

STEERING

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STEERING

DESCRIPTION

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.

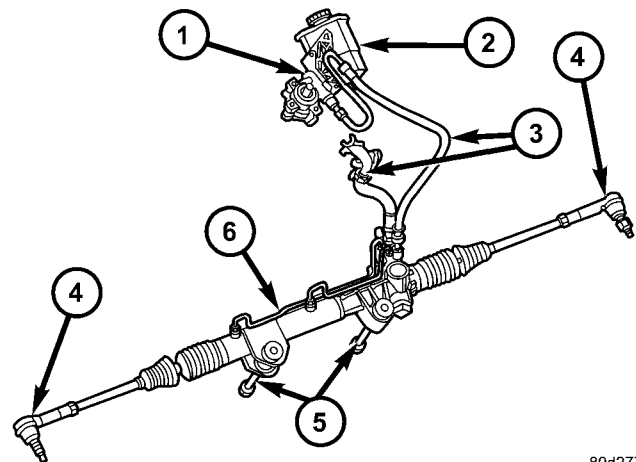
Power steering systems consist of:

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

OPERATION

The steering column shaft is attached to the gear pinion. The rotation of the pinion moves the gear rack from side-to-side. This lateral action of the rack pushes and pulls the tie rods to change the direction of the front wheels (Fig. 1).

Power assist is provided by an engine mounted hydraulic pump which supplies hydraulic fluid pressure to the steering gear.



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Fig. 1 STEERING COMPONENTS

- 1 - POWER STEERING PUMP ASSEMBLY
- 2 - RESERVOIR
- 3 - HOSES
- 4 - TIE ROD ENDS
- 5 - MOUNTING BOLTS
- 6 - RACK & PINION

STEERING (Continued)

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - POWER STEERING SYSTEM

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

STEERING NOISE

CONDITION	POSSIBLE CAUSES	CORRECTION
OBJECTIONAL HISS OR WHISTLE	1. Steering intermediate shaft to dash panel seal. 2. Noisy valve in power steering gear.	1. Check and repair seal at dash panel. 2. Replace steering gear.
RATTLE OR CLUNK	1. Gear mounting bolts loose. 2. Loose or damaged suspension components. 3. Internal gear noise. 4. Pressure hose in contact with other components. 5. Loose or damaged intermediate shaft or column.	1. Tighten bolts to specification. 2. Inspect and repair suspension. 3. Replace steering gear. 4. Reposition hose. 5. Inspect and repair or replace.
CHIRP OR SQUEAL	1. Loose belt.	1. Adjust or replace.
WHINE OR GROWL	1. Low fluid level. 2. Pressure hose in contact with other components. 3. Internal pump noise. 4. Air in fluid	1. Fill to proper level. 2. Reposition hose. 3. Replace pump. 4. Check for leaks, Evacuate air from P/S system.
SUCKING AIR SOUND	1. Loose return line clamp. 2. O-ring missing or damaged on hose fitting. 3. Low fluid level. 4. Air leak between pump and reservoir. 5. Reservoir cap not installed correctly.	1. Replace clamp. 2. Replace o-ring. 3. Fill to proper level. 4. Repair as necessary. 5. Install reservoir cap correctly.
SCRUBBING OR KNOCKING	1. Wrong tire size.	1. Verify tire size.

STEERING (Continued)**BINDING AND STICKING**

CONDITION	POSSIBLE CAUSE	CORRECTION
DIFFICULT TO TURN WHEEL STICKS OR BINDS	1. Low fluid level. 2. Tire pressure. 3. Steering components (ball joints/tie rod ends). 4. Loose belt. 5. Low pump pressure. 6. Column shaft coupler binding. 7. Steering gear worn. 8. Pump seized / Stuck valve	1. Fill to proper level. 2. Adjust tire pressure. 3. Inspect and repair as necessary. 4. Adjust or replace. 5. Pressure test and replace if necessary. 6. Replace coupler. 7. Replace gear. 8. Replace pump.

INSUFFICIENT ASST. OR POOR RETURN TO CENTER

CONDITION	POSSIBLE CAUSE	CORRECTION
HARD TURNING OR MOMENTARY INCREASE IN TURNING EFFORT	1. Tire pressure. 2. Low fluid level. 3. Loose belt. 4. Low pump pressure. 5. Internal gear leak.	1. Adjust tire pressure. 2. Fill to proper level. 3. Adjust or replace. 4. Pressure test and repair as necessary. 5. Replace gear.
STEERING WHEEL DOES NOT WANT TO RETURN TO CENTER POSITION	1. Tire pressure. 2. Wheel alignment. 3. Lack of lubrication. 4. High friction in steering gear.	1. Adjust tire pressure. 2. Align front end. 3. Inspect and lubricate suspension components. 4. Replace gear.

LOOSE STEERING AND VEHICLE LEAD

CONDITION	POSSIBLE CAUSE	CORRECTION
EXCESSIVE PLAY IN STEERING WHEEL	1. Worn or loose suspension or steering components. 2. Worn or loose wheel bearings. 3. Steering gear mounting. 4. Gear out of adjustment. 5. Worn or loose steering coupler.	1. Inspect and repair as necessary. 2. Inspect and repair or adjust bearings. 3. Tighten gear mounting bolts to specification. 4. Replace gear. 5. Inspect and replace as necessary.
VEHICLE PULLS OR LEADS TO ONE SIDE.	1. Tire Pressure. 2. Radial tire lead. 3. Brakes dragging. 4. Wheel alignment.	1. Adjust tire pressure. 2. Rotate tires. 3. Repair as necessary. 4. Align front end.

STEERING (Continued)

DIAGNOSIS AND TESTING - POWER STEERING FLOW AND PRESSURE

The following procedure is used to test the operation of the power steering system on the vehicle. This test will provide the gallons per minute (GPM) or flow rate of the power steering pump along with the maximum relief pressure. Perform test any time a power steering system problem is present. This test will determine if the power steering pump or power steering gear is not functioning properly. The following pressure and flow test is performed using Power Steering Analyzer Tool kit 6815 and (Fig. 2) Adapter Kit 6893.

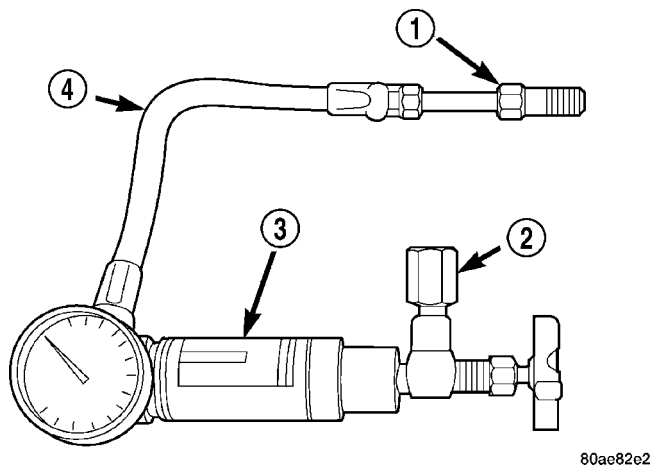


Fig. 2 Analyzer With Tube and Adapter

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

FLOW AND PRESSURE TEST

- (1) Check the power steering belt to ensure it is in good condition and adjusted properly.
- (2) Connect pressure gauge hose from the Power Steering Analyzer to adapter 6826.
- (3) Connect tube 6825A to Power Steering Analyzer test valve end.
- (4) Disconnect the high pressure hose from the power steering pump.
- (5) Connect the tube 6825A to the pump fitting.
- (6) Connect the power steering hose from the steering gear to the adapter 6826.
- (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) Gauge should read below 862 kPa (125 psi), if above, inspect the hoses for restrictions and repair as necessary. The initial pressure reading should be in the range of 345-552 kPa (50-80 psi).

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

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

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

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

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

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

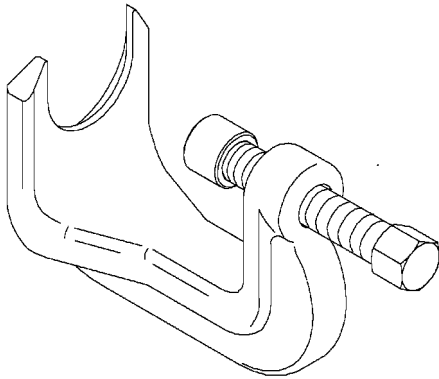
PUMP SPECIFICATION

ENGINE	RELIEF PRESSURE $\pm$ 65	FLOW RATE (GPM) AT 1500 RPM
1500 series	11032 kPa (1615 $\pm$ 65 psi)	3.1 - 3.5
2500 & 3500 series	12400 kPa (1800 $\pm$ 50 psi)	3.5 - 4.0

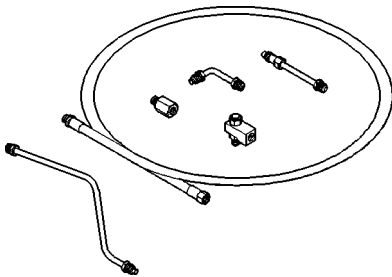
STEERING (Continued)

SPECIAL TOOLS

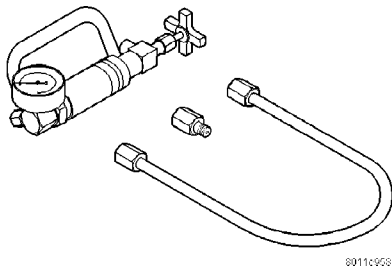
STEERING



PULLER - 8677

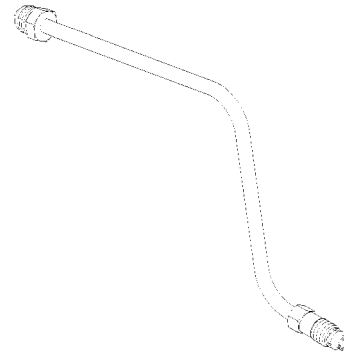


**ADAPTERS, POWER STEERING FLOW/PRESSURE
TESTER - 6893**



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**ANALYZER SET, POWER STEERING FLOW/
PRESSURE 6815**



**ADAPTER, POWER STEERING FLOW/PRESSURE -
6825A**

COLUMN

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COLUMN

DESCRIPTION

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

To service the steering wheel, switches or airbag, refer to Restraints 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.

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

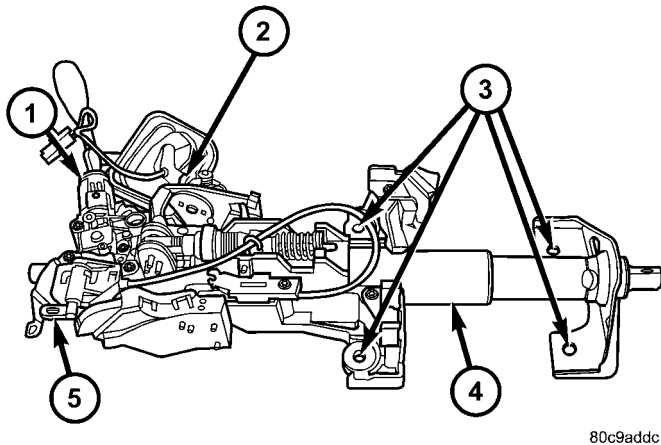
CAUTION: Do not attempt to remove the pivot bolts to disassemble the tilting mechanism. Do not remove shaft lock plate or plate retainer. This will damage the column.

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

NOTE: When servicing the steering wheel after removing the old bolt a new bolt must be used when installing.

COLUMN (Continued)

NOTE: When servicing the coupler a new bolt must be used when installing.



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Fig. 1 STEERING COLUMN

- 1 - LOCK CYLINDER
- 2 - GEAR SHIFT LEVER
- 3 - MOUNTING HOLES
- 4 - STEERING COLUMN
- 5 - TILT LEVER

DIAGNOSIS AND TESTING - STEERING COLUMN

If the vehicle is involved in a front end collision/the air bag has deployed the column must be inspected. This inspection will determine if the Column has collapsed. Inspect the column mounting capsules visually and manually push and pull them to check for separation or fractures. If capsules are fractured or have moved the column **MUST** be replaced.

REMOVAL

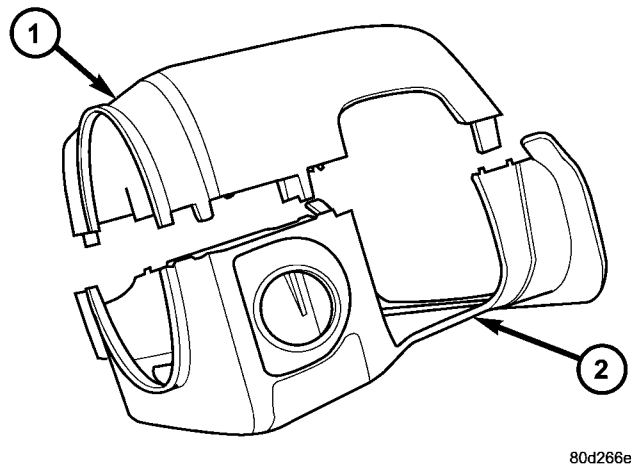
WARNING: BEFORE SERVICING THE STEERING COLUMN THE AIRBAG SYSTEM MUST BE DISARMED. REFER TO ELECTRICAL RESTRAINT SYSTEM FOR SERVICE PROCEDURES. FAILURE TO DO SO MAY RESULT IN ACCIDENTAL DEPLOYMENT OF THE AIRBAG AND POSSIBLE PERSONAL INJURY.

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

- (1) Position the front wheels **straight ahead**.
- (2) Disconnect the negative (ground) cable from the battery.
- (3) Remove the two switches from the steering wheel.
- (4) Remove the airbag, (Refer to 8 - ELECTRICAL/RESTRAINTS/DRIVER AIRBAG - REMOVAL).
- (5) Remove the steering wheel with special tool CJ98-1 or an appropriate steering wheel puller.

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

- (6) Remove the steering column opening cover (Refer to 23 - BODY/INSTRUMENT PANEL/STEERING COLUMN OPENING COVER - REMOVAL).
- (7) Remove the tilt lever.
- (8) Remove the column shrouds (Fig. 2).



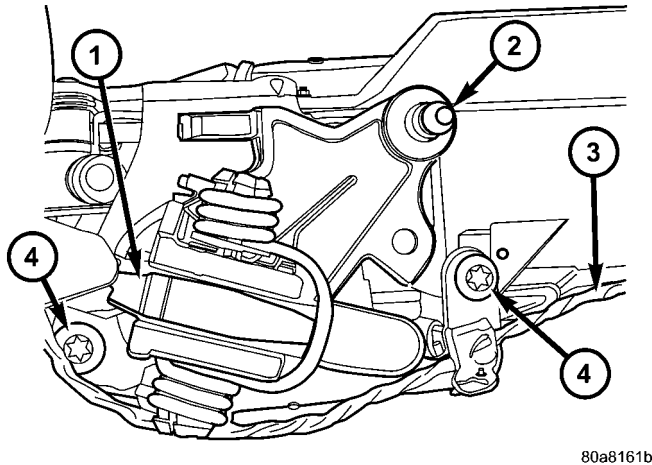
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Fig. 2 UPPER & LOWER SHROUDS

- 1 - UPPER SHROUD
- 2 - LOWER SHROUD

- (9) Remove the clock spring, (Refer to 8 - ELECTRICAL/RESTRAINTS/CLOCKSPRING - REMOVAL).
- (10) Disconnect the wiring harness to the column.
- (11) Remove the shift cable from the column shift lever actuator (Refer to 21 - TRANSMISSION/TRANSAXLE/AUTOMATIC - 32RH/GEAR SHIFT CABLE - REMOVAL). (Fig. 3).

COLUMN (Continued)



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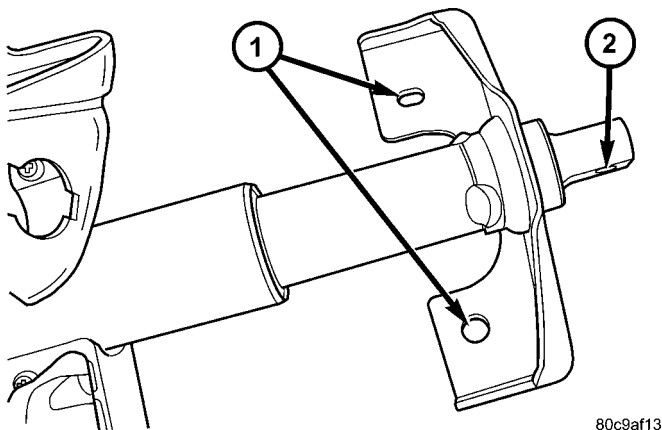
Fig. 3 SHIFT CABLE CONNECTOR

- 1 - Shift lever
- 2 - Cable Connection
- 3 - Overdrive Electrical Wiring
- 4 - Mounting Screws

(12) Release the shift cable from the column bracket and remove it from the bracket.

(13) Remove the SKIM module in order to disconnect the electrical connector.

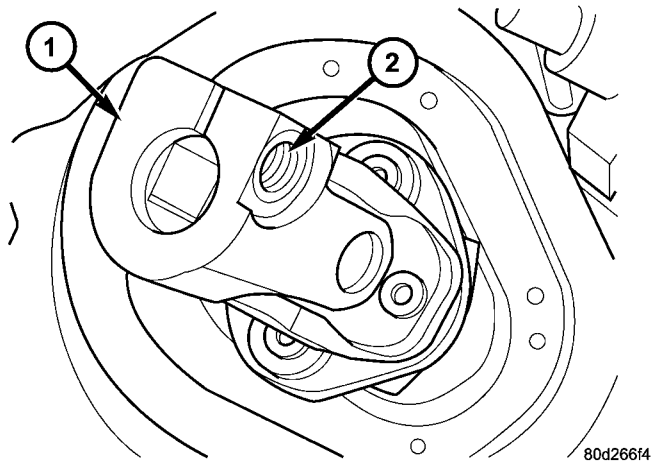
(14) Remove the upper steering shaft coupler bolt and slide the shaft down (Fig. 4) & (Fig. 5)



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Fig. 4 COUPLER SHAFT

- 1 - MOUNTING HOLES
- 2 - COUPLER BOLT HOLE



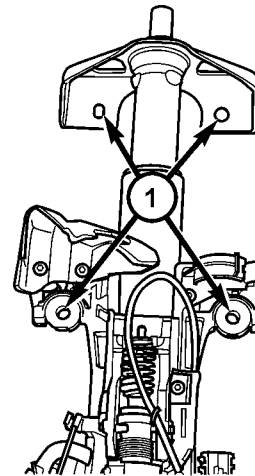
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Fig. 5 UPPER STEERING COUPLER

- 1 - STEERING COUPLER
- 2 - PINCH BOLT HOLE

(15) Remove the brake light switch and discard (Refer to 8 - ELECTRICAL/LAMPS/LIGHTING - EXTERIOR/BRAKE LAMP SWITCH - REMOVAL).

(16) Remove the four steering column mounting nuts (Fig. 6).



