

# Steering Gears & Linkage

## TOYOTA RECIRCULATING BALL — EXC. LAND CRUISER

Corolla, Corona,  
Cressida, Pickup

### DESCRIPTION

#### STEERING GEAR

Steering gear is a variable ratio, recirculating ball type. Ball bearings circulate within grooves in worm and nut.

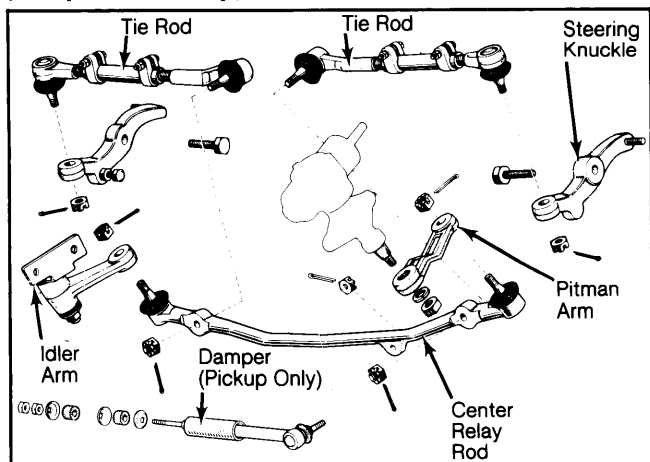
As worm shaft turns, ball nut moves up or down, turning the sector shaft and pitman arm.

#### STEERING LINKAGE

Linkage consists of an idler arm, center relay rod, adjustable tie rods, and steering knuckles. Pickups also use a steering damper attached to center relay rod.

The connection between each component is by ball joints. Linkage assembly is connected to steering gear by a pitman arm.

**Fig. 1: Exploded View of Toyota Steering Linkage (Except 4-WD Pickup)**



### ADJUSTMENT

See Overhaul in this article.

### REMOVAL & INSTALLATION

#### STEERING GEAR

##### Removal

1) Mark steering gear shaft at flexible coupling or universal joint and remove coupling. Mark steering gear shaft at pitman arm. Disconnect pitman arm from steering gear.

2) Remove steering gear bolts from frame and disconnect steering gear from steering shaft as gear is removed.

##### Installation

To install steering gear, reverse removal procedures. Make sure marks made upon removal are aligned upon installation.

#### STEERING LINKAGE

##### Removal

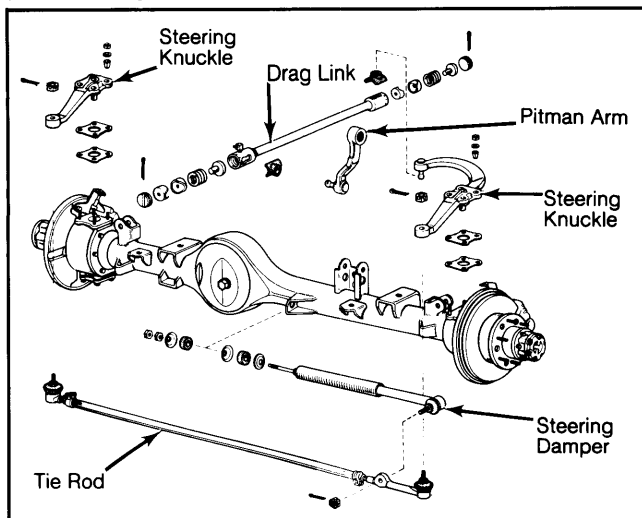
1) On all models except 4-WD Pickup, mark pitman arm at sector shaft. Use a puller to disconnect

pitman arm from sector shaft and tie rod ball joints from steering knuckles.

2) On 2-WD Pickup models, disconnect steering damper from crossmember. Remove idler arm bracket bolts, then remove steering linkage assembly from vehicle.

3) On 4-WD Pickup models, mark pitman arm at sector shaft and disconnect pitman arm. Disconnect steering damper from front axle. Remove steering knuckle-to-front axle bolts and remove steering linkage assembly from vehicle.

