

STEERING

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POWER STEERING

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GENERAL INFORMATION

STEERING SYSTEM

The power steering system uses a recirculating-ball type gear. The gear is mounted to the frame rail. The hydraulic pressure for the power steering gear is provided by a P-Series pump. The pump is mounted to the engine and driven by a belt on gasoline engines. On vehicles equipped with a diesel engine the pump is mounted to the back of the vacuum pump. A oil cooler is used on vehicles with the trailer tow option.



DIAGNOSIS AND TESTING

POWER STEERING SYSTEM

STEERING NOISE

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

CONDITION	POSSIBLE CAUSES	CORRECTION
OBJECTIONAL HISS OR WHISTLE	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. Loose or damaged steering linkage. 4. Internal gear noise. 5. Pressure hose in contact with other components.	1. Tighten bolts to specification. 2. Inspect and repair suspension. 3. Inspect and repair steering linkage. 4. Replace gear. 5. Reposition hose.
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.	1. Fill to proper level. 2. Reposition hose. 3. Replace pump.
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.	1. Replace clamp. 2. Replace o-ring. 3. Fill to proper level. 4. Repair as necessary.
SCRUBBING OR KNOCKING	1. Wrong tire size. 2. Wrong gear.	1. Verify tire size. 2. Verify gear.

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 or out of adjustment.	1. Fill to proper level. 2. Adjust tire pressure. 3. Lube, inspect and repair as necessary. 4. Adjust or replace. 5. Pressure test and replace if necessary. 6. Replace coupler. 7. Repair or replace gear.

DIAGNOSIS AND TESTING (Continued)

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. Lack of lubrication. 5. Low pump pressure. 6. Internal gear leak.	1. Adjust tire pressure. 2. Fill to proper level. 3. Adjust or replace. 4. Inspect and lubricate steering and suspension compnents. 5. Pressure test and repair as necessary. 6. Pressure and flow test, and repair as necessary.
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 steering and suspension compnents. 4. Test and adjust as necessary.

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. Adjust gear to specification. 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.

POWER STEERING PUMP

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DESCRIPTION AND OPERATION

POWER STEERING PUMP

The P-Series pump is used on these vehicles (Fig. 1).

Hydraulic pressure is provided for the power steering gear by the belt driven power steering pump. The power steering pump is a constant flow rate and displacement, vane-type pump.

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

Trailer tow option vehicles are equipped with a power steering pump oil cooler. The oil cooler is mounted to the radiator support.

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

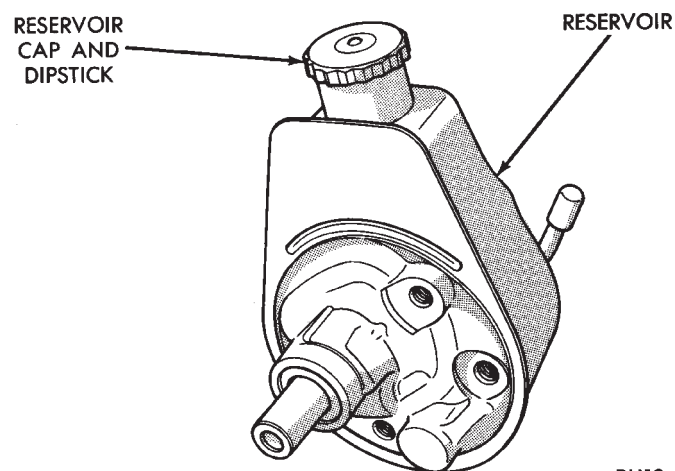


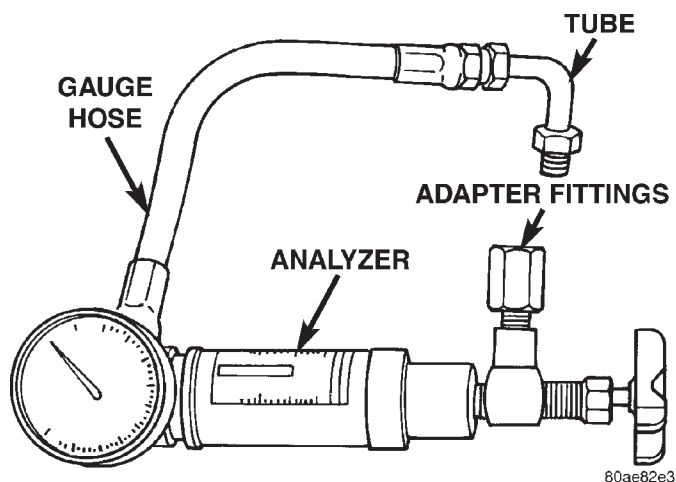
Fig. 1 P-Series—Pump

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DIAGNOSIS AND TESTING

PUMP FLOW RATE AND PRESSURE

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



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Fig. 2 Pressure Test Gauge

POWER STEERING ANALYZER INSTALLATION

WITHOUT HYDRAULIC BOOSTER

- (1) Remove the high pressure hose from the power steering pump.
- (2) Connect Tube 6844 into the pump hose fitting.

DIAGNOSIS AND TESTING (Continued)

(3) Connect pressure gauge hose from the Power Steering Analyzer to Tube 6844.

(4) Connect Adapter 6826 to Power Steering Analyzer test valve end.

(5) Connect the power steering hose from the steering gear to Adapter 6826.

WITH HYDRAULIC BOOSTER

(1) Remove high pressure hose which goes to the steering gear from the tube coming out of the booster.

(2) Connect Adapter 6826 to the Power Steering Analyzer pressure gauge hose.

(3) Connect pressure gauge hose to the tube coming out of the booster.

(4) Connect Tube 6844 to the steering gear hose and Power Steering Analyzer test valve end.

FLOW AND PRESSURE TEST

(1) Check belt condition and tension.

(2) Open the test valve completely.

(3) 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.

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

(5) Gauge should read below 1034 kPa (150 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).

(6) 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.

(7) 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.

(8) 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 the 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 repaired.

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 (P.S.I.)	FLOW (G.P.M.) at 1500 RPM
3.9L	1400 to 1500	2.7 to 3.1
5.2L	1400 to 1500	2.7 to 3.1
5.9L	1400 to 1500	2.7 to 3.1
8.0L	1400 to 1500	2.7 to 3.1
5.9L Diesel	1450 to 1550	3.1 to 3.5
All With Hydraulic Booster	1450 to 1550	3.1 to 3.5

NOTE: After performing test and removing Power Steering Analyzer, check power steering fluid level.

PUMP LEAKAGE DIAGNOSIS

SERVICE PROCEDURES

POWER STEERING PUMP - INITIAL OPERATION

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

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

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

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

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

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

(4) Raise the front wheels off the ground.

(5) Slowly turn the steering wheel right and left, lightly contacting the wheel stops at least 20 times.

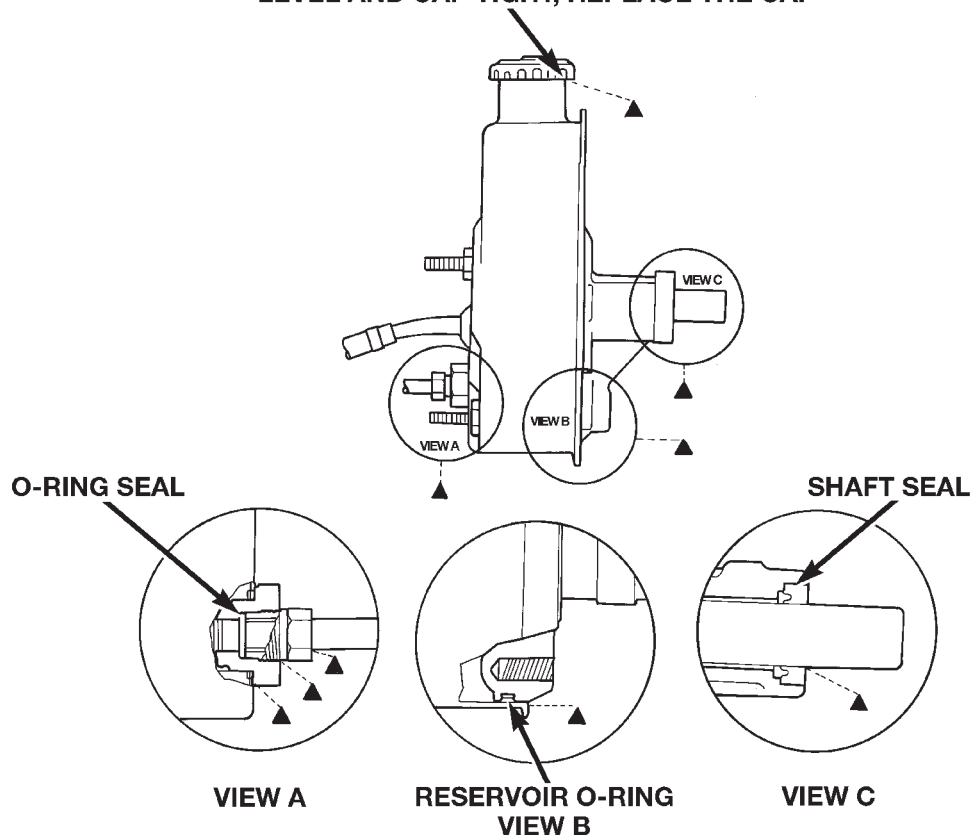
(6) Check the fluid level add if necessary.

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

SERVICE PROCEDURES (Continued)

PUMP LEAKAGE

CHECK OIL LEVEL; IF LEAKAGE PERSISTS WITH THE CORRECT LEVEL AND CAP TIGHT, REPLACE THE CAP



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

(9) 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.

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.

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

(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, disassemble and clean the steering gear and flush the system again.

(12) Install the return line/lines and perform Steering Pump Initial Operation.

REMOVAL AND INSTALLATION

POWER STEERING PUMP - GASOLINE ENGINE

WARNING: DO NOT REMOVE THE WATER PUMP COOLANT TUBE UNLESS THE COOLANT SYSTEM HAS BEEN DEPRESSURIZED AND DRAINED.

REMOVAL

- (1) Remove the serpentine drive belt, refer to Group 7 Cooling.
- (2) Remove the hoses from the power steering pump and cap the fittings.
- (3) Remove battery ground cable and unthread stud from cylinder head, do not remove from bracket.
- (4) Loosen upper bracket bolt and remove the lower bracket to engine block bolts.
- (5) Pivot the pump assembly past the coolant tube.
- (6) Remove the upper stud and remove upper bolt from cylinder head.
- (7) Remove steering pump and mounting bracket from engine as an assembly.
- (8) Remove the pump pulley, to access pump attaching bolts.
- (9) Remove the front pump bracket (Fig. 3). On 8.0L engine remove rear pump bracket (Fig. 4).

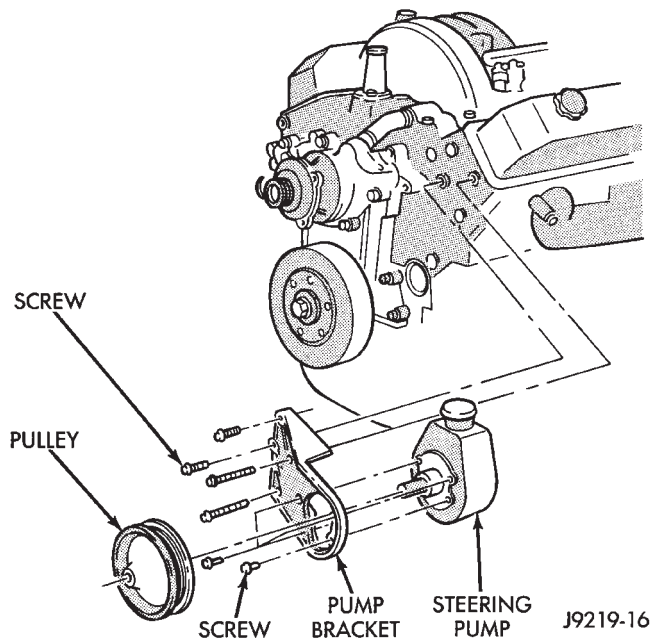


Fig. 3 Pump Mounting 3.9L, 5.2L and 5.9L

INSTALLATION

- (1) Install the front pump bracket and tighten bolts to 47 N·m (35 ft. lbs.). On 8.0L engine install rear pump bracket and tighten nut to 47 N·m (35 ft. lbs.), tighten bolts to 24 N·m (18 ft. lbs.).
- (2) Install the pump pulley.

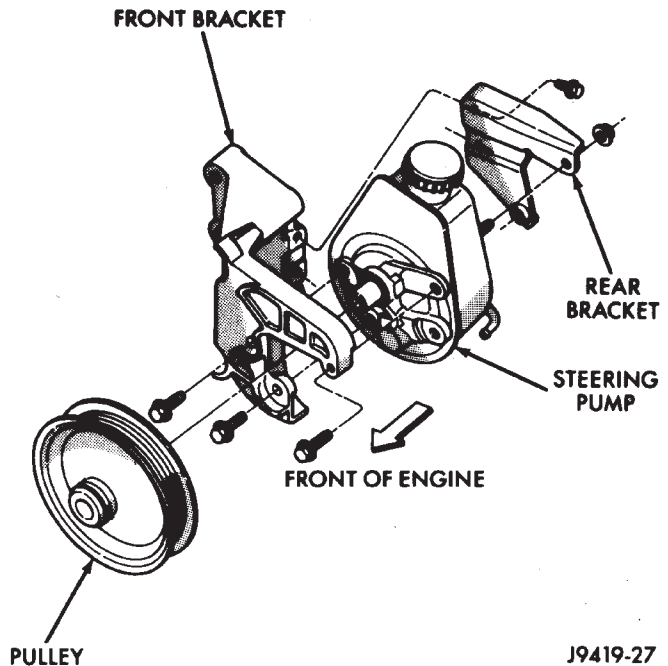


Fig. 4 Pump Mounting 8.0L

- (3) Install steering pump assembly on the engine block. Install the upper stud and bolt in bracket.
- (4) Pivot the pump down past the coolant tube and install the lower bolts in bracket.
- (5) Tighten the bolts and nut to 41 N·m (30 ft. lbs.).
- (6) Connect the hoses to the pump.
- (7) Install the serpentine drive belt refer to Group 7, Cooling for belt routing.
- (8) Fill the reservoir with power steering fluid, refer to Pump Initial Operation.

