BOSCH ALTERNATORS

Audi
BMW
Capri
Fiat
Fiesta
Lancia
Mercedes-Benz
Porsche
Saab
Volkswagen
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	Bosch Part No.①
Audi		
Fox	14/55	489 520
5000	14/55	489 659, 489 660
All With A/C	14/65	469 613, 469 614
BMW		
320i	14/55	489 648
530i		
Early	14/55	489 650
Late	14/65	489 619
633CSi, 733CSi	14/65	489 619
Capri		
4 Cyl.	14/35	489 665
	14/45	489 669
	14/55	489 671
V6	14/45	489 590
	14/55	489 595
	14/65	489 615
Fiat (All)	14/55	489 642
		489 743
Fiesta	14/55	489 667
Lancia	14/55	489 541
Mercedes-Benz		
230	14/55	489 556
280CE	14/55	489 527
	14/35	489 751
280E, 280SE	14/55	489 526
		489 751
450	14/55	489 556
	14/75	469 501
6.9	14/75	469 500
240D	14/55	489 556
300D, 300CD	14/55	489 527
300SD	14/35	489 683
Porsche 924	14/75	469 503
Saab		
99	14/55	400 922
Turbo	14/65	489 709
Volkswagen		
Type 2	14/70	450 001

APPLICATION (Cont.)

Model	Volts/Amps	Bosch Part No.①
Dasher	14/55	489 622
Rabbit/Scirocco	14/55	489 622
With A/C	14/65	489 714
Rabbit Diesel	14/35	489 745
	14/55	489 747
	14/65	489 712
Volvo 4 Cyl.	14/55	400 913, 400 933

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.

SPECIFICATIONS

Field Coil Resistance – Measured at slip rings, resistance should be 3.4-3.74 ohms for Capri, 4.0-4.4 ohms for other models.

Stator Windings Resistance – Measure resistance between phase output terminals. Capri with air conditioning and Fiesta should indicate .14-.16 ohms, Capri without air conditioning should indicate .25-.28 ohms, and remaining models should indicate .2 to .22 ohms.

NOTE – *See APPLICATION for rated outputs.*

ON VEHICLE TESTING

NOTE – *Off vehicle testing is explained as part of Overhaul procedure 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 Volts, 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. Also 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 five 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

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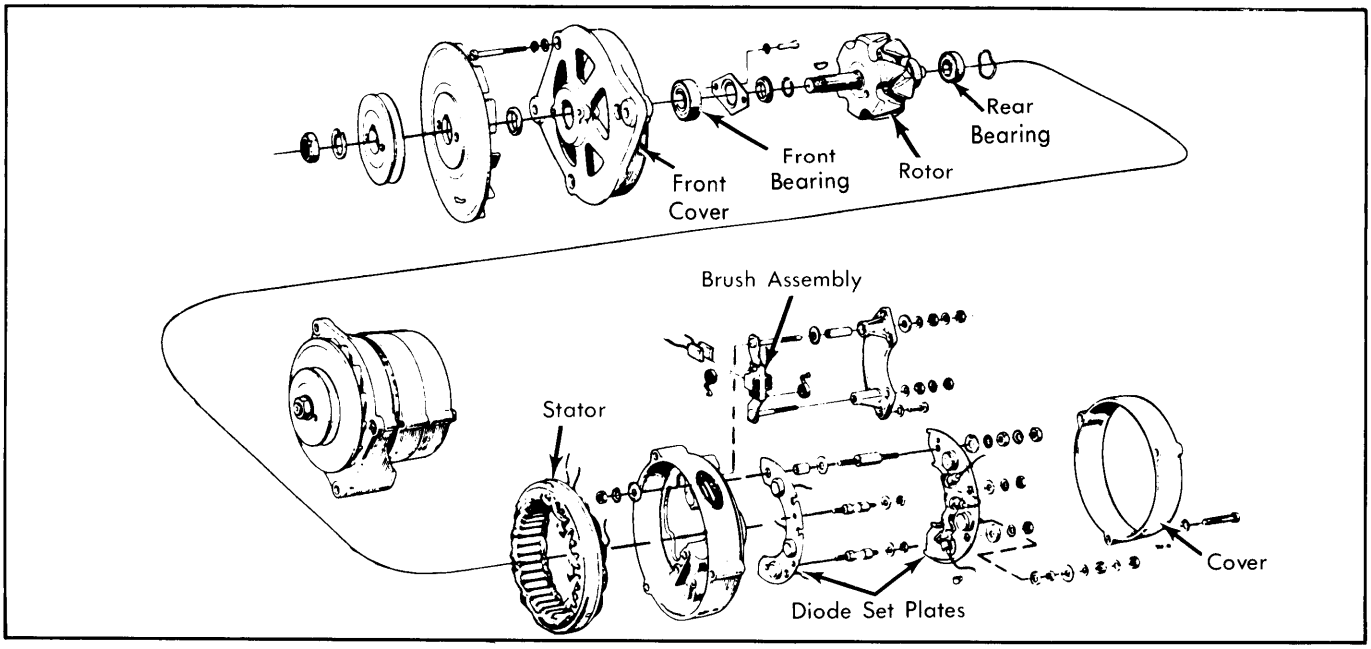

