

2007 STEERING

Steering System - Nitro

DESCRIPTION

STEERING SYSTEM

Power steering systems consist of:

- Steering column & Intermediate Shaft
- Rack and pinion steering gear
- Belt driven hydraulic steering pump
- Pump pressure, supply and return hoses
- Oil Cooler

OPERATION

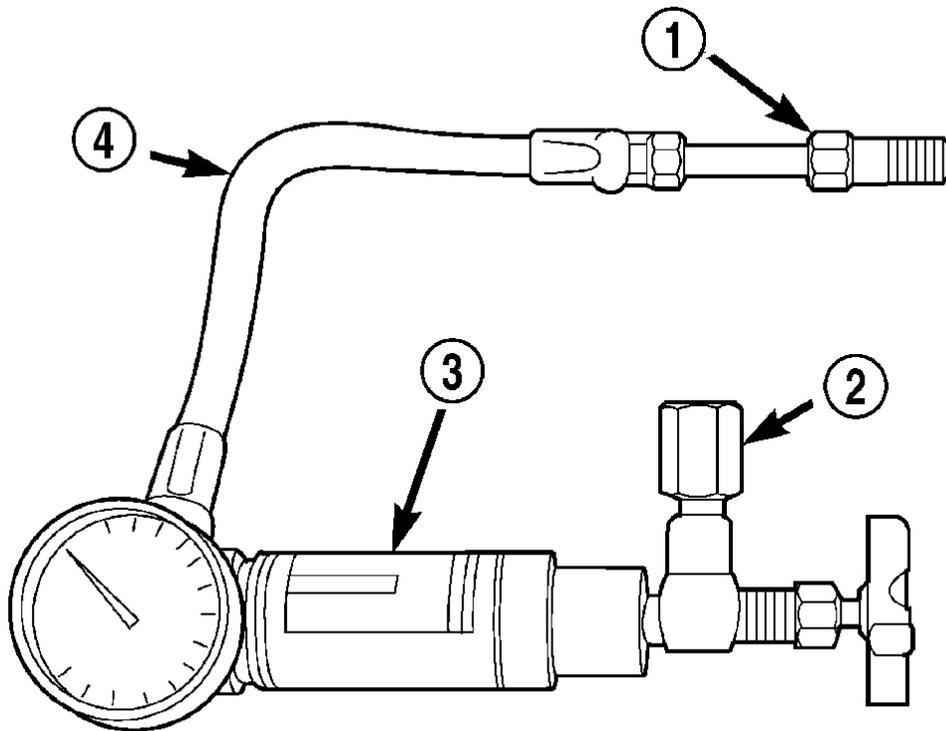
STEERING SYSTEM

The steering column intermediate shaft attaches the steering column 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. The pump supplies hydraulic fluid to the steering gear. All vehicles are equipped with an oil cooler.

DIAGNOSIS AND TESTING

POWER STEERING FLOW AND PRESSURE



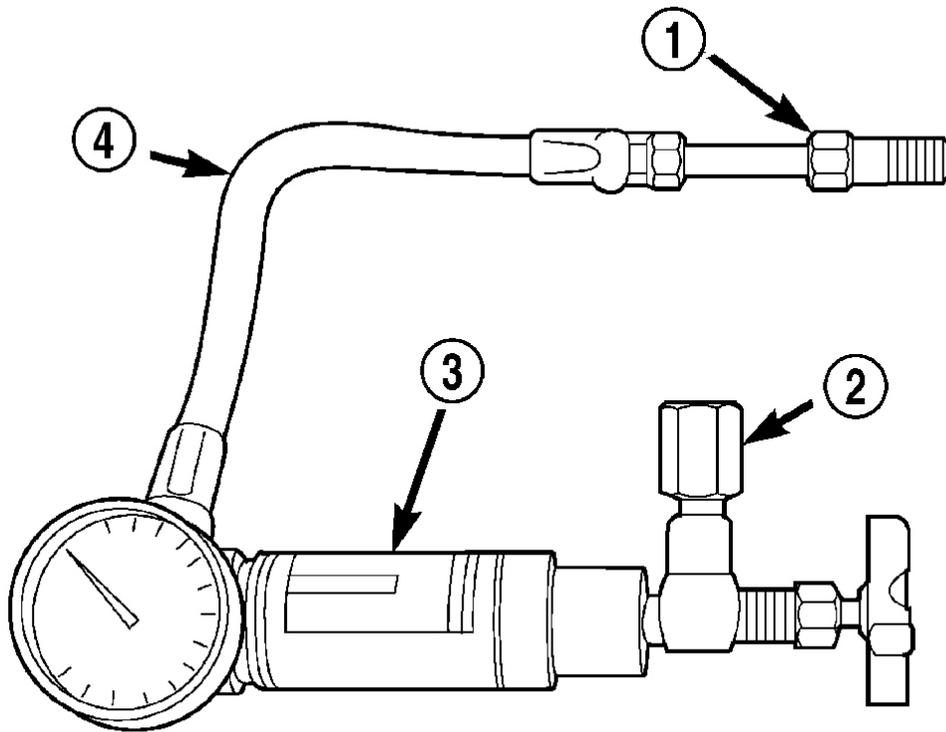
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Fig. 1: Analyzer With Tube & Adapter
 Courtesy of CHRYSLER LLC

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

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 and Adapter Kit 6893. See **Fig. 1**.

FLOW AND PRESSURE TEST



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Fig. 2: Analyzer With Tube & Adapter
 Courtesy of CHRYSLER LLC

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

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.
10. Check for air bubbles, evacuate if necessary.

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11. 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).
12. 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.

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.

13. 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.
14. 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 pressure 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	FLOW RATE (GPM) AT 1500 RPM
ALL	10342 kPa, PREFERRED (1450 psi) with a MAX 1550 psi & 7929 kPa, MIN (1400 psi)	2.4 - 2.8

STEERING SYSTEM DIAGNOSIS CHARTS

NOTE: There are three diagnosis charts following that cover NOISE, VIBRATION AND HARSHNESS (NVH) ISSUES, PERFORMANCE ISSUES, and FLUID ISSUES.

NOISE, VIBRATION AND HARSHNESS (NVH) ISSUES

CONDITION	POSSIBLE CAUSES	EVALUATION/CORRECTION
OBJECTIONABLE HISS OR WHISTLE WHILE TURNING STEERING WHEEL WHEN STATIONARY OR MOVING SLOWLY*	<ol style="list-style-type: none">1. Damaged or mispositioned steering column shaft/coupling dash boot seal.2. Mis-routed power steering hose.	<ol style="list-style-type: none">1. Check to ensure boot is properly installed and seals against sheet metal. Reposition or replace steering column shaft/coupling dash boot seal as necessary.2. Check routing of power steering hoses. Ensure hoses do not come in

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	<p>3. Restriction in pressure or return hose.</p> <p>4. Noisy valve in power steering gear.</p>	<p>unwanted contact with other components and objects.</p> <p>3. Using an electronic listening tool, determine if noise is coming from either pressure or return hose. Replace hose that noise is present within.</p> <p>4. For evaluation and correction, see <u>DIAGNOSIS AND TESTING.</u></p>
<p>RATTLE OR EXCESSIVE CLUNK**</p>	<p>1. Power steering gear loose on engine cradle/crossmember.</p> <p>2. Loose strut assembly mounting fasteners at tower or knuckle.</p> <p>3. Excessive play in outer tie rod.</p> <p>4. Engine cradle/crossmember mounting fasteners loose at frame or bushings worn.</p> <p>5. Wheel Mounting (Lug) nuts loose.</p> <p>6. Power steering hose touching the body or frame of vehicle.</p> <p>7. Stabilizer bar link joints worn (occurs with steering input only when moving, not stationary).</p> <p>8. Loose lower control arm mounting bolts at engine cradle, frame or crossmember (occurs with steering input only when moving, not stationary).</p> <p>9. Loose intermediate shaft or column.</p> <p>10. Lower control arm pivot bushing worn (occurs with steering input only when moving, not stationary).</p> <p>11. Internal power steering gear noise.</p> <p>12. Loose inner tie rod.</p>	<p>1. Check fastener torque and tighten to specifications. Replace as necessary. Check steering wheel center following repair.</p> <p>2. Check fastener torque and tighten to specifications.</p> <p>3. For evaluation and correction, see <u>DIAGNOSIS AND TESTING.</u></p> <p>4. Check fastener torque and tighten to specifications. Inspect bushings and repair as necessary.</p> <p>5. Inspect wheel mounting (Lug) nuts and studs and repair as necessary. Tighten nuts to specifications.</p> <p>6. For evaluation and correction, see <u>DIAGNOSIS AND TESTING.</u></p> <p>7. At park, jounce only one side of vehicle front to exercise stabilizer bar. Replace stabilizer bar link.</p> <p>8. Check control arm mounting bolts and tighten to specified torque.</p> <p>9. Rotate intermediate (steering) shaft in relationship to gear, checking for free-play. Check column fasteners and tighten to specifications as necessary.</p> <p>10. Inspect bushings for wear and replace lower control arm as necessary.</p> <p>11. Drive vehicle on rough road, then steer rapidly back and forth when stopped. Replace power steering gear as necessary.</p> <p>12. For evaluation and correction, see <u>DIAGNOSIS AND TESTING.</u></p>

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	13. Damaged engine cradle/crossmember.	13. Inspect the cradle/crossmember for cracks or other damage. Replace as necessary.
POPPING NOISE	<ol style="list-style-type: none"> 1. Loose steering gear mounting fasteners. 2. Loose outer tie rod mounting nut or jam nut. 3. Loose intermediate (steering) shaft coupling at gear input shaft. 4. Worn tie rod (outer or inner). 5. Worn axle half-shaft. 	<ol style="list-style-type: none"> 1. Check fasteners for proper torque and retighten as necessary. 2. Check fastener torque. Replace nuts as necessary and tighten to specifications. 3. Make sure coupling is fully seated on gear input shaft. Retighten or re-seat as necessary. 4. For evaluation and correction, see <u>DIAGNOSIS AND TESTING</u>. 5. For evaluation and correction, refer to <u>DIAGNOSIS AND TESTING</u>.
CHIRP OR SQUEAL (POWER STEERING PUMP)	<ol style="list-style-type: none"> 1. Loose power steering pump drive belt. 2. Pulley alignment incorrect. 3. Malfunctioning belt auto-tensioner 4. Power steering pump noisy (worn bearing/bushing noise). 5. Generator or water pump noisy. 	<ol style="list-style-type: none"> 1. Inspect belt. Replace belt if worn or glazed. Tighten/adjust power steering pump drive belt if equipped with a manual tensioner. 2. Realign accessory drives. 3. Verify belt tension. Replace belt auto-tensioner. 4. Using an electronic listening tool, determine if noise is coming from pump. Replace power steering pump as required. 5. Using an electronic listening tool, determine if noise is coming from Generator or water pump. Replace faulty component.
WHINE, GROWL, MOAN OR GROAN (POWER STEERING PUMP)***	<ol style="list-style-type: none"> 1. Low power steering fluid level. 2. Air in power steering fluid. 3. Power steering hose touching body or frame of vehicle. 4. Wear of power steering pump internal components. 	<ol style="list-style-type: none"> 1. Fill power steering fluid reservoir to proper level and check for leaks (make sure all air is bled from the system fluid). 2. Inspect for excessive air bubbles in fluid (fluid will appear foamy and lighter in color). Inspect hoses for leaks and replace as necessary. Bleed air from fluid. See <u>STANDARD PROCEDURE</u>. 3. For evaluation and correction, see <u>DIAGNOSIS AND TESTING</u>. 4. For evaluation and correction, see <u>DIAGNOSIS AND TESTING</u>.
COLD START WHINE OR MOAN (POWER	1. Low power steering fluid level.	1. Fill power steering fluid reservoir to proper level and check for leaks (make

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<p>STEERING PUMP)***</p>	<p>2. Extremely low ambient temperature (near 0°F (-18°C) or below)</p>	<p>sure all air is bled from the system fluid).</p> <p>2. Some noise is expected as pump attempts to pull cold, thick fluid. Noise should go away as vehicle warms up. Acceptable levels of excessive noise are one second at 0°F (-18°C) and 15 seconds at -20°F (-29°C). If noise is excessive, look for poor sealing on the return hose or a possible fluid leak.</p>
<p>SQUEAKING OR RUBBING SOUND</p>	<p>1. Steering column shroud or shaft rubbing.</p> <p>2. Clockspring inside steering column noisy.</p> <p>3. Boot/dash seal lubrication inadequate.</p> <p>4. Steering gear outer tie rod noisy.</p> <p>5. Steering gear internally noisy.</p>	<p>1. While turning the steering wheel, listen down column to locate. Check interference between moving components. Move or realign shrouds or shaft as necessary. Replace components if this does not correct problem.</p> <p>2. Remove clockspring and reinstall steering wheel for testing. If noise is gone, replace clockspring.</p> <p>3. Remove boot seal and recheck for noise. Lubricate seal as necessary.</p> <p>4. While a helper turns the steering wheel, use an electronic listening tool to determine if noise is coming from either outer tie rod. Replace outer tie rods as necessary.</p> <p>5. Remove dash seal boot, then exercise the steering wheel. If noise is still present at gear, replace steering gear.</p>
<p>SCRUBBING OR KNOCKING SOUND.</p>	<p>1. Incorrect tire or wheel size.</p> <p>2. Worn motor or transmission mount.</p> <p>3. Tires contacting wheel well.</p> <p>4. Interference between moving</p>	<p>1. Replace incorrect size tire or wheel with original equipment size.</p> <p>2. Drive vehicle, moving accelerator pedal rapidly up and down attempting to locate noise. Try in both forward and reverse. Replace mounts as necessary.</p> <p>3. Make sure wheel house is properly positioned. If not, reposition as necessary. If steering wheel is properly centered, check steering gear travel left to right by rotating the steering wheel to each stop. Steering wheel should rotate the same amount in both directions from center. If not, replace steering gear.</p> <p>4. Check for bent or misaligned</p>

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	steering components and other components. 5. Accessory drive pulley rubbing against another component.	components. Correct or replace as necessary. 5. Check pulleys for wear. Check for worn engine or transmission mount. Reposition components or replace mounts as necessary.
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NOTE: * There is some noise in all power steering systems. One of the most common is a hissing sound evident when turning the steering wheel when at a standstill or when parking and the steering wheel is at the end of its travel. 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 when high velocity fluid passes valve orifice edges. There is no relationship between this noise and the performance of the steering system.

NOTE: ** A light clunk may be felt or heard during steering wheel reversal while vehicle is stationary. This results from internal steering gear rack movement at the bushings and in no way affects the performance of the steering system. This movement may be felt in the steering components during steering wheel reversal.

NOTE: *** Power steering pump growl/moan/groan results from the development of high pressure fluid flow. Normally this noise level should not be high enough to be objectionable.

PERFORMANCE ISSUES

CONDITION	POSSIBLE CAUSES	EVALUATION/CORRECTION
STEERING WHEEL OR COLUMN HAS FREEPLAY/LASH/LOOSENESS (CLUNKING OR RATTLING)	<ol style="list-style-type: none"> 1. Loose coupling pinch bolt at gear input shaft. 2. Power steering gear loose on cradle/crossmember. 3. Excessive freeplay or noise from steering column bearings. 4. Excessive intermediate (steering) shaft coupling u-joint free-play. 5. Loose or worn outer tie rod. 	<ol style="list-style-type: none"> 1. Check pinch bolt torque. Replace pinch bolt if equipped with thread locker patch and tighten to specifications. 2. Inspect gear mounting bolts. Replace if necessary and tighten to specifications. 3. Replace steering column. 4. Rotate steering wheel back-and-forth while watching coupling. Observe for free-play. Replace intermediate shaft as necessary. 5. For evaluation and correction, see <u>DIAGNOSIS AND TESTING</u>. 6. For evaluation, refer to

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	<p>6. Lack of lubrication in lower ball joint or ball joint is damaged.</p> <p>7. Excessive lash inside steering gear.</p>	<p><u>DIAGNOSIS AND TESTING .</u> Lubricate ball joint if equipped with a zerk fitting and check for function. If not equipped with a zerk fitting, test and replace ball joint as necessary.</p> <p>7. Disconnect intermediate shaft and turn steering gear input shaft. Observe for any movement without a corresponding tire movement. Replace steering gear as necessary.</p>
<p>STEERING WHEEL HAS FORE AND AFT LOOSENESS.</p>	<p>1. Steering wheel retaining bolt loose.</p> <p>2. Loose steering column to instrument panel fasteners.</p> <p>3. Steering column lower bearing spring retainer slipped on steering column shaft.</p>	<p>1. Check steering wheel retaining bolt torque and tighten to specifications as necessary.</p> <p>2. Check steering column to instrument panel fastener torque and tighten to specifications as necessary.</p> <p>3. Pull steering wheel fore-and-aft while observing movement. Replace steering column as necessary.</p>
<p>STEERING WHEEL, DASH OR VEHICLE VIBRATES DURING STEERING MANEUVERS (ESPECIALLY AT LOW SPEED OR STANDSTILL).</p>	<p>1. Air in power steering fluid.</p> <p>2. Tire(s) not properly inflated.</p> <p>3. Excessive engine vibration.</p> <p>4. Loose tie rod end jam nut.</p> <p>5. Overcharged air conditioning (A/C) system.</p> <p>6. Grounded, damaged or loose engine mount.</p> <p>7. Loose or worn outer tie rod.</p> <p>8. Steering gear noisy.</p>	<p>1. Inspect for excessive air bubbles in fluid (fluid will appear foamy and lighter in color). Inspect hoses for leaks and replace as necessary. Bleed air from fluid. See <u>STANDARD PROCEDURE.</u></p> <p>2. Check and inflate tires to the specified pressure.</p> <p>3. Ensure that the engine is tuned properly.</p> <p>4. Check torque and tighten the inner to outer tie rod jam nut to specifications.</p> <p>5. Turn A/C off and verify issue goes away. Repair A/C as necessary.</p> <p>6. Visually inspect for damaged or misaligned mounts. Check fastener torque. Replace, realign or retighten as necessary.</p> <p>7. For evaluation and correction, see <u>DIAGNOSIS AND TESTING.</u></p> <p>8. During a parking event at 0 mph, verify there is vibration only with steering. Steer in both directions and verify that the noise follows the steering input. Check TSB's for any known issues. Replace steering gear as</p>

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<p>STEERING CATCHES, SURGES OR STICKS IN CERTAIN POSITIONS OR IS DIFFICULT TO TURN.</p>	<ol style="list-style-type: none"> 1. Low power steering fluid level. 2. Tire(s) not properly inflated. 3. Loose or slipping power steering/accessory drive belt. 4. Lack of lubrication in lower ball joint or ball joint is damaged. 5. Lack of lubrication in steering gear outer tie rod end (s). 6. Faulty power steering pump. 7. Excessive friction in intermediate shaft/coupler joint. 8. Excessive friction in steering column. 9. Worn or binding seat and bearing in front strut assembly. 10. Faulty steering gear. 	<p>necessary.</p> <ol style="list-style-type: none"> 1. Check fluid level and fill to proper level as necessary. Check for leaks. Make sure all air is bled from system. 2. Check and inflate tires to the specified pressure. 3. Verify belt tension. Replace belt auto-tensioner and belt as necessary. 4. For evaluation, refer to <u>DIAGNOSIS AND TESTING</u> . Lubricate ball joint if equipped with a zerk fitting and check for function. If not equipped with a zerk fitting, test and replace ball joint as necessary. 5. For evaluation and correction, see <u>DIAGNOSIS AND TESTING</u>. 6. Perform Power Steering Flow and Pressure Test. See <u>DIAGNOSIS AND TESTING</u>. Look for low or erratic flow or pressure. Replace power steering pump as necessary. 7. Disconnect intermediate shaft/coupler at steering gear and check joint for smooth operation in all directions. Replace intermediate shaft/coupler joint. 8. Disconnect intermediate shaft/coupler at steering gear. Turn steering wheel two revolutions in either direction from on center and check for smooth operation. DO NOT turn past two revolutions. Damage to the clockspring may occur. Replace steering column as necessary. 9. Disconnect outer tie rod ends from knuckles, then turn tire and wheel assembly checking for smooth operation. Replace front strut assembly seat and bearing. 10. With vehicle on hoist, tires unsupported and engine off, steer gear throughout travel and check for smooth operation. Replace steering gear (only after all previous components have
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<p>STEERING WHEEL DOES NOT RETURN TO CENTER POSITION.</p>	<ol style="list-style-type: none"> 1. Tire(s) not properly inflated. 2. Improper front wheel alignment. 3. Lack of lubrication in lower ball joint or ball joint is damaged. 4. Excessive friction in intermediate shaft/coupler joint. 5. Excessive friction in steering column. 6. Worn or binding seat and bearing in front strut assembly. 7. Excessive friction in power steering gear. 	<p>been checked).</p> <ol style="list-style-type: none"> 1. Check and inflate tires to the specified pressure. 2. Check and adjust wheel alignment as necessary. 3. For evaluation, refer to <u>DIAGNOSIS AND TESTING</u> . Lubricate ball joint if equipped with a zerk fitting and check for function. If not equipped with a zerk fitting, test and replace ball joint as necessary. 4. Disconnect intermediate shaft/coupler at steering gear and check joint for smooth operation in all directions. Replace intermediate shaft/coupler joint. 5. Disconnect intermediate shaft/coupler at steering gear. Turn steering wheel two revolutions in either direction from on center and check for smooth operation. DO NOT turn past two revolutions. Damage to the clockspring may occur. Replace steering column as necessary. 6. Disconnect steering gear outer tie rod ends at knuckles, then turn tire and wheel assembly in and out checking for smooth operation. Replace seat and bearing as necessary. 7. With vehicle on hoist, tires unsupported and engine off, steer gear throughout travel and check for smooth operation. Replace steering gear (only after all previous components have been checked).
<p>EXCESSIVE STEERING WHEEL KICKBACK FROM ROAD INPUTS</p>	<ol style="list-style-type: none"> 1. Air in power steering fluid. 2. Power steering gear loose on cradle/crossmember. 3. Steering column, coupling 	<ol style="list-style-type: none"> 1. Inspect for excessive air bubbles in fluid (fluid will appear foamy and lighter in color). Inspect hoses for leaks and replace as necessary. Bleed air from fluid. See <u>STANDARD PROCEDURE</u>. 2. Inspect gear mounting bolts. Replace if necessary and tighten to specifications. 3. Rotate steering wheel back-and-forth

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or intermediate shaft worn or loose.

while inspecting intermediate shaft going into steering gear. Look for excessive free-play. Retighten if loose bolt is found. Replace steering column, coupling or intermediate shaft if necessary.

4. Power steering pump flow is too low.

4. Perform Power Steering Flow and Pressure Test. See **DIAGNOSIS AND TESTING**. Look for low or erratic flow or pressure. Replace power steering pump as necessary.

FLUID ISSUES

CONDITION	POSSIBLE CAUSES	EVALUATION/CORRECTION
LOW FLUID LEVEL WITH VISIBLE LEAK.	<ol style="list-style-type: none"> 1. Loose power steering hose fittings or connections. 2. Damaged or missing O-ring at power steering hose tube nuts. 3. Power steering line or hose failure. 4. Power steering component leaking (reservoir, pump, gear). 	<ol style="list-style-type: none"> 1. Check torque on all tube nuts (at gear and pump). Inspect clamps at all rubber hose connections for correct position, damage and tension. Tighten tube nuts as required. Reposition or replace clamps at hose connections. Clean joints and reinspect for leaks. 2. Remove tube nut and inspect O-ring. If damaged or missing, replace O-ring. Clean joints and reinspect for leaks. 3. Clean fluid from around suspect areas. Run vehicle and inspect for leaks. Look inside reservoir to see if air is being ingested. Replace hoses as necessary. 4. Clean fluid from around suspect areas. Run vehicle and inspect for leaks. Look inside reservoir to see if air is being ingested. Replace power steering component as necessary.
AERATED FLUID.*	<ol style="list-style-type: none"> 1. Low power steering fluid level. 2. Air leak at power steering supply hose, reservoir or pump. 3. Air leak at power steering supply hose, reservoir or pump. 	<ol style="list-style-type: none"> 1. Check fluid level and fill to proper level as necessary. Check for leaks. Make sure all air is bled from system. 2. Inspect components. Put a hand vacuum pump on the reservoir and verify that the system can keep a vacuum. System should not lose more than 1 psi in 2 minutes (make sure vacuum pump is sealed well to the reservoir). 3. Inspect components. Place a hand vacuum pump with Adapter 9688 on reservoir and verify that system can

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sustain vacuum. System should not lose more than 1 psi in 2 minutes (make sure vacuum pump is sealed well to the reservoir). Replace steering component as necessary.

RESERVOIR FLUID
OVERFLOW OR FLUID
THAT IS MILKY IN
COLOR

1. Water contamination of power steering fluid.

1. Inspect fluid for milky appearance. Completely drain power steering fluid. Refill and bleed system. See **STANDARD PROCEDURE**.

NOTE: Extremely cold temperatures may cause power steering fluid aeration. The air should work its way out of the system as the fluid warms.

STANDARD PROCEDURE

POWER STEERING SYSTEM BLEED PROCEDURE

WARNING: The fluid level should be checked with engine off to prevent injury from moving components.

CAUTION: Mopar® Power Steering Fluid + 4 or Mopar® ATF+4 Automatic Transmission Fluid is to be used in the power steering system. Both Fluids have the same material standard specifications (MS-9602). No other power steering or automatic transmission fluid is to be used in the system. Damage may result to the power steering pump and system if another fluid is used. Do not overfill the system.

CAUTION: If the air is not purged from the power steering system correctly, pump failure could result.

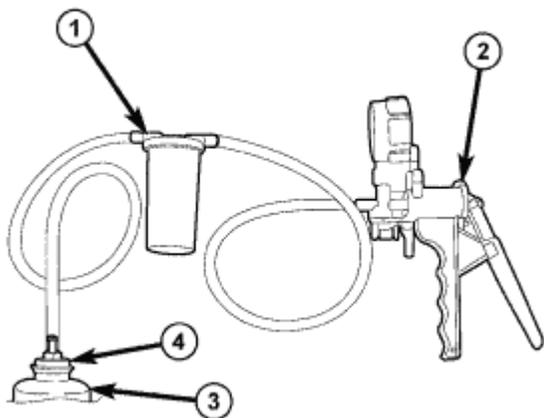


Fig. 3: Hand Vacuum Pump On Reservoir

Courtesy of CHRYSLER LLC

NOTE: Be sure the vacuum tool used in the following procedure is clean and free of any fluids.

1. Check the fluid level. As measured on the side of the reservoir, the level should indicate between MAX and MIN when the fluid is at normal ambient temperature. Adjust the fluid level as necessary. See **STANDARD PROCEDURE**.
2. Tightly insert Power Steering Cap Adapter (4), Special Tool 9688, into the mouth of the reservoir (3).

CAUTION: Failure to use a the vacuum pump reservoir (1) may allow power steering fluid to be sucked into the hand vacuum pump.

3. Attach Hand Vacuum Pump (2), Special Tool C-4207 or equivalent, with reservoir (1) attached, to the Power Steering Cap Adapter (4).

CAUTION: Do not run the engine while vacuum is applied to the power steering system. Damage to the power steering pump can occur.

NOTE: When performing the following step make sure the vacuum level is maintained during the entire time period.

4. Using Hand Vacuum Pump (2), apply 68-85 kPa (20-25 in. Hg) of vacuum to the system for a minimum of three minutes.
5. Slowly release the vacuum and remove the special tools.
6. Adjust the fluid level as necessary. Refer to step 1.
7. Repeat step 1 through step 6 until the fluid no longer drops when vacuum is applied.
8. Start the engine and cycle the steering wheel lock-to-lock three times.

NOTE: Do not hold the steering wheel at the stops.

9. Stop the engine and check for leaks at all connections.
10. Check for any signs of air in the reservoir and check the fluid level. If air is present, repeat the procedure as necessary.

SPECIAL TOOLS

STEERING COLUMN

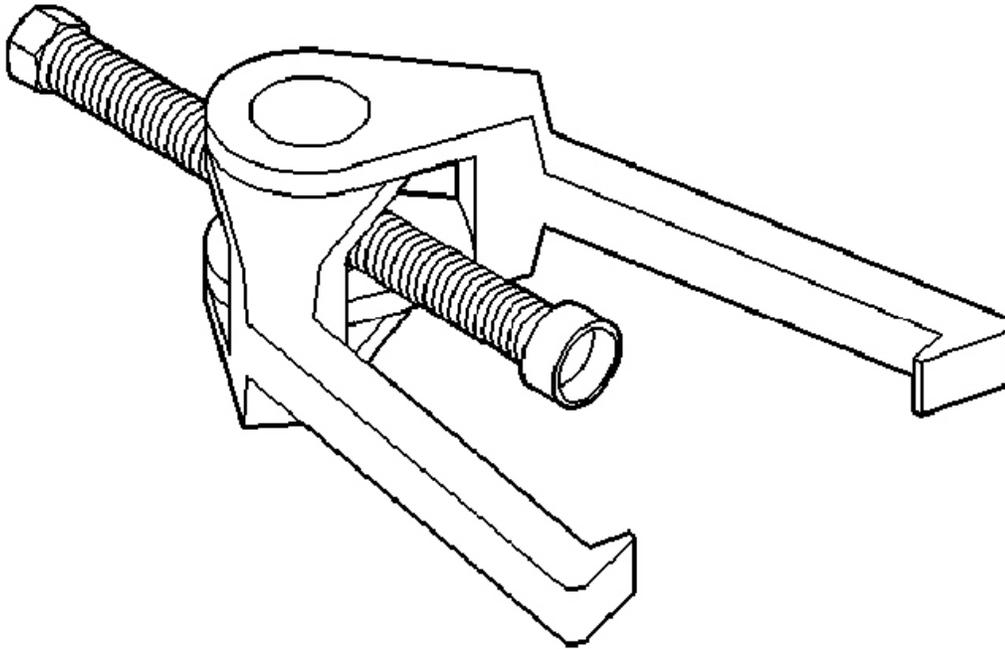


Fig. 4: Puller C-3894-A
Courtesy of CHRYSLER LLC

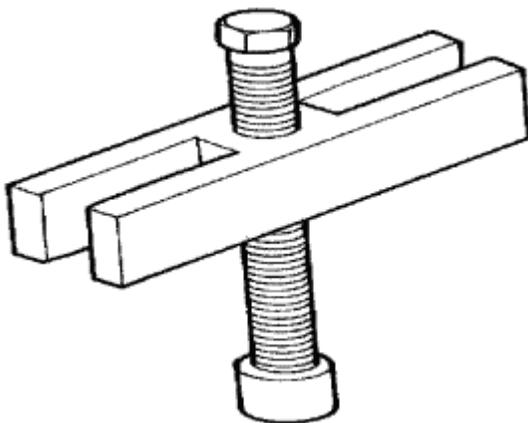


Fig. 5: Puller L-4407-A
Courtesy of CHRYSLER LLC

COLUMN

DESCRIPTION

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STEERING COLUMN

NOTE: The steering column on vehicles with an automatic transmission may not be equipped with an internal locking shaft that allows the ignition key cylinder to be locked with the key. Alternative methods of locking the steering wheel for service will have to be used.

The steering column has been designed to be serviced as an assembly. The column is connected to the steering gear with a one piece shaft. The upper half has a support bearing mounted to a bracket. The bracket mounts to the frame rail with two nuts. The shaft is serviceable. The key cylinder, switches, clock spring, trim shrouds and steering wheel are serviced separately.

OPERATION

STEERING COLUMN

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

To service the steering wheel, switches or airbag, refer to **RESTRAINTS - SERVICE INFORMATION** 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 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.

REMOVAL

STEERING COLUMN

1. Position front wheels **straight ahead**.
2. Remove and isolate the negative ground cable from the battery.
3. Remove the airbag, refer to **REMOVAL** .

