

ALTERNATOR - DELCO W/INTEGRAL REGULATOR

1988 Jeep Cherokee

1988 Alternators & Regulators
DELCO-REMY WITH INTEGRAL REGULATOR

Jeep

DESCRIPTION

There are 2 types of alternators used on these vehicles. The 12SI and 17SI series (Systems Integral), means alternator with built-in regulator. All 12SI alternators have "Y" stator windings, while all 17SI have delta windings.

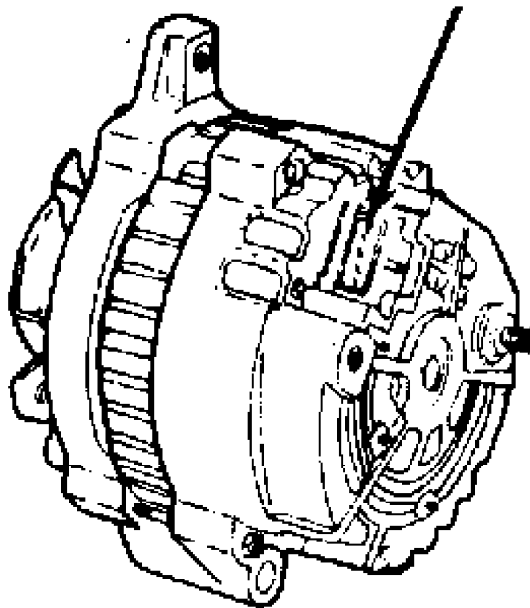
The CS130 (Charging System) alternators have a high amperage output. This alternator does not have a diode trio.

IDENTIFICATION

"P", "L", "I", "S" Terminals

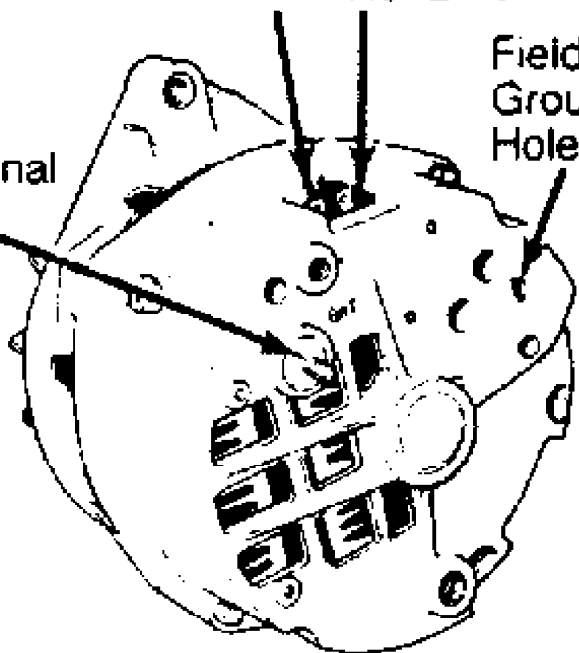
No. 1 Terminal

No. 2 Terminal



"BAT"
Terminal

Field
Ground
Hole



CS SERIES

SI SERIES

Fig. 1: Alternator Terminal Identification & Locations
"S" terminal is optional on CS130.

OPERATION

CS SERIES

Regulator voltage varies to compensate for temperature. Voltage is regulated by controlling rotor field current. Regulator switches rotor field current "on" and "off" at a fixed frequency of approximately 400 cycles per second.

By controlling "on" and "off" time correct system voltage can

be obtained. During high speeds "on" time may be 10 percent and "off" time 90 percent. During low speeds with high electrical loads, "on" time may be 90 percent and "off" time 10 percent.

SI SERIES

A rectifier bridge, connected to stator windings, contains 6 diodes (3 positive and 3 negative) molded into an assembly. This rectifier bridge changes stator AC voltage into DC voltage, which appears at output terminal.

Alternator field current is supplied through a diode trio which is also connected to stator windings. A capacitor is mounted to end frame, protecting rectifier bridge and diodes from high voltage and suppressing radio interference noise.

TROUBLE SHOOTING

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

TESTING

PRELIMINARY INFORMATION

NOTE: Before making electrical checks, visually inspect all terminals for clean, tight connections. Check alternator mounting bolts and drive belt tension. Battery must be in good condition to test charging system.

