

SEMI-SOLID STATE VOLTAGE REGULATOR

SEMI-SOLID STATE VOLTAGE REGULATOR - 15 VOLT (C611001-0201)

DESCRIPTION

Beginning with early 1974 thru 1977 single engine aircraft, a 15 volt semi-solid state voltage regulator was introduced as a replacement for the electro-mechanical voltage regulator. The semi-solid state voltage regulator features the following design:

1. The voltage limiter relay is replaced with a printed circuit board.
2. Silicon transistors are used for durability under high temperature conditions.
3. An internal voltage adjustment is provided on the printed circuit board. Turning the control clockwise increases the voltage setting and counterclockwise rotation decreases voltage. (See Figure 15 for illustration).
4. The voltage regulator cover is retained by screws, for access to internal voltage adjustment.
5. The regulator has a built-in protection circuit to guard against transient voltages.
6. The regulator incorporates the same package appearance as the mechanical regulator and provides a .19 pound weight saving.
7. The regulator incorporates a new electrical plug locking device and improved corrosion resistance.
8. Accidental shorts and incorrect wiring connections are prevented by blade type terminals.

SERVICE PROCEDURES

The semi-solid state voltage regulator is designed to be a long lasting, trouble free regulator. The regulator should be considered a non-repairable item containing only an internal voltage limiter adjustment.

NOTE

If readjustment of the voltage limiter does not provide the desired voltage setting while maintaining a correct specific gravity battery reading, the voltage regulator should be replaced with a new regulator.

VOLTAGE LIMITER TESTS - SILICON TRANSISTOR REGULATOR (15 VOLT)

Voltage limiter tests are essential when battery water usage or state of charge are causes for complaint.

Testing the voltage limiter is best accomplished on a test machine equipped with a variable speed electric motor to drive the alternator. This test machine should have a load ammeter, a field current ammeter, a voltmeter, an adjustable load (carbon pile) and a 12 volt battery. This type of test machine will be found in some aircraft service stations and in most automotive electrical repair shops.

REGULATOR BENCH TESTS

The procedures outlined are general and cover the important factors related to the testing of the 15 volt Cessna Alternator Regulator. Refer to the instructions supplied by the manufacturer of the test machine for operating details.

1. A 60 ampere Cessna Alternator must be used to supply the electrical current for the regulator test. Operate the alternator at 4500 to 4700 rpm.

