

# ALTERNATOR & REGULATOR

## Article Text

1993 Volkswagen EuroVan  
For Volkswagen Technical Site  
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Saturday, March 18, 2000 10:30PM

### ARTICLE BEGINNING

1993 ELECTRICAL  
Volkswagen Alternators & Regulators - Bosch

Volkswagen; Cabriolet, Corrado SLC, EuroVan,  
Fox, Golf, GTI, Jetta, Passat

### DESCRIPTION

Bosch alternators are conventional 3-phase, self-rectifying type alternators. Bosch 65 to 75-amp alternators use 3 positive and 3 negative diodes connected to stator windings to rectify current. Bosch 90-amp alternators use 14 diodes.

All alternators use 3 exciter diodes connected to stator windings. These diodes turn off the alternator indicator light and supply power to the voltage regulator while the engine is running. Bosch regulators are transistorized and integral with alternator.

### TROUBLE SHOOTING

NOTE: See TROUBLE SHOOTING - BASIC PROCEDURES article in GENERAL INFORMATION.

### ADJUSTMENTS

#### BELT TENSION

##### BELT ADJUSTMENT TABLE

XX

Application	Specification
A/C Compressor	
Cabriolet	
New .....	(1) 54 INCH Lbs. (6 N.m)
Used .....	(1) 36 INCH Lbs. (4 N.m)
Fox .....	13/64-3/8" (5-10 mm)
Passat GL	
New .....	(1) 72 INCH Lbs. (8 N.m)
Used .....	(1) 36 INCH Lbs. (4 N.m)
Alternator	
Cabriolet	
New .....	5/16" (8 mm)
Used .....	5/32" (4 mm)
Fox .....	3/8-9/16" (10-15 mm)
Passat GL .....	(1) (2) 72 INCH Lbs. (8 N.m)
Power Steering	
Passat GL .....	13/64" (5 mm)
Serpentine Belt	
Corrado SLC, EuroVan, Golf, GTI, Jetta & Passat GLX .....	
	(3)

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- (1) - Turn tensioning nut on toothed rack with Torque Wrench (VAG1410) and Ring Insert (SW VAG 1410-2).
- (2) - Start engine and let it idle for 5 minutes. Loosen bolts and retighten belt to specification.
- (3) - Serpentine belt tension automatically adjusted by tensioner.

AA

### ON-VEHICLE TESTING

#### WIRING CONTINUITY TEST

1) With ignition off, connect a voltmeter between alternator B+ terminal and ground. Voltmeter should indicate battery voltage. If battery voltage is not present, check wiring between alternator and battery.

2) Turn ignition on and ensure alternator indicator light comes on. If light does not come on, check wiring between alternator and warning light, including indicator bulb.

#### OUTPUT TEST

CAUTION: DO NOT load electrical system for more than 15-20 seconds during output test or possible system damage may occur.

1) Ensure connections at battery, alternator, and starter (most vehicles) are clean and tight. Ensure alternator, engine and body are properly grounded. Ensure alternator drive belt is tight and in good condition.

2) Turn off all accessories. Start engine and allow to idle. Connect ammeter following manufacturer's instructions. Run engine at 2000 RPM. Adjust carbon pile on tester to obtain maximum alternator output. DO NOT allow battery voltage to drop to less than 12.6 volts.

3) Alternator output should equal alternator rated output, minus 16-20 amps. If reading is more than 20 amps less than alternator rating, replace regulator and retest. If output is still low, repair or replace alternator.

#### REGULATOR CONTROL VOLTAGE TEST

1) Connect ammeter following manufacturer's instructions. Connect voltmeter leads to battery terminals. Start engine and run at 3000 RPM.

2) Run engine until voltage stops rising. Voltage should be 13.5-14.5 volts. If reading is incorrect, remove regulator and ensure brushes are longer than 3/16" (5 mm). Replace if necessary.

3) If brushes are okay and regulator fails to keep voltage within specified limits, replace regulator and retest. If voltage is still incorrect, repair or replace alternator.

### BENCH TESTING

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### DIODE ASSEMBLY

1) Place ohmmeter on X 100 scale. Connect ohmmeter leads across B+ terminal and 3 stator terminals one at a time. Reverse leads. Ohmmeter should indicate continuity in one direction only.

2) Connect ohmmeter leads across negative plate and 3 stator terminals one at a time. See Fig. 1. Reverse leads. Ohmmeter should indicate continuity in one direction only.

3) Connect ohmmeter leads across D+ terminal and 3 stator terminals one at a time. Reverse leads. Ohmmeter should indicate continuity in one direction only. Replace diode assembly if defective.

