DATSUN POWER-ASSISTED RACK & PINION

810

DESCRIPTION

Power steering is rack and pinion cam gear type. System consists of a rack and pinion steering gear, steering pump, reservoir and flexible connecting lines.

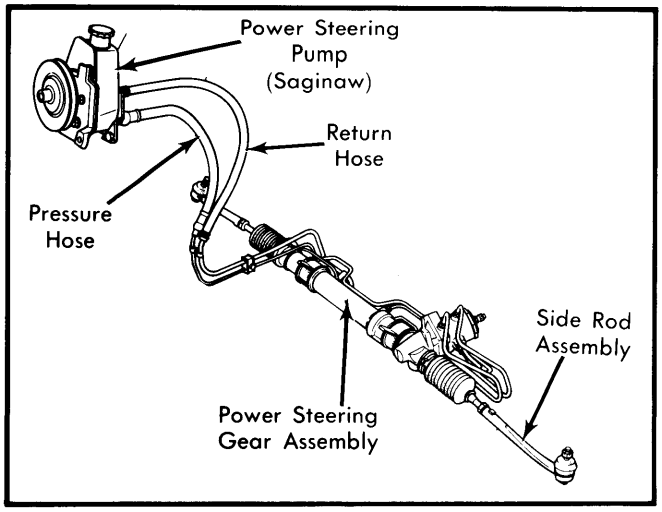

Fig. 1 View of Power Steering Assembly. Pump is Belt Driven From Crankshaft.

GENERAL SERVICING

HYDRAULIC SYSTEM LUBRICANT

Capacity

Saginaw Pump — 1⅜ quarts.
Atsugi Type "A" Pump — 1⅜ quarts.
Atsugi Type "B" Pump — 1.0 quarts.

Fluid Type — Dexron.

NOTE — *Normal operating temperature for power steering fluid is 140-176°F (60-80°C).*

HYDRAULIC SYSTEM BLEEDING

Raise and support front of vehicle. Quickly turn steering wheel right to left to lock positions until fluid level no longer decreases and bubbles do not appear. Start engine and idle for 2-3 minutes. Accelerate engine under no load 2-3 times. Let engine idle and quickly turn wheel lock-to-lock until air bubbles no longer appear.

NOTE — *Do not hold steering wheel at lock position for more than 15 seconds. Ensure no unusual noises appear from system.*

HYDRAULIC SYSTEM PRESSURE TEST

1) Disconnect pressure line at pump and connect pressure gauge and shut-off valve. Check fluid level, open shut-off valve and run engine for about 5 seconds. Check fluid level and restart engine.

2) Turn steering wheel lock-to-lock several times to expel air from system and bring fluid temperature up. Slowly close shut-off valve with wheel at lock position. Pressure at idle should be 995 psi (70 kg/cm²).

NOTE — *Fluid should be at normal operating temperature. Do not hold steering wheel in lock position for more than 15 seconds.*

3) If pressure is below specification, pump is faulty. If pressure rises above specification, relief valve in pump is at fault. In either case, replace pump.

ADJUSTMENTS

BELT TENSION

With 22 lbs. (10 kg) pressure on belt, deflection at center should be .31-.47" (8-12 mm).

STEERING WHEEL TURNING FORCE

Park vehicle on a dry, level surface. Set parking brake. Bring hydraulic fluid up to normal operating temperature. Attach a spring scale and check steering wheel turning force with wheel turned 360° from straight ahead. Force should be less than 5.5-6.6 lbs. (2.5-3.0 kg). If not, remove steering gear and check turning force of pinion gear.

PINION ROTATING FORCE AND RACK STARTING FORCE

Install gear to holding plate (KV48102100 or equivalent) and install in a vise. Disconnect cylinder tube and drain fluid. Attach torque wrench to pinion and measure turning force. Turning force should be 7.8 INCH lbs. (.9 N·m) average and less than 13 INCH lbs. (1.5 N·m) maximum. Attach spring scale to rack end to measure rack starting force. Force should be less than 42 lbs. (19 kg).