NOTE: If equipped with cruise control, disconnect clock spring harness from the cruise switch harness on the steering wheel.

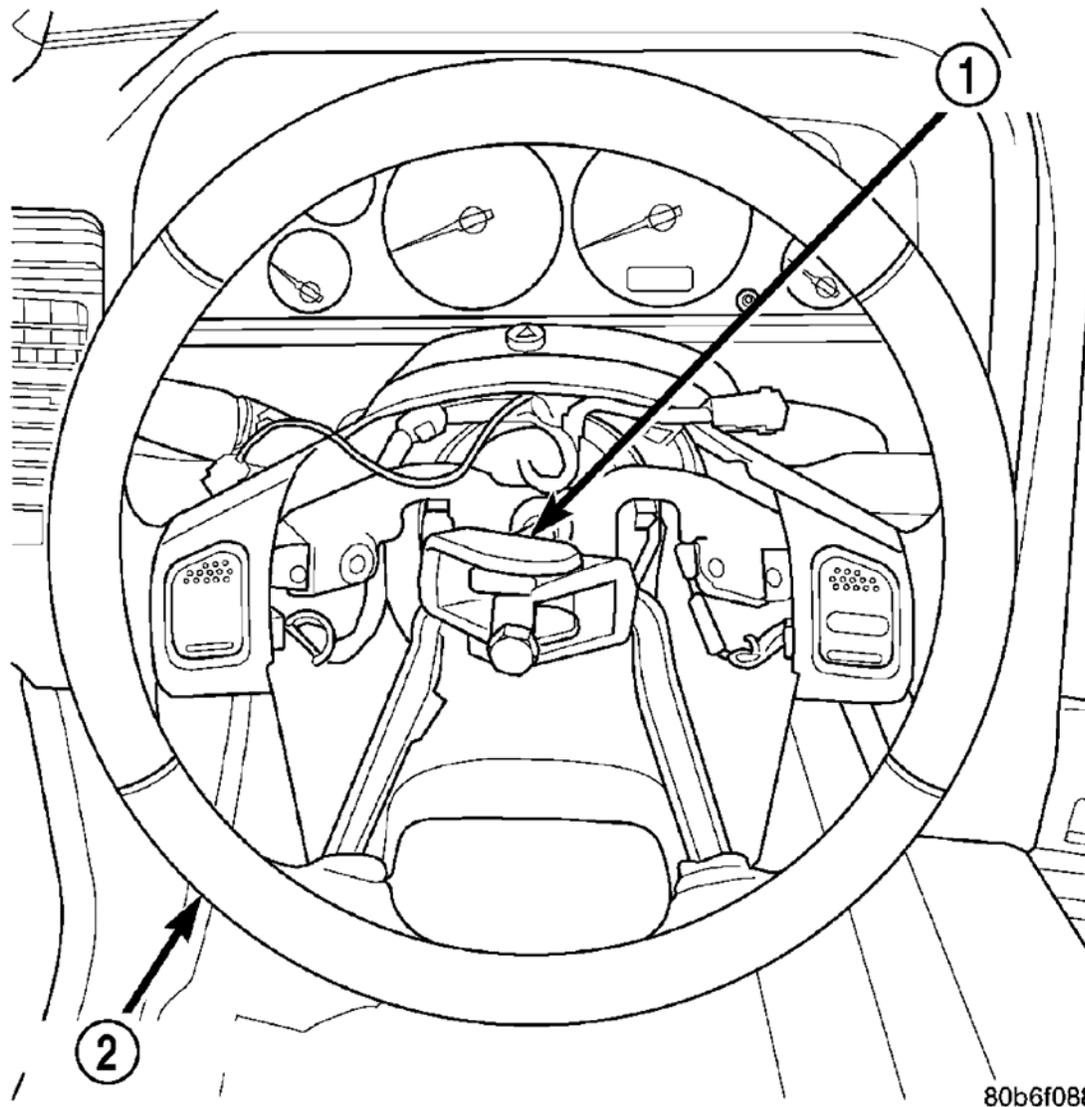


Fig. 6: Steering Wheel Puller
Courtesy of CHRYSLER LLC

1 - PULLER C-3894-A
2 - STEERING WHEEL

4. Remove the steering wheel (2) with puller C-3894-A (1) or an appropriate puller. See **Fig. 6**. See **REMOVAL**.

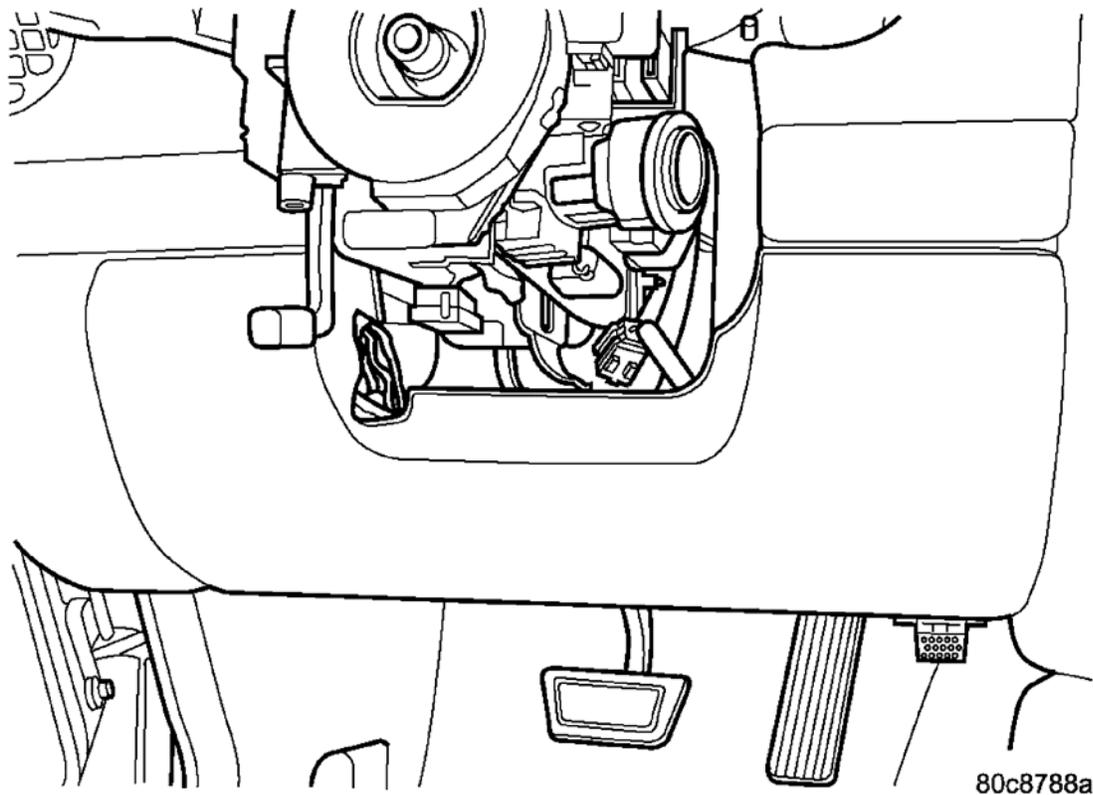
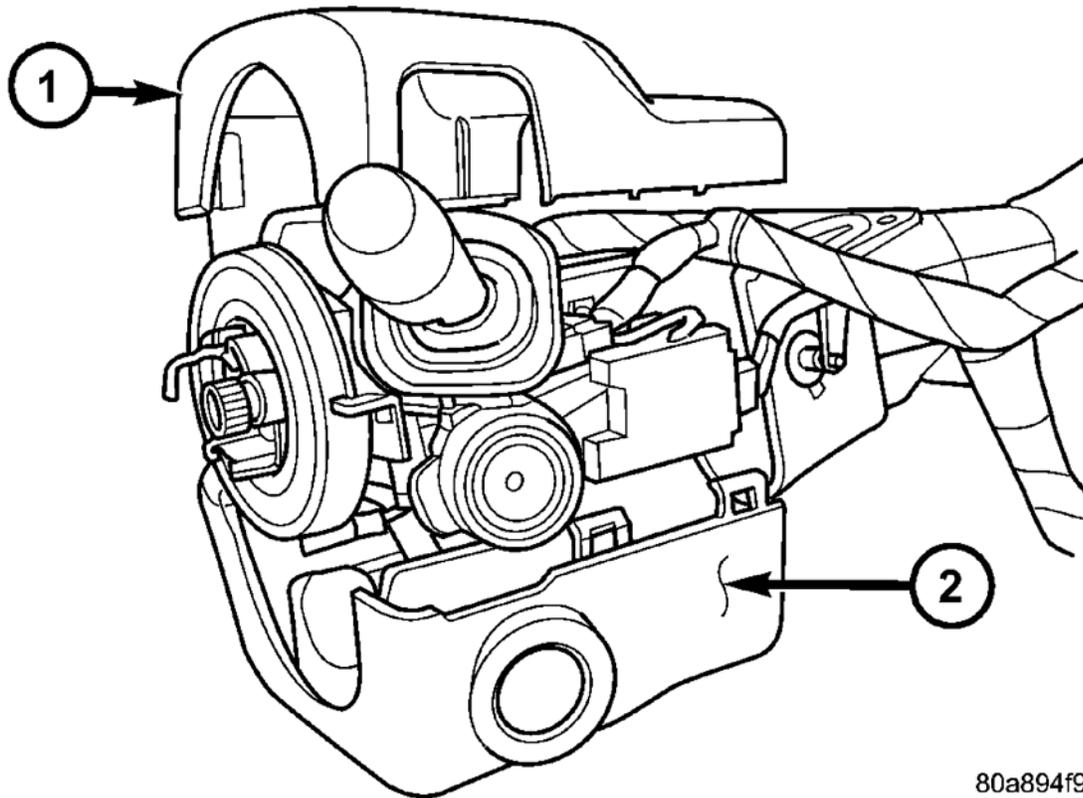


Fig. 7: Knee Blocker
Courtesy of CHRYSLER LLC

5. Remove steering column opening cover, refer to **REMOVAL** .



80a894f9

Fig. 8: Removing/Installing Shroud
Courtesy of CHRYSLER LLC

1 - Upper Shroud 2 - Lower Shroud

6. Remove screws from the lower column shroud (2) and remove both the upper and lower shrouds. See **Fig. 8.**

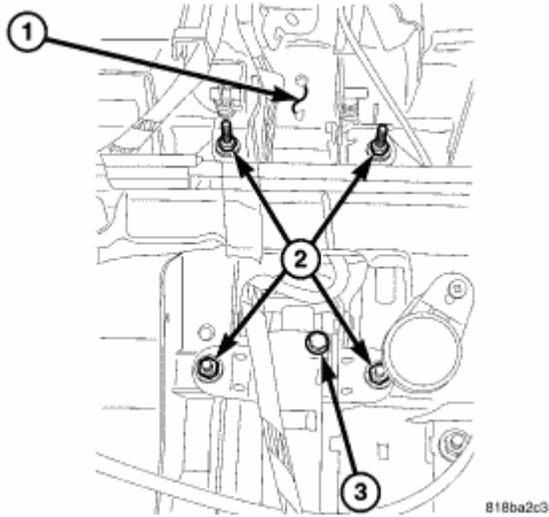
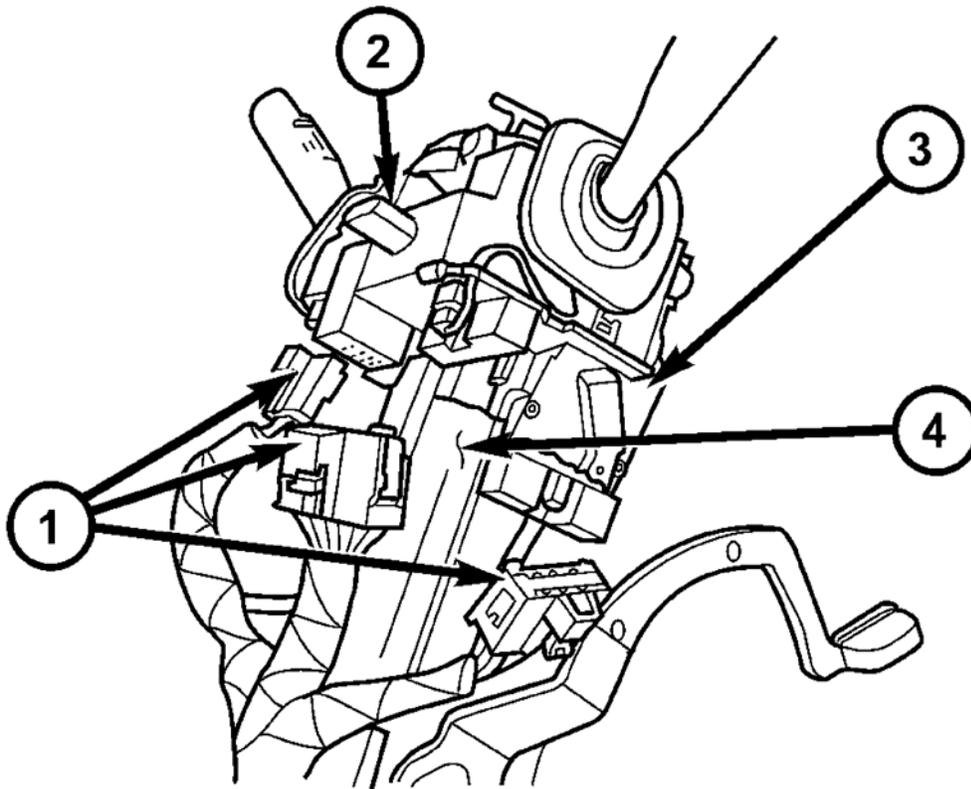


Fig. 9: Steering Column Bolts
Courtesy of CHRYSLER LLC

7. Turn ignition key to the on position.
8. If vehicle is equipped with automatic transmission, disconnect shifter interlock cable from the column.
9. Remove the steering coupler bolt and column mounting nuts (2) then lower column (1) off the mounting studs.



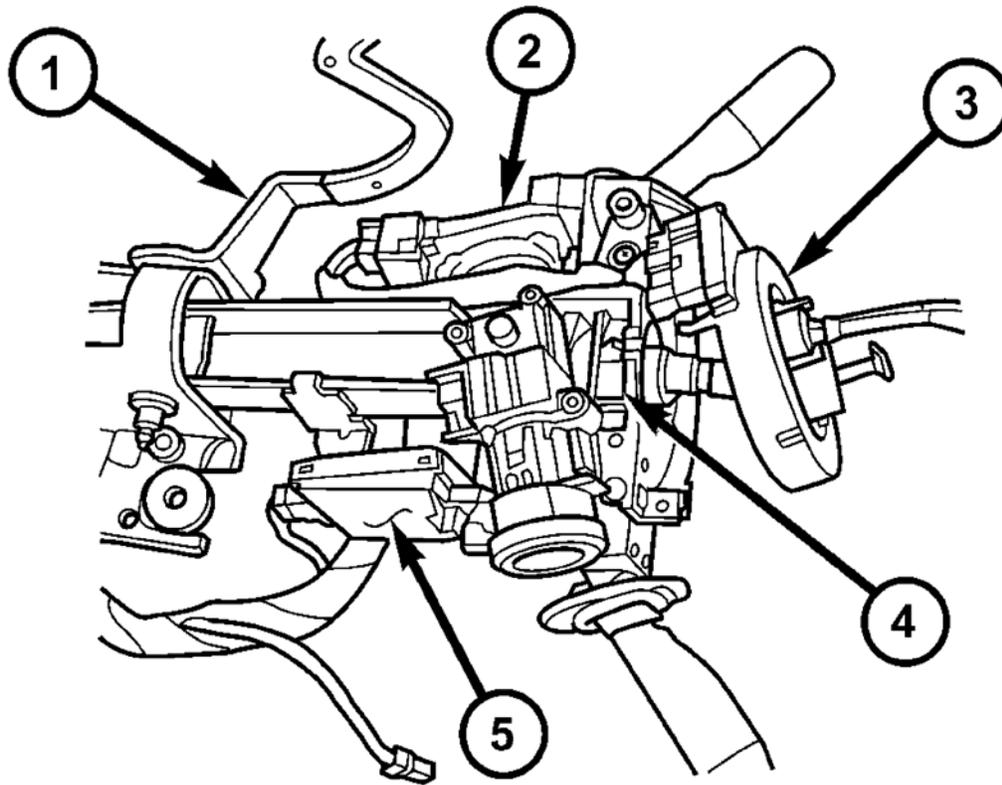
80a893e8

Fig. 10: Identifying Wiring Harness Column, Multi-Function Switch, Ignition Switch & Steering Column

Courtesy of CHRYSLER LLC

- | |
|--|
| 1 - Column Wiring Harness
2 - Multi-function Switch
3 - Ignition Switch
4 - Steering Column |
|--|

10. Disconnect and remove the wiring harness (1) from the column. See **Fig. 10**.
11. Slide the shifter interlock cable from the tie straps.



80a8941e

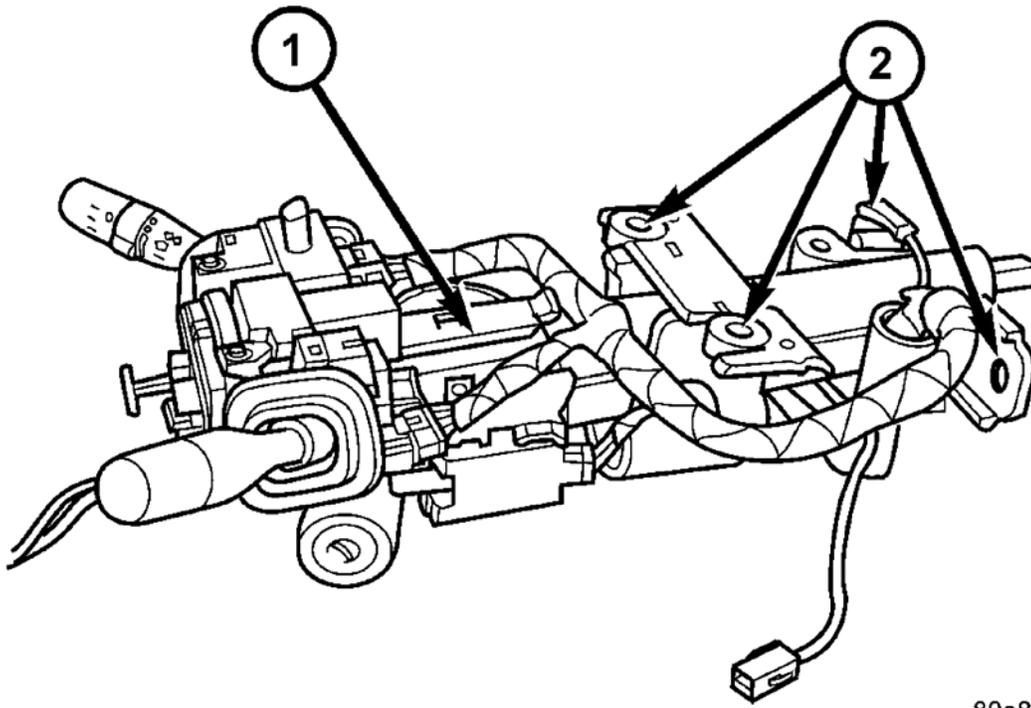
Fig. 11: Identifying Tilt Lever, Ignition Switch, Clockspring, Steering Column & Skim/Skreem
Courtesy of CHRYSLER LLC

- | |
|--|
| 1 - Tilt Lever
2 - Ignition Switch
3 - Clockspring
4 - Steering Column
5 - skim/skreem |
|--|

12. Remove column (4).
13. Transfer the necessary parts if needed.
14. Remove clock spring (3), switches, (SKREEM if equipped) (5) See **Fig. 11**. Refer to **REMOVAL**.

INSTALLATION

STEERING COLUMN

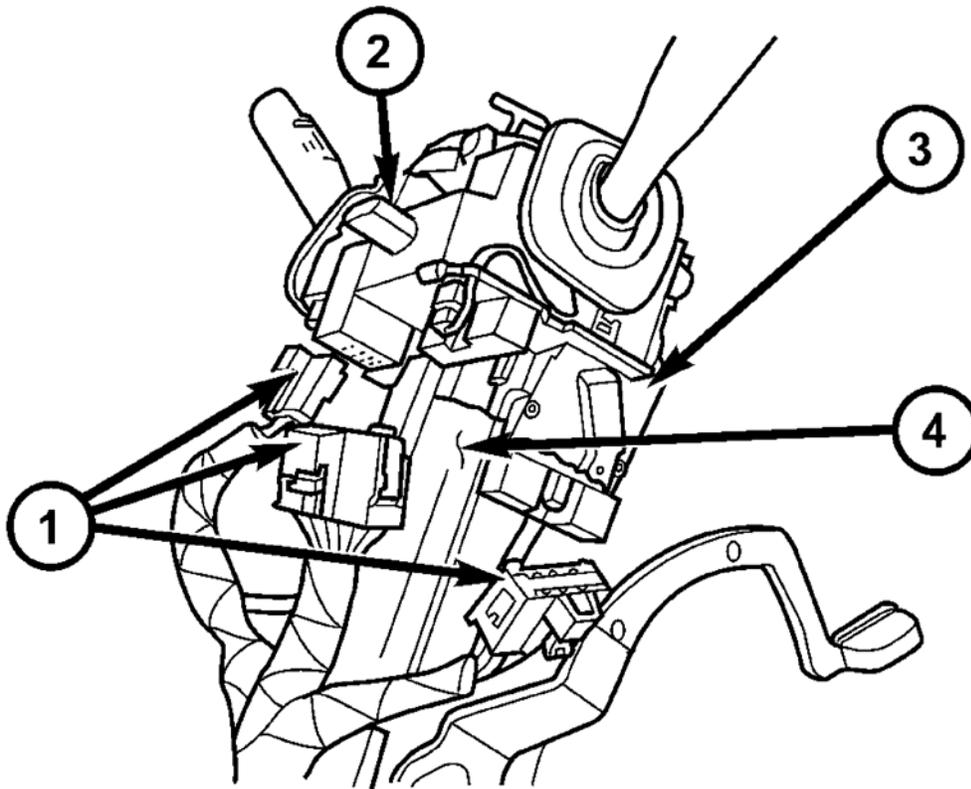


80a893db

Fig. 12: Steering Column Mounting
Courtesy of CHRYSLER LLC

- 1 - Steering Column
- 2 - Mounting Holes

1. Align and install column (1) into the steering coupler. See **Fig. 12**.



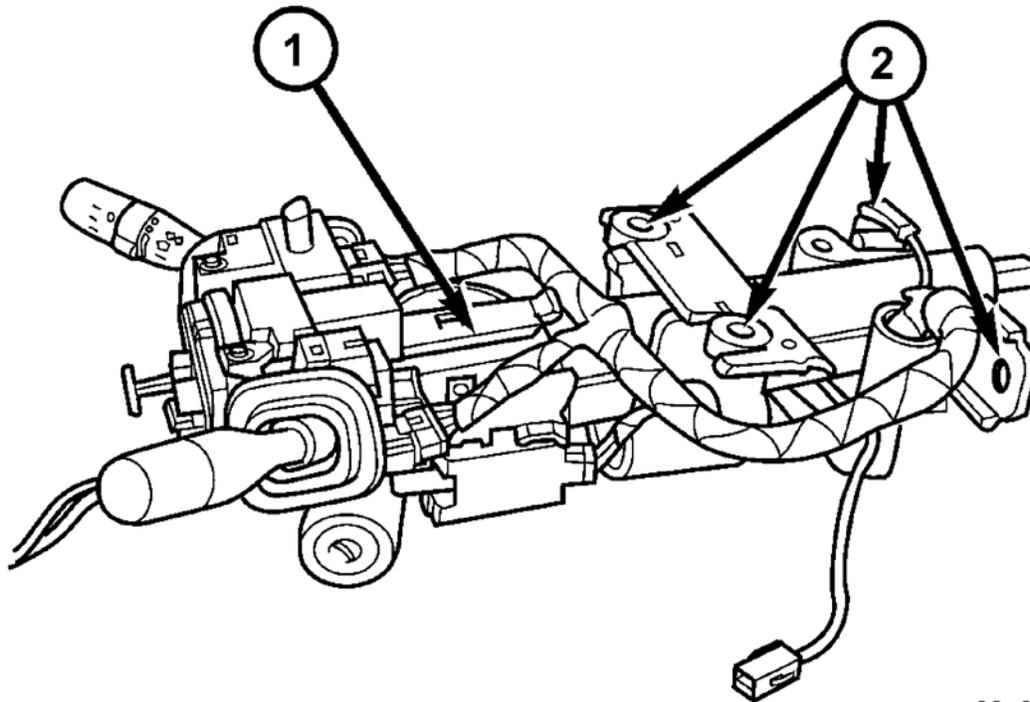
80a893e8

Fig. 13: Identifying Wiring Harness Column, Multi-Function Switch, Ignition Switch & Steering Column

Courtesy of CHRYSLER LLC

- | |
|--|
| <p>1 - Column Wiring Harness
2 - Multi-function Switch
3 - Ignition Switch
4 - Steering Column</p> |
|--|

2. Install column harness (1) and connect harness to switches. See **Fig. 13**.
3. Reroute the shifter interlock cable through the tie straps.



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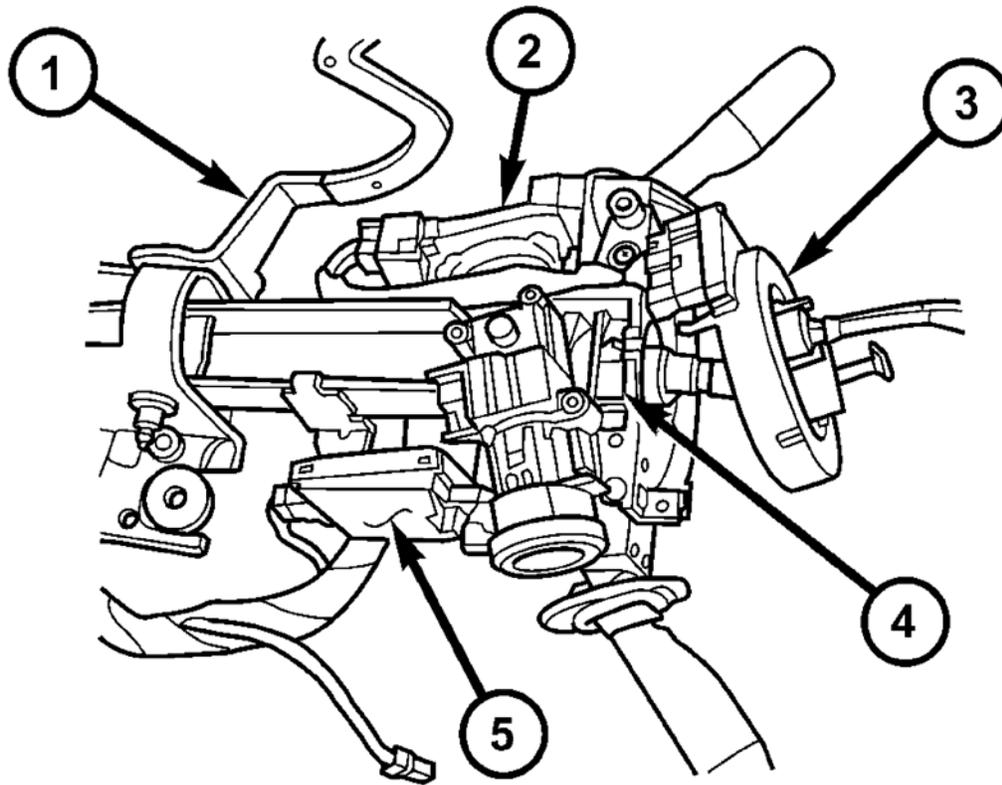
Fig. 14: Steering Column Mounting
Courtesy of CHRYSLER LLC

1 - Steering Column 2 - Mounting Holes

4. Install the column (1) onto the mounting studs (2). See **Fig. 12**.
5. Install the two mounting nuts and the two mounting bolts all finger tight.

CAUTION: Lower nuts must be installed and tightened first then the upper nuts in order to prevent damage to the capsules.

6. Tighten the lower mounting nuts to 17 N.m (150 in. lbs.).
7. Tighten the upper mounting nuts to 17 N.m (150 in. lbs.).

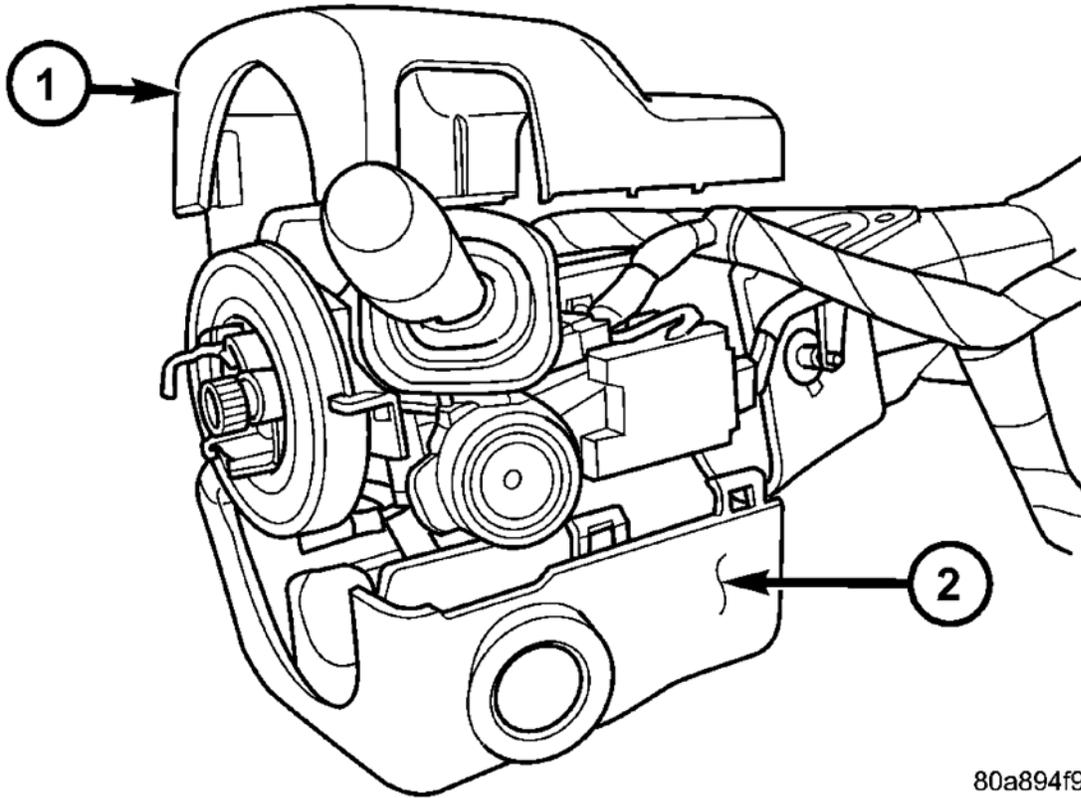


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Fig. 15: Identifying Tilt Lever, Ignition Switch, Clockspring, Steering Column & Skim/Skream
Courtesy of CHRYSLER LLC

- | |
|--|
| 1 - Tilt Lever
2 - Ignition Switch
3 - Clockspring
4 - Steering Column
5 - skim/skream |
|--|

8. Install the steering column coupler bolt and tighten to 53 N.m (39 ft. lbs.).
9. Reconnect the shifter interlock cable.
10. Center the clock spring (3) (if necessary) and install it on the column (4). See **Fig. 15**, refer to **INSTALLATION** .



