

STEERING SYSTEM - POWER

Article Text

1990 Audi 100

For atsg&cvt

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Sunday, July 02, 2000 12:16AM

ARTICLE BEGINNING

1990-92 STEERING

Audi - Power Rack & Pinion

80, 90, 100, 200

1992 80, 100

DESCRIPTION & OPERATION

Steering system consists of a belt-driven vane or rotary piston hydraulic pump, rotary piston pinion gear assembly and an oil reservoir. The flow control valve supplies fluid to the proper side of the rack piston when the steering wheel is turned. The pump mounts on the front of the engine. Two different rack designs are used.

The 80 and 90 models utilize a rack assembly that extends the rack from one side of the housing. The steering links are attached to a bracket on end of rack.

The 100 and 200 models use a rack assembly that is supported at both ends. The steering link bracket is attached to the center portion of the rack, through a window that exposes the rack. Rubber boots protect exposed portions of the rack from dust and contamination.

LUBRICATION CAPACITY

Lubricant capacity is approximately 1 qt. (.95L).

FLUID TYPE

Use only Audi Hydraulic Fluid (G 002 000).

FLUID LEVEL CHECK

CAUTION: Before removing reservoir cover on ABS equipped models, pump the brake pedal 20-25 times with engine off to bleed pressure from the hydraulic accumulator.

Remove reservoir cover. Start engine. Check fluid level. Ensure steering is pointed straight-ahead. Fluid level should be at MAX mark on side of fluid reservoir.

HYDRAULIC SYSTEM BLEEDING

80 & 90

1) Raise and support vehicle on stands. With engine off, turn steering wheel lock-to-lock several times, allowing air to escape.

2) Idle engine for 2 minutes with wheels in straight-ahead position. When no bubbles appear in reservoir, shut off engine and immediately check reservoir fluid level. Fill if necessary.

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100 & 200

1) With engine at idle, check that fluid is at proper level. Turn steering wheel lock-to-lock several times quickly. Do not force wheel against locks.

2) Repeat step 1) until fluid level remains at reservoir mark. Ensure no bubbles appear in reservoir when steering wheel is turned. Shut off engine. Check that oil level does not rise more than .375" (10 mm) above mark on reservoir.

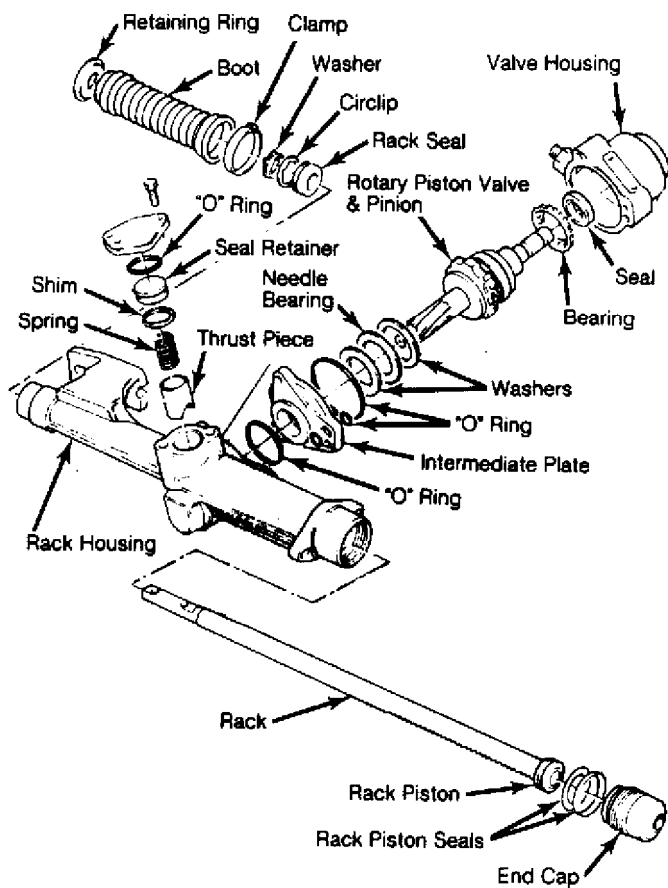


Fig. 1: Exploded View of 80 & 90 Power Steering Gear
Courtesy of Audi of America, Inc.