NOTE — *If either force is not to specifications, adjust retainer adjusting screw. If adjustment cannot be made correctly, replace steering gear.*

REMOVAL & INSTALLATION

STEERING GEAR

Removal — 1) Raise and support front of vehicle. Disconnect hose clamp fixing bolt. Disconnect flare nut at steering gear. Drain fluid. Remove hose clamp from steering gear mounting bracket. Detach side ball studs from knuckle arm with ball joint remover (HT72520000 or equivalent).

2) Loosen steering gear mounting bolts. Loosen bolt securing lower joint to pinion gear. Draw out lower joint from pinion gear. Remove bolt securing steering gear housing to suspension crossmember. Remove steering gear and linkage.

Installation — Install in reverse order of removal. Install lower joint on steering gear as shown in *Fig.* 2. Tighten steering gear mounting bolts.

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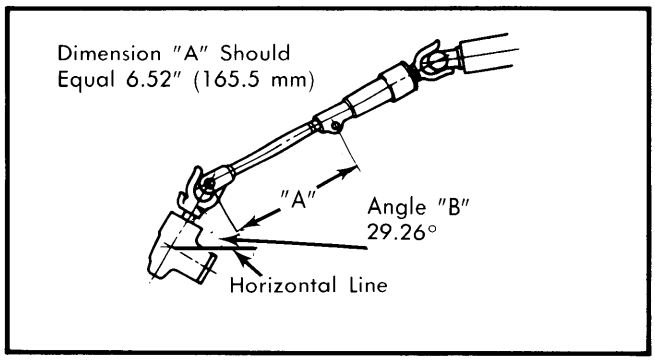

Fig. 2 Steering Shaft to Pinion Gear Lower Joint Attachment

STEERING PUMP

Removal – 1) Loosen power steering pump pulley lock nut. Turn adjusting bolt counterclockwise to loosen pump belt. Remove belt. Disconnect pressure hose flare nut at power steering pump. Drain fluid.

2) Remove hose clamp. Remove pump mounting bolts and pump. Remove flare nuts at steering gear. Remove hose clamps at suspension member. Remove hose from steering gear.

Installation – Install in reverse order of removal. After pump is installed, bleed system and adjust belt tension.

OVERHAUL

POWER STEERING GEAR

NOTE – *Before disassembling, measure pinion rotating force and rack starting force. If they cannot be adjusted properly, replace steering gear.*

Disassembly – 1) Attach steering gear to holding plate (KV48102100 or equivalent) and install in a vise. Remove boot clamp and breather tube. Flatten lock plate. Disconnect side rod and inner socket. Remove side rod assembly from steering gear.

2) Disconnect flare nuts at cylinder side, then pinion housing side of cylinder tubes. Remove tubes. Loosen adjusting screw lock nut. Remove retainer adjusting screw. Remove retainer.

3) Remove rear cover cap. Loosen rear cover lock nut 2 or 3 pitches with rear cover lock nut wrench (KV48101600). Remove rear cover with rear cover wrench (KV4810700).

4) Remove and discard rear cover "O" ring. Remove pinion shaft oil seal and discard. Index mark rear housing and pinion housing for reassembly reference. Remove rear housing attaching bolts.

5) Remove rear housing and discard "O" ring. Remove 2 thrust washers and needle bearing from upper surface of pinion. Remove pinion assembly, thrust washers and needle bearing. Do not hammer pinion assembly or damage teflon seal.