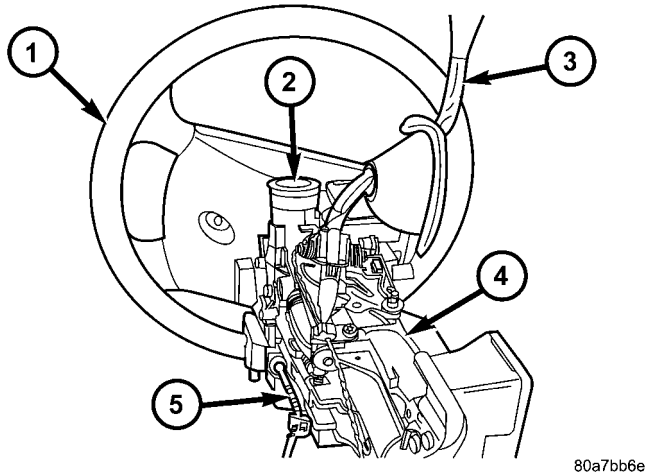
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Fig. 6 MOUNTING HOLES

- 1 - MOUNTING HOLES

(17) Remove the steering column assembly from the vehicle. (Fig. 7)

COLUMN (Continued)

**Fig. 7 STEERING COLUMN**

- 1 - Steering Wheel
- 2 - Key Cylinder
- 3 - Gear Shift Lever
- 4 - Steering Column
- 5 - Tilt Lever Cable

INSTALLATION

WARNING: BEFORE SERVICING THE STEERING COLUMN THE AIRBAG SYSTEM MUST BE DISARMED. REFER TO ELECTRICAL RESTRAINT SYSTEM FOR SERVICE PROCEDURES. FAILURE TO DO SO MAY RESULT IN ACCIDENTAL DEPLOYMENT OF THE AIRBAG AND POSSIBLE PERSONAL INJURY.

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

- (1) Position the steering column on the dash panel support and loosely install the mounting nuts.
- (2) Firmly slide the steering column upward against the studs in dash panel and hand tighten the nuts.
- (3) Install the steering shaft coupler on the steering shaft and loosely install a **new** bolt.
- (4) Center steering column in dash opening and tighten mounting nuts to 28 N·m (250 in. lbs.).

NOTE: Torque the upper left nut first then the lower right nut. Then torque the lower left nut then the upper right nut.

NOTE: A new bolt must be used for reinstallation.

- (5) Tighten the coupler bolt to 57 N·m (42 ft. lbs.).
- (6) Install a new brake light switch (Refer to 8 - ELECTRICAL/LAMPS/LIGHTING - EXTERIOR/BRAKE LAMP SWITCH - REMOVAL).

(7) Install the shifter cable. (Refer to 21 - TRANSMISSION/TRANSAXLE/AUTOMATIC - 32RH/GEAR SHIFT CABLE - INSTALLATION)

(8) Connect the wiring harness to the column.

(9) Install the SKIM module.

(10) Install the clockspring (Refer to 8 - ELECTRICAL/RESTRAINTS/CLOCKSPRING - REMOVAL).

(11) Install the shrouds.

(12) Install the steering column opening cover (Refer to 23 - BODY/INSTRUMENT PANEL/STEERING COLUMN OPENING COVER - INSTALLATION).

(13) Align the spline on the wheel hub to shaft.

(14) Then install the steering wheel and install a **new** bolt. Tighten the bolt to 61 N·m (45 ft. lbs.).

(15) Install the airbag (Refer to 8 - ELECTRICAL/RESTRAINTS/DRIVER AIRBAG - INSTALLATION).

(16) Install the two steering wheel switches.

(17) Install the tilt lever handle.

(18) Install the negative battery terminal.

(19) Test the operation of the horn, Electronic PRNDL Indicator, lights and any other functions that are steering column operated.

IGNITION SWITCH**DESCRIPTION**

The 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.

OPERATION

Vehicles equipped with an automatic transmission and a steering column mounted shifter: an interlock device is located within the shift cable. This interlock device is used to lock the transmission shifter in the PARK position when the key cylinder is in any position and the brake pedal is not depressed.

DIAGNOSIS AND TESTING - IGNITION SWITCH**TEST AND REPAIR**

If the key removal effort is excessive on a vehicle with a automatic transmission first adjust the shift linkage, (Refer to 21 - TRANSMISSION/TRANSAXLE/AUTOMATIC - 46RE/GEAR SHIFT CABLE - ADJUSTMENTS).

If the ignition switch effort is excessive remove the ignition key cylinder from the steering column. (Refer to 19 - STEERING/COLUMN/LOCK CYLINDER HOUSING - REMOVAL). Check the turning effort of the key cylinder. If the ignition key cylinder effort is excessive replace the key cylinder.

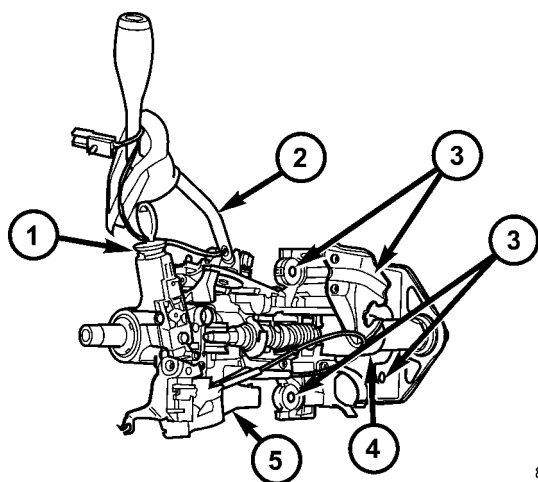
IGNITION SWITCH (Continued)

REMOVAL

SERVICE PRECAUTIONS

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

The tilt and standard column (Fig. 8) have been designed to be serviced as an assembly; without wiring, switches, shrouds, steering wheel, etc. Most steering column components can be serviced without removing the steering column from the vehicle.



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Fig. 8 STEERING COLUMN

- 1 - KEY CYLINDER
- 2 - GEAR SHIFT LEVER
- 3 - MOUNTING HOLES
- 4 - STEERING COLUMN
- 5 - IGNITION SWITCH

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

To service the steering wheel, switches or airbag, Refer to Electrical Restraints 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

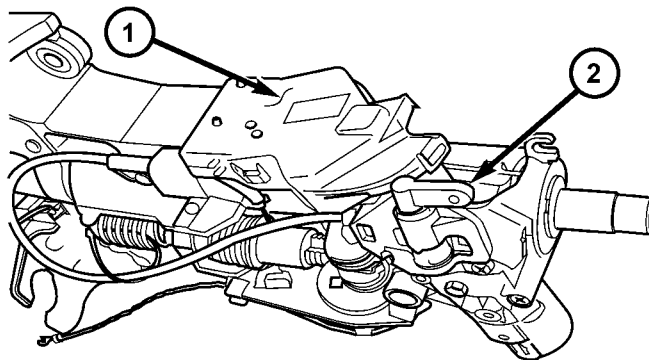
AIRBAG SYSTEM. THEY MUST NEVER BE REPLACED WITH ANY SUBSTITUTES. ANYTIME A NEW FASTENER IS NEEDED, REPLACE WITH THE CORRECT FASTENERS PROVIDED IN THE SERVICE PACKAGE OR FASTENERS LISTED IN THE PARTS BOOKS.

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

CAUTION: Do not attempt to remove the pivot bolts to disassemble the tilting mechanism.

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

- (1) Remove the negative (ground) cable from the battery.
- (2) Disable the airbag, (Refer to 8 - ELECTRICAL/RESTRAINTS/DRIVER AIRBAG - REMOVAL).
- (3) Remove the lower and upper shrouds.
- (4) Remove key cylinder. (Refer to 19 - STEERING/COLUMN/LOCK CYLINDER HOUSING - REMOVAL).
- (5) Disconnect the lower clockspring connectors.
- (6) Remove the wire retainer from the tilt lever bracket.
- (7) Remove the tilt lever mounting screws to gain access to the ignition switch mounting screws. (Fig. 9)



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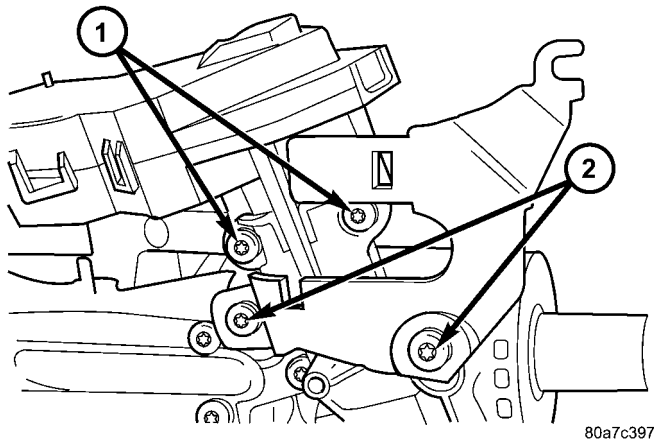
Fig. 9 IGNITION SWITCH WITH TILT

- 1 - IGNITION SWITCH
- 2 - TILT LEVER MECHANISM

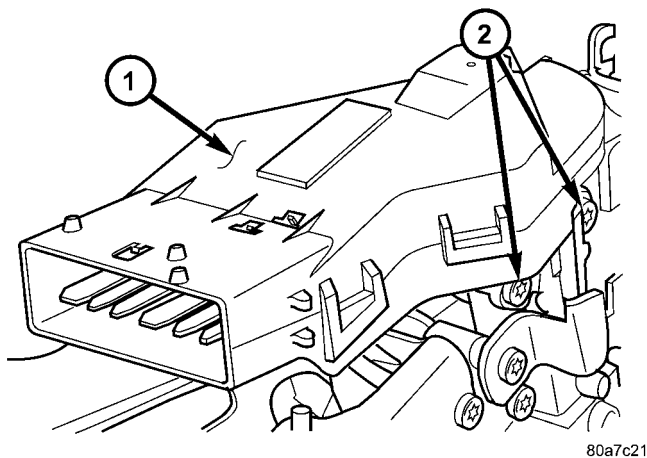
(8) For columns without tilt remove the bracket to gain access to the ignition switch mounting screws. (Fig. 10)

(9) Disconnect the electrical connector at rear of ignition switch (Fig. 11).

IGNITION SWITCH (Continued)

**Fig. 10 IGNITION SWITCH WITHOUT TILT**

- 1 - Ignition Switch Mounting Screws
2 - Non-Tilt Mounting Bracket Screws

**Fig. 11 IGNITION SWITCH**

- 1 - Ignition Switch
2 - Ignition Switch Mounting Screws

- (10) Remove ignition switch mounting screw.
(11) Using a small screwdriver, push on locking tab and remove switch from steering column.

INSTALLATION

The ignition key must be in the key cylinder for cylinder removal. The key cylinder must be removed first before installing ignition switch.

- (1) Before installing ignition switch, rotate the slot in the switch to the ON position.
(2) Connect the electrical connector to rear of the ignition switch. Make sure that locking tabs are fully seated into wiring connector.

- (3) Position switch to column and install the mounting screw. Tighten screw to 3 N·m (26 in. lbs.).
(4) Install the tilt lever bracket mounting screws. Tighten screws to 4.5 N·m (40 in. lbs.).
(5) If the column is non-tilt install the bracket. Tighten screws to 4.5 N·m (40 in. lbs.) (Fig. 10)
(6) Position the wire retainer into the tilt lever bracket.
(7) Reconnect the lower clockspring connectors.
(8) Install the key cylinder.
(9) Install steering column upper and lower shrouds.
(10) Enable the airbag system. (Refer to 8 - ELECTRICAL/RESTRAINTS/DRIVER AIRBAG - INSTALLATION).

KEY-IN IGNITION SWITCH**DESCRIPTION**

The key-in ignition switch is integral to the ignition switch, which is mounted on the left side of the steering column. It closes a path to ground for the Central Timer Module (CTM) when the ignition key is inserted in the ignition key cylinder and the driver door ajar switch is closed (driver door is open). The key-in ignition switch opens the ground path when the key is removed from the ignition key cylinder. The ground path is also opened when the driver door ajar switch is open (driver door is closed).

The key-in ignition switch cannot be repaired and, if faulty or damaged, the entire ignition switch must be replaced, (Refer to 19 - STEERING/COLUMN/IGNITION SWITCH - REMOVAL).

DIAGNOSIS AND TESTING - IGNITION SWITCH AND KEY LOCK CYLINDER**ELECTRICAL DIAGNOSIS**

For ignition switch electrical schematics, refer to Ignition Switch in the appropriate section of Electrical Wiring Diagrams.

MECHANICAL DIAGNOSIS (KEY DIFFICULT TO ROTATE)

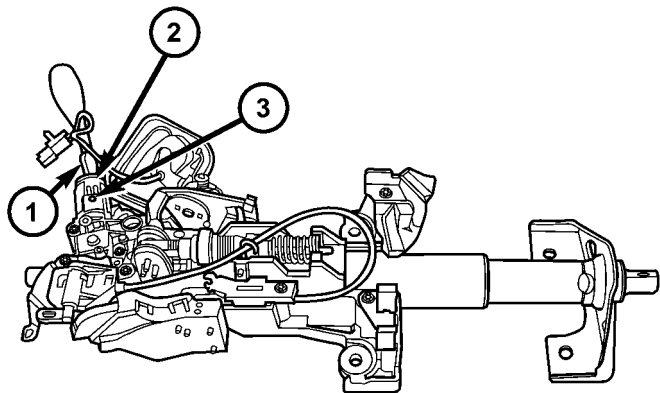
(Refer to 19 - STEERING/COLUMN/IGNITION SWITCH - DIAGNOSIS AND TESTING).

KEY CYLINDER

REMOVAL

The ignition key must be in the key cylinder for cylinder removal.

- (1) Disconnect negative cable from battery.
- (2) Remove upper and lower covers (shrouds) from steering column.
- (3) Place shifter in PARK position.
- (4) A retaining pin (Fig. 12) is located at side of key cylinder assembly.

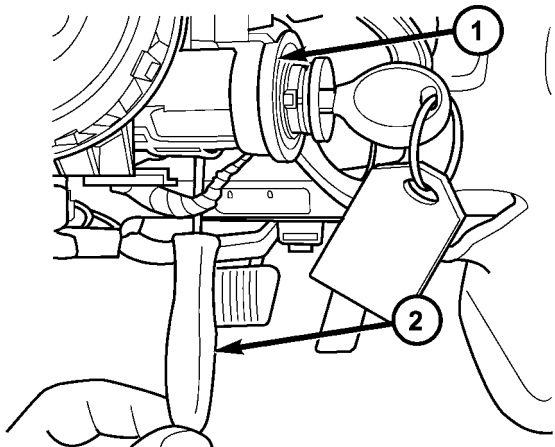


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Fig. 12 KEY CYLINDER

- 1 - KEY
- 2 - KEY CYLINDER
- 3 - RETAINING PIN HOLE

- (a) Rotate key to RUN position.
- (b) Press in on retaining pin while pulling key cylinder from ignition switch (Fig. 13).



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Fig. 13 KEY CYLINDER

- 1 - KEY CYLINDER
- 2 - PUNCH

INSTALLATION

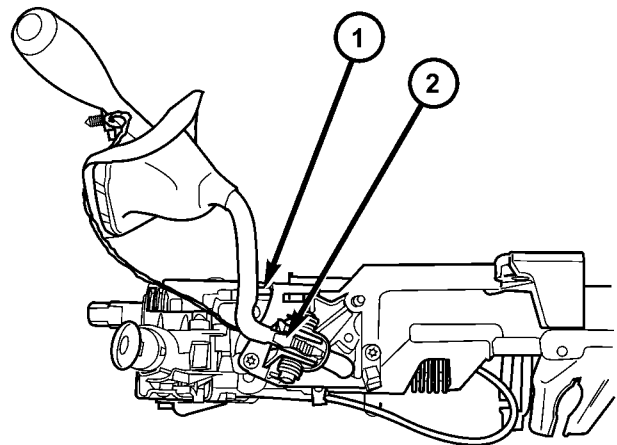
The ignition key must be in the key cylinder for cylinder installation.

- (1) Install the key cylinder into the housing using care to align the end of the key cylinder with the ignition switch.
- (2) Push the key cylinder in until it clicks.
- (3) Replace the upper and lower shrouds.
- (4) Reconnect the battery.

GEAR SHIFT LEVER

REMOVAL

- (1) Remove the kneeblocker. (Refer to 23 - BODY/INSTRUMENT PANEL/KNEE BLOCKER - REMOVAL).
- (2) Remove the upper and lower column shroud.
- (3) Remove and discard the brake light switch.
- (4) Loosen the column bolts and lower the column enough to allow clearance for the gear shift lever removal.
- (5) Disconnect the overdrive switch harness (if equipped).
- (6) Disconnect the shift cable from the shift lever.
- (7) Remove the SKIM.
- (8) Remove the gear shift lever mounting screws and remove the lever. (Fig. 14)
- (9) Remove the blocker pin from the inhibit link slot (Fig. 14).



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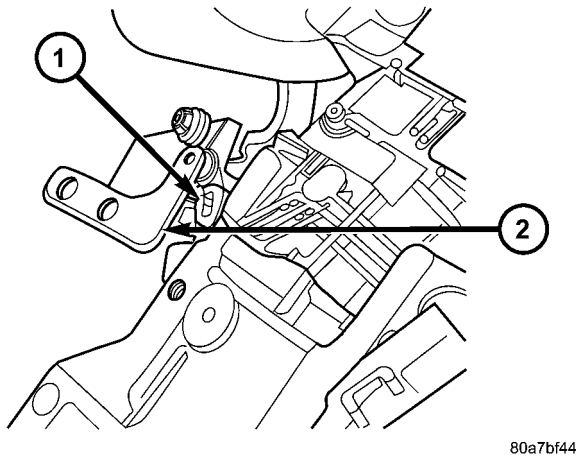
Fig. 14 GEAR SHIFT LEVER

- 1 - PARK INHIBIT BLOCKER SPRING
- 2 - GEAR SHIFT LEVER

INSTALLATION

- (1) Install the lever assembly using care to install the pin in the blocker to slider slot (Fig. 15) and install the mounting screws and tighten to 12 N·m (105 in. lbs.).

GEAR SHIFT LEVER (Continued)

**Fig. 15 GEAR SHIFT LEVER SPRING**

- 1 - BLOCKER TO INHIBIT LINK SLOT
2 - GEAR SHIFT LEVER

(2) Cycle the key from ACC to RUN and ensure that the blocker does not stick or bind.

(3) Turn the key to the OFF position and ensure that the shifter will not pull from the PARK position.

(4) Connect the over drive switch harness (if equipped).

NOTE: Route and tie off harness to original location.

(5) Connect the shift cable to the lever.

(6) Ensure the gear shift lever and transmission are in the PARK position and snap the cable adjust clip in place.

(7) Install a new brake light switch (Refer to 8 - ELECTRICAL/LAMPS/LIGHTING - EXTERIOR/BRAKE LAMP SWITCH - INSTALLATION).

(8) Install the SKIM and halo.

(9) Install the upper and lower column shroud.

(10) Install the column back into place and tighten.

(11) Install the kneeblocker. (Refer to 23 - BODY/INSTRUMENT PANEL/KNEE BLOCKER - INSTALLATION).

UPPER STEERING COUPLING

REMOVAL

(1) Disconnect the negative battery cable.

