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27-7617, 8412, 8413 Clunking Noise After Replacement

Application:

2002-2006 Cadillac Escalade Models
2000-2006 Chevrolet Suburban, Tahoe Models
2002-2006 Chevrolet Avalanche
2000-2006 GMC Yukon, Yukon XL Models
2003-2006 Hummer H2

Problem:

After replacing the steering gear box, some customers may comment on a clunk-type noise coming from under the hood that may also be felt in the steering wheel. These conditions may be more noticeable when turning at low speeds on rough road surfaces.

Cause:

Lower steering column bearing or the intermediate steering shaft may be the source of the noise.

Solution:

GM Technical Service Bulletin No.: 00-02-35-003N, dated: March 26, 2008 describes how to inspect and diagnose the lower steering column bearing and intermediate steering shaft as the source of the noise. The bulletin specifies the applications affected and references other vehicles with similar problems.

The lower steering column bearing may create the same noise as a defective intermediate steering shaft. Before replacing the intermediate shaft, check the steering column bearing first for movement by pushing up and down on the intermediate shaft where it attaches to the steering column.

Note:

Please refer to this TSB and your vehicle's service manual for specific diagnostics and detailed instructions. This ProTech bulletin is supplied as technical information only and is not an authorization for repair.

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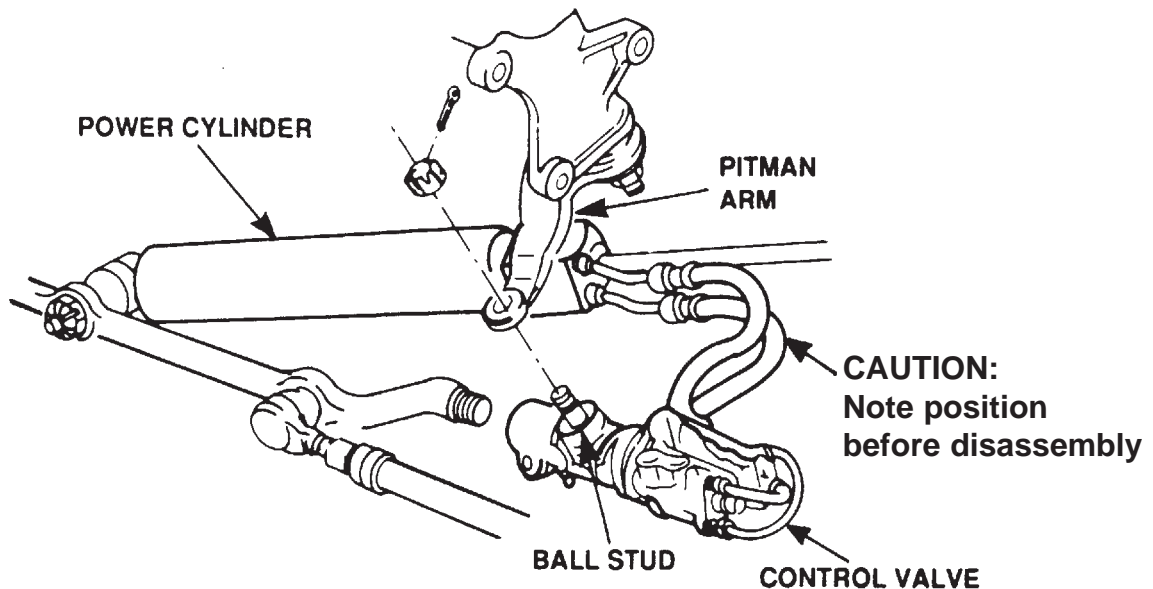


DON'T GET YOUR LINES CROSSED

Application: All linkage-type Power Steering Systems

Problem: After replacing the power steering unit, the vehicle steers violently from side to side by itself.

Solution: When installing a control valve or power cylinder, be extremely careful not to cross the pressure lines to the cylinder. Failure to do so can lead to a malfunction and could result in bodily injury and VOID WARRANTY.