80a894f9

Fig. 16: Removing/Installing Shroud
Courtesy of CHRYSLER LLC

1 - Upper Shroud 2 - Lower Shroud

11. Snap together the column shrouds (1 & 2) and install the mounting screws. See **Fig. 16**.

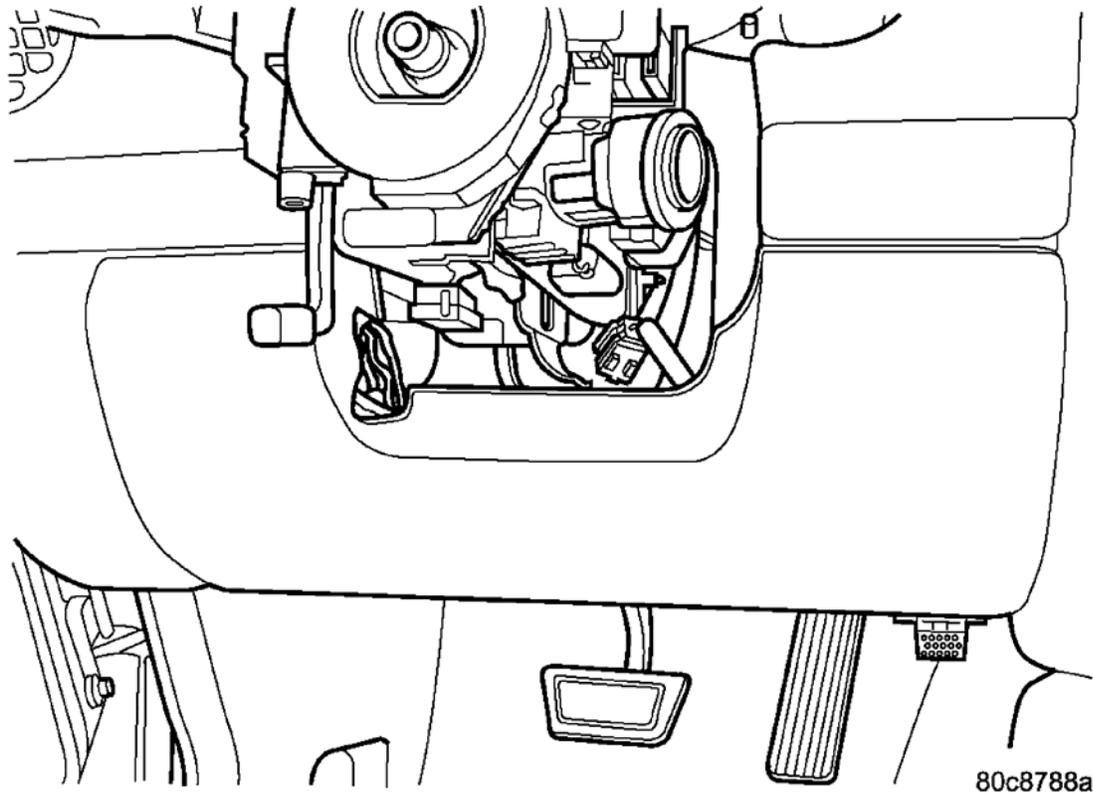


Fig. 17: Knee Blocker
Courtesy of CHRYSLER LLC

12. Install the steering column opening cover. Refer to INSTALLATION.

NOTE: Do not reuse the old steering wheel bolt (a new bolt must be used)

NOTE: Be certain that the steering wheel mounting bolt is tightened to the proper torque specification to ensure proper clockspring operation.

13. Install the steering wheel and tighten bolt to 54 N.m (40 ft. lbs.). See INSTALLATION.

NOTE: If equipped with cruise control, connect clock spring harness to cruise switch harness on the steering wheel.

14. Install the airbag, refer to INSTALLATION.

15. Install the negative battery terminal.

SPECIFICATIONS

TORQUE CHART

2007 Dodge Nitro R/T

2007 STEERING Steering System - Nitro

SPECIFICATIONS

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Steering Wheel Bolt	54	40	-
Steering Column Mounting Bolts	17	-	150
Steering Column Coupler Bolt	53	39	-
Intermediate Shaft Lower Support Bearing Nuts	12	9	106
Intermediate Shaft Lower Coupler Bolt	53	39	-
Ignition Switch Screws	2	-	17

IGNITION SWITCH

DESCRIPTION

SWITCH-IGNITION

The electrical ignition switch is located on the steering column. It is used as the main on/off switching device for most electrical components. The mechanical key cylinder is used to engage/disengage the electrical ignition switch.

DIAGNOSIS AND TESTING

SWITCH-IGNITION

ELECTRICAL DIAGNOSIS

For ignition switch electrical schematics, Refer to the appropriate section for the component.

MECHANICAL DIAGNOSIS (KEY DIFFICULT TO ROTATE)

Vehicles equipped with an automatic transmission and a floor mounted shifter: a cable is used to connect the interlock device in the steering column assembly, to the transmission floor shift lever. This interlock system is used to lock the transmission shifter in the PARK position when the key cylinder is rotated to any position. If the ignition key is difficult to rotate to or from any position, it may not be the fault of the key cylinder or the steering column components. The brake transmission shift interlock cable may be out of adjustment. Refer to **ADJUSTMENTS** . The interlock system within the steering column is not serviceable. If repair is necessary, the steering column assembly must be replaced. . See **REMOVAL**.

Vehicles equipped with a manual transmission and a floor mounted shifter: on certain models, a button is located on the steering column behind the ignition key cylinder. The button must be manually depressed to allow rotation of the ignition key cylinder to any position. If it is difficult to rotate the key to any position, the lever mechanism may be defective. This mechanism is not serviceable. If repair is necessary, the steering column assembly must be replaced. See **REMOVAL**.

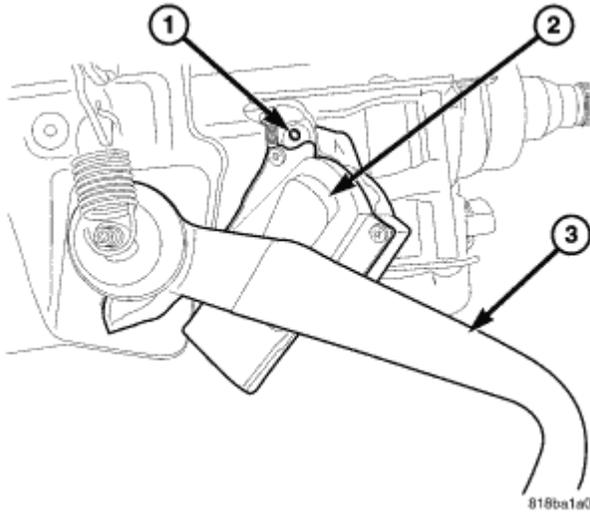
REMOVAL**SWITCH-IGNITION**

Fig. 18: Identifying Ignition Switch Mounting Screw, Ignition Switch & Arm
Courtesy of CHRYSLER LLC

1. Remove the steering column shrouds.

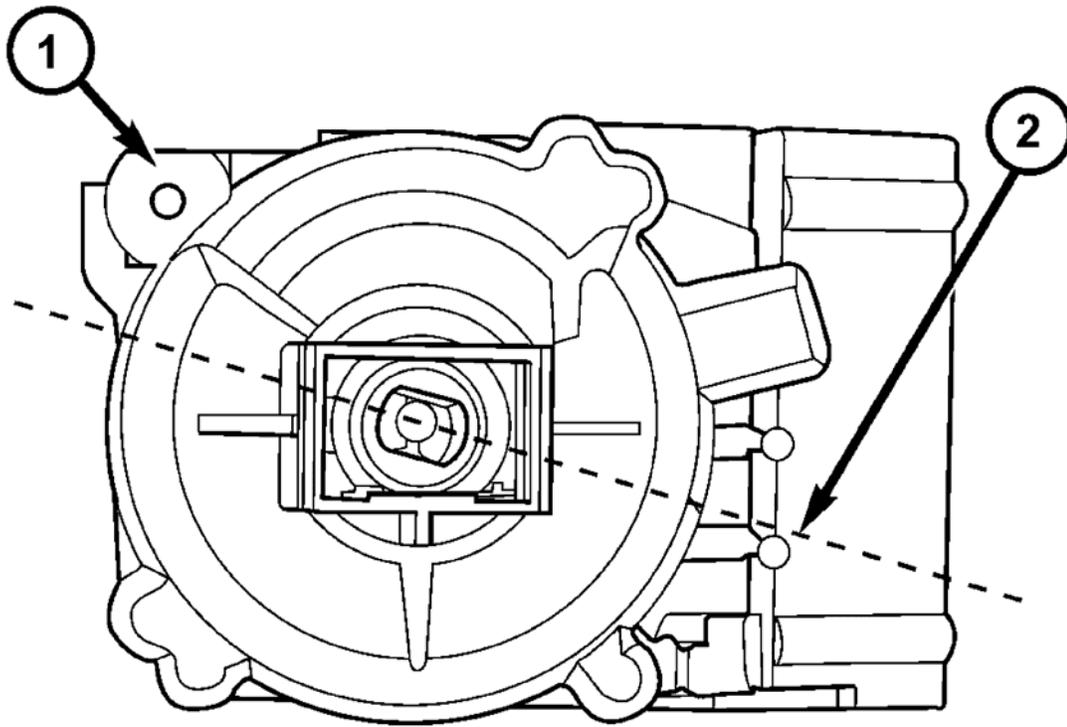
NOTE: The ignition key must be in the key cylinder for cylinder removal. The key cylinder must be removed first before removing ignition switch.

2. Remove lock cylinder. See **REMOVAL**.
3. Remove the multi-function switch.
4. Disconnect the electrical connector at the rear of the ignition switch.
5. Remove the ignition switch mounting screw (1). Use tamper proof torx bit to remove the screw.

NOTE: Tilt arm (3) must be moved to allow removal of the switch.

6. Pull the ignition switch (2) straight out to remove from the locking tabs.

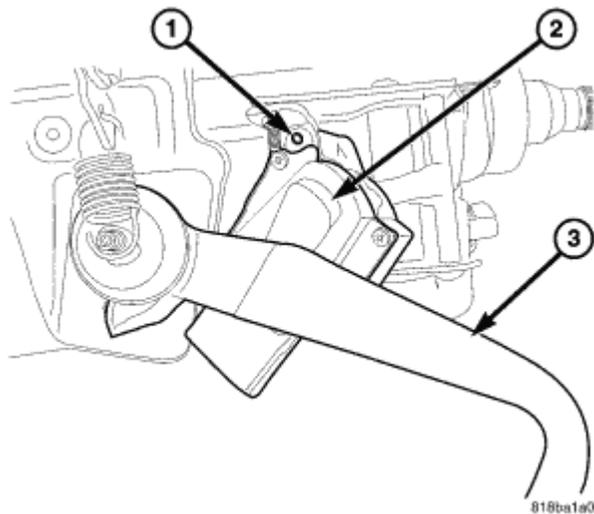
INSTALLATION**SWITCH-IGNITION**



80a898b0

Fig. 19: Identifying Ignition Switch & Switch In ON Position
Courtesy of CHRYSLER LLC

1. Before installing ignition switch (1), rotate the slot in the switch to the ON position (2).



818ba1a0

Fig. 20: Identifying Ignition Switch Mounting Screw, Ignition Switch & Arm
Courtesy of CHRYSLER LLC

NOTE: Tilt arm (3) must be moved to allow installation of the switch.

2. Position the switch (2) to the column and install tamper proof screw (1). Tighten screw to 2 N.m (17 in. lbs.).
3. Connect the electrical connector to rear of ignition switch. Make sure that locking tab is fully seated into wiring connector.

NOTE: The ignition key must be in the key cylinder for cylinder installation. The key cylinder must be aligned with the ignition switch for installation.

4. Install the lock cylinder. See INSTALLATION.
5. Test the operation of the lock cylinder for smooth rotating.
6. Install the multi-function switch.
7. Install steering column lower cover.

KEY-IN IGNITION SWITCH

DESCRIPTION

SWITCH-KEY IN IGNITION

The key-in ignition switch is integral to the ignition switch, which is mounted on the left side of the steering column, opposite the ignition cylinder. It closes a path to ground for the instrument cluster chime warning circuitry when the ignition key is inserted in the ignition lock cylinder and the driver door jamb switch is closed (driver door is open). The key-in ignition switch opens the ground path when the key is removed from the ignition cylinder.

The key-in ignition switch cannot be repaired and, if faulty or damaged, the entire ignition switch must be replaced. See REMOVAL.

DIAGNOSIS AND TESTING

SWITCH-KEY-IN IGNITION

For circuit descriptions and diagrams, Refer to the appropriate sections on the individual components.

WARNING: On vehicles equipped with airbags, refer to electrical - passive restraint systems before attempting any steering wheel, steering column, or instrument panel component diagnosis or service. Failure to take the proper precautions could result in accidental airbag deployment and possible personal injury.

1. Disconnect and isolate the battery negative cable. Remove the steering column shrouds. Unplug the key-in ignition switch wire harness connector from the ignition switch.
2. Check for continuity between the key-in switch sense circuit and the left front door jamb switch sense

circuit terminals of the key-in ignition switch. There should be continuity with the key in the ignition cylinder, and no continuity with the key removed from the ignition cylinder. If OK, go to step 3. If not OK, replace the faulty ignition switch assembly.

3. Check for continuity between the left front door jamb switch sense circuit cavity of the key-in ignition switch wire harness connector and a good ground. There should be continuity with the driver door open, and no continuity with the driver door closed. If OK, see the diagnosis for Instrument Cluster in this group. If not OK, repair the circuit to the driver door jamb switch as required.

KEY CYLINDER

REMOVAL

CYLINDER-KEY

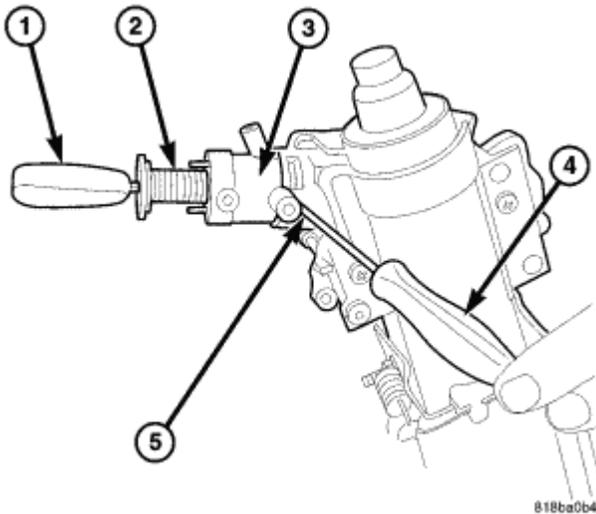


Fig. 21: Removing Key Cylinder
Courtesy of CHRYSLER LLC

The ignition key (1) must be in the key cylinder (2) for cylinder removal. The key cylinder must be removed first before removing ignition switch.

1. If equipped with an automatic transmission, place shifter in PARK position.
2. Remove the shroud covers.
3. Remove the remote keyless entry (S.K.R.E.E.M) module.
4. Remove the halo ring around the cylinder.
5. Rotate key to RUN position.
6. A release pin is located on the bottom of the key cylinder (5) with the access hole on the top of the lock cylinder housing (3).
7. Position a small screwdriver or pin punch (4) into pin access hole (5).
8. Push the pin punch (5) up while pulling key cylinder (2) from lock cylinder housing (3).

INSTALLATION

CYLINDER-KEY

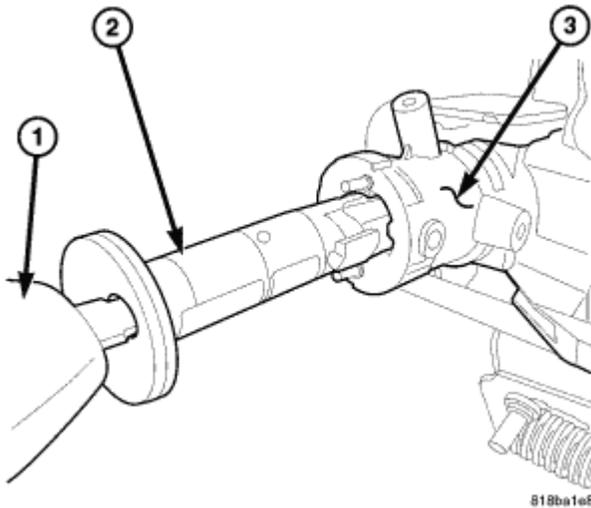


Fig. 22: Key Cylinder Install
Courtesy of CHRYSLER LLC

The ignition key (1) must be in the key cylinder (2) for cylinder installation.

1. Install the key cylinder (2) into the housing (3) using care to align the end of the key cylinder with the ignition switch.
2. Push the key cylinder (2) in until it clicks.
3. Rotate the key to the insert position.
4. Install the halo ring around the key cylinder housing.
5. Install the (S.K.R.E.E.M) module.
6. Install the shroud covers.

HOUSING-LOCK CYLINDER

REMOVAL

LOCK CYLINDER HOUSING

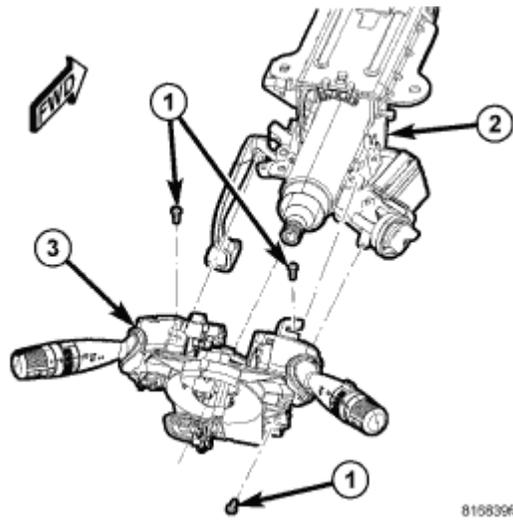


Fig. 23: Removing Steering Column Control Module (SCCM) From Steering Column
Courtesy of CHRYSLER LLC

1. Access and remove the Steering Column Control Module (SCCM) (3) from the steering column (2). Refer to **REMOVAL** .

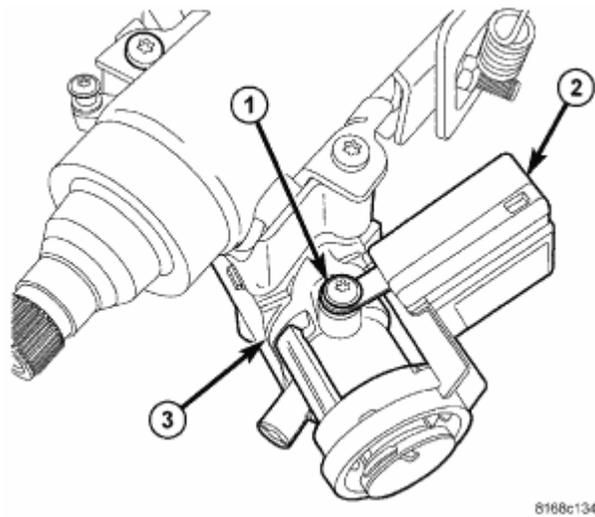
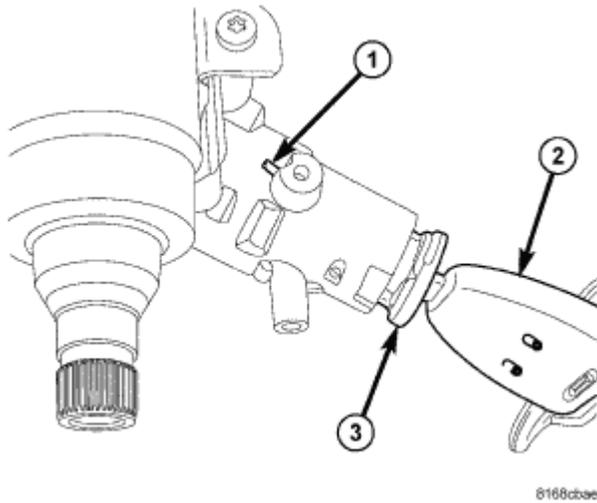


Fig. 24: Identifying Screw, SKREEM/WCM & Lock Cylinder Housing
Courtesy of CHRYSLER LLC

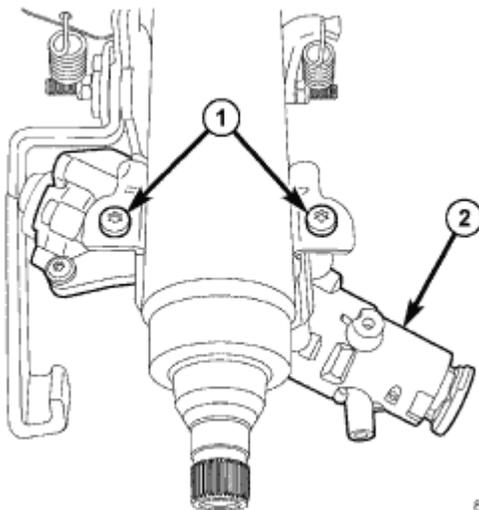
2. Remove the screw (1) fastening the SKREEM/WCM (2) to the lock cylinder housing (3).
3. Unhook the SKREEM/WCM (2) retainer fingers from the lock cylinder housing (3) and remove it.



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Fig. 25: Identifying Slot, Key & Key Cylinder
Courtesy of CHRYSLER LLC

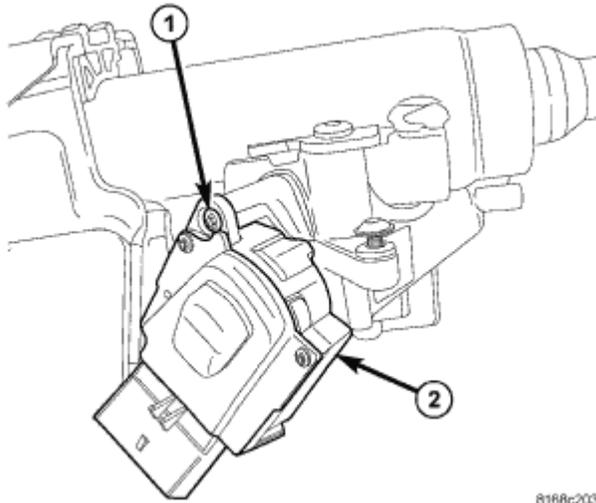
4. Insert the key (2) and turn the key cylinder (3) to the RUN position.
5. Insert an appropriate tool into the slot (1) formed into the lock cylinder housing depressing the key cylinder retaining tab.
6. Pull the key cylinder and key straight out of the lock cylinder housing as one unit.



8168cbc2

Fig. 26: Identifying Screws & Lock Cylinder Housing
Courtesy of CHRYSLER LLC

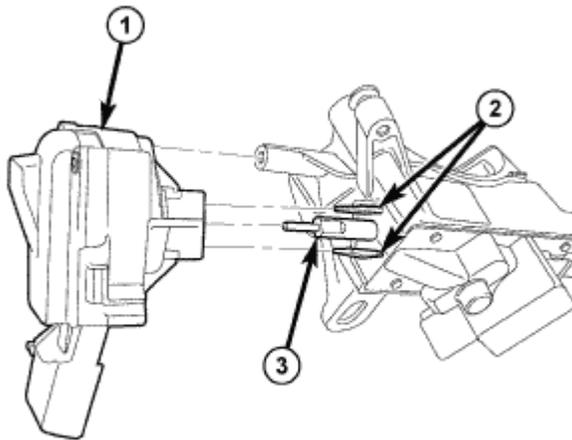
7. Using a Tamper-Proof Torx® Plus (five point) 30 bit, remove the two screws (1) fastening the lock cylinder housing (2) to the column.
8. Remove the lock cylinder housing from the steering column.



8168c203

Fig. 27: Identifying Mounting Screw & Ignition Module
Courtesy of CHRYSLER LLC

9. Remove the ignition module (2) mounting screw (1).



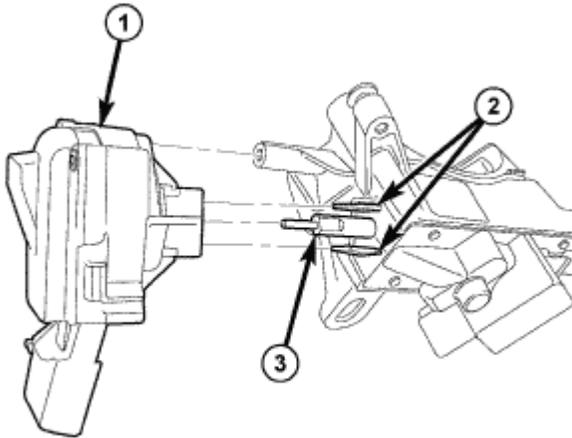
8168c64

Fig. 28: Identifying Module & Retaining Tabs
Courtesy of CHRYSLER LLC

10. Pull the module (1) straight out and off the retaining tabs (2) located on the lock cylinder housing.

INSTALLATION

LOCK CYLINDER HOUSING

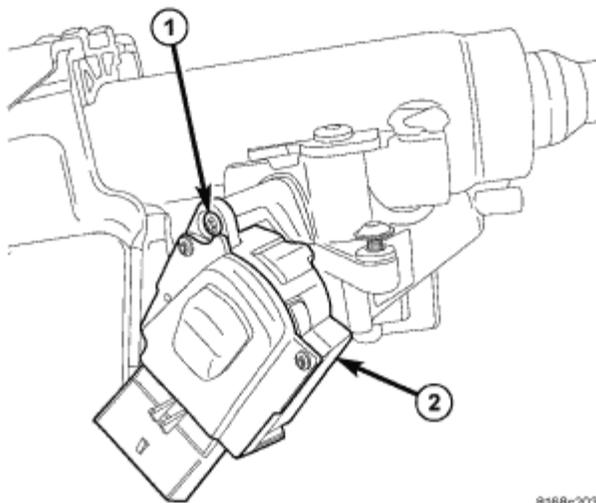


8168cb64

Fig. 29: Ignition Switch Removal/Installation
 Courtesy of CHRYSLER LLC

NOTE: Ignition module must be installed prior to lock housing installation on column. Otherwise, the tilt lever will obstruct installation of ignition switch.

1. Ensure the ignition module is in the RUN position and the actuator shaft in the lock housing is in the RUN position.
2. Align the ignition module with the pin (3), actuator shaft and retaining tabs (2) located on the lock cylinder housing. Carefully install the module, snapping it into place over the retaining tabs.



8168c203

Fig. 30: Identifying Ignition Module & Mounting Screw
 Courtesy of CHRYSLER LLC

3. Install the ignition module (2) mounting screw (1). Tighten the screw to 2 N.m (18 in. lbs.).

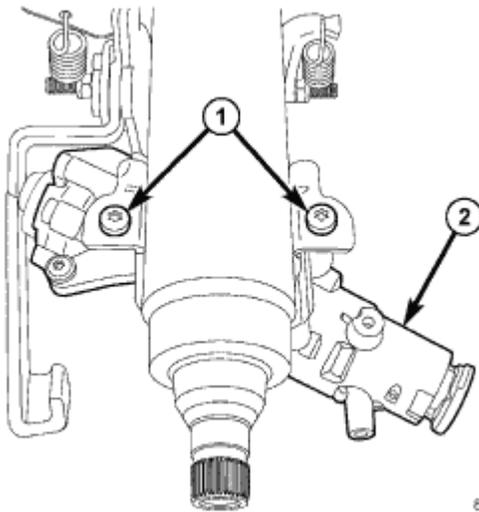


Fig. 31: Identifying Screws & Lock Cylinder Housing
Courtesy of CHRYSLER LLC

NOTE: Ignition module needs to be installed on lock cylinder housing before housing installation to clear tilt lever.

4. Position the lock cylinder housing in the RUN position.
5. Align the lock cylinder housing (2) with the steering column.
6. Install the two screws (1) fastening the lock cylinder housing (2) to the column. Tighten the screws to 12 N.m (110 in. lbs.).

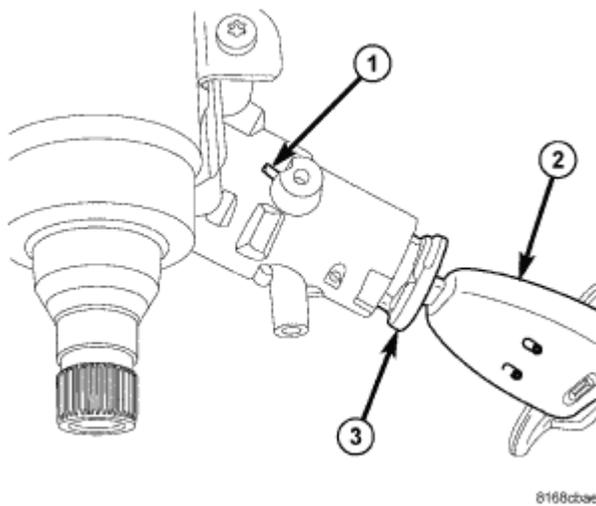
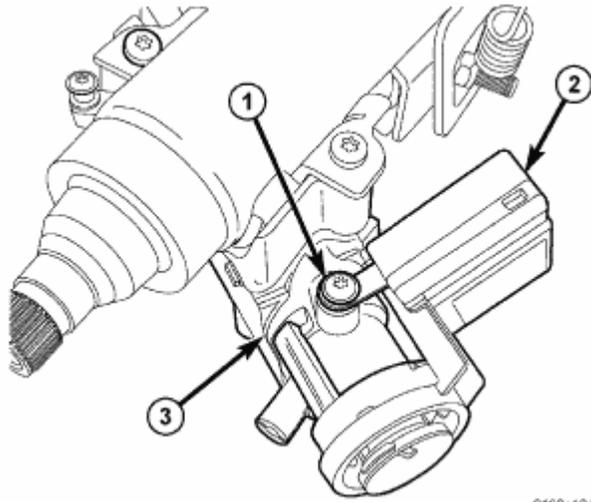


Fig. 32: Access Hole For Lock Cylinder Removal
Courtesy of CHRYSLER LLC

7. Place the actuator in the lock cylinder housing to the RUN position (if not already there).
8. Insert the key into the key cylinder and turn the key cylinder to the RUN position.
9. Align the retaining tab on the key cylinder with the slot in the top of the lock cylinder housing.

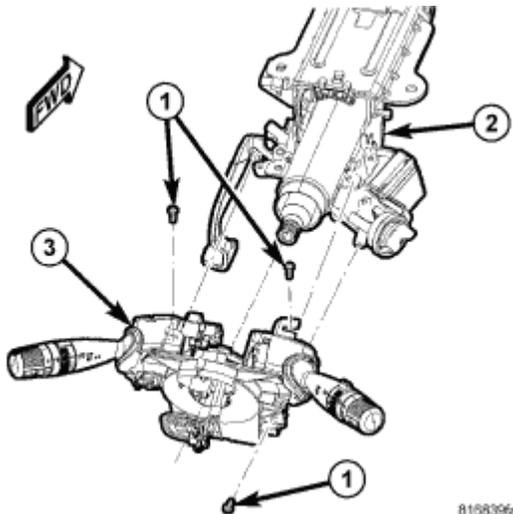
10. Slide the key cylinder into the lock cylinder housing until the key cylinder retaining tab locks the cylinder into place.
11. Rotate the key back and forth (OFF to START), then remove and reinstall it, making sure the key cylinder and lock cylinder housing operate properly.



8168c134

Fig. 33: Identifying Screw, SKREEM/WCM & Lock Cylinder Housing
 Courtesy of CHRYSLER LLC

12. Slide the ring of the SKREEM/WCM (2) over the lock cylinder housing (3) and engage the retainer fingers in the recesses formed on the lock cylinder housing.
13. Install the screw (1) fastening the SKREEM/WCM (2) to the lock cylinder housing (3). Tighten the screw to 2.5 N.m (22 in. lbs.).



815839fa

Fig. 34: Installing Steering Column Control Module (SCCM)
 Courtesy of CHRYSLER LLC

14. Install the Steering Column Control Module (SCCM) (3) and all components removed to access it. Refer

to **INSTALLATION** .

15. Check operation of all steering column mounted components.

INTERMEDIATE SHAFT

REMOVAL

STEERING INTERMEDIATE SHAFT - 4.0L

1. Disconnect the negative battery cable.
2. Remove knee blocker cover and knee blocker, refer to **REMOVAL** .

NOTE: The steering column on vehicles with an automatic transmission may not be equipped with an internal locking shaft that allows the ignition key cylinder to be locked with the key. Alternative methods of locking the steering wheel for service will have to be used.