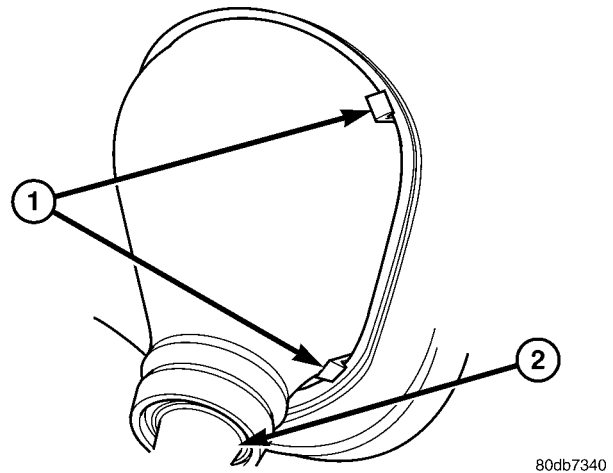
NOTE: The steering column on vehicles with an automatic transmission may not be equipped with an internal locking shaft that allows the ignition key cylinder to be locked with the key. Alternative methods of locking the steering wheel for service will have to be used.

(2) Lock the steering wheel with the tire in the straight position.

(3) Remove and discard the lower pinch bolt.

(4) Lower the steering coupler shaft from the column.

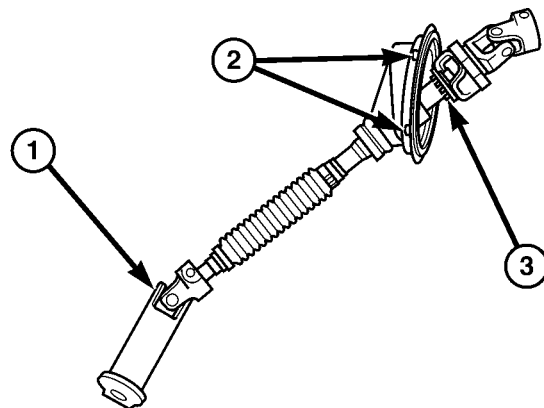
(5) Remove the upper steering coupling shaft seal by pushing in the four tags securing it to the panel (Fig. 16).

**Fig. 16 RELEASE TANGS**

- 1 - RELEASE TANGS (4)
2 - UPPER STEERING COUPLER SHAFT

(6) Remove and discard the lower coupler pinch bolt from the lower steering coupling shaft (Fig. 17).

(7) Remove the upper steering coupling shaft from the vehicle (Fig. 17).

**Fig. 17 UPPER STEERING COUPLER SHAFT**

- 1 - LOWER STEERING COUPLER
2 - RELEASE TANGS (4)
3 - UPPER STEERING COUPLER SHAFT

UPPER STEERING COUPLING (Continued)

INSTALLATION

(1) Install the upper steering coupling shaft to the vehicle (Fig. 17).

(2) Install the upper steering coupling shaft seal by pushing it in securing the four tangs to the panel (Fig. 16).

NOTE: Note: A new steering coupling shaft pinch bolt for the upper and lower shafts must be used.

(3) Install the steering coupler shaft to the column (Fig. 17).

(4) Install the upper pinch bolt use new bolt and tighten to 57 N.m (42 ft.lbs).

(5) Install the shaft to the lower coupler (Fig. 17).

(6) Install the lower pinch bolt use new bolt and tighten to 57 N.m (42 ft.lbs).

(7) Unlock the steering wheel.

(8) Reconnect the negative battery cable.

LOWER STEERING COUPLING

REMOVAL

REMOVAL - ALL LD & HD EXCEPT 4X4 HD

(1) Disconnect the negative battery cable.

(2) Raise and support the vehicle.

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 tire in the straight position.

(4) Remove the left front tire and wheel assembly.

(5) Mark both coupler connections for proper installation.

(6) Remove and discard the upper coupler pinch bolt.

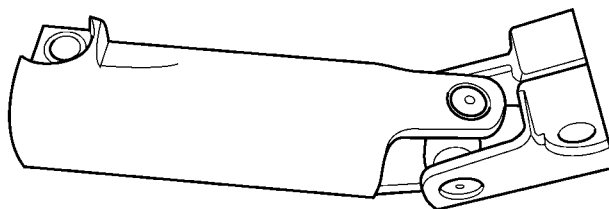
(7) Remove and discard the lower coupler pinch bolt.

(8) Remove the lower steering shaft coupler (Fig. 18).

REMOVAL - 4X4 HD

(1) Disconnect the negative battery cable.

(2) Raise and support the vehicle.



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Fig. 18 LOWER STEERING COUPLER

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 tire in the straight position.

(4) Remove the left front tire and wheel assembly.

(5) Remove and discard the upper coupler pinch bolt (Fig. 20).

(6) Remove and discard the lower coupler pinch bolt (Fig. 19).

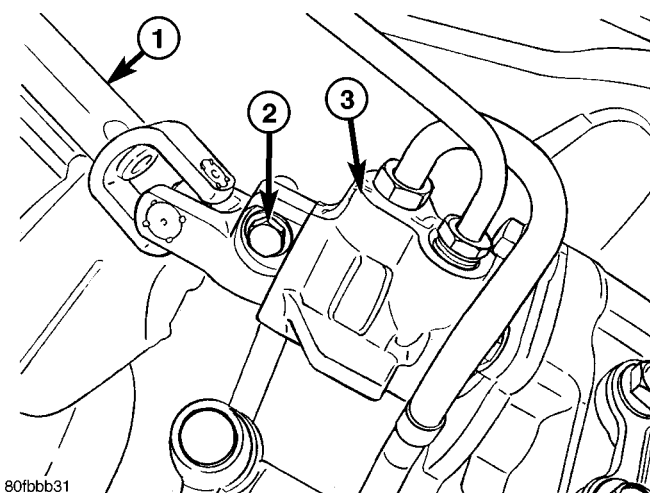


Fig. 19 LOWER COUPLER PINCH BOLT

- 1 - INTERMEDIATE STEERING SHAFT
- 2 - LOWER COUPLING BOLT
- 3 - STEERING GEAR

LOWER STEERING COUPLING (Continued)

(7) Remove the lower steering shaft coupler (Fig. 20).

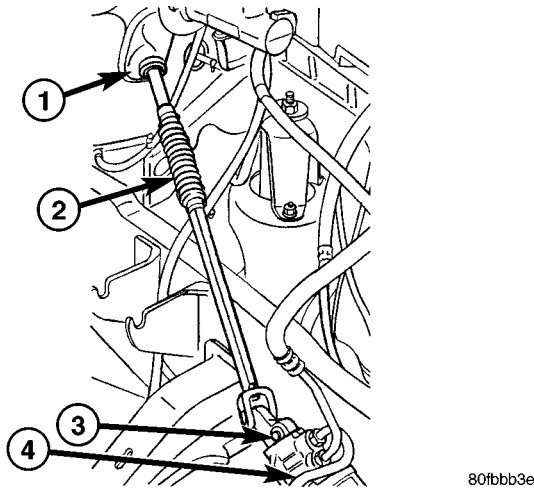


Fig. 20 INTERMEDIATE STEERING SHAFT

- 1 - UPPER COUPLING BOOT AND BOLT
- 2 - INTERMEDIATE STEERING SHAFT
- 3 - LOWER COUPLING BOLT
- 4 - STEERING GEAR

INSTALLATION

INSTALLATION - ALL LD & HD EXCEPT 4X4 HD

(1) Install the coupler to the steering rack & pinion using the marks made in the removal process.

(2) Install the coupler to the intermediate shaft using the marks made in the removal process.

NOTE: New pinch bolts must be used for reinstallation.

(3) Install the lower pinch bolt and tighten to 57 N·m (42 ft. lbs.).

(4) Install the upper pinch bolt and tighten to 57 N·m (42 ft. lbs.).

(5) Install the left front tire and wheel assembly (Refer to 22 - TIRES/WHEELS/WHEELS - STANDARD PROCEDURE).

(6) Lower the vehicle.

(7) Reconnect the negative battery cable.

(8) Unlock the steering wheel.

INSTALLATION - 4X4 HD

(1) Install the coupler to the steering gear.

(2) Install the coupler to the intermediate shaft.

NOTE: New pinch bolts must be used for reinstallation.

(3) Install the lower pinch bolt and tighten to 28 N·m (250 in. lbs.).

(4) Install the upper pinch bolt and tighten to 57 N·m (42 ft. lbs.).

(5) Install the left front tire and wheel assembly (Refer to 22 - TIRES/WHEELS/WHEELS - STANDARD PROCEDURE).

(6) Lower the vehicle.

(7) Reconnect the negative battery cable.

(8) Unlock the steering wheel.

STEERING WHEEL

REMOVAL

(1) Disable and remove the driver's side air bag. (Refer to 8 - ELECTRICAL/RESTRAINTS/DRIVER AIRBAG - REMOVAL).

(2) Partially remove the steering wheel bolt and leave the bolt in the column.

(3) Install puller CJ98-1 or equivalent using the top of the bolt to push on. (Fig. 21)

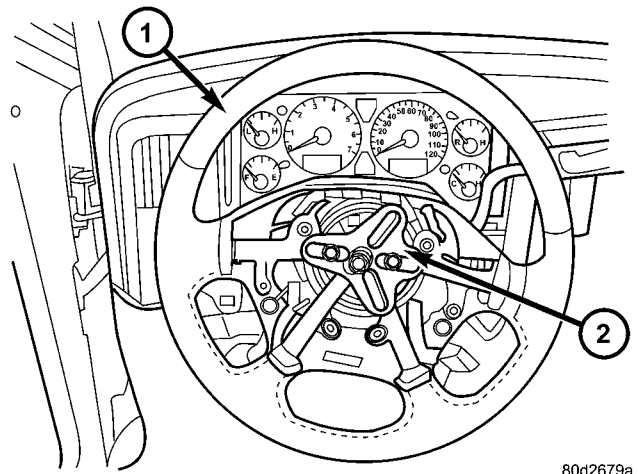


Fig. 21 STEERING WHEEL PULLER

- 1 - STEERING WHEEL
- 2 - SPECIAL TOOL CJ98-1

(4) Remove and discard the steering wheel bolt.

(5) Remove the steering wheel.

INSTALLATION

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 61 N·m (45 ft. lbs.).

(3) Install the driver's side air bag. (Refer to 8 - ELECTRICAL/RESTRAINTS/DRIVER AIRBAG - INSTALLATION).

GEAR - INDEPENDENT FRONT SUSPENSION

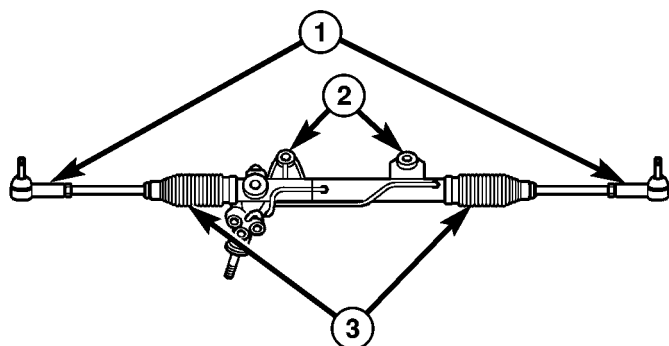
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GEAR - INDEPENDENT FRONT SUSPENSION

DESCRIPTION

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



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Fig. 1 STEERING GEAR

- 1 - OUTER TIE ROD ENDS
2 - MOUNTING BUSHINGS
3 - BELLOWS

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.

- (1) Lock the steering wheel.

- (2) Drain and siphon the power steering fluid from the reservoir.

- (3) Raise the vehicle.

- (4) Remove and discard the steering coupler pinch bolt.

- (5) Remove the power steering hoses from the rack & pinion.

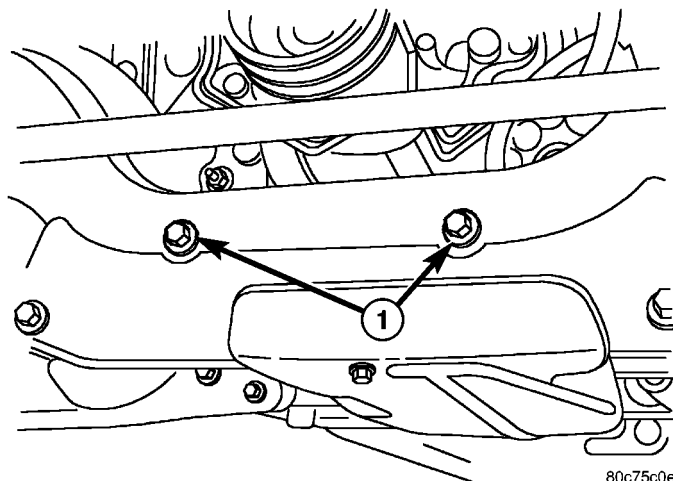
- (6) Remove the tire and wheel assembly.

- (7) Remove the tie rod end nuts and separate tie rod ends from the knuckles with Special tool 8677 (Refer to 19 - STEERING/LINKAGE/TIE ROD END - REMOVAL).

- (8) Remove the skid plate (Refer to 13 - FRAME & BUMPERS/FRAME/FRONT SKID PLATE - REMOVAL).

- (9) Remove the rack & pinion mounting bolts. (Fig. 2) & (Fig. 3)

- (10) Remove the rack & pinion from the vehicle.

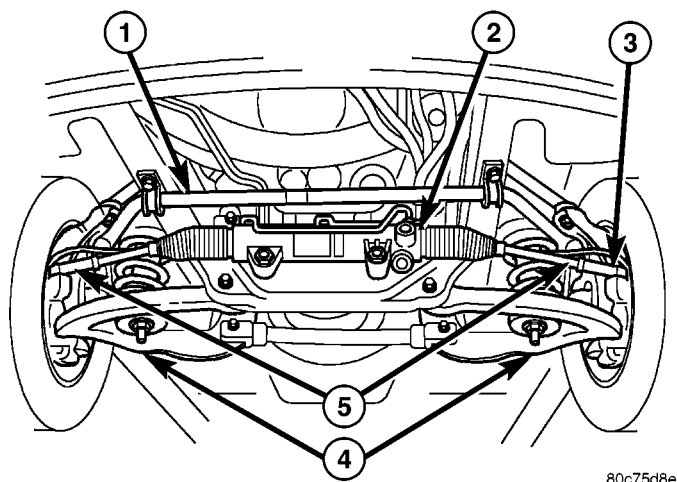


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Fig. 2 STEERING GEAR MOUNTING BOLTS

- 1 - STEERING GEAR MOUNTING BOLTS 4X4

GEAR - INDEPENDENT FRONT SUSPENSION (Continued)



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Fig. 3 STEERING GEAR 4X2

- 1 - SWAY BAR
- 2 - STEERING GEAR
- 3 - LEFT OUTER TIE ROD END
- 4 - LOWER CONTROL ARMS
- 5 - LEFT INNER & RIGHT OUTER (TIE ROD ENDS)

INSTALLATION

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

NOTE: In the frame there is two holes for the mounting of the steering gear one is slotted and one is round, When tightening the gear to specifications make sure to tighten the mounting bolt with the hole first to avoided movement of the steering gear.

(1) Install the gear on the front crossmember and tighten the mounting bolts to 319 N·m (235 ft. lbs.). (Fig. 4) & (Fig. 3).

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

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

(4) Install the tie rod ends into the steering knuckles and tighten the nuts to 61 N·m (45 ft. lbs.) then

an additional 90°. (Refer to 19 - STEERING/LINKAGE/TIE ROD END - INSTALLATION).

(5) Install the pressure power steering hose to the steering gear and tighten to 32 N·m (23 ft. lbs.). (Refer to 19 - STEERING/PUMP/HOSES - INSTALLATION).

(6) Install the return power steering hose to the steering gear and tighten to 71 N·m (52 ft. lbs.). (Refer to 19 - STEERING/PUMP/HOSES - INSTALLATION).

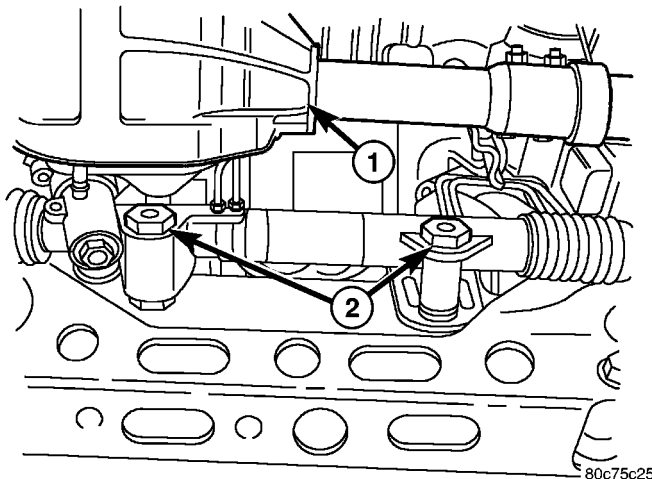
(7) Install the front skid plate (Refer to 13 - FRAME & BUMPERS/FRAME/FRONT SKID PLATE - INSTALLATION).

(8) Install the tire and wheel assembly (Refer to 22 - TIRES/WHEELS/WHEELS - STANDARD PROCEDURE).

(9) Remove the support and lower the vehicle.

(10) Fill the system with fluid, (Refer to 19 - STEERING/PUMP - STANDARD PROCEDURE).

(11) Adjust the toe position. (Refer to 2 - SUSPENSION/WHEEL ALIGNMENT - STANDARD PROCEDURE).



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Fig. 4 STEERING GEAR 4X4

- 1 - FRONT AXLE
- 2 - STEERING GEAR MOUNTING NUTS & BUSHINGS

GEAR - INDEPENDENT FRONT SUSPENSION (Continued)**SPECIFICATIONS****TORQUE CHART***TORQUE SPECIFICATIONS*

DESCRIPTION	N·m	Ft. Lbs.	In. Lbs.
Rack and Pinion Steering Gear Gear to Frame Bolts	319	235	—
Rack and Pinion Steering Gear Coupler Bolt	49	36	—
Tie Rod End Knuckle Nut	61 Then tighten an additional 90°	45 Then tighten an additional 90°	—
Tie Rod End Jam Nut	75	55	—
Power Steering Line Pressure Line	32	23	—
Power Steering Line Return Line	71	52	—
Power Steering Line Pressure Line To Pump	37	27	—

BUSHING**REMOVAL**

(1) Remove the steering gear (Refer to 19 - STEERING/GEAR - REMOVAL).

CAUTION: Do not overtighten the vise on the gear case.

(2) Mount the steering gear in a soft jawed vise.

NOTE: If the bushings are seized a brass punch can be used to remove the bushings from the gear using care not to strike the gear.

- (3) Remove the front mounting bushings.
- (4) Remove the rear mounting bushings.
- (5) Remove the steering gear from the vise and place it on the bench.

INSTALLATION

NOTE: Coat all bushings with a thin rubber lubricate oil prior to installation.

NOTE: A rubber mallet can be used to assist in the installation of the bushings once lubricated.

(1) Coat the rear bushings with a thin rubber lubricate oil then install the rear bushings using a rubber mallet to seat the bushings in the gear.

(2) Coat the front bushings with a thin rubber lubricate oil then install the front bushings using a rubber mallet to seat the bushings in the gear.

(3) Install the steering gear (Refer to 19 - STEERING/GEAR - INSTALLATION).

(4) Adjust the toe position (if necessary) (Refer to 2 - SUSPENSION/WHEEL ALIGNMENT - STANDARD PROCEDURE).

GEAR - LINK/COIL

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GEAR - LINK/COIL

DESCRIPTION

The power steering gear is a recirculating ball type gear (Fig. 1). The gear ratio's used are 12.5:1.