Caution: When replacing any part in the power steering system, ALWAYS FLUSH THE SYSTEM USING APPROVED POWER STEERING FLUID AND REPLACE HOSES! New parts can become contaminated with residues from existing components possibly causing malfunctions.

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Binding Steering On Turns

Application:

Applies to all steering systems.

Problem:

Binding, tight feel when turning steering wheel.

Cause:

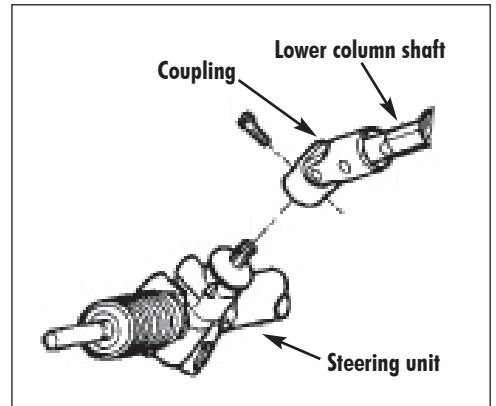
Possible steering coupling universal joint failure.

Solution:

Steering binding is often mistakenly diagnosed as a defective steering unit or power steering pump. Further diagnosis may reveal that it is a frozen or sticking universal coupling on the steering shaft that connects to the unit input shaft. Most couplers are sealed and cannot be lubricated. Exposure to weather and road conditions causes them to dry out and rust, shortening their life.

Test Procedure:

1. Disconnect the coupling from the steering unit input shaft (usually attached with a pinch bolt).
2. After sliding the coupling off of the input shaft, rotate the coupling U-joint in both directions to feel for any binding or tight spots.
3. If it is binding or tight, replace the coupling with a quality replacement.
4. If it is free and no binding is found, re-install coupling and continue diagnosis of other steering linkage and all mechanically-connected components. If all component test results are good, continue with diagnosis of hydraulic system including pressure tests. Refer to your vehicle's service manual for repair procedures, specs and possible TSB's.



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GM Power Steering Gear Pop or Crunch Noise

Application:

GM power steering gears: 27-6535, 6560, 7525, 7547, 7549, 7561, 7562, 7563, 7573 and 7583.

Problem:

Crunch and/or popping sound during low-speed turning.

Cause:

The lower control arm may be striking the steering knuckle during full-turn-type maneuvers, causing the crunch sound. Slight movement between the steering gear attaching bolt threads and the frame rail inboard steering gear attaching holes may cause the popping sound.

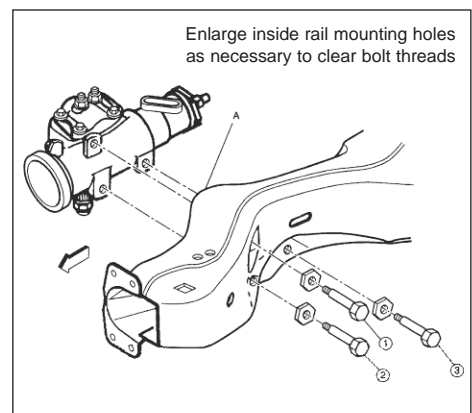
Solution:

Crunch sound: Applying a light coat of grease on the control arm and knuckle where contact is made should reduce the noise.

Popping sound: Examine the frame rail inboard steering gear attaching holes for evidence of bolt thread contact. Enlarge inboard mounting holes that show contact only enough to allow the bolt threads to be free in the frame holes (use appropriate tools for the job). Reinstall the gear, but do not tighten bolts 1, 2 and 3 (see figure 1). Then perform the following steps:

1. Start the vehicle and cycle the steering lock to lock several times, allowing the gear to reposition itself.
2. Torque attaching bolts (1, 2 and 3) to 70 ft. lbs. (95 Nm).

Please refer to the vehicle service manual for detailed gear removal and installation procedures.