**Fig. 2: Exploded View of Toyota Steering Linkage (4-WD Pickup)**



### Installation

1) To install steering linkage, reverse removal procedure and note the following. Make sure pitman arm-to-sector shaft marks are aligned.

2) To aid in toe-in adjustment, make sure tie rod lengths are to specifications. Measure tie rod lengths from center-to-center of ball joints. See Tie Rod Length chart.

### TIE ROD LENGTH

Application	In. (mm)
Corona .....	12.60 (320)
Corolla .....	12.52 (318)
Cressida .....	14.06 (357)
Pickup	
2-WD .....	12.36 (314)
4-WD .....	47.24 (1200)

### OVERHAUL

#### DISASSEMBLY

##### Steering Gear

1) On all models except 4-WD Pickup, mark pitman arm at sector shaft and remove pitman arm. Remove sector shaft adjusting screw lock nut. Remove sector shaft cover, then sector shaft.

2) Be careful not to lose adjusting screw and shim. Remove worm assembly lock nut, adjusting screw and oil seal. Remove worm assembly and bearings. See Fig. 3.

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**NOTE:** Do not disassemble ball nut from worm. If recirculating ball assembly has damaged or worn components, replace entire assembly.

3) On 4-WD Pickup models, mark pitman arm at sector shaft and remove pitman arm. Remove sector shaft adjusting screw lock nut. Remove sector shaft cover and sector shaft. Remove worm assembly cover and shims. Remove worm assembly with bearings. See Fig. 4.

### INSPECTION

1) Check all components for excessive wear or damage. Measure clearance between adjusting screw (with shim installed) and sector shaft. Maximum clearance should be .002" (.05 mm).

2) If clearance is not to specifications, shims are available from .0787" (2.00 mm) to .0866" (2.20 mm) in .0016" (.04 mm) increments.

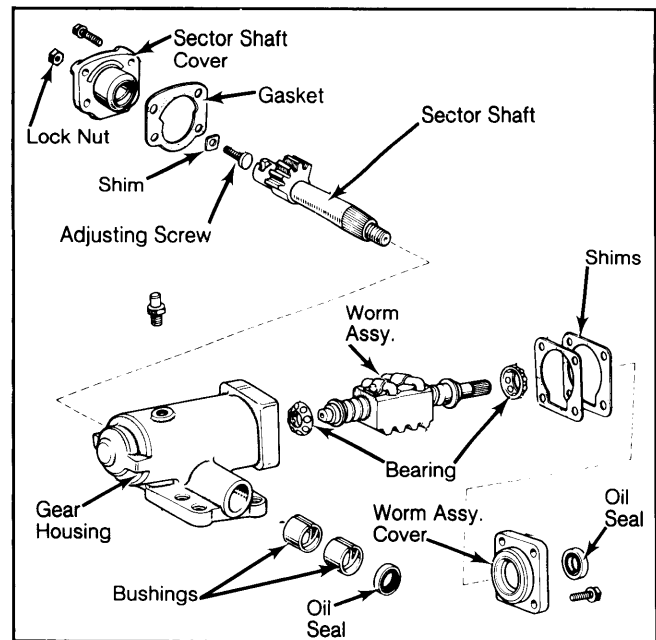
3) On all models except 4-WD Pickup, check sector shaft bearings for pitting and smooth operation. Replace if necessary.

4) On 4-WD Pickup, measure sector shaft diameter. Minimum diameter is 1.258" (31.95 mm). Measure sector shaft bushings (in gear housing) for clearance between sector shaft and bushings. Maximum clearance is .004" (.1 mm).

5) If clearance exceeds specifications and sector shaft is not worn beyond limit, replace bushings in gear housing and hone bushings to obtain standard clearance of .0004-.0024" (.01-.06 mm).