OPERATION

The gear acts as a rolling thread between the worm shaft and rack piston. The worm shaft is supported by a thrust bearing at the lower end and a bearing assembly at the upper end. When the worm shaft is turned from input from the steering column the rack piston moves. The rack piston teeth mesh with the pitman shaft. Turning the worm shaft, turns the pitman shaft, which turns the steering linkage.

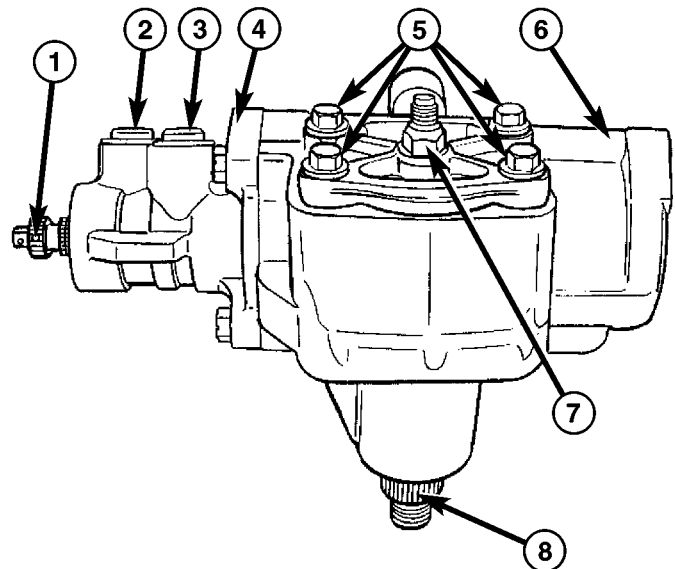
REMOVAL

(1) Place the front wheels in a straight-ahead position.

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.

(3) Siphon out as much power steering fluid as possible.



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Fig. 1 STEERING GEAR

- 1 - INPUT SHAFT
- 2 - OUTLET
- 3 - INLET
- 4 - VALVE ASSEMBLY HOUSING
- 5 - PITMAN SHAFT COVER BOLTS
- 6 - STEERING GEAR
- 7 - MESHLOAD ADJUSTER NUT
- 8 - PITMAN SHAFT

GEAR - LINK/COIL (Continued)

(4) Disconnect and cap the fluid hoses from steering gear (Refer to 19 - STEERING/PUMP/HOSES - REMOVAL).

(5) Remove coupler pinch bolt at the steering gear and slide shaft off gear (Fig. 2).

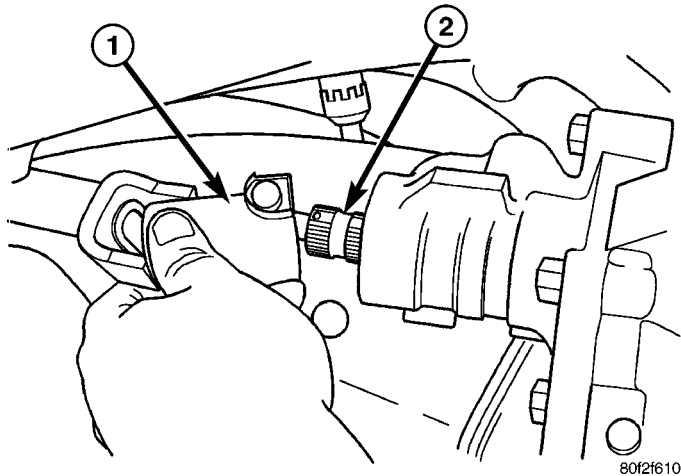


Fig. 2 COLUMN SHAFT

- 1 - STEERING COUPLER
2 - STEERING GEAR INPUT SHAFT

(6) Mark the pitman shaft and pitman arm for installation reference. Remove the pitman arm from the shaft with Puller C-4150A (Refer to 19 - STEERING/LINKAGE/PITMAN ARM - REMOVAL), (Fig. 3).

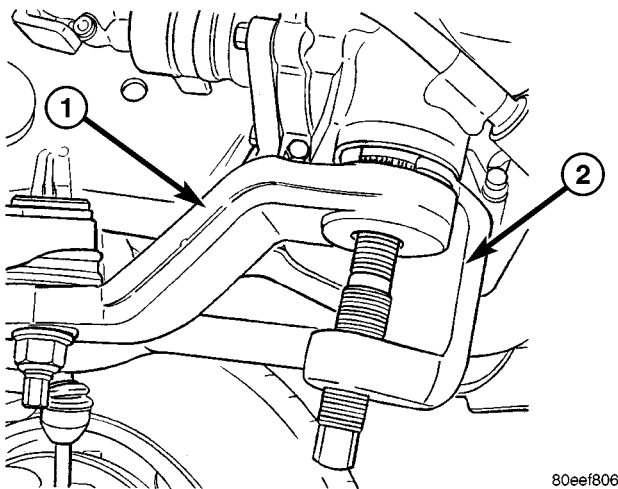
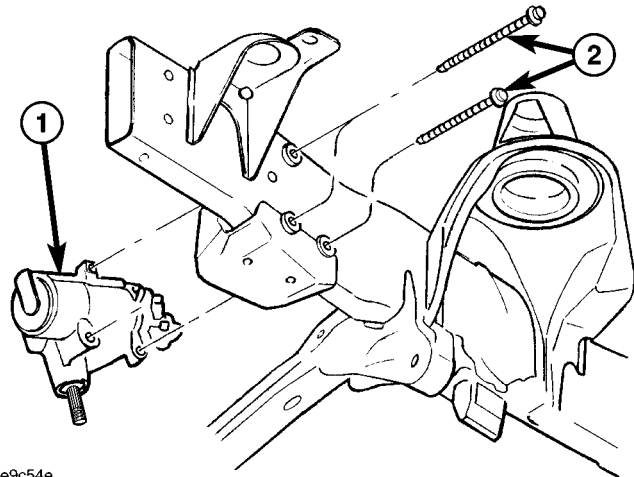


Fig. 3 PITMAN ARM REMOVAL

- 1 - PITMAN ARM
2 - C-4150A PULLER

(7) Remove steering gear three mounting bolts (Fig. 4). Remove the steering gear from the vehicle.



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Fig. 4 STEERING GEAR REMOVAL/INSTALLATION

- 1 - STEERING GEAR
2 - MOUNTING BOLTS (3)

INSTALLATION

(1) Position the steering gear on the frame rail and install the three mounting bolts (Fig. 4). Tighten the mounting bolts to 196 N·m (145 ft. lbs.).

(2) Align steering coupler on gear shaft. Install pinch bolt and tighten to 49 N·m (36 ft. lbs.) torque.

(3) Align and install the pitman arm (Refer to 19 - STEERING/LINKAGE/PITMAN ARM - INSTALLATION).

(4) Install the washer and retaining nut on the pitman shaft. Tighten the nut to 305 N·m (225 ft. lbs.).

(5) Connect fluid hoses to steering gear (Refer to 19 - STEERING/PUMP/HOSES - INSTALLATION), tighten to 31 N·m (23 ft. lbs.).

(6) Add fluid, (Refer to 19 - STEERING/PUMP - STANDARD PROCEDURE).

(7) Reset the toe and center the steering wheel (Refer to 2 - SUSPENSION/WHEEL ALIGNMENT - STANDARD PROCEDURE).

ADJUSTMENTS

ADJUSTMENT

CAUTION: Steering gear must be adjusted in the proper order. If adjustments are not performed in order, gear damage and improper steering response may result.

NOTE: Adjusting the steering gear in the vehicle is not recommended. Remove gear from the vehicle and drain the fluid. Then mount gear in a vise to perform adjustments.

GEAR - LINK/COIL (Continued)

- (1) Remove the steering gear from the vehicle (Refer to 19 - STEERING/GEAR - REMOVAL).
- (2) Mount the gear carefully into a soft-jawed vise.

CAUTION: Do not overtighten the vise on the gear case. This may affect the adjustment

(3) Hold the steering gear upside down over a drain pan and rotate the input shaft back and forth several times lock-to-lock to discharge the fluid from the steering gear

(4) Rotate the input shaft to the left stop and then back-off approximately 45 degrees. Using an inch-pound torque wrench on the input shaft, record the peak torque required to slowly and evenly rotate the input shaft clockwise $\frac{1}{2}$ turn (180 degrees) starting from the 45 degree position. This peak torque reading is the preload torque. The preload torque must be within 2 - 10 in-lbs.

(5) Rotate the input shaft to its center of travel (approximately 1.5 turns from either stop). Place the torque wrench on the input shaft with the handle in the vertical position. Rotate the torque wrench slowly and evenly $\frac{1}{4}$ turn (90 degrees) each side of center and record the peak torque measure on or near center. This total on-center torque reading must be 5 - 9 in-lbs higher than the previously measured preload torque without exceeding a total of 17 in-lbs. The value of the total on-center minus the preload torque is defined as the meshload torque

(6) If required, adjust the on-center torque by loosening the adjuster screw lock nut and turning the adjuster screw until the total on-center and meshload torque readings fall within the specified values. Turn the adjuster screw clockwise to increase and counter-clockwise to decrease the torque reading. While holding the adjuster screw in place, tighten the lock nut to 31 N·m (23 ft. lbs.).

(7) Re-check the preload and on-center torque readings.

(8) Install pitman arm on the steering gear (Refer to 19 - STEERING/LINKAGE/PITMAN ARM - INSTALLATION).

(9) Reinstall steering gear to the vehicle (Refer to 19 - STEERING/GEAR - INSTALLATION).

SPECIFICATIONS

POWER STEERING GEAR

SPECIFICATIONS

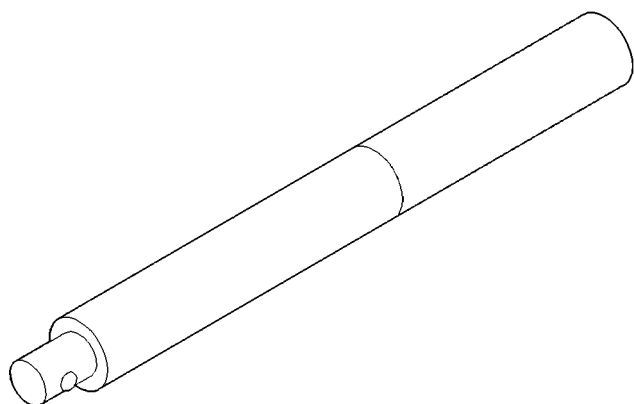
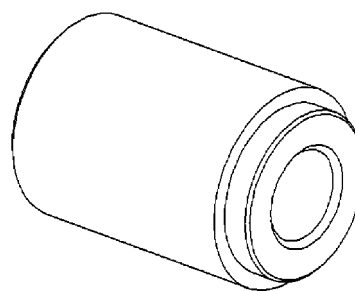
DESCRIPTION	SPECIFICATION
Steering Gear Type	Recirculating Ball
Gear Code & Ratio	12.5:1

TORQUE SPECIFICATIONS

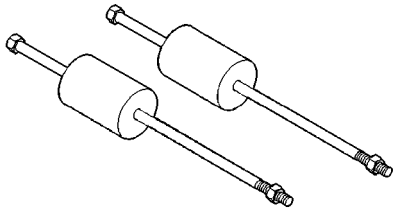
DESCRIPTION	N·m	Ft. Lbs.	In. Lbs.
Preload Torque	0.23-1.13	—	2-10
Meshload Torque	0.56-1.02	—	5-9 + Preload (17 Max)

GEAR - LINK/COIL (Continued)**TORQUE CHART***TORQUE SPECIFICATIONS*

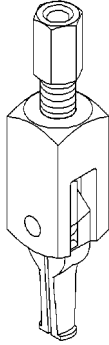
DESCRIPTION	N·m	Ft. Lbs.	In. Lbs.
Steering Gear Mounting Frame Bolts	196	145	—
Power Steering Line Pressure	32	23	—
Power Steering Line Return	71	52	—
Power Steering Line Pressure Line To Pump	37	27	—
Steering Gear Adjustment Screw Locknut	31	23	—
Steering Gear Pitman Shaft Nut	305	225	—
Steering Gear Pitman Shaft Cover Bolts	68	50	—
Steering Gear Valve Housing to Gear Bolts	54	40	—
Steering Gear Retainer Ring Screw	2.26	—	20
Steering Gear Retainer Ring	97	72	—

SPECIAL TOOLS**POWER STEERING GEAR*****HANDLE C-4171******INPUT SHAFT SEAL INSTALLER - 8987***

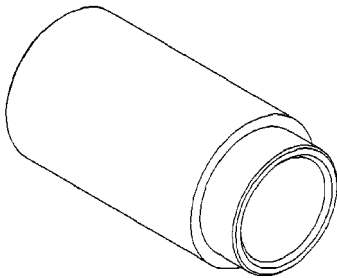
GEAR - LINK/COIL (Continued)



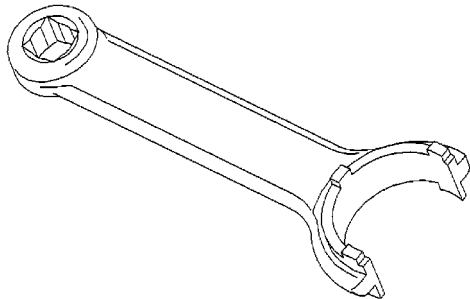
PULLER, SLIDE HAMMER - C-3752



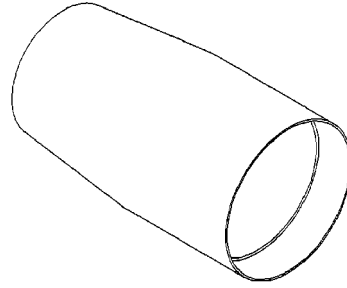
SEAL REMOVER ADAPTER - 8990



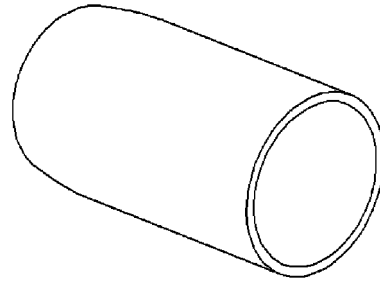
PITMAN SHAFT SEAL INSTALLER - 8989



RETAINER RING WRENCH - 8988



PITMAN SHAFT SEAL PROTECTOR - 8993



INPUT SHAFT SEAL PROTECTOR - 8986

PITMAN SHAFT SEAL

REMOVAL

REMOVAL - GAS ENGINE

(1) Separate the pitman arm from the gear box (Refer to 19 - STEERING/LINKAGE/PITMAN ARM - REMOVAL).

(2) Clean exposed end of pitman shaft and housing with a wire brush.

(3) Rotate the steering wheel from stop to stop and count the number of turns.

(4) Center the steering wheel by rotating it from the stop back 1 1/2 turns to achieve center position.

(5) Remove the pitman shaft cover bolts.

NOTE: The pitman shaft will not clear the housing if it is not centered.

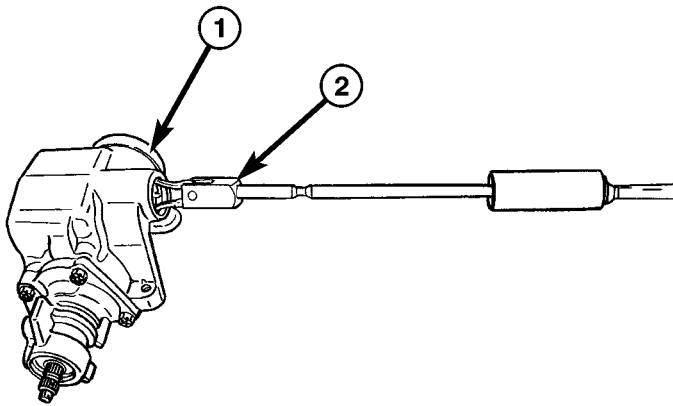
(6) Remove the pitman shaft from the gear.

(7) Remove dust seal from the housing with a special tool (Fig. 5).

CAUTION: Use care not to score the housing bore when prying out seals and washer.

(8) Remove retaining ring with snap ring pliers.

PITMAN SHAFT SEAL (Continued)



80ec6ecf

Fig. 5 SLIDE HAMMER

- 1 - STEERING GEAR
2 - SLIDE HAMMER C-3752 USED WITH SPECIAL TOOL ADAPTER 8990

(9) Remove washer from the housing.

NOTE: Tighten the slide hammer adapter 8990 into the seal using wrenches, in order to make a tight fit to pull the seal out. If this is not performed the seal may tear on the removal making it difficult to remove.

(10) Remove oil seal from the housing with a special tool 8990 with slide hammer C-3752.

REMOVAL - DIESEL

(1) Separate the pitman arm from the gear box (Refer to 19 - STEERING/LINKAGE/PITMAN ARM - REMOVAL).

(2) Remove the steering gear box (Refer to 19 - STEERING/GEAR - REMOVAL).

(3) Install the steering gear in a soft jawed bench vise.

(4) Clean exposed end of pitman shaft and housing with a wire brush.

(5) Rotate the input shaft with a 12 point socket from stop to stop and count the number of turns (Fig. 6).

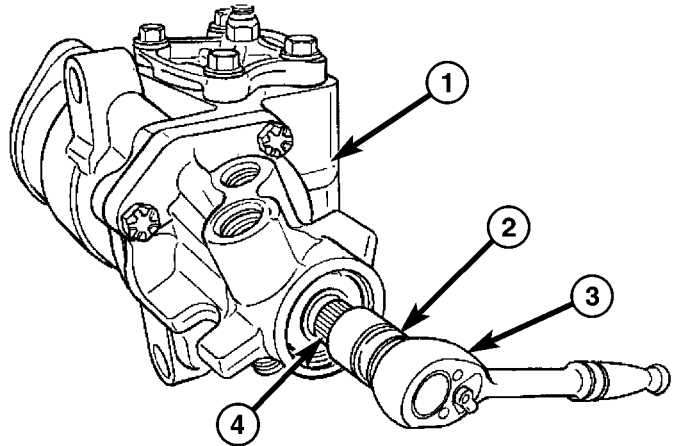
(6) Center the input shaft by rotating it from the stop 1/2 of the total amount of turns (Fig. 6).

(7) Remove the pitman shaft cover bolts.

NOTE: The pitman shaft will not clear the housing if it is not centered.

(8) Remove the pitman shaft from the gear.

(9) Remove dust seal from the housing with a special tool 8990 (Fig. 5).



80ec6d77

Fig. 6 CENTERING STEERING GEAR

- 1 - STEERING GEAR
2 - 12 POINT SOCKET
3 - RATCHET
4 - INPUT SHAFT

CAUTION: Use care not to score the housing bore when prying out seals.

(10) Remove retaining ring with snap ring pliers.

(11) Remove washer from the housing.

NOTE: Tighten the slide hammer adapter 8990 into the seal using wrenches, in order to make a tight fit to pull the seal out. If this is not performed the seal may tear on the removal making it difficult to remove.

(12) Remove oil seal from the housing with a special tool 8990 with slide hammer C-3752. (Fig. 5).

INSTALLATION**INSTALLATION - GAS ENGINE**

NOTE: Generous amounts of the high temperature grease from the seal kit should be applied to areas between the pitman shaft bearing and oil seals and also between the dust seals and snap ring.

(1) Coat the oil seal and washer with **high temp grease**.

