



STEERING

CONTENTS

	page		page
GENERAL INFORMATION	1	SAGINAW TILT STEERING COLUMN	25
POWER STEERING GEAR	17	SPECIFICATIONS AND TIGHTENING	
POWER STEERING PUMPS	1	REFERENCE	34

GENERAL INFORMATION

Safety goggles should be worn at all times when working on any steering gear or pump.

Throughout this group, references may be made to a particular L.H. platform vehicle by letter or number designation. A chart showing the breakdown of these designations is included in the Introduction Section at the front of this service manual.

The power steering system consists of these four major components. Power Steering Pump, Power Steering Gear, Pressure Hose, Return Line and Remote Power Steering Fluid Reservoir. Turning of the steering wheel is converted into linear travel through the meshing of

the helical pinion teeth with the rack teeth. Power assist steering is provided by an open center, rotary type control valve. It is used to direct oil from the pump to either side of the integral steering rack piston.

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

POWER STEERING PUMPS

INDEX

	page		page
Checking Power Steering Fluid Level	8	Power Steering Pump Removal	11
Flow Control Valve Fitting O-Ring Seal	16	Power Steering Pump Service	8
General Information	1	Power Steering Pump—Initial Operation	16
Power Steering Pump Fluid Reservoirs	14	Servicing Power Steering Hoses	9
Power Steering Pump Pressure Test	9	Steering Components Service Diagnosis	2
Power Steering Pump Pulley Service	13		

GENERAL INFORMATION

Hydraulic pressure for the operation of the power steering gear is provided by a belt driven power steering pump. The power steering pump is a constant flow rate and displacement vane type pump. All L.H. platform vehicles with all available engine options use the Saginaw T/C style power steering pump (Fig. 1). All L.H. platform vehicles use a remote mounted reservoir for the power steering fluid. The power steering fluid reservoir is mounted to the left frame rail of the vehicle just rearward on the battery tray.

The Saginaw T/C style power steering pump (Fig. 1). Consists of the pump internal components and pump housing and has no internal reservoir or sump for the power steering fluid.

Drive tangs on the power steering pump pinion, mate loosely with the stub shaft of the pump. This is to allow manual steering control to be maintained, if the drive belt on the power steering pump should break. However, under these conditions, steering effort will significantly increase.

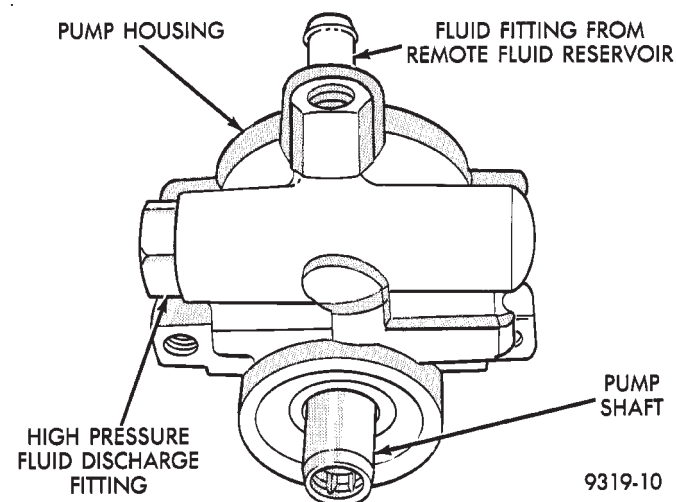


Fig. 1 Saginaw T/C Style Power Steering Pump



STEERING COMPONENTS SERVICE DIAGNOSIS

POWER STEERING SERVICE DIAGNOSIS

STEERING NOISES		
There is some noise in all power steering systems. One of the most common is a hissing sound evident at standstill parking. Hiss is a high frequency noise similar to that experienced while slowly closing a water tap. The noise is present in every valve and results from high velocity fluid passing valve orifice edges. There is no relationship between this noise and performance of the steering. Hiss may be expected when steering wheel is at end of travel or when slowly turning at standstill.		
CONDITION	POSSIBLE CAUSE	CORRECTION
OBJECTIONAL HISS OR WHISTLE	1. Noisy valve in gear	1. Check for proper seal between steering column coupling and dash seal. 2. Ensure steering column lower coupling has no metal-to-metal contact within the coupling by performing an electrical continuity check. (Remove coupling for check.) 3. If hiss is still extremely objectionable, replace steering gear.
RATTLE OR CLUNK	1. Gear loose on front crossmember 2. Crossmember-to-frame bolts or studs loose 3. Tie rod looseness (outer or inner) 4. Pressure hose touching other parts of vehicle 5. Noise internal to gear	1. Check gear-to-crossmember mounting bolts. Tighten to specification. 2. Torque bolts and studs to specifications. 3. Check tie rod pivot points for wear. Replace if necessary. 4. Adjust hose to proper position by loosening, repositioning, and retightening fitting. Do not bend tubing. 5. Replace gear.
CHIRP OR SQUEAL (IN THE AREA OF PUMP) PARTICULARLY NOTICEABLE AT FULL WHEEL TRAVEL AND DURING STANDSTILL PARKING	1. Loose belt	1. Adjust belt tension to specification.



POWER STEERING SERVICE DIAGNOSIS

STEERING NOISES – Continued

There is some noise in all power steering systems. One of the most common is a hissing sound evident at standstill parking. Hiss is a high frequency noise similar to that experienced while slowly closing a water tap. The noise is present in every valve and results from high velocity fluid passing valve orifice edges. There is no relationship between this noise and performance of the steering. Hiss may be expected when steering wheel is at end of travel or when slowly turning at standstill.

CONDITION	POSSIBLE CAUSES	CORRECTION
Pump growl results from the development of high pressure fluid flow. Normally this noise should not be high enough to be objectionable. Abnormal situations, such as a low oil level causing aeration or hoses touching the vehicle body, can create a noise level that could bring complaints.		
WHINE OR GROWL (PUMP NOISE)	1. Low fluid level. 2. Hose touching vehicle body or frame. 3. Extreme wear of pump internal parts.	1. Fill to proper level and perform leakage diagnosis. (Recheck after system is free of aeration.) 2. Reposition hose. Replace hose if tube ends are bent. 3. Replace pump and flush system.
SUCKING AIR SOUND	1. Loose return line clamp. 2. Missing O-ring on hose connection. 3. Low fluid level. 4. Air leak between reservoir and pump.	1. Tighten or replace clamp. 2. Inspect connection and replace O-ring as required. 3. Fill to proper level and perform leakage diagnosis. 4. Inspect and replace reservoir as required.
SQUEAK OR RUB SOUND	1. Sound from steering column. 2. Sound internal to steering gear.	1. Check for squeak in steering column. Inspect for contact between shroud intermediate shaft, column, and wheel. (Realign if necessary.) (a) Check for lack of grease on steering column, dash to lower coupling seal. 2. Replace gear.
SCRUBBING/KNOCKING	1. Incorrect tire size. 2. Check clearance between tires and other vehicle components, through full travel. 3. Check for interference between steering gear and other components. 4. Incorrect gear supplied.	1. Verify tire size is the same as originally supplied. 2. Correct as necessary. 3. Correct as necessary. 4. Replace gear.



POWER STEERING SERVICE DIAGNOSIS

BINDS STICKS SEIZED		
CONDITION	POSSIBLE CAUSE	CORRECTION
CATCHES, STICKS IN CERTAIN POSITIONS OR DIFFICULT TO TURN	1. Low fluid level 2. Tires not properly inflated 3. Lack of lube in ball joints 4. Lack of lube in outer tie rod ends 5. Loose pump belt 6. Faulty pump flow control (Verify cause using Pump Test Procedure) 7. Excessive friction in steering column or intermediate shaft 8. Steering column coupling binding 9. Excessive friction in gear	1. Fill to proper level and perform leakage diagnosis. 2. Inflate tires to proper pressure. 3. Lubricate where possible. 4. Lubricate where possible. 5. Tighten or replace belt. 6. Replace pump. 7. Correct condition. (See Steering Column Service Procedure.) 8. Realign as necessary. 9. Replace gear.
SHAKE SHUDDER VIBRATION		
CONDITION	POSSIBLE CAUSE	CORRECTION
VIBRATION OF THE STEERING WHEEL AND/OR DASH DURING DRY PARK OR LOW SPEED STEERING MANEUVERS	1. Air in the power steering system 2. Tires not properly inflated 3. Excessive engine vibration 4. Loose tie rod end 5. Faulty accessory drive belt tensioner. (Poly-V belt systems only) 6. Overcharged air conditioner	1. Steering shudder can be expected in new vehicles and vehicles with recent steering system repairs. Shudder should improve after the vehicle has been driven several weeks. 2. Inflate tires to proper pressure. 3. Make sure that engine is running properly. 4. Check inner and outer tie rod and jam nut for excessive free play. 5. Check dynamic belt tensioner for abnormal vibration. (See Drive Belt Adjustments.) 6. Check air conditioning pump head pressure. (See Air Conditioning Refrigerant System Diagnosis.)



POWER STEERING SERVICE DIAGNOSIS

LOW ASSIST, NO ASSIST, OR HARD STEERING

CONDITION	POSSIBLE CAUSE	CORRECTION
STIFF, HARD TO TURN, SURGES, MOMENTARY INCREASE IN EFFORT WHEN TURNING	1. Tires not properly inflated 2. Low fluid level 3. Loose belt 4. Lack of ball joint lubrication 5. Low pressure pump (Verify using Pump Test Procedure) 6. High internal leak gear	1. Inflate tires to proper pressure. 2. Add power steering fluid as required and perform leakage diagnosis. 3. Tighten or replace belt. 4. Lubricate or replace as required. 5. Verify cause using Pump Test Procedure. Replace pump if necessary. 6. Check steering system using test procedure. If steering gear is at fault, replace steering gear.

POOR RETURN TO CENTER

CONDITION	POSSIBLE CAUSE	CORRECTION
STEERING WHEEL DOES NOT WANT TO RETURN TO CENTER POSITION	1. Tires not properly inflated 2. Improper front wheel alignment 3. Lack of lubrication in ball joint 4. Steering column U-joints misaligned 5. Mispositioned dash cover 6. Steering wheel rubbing 7. Tight steering shaft bearings 8. Excessive friction coupling universal joint 9. High friction in the steering gear	1. Inflate tires to proper pressure. 2. Check and adjust as necessary. 3. Replace as required or lubricate. 4. Realign steering column U-joints. 5. Reposition dash cover. To evaluate items 6 and 7, disconnect the intermediate steering shaft. Turn the steering wheel and listen for internal rubbing in column. 6. Adjust covers. 7. Replace bearings. 8. Replace U-joints. 9. Replace steering gear.



POWER STEERING SERVICE DIAGNOSIS

LOOSE STEERING		
CONDITION	POSSIBLE CAUSE	CORRECTION
EXCESSIVE WHEEL KICKBACK OR TOO MUCH STEERING WHEEL PLAY	1. Air in system 2. Gear loose on crossmember 3. Worn/broken intermediate shaft 4. Free play in steering column 5. Loose ball joints 6. Pinch bolt loose on ball joint 7. Front wheel bearings loose or worn 8. Loose outer tie rod ends 9. Loose inner tie rod ends 10. Defective steering gear rotary valve	1. Add fluid. 2. Check gear to crossmember mounting bolts. Tighten to specification. 3. Check for worn universal joint and broken isolator. Replace intermediate shaft if worn. 4. Check and replace as required. 5. Check and replace as required. 6. Check pinch bolts and tighten as required to specified torque. 7. Tighten hub nut or replace with new parts as necessary. 8. Check and replace as required. 9. Replace gear. 10. Replace gear.
VEHICLE LEADS TO THE SIDE		
CONDITION	POSSIBLE CAUSE	CORRECTION
WHEEL DOES NOT WANT TO RETURN TO CENTER POSITION	1. Radial tire lead 2. Front end misaligned 3. Wheel braking 4. Unbalanced steering gear valve. (If this is the cause, the steering efforts will be very light in direction of lead and heavier in the opposite direction)	1. Rotate tires as recommended in Tire Service. 2. Align front end as recommended in Wheel Alignment Service Procedure. 3. Check for dragging brakes as directed in Brake Service Procedure. 4. Checking for pull with outer tie rod end disconnected. If verified, replace gear.



POWER STEERING SERVICE DIAGNOSIS

FLUID LEAK

CONDITION	POSSIBLE CAUSES	CORRECTION
LOW FLUID LEVEL WITH: • NO VISIBLE SIGNS OF LEAKS ON THE STEERING GEAR, PUMP, ON FLOOR, OR ANYWHERE ELSE	1. Overfilled reservoir. 2. Hose connections at pump or gear.	1. Adjust fill level. 2. Check for loose fittings and tighten to specifications. If fittings are tight, examine for damaged or missing O-ring and replace as required.
LOW FLUID LEVEL WITH: • VISIBLE LEAK ON STEERING GEAR, PUMP, FLOOR, OR ANYWHERE ELSE	3. Pump or gear leak.	3. Identify location of leak and repair or replace as indicated in Power Steering Pump and/or Gear sections of this service manual.

FOAMY OR MILKY FLUID

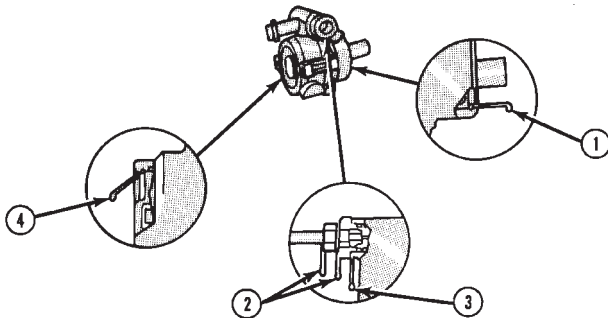
CONDITION	POSSIBLE CAUSES	CORRECTION
AERATION AND OVER- FLOW OF FLUID	1. Air leaks. 2. Low fluid level. 3. Cracked pump housing. 4. Water contamination.	1. Check for air leak as described under sucking air and correct. 2. Extremely cold temperatures may cause system aeration if the oil level is low. Add fluid as required. 3. Remove pump from vehicle and separate reservoir from housing. Check expansion plug and housing for cracks. Replace pump as required. 4. Drain and refill fluid if there is evidence of contamination.



POWER STEERING PUMP SERVICE

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

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



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

9319-11

Fig. 2 Power Steering Pump Leakage Diagnosis

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

Hydraulic pressure is provided for operation of the power steering gear by the belt driven power steering pump (Fig. 1). It is a constant displacement, vane type pump. The power steering pump is connected to the steering gear by a power steering fluid pressure hose and power steering return line.

Rectangular pumping vanes carried by a shaft driven rotor move the fluid from the intake to the cam ring pressure cavities. As the rotor begins to turn, centrifugal force throws the vanes against the inside surface of the cam ring to pickup residual oil. This oil is then forced into the high pressure area. As more oil is picked up by the vanes. That additional oil is forced into the cavities of the thrust plate through two crossover holes in the cam ring and pressure plate. The crossover holes empty into the high pressure area between the pressure plate and the housing end cover.

When the high pressure area of the power steering pump is filled with power steering fluid. Power steering fluid then flows under the vanes in the rotor slots, forcing the vanes to follow the inside oval surface of the

cam ring. As the vanes reach the restricted area of the cam ring, oil is forced out from between the vanes. When excess oil flow is generated during high-speed operation. A regulated amount of oil returns to the pump intake side through a flow control valve. The flow control valve reduces the power required to drive the pump and holds down temperature build-up.

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

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

CHECKING POWER STEERING FLUID LEVEL

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

Wipe remote power steering fluid reservoir filler cap (Fig. 3) free of dirt. Then check fluid level in remote reservoir. The dipstick should indicate FULL COLD when fluid is at normal ambient temperature, approximately 21°C to 27°C (70°F to 80°F). In all pumps add fluid as necessary, use only **Mopar® Power Steering Fluid, or equivalent. DO NOT USE ANY TYPE OF AUTOMATIC TRANSMISSION FLUID.**

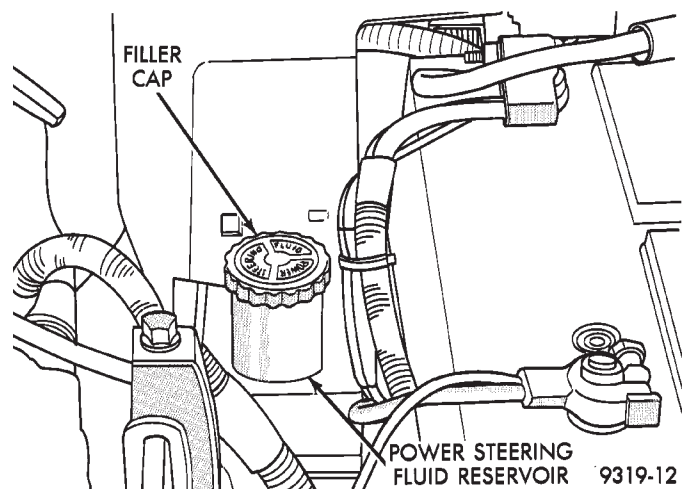


Fig. 3 Power Steering Fluid Remote Reservoir



POWER STEERING PUMP PRESSURE TEST

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

- (1) Check belt tension and adjust as necessary.
- (2) Disconnect high pressure power steering hose at power steering pump (Fig. 4). Use a container for dripping power steering fluid.

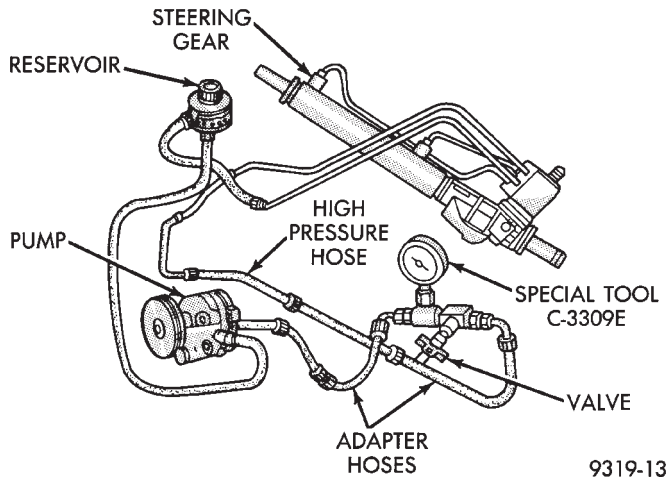


Fig. 4 Pressure Test Gauge

- (3) Connect Pressure Gauge, Special Tool C-3309-E (Fig. 4) to both hoses using adapter fittings. Connect spare pressure hose to gear or pump.
- (4) Open the test valve completely.
- (5) Start engine and let idle.
- (6) Check fluid level, add fluid as necessary.
- (7) Gauge should read below 862 kPa (125 psi), if above, inspect the hoses for restrictions and repair as necessary. The initial pressure should be in the range of 345-552 kPa (50-80 psi).

