ALTERNATOR - BOSCH 35/75-AMP & 40/90-AMP

1988 Chrysler LeBaron Convert/Coupe

1988 ALTERNATORS & REGULATORS
Chrysler Motors - Bosch 35/75 & 40/90 Amp Alternator

All Models

DESCRIPTION

The charging system is composed of an alternator, electronic voltage regulator (EVR), Single Module Engine Controller (SMEC), voltmeter and battery. The alternator has 12 built-in silicon rectifiers which convert AC current to DC. The alternator consists of a rotor, stator, rectifiers, front and rear covers and a drive pulley.

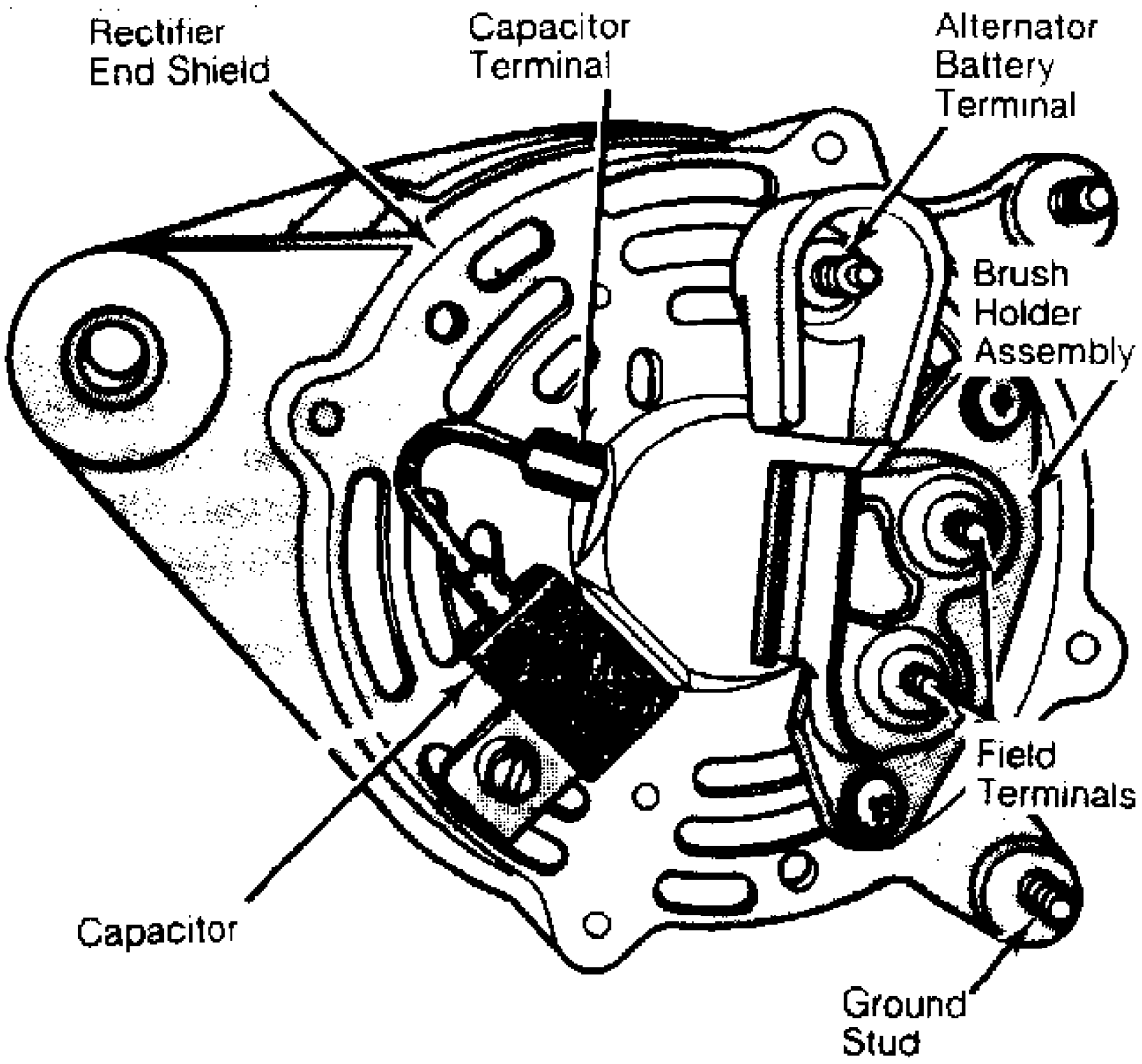

Fig. 1: Rear View of Bosch 40/90 Alternator
Courtesy of Chrysler Motors.

OPERATION

ELECTRONIC REGULATOR

The electronic regulator is contained within the SMEC. It is a device that regulates vehicle electrical system voltage by limiting output voltage that is generated by the alternator. This is accomplished by controlling amount of current that is allowed to pass through alternator field winding.

The alternator field is turned on by the SMEC. The SMEC looks at battery temperature to determine control voltage. The field is then driven at a duty cycle proportional to the difference between battery voltage and desired control voltage. One important feature of the electronic regulator is the ability of its control circuit to vary regulated system voltage up or down as temperature changes. This provides varying charging conditions for battery regardless of ambient temperatures.

ON-BOARD DIAGNOSTIC SYSTEM

If on-board diagnostic system senses that one of the critical circuits is bad during a predetermined amount of time during the monitoring cycle, it will consider this a real problem and put a fault code into memory. Each input and output circuit monitored by the on-board diagnostic system has its own fault code.

The fault code will stay in memory as long as the circuit continues to be bad. However, if the problem does not happen again after the fault code is put into memory, the SMEC is programmed to clear the memory after 50 to 100 engine starts. The memory can also be cleared by disconnecting the battery and reconnecting it.

FAULT CODES

Fault codes are 2-digit numbers that identify which circuit is bad. In most cases they do not identify which component in a circuit is bad. Therefore, a fault code is only a result, not necessary the reason for the problem. However, in some cases, as a result of the design of the driveability test procedure, a fault code can be the reason for the problem. It is important that the test procedure be followed in order to understand what the fault codes of the on-board diagnostic system are trying to tell.

Indicator Codes

Indicator codes are 2-digit numbers that will tell if certain sequences or conditions have occurred.

ATM Test Codes

ATM test codes are 2-digit numbers that identify various circuits that will be used during diagnostics.

Sensor Access Codes

Sensor access codes will be the same as some ATM test codes. They will be used to access a sensor readout.

Engine Running Test Codes

Engine running test codes are 2-digit numbers. They will be used to access sensor readouts while the engine is running.

DIAGNOSTIC READOUT BOX

A Diagnostic Readout Box (C4805) is used to put the system into a diagnostic test mode, circuit actuation test mode, switch test mode, sensor test mode and engine running test mode. These 5 modes of

testing are required to properly diagnose the system and will be used in the diagnostic test procedure. See Fig. 2. The following is a description of each test mode:

Diagnostic Test Mode
This mode is use to see if there are any fault codes stored in the on-board diagnostic system memory.

Circuit Actuation Test Mode
This mode is used to turn a specific circuit on and off in order to check it. ATM test codes are used in this mode.

Switch Test Mode
This mode is used to determined if specific inputs are being received by the SMEC.

Sensor Test Mode
This mode is used to see the output signals of certain sensors as received by the SMEC when engine is not running.

Engine Running Test Mode
This mode is used to see sensor output signals as received by the SMEC while the engine is running. Also, this test mode will be used to establish some specific engine running conditions required for diagnosis.

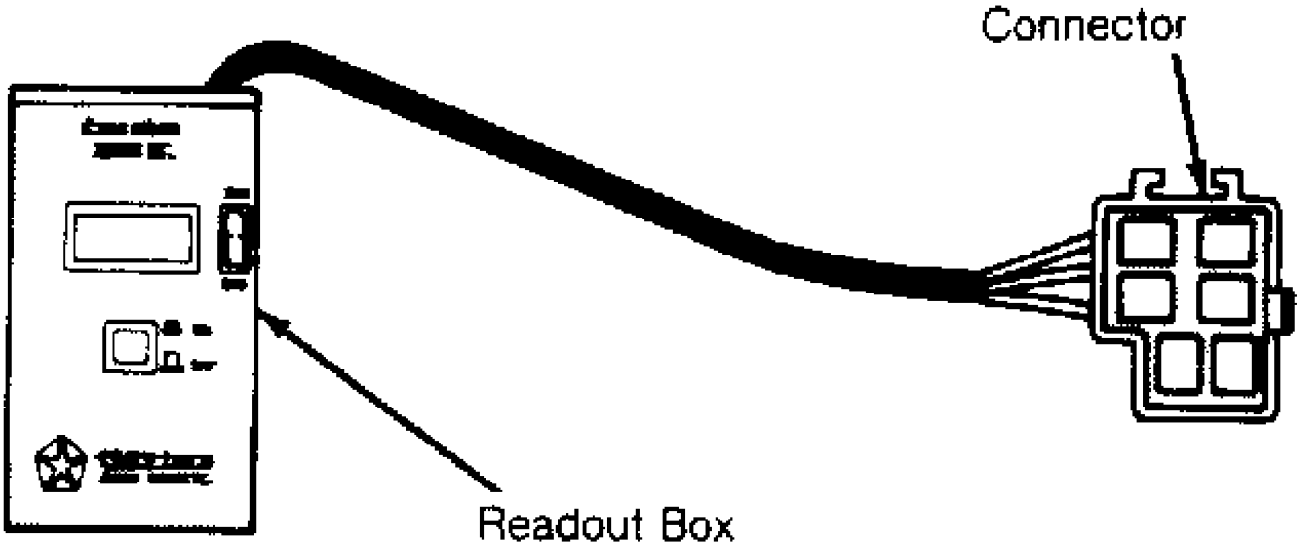

Fig. 2: View of Diagnostic Readout Box
Courtesy of Chrysler Motors.

TROUBLE SHOOTING

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

TESTING (ON-VEHICLE)

ALTERNATOR OUTPUT WIRE RESISTANCE TEST

NOTE: Be sure to check the on-board diagnostic fault codes. They play a major role in diagnosing a charging system failure.

1) Alternator output wire resistance test will show amount of voltage drop across alternator output wire between alternator "Bat" terminal and battery post.

2) Before starting test, ensure vehicle has a fully charged battery. Turn ignition off. Disconnect negative battery cable. See Fig. 3. Disconnect alternator output wire from alternator output terminal.

3) Connect a 0-150 ampere scale DC ammeter in series between alternator "Bat" terminal and disconnected alternator output wire. Connect positive lead to alternator "Bat" terminal and negative lead to disconnected alternator output wire.

4) Connect positive lead of a test volt/ohmmeter (range 0-18 volts minimum) to disconnected alternator output wire. Connect negative lead of test volt/ohmmeter to positive battery cable at positive post.

