

Power Steering

HONDA POWER-ASSISTED RACK & PINION

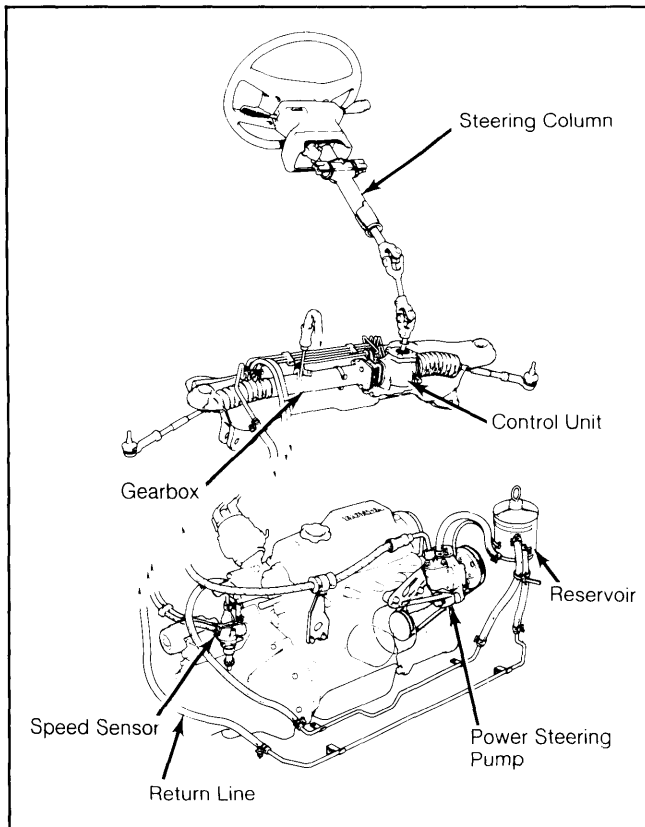
Accord, Prelude

DESCRIPTION

Power steering is rack and pinion with the power assist proportional to both vehicle speed and steering load. Power assist is high when vehicle speed is low and reduces as vehicle speed increases.

The system consists of a power rack and pinion steering gear, steering pump, fluid reservoir, fluid cooler, vehicle speed sensor and connecting lines and hoses.

Fig. 1: View of Accord Power Steering System



Prelude uses a different reservoir.

LUBRICATION

CAPACITY

2.1 qts (2.0L)

FLUID TYPE

Honda power steering fluid only.

CAUTION: The use of any other fluids, such as ATF or other manufacturer's power steering fluid, will cause damage to the system.

OIL FILTER REPLACEMENT

1) To drain, disconnect cooler return hose from reservoir and place end in container. Start engine and run at fast idle. Turn steering wheel lock-to-lock several times until fluid flow stops.

2) Fill reservoir and repeat draining procedure to flush system. Remove reservoir from vehicle before removing guide bolt.

3) Remove guide bolt. Remove clip on end of guide bolt to remove filter and remaining components, noting their respective positions.

4) Clean and inspect all parts. Replace worn or defective parts. Carefully reassemble components to reservoir. Make sure that retaining clip seats in filter recess. Install reservoir in vehicle.

5) Fill reservoir with fluid, start engine and run at fast idle. Turn steering wheel lock-to-lock several times to bleed air from system. Check fluid and add, if necessary.

ADJUSTMENTS

BELT TENSION

1) Measure pump belt deflection midway between pulleys. Deflection should be .47-.55" @ 22 lbs. pressure (12-14 mm @ 98 N) for Accord.

2) Deflection on Prelude should be .71-.87" @ 22 lbs. pressure (18-22 mm @ 98 N). Replace belt when pump adjusting bolt reaches "bump" on adjusting bracket.

HYDRAULIC SYSTEM PRESSURE CHECK

1) Disconnect outlet hose from pump. Install pressure gauge and valve (07406-0010000).

2) Open valve. With engine running, turn steering wheel from lock-to-lock several times until fluid is at operating temperature.

3) Check idle speed and adjust if necessary. Close valve and read pressure gauge.

CAUTION: Do not keep valve closed for more than 5 seconds or pump could be damaged by overheating.

