DATSUN 200SX, 210, 510 & 810 RECIRCULATING BALL

200SX
210
510
810

DESCRIPTION

The steering gear used on these vehicles is a recirculating ball type. The worm shaft is joined to the steering shaft by a rubber shock-absorbing coupling. The steering linkage is a relay design, with the steering gear attached by a pitman arm to one end of the center link (cross shaft), while the other end of the center link moves on the idler arm.

REMOVAL & INSTALLATION

STEERING GEAR

Removal – On 210 models, remove clutch operating cylinder (if equipped). Do not remove clutch hose. On 200SX, 210 and 510 models, disconnect exhaust pipe from manifold (disconnect any brackets holding exhaust pipe in place). On all models, remove bolt holding worm shaft to rubber coupling. Remove nut holding gear arm to sector shaft and remove steering gear arm from sector shaft. Remove bolts securing steering gear housing to body side member. Remove steering gear housing from vehicle.

Installation – To install, reverse removal procedure, aligning markings on pitman arm with markings on sector shaft.

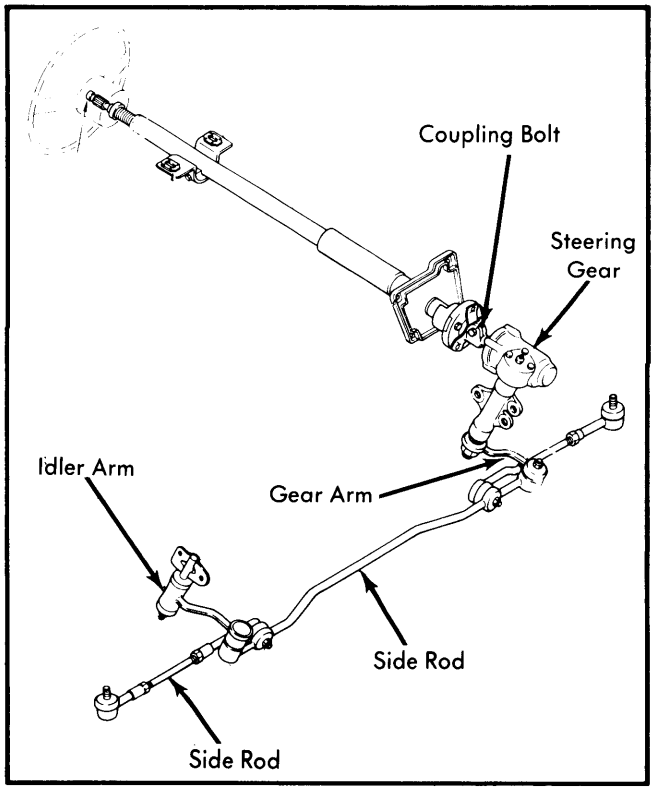

Fig. 1 Datsun Steering Gear Linkage (210 Shown, Others Similar)

STEERING LINKAGE

Removal – Jack up front of vehicle and support with stands. Detach both outer tie rod ends from steering knuckles. Separate cross shaft from idler arm and pitman arm, then remove cross shaft and tie rods as an assembly. Idler assembly may be removed from side member, if necessary to replace bushing.

Installation – To install, reverse removal procedure, noting the following: Set tie rod end length to the prescribed setting, then check wheel alignment. See *Datsun in WHEEL ALIGNMENT section.*

Tie Rod Settings

Application	①In. (mm)
200SX	12.05 (306.0)
210, 510	12.40 (315.0)
810	
Steering Gear Arm Side	14.35 (364.5)
Idler Arm Side	14.19 (360.5)

① – As measured from center-to-center of tie rod ball studs.

ADJUSTMENT

NOTE – *Steering gear adjustments are performed during reassembly. See Overhaul as outlined below.*

OVERHAUL

STEERING GEAR

Disassembly –**1)** Drain gear box of oil, then place unit in padded vise or on suitable holding fixture mounted in a vise.

2) Loosen adjusting screw lock nut and remove sector shaft cover screws. Turn adjusting screw a few turns clockwise and withdraw sector shaft. Remove rear cover. Withdraw bearing shims and worm assembly. Remove oil seal.

NOTE – *Do not remove sector shaft needle bearings from housing. If defective, replace housing assembly. Do not disassemble ball nut; replace, if necessary, with worm shaft assembly.*

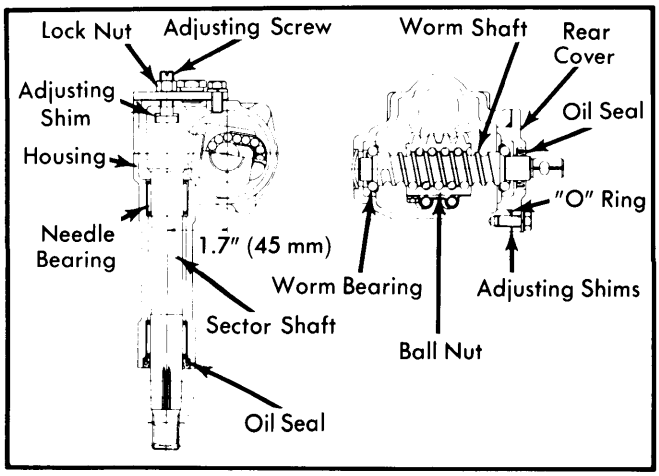

Fig. 2 Sectional View of Datsun Recirculating Ball Steering Gear

DATSUN 200SX, 210, 510 & 810 RECIRCULATING BALL (Cont.)