5) Remove air hose between SMEC and air cleaner. Connect one end of a jumper wire to ground and with other end probe Green "R3" lead wire on dash side of Black 8-way connector.

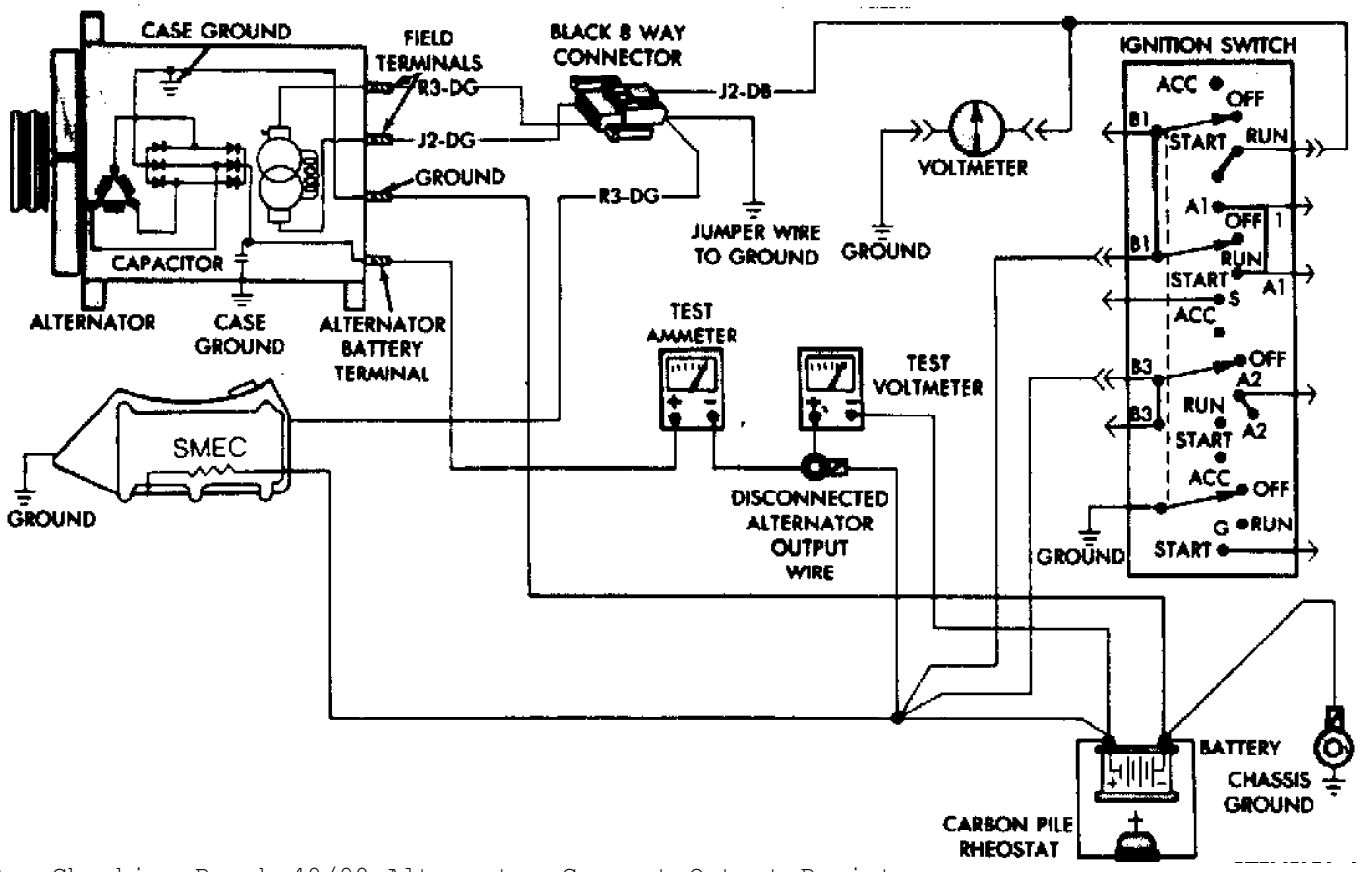

Fig. 3: Checking Bosch 40/90 Alternator Current Output Resistance Courtesy of Chrysler Motors.

NOTE: DO NOT connect Blue "J2" lead of 8-way wiring connector to ground. Both "R3" and "J2" leads are Green on alternator side of 8-way connector. At dash end of 8-way connector "R3"

is Green and "J2" is Blue.

6) Connect an engine tachometer and reconnect negative battery cable. Connect Variable Carbon Pile Rheostat (C3950) between battery terminals. Be sure carbon pile is in open or off position before connecting leads.

7) Start engine. Immediately after starting, reduce engine speed to idle. Adjust engine speed and carbon pile to maintain 20 amps flowing in circuit. Observe volt/ohmmeter reading. Volt/ohmmeter reading should not exceed 0.5 volts.

8) If a higher voltage drop is indicated, inspect, clean and tighten all connections between alternator "Bat" terminal and positive battery post. A voltage drop test may be performed at each connection to locate the connection with excessive resistance. If resistance tested satisfactorily, reduce engine speed, turn off carbon pile and turn off ignition.

9) Disconnect negative battery cable. Remove test ammeter, volt/ohmmeter, carbon pile and tachometer. Remove jumper wire between 8-way Black connector and ground.

10) Connect alternator output wire to alternator "Bat" terminal post. Reconnect negative battery cable. Reconnect hose between SMEC and air cleaner.

CURRENT OUTPUT TEST

1) The current output test determines whether or not alternator is capable of delivering its rated current output. Before starting any tests make sure vehicle has a fully charged battery. Disconnect negative battery cable. Disconnect alternator output wire at alternator battery terminal.

2) Connect a 0-150 ampere scale DC ammeter in series between alternator "Bat" terminal and disconnected alternator output wire. Connect positive lead to alternator "Bat" terminal and negative lead to disconnected alternator output wire. See Fig. 4.

3) Connect positive lead of a test volt/ohmmeter (0-18 volt range minimum) to alternator "Bat" terminal. Connect negative lead of test volt/ohmmeter to a good ground.

4) Connect an engine tachometer and reconnect negative battery cable. Connect Variable Carbon Pile Rheostat (C3950) between battery terminals. Be sure carbon pile is in open or off position before connecting leads.

5) Remove air hose between SMEC and air cleaner. Connect one end of jumper wire to ground and with other end probe Green "R3" lead wire on dash side of Black 8-way connector.

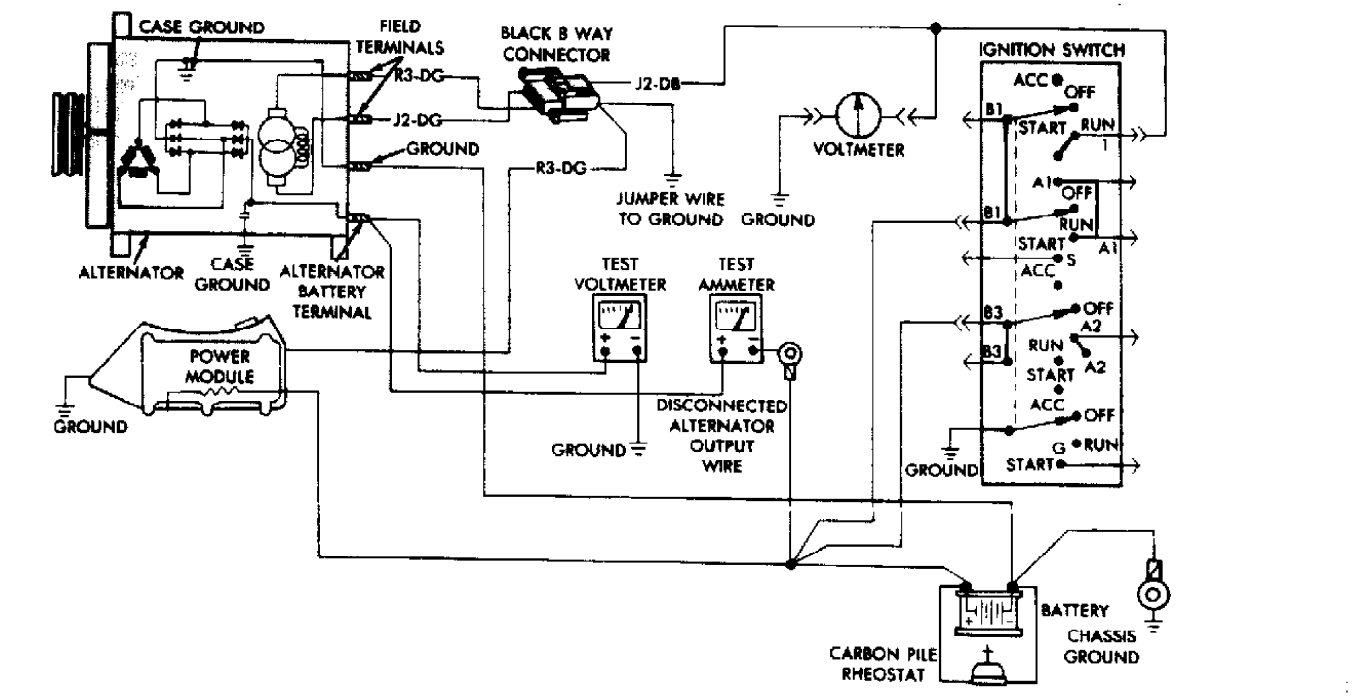

Fig. 4: Bosch 40/90 Alternator Current Output Wiring Diagram
Courtesy of Chrysler Motors.

NOTE: DO NOT connect Blue "J2" lead of 8-way wiring connector to ground. Both "R3" and "J2" leads are Green on alternator side of 8-way connector. At dash end of 8-way connector "R3" is Green and "J2" is Blue.

6) Start engine. Immediately after starting reduce engine speed to idle. Adjust carbon pile and engine speed in increments until a speed of 1250 RPM and volt/ohmmeter reading of 15 volts is obtained. DO NOT allow voltage to read above 16 volts.

7) If reading is less than specified and alternator output wire resistance is not excessive alternator should removed from vehicle and bench tested. After current output test is completed reduce engine speed, turn off carbon pile and turn off ignition.

8) Disconnect negative battery cable. Remove test ammeter, volt/ohmmeter, tachometer and carbon pile. Remove jumper wire between 8-way Black connector and ground.

9) Connect alternator output wire to alternator "Bat" terminal post. Reconnect negative battery cable. Reconnect hose between SMEC and air cleaner.

NOTE: Be sure to check on-board diagnostics fault codes. They play a major role in diagnosing a charging system failure.