POWER STEERING PUMP—DIESEL ENGINE

REMOVAL

- (1) Remove and cap steering pump hoses and vacuum pump vacuum line.
- (2) Remove the sender unit from engine block and plug hole in block (Fig. 5).
- (3) Remove and cap the oil feed line from the bottom of the vacuum pump (Fig. 6).
- (4) Remove the lower bolt that attaches the vacuum/steering pump assembly to the engine block. Remove the nut from the steering pump attaching bracket (Fig. 6).
- (5) Remove upper bolt from the pump assembly (Fig. 7) and remove the assembly.
- (6) Remove the mounting gasket.
- (7) Remove the steering pump to vacuum pump bracket attaching nuts (Fig. 8).
- (8) Slide the steering pump from the bracket. Use care not to damage the internal oil seal in the vacuum pump (Fig. 9).

REMOVAL AND INSTALLATION (Continued)

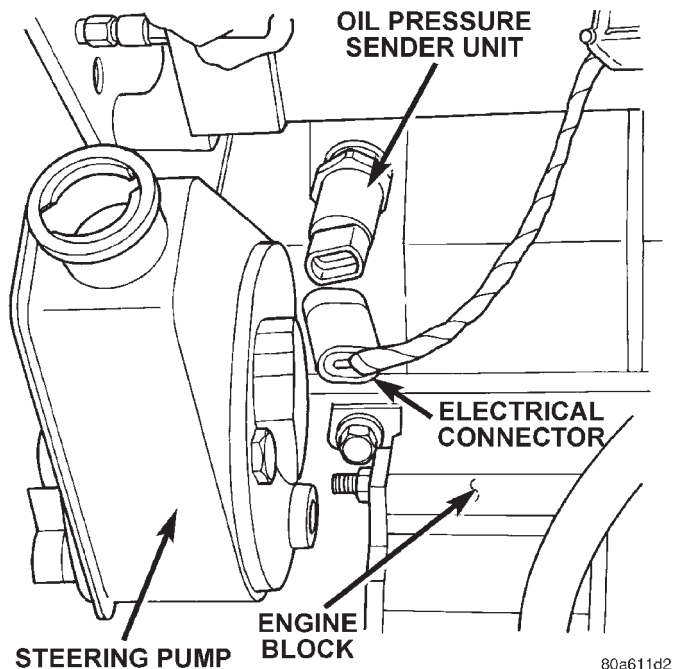


Fig. 5 Oil Pressure Sending Unit

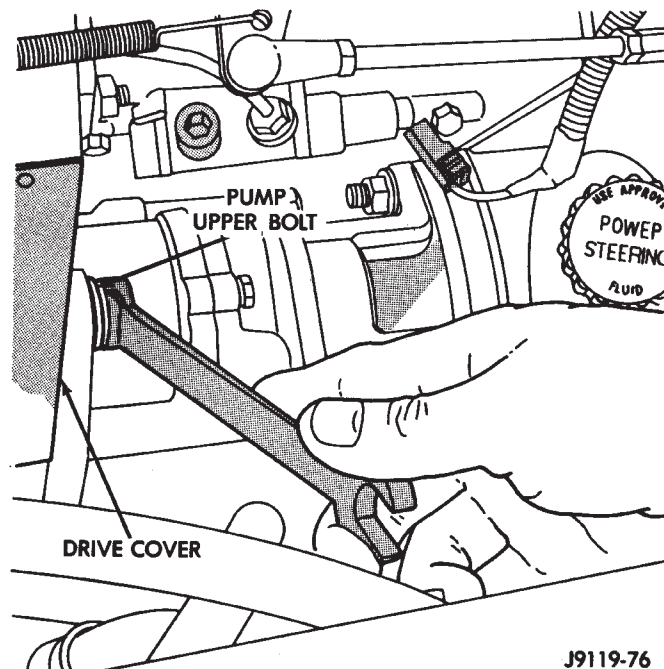


Fig. 7 Pump Assembly Upper Bolt

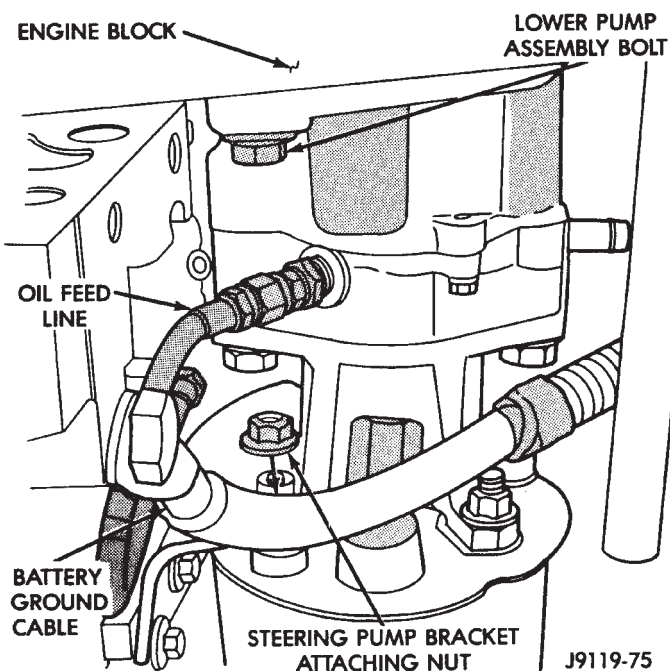


Fig. 6 Oil Feed Line

(9) Remove the two pump body spacers.

INSTALLATION

- (1) Install the two pump body spacers.
- (2) Rotate the drive gear until the steering pump and vacuum pump drive dogs align. Install the steering pump onto the vacuum pump bracket. Use care to avoid damaging the oil seal in the vacuum pump during installation. **The steering pump housing**

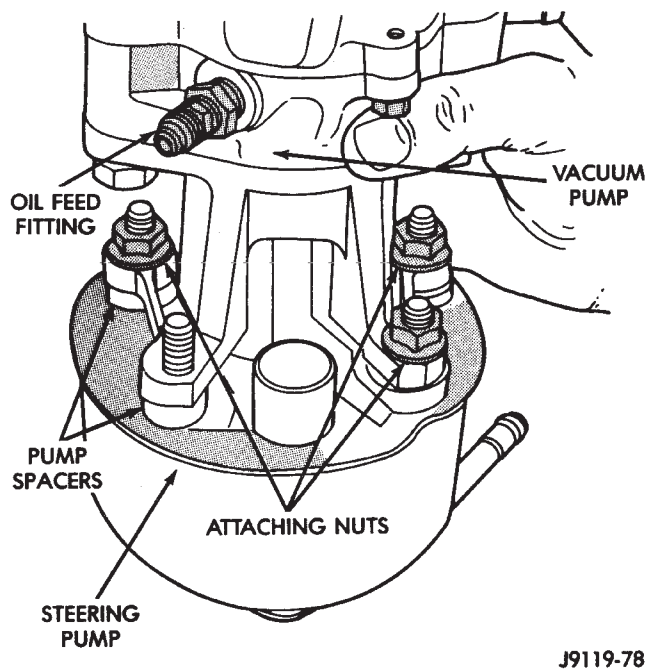
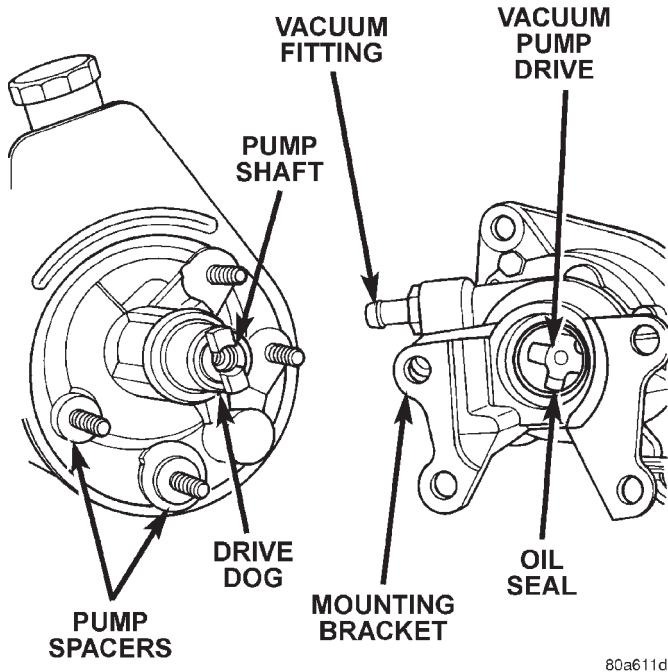


Fig. 8 Bracket Mounting Nuts

and spacers must mate completely with the vacuum pump bracket.

- (3) Install the vacuum pump bracket to steering pump nuts and tighten to 24 N·m (18 ft. lbs.).
- (4) Position new gasket on vacuum pump assembly. Use sealer if necessary to retain the gasket.
- (5) Align and install the pump assembly on the engine. Ensure the steering pump stud is inserted

REMOVAL AND INSTALLATION (Continued)

**Fig. 9 Steering Pump & Vacuum Pump**

into the block bracket. Tighten the pump-to-engine block attaching bolts to 77 N·m (57 ft. lbs.).

(6) Install the steering pump to attaching bracket nut and tighten to 24 N·m (18 ft. lbs.).

(7) Remove plug and install the oil pressure sending unit and electrical connector.

(8) Install the oil feed line to the vacuum pump. Tighten the oil line connection to 7 N·m (60 in. lbs./ 5 ft. lbs.).

(9) Install the fluid hoses to the power steering pump. Tighten the pressure fitting at the pump to 31 N·m (23 ft. lbs.).

(10) Install and clamp the hose on the vacuum pump.

(11) Fill the reservoir with power steering fluid, refer to Pump Initial Operation.

(12) Start the engine and check the operation of the brakes.

DISASSEMBLY AND ASSEMBLY

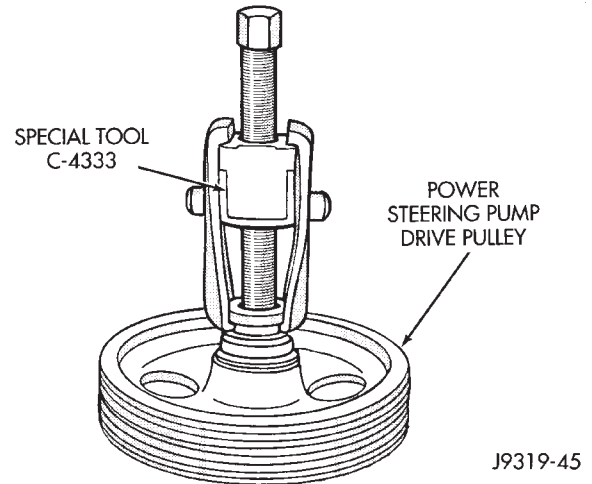
PUMP PULLEY

DISASSEMBLY

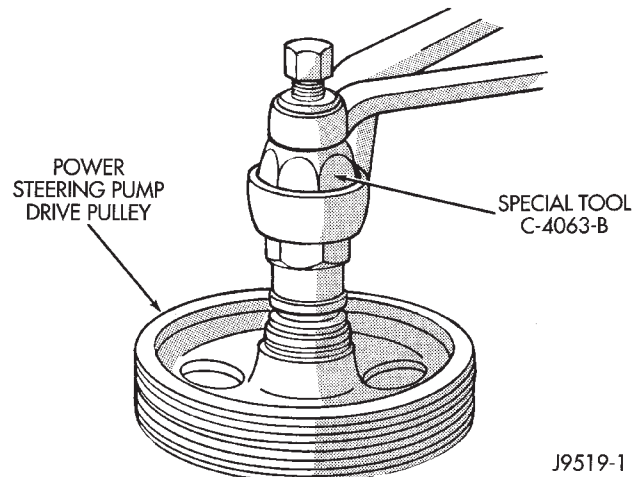
- (1) Remove pump assembly.
- (2) Remove pulley from pump with Puller C-4333 (Fig. 10).

ASSEMBLY

- (1) Replace pulley if bent, cracked, or loose.

**Fig. 10 Pulley Removal**

- (2) Install pulley on pump with Installer C-4063-B (Fig. 11) flush with the end of the shaft. Ensure the tool and pulley remain aligned with the pump shaft.

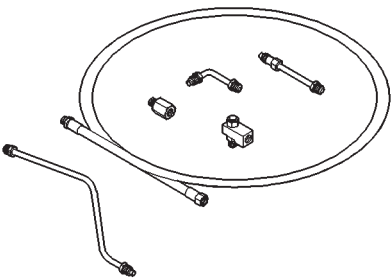
**Fig. 11 Pulley Installation**

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

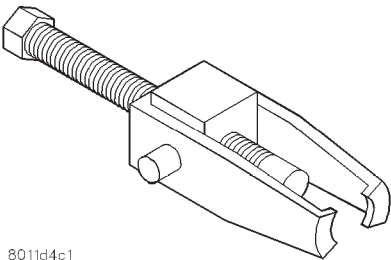
SPECIFICATIONS

TORQUE CHART

DESCRIPTION	TORQUE
Power Steering Pump	
Reservoir Bolts . . . . .	.56 N·m (42 ft. lbs.)
Flow Control Valve . . . . .	.75 N·m (55 ft. lbs.)
Pressure Line . . . . .	.31 N·m (23 ft. lbs.)
Oil Cooler Bolt. . . . .	.20 N·m (15 ft. lbs.)
Pump Mounting - 3.9L, 5.2L & 5.9L	
Bracket to Pump . . . . .	.47 N·m (35 ft. lbs.)
Bracket to Engine . . . . .	.41 N·m (30 ft. lbs.)
Pump Mounting - 8.0L	
Rear Bracket to Pump. . . . .	.47 N·m (35 ft. lbs.)
Rear Bracket to Front Bracket .24 N·m (18 ft. lbs.)	
Bracket to Engine . . . . .	.41 N·m (30 ft. lbs.)
Pump Mounting - Diesel	
Pump to Vacuum Pump. . . . .	.24 N·m (18 ft. lbs.)
Pump Assembly to Engine. . . .	.77 N·m (57 ft. lbs.)
Pump to Support Bracket . . . .	.24 N·m (18 ft. lbs.)



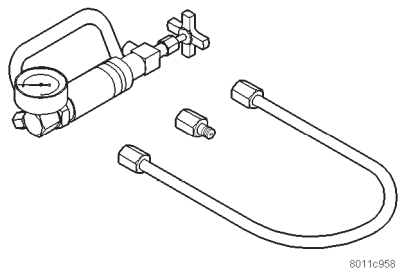
Adapters, Power Steering Flow/Pressure Tester
6893



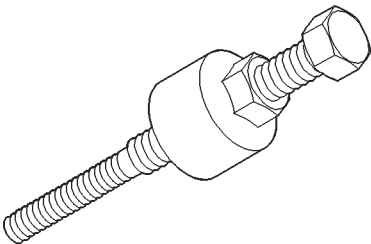
Puller C-4333

SPECIAL TOOLS

POWER STEERING PUMP



Analyzer Set, Power Steering Flow/Pressure 6815



Installer, Power Steering Pulley C-4063-B

POWER STEERING GEAR

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DESCRIPTION AND OPERATION

POWER STEERING GEAR

The power steering gear is a recirculating ball type gear (Fig. 1). 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 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.