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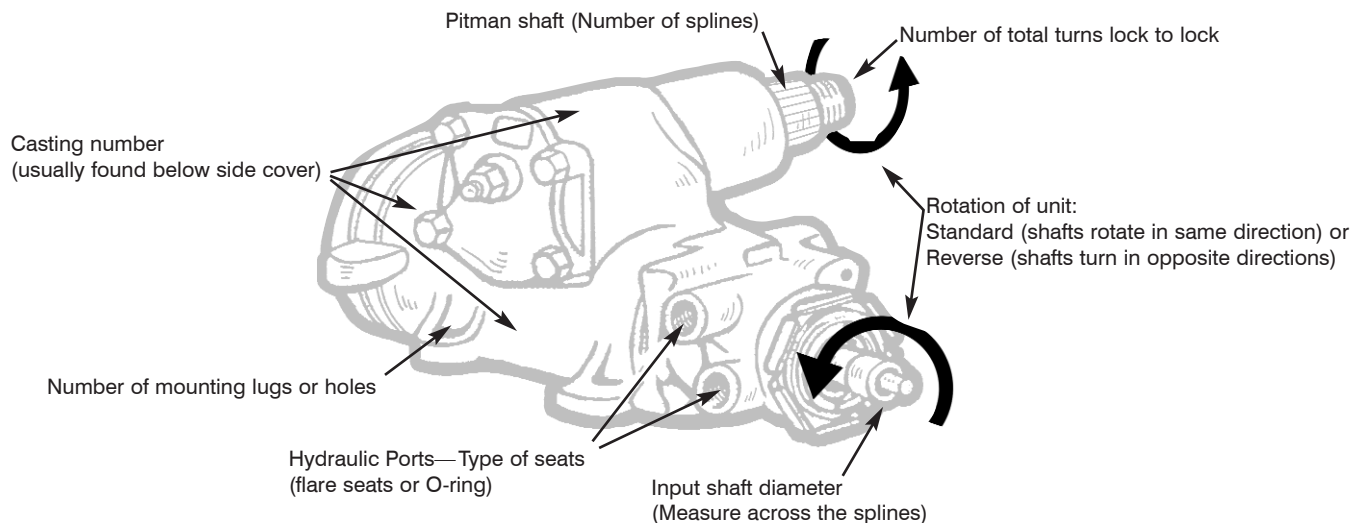
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Gear Box Identification Guide

To properly identify a power steering gear box, use the following identification guide:

- Casting number (see catalog)
- Number of mounting holes
- Input shaft diameter (measure across the splines)
- Type of hydraulic port seats (flare or o-ring)
- Pitman shaft spline count
- Rotation of unit (standard or reverse)
- Number of total turns lock-to-lock

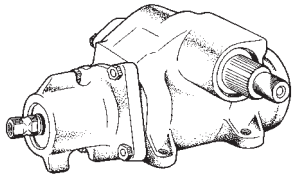


Note:

- Ford units may have an ID tag.
- Saginaw units may have a broadcast code printed on side cover.
- Chrysler units may require transfer of steering and control valve bodies (Refer to PT 27-0001).

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Steering Components



- Control Valves
- Power Steering Filters
- Rack & Pinion Units
- Power Cylinders
- Power Steering Pumps
- Steering Gears

- Full-line domestic and import coverage
- Limited lifetime warranty
- Hydraulically tested for proper flow, seal, pressure and output, guaranteeing like-new performance
- 100% new seals and o'rings installed
- All critical parts tested three times before leaving the factory
- CARDONE Steering components painted for consistent appearance
- The industry's leading full-line national Steering components remanufacturer
 - An aggressive new product introduction program keeps you on the leading edge with the parts you need.
- Outstanding availability
 - The best and most consistent in the industry!
- ASE certified technical support
 - CARDONE Steering components stay sold!
- Priority Plus emergency overnight shipping
 - This service helps you increase your customers' satisfaction.
- Easy-to-use catalogs, product instruction guides and tech service bulletins
 - Outstanding product support!



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Identifying Steering Gear 27-7565 and 27-7569

Application:

Ford trucks with power steering gear, specifying either 27-7565 (OE numbers F7UZ 3504-GA, F7UZ 3504-GARM/GBRM), or 27-7569 (OE number F7UZ 3504-FA, F7UZ 3504-FARM/FBRM, 2C3Z 3504-AARM/ABRM, YC3Z 3504-AARM/ABRM).