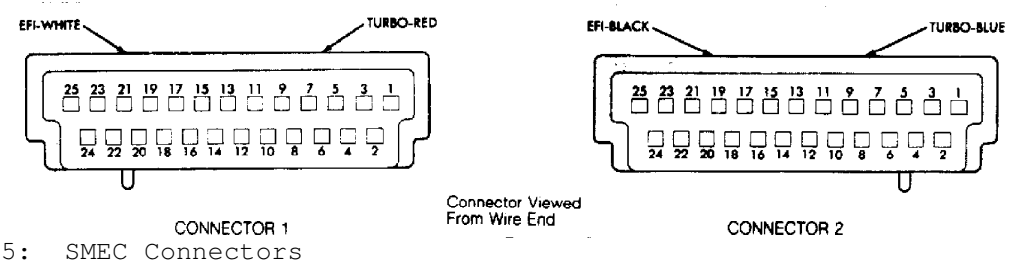

Fig. 5: SMEC Connectors
Courtesy of Chrysler Motors

DIAGNOSTIC SYSTEM

ENGINE RUNNING TEST MODE

1) Connect Diagnostic Readout Box (C4805) to mating connector in wiring harness by left front shock tower. Make sure read/hold switch is in the "Read" position.

2) Start engine and observe display of readout box. When oxygen sensor is at operating temperature, the display will show if oxygen system is switching rich/lean by alternately displaying "0" (lean) and "1" (rich).

3) When engine is running in Neutral or Park and the oxygen system is displayed, idle motor system can be checked by moving read/hold switch to hold position. Engine speed should increase to about 1500 RPM.

4) When engine is running, oxygen switching is displayed and read/hold switch is in "Read" position. Press and hold ATM button until desired engine running test code appears on the display, then release button.

5) Move read/hold switch to hold position. The SMEC will now use the readout box to display output of selected sensors or it will run engine in a specified mode for diagnosis.

6) All readings displayed are to be divided by 10 except coolant sensor and engine RPM which are to be multiplied by 10. Battery voltage, manifold vacuum, and vehicle speed are actual and no correction is required.

Circuit Actuation Test Mode (ATM)

1) Put system into diagnostic test mode and wait for "55" to appear on readout box display and make sure "Read/Hold" switch is in "Read" position. Press and hold ATM button on readout box until desired ATM test code appears on display and then release button.

2) SMEC will turn selected circuit on and off at 2 second intervals for 5 minutes and then turn test off. To stop test before 5 minute period, turn ignition off.

Sensor Test Mode

1) Put system into actuation test mode (ATM). Press and hold ATM button until desired sensor access code appears on display and then release button.

2) Move "Read/Hold" switch to hold position. Since sensor access codes are the same as some ATM test codes, the ATM test circuit will turn on before moving "Read/Hold" switch to "Hold" position.

3) SMEC will now use readout box to display output of selected sensor. All readings displayed are to be divided by 10 except coolant sensor which is to be multiplied by 10. Battery voltage is actual and no correction is required.

POWER LOSS/LIMIT LIGHT

If for some reason diagnostic readout box is not available, SMEC can show fault codes by means of flashing power loss/limit light on instrument panel cluster. To activate this function turn ignition key on-off, on-off, on within 5 seconds. The power loss/limit light will then come on for 2 seconds as a bulb check. Immediately following this it will display a fault code by flashing on and off.

There is a short pause between flashes and a longer pause between digits. All codes displayed are 2 digit numbers with a 4 second pause between codes. Any number of codes can be displayed as long as they are in memory. The light will flash until all of them are displayed.

Switch Test Mode

After all codes are displayed, switch function can be verified. The light will turn on or off when a switch is turned on or off. Unlike the diagnostic readout box the power loss/limit light cannot do the following:

* Once the light begins to display fault codes, it cannot be stopped. If you lose count it will be necessary to start all over again.
* The light cannot display any codes related to "88" diagnoses or blank displays.
* The light cannot show if the oxygen feedback system is switching (lean-rich) and if the idle motor system is operational.
* The light cannot perform the actuation test mode, sensor test modes or engine running test.

LIMP-IN MODE

If information from critical sensors fails certain on-board diagnostic tests, the SMEC goes into a "limp-in mode", turns on the power loss/limit light and substitutes a modified signal in place of the failed one, in order to keep vehicle driveable. The following is a description of each charging system "limp-in" mode.

Battery Voltage Sense

If this signal drops below 4 volts after the engine has been running for one minute, fault Code 16 is recorded in memory and the power loss/limit light is turned on. At this time the SMEC will operate the charging system at a fixed rate.

Battery Voltage Too High

If the SMEC senses that the battery sense voltage is more than one volt above the desired control voltage, fault Code 46 is recorded in memory and the power loss/limit is turned on. If these 2 sensor signals return to within specifications while the engine is running, the power loss/limit light will turn off and the charging system will return to normal operation. The fault code will remain in memory for evaluation by the SMEC but will be cleared after 50 to 100 engine starts if the fault does not happen again.

DIAGNOSTIC TESTING - 35/75 AMP

Test 1 - Checking Charging Circuit For Fault Codes

1) Connect Diagnostic Readout Box (C 4805) to engine harness connector. Turn ignition switch on-off, on-off, on within 5 seconds. Record all codes. If code 47 appears at this time, go to step 4) or 5). Turn ignition off and disconnect and reconnect battery connector. Start engine and run for 2 minutes. Turn engine off. Turn ignition switch off-on, off-on within 5 seconds. Record all codes. If Codes 88-12-55 are displayed it indicates no faults. Go to TEST 2.

2) If same code appears before and after engine is started and problem still exists check that diagnostic readout box is operational. Check that there is not an open circuit in wires between SMEC and diagnostic connector.

3) If a fault code does not reappear after engine is started problem no longer exists. Go to TEST 2.

4) If Codes 88-12-16-55 are displayed Code 16 indicates a battery voltage for charging system fault. Go to TEST 3.

5) If Codes 88-12-46-55 or 88-12-41-46-55 are displayed, Code 46 or 41-46 indicates an alternator field (charging system output to high) fault. Go to TEST 4.

6) If Codes 88-12-41-55 or 88-12-41-47-55 are displayed, Codes 41 or 41-47 indicates an alternator field (charging system output to low) fault. Go to TEST 5.

7) If Codes 88-12-44-55 are displayed, Code 47 indicates an alternator output fault. Check for a loose fan belt then check battery and alternator systems. Record all codes.

8) No Code 88, battery voltage for SMEC is low. This will leave system in standby memory. Repair battery feed wire to cavity No. 2 of SMEC connector (Black on EFI and Blue on turbo vehicles) for an open circuit.

Test 2 - Checking Sensor Calibration Battery Temperature Ckt

1) Connect diagnostic readout box. Display on readout box should be .02-3.0 volts. Check for battery draindown condition.

2) Put system in engine running test mode 61. Divide reading by 10. Display on readout box should be 2-5 volts. If not okay, replace SMEC.

Test 3 - Checking For Fault Code 16

1) This test will check for direct battery feed to SMEC. Circuit is also memory feed to SMEC. Code 16 with lower battery voltage will turn on power loss/limit light.

2) Put system in sensor test mode 07. Display on readout box should be within one volt of battery voltage. Reading on display is actual. Connect a jumper wire between cavities No. 2 and 22 of SMEC connector (Black on EFI and Blue on turbo vehicles).

3) If voltage is within one volt of battery voltage, repair wire in cavity No. 22 of SMEC connector (Black on EFI and Blue on turbo vehicles) for an open circuit to the wiring harness splice.

4) If display on readout box is 0 volts, replace SMEC. Before replacing SMEC, make sure terminal in cavity No. 22 is not crushed so that it cannot touch SMEC pin.

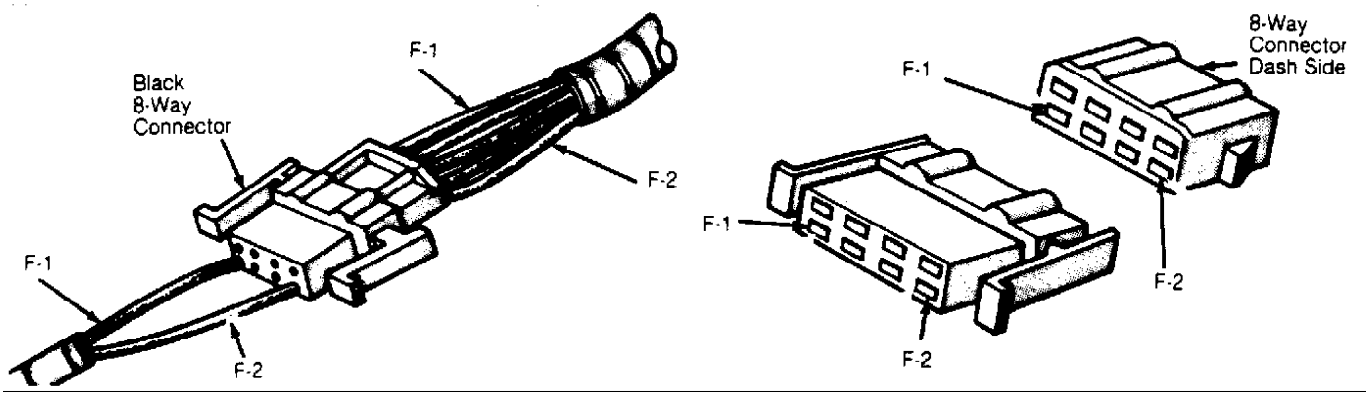

Fig. 6: Identifying F-1 and F-2 Connectors
Courtesy of Chrysler Motors.

Test 4 - Checking For Fault Codes 41-46 or 46

1) This test will check field circuit to SMEC. Disconnect SMEC 14-way connector. See Fig. 7.

2) Connect a volt/ohmmeter between cavity No. 8 or 10-way connector and ground. Turn ignition switch to "RUN" position.

3) Volt/ohmmeter reading should be within one volt of battery voltage. If it is, go to TEST 5. If volt/ohmmeter reading is 0-1 volts, repair alternator field circuit for short to ground.