TESTING (ON-VEHICLE)

CS SERIES

Over/Undercharged Battery (W/ Standard Instruments)

1) If an overcharging condition is suspected, run engine at a moderate speed. Connect a voltmeter across battery terminals. If voltmeter indicates more than 16 volts, replace alternator.

2) If an undercharging condition is suspected, disconnect 2-wire connector from alternator. Turn ignition on with engine off. Connect a voltmeter between terminal "L" in wiring harness and ground. Record reading.

3) If terminal "I" is used, connect voltmeter between terminal "I" and ground. Record reading. If voltmeter reads battery voltage, circuits are okay. If voltmeter reads zero, this indicates an open circuit between terminal checked and battery. Repair as necessary.

Overcharged Battery (W/ Gauges)

If an overcharging condition is suspected, run engine at a moderate speed. Connect a voltmeter across battery terminals. If voltmeter indicates more than 16 volts, replace alternator.

Alternator Output Test (W/ Standard Instruments Or Gauges)

1) Run engine at moderate speed, all electrical accessories off. Measure voltage across battery, if above 16 volts, replace alternator.

2) Connect an ammeter in circuit at "BAT" terminal of alternator. Turn on all available accessories. Connect a battery load tester across battery. Operate engine at 2000 RPM and adjust battery load tester as required to obtain maximum current output while

maintaining 13 volts or more.

3) Output must be within 15 amps of rated output stamped on alternator. If output is not within 15 amps of rated output, replace alternator.

SI SERIES

Overcharged Or Undercharged Battery

1) If an overcharging condition is suspected, attach a voltmeter across battery terminals. Run engine at a moderate speed with all accessories off. If voltmeter reads 15.5 volts or more, remove alternator for repair.

2) If an undercharging condition is suspected, turn ignition on. Connect a voltmeter from alternator "BAT" terminal to ground. Voltmeter should read 12 volts. Connect voltmeter between No. 1 terminal and ground. Voltmeter should read one volt or more.

3) Connect voltmeter between No. 2 terminal and ground. Voltmeter should read 12 volts. A zero reading on any connection indicates an open between connection and battery. Opens in the No. 2 lead may be between terminals at the crimp between harness wire and terminal, or in wire.

Alternator Output Test

1) Connect an ammeter in circuit at "BAT" terminal of alternator. Turn on all available accessories. Connect a carbon pile across battery. Operate engine at 2000 RPM and adjust carbon pile as required to obtain maximum current output.

2) Ampere output must be within 10 amps of rated output. If output is not within 10 amps of rated output, ground field winding by inserting a screwdriver into test hole. Repeat step 1).

3) If output increases to within 10 amps of rated output with field grounded, regulator is defective. If output remains below 10 amps of rated output, check field winding, diode trio, rectifier bridge, and stator.

CAUTION: Tab is within 3/4" of casting surface. DO NOT force tool beyond 1" into end frame. If test hole is not accessible, proceed to BENCH TESTING.

BENCH TESTING

NOTE: There are no internal checks for CS series alternators.

SI SERIES

Rotor Field Winding Test

1) To check for grounds, attach ohmmeter leads to shaft and slip ring (each ring in turn). If reading is not infinity, replace rotor.

2) To test for open field, attach ohmmeter leads to each slip ring. Resistance should measure about 2.4–2.8 ohms on 12SI series, or 1.7–2.1 ohms on 17SI series. If not, replace rotor.

