CHARGING SYSTEM

CONTENTS

DESCRIPTION AND OPERATION

The Delcotron is a continuous output alternating generator that features a built in solid state diode rectified voltage regulator. It is belt driven by the crankshaft pulley and supplies D.C. voltage for charging the Energizer (battery) and operating electrical accessories even at idle speeds. The generator assembly does not require periodic maintenance.

A running charge will take place in the 1975 generator rotor shaft which involves a second set of generator part numbers. The part numbers are listed in the specification chart.

The large diameter of the drive end of the rotor shaft is being extended to eliminate the need for the inside collar. The new rotor and shaft assembly will fit the past model generators. The past model rotor and shaft assembly will replace if necessary, the new type rotor and shaft assembly providing an inside collar is also used. This charge has no effect on generator ratings or test procedures.

A new feature has been designed into the charging system for 1975.

In the event that a malfunction such as an open field winding in the generator or an open voltage regulator circuit would occur, the generator indicator light will glow thus, warning the driver that a problem exists in the charging circuit. To accomplish this a 40 ohm resistor is installed across the voltage regulator in the generator. The resistance wire to the accessory terminal of the ignition switch has been eliminated for 1975. When the engine is started and remains at slow idle the indicator light will continue to glow. When the rpm"s are increased to approximately 900 or more the light will go out and remain out even when the engine returns to idle speed.

A typical 10S1 wiring diagram is illustrated in Figure 1D-1.

When the ignition switch is closed, current from the battery flows through the indicator lamp to the generator No. 1 terminal, through resistor R1, diode D1, and the base-emitter of transistor TR1 to ground, and then back to the battery. This turns on transistor TR1 and current flows through the generator field coil and TR1 back to the battery. The indicator lamp then turns on. Resistor R5 carries some of the indicator lamp current.

With the generator operating, A.C. voltages are generated in the stator windings and the stator supplies D.C. field

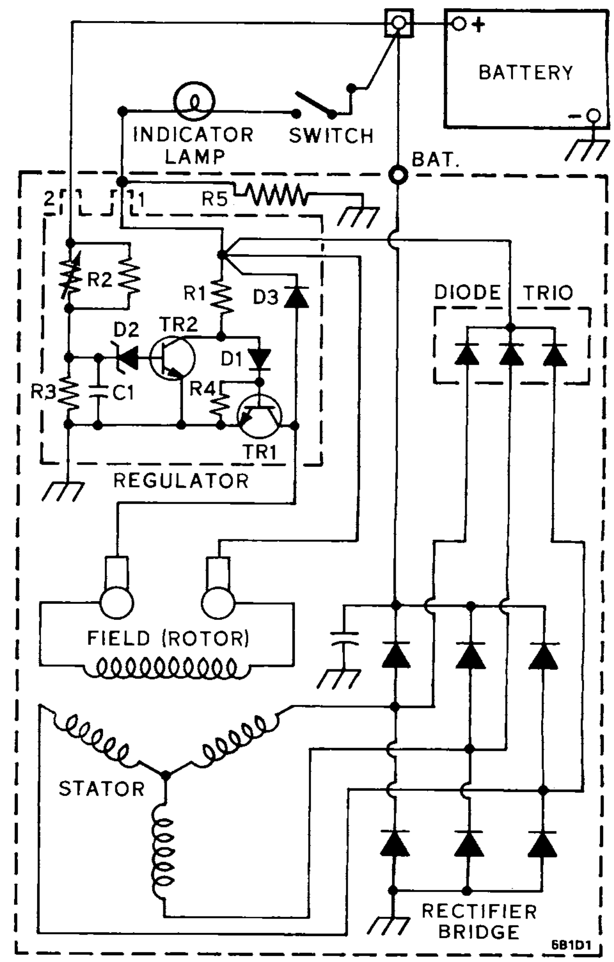

Figure 1D-1 Delcotron Wiring Schematic

current through the diode trio, the field, TR1, and then through the grounded diodes in rectifier bridge back to the stator. Also the six diodes in the rectifier bridge change the stator A.C. voltages to a D.C. voltage which appears between ground and the generator "BAT" terminal. As generator speed increases, current is provided for charging the battery and operating electrical accessories. Also, with the generator operating, the same voltage appears at the "BAT" and No. 1 terminals and the indicator lamp goes out to indicate the generator is producing voltage.

The No. 2 terminal on the generator is always connected to the battery but the discharge current is limited to a negligible value by the high resistances of R2 and R3. As the generator speed and voltage increase, the voltage between R2 and R3 increases to the point where zener diode D2 conducts. Transistor TR2 then turns on and TR1 turns off. With TR1 off, the field current and system voltage decrease, and D2 then blocks current flow causing TR1 to turn back on. As the field current and system voltage increases, this cycle repeats many times per second to limit the generator voltage to a preset value.

DIAGNOSIS

TROUBLE SHOOTING PROCEDURES

Adherence to the following procedures in the order presented will lead to the location and correction of charging system defects in the shortest possible time. It will never be necessary to perform all the procedures to locate the trouble.

A basic wiring diagram illustrating lead connections is shown in Figure 1D-2.

To avoid damage to the electrical equipment, observe the following precautions:

1. Do not polarize the generator.

2. Do not short across or ground any of the terminals in the charging circuit, except as specifically instructed herein.

3. Never operate the generator with the output terminal open-circuited unless the field circuit is also open-circuited.

4. Make sure the generator and battery have the same ground polarity.

5. When connecting a charger or booster battery to the vehicle battery, connect the positive cable from booster battery to discharged battery first, then connect one end of the negative cable to the booster battery and the other end to a point on the engine remote from the discharged battery such as the generator brace to prevent arcing at the battery.

In some circuits an ammeter may be used instead of an indicator lamp. In this case, Section "A" pertaining to faulty indicator lamp operation should be omitted from the troubleshooting procedure.

Trouble in the charging system will show up as one or more of the following conditions:

> **NOTE:** *When testing the generator, all accessories must be shut off and the blower motor lead disconnected.*

1. Faulty indicator lamp operation.

2. An undercharged battery, as evidenced by slow cranking and low specific gravity readings.

3. An overcharged battery, as evidenced by excessive water usage.

A. FAULTY INDICATOR LAMP OPERATION

Check the indicator lamp for normal operation as shown below:

