

# STEERING SYSTEM - POWER

## Article Text

1991 Volkswagen Passat  
For Volkswagen Technical Site  
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Wednesday, August 25, 1999 09:03PM

### ARTICLE BEGINNING

1990-92 STEERING

Volkswagen - Power Rack & Pinion

1990-92 Passat

1991-92 Cabriolet, Corrado, Golf, GTI, Jetta, Vanagon

### DESCRIPTION & OPERATION

System consists of a vane pump, rack and pinion steering gear, and an oil reservoir. Vane pump draws fluid from reservoir and supplies it to flow control valve. Control valve directs fluid to appropriate side of rack piston.

### LUBRICATION

#### CAPACITY

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

#### FLUID TYPE

On all models, the recommended fluid type is V.W. Hydraulic Oil (G 002 000).

#### FLUID LEVEL CHECK

Remove reservoir cover. Start engine and let idle. Fluid level should be between MIN and MAX marks on reservoir.

#### HYDRAULIC SYSTEM BLEEDING

1) Start engine and let idle. Ensure fluid is at proper level. Turn steering wheel from lock to lock several times quickly.

2) Continue until fluid level remains at reservoir mark. Ensure no bubbles appear in reservoir when steering wheel is turned. Shut off engine. Ensure oil level does not rise more than 3/8" (10 mm).

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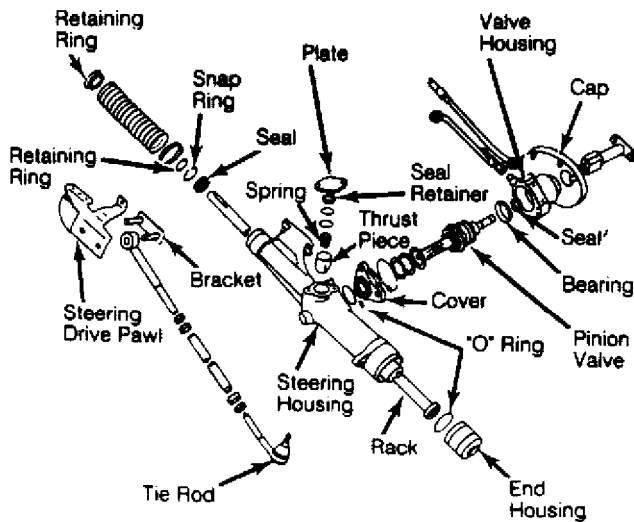


Fig. 1: Identifying Typical Power Rack & Pinion Components  
Courtesy of Volkswagen United States, Inc.

## ADJUSTMENTS

### POWER STEERING PUMP BELT

Loosen nuts on pump mounting bracket. Turn adjuster bolt until belt deflection is 3/8" (10 mm) at center of belt. Tighten nuts to specification.

## TESTING

### HYDRAULIC SYSTEM PRESSURE TEST

1) Install Pressure Gauge (US1074 B) between pressure hose and pressure line at valve housing. Open pressure gauge valve. Run engine at idle. Turn steering wheel from lock to lock several times.

2) On Vanagon, pressure should be 1670-1750 psi (117-123 kg/cm<sup>2</sup>). On all others, pressure should be 1100-1200 psi (78-84 kg/cm<sup>2</sup>). If pressure is not within limits, see PUMP PRESSURE TEST.

3) If pump pressure is within specification, but system pressure is low, replace steering gear.

### PUMP PRESSURE TEST

1) Install Pressure Gauge (US1074 B) between pressure hose and pressure line of valve housing. Start engine and let idle. Close valve. Leave valve closed for no longer than 5 seconds. On Vanagon, pressure should be 1670-1750 psi (117-123 kg/cm<sup>2</sup>). On all others, pressure should be 1100-1200 psi (78-84 kg/cm<sup>2</sup>).

2) On all vehicles except Vanagon, go to step 3). On Vanagon, if pressure is not to specification, inspect limiting valve and housing bores and piston for obstructions. Ensure piston moves freely in housing. Install new valve if necessary.

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3) If pump pressure is not within specification, replace pump.

### STEERING WHEEL TURNING FORCE

#### Except Vanagon

Remove steering gear. See POWER RACK & PINION under REMOVAL & INSTALLATION. Loosen lock nut. Turn adjuster bolt until pinion shaft can be turned by hand without binding. Hold adjuster bolt in position while tightening lock nut.

#### Vanagon

If steering effort is too high, check steering shaft, steering linkage, "U" joints, and ball joints for binding. If all are okay, replace steering gear.

## REMOVAL & INSTALLATION

### POWER STEERING PUMP

#### Removal

Remove alternator and pump belts. Disconnect hydraulic lines from pump. Cap lines to prevent contamination. Remove bracket bolts. Remove pump. See Fig. 2.

#### Installation

To install, reverse removal procedure. Adjust belt tension. See POWER STEERING PUMP BELT under ADJUSTMENTS. Tighten nuts and bolts to specification. See TORQUE SPECIFICATIONS table at end of article. Fill and bleed hydraulic system. See HYDRAULIC SYSTEM BLEEDING. Start engine and check for leaks.

