

## MERCEDES-BENZ POWER-ASSISTED RECIRCULATING BALL

### All Models

### DESCRIPTION

Power steering is composed of power steering pump and steering gear. Some models use a VT27 pump, which has a separate oil reservoir, and some models use a VT49 pump, which has an integral oil reservoir.

Both power steering pumps are engine driven vane type with control valve. The purpose of the steering gear pump is to supply fluid (under pressure) to the steering gear.

Steering gear has integral piston/steering nut. Fluid pressure to each side of piston/steering nut is controlled by a control valve which is moved by a lever from steering column shaft.

**NOTE** – VT27 pump (separate reservoir) and VT49 pump (integral reservoir) are similar, however removal and overhaul procedures for the VT49 pump were not available at time of publication.

### LUBRICATION

**Capacity** – 2.6 pts. (1.5 lts.) automatic transmission fluid.

### REMOVAL & INSTALLATION

#### POWER STEERING PUMP

**Removal (VT27)** – Remove power steering tank cover, spring and damping plate. Drain tank with a syringe. Disconnect and plug high pressure and return hoses.

2) Loosen fastening bolts and push pump towards engine, remove "V" belts from pulley. Remove remaining bolts and remove pressure pump with carrier.

**Installation (VT27)** – To install power steering pump, reverse removal procedure. Fill system with recommended fluid.

#### POWER STEERING GEAR

**Removal** – 1) Drain fluid from power steering pump. Disconnect and plug pressure line and return line from steering gear. Remove bolts from steering coupling. Remove rear exhaust system and left hand exhaust pipe at manifold (all 450 models). Disconnect center link and tie rod from pitman arm. Remove bolts securing steering gear to frame, force steering gear from steering column shaft, in a downward direction.

2) Drain fluid from steering gear, remove steering coupling and pitman arm from gear (be sure to mark pitman shaft-to-pitman arm position for proper assembly).

**Installation** – To install steering gear, reverse removal procedure. Replace locking nuts and bolts, tighten to specifications. Fill system with recommended fluid.

### OVERHAUL

#### POWER STEERING PUMP

**Disassembly (VT27)** – 1) Remove knurled nut and tank cover with seal.

2) Remove spring, damping plate and filter ring

3) Remove bolt and hollow screw, then remove tank with "O" rings from pump housing.

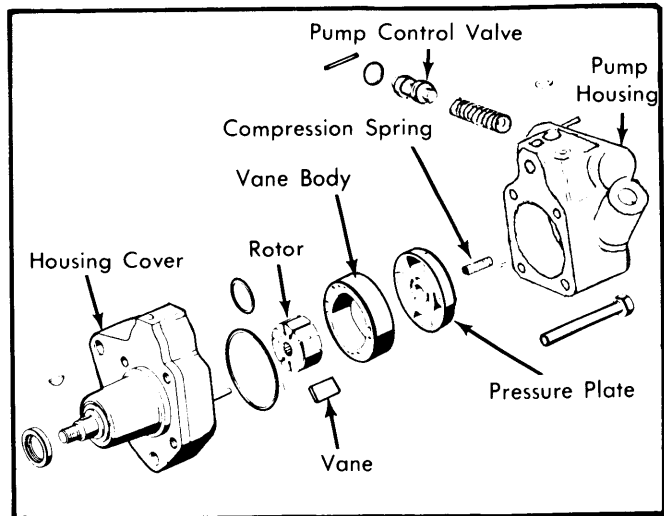


Fig. 1 Exploded View of Power Steering Pump (VT 27 Shown)

4) Remove bolts connecting pump cover to pump body.

5) Remove compression spring from pressure plate. Mark pressure plate and vane body and then lift off pressure plate from pins on vane body.

6) Remove vane rotor with vanes and vane body. Remove all "O" rings then remove control valve from pump body.

7) Dismantle control valve and check for worn, damaged or missing parts. See Fig. 1.