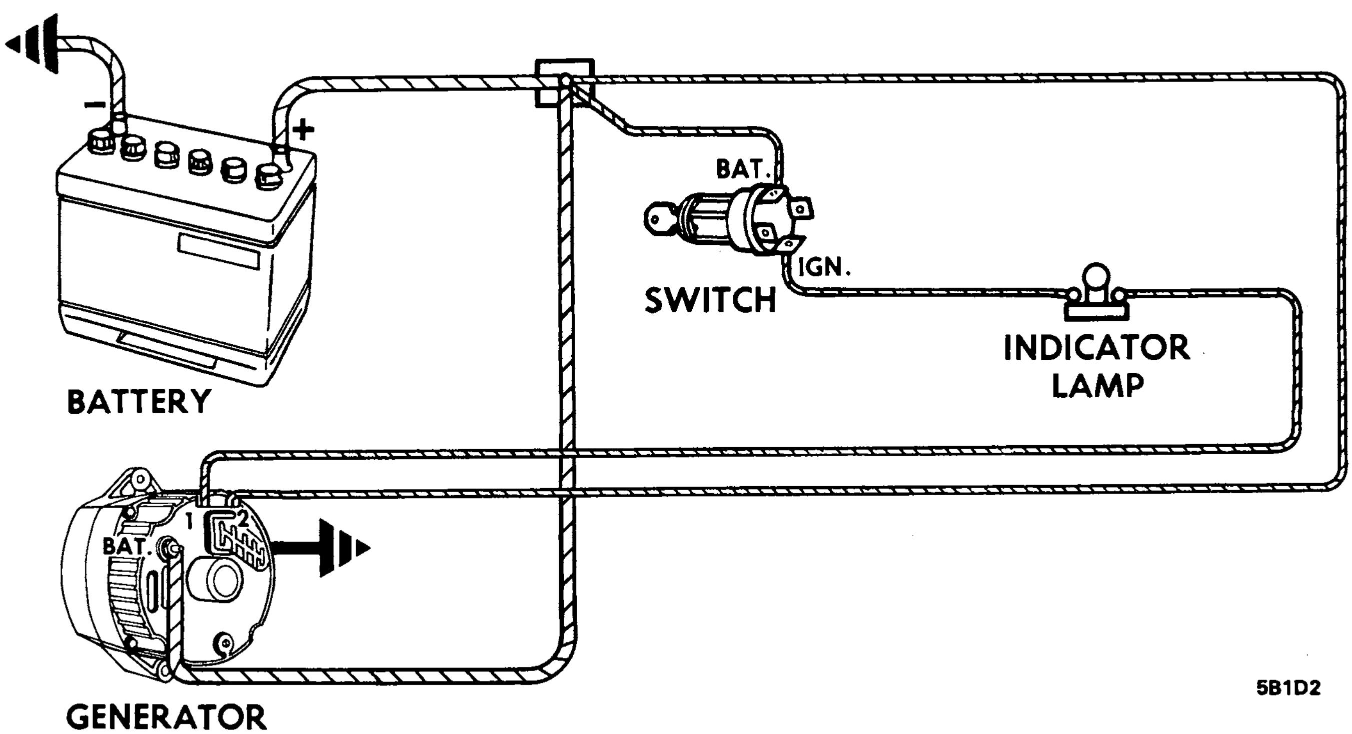

Figure 1D-2 Generating System Wiring

Switch	Lamp	Engine
Off	Off	Stopped
On	On	Stopped
On	Off	Running

If the indicator lamp operates normally, proceed to "Undercharged" battery or "Overcharged" battery section. Otherwise, proceed to either one of the following three abnormal conditions.

1. **Switch Off, Lamp On**-In this case, disconnect the two leads from the generator No. 1 and No. 2 terminals. If the lamps stays on, there is a short between these two leads. If the lamp goes out, replace the rectifier bridge. This condition will cause an undercharged battery.

2. **Switch On, Lamp Off, Engine Stopped**-This condition can be caused by the defects listed in Part 1 above, or by an open in the circuit. To determine where an open exists, proceed as follows:

a. Check for a blown fuse, a burned out bulb, defective bulb socket or an open in No. 1 lead circuit between generator and ignition switch.

b. If no defects have been found, proceed to "UNDERCHARGED BATTERY" section.

3. **Switch On, Lamp On, Engine Running**-Check for a blown fuse (where used) between indicator lamp and switch. In the event of a mechanic"s start with the choke cam at slow idle, the light will remain on until the engine has been accelerated to approximately 900 RPM or more.-The other possible causes of this condition are covered in the "UNDERCHARGED BATTERY" section.

If a defect has been found and corrected at this point, no further checks need be made.

UNDERCHARGED BATTERY

This condition, as evidenced by slow cranking and low specific gravity readings, can be caused by one or mor of the following conditions even though the indicator lamp may be operating normally. The following procedure also applies to circuits with an ammeter.

1. Insure that the undercharged condition has not been caused by accessories having been left on for extended periods.

2. Check the drive belt for proper tension.

3. If a battery defect is suspected, perform battery test.

4. Inspect the wiring for defects. Check all connections for tightness and cleanliness, including the slip connectors at the generator and firewall, and the cable connections to the battery terminals.

5. With ignition switch on and all wiring harness leads connected, connect a voltmeter from:

a. generator "BAT" terminal to ground

b. generator No. 1 terminal to ground

c. generator No. 2 terminal to ground

A zero reading indicates an open between voltmeter connection and battery.

6. If previous Steps 1 through 5 check satisfactorily, check Delcotron generator as follows:

a. Disconnect battery ground cable.

b. Connect an ammeter in the circuit at the "BAT" terminal of the generator.

c. Reconnect battery ground cable.

d. Turn on radio, windshield wipers, lights high beam and blower motor high speed. Connect a carbon pile across the battery.

e. Operate engine at moderate speed as required, and adjust carbon pile as required, to obtain maximum current output.

f. If ampere output is within 10 amperes of rated output as stamped on generator frame, generator is not defective; recheck Steps 1 through 5.

g. If ampere output is not within 10 amperes of rated output, ground the field winding by inserting a screwdriver into the test hole. Tab is within 3/4 inch of casting surface. Do not force screwdriver deeper than one inch into end frame.

h. Operate engine at moderate speed as required, and adjust carbon pile as required to obtain maximum current output.

i. If output is within 10 amperes of rated output, replace voltage regulator and check field winding.

j. If output is not within 10 amperes of rated output, check the field winding, diode trio, rectifier bridge, and stator.

k. Remove ammeter from generator and turn accessories off.

C. OVERCHARGED BATTERY

1. To determine battery condition, perform battery test.

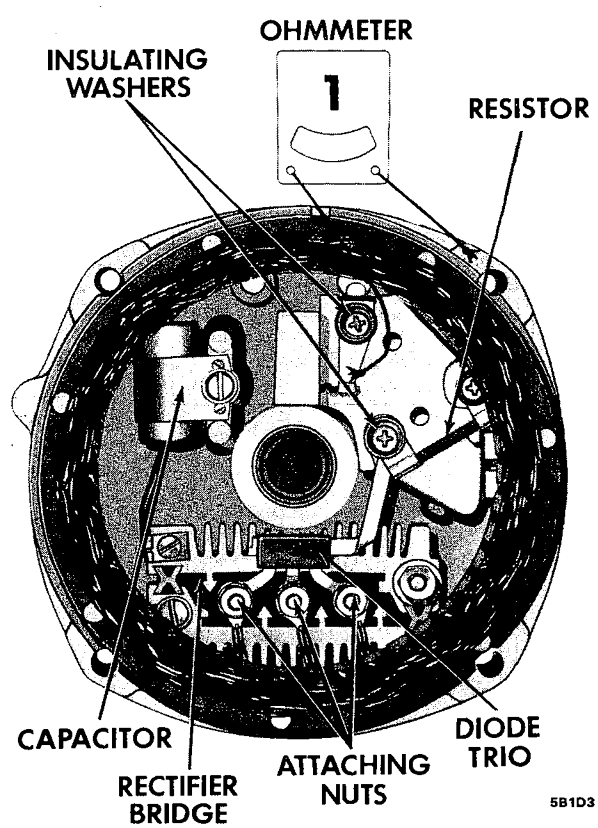

Figure 1D-3 - Checking Brush Lead Clip

2. Connect a voltmeter from generator No. 2 terminal to ground. If reading is zero, No. 2 lead circuit is open.

3. If battery and No. 2 lead circuit check good, but an obvious overcharge condition exists as evidenced by excessive battery water usage, proceed as follows:

a. Separate end frames. Check field winding for shorts. If shorted replace rotor and regulator. Check field winding for grounds. If grounded replace only the rotor.

b. Connect ohmmeter using lowest range scale from brush lead clip to end frame as shown in Step 1, Figure 1D-3 then reverse lead connections.

c. If both readings are zero, either the brush lead clip is grounded or regulator is defective.

d. A grounded brush lead clip can result from omission of insulating washer, omission of insulating sleeve over screw, or damaged insulating sleeve. Remove screw to inspect sleeve. If satisfactory, replace regulator.

FAULTY INDICATOR LAMP OPERATION

Check the indicator lamp for normal operation as shown below.

Switch	Lamp	Engine
OFF	OFF	STOPPED
ON	ON	STOPPED
ON	OFF	RUNNING

If the indicator lamp operates normally, proceed to "Undercharged Battery" or "Overcharged Battery" section. Otherwise, proceed to either one of the following three **abnormal** conditions.

Switch Off, Lamp On—In this case, disconnect the two leads from the generator No. 1 and No. 2 terminals. If the lamp stays on, there is a short between these two leads. If the lamp goes out, replace the rectifier bridge. This condition will cause an undercharged battery.

Switch On, Lamp Off, Engine Stopped—This condition can be caused by the defects listed in **Switch Off, Lamp On section,** or by an open in the circuit.

To determine where an open exists, check for a blown fuse, a burned out bulb, defective bulb socket, or an open in No. 1 lead circuit between generator and ignition switch.

If no defects are found, proceed to "UNDERCHARGED BATTERY" section.

Switch On, Lamp On, Engine Running—Check for a blown fuse (where used) between indicator lamp and switch. The other possible causes of this condition are covered in the "UNDERCHARGED BATTERY" section.

