Install tie rod ends into the steering knuckles and tighten the nuts to 88 N·m (65 ft. lbs.).
- (5) Install power steering lines to steering gear.
- (6) Install the splash shield.
- (7) Remove support and lower vehicle.
- (8) Fill system with fluid and perform Power Steering Pump Initial Operation.
- (9) Adjust the toe position. Refer to Group 2 Suspension.

DISASSEMBLY AND ASSEMBLY

BOOT SEAL

REMOVAL

- (1) Remove steering gear.
- (2) Loosen the jam nut then remove the tie rod end and jam nut.
- (3) Remove the outer clamp from the rubber boot (Fig. 9).
- (4) Remove the boot inner clamp.
- (5) On 4x2 vehicles mark the breather tube location on steering gear before removing the rubber boot (Fig. 9).

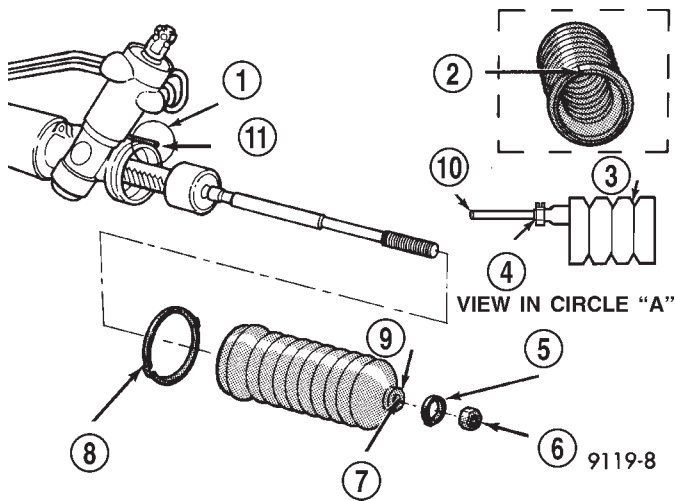


Fig. 9 Boot Seal - 4x2

- 1 - CIRCLE "A"
- 2 - MARK BREATHER TUBE LOCATION
- 3 - BOOT
- 4 - SNORKEL CLAMP
- 5 - BOOT CLAMP (OUTER)
- 6 - JAM NUT
- 7 - USE LUBE HERE
- 8 - BOOT CLAMP (INNER)
- 9 - BOOT SEAL
- 10 - BREATHER TUBE
- 11 - BREATHER TUBE

INSTALLATION

- (1) Lubricate the boot outer groove (tie rod) with silicone type lubricant. Ensure that the boot is not twisted.
- (2) On 4x2 vehicles align the breather tube with the reference mark on the steering gear.
- (3) Position and align the new boot over the housing.
- (4) Install inner clamp on the rubber boot.
- (5) Install the snorkel clamp on 4x2 vehicles.
- (6) Install outer clamp on the inner tie rod.
- (7) Install the jam nut and the tie rod end.
- (8) Install steering gear.

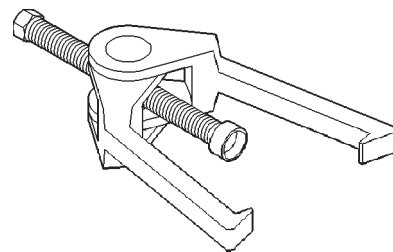
SPECIFICATIONS

TORQUE CHART

DESCRIPTION	TORQUE
Rack and Pinion Steering Gear	
Gear to Frame Bolts	258 N·m (190 ft. lbs.)
Intermediate Shaft Bolt	49 N·m (36 ft. lbs.)
Tie Rod End	
Knuckle Nut	108 N·m (80 ft. lbs.)
Jam Nut	75 N·m (55 ft. lbs.)
Lines	
Pressure Line	35 N·m (25 ft. lbs.)
Return Line	35 N·m (25 ft. lbs.)