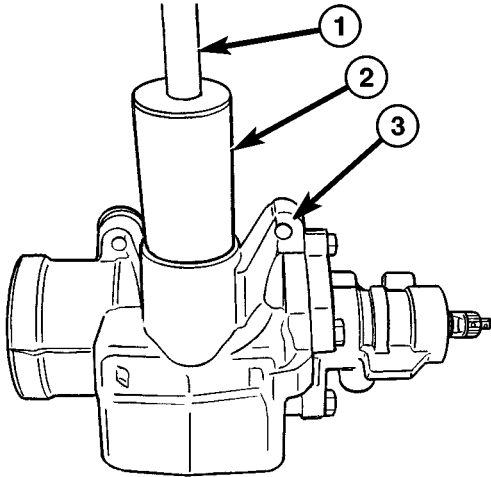
NOTE: Install the oil seal with the lip facing inward. Flat side of the oil seal should be against the washer.

(2) Install the oil seal with special tool 8989 driver and C-4171 handle (Fig. 7).

(3) Install backup washer.

(4) Install the retainer ring with snap ring pliers.

PITMAN SHAFT SEAL (Continued)

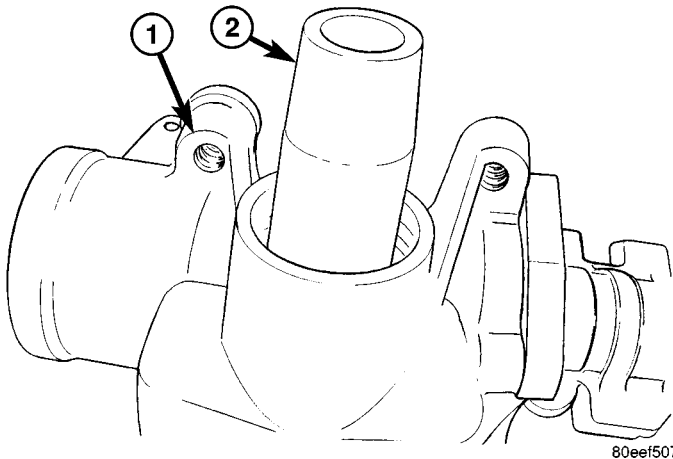


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Fig. 7 SEAL INSTALLATION

- 1 - SPECIAL TOOL
C-4171
2 - SPECIAL TOOL
8989
3 - STEERING GEAR

- (5) Coat the dust seal with **high temp grease**.
(6) Install the dust seal with a driver and handle (Fig. 7).
(7) Install protective seal protector 8993 over the shaft (Fig. 8).



80eef507

Fig. 8 PITMAN SHAFT SEAL PROTECTOR

- 1 - STEERING GEAR
2 - SPECIAL TOOL
8993

- (8) Install the pitman shaft into the steering gear until it fully seats into the bearing.
(9) Install the new cover bolts and tighten to 68 N·m (50 ft. lbs.).
(10) Install the pitman arm (Refer to 19 - STEERING/LINKAGE/PITMAN ARM - INSTALLATION).

INSTALLATION - DIESEL

NOTE: Generous amounts of the high temperature grease from the seal kit should be applied to areas between the pitman shaft bearing and oil seals and also between the dust seals and snap ring.

- (1) Coat the oil seal and washer with **high temp grease**.

NOTE: Install the oil seal with the lip facing inward. Flat side of the oil seal should be against the washer.

- (2) Install the oil seal with special tool 8989 driver and C-4171 handle (Fig. 7).
(3) Install backup washer.
(4) Install the retainer ring with snap ring pliers.
(5) Coat the dust seal with **high temp grease**.
(6) Install the dust seal with special tool 8989 driver and C-4171 handle (Fig. 7).
(7) Install protective seal protector 8993 over the shaft (Fig. 8).
(8) Install the pitman shaft into the steering gear until it fully seats into the bearing.
(9) Install the new cover bolts and tighten to 68 N·m (50 ft. lbs.).
(10) Install the steering gear (Refer to 19 - STEERING/GEAR - INSTALLATION).
(11) Install the pitman arm (Refer to 19 - STEERING/LINKAGE/PITMAN ARM - INSTALLATION).
(12) Perform a wheel alignment (Refer to 2 - SUSPENSION/WHEEL ALIGNMENT - STANDARD PROCEDURE).

STEERING GEAR INPUT SHAFT SEAL**REMOVAL**

- (1) Remove the steering gear from the vehicle (Refer to 19 - STEERING/GEAR - REMOVAL).

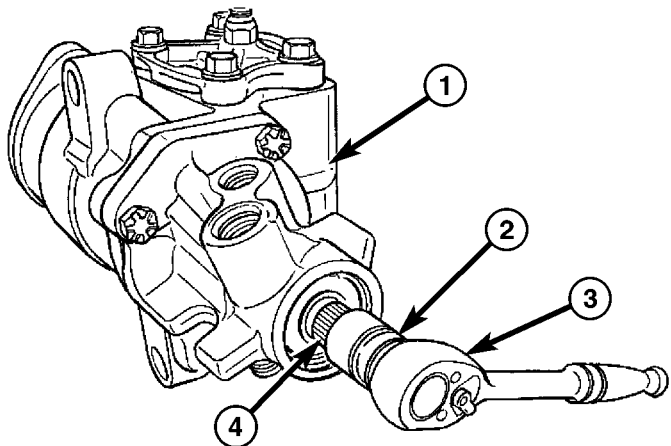
CAUTION: Do not overtighten the vise on the gear case. This may affect the adjustment

- (2) Mount the steering gear upside down over a drain pan in a soft jawed vise.
(3) Place a drain pan under the gear and rotate the input shaft back and forth several times lock-to-lock to discharge the fluid from the steering gear.
(4) Drain all the remaining fluid from the gear.
(5) Rotate the input shaft from stop to stop and count the number of turns using a 12 point socket (Fig. 9).

STEERING GEAR INPUT SHAFT SEAL (Continued)

NOTE: The pitman shaft will not clear the housing if it is not centered.

(6) Center the input shaft by rotating it from the stop back 1 1/2 turns to achieve center position (Fig. 9).



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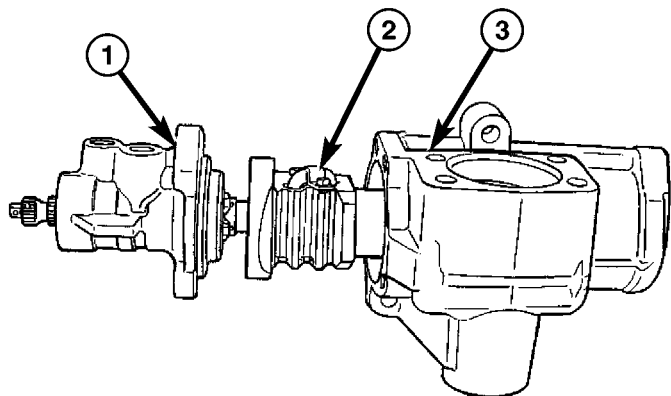
Fig. 9 CENTERING STEERING GEAR

- 1 - STEERING GEAR
- 2 - 12 POINT SOCKET
- 3 - RATCHET
- 4 - INPUT SHAFT

(7) Remove the pitman shaft (Refer to 19 - STEERING/GEAR/PITMAN SHAFT - REMOVAL).

(8) Remove the four bolts securing the valve housing.

(9) Remove the valve housing from the steering gear (Fig. 10).

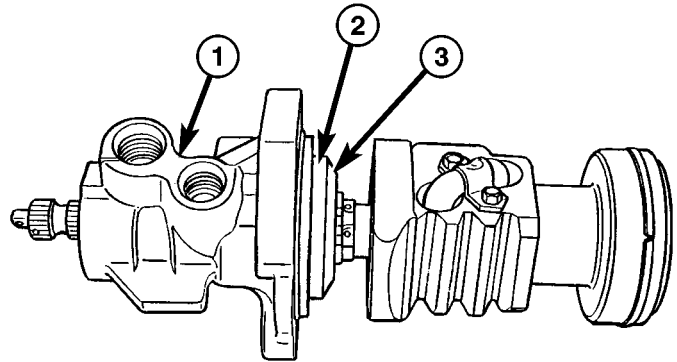


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Fig. 10 VALVE ASSEMBLY

- 1 - VALVE HOUSING
- 2 - WORMSHAFT BALLS
- 3 - STEERING GEAR HOUSING

(10) Remove the valve housing and wormshaft assembly from the steering gear housing and place the valve housing in a soft jawed vise (Fig. 11).

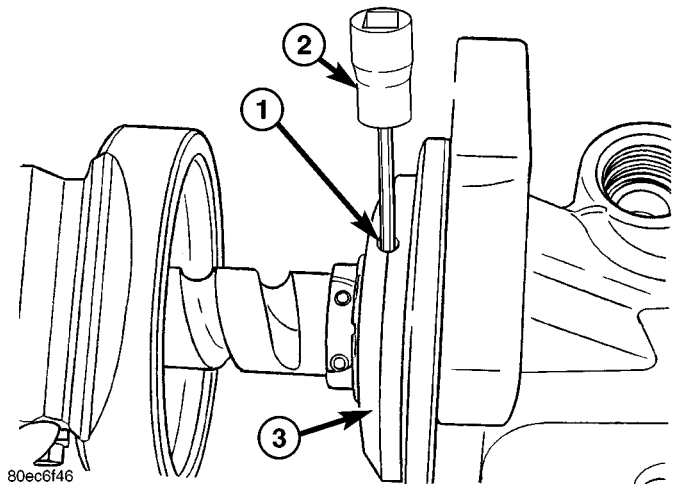


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Fig. 11 VALVE HOUSING AND WORMSHAFT

- 1 - VALVE HOUSING
- 2 - SET SCREW
- 3 - RETAINER RING

(11) Remove the retainer ring set screw from the valve housing (Fig. 12).



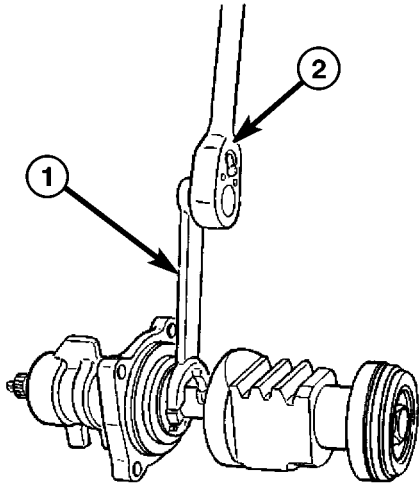
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Fig. 12 SET SCREW FOR THE RETAINER RING

- 1 - SET SCREW
- 2 - 3/32 ALLEN HEAD SOCKET
- 3 - RETAINER RING

STEERING GEAR INPUT SHAFT SEAL (Continued)

(12) Using special tool reatainer ring wrench to remove the steering gear worm thrust bearing reatainer ring (Fig. 13).

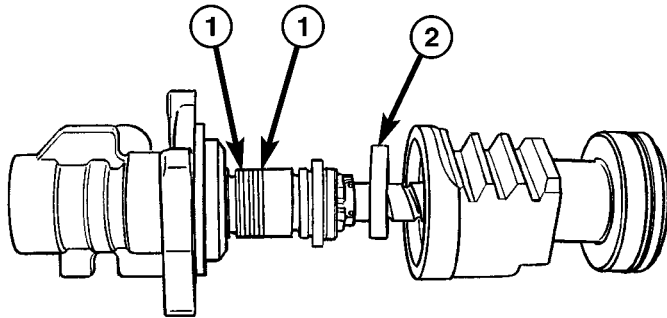


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Fig. 13 REATINER RING REMOVAL

- 1 - SPECIAL TOOL
8988
2 - RATCHET

(13) Separate the wormshaft assembly from the valve housing, Then remove the wormshaft assembly from the vise (Fig. 14).

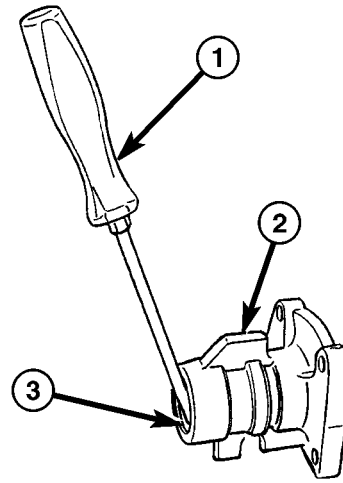


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Fig. 14 WORMSHAFT AND VALVE ASSEMBLY

- 1 - PISTON TEFLON SEALS
2 - RETAINER RING

(14) Remove the dust seal with a pick (Fig. 15).



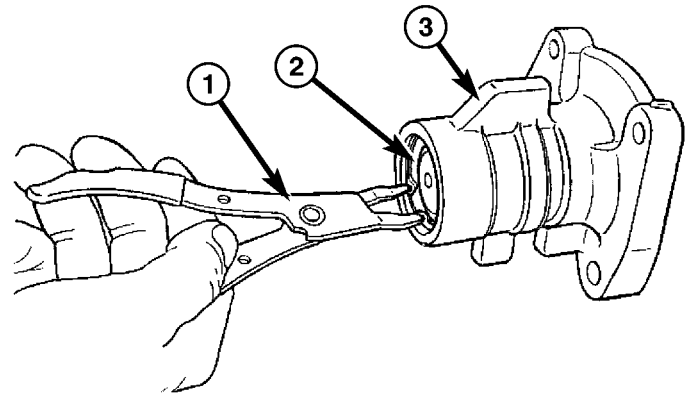
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Fig. 15 DUST SEAL REMOVAL

- 1 - PICK
2 - VALVE HOUSING
3 - SEAL

CAUTION: Use care not to score the housing bore when removing seals.

(15) Remove the snap ring with snap ring pliers (Fig. 16).



80ec701b

Fig. 16 SNAP RING REMOVAL

- 1 - SNAP RING PLIERS
2 - SNAP RING
3 - VALVE HOUSING

STEERING GEAR INPUT SHAFT SEAL (Continued)

(16) Using special tool slide hammer C-3752 with adapter 8990 remove the oil seal (Fig. 17).

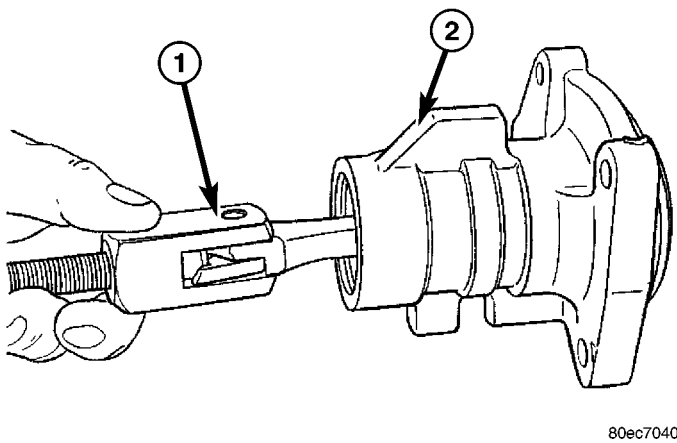


Fig. 17 OIL SEAL REMOVAL

1 - SPECIAL TOOL
8990
WITH SLIDE HAMMER C-3752
2 - VALVE HOUSING

INSTALLATION

(1) Inspect the piston teflon seals for damage. Replace if needed.

NOTE: To replace the teflon seals, use a pick to remove the teflon o-ring and the rubber o-ring underneath. Install a new rubber o-ring in the piston seal groove and a new teflon o-ring over the top of it.

(2) Install the valve into the valve housing.

(3) Thread the retainer ring into the valve housing (Fig. 18). Tighten to 97 N·m (72 ft. lbs.)

NOTE: It is very important to make sure to compensate for the added length of the torque wrench when torquing to proper specifications.

(4) Install the retainer ring set screw. Tighten to 2.26 N·m (20 in. lbs.)

(5) Clean the steering gear housing.

CAUTION: Valve assembly must be centered to the housing (Fig. 19).

(6) Install the valve assembly into the steering gear (Fig. 19). Tighten the new bolts to 54 N·m (40 ft. lbs.)

(7) Install the input shaft seal protector 8986 (Fig. 20).

(8) Coat the new seal in **high temp grease** and Install the new oil seal using special tool 8987 driver and C-4171 handle (Fig. 21).

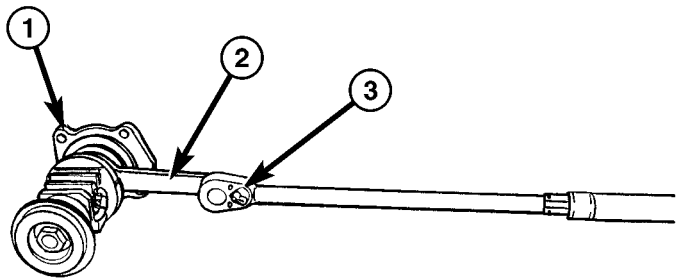


Fig. 18 RETAINER RING INSTALLATION

1 - VALVE HOUSING
2 - SPECIAL TOOL
3 - TORQUE WRENCH

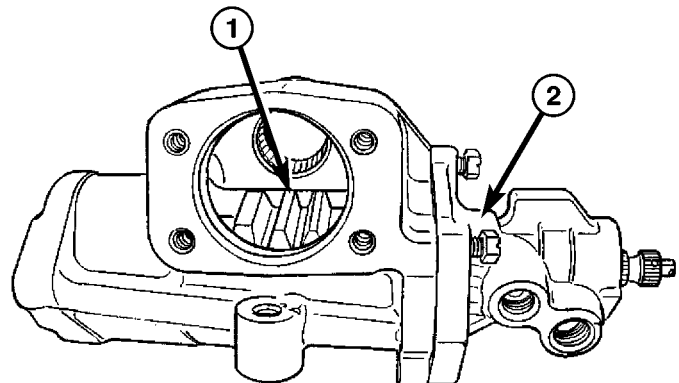


Fig. 19 CENTERED GEAR TEETH

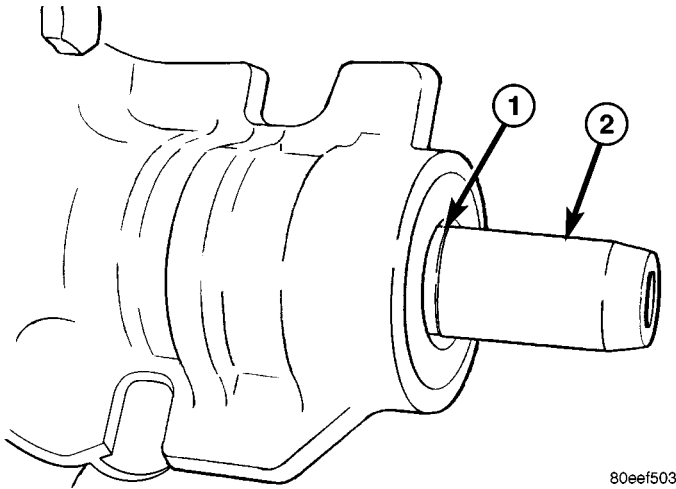
1 - GEAR INSTALLED WITH THE CENTER TOOTH CENTERED IN HOLE
2 - VALVE HOUSING

NOTE: Drive the oil seal into the housing until the outer edge does not quite clear the snap ring groove.