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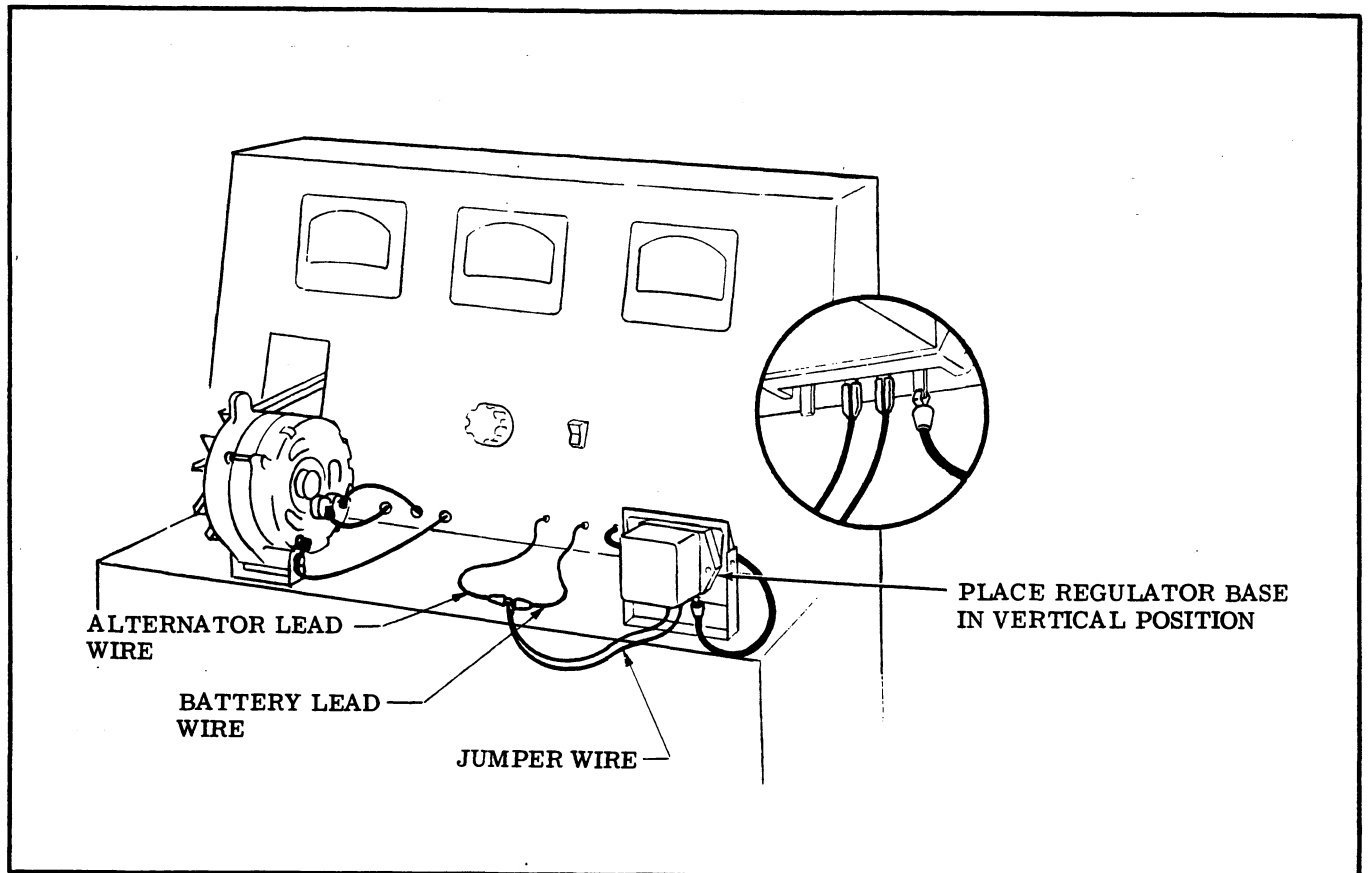