SPECIAL TOOLS

RACK & PINION STEERING GEAR



Puller C-3894-A

STEERING COLUMN

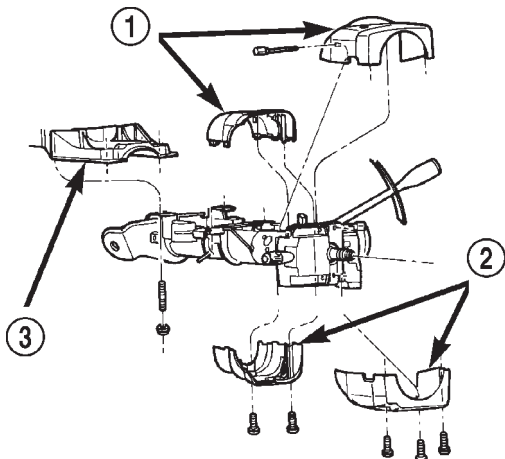
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STEERING COLUMN	16		

DESCRIPTION AND OPERATION

STEERING COLUMN

The tilt and standard column (Fig. 1) has been designed to be serviced as an assembly; less wiring, switches, shrouds, steering wheel, etc. Most steering column components can be serviced without removing the steering column from the vehicle.



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Fig. 1 Steering Column

- 1 - UPPER SHROUD
- 2 - LOWER SHROUD
- 3 - PANEL BRACKET

NEGATIVE (GROUND) CABLE. THEN WAIT TWO MINUTES FOR THE SYSTEM CAPACITOR TO DISCHARGE. FAILURE TO DO SO COULD RESULT IN ACCIDENTAL DEPLOYMENT OF THE AIRBAG AND POSSIBLE PERSONAL INJURY. THE FASTENERS, SCREWS, AND BOLTS, ORIGINALLY USED FOR THE AIRBAG COMPONENTS, HAVE SPECIAL COATINGS AND ARE SPECIFICALLY DESIGNED FOR THE AIRBAG 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.

CAUTION: Do not hammer on steering column shaft or shift tube. This may cause damage to the shaft, shift tube or bearing.

CAUTION: Do not attempt to remove or modify the park lock slider or link.

CAUTION: Do not attempt to remove the pivot pins to disassemble the tilting mechanism. Do not remove shaft lock plate or plate retainer. This will damage the column (Fig. 2) and (Fig. 3).

SERVICE PRECAUTIONS

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

To service the steering wheel, switches or airbag, refer to Group 8M and follow all WARNINGS and CAUTIONS.

WARNING: THE AIRBAG SYSTEM IS A SENSITIVE, COMPLEX ELECTRO-MECHANICAL UNIT. BEFORE ATTEMPTING TO DIAGNOSE, REMOVE OR INSTALL THE AIRBAG SYSTEM COMPONENTS YOU MUST FIRST DISCONNECT AND ISOLATE THE BATTERY

DIAGNOSIS AND TESTING

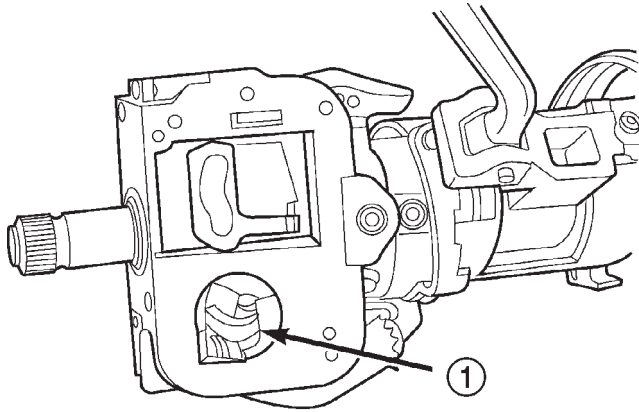
IGNITION SWITCH

TEST AND REPAIR

If the key removal effort is excessive on a vehicle with a automatic transmission first adjust the shift linkage, refer to Group 21 Transmission And Transfer Case for procedure.