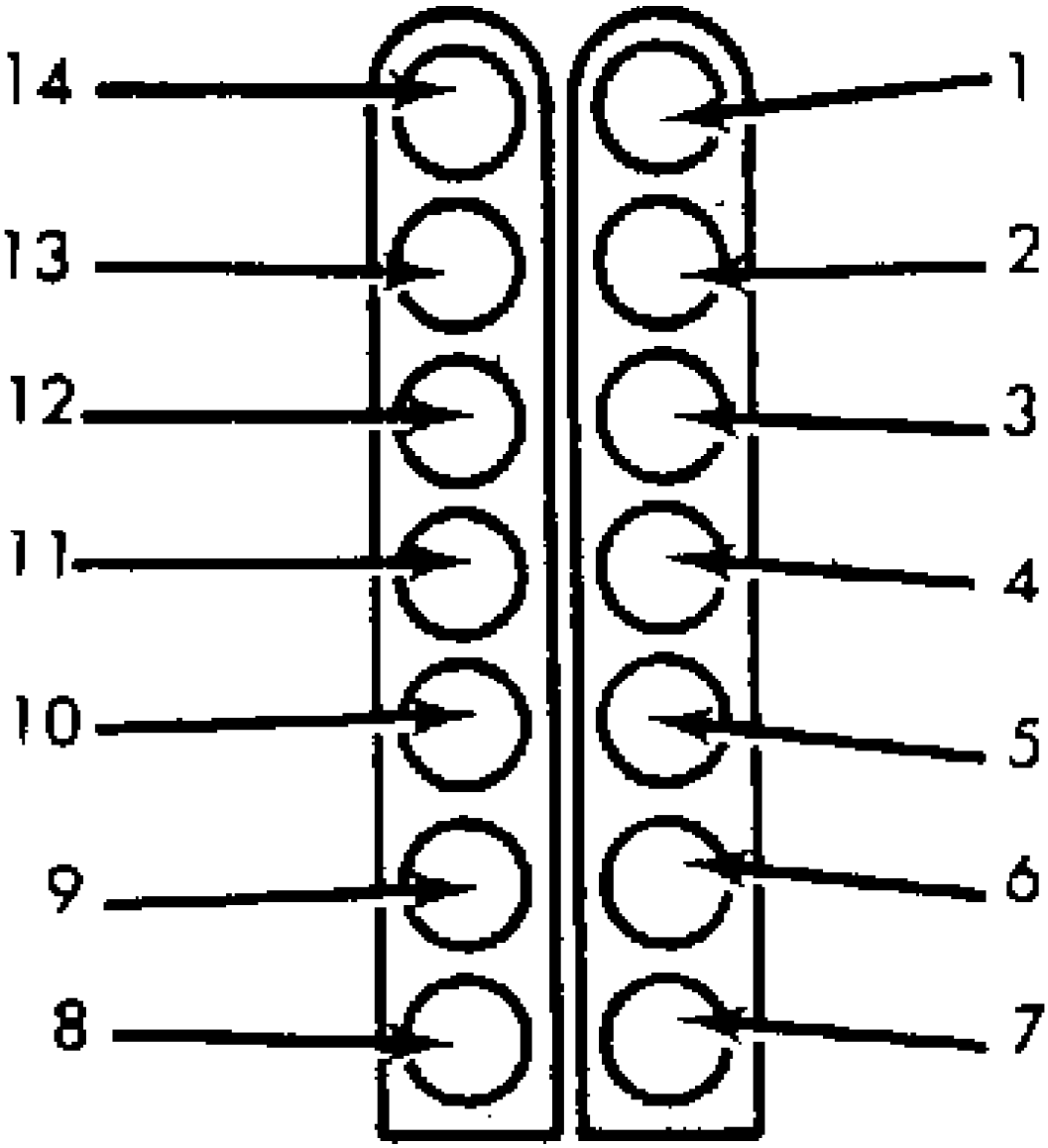

Fig. 7: Power Module 14-Way Connector
Courtesy of Chrysler Motors.

Test 5 - Check Alt. Field Control to Power Module for Short

1) This test checks field circuit to SMEC for a short circuit. Turn ignition off. Reconnect SMEC 10-way connector.

2) Disconnect SMEC 12-way connector. At alternator trace one of field terminal wires back to Black 8-way connector at rear of battery. Green wire-to-Green wire at connector will be "F2". Green wire to Blue wire at connector will be "F1". Tag wire for future test procedures. Turn ignition switch to "RUN" position.

3) Connect a volt/ohmmeter between "F2" wire on dash side of Black 8-way connector and ground. Turn ignition switch to "RUN" position. Voltage reading should be within one volt of battery. If it is, go to TEST 6.

4) If volt/ohmmeter reading is between 0-1 volt, replace SMEC. Test pin 11 of 14-way connector short to ground. Test should

read an open circuit.

5) If both tests are not as specified, replace SMEC. Before replacing SMEC make sure Dark Green wire is not shorted to SMEC connector or alternator connector.

Test 6 - Check Alternator Field Control to SMEC for Short Ckt

1) This test checks wires at SMEC connectors. Disconnect 60-way connector. Turn ignition off.

2) Disconnect SMEC connector (White on EFI and Blue on turbo vehicles). Connect an volt/ohmmeter between cavity No. 11 of SMEC 12-way connector and ground.

3) If volt/ohmmeter is not showing continuity, replace SMEC. If volt/ohmmeter is showing continuity, repair short to ground in wire at cavity No. 11.

Test 7 - Checking For Fault Code 41 or 41-47

1) Connect one end of jumper wire to a good engine ground. Start engine. Put system into engine running test mode 67. Note that voltage reading displayed on readout box.

2) Very quickly touch other end of jumper wire between "F2" wire on dash side of Black 8-way connector and ground. Volt/ohmmeter is showing an increase in voltage.

3) If voltage increases, this indicates alternator is operating correctly. Go to TEST 8. If voltage is not showing an increase in voltage, this indicates alternator is not operating and you should immediately go to TEST 12.

Test 8 - Checking Charging System Field Control Circuit At SMEC

1) With engine running, select Test Mode 67. Connect voltmeter between cavity No. 2 of SMEC black connector and ground. Connect one end of a jumper wire to cavity No. 5 of SMEC white connector, then quickly touch other end of wire to SMEC mounting stud.

2) If voltmeter shows increase in voltage, replace SMEC. Before replacing SMEC, make sure terminal in cavity No. 5 is not crushed preventing it from touching SMEC pin. If voltmeter does not show an increase in voltage, go to TEST 9.

Test 9 - Check Alternator Field Control Ckt of Power Module

1) Turn engine off. Disconnect SMEC 14-way connector. Connect a volt/ohmmeter between cavity No. 5 of 14-way connector and ground. Turn ignition switch to "RUN" position.

2) If volt/ohmmeter reading is within one volt of battery voltage, go to TEST 11. If volt/ohmmeter reading is zero, go to TEST 10.

Test 10 - Checking Charging System Field Control Circuit

1) Turn ignition off. Disconnect 12-way connector from SMEC. Connect a volt/ohmmeter between pin No. 11 and ground. Turn ignition switch to "RUN".

2) If volt/ohmmeter reading is within one volt of battery voltage, repair open in wire to cavity No. 5 of SMEC white connector. If volt/ohmmeter reading is zero, replace SMEC.

Test 11 - Checking Charging System Field Control To SMEC For An Open Circuit

1) Turn ignition off. Disconnect 10-way connector from SMEC. Connect a volt/ohmmeter between pin No. 8 and ground. Turn ignition switch to "RUN".

2) If volt/ohmmeter reading is within one volt of battery voltage, replace SMEC. Before replacing SMEC, make sure terminal tabs in cavity No. 8 is not crushed preventing it from touching SMEC pin. If volt/ohmmeter reading is zero to one volt, replace SMEC. If

volt/ohmmeter is showing zero volts, repair wire of cavity No. 8 for an open to alternator.

Test 12 - Checking for Voltage to Alternator Field Circuit

1) Turn ignition off. Connect volt/ohmmeter to Dark Blue "F1" terminal of Black 8-way connector and ground. Turn ignition switch to "RUN" position.

2) If volt/ohmmeter reading is within one volt of battery voltage, repair alternator or alternator field wires of engine wiring harness for an open circuit to the alternator.

3) If volt/ohmmeter reading is zero volts, repair open circuit in Dark Blue wire to wiring harness splice.

Test 13 - Checking For Code 44 - Battery Temp. Sensor Circuit

1) Turn ignition switch off. Disconnect SMEC connector. Connect an volt/ohmmeter between cavity No. 22 of SMEC black connector and ground.

2) If volt/ohmmeter shows any resistance, replace SMEC. Before replacing SMEC, ensure that terminal tab in cavity No. 20 is not crushed preventing it from touching SMEC pin.

3) If volt/ohmmeter shows no resistance, go to TEST 14. If volt/ohmmeter shows an open circuit, go to TEST 15.

Test 14 - Checking Battery Temperature Sensor Wire For Short

1) Disconnect SMEC black connector. Connect volt/ohmmeter between cavity No. 20 of connector and ground. Disconnect power module 12-way connector.

2) If volt/ohmmeter shows and open circuit, replace power module. If volt/ohmmeter shows no resistance, repair wire to cavity No. 20 for short to ground.

Test 15 - Checking Battery Temperature Sensor Wire For Open

1) Disconnect the power module 12-way connector. Connect a volt/ohmmeter between pins 3 and 12 of power module.

2) If volt/ohmmeter shows any resistance, repair wire in cavity No. 3 of power module 12-way connector for an open.

3) If volt/ohmmeter shows no resistance or an open circuit, replace power module.

DIAGNOSTIC TESTING - 40/90 AMP

Test 1 - Checking Charging Circuit For Fault Codes

1) Connect Diagnostic Readout Box (C 4805) to engine harness connector. Turn ignition switch on-off, on-off, on within 5 seconds. If Codes 88-12-55 are displayed it indicates no faults. Go to TEST 2.

2) If Codes 88-12-16-55 are displayed Code 16 indicates a battery voltage for charging system fault. Go to TEST 3. Record all codes.

3) Turn ignition off and disconnect and reconnect battery connector. Start engine and run for 2 minutes. If Codes 88-12-46-55 or 88-12-41-46-55 are displayed, Code 46 or 41-46 indicates an alternator field (charging system output to high) fault. Go to TEST 4.

4) If Codes 88-12-41-55 or 88-12-41-47-55 are displayed, Codes 41 or 41-47 indicates an alternator field (charging system output to low) fault. Go to TEST 5.

5) If Codes 88-12-44-55 are displayed, Code 47 indicates an alternator output fault. Check for a loose fan belt then check battery and alternator systems. Record all codes.

6) No Code 88, battery voltage for SMEC is low. This will leave system in standby memory. Repair battery feed wire to cavity No. 2 of SMEC connector (Black on EFI and Blue on turbo vehicles) for an open circuit.

7) If same code appears before and after engine is started

and problem still exists check that diagnostic readout box is operational. Check that there is not an open circuit in wires between SMEC and diagnostic connector.

8) If a fault code does not reappear after engine is started problem no longer exists. Go to TEST 2.

Test 2 - Checking For Intermittent Failures

Majority of intermittent failures are caused by wiring connections. The only way to find them is to try and duplicate the problem. Since the SMEC can remember where they are, the ATM and sensor test modes can be used in an attempt to locate them.

If a fault code does not reappear in TEST 1, the following procedure should be used to determine if wiring and connections are the cause of the problem.

1) If fault Code 41 does not reappear use the ATM Test Mode 09 as indicated. Connect a volt/ohmmeter to Dark Green wire of headlight to dash harness 8-way connector terminal of alternator and watch pulsations of meter.

