MANUAL STEERING GEAR TROUBLE SHOOTING

CONDITION & POSSIBLE CAUSE	CONDITION & POSSIBLE CAUSE
Rattle or Chucking Noise in Rack and Pinion. • Rack and pinion attachment loose. • Lack of lubricant, or incorrect lubricant in rack and pinion assembly. • Pitman arm loose on shaft, or steering gear mounting bolts loose. **Excessive Play or Looseness** • Front wheel bearing improperly adjusted. • Loose or worn steering linkage, ball joints or steering gear shaft. • Steering arm loose on steering gear shaft. • Incorrect front wheel alignment. • Steering gear housing attachment bolts loose, or steering gear adjustment too loose. • Steering arms loose at knuckles. • Grease, oil or fluid on brake linings. • Rack and pinion mounting loose or out of adjustment. • Tie rod end loose. • Steering wheel loose. • Excessive Pitman shaft-to-ball nut lash. **Poor Returnability** • Lack of lubricant in ball joints, steering gear or linkage. • Binding in linkage or ball joints. • Improper front end alignment, steering gear adjustment or tire pressure.	**Wheel Tramp (Excessive Vertical Motion)** • Improper tire pressure. • Improper balance of wheels, tires or brake rotors. • Worn or faulty shock absorbers. • Loose tie rod ends or steering connections. • Improper wheel alignment. • Loose or worn wheel bearings. **Steering Pulls to One Side** • Improper tire pressure, or mismatch of front tires. • Wheel bearings not adjusted properly. • Bent suspension components, or broken or sagging springs. • Improper wheel alignment. • Brakes dragging. **Instability** • Low or uneven tire pressure. • Loose or worn wheel bearings, idler arm bushing or strut bushings. • Incorrect front wheel alignment. • Steering gear not centered. • Broken rear springs or inoperative shock absorbers. • Improper steering cross shaft adjustment.

POWER STEERING TROUBLE SHOOTING

CONDITION & POSSIBLE CAUSE	CONDITION & POSSIBLE CAUSE
Power Steering Noise Diagnosis **Rattle or Chucking in Steering Gear** • Pressure hoses touching engine parts. • Loose Pitman shaft over center adjustment. • Tie rod ends, or Pitman arm loose. • Rack and pinion attachment loose. • Free play in worm and piston assembly. • Loose sector shaft or thrust bearing adjustment. • Free play in pot coupling, or worn shaft serrations. **Growl in Steering Pump** • Excessive back pressure in hoses or steering gear because of restrictions. • Scored pressure plates, thrust plates or rotor. • Extreme wear of cam ring.	**Rattle in Steering Pump** • Vanes not installed properly, or vanes sticking in rotor slots. **Swish Noise in Steering Pump** • Defective flow control valve. **Groan in Steering Pump** • Air in fluid, or poor pressure hose connections. **Squawk Noise When Turning** • Damper "O" ring on valve spool cut.

POWER STEERING TROUBLE SHOOTING (Cont.)

CONDITION & POSSIBLE CAUSE

Power Steering Noise Diagnosis (Cont.)

Moan or Whine in Steering Pump

- Pump shaft bearing scored.
- Air in fluid, or low fluid level.
- Hose or column grounded.
- Valve cover "O" ring missing or damaged.
- Valve cover baffle missing or damaged.
- Interference of components in pumping elements.
- Loose or poor bracket alignment.

Hissing Noise When Parking

- Internal leakage in steering gear. Check valve assembly first.

Chirp Noise in Steering Pump

- Loose or worn power steering pump belt.

Buzzing Noise When Not Steering

- Noisy pump.
- Free play in steering shaft upper bearing or bearing loose on shaft serrations.

Clicking Noise in Pump

- Noise probably caused by pump slippers being too long, broken slipper springs, excessive wear, nicked rotors or damaged cam contour.

Power Steering Handling Diagnosis

Poor Return of Steering Wheel to Center

- Steering wheel rubbing against turn signal housing.
- Lower coupling flange rubbing against steering gear adjuster plug.
- Tight or frozen steering shaft bearings.
- Steering gear adjustment over specifications.
- Sticking or plugged spool valve.
- Improper front end alignment.
- Wheel bearings worn or loose.
- Tie rods or ball joints binding.
- Intermediate shaft joints binding.
- Kinked pressure hoses.
- Loose housing head spanner nut.
- Damaged valve lever.
- Sector shaft or worm thrust bearing adjustment too tight.
- Reaction ring sticking in cylinder or housing head, or seal worn.
- Steering pump internal leakage.
- Steering gear-to-column misalignment.
- Lack of lubrication in steering linkage or ball joints.

CONDITION & POSSIBLE CAUSE

Momentary Increase in Effort When Turning Left or Right Fast

- High internal pump leakage.
- Power steering pump belt slipping.
- Low fluid level.
- Engine idle speed too low.
- Air in pump fluid system.
- Pump output low.
- Steering gear malfunctioning.

Steering Wheel Surges or Jerks When Turning

- Low fluid level or loose fan belt.
- Insufficient pump pressure.
- Sticky flow control valve.
- Steering linkage hitting engine oil pan at full turn.

Excessive Wheel Kick Back or Free Play

- Air in pump fluid system.
- Worn poppet valve in steering gear.
- Excessive over center lash.
- Loose thrust bearing preload adjustment in steering gear.
- Free play in pot coupling.
- Steering gear flexible coupling loose on shaft, or rubber disc mounting nuts loose.
- Coupling loose on worm shaft serrations.
- Improper sector shaft adjustment.
- Excessive worm piston side play.
- Damaged valve lever.
- Universal joint loose.
- Defective rotary valve.

Lack of Power Assist When Parking

- Sticking flow control valve.
- Insufficient pump pressure output.
- Excessive internal pump leakage.
- Excessive internal gear leakage.
- Lower coupling flange rubbing against steering gear adjuster plug.
- Loose pump belt or low fluid level.
- Engine idle speed too low.
- Steering gear-to-column misalignment.

Lack of Power Assist in Left Turns

- Left turn reaction seal "O" ring worn, damaged or missing.
- Cylinder head "O" ring damaged.

Lack of Power Assist in Right Turns

- Column pot coupling bottomed.
- Right turn reaction seal worn, missing or damaged.
- Excessive internal leakage through piston end plug and/or side plugs.

POWER STEERING TROUBLE SHOOTING (Cont.)

CONDITION & POSSIBLE CAUSE	CONDITION & POSSIBLE CAUSE
Power Steering Handling Diagnosis (Cont.) **Lack of Effort in Turning** • Left or right reaction seal worn or damaged. • Left or right reaction oil passageway not drilled in housing or cylinder head. • Left or right reaction seal ring sticking in housing head. **Car Wanders to One Side** • Front end alignment incorrect. • Unbalanced steering gear valve.	**Low Pressure Due to Steering Pump** • Flow control valve stuck or inoperative. • Pressure plate not flat against cam ring. • Extreme wear of cam ring. • Scored pressure plate, thrust plate or rotor. • Vanes not installed properly, or vanes sticking in rotor slots. • Cracked or broken thrust or pressure plate. **Low Pressure Due to Steering Gear** • Pressure loss in cylinder due to worn piston ring or scored housing bore. • Leakage at valve rings, or at valve body-to-worm seal connection. **Foaming, Milky Power Steering Fluid, Low Fluid Level or Low Pressure** • Air trapped in fluid, and loss of fluid due to internal pump leakage which creates fluid overflow.