

## SUBARU RACK & PINION

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### DESCRIPTION

Steering gear, mounted on crossmember, is a rack and pinion type, with backlash automatically adjusted. Pinion is connected to steering shaft by a flexible rubber coupling. Steering knuckle arms are connected to rack by tie rods which are threaded onto ball joint studs at each end of rack.

### ADJUSTMENT

#### BACKLASH

Backlash is automatically held to a minimum by a spring-loaded rack plunger which bears against rack. Adjustment is

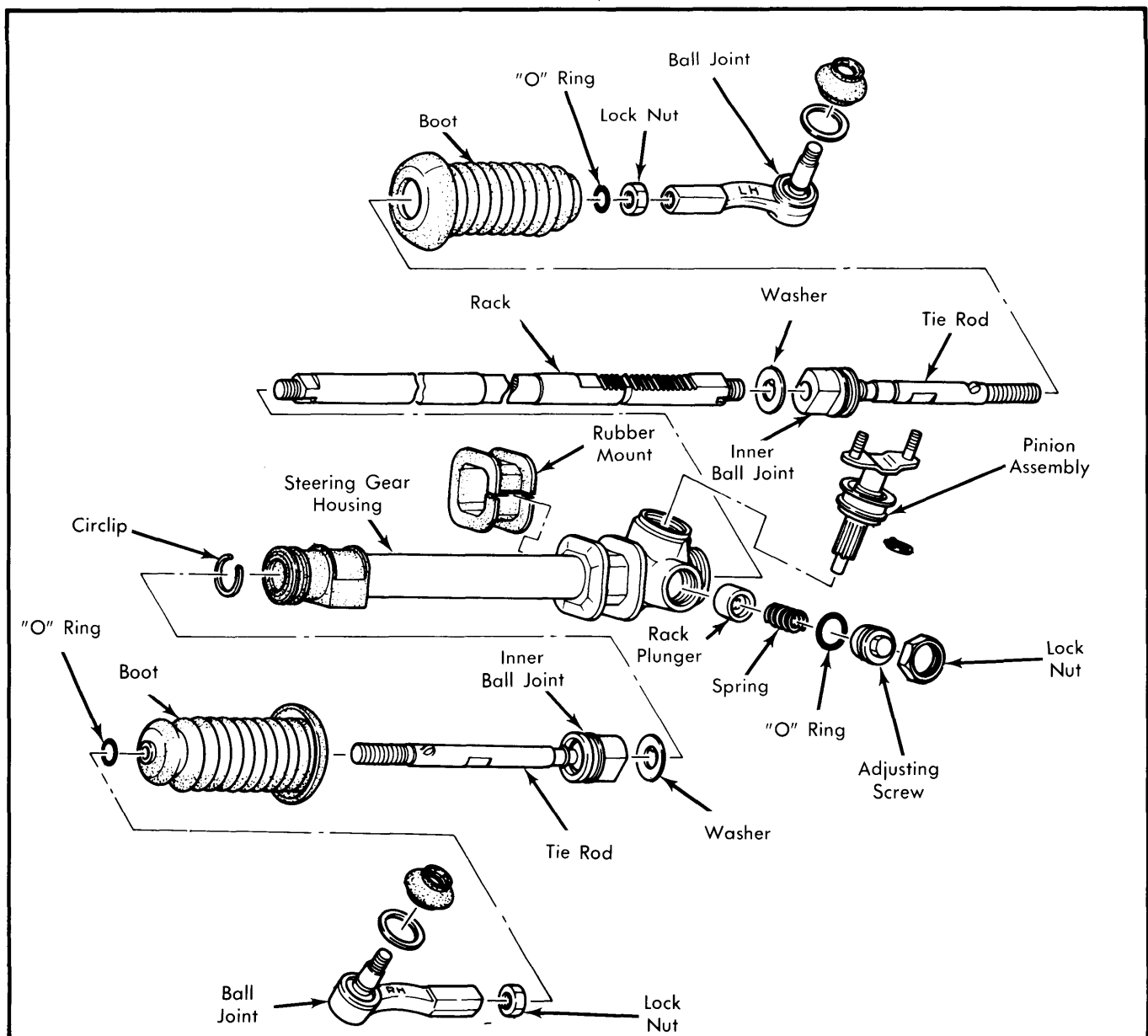
not normally required. End play of rack plunger may be corrected if necessary by turning adjusting screw in until it contacts plate, then backing screw out  $\frac{1}{24}$ th (15°) of a turn. This will give a clearance of .0025" (.063 mm) between adjusting screw and rack plunger. Hold adjusting screw from turning and tighten lock nut.

### REMOVAL & INSTALLATION

#### STEERING GEAR

**Removal** - 1) Disconnect battery negative terminal. Raise and support front of vehicle. Remove both front wheels. Disconnect ball joints from steering knuckles.

2) Disconnect flexible coupling from pinion gear. Remove hot air stove from exhaust manifold and air cleaner. Disconnect exhaust manifold and pull down out of way. Remove rubber boot protector.



**Fig. 1 Exploded View of Subaru Rack & Pinion Steering Gear Assembly**

## SUBARU RACK &amp; PINION (Cont.)

3) Remove bolts attaching steering gear housing to crossmember. Lower gear housing until pinion gear is disconnected from flexible coupling. Rotate gear housing backwards and remove gear housing from left side.

