BOSCH ALTERNATORS

Audi **Porsche**
BMW **Saab**
Fiat **Volkswagen**
Mercedes-Benz **Volvo**

DESCRIPTION

Bosch alternators are conventional 3 phase, self rectifying type alternators. Nine rectifier diodes are connected to stator windings (3 to each phase lead). Diodes change alternator A.C. voltages to D.C. voltages coming out of the "B+" and the "D+" terminals of the alternator.

APPLICATION

Model	Volts/Amps	①Bosch Part No.
Audi		
4000		
Standard	14/55	469 520
Heavy Duty	14/65	489 713
California	14/35	469 502
5000		
Gasoline & Diesel	14/35	469 502
Gasoline Only	14/55	489 653
Gasoline & Diesel	14/65	489 613
All With A/C	14/90	489 514
BMW		
320i	14/65	489 718
528i, 633CSi, 733i	14/65	489 619
Fiat		
Brava & Spider		
Standard	14/55	489 743
With A/C	14/65	489 824
Mercedes-Benz		
240D	14/55	489 556
280 Series	14/35	489 751
300 Series	14/55	489 527
300 Turbo	14/55	489 683
380 Series	14/70	489 898
Porsche 924	14/75	469 502
Saab		
99	14/55	489 783
900	14/55	489 735
Volkswagen		
Dasher		
Gasoline	14/55	489 622
Diesel	14/55	489 520
Calif. & All With A/C	14/65	489 713
Jetta, Rabbit & Scirocco		
Standard	14/45	489 858
With A/C	14/65	489 713
Rabbit Diesel		
Standard	14/35	489 799
With A/C	14/65	489 712
Vanagon	14/65	489 913
Volvo		
Standard	14/55	400 933
Heavy Duty	14/70	450 009
Diesel	14/55	②1257294

① — Bosch part numbers are preceded by 0 120 for alternators. Integral regulator models are numbered 469 and 489, while separate regulator models are numbered 400 and 450.
② — Volvo part number.

ON VEHICLE TESTING

NOTE — *Off vehicle testing is included in Overhaul procedures in this article.*

WIRING CONTINUITY TEST

Disconnect terminal plug from rear of alternator and connect a voltmeter negative terminal to ground. With ignition "ON", connect positive lead to each of the connector wires in turn. Voltmeter should read battery voltage as each positive connection is made. If proper voltage is not read, trace each wire to find fault.

VOLTAGE DROP TEST — GROUND SIDE

Connect voltmeter between negative terminal of battery and alternator housing. Start engine and run at approximately 3000 RPM. If voltmeter reading exceeds .25 volt, a high resistance in negative side of charging circuit is indicated. If so, check for loose, dirty or corroded connections.

OUTPUT TEST

Disconnect terminal plug from rear of alternator and connect ammeter in series between alternator center terminal and corresponding socket in terminal plug. Connect a jumper lead between the "D+" terminal and its corresponding socket in terminal plug. Start engine and run at approximately 3000 RPM. Turn on headlights and leave on for 5 minutes. Ammeter should read maximum alternator amperage at normal operating temperature.

REGULATOR CONTROL VOLTAGE TEST

Connect voltmeter between battery terminals. Connect ammeter in series between "B+" terminal of alternator and corresponding terminal of connector plug. Connect a jumper lead between alternator "D+" terminal and corresponding terminal of connector plug. Start engine and increase speed to approximately 3000 RPM. Run engine until charging rate falls below 3-5 amps. Voltmeter should then read 13.7-14.4 volts. If these readings are not obtained, replace regulator.

NOTE — *Test cables should not be removed or load excessively reduced during testing procedure. Considerable load variations may damage the diodes. Control lamp should not go on at any time during the test.*

OVERHAUL

DISASSEMBLY

1) Scribe mark for alignment on front and rear alternator housing. Remove nut, pulley, fan and key. Unscrew brush plate assembly and remove from alternator. Remove frame bolts and separate rear frame from front frame with rotor. Press rotor from frame and bearing from rotor. Remove insulation from wires and cut wires as close to soldered joints as possible.

NOTE — *On 4XX 6XX series alternators, lift and secure brushes prior to disassembly.*

BOSCH ALTERNATORS (Cont.)

2) Diodes may be tested at this point without further disassembly. Use care with insulating bushings under positive diode carrier. To remove negative carrier, extract threaded studs. When one diode has been damaged due to short circuiting, the 3 complementing diodes must also be replaced. Unscrew nuts on both "B+" terminal bolts and lift positive carrier (heat sink) up and back.

TESTING AND REPAIRING

Diode Assemblies – Test diodes with suitable tester before dismantling slip ring and end frame. DO NOT lay positive diode carrier on housing or a false reading will be obtained. Disconnect conductor from "D+" to exciter diodes at heat sink. Unscrew spring and brush holder and remove from alternator. Unsolder stator lead and negative diode connections. Unscrew exciter diodes heat sink and remove together with positive diodes heat sink. Clean all components with trichlorethylene prior to further testing.

Stator – Test stator for short circuits to ground. Tester voltage should be 40V AC. Measure resistance of stator windings between phase connections. Fiesta should indicate .14-.16 ohms, with all remaining models showing .20 to .22 ohms.

