SERVICE HARLEY-DAVIDSON BULLETIN

NO. 522 SEPTEMBER 30, 1965

CHECKING THE SERVI-CAR DELCOTRON ELECTRICAL SYSTEM

Using The Sun Vat-26 Tester

Late 1965 and 1966 Servi-Cars have the alternator type (Delcotron) 12-volt charging system. This means that the specifications and testing information are different from the 12-volt D.C. generator system. This bulletin gives testing instructions for using the Sun VAT-26 voltage-ampere tester for trouble shooting the alternator, regulator, battery and associated wiring.

To trouble shoot the electrical system four basic tests are required:

1. Battery capacity test.

2. Alternator charging system test.

3. Regulator voltage control test.

4. Circuit resistance (voltage drop) test.

Preliminary Checks:

Check alternator belt tension and condition — a slipping belt could result in a discharged battery. Belt should be tightened so that it requires 8 to 10 pounds pressure to deflect belt 1/4 inch at midspan.

Check condition of wires and connections.

1. BATTERY CAPACITY TEST (See Figure 1)

A. TESTER CONTROLS

1. Polarity switch to Negative.

2. Load control knob to Direct.

3. Voltage switch to 16 V.

4. Ammeter selector to 300A.

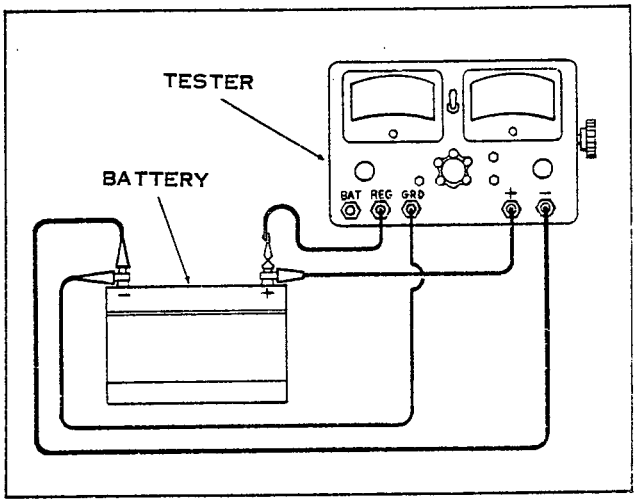

Figure 1.

B. TESTER CONNECTIONS

1. Connect a large alligator clip to the Tester lead marked "REG" — this clip is connected to the battery Positive post after removing battery cable.

2. Connect ground "GRD" lead of tester to battery Negative post.

3. Connect voltmeter Positive lead to battery Positive post.

4. Connect voltmeter Negative lead to battery Negative post.

SPECIFICATION TABLE

ALTERNATOR (DELCOTRON) H.D. PART NO. 29958-65 D.R. PART NO. 1100687	VOLTAGE REGULATOR H.D. PART NO. 74510-65 D.R. PART NO. 1119516	
Field Current Draw (Test 2C) 1.9-2.3 AMP	VOLTAGE SETTING (Test 3)	
Output (Test 2D) 18 AMP @ 900 RPM	Upper Contacts	13.5 to 14.9 Volts (14.4 Desired)
Output (Test 2D) 28 AMP @ 2200 RPM	Lower Contacts	0.1 to 0.4 Volt Lower than Above

C. TEST

1. Turn load control knob clockwise until a reading is obtained on the ammeter of 3 times the battery A.H. rating. (Example: 51 A.H. battery (51 x 3) = 153 amperes.)

2. While 153 ampere load is being applied to battery for 15 seconds observe voltmeter reading — a battery in good condition should maintain voltage above 9.6 volts for 15 seconds. If battery does not pass this test it may not be defective but only discharged. Battery should be recharged and retested for serviceability.

A discharged battery would indicate alternator or regulator difficulties and the following test should be made.