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

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

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

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

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

- (9) Open the test valve, (Fig. 4) turn steering wheel extreme left and right positions against the stops. Record the highest indicated pressure at each position. Compare readings to specifications. If highest output pressures are not the same against either stop, the steering gear is leaking internally and must be replaced.

SERVICING POWER STEERING HOSES

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

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

POWER STEERING PRESSURE HOSE

REMOVE

- (1) Position drain pan under vehicle for leaking power steering fluid. Loosen and remove the power steering pressure hose fitting (Fig. 1) from the power steering gear. Let power steering fluid drain from hose.

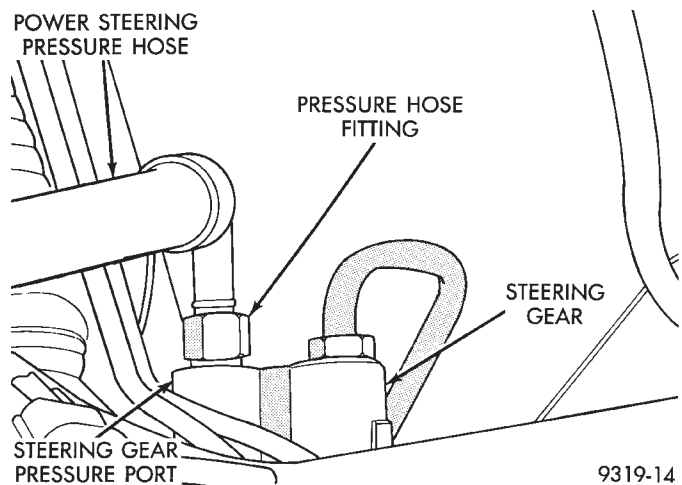


Fig. 1 Power Steering Hose To Steering Gear Fitting

- (2) Position drain pan under vehicle for leaking power steering fluid. Loosen and remove power steering pressure hose fitting (Fig. 2) from outlet fitting of the power steering pump. Let power steering fluid drain from hose.

- (3) Remove power steering pressure hose assembly from the vehicle.

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

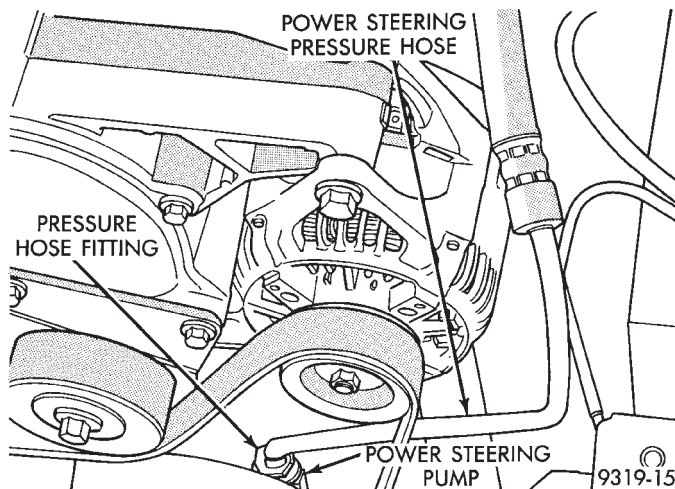


Fig. 2 Power Steering Hose To Power Steering Pump Fitting

INSTALL

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

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

(3) Install power steering pressure hose into outlet fitting of the power steering pump (Fig. 2). **Do not tighten power steering pressure hose to power steering pump fitting at this time.**

(4) Route power steering pressure hose through routing bracket on engine assembly. See (Fig. 3 and 4) for hose routing and bracket location for 3.3 and 3.5 ltr. engine applications.

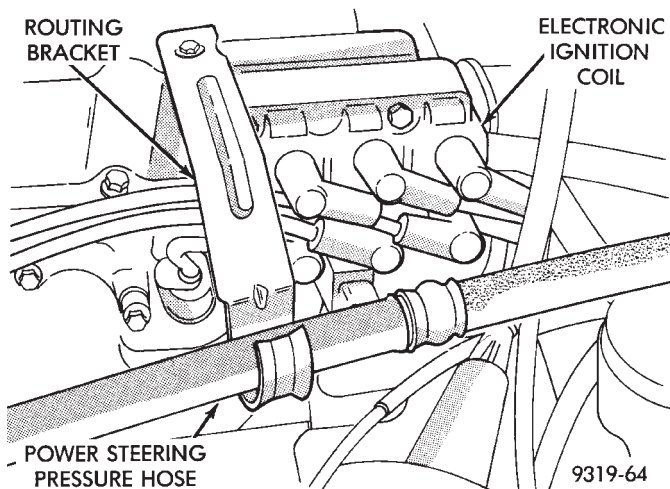


Fig. 3 3.3 ltr. Power Steering Pressure Hose Routing And Bracket

(5) Install power steering pressure hose into pressure port of the power steering gear (Fig. 1). Then torque the power steering pressure hose to steering gear fitting to 31 N•m (23 ft. lbs.).

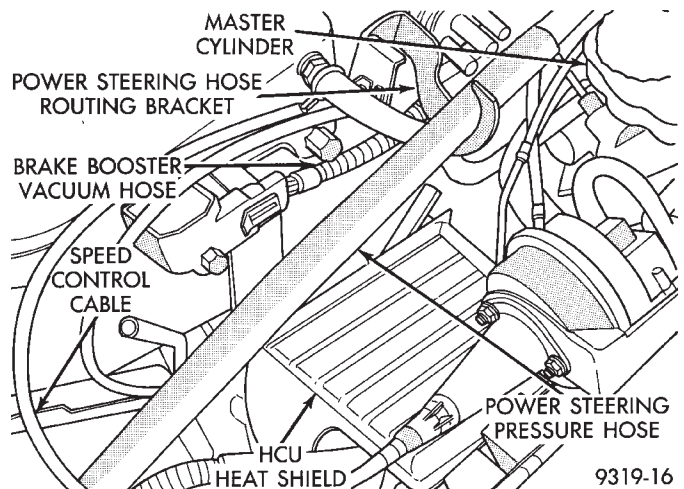


Fig. 4 3.5 ltr. Power Steering Pressure Hose Routing And Bracket

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

(6) Route power steering pressure hose at power steering pump so it is not in contact with any engine or body components (Fig. 2). Then torque power steering pressure hose to power steering pump fitting to 31 N•m (23 ft. lbs.).

(7) Start engine and turn steering wheel several times from stop to stop to bleed air from fluid in system. Stop engine, check fluid level, and inspect system for leaks. See Checking Fluid Level.

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

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

POWER STEERING RETURN HOSE

REMOVE

(1) Position drain pan under vehicle for leaking power steering fluid. Loosen and remove the power steering return hose fitting (Fig. 5) from the power steering gear. Let power steering fluid drain from hose.

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

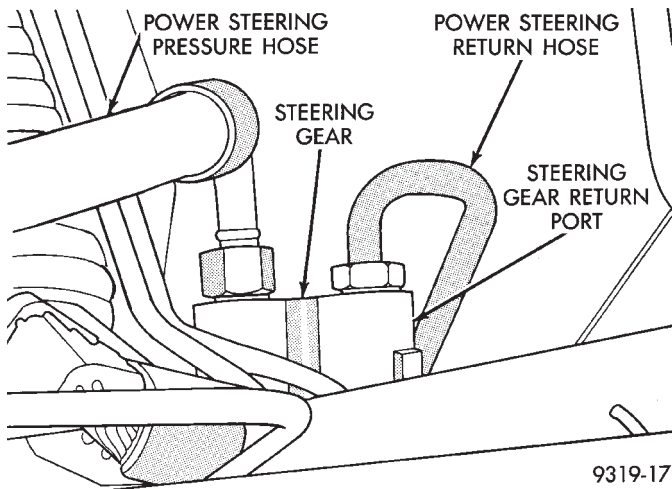


Fig. 5 Power Steering Return Hose At Steering Gear

(3) Unclip power steering return hose from routing clip on frame rail (Fig. 6).

(4) Position drain pan under remote power steering fluid reservoir. Remove hose clamp from power steering return hose at remote power steering fluid reservoir (Fig. 6). Let power steering fluid drain from remote reservoir.

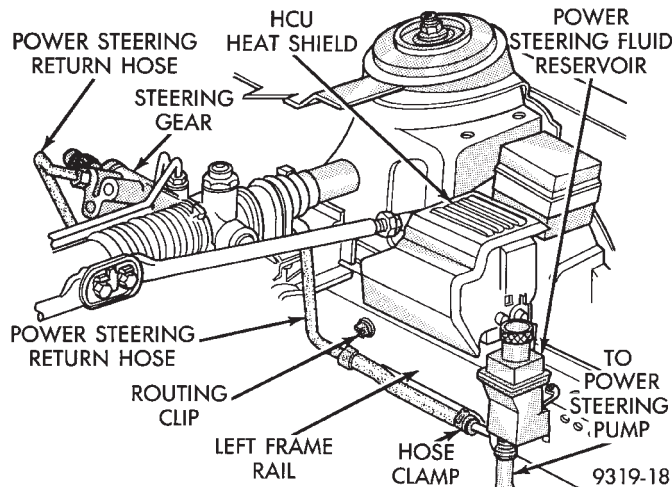


Fig. 6 Power Steering Return Hose Routing And Attaching

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

INSTALL

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

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

(3) Install the power steering return hose assembly back into the vehicle. Be sure hose assembly is properly routed (Fig. 6).

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

(5) Install power steering return hose, onto remote power steering fluid reservoir (Fig. 6). Install hose clamp on power steering return hose, at power steering fluid reservoir (Fig. 6). **Be sure hose clamp is installed on hose past upset bead on power steering fluid reservoir.**

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

(7) Lower vehicle.

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

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

(9) Start engine and turn steering wheel several times from stop to stop to bleed air from fluid in system. Stop engine, check fluid level, and inspect system for leaks. See Checking Fluid Level.

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

POWER STEERING PUMP REMOVAL

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

REMOVE (ALL ENGINES)

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

(2) Loosen power steering pump serpentine drive belt on 3.3-ltr engine, by loosening generator mounting bolt A and adjusting bolt locknut B (Fig. 1). Then loosen adjusting bolt (Fig. 1). Loosen power steering pump serpentine drive belt on 3.5-ltr engine, by loosening adjustment pulley locking nut (Fig. 2) and then loosening adjusting bolt (Fig. 2).

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

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

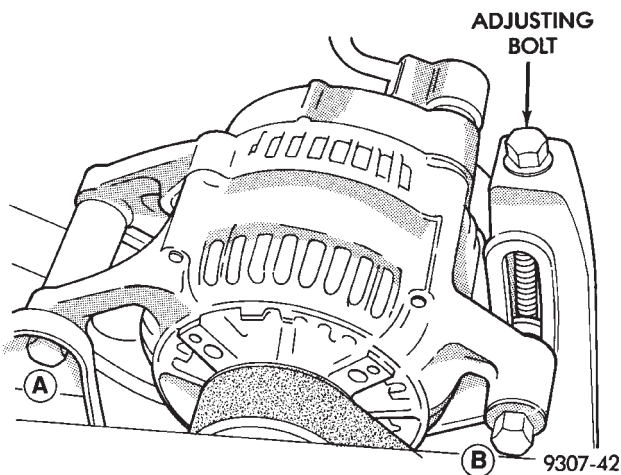


Fig. 1 Power Steering Pump Drive Belt 3.3-ltr

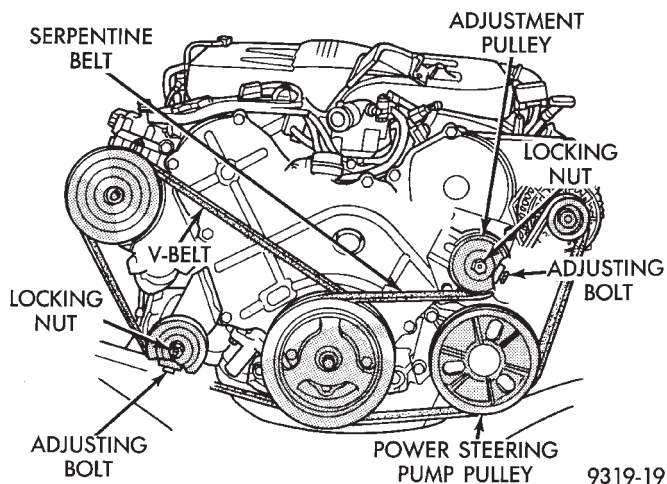


Fig. 2 Power Steering Pump Drive Belt 3.5-ltr

(5) Put oil drain pan under vehicle to catch power steering fluid. Remove hose clamp from power steering fluid reservoir to power steering pump hose, at power steering pump (Fig. 3). Then remove hose from power steering pump.

(6) Loosen and remove power steering pressure hose from power steering pump discharge fitting (Fig. 4).

(7) Loosen and remove the 3 bolts attaching the power steering pump to power steering pump bracket (Fig. 5). Access to power steering pump mounting bolts is through holes in power steering pump drive pulley (Fig. 5).

(8) Remove power steering pump and drive pulley as an assembly from the front of the engine compartment (Fig. 6).

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

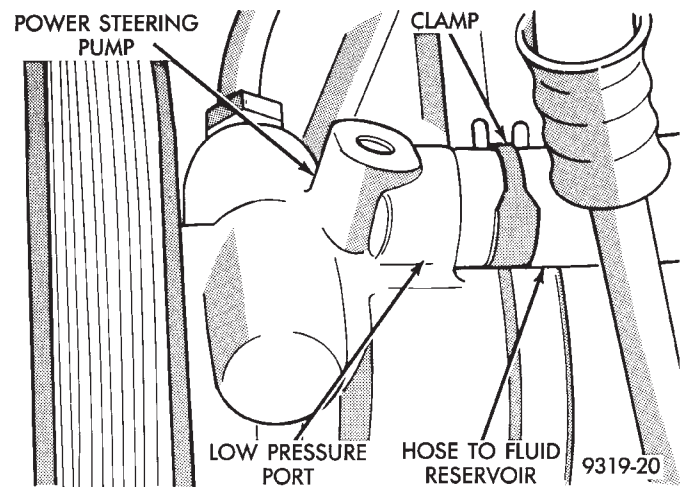


Fig. 3 Power Steering Fluid Hose From Remote Reservoir

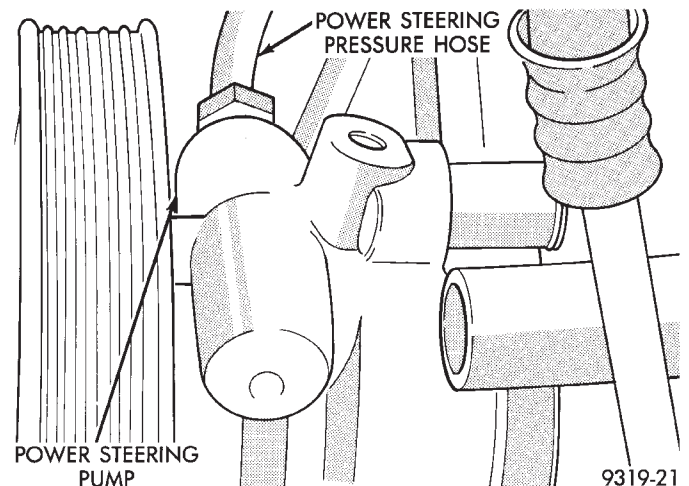


Fig. 4 Power Steering Pressure Hose

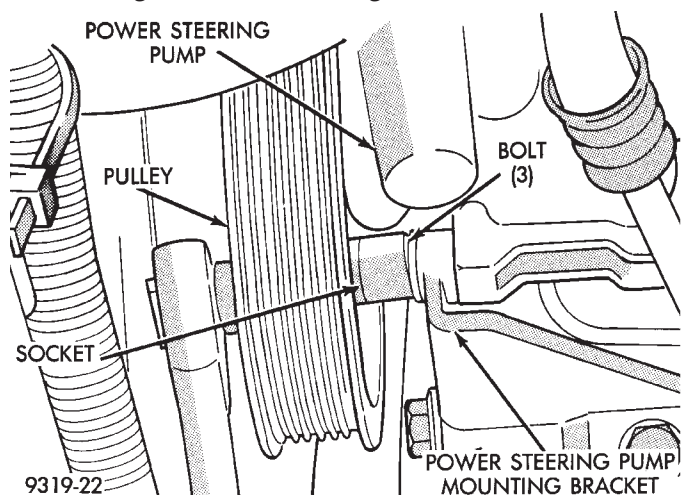


**Fig. 5 Power Steering Pump Mounting Bolts
INSTALL**

(1) Install power steering pump back in vehicle from the bottom of the engine compartment (Fig. 6).

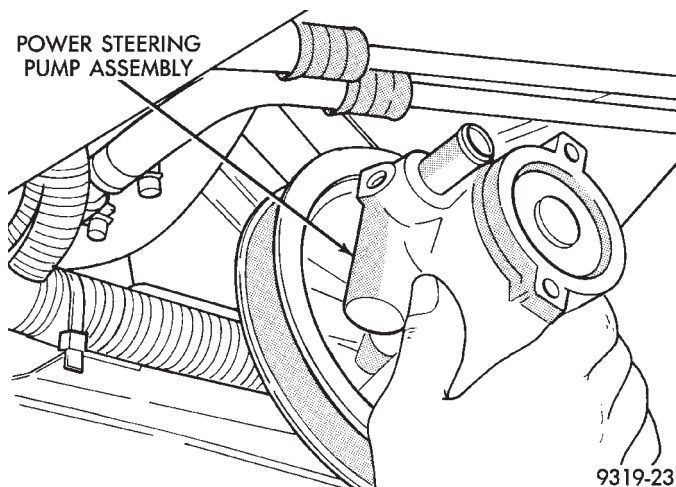


Fig. 6 Power Steering Pump Removal And Installation

(2) Install power steering pump back on mounting bracket. Install the 3 bolts attaching the power steering pump to the mounting bracket (Fig. 5). Torque power steering pump mounting bolts to 54 N•m (40 ft. lbs.).