Using Ohmmeter To Check For Grounds

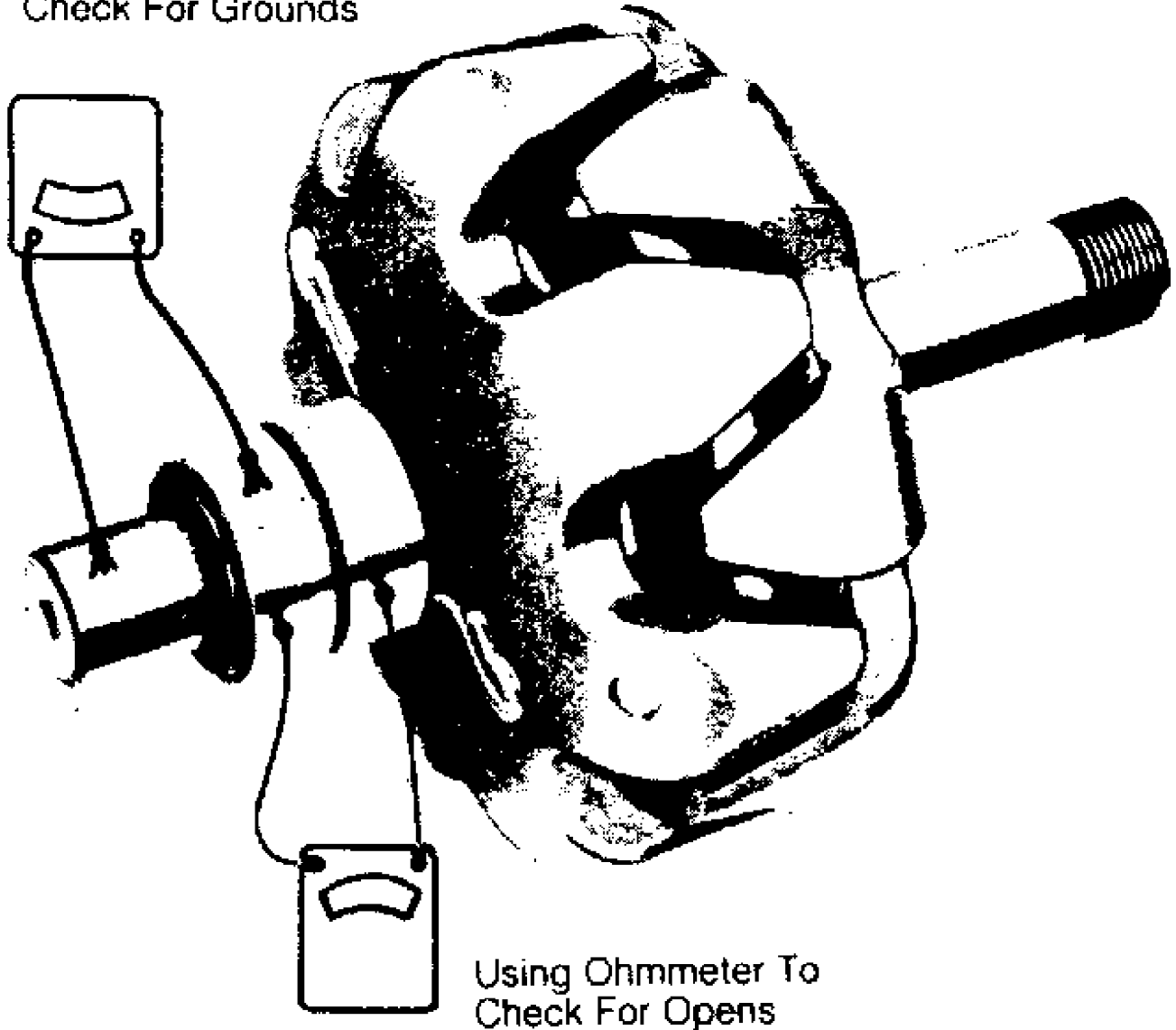


Fig. 2: Rotor Bench Test For Open or Short Circuit

Stator Test

NOTE: Delco 17SI alternator has delta stator windings and cannot be checked for open circuit.

1) For 12SI series alternator, measure resistance between stator leads. See Fig. 3. If reading is not infinity, replace stator.

2) On all models, connect ohmmeter leads to any stator lead and to stator frame. Ohmmeter reading should be infinity. See Fig. 3.