3. Lock the steering wheel with the tires in the straight ahead position.

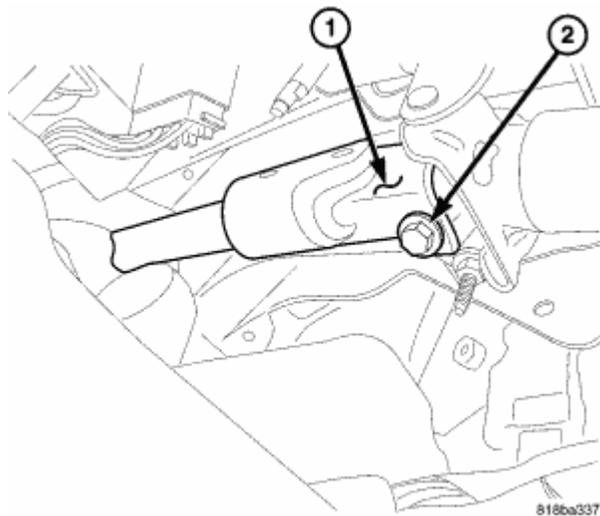


Fig. 35: Identifying Lower Column Pinch Bolt & Steering Coupler
Courtesy of CHRYSLER LLC

4. Remove the lower column pinch bolt (2).
5. Lower the steering coupler (1) shaft from the column.

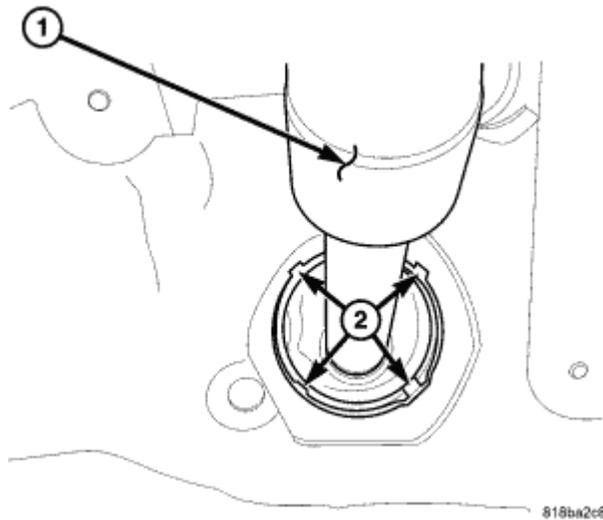


Fig. 36: Removing/Installing Intermediate Shaft Seal By Pushing In Four Tangs Securing To Panel
Courtesy of CHRYSLER LLC

6. Remove the intermediate shaft seal by pushing in the four tangs (2) securing it to the panel.

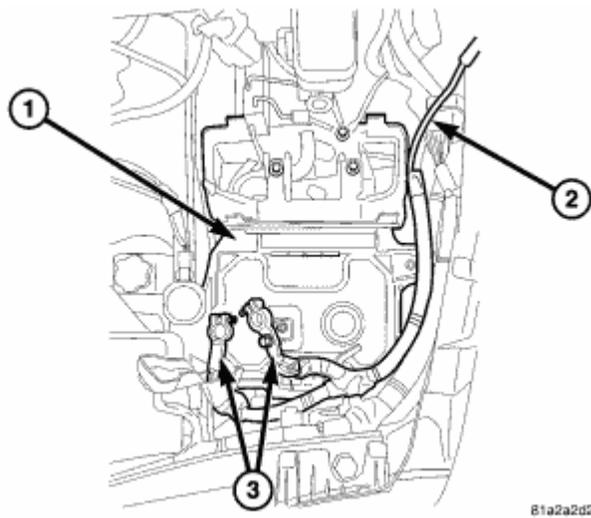
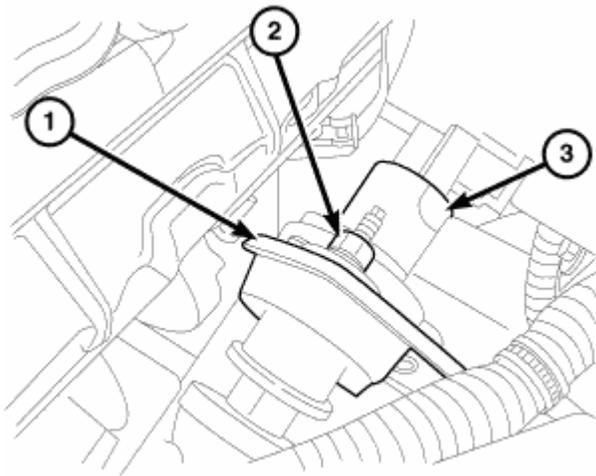


Fig. 37: Identifying Battery Tray, Power Center & Battery Terminals
Courtesy of CHRYSLER LLC

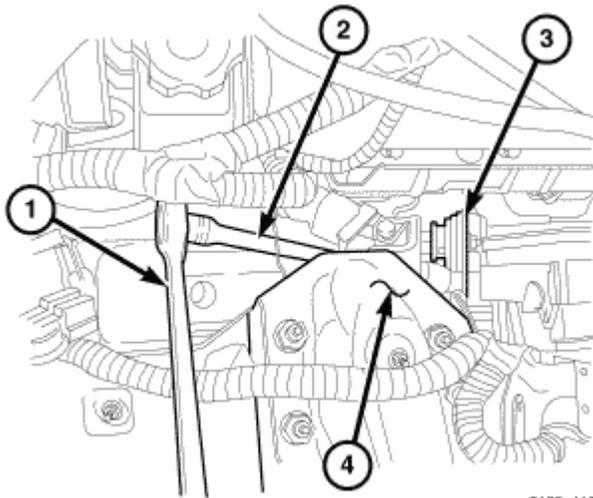
7. Remove the battery. Refer to **REMOVAL** .
8. Unclip the power center (2) and move it to the side out of the way to access the battery tray (1).
9. Remove the battery tray (1). Refer to **REMOVAL** .



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Fig. 38: Removing Nuts For Intermediate Shaft Support Bearing
Courtesy of CHRYSLER LLC

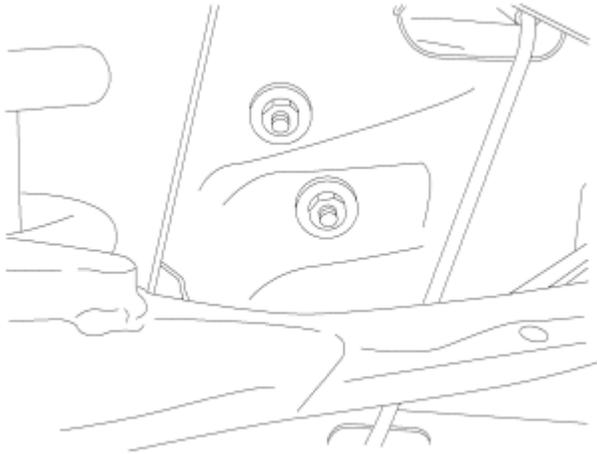
Remove the nuts (2) for the intermediate shaft support bearing (1).



8195c410

Fig. 39: Identifying Ratchet, Extension, Center Support Bearing Bracket & Shock Tower
Courtesy of CHRYSLER LLC

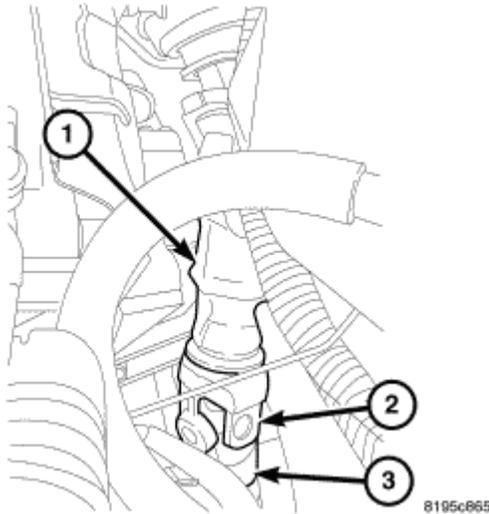
10. Remove the center support bearing bracket (3) from the mount on the shock tower (4) using a ratchet (1) with an extension (2).



8195c414

Fig. 40: Identifying Shock Tower Nuts
Courtesy of CHRYSLER LLC

11. Remove the nuts from the shock tower **if removing the bracket.**



8195c865

Fig. 41: Identifying Intermediate Shaft, Coupler & Lower Coupler Pinch Bolt
Courtesy of CHRYSLER LLC

12. Remove the lower coupler pinch bolt (3) at the steering gear.
13. Remove the coupler (2) at the steering gear.
14. Remove the intermediate shaft (1) from the vehicle.
15. Remove the center support bearing from the steering shaft (if replacing the intermediate shaft).

STEERING INTERMEDIATE SHAFT - 3.7L & DIESEL

1. Disconnect the negative battery cable.
2. Remove knee blocker cover and knee blocker, refer to **REMOVAL** .

NOTE: The steering column on vehicles with an automatic transmission may not be equipped with an internal locking shaft that allows the ignition key cylinder to be locked with the key. Alternative methods of locking the steering wheel for service will have to be used.

3. Lock the steering wheel with the tires in the straight ahead position.

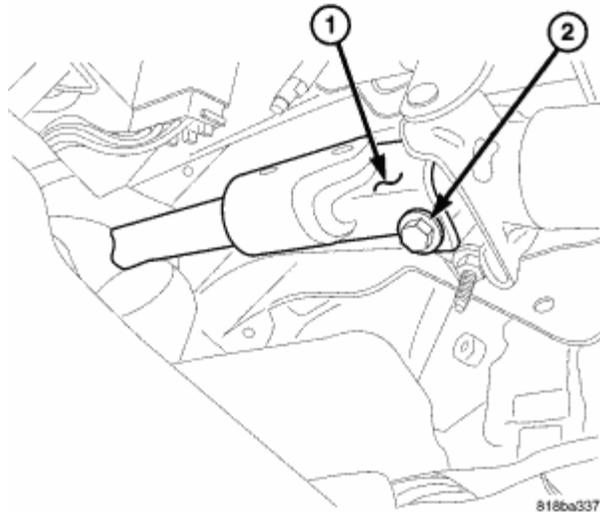


Fig. 42: Identifying Lower Column Pinch Bolt & Steering Coupler
Courtesy of CHRYSLER LLC

4. Remove the lower column pinch bolt (2).
5. Lower the steering coupler (1) shaft from the column.

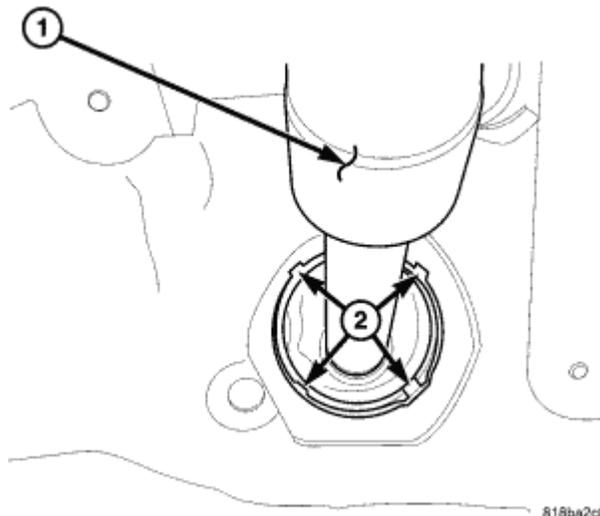
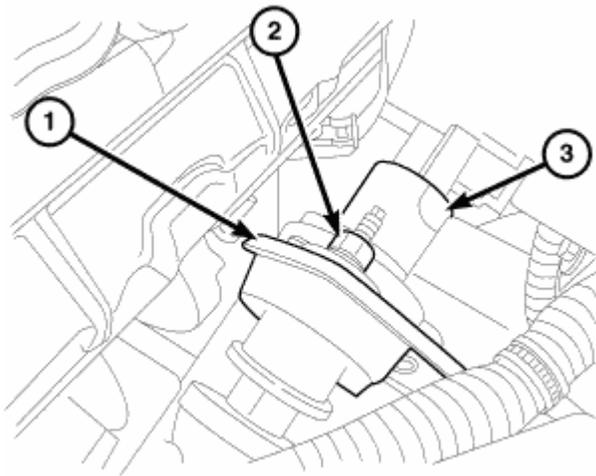


Fig. 43: Removing/Installing Intermediate Shaft Seal By Pushing In Four Tangs Securing To Panel
Courtesy of CHRYSLER LLC

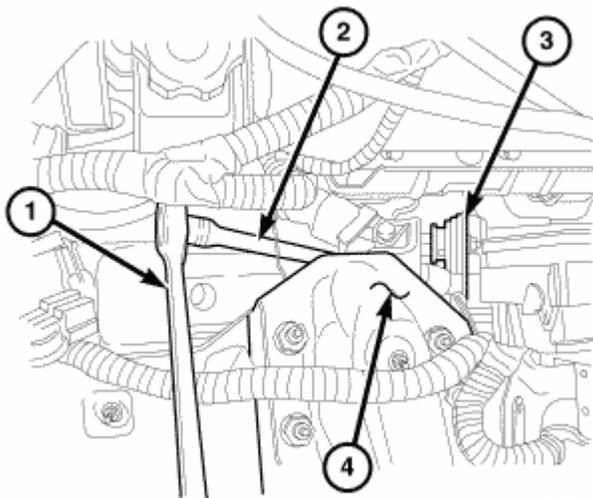
6. Remove the intermediate shaft seal by pushing in the four tangs (2) securing it to the panel.



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Fig. 44: Removing Nuts For Intermediate Shaft Support Bearing
Courtesy of CHRYSLER LLC

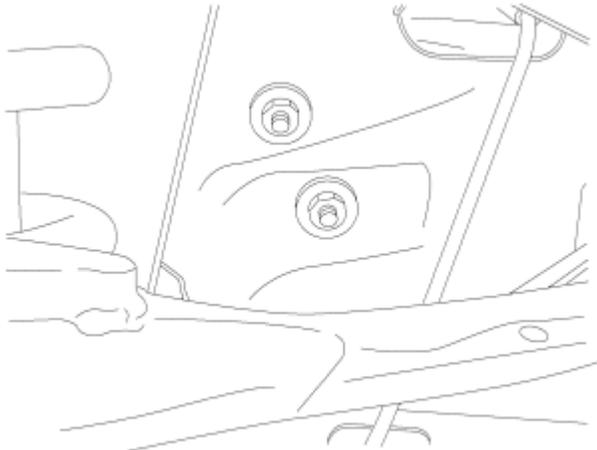
Remove the nuts (2) for the intermediate shaft support bearing (1).



8195c410

Fig. 45: Identifying Ratchet, Extension, Center Support Bearing Bracket & Shock Tower
Courtesy of CHRYSLER LLC

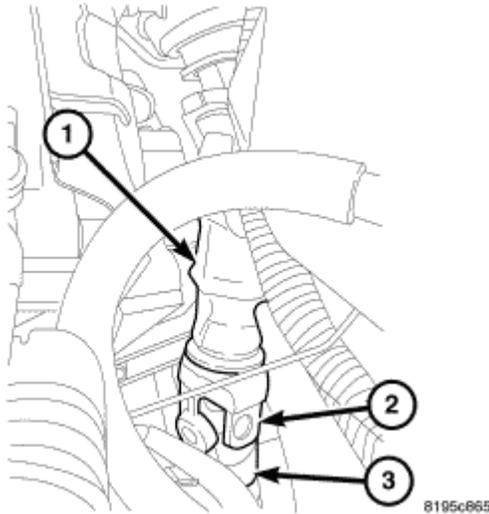
7. Remove the center support bearing bracket (3) from the mount on the shock tower (4) using a ratchet (1) with an extension (2).



8195c414

Fig. 46: Identifying Shock Tower Nuts
Courtesy of CHRYSLER LLC

8. Remove the nuts from the shock tower **if removing the bracket.**



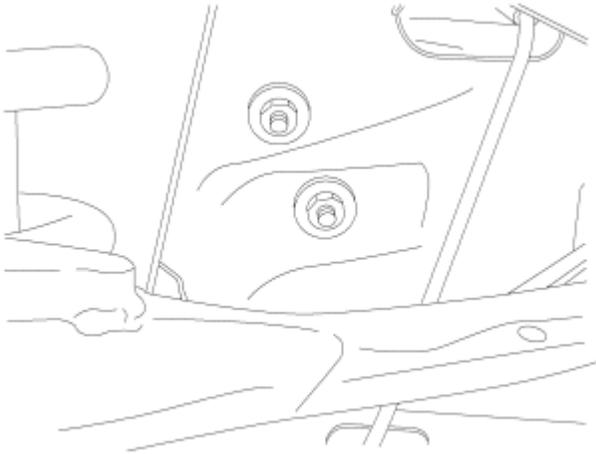
8195c865

Fig. 47: Identifying Intermediate Shaft, Coupler & Lower Coupler Pinch Bolt
Courtesy of CHRYSLER LLC

9. Remove the lower coupler pinch bolt (3) at the steering gear.
10. Remove the coupler (2) at the steering gear.
11. Remove the intermediate shaft (1) from the vehicle.
12. Remove the center support bearing from the steering shaft (if replacing the intermediate shaft).

INSTALLATION

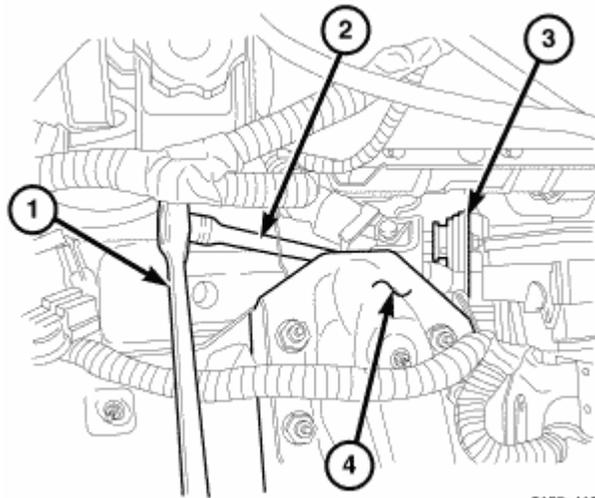
STEERING INTERMEDIATE SHAFT - 4.0L



8195c414

Fig. 48: Identifying Shock Tower Nuts
Courtesy of CHRYSLER LLC

1. Install the center support bearing bracket to the shock tower (if removed). Tighten to 12 N.m (106 in.lbs.).



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Fig. 49: Identifying Ratchet, Extension, Center Support Bearing Bracket & Shock Tower
Courtesy of CHRYSLER LLC

2. Install the intermediate shaft to the vehicle and install and tighten the center support bearing to the bracket (3) nuts.

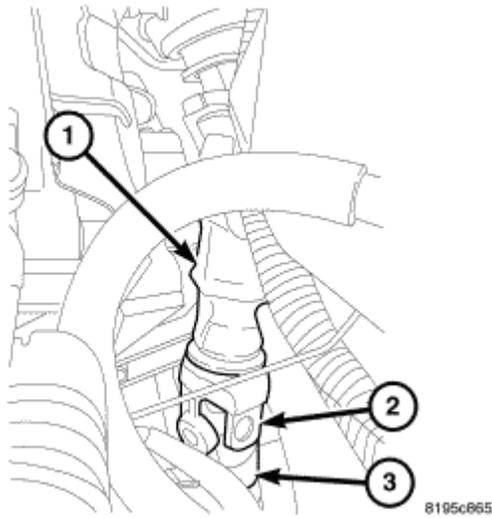


Fig. 50: Identifying Intermediate Shaft, Coupler & Lower Coupler Pinch Bolt
Courtesy of CHRYSLER LLC

3. Install the coupler (2) at the steering gear.
4. Install the lower coupler pinch bolt (3) at the steering gear and tighten the bolt to 53 N.m (39 ft. lbs).

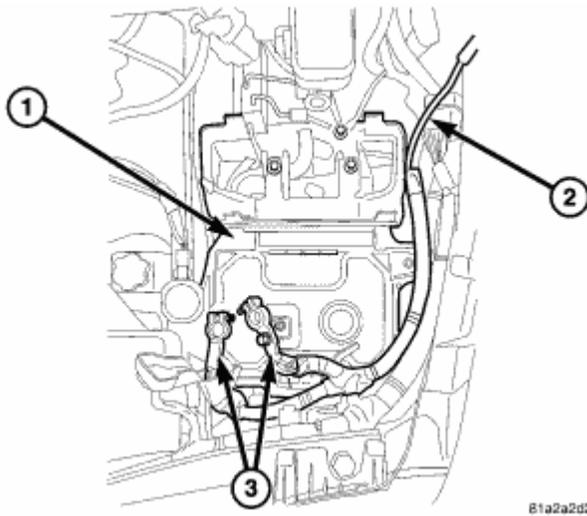


Fig. 51: Identifying Battery Tray, Power Center & Battery Terminals
Courtesy of CHRYSLER LLC

5. Install the battery tray (1). Refer to **INSTALLATION** .
6. Install the battery. Refer to **INSTALLATION** .
7. Reinstall the power center (2) back into place.

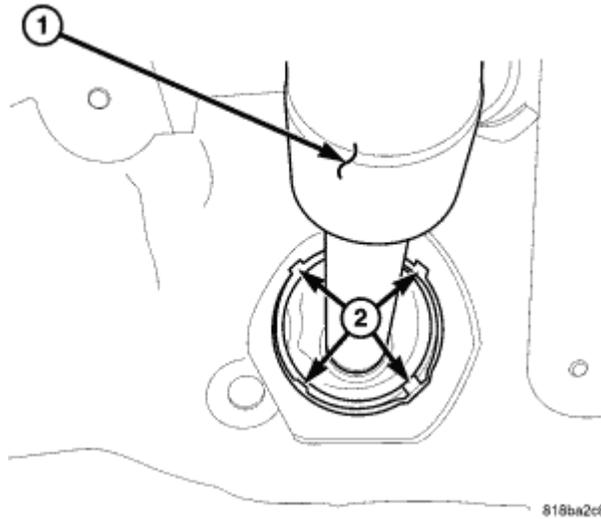


Fig. 52: Removing/Installing Intermediate Shaft Seal By Pushing In Four Tangs Securing To Panel
 Courtesy of CHRYSLER LLC

8. Install the intermediate shaft seal by pushing it in securing the four tangs (2) to the panel.

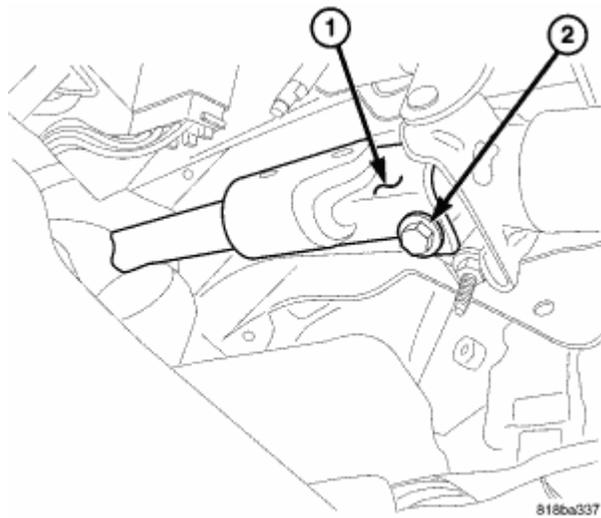
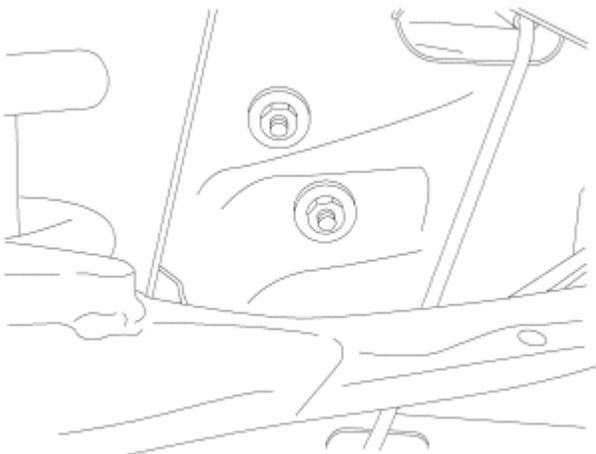


Fig. 53: Identifying Lower Column Pinch Bolt & Steering Coupler
 Courtesy of CHRYSLER LLC

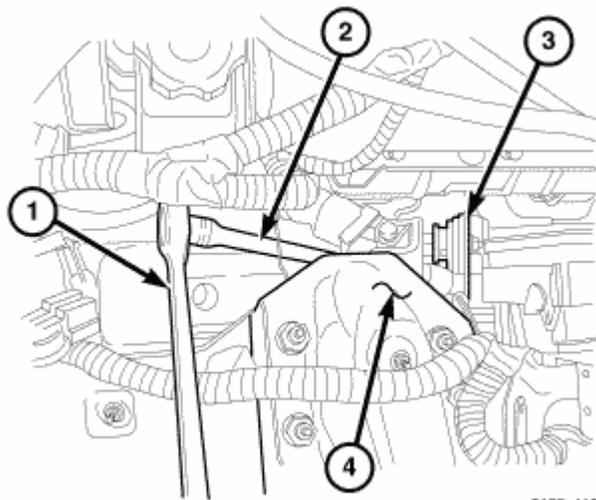
9. Install the steering coupler shaft (1) to the column.
10. Install the upper pinch bolt (2) and tighten the bolt to 53 N.m (39 ft. lbs.).
11. Unlock the steering wheel.
12. Install the knee blocker cover and knee blocker. Refer to **INSTALLATION** .
13. Reconnect the negative battery cable.



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Fig. 54: Identifying Shock Tower Nuts
Courtesy of CHRYSLER LLC

1. Install the center support bearing bracket to the shock tower (if removed). Tighten to 12 N.m (106 in.lbs.).



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Fig. 55: Identifying Ratchet, Extension, Center Support Bearing Bracket & Shock Tower
Courtesy of CHRYSLER LLC

2. Install the intermediate shaft to the vehicle and install and tighten the center support bearing to the bracket (3) nuts.

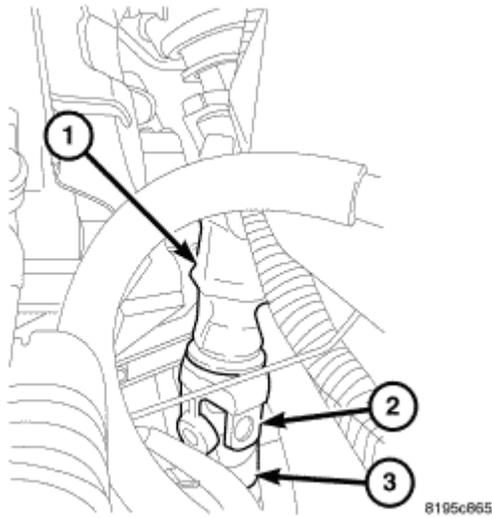


Fig. 56: Identifying Intermediate Shaft, Coupler & Lower Coupler Pinch Bolt
Courtesy of CHRYSLER LLC

3. Install the coupler (2) at the steering gear.
4. Install the lower coupler pinch bolt (3) at the steering gear and tighten the bolt to 53 N.m (39 ft. lbs).

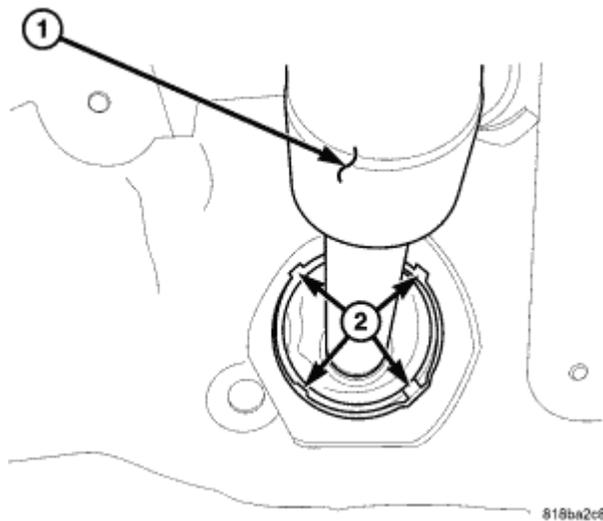


Fig. 57: Removing/Installing Intermediate Shaft Seal By Pushing In Four Tangs Securing To Panel
Courtesy of CHRYSLER LLC

5. Install the intermediate shaft seal by pushing it in securing the four tangs (2) to the panel.

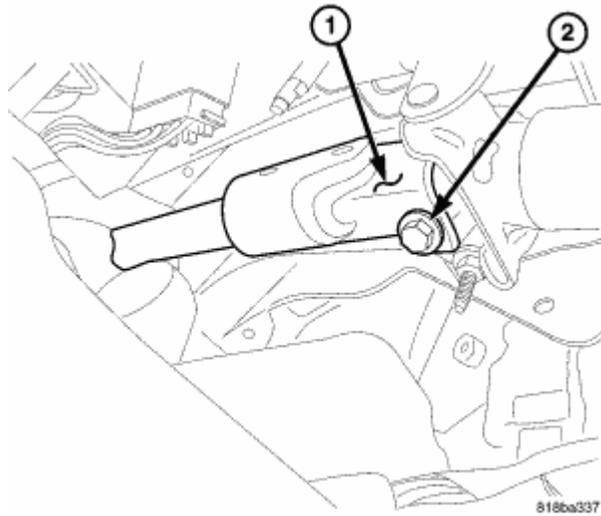


Fig. 58: Identifying Lower Column Pinch Bolt & Steering Coupler
Courtesy of CHRYSLER LLC

6. Install the steering coupler shaft (1) to the column.
7. Install the upper pinch bolt (2) and tighten the bolt to 53 N.m (39 ft. lbs.).
8. Unlock the steering wheel.
9. Install the knee blocker cover and knee blocker. Refer to **INSTALLATION** .
10. Reconnect the negative battery cable.

STEERING WHEEL

REMOVAL

STEERING WHEEL

1. Disable and remove the drivers side airbag. Refer to **REMOVAL** .
2. Partially remove the steering wheel bolt and leave the bolt in the column.

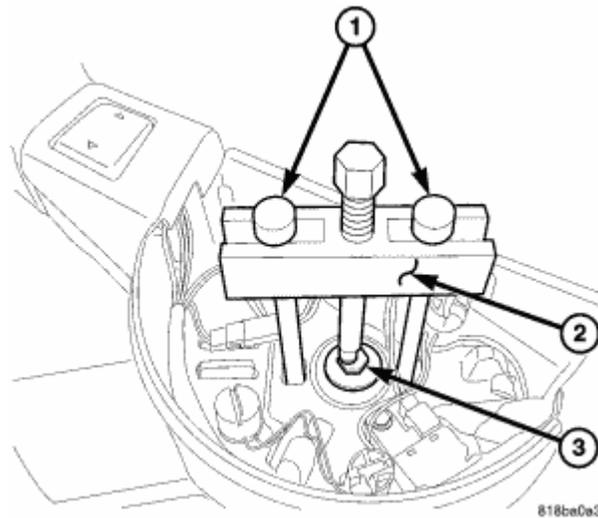


Fig. 59: Identifying OTC® 7929A Jaws, L-4407A Puller & Puller Jaws
Courtesy of CHRYSLER LLC

3. Install puller special tool L-4407A puller (2) with OTC® 7929A jaws (1) or equivalent using the top of the bolt (3) to push on.

NOTE: Ensure the puller jaws (1) are seated in the pockets of the steering wheel armature.