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

(3) Install the power steering pressure hose on the outlet port of the power steering pump (Fig. 4). Torque the power steering pressure hose fitting to 34 N•m (25 ft. lbs.).

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

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

(6) Lower vehicle

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

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

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

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

(10) Start engine and turn steering wheel several times from stop to stop to bleed air from fluid in sys-

tem. Stop engine, check fluid level, and inspect system for leaks. See Checking Fluid Level.

POWER STEERING PUMP PULLEY SERVICE

REMOVE

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

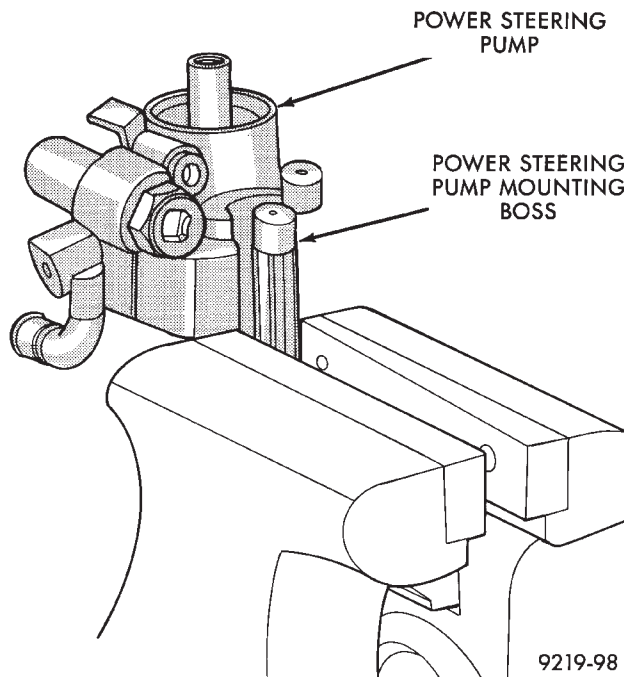


Fig. 1 Power Steering Pump Mounted In Vise

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

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

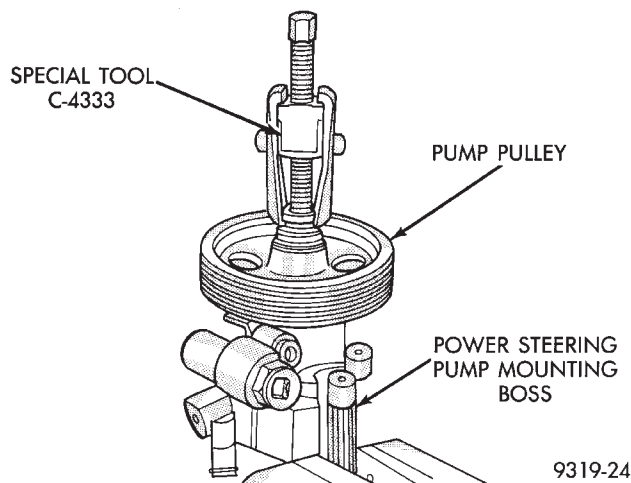


Fig. 2 Removing Power Steering Pump Pulley



INSTALL

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

(1) Place the power steering pump pulley on the end of the power steering pump shaft. Make sure the pulley is installed squarely on the end of the shaft (Fig. 3).

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

(2) Install the spacer provided with the replacement power steering pump or power steering pulley into the hub of the power steering pump pulley (Fig. 3).

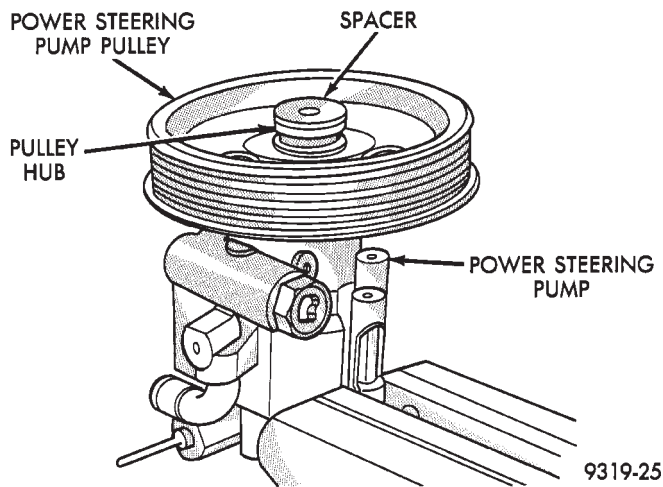


Fig. 3 Pulley And Spacer Installed On Pump

(3) Insert the Pulley Installer, Special Tool C-4063, (without adapters) through hole in spacer. Then thread it into the end of the power steering pump shaft (Fig. 4). Tighten the installer into shaft.

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

(5) Continue to push pulley onto shaft of power steering pump until Pulley Installer, Special Tool C-4063 will no longer turn. This will ensure the

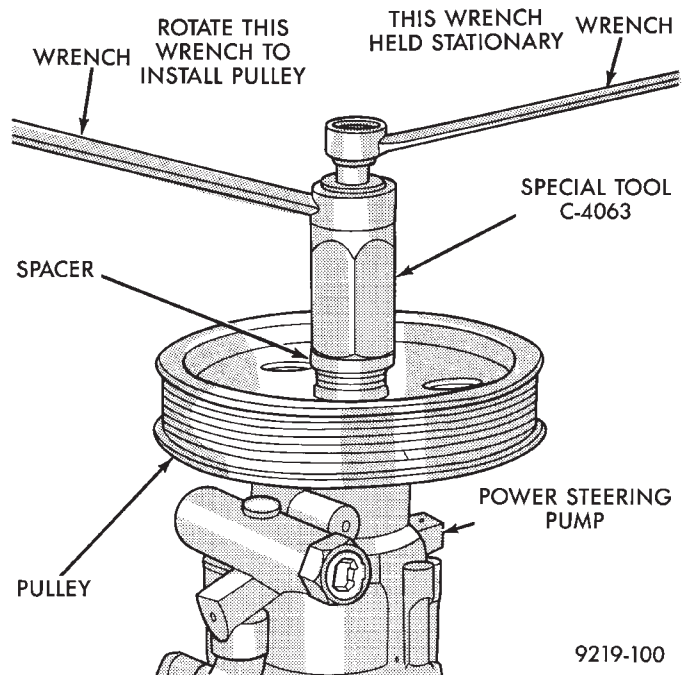


Fig. 4 Installing Power Steering Pump Pulley

spacer provided is fully seated against the front of the power steering pump shaft (Fig. 5).

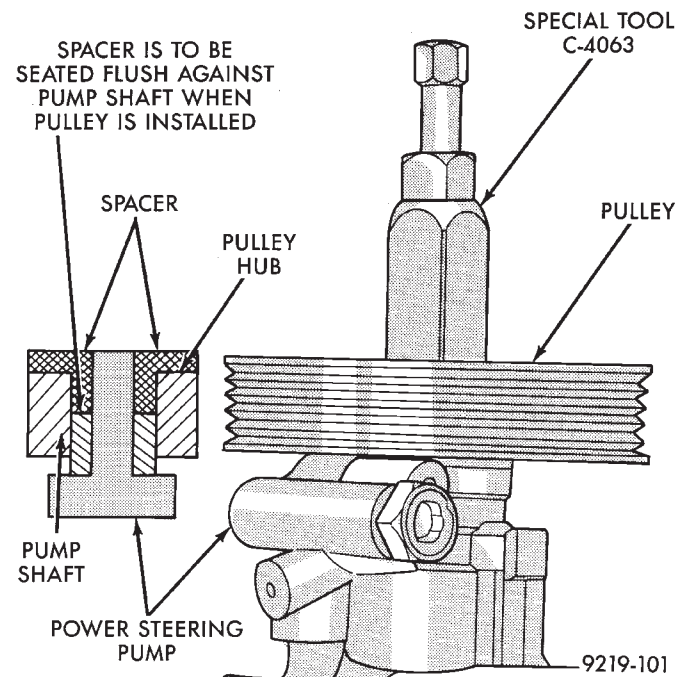


Fig. 5 Power Steering Pump Pulley Installed

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

POWER STEERING PUMP FLUID RESERVOIRS

The power steering pump fluid reservoir on the L.H. platform vehicle is remotely mounted from the



power steering pump. The reservoir is located on the left front frame rail rearward of the battery (Fig. 6).

REMOVE

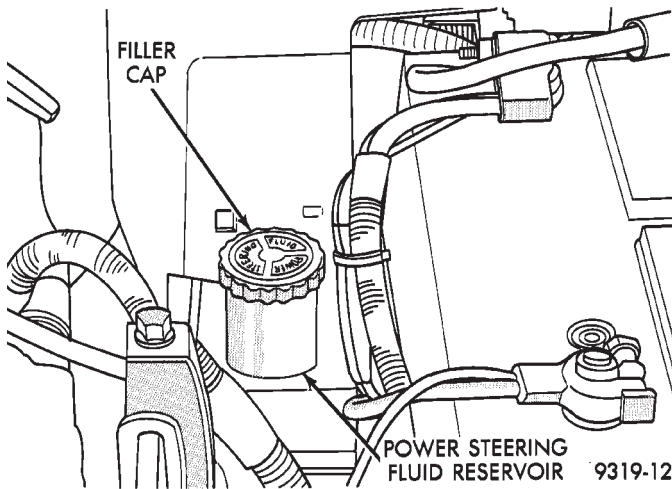


Fig. 6 Power Steering Fluid Reservoir Location

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

(2) Position drain pan under vehicle for leaking power steering fluid. Loosen and remove power steering return hose (Fig. 7) from side of power steering fluid reservoir. Remove hose from bottom of power steering fluid reservoir going to power steering pump (Fig. 7). Let power steering fluid drain from hoses and reservoir.

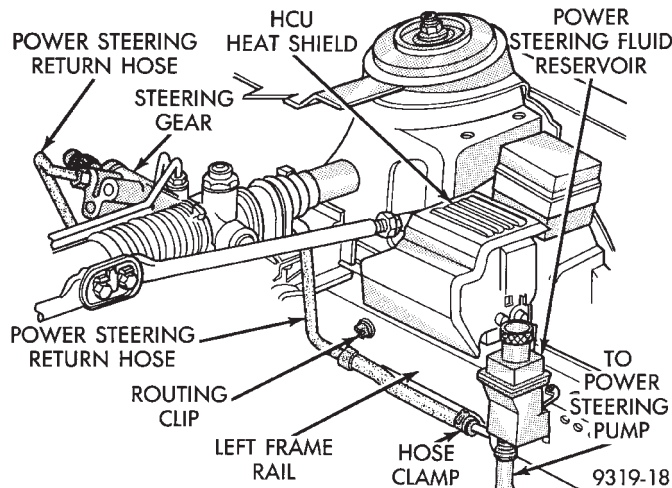


Fig. 7 Power Steering Fluid Reservoir Hoses

(3) Lower vehicle.
(4) Remove battery.
(5) Remove the 4 fasteners (Fig. 8) attaching the battery tray to the body and frame of the vehicle. Then remove battery tray from vehicle.

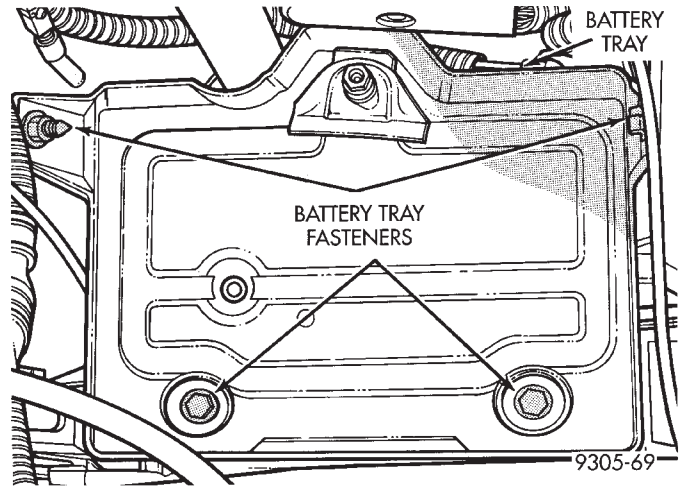


Fig. 8 Battery Tray Mounting

(6) Remove screw attaching fluid reservoir to frame rail (Fig. 9). Then remove fluid reservoir from frame rail.

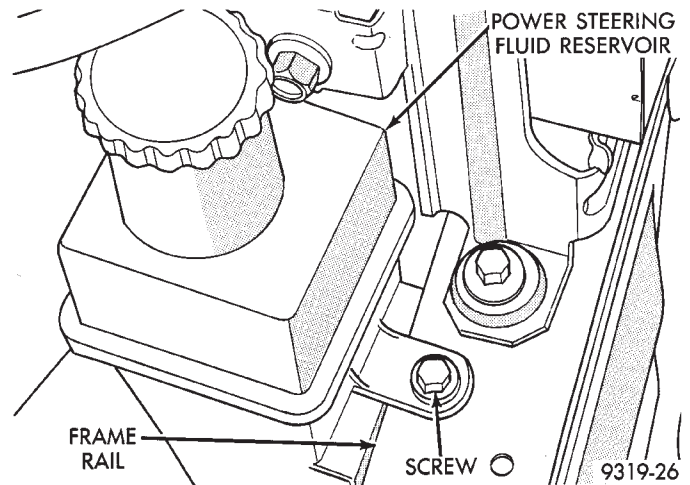


Fig. 9 Power Steering Fluid Reservoir Attaching

INSTALL

(1) Install power steering fluid reservoir on frame rail. Be sure tab on bottom of fluid reservoir is inserted in hole on frame rail. Install the screw attaching fluid reservoir to frame rail. Torque attaching screw (Fig. 9) to 7 N•m (60 in. lbs.).

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

(3) Raise vehicle.

(4) Install power steering return hose onto nipple on side of fluid reservoir (Fig. 7). Install hose going to power steering pump, on bottom nipple of fluid reservoir (Fig. 7). Install the hose clamps, being sure they are past hose retention beads on reservoir nipples.

(5) Lower vehicle.

(6) Install battery.



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

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

(8) Start engine and turn steering wheel several times from stop to stop to bleed air from fluid in system. Stop engine, check fluid level, and inspect system for leaks. See Checking Fluid Level.

FLOW CONTROL VALVE FITTING O-RING SEAL

REMOVAL

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

(2) Remove fitting from pump housing (Fig. 10). **Prevent flow control valve and spring from sliding out of housing bore.**

(3) Remove and discard O-ring seal (Fig. 10).

INSTALLATION

(1) If necessary, clean and install flow control valve and spring in pump housing bore (Fig. 10). **Be sure the hex nut end of the valve is facing in toward the pump.**

(2) Install O-ring seal onto fitting (Fig. 10).

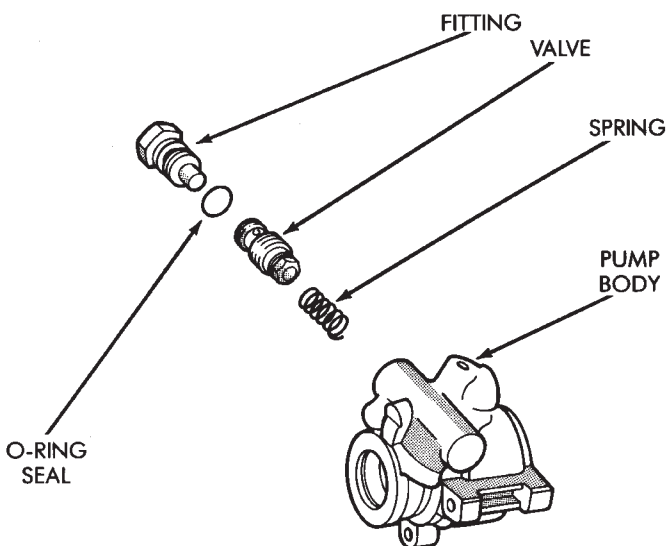
(3) Install fitting in pump housing and tighten to 75 N•m (55 ft. lbs.)

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

POWER STEERING PUMP—INITIAL OPERATION

CAUTION: The fluid level should be checked with engine off to prevent injury from moving components. Use only Mopar® Power Steering Fluid. Do not use automatic transmission fluid. Do not overfill.

Wipe filler cap clean, then check the fluid level. The dipstick should indicate **FULL COLD** when the fluid is at normal temperature of approximately 21°C to 27°C (70°F to 80°F).



J8919-86

Fig. 10 Flow Control Valve Fitting Removal/Installation

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

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

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

(4) Raise the front wheels off the ground.

(5) Start the engine. Slowly turn the steering wheel right and left, lightly contacting the wheel stops.

(6) Add power steering fluid if necessary.

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

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

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



POWER STEERING GEAR

INDEX

	page		page
General Information	17	Steering Gear Service	17
Outer Tie Rod	23		

GENERAL INFORMATION

The power steering gear (Fig. 1) should NOT be serviced or adjusted. If a malfunction or oil leak occurs. The complete steering gear should be replaced.

The power steering system consists of these five major components. Power Steering Gear, Power Steering Pump, Pressure Hose, Return Line and Remote Power Steering Fluid Reservoir. Turning of the steering wheel is converted into linear travel through the meshing of the helical pinion teeth with the rack teeth. Power assist steering is provided by an open center, rotary type control valve which directs oil from the pump to either side of the integral rack piston.

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

The drive tangs on the pinion of the power steering pump mate loosely with a stub shaft. This is to permit manual steering control to be maintained if the drive belt on the power steering pump should break. However, under these conditions, steering effort will be increased.