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UNDERCHARGED BATTERY

This condition, as evidenced by slow cranking and low specific gravity readings, can be caused by one or more of the following conditions even though the indicator lamp may be operating normally. The following procedure also applies to circuits with an ammeter.

1. Insure that the undercharged condition has not been caused by accessories having been left on for extended periods.
2. Check the drive belt for proper tension.
3. If a battery defect is suspected, perform battery test.
4. Inspect the wiring for defects. Check all connections for tightness and cleanliness, including the slip connectors at the generator and firewall, and the cable clamps and battery posts.
5. With ignition switch on connect a voltmeter from:
   a. generator "BAT" terminal to ground
   b. generator No. 1 terminal to ground
   c. generator No. 2 terminal to ground

   A zero reading indicates an open between voltmeter connection and battery.
6. If previous Steps 1 through 5 check satisfactorily, check Delcotron generator as follows:
   a. Disconnect battery ground cable.
   b. Connect an ammeter in the circuit at the "BAT" terminal of the generator.
   c. Reconnect battery ground cable.
   d. Turn on radio, windshield wipers, lights high beam and blower motor high speed. Connect a carbon pile across the battery.
   e. Operate engine at moderate speed as required, and adjust carbon pile as required, to obtain maximum current output.

If ampere output is within 10 amperes of rated output as stamped on generator frame, generator is not defective; recheck Steps 1 through 5.

If ampere output is not within 10 amperes of rated output, ground the field winding by inserting a screwdriver into the test hole. Tab is within 3/4 inch of casting surface. Do not force screwdriver deeper than one inch into end frame.
Operate engine at moderate speed as required, and adjust carbon pile as required to obtain maximum current output.

If output is within 10 amperes of rated output, replace regulator.

If output is not within 10 amperes of rated output, check the field winding, diode trio, rectifier bridge, and stator.

OVERCHARGED BATTERY

1. To determine battery condition, perform battery test.
2. Connect a voltmeter from generator No. 2 terminal to ground. If reading is zero, No. 2 lead circuit is open.
3. If battery and No. 2 lead circuit check good, but an obvious overcharge condition exists as evidenced by excessive battery water usage, proceed as follows:
   a. Separate end frames. Check field winding for shorts. If shorted replace rotor and regulator.
   b. Connect ohmmeter using lowest range scale from brush lead clip to end frame as shown in Step 1, Figure 1D-3, then reverse lead connections.
   c. If both readings are zero, either the brush lead clip is grounded or regulator is defective.
   d. A grounded brush lead clip can result from omission of insulating washer, omission of insulating sleeve over screw, or damaged insulating sleeve. Remove screw to inspect sleeve. If satisfactory, replace regulator.

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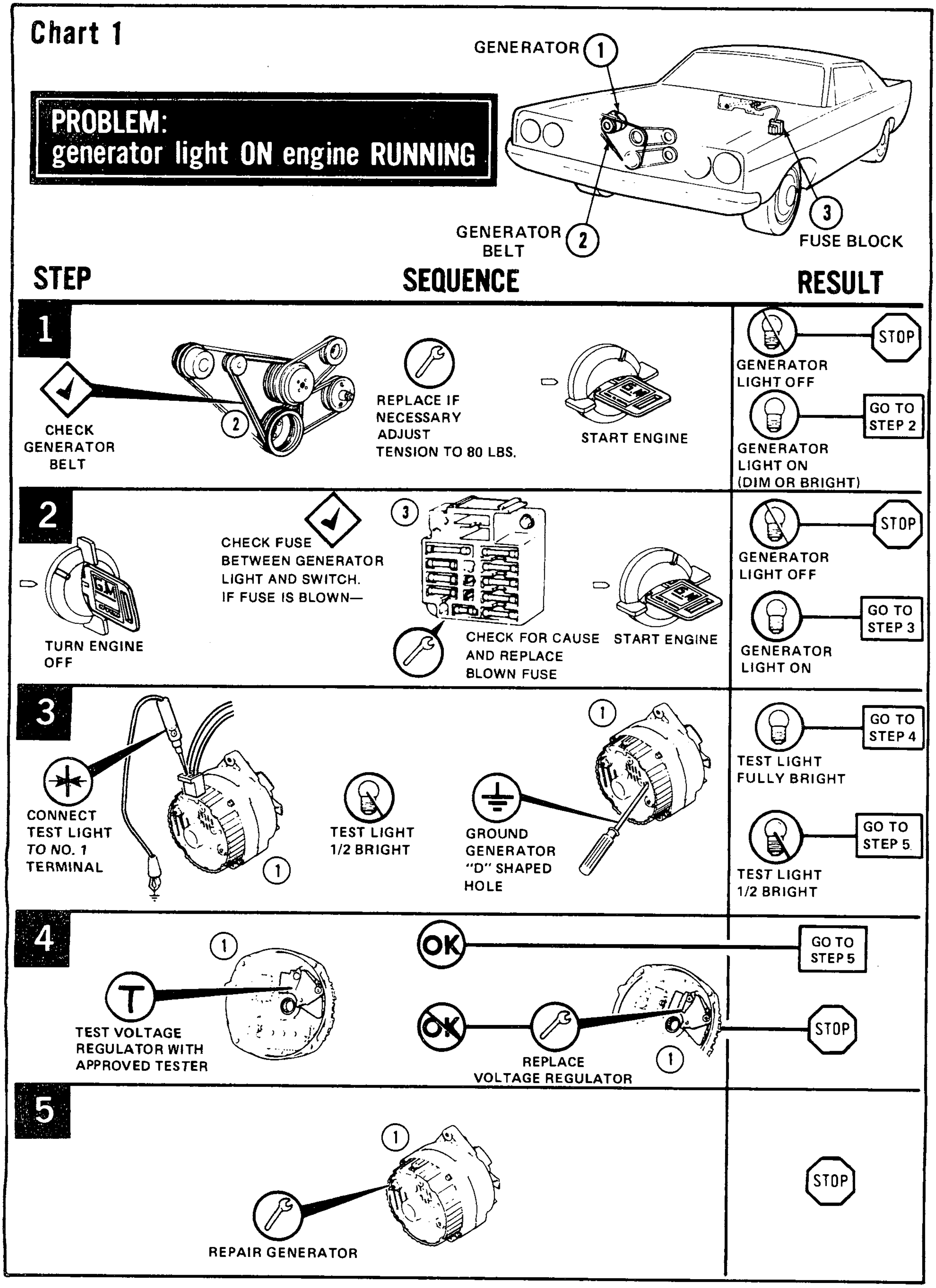


Chart 1
PROBLEM:
generator light ON engine RUNNING
GENERATOR 1
GENERATOR BELT 2
3 FUSE BLOCK
STEP
SEQUENCE
RESULT
1
CHECK GENERATOR BELT
2
REPLACE IF NECESSARY ADJUST TENSION TO 80 LBS.
START ENGINE
GENERATOR LIGHT OFF
STOP
GENERATOR LIGHT ON (DIM OR BRIGHT)
GO TO STEP 2
2
TURN ENGINE OFF
CHECK FUSE BETWEEN GENERATOR LIGHT AND SWITCH. IF FUSE IS BLOWN—
3
CHECK FOR CAUSE AND REPLACE BLOWN FUSE
START ENGINE
GENERATOR LIGHT OFF
STOP
GENERATOR LIGHT ON
GO TO STEP 3
3
CONNECT TEST LIGHT TO NO. 1 TERMINAL
1
TEST LIGHT 1/2 BRIGHT
GROUND GENERATOR "D" SHAPED HOLE
1
TEST LIGHT FULLY BRIGHT
GO TO STEP 4
TEST LIGHT 1/2 BRIGHT
GO TO STEP 5
4
1
TEST VOLTAGE REGULATOR WITH APPROVED TESTER
OK
GO TO STEP 5
OK
REPLACE VOLTAGE REGULATOR
1
STOP
5
1
REPAIR GENERATOR
STOP