2. ALTERNATOR TEST (See Figure 2)

A. TESTER CONTROLS

1. Polarity switch to Negative.

2. Tester load control knob to Direct.

3. Voltage switch to 16 V.

4. Ammeter selector to 100A.

5. Generator field control to "OPEN."

B. TESTER CONNECTIONS (See Figure 2)

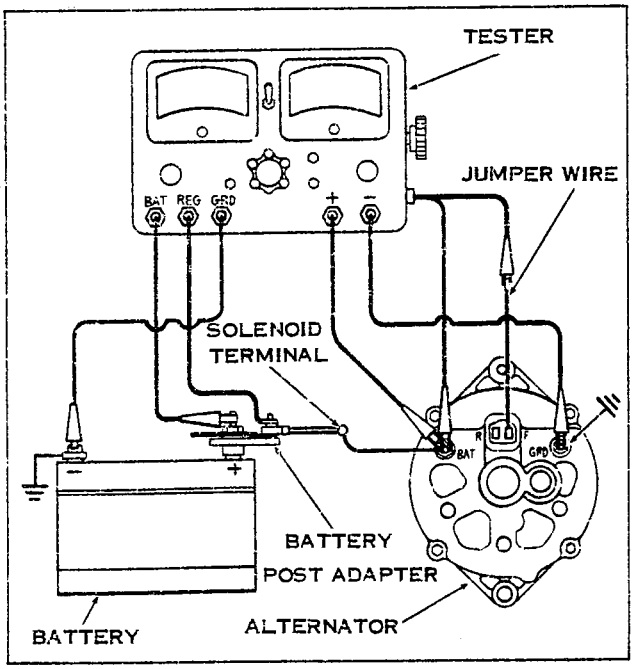

Figure 2.

Ammeter Leads

1. Disconnect battery Positive cable from battery Positive post. With the by-pass switch open, install the battery post adapter, Sun Model BPA, on the Positive battery post and tighten clamping screw. Use care when making connections at battery Positive terminal post to keep from shorting between post and surrounding grounded frame.

2. Connect the Positive battery cable to the battery post adapter.

3. Connect the battery "BAT" lead of tester to stud on the adapter.

4. Connect regulator "REG" lead of tester to binding post on the adapter.

5. Connect ground "GRD" lead of tester to the battery Negative post.

Voltmeter Leads

6. Connect voltmeter Positive lead to the "BAT" terminal of alternator.

7. Connect voltmeter Negative lead to grounded terminal of alternator.

Generator Field Control Leads

8. Disconnect cable connection plug from alternator.

9. Connect a short jumper wire with a slip-on type connector to the "F" terminal of alternator. NOTE: Sun Part No. 6002-048 jumper lead can be used.

10. Connect one generator field control lead of the tester to the end of the field jumper wire and the other lead to the "BAT" terminal of the alternator.

C. FIELD CURRENT DRAW TEST

This test is made with engine off — be sure battery post adapter switch is open.

1. Turn generator field control to the "DIRECT" position.

2. Observe ammeter. Ammeter indicates field current draw. Refer to specifications in chart on first page.

3. Return field control to the "OPEN" position.

No field current draw or a low reading would indicate poor brush contact or open field winding. Refer to Delco-Remy Service Bulletin No. 1G-262 for Delcotron Service procedures.

D. ALTERNATOR OUTPUT TEST

NOTE

Turn lights and other accessories off.

1. Close battery post by-pass switch. Start engine, then open by-pass switch and run engine at approximately 900 RPM (idle speed).

2. Turn field control to "DIRECT" position. Ammeter now indicates output of alternator at idle speed. Refer to specifications for specified output at idle speed.

3. Turn field control to "OPEN" – run engine at approximately 2200 RPM – (30 MPH) and turn tester load control clockwise until voltmeter reading is reduced to 8 volts.

4. Turn field control to "DIRECT" and readjust load control to obtain a 14-volt reading. Ammeter now indicates output of alternator. Refer to specifications for specified output at 2200 RPM.

5. Turn field control to "OPEN" and turn load control knob to "DIRECT" as soon as possible after taking output reading (Step 4).

3. VOLTAGE REGULATOR TESTS (See Figure 3)

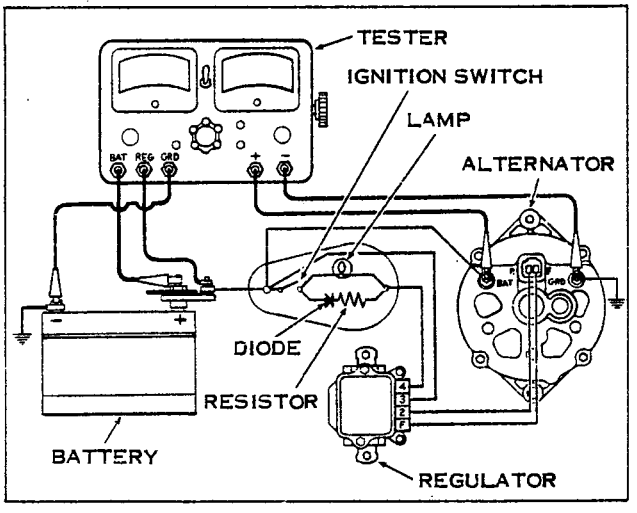

Figure 3.