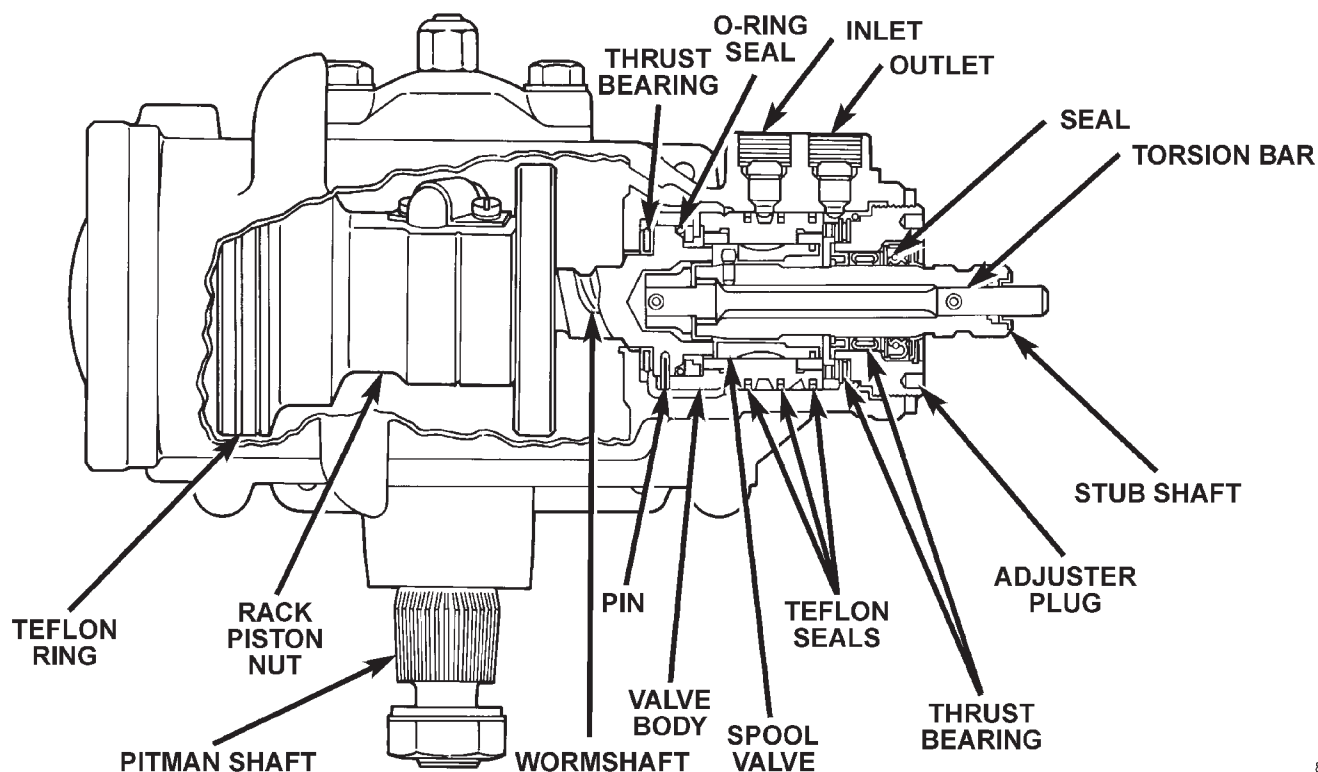
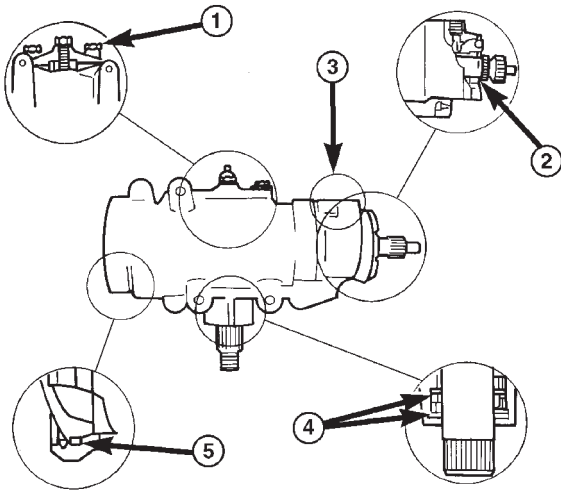


Fig. 1 Power Steering Gear

DIAGNOSIS AND TESTING

POWER STEERING GEAR LEAKAGE DIAGNOSIS



1. SIDE COVER LEAK - TORQUE SIDE COVER BOLTS TO SPECIFICATION. REPLACE THE SIDE COVER SEAL IF THE LEAKAGE PERSISTS.

2. ADJUSTER PLUG SEAL - REPLACE THE ADJUSTER PLUG SEALS.

3. PRESSURE LINE FITTING - TORQUE THE HOSE FITTING NUT TO SPECIFICATIONS. IF LEAKAGE PERSISTS, REPLACE THE SEAL.

4. PITMAN SHAFT SEALS - REPLACE THE SEALS.

5. TOP COVER SEAL - REPLACE THE SEAL.

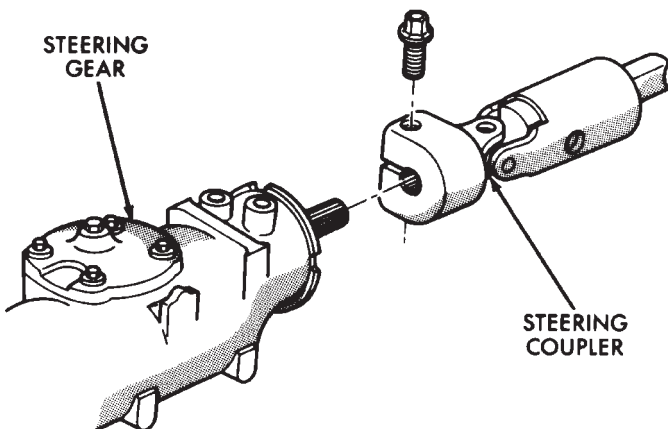
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REMOVAL AND INSTALLATION

POWER STEERING GEAR

REMOVAL

- (1) Place the front wheels in a straight-ahead position.
- (2) Disconnect and cap the fluid hoses from steering gear.
- (3) Remove coupler pinch bolt at the steering gear and slide shaft off gear (Fig. 2).



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Fig. 2 Column Shaft

- (4) Mark the pitman shaft and pitman arm for installation reference. Remove the pitman arm from the shaft with Puller C-4150A (Fig. 3).

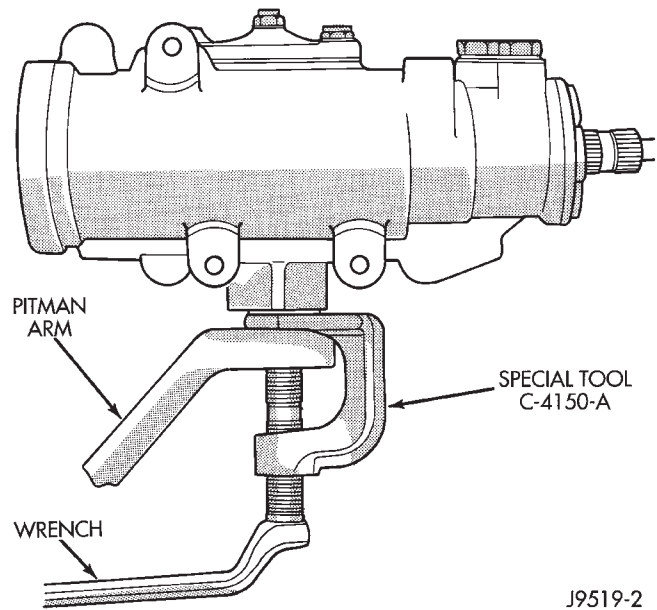


Fig. 3 Pitman Arm

- (5) Remove steering gear retaining bolts and nuts. Remove the steering gear from the vehicle.

INSTALLATION

- (1) Position the steering gear on the frame rail and install the bolts. Tighten mounting bolts to specifications.
- (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.
- (4) Install the washer and retaining nut on the pitman shaft. Tighten the nut to 251 N·m (185 ft. lbs.).
- (5) Connect fluid hoses to steering gear, tighten to 31 N·m (23 ft. lbs.). Add fluid, refer to Power Steering Pump Initial Operation.

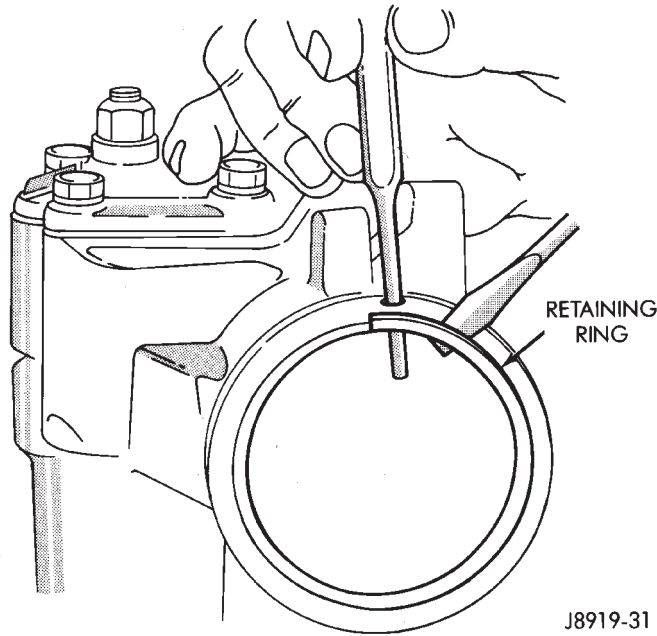
DISASSEMBLY AND ASSEMBLY

HOUSING END PLUG

DISASSEMBLY

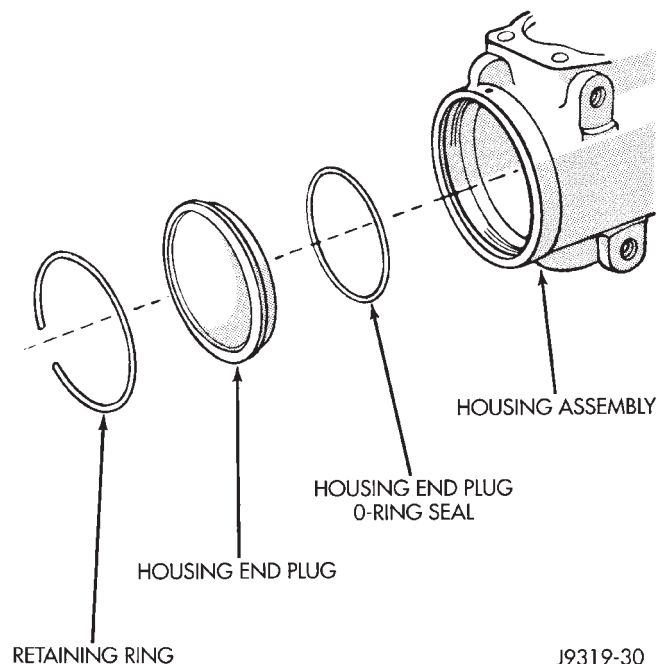
- (1) Unseat and remove retaining ring from groove with a punch through the hole in the end of the housing (Fig. 4).
- (2) Slowly rotate stub shaft with 12 point socket COUNTER-CLOCKWISE to force the end plug out from housing.

DISASSEMBLY AND ASSEMBLY (Continued)

**Fig. 4 End Plug Retaining Ring**

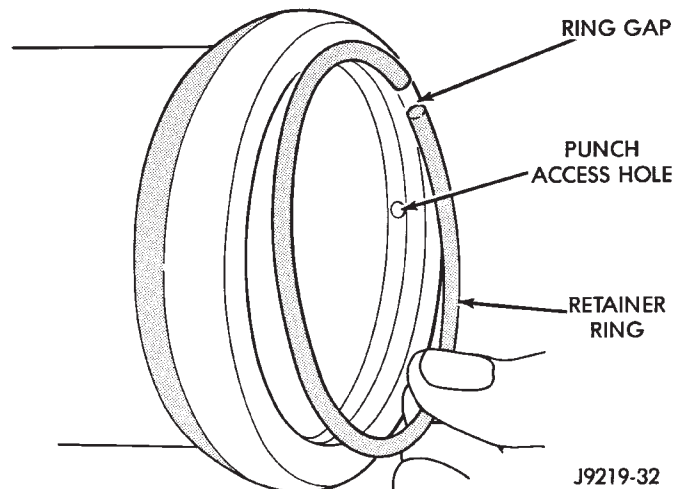
CAUTION: Do not turn stub shaft any further than necessary. The rack piston balls will drop out of the rack piston circuit if the stub shaft is turned too far.

- (3) Remove O-ring from the housing (Fig. 5).

**Fig. 5 End Plug Components****ASSEMBLY**

- (1) Lubricate O-ring with power steering fluid and install into the housing.
- (2) Install end plug by tapping the plug lightly with a plastic mallet into the housing.

- (3) Install retaining ring so one end of the ring covers the housing access hole (Fig. 6).

**Fig. 6 Installing The Retaining Ring****PITMAN SHAFT/SEALS/BEARING****DISASSEMBLY**

- (1) Clean exposed end of pitman shaft and housing with a wire brush.
- (2) Remove preload adjuster nut (Fig. 7).
- (3) Rotate the stub shaft with a 12 point socket from stop to stop and count the number of turns.
- (4) Center the stub shaft by rotating it from the stop 1/2 of the total amount of turns.
- (5) Remove side cover bolts and remove side cover, gasket and pitman shaft as an assembly (Fig. 7).

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

- (6) Remove pitman shaft from the side cover.
- (7) Remove dust seal from the housing with a seal pick (Fig. 8).