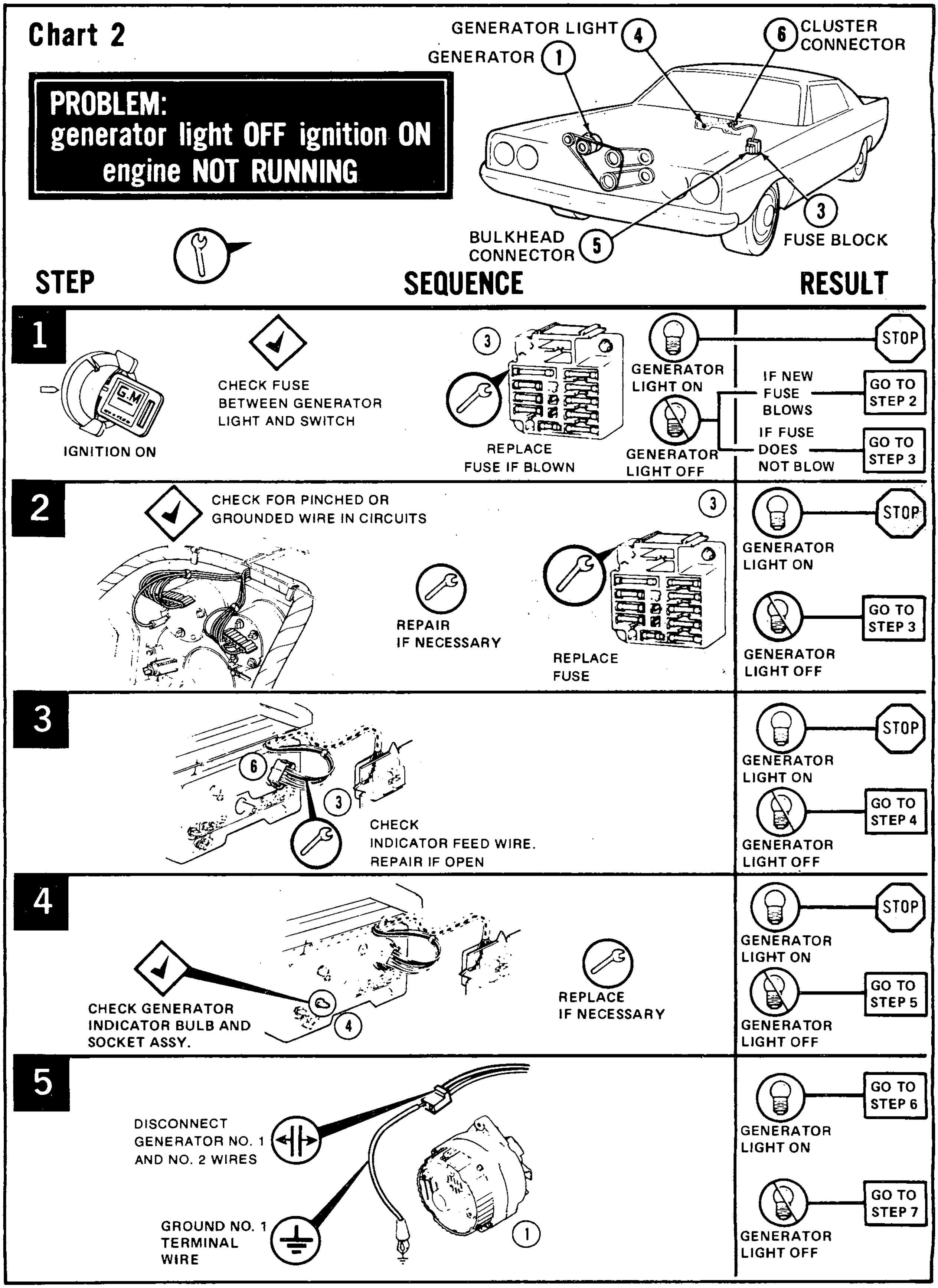


Chart 2
PROBLEM:
generator light OFF ignition ON
engine NOT RUNNING
GENERATOR LIGHT 4
GENERATOR 1
6 CLUSTER CONNECTOR
BULKHEAD CONNECTOR 5
3 FUSE BLOCK
STEP
SEQUENCE
RESULT
1
IGNITION ON
CHECK FUSE BETWEEN GENERATOR LIGHT AND SWITCH
3
REPLACE FUSE IF BLOWN
GENERATOR LIGHT ON
STOP
GENERATOR LIGHT OFF
IF NEW FUSE BLOWS
GO TO STEP 2
IF FUSE DOES NOT BLOW
GO TO STEP 3
2
CHECK FOR PINCHED OR GROUNDED WIRE IN CIRCUITS
REPAIR IF NECESSARY
3
REPLACE FUSE
GENERATOR LIGHT ON
STOP
GENERATOR LIGHT OFF
GO TO STEP 3
3
6
3
CHECK INDICATOR FEED WIRE. REPAIR IF OPEN
GENERATOR LIGHT ON
STOP
GENERATOR LIGHT OFF
GO TO STEP 4
4
CHECK GENERATOR INDICATOR BULB AND SOCKET ASSY.
4
REPLACE IF NECESSARY
GENERATOR LIGHT ON
STOP
GENERATOR LIGHT OFF
GO TO STEP 5
5
DISCONNECT GENERATOR NO. 1 AND NO. 2 WIRES
GROUND NO. 1 TERMINAL WIRE
1
GENERATOR LIGHT ON
GO TO STEP 6
GENERATOR LIGHT OFF
GO TO STEP 7

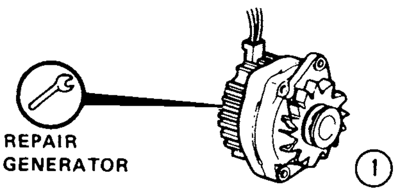
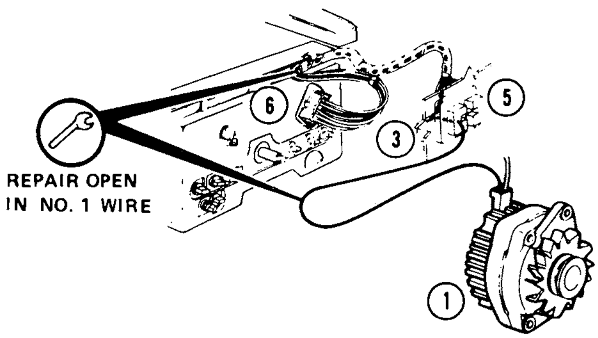
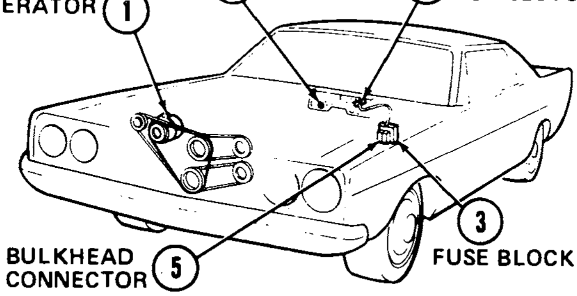
STEP	SEQUENCE	RESULT
6		STOP
7		STOP