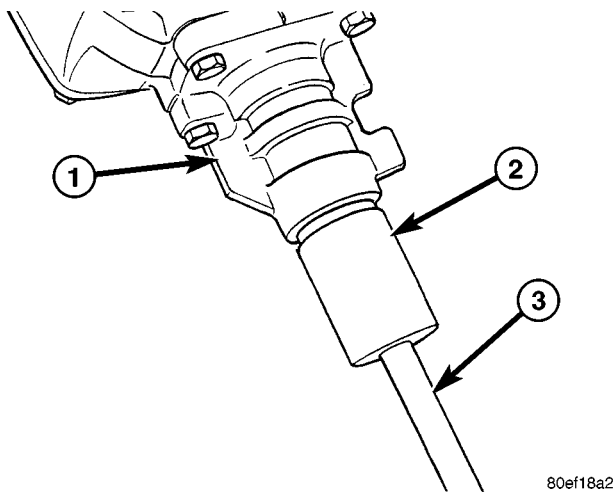
(9) Insert the snap ring into the housing. Using special tool 8987 driver and C-4171 handle push the snap ring and oil seal together until the snap ring seats in the groove.

NOTE: Generous amounts of the high temperature grease from the seal kit should be applied to areas between the pitman shaft bearing and oil seals and also between the dust seals and snap ring.

STEERING GEAR INPUT SHAFT SEAL (Continued)

**Fig. 20 INPUT SHAFT SEAL PROTECTOR**

- 1 - INPUT SHAFT
2 - SPECIAL TOOL
8986

**Fig. 21 INPUT SHAFT SEAL INSTALLATION**

- 1 - VALVE HOUSING
2 - SPECIAL TOOL
8987
3 - SPECIAL TOOL
C-4171

(10) Install the new dust seal using **high temp grease**, special tool C-4171 (driver) and 8987 (handle).

(11) Check to make sure the gear is centered in the middle tooth before installing the pitman shaft (Fig. 19).

(12) Install the pitman shaft into the steering gear (Refer to 19 - STEERING/GEAR/PITMAN SHAFT - INSTALLATION).

(13) Perform over-center meshload adjustment (Refer to 19 - STEERING/GEAR - ADJUSTMENTS).

(14) Install the steering gear to the vehicle (Refer to 19 - STEERING/GEAR - INSTALLATION).

(15) Perform a wheel alignment (Refer to 2 - SUSPENSION/WHEEL ALIGNMENT - STANDARD PROCEDURE).

PITMAN SHAFT

REMOVAL

REMOVAL - GAS

(1) Separate the pitman arm from the gear box (Refer to 19 - STEERING/LINKAGE/PITMAN ARM - REMOVAL).

(2) Clean exposed end of pitman shaft and housing with a wire brush.

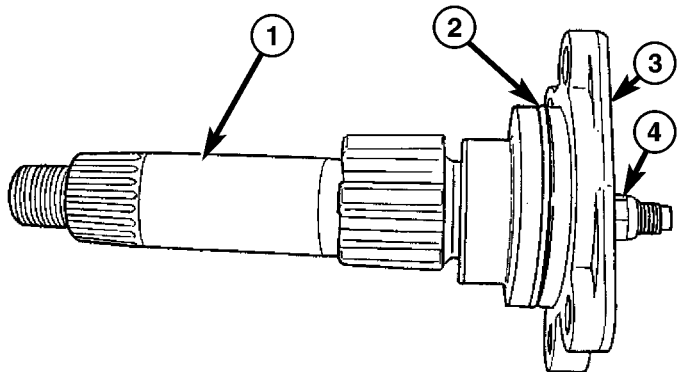
(3) Rotate the steering wheel from stop to stop and count the number of turns.

(4) Center the steering wheel by rotating it from the stop back 1 1/2 turns to achieve center position.

(5) Remove the pitman shaft cover bolts.

NOTE: The pitman shaft will not clear the housing if it is not centered.

(6) Remove the pitman shaft from the gear (Fig. 22).



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Fig. 22 PITMAN SHAFT

- 1 - PITMAN SHAFT
2 - O-RING SEAL
3 - COVER
4 - ADJUSTING NUT

(7) Remove the cover if needed by loosening the adjuster nut, Then removing the cover from the pitman shaft.

PITMAN SHAFT (Continued)

REMOVAL - DIESEL

(1) Separate the pitman arm from the gear box (Refer to 19 - STEERING/LINKAGE/PITMAN ARM - REMOVAL).

(2) Remove the steering gear box (Refer to 19 - STEERING/GEAR - REMOVAL).

(3) Install the steering gear in a soft jawed bench vise.

(4) Clean exposed end of pitman shaft and housing with a wire brush.

(5) Rotate the stub shaft with a 12 point socket from stop to stop and count the number of turns (Fig. 23).

(6) Center the stub shaft by rotating it from the stop 1/2 of the total amount of turns (Fig. 23).

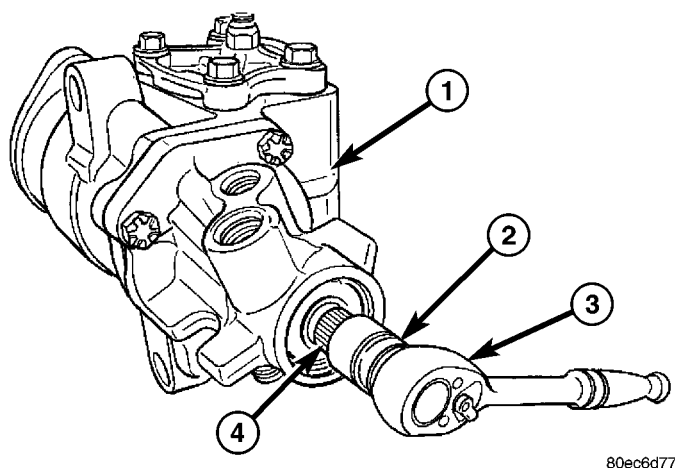


Fig. 23 CENTERING STEERING GEAR

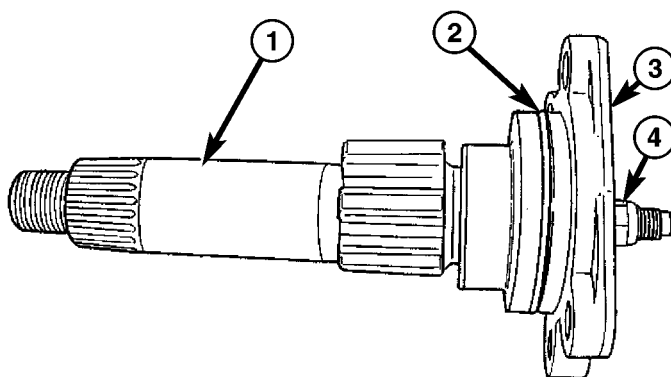
- 1 - STEERING GEAR
- 2 - 12 POINT SOCKET
- 3 - RATCHET
- 4 - INPUT SHAFT

(7) Remove the pitman shaft cover bolts.

NOTE: The pitman shaft will not clear the housing if it is not centered.

(8) Remove the pitman shaft from the gear (Fig. 24).

(9) Remove the cover if needed by loosening the adjuster nut, Then removing the cover from the pitman shaft.



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Fig. 24 PITMAN SHAFT

- 1 - PITMAN SHAFT
- 2 - O-RING SEAL
- 3 - COVER
- 4 - ADJUSTING NUT

INSTALLATION

INSTALLATION - GAS

- (1) Coat the seal with **power steering fluid**.
- (2) Install pitman shaft into the steering gear until it fully seats into the bearing.
- (3) Install the new cover bolts and tighten to 68 N·m (50 ft. lbs.).
- (4) Perform over-center meshload adjustment, (Refer to 19 - STEERING/GEAR - ADJUSTMENTS).
- (5) Install the pitman arm (Refer to 19 - STEERING/LINKAGE/PITMAN ARM - INSTALLATION).
- (6) Perform a wheel alignment (Refer to 2 - SUSPENSION/WHEEL ALIGNMENT - STANDARD PROCEDURE).

INSTALLATION - DIESEL

- (1) Coat the seal with **power steering fluid**.
- (2) Install the pitman shaft into the steering gear until it fully seats into the bearing.
- (3) Install the new cover bolts and tighten to 68 N·m (50 ft. lbs.).
- (4) Perform over-center meshload adjustment (Refer to 19 - STEERING/GEAR - ADJUSTMENTS).
- (5) Install the steering gear (Refer to 19 - STEERING/GEAR - INSTALLATION).
- (6) Install the pitman arm (Refer to 19 - STEERING/LINKAGE/PITMAN ARM - INSTALLATION).
- (7) Perform a wheel alignment (Refer to 2 - SUSPENSION/WHEEL ALIGNMENT - STANDARD PROCEDURE).

LINKAGE - INDEPENDENT FRONT SUSPENSION

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LINKAGE - INDEPENDENT FRONT SUSPENSION

DIAGNOSIS AND TESTING - OUTER TIE ROD END

NOTE: If the outer tie rod end is equipped with a lubrication fitting, grease the joint then road test the vehicle before performing test.

(1) Raise the front of the vehicle. Place safety floor stands under both lower control arms as far outboard as possible. Lower the vehicle to allow the stands to support some or all of the vehicle weight.

(2) Remove the front tires.

(3) Mount a dial indicator solidly to the vehicle steering knuckle and then zero the dial indicator.

(4) Position indicator plunger on the topside of the outer tie rod end.

NOTE: The dial indicator plunger must be perpendicular to the machined surface of the outer tie rod end.

(5) Position a pry bar in order to pry downwards on the outer tie rod end.

(6) If the travel exceeds 0.5 mm (0.020 in.), replace the outer tie rod end (Refer to 19 - STEERING/LINKAGE/TIE ROD END - REMOVAL).

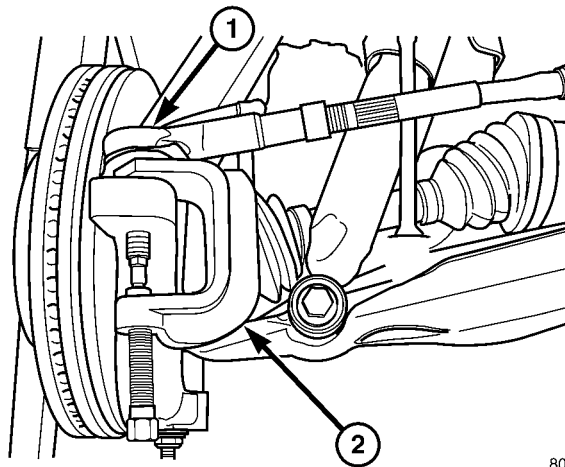
(7) If the outer tie rod end is within specs reinstall the front tires (Refer to 22 - TIRES/WHEELS/WHEELS - STANDARD PROCEDURE).

TIE ROD END

REMOVAL - OUTER TIE ROD END

NOTE: Do not twist the boot anytime during removal or installation.

- (1) Loosen the jam nut.
- (2) Remove the outer tie rod end nut from the ball stud.
- (3) Separate the tie rod ball stud from the knuckle with Remover 8677 (Fig. 1).
- (4) Unthread the outer tie rod end from the inner tie rod.



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Fig. 1 TIE ROD SEPARATION

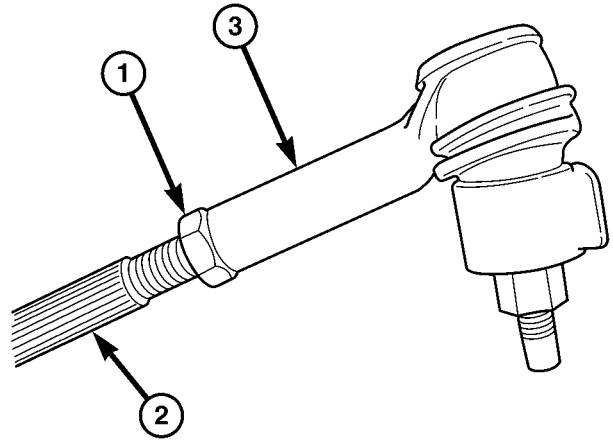
- 1 - TIE ROD END
2 - SPECIAL TOOL 8677

TIE ROD END (Continued)

INSTALLATION - OUTER TIE ROD END

NOTE: Do not twist the boot at anytime during removal or installation.

- (1) Thread the outer tie rod end onto the inner tie rod, to it's original position (Fig. 2).
- (2) Install the outer tie rod end into the steering knuckle (Fig. 2).
- (3) Tighten the ball stud nut on the ball stud to 61 N·m (45 ft. lbs.) then an additional 90°.
- (4) Set wheel toe pattern, (Refer to 2 - SUSPENSION/WHEEL ALIGNMENT - STANDARD PROCEDURE).
- (5) Tighten jam nut to 75 N·m (55 ft. lbs.) (Fig. 2).



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Fig. 2 TIE ROD END

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

LINKAGE - LINK/COIL

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DAMPER		TRACK BAR	
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DRAG LINK			
REMOVAL	35		

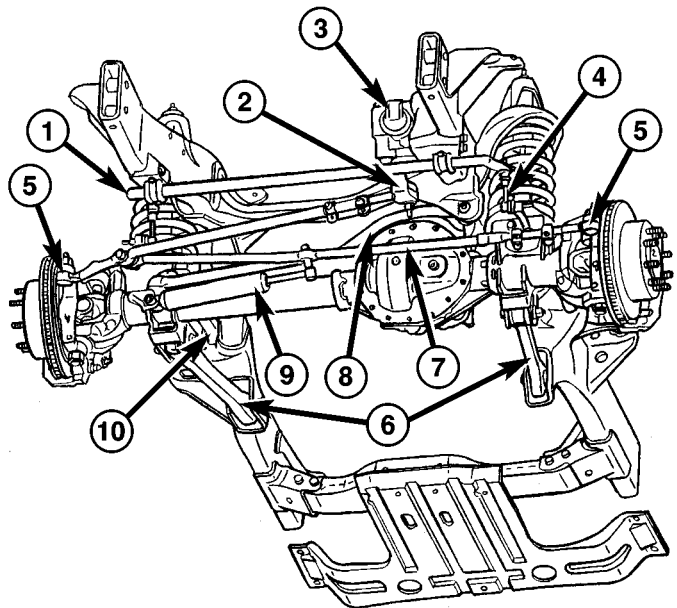
LINKAGE - LINK/COIL

DESCRIPTION

The steering linkage is comprised of a tie rod end, tie rod, drag link, steering damper and pitman arm (Fig. 1).

CAUTION: If any steering components are replaced or serviced an alignment must be performed.

NOTE: To avoid damaging ball stud seals, use Puller C-3894-A or an appropriate puller to remove tie rod ends (Fig. 2).

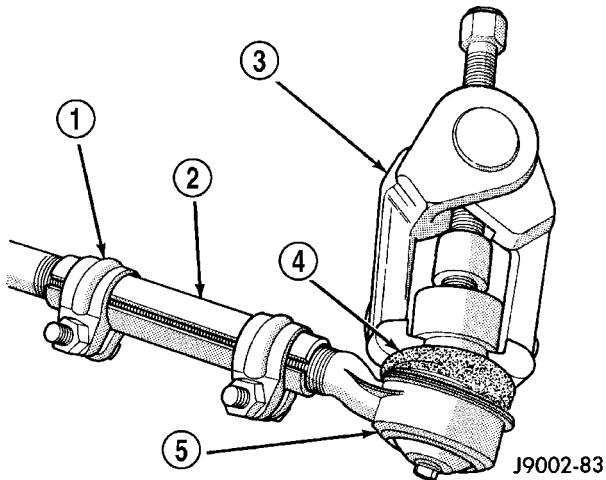


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Fig. 1 LINK/COIL FRONT SUSPENSION

- 1 - STABILIZER BAR
- 2 - PITMAN ARM
- 3 - STEERING GEAR
- 4 - STABILIZER LINK
- 5 - TIE ROD ENDS
- 6 - LOWER SUSPENSION ARMS
- 7 - DRAG LINK
- 8 - TRACK BAR
- 9 - DAMPER
- 10 - UPPER SUSPENSION ARM

LINKAGE - LINK/COIL (Continued)

**Fig. 2 Ball Stud Puller**

- 1 - CLAMP
 2 - ADJUSTMENT SLEEVE
 3 - PULLER TOOL C-3894-A
 4 - SEAL
 5 - TIE-ROD END

STANDARD PROCEDURE - LUBRICATION

Periodic lubrication of the steering system components is required. Refer to Lubrication And Maintenance for the recommended maintenance schedule.

The following components must be lubricated:

- Tie rod
- Tie rod end
- Drag link

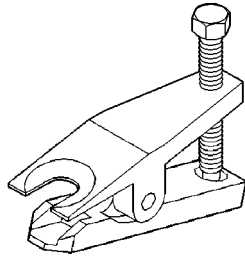
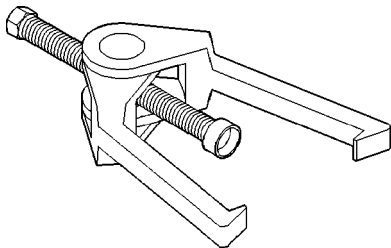
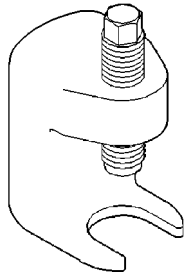
SPECIFICATIONS**TORQUE CHART***TORQUE SPECIFICATIONS*

DESCRIPTION	N·m	Ft. Lbs.	In. Lbs.
Pitman Arm Gear Shaft Nut	300	225	—
Drag Link Pitman Arm	88	65	—
Drag Link Tie Rod	108	80	—
Drag Link Adjuster Clamp	61	45	—
Tie Rod End Knuckle	108	80	—
Tie Rod End Adjuster Clamp	61	45	—
Stabilizer Bar Link to Axle	68	50	—
Steering Damper Axle	95	70	—
Steering Damper Tie Rod	81	60	—

LINKAGE - LINK/COIL (Continued)

SPECIAL TOOLS

STEERING LINKAGE

**Remover Ball Stud MB-991113****Puller Tie Rod C-3894-A****Remover Ball Joint C-4150A**

DAMPER

REMOVAL

- (1) Remove the steering damper mounting nuts and bolts.
- (2) Slide the damper from the isolation bushing.
- (3) Remove the damper.

INSTALLATION

- (1) Install the steering damper on the axle and isolation bushing. Tighten nut to 95 N·m (75 ft. lbs.).
- (2) Install the steering damper on the tie rod. Tighten nut to 81 N·m (60 ft. lbs.).

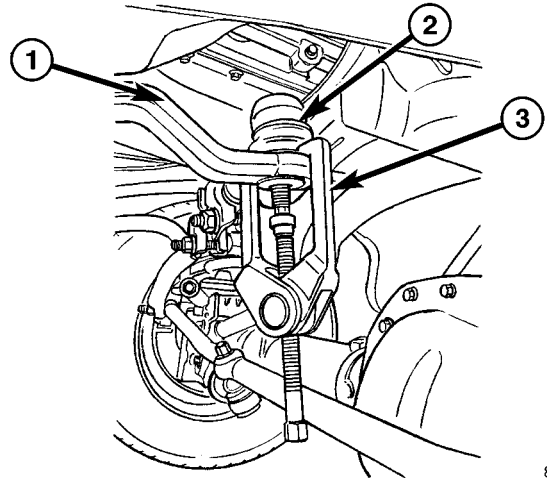
DRAG LINK

REMOVAL

- (1) Remove the draglink nut from the pitman arm side.

- (2) Remove the drag link nut from the knuckle side.