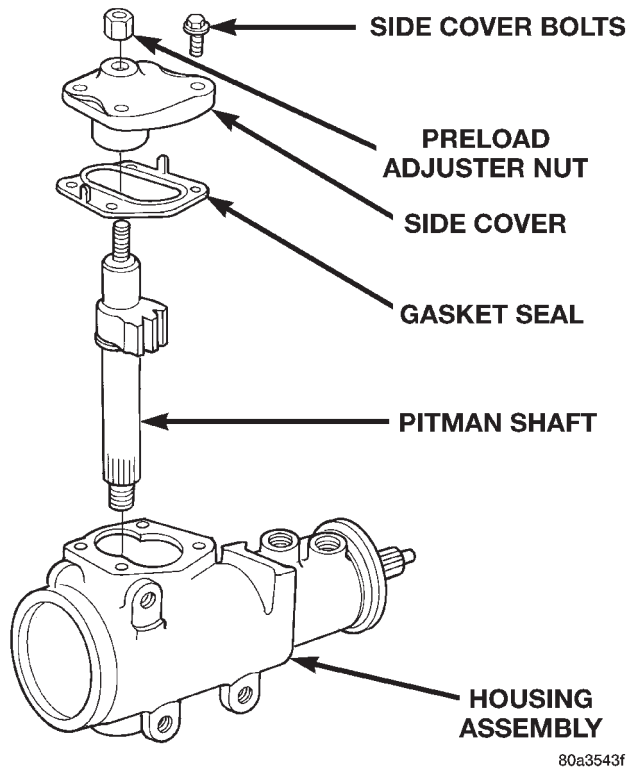
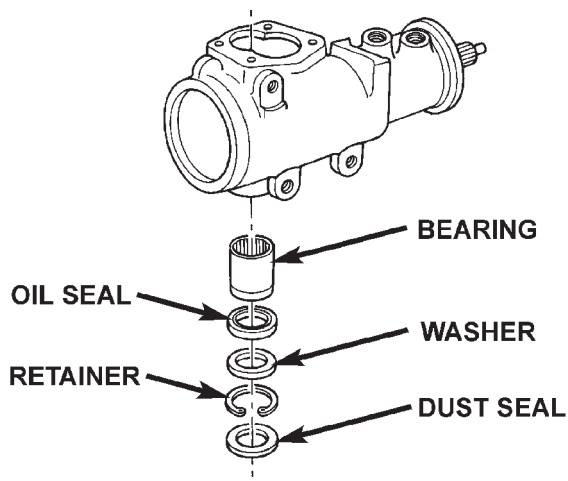
CAUTION: Use care not to score the housing bore when prying out seals and washer.

- (8) Remove retaining ring with snap ring pliers.
- (9) Remove washer from the housing.
- (10) Remove oil seal from the housing with a seal pick.
- (11) Remove pitman shaft bearing from housing with a bearing driver and handle (Fig. 9).

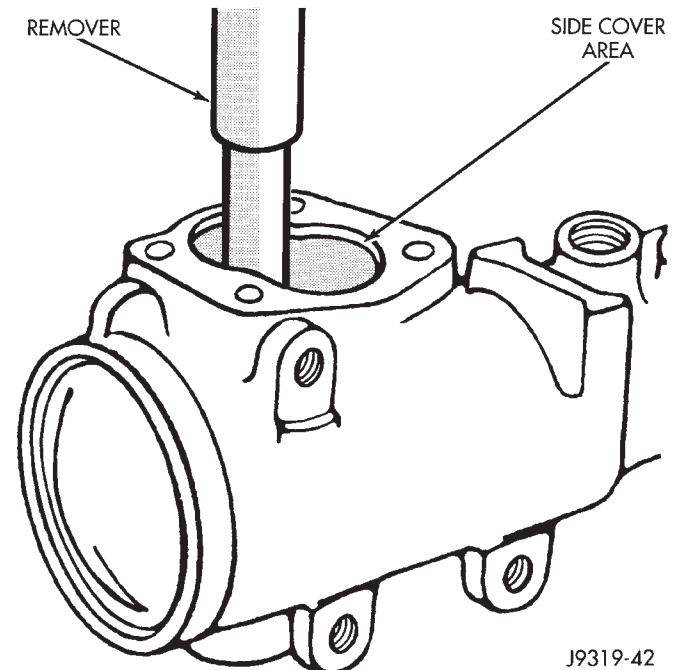
ASSEMBLY

- (1) Install pitman shaft bearing into housing with a bearing driver and handle.
- (2) Coat the oil seals and washer with grease.
- (3) Install the oil seal with a driver and handle.
- (4) Install backup washer.
- (5) Install the retainer ring with snap ring pliers.

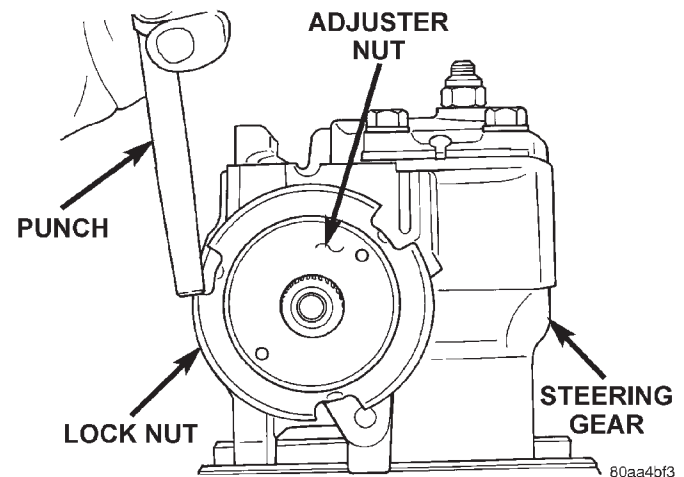
DISASSEMBLY AND ASSEMBLY (Continued)

**Fig. 7 Side Cover and Pitman Shaft****Fig. 8 Pitman Shaft Seals & Bearing**

- (6) Install dust seal with a driver and handle.
- (7) Install pitman shaft to side cover by screwing shaft in until it fully seats to side cover.
- (8) Install preload adjuster nut. **Do not tighten nut until after Over-Center Rotation Torque adjustment has been made.**
- (9) Install gasket to side cover and bend tabs around edges of side cover (Fig. 7).
- (10) Install pitman shaft assembly and side cover to housing.
- (11) Install side cover bolts and tighten to 60 N·m (44 ft. lbs.).
- (12) Adjust Over-Center Rotation Torque.

**Fig. 9 Needle Bearing Removal****SPOOL VALVE****DISASSEMBLY**

- (1) Remove lock nut (Fig. 10).
- (2) Remove adjuster nut with Spanner Wrench C-4381.
- (3) Remove thrust support assembly out of the housing (Fig. 11).
- (4) Pull stub shaft and valve assembly from the housing (Fig. 12).

**Fig. 10 Lock Nut and Adjuster Nut**

- (5) Remove stub shaft from valve assembly by lightly tapping shaft on a block of wood to loosen shaft. Then disengage stub shaft pin from hole in spool valve and separate the valve assembly from stub shaft (Fig. 13).

DISASSEMBLY AND ASSEMBLY (Continued)

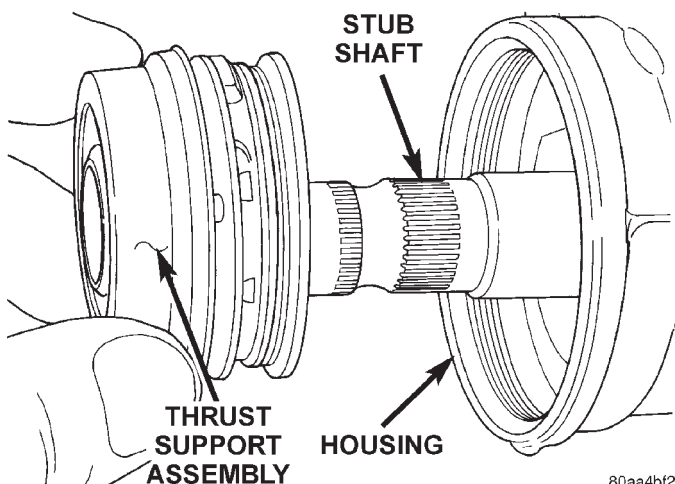


Fig. 11 Thrust Support Assembly

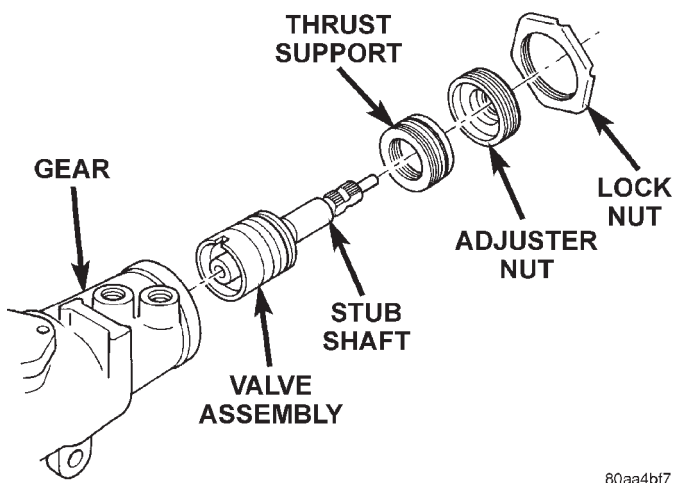


Fig. 12 Valve Assembly With Stub Shaft

(6) Remove spool valve from valve body by pulling and rotating the spool valve from the valve body (Fig. 14).

(7) Remove spool valve O-ring and valve body teflon rings and O-rings underneath the teflon rings (Fig. 15).

(8) Remove the O-ring between the worm shaft and the stub shaft.

ASSEMBLY

NOTE: Clean and dry all components, then lubricate with power steering fluid.

- (1) Install spool valve spool O-ring.
- (2) Install spool valve in valve body by pushing and rotating. Hole in spool valve for stub shaft pin must be accessible from opposite end of valve body.
- (3) Install stub shaft in valve spool and engage locating pin on stub shaft into spool valve hole (Fig. 16).

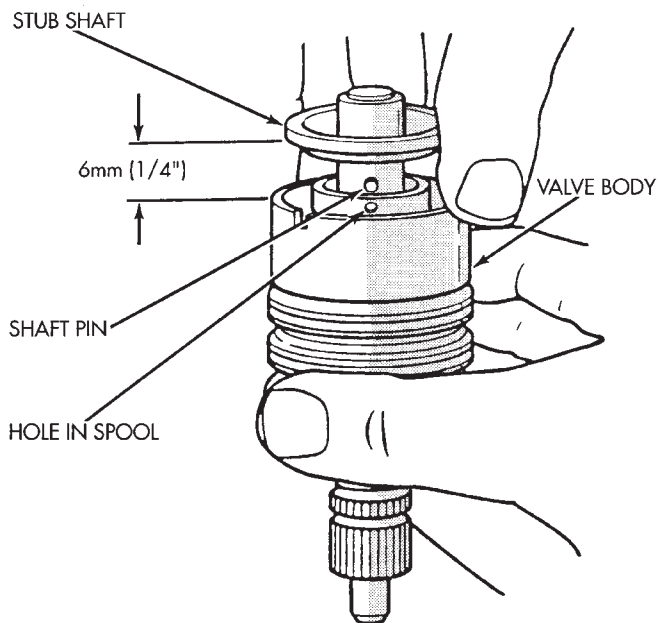


Fig. 13 Stub Shaft

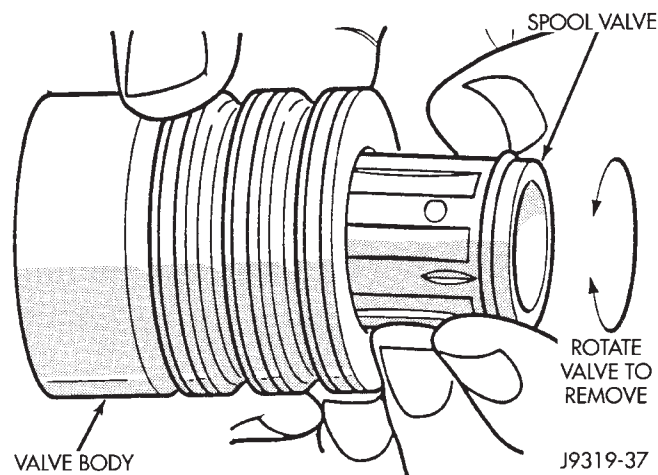


Fig. 14 Spool Valve

NOTE: Notch in stub shaft cap must fully engage valve body pin and seat against valve body shoulder.

(4) Install O-rings and teflon rings over the O-rings on valve body.

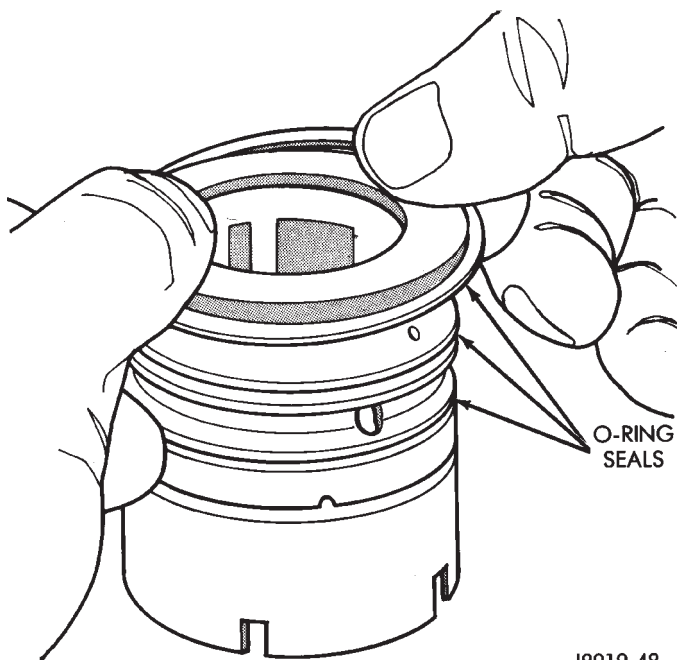
(5) Install O-ring into the back of the stub shaft cap (Fig. 17).

(6) Install stub shaft and valve assembly in the housing. Line up worm shaft to slots in the valve assembly.

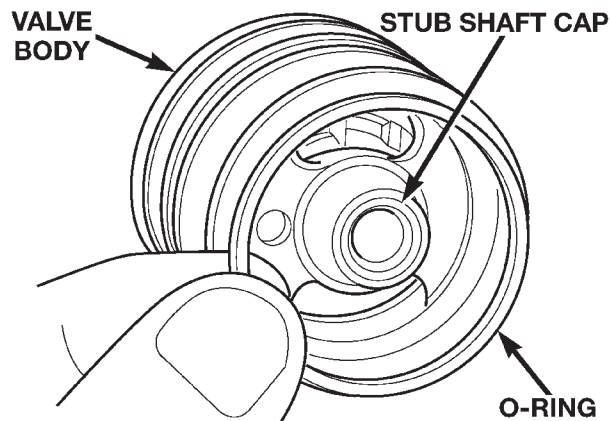
(7) Install thrust support assembly.

NOTE: The thrust support is serviced as an assembly. If any component of the thrust support is damaged the assembly must be replaced.