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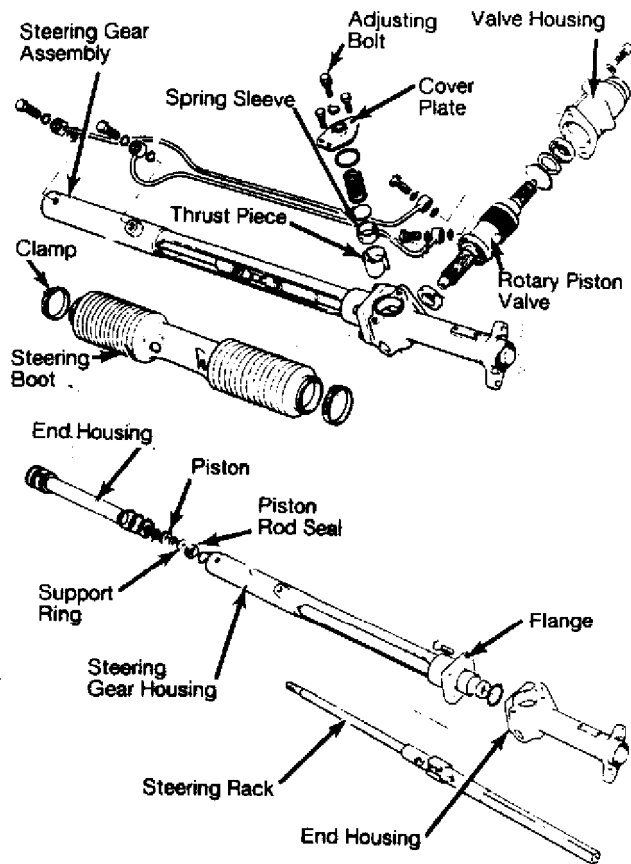


Fig. 2: Exploded View of 100 & 200 Power Steering Gear
Courtesy of Audi of America, Inc.

STEERING PUMP BELT TENSION ADJUST

Loosen pump-to-bracket mounting bolts. Turn adjusting nut (located on bracket) until belt deflection is .375" (10 mm) at center of belt. Tighten bracket nuts.

STEERING GEAR THRUST PLATE ADJUST (100 & 200)

100 & 200

Loosen lock nut on steering gear. Hand tighten adjusting screw until it touches thrust plate. Holding adjusting screw in position and tighten lock nut. Check adjustment with engine idling. Readjust if necessary.

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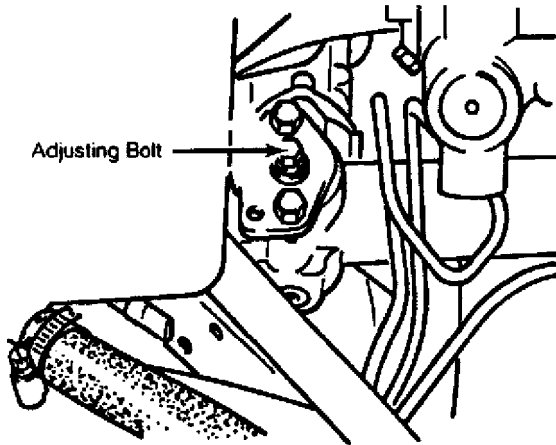


Fig. 3: Adjusting 100 & 200 Steering Gear
Courtesy of Audi of America, Inc.

PUMP DELIVERY PRESSURE TEST

1) Use a clamp to block off the pressure and suction hoses. Remove the pressure hose and banjo bolt from steering pump. Install test gauge adapter and sealing washer in place of banjo bolt. Install pressure gauge. Remove hose clamp from suction hose. See Fig. 4.

2) Start engine and run at idle. Record pressure gauge reading. Maximum running time for this measurement is 10 seconds. If pressure is not to specification, replace pressure relief valve or pump. See PUMP DELIVERY PRESSURE TABLE. Remove pressure testing gauge and install pressure line and banjo bolt. Refill fluid reservoir as necessary. Start engine and check for leaks.