Problem:

How to determine which unit to order — what is different?

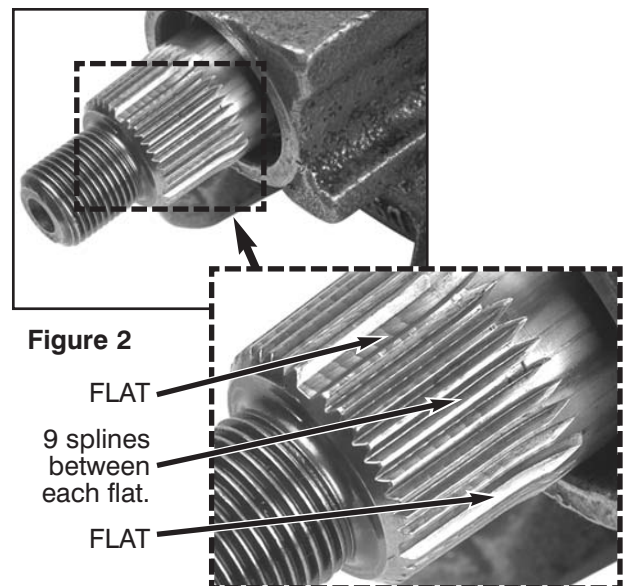
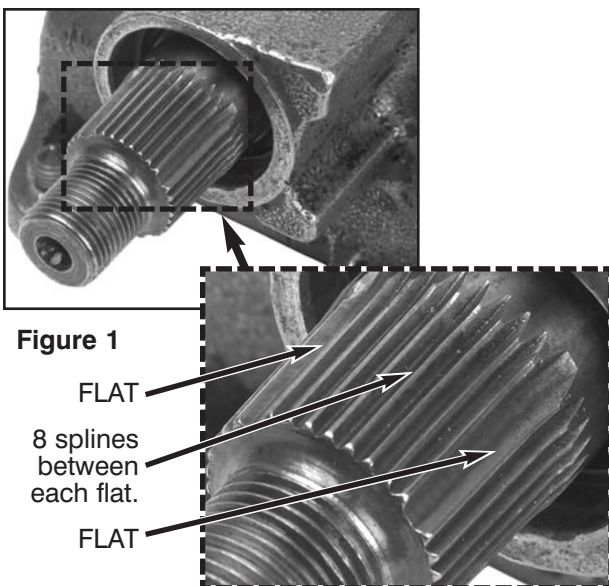
Solution:

Pitman shafts have different spline counts.

27-7565 has a total of 32 splines (4 flats with 8 splines between flats)

Figure 1.

27-7569 has 36 splines (4 flats with 9 splines between flats) **Figure 2.**



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Steering Gear Pitman Shaft Movement

Application:

Vehicles with power steering gear boxes.

Problem:

Observed side-to-side movement of the steering gear box pitman shaft.

Cause:

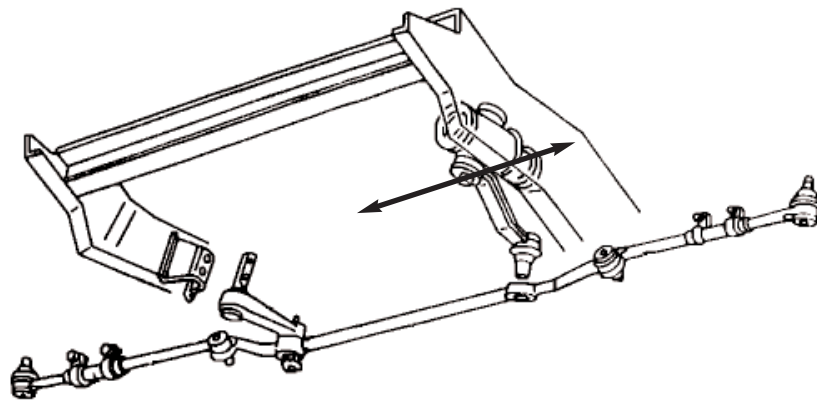
The majority of power steering gears are built with a roller bearing that supports the pitman shaft and allows it to rotate; the force that is placed on the pitman arm transfers to the pitman shaft. This roller bearing is designed to absorb that type of movement, however, for some applications a noticeable amount of lateral movement can be observed (see graphic below). This is a normal characteristic of a roller bearing when used in this application.