2) Once in correct test mode, wiggle all connectors and wires in the circuit. When bad connection or wire is located the ATM test will stop.

3) If fault Code 16 or 44 does not reappear use sensor test mode 01 or 07 as indicated. Once in correct test mode, wiggle all connectors and wires in the circuit. When bad connection or wire is located display on readout box will change.

Test 3 - Checking Sensor Calibration Battery Temperature Ckt

1) Connect diagnostic readout box. Display on readout box should be .02-3.0 volts. Check for battery draindown condition.

2) Put system in engine running test mode 61. Divide reading by 10. Display on readout box should be 2-5 volts. If not okay, replace SMEC.

Test 4 - Checking For Fault Code 16

1) This test will check for direct battery feed to SMEC. Circuit is also memory feed to SMEC. Code 16 with lower battery voltage will turn on power loss/limit light.

2) Put system in sensor test mode 07. Display on readout box should be within one volt of battery voltage.

3) If voltage is not as specified, repair wire in cavity No. 22 of SMEC connector (Black on EFI and Blue on turbo vehicles) for an open circuit to the wiring harness splice. Reading on display is actual.

4) Connect a jumper wire between cavities No. 2 and 22 of SMEC connector (Black on EFI and Blue on turbo vehicles). If not okay, replace SMEC. Before replacing SMEC, make sure terminal in cavity No. 22 is not crushed so that it cannot touch SMEC pin.

Test 5 - Checking For Fault Codes 41-46 or 46

1) This test will check field circuit to SMEC. Disconnect SMEC 14-way connector. See Fig. 7.

2) Connect a volt/ohmmeter between cavity No. 8 or 10-way connector and ground. Turn ignition switch to "RUN" position.

3) Volt/ohmmeter reading should be within one volt of battery voltage. If volt/ohmmeter reading is 0-1 volts, repair alternator field circuit for short to ground.

Test 6 - Check Alt. Field Control to Power Module for Short

1) This test checks field circuit to SMEC for a short circuit. Turn ignition off. Reconnect SMEC 14-way connector.

2) Disconnect SMEC 60-way connector. See Fig. 8. At alternator trace one of field terminal wires back to Black 8-way

connector at rear of battery. Green wire-to-Green wire at connector will be "F2". Green wire to Blue wire at connector will be "F1". Tag alternator for future test procedures.

3) Connect a volt/ohmmeter between "F2" wire on dash side of Black 8-way connector and ground. Turn ignition switch to "RUN" position. Voltage reading should be within one volt of battery. If not okay, go to TEST 7.

4) Turn ignition switch to "RUN" position. If volt/ohmmeter reading is between 0-1 volt, replace SMEC. Test pin 11 of 14-way connector short to ground. Test should read an open circuit.

5) If both tests are not as specified, replace SMEC. Before replacing SMEC make sure Dark Green wire is not shorted to SMEC connector or alternator connector.

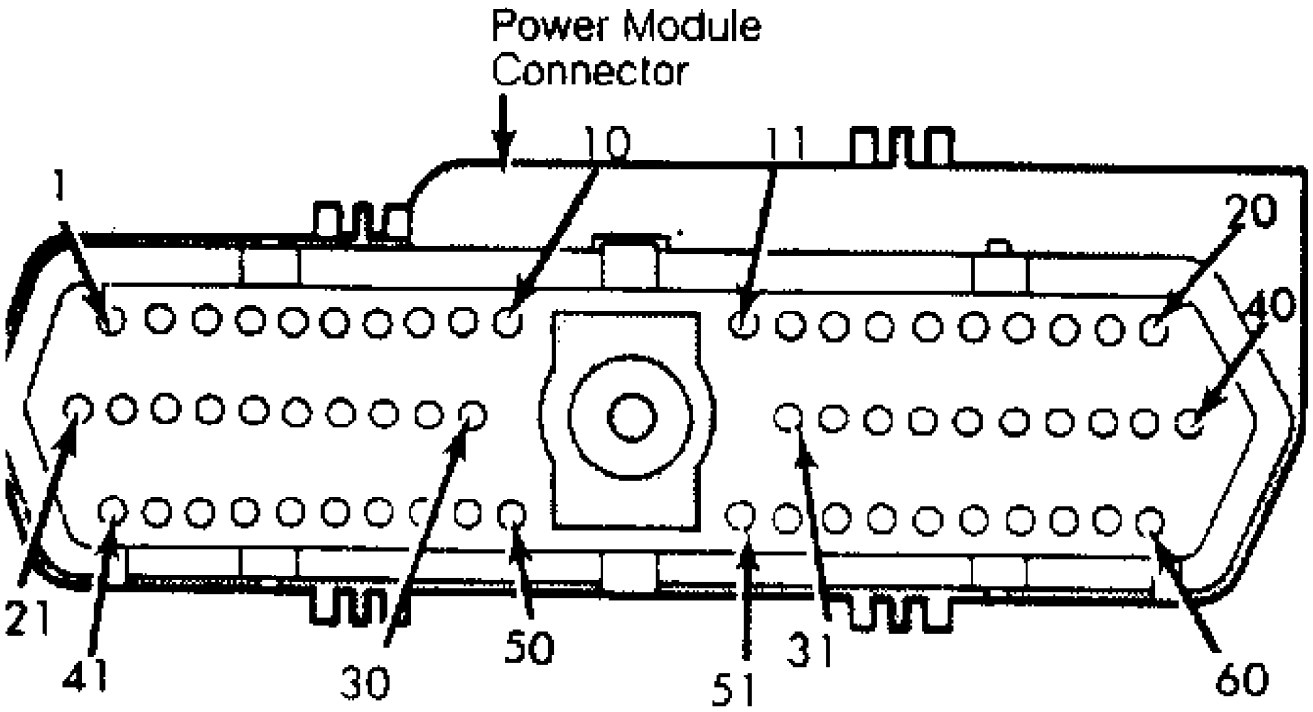

Fig. 8: Power Module 60-Way Connector
Courtesy of Chrysler Motors.

Test 7 - Check Alternator Field Control to SMEC for Short Ckt

1) This test checks wires at SMEC connectors. Disconnect 60-way connector. Turn ignition off.

2) Disconnect SMEC connector (White on EFI and Blue on turbo vehicles). Connect an volt/ohmmeter between cavity No. 11 of SMEC 12-way connector and ground.

3) If volt/ohmmeter is not showing continuity, replace SMEC. If volt/ohmmeter is showing continuity, repair short to ground in wire at cavity No. 11.

Test 8 - Checking For Fault Code 41 or 41-47

1) Connect one end of jumper wire to a good engine ground. Start engine. Put system into engine running test mode 67. Note that voltage reading displayed on readout box.

2) Very quickly touch other end of jumper wire between "F2" wire on dash side of Black 8-way connector and ground. Volt/ohmmeter is showing an increase in voltage.

3) If voltage increases, this indicates alternator is

operating correctly. Go to TEST 8. If voltage is not showing an increase in voltage, this indicates alternator is not operating and you should immediately go to TEST 12.

Test 9 - Check Alternator Field Control Ckt of Power Module

1) Turn engine off. Disconnect SMEC 14-way connector. Connect a volt/ohmmeter between cavity No. 14 of 14-way connector and ground. Turn ignition switch to "RUN" position.

2) If volt/ohmmeter reading is within one volt of battery voltage. Go to TEST 10. If volt/ohmmeter reading is zero, repair open circuit from 14 to 8-way connectors.

Test 10 - Checking Charging System Field Control Circuit

1) Turn ignition off. Disconnect 60-way connector from SMEC. Connect a volt/ohmmeter between "F2" cavity in dash panel connector and ground.

2) Connect one end of a jumper wire to cavity No. 14 of 60-way SMEC connector. Turn ignition on. Very quickly touch other end of jumper wire to ground, observe volt/ohmmeter.

3) If volt/ohmmeter reading is zero to one volt, replace SMEC. If volt/ohmmeter is not showing zero to one volt, check wiring for open circuit between 14-way and 60-way connectors.

Test 11 - Check Alternator Field Ckt Between 60-Way & 14-Way Connectors

Turn ignition off. Disconnect 60-way and 14-way connectors from the SMEC. Test for continuity from cavity No. 11 of 14-way connector and cavity No. 14 of 60-way connector. If there is continuity, replace SMEC.

Test 12 - Checking for Voltage to Alternator Field Circuit

1) Turn ignition off. Connect volt/ohmmeter to Dark Blue "F1" terminal of Black 8-way connector and ground. Turn ignition switch to "RUN" position.

2) If volt/ohmmeter reading is within one volt of battery voltage, repair alternator or alternator field wires of engine wiring harness for an open circuit to the alternator.

3) If volt/ohmmeter reading is zero volts, repair open circuit in Dark Blue wire to wiring harness splice.

DISASSEMBLY

1) Place alternator assembly mounting lug in a vise with soft jaws and loosen and remove pulley nut. Remove brush holder screws. Remove brush holder assembly. Remove battery positive terminal insulator nut and remove insulator.

2) Disconnect capacitor terminal. Remove capacitor. Remove pulley nut. Remove alternator pulley. Remove pulley-to-fan spacer and fan unit. Remove end shield bolts. Pry between stator and drive end shield with blade of screwdriver.

3) Carefully separate drive end shield from stator winding. Pull stator and rectifier end shield away from rotor and drive end shield. Separate bearing from bearing spacer. Remove rectifier assembly screws.

4) Remove rectifier, stator, and battery positive post insulator. See Fig. 9. Using a soldering gun, unsolder stator leads from rectifier. Remove drive end shield bearing retainer screws. Pull rotor assembly from drive end shield.