4. Remove the steering wheel.

INSTALLATION

STEERING WHEEL

NOTE: Do not reuse the old steering wheel bolt (a new bolt must be used)

1. Install steering wheel to the column

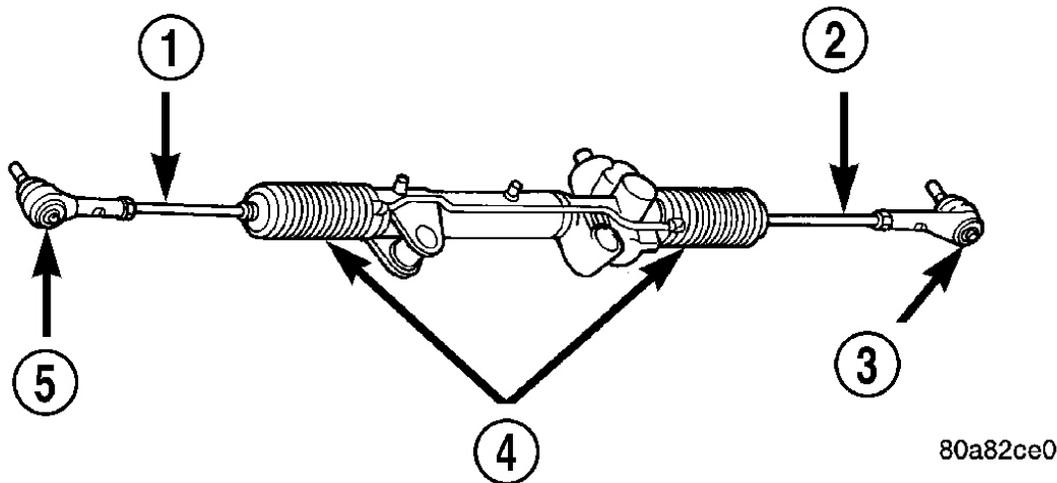
NOTE: Be certain that the steering wheel mounting bolt is tightened to the proper torque specification to ensure proper clockspring operation.

2. Install the new steering wheel bolt. Tighten the bolt to 54 N.m (40 ft. lbs.).
3. Install the drivers side air bag. Refer to INSTALLATION .

GEAR

DESCRIPTION

RACK & PINION STEERING GEAR



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Fig. 60: Rack & Pinion Steering Gear
 Courtesy of CHRYSLER LLC

1 - TIE ROD - INNER
2 - TIE ROD - INNER
3 - TIE ROD END - OUTER LH
4 - BOOTS
5 - TIE ROD END - OUTER RH

A rack and pinion steering gear 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, With the exception of the outer tie rods (3 & 5) which are serviced separately. See **Fig. 60**.

OPERATION

RACK & PINION STEERING GEAR

The steering column intermediate 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, which are connected to the steering knuckles to change the direction of the front wheels.

DIAGNOSIS AND TESTING

POWER STEERING GEAR

NOTE: This information is designed to be used in conjunction with the diagnostic charts at the beginning of the article. See **DIAGNOSIS AND TESTING**.

2007 Dodge Nitro R/T

2007 STEERING Steering System - Nitro

OBJECTIONABLE HISS OR WHISTLE POSSIBLY CAUSED BY A NOISY STEERING GEAR

1. Check and adjust power steering fluid level in the reservoir as necessary. See **STANDARD PROCEDURE**.
2. Start the vehicle and heat system by steering lock-to-lock 5 times with the engine running at 3000 RPM. Do not hold the gear against the stops for more than 5 seconds at a time.
3. Return the engine to idle speed.
4. Listen for the noise when turning the wheel slowly off center during a dry park maneuver.
5. Replace power steering gear if the hiss or whistle is present. See **REMOVAL**.

REMOVAL

RACK & PINION - 2WD

1. Siphon the power steering fluid from the power steering reservoir.

NOTE: **The steering column on vehicles with an automatic transmission may not be equipped with an internal locking shaft that allows the ignition key cylinder to be locked with the key. Alternative methods of locking the steering wheel for service will have to be used.**

2. Lock the steering wheel to prevent spinning of the clockspring.
3. Raise and support the vehicle.
4. Remove the tire and wheel assembly.

NOTE: **Mark the alignment adjusting cams and tie rod end jam nuts on the steering gear for easier installation.**

5. Remove the tie rod end nuts.
6. Separate tie rod ends from the knuckles with Puller C-3894-A.

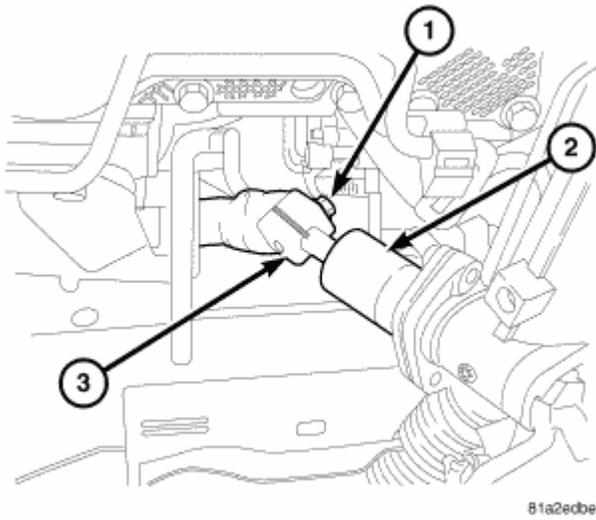


Fig. 61: Removing/Installing Lower Intermediate Shaft Coupler Pinch Bolt And Sliding Coupler Off/On Gear
Courtesy of CHRYSLER LLC

7. Remove the lower intermediate shaft coupler pinch bolt and slide the coupler off the gear.

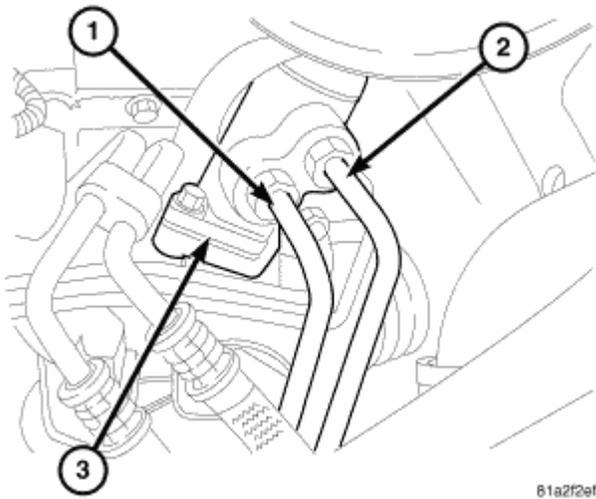
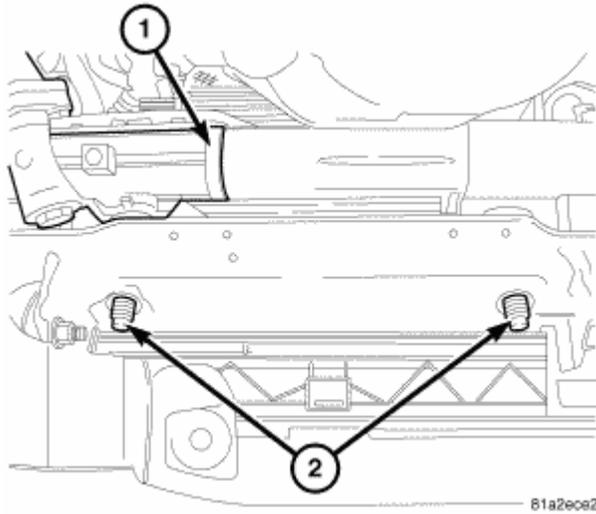


Fig. 62: Identifying Power Steering Lines & Gear
Courtesy of CHRYSLER LLC

8. Remove the power steering lines (1 & 2) from the gear (3).



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Fig. 63: Identifying Steering Gear & Gear Mounting Bolts
 Courtesy of CHRYSLER LLC

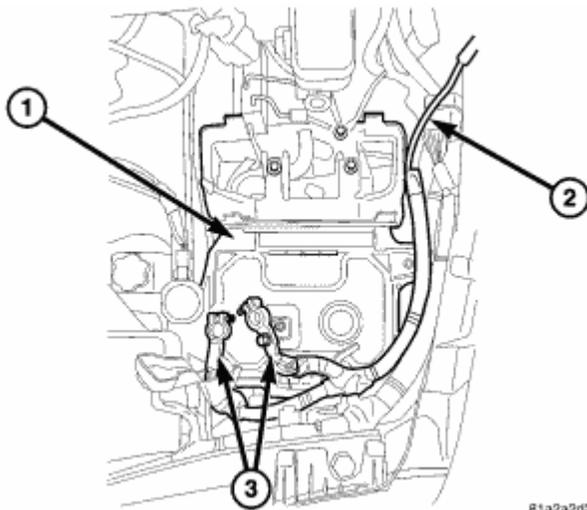
9. Remove the mounting bolts (2) from the gear (1) to the front cradle.
10. Remove the steering gear (1) from the vehicle.

RACK & PINION - 4WD

1. Siphon the power steering fluid from the power steering reservoir.

NOTE: The steering column on vehicles with an automatic transmission may not be equipped with an internal locking shaft that allows the ignition key cylinder to be locked with the key. Alternative methods of locking the steering wheel for service will have to be used.

2. Lock the steering wheel to prevent spinning of the clockspring.



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Fig. 64: Identifying Battery Tray, Power Center & Battery Terminals

Courtesy of CHRYSLER LLC

3. Disconnect the battery (3).
4. Remove the battery. Refer to **REMOVAL** .
5. Unclip the power center (2) and move it to the side out of the way to access the battery tray (1).
6. Remove the battery tray (1). Refer to **REMOVAL** .

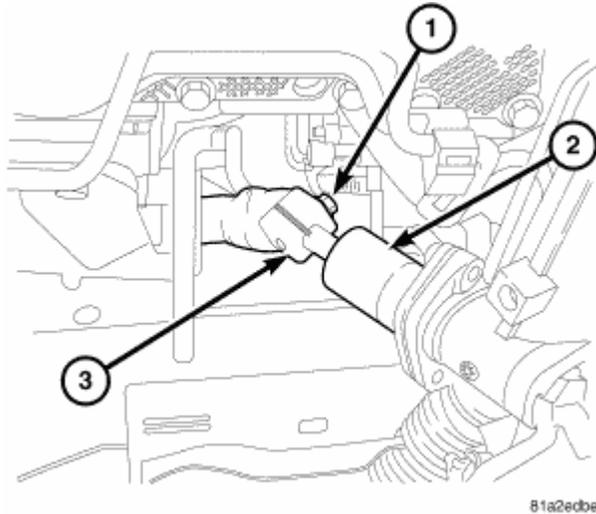


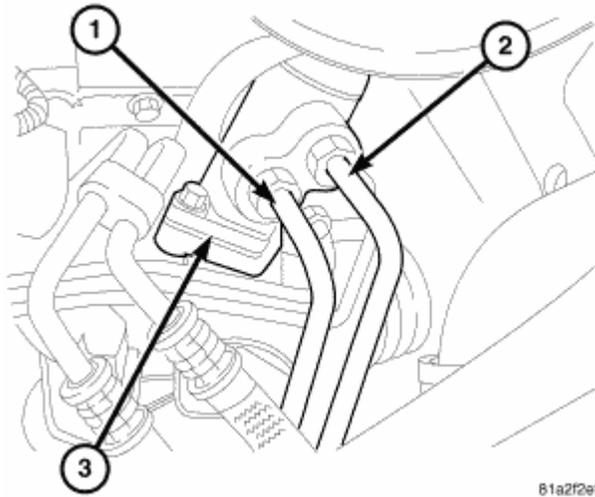
Fig. 65: Removing/Installing Lower Intermediate Shaft Coupler Pinch Bolt And Sliding Coupler Off/On Gear

Courtesy of CHRYSLER LLC

7. Remove the lower intermediate shaft coupler pinch bolt and slide the coupler off the gear.
8. Raise and support the vehicle.
9. Remove the tire and wheel assembly.

NOTE: Mark the alignment adjusting cams and tie rod end jam nuts on the steering gear for easier installation.

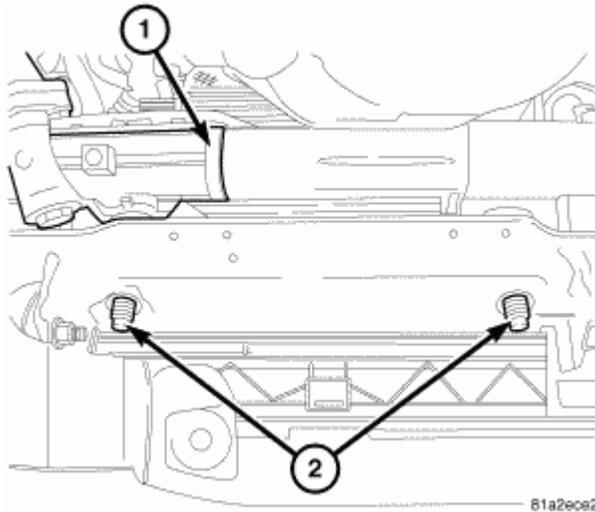
10. Remove the tie rod end nuts.
11. Separate tie rod ends from the knuckles with Puller C-3894-A.



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Fig. 66: Identifying Power Steering Lines & Gear
 Courtesy of CHRYSLER LLC

12. Remove the power steering lines (1&2) from the gear (3).



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Fig. 67: Identifying Steering Gear & Gear Mounting Bolts
 Courtesy of CHRYSLER LLC

13. Remove the mounting bolts (2) from the gear (1) to the front cradle.
14. Remove the left front lower suspension arm cam/bolt and lower the control arm enough to get the axle mounting bracket bolt out. **This must be done to remove the axle mounting bracket.**
15. Remove the axle mounting bracket.
16. Remove the oil filter and trough.
17. Put the steering gear in the full right position and lower the gear out of the vehicle.
18. Remove the steering gear (1) from the vehicle.

1. Siphon the power steering fluid from the power steering reservoir.

NOTE: The steering column on vehicles with an automatic transmission may not be equipped with an internal locking shaft that allows the ignition key cylinder to be locked with the key. Alternative methods of locking the steering wheel for service will have to be used.

2. Lock the steering wheel to prevent spinning of the clockspring.
3. Raise and support the vehicle.
4. Remove air cleaner housing. Refer to **REMOVAL** .
5. Remove the washer/coolant reservoir assembly.
6. Remove the fan shroud.
7. Remove the pressure and return lines at the gear.
8. Remove the front tire and wheel assemblies.
9. Remove the front axle. Refer to **REMOVAL** .
10. Remove the tie rod end nuts.
11. Separate tie rod ends from the knuckles with Puller C-3894-A.

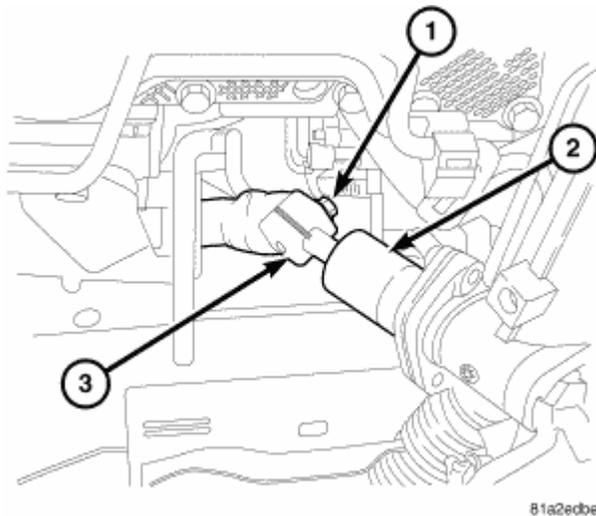
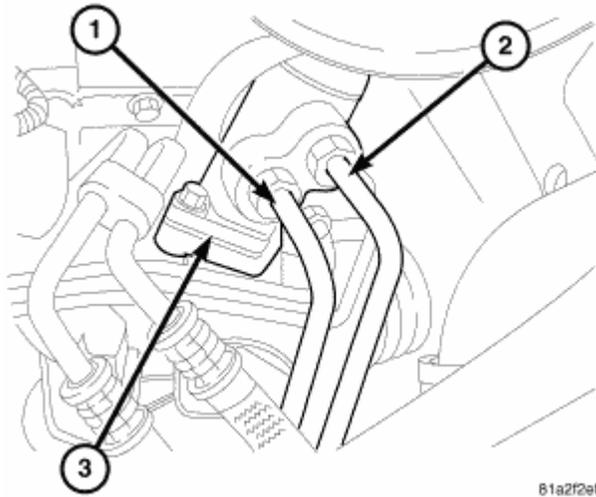


Fig. 68: Removing/Installing Lower Intermediate Shaft Coupler Pinch Bolt And Sliding Coupler Off/On Gear
Courtesy of CHRYSLER LLC

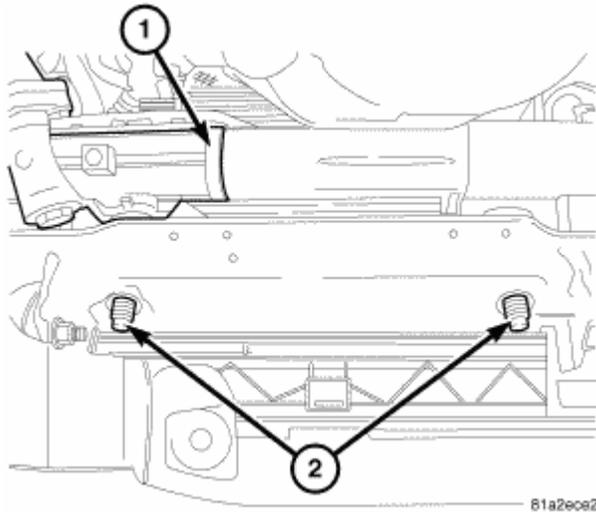
12. Remove the intermediate shaft (3) lower coupler pinch bolt (1) and slide the coupler (3) off the gear (2).



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Fig. 69: Identifying Power Steering Lines & Gear
Courtesy of CHRYSLER LLC

13. Remove the power steering lines (1&2) from the gear (3).



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Fig. 70: Identifying Steering Gear & Gear Mounting Bolts
Courtesy of CHRYSLER LLC

14. Remove the mounting bolts (2) from the gear (1) to the front cradle.
15. Remove the steering gear (1) from the vehicle.

INSTALLATION

RACK & PINION - 4.0L

2007 Dodge Nitro R/T

2007 STEERING Steering System - Nitro

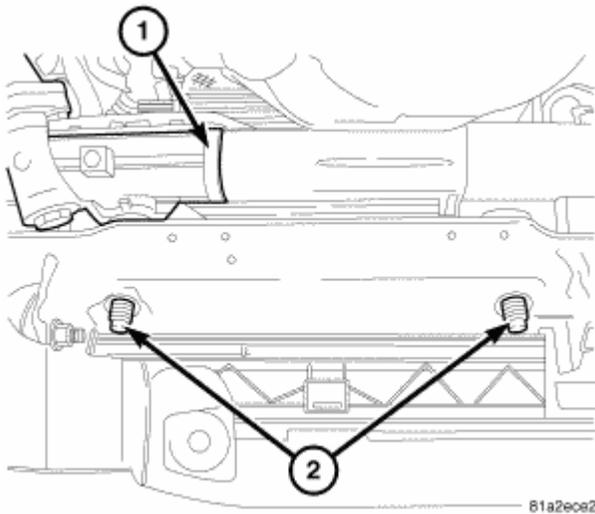


Fig. 71: Identifying Steering Gear & Gear Mounting Bolts
Courtesy of CHRYSLER LLC

1. Transfer the tie rod ends to the new steering gear (if needed).
2. Install the steering gear (1) to the vehicle.
3. Install the gear mounting bolts (2) to the front cradle. Tighten the gear mounting bolts to 176 N.m (130 ft.lbs.).

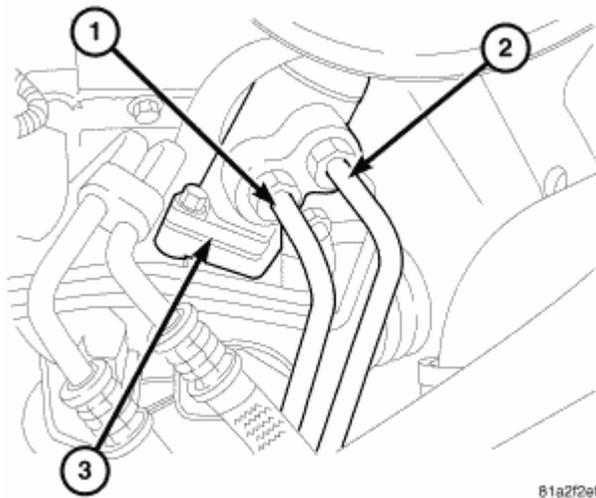
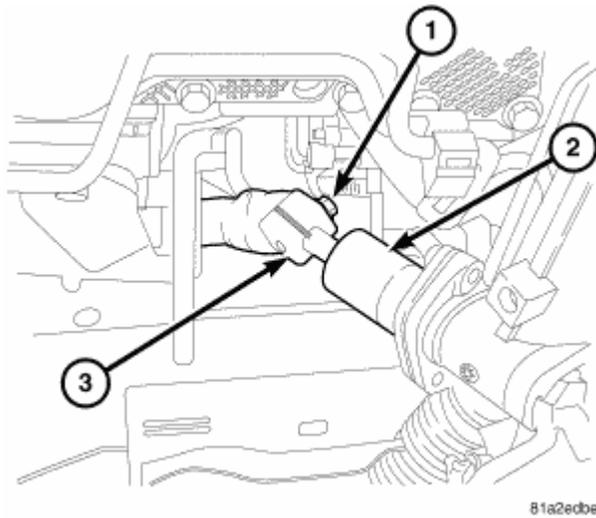


Fig. 72: Identifying Power Steering Lines & Gear
Courtesy of CHRYSLER LLC

4. Install the power steering lines (1&2) to the gear (3), tighten the tube nuts to 27 N.m (20 ft.lbs.).

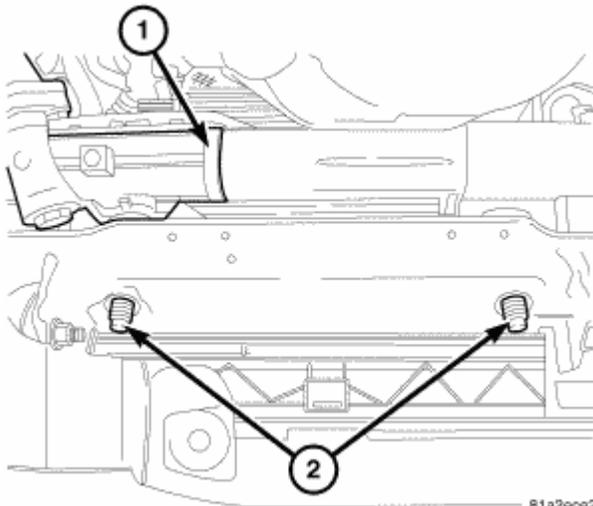


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Fig. 73: Removing/Installing Lower Intermediate Shaft Coupler Pinch Bolt And Sliding Coupler Off/On Gear
 Courtesy of CHRYSLER LLC

5. Install the lower coupler bolt and slide the coupler on to the gear and tighten the bolt to 53 N.m (39 ft. lbs)
6. Install the tie rod end to the knuckle and tighten the nuts to 41 N.m (30 ft.lbs.) Plus an additional 90° turn.
7. Install the front axle. Refer to **INSTALLATION** .
8. Install the tire and wheel assembly. Refer to **STANDARD PROCEDURE** .
9. Lower the vehicle.
10. Unlock the steering wheel.
11. Fill the power steering fluid. See **STANDARD PROCEDURE**.
12. Reset the toe and center the steering wheel. Refer to **STANDARD PROCEDURE** .

RACK & PINION - 2WD



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Fig. 74: Identifying Steering Gear & Gear Mounting Bolts
 Courtesy of CHRYSLER LLC

1. Transfer the outer tie rod ends to the new steering gear (if needed).
2. Install the steering gear (1) to the vehicle.
3. Install the gear mounting bolts (2) to the front cradle. Tighten the gear mounting bolts to 176 N.m (130 ft.lbs.).

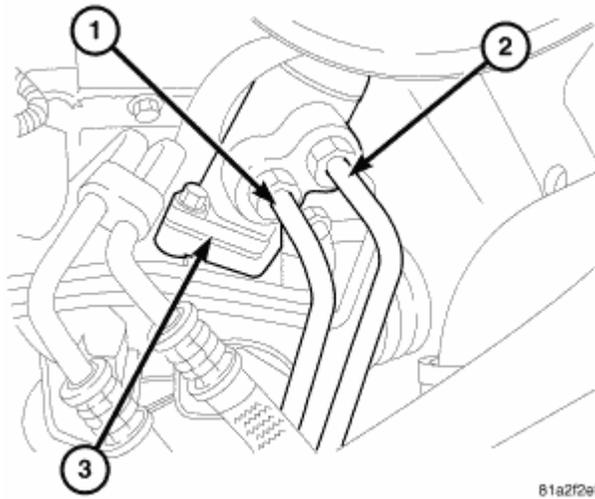


Fig. 75: Identifying Power Steering Lines & Gear
 Courtesy of CHRYSLER LLC

4. Install the power steering lines (1&2) to the gear (1). Tighten the tube nuts to 27 N.m (20 ft.lbs.).

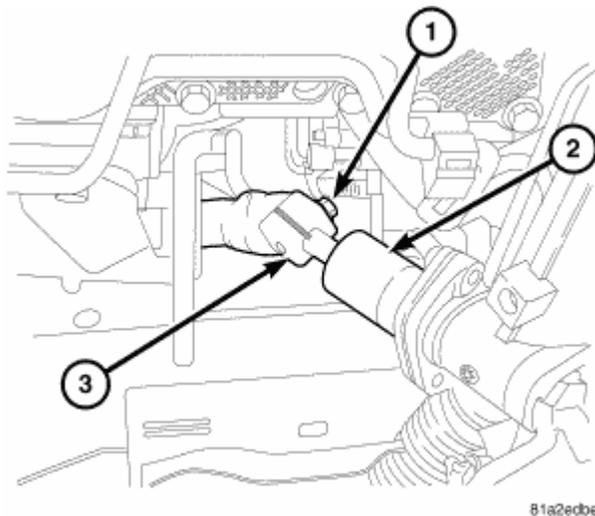


Fig. 76: Removing/Installing Lower Intermediate Shaft Coupler Pinch Bolt And Sliding Coupler Off/On Gear
 Courtesy of CHRYSLER LLC

5. Install the lower coupler pinch bolt and slide the coupler on to the gear. Tighten to 53 N.m (39 ft.lbs.).

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2007 STEERING Steering System - Nitro

6. Install the tie rod end to the knuckle and tighten the nuts to 41 N.m (30 ft.lbs.) Plus an additional 90° turn.
7. Install the tire and wheel assembly. Refer to **STANDARD PROCEDURE** .
8. Install the skid plate. Refer to **INSTALLATION** .
9. Lower the vehicle.
10. Unlock the steering wheel.
11. Fill the power steering fluid. See **STANDARD PROCEDURE**.
12. Reset the toe and center the steering wheel. Refer to **STANDARD PROCEDURE** .

RACK & PINION - 4WD

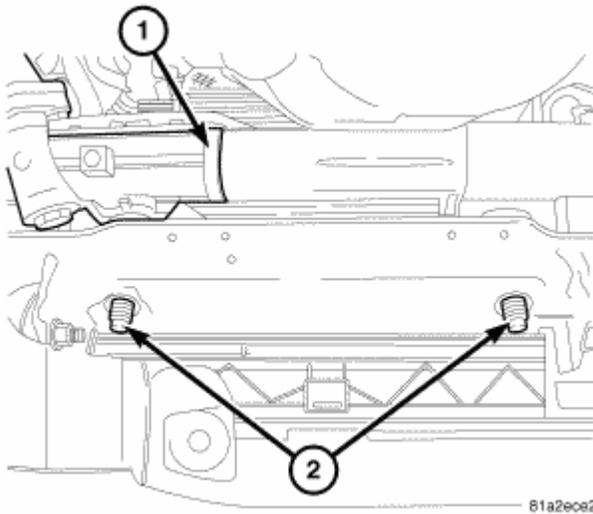


Fig. 77: Identifying Steering Gear & Gear Mounting Bolts
Courtesy of CHRYSLER LLC

1. Transfer the outer tie rod ends to the new steering gear (if needed).
2. Install the steering gear (1) to the vehicle.
3. Install the gear mounting bolts (2) to the front cradle. Tighten the gear mounting bolts to 176 N.m (130 ft.lbs.).

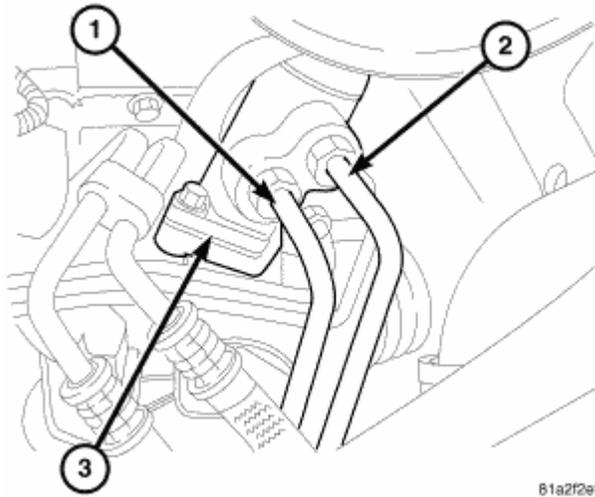


Fig. 78: Identifying Power Steering Lines & Gear
 Courtesy of CHRYSLER LLC

4. Install the power steering lines (1 & 2) to the gear (3). Tighten the tube nuts to 27 N.m (20 ft.lbs.).
5. Install the oil filter trough and filter.
6. Install the axle mounting bracket.
7. Install the left lower control arm into position and install the cam/bolt.
8. Install the tie rod end to the knuckle and tighten the nuts to 41 N.m (30 ft.lbs.) Plus an additional 90° turn.
9. Install the tire and wheel assembly. Refer to **STANDARD PROCEDURE** .
10. Lower the vehicle.

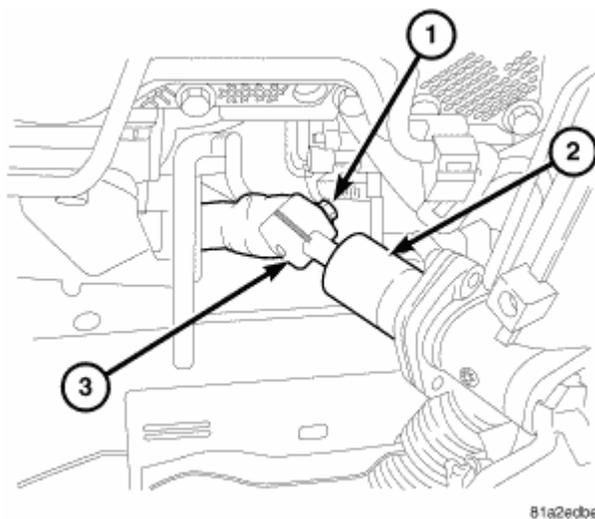


Fig. 79: Removing/Installing Lower Intermediate Shaft Coupler Pinch Bolt And Sliding Coupler Off/On Gear
 Courtesy of CHRYSLER LLC

11. Install the lower coupler pinch bolt and slide the coupler on to the gear. Tighten to 53 N.m (39 ft.lbs.).

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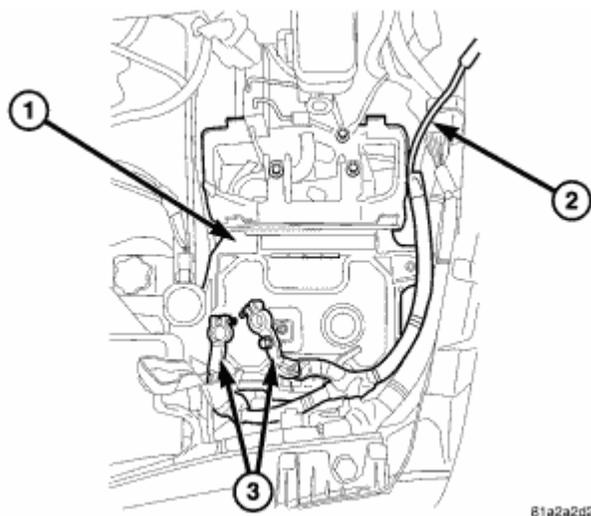


Fig. 80: Identifying Battery Tray, Power Center & Battery Terminals
Courtesy of CHRYSLER LLC

12. Install the battery tray (1). Refer to **INSTALLATION** .
13. Install the battery. Refer to **INSTALLATION** .
14. Reinstall the power center (2) back into place.
15. Reconnect the battery cables (3).
16. Unlock the steering wheel.
17. Fill the power steering fluid. See **STANDARD PROCEDURE**.
18. Perform a wheel alignment. Refer to **STANDARD PROCEDURE** .