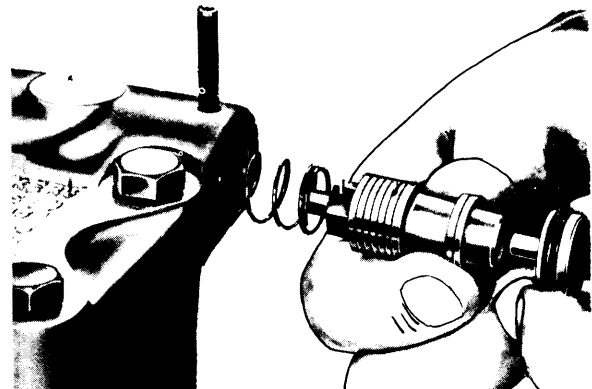


Fig. 2 Removing Pump Control Valve Assembly (VT27 Shown)

### MERCEDES-BENZ POWER-ASSISTED RECIRCULATING BALL (Cont.)

**Inspection (VT27)** – 1) Check vanes and rotor for damage or wear: vanes should slide easily in rotor. If necessary, replace vanes and rotor.

2) Check vane body for excessive wear. If necessary to replace vane body, vanes and rotor must also be replaced.

3) Check running surfaces of housing cover. If worn, replace entire pump. Check surface of pressure plate and replace if worn.

4) Check control valve. If worn, replace entire pump. Install shell halves on shaft and check end play. If end play exceeds specifications, replace entire pump.

**Assembly (VT27)** – To assemble steering pump, reverse disassembly procedure.

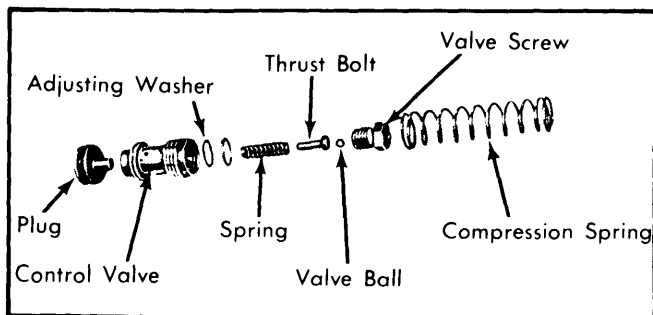


Fig. 3 Exploded View of Control Valve Components (VT27 Shown)

#### POWER STEERING GEAR

**Disassembly** – 1) Attach steering gear to a suitable assembly plate (116 589 01 59 00). Remove lock nut from adjusting screw and remove copper seal ring. Remove bolts attaching pitman shaft cover to steering case.

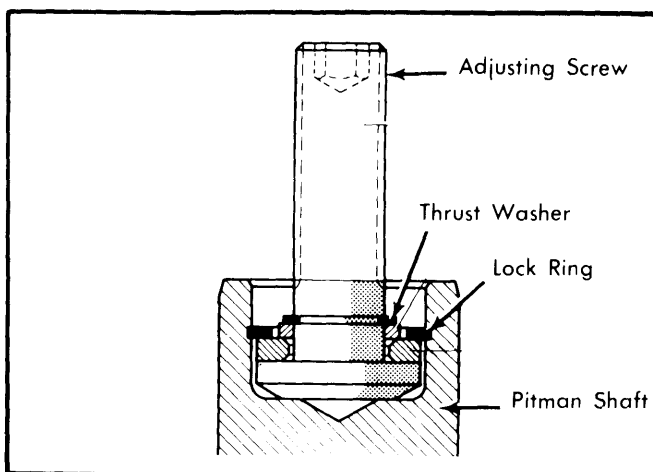


Fig. 4 Sectional View of Adjusting Screw

2) With steering in center position, turn adjusting screw counterclockwise. This forces pitman shaft, with housing, from steering gear case. Remove pitman shaft with cover. Remove "O" rings from cover. Remove lock ring and seal ring. Remove lock ring from pitman shaft and remove adjusting screw with thrust washers. See Fig. 4.

3) Remove bolts securing bearing cap to steering gear case. Turn worm gear counterclockwise until bearing cap is forced out of steering gear case.