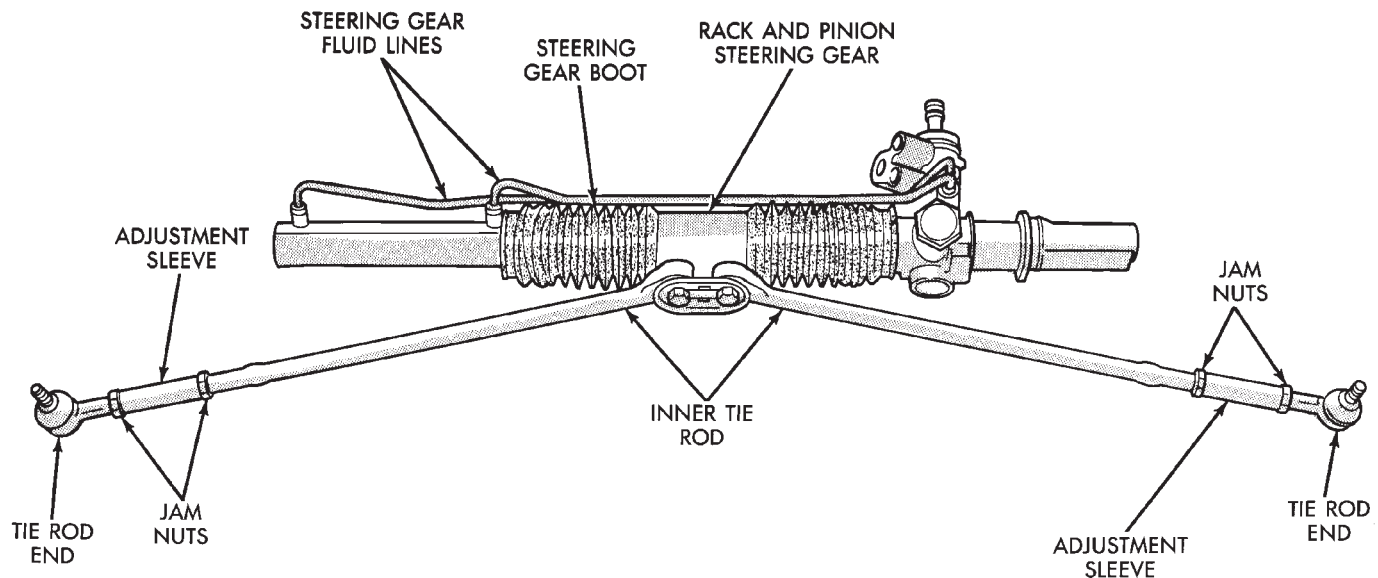
STEERING GEAR SERVICE

The power steering gear should NOT be serviced or adjusted. If a malfunction or oil leak occurs. The complete steering gear should be replaced.

Note: Any time steering gear assembly is removed from vehicle or tie rod ends loosened. A front end alignment must be performed on the vehicle.

REMOVE

- (1) Disconnect and isolate (-) negative battery cable from negative post on battery.
- (2) Raise vehicle on jackstands or centered on a frame contact type hoist. See Hoisting in the Lubri-



9319-27

Fig. 1 Power Steering Gear Assembly



cation and Maintenance section of this manual, for the required lifting procedure to be used for this vehicle.

(3) Remove gear shift cable, from shift lever on transaxle. Loosen bolt (Fig. 2) at gear shift cable to transaxle mount. Remove gear shift cable from transaxle.

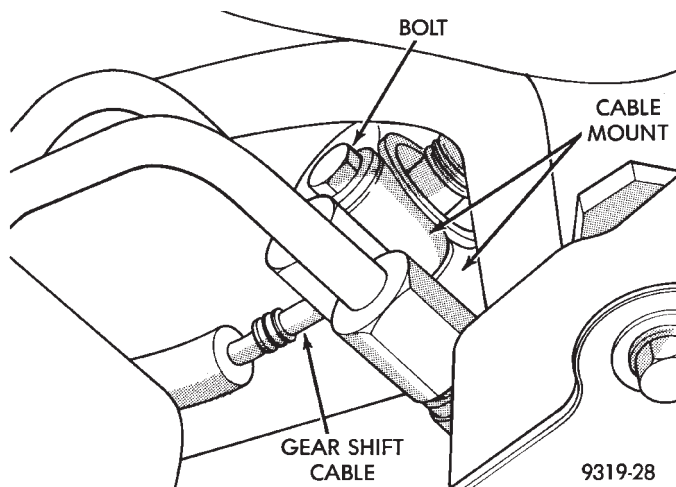


Fig. 2 Gear Shift Cable Attachment To Transaxle.

(4) Lower vehicle.

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

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

(7) Remove the 6 screws attaching cowl closure panel to cowl. Remove the cowl closure panel and weatherstrip as an assembly from the cowl (Fig. 3).

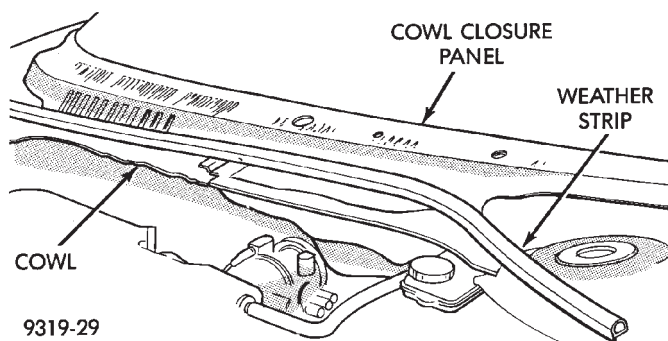


Fig. 3 Cowl Closure Panel Remove And Install

(8) Disconnect air plenum from throttle bodies, PCV make up air tube and idle air control motor. Remove plenum from the right side of the vehicle (Fig. 4).

(9) Disconnect wiper module wiring harness connector, from vehicle wiring harness (Fig. 5).

(10) Remove the 5 screws attaching wiper module assembly to vehicle cowl panel (Fig. 6). Then remove wiper module from cowl panel.

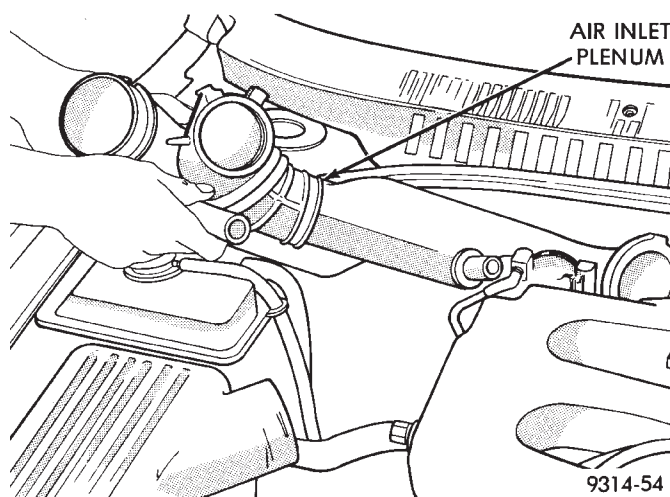


Fig. 4 Air Intake Plenum Removal

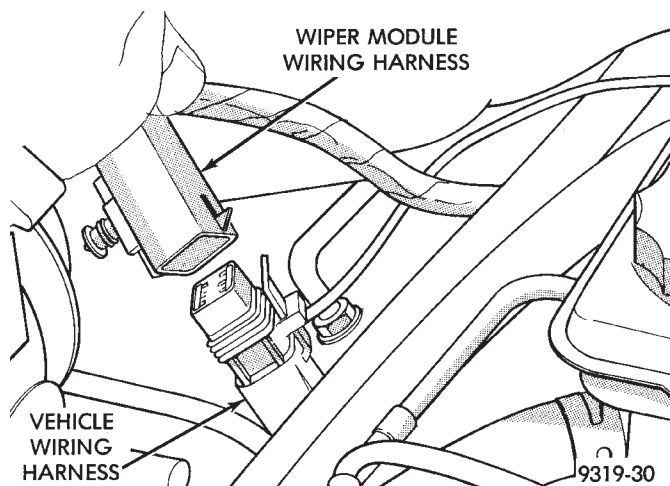


Fig. 5 Wiper Module Wiring Harness Connector

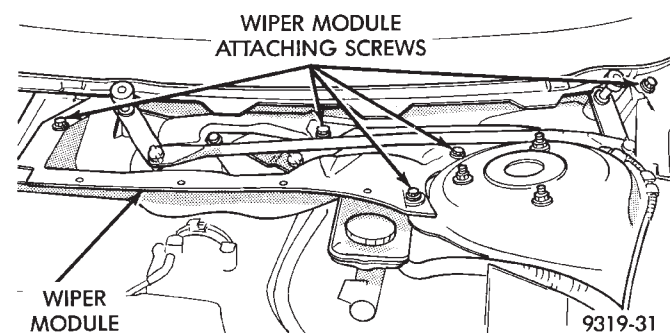


Fig. 6 Wiper Module Assembly Attaching Screws

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

(12) Turn front wheels of vehicle to the full left turn position. Then turn wheels back until roll pin in steering coupler is accessible for removal (Fig. 7). **Then position ignition switch in lock position to keep steering column from rotating after coupler is removed from steering gear. If steering column shaft rotates beyond normal number of**



turns in either direction clock spring damage will occur.

(13) Using paint mark steering coupler and steering gear shaft (Fig. 7) for orientation of parts at assembly.

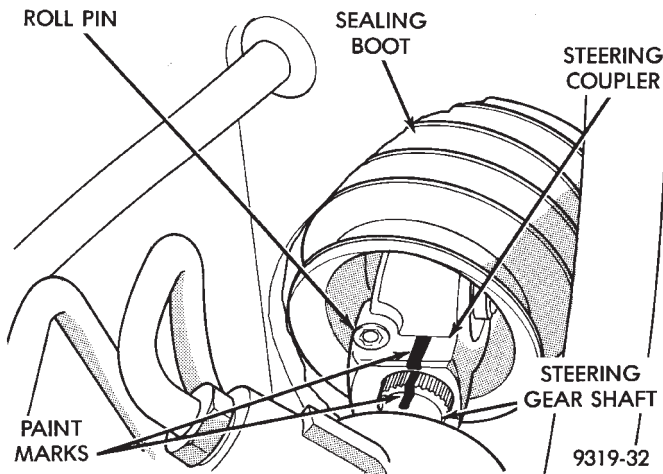


Fig. 7 Steering Gear Coupler Position For Roll Pin Removal

(14) Using correct size pin punch, remove roll pin retaining steering coupler to steering gear shaft.

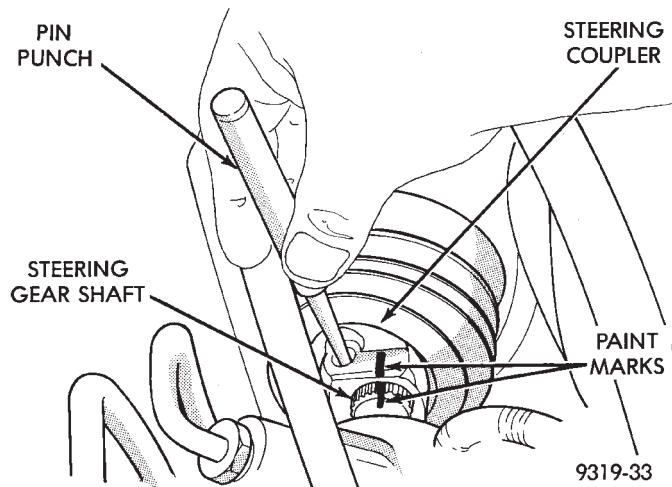


Fig. 8 Steering Coupler Roll Pin Removal

CAUTION: When removing pedal travel sensor from brake vacuum booster.

The vacuum booster must be bled of all stored vacuum before travel sensor is removed. Failure to do this may result in the sealing O-Ring being sucked into the vacuum booster. If O-Ring is sucked into vacuum booster, vacuum booster will need to be replaced.

(15) Remove the pedal travel sensor from the brake booster using the following procedure.

- Pump brake pedal approximately 20 times to evacuate stored vacuum.

- Remove wiring harness connector from travel sensor.

- Using a small screwdriver lift retaining ring from notch (Fig. 9). Then remove retaining ring from grommet.

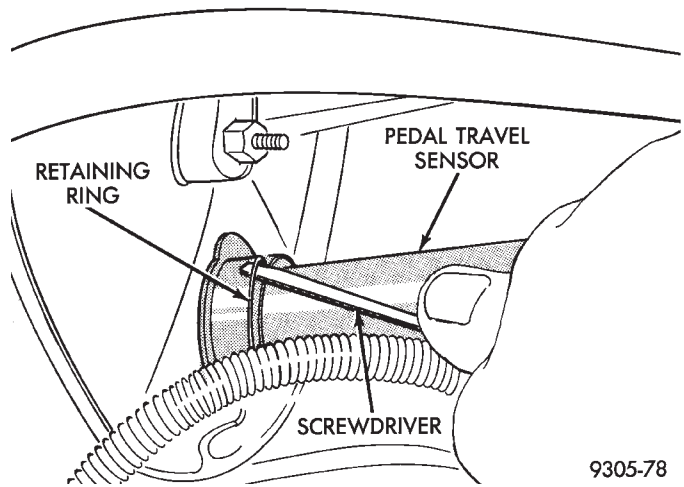


Fig. 9 Pedal Sensor Retaining Ring Removal

- Remove pedal travel sensor from brake booster by carefully pulling it straight out of its mounting grommet **DO NOT TWIST**.

(16) Loosen and remove the 2 nuts attaching master cylinder assembly to brake booster. Remove master cylinder assembly with brake lines connected from the brake booster assembly. Carefully position the master cylinder assembly against left shock tower.

(17) Remove power steering pressure hose and return hose from power steering gear (Fig. 10).

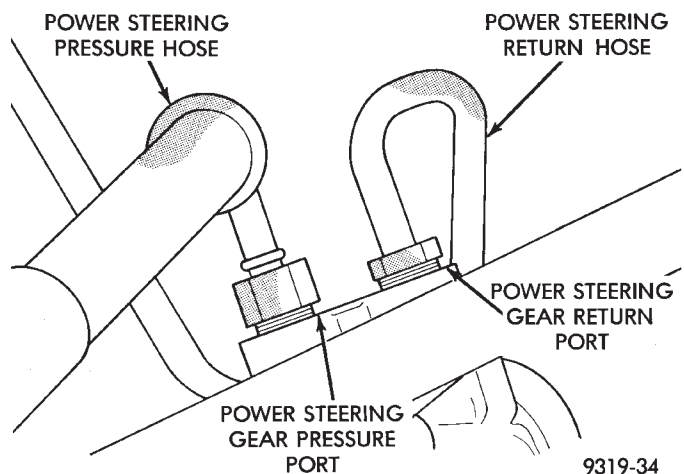


Fig. 10 Power Steering Hose Connections At Steering Gear

(18) Bend back retaining tabs on bolts attaching tie rods to steering gear. Loosen and remove bolts attaching tie rods to steering gear (Fig. 11). Lay tie rods, bolts and plate as an assembly on bell housing of transaxle.

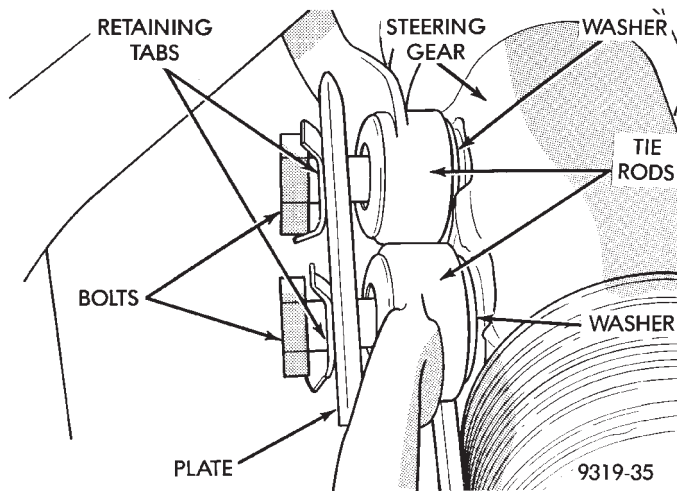


Fig. 11 Tie Rod Attachment To Steering Gear

(19) Remove the 4 bolts attaching steering gear assembly to crossmember (Fig. 12).

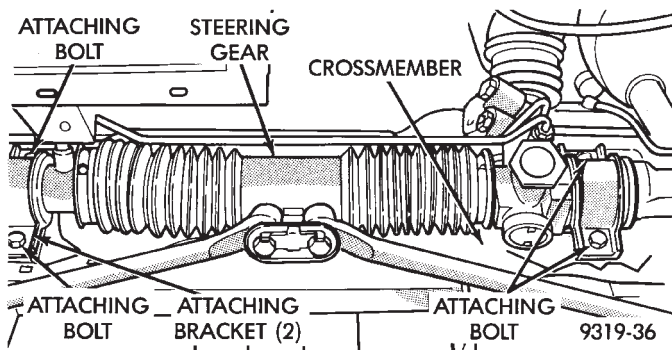


Fig. 12 Steering Gear Attachment To Crossmember

(20) Slide steering gear forward in vehicle to disengage steering coupler from steering gear shaft. **After steering gear is disengaged from steering coupler, do not rotate steering gear shaft.**

(21) Remove steering gear assembly from vehicle through area in cowl that the windshield wiper module was previously removed from (Fig. 13).

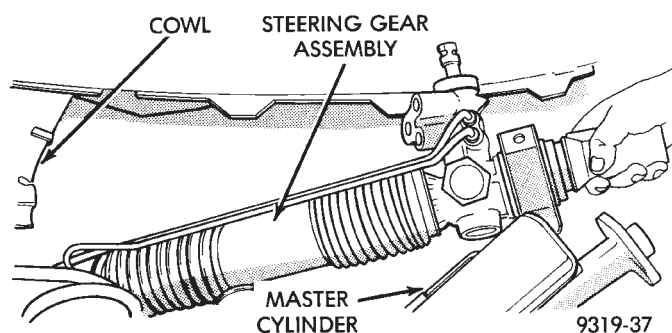


Fig. 13 Steering Gear Assembly Removal And Installation

INSTALLATION

If a replacement steering gear assembly is being installed in the vehicle. The replacement steering gear will need to be positioned prior to installation in vehicle, using the following procedure. Carefully grasp shaft of steering gear and rotate until steering gear center take off is in a full left turn position.