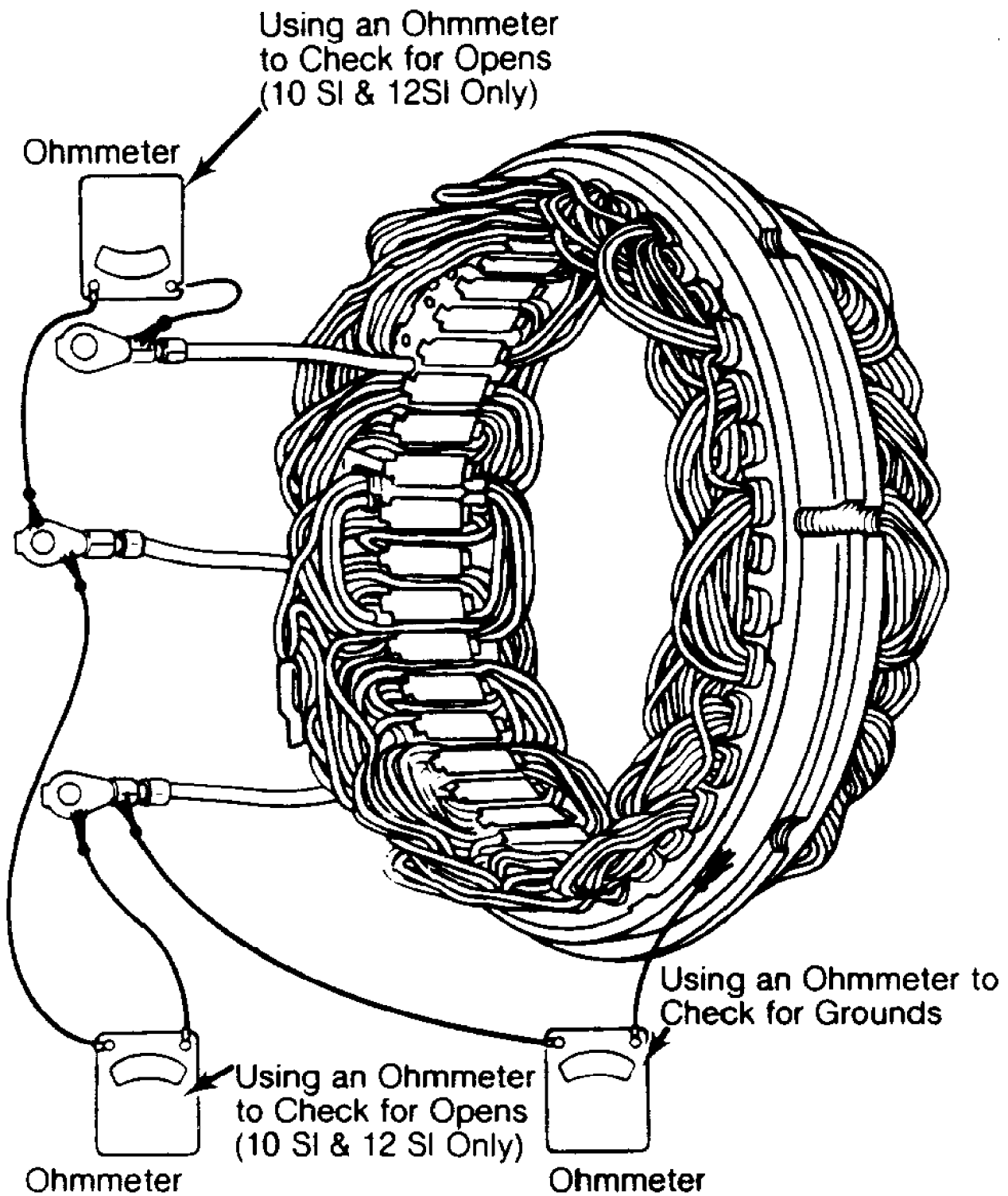


Fig. 3: Testing Stator for Open or Grounded Circuits

10030

Diode Trio Test

1) Remove diode trio from end frame. Connect an ohmmeter to single connector and to one of the 3 connectors. See Fig. 4. Note

reading and reverse leads. If readings are the same, replace diode trio.

2) A good diode trio will give a high and low reading. Repeat tests between single connector and each of the 3 connectors. Connect ohmmeter to each of the 3 connectors. If any readings are zero, replace diode trio.

NOTE: Before replacing diode trio, also check rectifier bridge. DO NOT use high voltage, such as 110-volt test light, when testing diode trio.

