1968-73 TOYOTA COROLLA

Corolla 1100 (1968-70)
Corolla 1200 (1970-73) ①
Corolla 1600 (1971-73)

① – From May 1970, Corolla 1200 models incorporate the recirculating ball type steering gear.

DESCRIPTION

STEERING GEAR

Corolla 1100 & Corolla 1200 (Early Models) – The steering gear is a light-acting worm and roller type, having a gear ratio of 18:1. Gear housing is secured to front side member. The sector shaft rides in housing bushings, while roller turns in ball bearings.

Corolla 1200 (May 1970 & Later) & Corolla 1600 – The steering gear system is essentially the same as earlier Corolla models, however it has been adapted to include a ball nut which contains recirculating balls. This type gear provides more accurate, responsive steering action.

STEERING LINKAGE

All Models – 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

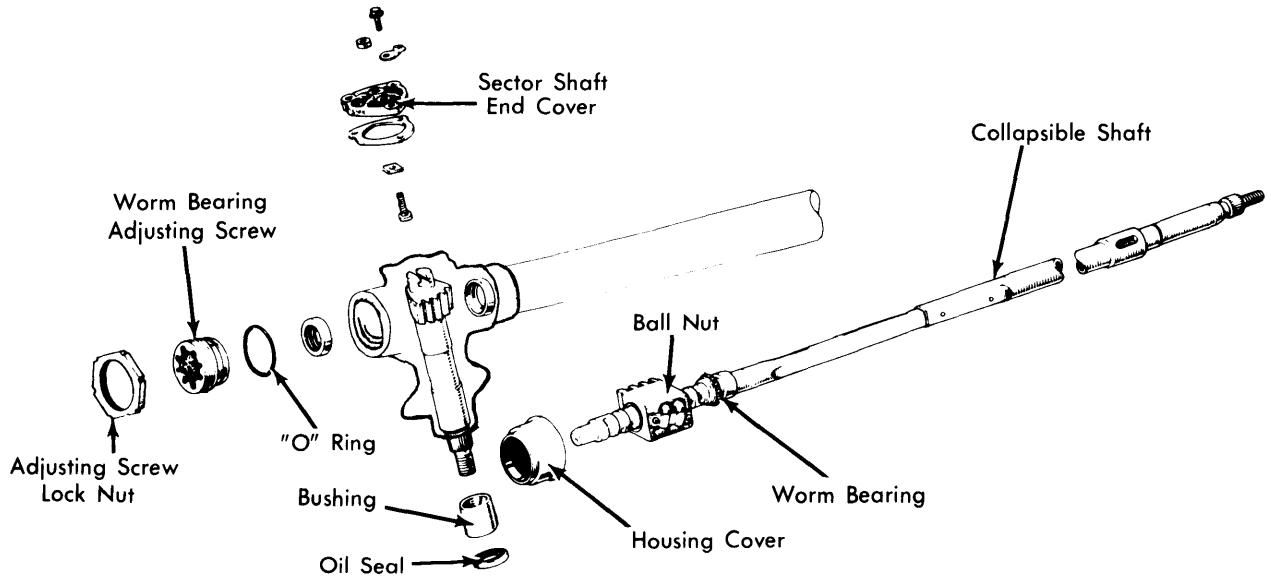
Removal – 1) Remove steering wheel from shaft, disconnect turn signal switch wiring harness from under instrument panel, position turn signal in right turn position, loosen attaching screw, and remove turn signal switch.

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.



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RECIRCULATING BALL TYPE STEERING GEAR

1968-73 TOYOTA COROLLA (Cont.)

STEERING LINKAGE

Removal (All Models) – 1) Raise and support front of vehicle and remove front wheels. Remove idler arm from side member. Loosen and remove pitman arm retaining nut, then pull pitman arm from sector shaft, using suitable puller (09610-12010).

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

STEERING GEAR

Disassembly (Worm & Roller Gear) – 1) Place gear assembly in a vise. Remove bolts attaching end cover to gear housing. Loosen sector shaft adjusting screw lock nut, then remove sector shaft end cover by turning adjusting screw in. Remove sector shaft from gear housing and drain lubricant.