(1) Install steering gear assembly back in vehicle through windshield wiper module opening in cowl (Fig. 13).

(2) If original steering gear assembly is being installed back in vehicle. Align paint mark on steering coupler with paint mark on steering gear shaft and install steering gear shaft into steering coupler. **If a replacement steering gear assembly is being installed in vehicle. Steering gear shaft and steering coupler must be aligned using the following procedure. Rotate steering gear shaft back from the full left turn position until master spline on steering gear shaft is aligned with master spline on steering coupler. Then install steering gear shaft into steering coupler.**

CAUTION: Proper torque on the steering gear to crossmember mounting bolts is very important.

(3) Align steering gear with mounting holes in crossmember. Install the 4 bolts attaching steering gear brackets and steering gear assembly to crossmember. **Be sure brake line routing clip is installed under left steering gear mounting bracket.** Torque the 4 steering gear assembly to crossmember attaching bolts to 68 N•m (50 ft. lbs.).

(4) Install the steering coupler to steering gear shaft retaining roll pin (Fig. 14). Roll pin must be installed until it is flush with top edge of steering coupler (Fig. 7).

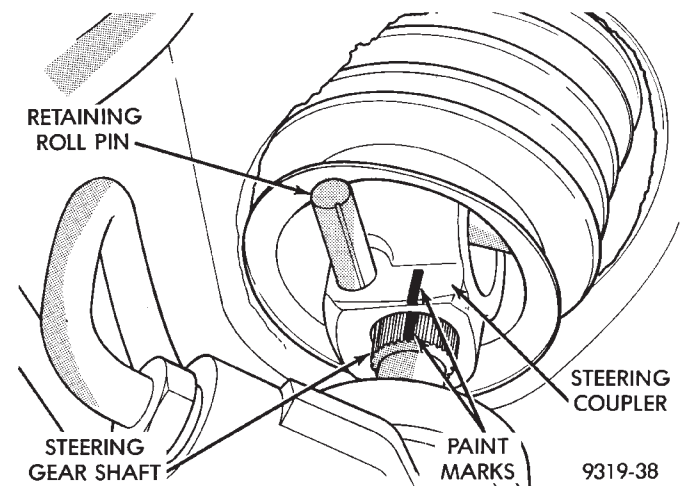


Fig. 14 Installing Coupler Retaining Roll Pin



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

(5) Attach power steering fluid, pressure and return lines onto proper ports of the steering gear (Fig. 15). Torque both power steering line fittings at steering gear to 31 N•m (23 ft. lbs.).

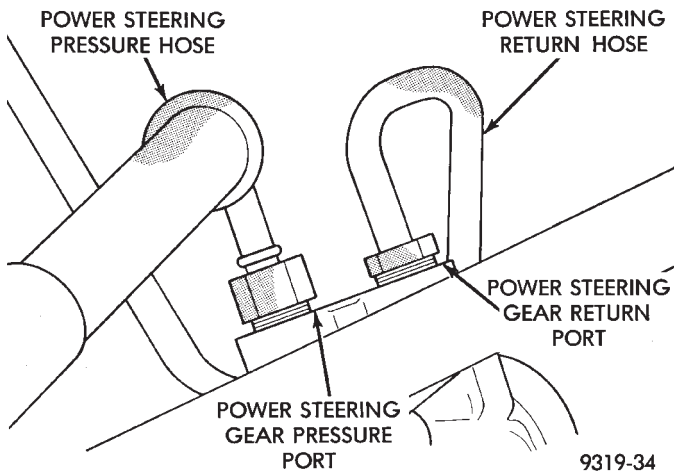


Fig. 15 Power Steering Fluid Line Connections At Steering Gear

(6) Align center take off on steering gear with the tie rod assemblies. Install tie rod attaching bolts and washers into steering gear assembly. **Be sure washers are installed between tie rods and steering gear (Fig. 16).** Torque tie rod to steering gear attaching bolts to 75 N•m (55 ft. lbs.). After tie rod attaching bolts are torqued, bend attaching bolt retaining tabs against heads of attaching bolts (Fig. 17).

(7) Install pedal travel sensor retaining ring on travel sensor grommet in the vacuum booster (Fig. 18). Tab on retaining ring should be located in top notch of mounting grommet.

(8) Sparingly lubricate pedal travel sensor O-Ring with fresh clean brake fluid. Then install pedal travel sensor O-Ring in pedal travel sensor mounting grommet (Fig. 19).

(9) Sparingly coat end of pedal travel sensor with clean fresh brake fluid. Install pedal travel sensor into mounting grommet by pushing it straight into mounting grommet on vacuum booster. Be sure travel sensor is inserted into grommet until tab on travel sensor is past retaining ring on grommet. Install wiring harness connector on pedal travel sensor.

(10) Install master cylinder back on mounting studs on brake booster. Install the 2 nuts attaching

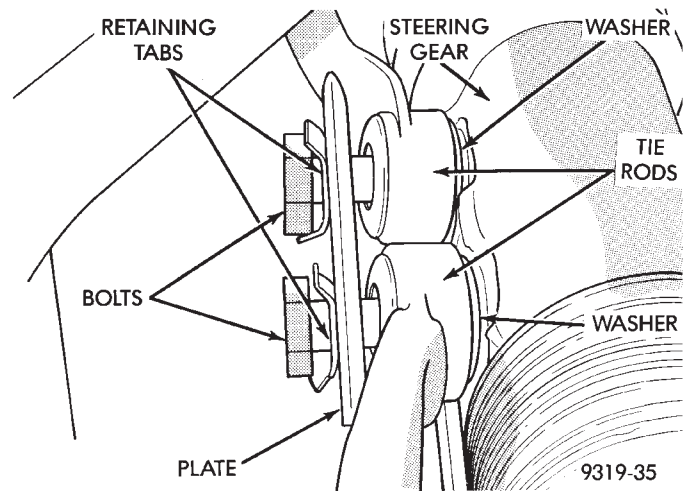


Fig. 16 Tie Rod Attachment To Steering Gear

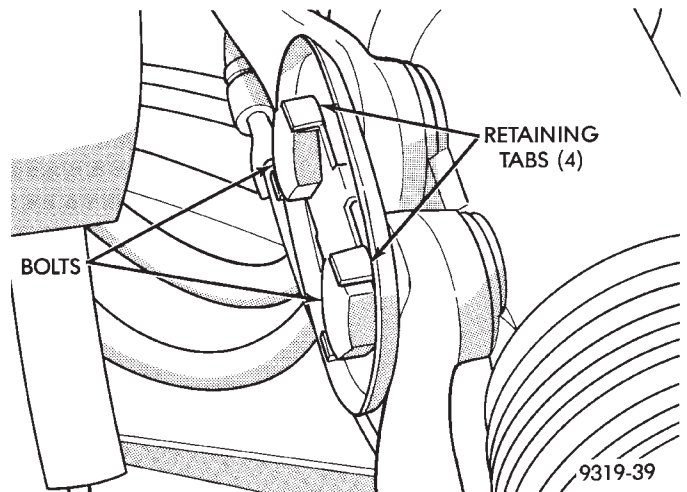


Fig. 17 Attaching Bolt Retaining Tabs

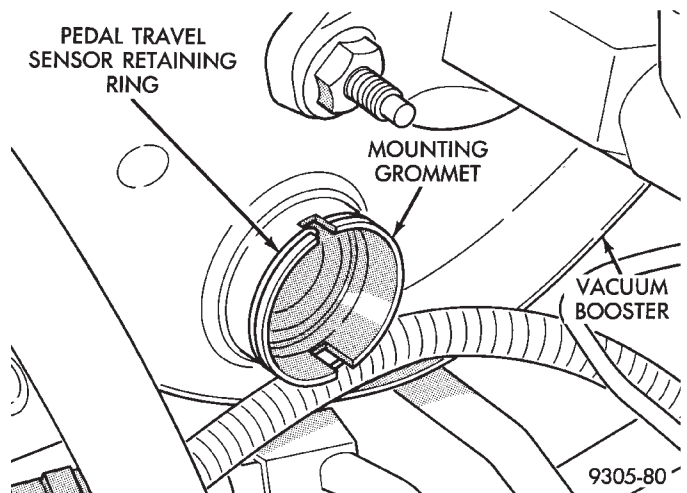


Fig. 18 Retaining Ring Installed On Grommet

master cylinder assembly to brake booster. Torque the 2 master cylinder to brake booster mounting nuts to 28 N•m (250 in. lbs.).

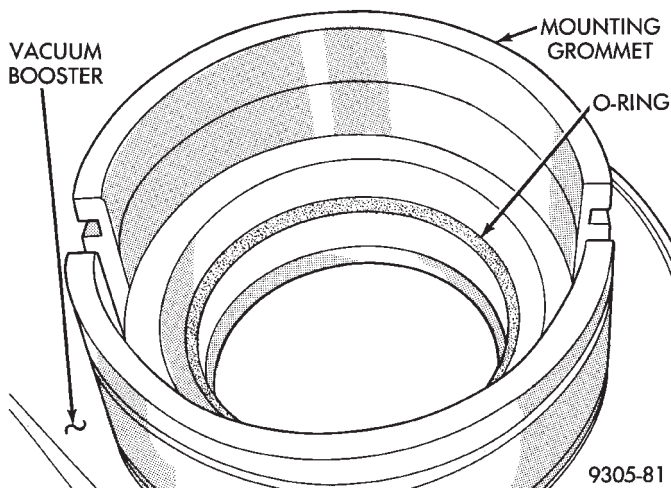


Fig. 19 O-Ring Installed In Travel Sensor Mounting Grommet

(11) Install vacuum supply hose for power brake booster back on intake manifold vacuum port. Install hose clamp on vacuum hose.

(12) Install windshield wiper module assembly into cowl of vehicle. Install and securely tighten the 5 screws attaching windshield wiper module to cowl (Fig. 20).

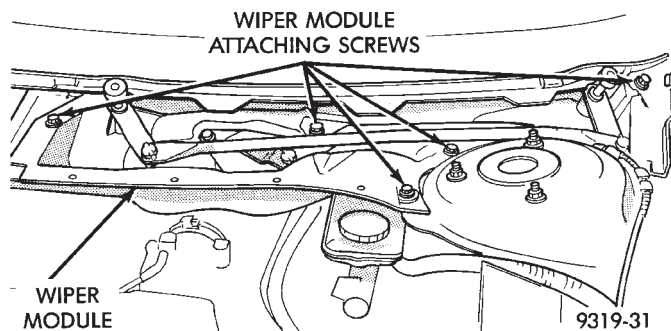


Fig. 20 Windshield Wiper Module Attaching Screws

(13) Connect wiring harness connector from windshield wiper module into vehicle wiring harness (Fig. 21).

(14) On 3.5 ltr engine applications, install air intake plenum back into vehicle (Fig. 22). Connect air intake plenum to throttle bodies, PCV make up air tube and idle air control motor.

(15) Install cowl closure panel back on top of cowl and windshield wiper module. Install and securely tighten the 6 screws attaching cowl closure to vehicle (Fig. 23). Install weather strip on shock towers and the clips securing cowl closure panel to windshield wiper module.

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

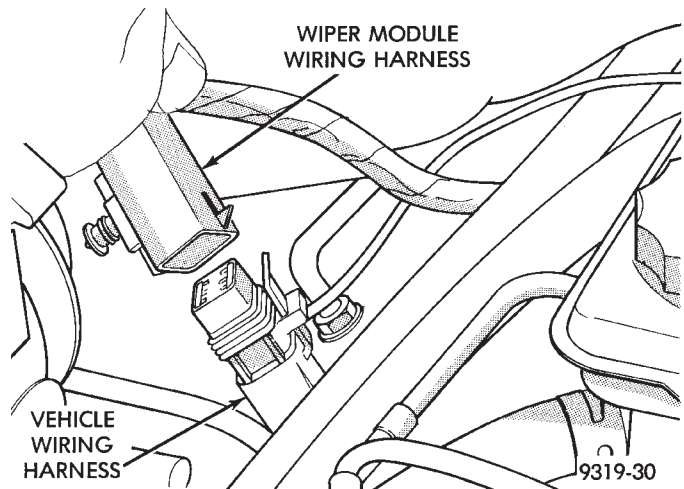


Fig. 21 Windshield Wiper Module Wiring Connection

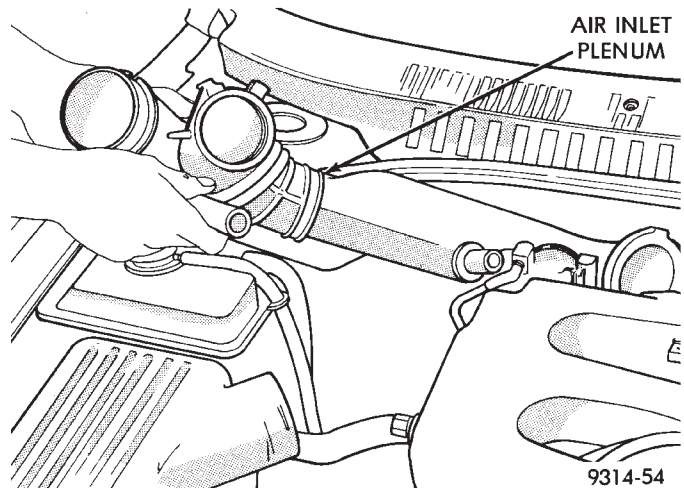


Fig. 22 Air Intake Plenum Installation

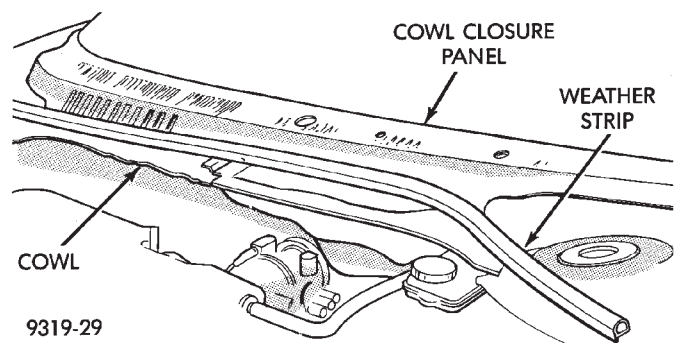


Fig. 23 Cowl Closure Panel Installation

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

(18) Raise vehicle.

(19) Install gear shift cable onto shift lever on transaxle. Install gear shift cable on cable mounting bracket of transaxle and securely tighten bolt (Fig. 24).

(20) Lower vehicle.

(21) Install the wheel and tire assemblies.

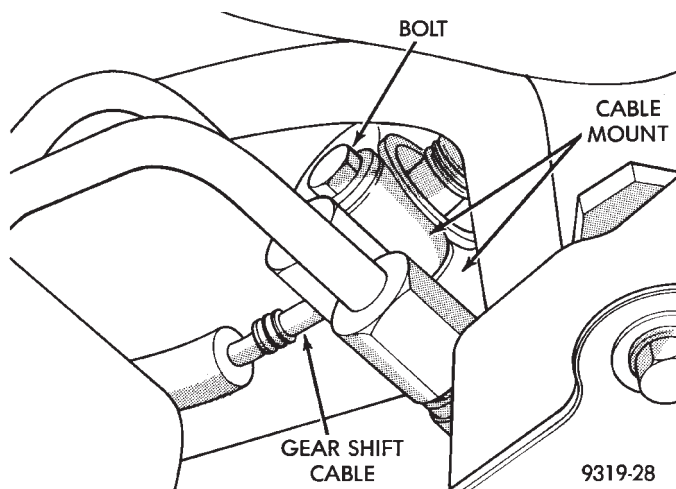


Fig. 24 Gear Shift Cable Attachment To Transaxle

(22) Install and tighten wheel mounting stud nuts in proper sequence (Fig. 25) until all nuts are torqued to half specification. Then repeat the tightening sequence to the full specified torque of 129 N•m (95 ft. lbs.).

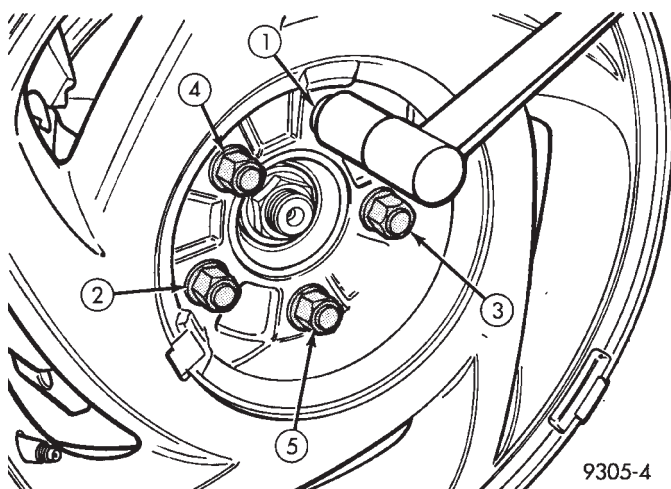


Fig. 25 Tightening Wheel Nuts

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

CAUTION: Do not use automatic transmission fluid.

(24) Start engine and turn steering wheel several times from stop to stop to bleed air from fluid in system. Stop engine, check fluid level, and inspect system for leaks. **Fill pump reservoir to correct level with Mopar®, Power Steering Fluid, or equivalent.** See Checking Fluid Level.

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

OUTER TIE ROD

REMOVAL

(1) Raise vehicle on jackstands or centered on a frame contact type hoist. See Hoisting in the Lubri-

cation and Maintenance section of this manual, for the required lifting procedure to be used for this vehicle.

(2) Remove tire and wheel assembly.

(3) Loosen the outer tie rod to adjustment sleeve jam nut (Fig. 1).