PUMP DELIVERY PRESSURE TABLE

APPLICATION			
Application			
		psi	kg/cm ²
80 & 90		1450-1595	 102-112
100 & 200		2103-2393	 148-168

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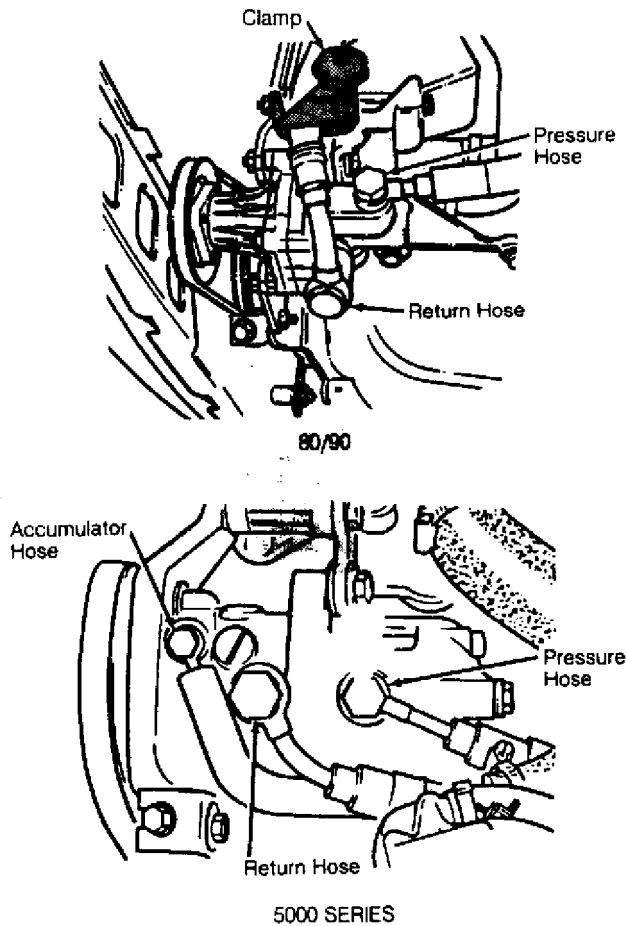


Fig. 4: Testing Pump Delivery Pressure
Courtesy of Audi of America, Inc.

LEAKAGE TEST

1) With engine idling, turn steering wheel to full lock and hold. Inspect all connections. If leaking at steering pinion, replace housing seal and both intermediate plate seals.

2) If intermediate plate seal is leaking, fluid will have entered rack housing. Check for fluid by loosening outer clamp on right steering boot while pushing boot in. If seal is leaking, replace all seals.

STEERING GEAR R & I (80 & 90)

Removal (80 & 90)

1) Drain fluid from system. Disconnect hydraulic lines from valve housing. Remove lower instrument panel trim. Remove boot from lower steering column and push into passenger compartment.

2) Disconnect lower steering shaft from pinion shaft. Disconnect pressure and return line banjo bolts. Remove tie rod bracket bolts from end of steering rack. Disconnect tie rods from

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bracket. Remove bolts attaching gear housing to body. Remove housing.

Installation

To install, reverse removal procedure. Install one tie rod to steering gear and start bolts before installing other tie rod.

STEERING GEAR R & I (100 & 200)

Removal(100 & 200)

1) Drain fluid from system. Disconnect hydraulic lines. Cap openings. Remove tie rod lock plate and both tie rod retaining bolts.

2) Separate tie rods from steering gear. Disconnect steering column pinch bolt. Raise front of vehicle and take weight off front wheels. Remove steering gear retaining bolts from body. Turn wheels to full steering lock. Remove steering gear through opening in right wheelwell.

Installation

To install, reverse removal procedure. Replace tie rod lock plate before reinstallation. Install one tie rod to steering gear before installing other tie rod.

VANE PUMP R & I (80 & 90)

Removal (80 & 90)

Remove vane pump drive belt. Disconnect hydraulic lines from pump. Cover openings. Remove retaining bolts from bracket. Remove pump from engine.

Installation

To install, reverse removal procedure. Adjust belt deflection to .375" (10.0 mm) at center. After installing hydraulic lines, start engine. Turn steering wheel to full lock. Check for leaks.

ROTARY PISTON PUMP R & I (100 & 200)

CAUTION: Before opening reservoir or working on hydraulic circuit, pump the brake pedal 20-25 times with the engine off to bleed pressure from the hydraulic accumulator.

Removal (100 & 200)

Loosen pump bracket and pump mounting bolts. Disconnect hydraulic lines from pump. Remove pump from vehicle with brackets and pulley attached. Remove fluid reservoir and mounting bracket. Clean reservoir and clean or replace strainer.