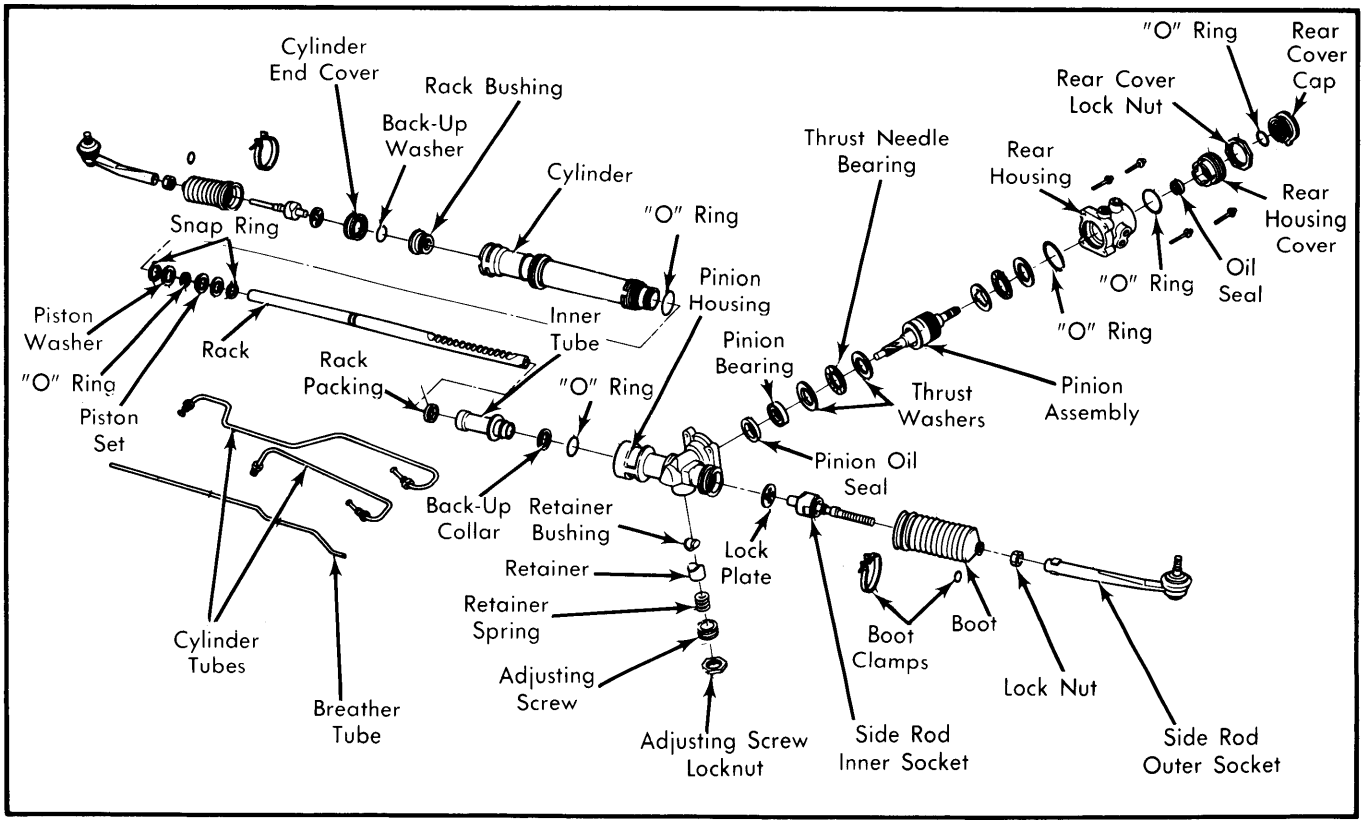

Fig. 3 Exploded View of Power Rack & Pinion Steering Gear

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6) Remove pinion bearing and pinion oil seal. Put index mark on housing and cylinder. Disconnect cylinder lock nut with lock nut wrench (KV48101800). Separate cylinder from pinion housing.

7) Remove rack bushing and discard. Remove cylinder "O" ring and discard. Remove inner tube. Remove "O" ring and inner tube collar from inner tube. Remove rack packing and back-up collar.

Inspection – Thoroughly clean all parts in automatic transmission fluid and blow dry. Replace all oil seals, "O" rings and snap rings. Inspect all steering gear components. Replace steering gear assembly as a unit if components are worn or damaged.

NOTE – *When assembling power steering gear, apply automatic transmission fluid to "O" rings, seals and moving parts.*

Reassembly — 1) Install new "O" ring to inner tube. Attach back-up collar to inner tube and press new rack packing into place. Use less than 1323 lbs. (600 kg) force. Install inner tube.

NOTE – *To prevent damage, wrap cellophone tape around rack end edge and affected piston areas.*

2) Install new snap ring to rack. Install piston component parts to rack. Apply a coat of grease to rack surface. Install new "O" ring to cylinder. Position cylinder on pinion housing and align index marks.