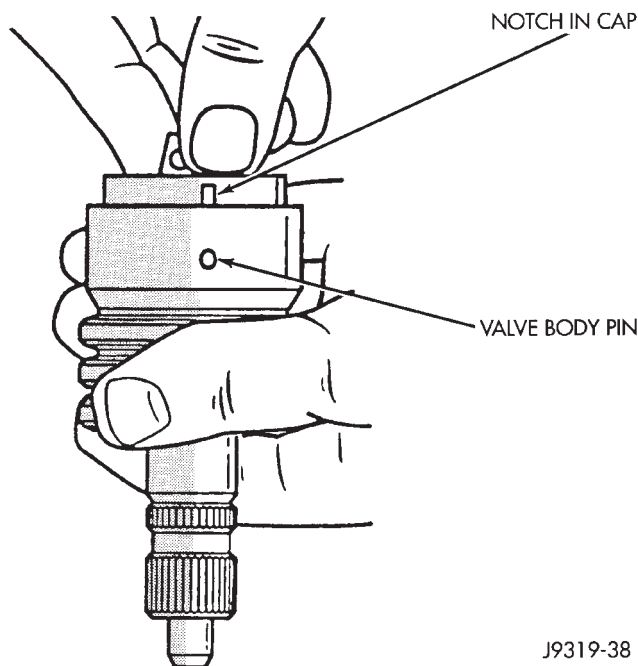
DISASSEMBLY AND ASSEMBLY (Continued)



J8919-48

Fig. 15 Valve Seals

80accfc0

Fig. 17 Stub Shaft Cap O-Ring

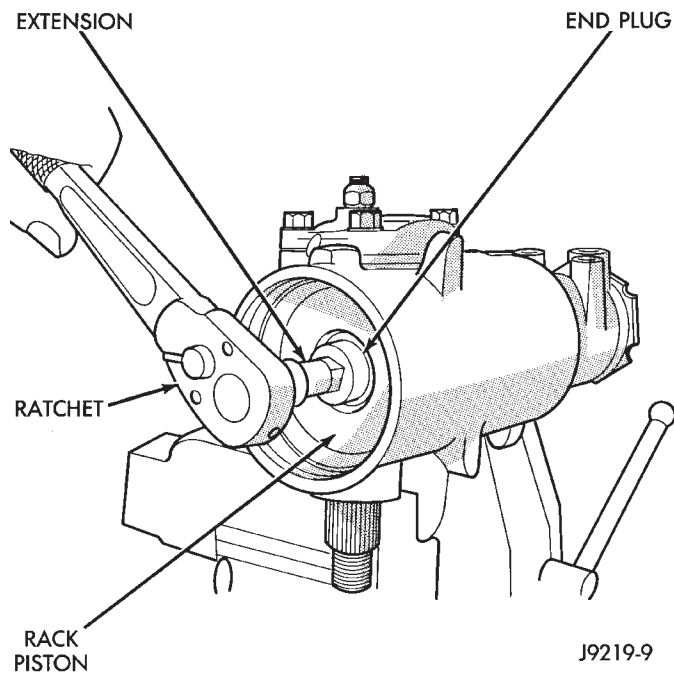
J9319-38

Fig. 16 Stub Shaft Installation

- (8) Install adjuster nut and lock nut.
- (9) Adjust Thrust Bearing Preload and Over-Center Rotating Torque.

RACK PISTON AND WORM SHAFT**DISASSEMBLY**

- (1) Remove housing end plug.
- (2) Remove rack piston plug (Fig. 18).
- (3) Remove side cover and pitman shaft.

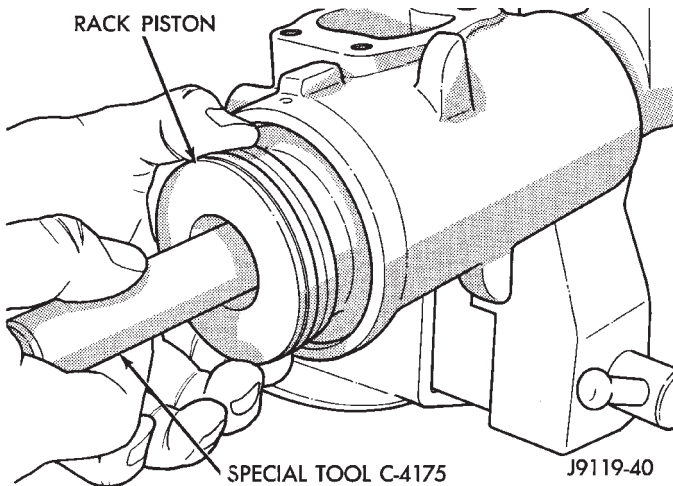
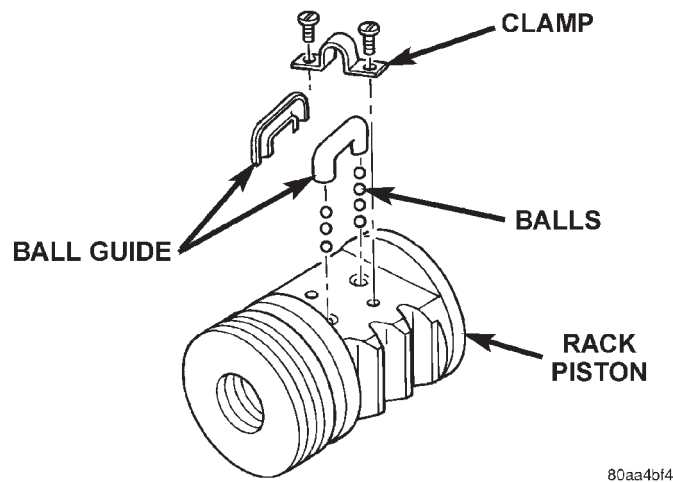


J9219-9

Fig. 18 Rack Piston End Plug

- (4) Turn stub shaft COUNTERCLOCKWISE until the rack piston begins to come out of the housing.
- (5) Insert Arbor C-4175 into bore of rack piston (Fig. 19) and hold tool tightly against worm shaft.
- (6) Turn the stub shaft with a 12 point socket COUNTERCLOCKWISE, this will force the rack piston onto the tool and hold the rack piston balls in place.
- (7) Remove the rack piston and tool together from housing.
- (8) Remove tool from rack piston.
- (9) Remove rack piston balls.
- (10) Remove clamp bolts, clamp and ball guide (Fig. 20).
- (11) Remove teflon ring and O-ring from the rack piston (Fig. 21).

DISASSEMBLY AND ASSEMBLY (Continued)

**Fig. 19 Rack Piston with Arbor****Fig. 20 Rack Piston**

(12) Remove the adjuster lock nut and adjuster nut from the stub shaft.

(13) Pull the stub shaft with the spool valve and thrust support assembly out of the housing.

(14) Remove the worm shaft from the housing (Fig. 22).

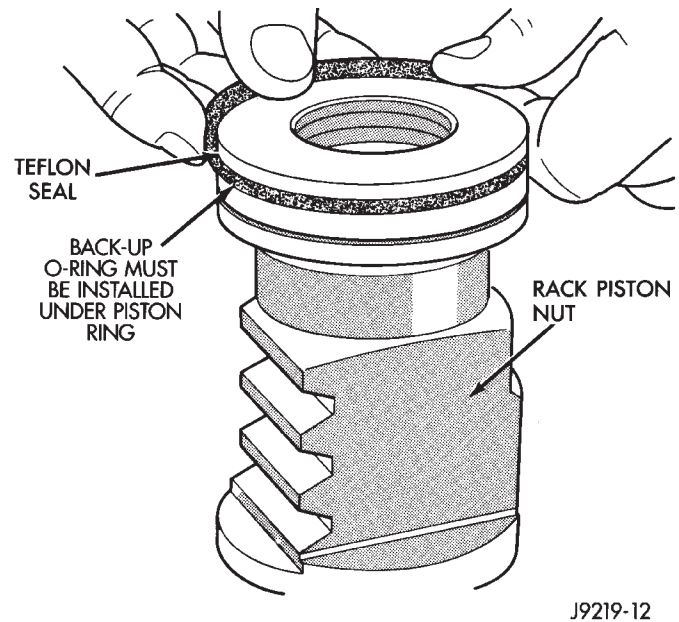
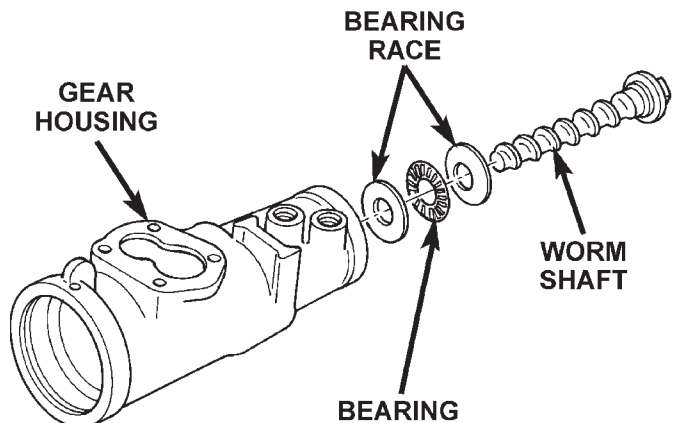
ASSEMBLY

NOTE: Clean and dry all components and lubricate with power steering fluid.

(1) Check for scores, nicks or burrs on the rack piston finished surface. Slight wear is normal on the worm gear surfaces.

(2) Install O-ring and teflon ring on the rack piston.

(3) Install worm shaft in the rack piston and align worm shaft spiral groove with rack piston ball guide hole (Fig. 23).

**Fig. 21 Rack Piston Teflon Ring and O-Ring****Fig. 22 Worm Shaft**

CAUTION: The rack piston balls must be installed alternately into the rack piston and ball guide. This maintains worm shaft preload. There are 12 black balls and 12 silver (Chrome) balls. The black balls are smaller than the silver balls.

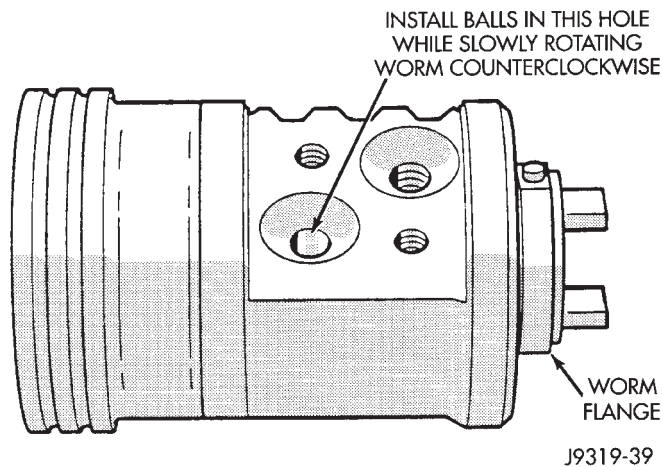
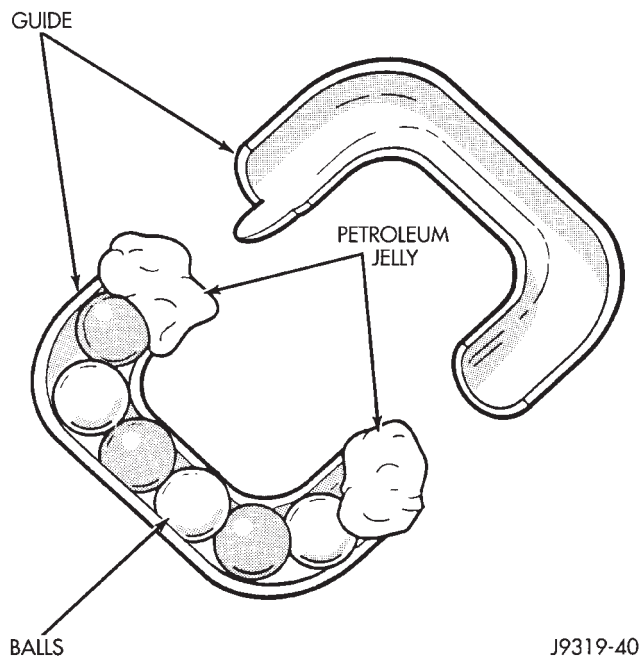
(4) Lubricate and install rack piston balls through return guide hole while turning worm shaft COUNTERCLOCKWISE (Fig. 23).

(5) Install remaining balls in guide using grease to hold the balls in place (Fig. 24).

(6) Install the guide onto rack piston and install clamp and clamp bolts. Tighten bolts to 58 N·m (43 ft. lbs.).

(7) Insert Arbor C-4175 into bore of rack piston and hold tool tightly against worm shaft.

DISASSEMBLY AND ASSEMBLY (Continued)

**Fig. 23 Installing Balls in Rack Piston****Fig. 24 Balls in the Return Guide**

(8) Turn the worm shaft **COUNTERCLOCKWISE** while pushing on the arbor. This will force the rack piston onto the arbor and hold the rack piston balls in place.

(9) Install the races and thrust bearing on the worm shaft and install shaft in the housing (Fig. 22).

(10) Install the stub shaft with spool valve, thrust support assembly and adjuster nut in the housing.

(11) Install the rack piston and arbor tool into the housing.

(12) Hold arbor tightly against worm shaft and turn stub shaft **CLOCKWISE** until rack piston is seated on worm shaft.

(13) Install pitman shaft and side cover in the housing.

(14) Install rack piston plug and tighten to 150 N·m (111 ft. lbs.).

(15) Install housing end plug.

(16) Adjust worm shaft thrust bearing preload and over-center rotating torque.

ADJUSTMENTS

STEERING GEAR

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.

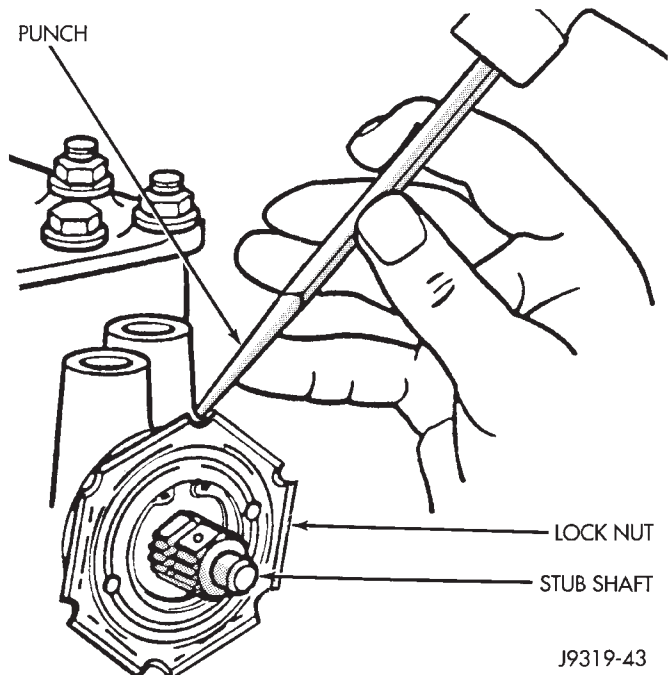
WORM THRUST BEARING PRELOAD

(1) Mount the gear carefully into a vise.