4) On Accord, pump pressure should be 1135 psi (79 kg/cm²), on Prelude, pressure should be 925 psi (65 kg/cm²). If pressure is too low, replace pump.

5) Open valve fully and turn steering wheel to full left lock. Read gauge, turn wheel to right lock and read gauge.

6) Both readings should be at least minimum. A low reading indicates rack and pinion housing or speed sensor is defective. See Speed Sensor Check in this article. If sensor is okay, replace control unit.

SPEED SENSOR CHECK

Low Speed Assist

1) Start engine and let idle. Attach spring tension scale to steering wheel (outer end of spoke). Vehicle should be on a clean dry surface.

2) Turn steering wheel with the tension gauge and check reading. On Accord, reading should be no more than 4 lbs. (18 N), on Prelude, no more than 6 lbs. (27 N).

3) If reading is higher than specified, disconnect and plug large diameter hose running from steering gear to speed sensor.

4) Measure pull as described above. If scale reads less than with hose connected, the sensor is defective and should be replaced.

HONDA POWER-ASSISTED RACK & PINION (Cont.)

High Speed Assist

1) With power steering fluid at normal operating temperature, stop engine and disconnect all 3 sensor hoses (at speed sensor).

2) Connect special by-pass tool (07406-0010100) to the 3 hoses. This tool simulates driving speeds over 30 MPH. Start engine.

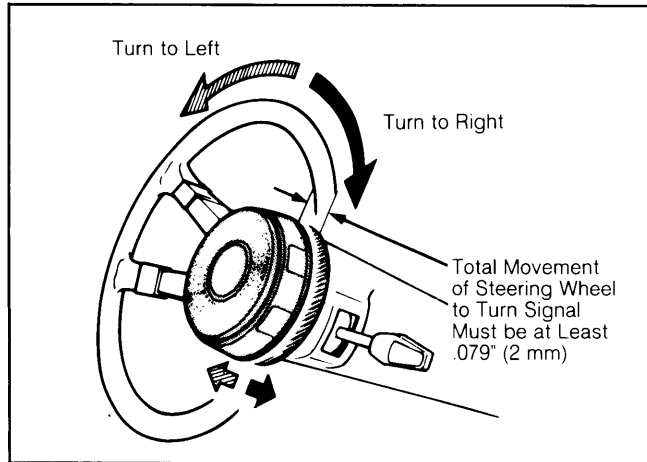
3) Measure steering effort as described previously. If turning force is 11 lbs. (49 N) or more, replace speed sensor.

4) If turning force is less than 11 lbs. (49 N), speed sensor is OK. Check for a restriction in sensor feed line. If sensor feed line is OK, replace steering gear assembly.

SPOOL VALVE CHECK

1) With engine not running, turn steering wheel to left and then to right. Steering wheel cover should move closer to or further away from turn signal cover.

Fig. 2: Checking Steering Shaft Movement



Steering shaft should slide freely in column.

2) Movement of steering wheel should be at least .079" (2 mm) for proper spool valve operation. If the steering wheel moves only in or only out, but not both directions, loosen the bolts in steering shaft connector.

3) Adjust shaft and make sure that shaft slides freely in column. Retighten bolts. If adjustment does not restore correct movement of steering wheel, replace control unit.

RACK GUIDE

To adjust loosen rack screw lock nut. Tighten rack screw until rack piston compresses spring and seats against guide. Back off 70° (1/5 turn) and tighten lock nut.

REMOVAL & INSTALLATION

CONTROL UNIT

Removal

1) Remove boot from base of steering column. Loosen top and bottom bolts in steering shaft connector. Slide connector up off pinion shaft.

2) Drain fluid. Remove gearbox shield. Thoroughly clean control unit, lines and gearbox with solvent. Blow dry. Disconnect lines from control unit. Plug lines.

3) Loosen lock nut on rack guide screw with socket and lock nut wrench (07916-6920100). Back out screw until finger tight. Remove retaining bolts. Pull control unit down out of gearbox while pushing tire into a right turn.

Installation

To install, reverse removal procedures. Use new "O" rings coated with grease. Adjust rack guide screw and steering shaft. Bleed system.