**CAUTION:** When checking worm gear and ball nut, do not let ball nut bottom out on either end of

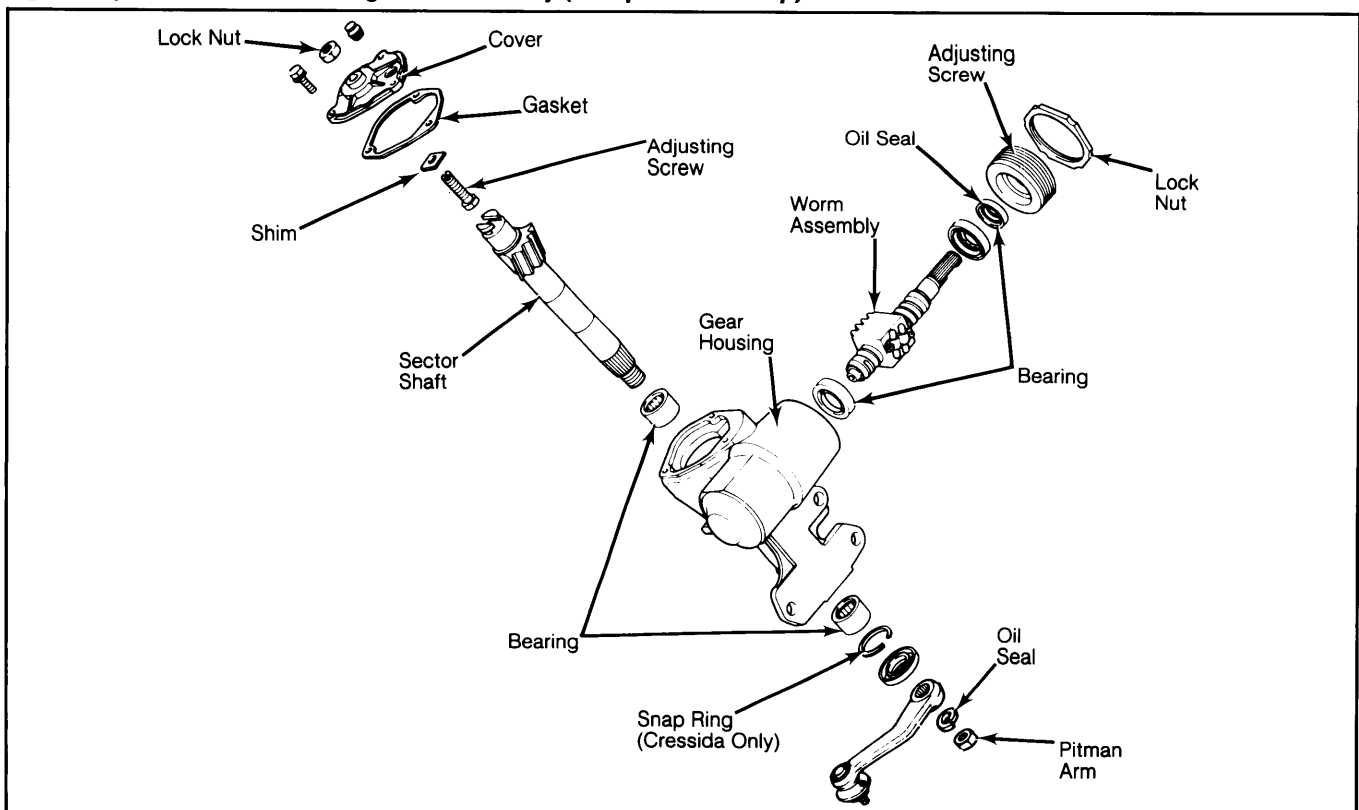
**Fig. 4: Exploded View of Steering Gear Assembly (4-WD Pickup)**



worm gear. If ball nut bottoms out, damage to worm assembly will occur.

6) On all models, check worm assembly bearings. Replace bearings if damaged or worn. Check worm gear and ball nut for damage.

**Fig. 3: Exploded View of Steering Gear Assembly (Except 4-WD Pickup)**



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7) Hold worm assembly up at an angle so ball nut will travel down worm gear (full travel) and check for smooth operation. Replace worm assembly if any damage is found or operation is not smooth.

### REASSEMBLY & ADJUSTMENT

#### Steering Gear

1) Grease all bearings and sliding portions of gear assembly. Install bearings on worm assembly. Install worm assembly to gear housing.

