## TOYOTA COROLLA RECIRCULATING BALL

**Corolla**

### DESCRIPTION

#### STEERING GEAR

Steering gear is a worm and sector gear using a recirculating ball. A worm bearing adjusting screw is provided to eliminate excessive backlash.

#### STEERING LINKAGE

Linkage consists of a pitman arm, relay rod, idler arm, and two adjustable tie rod ends which connect to steering knuckles. The pitman arm-to-relay rod connection and tie rod end-to-steering knuckle connection are ball joint type, completely sealed and requiring no lubrication service.

### ADJUSTMENT

Worm bearing preload is adjusted by varying shims installed between gear housing and upper outer race of worm bearing. *NOTE — For further adjustment procedures, see Overhaul in this article.*

### REMOVAL & INSTALLATION

#### STEERING GEARS

**Removal** — 1) Remove steering wheel from shaft, disconnect turn signal switch wiring harness from under instrument panel, position turn signal in right turn position, loosen attaching screw, and remove turn signal switch.

2) Loosen steering column attaching screw under turn signal switch, and remove steering column from housing. Remove housing clamp from column tube, but do not loosen housing completely. *NOTE — If necessary, column bushings may be replaced at this time.*

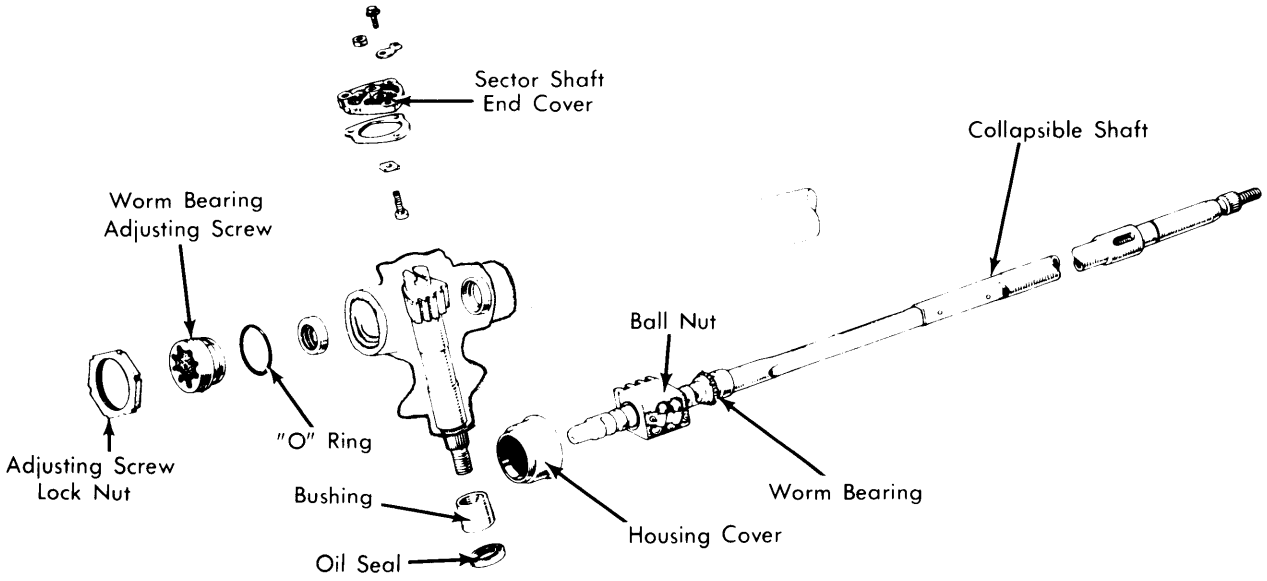
3) Remove instrument panel undertray, if equipped. Remove steering column clamp (bracket). Disconnect speedometer cable from gear housing and disconnect wiring from oil pressure switch and water temperature sender.

4) Jack up front of vehicle and support with safety stands at side rails. Turn front wheels to left, then disconnect the pitman arm from sector shaft, using suitable puller (09610-12010). Remove engine stone shield. Unbolt gear housing from body, then pull entire gear and shaft assembly out from underside of vehicle.

**Installation** — Reverse removal procedure, noting the following: Temporarily attach column tube to instrument panel, to assist in proper alignment for bolting gear housing to body. Set clearance between steering column housing and turn signal switch to .016" (.4 mm) and clearance between turn signal switch and steering wheel to .12" (2.7 mm). Adjust clearances by moving column housing.