IMPORTANT NOTE

- This is not the result of a defective steering gear and/or other related internal steering gear components.
- This type of play is not related to excessive steering wheel play or vehicle drift and wander.

Solution:

Diagnosis and repair of steering wheel play, vehicle drift or vehicle wander may be attained by referencing your vehicle's service manual and technical service bulletins related to steering problems. For example, see Chrysler (Dodge truck) TSB 05-04-99.



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POWER STEERING—DO'S & DON'TS

Listed below are a few basic, but important tips to help ensure a successful installation of a replacement power steering pump.

DO: Replace all hoses that show signs of cracking and/or deterioration.

DON'T: Use a hammer, press or impact gun when installing pulley on the replacement pump.

ALWAYS USE A HAND WRENCH.

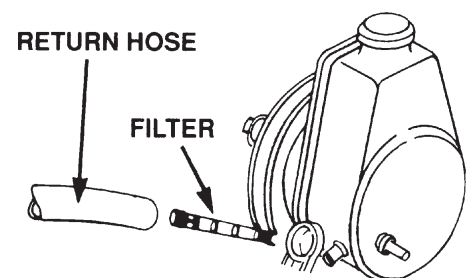
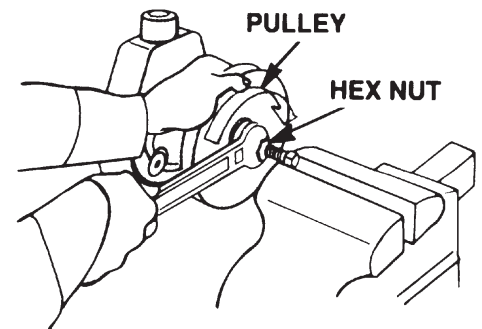
DON'T: Assume the system is free of contaminants. Failure to flush will lead to premature pump failure.

DO: Torque mounting bolts and hoses to proper specifications. Use a belt tension gauge when installing belt. Refer to vehicle service manual for proper tightening specifications.

DON'T: Let a quality job go to the shop unprotected.

DO: Use a power steering filter when applicable.

DO: Use new fluid recommended for your vehicle.



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ProTech Bulletin Summary: Rack and Pinion, Steering Gear, Control Valve and Power Cylinder

Before replacing any power steering component, the cause of original unit failure must be determined and corrected. Installing a replacement unit without correcting the problem will lead to early failure. Always refer to the vehicle service manual for specific installation procedures and specifications. The ProTech bulletins listed below cover topics that should be done BEFORE, DURING or AFTER installation of the replacement unit. They assist with part selection, describe typical problems and solutions, and provide installation help and service advice.

Before Installation:

- 20-0016 Consider replacing older hydraulic hoses
- 22-0005 Ford ID guide
- 22-0008 1996-1998 GM applications, CARDONE upgrade overcomes bearing problem
- 27-0002 GM gearbox ID guide
- 27-0005 27-7565 and 27-7569 difference ID guide

During Installation:

- 20-0007 O-ring line and fitting seals must be replaced
- 20-0008 Flushing must be done
- 20-0010 Relocating hose may eliminate noisy operation
- 20-0012 Preferred flushing procedure
- 20-0014 Prevent steering column air bag coil damage
- 20-0027 Use correct OE approved fluid, do not use "top-off" products
- 22-0001 No thread sealing tape on fittings, check for damaged hoses, other problems, and flushing tip
- 22-0003 Loosening boot clamps to prevent boot damage during alignment
- 22-0004 Common causes of port thread damage
- 22-0006 Center Take Off (CTO): prevent damage to rack – use only original mounting hardware
- 22-0007 Ford rack hydraulic ports identical size - which is pressure, which is return ID guide
- 22-0009 Chrysler van shudder problem
- 22-0010 Ford rack units may have a pressure port check valve - where does it install
- 26-0001 Jaguar installation tip for 26-1916
- 26-0002 Toyota leaking fittings: causes and solutions
- 27-0001 Chrysler 1962-1972 troubleshooting tips
- 28-0001 Power cylinder and control valve lines easily crossed