**Installation** — To install steering gear assembly, reverse removal procedures and note the following: tighten left steering gear housing bracket first. Tighten ball joint nuts to specifications, then turn a maximum of  $1/6$  turn to align cotter pin hole.

**OVERHAUL****STEERING GEAR**

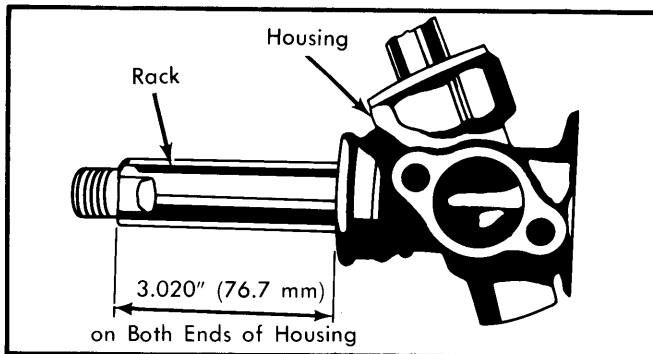
**Disassembly** — 1) Place steering gear housing in a padded vise. Loosen lock nuts and remove ball joints from rods. Remove "O" rings from outside of rubber boots, then remove rubber boots. Unbend tab on inner ball joint lock washer, then loosen lock nut and remove inner ball joint from rack. Repeat procedure for other inner ball joint.

2) Remove rack plunger lock nut, adjusting screw, spring and rack plunger. Remove pinion gear oil seal from steering gear housing. Remove pinion gear large snap ring from housing.

3) Remove pinion gear from steering gear housing. Pull rack out of steering gear housing, from pinion side. Remove pinion gear small snap ring (located on pinion gear).

4) Press bearing off pinion gear, then remove oil seal and large snap ring.

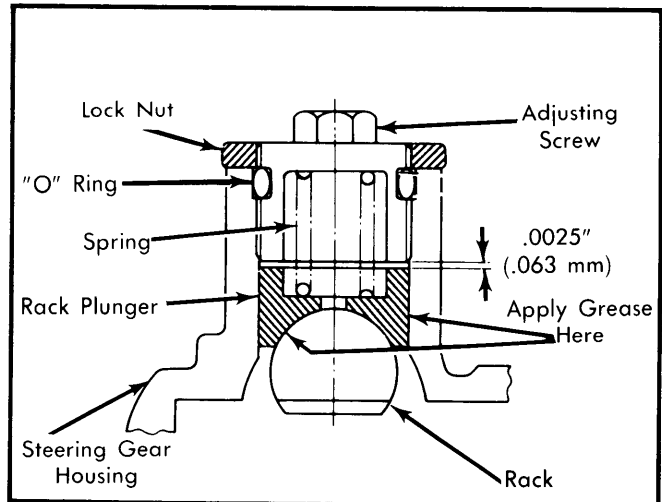
**Inspection** — Check for bent rack. Place rack ends in "V" blocks and attach dial indicator so plunger rests on center of rack. Rotate rack and note deflection of gauge. Maximum deflection should be less than  $.004"$  (.1 mm). Replace if not to specifications. Check all other steering gear components and replace if worn, scored or damaged.



**Fig. 2** View Showing Method of Centering Rack in Gear Housing

**Reassembly** — 1) If pinion gear was disassembled, slide large snap ring on pinion. Install new oil seal, then press on new bearing. Install small snap ring to pinion gear.

2) Grease toothed and sliding portions of rack and install rack into steering gear housing, from pinion side. Locate rack in housing so that 3.02" (76.7 mm) of rack protrudes from each end of housing.



**Fig. 3** Cross Sectional View of Pinion Gear and Rack Showing Lubrication Points and Backlash Adjustment

3) Grease pinion gear teeth and install into steering gear housing. Flange on pinion gear should be out of line of straight ahead position by  $36^\circ$  when meshed with rack teeth properly.

4) Install large snap ring, of pinion gear, to steering gear housing. Measure amount of pinion gear end play. End play should be less than  $.012"$  (.3 mm). If end play is not to specifications, check for worn snap rings, bearing or steering gear housing. Replace components as necessary.

5) With pinion gear end play correct, press oil seal into steering gear housing. Grease rack plunger cavity. Install rack plunger, spring, adjusting screw and lock nut. Adjust rack plunger backlash. See backlash adjustment in this article.

6) Install tie rod inner ball joint lock washer to rack. Grease inner ball joint and install to rack. Bend lock washer over flat area on inner ball joint. Grease inside lip of rubber boot (large end) and install boot to steering gear housing. Install "O" ring to boot outer end.

7) Install ball joints and lock nuts to tie rods. Make sure ball joints are installed on correct end of steering gear. Left ball joint is marked "LH", right ball joint is marked "RH".

8) Make sure steering gear operates properly and smoothly. Check pinion rotating torque in straight ahead position. Rotating torque should be  $.8-1.1$  ft. lbs. (.11-1.5 N·m).

**TIGHTENING SPECIFICATIONS**

Application	Ft. Lbs. (N·m)
Ball Joint Nut .....	18-25 (24-34)
Gear-to-Crossmember .....	33-40 (45-54)
Rack Plunger Lock Nut .....	29-43 (39-58)
Tie Rod-to-Ball Joint Lock Nut .....	58-65 (79-88)
Tie Rod Inner Ball Joint Lock Nut .....	58 (79)