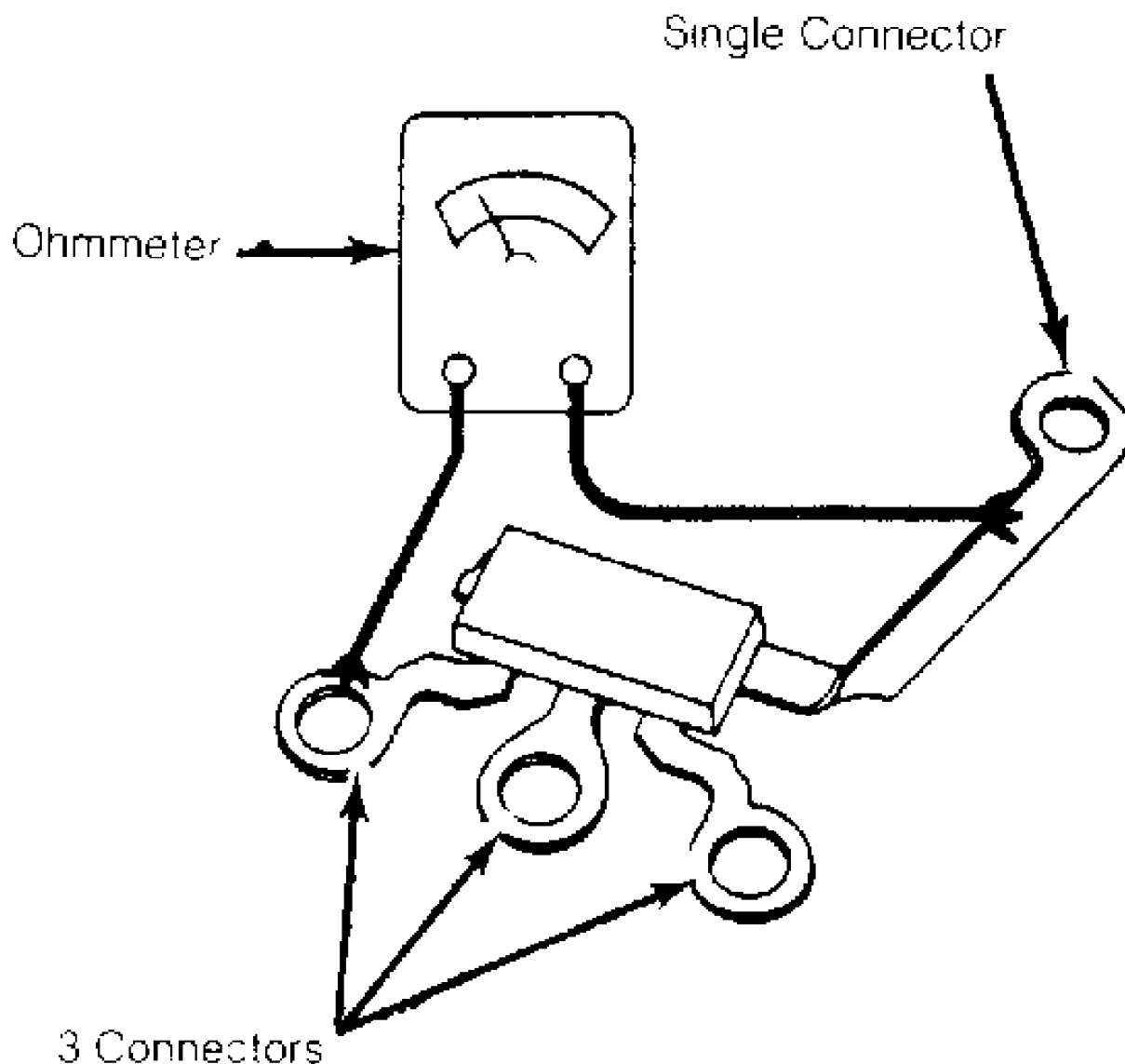


Fig. 4: Bench Testing Diode Trio

Rectifier Bridge Test

1) Position ohmmeter with one lead touching grounded heat sink and the other lead touching flat metal on one of the 3 terminals

or threaded studs. Observe reading and reverse test lead connections. See Fig. 5.

2) If both readings are the same, replace rectifier bridge. A good bridge will give a high and low reading. Retest all terminals (6 tests with insulated heat sink).

3) Connect test leads to insulated heat sink and one edge of the 3 terminals. Observe reading and reverse connections. Repeat test on all terminals (6 tests with insulated heat sink).

4) When all 12 tests have been made, testing is complete. DO NOT use high voltage light to check bridge. DO NOT replace diode trio or rectifier bridge unless at least one pair of readings is the same (with leads reversed).