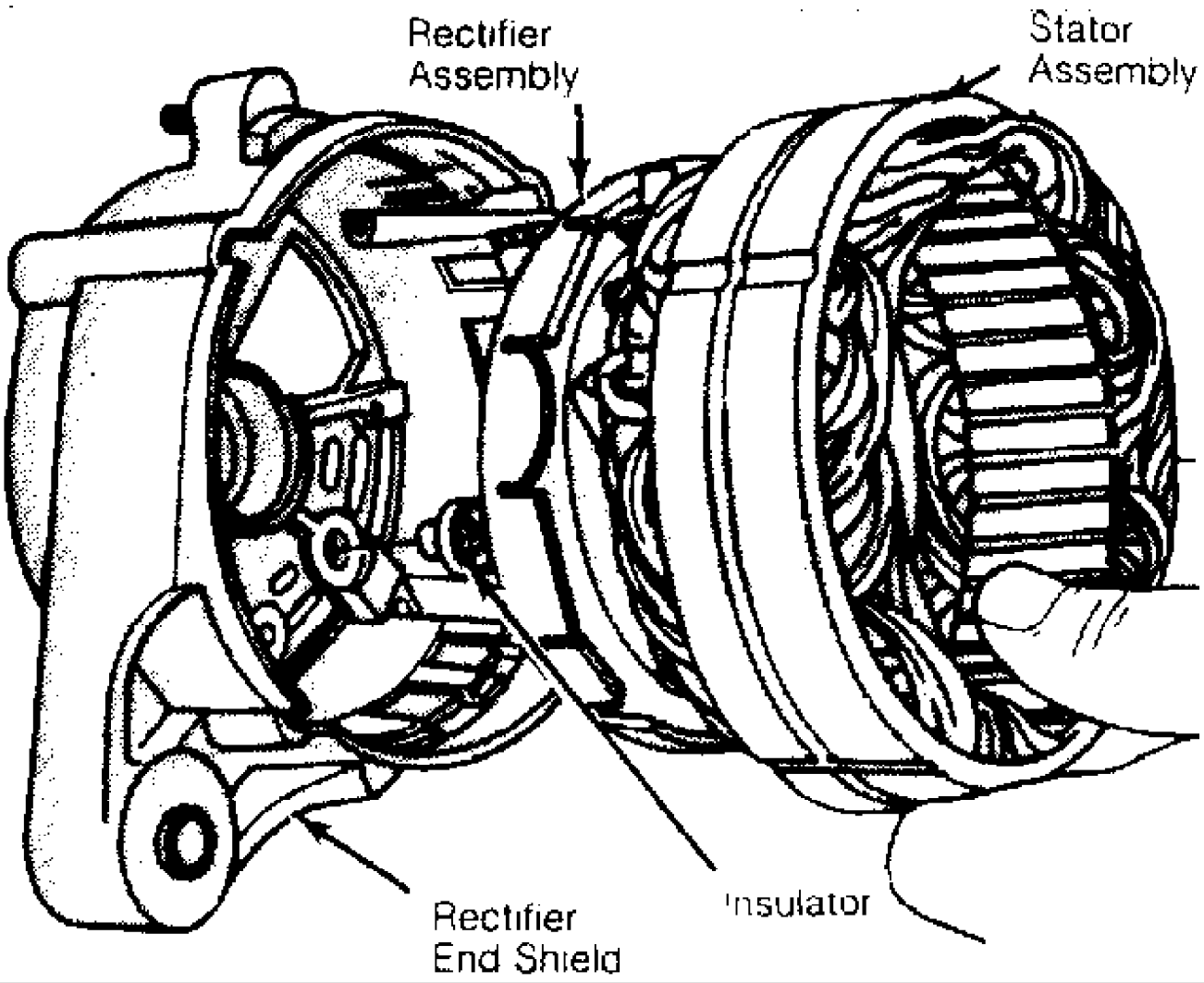

Fig. 9: Removing Rectifier & Stator Assembly
Courtesy of Chrysler Motors.

5) Using Bearing Puller (C4886), remove drive end bearing. Using Bearing Puller (C4068 or C4333), remove rectifier end bearing. See Fig. 10.

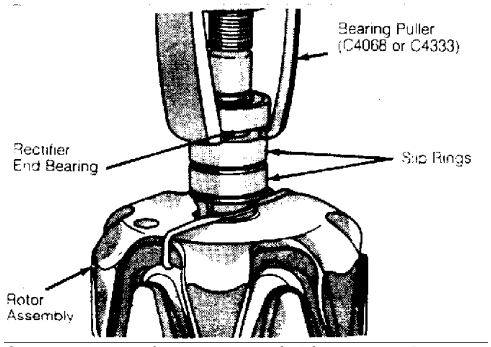

Fig. 10: Removing Rectifier End Bearing
Courtesy of Chrysler Motors.

BENCH TEST

Rotor Assembly Test

1) Check field slip rings for excessive wear or roughness. If slip ring has only minor damage, clean with a fine emery cloth. If slip rings are too badly damaged, rotor must be replaced.

2) Using a volt/ohmmeter, test for continuity from one slip ring to the other. Test should show a closed circuit. Using a volt/ohmmeter, test for continuity from both field coil slip rings to rotor shaft or core.

3) Test should show open circuit. If failure is detected in either test, replace rotor assembly. See Figs. 11 and 12.

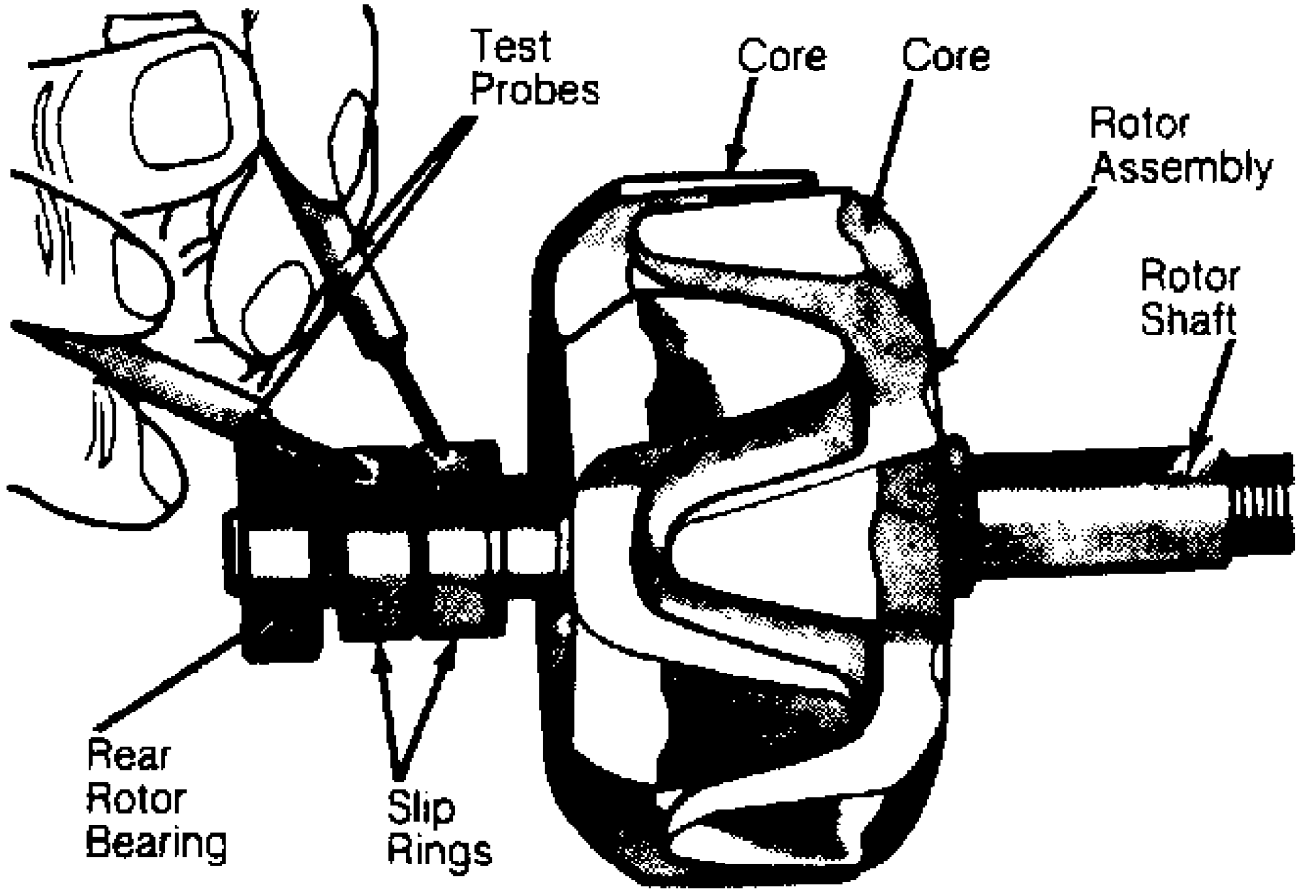

Fig. 11: Testing Rotor Coils
Courtesy of Chrysler Motors.

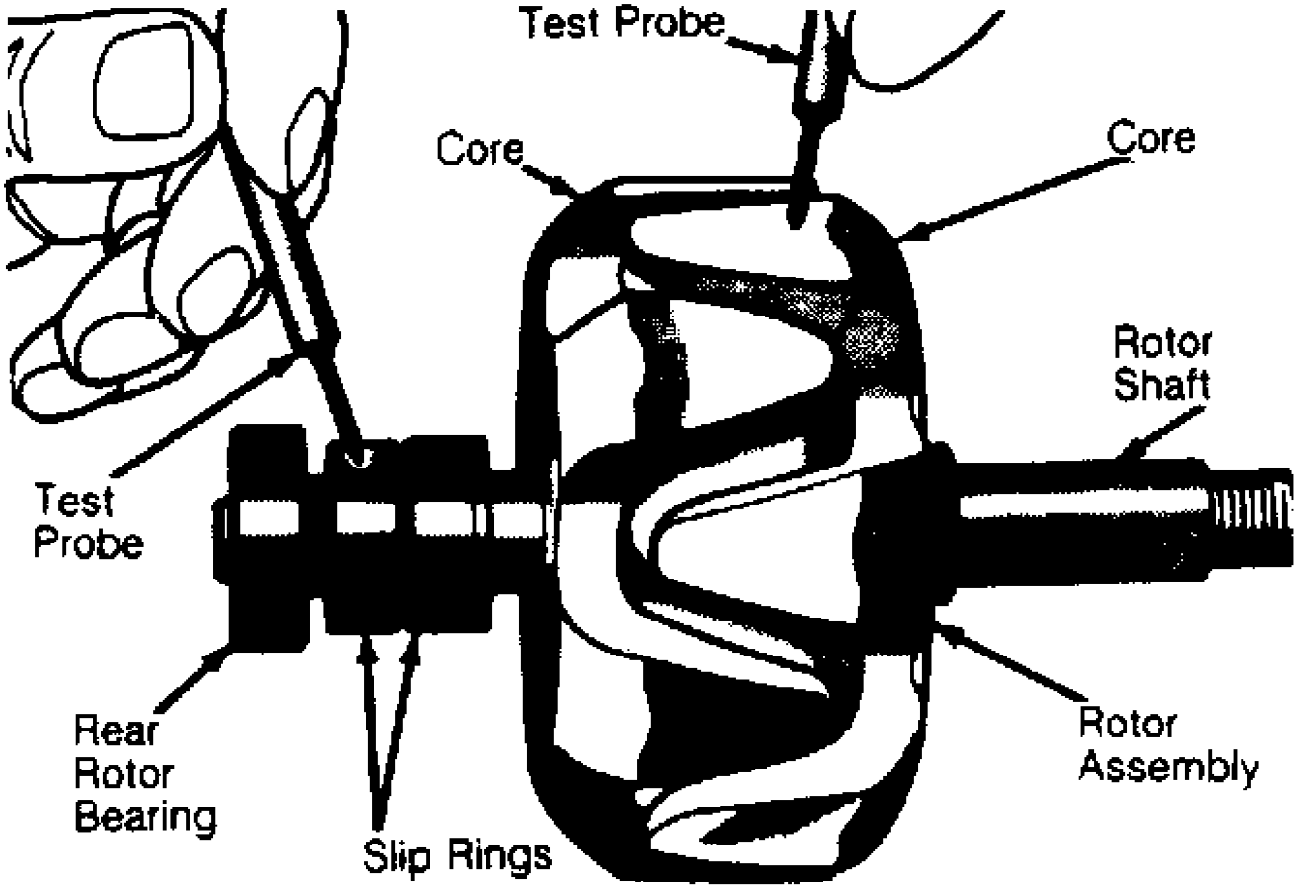

Fig. 12: Testing Rotor Coil for Ground
Courtesy of Chrysler Motors.