Chart 3

PROBLEM:
generator light ON ignition OFF



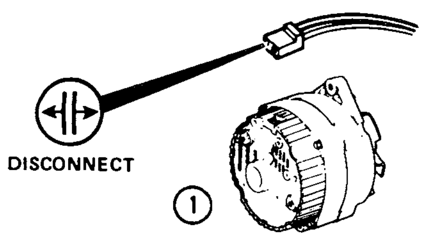
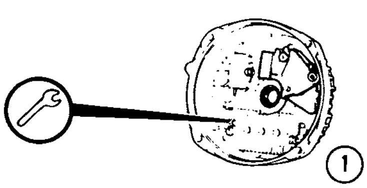
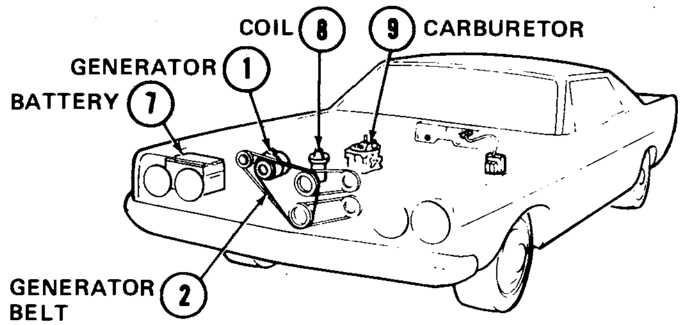
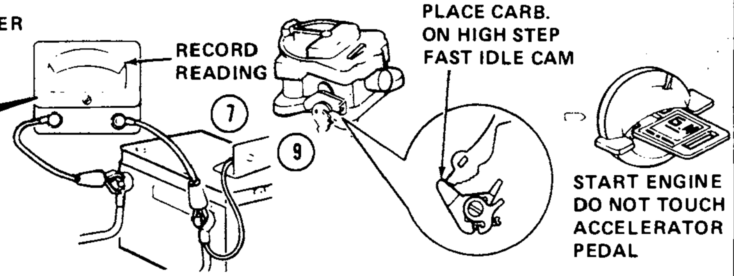
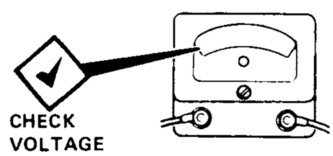
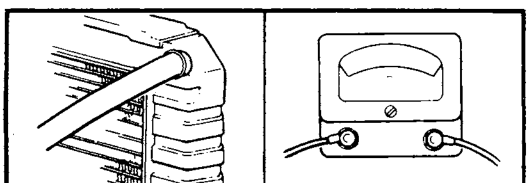
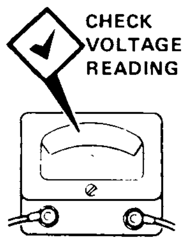
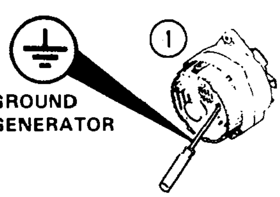
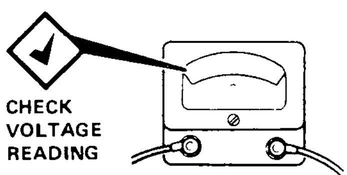
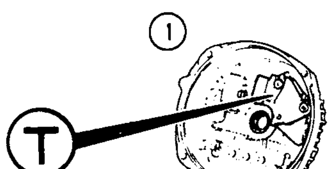
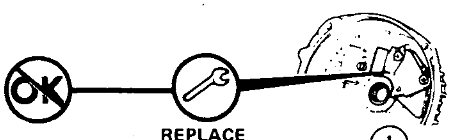
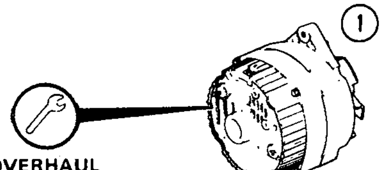
STEP	SEQUENCE	RESULT
1	 DISCONNECT (1) — GENERATOR LIGHT ON → REPAIR SHORT BETWEEN NO. 1 WIRE AND NO. 2 WIRE; GENERATOR LIGHT OFF	STOP; GO TO STEP 2
2		STOP

Chart 4

PROBLEM:
battery UNDERCHARGED



STEP	SEQUENCE	RESULT
1	CHECK GENERATOR BELT (2) — REPLACE IF NECESSARY ADJUST TENSION TO 80 LBS. MAKE SURE NO ACCESSORIES WERE LEFT ON, IGNITION OFF, DOORS CLOSED, UNDER HOOD LIGHTS DISCONNECTED DISCONNECT NEGATIVE CABLE (7) CONNECT TEST LIGHT BETWEEN CABLE & BATTERY POST (7)	TEST LIGHT ON — GO TO STEP 2 TEST LIGHT OFF – NO DRAIN ON BATTERY — GO TO STEP 3
2	TAP CABLE AGAINST POST (7) TEST LIGHT ON TRACE & CORRECT CONTINUOUS DRAIN ON BATTERY	TEST LIGHT OFF — STOP TEST LIGHT ON — GO TO STEP 3
3	RECONNECT NEGATIVE CABLE CONNECT JUMPER (-) TERMINAL AND GROUND (8) (ON H.E.I. DISCONNECT FEED WIRE) CONNECT VOLTMETER (+) TERMINAL AND GROUND (1) CRANK ENGINE LONG ENOUGH FOR STABILIZED READING	NEEDLE ABOVE 9.0 VOLTS — GO TO STEP 6 NEEDLE BELOW 9.0 VOLTS — GO TO STEP 4
4	CHECK VOLTAGE ACROSS POST WHILE CRANKING (7) IF READING IS WITHIN .5 VOLT OF VOLTAGE AT GEN. — TEST BATTERY USING BATTERY LOAD TEST PROCEDURE (7) IF READING IS NOT WITHIN .5 VOLT OF READING AT GEN. CHECK FOR BATTERY TO DELCOTRON CIRCUIT RESISTANCE	BATTERY OK CHARGE AS SPECIFIED BY TEST — GO TO STEP 6 BATTERY NOT OK — GO TO STEP 5
5	REPLACE BATTERY (7)	GO TO STEP 6

STEP	SEQUENCE	RESULT
6	DISCONNECT COIL JUMPER OR RECONNECT HEI FEED WIRE. CONNECT VOLTMETER ACROSS BATTERY. RECORD READING (7) (9). PLACE CARB. ON HIGH STEP FAST IDLE CAM. START ENGINE DO NOT TOUCH ACCELERATOR PEDAL. 	GO TO STEP 7
7	TURN ON ACCESSORIES: HEADLIGHTS-HI; A/C – HI; RADIO; BLOWER TYPE DEFOGGER. CHECK VOLTAGE READING 	IF VOLTAGE READS LOWER THAN PREVIOUS READING — GO TO STEP 9 IF VOLTAGE READS HIGHER THAN PREVIOUS READING — GO TO STEP 8
8	TURN OFF ACCESSORIES. WAIT UNTIL UPPER RADIATOR INLET IS HOT AND VOLTMETER NEEDLE STOPS  CHECK VOLTAGE READING 	IF METER READS UNDER 12.5 — GO TO STEP 9 IF METER READS OVER 15.5 — GO TO STEP 10 IF METER READS 12.5 TO 15.5 SEE NOTE — STOP
9	GROUND GENERATOR (1)  CHECK VOLTAGE READING 	IF VOLTAGE READS HIGHER THAN PREVIOUS READING — GO TO STEP 10 IF VOLTAGE READS LOWER THAN PREVIOUS READING — GO TO STEP 11
10	TEST VOLTAGE REGULATOR WITH APPROVED TESTER (1)  OK — GO TO STEP 11; NOT OK — REPLACE VOLTAGE REGULATOR (1) 	OK: GO TO STEP 11 NOT OK: STOP
11	OVERHAUL GENERATOR (1) 	STOP

NOTE: IF NOTHING HAS BEEN FOUND RE-EDUCATE OWNER ON EXCESSIVE IDLING, SLOW OR SHORT DISTANCE DRIVING WITH ALL ACCESSORIES ON.