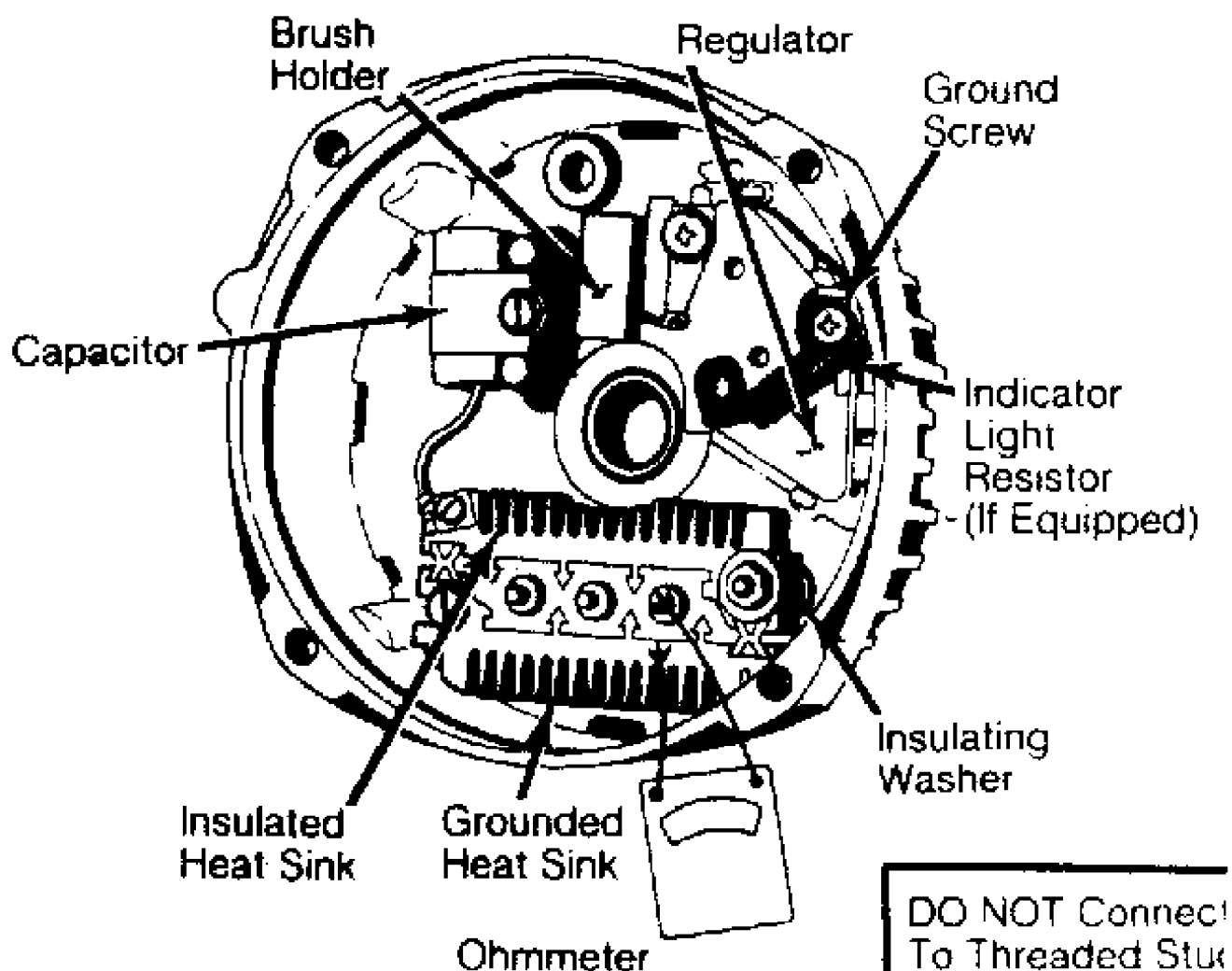


Fig. 5: Bench Testing Rectifier Bridge

OVERHAUL

NOTE: There are no overhaul procedures for CS130 alternators.

INSPECTION

Wash all metal parts except bearings, stator and rotor. Inspect rotor slip rings. They may be cleaned with 400 grit or finer

polishing cloth, while rotor is being rotated. Slip rings may be lathe turned to .002" (.05 mm) maximum indicator reading.