Stator Assembly Test

1) Check stator for worn or broken leads, distorted frame, or burned windings. Clean a small area of stator frame for making a good electrical contact. Using a volt/ohmmeter, test for continuity from stator leads to frame. Test should show an open circuit. See Figs. 13 and 14.

2) Test for continuity from one stator lead to other leads. Test should show a closed circuit. If failure is detected in either test, replace stator assembly.

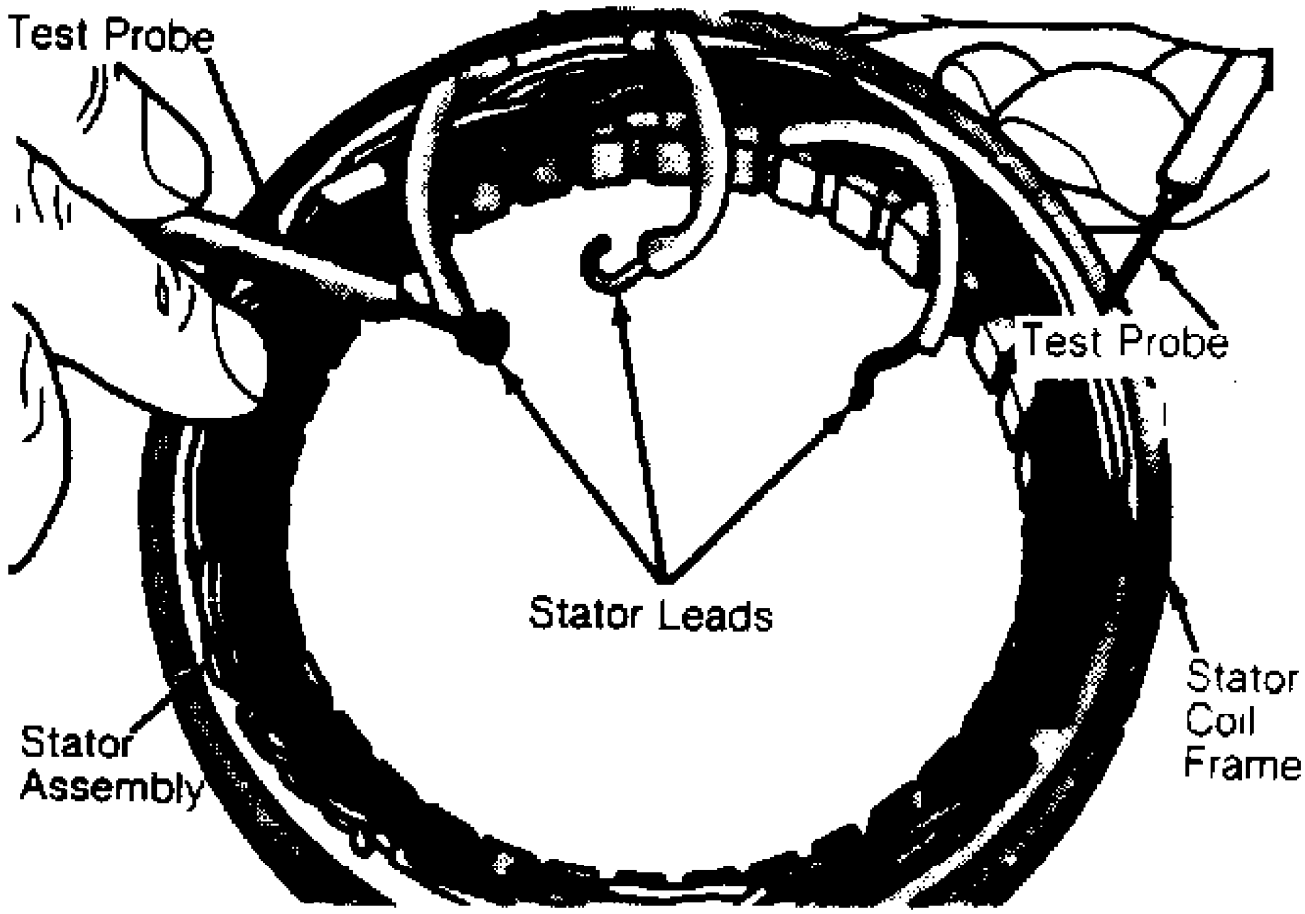

Fig. 13: Testing Stator Coil Ground
Courtesy of Chrysler Motors.

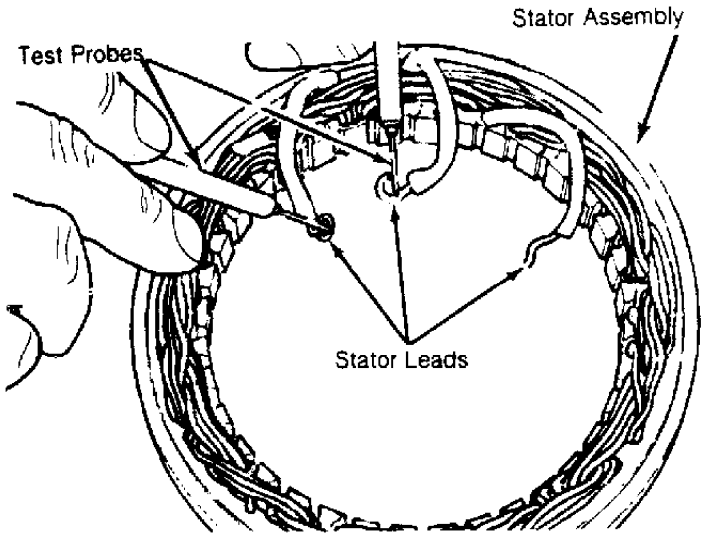

Fig. 14: Testing Stator Coil for Open or Ground
Courtesy of Chrysler Motors.

Rectifier Test

1) Check rectifier assembly for poor solder joints, cracks,

or signs of overheating. See Fig. 15. Using a volt/ohmmeter, test for continuity from positive diode pin to positive heat sink.

2) Reverse volt/ohmmeter test probes and repeat test. The test should show continuity in one direction only. Test for continuity from negative diode pin to negative heat sink.

3) Reverse volt/ohmmeter test probes and repeat test. The test should show continuity in one direction only. If failure is detected in either test, replace rectifier assembly.

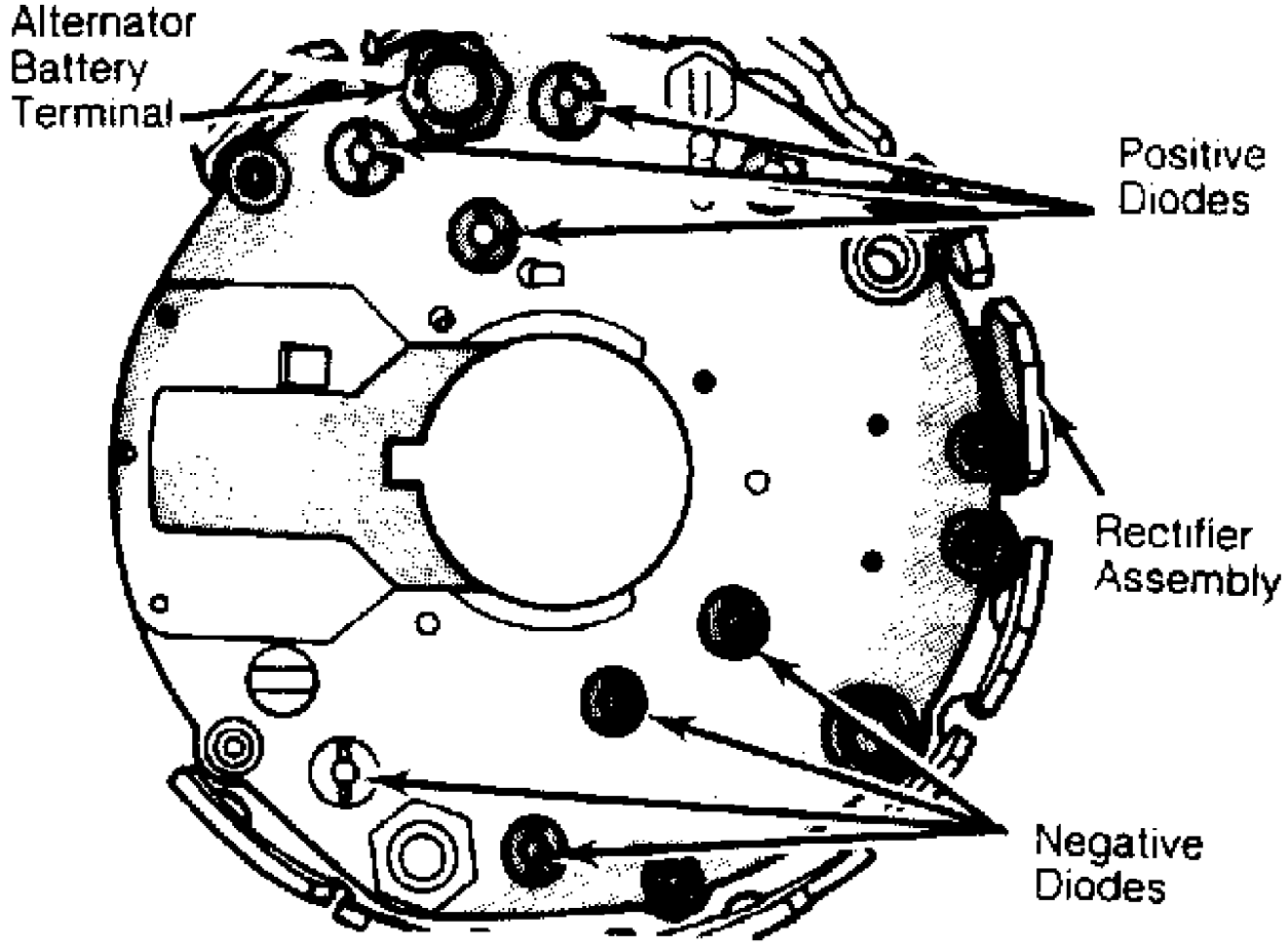

Fig. 15: Checking Rectifier Assembly
Courtesy of Chrysler Motors.