Inspection – Inspect gear teeth on sector shaft and ball nut for wear or damage; replace as necessary. Check bearings for wear or roughness during rotation. Ensure ball nut moves smoothly over its entire length of travel.

Assembly & Adjustment – 1) Lubricate bearings, gear, and other moving parts with gear oil. Apply suitable grease to oil seal lip and press seal into rear cover. Install "O" ring, worm shaft assembly, and worm bearing shims to gear housing. **NOTE** – *Be sure to install thicker shims to gear housing side.*

2) By selecting suitable shims, adjust worm bearing preload so that initial turning torque of worm shaft is as specified (see illustration). Rotate worm shaft a few turns to properly settle worm bearing before taking preload measurement.

Worm Bearing Preload

Application	INCH Lbs. (cmkg)
210 & 810	3.5-5.2 (4.0-6.0)
200SX & 510	3.5-6.9 (4.0-8.0)

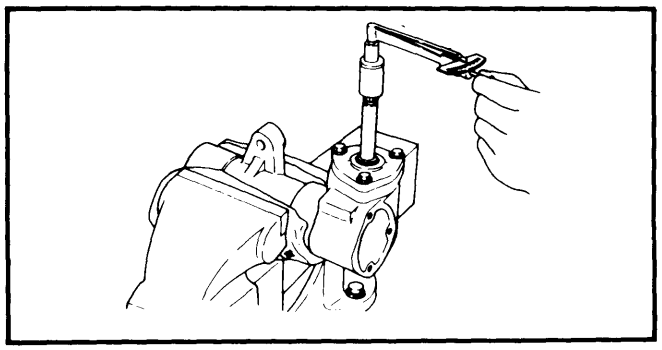

Fig. 3 Measuring Steering Gear Initial Turning Torque

3) Insert adjusting screw into "T" groove of sector shaft and adjust end play between shaft and screw head to .0004-.0012" (.01-.03 mm) by selecting appropriate shim size.

4) Rotate worm shaft until ball nut is in center of travel, then install sector shaft and adjusting screw in gear housing. Ensure center tooth of sector shaft is engaged with center of ball nut. Apply sealant and gasket material to sector shaft attaching face.

5) Turn adjusting screw counterclockwise to set cover on gear housing. Temporarily install retaining bolts. Turn adjusting screw further counterclockwise until sector shaft is drawn upward about .08-.12" (2-3 mm). Fully tighten cover bolts.

6) Push sector shaft against ball nut by gradually turning adjusting screw until sector shaft gear lightly meshes with ball nut gear, and temporarily secure adjusting screw with lock nut.

7) Install pitman arm to sector shaft and move it side-to-side several times to ensure smooth operation. Set pitman arm at center point and adjust backlash (by turning adjusting screw) such that free movement at top end of pitman arm is .004" (0.1 mm).

8) Turn adjusting screw clockwise approximately $\frac{1}{8}$-$\frac{1}{6}$ turn and tighten lock nut securely, after moving sector shaft several times. Fill gear housing with approximately $\frac{5}{8}$ pint (.27 litre) of suitable gear oil. Install filler plug.

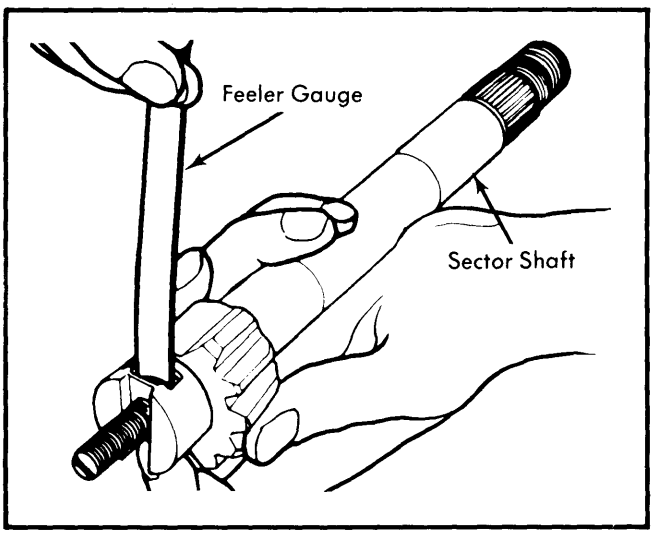

Fig. 4 Measuring Sector Shaft-to-Adjusting Screw End Play

TIGHTENING SPECIFICATIONS

Application	Ft. Lbs. (mkg)
Pitman Arm-to-Gear	94-108 (13.0-14.9)
Rear Cover Bolts	
210	14-22 (2.0-3.0)
All Others	11-18 (1.5-2.5)
Adjusting Screw Lock Nut	
210	14-22 (2.0-3.0)
All Others	12-18 (1.7-2.5)
Gear-to-Frame	
810	38-46 (5.3-6.3)
All Others	51-58 (7.0-8.0)
Idler Arm-to-Frame	
810	23-31 (3.2-4.3)
All Others	51-58 (7.0-8.0)
Ball Stud Nuts	
210, 510	22-51 (3.0-7.0)
200SX, 810	40-72 (5.5-10.0)
Tie Rod Lock Nuts	
810	8-12 (1.1-1.7)
All Others	58-72 (8.0-10.0)
Worm Shaft Coupling Bolt	29-36 (4.0-5.0)