## MAZDA RECIRCULATING BALL

**RX-2**
**RX-3**
**RX-4**
**808**
**B1600**
**Rotary Pickup**

### DESCRIPTION

Steering gear is a recirculating ball type with a variable ratio, depending on turning angle of sector shaft. The pinion shaft and steering shaft are an integral (nonseparable) unit on some models, while the shaft is separable from the pinion on others. Steering linkage is basically the same for all models, having a nonadjustable center link, two adjustable tie rods, an idler arm assembly, and pitman arm.

### ADJUSTMENT

*NOTE — Adjustments are performed during assembly portion of overhaul. See Overhaul procedure in this article.*

### REMOVAL & INSTALLATION

#### STEERING GEAR (RX-3, 808 & B1600)

**Removal** — 1) Remove horn cap, horn contact cup, and spring. Scribe mark position of steering wheel to shaft. Unscrew steering wheel attaching nut and remove steering wheel. Pull off the light switch knob. Remove screws attaching column cover and remove cover. Withdraw stop ring, cancelling cam, and spring from end of shaft. Disconnect wiring for combination switch assembly, then remove the switch.

2) Detach column support bracket. Loosen nut securing bottom of column jacket to gear housing. Pull jacket off shaft. Separate the dust cover from the dash panel.

3) Raise and support front of vehicle and remove left front wheel. Unscrew nuts and bolts securing upper control arm shaft to support bracket. Note number and placement of shims so that correct wheel alignment can be retained when reassembly is made. Remove left upper control arm.

4) Disconnect center link from pitman arm, using a suitable puller (49 0118 850C). Remove nuts and bolts holding steering gear to frame, noting any shims which may be present. Withdraw steering gear from vehicle.

**Installation** — To install, reverse removal procedure, ensuring any shims which were removed are installed in original positions.

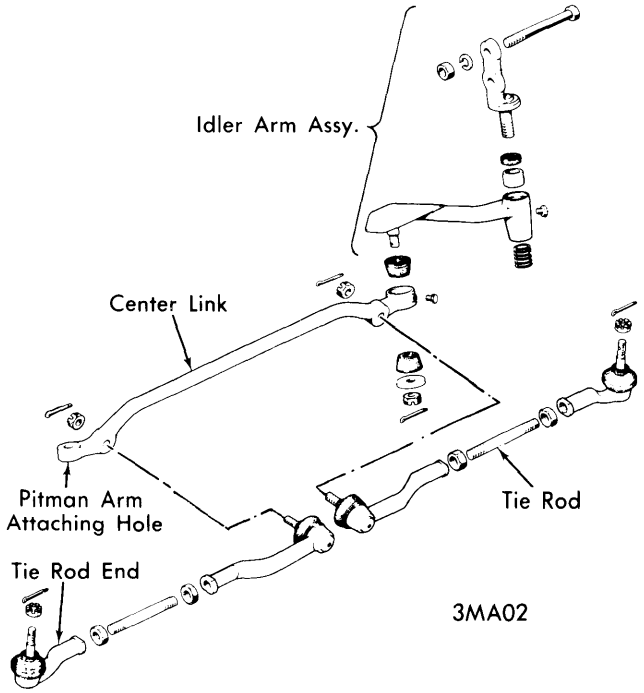
#### STEERING GEAR (RX-2, RX-4 & ROTARY PICKUP)

**Removal** — Raise and support front of vehicle. Remove front wheel. Detach pitman arm from center link. Loosen pinch bolt at flexible rubber coupling. Remove screws attaching insulator to pitman arm and remove insulator (Rotary Pickup). Detach pitman arm from gear. Remove speedometer cable from clips attached to gear housing and power brake unit (RX-4). Unbolt gear housing from frame, checking for any alignment shims. Remove gear housing.

**Installation** — To install, reverse removal procedure, being sure that gear alignment shims are replaced in original position.

#### STEERING LINKAGE (ALL MODELS)

Steering linkage may be removed as an assembly or as individual components. Whenever tie rod setting is disturbed, toe-in must be reset. *See Mazda in WHEEL ALIGNMENT section.*



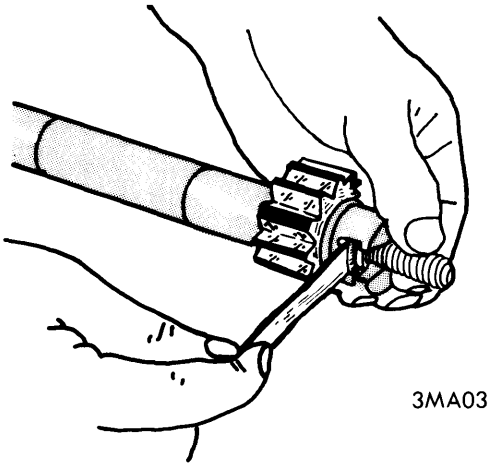

**MAZDA STEERING LINKAGE (TYPICAL)**

### OVERHAUL

#### STEERING GEAR (ALL MODELS)

**Disassembly** — Drain gear oil from housing. Remove pitman arm from sector shaft, if not done so during removal. Unscrew side cover attaching bolts and loosen adjusting screw lock nut. Turn adjusting screw in to remove side cover from housing. Take adjusting screw and shim from slot in sector shaft. Withdraw sector shaft. Unbolt end cover, then withdraw worm and ball nut assembly. Remove housing oil seal if necessary.