SPECIFICATIONS

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Rack and Pinion Steering Gear to Frame Bolts	176	130	-
Rack and Pinion Steering Gear Intermediate Shaft Bolt	53	39	-
Intermediate Shaft Lower Support Bearing Nuts	12	9	106
Tie Rod End Knuckle Nut	41 Plus an additional 90° turn	30 Plus an additional 90° turn	-
Tie Rod End Jam Nut	75	55	-
Power Steering Line Pressure Line	27	20	-
Power Steering Line	27	20	-

Return Line

SPECIAL TOOLS

RACK & PINION STEERING GEAR

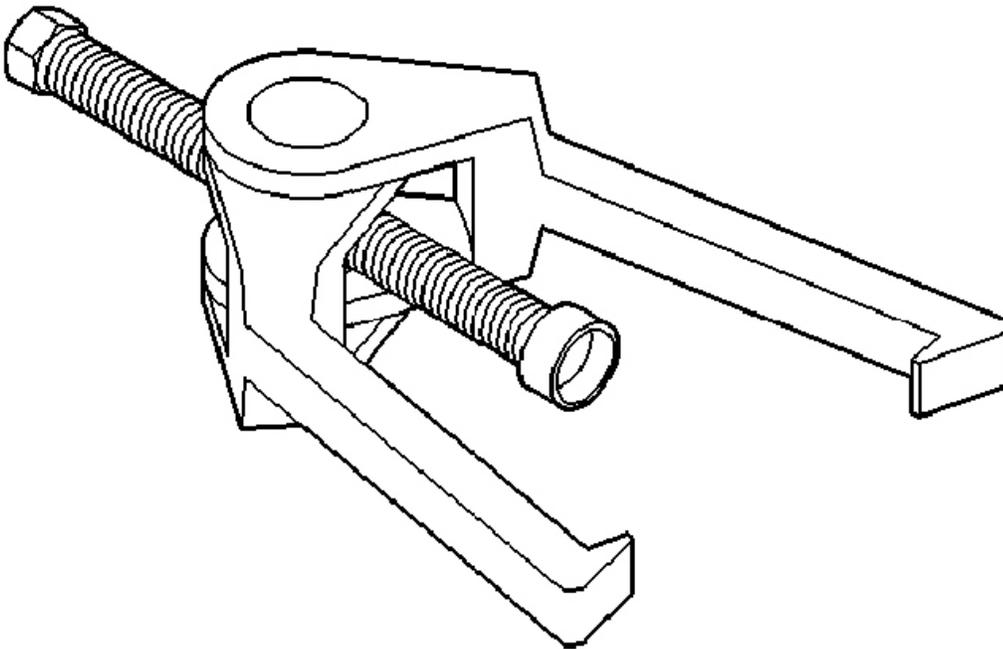


Fig. 81: Puller C-3894-A
Courtesy of CHRYSLER LLC

LINKAGE

TIE ROD END

DIAGNOSIS AND TESTING

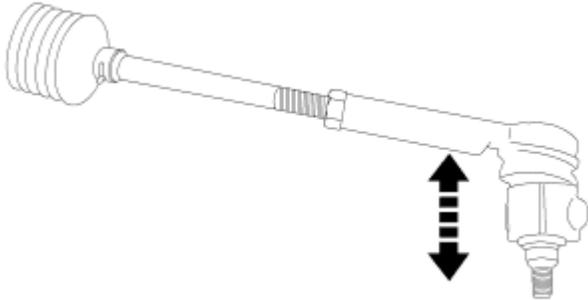
TIE ROD

Tie rod free-play can be measured using the following hand methods:

NOTE: When checking free-play, **DO NOT** rotate the tie rod. Just because a tie rod rotates easily, it is not necessarily faulty.

NOTE: Always check and repair (if necessary) outer tie rod free-play before checking inner tie rod free-play. False results can otherwise be obtained.

OUTER TIE ROD

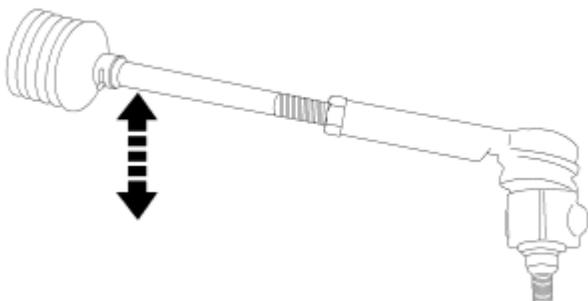


81896/34

Fig. 82: Checking Outer Tie Rod Free Play
Courtesy of CHRYSLER LLC

Grasp the outer tie rod near the ball stud and attempt to move the tie rod straight up and down. If any free-play is felt, replace the outer tie rod. See **REMOVAL**. If no free-play is felt at the outer tie rod, attempt to move the inner tie rod in the same manner. Refer to the following procedure.

INNER TIE ROD



81896/38

Fig. 83: Checking Inner Tie Rod Free Play
Courtesy of CHRYSLER LLC

Grasp the inner tie rod near the steering gear bellows and attempt to move the tie rod straight up and down. If

any free-play is felt, replace the steering gear. See **REMOVAL**.

STANDARD PROCEDURE

STEERING LINKAGE

The tie rod end and ball stud seals should be inspected during all oil changes. If a seal is damaged, replace the tie rod.

CAUTION: If any steering components are replaced or serviced an alignment must be performed, to ensure the vehicle meets all alignment specifications.

REMOVAL

OUTER TIE ROD END

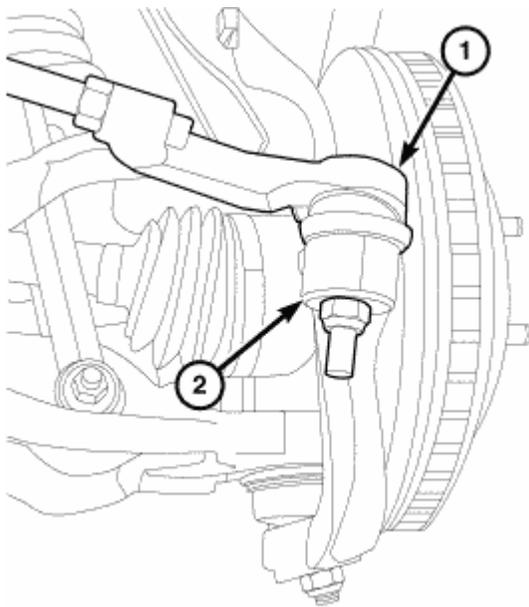


Fig. 84: Identifying Outer Tie Rod End & Nut
Courtesy of CHRYSLER LLC

1. Raise and support the vehicle.
2. Remove the tire and wheel assembly.

NOTE: Mark the outer to inner tie rod end for easier installation.

3. Loosen the tie rod end jam nut.
4. Remove the outer tie rod end nut (2).

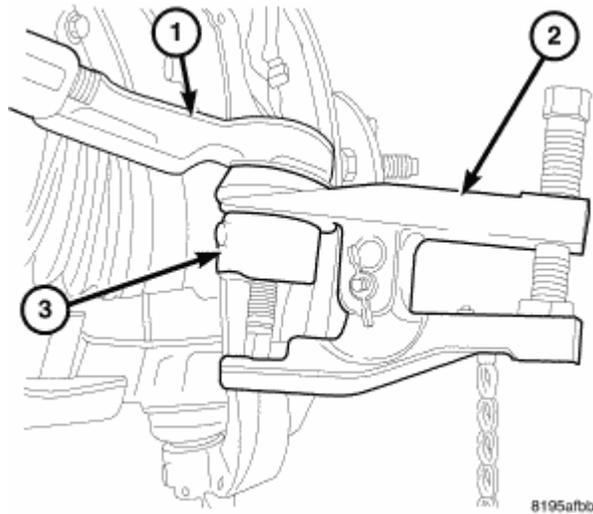


Fig. 85: Identifying Outer Tie Rod End, Knuckle & Tool 9360
Courtesy of CHRYSLER LLC

NOTE: Never use anything other than the specified tool to disassemble the ball joints & tie rods from the steering knuckle. Ball joint seal or knuckle damage can result.

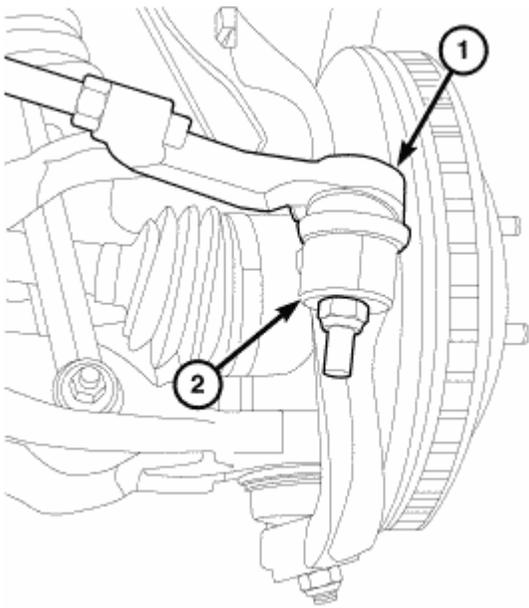
5. Separate the outer tie rod end (1) from the knuckle (3) using tool 9360 (2).

NOTE: Count the number of turns when removing.

6. Remove the outer tie rod end (1) from the inner tie rod.

INSTALLATION

OUTER TIE ROD END



618a30ae

Fig. 86: Identifying Outer Tie Rod End & Nut

Courtesy of CHRYSLER LLC

1. Install the outer tie rod end (1) to the inner tie rod end to the exact number of turns that it was removed.
2. Install the outer tie rod end (1) to the knuckle. Tighten the nut (2) to 41 N.m (30 ft.lbs.) Plus an additional 90° turn.
3. Tighten the jam nut to 75 N.m (55 ft.lbs).
4. Install the tire and wheel assembly. Refer to **STANDARD PROCEDURE** .
5. Reset the toe and center the steering wheel. Refer to **STANDARD PROCEDURE** .

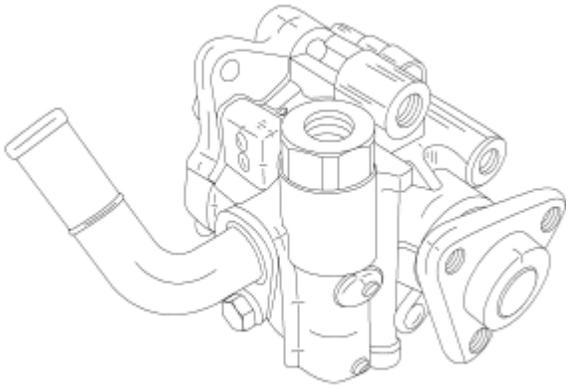
PUMP

DESCRIPTION

2.8L POWER STEERING PUMP

2007 Dodge Nitro R/T

2007 STEERING Steering System - Nitro

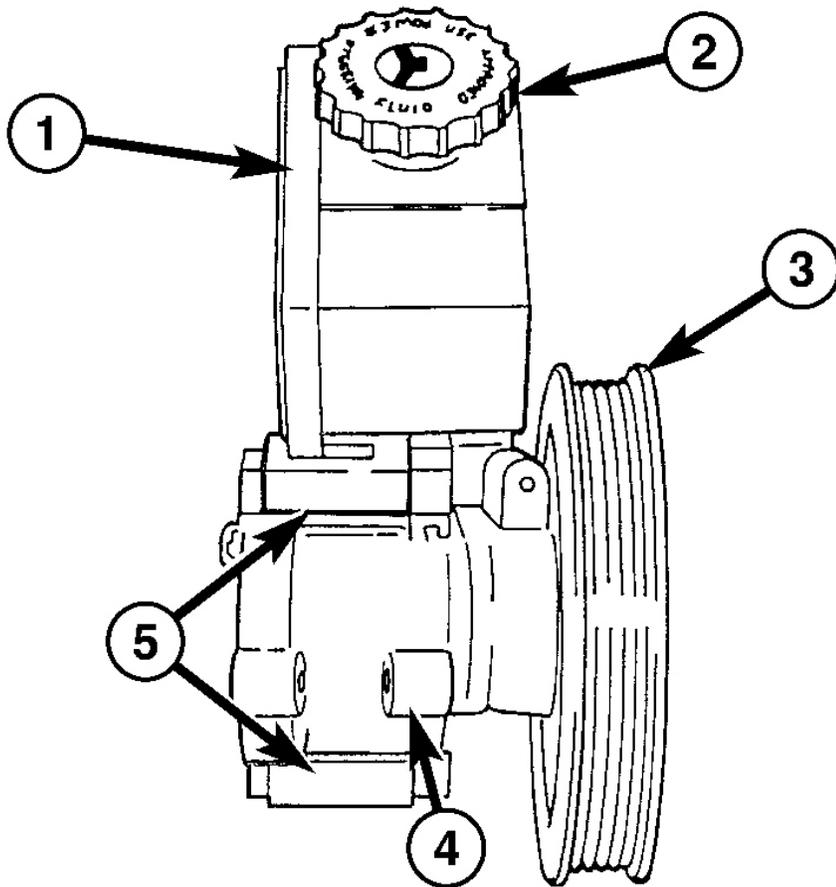


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Fig. 87: Power Steering Pump
Courtesy of CHRYSLER LLC

Hydraulic pressure for the power steering system is provided by a belt driven power steering pump. The pump shaft has a bolt-on drive pulley that is belt driven by the crankshaft pulley. The reservoir is separate from the pump body. The power steering pump is connected to the steering gear by the pressure and return hoses.

3.7L POWER STEERING PUMP

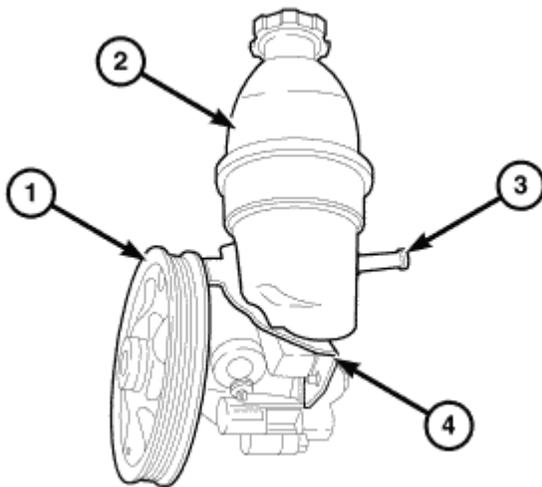


80c8a8d8

Fig. 88: Power Steering Pump Assembly
Courtesy of CHRYSLER LLC

- 1 - RESERVOIR
- 2 - CAP
- 3 - PULLEY
- 4 - PUMP BODY
- 5 - RESERVOIR RETAINING CLIPS

Hydraulic pressure for the power steering system is provided by a belt driven power steering pump (4). See **Fig. 88**. The pump shaft has a pressed-on high strength plastic drive pulley (3) that is belt driven by the crankshaft pulley.



81a2e3da

Fig. 89: Identifying Drive Pulley, Reservoir & Power Steering Pump

Courtesy of CHRYSLER LLC

Hydraulic pressure for the power steering system is provided by a belt driven power steering pump (4). The pump shaft has a pressed-on high strength plastic drive pulley (1) that is belt driven by the crankshaft pulley. The integral reservoir (2) used on the 4.0L is attached to the pump body (4).

OPERATION

POWER STEERING PUMP

The power steering pump is a constant flow rate and displacement, vane-type pump. The pump internal parts operate submerged in fluid. The flow control orifice is part of the high pressure line fitting. The pressure relief valve inside the flow control valve limits the pump pressure.

NOTE: Power steering pumps have different pressure rates and are not interchangeable with other pumps.

DIAGNOSIS AND TESTING

POWER STEERING PUMP AND HOSES

NOTE: This information is designed to be used in conjunction with the diagnostic charts at the beginning of the article. See DIAGNOSIS AND TESTING.

CHECKING FOR WEAR OF POWER STEERING PUMP INTERNAL COMPONENTS

1. Place gear selector in PARK (or NEUTRAL) with wheels chalked.
2. With the engine idling, have a helper turn the steering wheel.
3. Using an electronic listening tool, determine if noise is coming from the pump.
4. Increase the engine speed and have a helper turn the steering wheel. Does the noise change with load?

- Replace the power steering pump if excessive noise is present. See **REMOVAL**.

CHECKING FOR POWER STEERING HOSES TOUCHING BODY OR FRAME OF VEHICLE

Check hoses and hose tubes as following:

Inspect hoses and hose tubes for witness marks. If witness marks are present, adjust hose(s) to the proper position by loosening, repositioning and tightening attachments to the specified torque. See **SPECIFICATIONS**. **Do not bend tubing to adjust**. Replace the hose assembly if damaged.

Check fastener torque of hose mounting brackets and tube nuts. See **SPECIFICATIONS**.

Have a helper bump the steering gear off of the stops to induce pressure fluctuations which may move the hose. If hose contact is made, adjust hose(s) to the proper position by loosening, repositioning and tightening attachments to the specified torque. See **SPECIFICATIONS**. **Do not bend tubing to adjust**. Replace the hose assembly if damaged.

REMOVAL

POWER STEERING PUMP - 4.0L ENGINE

- Siphon out as much power steering fluid as possible.
- Remove air cleaner housing. Refer to **REMOVAL**.
- Remove the washer/coolant reservoir assembly.
- Remove the fan shroud.

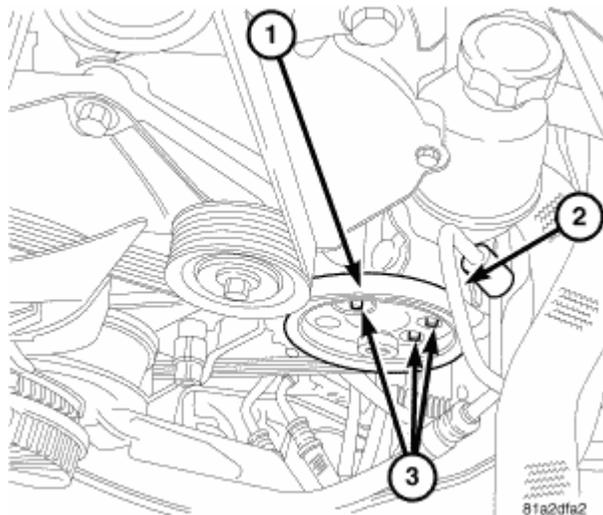
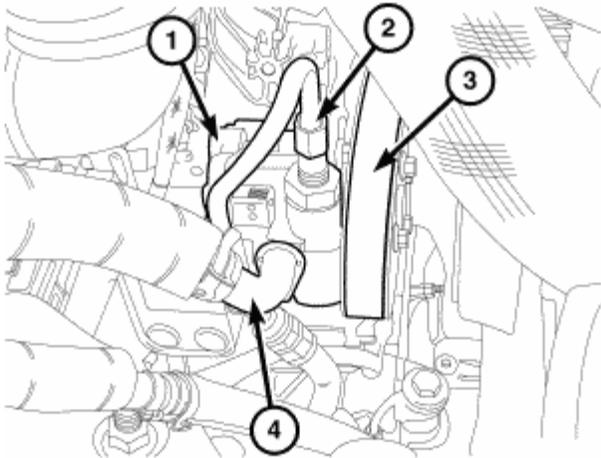


Fig. 90: Identifying Power Steering Belt, Pressure Line & Power Steering Pump Mounting Bolts
Courtesy of CHRYSLER LLC

- Remove power steering belt (2). Refer to **REMOVAL**.
- Remove pressure line (2) at the pump.
- Remove return line at the reservoir.

8. Remove three pump mounting bolts (3) through pump pulley.
9. Remove pump from the vehicle.
10. If pulley needs removal, see **REMOVAL**.

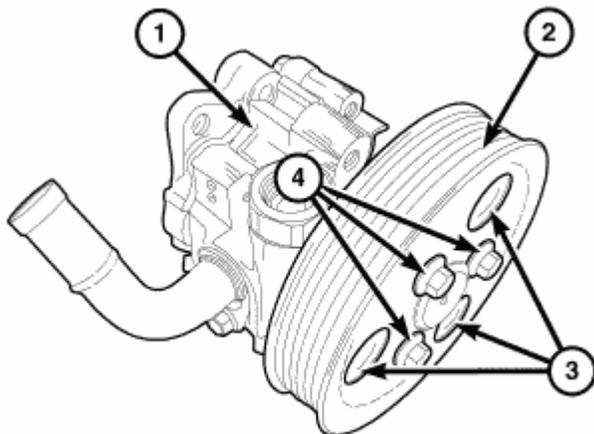
POWER STEERING PUMP - 2.8L DIESEL



81b98caf

Fig. 91: Identifying Pump, Pressure Power Steering Hoses, Serpentine Belt & Supply Hose
 Courtesy of CHRYSLER LLC

1. Siphon out as much power steering fluid as possible.
2. Remove the air cleaner housing. Refer to **REMOVAL**.
3. Remove the turbo air inlet tube.
4. Remove the serpentine drive belt (3). Refer to **REMOVAL**.
5. Remove the power steering hoses (2 & 4).



81b98e16

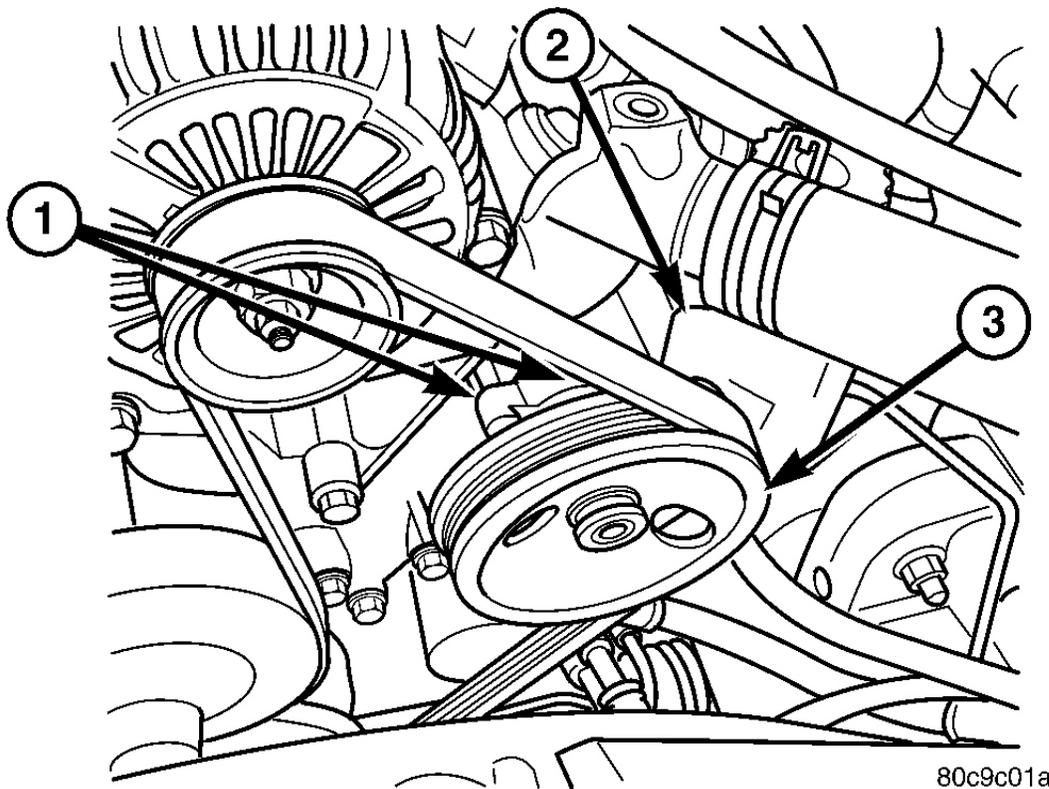
Fig. 92: Identifying Pump, Bolts & Pulley Access Holes

Courtesy of CHRYSLER LLC

6. Remove the three bolts (2) securing the pump (1) to the engine through the pulley access holes (3).
7. Remove the pump (1) from the vehicle.

POWER STEERING PUMP - 3.7L

1. Siphon out as much power steering fluid as possible.



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Fig. 93: Power Steering Pump - 3.7L
Courtesy of CHRYSLER LLC

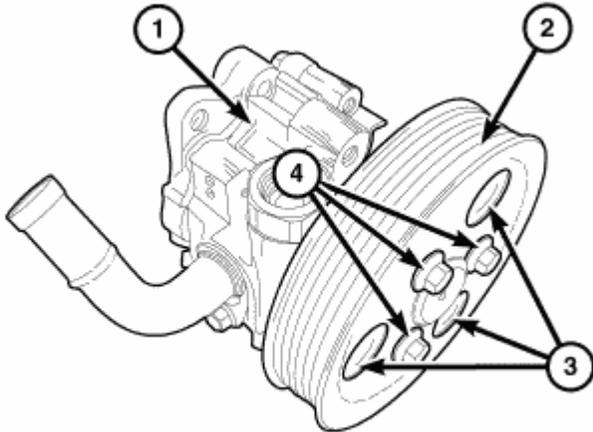
- | |
|---|
| 1 - MOUNTING BOLTS
2 - RESERVOIR
3 - STEEL PULLEY |
|---|

2. Remove the serpentine drive belt. Refer to **REMOVAL**.
3. Remove the power steering high pressure hose at the pump.
4. Remove the return hose at the pump.

5. Remove the three bolts (1) securing the pump to the engine through the holes in the pulley (3).
6. Remove the pump from the vehicle.

INSTALLATION

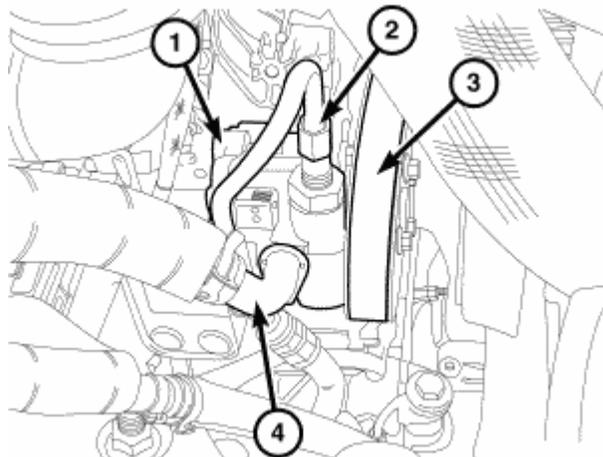
POWER STEERING PUMP - 2.8L DIESEL



81b98e16

Fig. 94: Identifying Pump, Bolts & Pulley Access Holes
Courtesy of CHRYSLER LLC

1. Install the pump (1) to the vehicle.
2. Install the three bolts securing the pump (1) to the engine through the access holes (3) and tighten to 28 N.m (21 ft. lbs.).

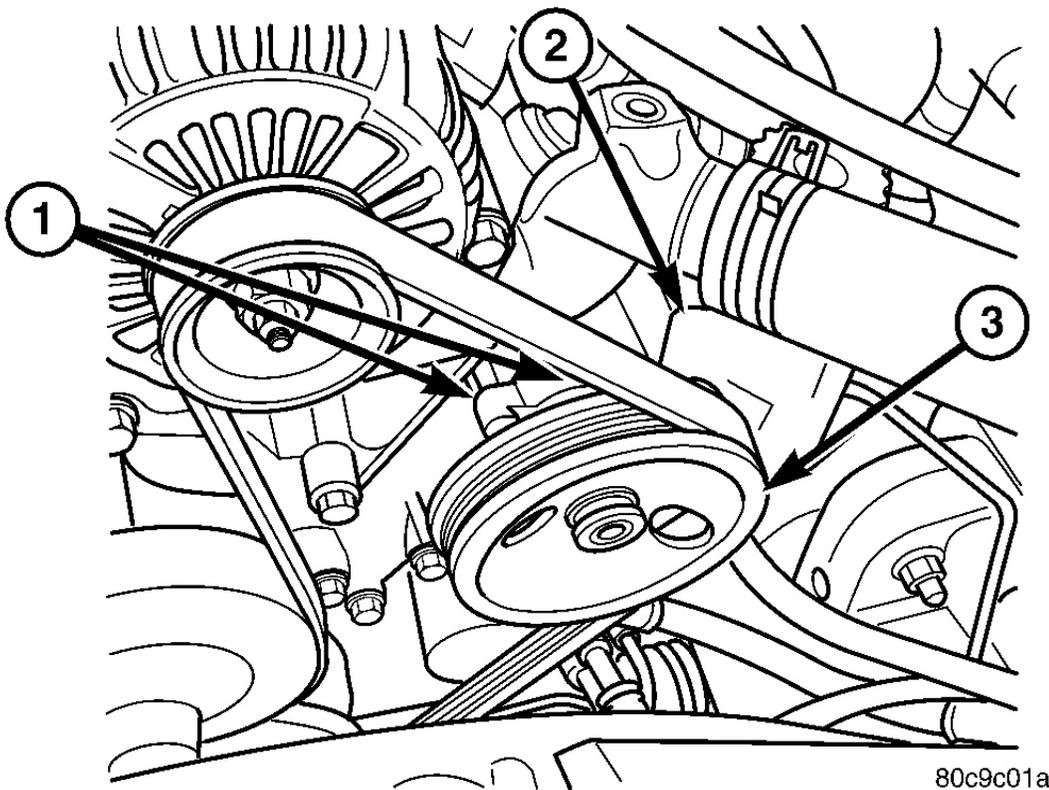


81b08caf

Fig. 95: Identifying Pump, Pressure Power Steering Hoses, Serpentine Belt & Supply Hose
Courtesy of CHRYSLER LLC

3. Install the pressure power steering hoses (2). Tighten to 31 N.m (23 ft. lbs.)

4. Reclamp the supply hose (4) to the pump (1).
5. Install the serpentine belt (3). Refer to **INSTALLATION** .
6. Install the air inlet tube.
7. Install the air cleaner housing. Refer to **INSTALLATION** .
8. Refill the power steering fluid and bleed the system. See **STANDARD PROCEDURE**.

POWER STEERING PUMP - 3.7L

80c9c01a

Fig. 96: Power Steering Pump - 3.7L
Courtesy of CHRYSLER LLC

- | |
|---|
| 1 - MOUNTING BOLTS
2 - RESERVOIR
3 - STEEL PULLEY |
|---|

1. Install the pump to the vehicle.
2. Install the three bolts (1) securing the pump to the engine. Tighten the bolts to 28 N.m (21 ft.lbs.). See **Fig. 96**.

3. Install the power steering hoses. Tighten to 27 N.m (20 ft.lbs.).
4. Install the serpentine belt. Refer to **INSTALLATION** .
5. Refill the power steering fluid and check for leaks. See **STANDARD PROCEDURE**.