GEARBOX

Removal

1) Raise vehicle and support with safety stands. Remove control unit and wheel assemblies. Separate tie rods from steering knuckles.

2) On Accord with 5-speed transmission, remove bolt from shift rod clevis. Disconnect shift rod.

3) On Prelude, remove engine shields and stabilizer bar brackets. Take weight off engine. On all models, remove center beam and steering gear mounting brackets.

4) On Prelude, rotate gearbox until clamps on front are visible. Remove clamps and pull output lines free of gearbox. On all models, remove gearbox through driver's side of frame.

Installation

1) Install gearbox. On Prelude, clamp pump output line to gearbox before mounting box to frame. On Accord, install shift rod torque arm and tighten.

2) On all models, install center beam. On Prelude, install stabilizer bar brackets and engine shields. On all models, connect tie rods to steering knuckles.

3) Install control unit as outlined in this section. Adjust rack guide screw and bleed system. Install wheel assemblies.

STEERING PUMP

Removal

1) Drain fluid from system. Disconnect inlet and outlet hoses at pump. Remove power steering belt by loosening the pump pivot and adjusting bolts.

2) Remove pump retaining bolts, bracket and power steering pump.

Installation

1) To install, reverse removal procedures. Full reservoir to full mark on dipstick with new fluid.

CAUTION: Use only genuine Honda power steering fluid.

2) Start engine and let run at fast idle while turning the steering wheel lock-to-lock several times to bleed air from system.

SPEED SENSOR

Removal

1) Lift speedometer cable boot up to gain access to retaining clip. Remove retaining clip and pull out cable.

2) Disconnect and plug speed sensor hoses, back off speedometer gear set bolt. Lift speed sensor out.

Installation

After replacing sensor, turn steering wheel from lock-to-lock several times (engine idling), to bleed air from system.

Power Steering

HONDA POWER-ASSISTED RACK & PINION (Cont.)

OVERHAUL

NOTE: Overhaul of Honda power steering components is limited to replacement of seals.

GEARBOX

Disassembly

1) Carefully clamp gearbox in a vise. Loosen bands and pull boots away from end of gearbox. Unbend tie rod lock washers. Unscrew tie rods.

2) Remove hydraulic lines from gearbox. Remove lock nut and rack guide screw. Remove spring, rack guide, and shim. Remove bolts from middle of gearbox.

3) Slide pinion side of gearbox off rack. Shake retainer out of gearbox. Check lip of pinion bearing dust seal. If damaged, pry out seal.

4) Remove circlip and knock out bearing. Pack new bearing with Molybdenum Disulphide grease. Install bearing with driver (07949-61-10000) and attachment (07746-0010100).

NOTE: Use Molybdenum Disulphide grease on pinion bearing only. Use steering grease elsewhere.

5) Install circlip. Coat lip of new seal with grease and install in the same way as bearing. Remove port side of gearbox from rack. Remove rack bushing. Remove cylinder cap and cylinder from rack.

6) From other side of rack, remove snap ring, seal retainer and cylinder spring. Pry piston ring and "O" ring under it from rack.

Inspection

1) Replace any parts with damaged sliding surfaces. Note that rack, pinion housing and gearbox are matched and must be replaced as a unit.

2) Always replace "O" rings and seals with new parts when reassembling. Coat "O" rings with grease.

Reassembly

1) Install new "O" ring on rack. Make sure narrow edge faces out. Install a new piston ring on rack with piston ring guide (07974-6890501) coated with power steering fluid.

2) Slide tool onto rack, big end first. Install piston ring to piston groove (on top of "O" ring). Install a new cylinder end seal to retainer with groove facing out.

3) Grease lip. Install a new "O" ring to retainer. Reinstall retainer on rack. Coat end slider tool (07974-689081) with grease.

4) Make sure surface isn't damaged. Set slider over seal in retainer. Coat rack and fill teeth with grease. Install cylinder ring to rack.

5) Hold tool and retainer together and slide onto rack so that slot in tool runs along smooth side.

6) Pull slider out of retainer, spread ends and remove from rack. Install snap ring on rack. Install cylinder. Coat piston ring and inside of sizing tool (07974-6890601) with power steering fluid.