Fig. 1 Disassembled View of Bosch Alternator

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

NOTE – *On 0 120 400 600 series alternators, lift carbon brushes with a hook and secure them, prior to disassembly (see illustration).*

1) Remove nut, pulley, hub and key. Mark location of alternator in blower housing. Unscrew brush plate assembly and remove from alternator. Remove bolts from end frame, then remove frame and field rotor. Press rotor out of end frame. Press ball bearing off rotor. Remove insulating conduit from wires and cut wires as close to soldered joints as possible.

2) The diodes may be tested at this point, prior to further disassembly. Care should be exercised with insulating bushings under positive diode carrier. To remove negative carrier, extract threaded studs. When one rectifying diode has been damaged due to short circuiting, the three complementing diodes must be replaced also. Unscrew nuts on both "B+" terminal bolts and lift positive diode carrier (heat sink) up and back.

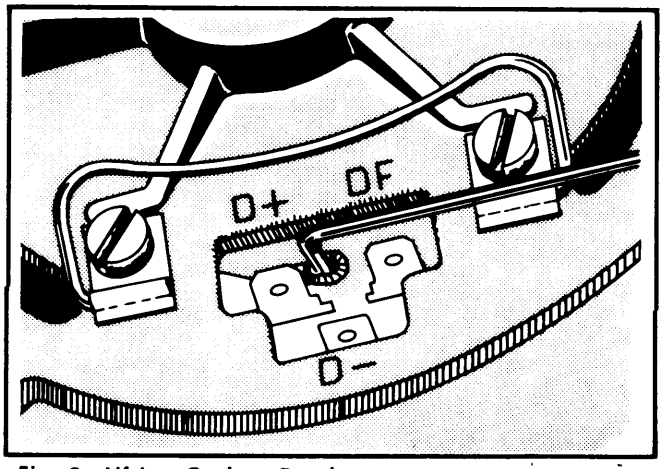

Fig. 2 Lifting Carbon Brushes on 0120 400 600 Series

TESTING & REPAIRING

Diode Assemblies – Test diodes with a suitable alternator tester (EFAW 192) before dismantling slip ring end frame further. CAUTION – *Do not lay positive diode carrier on housing or false reading will be obtained.* Disconnect conductor from "D+" to the exciter diodes at the exciter diodes 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.

NOTE – *Before further testing, lightly clean all components in gasoline or trichlorethylene, but do not soak.*

Stator – Test stator for short circuits to ground, using suitable tester (EFAW 84). Test voltage should be 40V AC. Measure resistance of stator windings between phase connections. See *Specifications for proper value.*

Rotor – 1) Test claw pole rotor for short circuits to ground. Test voltage should be 40V AC. Measure resistance of exciter

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(field coil) in rotor with ohmmeter. See *Specifications for proper value*. Turn down slip rings on a lathe, using suitable tailstock chuck (EFAW 75 or GDF 85 R 3).

2) After turning, check concentricity of slip rings with dial gauge. Runout should not exceed .001" (.03 mm). Minimum diameter of slip rings may be 1.25" (31.5 mm). Maximum runout of pole wheel must not exceed .002" (.05 mm).

Diode Replacement – In case diodes are found to be defective, replacement of entire diode plate assembly is recommended. 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 bearings on one side. Press ball bearing into drive end frame with shielded side downward. Screw on retainer plate. Press ball bearing onto rotor (slip ring end), then press drive end frame onto rotor.

Carbon Brushes – Minimum brush length is .2" (5 mm). If replacement is required, grip brush lead 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.

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.