Slip rings are not replaceable. Excessive damage will require rotor replacement. Inspect brushes for wear, replacing them if more than 50% worn.

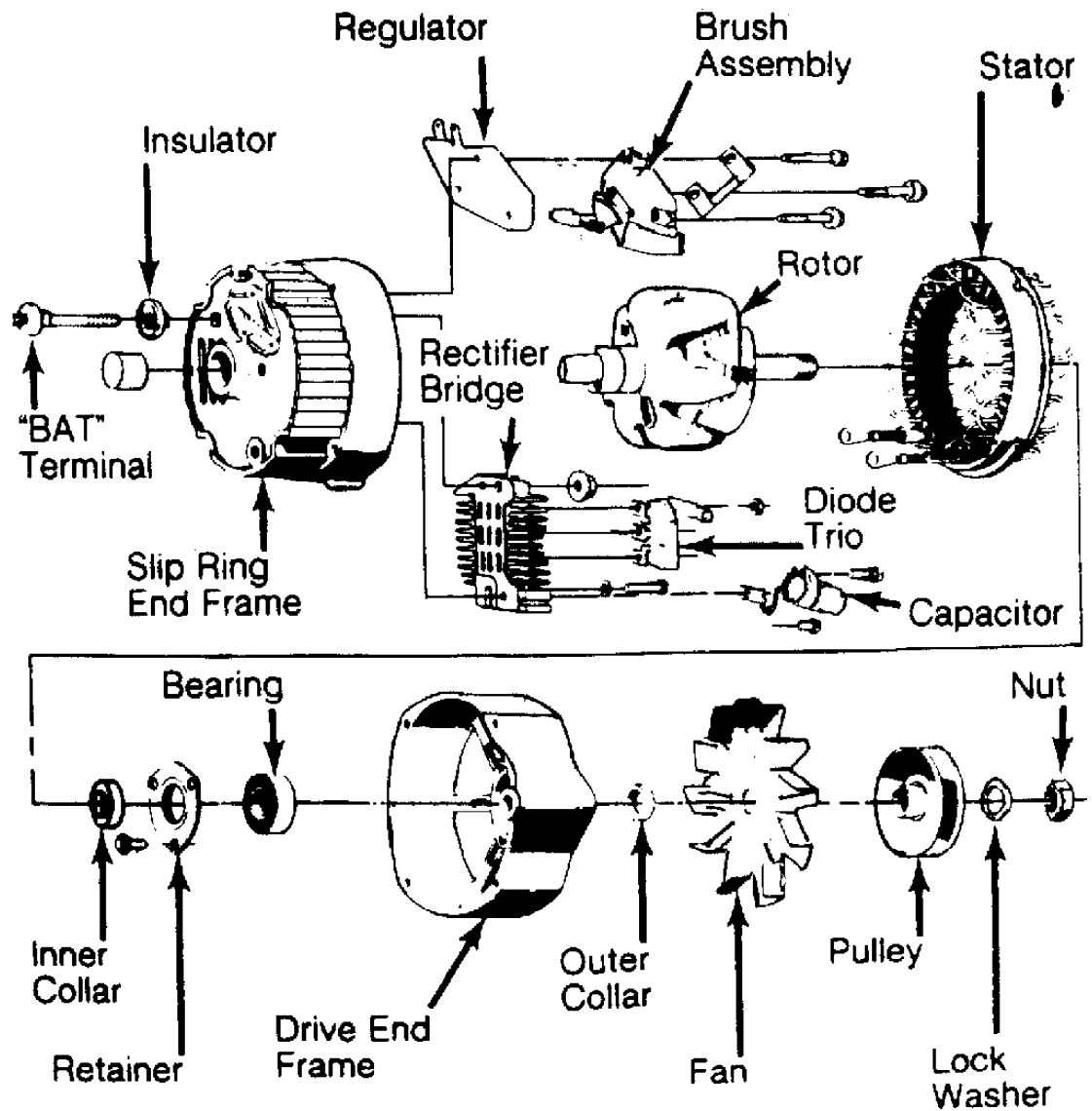


Fig. 6: Exploded View of Model 12SI Alternator
 Courtesy of General Motors Corp.

