

## **DRIVE AXLE - REAR**

### **Article Text**

1987 Volkswagen Quantum/Quantum Syncro  
For Volkswagen Technical Site  
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Sunday, March 19, 2000 01:44AM

#### **ARTICLE BEGINNING**

1987 Drive Axle  
VOLKSWAGEN QUANTUM SYNCRO

#### **\* PLEASE READ THIS FIRST \***

NOTE: Complete information is not available from manufacturer.

#### **DESCRIPTION**

The rear axle is part of the full time 4WD system. Unlike most 4WD vehicles, this system does not use a transfer gearbox. The complete system consists of 3 differentials: front, central and rear. The front and central differential are incorporated with the 5-speed transmission. The central and rear differential can be locked at any speed for varying road conditions.

The rear differential has a hypoid type ring and pinion gear. The drive pinion gear is supported by roller bearings and preload is maintained by a collapsible spacer between the bearings. A locking device is incorporated and consists of a shift shaft, shift fork operating sleeve and gear.

#### **OPERATION**

Power is transmitted via the transmission to the central differential, through a drive shaft, to the rear axle final drive. Power is also transmitted through the pinion shaft to the front axle differential.

When traction between road surface and tires is low, differential locks for both central and rear axle differentials can be engaged to improve traction. The differential locks can be engaged either when the vehicle is stationary or while driving. There are 2 warning lamps on the console that indicate when the differentials are locked.

#### **VACUUM SYSTEM**

Central and rear differential locks are operated by a vacuum system. Center differential can be locked independently of rear differential. Rear differential can only be locked if center differential is locked. When differential locks are engaged, warning lights on console light up.

When operating knob is pulled to first position, vacuum is supplied to engagement side of center vacuum unit. When operating knob is pulled to second position, vacuum is supplied to engagement side of center and rear vacuum units.

When vacuum switch is pushed in, vacuum is transferred to the opposite side of vacuum units and differential locks are disengaged. See Fig. 1.

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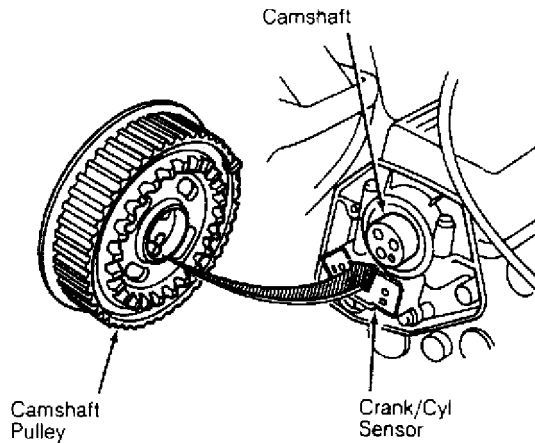


Fig. 1: Vacuum Control System  
Courtesy of Audi of America, Inc.

### AXLE RATIO & IDENTIFICATION

The rear axle identification code is stamped under the front nose section of the drive axle. Quantum Syncro rear final drive has identification letters AAG. Quantum Syncro final drive is 4.11:1.

### ADJUSTMENTS

#### CENTER DIFFERENTIAL LOCK

Disengage lock. Plastic bracket on servo must be pulled in. Check that cable is located correctly at all mounting points. Pull outer cable to rear and install clip in front groove on outer cable. See Fig. 2.

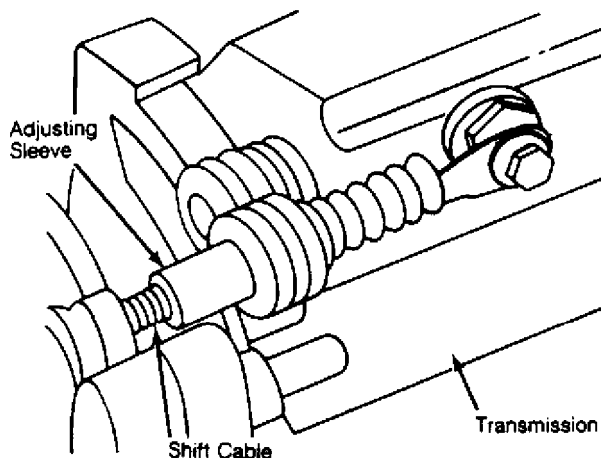


Fig. 2: Center Differential Lock

NOTE: Differential lock can only be engaged with sufficient vacuum. If necessary, run engine and check lock operation.