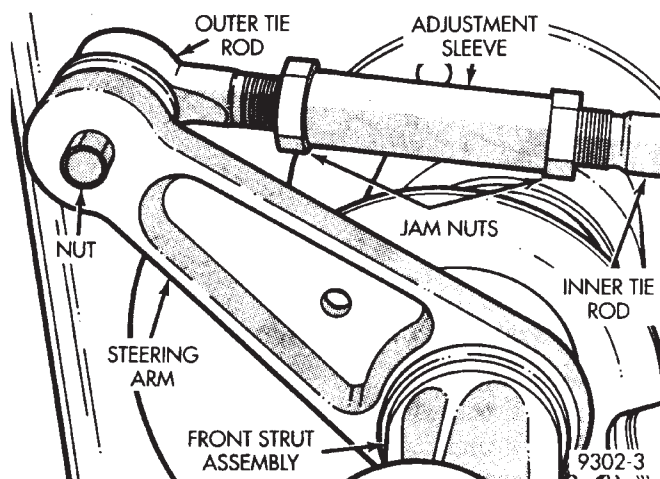


Fig. 1 Outer Tie Rod Jam Nut And Adjustment Sleeve

(4) Loosen but do not remove outer tie rod to strut assembly steering arm attaching nut (Fig. 2). Then remove outer tie rod from steering arm using Puller, Special Tool MB-990635 of equivalent (Fig. 2).

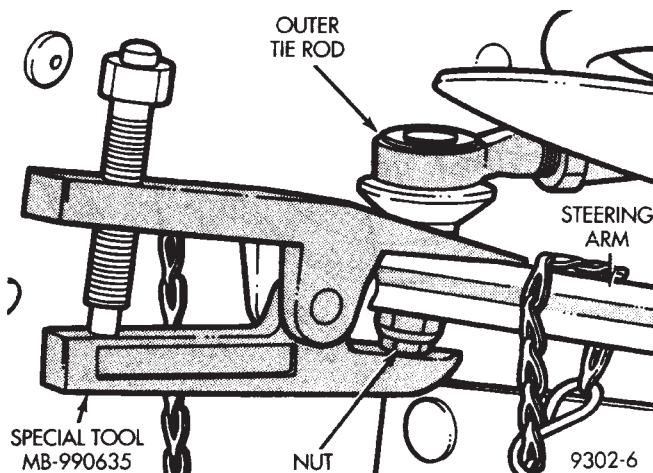


Fig. 2 Removing Outer Tie Rod From Steering Arm

(5) Remove outer tie rod from adjustment sleeve.

INSTALLATION

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

(2) Do not tighten jam nut.

(3) Install outer tie rod into steering arm on front strut assembly. Install tie rod to steering arm attaching nut and torque to 37 N•m (27 ft.lbs.).



(4) Install and tighten wheel mounting stud nuts in proper sequence (Fig. 3) until all nuts are torqued to half specification. Then repeat the tightening sequence to the full specified torque of 129 N•m (95 ft. lbs.).

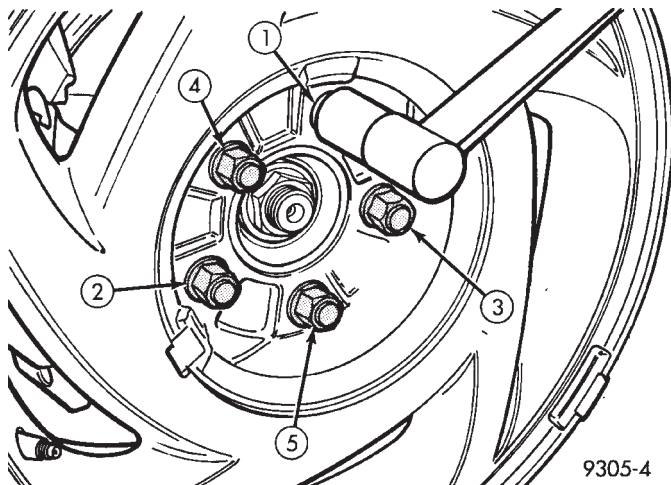


Fig. 3 Tightening Wheel Nuts

(5) Check the front wheel TOE setting on vehicle and make required changes. **When making front wheel TOE adjustments be sure the maximum exposed thread requirements (Fig. 3) are not exceeded.**

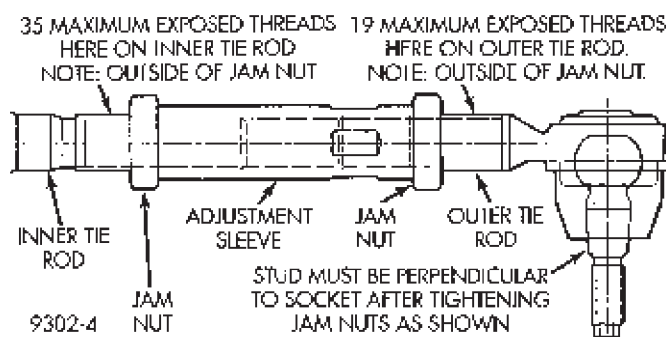


Fig. 3 Tie Rod Thread Engagement Requirements

CAUTION: When torquing adjustment sleeve jam nuts. The following procedure must be followed to ensure adequate torquing and retention of the adjustment sleeve jam nuts is obtained.

- Install correct size open end wrench on flat of adjustment sleeve to keep adjustment sleeve from turning.
 - (A) While holding adjustment sleeve from turning, torque outer tie rod to adjustment sleeve jam nut to 75 N•m (55 ft. lbs.). When outer tie rod jam nut is correctly torqued outer tie rod stud must be perpendicular to socket (Fig. 3).
 - (B) While holding adjustment sleeve from turning, torque inner tie rod to adjustment sleeve jam nut to 75 N•m (55 ft. lbs.).
- Lower vehicle.



SAGINAW TILT STEERING COLUMN

INDEX

	page		page
General Information	25	Steering Column Jacket Bushing Assembly	33
Steering Column Component Service	32	Steering Column Service Procedures	25

GENERAL INFORMATION

WARNING: THE AIR BAG SYSTEM IS A SENSITIVE, COMPLEX ELECTRO-MECHANICAL UNIT. BEFORE ATTEMPTING TO DIAGNOSE, REMOVE OR INSTALL THE AIR BAG SYSTEM COMPONENTS YOU MUST FIRST DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE. FAILURE TO DO SO COULD RESULT IN ACCIDENTAL DEPLOYMENT OF THE AIR BAG AND POSSIBLE PERSONAL INJURY.

THE FASTENERS, SCREWS, AND BOLTS, ORIGINALLY USED FOR THE AIR BAG COMPONENTS, HAVE SPECIAL COATINGS AND ARE SPECIFICALLY DESIGNED FOR THE AIR BAG SYSTEM. THEY MUST NEVER BE REPLACED WITH ANY SUBSTITUTES. ANYTIME A NEW FASTENER IS NEEDED, REPLACE WITH THE CORRECT FASTENERS PROVIDED IN THE SERVICE PACKAGE OR FASTENERS LISTED IN THE PARTS BOOKS.

BEFORE SERVICING A STEERING COLUMN EQUIPPED WITH AN AIR BAG, REFER TO GROUP 8M, ELECTRICAL FOR PROPER AND SAFE SERVICE PROCEDURES.

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

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

CAUTION: Disconnect negative (ground) cable from the battery, before servicing any column component.

CAUTION: Do not attempt to remove the pivot pins to disassemble the tilting mechanism. Do not attempt to remove the upper steering column retaining ring. There are no serviceable components within the base steering column assembly.

STEERING COLUMN SERVICE PROCEDURES

STEERING COLUMN REMOVAL

To service the steering wheel and its components or the air bag, refer to Group 8M, Restraint Systems. Follow all WARNINGS.

To service the switches, refer to the appropriate section of Group 8, Electrical.

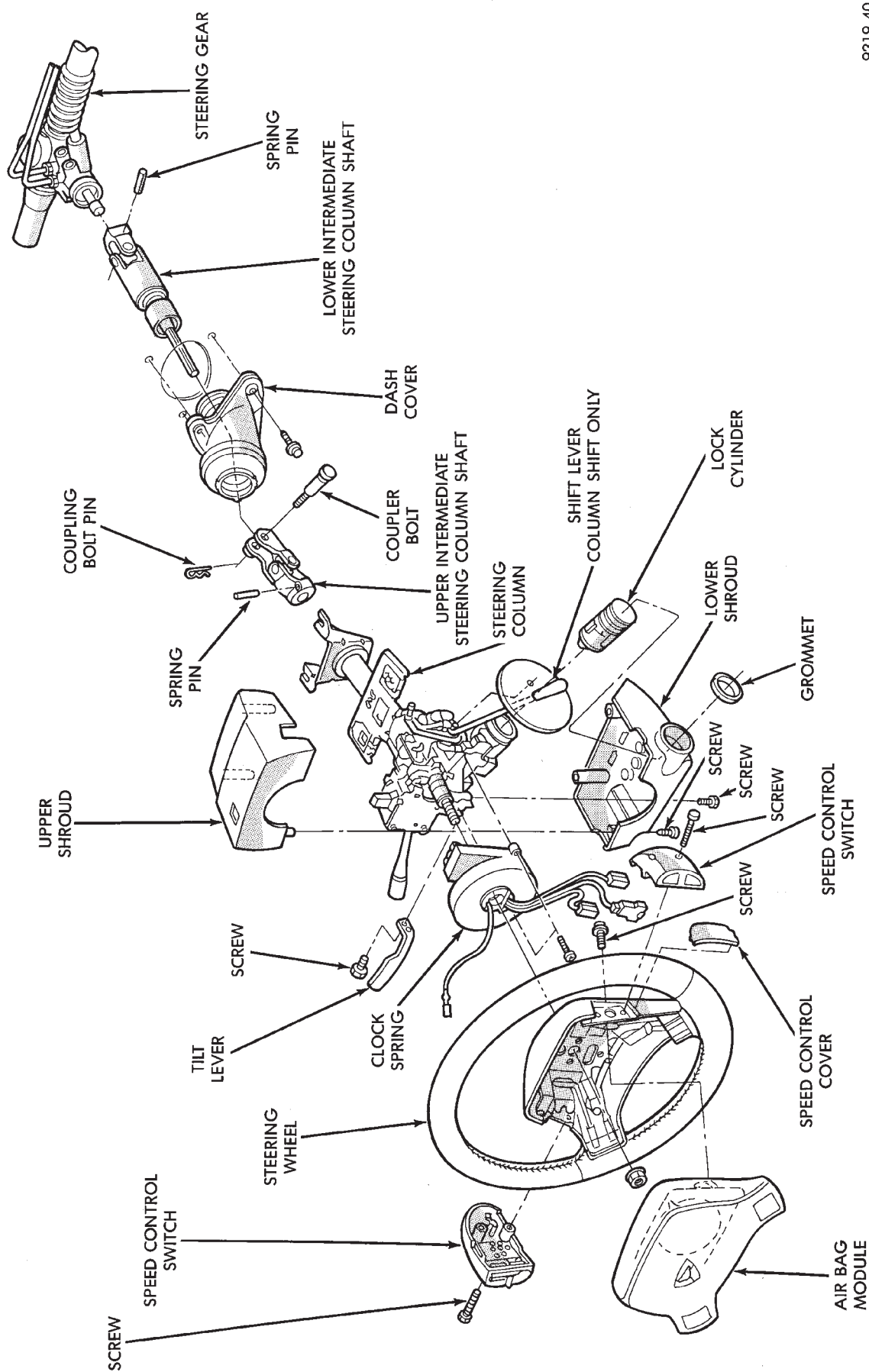
To replace the steering column assembly, refer to the steering column removal procedure. For location of components referred to in the procedure see (Fig. 1).

WARNING: BEFORE BEGINNING ANY AIR BAG SYSTEM COMPONENT INSTALLATION OR REMOVAL PROCEDURES. REMOVE AND ISOLATE THE NEGATIVE (-) BATTERY CABLE (GROUND) FROM THE VEHICLE BATTERY. THIS IS THE ONLY SURE WAY TO DISABLE THE AIR BAG SYSTEM. FAILURE TO DO THIS COULD RESULT IN ACCIDENTAL AIR BAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

STEERING COLUMN REMOVAL

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

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





(2) Disconnect the negative (ground) cable from the battery and isolate cable from battery.

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

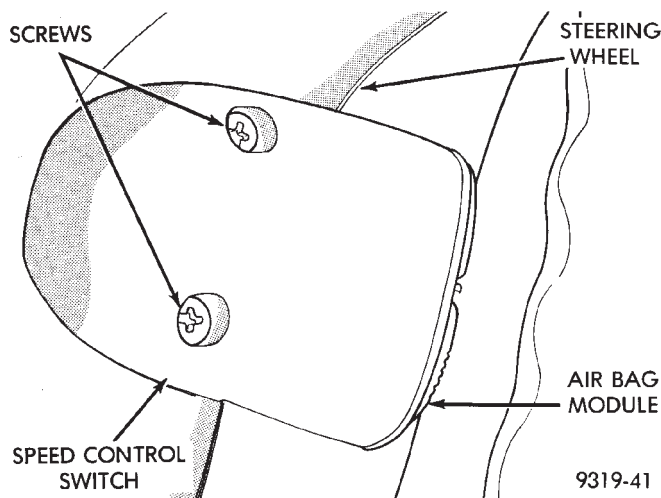


Fig. 2 Speed Control Switches

(4) Remove the 2 bolts attaching air bag module to steering wheel (Fig. 3).

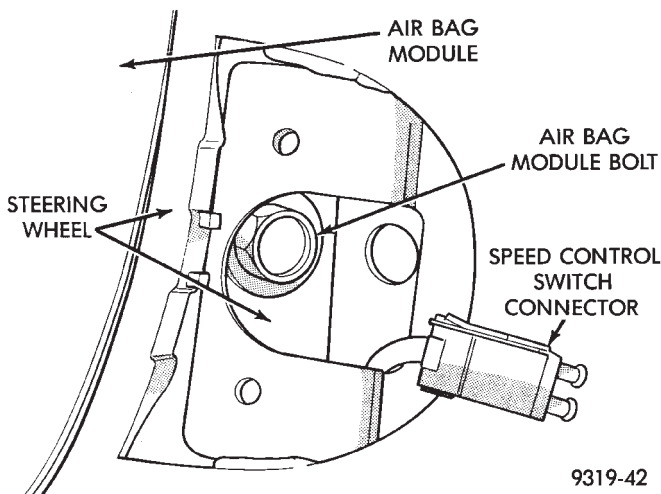


Fig. 3 Air Bag Module Attaching Bolts

(5) Lift air bag module from steering wheel. Disconnect wiring harness connections (Fig. 4) from rear of air bag module and remove module from steering wheel.

(6) Remove the steering wheel retaining nut from the steering column shaft (Fig. 5).

(7) Remove steering wheel from shaft using Puller, Special Tool C-3428-B or equivalent (Fig. 6). **Do not bump or hammer on steering column shaft to remove wheel.**

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

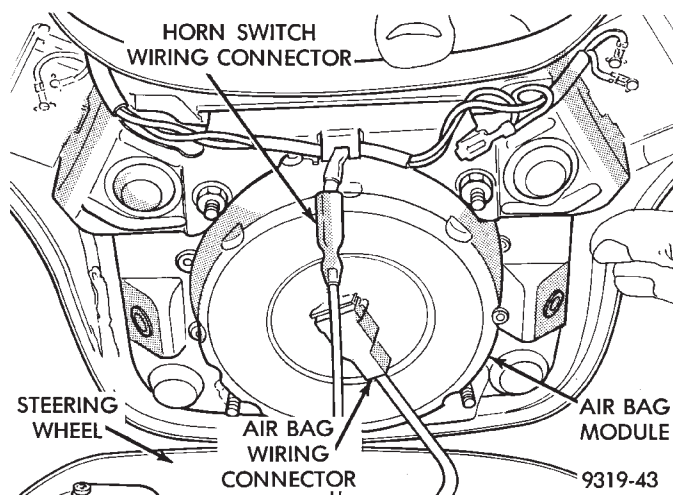


Fig. 4 Wiring Harness Connections To Air Bag Module

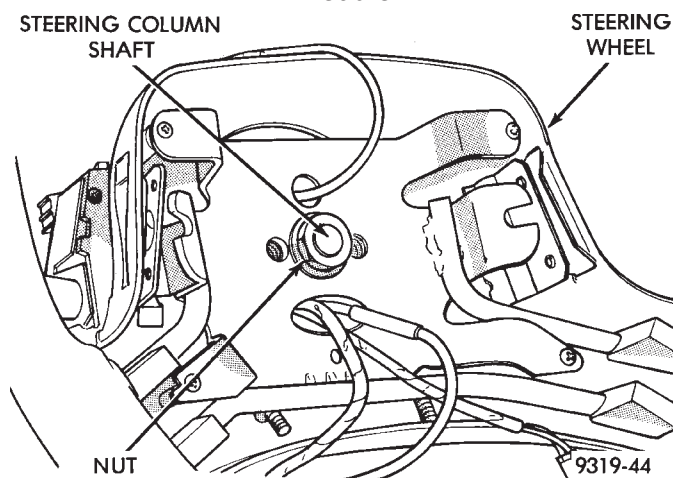


Fig. 5 Steering Wheel Retaining Nut

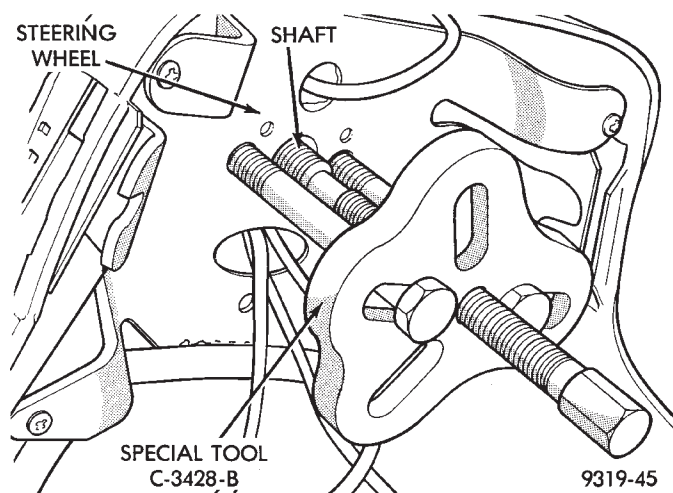


Fig. 6 Removing Steering Wheel From Shaft



- (9) Remove the 2 air bag fuses from fuse panel (Fig. 7).