2) Remove worm bearing adjusting screw with suitable wrench (09617-12010). Extract "O" ring between adjusting screw and outer race of ball bearing. Install a nut on top end of main shaft to use as surface for tapping, and tap main shaft, with bearings, from gear housing. Remove bushing and collar from top end of column tube.

Inspection – 1) Check bearing, sector shaft, bushings, and oil seal for any wear or damage. Replace parts as necessary. If necessary, roller may be replaced in sector shaft by grinding welded portion from nut, removing worm, installing new component and rewelding nut.

2) Check inner diameter of bushing. It should be less than .989" (25.1 mm). Replace bushings if excessive diameter is noted.

Assembly & Adjustment – 1) Coat worm shaft bearings with gear lubricant and assembly bearing to both sides of worm gear. Insert main shaft, with bearings, into gear housing. Install lower bearing outer race, using suitable tool (09562-10012).

2) Apply grease to new "O" ring and install ring, worm bearing adjusting screw and lock nut onto gear housing. To adjust steering worm preload, first check turning torque of main shaft by attaching a cord (wind around shaft) and pull-scale to top of shaft. Torque should read 2.6-3.7 lbs. (1.2-1.7 kg). Adjust preload by turning adjusting screw as required. *NOTE – The worm bearing adjusting screw must be held firmly while checking preload. After correct adjustment is obtained, tighten lock nut to specification.*

3) Select and fit sector shaft thrust washer to obtain a minimum clearance between sector shaft and thrust washer. Thrust washers are available in the following sizes: .079" (2.01 mm), .082" (2.07 mm), .083" (2.11 mm), .085" (2.15 mm).

4) Apply gear lubricant to sector shaft and "S" type oil seal, then install sector shaft with adjusting bolt and thrust washer into housing. Install end cover gasket and cover plate over adjusting screw. Install and torque cover retaining bolts to specification.

5) Adjust backlash between worm and roller as follows: Install pitman arm and attaching nut onto sector shaft temporarily. Position sector shaft at center of worm gear, then turn sector shaft adjusting screw to obtain a lash of .006-.007" (.16-.19 mm), as measured at end of pitman arm. Tighten adjusting screw lock nut to specification.

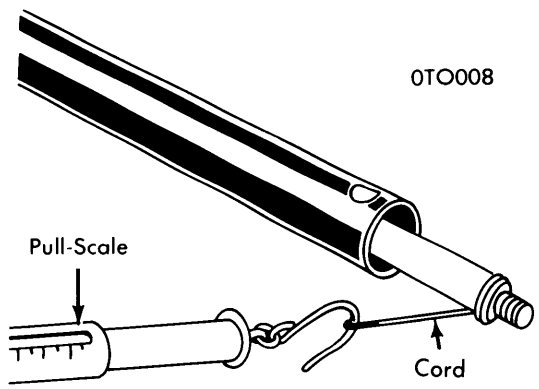
6) To check relative position of sector shaft and worm, turn main shaft clockwise all the way, then turn back counterclockwise exactly 180° and recheck backlash as described. Backlash should now read .04-.06" (0.9-1.6 mm). Next, reverse turning procedure and check backlash for other side (first turn counterclockwise, then clockwise 180°). Lash for this side should not exceed .03" (0.7 mm). If lash is excessive, install suitable adjusting shim. *NOTE – If backlash adjustment is made, recheck worm preload.*

7) Install new bushing and collar on top end of steering main shaft.

Disassembly (Recirculating Ball Type) – 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

1968-73 TOYOTA COROLLA (Cont.)

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 5.5-14.0 lbs. Install worm bearing adjusting screw and turn to obtain specified torque.

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 13.9-22.3 lbs. If out of specification, turn sector shaft adjusting screw to gain specified torque.

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	
1970 & Before	18 (2.5)
1971 & Later	27 (3.7)
Pitman Arm-to-Sector Shaft	65 (9.0)
Gear-to-Frame	
1970 & Before	14 (1.9)
1971 & Later	27 (3.7)
Steering Wheel Nut	18 (2.5)
Roller-to-Shaft Retaining Nut (1970 & Before)	13 (1.8)
Sector Shaft End Cover	14 (1.9)