**Inspection** — Check ball nut rotation on worm. If movement is not smooth for full length of travel, replace worm and ball nut

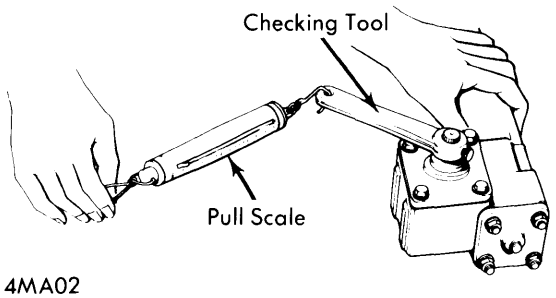



**CHECKING ADJUSTING SCREW CLEARANCE**

## MAZDA RECIRCULATING BALL (Cont.)

assembly. Ball nut is not to be serviced separately. Check worm bearings and cups, sector shaft gear surface, and oil seal. If any component is defective, replace it.

**Assembly & Adjustment** – **1)** Replace oil seal in housing. Insert worm shaft and ball nut assembly into gear housing. Position end cover (or column jacket) with bearing preload adjusting shims and tighten cover (jacket) bolts. Attach preload checking tool (49 0180 510) to pinion splines (or top end of steering shaft) and connect a pull scale to the tool. If reading is below .22 lb. (.1 kg) reduce the shim; if above .88 lb. (.4 kg), increase the shim.

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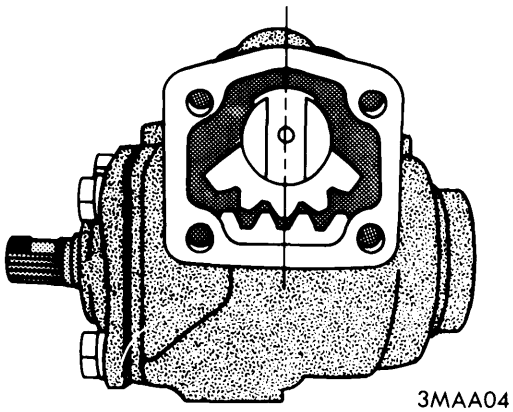
**CHECKING BEARING PRELOAD**

**2)** Insert sector shaft into gear housing, using care not to damage oil seal. Ensure center of sector gear is aligned with center of worm gear (see illustration). Insert adjusting screw into slot in end of sector shaft. Check end clearance as illustrated and add appropriate shim to bring clearance within 0-.004" (0-.1 mm) on RX-4 and Rotary Pickup models or .001-.003" (.02-.08 mm) on all others. Place side cover and gasket over adjusting screw and turn adjusting screw until cover is in place, install attaching bolts.

**3)** Install pitman arm onto sector shaft, aligning marks. Install and tighten retaining nut. Measure pitman arm backlash. If necessary, turn sector adjusting screw until zero backlash is obtained (measured with dial scale at outer end of pitman arm), then turn adjusting screw out by $^{1}/_{12}$ (30°) turn. Tighten adjusting screw lock nut, taking care not to disturb backlash adjustment.



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**ALIGNING SECTOR GEAR & RACK**

**4)** Check worm shaft rotating torque. Attach checking tool (49 0180 510) to worm shaft, with pull scale. If rotating torque is less than 1.98 lbs. (.9 kg) or more than 3.3 lbs. (1.5 kg), readjust bearing preload. Refill gear housing with suitable lubricant.

### TIGHTENING SPECIFICATIONS

| Application | Ft. Lbs. (mkg) |
|---|---|
| Steering Wheel Nut | 22-29 (3.04-4.01) |
| Gear-to-Frame | 32-40 (4.42-5.53) |
| Pitman Arm-to-Sector Shaft | 108-130 (14.9-18.0) |
| Idler Arm-to-Bracket | 32-40 (4.42-5.53) |
| Ball Joint Connections | 18-25 (2.49-3.46) |
| Tie Rod Lock Nut | 51-58 (7.05-8.02) |
| Column Jacket-to-Gear | 6 (.83) |
| End Cover Bolts | 12-17 (1.66-2.35) |