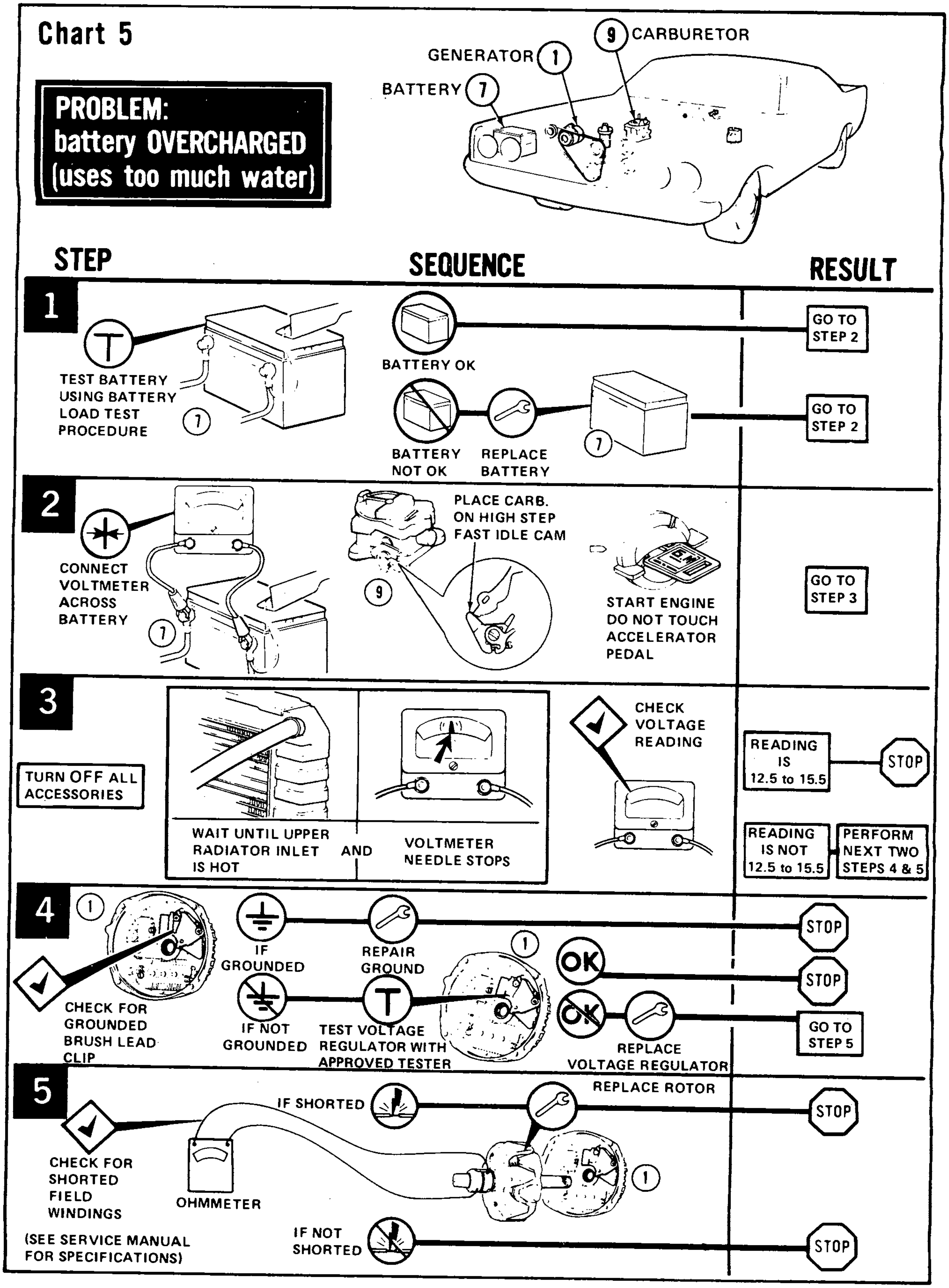


Chart 5
PROBLEM:
battery OVERCHARGED
(uses too much water)
GENERATOR 1
BATTERY 7
9 CARBURETOR
STEP
SEQUENCE
RESULT
1
TEST BATTERY USING BATTERY LOAD TEST PROCEDURE
BATTERY OK
GO TO STEP 2
BATTERY NOT OK
REPLACE BATTERY
GO TO STEP 2
2
CONNECT VOLTMETER ACROSS BATTERY
PLACE CARB. ON HIGH STEP FAST IDLE CAM
START ENGINE DO NOT TOUCH ACCELERATOR PEDAL
GO TO STEP 3
3
TURN OFF ALL ACCESSORIES
WAIT UNTIL UPPER RADIATOR INLET IS HOT
AND
VOLTMETER NEEDLE STOPS
CHECK VOLTAGE READING
READING IS 12.5 to 15.5
STOP
READING IS NOT 12.5 to 15.5
PERFORM NEXT TWO STEPS 4 & 5
4
CHECK FOR GROUNDED BRUSH LEAD CLIP
IF GROUNDED
REPAIR GROUND
STOP
IF NOT GROUNDED
TEST VOLTAGE REGULATOR WITH APPROVED TESTER
OK
STOP
OK
REPLACE VOLTAGE REGULATOR
GO TO STEP 5
5
CHECK FOR SHORTED FIELD WINDINGS
(SEE SERVICE MANUAL FOR SPECIFICATIONS)
OHMMETER
IF SHORTED
REPLACE ROTOR
STOP
IF NOT SHORTED
STOP

MAJOR REPAIR

OVERHAUL PROCEDURES

Removal (Without A/C)

1. Disconnect negative battery cable.
2. Disconnect electrical connections.
3. Remove tensioner bracket bolt.
4. Remove pivot bolt.

On some models it may be necessary to loosen and rotate fan shroud to completely remove pivot bolt from bracket.

5. Remove Delcotron.

Removal (With A/C)

1. Disconnect negative battery cable.

Remove air cleaner on cars equipped with the dual- snorkel air cleaner.

2. Remove compressor mounting brace.
3. Loosen fan shroud by removing mounting bolts.
4. Remove Delcotron tensioner bracket bolt. Loosen bolt that attaches Delcotron to front of engine and swing bracket up and out of way.
5. Remove Delcotron pivot bolt.

On some models it may be necessary to loosen and rotate fan shroud to completely remove pivot bolt from bracket.

6. Remove Delcotron belt.
7. Turn Delcotron up on end and remove electrical connection.
8. Remove Delcotron.

Disassembly

1. Scribe a mark across end frames and stator ring for ease of reassembly.
2. Remove four thru-bolts and separate the drive end frame and rotor assembly from the stator and slip ring end frame assembly by prying apart with a screwdriver at the stator slot. Brushes and brush springs will pop out of brush holder.
3. Place a piece of plastic type tape over the slip ring end frame bearing to prevent entry of dirt or other foreign material. (If bearing is not to be removed).
4. Remove drive end frame from rotor by placing the rotor in a vise only tight enough to permit removal of shaft nut (excessive tightening may cause distortion of the rotor).
5. Remove shaft nut, washer, pulley, fan and collar, then slide drive end frame off the rotor shaft.
6. Remove bearing, retainer and seal from drive and frame.
7. Support inside of drive end frame and press ball bearing and slinger out of end frame.
8. Remove retaining nuts and pry stator from slip ring end frame.
9. Remove capacitor.
10. Remove diode trio.
11. Remove rectifier bridge and battery terminal stud.
12. Remove resistor, brush holder and regulator.
13. Support inside end of end frame and press seal and roller bearing out of end frame.

Inspection and Testing

1. Rotor and Slip rings.

Visually inspect the rotor assembly for damage and/or wear. The rotor field windings can be tested for "OPENS", "SHORTS", or "GROUNDS" by using an Ohmmeter or "Continuity Test Lamp". Touch the continuity lamp or ohmeter leads to the slip rings. See Figure 1D-4.

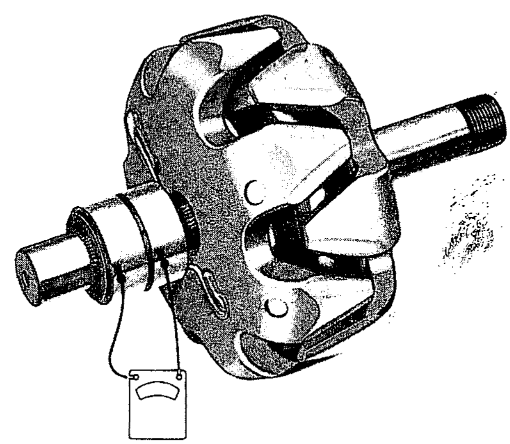


Figure 1D-4 Checking Rotor for Opens and Shorts

If the lamp does not light or the ohmeter needle does not move, there is an "Open" in the windings. If there is an ohmmeter reading and the reading is below the specied value, the winding is shorted. A reading above the specified value indicates excessive resistance in the winding.

The specified resistance value can be determined by dividing the voltage by the current given in Specifications. To check for a ground, connect one lead of (Continuity Lamp or Ohmmeter) to a slip ring and the other lead to the rotor shaft. If there is a reading on the Ohmmeter or the Continuity lamp lights, there is a ground in the circuit. If the rotor is not defective but the generator fails to supply rated output, the defect is in the diode trio, rectifier bridge or stator.

If the slip rings are dirty or worn, spin the rotor and clean up with 400 grain or finer polishing cloth or true up in a lathe removing only the necessary material to within .002 maximum indicator reading and finish with the polishing cloth. Remove any dust with compressed air.

2. Stator windings.

Visually inspect stator for damage, a loose connection, or discolored windings.

