TOYOTA (EXC. LAND CRUISER) RECIRCULATING BALL

Celica
Corona
Corolla
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 idler arm, center relay rod, two adjustable tie rods, and two steering knuckles. The connection between each component is through ball joints. The linkage assembly is joined to the steering gear at the pitman arm.

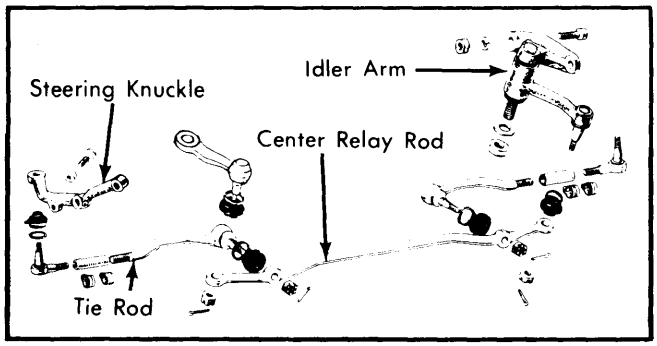

Fig. 1 Toyota Steering Linkage with Bushings and Retainers (Typical Illustration)

ADJUSTMENT

See Overhaul procedures in this article.

REMOVAL & INSTALLATION

STEERING GEAR

Removal – Remove clamp bolt attaching steering shaft to worm shaft. On Corona models, remove two bolts in flexible coupling after removing air cleaner for access. Using a suitable puller, detach relay rod from pitman arm. Unbolt gear housing from frame and remove from vehicle.

Installation (All Models) – Reverse removal procedure, aligning worm shaft cut portion with flexible coupling yoke.

STEERING LINKAGE

Removal – Using a suitable puller, disconnect pitman arm from sector shaft. Remove idler arm support from frame. Detach tie rod ends from steering knuckles, using a suitable puller. Remove steering linkage assembly from vehicle.

Installation – Connect tie ends to steering knuckles and torque retaining nuts to specification. Install pitman to sector shaft (ensure correct positioning of aligning marks as illustrated). Tighten nut to specified torque. Place idler arm support on frame and tighten retaining bolts to specification. Adjust toe-in.

OVERHAUL

STEERING GEAR

Disassembly – Using a suitable puller, remove pitman arm. Loosen sector shaft adjusting screw lock nut. Remove bolts attaching end cover, then remove cover and sector shaft. Loosen worm bearing adjusting screw lock nut and remove worm assembly with bearing.

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

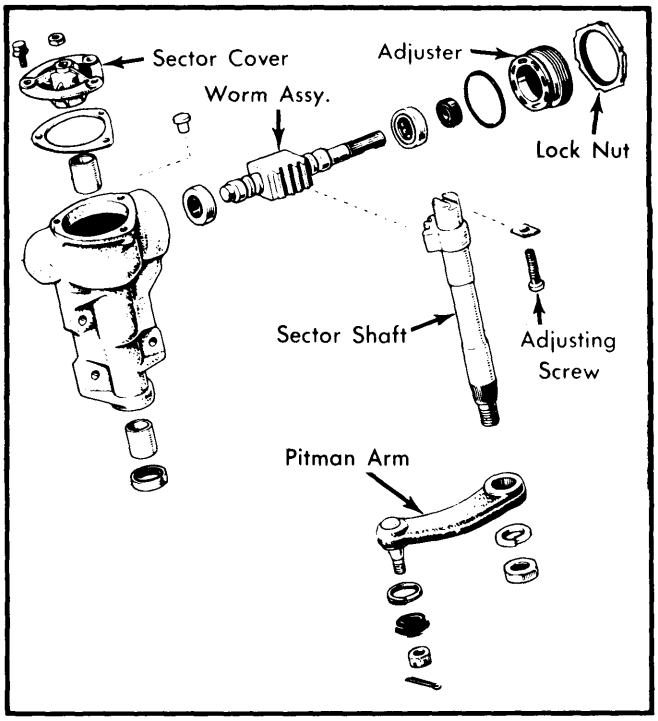

Fig. 2 Exploded View of Recirculating Ball Type Steering (Corona Shown, Others Similar)

Inspection – Check all components for wear or damage and replace as necessary. Check sector shaft-to-bushing clearance: it must not exceed .0020" (.05 mm). If clearance is exceeded, replace bushing or shaft.

Assembly & Adjustment – 1) Lubricate all bearings and sliding portions of gear assembly. Install worm into gear housing, then install adjusting screw and lock nut. Check worm bearing preload with an INCH-lb. torque wrench. Turn adjusting screw as required to bring preload within limits. Tighten lock nut and recheck preload.

