

## GENERAL MOTORS POWER RACK & PINION

**Buick**  
**Century**  
**Skylark**  
**Chevrolet**  
**Celebrity**  
**Chevette**  
**Citation**

**Oldsmobile**  
**Cutlass Ciera**  
**Omega**  
**Pontiac**  
**6000**  
**Phoenix**  
**T1000**

### DESCRIPTION

The power rack and pinion steering system has a rotary control valve which directs hydraulic fluid to either side of the rack piston. The integral rack piston is attached to the rack and converts hydraulic pressure to a linear force which moves the rack left or right. The force is then transmitted through the inner and outer tie rods to the steering knuckle. In the event of hydraulic failure, manual control is maintained. However, an increase in effort can be expected. The motion of turning the steering wheel is transferred to the pinion. The motion of the pinion is then transferred through the pinion teeth which mesh with teeth on the rack, which moves the rack.

### LUBRICATION, TROUBLE SHOOTING & TESTING

See *Power Steering General Servicing* in this Section.

### REMOVAL & INSTALLATION

#### STEERING GEAR

**Removal** — Raise vehicle and remove front wheels. Loosen bolt at steering column-to-intermediate shaft. Disconnect tie rods from steering knuckle. Remove pressure and return lines, remove rack retaining brackets and remove rack and pinion assembly from vehicle.

**NOTE** — On some models, removal of some shields, tubes or crossmembers may be required prior to removal of the steering gear.

**Installation** — To install, reverse removal procedure

### OVERHAUL

#### INNER TIE RODS

**Disassembly** — 1) Remove shock damper ring from inner tie rod housing and slide back on rack. Put wrench on rack flat to prevent rack damage when removing tie rods.

2) Put wrench on tie rod pivot housing flats and turn housing counterclockwise until tie rod assembly separates from rack.

**Reassembly** — 1) Bottom inner tie rod assembly on rack. Torque housing, using wrench on rack to avoid internal gear damage. Support rack and housing and stake tie rod housing to rack flat.

2) Inspect stake. A .010" feeler gauge must not pass between rack and housing stake on either side. Slide shock damper over inner tie rod housing until it engages.

#### INPUT SHAFT & VALVE ASSEMBLY

**Stub Shaft Seal Removal** — 1) Remove retaining ring from upper end and dust cover from lower end of pinion shaft housing. Hold splined end of stub shaft with  $1\frac{1}{16}$ " 12 point socket and remove pinion lock nut.