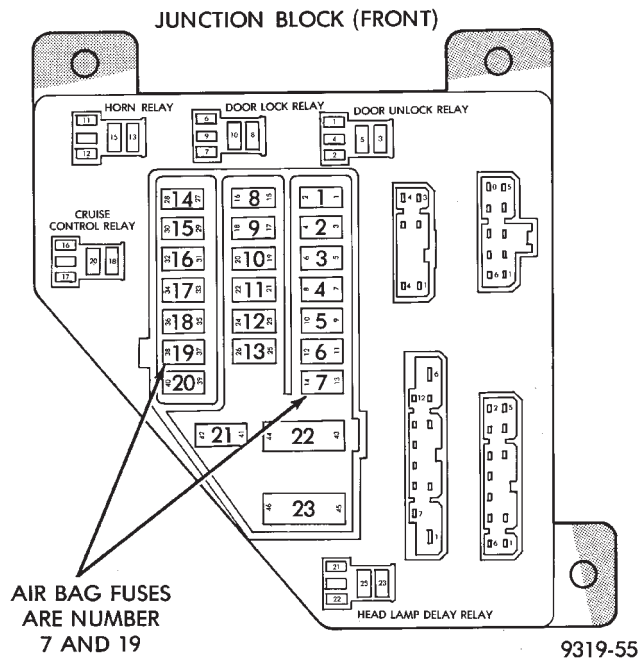


Fig. 7 Air Bag Fuse Locations

(10) Remove left and right cowl area trim panels. Refer to Group 8 Electrical in this service manual for the required removal procedure.

(11) Remove console or instrument panel lower center cover and ash receiver assembly. Refer to Group 8 Electrical in this service manual for the required removal procedure.

(12) Remove left under instrument panel silencer/duct.

(13) Remove entire lower dash panel assembly from vehicle. Refer to Group 8 Electrical in this service manual for required removal procedure of the lower dash panel.

(14) Remove the under steering column air outlet duct (Fig. 8).

(15) Tilt steering column to the full down position. This will allow upper shroud to be removed easier avoiding damage to shroud. Then remove tilt lever and upper and lower steering column shrouds from steering column assembly (Fig. 9).

(16) If vehicle is equipped with a column shifter, shift cable is removed from steering column using following procedure. Install tilt lever back on steering column securely tightening attaching screw, then tilt steering column to the up position. Then pry shift cable off shifter pin on shifter mechanism. Remove shift cable retaining clip at shift cable support bracket, being careful not to bend cable bracket.

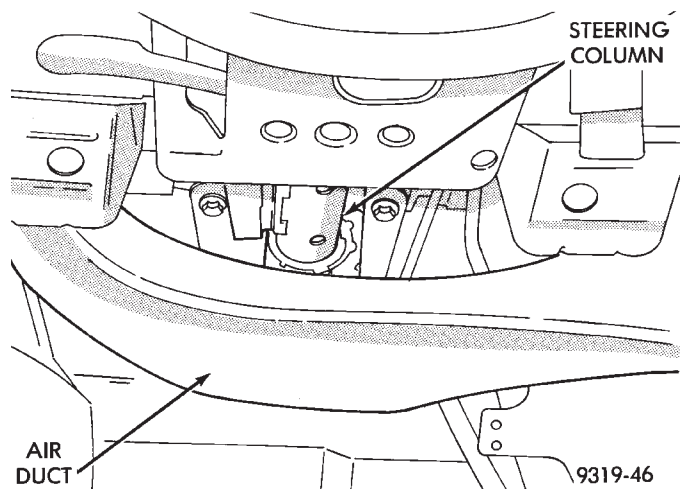


Fig. 8 Under Steering Column Air Duct

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

(17) Turn ignition key to the run position unlocking steering column. Depress tab and remove floor shift interlock cable from steering column socket (Fig. 10).

(18) Remove coupling bolt retaining pin, from lower steering column coupler bolt (Fig. 11). Then remove coupler bolt and separate coupler from intermediate shaft (Fig. 11).

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

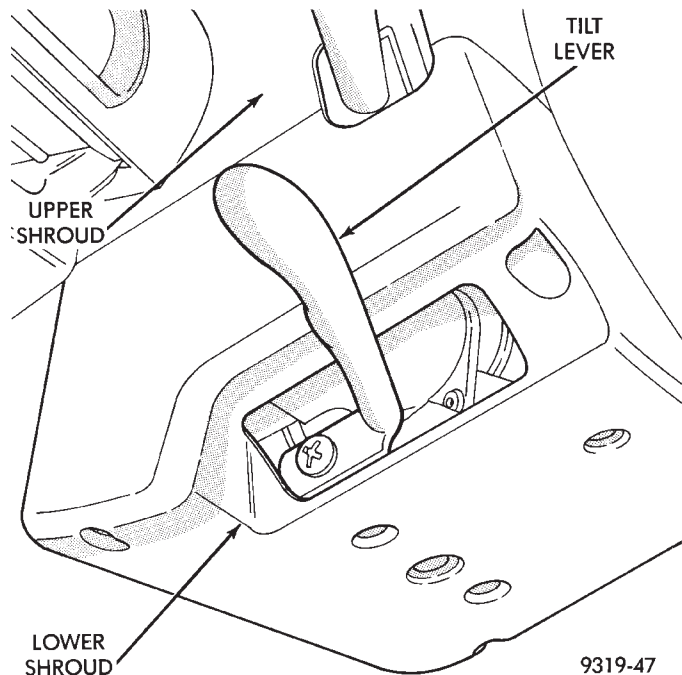


Fig. 9 Tilt Lever And Upper And Lower Shrouds

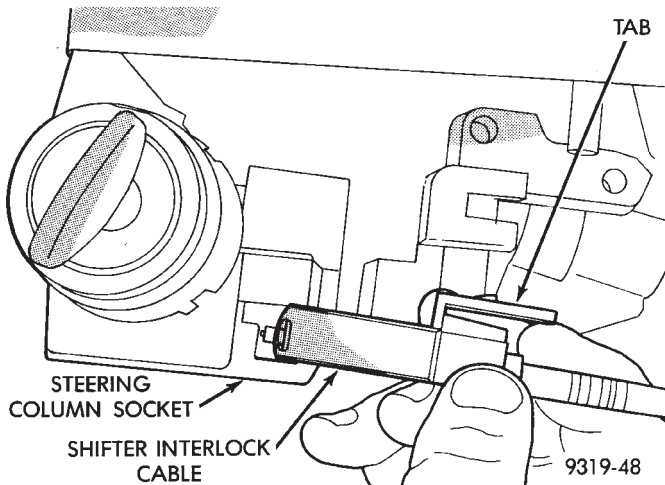


Fig. 10 Shifter Interlock Cable Removal

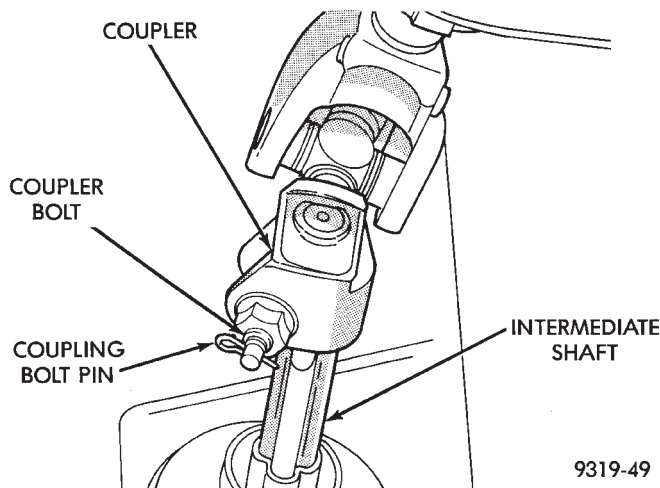


Fig. 11 Coupler Bolt And Retaining Pin

(20) While supporting weight of steering column to prevent damage to lower bracket and plastic adapter tabs. Loosen and remove the 2 nuts and washers attaching upper steering column assembly bracket (Fig. 12) to steering column mounting bracket.

(21) Remove steering column assembly from its mounting bracket and lay it on the floor of the vehicle (Fig. 13).

(22) Remove wiring harness connectors from turn signal/multi-function switch and ignition switch (Fig. 13).

(23) Remove the wiring harness connectors from the halo light and clock spring (Fig. 14). Carefully remove steering column wiring trough from its mounting bracket by depressing tab.

(24) Remove the steering column assembly out through the passenger compartment. Use care to avoid damaging the paint or interior trim.

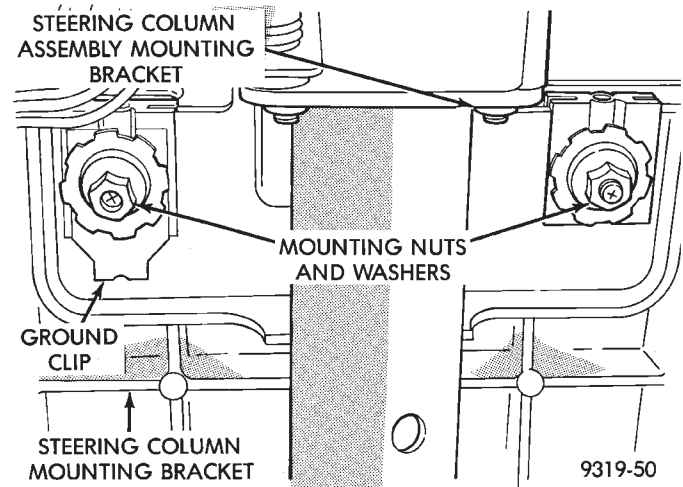


Fig. 12 Upper Steering Column Assembly Mounting

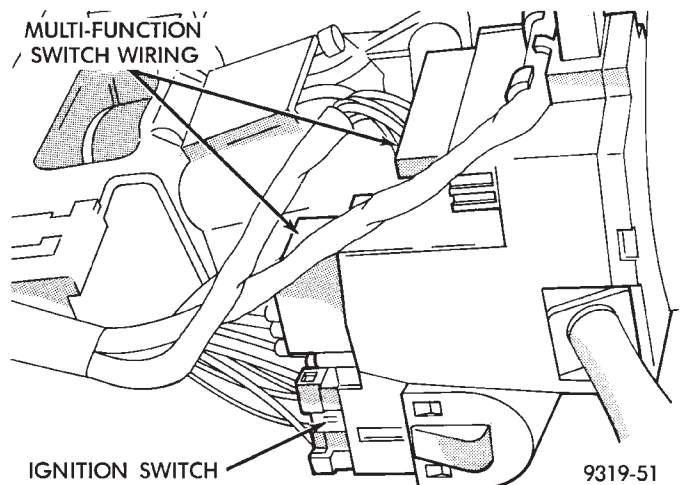


Fig. 13 Steering Column Assembly Removed From Bracket

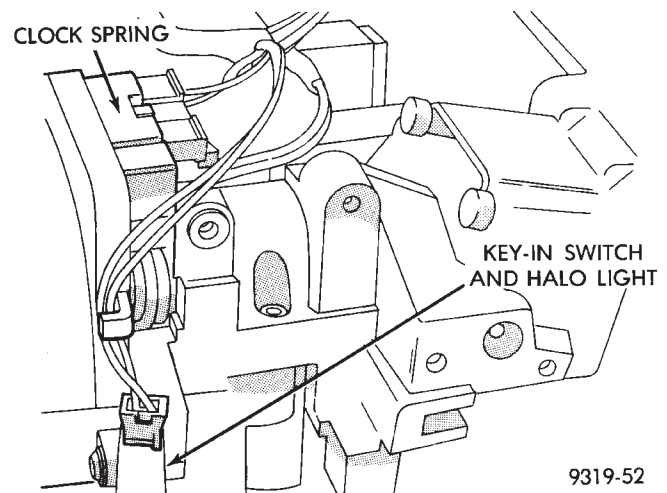
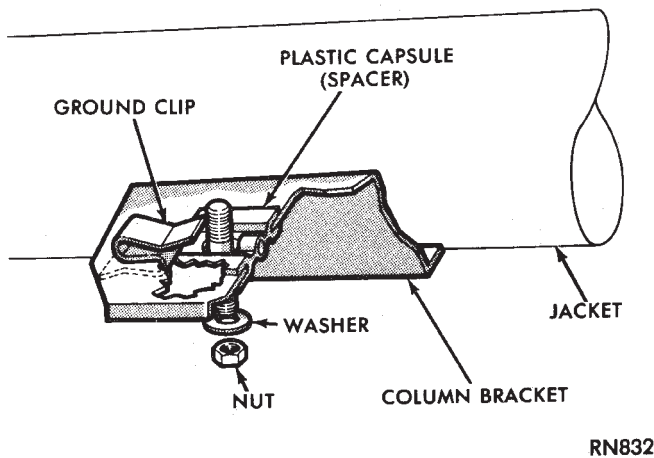


Fig. 14 Halo Light And Clock Spring Wiring Connections

STEERING COLUMN INSTALLATION

(1) Ensure ground clip is installed on left capsule slot (Fig. 15). The plastic capsules should be pre-assembled in the bracket slots.

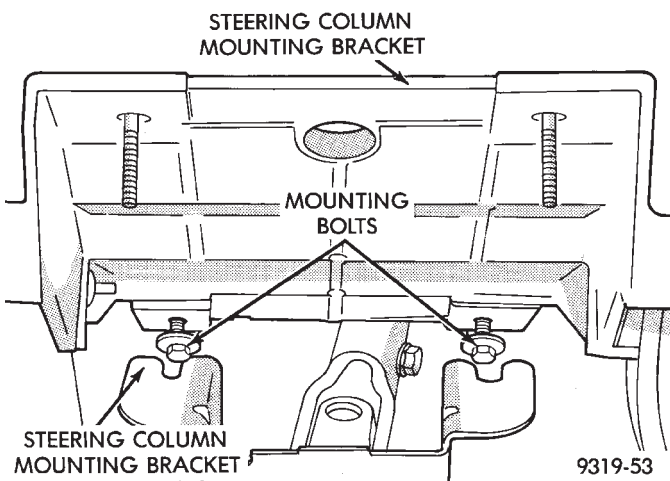


RN832

Fig. 15 Ground Clip & Spacer Installation

(2) Position steering column on the floor of the vehicle. Install wiring harness trough on steering column. Note: Yellow connector mates to air bag clock spring connector (yellow paint marked). Connect vehicle wiring harness connectors to turn signal/multi function switch, ignition switch, halo light and clock spring. Be sure to route wiring through clips on multi function switch and on side of clock spring (Fig. 13 and 14). Be sure wiring is taut and free of interference with column shift actuator in low gear.

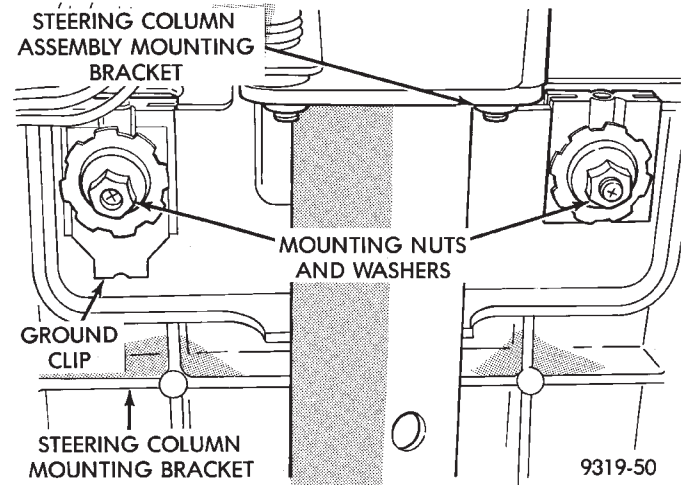
(3) Install steering column assembly back on its mounting bracket, by first sliding lower steering column bracket onto bolts in mounting bracket (Fig. 16). **Do not tighten these bolts at this time.**



9319-53

Fig. 16 Installation Of Steering Column On Bracket

(4) Raise top of steering column until upper steering column mounting bracket, is installed on the studs in the steering column mounting bracket (Fig. 17). Install but do not tighten the 2 nuts attaching the steering column assembly to its mounting bracket.



9319-50

Fig. 17 Upper Steering Column Assembly Mounting Bracket

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

(6) **Be sure both breakaway capsules are fully seated in the slots of the steering column upper support bracket. Then torque the 2 upper steering column assembly to support bracket nuts to 11 N•m (95 in. lbs.). Torque the 2 lower steering column assembly to mounting bracket nuts to 11 N•m (95 in. lbs.).**

(7) Install the upper column coupler onto the lower coupler shaft. Install coupler bolt (Fig. 11) into steering coupler and torque to 28 N•m (21 ft. lbs.). **Be sure to install the coupler retaining pin (Fig. 11) into coupler bolt.**

(8) If vehicle is equipped with a floor shifter, turn key to run position and install shift interlock cable into steering column socket (Fig. 18). Be sure locking tap on interlock cable is fully engaged with steering column socket.

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

(10) If vehicle is with a column shifter, correctly route shift cable to cable support bracket and install

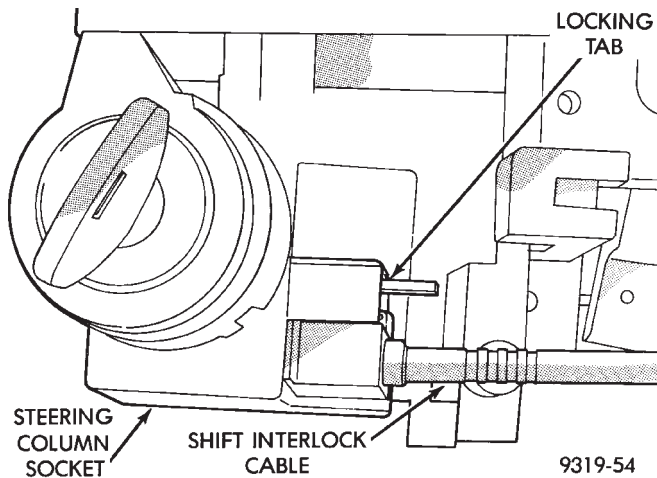


Fig. 18 Shift Interlock Cable Installed

attaching clip. When installing clip, be sure clip is fully seated and cable support bracket does not get bent. Verify clearance to steering column jacket by tilting steering column. Then install shift cable on shift mechanism. Refer to the Ignition Switch And Interlock Section of Group 8 for the required operation check and adjustment of the interlock system.

(11) Install the upper and lower steering column assembly shrouds (Fig. 9) on the steering column. Install and securely tighten the 6 screws attaching the shrouds to the steering column. Install the tilt lever (Fig. 9) on steering column and install and securely tighten tilt lever attaching screw. Do not cross thread lever attaching screw.