A. TESTER CONTROLS (Same as previous Test 2)

B. TESTER CONNECTIONS (Same as previous Test 2 except as follows) (See Figure 3)

1. Disconnect field control leads and field jumper wire from "F" terminal of alternator and reconnect regulator cable connector plug to alternator.

2. Close battery post adapter switch, start engine then open switch.

3. Before making the following test, system should be operated 15 minutes with lights on to permit system temperature to normalize.

C. UPPER CONTACT (SHORTING CONTACT) VOLTAGE SETTING

1. Adjust engine speed to 2200 RPM.

2. Turn load control knob to 1/4" ohm position. Voltage indicated on meter is upper contact setting. Refer to specifications.

D. LOWER CONTACT (SERIES CONTACT) VOLTAGE SETTING

Turn load control knob clockwise slowly until a kickback is noted on voltmeter (at approximately 5 ampere load indicated on ammeter). Voltage indicated is voltage setting of lower contacts. Refer to specifications.

NOTE

Difference in voltages of upper and lower contact operation should be within specifications.

If regulator settings are not within specifications, replace regulator or service and adjust setting according to Delco-Remy Bulletin No. 1R-262.

4. CIRCUIT TESTS

A. TESTER CONTROLS (Same as previous Test 3 except as follows)

B. TESTER CONNECTIONS (Same as previous Test 3 except as follows)

C. INSULATED (POSITIVE) BATTERY CHARGING CIRCUIT RESISTANCE TEST (See Figure 4)

1. Set voltage switch to 4-volt scale.

2. Connect Positive voltmeter lead to the alternator output "BAT" terminal.

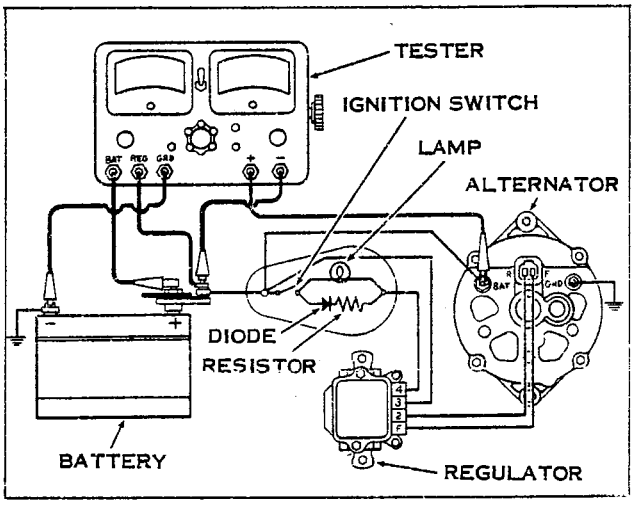

Figure 4.

3. Connect Negative lead to the battery end of the Positive battery cable.

4. Adjust engine speed to 2200 RPM and turn load control clockwise until ammeter indicates 20 amperes.

5. Voltmeter reading indicates voltage drop in positive circuit — should be 0.3 volt or less.

D. GROUND (NEGATIVE) CIRCUIT RESISTANCE TEST (See Figure 5)

1. Following same procedure as in previous test (C) except move Negative voltmeter lead to alternator ground "GRD" terminal and move Positive voltmeter lead to the Negative battery post.

2. Voltmeter reading indicates voltage drop in ground circuit — should be 0.1 volt or less.

If either of circuit tests show voltage drops greater than allowable, wiring and terminal connection must be checked for high resistance connections.

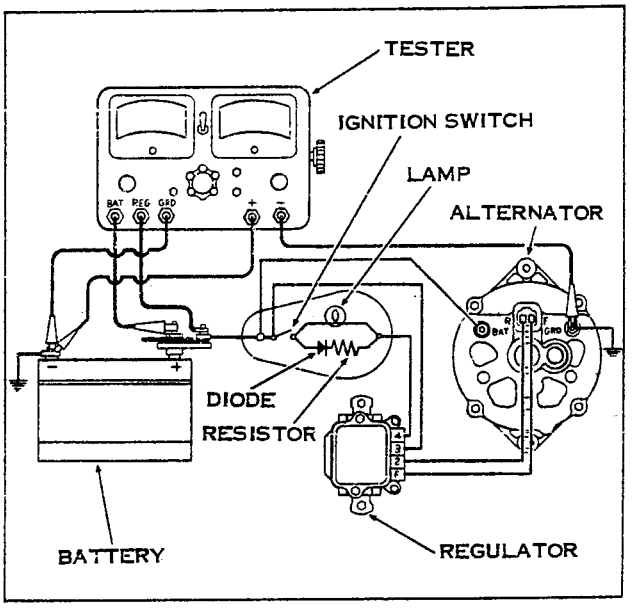

Figure 5.

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