If the ignition switch effort is excessive remove the ignition key cylinder from the steering column. Refer

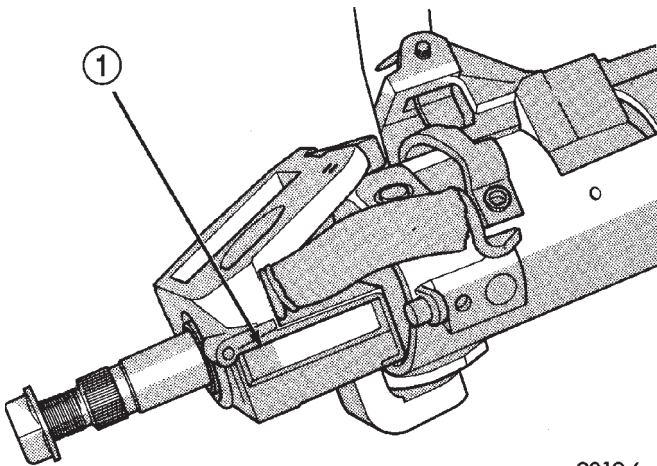
DIAGNOSIS AND TESTING (Continued)



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Fig. 2 Observe Cautions

1 - CAUTION: NEVER REMOVE SHAFT LOCK PLATE



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Fig. 3 Observe Cautions

1 - CAUTION: NEVER REMOVE SHAFT LOCK PLATE RETAINER

to Group 8D Ignition System. Check the turning effort of the key cylinder. If the ignition key cylinder effort is excessive replace the key cylinder. If the ignition key cylinder operates properly look for the following conditions.

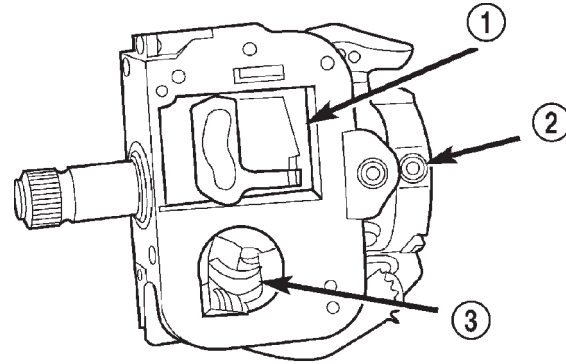
(1) Look for rough areas or flash in the casting and if found remove with a file (Fig. 4).

(2) Grease the lock plate actuator, lock plate, slider and locking link.

REMOVAL AND INSTALLATION

STEERING COLUMN

WARNING: BEFORE SERVICING THE STEERING COLUMN THE AIRBAG SYSTEM MUST BE DISARMED, REFER TO GROUP 8M RESTRAINT SYSTEMS FOR SERVICE PROCEDURES. FAILURE TO



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Fig. 4 Steering Column Flash Removal

1 - FILE THIS AREA TO REMOVE FLASHING AND PROVIDE CLEARANCE TO ELIMINATE BINDING

2 - PARK LOCK SLIDER

3 - CAUTION: NEVER REMOVE SHAFT LOCK PLATE

DO SO MAY RESULT IN ACCIDENTAL DEPLOYMENT OF THE AIRBAG AND POSSIBLE PERSONAL INJURY.

CAUTION: All fasteners must be torqued to specification to ensure proper operation of the steering column.

REMOVAL

- (1) Position front wheels straight ahead.
- (2) Remove the negative (ground) cable from the battery.
- (3) Remove the airbag, refer to Group 8M Restraint Systems.
- (4) Remove the steering wheel with an appropriate puller.

CAUTION: Ensure the puller bolts are fully engaged into the steering wheel and not into the clockspring, before attempting to remove the wheel. Failure to do so may damage the steering wheel/clockspring.

(5) Remove the steering column opening cover and knee blocker, refer to Group 8E Instrument Panel Systems.