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## REAR DIFFERENTIAL LOCK

Disengage lock. Clevis pin on servo must be pressed out. Loosen clamping bolt for lever on operating shaft. Turn operating shaft clockwise to stop and pull servo clevis out. In this position, tighten clamping bolt for lever. See Fig. 3.

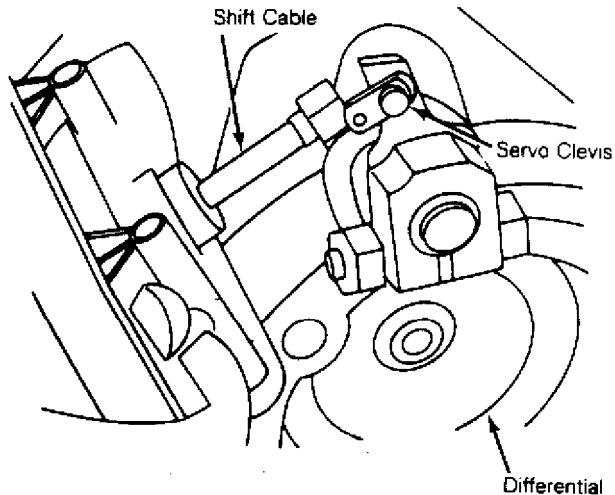


Fig. 3: Rear Differential Lock

## DRIVE SHAFT

NOTE: When removing drive shaft always replace CV joint seals.

1) Loosen center support bearing bolts. Remove adjustment washers and reinstall bolts. Check drive shaft alignment with a straightedge approximately 47" (1194 mm) long. Be sure edge is perfectly straight. Cut recess .593" (15.08 mm) deep and 7.875" (200.03 mm) long in area of center support bearing.

2) Raise drive shaft by tightening bolts until both halves are exactly in line. Distance from center of "U" joint to support bracket must be equal. Measure dimensions from support bracket to support arm and select appropriate adjustment washers and install.

3) Align drive shaft from side to side by moving center bearing. Stretch a piece of string between front and rear CV joint outside diameters. Move center bearing until drive shaft runs parallel to string. String must not rest against center support bearing..

## REMOVAL & INSTALLATION

NOTE: If repairs to rear final drive are necessary, other than those described in this article, complete unit must be replaced as an assembly.

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#### Removal

Detach drive shaft from transmission output flange and support end of shaft. Disconnect drive shaft from rear final drive flange. If necessary, engage differential lock and block wheel. Tie up shaft end. Detach center bearing from body and remove drive shaft.

#### Installation

To install, reverse removal procedure. Always replace CV joint seals. Align drive shaft after installation.

### AXLE SHAFTS

**NOTE:** Axle shafts are diagonally interchangeable. Left rear is identical with right front and right rear is identical with left front.

#### Removal

1) Loosen wheel bolts (remove and install axle nut only with wheels on ground). Remove axle nut. Raise vehicle and remove wheel. Remove right brake backing plate.

2) Detach axle shaft from final drive flange and lay out of way. Remove ball joint clamp bolt. Detach brake hose from bracket. Pry ball joint out of hub. Move strut toward outside.

3) Press stub axle from hub. Check that there is sufficient clearance between inner CV joint and final drive housing. Remove axle assembly. See Fig. 4.

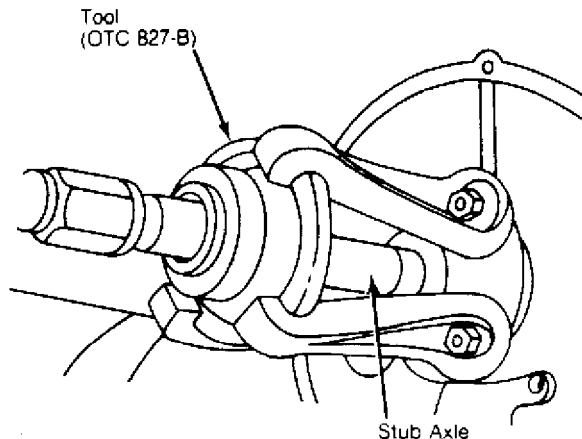


Fig. 4: Pressing Out Stub Axle

**NOTE:** Remove stub axle with mechanical or hydraulic puller only. Never heat up stub axle, as this will severely damage assembly.