Rotor – Test claw pole rotor for short circuits to ground using 40V AC tester. Measure resistance of exciter (field coil) in rotor with ohmmeter across slip rings. Resistance should be 4.0-4.4 ohms. If necessary, turn slip rings in a lathe, noting maximum runout of .001" (.03 mm) and minimum diameter of 1.25" (31.5 mm). Maximum pole wheel runout should not exceed .002" (.05 mm).

Diode Replacement – In case diodes are found to be defective, entire diode plate assembly should be replaced. Care must be exercised in soldering near diodes due to possible damage from excess heat. Use flat jawed pliers as heat sink applied to leads when soldering diode connections.

Drive End Frame – Check ball bearings for wear and replace as necessary. Lubricate ball bearings on one side. Press ball bearing into drive end frame with shielded side downward. Screw on retainer plate. Press ball bearing on slip ring end of rotor and press drive end frame onto drive end of rotor.

Carbon Brushes – Minimum brush length is .2" (5 mm). If replacement is required, grip brush with flat-jawed pliers and unsolder brushes. Do not allow solder to run into strands of brush leads. Brush must be free to slide in holder with normal spring tension of 10-14 ozs. (283-397 g).

REASSEMBLY

1) Solder stator and diode connections using caution not to overheat diodes. Place stator and diode assembly in rear housing and secure with screws.

2) Lubricate new rear bearing and press onto rotor shaft, assuring that shielded side of bearing faces slip rings. Place front bearing in housing with shielded side rearward. Install retainer plate.

3) Place spacer ring on rotor shaft and install rotor assembly into front housing. Press front bearing retaining ring over shaft and into front housing with a socket.

4) Coat bearing bore of rear housing with grease and install spring washer. Assemble front housing with rotor to rear housing, using a turning or twisting motion to seat rear bearing. Line up scribed alignment marks and install screws through housing.

5) Install shaft key, washer, fan, spacer, pulley, lock washer and nut. Install brush and connector plug assembly and retain with screws.

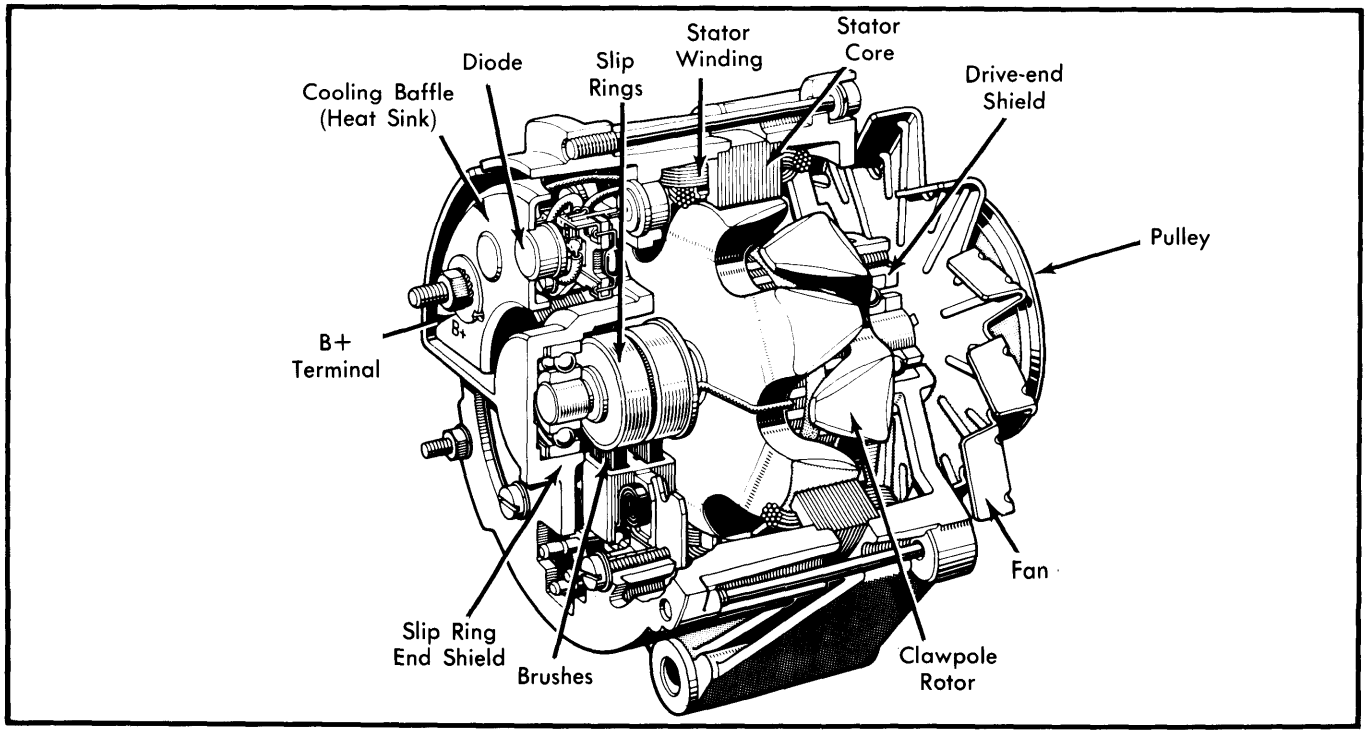

Fig. 1 Cutaway View of Bosch Alternator