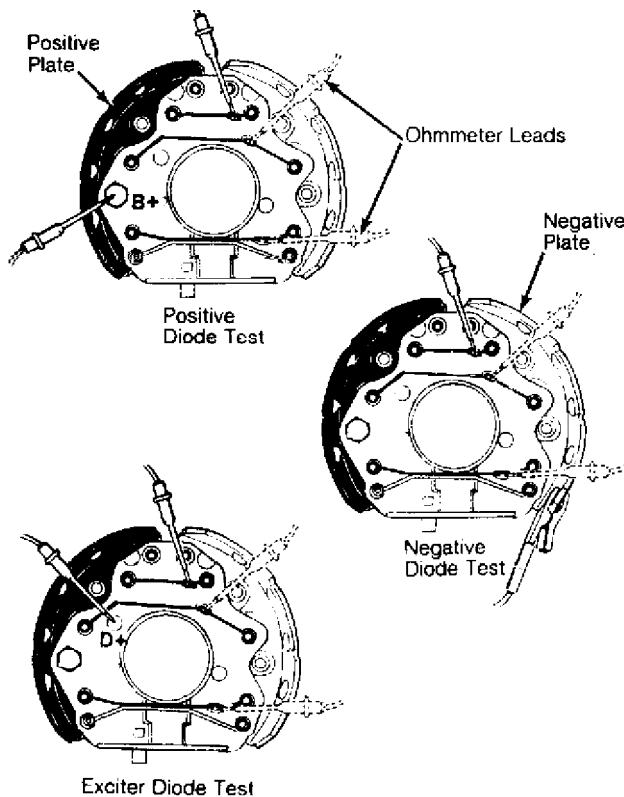


Fig. 1: Testing Diode Assembly  
Courtesy of Volkswagen United States, Inc.

### STATOR

1) Place ohmmeter on lowest scale. Connect ohmmeter across stator leads. Resistance should be approximately .09-.10 ohms. If resistance is incorrect, stator has open or shorted windings and must be replaced.

2) Place ohmmeter on X 1000 scale. Connect ohmmeter between stator core and stator lead. No continuity should exist. If continuity exists, stator is grounded and must be replaced.

### ROTOR

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1) Place ohmmeter on lowest scale. Connect ohmmeter across slip rings. Resistance should be 2.8-3.1 ohms.

2) If resistance is too low, rotor has short circuit and must be replaced. If resistance is infinity (no continuity), rotor has open circuit and must be replaced.

3) Place ohmmeter on X 1000 scale. Connect ohmmeter between either slip ring and rotor core. No continuity should exist. If continuity exists, rotor is grounded and must be replaced.

4) Clean slip rings using fine sandpaper. Rings which are worn or pitted should be turned on lathe. Minimum ring diameter is 1 1/16".

5) If slip rings are beyond repair, remove rear bearing from slip ring end of rotor. Unsolder wires from slip rings and bend up ends of rotor winding. Pull off slip rings. Ensure ends of rotor winding are not damaged.

6) Insert ends of rotor winding into slip ring and press new slip ring onto rotor. Slip ring end must be 9/64" from end of collar. Solder rotor winding to slip ring terminals. Turn rings on lathe and retest rotor. Maximum slip ring runout is .0012" (.03 mm).

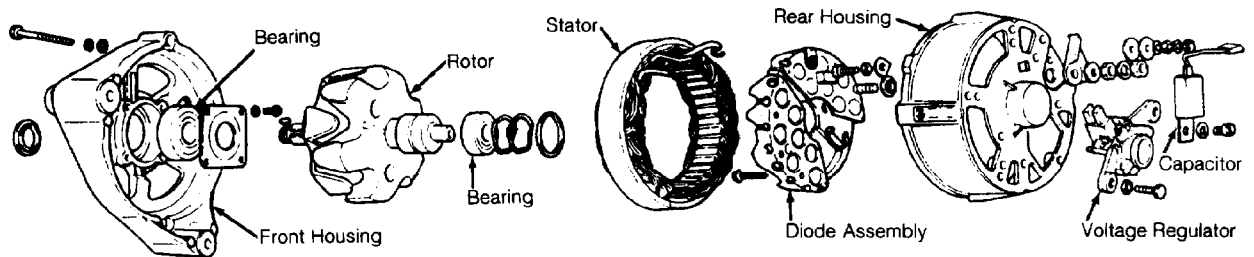
### BEARINGS

Always replace bearings. If replacement front bearing is sealed on one side only, open side must face rotor. If replacement rear bearing is sealed on one side only, open side must face away from rotor.

### BRUSHES

Ensure brushes are longer than 7/32". Replace if necessary. Unsolder brushes from voltage regulator. Solder new brushes. DO NOT allow solder to run into strands of brush leads. Brushes must be free to slide in brush holder with normal spring tension of 10-14 ozs. (283-397 g).

### OVERHAUL



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Fig. 2: Exploded View Of Bosch Alternator (Typical)  
Courtesy of Volkswagen United States, Inc.

END OF ARTICLE