POWER STEERING PUMP - 4.0L ENGINE

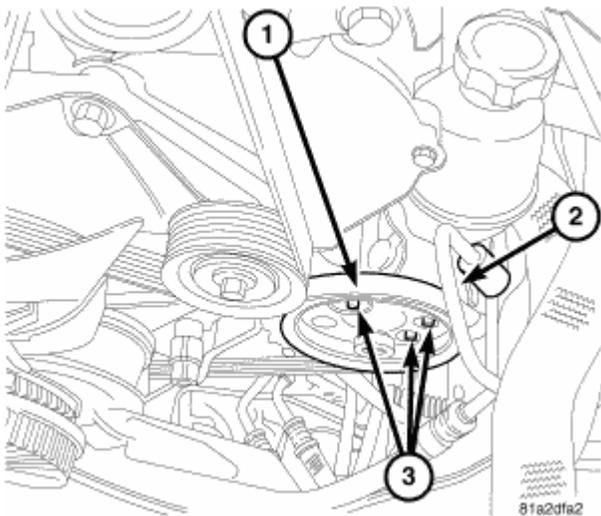


Fig. 97: Identifying Power Steering Belt, Pressure Line & Power Steering Pump Mounting Bolts
 Courtesy of CHRYSLER LLC

1. Install power steering pump back in engine compartment using reverse order of its removal.
2. Install three power steering pump mounting bolts (3) through pulley. Tighten pump mounting bolts to 28 N.m (21 ft. lbs.).

NOTE: Before installing power steering pressure hose on power steering pump, replace O-ring on end of power steering pressure hose. Lubricate O-ring using clean power steering fluid.

3. Install pressure line (2) into pump. Thread pressure line tube nut into pump and tighten to 27 N.m (20 ft. lbs.).
4. Install return line into the reservoir.
5. Install power steering belt (1). Refer to **INSTALLATION** .
6. Install the fan shroud.
7. Install the washer/coolant reservoir assembly.
8. Install air cleaner housing. Refer to **INSTALLATION** .
9. Fill and bleed power steering system. See **STANDARD PROCEDURE**.
10. Inspect for leaks.

SPECIFICATIONS

TORQUE SPECIFICATIONS

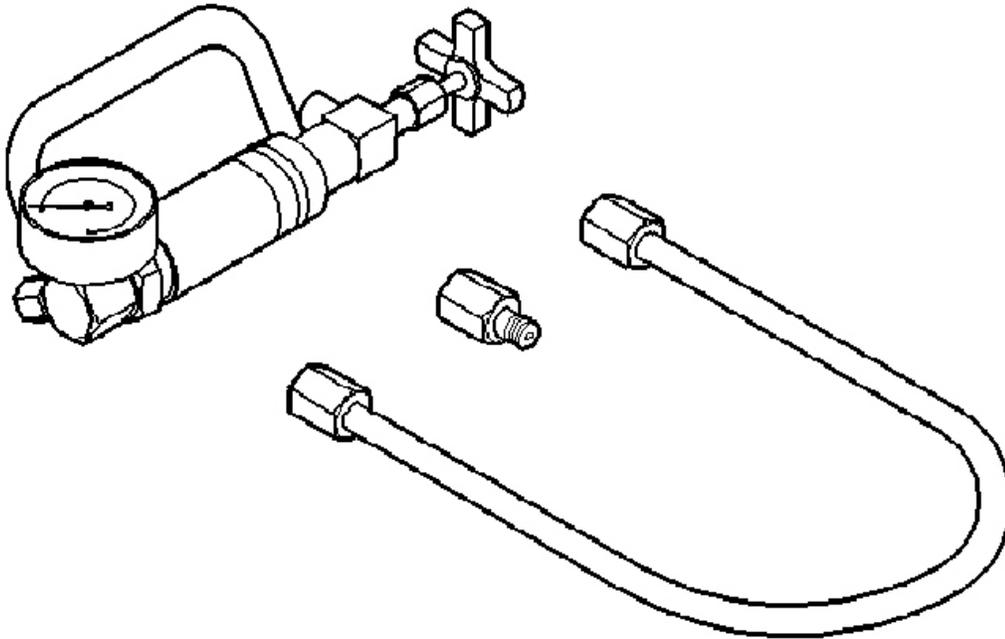
2007 Dodge Nitro R/T

2007 STEERING Steering System - Nitro

TORQUE SPECIFICATIONS

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Power Steering Pump to Engine	28	21	250
Power Steering Pump Bracket to Engine (DIESEL)	47	35	-
Power Steering Remote Reservoir (DIESEL)	12	9	105
Power Steering to Pump Pressure Line	31	23	275
Power Steering Pump Pressure Line Bracket to Body (DIESEL)	20	14	175
Power Steering Remote Reservoir Mounting Bracket Screw (DIESEL)	12	9	105
Power Steering Pulley to Pump (DIESEL)	28	21	250
Power Steering Fluid Cooler Screws	4	3	35

SPECIAL TOOLS**POWER STEERING PUMP**



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Fig. 98: Power Steering Pressure Analyzer Set 6815
Courtesy of CHRYSLER LLC

2007 Dodge Nitro R/T

2007 STEERING Steering System - Nitro

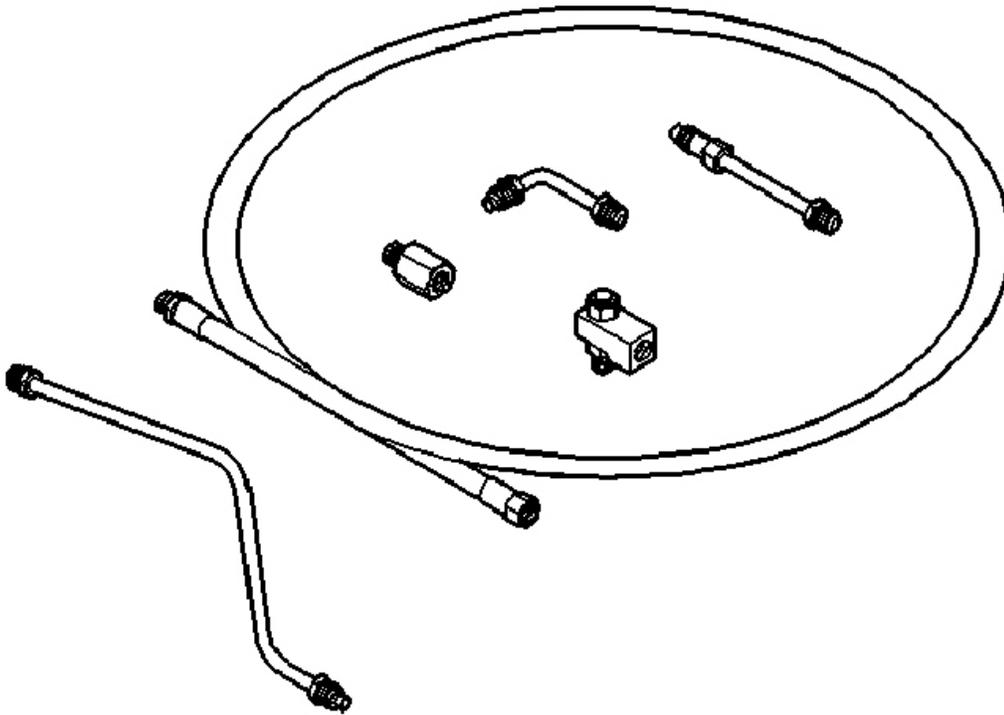
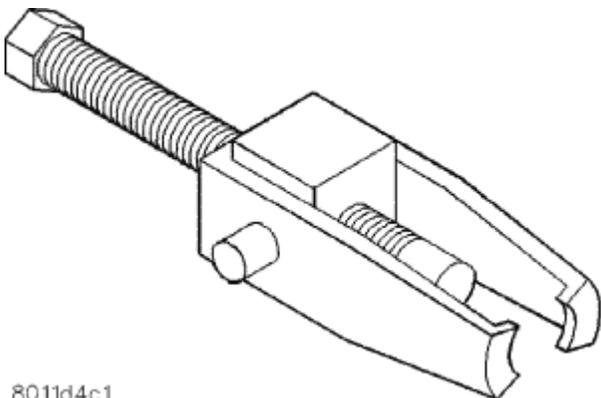


Fig. 99: Power Steering Flow/Pressure Tester 6893 Adapters
Courtesy of CHRYSLER LLC



8011d4c1

Fig. 100: Puller C-4333
Courtesy of CHRYSLER LLC

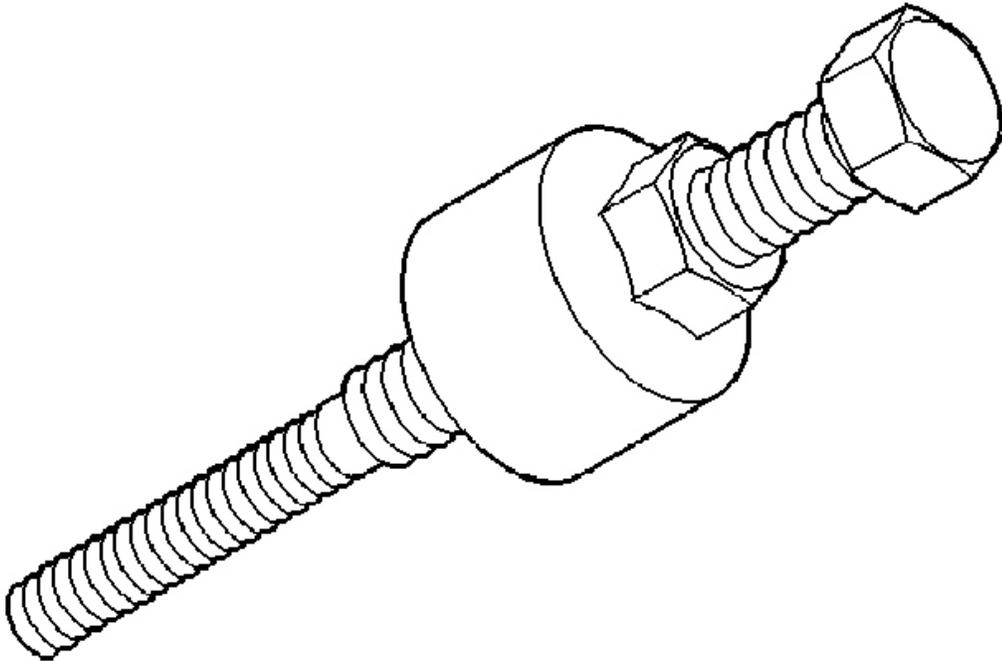


Fig. 101: Installer C-4063B
Courtesy of CHRYSLER LLC

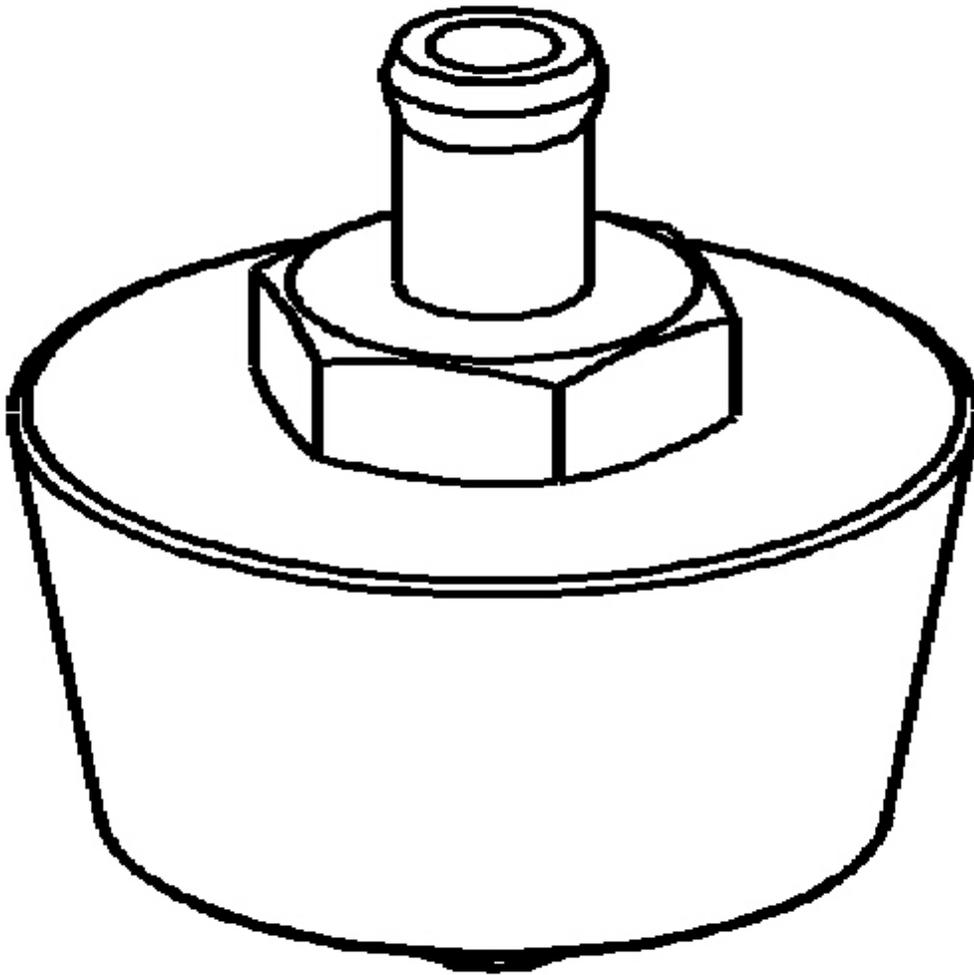


Fig. 102: Reservoir Vacuum Plug - 9688
Courtesy of CHRYSLER LLC

FLUID

DESCRIPTION

ATF+4, TYPE 9602

The recommended fluid for the power steering system is Mopar® ATF +4.

Mopar® ATF+4, when new is red in color. The ATF+4 is dyed red so it can be identified from other fluids used

2007 Dodge Nitro R/T

2007 STEERING Steering System - Nitro

in the vehicle such as engine oil or antifreeze. The red color is not permanent and is not an indicator of fluid condition. As the vehicle is driven, the ATF+4 will begin to look darker in color and may eventually become brown. **THIS IS NORMAL.** ATF+4 also has a unique odor that may change with age. Consequently, odor and color cannot be used to indicate the fluid condition or the need for a fluid change.

STANDARD PROCEDURE

POWER STEERING FLUID LEVEL CHECKING

WARNING: The fluid level should be checked with engine off to prevent injury from moving components.

CAUTION: MOPAR® ATF+4 is to be used in the power steering system. No other power steering or automatic transmission fluid is to be used in the system. Damage may result to the power steering pump and system if any other fluid is used, and do not overfill.

NOTE: Power steering reservoir does not contain a dipstick. Fluid level indicators are molded into the side of the reservoir **WITH REMOTE RESERVOIR.**

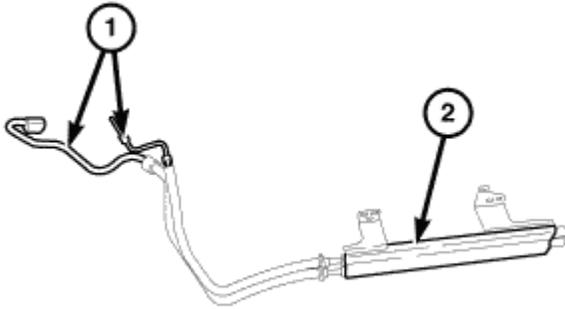
The power steering fluid level can be viewed on the dipstick attached to the filler cap. Before opening power steering system, wipe the reservoir filler cap free of dirt and debris. Remove the cap and check the fluid level on its dipstick. When the fluid is at normal ambient temperature, approximately 21°C to 27°C (70°F to 80°F), the fluid level should read between the minimum and maximum on dipstick (GAS) or Reservoir (DIESEL). Only add fluid when the vehicle is cold.

Use **only Mopar® ATF+4** . Do not overfill the power steering system.

FLUID COOLER

DESCRIPTION

FLUID COOLER



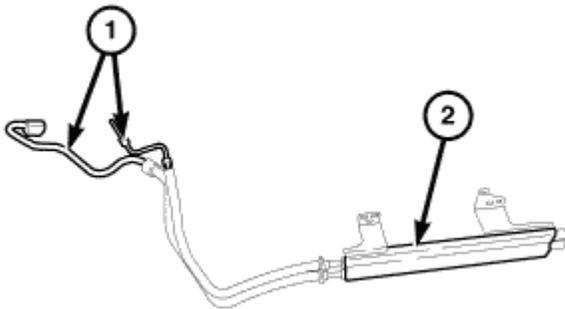
81a2e4e2

Fig. 103: Fluid Cooler With Hoses
Courtesy of CHRYSLER LLC

The power steering fluid cooler (2) is located at the front of the vehicle. It is mounted in front of the vehicle and just rearward of the front fascia. The cooler is positioned so it is in the air flow through the front fascia of the vehicle. The cooler can be serviced without the return hoses (1).

OPERATION

POWER STEERING FLUID COOLER



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Fig. 104: Fluid Cooler With Hoses
Courtesy of CHRYSLER LLC

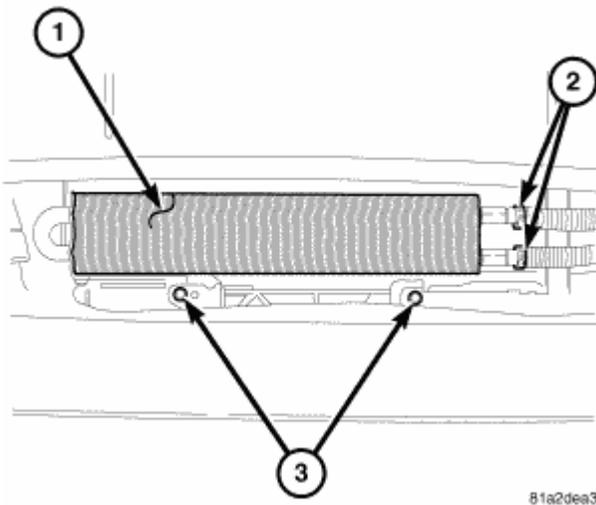
The purpose of the power steering fluid cooler (2) is to keep the temperature of the power steering system fluid from rising to a level that would affect the performance of the power steering system.

The cooler used on this vehicle is referred to as a fluid-to-air type cooler. This means that the air flow across the

fin/tubes 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, 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.

REMOVAL

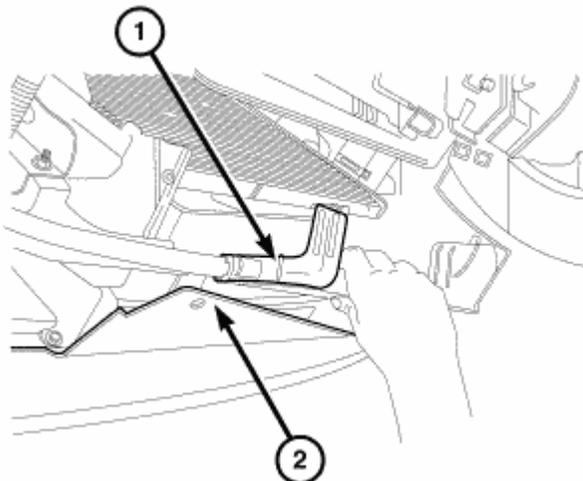
FLUID COOLER



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Fig. 105: Identifying Cooler, Hose Clamps & Mounting Screws
Courtesy of CHRYSLER LLC

1. Siphon the power steering fluid.
2. Raise and support the vehicle.
3. Remove the hose clamps (2) from the cooler lines.
4. Remove the 3 mounting screws (3) for the cooler (1).



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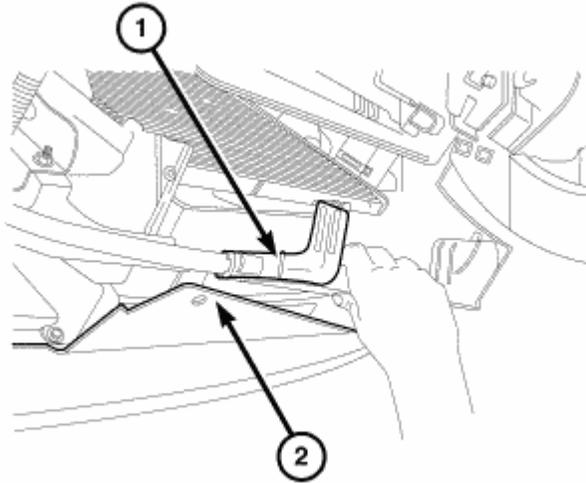
Fig. 106: Identifying Cooler & Front Fascia

Courtesy of CHRYSLER LLC

5. Remove the front fascia push pins and lower the fascia (2) to remove the cooler (1) from the bottom.

INSTALLATION

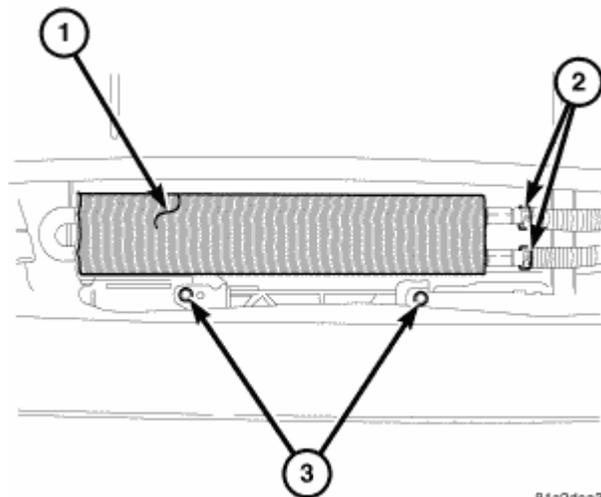
FLUID COOLER



81a2debc

Fig. 107: Identifying Cooler & Front Fascia
Courtesy of CHRYSLER LLC

1. Install the cooler (1) from the bottom between the front fascia (2) and core support.
2. Install the front fascia push pins.



81a2dea3

Fig. 108: Identifying Cooler, Hose Clamps & Mounting Screws
Courtesy of CHRYSLER LLC

3. Install the 3 mounting screws (3) for the cooler (1). Tighten to 4 N.m (35 in. lbs.).

4. Install and reclamp (2) the cooler hoses to the cooler (1) using new crimp clamps.
5. Lower the vehicle.
6. Refill the power steering fluid. See **STANDARD PROCEDURE**.

HOSES

REMOVAL

RETURN GEAR TO COOLER

1. Siphon out as much power steering fluid as possible.
2. Remove air cleaner housing. Refer to **REMOVAL** .
3. Remove the washer/coolant reservoir assembly.
4. Remove the fan shroud.
5. Raise and support the vehicle.

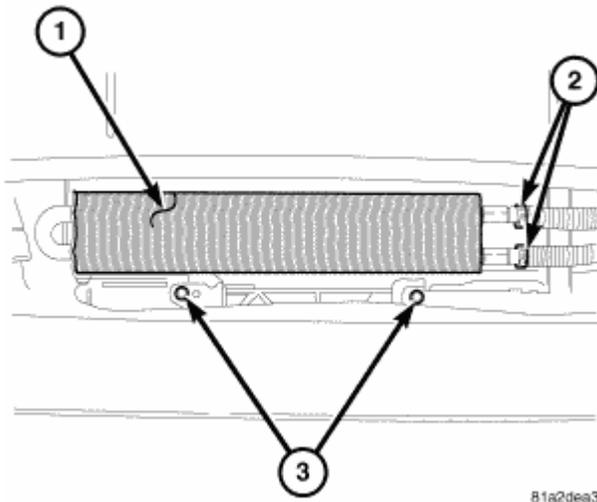
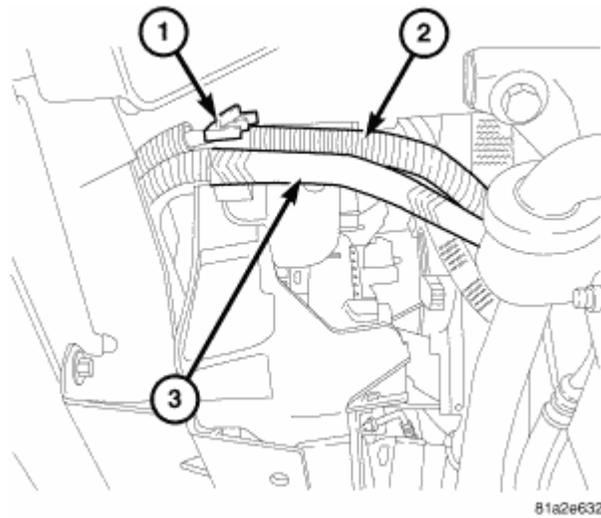


Fig. 109: Identifying Cooler, Hose Clamps & Mounting Screws
Courtesy of CHRYSLER LLC

6. Remove the hose clamp (2) for the return hose from the cooler (1).



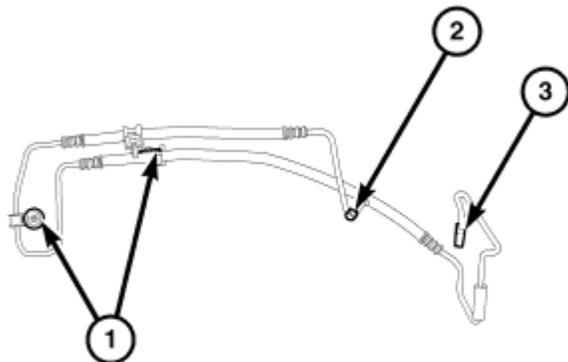
81a2e632

Fig. 110: Identifying Return Hose Assembly & Routing Clip
Courtesy of CHRYSLER LLC

7. Remove the return hose at the steering gear.
8. Remove the return hose routing clip (1).
9. Remove the hose/line from the vehicle.

PRESSURE HOSE

1. Siphon out as much power steering fluid as possible.
2. Remove air cleaner housing. Refer to **REMOVAL** . . Refer to **REMOVAL** .
3. Remove the washer/coolant reservoir assembly.
4. Remove the fan shroud.
5. Remove power steering belt. Refer to **REMOVAL** .



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Fig. 111: Pressure Hose
Courtesy of CHRYSLER LLC

6. Remove pressure hose (3) at the pump.
7. Remove the pressure hose (2) from the gear.

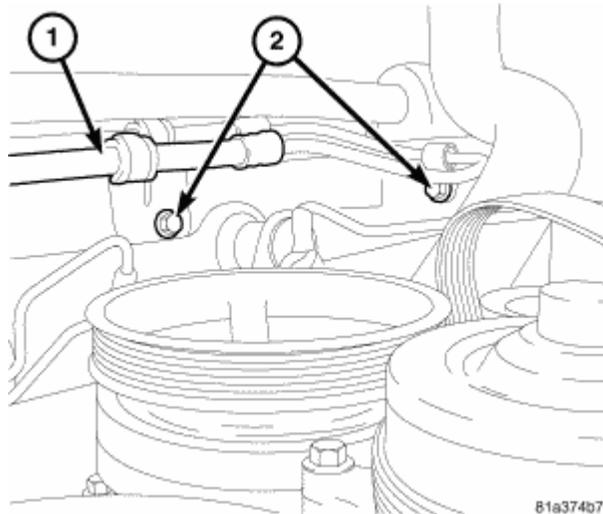


Fig. 112: Pressure Hose & Mounting Bolts
 Courtesy of CHRYSLER LLC

8. Remove the pressure hose (1) mounting bolts (2) to the frame.
9. Remove the pressure hose (1) from the vehicle.

RETURN LINE DIESEL

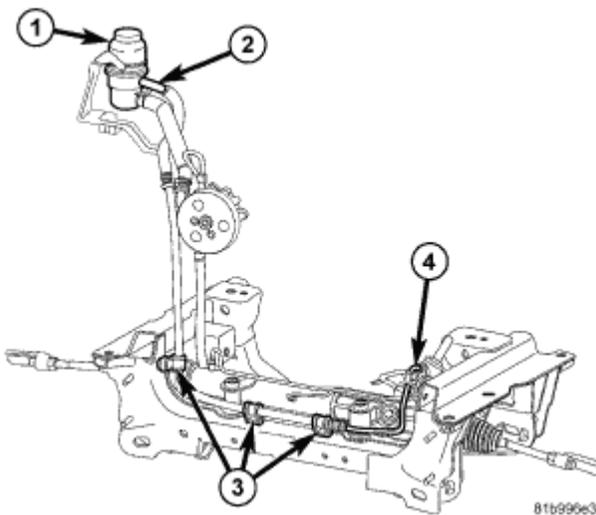


Fig. 113: Identifying Reservoir, Return Hose, Gear & Bracket Bolts
 Courtesy of CHRYSLER LLC

1. Siphon the power steering fluid from the reservoir.
2. Remove the air box. Refer to **REMOVAL** .
3. Remove the return hose (2) at the reservoir (1).

4. Remove the return line at the gear (4).
5. Remove the return line mounting bracket bolts (3) at the frame.
6. Remove the return hose (2) from the vehicle.

PRESSURE HOSE - DIESEL

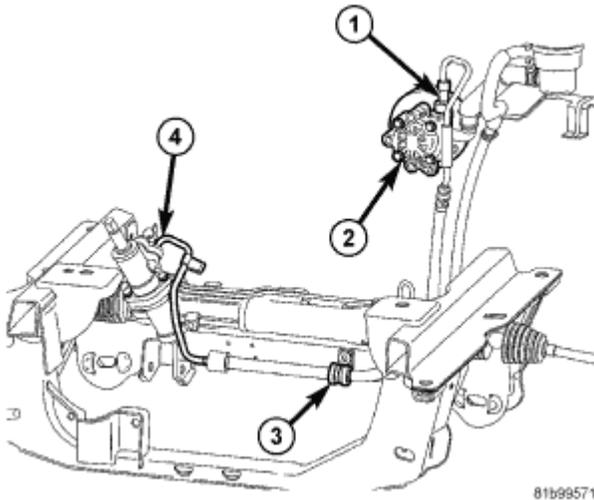


Fig. 114: Identifying Pressure Line, Pump, Bracket Bolts & Gear
Courtesy of CHRYSLER LLC

1. Siphon the power steering fluid from the reservoir.
2. Remove the air box. Refer to **REMOVAL** .
3. Remove the pressure line (1) at the pump (2).
4. Raise and support the vehicle.
5. Remove the pressure line mounting bracket bolts (3) at the frame.
6. Remove the pressure line at the gear (4)
7. Remove the pressure hose (1) from the vehicle.

RETURN COOLER TO RESERVOIR

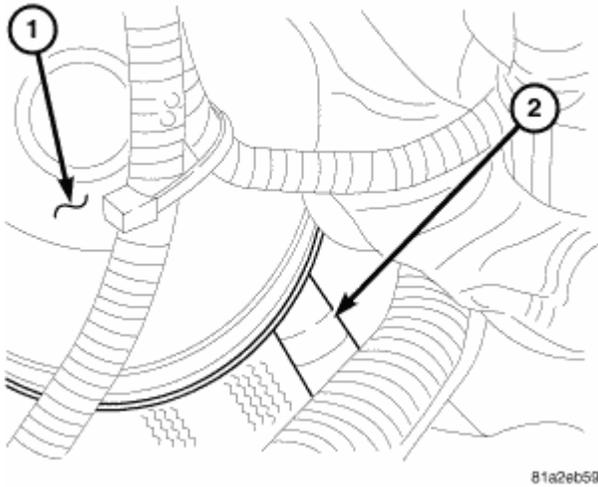


Fig. 115: Identifying Reservoir & Return Hose
Courtesy of CHRYSLER LLC

1. Siphon the power steering fluid.
2. Remove the return hose (2) from the reservoir (1).
3. Raise and support the vehicle.