7) Carefully slide tool onto rack and over piston ring. Rotate tool and move up and down to break in piston ring. Coat inside of cylinder with power steering fluid. Slide cylinder onto rack and over piston ring.

8) Slide rack back and forth to help seat ring against cylinder wall. Coat new "O" rings with grease and install to cap. Slide cap onto rack and press into end of cylinder.

9) Slide rack bushing onto rack. Install retainer washer in pinion side of gearbox. Insert rack teeth all the way into pinion side of gearbox. Using fingers, push old end seal out port side of gearbox.

10) Grease new "O" ring and install on end of port side housing. Set pinion side housing on end and slip end seal guide tool (07974-6891100) onto end of rack. Coat with grease.

11) Coat lip of new end seal with grease. Slide seal onto rack with grooved side in. Slip port side of gearbox onto rack. Push down enough to get end seal into bore.

12) Push again to get middle "O" ring in and finally to compress cylinder spring so middle flanges touch momentarily.

13) Lift port side housing off rack. Look inside and check that new end seal has seated. Install housing and tighten bolts. Move rack in and out of gearbox to make sure it operates smoothly.

14) Wipe grease off guide, shim, and smooth side of rack. Set shim and guide on rack. Turn guide to check for play. If there is play, try various thickness shims to obtain least play.

15) Shims are available in 4 thicknesses from .076" (1.95 mm) to .082" (2.10 mm). Coat shim with grease. Set it in the guide and set guide in the gearbox.

16) Put spring in and install guide screw and lock nut finger tight on top. Clamp box in a vise. Place a new lock washer and stop washer on end of each tie rod.

NOTE: Stop washer on driver's side is thicker.

17) Attach tie rods into rack. Make sure tabs on lock washers fit into slots on rack. Bend lock washer over against straight edge on flange. Tighten each rod.

18) Install boots and clamps on gearbox. Connect air transfer tube. Install hydraulic lines. Check cut-off valve by pulling cap off control unit, pushing valve out and inspecting. If valve is okay, reinstall with spring.

19) Hold finger over end of bore and push valve in at other end to check for smooth movement. If valve is damaged, replace with a new unit.

20) Note that valve is selective fit and there are 3 sizes. All 3 must be tried to ensure correct fit. Start with largest valve. Spring must be able to push valve back, and valve must move freely.

POWER STEERING PUMP

Disassembly

1) Remove pulley. If damaged, remove hub bolts. If only the front seal is leaking, pry out with a screwdriver. Coat lip of new seal with grease.

2) Start seal by hand and push in with a socket. Reinstall pulley. To completely overhaul unit, remove end cover bolts starting with upper right and progressing in a diagonal fashion. Remove "O" ring from end cover.

3) Remove drive gear and driven gear from pump housing. Separate pump housing from port housing and remove "O" ring. Pry seal out of end cover.

Reassembly

1) Install a new seal in cover. Start seal in by hand, push in with a socket. Coat lip of seal with grease. Grease groove and install "O" ring to port housing.

2) Lubricate gear shaft bushings with power steering fluid. Set pump housing in place on port housing.

HONDA POWER-ASSISTED RACK & PINION (Cont.)

Lubricate gears with power steering fluid. Insert gears to pump.

3) Grease "O" ring and position in groove on end cover. Reinstall cover on pump. Be careful not to damage lip of shaft seal. Install bolts in same sequence as removed.

4) Tighten in sequence to 7 ft. lbs. (10 N.m) then to 15 ft. lbs. (20 N.m) and finally to 22 ft. lbs. (30 N.m). If old pulley was replaced, install new pulley on hub.

5) Slide pulley onto pump shaft and tighten. Rotate pulley to make sure pump turns.

TIGHTENING SPECIFICATIONS

Application	Ft. Lbs. (N.m)
Pump Pivot Bolt	36 (49)
Pulley Nut	33 (45)
Pump End Cover Bolts	¹ 22 (30)
Gear Mounting Brackets	16 (22)
Tie Rod Nuts	32 (44)
Rack Guide Screw Lock Nut	18 (24)

¹ — In 3 steps, see Power Steering Pump in this article.