- (3) Remove the drag link from the right knuckle and pitman arm with Puller C-3894A (Fig. 3).



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Fig. 3 DRAGLINK REMOVAL

- 1 - PITMAN ARM
- 2 - DRAGLINK
- 3 - C-3894-A PULLER

INSTALLATION

- (1) Install the drag link to the pitman arm. Install the nut and tighten to 88 N·m (65 ft. lbs.).
- (2) Install the drag link to the right steering knuckle. Install the nut and tighten to 108 N·m (80 ft. lbs.).
- (3) Install tie rod to the left steering knuckle and drag link. Install the nuts and tighten to 108 N·m (80 ft. lbs.).
- (4) Remove the supports and lower the vehicle to the surface. Center steering wheel and adjust toe, (Refer to 2 - SUSPENSION/WHEEL ALIGNMENT - STANDARD PROCEDURE).
- (5) After adjustment tighten tie rod adjustment sleeve clamp bolts to 61 N·m (45 ft. lbs.).

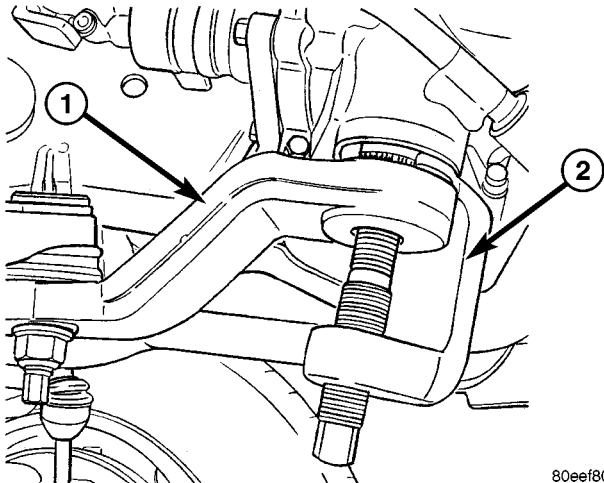
NOTE: Position the clamp on the sleeve so retaining bolt is located on the bottom side of the sleeve.

PITMAN ARM

REMOVAL

- (1) Remove the drag link from the right knuckle and pitman arm with Puller C-4150A (Fig. 4).
- (2) Mark the pitman arm and shaft positions for installation reference. Remove the nut and washer from the pitman arm (Fig. 5). Remove the pitman arm with Puller C-4150A.

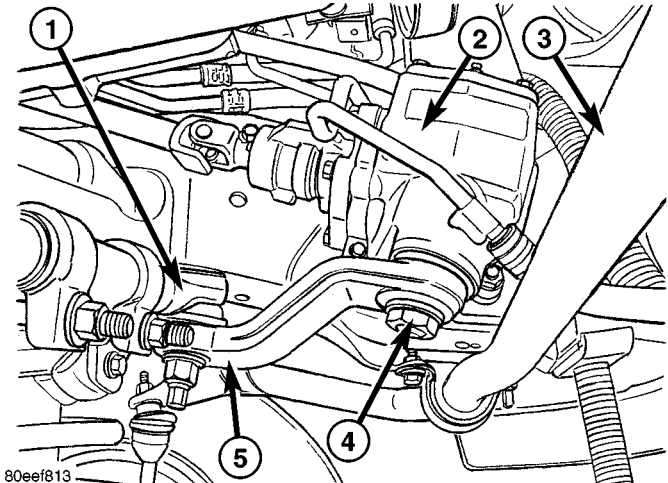
PITMAN ARM (Continued)



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Fig. 4 PITMAN ARM REMOVAL

- 1 - PITMAN ARM
- 2 - C-4150A PULLER



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Fig. 6 PITMAN ARM INSTALLED

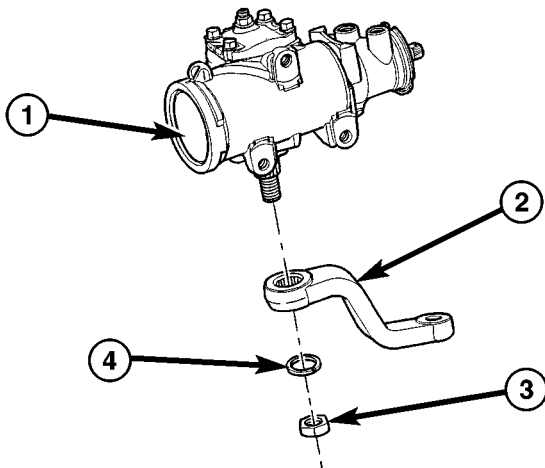
- 1 - DRAGLINK
- 2 - STEERING GEAR
- 3 - SWAYBAR
- 4 - NUT/WASHER
- 5 - PITMAN ARM

NOTE: Position the clamp on the sleeve so retaining bolt is located on the bottom side of the sleeve.

TIE ROD END

REMOVAL

- (1) Remove tie rod nuts (Fig. 7).
- (2) Remove tie rod from drag link and left knuckle with Puller C-4150A.



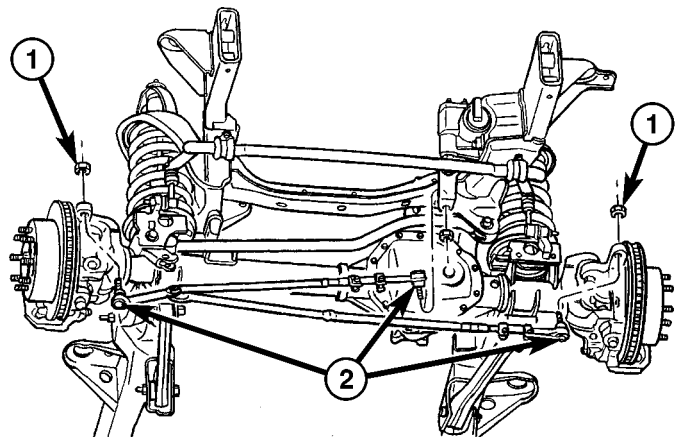
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Fig. 5 PITMAN ARM REMOVAL/INSTALLATION

- 1 - STEERING GEAR
- 2 - PITMAN ARM
- 3 - NUT
- 4 - WASHER

INSTALLATION

- (1) Align reference marks and install pitman arm.
- (2) Install the lock washer and retaining nut on the pitman shaft and tighten nut to 251 N·m (185 ft. lbs.).
- (3) Install the drag link to the pitman arm (Fig. 6). Install the nut and tighten to 108 N·m (80 ft. lbs.).
- (4) Remove the supports and lower the vehicle to the surface. Center steering wheel and adjust toe, (Refer to 2 - SUSPENSION/WHEEL ALIGNMENT - STANDARD PROCEDURE).
- (5) After adjustment tighten tie rod adjustment sleeve clamp bolts to 61 N·m (45 ft. lbs.).



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Fig. 7 TIE ROD ENDS

- 1 - NUT
- 2 - TIE ROD ENDS

TIE ROD END (Continued)

INSTALLATION

(1) Install tie rod to the left steering knuckle and drag link. Install the nuts and tighten to 108 N·m (80 ft. lbs.).

(2) Remove the supports and lower the vehicle to the surface. Center steering wheel and adjust toe, (Refer to 2 - SUSPENSION/WHEEL ALIGNMENT - STANDARD PROCEDURE).

(3) After adjustment tighten tie rod adjustment sleeve clamp bolts to 61 N·m (45 ft. lbs.).

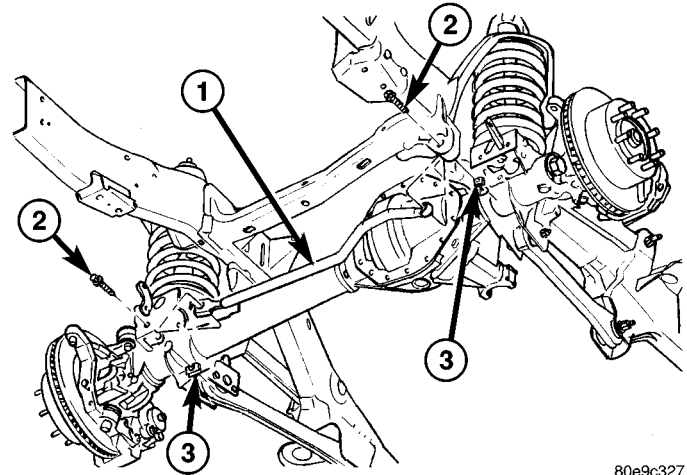
NOTE: Position the clamp on the sleeve so retaining bolt is located on the bottom side of the sleeve.

TRACK BAR**REMOVAL**

- (1) Raise and support the axle.
- (2) Remove the track bar bolts and nuts (Fig. 8).
- (3) Remove the track bar (Fig. 8).

INSTALLATION

- (1) Install the track bar.
- (2) Install the new bolts and nuts. Tighten to 203 N·m (150 ft lbs.).



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Fig. 8 TRACK BAR REMOVAL/INSTALLATION

- 1 - TRACK BAR
2 - BOLT
3 - NUT

(3) Remove the supports under the axle and lower the vehicle to the ground.

PUMP

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PUMP

DESCRIPTION

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.

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

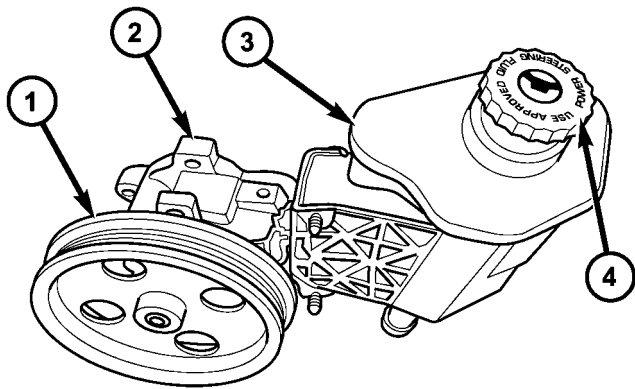
All vehicles are equipped with a power steering fluid cooler.

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

OPERATION

Hydraulic pressure is provided for the power steering gear by the belt driven power steering pump (Fig. 1). The power steering pumps are constant flow rate and displacement, vane-type pumps.

PUMP (Continued)



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Fig. 1 POWER STEERING PUMP

- 1 - 3.7L & 4.7L (6 GROOVE)
PHENOLIC (PLASTIC TYPE) PULLEY
- 1 - 5.7L, 5.9L & 8.0L (7 GROOVE)
PHENOLIC (PLASTIC TYPE) PULLEY
- 1 - 5.9L DIESEL (8 GROOVE)
STEEL PULLEY
- 2 - PUMP ASSEMBLY
- 3 - RESERVOIR
- 4 - CAP

DIAGNOSIS AND TESTING - PUMP LEAKAGE

The pump is serviced as an assembly and should not be disassembled. The plastic pump reservoir and the reservoir o-rings can be replaced.

Check for leaks in the following areas:

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

STANDARD PROCEDURE**STANDARD PROCEDURE - POWER STEERING PUMP - INITIAL OPERATION**

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.

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

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

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

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

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

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

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

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

STANDARD PROCEDURE - FLUSHING POWER STEERING SYSTEM

Flushing is required when the power steering/hydraulic booster system fluid has become contaminated. Contaminated fluid in the steering/booster system can cause seal deterioration and affect steering gear/booster spool valve operation.

- (1) Raise the front end of the vehicle off the ground until the wheels are free to turn.

- (2) Remove the return line from the pump.

NOTE: If vehicle is equipped with a hydraulic booster remove both return lines from the pump.

- (3) Plug the return line port/ports at the pump.
- (4) Position the return line/lines into a large container to catch the fluid.

- (5) While an assistant is filling the pump reservoir start the engine.

- (6) With the engine running at idle turn the wheel back and forth.

NOTE: Do not contact or hold the wheel against the steering stops.

- (7) Run a quart of fluid through the system then stop the engine and install the return line/lines.

- (8) Fill the system with fluid and perform Steering Pump Initial Operation, (Refer to 19 - STEERING/ PUMP - STANDARD PROCEDURE).

- (9) Start the engine and run it for fifteen minutes then stop the engine.

PUMP (Continued)

(10) Remove the return line/lines from the pump and plug the pump port/ports.

(11) Pour fresh fluid into the reservoir and check the draining fluid for contamination. If the fluid is still contaminated, then flush the system again.

(12) Install the return line/lines and perform Steering Pump Initial Operation, (Refer to 19 - STEERING/PUMP - STANDARD PROCEDURE).

REMOVAL

REMOVAL - GAS

(1) Drain and siphon the power steering fluid from the reservoir.

(2) Remove the serpentine belt.

CAUTION: Do not remove the fitting on the pump that the high pressure hose screws into. The fitting may come loose unless it is backed up using another wrench. If the fitting does come loose, it must be retightened before continuing. (57 - 67Nm, 40 - 50 lbft) If this fitting comes out of the pump body, the internal spring and valve parts will fall out of the pump and they cannot be reinstalled properly. If this occurs the pump needs to be replaced with a new pump.

(3) Disconnect the return hose. (Fig. 2)

(4) Disconnect the pressure hose. (Fig. 2)

(5) Access to remove the three bolts securing the pump to the cylinder head can be gained thru the pulley holes. (Fig. 2)

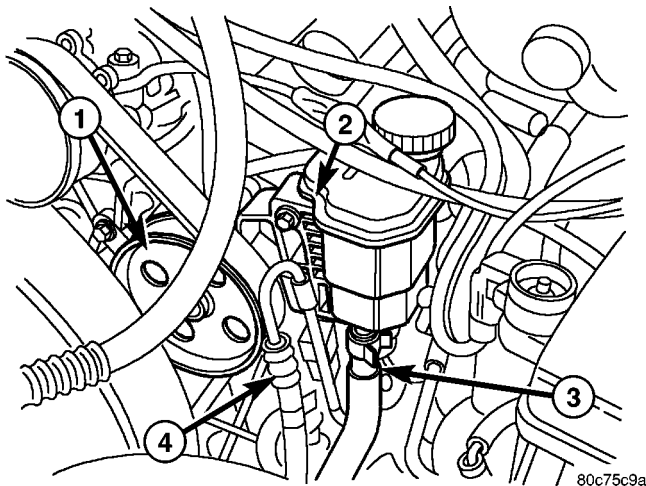


Fig. 2 POWER STEERING PUMP

- 1 - POWER STEERING PULLEY
- 2 - POWER STEERING RESERVOIR
- 3 - RETURN HOSE
- 4 - HIGH PRESSURE HOSE

REMOVAL - DIESEL

(1) Drain and siphon the power steering fluid from the reservoir.

(2) Remove the serpentine belt.

CAUTION: Do not remove the fitting on the pump that the high pressure hose screws into. The fitting may come loose unless it is backed up using another wrench. If the fitting does come loose, it must be retightened before continuing. (57 - 67Nm, 40 - 50 lbft) If this fitting comes out of the pump body, the internal spring and valve parts will fall out of the pump and they cannot be reinstalled properly. If this occurs the pump needs to be replaced with a new pump.

(3) Disconnect the return hose.

(4) Disconnect the pressure hose.

(5) Access to remove the three bolts securing the pump to the cylinder head can be gained thru the pulley holes.

(6) Loosen the pump bracket to the block.

(7) Remove the 6 intake plenum bolts (Fig. 3).

(8) Loosen the inner cooler tube clamp at the intake plenum and remove the intake plenum.

(9) Loosen the inner cooler tube clamp at the radiator support side and remove the tube from the vehicle.

(10) Remove the power steering pump from the top of the engine compartment where the intake plenum was (Fig. 3).

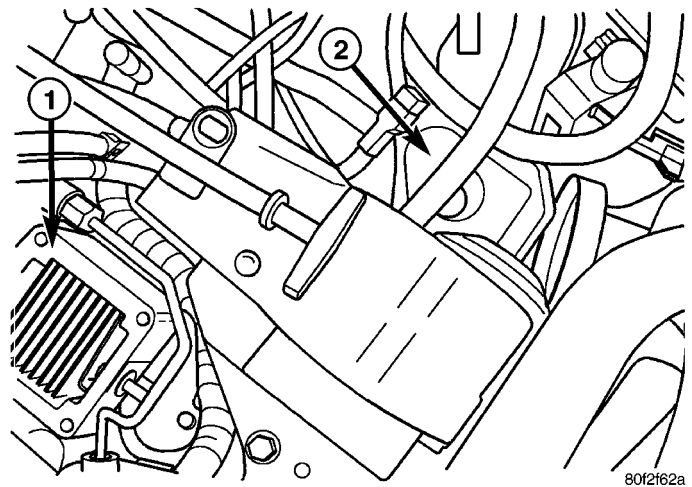


Fig. 3 POWER STEERING PUMP ACCESS

- 1 - INTAKE PLENUM MOUNTING
- 2 - POWER STEERING PUMP

PUMP (Continued)**INSTALLATION****INSTALLATION - GAS**

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

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

(3) Reconnect the pressure line and return hose to the pump and reservoir. Tighten the pressure line to 37 N·m (27 ft. lbs.).

(4) Install the serpentine drive belt, (Refer to 7 - COOLING/ACCESSORY DRIVE/DRIVE BELTS - INSTALLATION).

(5) Fill the power steering pump, (Refer to 19 - STEERING/PUMP - STANDARD PROCEDURE).

INSTALLATION - DIESEL

(1) Set the power steering pump in place in the engine compartment from the top (Fig. 3).

(2) Install the inner cooler tube.

(3) Tighten the inner cooler tube clamp at the radiator support side.

(4) Install the 6 intake plenum bolts (Fig. 3).

(5) Tighten the inner cooler tube clamp at the intake plenum.

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

(7) Tighten the pump bracket to the block.

(8) Reconnect the pressure line and return hose to the pump and reservoir. Tighten the pressure line to 37 N·m (27 ft. lbs.).

(9) Install the serpentine drive belt, (Refer to 7 - COOLING/ACCESSORY DRIVE/DRIVE BELTS - INSTALLATION).

(10) Fill the power steering pump, (Refer to 19 - STEERING/PUMP - STANDARD PROCEDURE).

SPECIFICATIONS**TORQUE CHART***TORQUE SPECIFICATIONS*

DESCRIPTION	N·m	Ft. Lbs.	In. Lbs.
Power Steering Pressure Switch	10	—	80
Power Steering Line Pressure Line	32	23	—
Power Steering Line Return Line	71	52	—
Power Steering Line Pressure Line To Pump	37	27	—
Power Steering Pump Mounting Bolts	28	27	—
Power Steering Pump Reservoir Bolts	7	5	—
Power Steering Pump Bracket Bolts	7	5	—

FLUID

DESCRIPTION

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 in the vehicle such as engine oil or anti-freeze. 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: FLUID LEVEL SHOULD BE CHECKED WITH THE ENGINE OFF TO PREVENT PERSONAL INJURY FROM MOVING PARTS.

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.

The power steering fluid level can be viewed on the dipstick attached to the filler cap. There are two ranges listed on the dipstick, COLD and HOT. 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 area of the cold range. When the fluid is hot, fluid level is allowed to read up to the highest end of the HOT range. Only add fluid when the vehicle is cold.

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

FLUID COOLER

REMOVAL

- (1) Drain and siphon the power steering fluid.
- (2) Disconnect the return and supply hoses connected to the power steering fluid cooler.

- (3) Remove the mounting bracket bolts securing the fluid cooler to the brace. (Fig. 4)& (Fig. 5)
- (4) Remove the fluid cooler from the vehicle.