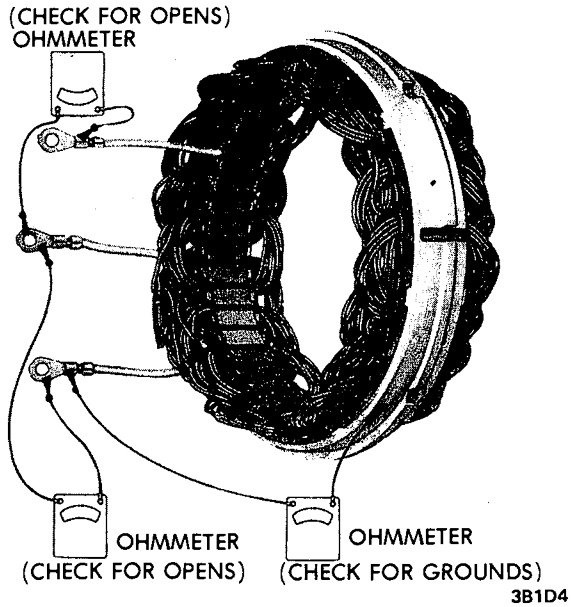


Figure 1D-5 Checking Stator Windings

Test the windings for "OPENS" or "GROUNDS" with a continuity light or ohmmeter as shown in Figure 1D-5.

If the lamp lights or the ohmmeter reading is low when connected from any stator lead to the frame, the windings are grounded. If the lamp does not light or the ohmeter reading is high when successively connected between each pair of stator leads, the windings are "OPEN". See Figure 1D-5. Shorted stator windings are difficult to locate. However, if all other electrical tests are normal and the generator fails to work, the windings are shorted.

A shorted stator can cause the indicator lamp to be on with the engine running at low speed.

3. Diode trio.

Visually inspect for cracks in case or terminal connectors. Test diode trio by connecting one ohmmeter lead to the

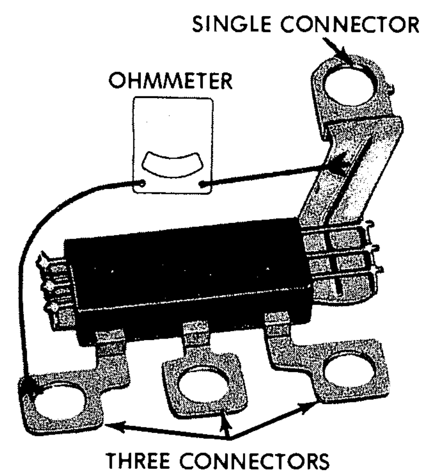


Figure 1D-6 Checking Diode Trio

Observe reading on lowest scale. Reverse leads to the same connectors. If both readings are the same, the diode trio

single connector and the other lead successively to each of the three connectors as in Figure 1D-6.

is defective. A good diode trio will allow current to pass in one direction but not in the other.

4. Rectifier bridge.

Visually inspect for cracks or burnt terminals. The rectifier bridge has grounded heat sink and insulated heat sink.

Test rectifier bridge by attaching one ohmeter lead to the grounded heat sink and the other to each of the three terminals and observe readings. Reverse the leads and take another reading. If both readings are the same, replace recetifier bridge. Repeat this test using the insulated heat sink. A good rectifier bridge will have one high and one low reading on both the grounded and the insulated sides.

Assembly

1. Support inside of slip ring end frame.

2. Lightly lubricate seal lip and press seal part way in the end frame with the lip of the seal toward the rotor.

3. Lubricate roller bearing with Delco-Remy lubricant or equivalent and install in the slip ring end frame.

4. Position bearing end plug on bearing and press end plug bearing and seal until plug is flush with the end frame.

5. Position the regulator in the end frame.

6. Load brush springs and brushes in the brush holder and install pin to hold springs and brushes in a compressed position, then install brush holder and resistor in the end frame.

7. Install rectifier bridge and battery terminal stud. Check with test light or ohmeter to make sure that current

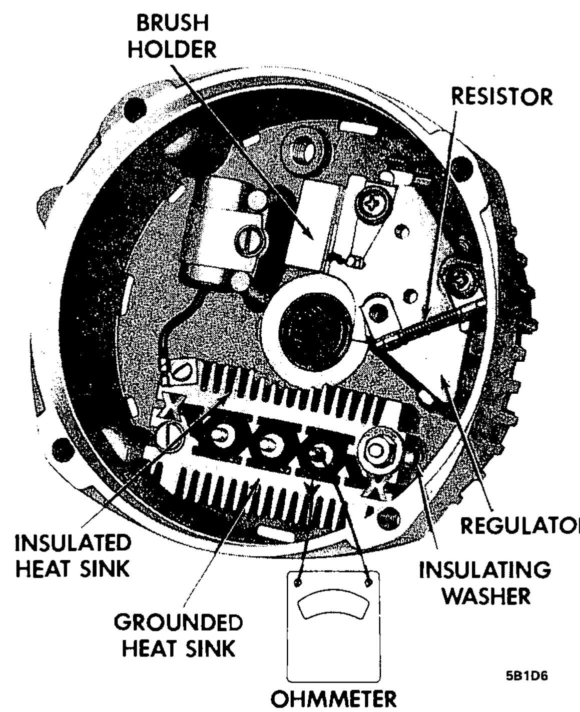


Figure 1D-7 Checking Rectifier Bridge

is flowing only one way through the diodes. See Figure 1D-7.

8. Install diode trio. Make sure that current flows only one way through the single connector using a test light or ohmmeter.

9. Install capacitor.

10. Install stator. Test the three wires with the test light for continuity. Also check any wire against the case and holder to insure there being no ground.

11. Support inside center of drive end frame.

12. Insert slinger and press ball bearing in. See Figure 1D-8.

13. Fill seal cavity 1/4 full with Delco-Remy lubricant or equivalent and install ball bearing retainer. (Do not overfill, as this may cause the bearing to overheat.)

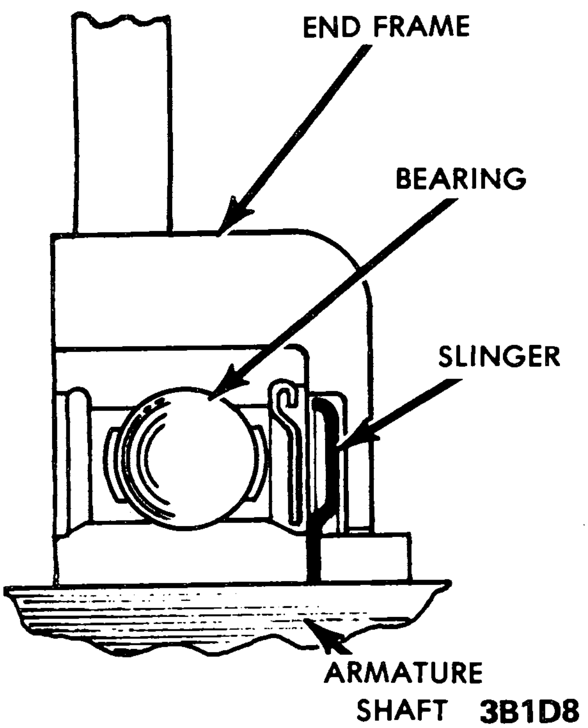


Figure 1D-8 Drive End Bearing Assembly

14. Position rotor in vise. Assemble drive end frame collar, fan, puller washer, and nut. Torque nut to 40- 60 ft.lbs.

15. Assemble end frame assemblies, observing the scribe mark and install four through bolts.

16. Remove brush restraining pin.

Generator Bench Check

To check the generator in a test stand, proceed as follows:

1. Make connections as shown in Figure 1D-9, except leave the carbon pile disconnected.

Ground polarity of Energizer and generator must be the same. Use a fully charged Energizer or battery and a 10 ohm resistor rated at six watts or more between the generator No. 1 terminal and the Energizer.