#### STEERING LINKAGE

**Removal** — 1) Raise and support front of vehicle and remove front wheels. Remove idler arm from side member. Loosen and remove pitman arm from sector shaft, using suitable puller (09610-12010).

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**RECIRCULATING BALL TYPE STEERING GEAR**

## TOYOTA COROLLA RECIRCULATING BALL (Cont.)

2) Detach tie rod ends from steering knuckles, using same puller as for pitman arm removal. Remove entire steering linkage assembly from vehicle.

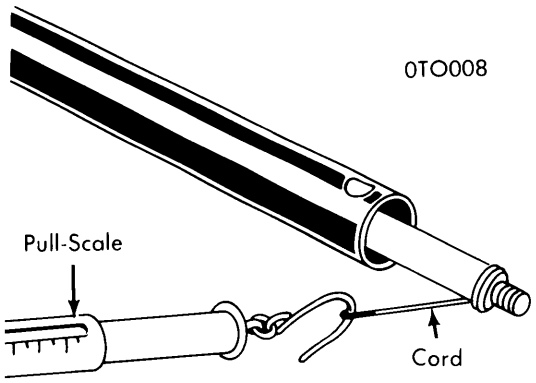
**Installation** – Install by reversing removal procedures, tightening nuts to specifications. Adjust toe-in.

### OVERHAUL

**Disassembly** – 1) Remove sector shaft adjusting screw lock nut. Unscrew sector shaft end cover retaining bolts, then remove cover by turning adjusting screw in. Remove worm bearing adjusting screw lock nut, using suitable wrench (09617-22020) and unscrew worm bearing adjusting screw, using suitable tool (09616-30011).

2) Extract "O" ring and worm bearing from gear housing. Carefully withdraw steering main shaft from housing, taking proper precautions not to allow ball nut to turn to end of travel (ball nut striking end of worm may damage ball guides or bearings). Pull bearing (above ball nut) from shaft, then remove bearing race. Detach steering gear housing cover from lower end of housing. From sector shaft, remove oil seal and bushing.

**Inspection** – Check all components for looseness, damage, or wear and replace as required. Measure sector shaft bushing inner diameter for 1.1032-1.1040" (28-28.021 mm), and sector shaft diameter for 1.1024-1.1029" (27.98-27.993 mm). Check bearing races for scoring, pitting, or other abnormalities and replace as necessary. Replace housing oil seal.




**MEASURING WORM BEARING PRELOAD**

**Reassembly & Adjustment** – 1) Apply gear lubricant to all bearings and sliding portions as they are reassembled. Clamp gear housing in vise in position of installation on vehicle. Replace bushings, seals, bearings, and races in reverse of removal sequence. Install steering main shaft and check worm bearing preload (turning torque) as follows: Wrap a cord around top end of shaft and attach a pull-scale to cord. Suitable preload should be 5.5-14 lbs. (2.5-6.4 kg). Install worm bearing adjusting screw and turn to obtain specified preload range.

2) Measure sector shaft-to-adjusting screw clearance (thrust washer installed) between head of adjusting screw and bottom of "T" slot. Clearance limit is .0035" (.09 mm). If clearance is beyond specified limit, replace thrust washer with one of a greater thickness. Position ball nut at center of travel and insert sector shaft, engaging center teeth of ball nut and sector shaft.

3) Install sector shaft gasket, cover, and attaching bolts. Recheck worm bearing preload in same manner as previously described. Preload should now measure 14-22 lbs. (6.4-10 kg). If out of specified range, turn sector shaft adjusting screw as required.

4) Install pitman arm to sector shaft, having gear set at center position. Attach a dial gauge to measure pitman arm backlash. Backlash, as measured at end of pitman arm, should not exceed 5° on either side of center.

### TIGHTENING SPECIFICATIONS

| Application | Ft. Lbs. (mkg) |
|---|---|
| Steering Column Clamp | 15-22 (2.0-3.0) |
| Pitman Arm-to-Sector | 50-80 (6.9-11.1) |
| Gear-to-Frame | 22-33 (3.0-4.6) |
| Steering Wheel Nut | 15-22 (2.0-3.0) |
| Sector Shaft End Cover | 11-16 (1.5-2.2) |