TOYOTA (EXC. LAND CRUISER) RECIRCULATING BALL (Cont.)

Initial Worm Bearing Preload

Application	INCH-lbs. (cmkg)
Celica	2.6-3.5 (3-4)
Corolla & Corona	3.5-5.2 (4-6)
Pickup	2.6-5.2 (3-6)

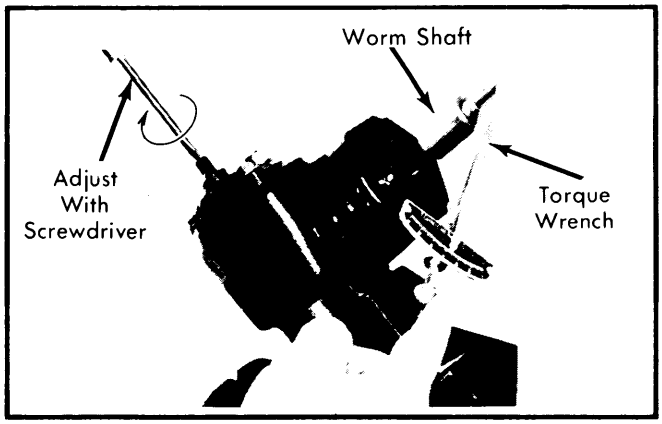

Fig. 3 Measuring Worm Bearing Preload

2) Install adjusting screw and thrust washer into sector shaft and measure thrust clearance (between head of adjusting screw and bottom of "T" slot). Maximum clearance is .002" (.05 mm). If clearance is exceeded, replace thrust washer with one of correct size to bring clearance within limits.

NOTE – *Ensure ball nut is at center of travel before inserting sector shaft. Loosen adjusting screw completely before shaft insertion.*

3) Install sector shaft to end cover. Coat gasket with sealer, then install assembly into gear housing. After sector shaft cover is bolted into place, repeat worm bearing preload test. Use sector shaft adjusting screw to obtain correct preload.

Final Worm Bearing Preload

Application	INCH-lbs. (cmkg)
Celica	2.6-3.5 (3-4)
Corolla & Corona	6.9-9.5 (8-11)
Pickup	6.1-9.5(7-11)

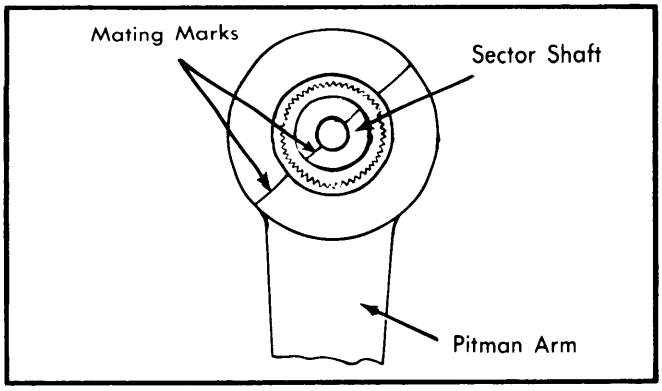

Fig. 4 Aligning Pitman Arm to Sector Shaft

4) Install pitman arm (aligning mating marks); attach a dial gauge to measure pitman arm backlash. Backlash, as measured at pitman arm outer end, should not exceed 5° from either side of center. After checking, tighten adjusting screw lock nut securely.

TIGHTENING SPECIFICATIONS

Application	Ft. Lbs. (mkg)
Steering Gear-to-Frame	
Celica & Corona	36-51 (5-7)
Corolla & Pickup	25-36 (3.5-5)
Pitman Arm-to-Sector Shaft	
Celica & Corona	80-101 (11-14)
Corolla	72-101 (10-14)
Pickup	80-90 (11-12.5)
Worm Adjusting Screw Lock Nut	
Celica & Corolla	95-122 (13-17)
Corona & Pickup	58-72 (8-10)
Sector Shaft Adjuster Lock Nut	
All Models	14-22 (2-3)
Sector Shaft Cover Bolts	
All Models	11-16 (1.5-2.2)
Pitman Arm-to-Relay Rod	
Pickup	54-80 (7.5-11)
All Other Models	36-51 (5-7)
Relay Rod-to-Idler Arm	
Pickup	54-80 (7.5-11)
All Other Models	36-51 (5-7)
Tie Rod-to-Steering Knuckle	
Pickup	54-80 (7.5-11)
All Other Models	36-51 (5-7)