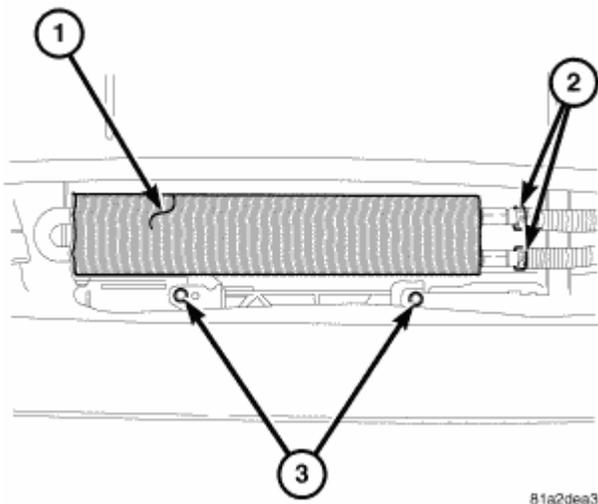


Fig. 116: Identifying Cooler, Hose Clamps & Mounting Screws
Courtesy of CHRYSLER LLC

4. Remove the hose clamp (2) for the cooler to reservoir hose from the cooler (1).

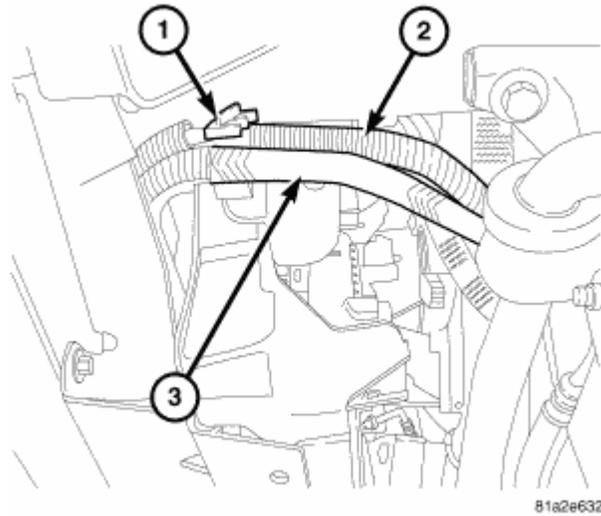


Fig. 117: Identifying Return Hose Assembly & Routing Clip
 Courtesy of CHRYSLER LLC

5. Remove the return hose assembly from the routing clip (1).
6. Remove the 3 push pins and lower the front fascia.
7. Remove the hose from the vehicle.

SUPPLY HOSE -DIESEL

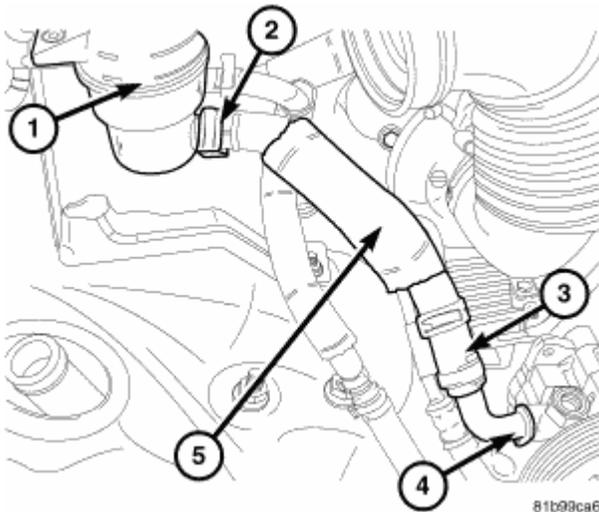


Fig. 118: Identifying Reservoir, Supply Hoses & Pump
 Courtesy of CHRYSLER LLC

1. Siphon the power steering fluid from the reservoir (1).
2. Remove the air box. Refer to **REMOVAL** .
3. Remove the supply hose (2) at the reservoir (1).
4. Remove the supply hose (3) at the pump (4).
5. Remove the supply hose (5) from the vehicle.

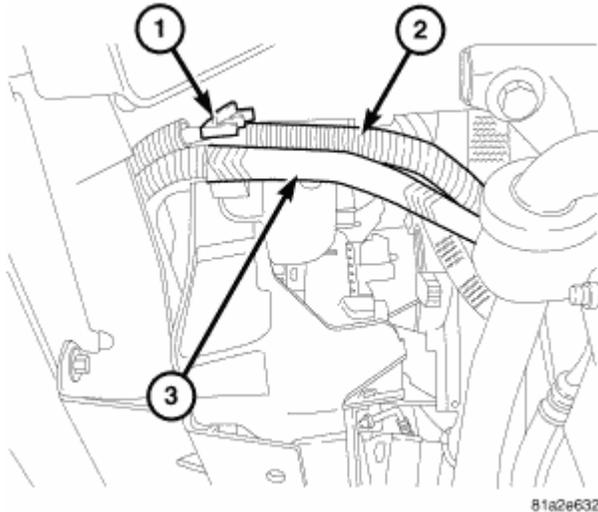
INSTALLATION**RETURN GEAR TO COOLER**

Fig. 119: Identifying Return Hose Assembly & Routing Clip
 Courtesy of CHRYSLER LLC

1. Install the return hose/line at the mounting clip (1).

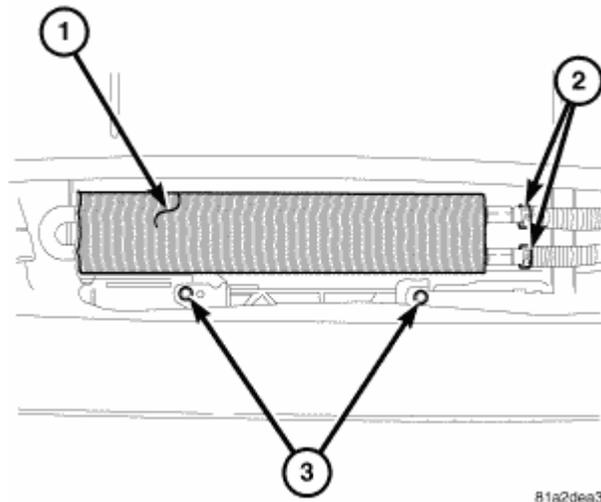


Fig. 120: Identifying Cooler, Hose Clamps & Mounting Screws
 Courtesy of CHRYSLER LLC

2. Install return hose to the steering gear.
3. Install return hose to the cooler (1) and reclamp (2) with a new crimp clamp.
4. Install the fan shroud.
5. Install the washer/coolant reservoir assembly.
6. Install air cleaner housing. Refer to **INSTALLATION**.

7. Fill and bleed power steering system. See **STANDARD PROCEDURE**.
8. Inspect for leaks.

RETURN LINE DIESEL

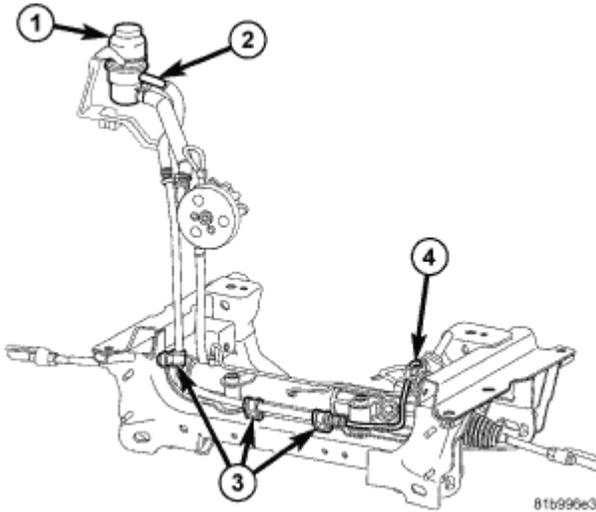


Fig. 121: Identifying Reservoir, Return Hose, Gear & Bracket Bolts
Courtesy of CHRYSLER LLC

1. Install the return hose (2) to the vehicle
2. Install the return hose mounting bracket bolts (3) to the frame.
3. Install the return hose at the gear (4).
4. Install the return hose (2) at the reservoir (1).
5. Install the airbox. Refer to **INSTALLATION** .
6. Refill the power steering fluid.
7. Bleed the power steering system. See **STANDARD PROCEDURE**.
8. Check for leaks.

SUPPLY HOSE DIESEL

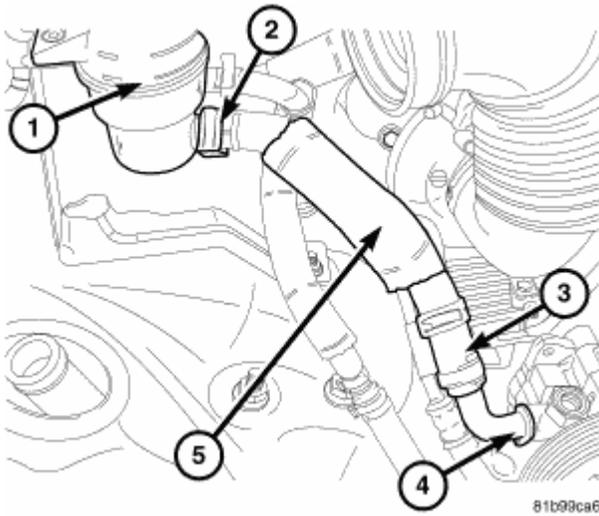


Fig. 122: Identifying Reservoir, Supply Hoses & Pump
 Courtesy of CHRYSLER LLC

1. Install the supply hose (5) to the reservoir (1) and pump (4).
2. Reclamp the supply hose at the pump (3).
3. Reclamp the supply hose at the reservoir (2).
4. Install the airbox. Refer to **INSTALLATION** .
5. Refill the power steering fluid.
6. Bleed the power steering system. See **STANDARD PROCEDURE**.
7. Check for leaks.

PRESSURE HOSE

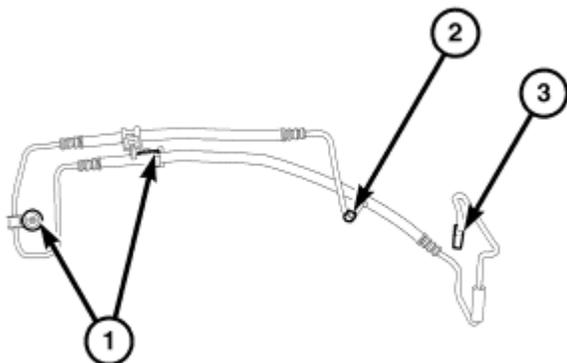


Fig. 123: Pressure Hose
 Courtesy of CHRYSLER LLC

1. Install the pressure hose (2) at the gear.

2. Install pressure line (3) into pump. Thread pressure line tube nut into pump and tighten to 31 N.m (275 in. lbs.).

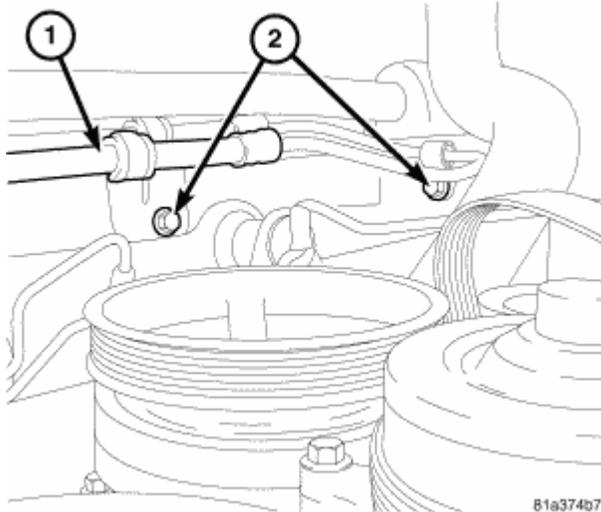


Fig. 124: Pressure Hose & Mounting Bolts
 Courtesy of CHRYSLER LLC

3. Install the pressure hose mounting bolts (2) to the frame. Tighten to 12 N.m (105 in. lbs.).
4. Install power steering belt. Refer to **INSTALLATION** .
5. Install the fan shroud.
6. Install the washer/coolant reservoir assembly.
7. Install air cleaner housing. Refer to **INSTALLATION** .
8. Fill and bleed power steering system. See **STANDARD PROCEDURE**.
9. Inspect for leaks.

RETURN COOLER TO RESERVOIR

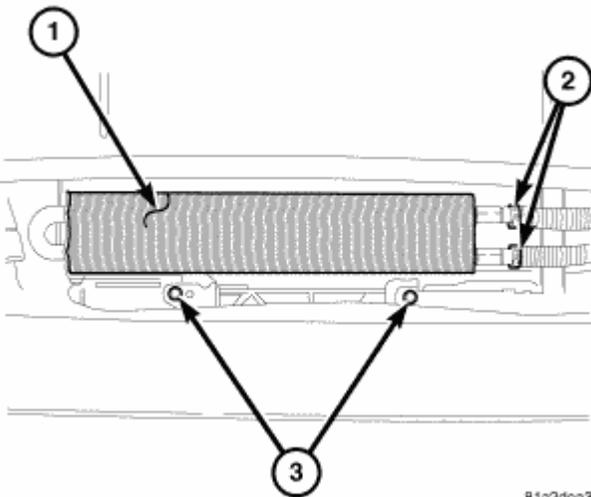


Fig. 125: Identifying Cooler, Hose Clamps & Mounting Screws
Courtesy of CHRYSLER LLC

1. Install the hose to the vehicle.
2. Install the 3 push pins and install the front fascia into position.
3. Install the hose to the cooler (1) and reclamp (2) with a new hose crimp clamp.

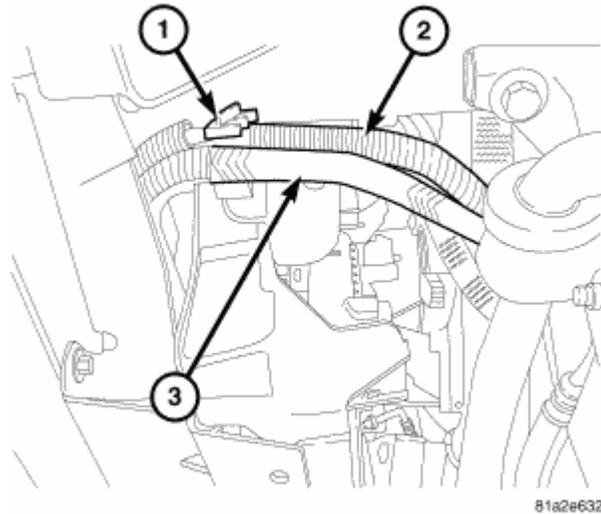


Fig. 126: Identifying Return Hose Assembly & Routing Clip
Courtesy of CHRYSLER LLC

4. Install the return hose assembly routing clip (1).

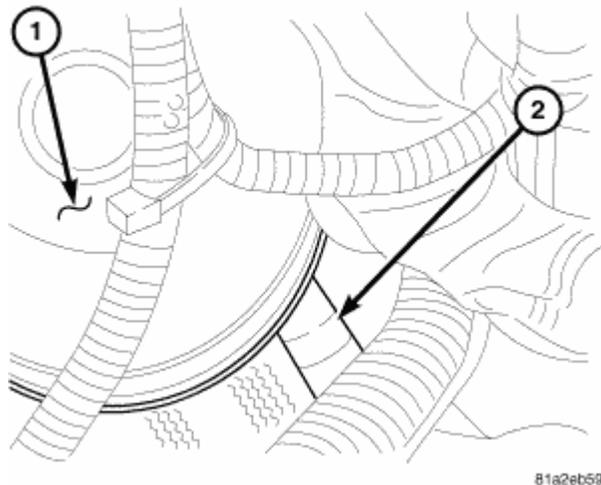


Fig. 127: Identifying Reservoir & Return Hose
Courtesy of CHRYSLER LLC

5. Install a new hose clamp for the cooler to reservoir hose (2) to the reservoir (1).
6. Lower the vehicle.

7. Fill and bleed power steering system. See **STANDARD PROCEDURE**.
8. Inspect for leaks.

PRESSURE HOSE - DIESEL

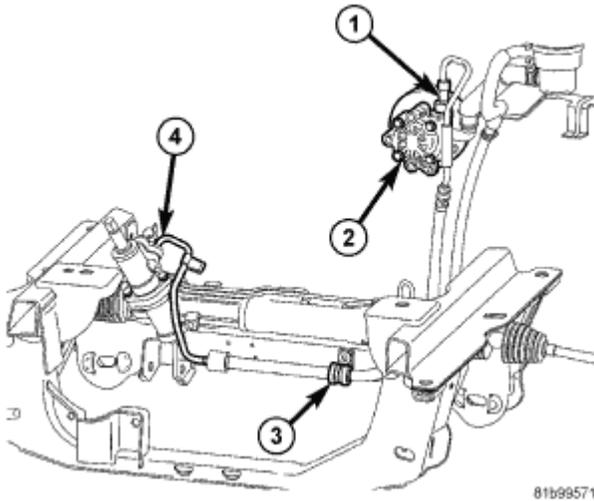


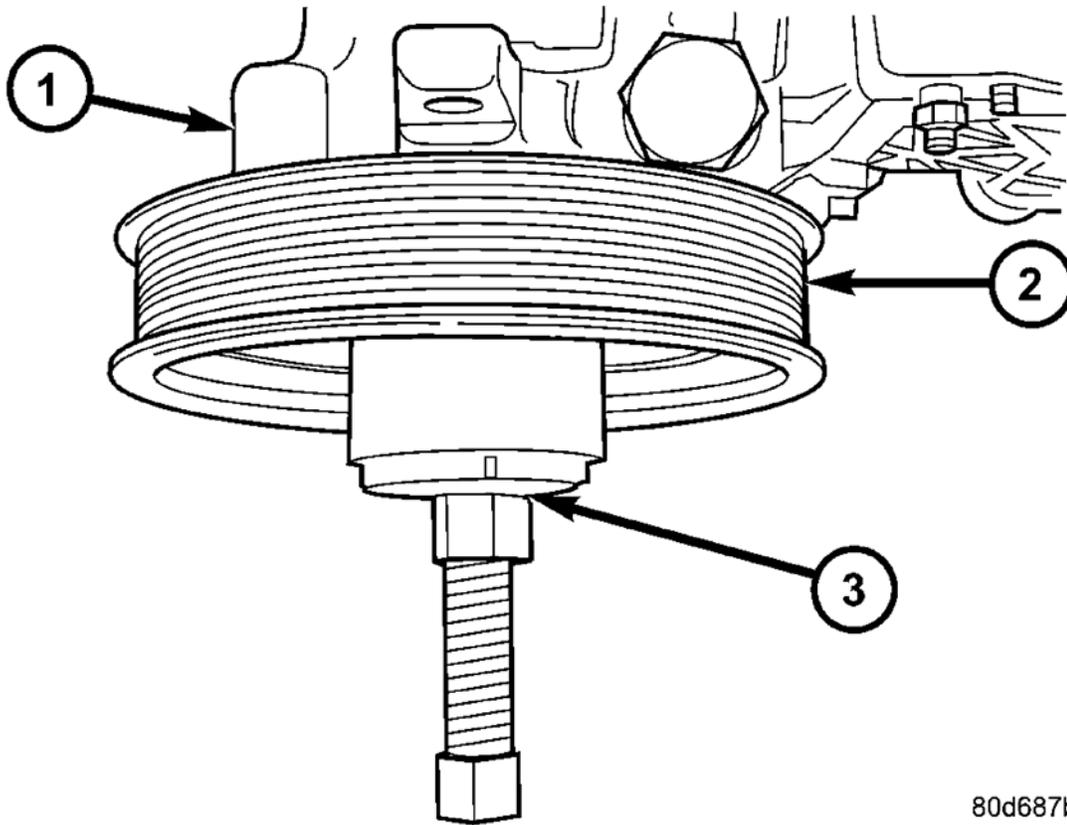
Fig. 128: Identifying Pressure Line, Pump, Bracket Bolts & Gear
Courtesy of CHRYSLER LLC

1. Install the pressure hose (1) to the vehicle.
2. Install the pressure hose mounting bracket bolts (3) to the frame.
3. Install the pressure hose at the gear (4).
4. Install the pressure line (1) at the pump (2).
5. Install the airbox. Refer to **INSTALLATION** .
6. Refill the power steering fluid.
7. Bleed the power steering system. See **STANDARD PROCEDURE**.
8. Check for leaks.

PULLEY

REMOVAL

PULLEY- GAS ENGINE



80d687b0

Fig. 129: Removing Pulley
Courtesy of CHRYSLER LLC

CAUTION: Do not reuse the old power steering pump pulley it is not intended for reuse. A new pulley must be installed if removed.

1. Remove air cleaner housing. Refer to **REMOVAL** .
2. Remove the washer/coolant reservoir assembly.
3. Remove the fan shroud.
4. Remove power steering belt. Refer to **REMOVAL** .
5. Remove the pulley (2) from the pump using (OTC® 7185) power steering pulley removal tool or equivalent (3).

PULLEY - DIESEL ENGINE

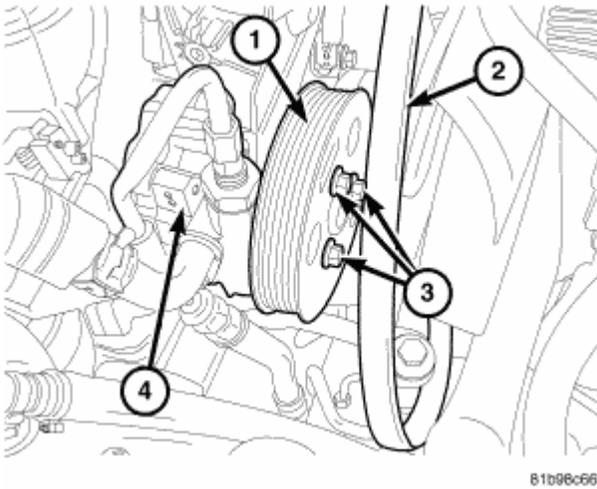


Fig. 130: Identifying Pulley, Serpentine Drive Belt, Bolts & Pump
Courtesy of CHRYSLER LLC

1. Remove the air cleaner box. Refer to **REMOVAL** .
2. Remove the air inlet tube.
3. Remove the serpentine drive belt (2).
4. Remove the three bolts (3) securing the pulley (1) to the pump (4).

INSTALLATION

PULLEY - DIESEL ENGINE

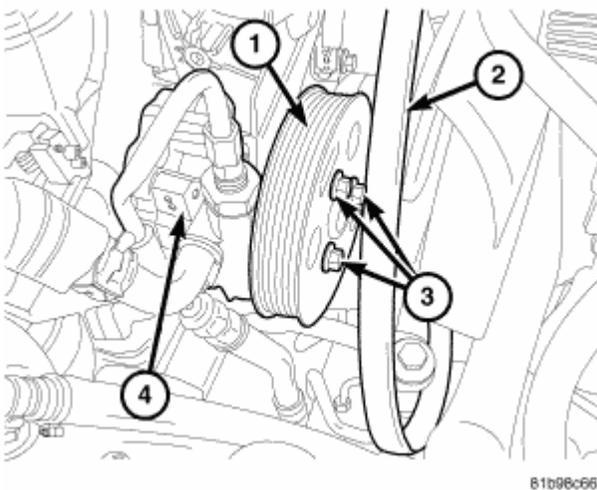
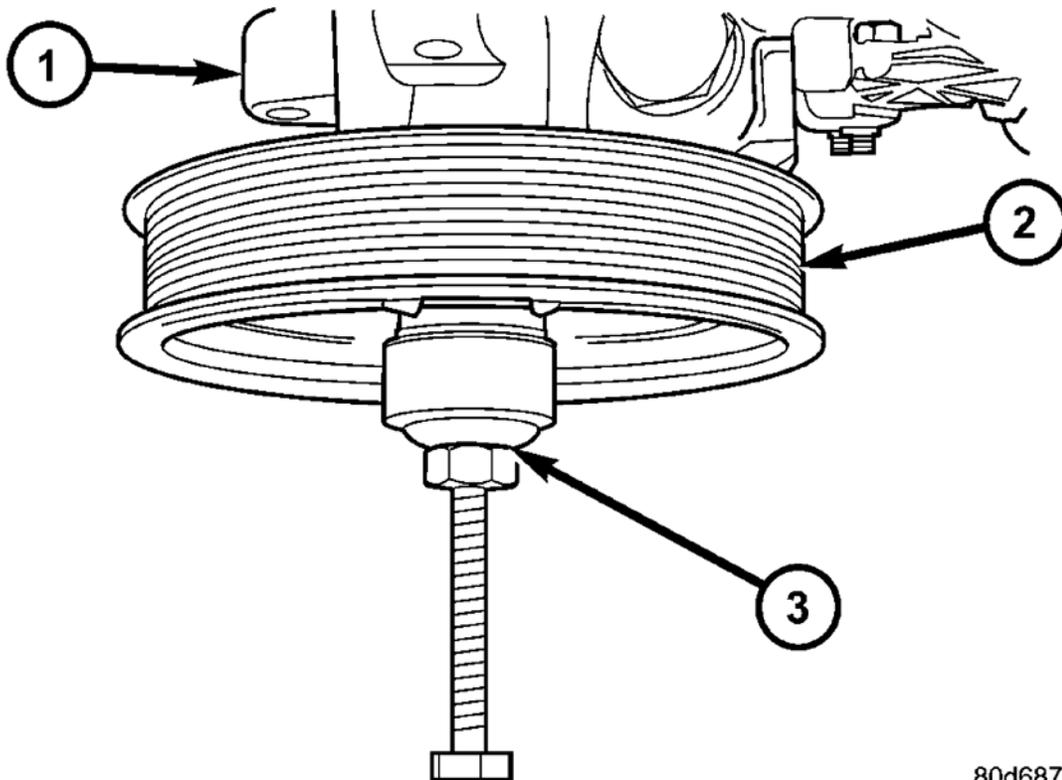


Fig. 131: Identifying Pulley, Serpentine Drive Belt, Bolts & Pump
Courtesy of CHRYSLER LLC

1. Install the pulley (1) to the pump shaft.
2. Install the three bolts (3) securing the pulley (1) to the pump (4). Tighten to 47 N.m (35 ft. lbs.).

3. Install the serpentine belt (2).
4. Install the air inlet tube.
5. Install the air cleaner box. Refer to **INSTALLATION** .

PULLEY - GAS ENGINE

80d687bd

Fig. 132: Identifying Pump, Pulley & Installation Tool
Courtesy of CHRYSLER LLC

CAUTION: Do not reuse the old power steering pump pulley it is not intended for reuse. A new pulley must be installed if removed.

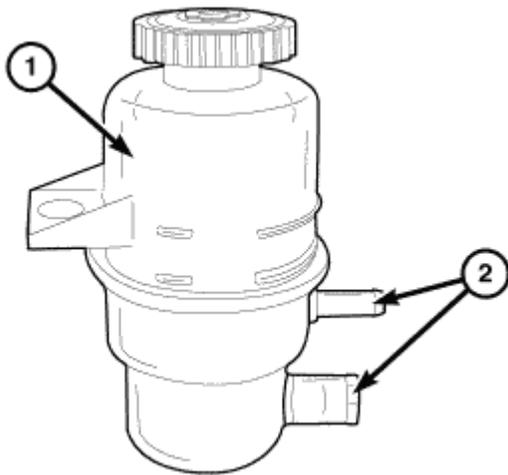
1. Replace the pulley (2) if it's bent, cracked, or loose.
2. Install the pulley (2) on the pump (1) using (OTC ® 7771) power steering pulley installation tool or equivalent (3) making sure it is flush with the end of the shaft. Ensure the tool and pulley remain aligned with the pump shaft.
3. Install the air box assembly. Refer to **INSTALLATION** .
4. Install power steering belt. Refer to **INSTALLATION** .
5. Install the fan shroud.
6. Install the washer/coolant reservoir assembly.

7. Install air cleaner housing. Refer to **INSTALLATION** .

RESERVOIR

DESCRIPTION

RESERVOIR



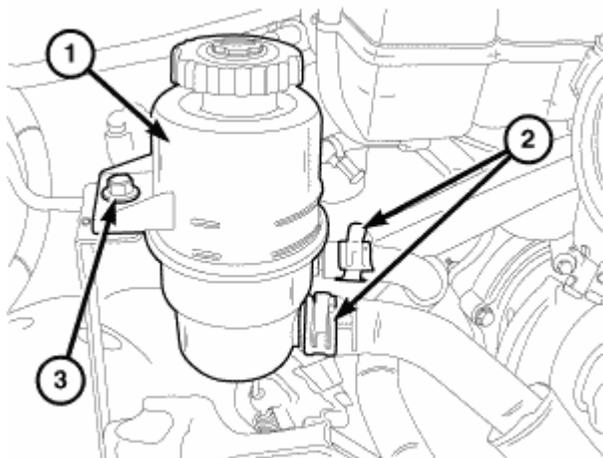
81b98c17

Fig. 133: Fluid Reservoir
Courtesy of CHRYSLER LLC

Only the diesel engine reservoir (1) is serviced separately. The 3.7L & 4.0L power steering reservoirs are not serviced separately from the pump.

REMOVAL

FLUID RESERVOIR - DIESEL



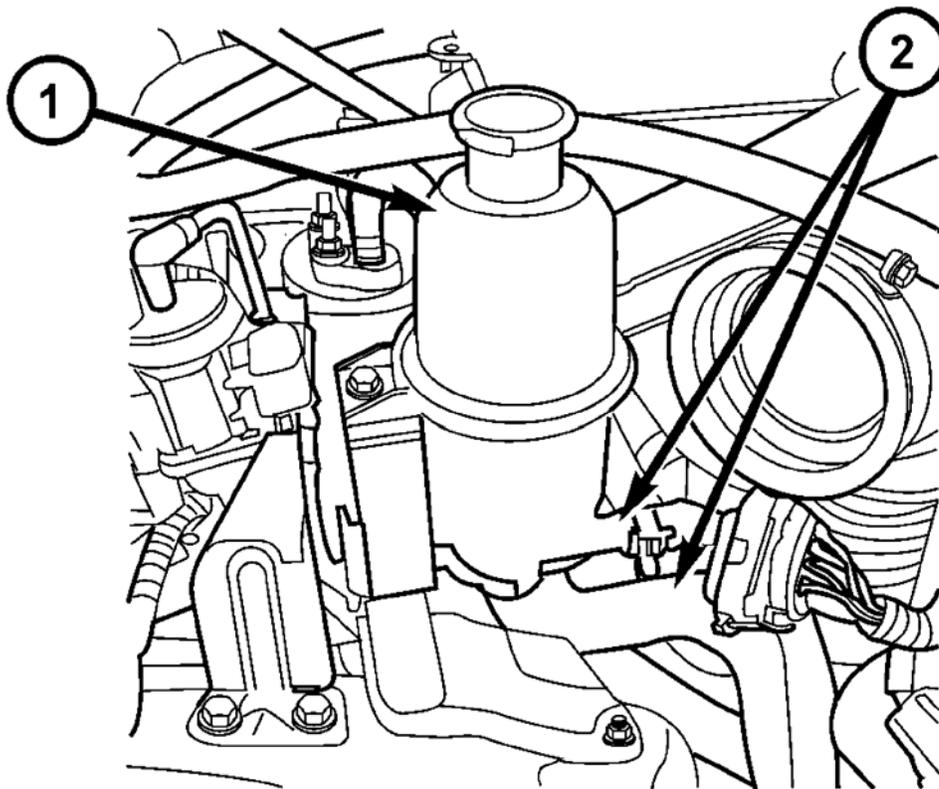
81b98c0a

Fig. 134: Identifying Reservoir, Power Steering Hoses & Reservoir
Courtesy of CHRYSLER LLC

1. Siphon out as much power steering fluid as possible.
2. Remove the power steering hoses (2).
3. Remove the bolt securing the reservoir (3) to the mounting bracket.
4. Remove the reservoir (1).

INSTALLATION

FLUID RESERVOIR - DIESEL



80c67469

Fig. 135: Identifying Fluid Reservoir & Return Hoses
Courtesy of CHRYSLER LLC

- | |
|---------------------|
| 1 - FLUID RESERVOIR |
| 2 - RETURN HOSES |

1. Install the reservoir (1) to the mounting bracket.
2. Install and tighten the bolt to 12 N.m (9 ft. lbs.).
3. Install the hoses (2).

2007 Dodge Nitro R/T

2007 STEERING Steering System - Nitro

4. Refill the power steering fluid and check for leaks. See **STANDARD PROCEDURE**.