2) On all models except 4-WD Pickup, install oil seal and adjusting nut. Tighten nut while rotating worm gear to seat bearings. Loosen adjusting nut, then tighten while measuring preload. See Initial Worm Bearing Preload chart.

3) With preload to specification, hold adjusting nut, install and tighten lock nut.

4) On 4-WD Pickup, install oil seal to worm assembly cover. Install same shims as removed, then install end cover and tighten bolts. Measure preload of worm assembly. See Initial Worm Bearing Preload chart.

5) If not to specifications, add or remove shims until preload is to specifications. Shims are available from .002-.004" (.01 mm) increments, with 2 larger sizes available; .008" (.2 mm) and .020" (.5 mm).

#### INITIAL WORM BEARING PRELOAD

Application	INCH Lbs. (N.m)
Corona	2.6-3.5 (.29-.39)
Corolla	1.7-3.5 (.19-.39)
Cressida	2.6-3.5 (.29-.39)
Pickup	
2-WD	2.6-4.3 (.29-.47)
4-WD	3.0-5.6 (.33-.62)

6) Center ball nut on worm shaft and install sector shaft so center teeth of both are meshed together. Install shim (selected previously) to adjusting screw and install to sector shaft.

7) Install sector shaft end cover to gear housing and loosen adjusting nut as far as possible. Install cover bolts and tighten. Adjust final worm bearing preload by tightening adjusting screw. See Final Worm Bearing Preload chart.

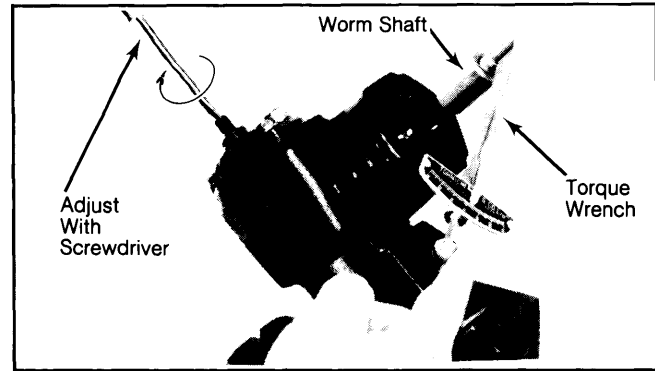
8) Install lock nut and tighten while holding adjusting nut from turning. See Fig. 5.

#### FINAL WORM BEARING PRELOAD

Application	INCH Lbs. (N.m)
Corona	4.3-5.2 (.47-.57)
Corolla, Cressida	2.6-3.5 (.29-.39)
Pickup	
2-WD	6.9-9.1 (.57-.81)
4-WD	6.9-9.5 (.80-1.0)

9) Install pitman arm and nut (aligning mating marks). Attach dial indicator so plunger touches end of pitman arm. Sector shaft should have no backlash when measured at any point 100° on either side of centered position.

Fig. 5: Measuring Final Worm Bearing Preload



#### TIGHTENING SPECIFICATIONS

Application	Ft. Lbs. (N.m)
Ball Joint Nuts (All)	
Pickup	<sup>1</sup> 54-80 (73-109)
All Other Models	36-51 (49-69)
Idler Arm Nut	
Pickup (2WD Only)	58-87 (79-118)
All Other Models	51-65 (69-88)
Pitman Arm-to-Sector Shaft Nut	
Corolla	72-101 (98-137)
Pickup	
2-WD	80-90 (109-122)
4-WD	116-137 (157-186)
All Other Models	80-101 (109-137)
Sector Shaft Adjusting Screw Lock Nut	
Corona	15-25 (20-34)
Pickup	
2-WD	14-22 (19-30)
4-WD	25-36 (34-49)
All Other Models	14-22 (19-30)
Worm Assy. Adjusting Screw Lock Nut	
Corona	166-188 (226-256)
Pickup (2WD Only)	166-188 (226-256)
All Other Models	109-144 (148-195)

<sup>1</sup> — Damper-to-relay rod should be 36-51 ft. lbs. (49-69 N.m).