**CAUTION** — Damage to pinion teeth will occur if stub shaft is not held.

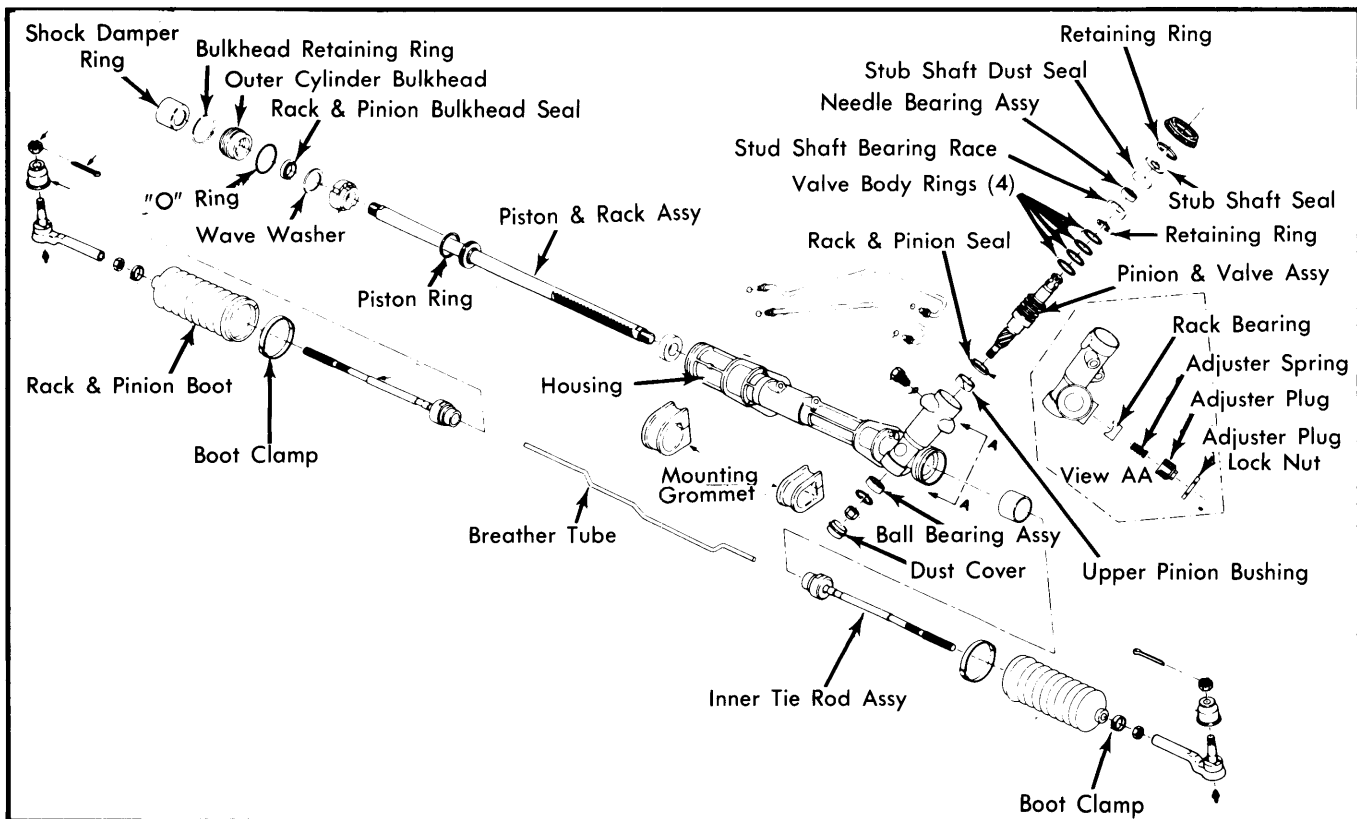


Fig. 1 Power Rack & Pinion Steering Assembly

## GENERAL MOTORS POWER RACK &amp; PINION (Cont.)

2) Press on threaded (bottom) end of pinion shaft until flush with ball bearing assembly and remove stub shaft dust seal and seal. If required, remove needle bearing and race from splined end of shaft.

**NOTE** — Complete removal of valve and pinion assembly is not necessary.

**Installation** — To install, reverse removal procedure. Hold stub shaft to firmly seat and torque lock nut.

**Valve Pinion Removal** — 1) Turn stub shaft until rack extends equal distance from both sides of housing. Mark location of stub shaft flat on housing and press on threaded end of pinion to remove valve and pinion assembly. Carefully remove rings from valve body if replacement is necessary.

2) If ball bearing assembly (lower) requires replacement, remove retaining ring and tap out bearing with drift or punch. Use suitable socket to press on outer race of new bearing assembly, being careful not to cock bearing when installing in housing. Install retaining ring with large lug to right (counter-clockwise) side of gap.

3) Remove upper pinion bearing and seal with  $\frac{1}{4}$ " punch. Install new bushing, then seat seal. Torque pinion lock nut and install dust cover.

**Installation** — Carefully place new rings on valve body assuring that they are not cut. With rack centered in housing, install valve and pinion assembly so that shaft flat and mark on housing line up when assembly is seated. Torque pinion lock nut and install dust cover.

**Gear Housing and Rack Disassembly** — 1) Use punch in access hole of housing and remove retaining ring. Remove fluid lines and finger tighten plugs in line holes of cylinder.

2) Remove adjuster plug and lock nut, spring and rack bearing. Turn pinion shaft to right, forcing bulkhead out of housing. Remove rack from housing. Remove and dispose of piston ring. Install seal removal tool (J-29738) into housing and use a 12" rod to tap on tool until seal is removed from housing.

**Gear Housing and Rack Reassembly** — 1) Install new piston ring on right (smooth) side of rack with care so as not to cut ring. Wrap card stock around rack teeth and slide seal, lip facing inward, onto rack. Slide stock and seal over rack teeth and bottom seal on rack piston.

2) Coat all parts with power steering fluid and place bullet seal protector over end of rack. Slide rack and seal in housing tapping with rubber mallet to seat seal.

3) Install in order: cylinder inner bulkhead, spring (wave) washer, bulkhead rack seal, "O" ring seal, cylinder outer bulkhead, bulkhead retaining ring and shock dampener. Retaining ring must be fully seated with end approximately  $\frac{1}{2}$ " from access hole.

4) Coat adjuster plug with lithium base grease and install rack bearing, spring, adjuster plug and nut. Tighten adjuster plug until it bottoms, then back off 40-60°. Check torque on pinion and tighten lock nut while holding adjuster plug stationary.

5) Install fluid lines using new "O" rings. Finger tighten both ends of lines prior to tightening to final torque. Install grommets and breather tube in proper location, then install tie rod and boot seals.

## TIGHTENING SPECIFICATIONS

Application	Ft. Lbs. (N·m)
Adjuster Plug Nut .....	50 (68)
Inner Tie Rod Housing-to-Rack .....	70 (95)
Outer Tie Rod Jam Nut .....	50 (68)
Pinion Lock Nut .....	26 (35)
Steering Gear Mounting Nuts	
Chevette & T1000 .....	14 (19)
All Others .....	70 (95)
Tie Rod-to-Steering Knuckle .....	35 (47)
Intermediate Shaft Pinch Bolt .....	45 (61)