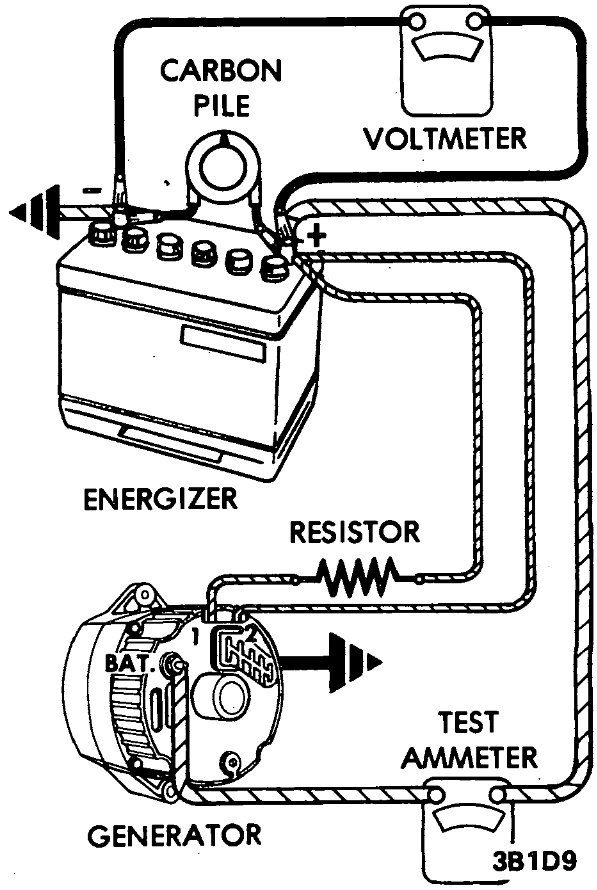


Figure 1D-9 Bench Check Connections

2. Slowly increase the generator speed and observe the voltage.

3. If the voltage is uncontrolled with speed and increases above 15.5 volts, check for a grounded brush lead clip, as covered under heading of "Overcharged Energizer," Step 3. If not grounded, test regulator with an approved regulator tester and check field winding. The battery must be fully charged when making this check.

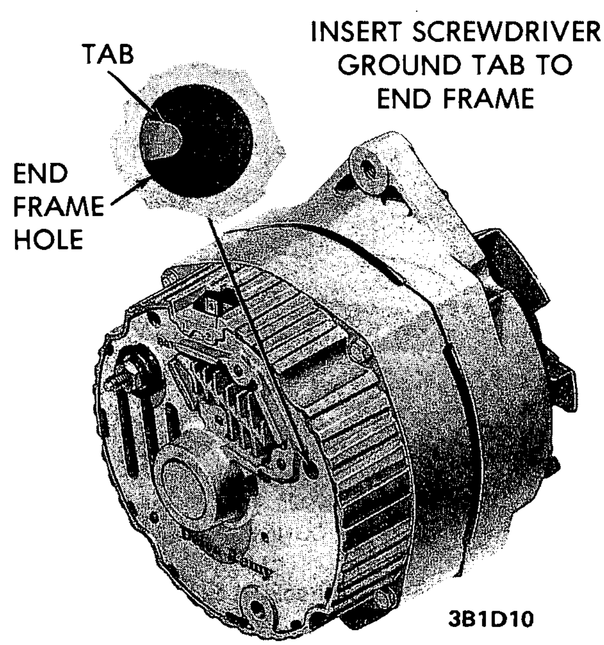


Figure 1D-10 Grounding Field Windings

4. If voltage is below 15.5 volts, connect the carbon pile as shown in Figure 1D-9.

5. Operate the generator at moderate speed as required, and adjust the carbon pile as required to obtain maximum current output.

6. If output is within 10 amperes of rated output, as stamped on generator frame, generator is good.

7. If output is not within 10 amperes of rated output, keep battery loaded with carbon pile and ground generator field, see Figure 1D-10.

8. Operate generator at moderate speed and adjust carbon pile as required to obtain maximum output.

9. If output is within 10 amperes of rated output, test regulator with an approved regulator tester and check field winding.

10. If output is not within 10 amperes of rated output, check the field winding, diode trio, rectifier bridge, and stator, as previously covered.

Installation (Without A/C)

1. Install Delcotron.
2. Replace pivot bolt.
3. Install tensioner bracket bolt.
4. Adjust a used Delcotron belt tension to 80 lbs. or a new belt to 125 ± 10 lbs.
5. Hook up electrical connections.
6. Install battery cable.

Installation (With A/C)

1. Install Delcotron.
2. Hook up electrical connections.
3. Install Delcotron pivot bolt.
4. Install Delcotron drive belt.
5. Install tension bracket and adjust used belt tension to 80 lbs. or a new belt to 125±10 lbs.
6. Replace compressor mounting brace.
7. Adjust used A/C belt tension to 100 lbs. or a new A/C belt to 150±10 lbs.
8. Install fan shroud bolts.
9. Install air cleaner.
10. Connect negative battery cable.

SPECIFICATIONS

GENERAL SPECIFICATIONS

Make and Type .... Delco-Remy, Delcotron
Drive and Rotation .... Fan Belt, Clockwise

VOLTAGE REGULATOR

Make and Type .... Delco-Remy, Integral W/Delcotron
Regulator Number 1116384
Voltage Regulator Setting at 2000 Eng. RPM
(After 15 Minutes Warm-Up at 1500 Eng. RPM) .... 14± .5 Volts

GENERATOR APPLICATIONS

AMPERE RATING	37 AMP STD.	37 AMP STD.	37 AMP STD.
Application	A-H-X-231 cu. in. and X-260 cu. in.	X-250 cu. in.	A-X-350 cu. in.
Generator Number	*1102483 **1102394	*1100497 **1102491	*1102399 **1102388
Field Current Draw-Rotor Removed (amps. at 80°F. and 12 volts)	4-4.5	4-4.5	4-4.5
Bench Test at 14 Volts and 80°F. (amps. at Gen. RPM)-	37 @ 5500	37 @ 5500	37 @ 5500
Belt Tension			
New	125 ± 10 lbs.	125 ± 10 lbs.	125 ± 10 lbs.
Used	80 lbs.	80 lbs.	80 lbs.

AMPERE RATING	42 AMP STD.	42 AMP STD.	55 AMP
Application	B-C-E-350-455 cu. in.	B-C-400 cu. in.	A-H-X-231 cu. in. A/C
Generator Number	*1102400 **1102389	– **1102861	*1102494 **1102495
Field Current Draw-Rotor Removed (amps. at 80°F. and 12 Volts)	4-4.5	4-4.5	4-4.5

Bench Test at 14 Volts and 80°F. (amps. at Gen. RPM)	42 @ 5500	42 @ 5500	55 @ 5500
Belt Tension			
New	125 ± 10 lbs.	125 ± 10 lbs.	125 ± 10 lbs.
Used	80 lbs.	80 lbs.	80 lbs.

AMPERE RATING	**55 AMP.**	**55 AMP.**	**55 AMP.**
Application	X-250 cu. in. A/C	X-260 cu. in. A/C	A-X-350 cu. in A/C
Generator Number	*1100560 **1102478	*1102488 **1102840	*1102457 **1102390
Field Current Draw-Rotor Removed (amps. at 80°F. and 12 Volts)	4-4.5	4-4.5	4-4.5
Bench Test at 14 Volts and 80°F. (amps. at Gen. RPM)	55 @ 5500	55 @ 5500	55 @ 5500
Belt Tension			
New	125 ± 10 lbs.	125 ± 10 lbs.	125 ± 10 lbs.
Used	80 lbs.	80 lbs.	80 lbs.

AMPERE RATING	**61 AMP.**	**61 AMP.**	**63 AMP.**
Application	B-C-E-350-455 cu. in. A/C	B-C-400 cu. in. A/C	B-C-E-350-455 cu. in. A/C, HBL
Generator Number	*1102460 **1102391	– **1102862	*1102461 **1102392
Field Current Draw-Rotor Removed (amps. at 80° and 12 Volts)	4-4.5	4-4.5	4-4.5
Bench Test at 14 Volts and 80°F. (amps. at Gen. RPM)	61 @ 5500	61 @ 5500	63 @ 5500
Belt Tension			
New	125 ± 10 lbs.	125 ± 10 lbs.	125 ± 10 lbs.
Used	80 lbs.	80 lbs.	80 lbs.

AMPERE RATING	**63 AMP.**	**80 AMP.**	**80 AMP.**
Application	B-C-400 cu. in. A/C, HD, Cooling, HBL	A-B-C-E-350-455 cu. in. Police and Trailer Option	B-C-400 cu. in. Police and Trailer Option
Generator Number	– **1102467	*1101031 **1101024	– **1101016
Field Current Draw-Rotor Removed (amps. at 80°F. and 12 Volts)	4-4.5	4.4-4.9	4.4-4.9
Bench Test at 14 Volts and 80°F. (amps. at Gen. RPM)	63 @ 5500	80 @ 5500	80 @ 5500
Belt Tension			
New	125 ± 10 lbs.	125 ± 10 lbs.	125 ± 10 lbs.
Used	80 lbs.	80 lbs.	80 lbs.

*Early production generators.

**After job production generators with rotor shaft configuration changes.