NOTE – *Be careful not to damage teflon ring.*

3) Tighten cylinder lock nut with lock nut wrench (KV48101800). Attach new back-up washer and tighten end cover with cylinder holder (KV48101900). Press new pinion oil seal into pinion housing.

4) Apply coat of grease to oil seal lip. Attach 2 thrust washers, thrust bearings and needle bearing. Apply grease to bearing. Position rack with equal protrusion at ends and with teeth facing pinion at right angles.

5) Install pinion so that punch mark on pinion shaft is located exactly on rear side as it is mounted in vehicle. Apply coat of grease to rack and pinion gear. Install new "O" ring to rear housing.

6) Install housing by aligning index marks. Tighten housing. Install new pinion shaft oil seal and press into rear housing cover. Install second "O" ring to cover.

7) Fit rear housing lock nut approximately 10 pitches down on rear housing cover. Completely tighten rear housing cover to pinion housing. Turn back cover 1 turn from that position.

8) Turn pinion shaft lock-to-lock several times and measure pinion rotating force. Force should be 1.3-2.2 INCH lbs. (.15-.25 N·m). Tighten rear cover lock nut with rear cover wrench (KV48101700).

9) Apply a coat of grease to contact surface of rack and install retainer to pinion housing. Install retainer spring and fully tighten adjusting screw. Turn back screw 20-25° and tighten lock nut.

10) Measure and adjust pinion rotating force and rack starting force. See Adjustments in this article. Temporarily tighten flare nut at rear housing side and then at cylinder side. Then tighten to final torque.

11) Fit inner socket to rack end with new lock plate. Be sure lock plate ratchet enters groove at end portion of rack so rack and inner socket fit snugly. Tighten inner socket and securely bend lock plate at 2 cut-outs.

NOTE – *To prevent damage to boot, remove burrs after bending plate.*

12) Screw in side rod outer socket until distance between boot and outside of lock nut is 1.68" (42.7 mm). Measure rack stroke. Stroke should be 2.76" (70 mm). Apply sealant to contact surfaces between boot, cylinder and breather.

13) Install boot as shown in *Fig. 4*. Set breather tube. Locate clamp bolt opposite breather tube and tighten. Ensure rack moves smoothly, boot is not deformed, and clamp is held tightly in place.

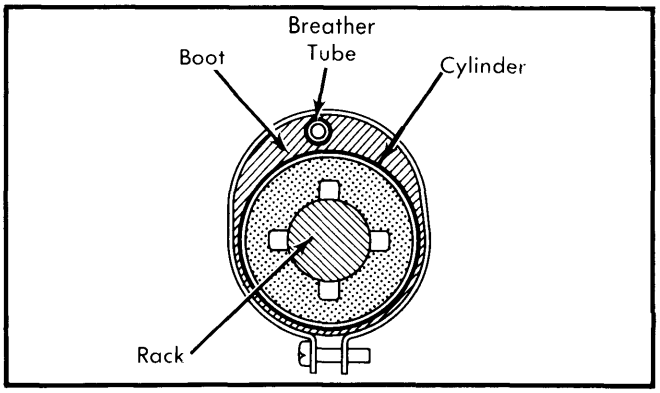

Fig. 4 Boot and Rack Positioning. Apply Sealant to Contact Surfaces.

POWER STEERING PUMP

NOTE – *Manufacturer does not recommend overhaul of power steering pump. Replace as a unit if defective.*

TIGHTENING SPECIFICATIONS

Application	Ft. Lbs. (N·m)
Side Rod-to-Knuckle Arm	40-47 (54-98)
Gear Housing Clamp Bolt	25-33 (34-44)
Lower Joint-to-Pinion Gear	24-48 (32-48)
Lower Joint-to-Rubber Coupling	29-36-(39-49)
Pressure Hose-to-Pump	29-36 (39-49)
Hose Connector-at-Steering Gear	29-36 (39-49)
Pump Mounting Bolt	20-27 (26-36)
Cylinder Lock Nut	58-72 (79-98)
Retainer Adjusting Screw Lock Nut	29-43 (39-59)
Rear Cover Lock Nut	58-72 (79-98)
Flare Nuts	29-36 (39-49)