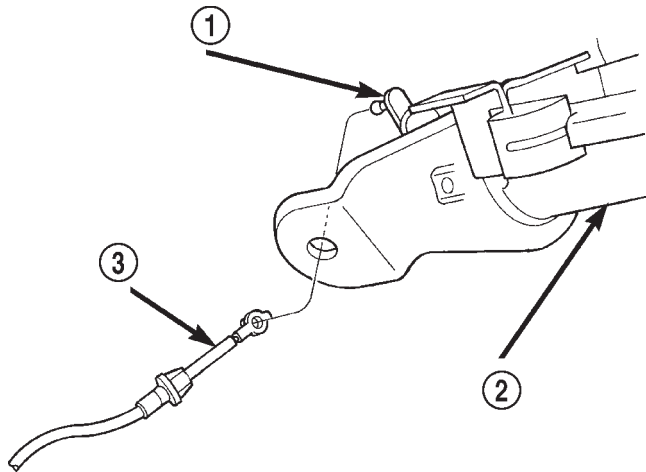
(6) Disconnect shift cable (column shift vehicles). Pry shift cable from the shift lever and remove from cable bracket (Fig. 5).

(7) Remove PRNDL cable (column shift vehicles). Put shift lever in **Park** position. Pull cable and twist to remove from PRNDL lever. Push tab on top of cable retainer, then squeeze sides to remove retainer from the column (Fig. 6).

(8) Remove tilt lever (if equipped) from column.

(9) Remove the lower and upper shrouds (Fig. 7).

REMOVAL AND INSTALLATION (Continued)

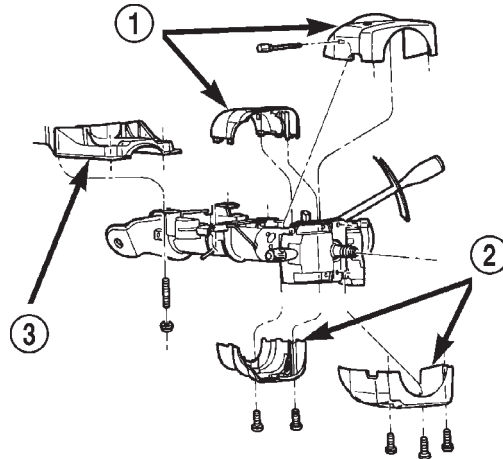


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Fig. 5 Shift Cable

- 1 - SHIFT LEVER
- 2 - STEERING COLUMN
- 3 - SHIFT CABLE

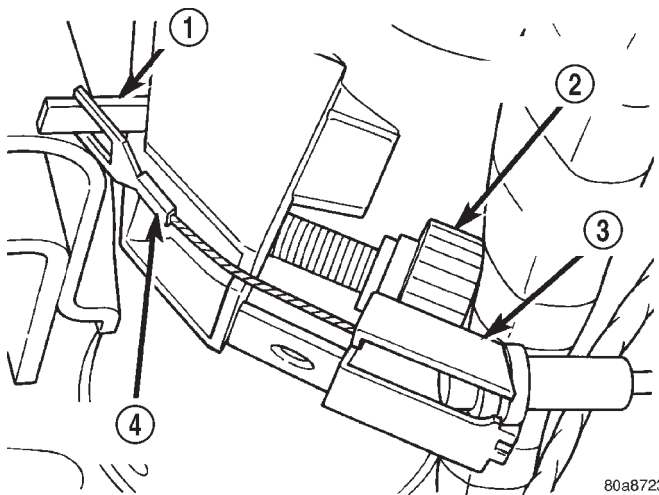
CAUTION: Failure to follow Group 8 Electrical procedure for clockspring removal, may damage the clockspring plastic latches.



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Fig. 7 Column Shrouds

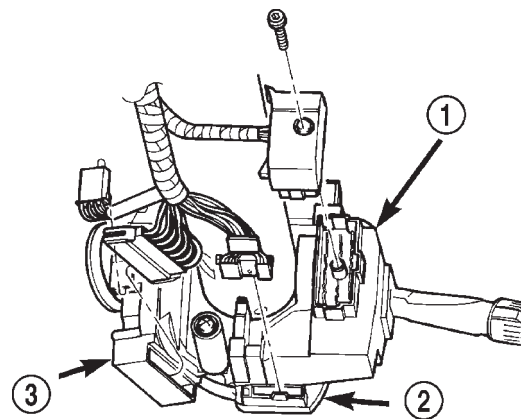
- 1 - UPPER SHROUD
- 2 - LOWER SHROUD
- 3 - PANEL BRACKET



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Fig. 6 PRNDL Drive Cable

- 1 - PRNDL LEVER
- 2 - THUMB SCREW
- 3 - CABLE RETAINER
- 4 - PRNDL CABLE



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Fig. 8 Multi-function Switch & Column Wiring

- 1 - MULTI-FUNCTION SWITCH
- 2 - SPEED CONTROL
- 3 - IGNITION SWITCH

(10) Remove the turn signal multi-function switch connector with a 7 mm socket (Fig. 8).