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

(2) Remove adjuster plug locknut (Fig. 25).

(3) Rotate the stub shaft back and forth with a 12 point socket to drain the remaining fluid.

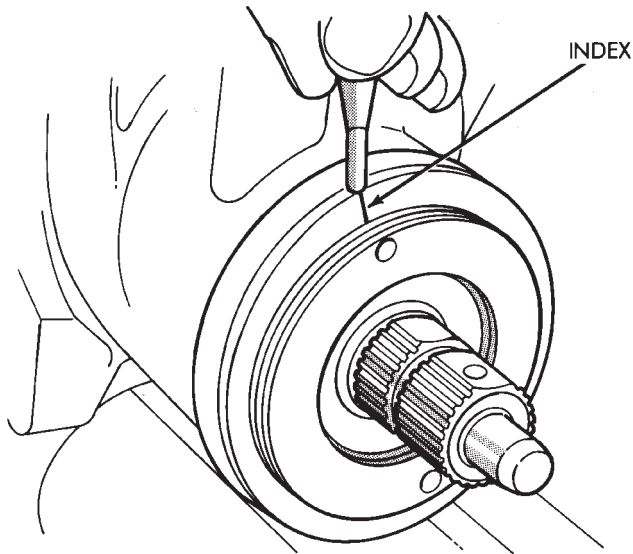
**Fig. 25 Loosening the Adjuster Plug**

(4) Turn the adjuster in with Spanner Wrench C-4381. Tighten the plug and thrust bearing in the

ADJUSTMENTS (Continued)

housing until firmly bottomed in the housing about 34 N·m (25 ft. lbs.).

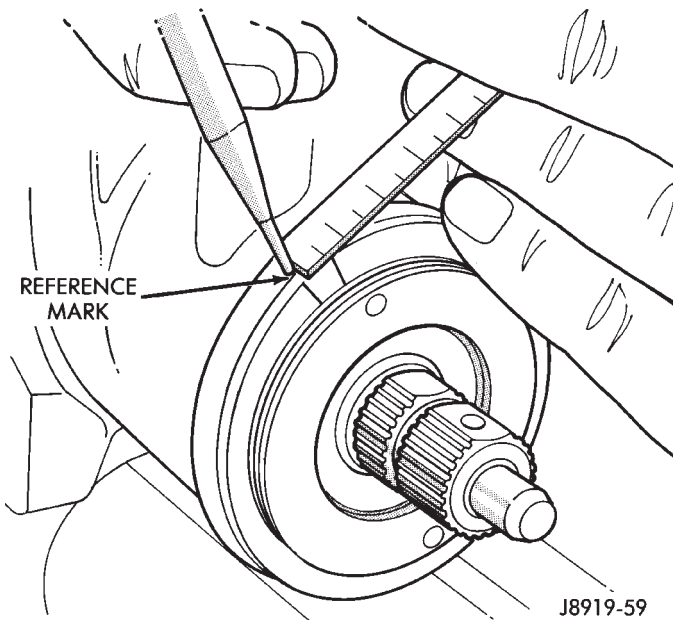
(5) Place an index mark on the housing even with one of the holes in adjuster plug (Fig. 26).



J8919-58

Fig. 26 Alignment Marking On Housing

(6) Measure back (counterclockwise) 10 mm (0.40 in) and mark housing (Fig. 27).

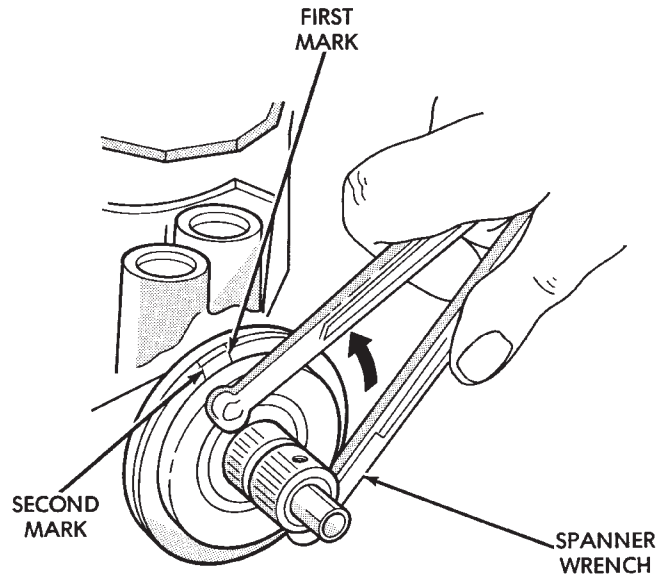


J8919-59

Fig. 27 Second Marking On Housing

(7) Rotate adjustment cap back (counterclockwise) with spanner wrench until hole is aligned with the second mark (Fig. 28).

(8) Install and tighten locknut to 108 N·m (80 ft. lbs.). Be sure adjustment cap does not turn while tightening the locknut.



J9219-30

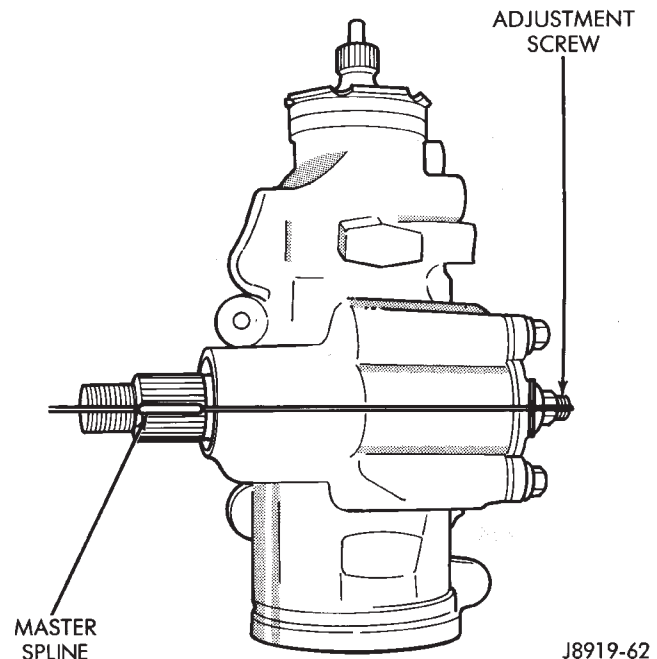
Fig. 28 Aligning To The Second Mark

OVER-CENTER

NOTE: Before performing this procedure, the worm bearing preload adjustment must be performed.

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

(2) Starting at either stop, turn the stub shaft back 1/2 the total number of turns. This is the center of the gear travel (Fig. 29).



J8919-62

Fig. 29 Steering Gear Centered

ADJUSTMENTS (Continued)

(3) Place the torque wrench in the vertical position on the stub shaft. Rotate the wrench 45 degrees each side of the center and record the highest rotational torque in this range (Fig. 30). This is the Over-Center Rotating Torque.

NOTE: The stub shaft must rotate smoothly without sticking or binding.

(4) Rotate the stud shaft between 90° and 180° to the left of center and record the left off-center preload. Repeat this to the right of center and record the right off-center preload. The average of these two recorded readings is the Preload Rotating Torque.

(5) The Over-Center Rotating Torque should be 0.45-0.9 N·m (4-8 in. lbs.) **higher** than the Preload Rotating Torque.

(6) If an adjustment to the Over-Center Rotating Torque is necessary, first loosen the adjuster lock nut. Then turn the pitman shaft adjuster screw back (COUNTERCLOCKWISE) until fully extended, then turn back in (CLOCKWISE) one full turn.

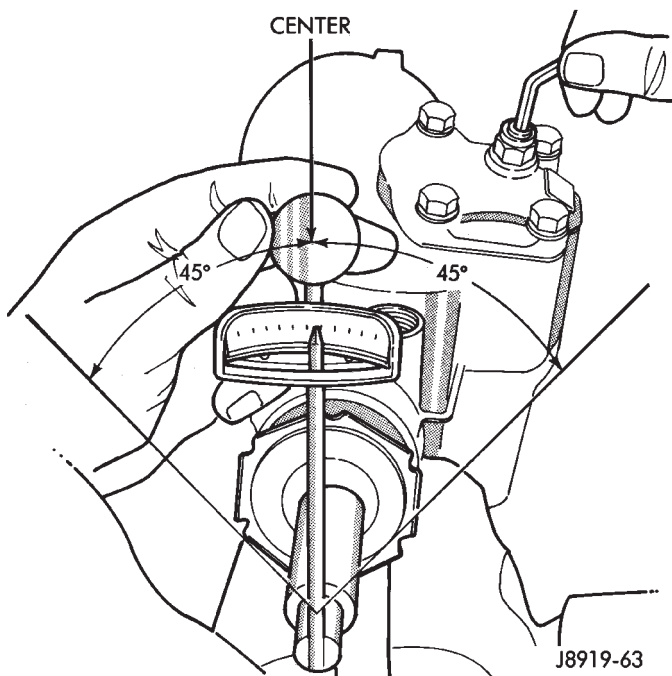


Fig. 30 Checking Over-center Rotation Torque

(7) Remeasure Over-Center Rotating Torque. If necessary turn the adjuster screw and repeat measurement until correct Over-Center Rotating Torque is reached.

NOTE: To increase the Over-Center Rotating Torque turn the screw **CLOCKWISE**.

(8) Prevent the adjuster screw from turning while tightening adjuster lock nut. Tighten the adjuster lock nut to 49 N·m (36 ft. lbs.).

SPECIFICATIONS

POWER STEERING GEAR

Steering Gear

Type Recirculating Ball

Gear Code & Ratio

BN 17.5:1

HF 16-13:1

Wormshaft Bearing

Preload 0.45-1.13 N·m (10-15 in. lbs.)

Pitman Shaft Overcenter Drag

New Gear (under 400 miles) 0.45-0.90 N·m
(6-10 in. lbs.)

+ Wormshaft Preload

Used Gear (over 400 miles) 0.5-0.6 N·m
(4-5 in. lbs.)

+ Wormshaft Preload

TORQUE CHART

DESCRIPTION**TORQUE****Steering Gear Mounting**

Frame Bolts 176 N·m (130 ft. lbs.)

Line Fittings

Pressure 31 N·m (23 ft. lbs.)

Return 31 N·m (23 ft. lbs.)

Steering Gear

Adjustment Cap Locknut 108 N·m (80 ft. lbs.)

Adjustment Screw Locknut 58 N·m (43 ft. lbs.)

Pitman Shaft Nut 251 N·m (185 ft. lbs.)

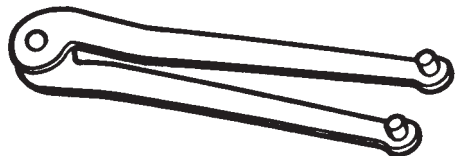
Rack Piston Plug 149 N·m (110 ft. lbs.)

Side Cover Bolts 61 N·m (45 ft. lbs.)

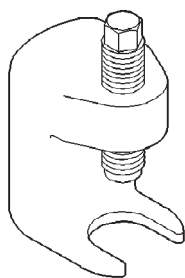
Return Guide Clamp Bolt 5 N·m (4 ft. lbs.)

SPECIAL TOOLS

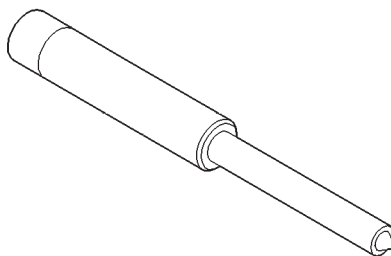
POWER STEERING GEAR



Remover/Installer, Steering Plug C-4381



Remover, Pitman Arm C-4150A



Remover/Installer Steering Rack Piston C-4175

STEERING COLUMN

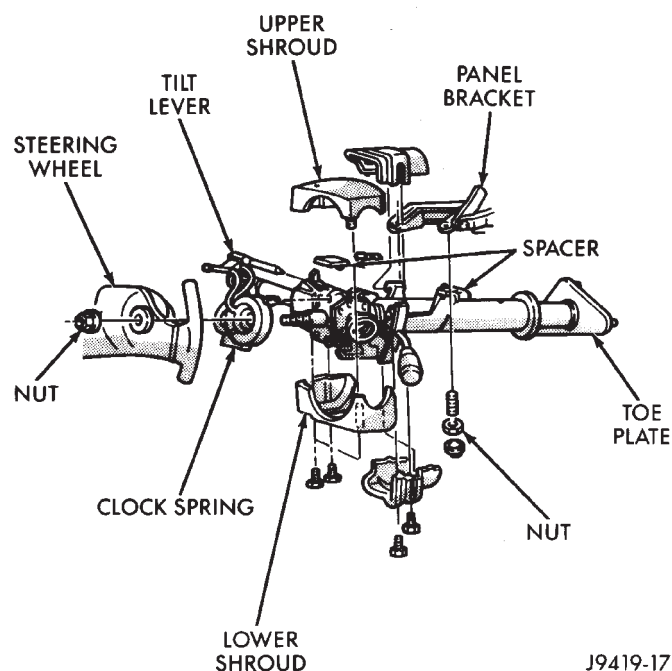
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GENERAL INFORMATION

STEERING COLUMN

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



J9419-17

Fig. 1 Steering Column

SERVICE PRECAUTIONS

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

To service the steering wheel, switches or the airbag, refer to the appropriate section of Group 8. Follow all WARNINGS.

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.

WARNING: THE AIRBAG SYSTEM IS A SENSITIVE, COMPLEX ELECTRO-MECHANICAL UNIT.