After Installation:

- 20-0004 Defective old hoses and improper flushing allow contamination to prevent proper operation
- 20-0005 Prevent problems - replace old hoses
- 20-0021 Two different in-line filters fight contamination
- 27-0003 Dodge truck side-to-side movement: TSB alert
- 27-0006 Popping, crunch noise on certain GM steering gears
- 27-0007 Binding on turns
- 27-0008 Test installed unit under pressure to avoid false loose evaluation

CARDONE Technical Service develops ProTech bulletins that are intended to help the installer avoid common installation and service errors. The information presented is derived from our own experience, and product knowledge gained from component analysis and research. Following these tips will ensure the best possible performance and service life of the replacement unit.

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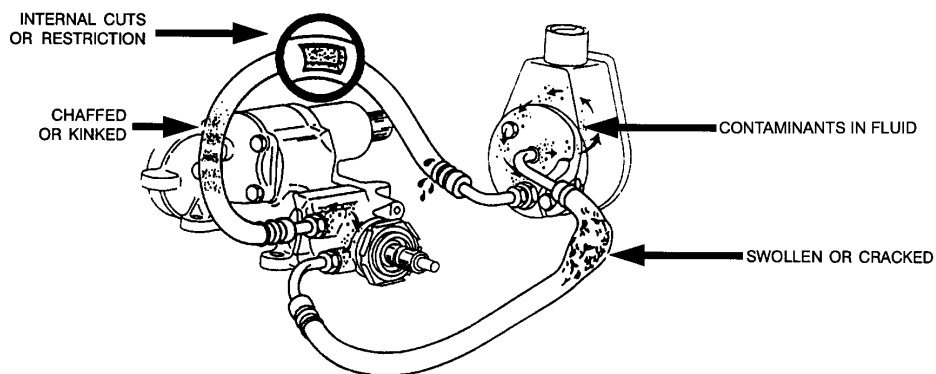
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Royal Flush - Simple Power Steering Contamination Test

Prior to replacing any power steering system component, the power steering system must be flushed before operation. Flushing removes old hydraulic fluid and contaminants in the power steering system that will cause accelerated wear or improper operation of the replacement unit. Follow the steps below to properly flush the system.

- 1) Remove pressure and return lines from pump. Flush pump reservoir, return and pressure lines by pouring new fluid through components until fluid runs clear. Be sure to only use fluid recommended for your vehicle.
- 2) Reconnect pressure line to pump and steering component. Reconnect return line only to steering component.
- 3) Place return line from power steering unit into a drain pan. Cap return port on reservoir to prevent leakage.
- 4) Fill power steering pump reservoir with NEW fluid recommended for your vehicle.
- 5) Disable the engine so it will not start when cranked. Refer to vehicle service manual for correct procedure.
- 6) Crank engine and continue to replenish fluid until fluid coming from return line has no air bubbles. NEVER LET THE POWER STEERING PUMP RUN DRY! Note: Do not crank engine for more than a few seconds at a time or starter will overheat.
- 7) Install an in-line power steering filter in return line to increase the life of the power steering components. Connect the return line to the power steering pump, making sure all lines are properly torqued. Overtightening hydraulic lines will strip the threads. Failure to install a filter or properly torque fittings will VOID WARRANTY.
- 8) Be sure fluid in pump reservoir is at proper operating level.
- 9) Start the engine and turn the steering wheel from side to side 2 to 4 times to bleed the system.
- 10) Refill reservoir to proper level if necessary.
- 11) Check for smooth assist, excessive noise, connections for leakage and system for proper operation.



Note:

CARDONE recommends replacing flexible power steering lines that are more than 4 years old.