(11) Remove remaining electrical connections from the column switches (Fig. 8).

(12) Remove the bolt and nut from upper intermediate shaft (Fig. 9). Slide upper intermediate shaft off column shaft.

(13) Remove column mounting nuts (Fig. 10).

(14) Remove column from vehicle.

(15) Remove clockspring, switches and key cylinder, refer to Group 8 Electrical for procedures.

INSTALLATION

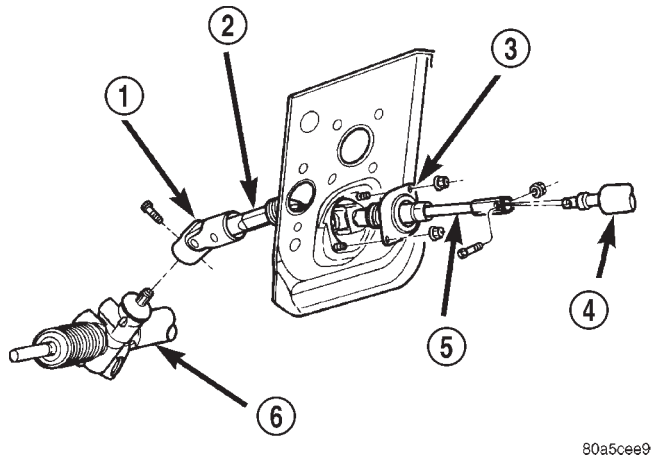
(1) Install switches, clockspring and key cylinder, refer to Group 8 Electrical for procedures.

(2) Position the column to the panel bracket and attaching studs. Install, but **loose assemble** the mounting nuts.

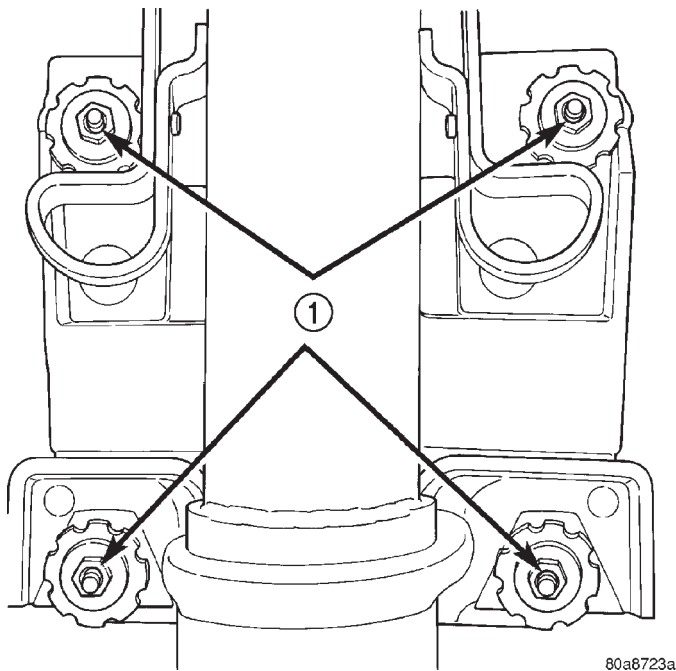
(3) Slide upper intermediate shaft onto the column shaft. Install a **new** bolt and nut and tighten to 49 N·m (36 ft. lbs.).

(4) Tighten column mounting nuts to 12 N·m (105 in. lbs.).