FIGURE 12

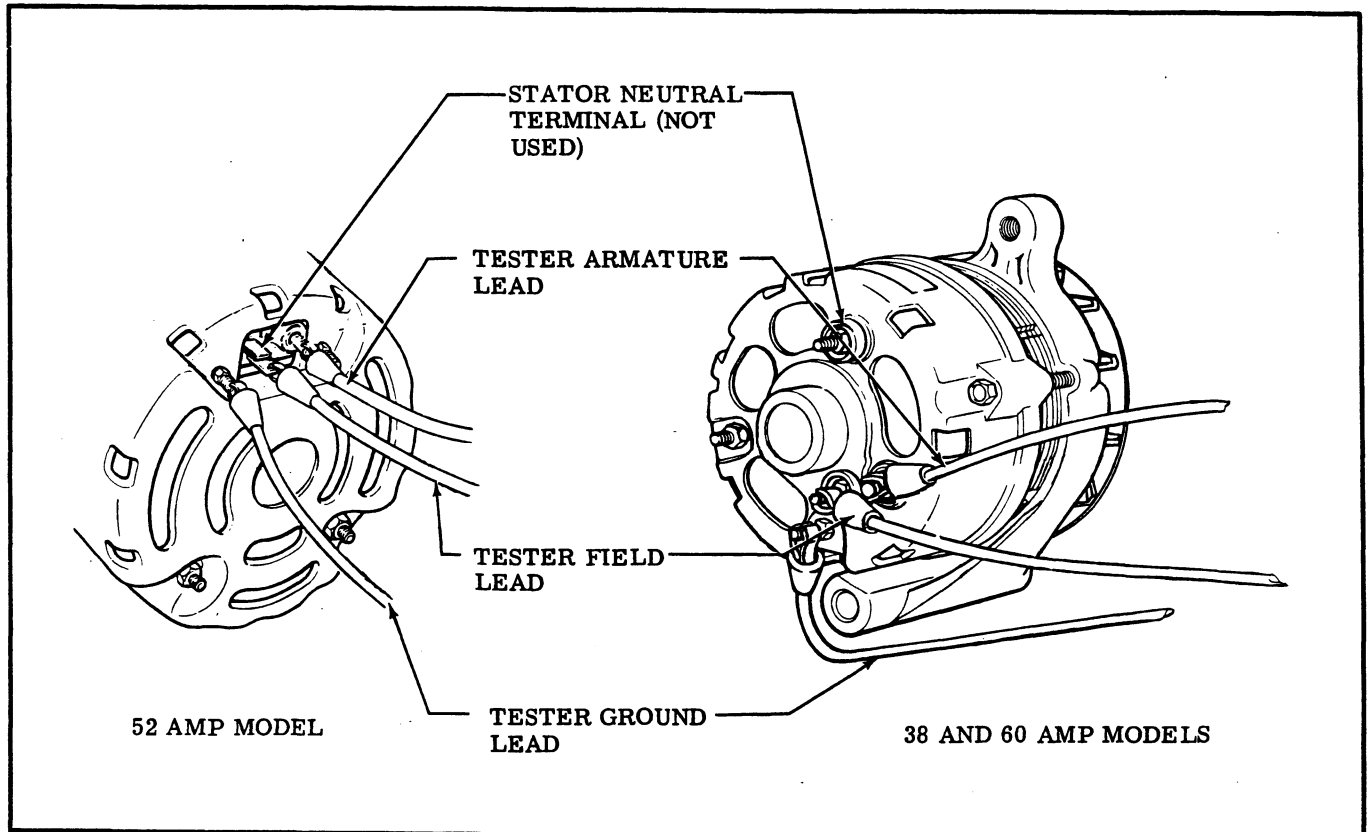


FIGURE 13

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2. The tester battery must be in good condition and fully charged; 1.260 specific gravity, minimum.
3. Mount the regulator in the same position as it is in the aircraft. All connections must be tight and secure.
4. The ALTERNATOR and BATTERY lead wires of the test machine must be connected together and a jumper used to connect the test machine to the regulator.