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

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

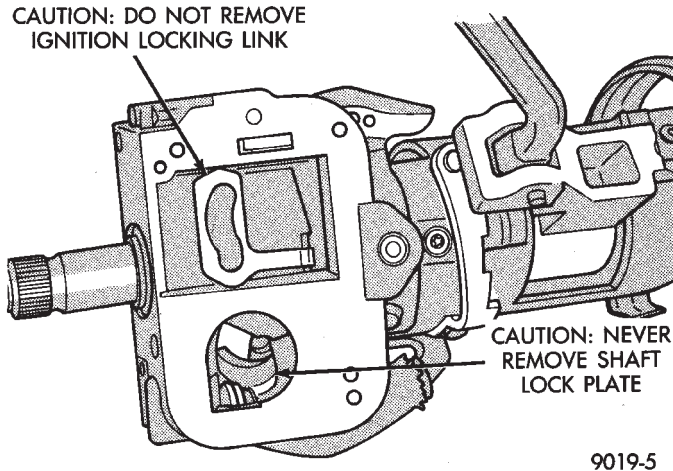
DIAGNOSIS AND TESTING

IGNITION SWITCH

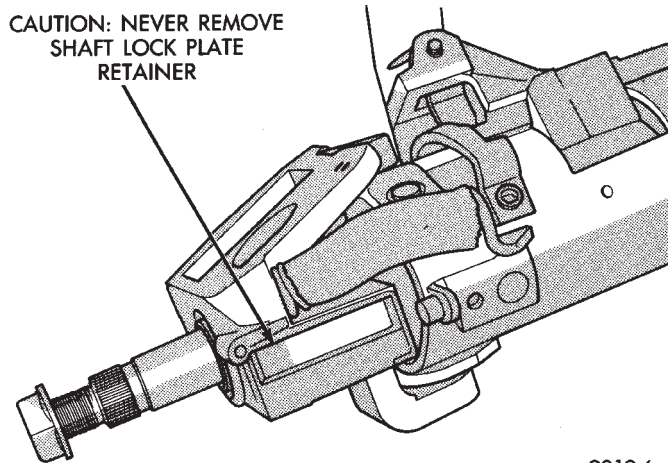
TEST AND REPAIR

If the ignition switch effort is excessive, remove the ignition switch from the steering column. Refer to Group 8D Ignition System. Using a key cylinder,

DIAGNOSIS AND TESTING (Continued)



9019-5

Fig. 2 Observe Cautions

9019-6

Fig. 3 Observe Cautions

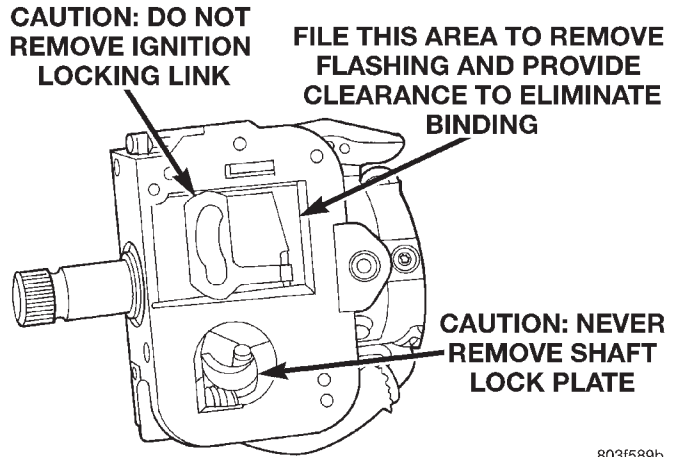
check the turning effort of the switch. If the ignition switch binds look for the following conditions.

- (1) Look for rough areas or flash in the casting and if found remove with a file (Fig. 4).
- (2) Remove the link and slider and check the link to see if it is bent. If so replace with a new part.
- (3) Put the slider in its slot in the sleeve and verify a loose fit over the length of the slot. If the slider binds in the slot at any point lightly file the slider until clearance is achieved.
- (4) If no binding is found, lightly file the ramp on the ignition switch, (The ramp fits into the casting) until binding no longer occurs.

REMOVAL AND INSTALLATION

STEERING COLUMN

WARNING: BEFORE SERVICING THE STEERING COLUMN THE AIRBAG SYSTEM MUST BE DISARMED, REFER TO GROUP 8M RESTRAINT SYS-



803f589b

Fig. 4 Steering Column Flash Removal And Non-Serviceable Components

TEMS FOR SERVICE PROCEDURES. FAILURE TO DO SO MAY RESULT IN ACCIDENTAL DEPLOYMENT OF THE AIRBAG AND POSSIBLE PERSONAL INJURY.

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

REMOVAL

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

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

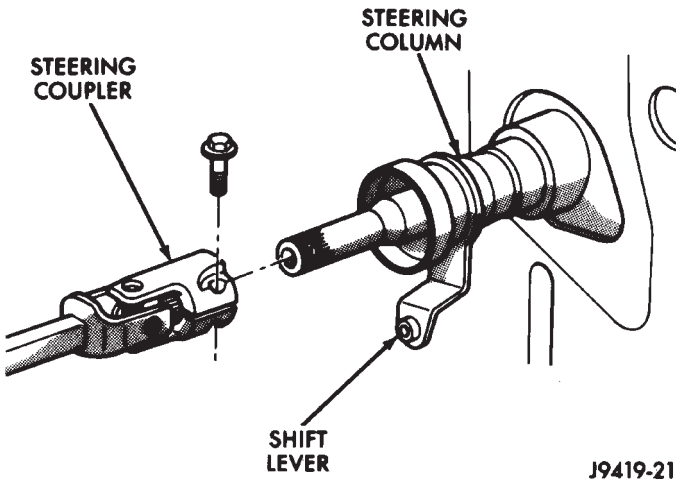
- (5) Remove the shift link rod in engine compartment (if equipped). Pry rod out from grommet in the shift lever.

- (6) Scribe or paint reference mark on the column shaft-to-coupler. This will aid in column shaft installation alignment. Remove the steering column shaft-to-coupler bolt (Fig. 5).

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

- (8) Remove PRNDL cable on column shift vehicles. Put shift lever in **Park** position. Pull cable and twist to remove from position arm. Push tab up on bottom

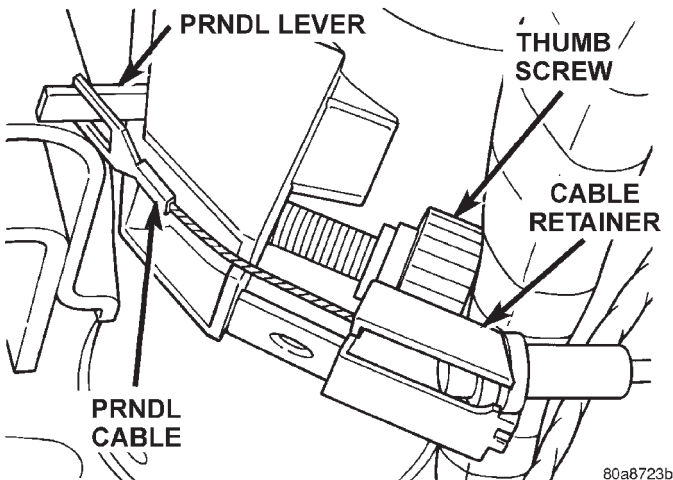
REMOVAL AND INSTALLATION (Continued)



J9419-21

Fig. 5 Steering Coupler

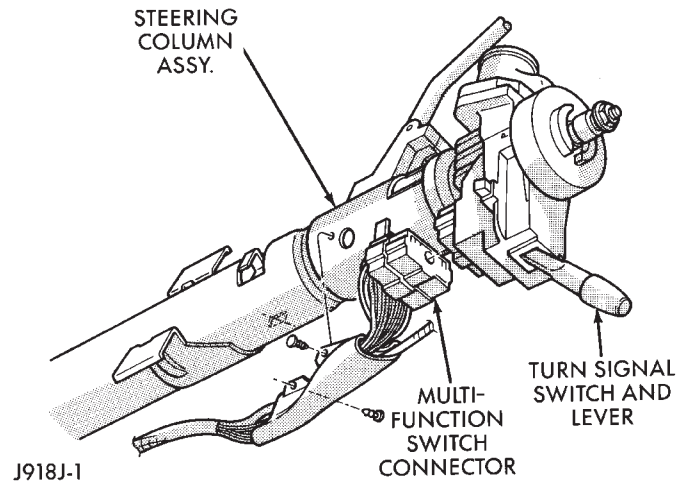
of cable retainer, then squeeze sides to remove retainer from column (Fig. 6).



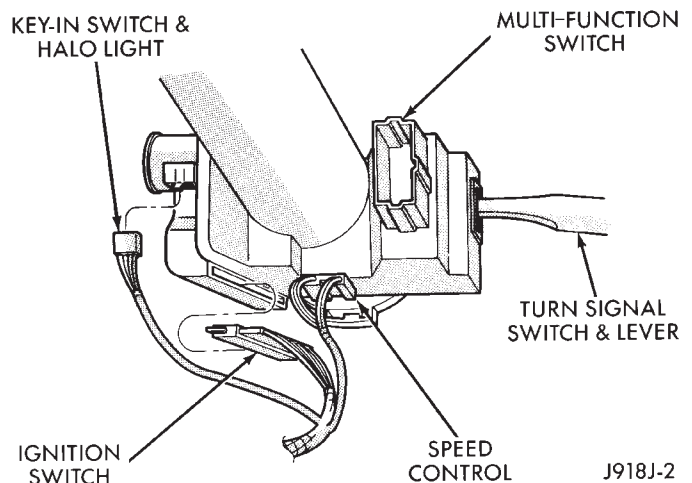
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Fig. 6 PRNDL Drive Cable

- (9) Remove tilt lever (if equipped) from column.
- (10) Remove the upper and lower lock housing shroud and remove the lower fixed shroud.
- (11) Remove the turn signal multi-function switch with a 7mm socket (Fig. 7).
- (12) Loosen the upper Support Bracket nuts to allow some slack. This will aid in removal of the upper fixed shroud.
- (13) Remove electrical connections from Key-in light, Ignition Switch, Horn and Clock Spring (Speed Control) (Fig. 8).
- (14) Remove the wiring harness from the column by prying out the plastic retainer buttons.
- (15) Remove toe plate fasteners.
- (16) Remove column from vehicle.
- (17) Remove clock spring and switches, refer to Group 8 Electrical for procedures.



J918J-1

Fig. 7 Multi-function Switch

J918J-2

Fig. 8 Steering Column Wiring**INSTALLATION**

- (1) Install clock spring and switches, refer to Group 8 Electrical for procedures.
- (2) Column shift vehicles, install a new grommet. Use multi-purpose lubricant, or equivalent, to aid installation of the grommet.

NOTE: A new grommet should be used when ever the rod is disconnected from the lever.

- (3) Remove the shipping lock pin if necessary.
- (4) Install the ground clip on the left spacer slot.
- (5) Install column through floor pan.
- (6) Position the column bracket breakaway capsules on the mounting studs. Install, but **loose assemble** the two upper bracket nuts.
- (7) With the front wheels in the straight-ahead position. Align steering column shaft to the coupler. Install a **new** pinch bolt and tighten to 49 N-m (36 ft. lbs.).

REMOVAL AND INSTALLATION (Continued)

(8) Clip the wiring harness on the steering column. Connect the multi- function switch wiring and tighten with 7mm socket.

(9) Install the upper fixed shroud.

(10) Be sure both breakaway capsules are fully seated in the slots in the column support bracket. Tighten upper bracket nuts to 12 N·m (105 in. lbs.).

(11) Tighten the toe plate to floor pan attaching nuts to 22.5 N·m (200 in. lbs.).

(12) Install the wiring connections to the column. Install the lower fixed shroud.

(13) Column shift vehicles, install the PRNDL driver cable. Place shifter in Park position. If indicator needs adjusting, turn thumb screw on cable retainer to adjust cable.

(14) Install the lock housing shrouds. Install the tilt lever (if equipped).

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

(16) Install steering wheel and tighten nut to 61 N·m (45 ft. lbs.).

(17) Install airbag, refer to Group 8M Restraint Systems.

(18) Column shift vehicles, connect the shift link rod to the transmission shift lever. Use multi-purpose lubricant, or an equivalent product, to aid the installation.

(19) Install the battery ground (negative) cable.

(20) Verify operation of the automatic transmission shift linkage and adjust as necessary. Refer to Group 21, Transmission for adjustment procedure.

GEAR SHIFT LEVER**REMOVAL**

(1) Support the steering column assembly as shown in (Fig. 9) using a suitable size socket.

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

INSTALLATION

(1) Support the steering column using a suitable size socket.

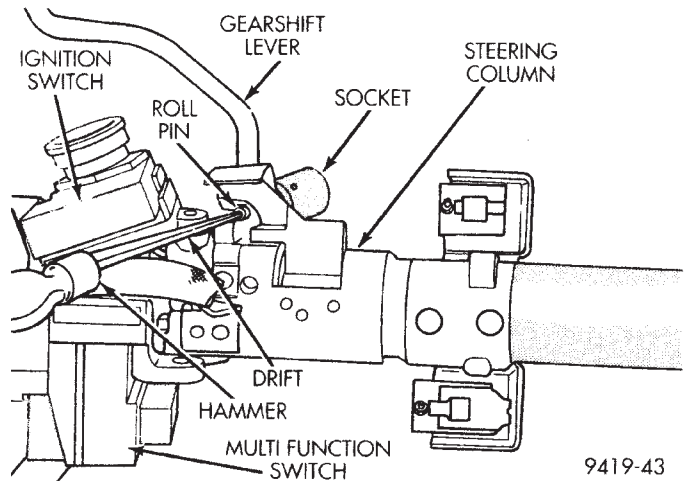


Fig. 9 Gear Shift Lever

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

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

SPECIFICATIONS**TORQUE CHART**

Description	Torque
Steering Wheel	
Nut . . . . .	.61 N·m (45 ft. lbs.)
Steering Coupler	
Bolt . . . . .	.49 N·m (36 ft. lbs.)
Steering Column	
Upper Bracket12 N·m (105 in. lbs.)
Toe Plate23 N·m (200 in. lbs.)

STEERING LINKAGE—IFS SUSPENSION

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GENERAL INFORMATION

IFS-STEERING LINKAGE

Light duty (LD) and heavy duty (HD) steering linkage is used with IFS suspensions (Fig. 1). Heavy duty linkage is used on 8800 and 10500 lb. GVW vehicles. Vehicles with 10500 lb. GVW rating have a steering damper mounted from a frame bracket to the centerlink.

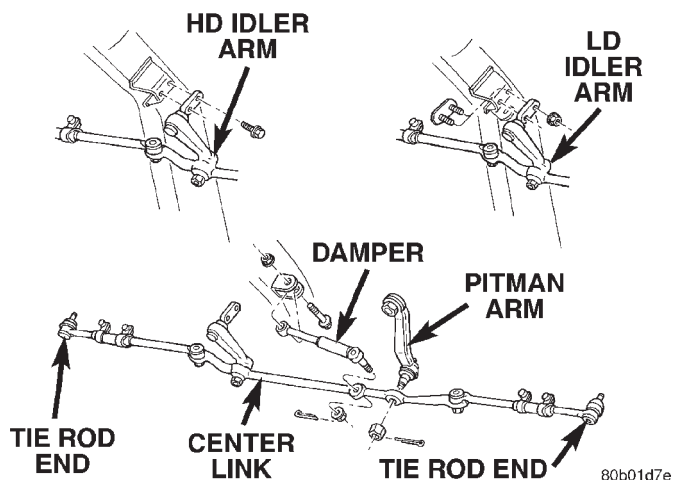


Fig. 1 Steering Linkage

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

CAUTION: Components attached with a nut and cotter pin must be torqued to specification. Then if the slot in the nut does not line up with the cotter pin hole, tighten nut until it is aligned. Never loosen the nut to align the cotter pin hole.