**NOTE** – Balls will fall out of ball guide if worm gear is turned too far.

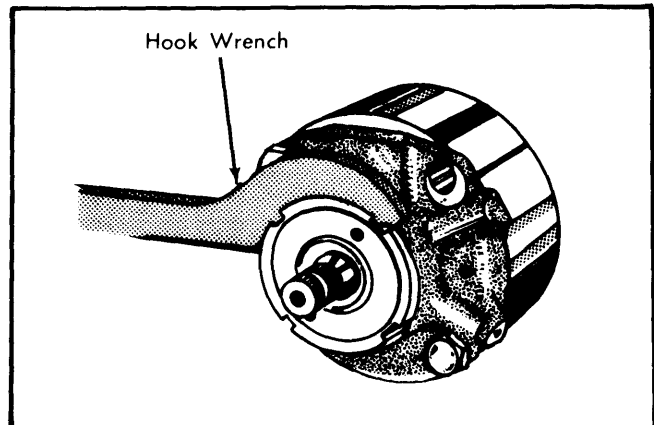


Fig. 5 Removing Slotted Nut with Special Hook Wrench

4) Remove bearing cap and worm gear with piston/steering nut from steering gear case.

5) Unscrew worm gear with bearing cap from piston/steering nut. **CAUTION** – Do not lose balls.

6) Remove "O" ring from bearing cap and attach bearing cap to a suitable assembly fixture.

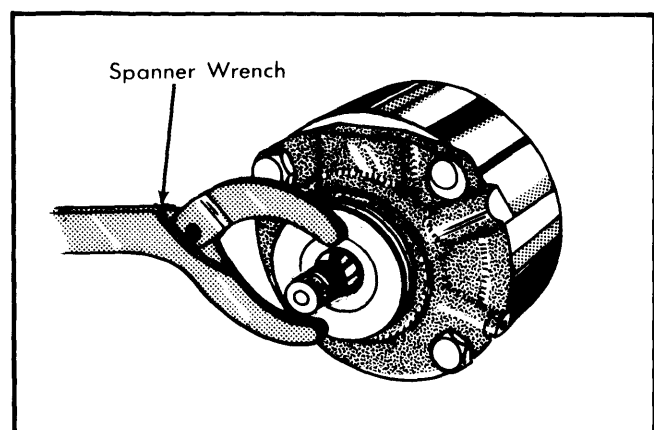


Fig. 6 Removing Bearing Insert From Bearing Cap

7) Unscrew slotted nut, using hook wrench, from bearing insert. See Fig. 5.

8) Remove bearing insert from bearing cap, using spanner wrench (Fig. 6), then remove seal and "O" rings from worm gear.

9) Remove bearing and disc from bearing cap. Remove bolts, clamp, and both ball guide halves from piston/steering nut.