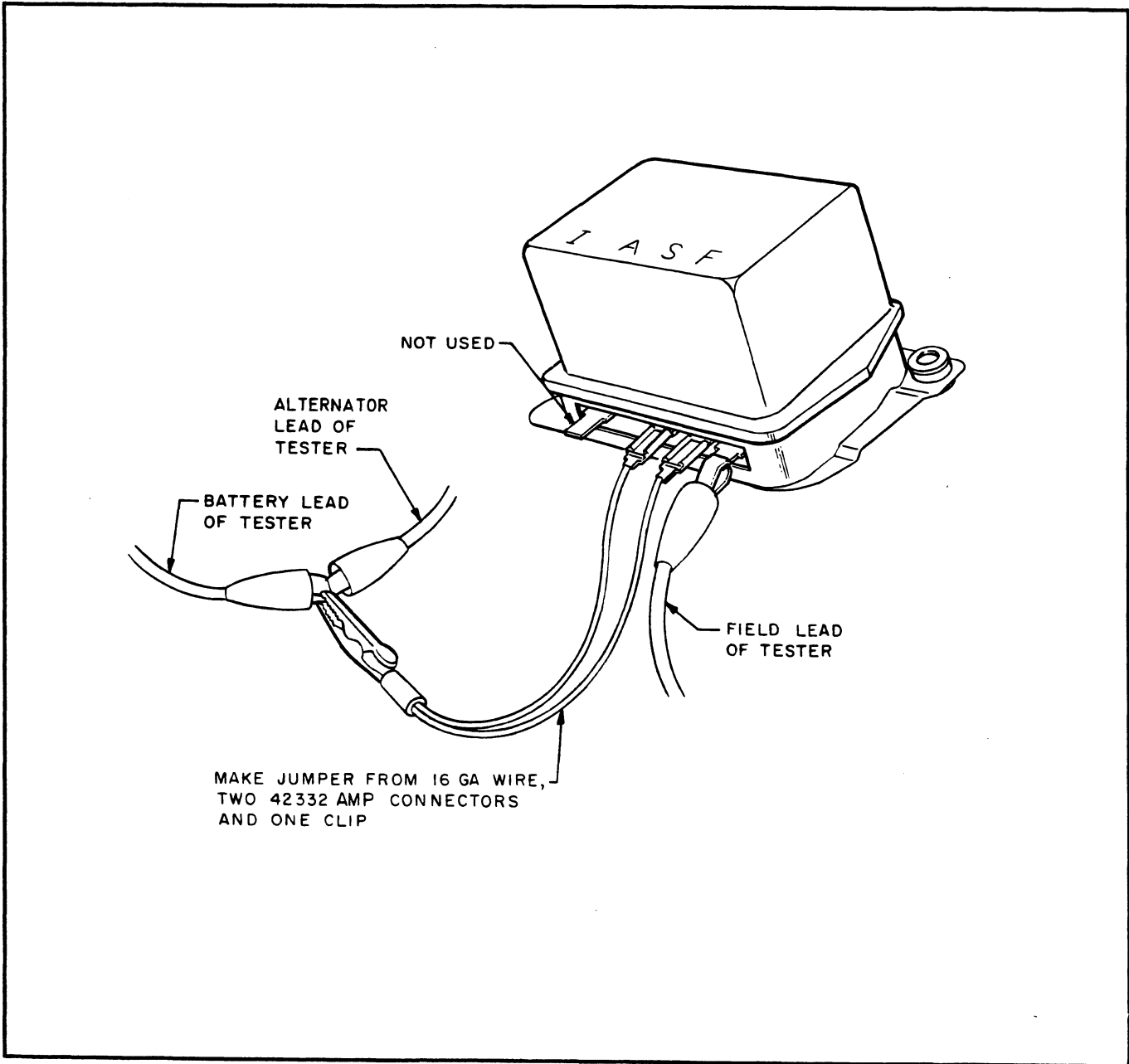


FIGURE 14

5. The voltage regulator temperature must be normalized when the calibration of the voltage limiter is observed. Operate for 20 minutes at 0.3 - 0.8 amperes field current. An air blast must be provided to maintain the regulator case temperature within 5° F of room temperature.
6. Maintain the field current at 0.3 - 0.8 ampere, and read the voltage limiter calibration. Voltage setting should be 14.0 to 14.4 volts at 75° F. See voltage versus temperature chart in semi-solid state regulator specification section for voltage setting at other temperatures.

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TEST CONCLUSIONS

The voltage should be within specifications when the regulator temperature is normalized. If voltage reading is not within specifications. Adjust the regulator to the correct value.

NOTE

Erratic operation is indicated when the voltmeter pointer is jumpy and unsteady. Check for loose connection, loose drive belt, or intermittent loads.

VOLTAGE LIMITER ADJUSTMENT

To adjust the voltage limiter, refer to Figure 15 and proceed as follows:

1. To gain access to the voltage limiter adjustment screw, remove the regulator cover by removing the two screws attaching the regulator cover.
2. To adjust the voltage limiter, turn the voltage adjustment screw clockwise to increase the voltage setting, or counterclockwise to decrease the voltage setting.

CAUTION

The voltage regulator has been preset at the factory to provide 14.0 to 14.4 volts at 70°F. Never shift the voltage setting by more than .1 - .3 volts from previous setting. Always allow an adequate time interval between each new voltage setting.