#### Installation

To install, reverse removal procedure. Replace gasket on inner CV joint. Ensure axle splines are free of grease and oil. Apply

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a bead of locking compound about .203" (5.16 mm) wide around splines. Install axle shaft.

### DRIVE AXLE

#### Removal

1) Remove rear drive shaft, lock rear differential and block wheel. Disconnect axle shafts. Remove clevis pin lock at differential lock lever.

2) Remove lock pin (only possible with differential lock in off position). Remove drive axle mounting bolts. Slightly raise drive axle with jack. Push forward, then carefully lower unit.

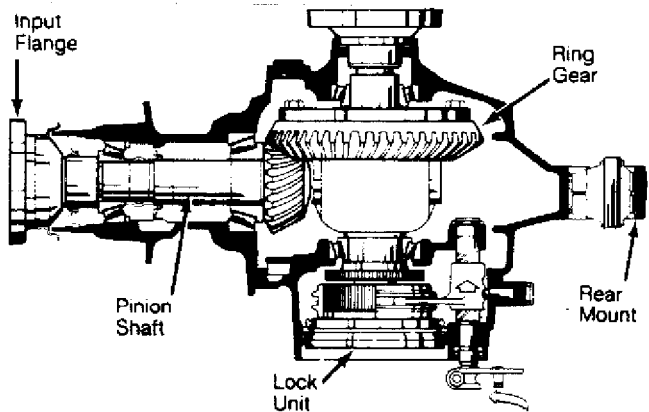


Fig. 5: Sectional View of Drive Axle  
Courtesy of Audi of America, Inc.

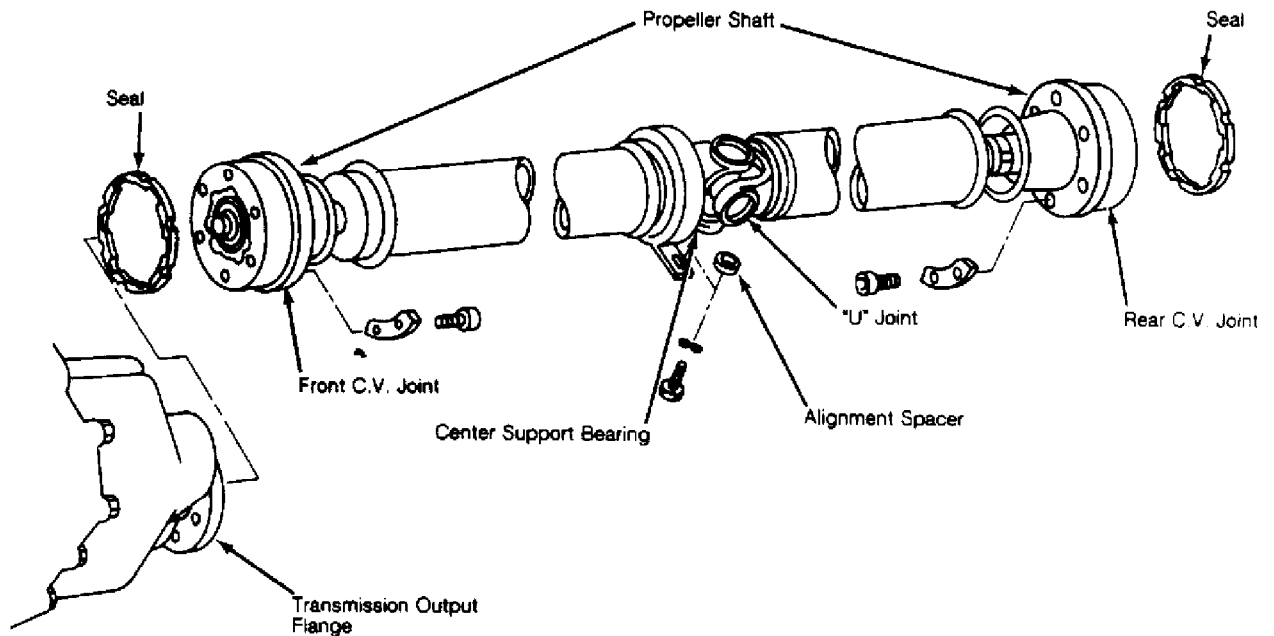


Fig. 6: Exploded View of Drive Shaft

#### Installation

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To install, reverse removal procedure. Ensure final drive mounts are not under tension. Readjust differential lock cable.