## MERCEDES-BENZ POWER-ASSISTED RECIRCULATING BALL (Cont.)

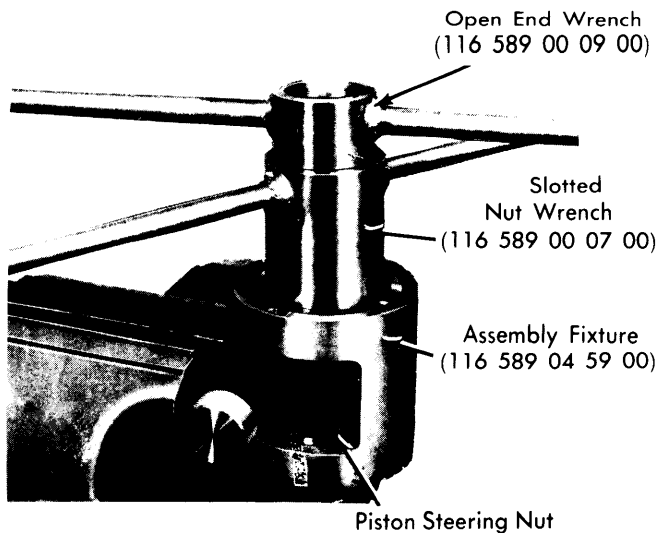


Fig. 7 Removing Worm Gear Nut from Piston/Steering Nut

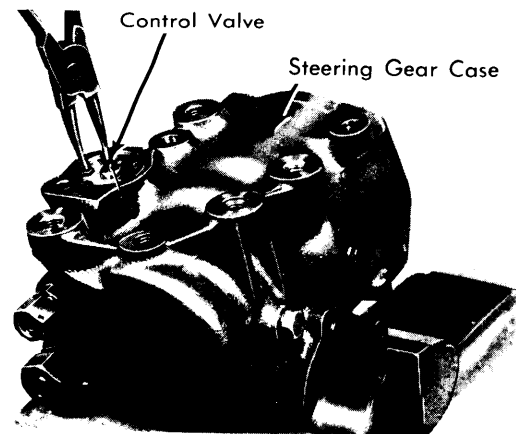


Fig. 9 Steering Gear Case with Detail of Control Valve

10) Using suitable clamp and tools (Fig. 7), remove worm gear nut from piston/steering nut. Remove seal ring and "O" ring from worm gear nut. On early models, remove axial disc from worm gear nut

3) Check pitman shaft for wear or damage on bearing surfaces, check for bent or warped shaft and replace as necessary. Check steering case, cover, and bearing insert for wear or damage and replace as necessary.

4) On control valve, check reaction piston in control valve for free movement. If necessary remove pistons from control valve by removing lock rings.

**Assembly** — To assemble steering gear, reverse disassembly procedure. Replace all "O" rings and sealing rings. Adjust gear to specifications.

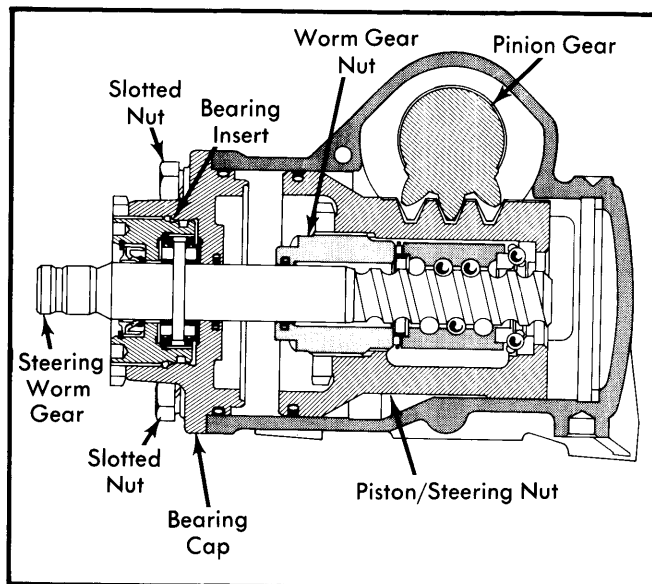


Fig. 8 Cross-Sectional View of Steering Gear

11) Remove bearings from piston/steering nut. See Fig. 8.

12) Remove lock ring, cover and control valve from steering gear case. See Fig. 9.

**Inspection** — 1) On worm gear, check ball paths and bearings surfaces for wear and damage, replace if necessary.

2) On piston/steering nut, remove seal rings, "O" rings, bearings and races, and worm gear nut. Inspect for wear or damage and replace as necessary.

### SPECIFICATIONS

Application	Dimensions
Steering Wheel Free Play .....	1" Maximum
Pump Circulation Pressure .....	28.4-71 psi
Number of Balls in Ball Circuit .....	24
End Play of Pump Shaft	
New .....	.028" Maximum
Used .....	.039" Maximum

### TIGHTENING SPECIFICATIONS

Application	Ft. Lbs. (mkg)
Steering Gear-to-Frame .....	43 (6.0)
Pitman Arm-to-Pitman Shaft .....	116-145 (16.0-19.0)
Linkage Ball Pin Nuts .....	25 (3.5)
Slotted Nut-to-Bearing Cap .....	87-101 (12.0-14.0)
Bearing Cap-to-Steering Gear .....	43-47 (6.0-6.5)
Adjusting Screw Nut .....	22-25 (3.0-3.5)
Idler Arm-to-Frame .....	87 (12.0)
Pump Shaft Nut .....	43 (6.0)
Pump Housing Bolts .....	25-29 (3.5-4.0)