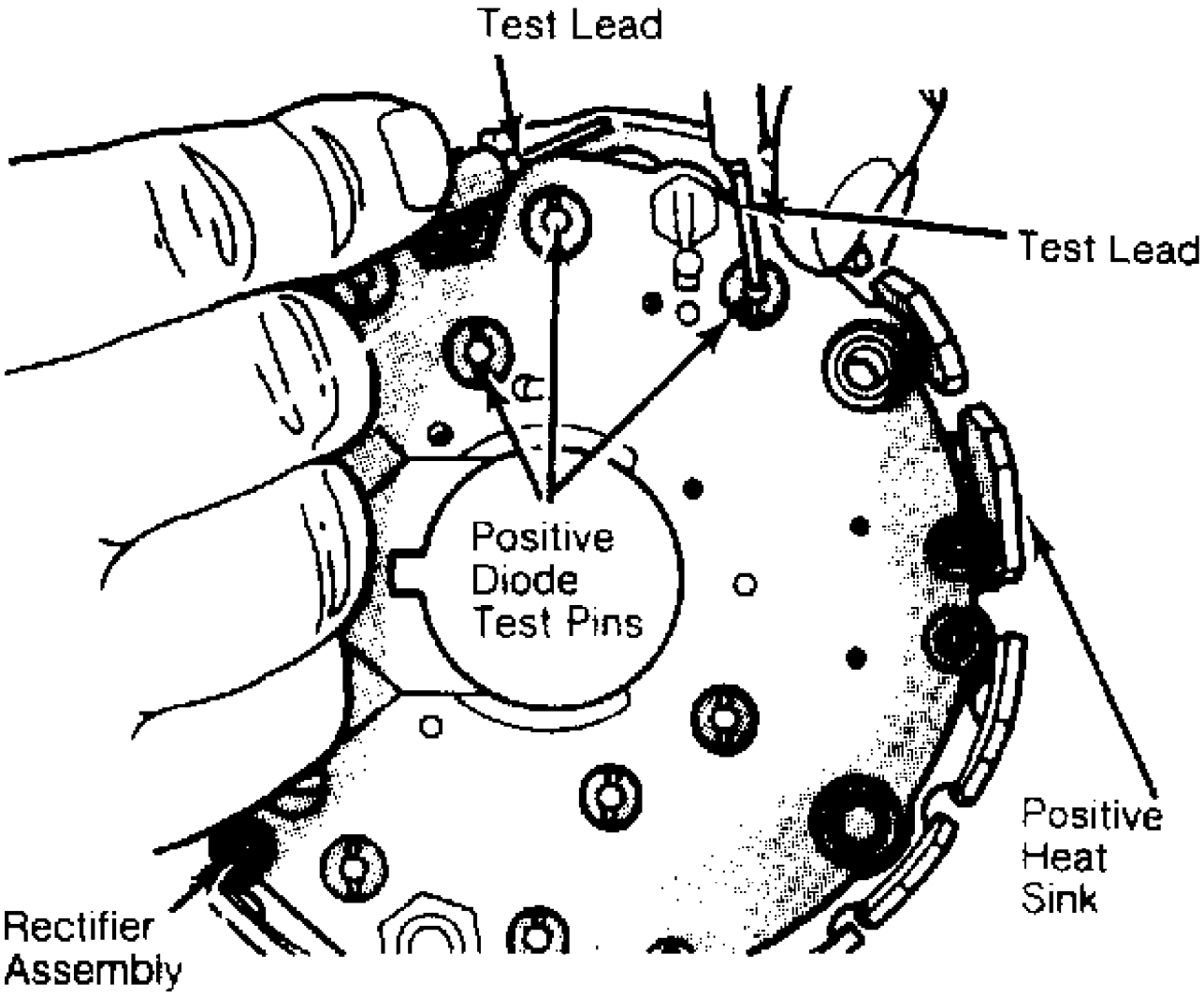

Fig. 16: Testing Positive Diodes
Courtesy of Chrysler Motors.

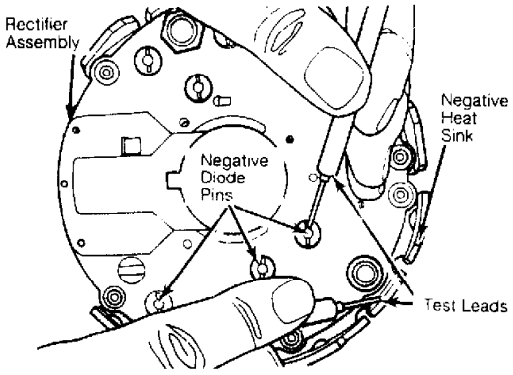

Fig. 17: Testing Negative Diodes
Courtesy of Chrysler Motors.

Brush Holder Test
1) When testing brushes and brush springs make sure that

brushes move smoothly in brush holder. Sticking brushes require replacement of brush holder assembly.

2) Using a volt/ohmmeter touch one test lead to inner brush, and other test lead to field terminal. If there is no continuity, replace brush assembly. With the volt/ohmmeter touch one test lead to outer brush and other test lead to field terminal. If there is no continuity, replace brush assembly. See Fig. 18.

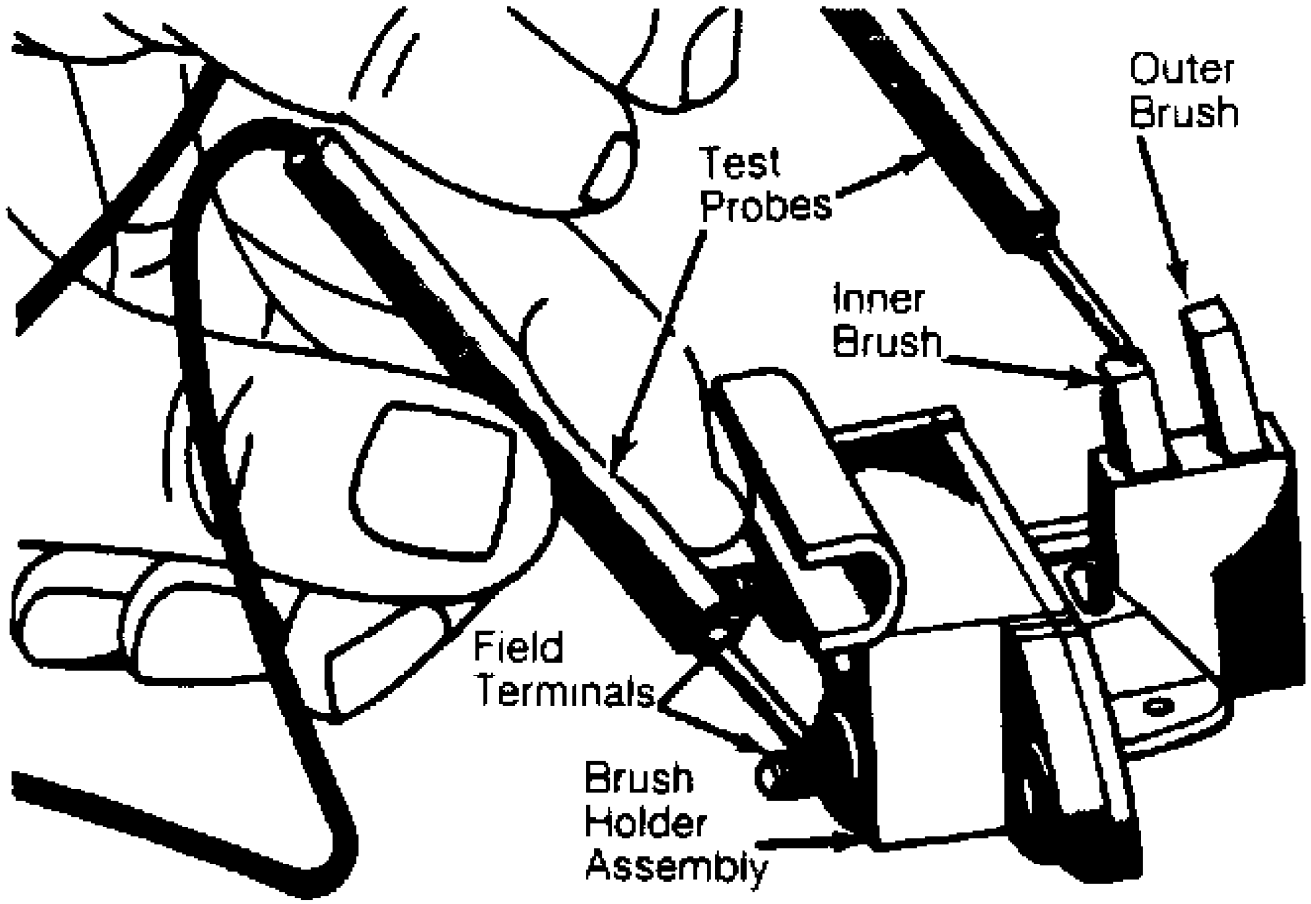

Fig. 18: Testing Inner & Outer Brush Circuit
Courtesy of Chrysler Motors.

CLEANING ALTERNATOR PARTS

DO NOT immerse stator field coil, rotor or rectifier assembly in cleaning solvent. Solvent will damage these components. Use an electrical parts cleaner and blow dry with compressed air.

REASSEMBLY

MAIN CASE

1) Install rear rotor bearing oil and dust seal. Install inner alternator battery "B+" terminal insulator. Install rectifier assembly.

2) Install stator assembly into rectifier end shield. Align scribe marks on stator and rectifier end shield. Solder stator leads to rectifier assembly.

3) Position front bearing to drive end shield. Install alternator drive end shield bearing retainer. Install pulley fan spacer.

4) Position drive end shield over rotor, position spacer over rotor. Use a suitable socket and press drive end shield onto rotor. Install rectifier end shield and stator assembly into drive end shield and rotor assembly.

5) Position brush holder assembly to alternator assembly. Install capacitor. Plug in capacitor terminal. Install Woodruff key into rotor shaft. Install fan over rotor shaft.

6) Install Poly-Vee pulley-to-fan spacer over rotor shaft. Install pulley. Install pulley mounting nut to rotor shaft. Hold pulley with oil filter wrench and tighten nut.

SPECIFICATIONS

ALTERNATOR SPECIFICATIONS

Application	Specification
Rated Amp Output	40-90
Minimum Current Output	(1) *
Field Current Draw @ 12 Volts (2)	2.5-5.0 Amps
Condenser Capacity	(3) *
Rotation	Clockwise

(1) - 40/90 amp alternator minimum current output is 40 amps. 35/75 amp alternator minimum current output is 30 amps.
(2) - Rotating by Hand.
(3) - 2.2 Microfarad Plus or Minus 20%.