CAUTION: Prime new or replacement pumps before installation.

Installation

1) Attach brackets and pulley to new pump. Prime new pump by pouring hydraulic fluid into the outlet port, rear chamber and suction

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chamber. Rotate pump slowly, by hand, through 4-5 complete revolutions.

2) Fluid should be discharged from the rear chamber. Keep suction chamber full of fluid. Install pump on vehicle. Disconnect pump-to-accumulator hose at accumulator and ensure hydraulic damper is installed and that hose is not restricted.

3) Connect pressure hose to rear chamber. Ensure correct banjo bolt is used. Pumps fitted with a Red identification tag use a banjo bolt that has a small hole and filter screen (N 903 246.01). Pumps fitted with a Silver tag use a banjo bolt with 3 large holes, and no filter screen (N 021 071 2). See 100 & 200 BANJO BOLT IDENTIFICATION table.

4) Connect the suction line to the pump. Ensure correct banjo bolt is used on pumps fitted with Silver identification tags. The tag may have an identifying number located on the left side of the first line.

100 & 200 BANJO BOLT IDENTIFICATION TABLE

Application				Part Number	Grooves On
					Hex Head
Pressure Hose					
Red Tag On Pump		.....	N 903 246.01	.....	0
Silver Tag On Pump		.....	N 021 071 2	.....	0
Suction Hose					
Silver Tag					
"1"		.....	N 021 072 2	.....	0
"2"		.....	N 902 670.01	.....	1
"3"		.....	N 902 669.01	.....	2
"No Number"		.....	N 902 670.01	.....	1

OVERHAUL

NOTE: On 80 & 90 models, check output and system pressure before disassembling steering gear. Use all parts in repair kit. Use new self-locking nuts.

NOTE: Overhaul of 100 & 200 steering gear is not recommended. If necessary, manufacturer supplies a Short Rack as an assembly only. Check system output and pressure before removing steering gear.

VALVE HOUSING INPUT SHAFT SEAL R & I (80 & 90)

Removal & Installation (80 & 90)

1) Remove rotary valve housing from steering gear. Remove pinion gear and intermediate cover. Remove "O" rings from intermediate cover. Position housing on a flat surface on its mounting surface. Push seal into housing cavity.

2) Install seal with sealing lips facing steering pinion.

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Press seal in place from inside of housing. Install new "O" rings on intermediate cover. Install pinion gear shaft and housing on steering gear.

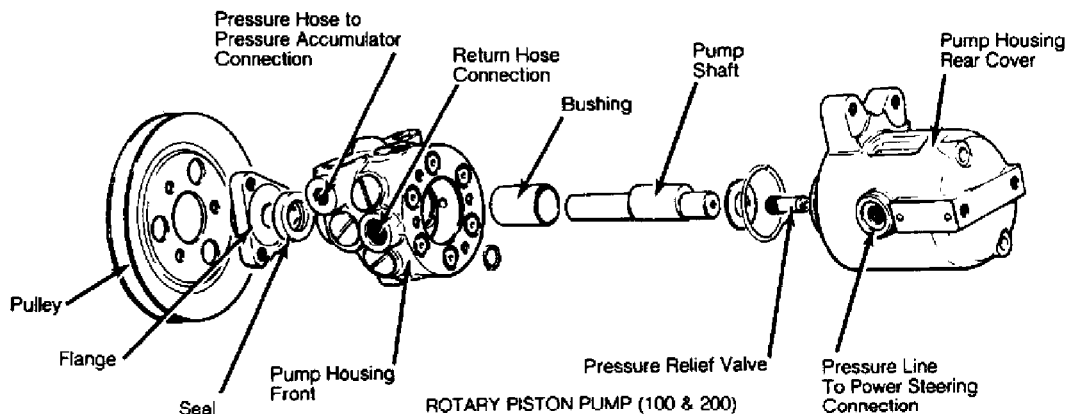
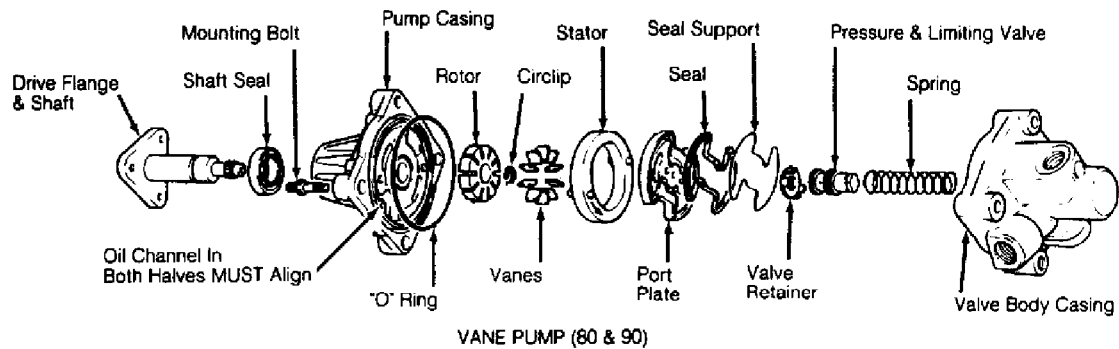