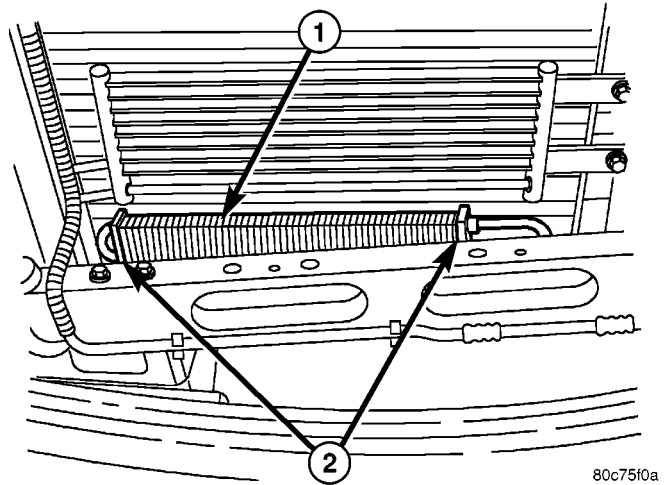


Fig. 4 V6 & V8 P/S FLUID COOLER

- 1 - POWER STEERING FLUID COOLER
- 2 - MOUNTING BOLTS

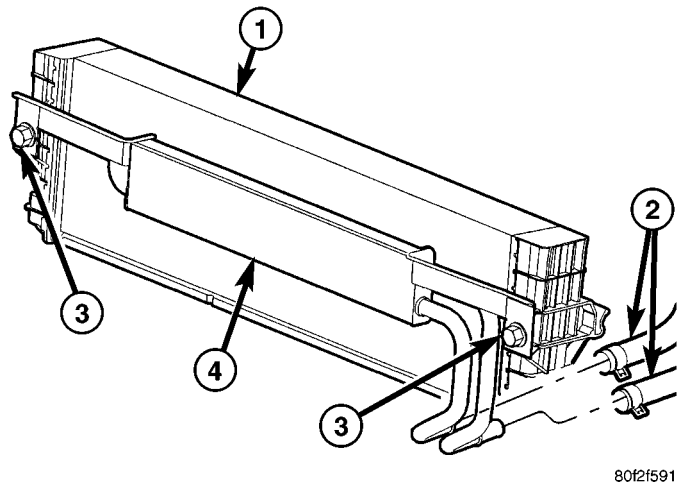


Fig. 5 V10 & DIESEL P/S FLUID COOLER

- 1 - RADIATOR
- 2 - POWER STEERING HOSES
- 3 - MOUNTING BOLTS
- 4 - P/S FLUID COOLER

INSTALLATION

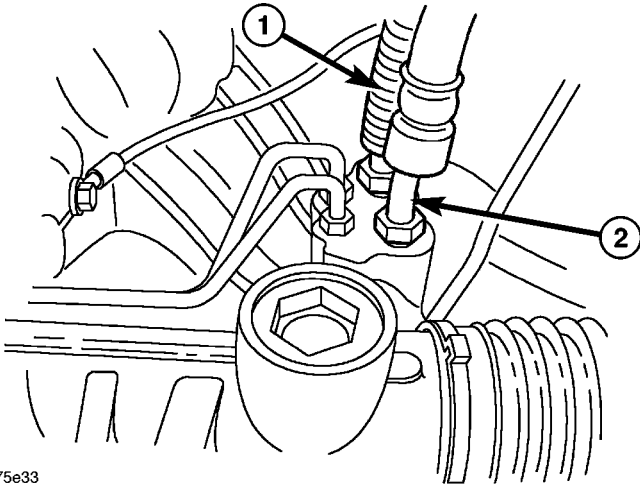
- (1) Install the fluid cooler to the vehicle.
- (2) Install the mounting bracket bolts securing the fluid cooler to the brace (Fig. 4)& (Fig. 5).
- (3) Reclamp the return and supply hoses to the power steering fluid cooler.
- (4) Refill the power steering fluid (Refer to 19 - STEERING/PUMP - STANDARD PROCEDURE).

HOSES - I.F.S.

REMOVAL

REMOVAL - RETURN HOSE - GEAR TO COOLER

- (1) Drain and siphon the power steering system.
- (2) Raise and support the vehicle.
- (3) Disconnect the return hose at the cooler.
- (4) Disconnect the return hose at the gear (Fig. 6).
- (5) Remove the return hose from the routing clamp at the fan shroud and then remove from the vehicle.



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Fig. 6 HOSE CONNECTIONS

- 1 - RETURN HOSE
2 - PRESSURE HOSE

REMOVAL - PRESSURE HOSE

- (1) Drain and siphon the power steering system.
- (2) Raise and support the vehicle.
- (3) Disconnect the pressure hose at the pump.
- (4) Disconnect the pressure hose at the gear (Fig. 6).
- (5) Remove the pressure hose from the vehicle.

REMOVAL - RETURN HOSE - RESERVOIR TO COOLER

- (1) Drain and siphon the power steering system.
- (2) Disconnect the return hose at the reservoir.
- (3) Raise and support the vehicle.
- (4) Remove the return hose from the routing clamp at the fan shroud.
- (5) Disconnect the return hose at the cooler.
- (6) Remove the hose from the vehicle.

INSTALLATION

INSTALLATION - RETURN HOSE - GEAR TO COOLER

- (1) Install the return hose to the vehicle.
- (2) Reconnect the return hose at the cooler.
- (3) Reconnect the return hose at the gear. Tighten the hose to 71 N·m (52 ft. lbs.) (Fig. 6).
- (4) Reattach the hose to the routing clip at the fan shroud.
- (5) Remove the support and lower the vehicle.
- (6) Refill the power steering system, (Refer to 19 - STEERING/PUMP - STANDARD PROCEDURE).

INSTALLATION - PRESSURE HOSE

NOTE: Be sure to align the pressure hose so it does not contact the fan shroud or the frame rail.

- (1) Install the pressure hose to the vehicle.
- (2) Reconnect the pressure hose at the gear. Tighten the hose to 32 N·m (23 ft. lbs.) (Fig. 6).
- (3) Reconnect the pressure hose at the pump. Tighten the hose to 36 N·m (27 ft. lbs.).
- (4) Remove the support and lower the vehicle.
- (5) Refill the power steering system, (Refer to 19 - STEERING/PUMP - STANDARD PROCEDURE).

INSTALLATION - RETURN HOSE - RESERVOIR TO COOLER

- (1) Install the return hose to the vehicle.
- (2) Reconnect the return hose at the cooler.
- (3) Reattach the hose to the routing clip at the fan shroud.
- (4) Remove the support and lower the vehicle.
- (5) Reconnect the return hose at the reservoir.
- (6) Refill the power steering system, (Refer to 19 - STEERING/PUMP - STANDARD PROCEDURE).

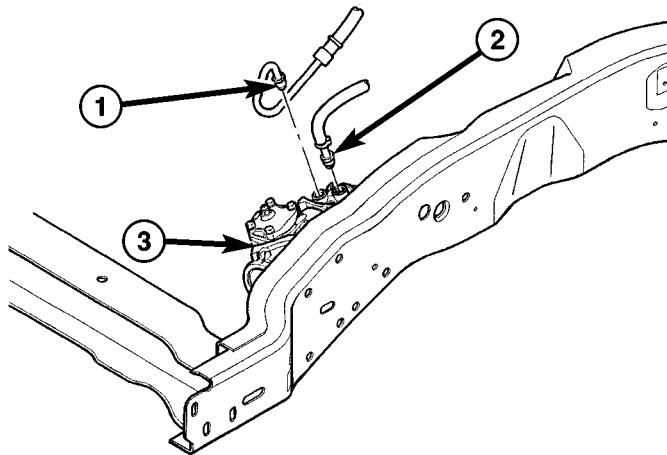
HOSES - LINK/COIL

REMOVAL

REMOVAL - RETURN HOSE - GEAR TO COOLER

- (1) Drain and siphon the power steering system.
- (2) Raise and support the vehicle.
- (3) Disconnect the return hose at the cooler.
- (4) Disconnect the return hose at the gear (Fig. 7).
- (5) Remove the return hose from the routing clamp at the fan shroud and then remove from the vehicle.

HOSES - LINK/COIL (Continued)



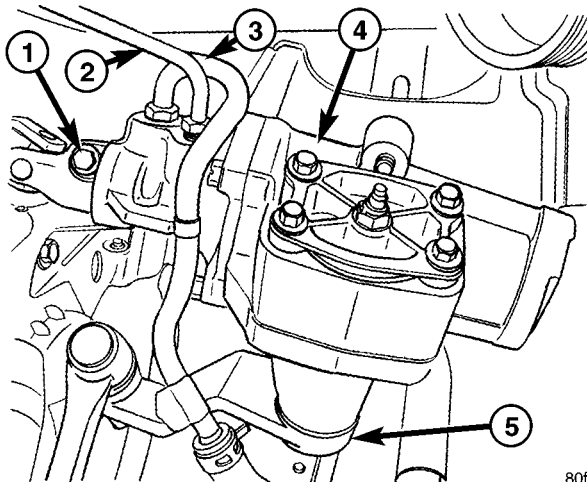
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Fig. 7 POWER STEERING HOSES TO STEERING GEAR

- 1 - HIGH PRESSURE HOSE
- 2 - RETURN HOSE
- 3 - STEERING GEAR

REMOVAL - PRESSURE HOSE

- (1) Drain and siphon the power steering system.
- (2) Raise and support the vehicle.
- (3) Disconnect the pressure hose at the pump.
- (4) Disconnect the pressure hose at the gear (Fig. 8).



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Fig. 8 HOSES INSTALLED

- 1 - LOWER COUPLING BOLT
- 2 - HIGH PRESSURE HOSE
- 3 - RETURN HOSE
- 4 - STEERING GEAR
- 5 - PITMAN ARM

- (5) Remove the pressure hose from the vehicle.

REMOVAL - RETURN HOSE - RESERVOIR TO COOLER

- (1) Drain and siphon the power steering system.
- (2) Disconnect the return hose at the reservoir.
- (3) Raise and support the vehicle.
- (4) Remove the return hose from the routing clamp at the fan shroud.
- (5) Disconnect the return hose at the cooler.
- (6) Remove the hose from the vehicle.

INSTALLATION**INSTALLATION - RETURN HOSE - GEAR TO COOLER**

- (1) Install the return hose to the vehicle.
- (2) Reconnect the return hose at the cooler.
- (3) Reconnect the return hose at the gear. Tighten the hose to 71 N·m (52 ft. lbs.) (Fig. 7).
- (4) Reattach the hose to the routing clip at the fan shroud.
- (5) Remove the support and lower the vehicle.
- (6) Refill the power steering system,(Refer to 19 - STEERING/PUMP - STANDARD PROCEDURE).

INSTALLATION - PRESSURE HOSE

NOTE: Be sure to align the pressure hose so it does not contact the fan shroud or the frame rail.

- (1) Install the pressure hose to the vehicle.
- (2) Reconnect the pressure hose at the gear. Tighten the hose to 32 N·m (23 ft. lbs.) (Fig. 8).
- (3) Reconnect the pressure hose at the pump. Tighten the hose to 36 N·m (27 ft. lbs.).
- (4) Remove the support and lower the vehicle.
- (5) Refill the power steering system,(Refer to 19 - STEERING/PUMP - STANDARD PROCEDURE).

INSTALLATION - RETURN HOSE - RESERVOIR TO COOLER

- (1) Install the return hose to the vehicle.
- (2) Reconnect the return hose at the cooler.
- (3) Reattach the hose to the routing clip at the fan shroud.
- (4) Remove the support and lower the vehicle.
- (5) Reconnect the return hose at the reservoir.
- (6) Refill the power steering system,(Refer to 19 - STEERING/PUMP - STANDARD PROCEDURE).

POWER STEERING PRESSURE SWITCH

DESCRIPTION

A pressure sensing switch is used in the power steering system. It is mounted on the high-pressure steering hose (Fig. 9). This switch will be used with both 3.7L, 4.7L and 5.7L engines. There is no pressure switch used for the 5.9L pump.

OPERATION

The switch is used on the 3.7L V-6, 4.7L & 5.7L V-8 engines.

The power steering pressure switch provides an input to the Powertrain Control Module (PCM). This input is provided during periods of high steering pump load and low engine rpm; such as during parking maneuvers. The PCM increases the idle speed through the Idle Air Control (IAC) motor. This is done to prevent the engine from stalling under the increased load.

When steering pump pressure exceeds $3275 \text{ kPa} \pm 690 \text{ kPa}$ ($475 \text{ psi} \pm 100 \text{ psi}$), the Normally Closed (NC) switch will open and the PCM will increase the engine idle speed. This will prevent the engine from stalling.

When pump pressure drops to approximately 1379 kPa (200 psi), the switch circuit will re-close and engine idle speed will return to its previous setting.

REMOVAL - 3.7L, 4.7L & 5.7L

The power steering pressure switch is installed in the power steering high-pressure hose (Fig. 9).

(1) Disconnect electrical connector from power steering pressure switch.

(2) Place a small container or shop towel beneath switch to collect any excess fluid.

(3) Remove switch. Use back-up wrench on power steering line to prevent line bending.

INSTALLATION - 3.7L, 4.7L & 5.7L

This switch is used only with the 3.7L V-6 and the 4.7L, 5.7L V-8 engines.

(1) Install power steering switch into power steering line.

(2) Tighten to $8\text{--}11 \text{ N}\cdot\text{m}$ ($70\text{--}100 \text{ in. lbs.}$) torque.

(3) Connect electrical connector to switch.

(4) Check power steering fluid and add as necessary.

(5) Start engine and again check power steering fluid. Add fluid if necessary.

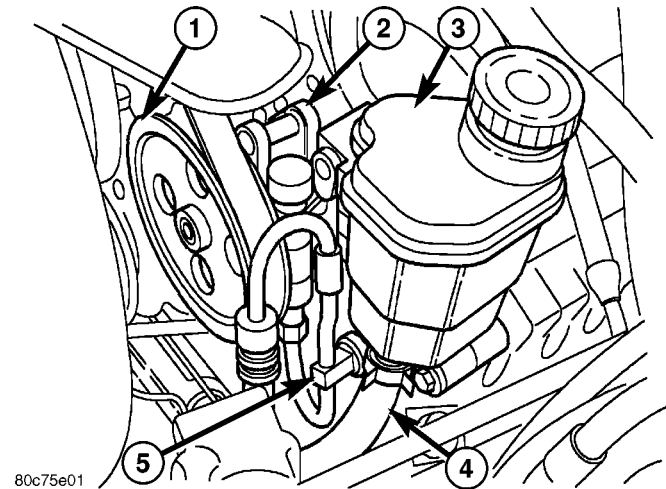


Fig. 9 PRESSURE SWITCH

- 1 - POWER STEERING PULLEY
- 2 - POWER STEERING PUMP HOUSING
- 3 - POWER STEERING FLUID RESERVOIR
- 4 - RETURN HOSE
- 5 - HIGH PRESSURE HOSE WITH PRESSURE SWITCH

PULLEY

REMOVAL

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 the power steering pump assembly. (Refer to 19 - STEERING/PUMP - REMOVAL).

(2) Remove the pulley from the pump with an appropriate power steering pulley removal tool (Fig. 10).

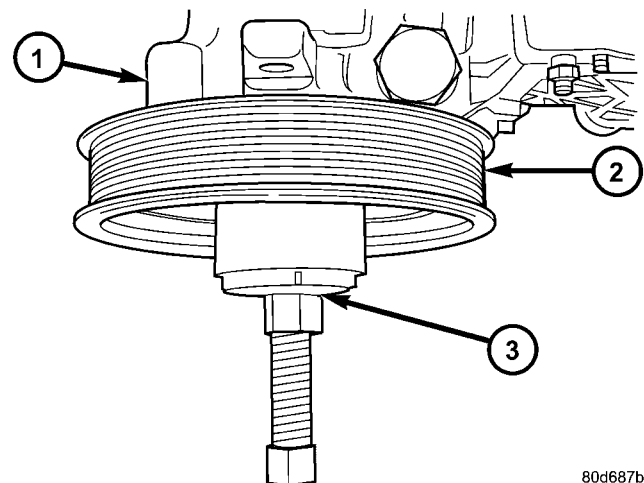


Fig. 10 PULLEY REMOVAL

- 1 - POWER STEERING PUMP
- 2 - PULLEY
- 3 - POWER STEERING PULLEY REMOVAL TOOL

PULLEY (Continued)

INSTALLATION

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 if it's bent, cracked, or loose.
- (2) Install the pulley on the pump with an appropriate power steering pulley installation tool (Fig. 11) making sure it is flush with the end of the shaft. Ensure the tool and pulley remain aligned with the pump shaft.

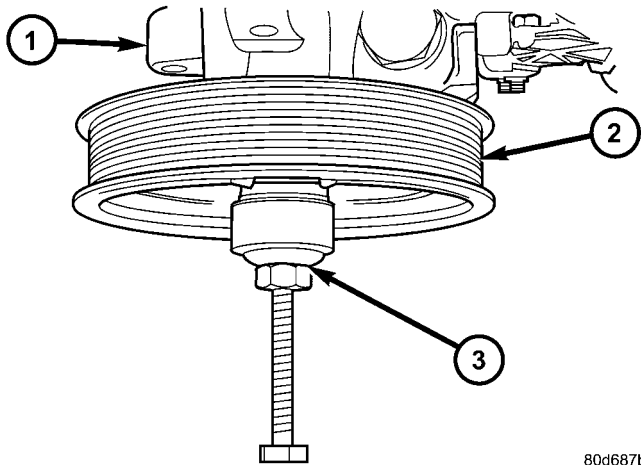


Fig. 11 PULLEY INSTALLATION

- 1 - POWER STEERING PUMP
- 2 - PULLEY
- 3 - POWER STEERING PUMP PULLEY INSTALLATION TOOL

- (3) Install the power steering pump assembly, (Refer to 19 - STEERING/PUMP - INSTALLATION).
- (4) Run engine until warm (5 min.) and note any belt chirp. If chirp exists, move pulley outward

approximately 0.5 mm (0.020 in.). If noise increases, press on 1.0 mm (0.040 in.). **Be careful that pulley does not contact mounting bolts.**

RESERVOIR

REMOVAL

- (1) Drain and siphon the power steering fluid from the reservoir.
- (2) Remove the serpentine belt.
- (3) Remove the power steering pump (Refer to 19 - STEERING/PUMP - REMOVAL).
- (4) Remove the reservoir mounting bolts.
- (5) Remove the reservoir.
- (6) Remove the rear bracket to the pump mounting bolts.

INSTALLATION

- (1) Install the reservoir bracket to the pump housing. **Do not reuse the o-rings (install new o-rings).** Tighten bolts to 7 N·m (5 ft. lbs.).

NOTE: Ensure the reservoir is fully seated onto the pump.

- (2) Install the reservoir to the bracket/pump body.
- (3) Install the reservoir mounting bolts. Tighten bolts to 7 N·m (5 ft. lbs.).
- (4) Install the power steering pump (Refer to 19 - STEERING/PUMP - INSTALLATION).
- (5) Install the serpentine drive belt, (Refer to 7 - COOLING/ACCESSORY DRIVE/DRIVE BELTS - INSTALLATION).
- (6) Fill the power steering pump, (Refer to 19 - STEERING/PUMP - STANDARD PROCEDURE).