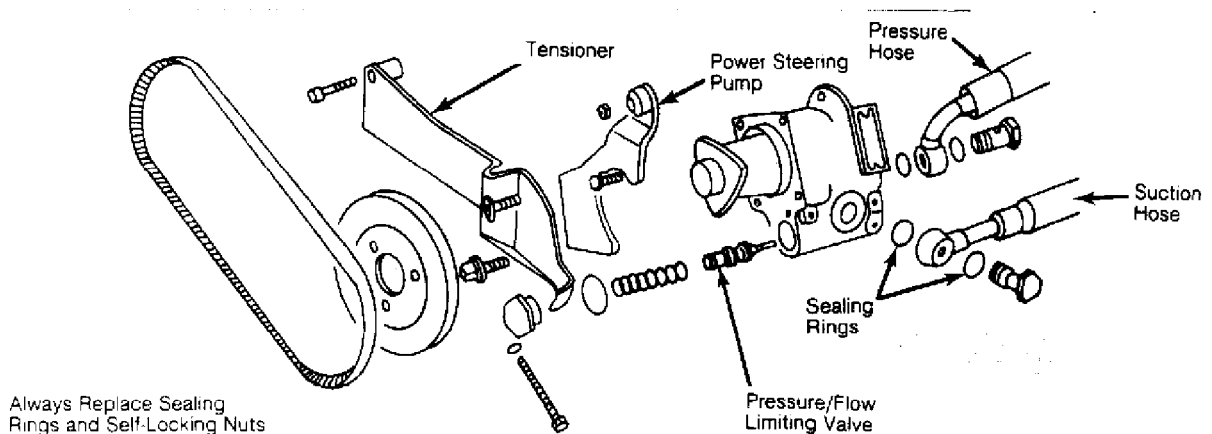


Fig. 2: Identifying Typical Power Steering Pump Components  
Courtesy of Volkswagen United States, Inc.

### POWER RACK & PINION

NOTE: Refer to illustration for exploded view of power rack and

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pinion components. See Fig. 1.

### **Removal (Cabriolet)**

1) Remove pressure line from pump. Drain fluid from pump and line. Disconnect tie rod ends from steering knuckles. Remove transmission mount and bracket. Remove exhaust manifold.

2) Remove hydraulic lines from steering gear. Plug openings. Remove shift linkage from steering gear (if equipped). Remove ground wire. Disconnect pinion shaft at "U" joint. Remove retaining bolts and steering gear.

### **Removal (Corrado)**

1) Disconnect return line from pump. Drain fluid from pump and line. Disconnect tie rod ends from steering knuckles.

2) Remove lock bolt at "U" joint. Remove steering gear retaining bolts. Disconnect hydraulic lines at steering gear. Plug openings.

3) Support engine and transmission. Remove subframe bolts. Remove steering gear.

### **Removal (Golf, GTI & Jetta)**

1) Disconnect return line from pump. Drain fluid from pump and line. Disconnect tie rod ends from steering knuckles.

2) Remove shift linkage from steering gear (if equipped). Disconnect pinion shaft at "U" joint. Disconnect hydraulic lines from steering gear. Plug openings. Remove retaining bolts.

3) Support engine and transmission with Engine Support (10-222A). Remove left transmission mount bolts. Loosen right transmission mount bolts. Remove steering gear.

### **Removal (Passat)**

1) Disconnect return line from pump. Drain fluid from pump and line. Disconnect tie rod ends from steering knuckles.

2) Support engine and transmission with Engine Support (10-222A and 10-222A/1). Remove steering gear boot. Remove transmission mount bolts. Lower engine/transmission sufficiently to separate steering shaft halves.

3) Disconnect hydraulic lines from steering gear. Plug openings. Remove retaining nuts and steering gear.

### **Removal (Vanagon)**

1) Removal and installation information is not available from manufacturer.

### **Installation (All Models)**

Reverse removal procedure to install. Tighten nuts and bolts to specification. See TORQUE SPECIFICATIONS table at end of article. Fill and bleed hydraulic system. See HYDRAULIC SYSTEM BLEEDING. Check wheel alignment. See appropriate WHEEL ALIGNMENT SPECIFICATIONS & PROCEDURES article in the WHEEL ALIGNMENT section:

\* WHEEL ALIGNMENT SPECIFICATIONS & PROCEDURES - (1990 - All

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models except Corrado & Passat)

- \* WHEEL ALIGNMENT SPECIFICATIONS & PROCEDURES - (1990 - Corrado & Passat)
- \* WHEEL ALIGNMENT SPECIFICATIONS & PROCEDURES - 1991
- \* WHEEL ALIGNMENT SPECIFICATIONS & PROCEDURES - 1992

## OVERHAUL

Manufacturer recommends that power steering pump and steering gear be replaced, rather than be repaired.

## TORQUE SPECIFICATIONS

### TORQUE SPECIFICATIONS TABLE

Application		Ft. Lbs. (N.m)
End Housing Bolt	.....	37 (50)
Power Steering Pump Bolt	.....	18 (25)
Pressure-Flow Limiting Valve Cap	.....	42 (57)
Pressure Line Fitting	.....	29 (39)
Return Line Fitting		
On Pump	.....	29 (39)
On Valve Housing	.....	22 (30)
Steering Gear Adjuster Lock Nut	.....	(1)
Steering Gear Retaining Bolt	.....	22 (30)
Subframe Bolt		
Long	.....	96 (130)
Short	.....	59 (80)
Tie Rod-to-Steering Arm	.....	32 (44)
Valve Housing Bolt	.....	15 (20)

(1) - Not specified by manufacturer.

END OF ARTICLE