### FINAL DRIVE FLANGE OIL SEAL

#### Removal (Right Side)

Disconnect axle shaft. While holding flange with drift, remove drive flange bolt. Place oil drip tray in position. Pull drive flange out and remove oil seal.

#### Installation

To install, drive in oil seal completely. Be careful not to damage seal. Fill space between sealing lips with multipurpose grease.

#### Removal (Left Side)

Drain oil from drive axle. Remove axle shaft and push upward out of way. Remove left drive axle mount. Lower drive axle until flange is accessible. Remove drive flange bolt while holding flange with 2 bolts. DO NOT lose adjustment shim between flange shaft and drive axle. Using a seal puller, remove oil seal.

#### Installation

1) Install threaded shaft of Seal Installer (3066). Place oil seal on seal installer and tighten to stop. Remove seal installer. Fill oil seal and sealing lips with multipurpose grease. See Fig. 7.

2) Attach adjustment shim (with grease) on flange shaft and install. Tighten drive flange bolt to 25 ft. lbs. (34 N.m). Install left final drive mount and tighten nut to 32 ft. lbs. (45 N.m). Check drive axle oil level and top off as necessary.

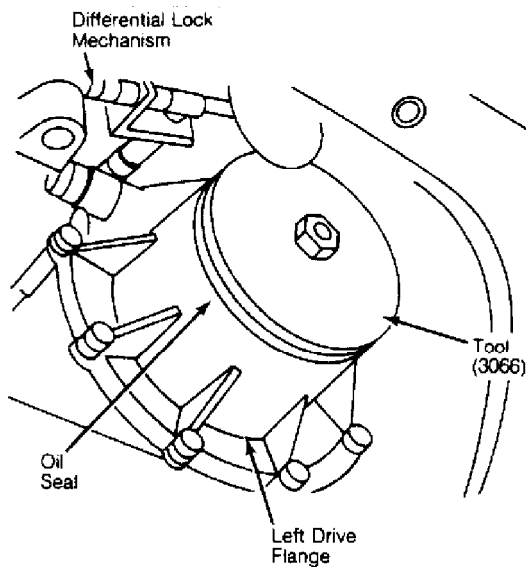


Fig. 7: Installing Left Flange Seal

### PINION SHAFT SEAL

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#### Removal

Disconnect rear drive shaft at drive axle. Mark position of pinion nut on pinion. Always use same pinion nut if possible. Using Flange Holder (3028), remove pinion nut. Using Puller (VW 391), remove pinion flange. Using Seal Puller (VW 691), remove oil seal.

#### Installation

1) Fill oil seal with multipurpose grease between sealing lips and install to stop. Install pinion flange. Clean grease and oil from threads of pinion nut and pinion shaft.

2) Coat threads of pinion nut with thin coat of locking compound. Tighten pinion nut exactly to previously marked position. Lock collar of pinion nut. Connect drive shaft and tighten to 32 ft. lbs. (45 N.m). See Fig. 8.

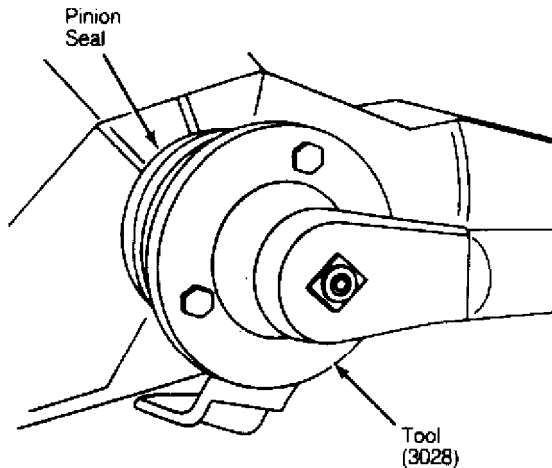


Fig. 8: Replacing Drive Axle Pinion Seal

### TORQUE SPECIFICATIONS

#### TORQUE SPECIFICATIONS TABLE

Application		Ft. Lbs. (N.m)
Axle Shaft Bolt	.....	58 (80)
Axle Nut	.....	203 (280)
Ball Joint Clamp Nut	.....	47 (65)
Center Support Bearing Bolt	.....	14 (20)
Drive Shaft-to-Transmission		
Output Flange Bolt	.....	40 (55)
Drive Shaft to Drive Axle Bolt	.....	32 (45)
Rear Axle To Subframe Bolt	.....	32 (45)
Wheel Bolt	.....	80 (110)

END OF ARTICLE