NOTE: Periodic lubrication of the steering system components is required. Refer to Group 0, Lubrication And Maintenance for the recommended maintenance schedule.

NOTE: When servicing the steering linkage, use care to avoid damaging ball stud seals. Use Puller C-3894-A or an appropriate puller to remove tie rod ends (Fig. 2).

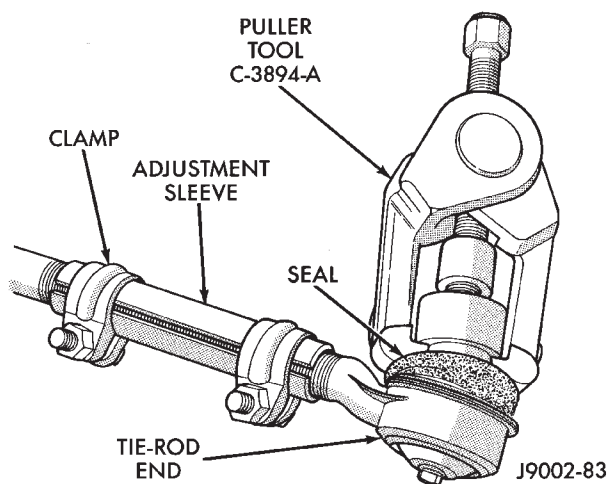


Fig. 2 Tie Rod End

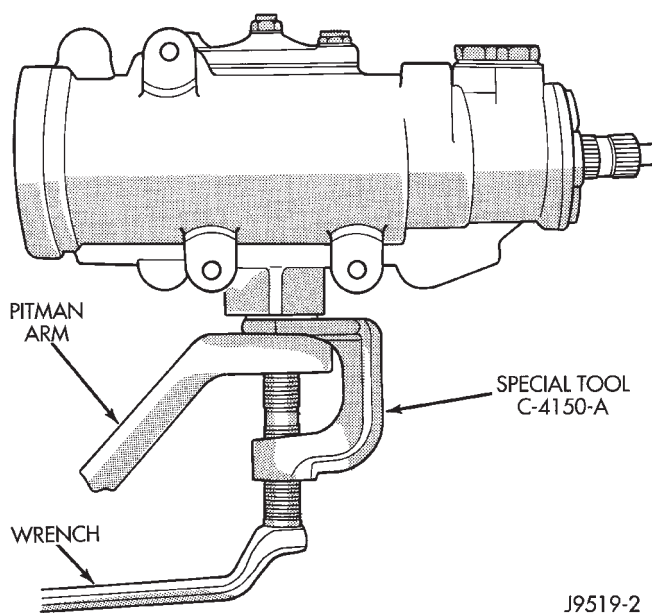
REMOVAL AND INSTALLATION

STEERING LINKAGE

REMOVAL

- (1) Remove the cotter pin and nut from the tie-rod.
- (2) Remove the tie-rod end ball studs from the steering knuckles with an appropriate puller.
- (3) Remove inner tie-rod ends from center link.
- (4) If equipped remove steering damper from center link and frame bracket.
- (5) Remove idler arm ball stud from center link with an appropriate puller. Remove idler arm mounting nuts (LD) or mounting bolts (HD) from frame bracket.
- (6) Remove pitman arm ball stud from center link.
- (7) Mark the pitman arm and shaft positions for installation reference. Remove pitman arm with Puller C-4150A (Fig. 3).

REMOVAL AND INSTALLATION (Continued)



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Fig. 3 Pitman Arm**INSTALLATION**

(1) Position idler arm on the frame bracket and tighten the mounting nuts (LD) or bolts (HD) to specification.

(2) Center steering gear to alignment marks and install pitman arm.

(3) Install the lock washer and retaining nut on the pitman shaft. Tighten the nut to 251 N·m (185 ft. lbs.).

(4) Install center link to ball studs and tighten retaining nuts to 88 N·m (65 ft. lbs.). Install new cotter pins.

(5) Install tie-rod ends into center link and tighten the nuts to 88 N·m (65 ft. lbs.). Install new cotter pins.

(6) Install steering damper to frame bracket and center link (if equipped). Tighten frame mounting nut to 108 N·m (80 ft. lbs.). Tighten center link mounting nut to 68 N·m (50 ft. lbs.) and install a new cotter pin.

(7) Install tie-rod ends into steering knuckles and tighten nuts to 88 N·m (65 ft. lbs.). Install new cotter pins.

(8) Remove the supports and lower the vehicle to the surface. Center steering wheel and adjust toe (refer to the Alignment Specifications chart within Group 2, Front Suspension).

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

(9) After adjustment, tighten the tie-rod adjustment sleeve clamp bolt to 54 N·m (40 ft. lbs.).

SPECIFICATIONS**TORQUE CART****DESCRIPTION****TORQUE****Pitman Arm**

Ball Stud Nut 88 N·m (65 ft. lbs.)

Shaft Nut. 251 N·m (185 ft. lbs.)

Idler Arm

Ball Stud Nut 88 N·m (65 ft. lbs.)

Mounting Nuts LD 68 N·m (50 ft. lbs.)

Mounting Bolts HD 264 N·m (195 ft. lbs.)

Steering Damper

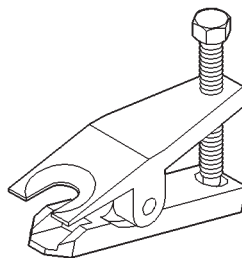
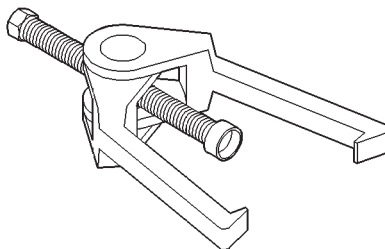
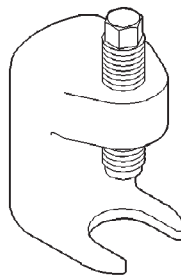
Frame Nut. 108 N·m (80 ft. lbs.)

Center Link Nut 68 N·m (50 ft. lbs.)

Tie Rod

Ball Stud Nut 88 N·m (65 ft. lbs.)

Tie Rod Clamp. 61 N·m (45 ft. lbs.)

SPECIAL TOOLS**STEERING LINKAGE****Remover Ball Stud MB-991113****Puller Tie Rod C-3894-A****Remover Pitman C-4150A**

STEERING LINKAGE—LINK/COIL SUSPENSION

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GENERAL INFORMATION

LINK/COIL-STEERING LINKAGE

A light duty (LD) steering linkage (Fig. 1) is used on 6400, 6600 and 7500 lb. GVW vehicles. A heavy duty (HD) steering linkage (Fig. 2) is used on 8800 and 11000 lb. GVW vehicles. The steering linkage is comprised of a tie rod end, tie rod, drag link, steering damper and pitman arm.

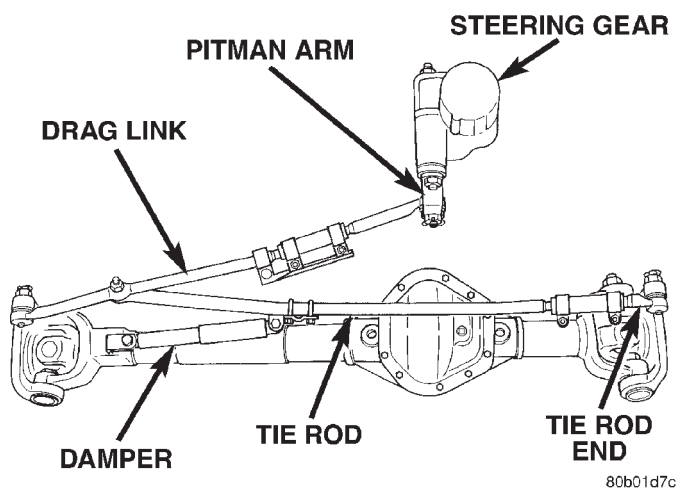


Fig. 1 Light Duty Steering Linkage

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

CAUTION: Components attached with a nut and cotter pin must be torqued to specification. Then if the slot in the nut does not line up with the cotter pin hole, tighten nut until it is aligned. Never loosen the nut to align the cotter pin hole.

NOTE: Periodic lubrication of the steering system components is required. Refer to Group 0, Lubrica-

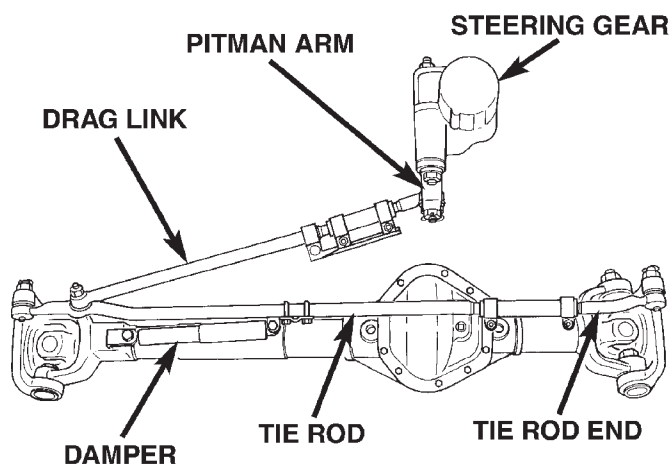


Fig. 2 Heavy Duty Steering Linkage

tion And Maintenance for the recommended maintenance schedule.

NOTE: To avoid damaging ball stud seals, use Puller C-3894-A or an appropriate puller to remove tie rod ends (Fig. 3).

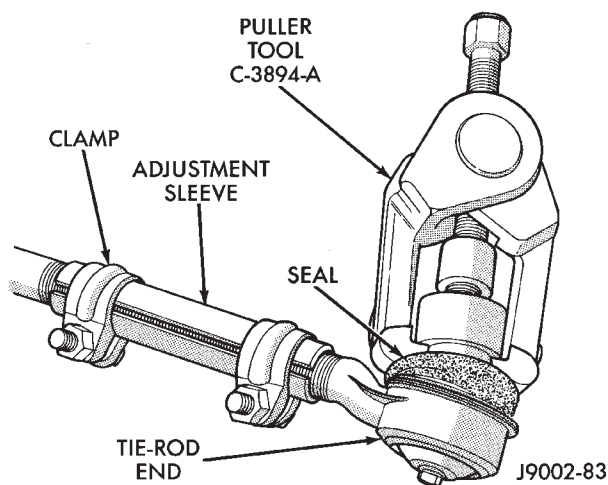


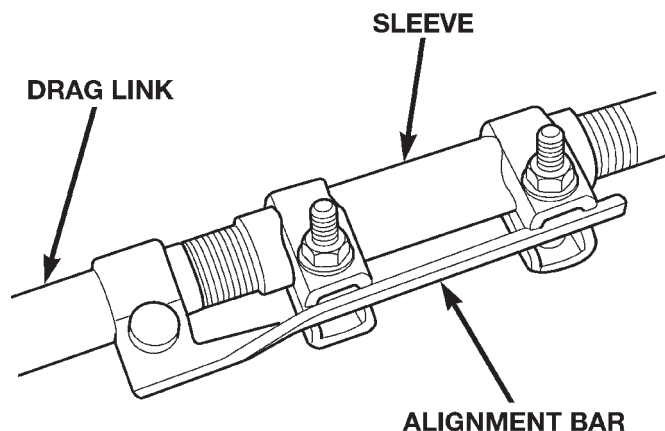
Fig. 3 Tie Rod End

1998 Ram Truck
 Publication No. 81-370-8108
 TSB 26-05-98 May, 1998

REMOVAL AND INSTALLATION

STEERING LINKAGE

NOTE: Do not loosen/move alignment bar or alignment bar clamp (Fig. 4). The bar is used as a locator for the adjuster clamps.



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Fig. 4 Alignment Bar

REMOVAL

- (1) Remove tie rod from drag link.
- (2) Remove steering damper from drag link with Puller C-4150A.
- (3) Remove drag link tie rod end from steering knuckle and pitman arm.
- (4) Mark the pitman arm and shaft positions for installation reference. Remove the nut and washer from the pitman arm. Remove the pitman arm with Puller C-4150A.
- (5) Remove tie rod from steering knuckle.

INSTALLATION

NOTE: When installing linkage tighten nuts to proper torque, then align cotter pin slot by tightening nut if necessary.

- (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 drag link ball studs to steering knuckle and pitman arm. Install the retaining nuts and tighten to 88 N·m (65 ft. lbs.). Install new cotter pins.
- (4) Install tie rod on steering knuckle and drag link. Tighten the nuts to 88 N·m (65 ft. lbs.). Install new cotter pins.
- (5) Install steering damper on drag link and tighten nut to 68 N·m (50 ft. lbs.). Install new cotter pin.
- (6) Remove the supports and lower the vehicle to the surface. Center steering wheel and adjust toe, refer to Group 2 Suspension.
- (7) 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.

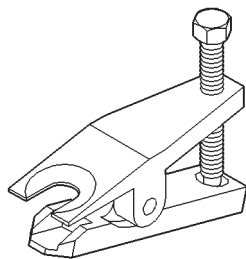
SPECIFICATIONS

TORQUE CHART

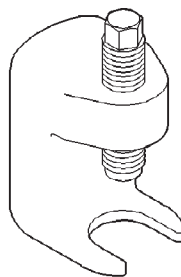
DESCRIPTION	TORQUE
Pitman Arm	
Shaft	251 N·m (185 ft. lbs.)
Drag Link	
Ball Stud.	88 N·m (65 ft. lbs.)
Clamp LD.	61 N·m (45 ft. lbs.)
Clamp HD	88 N·m (65 ft. lbs.)
Tie Rod End	
Ball Stud.	88 N·m (65 ft. lbs.)
Clamp	61 N·m (45 ft. lbs.)
Tie Rod	
Ball Stud.	88 N·m (65 ft. lbs.)
Steering Damper	
Axle	88 N·m (65 ft. lbs.)
Tie Rod	68 N·m (50 ft. lbs.)

SPECIAL TOOLS

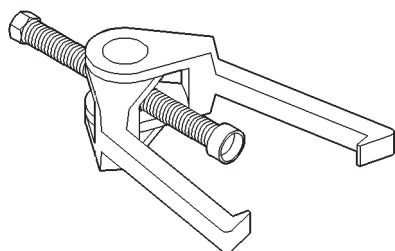
STEERING LINKAGE



Remover Ball Stud MB-991113



Remover Pitman C-4150A



Puller Tie Rod C-3894-A