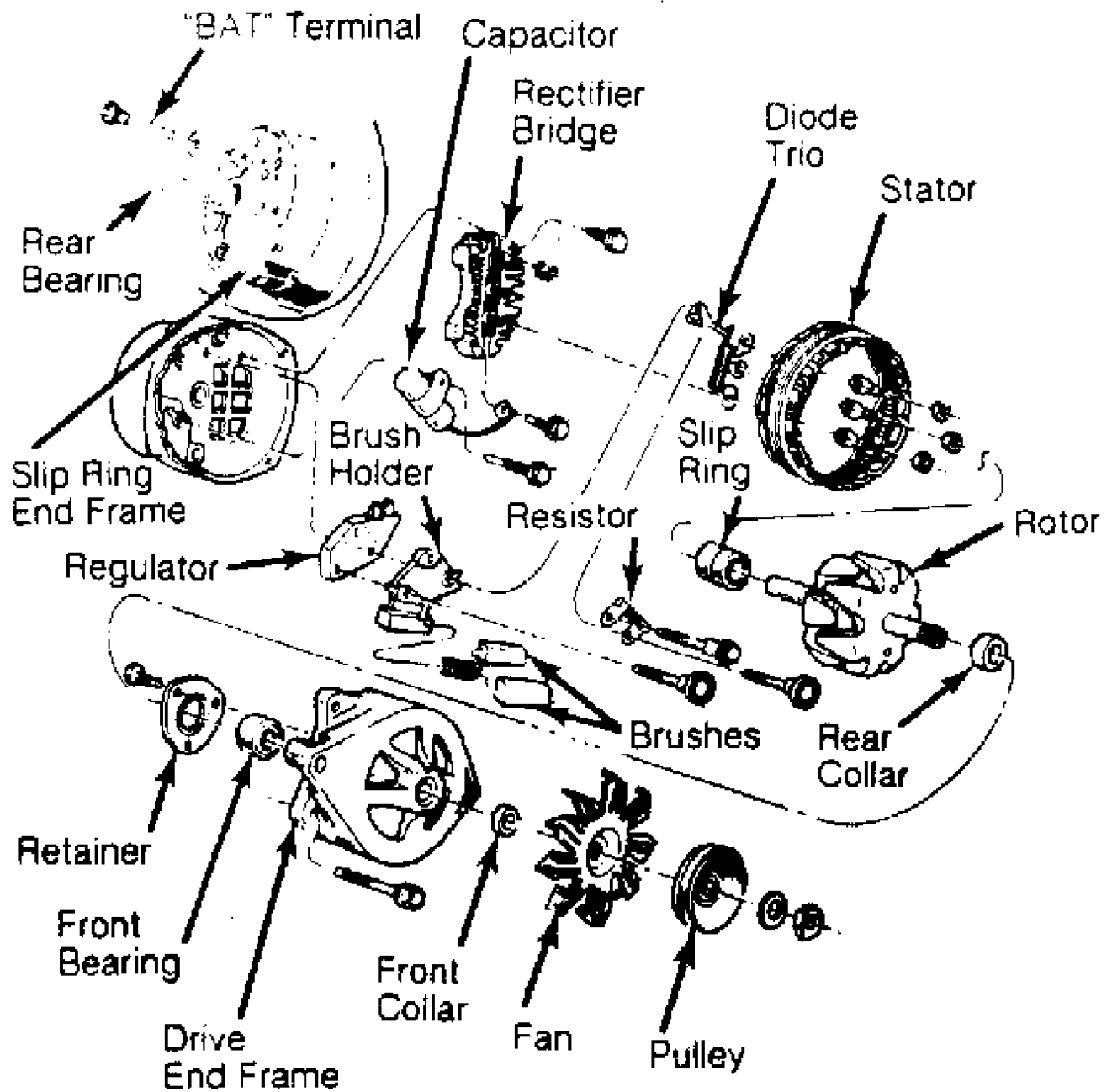


Fig. 7: Exploded View of Model 17SI Alternator
 Courtesy of General Motors Corp.

SPECIFICATIONS

ALTERNATOR OUTPUT FOR CS SERIES

Stamped Rating	Amps @ 14v	Engine RPM
85	30	1600
100	36	1600
105	42	1600

ALTERNATOR OUTPUT FOR SI SERIES

Stamped Rating	Amps @ 14v	Engine RPM
66	23	1600
78	30	1600
94	30	1600
120	50	1600