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Test Steering Gears Under Pressure

Application:

All Domestic Power Steering Gears

Problem:

After installation of a replacement unit, input shaft free-play seems excessive.

Cause:

Unit must be tested under pressure from power steering pump.

Solution:

Most steering gears will have more free-play around center until power steering pressure is applied to the gear. Follow the test steps below when testing for free-play.

1. Gear must be on mechanical center. Determine center by dividing total turns lock-to-lock in half. If gear is not centered there will be excessive play.
2. Start engine. Be sure pump is producing proper pressure and flow through the gear. If gear is not under pressure, the input shaft (which consists of a torsion bar within the spool valve) will produce play. When under pressure, the fluid compensates. With no pressure applied, input play can exceed 5 degrees.
3. Test unit.

If free-play persists, be sure coupler is good, it is firmly tightened to the shaft, suspension components and linkages are serviceable, and tires are correct for the vehicle and properly inflated.

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TROUBLESHOOTING CHRYSLER POWER STEERING GEAR BOXES

Application:

Chrysler vehicles 1962-1972 (27-6546), 1975-1988 (27-6542)

Problem:

Whine or growl noises.
Poor steering return.
Hard steering or lack of assist.
Binding in steering or leakage.

Cause:

Sticking Power Piston or restriction in Control Valve Body.

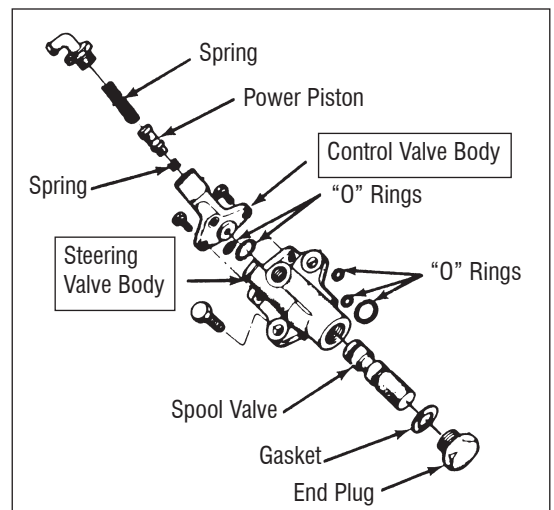
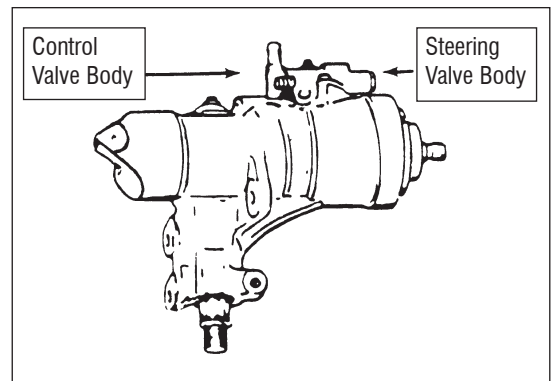
Solution:

Disassemble *Control Valve Body*. Clean & inspect all parts. Flush system thoroughly and bleed according to manufacturers specifications.

NOTE: *Control Valve* body *may not* be supplied with your replacement gear box. Do not transfer part until thoroughly flushed

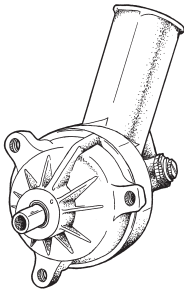
Note:

Do not tamper with steering valve body, this is pre-set at the factory.



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Power Steering Pumps



- Control Valves
- Power Cylinders
- Power Steering Pumps
-Filters
- Rack & Pinion Units
- Steering Gears

Cam Rings - In order to prevent low flow, noise, or no pressure, CARDONE resurfaces the cam ring to give it the original, consistent surface. By running your finger around the inside of the cam ring, you will be able to feel the smooth inner surface. Every unit is tested for proper flow and pressure to make sure it meets all OEM specifications. This process ensures a high quality unit that won't come back.