Fig. 5: Exploded View of Steering Pump Assemblies
Courtesy of Audi of America, Inc.

VALVE HOUSING INPUT SHAFT SEAL R & I (100 & 200)

Removal & Installation (100 & 200)

1) Remove valve housing retaining bolts. Remove housing. Remove pinion gear and intermediate cover. Remove "O" rings from intermediate cover. Drive out intermediate cover oil seal.

2) Clamp housing in padded vise. Drive oil seal into housing cavity. Install new seals from inside housing. Ensure housing seal lip faces intermediate cover, and cover seal lip faces valve housing. Replace both intermediate cover "O" rings. To install, reverse removal procedure. Protect pinion teeth on shaft when replacing intermediate cover. Do not damage "O" rings.

STEERING GEAR & RACK SEAL OVERHAUL (80 & 90)

Disassembly (80 & 90)

1) With steering gear removed from vehicle, remove pinion valve housing. Remove pinion valve assembly, intermediate plate and

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seal retainer. Remove thrust piece cover plate and thrust piece assembly from steering housing.

2) Remove retaining ring, clamp and boot from rack. Remove retaining ring, and snap ring from housing. Remove end cap and "O" ring from housing. Pull rack from housing. Using oil seal puller, remove oil seal from housing.

Reassembly

1) To install new oil seal in housing, place oil seal on flat surface and push seal installation sleeve (available in Repair Kit 811 498 020) into oil seal. Slide rack into housing.

2) Using Seal Installers (VW 426 and VW 416b), slide oil seal with sleeve over rack and into housing. Remove sleeve. Install snap ring and retaining ring into housing.

3) Install end housing with new "O" ring. Install thrust piece, spring, "O" ring, seal retainer, and plate. Install clamp, boot, and retaining ring. Install valve assembly as previously outlined.

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS TABLE

AA

Application	Ft. Lbs. (N.m)
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80 & 90

Banjo Bolts

Pressure Line-to-Pump	37 (50)
Pressure Line-to-Rack	37 (50)
Return Line-to-Rack	30 (40)
Supply Hose-to-Pump	37 (50)
End Cap	37 (50)
Pump Bracket Mounting Bolts	15 (20)
Rack-to-Bulkhead	33 (45)
Rack-to-Fender Panel	15 (20)
Thrust Piece Cover	15 (20)
Tie Rod-to-Rack Bracket	33 (45)
Valve Housing-to-Rack Housing	15 (20)

100 & 200

Banjo Bolts

Accumulator Line-to-Pump	11 (15)
Pressure Line-to-Pump	18 (25)
Pressure Line-to-Valve Body	30 (40)
Rack Line-to-Valve Housing (2)	15 (20)
Return Line-to-Pump	30 (40)
Return Line-to-Valve Body	30 (40)
Valve Housing-to-Rack (Inside Banjo)	15 (20)
Valve Housing-to-Rack (End Banjo)	7 (10)
Flange Tube Pinch Bolt	18 (25)
Piston Retaining Nut	15 (20)
Pump Mounting Bolts	15 (20)

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Pump Mounting Bolts (1992)		18 (25)
Tie Rod Locking Nut		30 (40)
Tie Rod Locking Nut (1992)		37 (50)
Tie Rod-to-Steering Rack		44 (60)

INCH Lbs. (N.m)

Banjo Bolt

Valve Housing-To-Rack (End Banjo)		80 (9)
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End Housing-to-Rack Tube		71 (8)
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END OF ARTICLE