REMOVAL AND INSTALLATION (Continued)

**Fig. 9 Column Shafts & Couplers**

- 1 - COUPLER
- 2 - LOWER SHAFT
- 3 - TOE PLATE
- 4 - STEERING COLUMN
- 5 - UPPER SHAFT
- 6 - RACK AND PINION STEERING GEAR

**Fig. 10 Column Mounting Nuts**

- 1 - MOUNTING NUTS

(5) Connect the multi-function switch wiring and tighten with 7mm socket to 2 N·m (17 in. lbs.).

(6) Install the wiring connections to the column switches.

(7) Install the lower and upper shrouds.

(8) Install the PRNDL cable (column shift vehicles). Place shifter in Park position. If indicator needs adjusting turn thumb screw on cable retainer to adjust cable.

(9) Install shift cable (column shift vehicles).

(10) Install the tilt lever (if equipped).

(11) Install the knee blocker and steering column opening cover, refer to Group 8E Instrument Panel Systems for procedures.

(12) Install steering wheel and tighten nut to 47 N·m (35 ft. lbs.).

(13) Install airbag, refer to Group 8M Restraint Systems for procedure.

(14) Connect the battery ground (negative) cable.

(15) Check operation of the automatic transmission shift linkage and adjust as necessary. Refer to Group 21, Transmission and Transfer Case for adjustment procedure.

GEAR SHIFT LEVER**REMOVAL**

(1) Support the steering column assembly as shown in (Fig. 11) using a suitable size socket and back-up support.

(2) Disconnect over drive switch wiring.

(3) Using a drift of the appropriate size drive the knurled pin out of the steering column and gear shift lever. Remove the gear shift lever from the steering column assembly.

CAUTION: The pin can only be removed from the direction shown (Fig. 11).

INSTALLATION

(1) Support the steering column using a suitable size socket and back-up support.

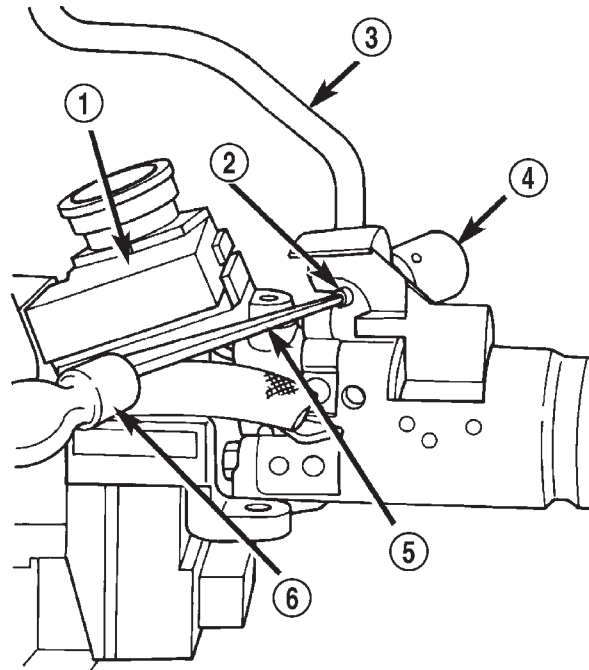
(2) Install the gear shift lever into the steering column assembly. Align the pin holes in the gear shift lever and the steering column assembly.

CAUTION: The pin must be installed in the original direction.

(3) Carefully Install the pin into the steering column assembly and through the shift lever. If the pin binds check the alignment on the holes. Be sure pin is fully installed into the steering column assembly.

(4) Connect over drive switch wiring.

REMOVAL AND INSTALLATION (Continued)



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Fig. 11 Gear Shift Lever Removal

- 1 - IGNITION SWITCH
- 2 - KNURLED PIN
- 3 - GEARSHIFT LEVER
- 4 - SOCKET
- 5 - DRIFT
- 6 - HAMMER

SPECIFICATIONS

TORQUE CHART

DESCRIPTION

TORQUE

Steering Column

Steering Wheel Nut	47 N·m (35 ft. lbs.)
Column Bracket Nuts	12 N·m (105 in. lbs.)
Shaft Coupler Bolts	49 N·m (36 ft. lbs.)
Multi-function Switch Bolt . . .	2 N·m (17 in. lbs.)