(12) Install the under steering column air outlet duct (Fig. 8).

(13) Install lower dash panel assembly back in the vehicle. Refer to Group 8 Electrical for the required installation procedure for the lower dash panel assembly.

(14) Install the left side under instrument panel silencer/duct back in the vehicle.

(15) Install console and or instrument panel lower center cover and ash receiver assembly. Refer to Group 8 Electrical in this service manual for the required installation procedure.

(16) Install the left and right cowl area trim panels. Refer to Group 8 Electrical in this service manual for the required installation procedure.

(17) Install the 2 air bag fuses back in the junction block. Refer to (Fig. 7) for the proper fuse locations.

(18) Install the instrument panel left and right end covers.

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

(19) Align master splines on steering wheel and steering column shaft. Then install steering wheel on steering column shaft routing wiring through steering wheel as shown in (Fig. 19). Install steering wheel to steering column retaining nut, tighten nut to draw steering wheel onto steering column shaft. Torque steering wheel to steering column retaining nut to 61 N•m (45 ft. lbs).

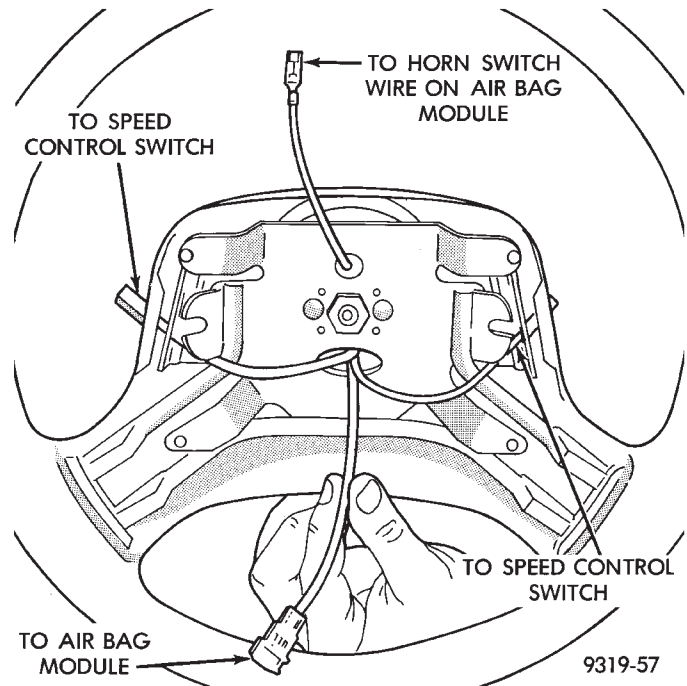


Fig. 19 Wire Routing Through Steering Wheel

(20) Connect vehicle wiring harness connectors to connections on air bag module (Fig. 20).

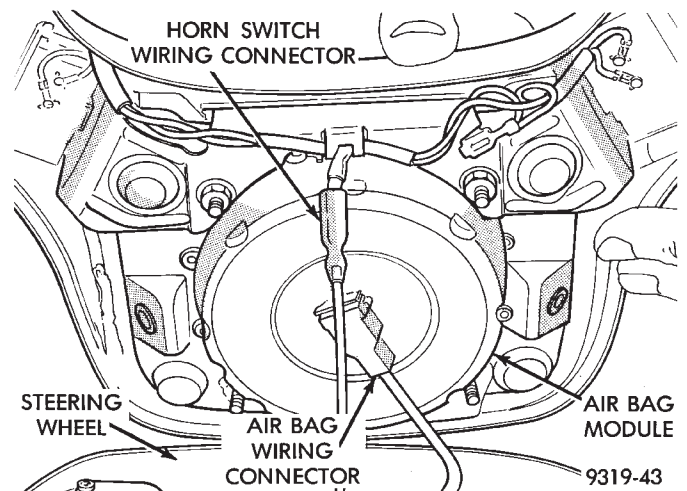


Fig. 20 Wiring Harness connections At Air Bag Module

(21) Install air bag module into steering wheel being careful not to pinch any wires. Install the 2 air bag module to steering wheel attaching bolts (Fig. 21). Center air bag module to steering wheel spokes and tighten bolts to hold air bag module in place.



Torque the 2 air bag module to steering wheel attaching bolts to 10 N•m (8 ft. lbs.).

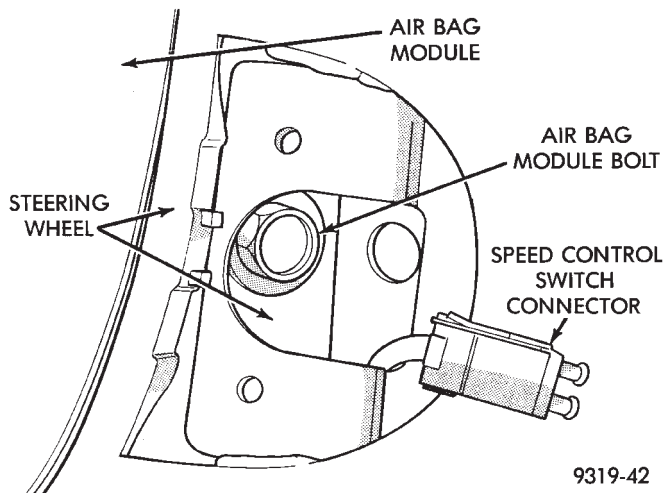


Fig. 21 Air Bag Module Attaching Bolts

(22) Connect the speed control switches to the vehicle wiring harness. Install speed control switches into steering wheel then install and securely tighten the 2 screws attaching each speed control switch to the steering wheel. If vehicle is not equipped with speed control install the 2 speed control switch covers.

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

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

STEERING COLUMN COMPONENT SERVICE

The Saginaw tilt steering column has been designed to be serviced as an assembly; less wiring, switches, shrouds, steering wheel, etc. Also most steering column components can be serviced without removing the steering column from the vehicle. For additional information on electrical components refer to **Group 8H Electrical**.

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

GEAR SHIFT LEVER

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

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

REMOVE

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

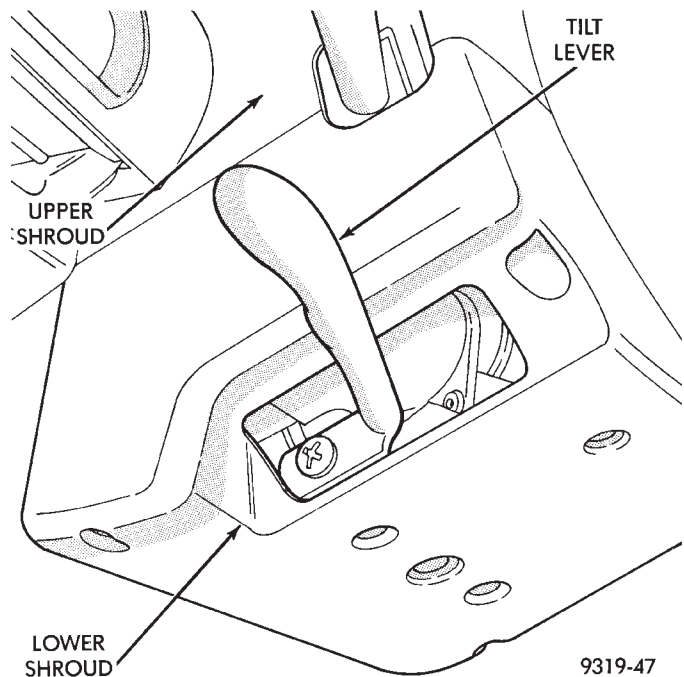


Fig. 1 Tilt Lever And Upper And Lower Shrouds

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

(3) Unlock shift cable adjuster.

(4) Remove the 3 Torx head screws attaching the shifter assembly to the steering wheel tilt housing (Fig. 2). Then remove shifter assembly from tilt housing and unhook interlock cable from shifter assembly (Fig. 2).

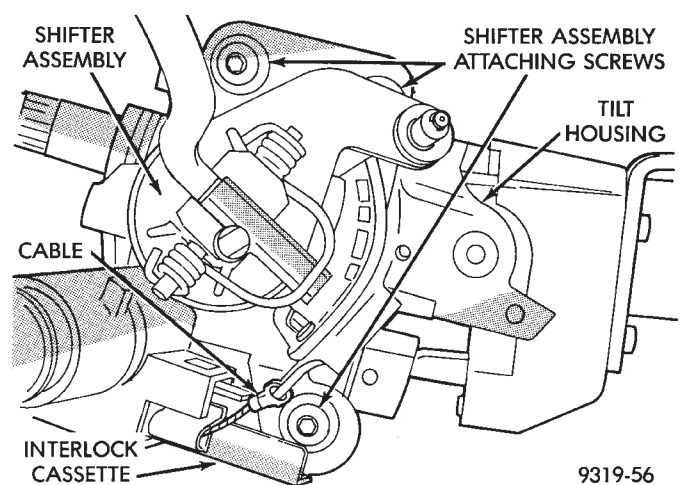


Fig. 2 Shifter Assembly Attachment To Tilt Housing

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



INSTALL

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

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

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

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

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

(6) Lock the gear shift cable adjuster.

(7) Install upper and lower shroud on steering column assembly and tilt lever (Fig. 1).

STEERING COLUMN JACKET BUSHING ASSEMBLY

If diagnosed to be defective, the steering column jacket bushing assembly can be serviced as a separate component of the steering column. Thus not requiring replacement of the entire steering column assembly.

The steering column assembly will need to be removed from the vehicle to allow replacement of the steering column jacket bushing assembly.

REMOVE

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

(2) Remove steering coupler from steering shaft (Fig. 3) by removing spring pin from coupler and sliding coupler off end of steering shaft. Steering column shaft must be supported during removal of spring pin. This is to prevent damage to steering column bearings.

(3) Separate steering column bracket from jacket bushing, by depressing retaining tabs on bushing and sliding bracket off bushing (Fig. 4).

(4) Using a pin punch lightly tap jacket bushing off end of steering column jacket and steering shaft (Fig. 5).

INSTALL

If the replacement steering column jacket bushing comes assembled to the lower steering column mounting bracket. Separate steering column jacket bushing from bracket before installing bushing on steering column. Use procedure in step 3 of the bushing removal procedure.

(1) Align tab on steering column jacket bushing, with slot in steering column jacket. Push steering

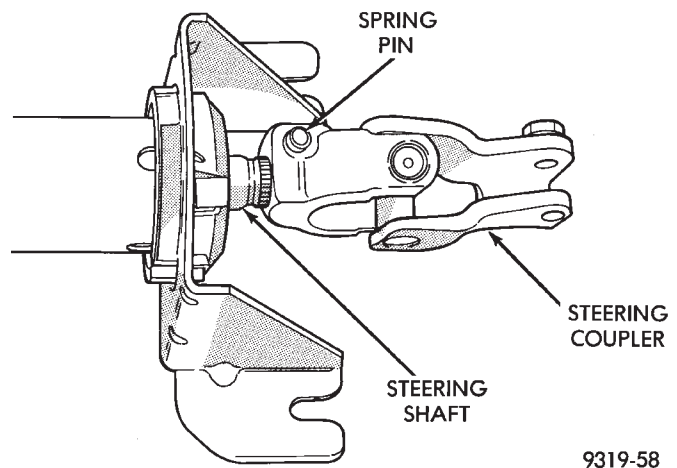


Fig. 3 Coupler Removal From Steering Column Shaft

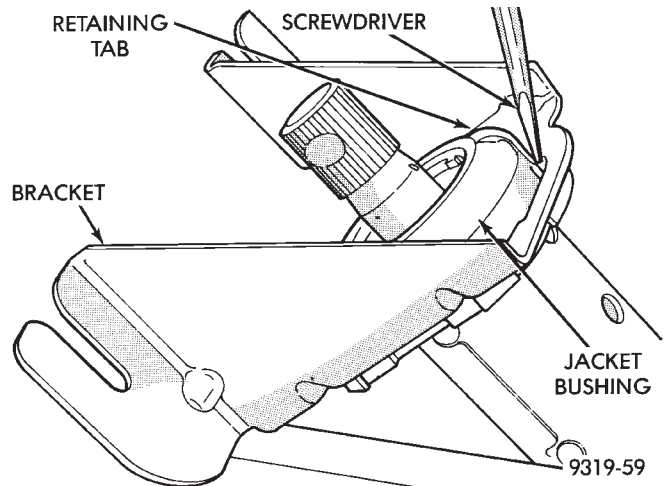


Fig. 4 Bracket Removal From Jacket Bushing

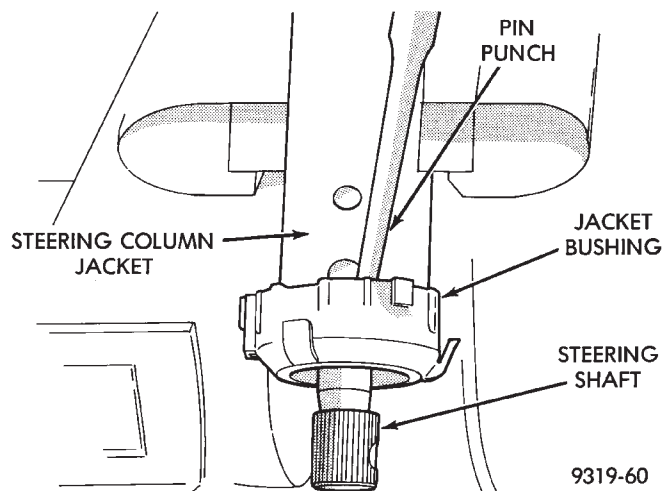


Fig. 5 Jacket Bushing Removal From Steering Column Jacket

column jacket bushing on steering column jacket by hand until tab is started into slot.



1993 Concorde/Intrepid/Vision
Publication No. 81-270-3140
TSB 26-12-96 December, 1996

(2) Position steering column in an arbor press supported by the upper mounting bracket as shown in (Fig. 6). Place Installer, Special Tool MB-990800 on steering column jacket bushing and squarely align steering column with ram of arbor press. Press bushing onto steering column jacket until fully seated.

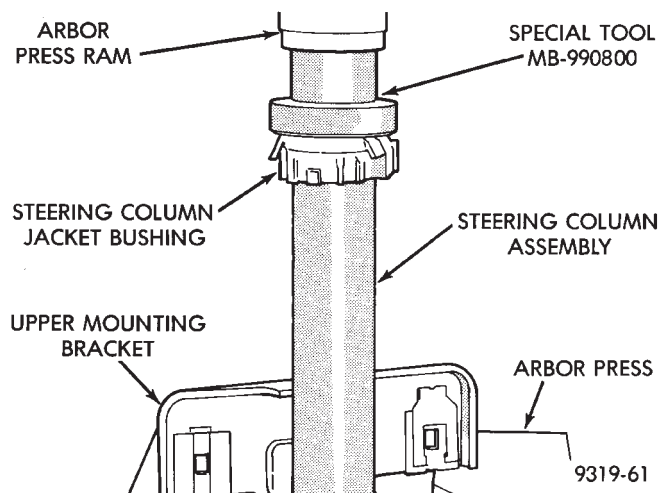


Fig. 6 Installing Steering Column Jacket Bushing

(3) Correctly align tabs on steering column jacket bushing with lower steering column bracket. Then

push bracket onto bushing until fully seated against alignment tabs on bushing. Be sure all 3 retaining tabs are expanded out past edge of lower bracket.

(4) Install steering coupler on steering shaft until correctly positioned to allow spring pin to be installed in coupler. Then install spring pin into coupler, until flush with surface of steering coupler (Fig. 7). Steering column shaft must be supported during installation of spring pin. This is to prevent damage to steering column bearings.

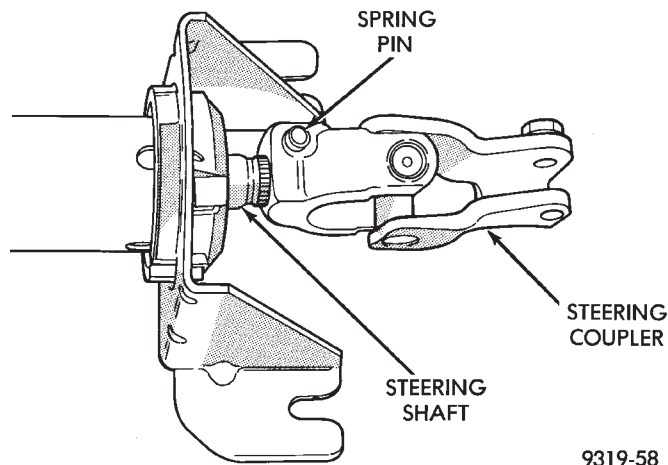


Fig. 7 Coupler Installed On Steering Column Shaft

SPECIFICATIONS AND TIGHTENING REFERENCE

POWER STEERING PUMP SPECIFICATIONS

POWER STEERING PUMP SPECIFICATIONS	
Output Flow at 1500 rpm and Minimum Pressure	7.2 to 8.7 Liters/Min (1.9 to 2.3 GPM)
Pressure Relief.....	8275 to 8975 kPa (1200 to 1300 psi)

9319-62

TORQUE SPECIFICATIONS

DESCRIPTION	TORQUE
Steering Gear To Crossmember Bolts	68 N•m (50 ft. lbs.)
Tie Rod End To Strut Steering Arm Attaching Nut	37 N•m (27 ft. lbs.)
Inner and Outer Tie Rod To Adjustment Sleeve Jam Nut.....	75 N•m (55 ft. lbs.)
Power Steering Pressure Hose Tube Nuts	31 N•m (23 ft. lbs.)
Return Tube Nut.....	31 N•m (23 ft. lbs.)
Power Steering Fluid Pressure Hose To Discharge Fitting	34 N•m (25 ft. lbs.)
Power Steering Pump Discharge Fitting (Saginaw)	75 N•m (55 ft. lbs.)
Power Steering Pump To Bracket Mounting Bolts.....	48 N•m (35 ft. lbs.)
Steering Wheel To Shaft Nut.....	61 N•m (45 ft. lbs.)
Steering Column Stud Nut	12 N•m (105 in. lbs.)
Steering Column Clamp Bolt	12 N•m (105 in. lbs.)

9319-63