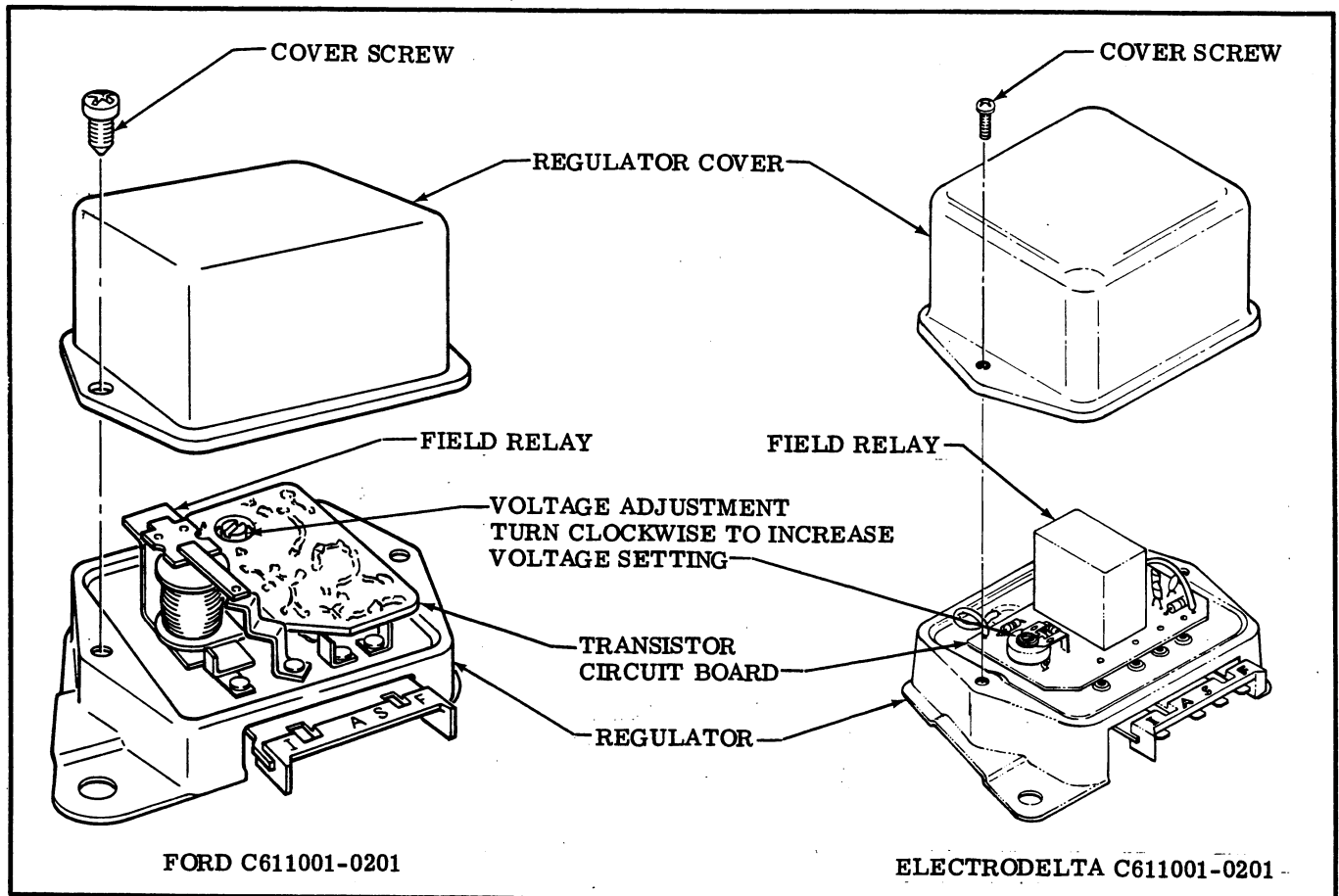


FIGURE 15

SEMI-SOLID STATE VOLTAGE REGULATOR

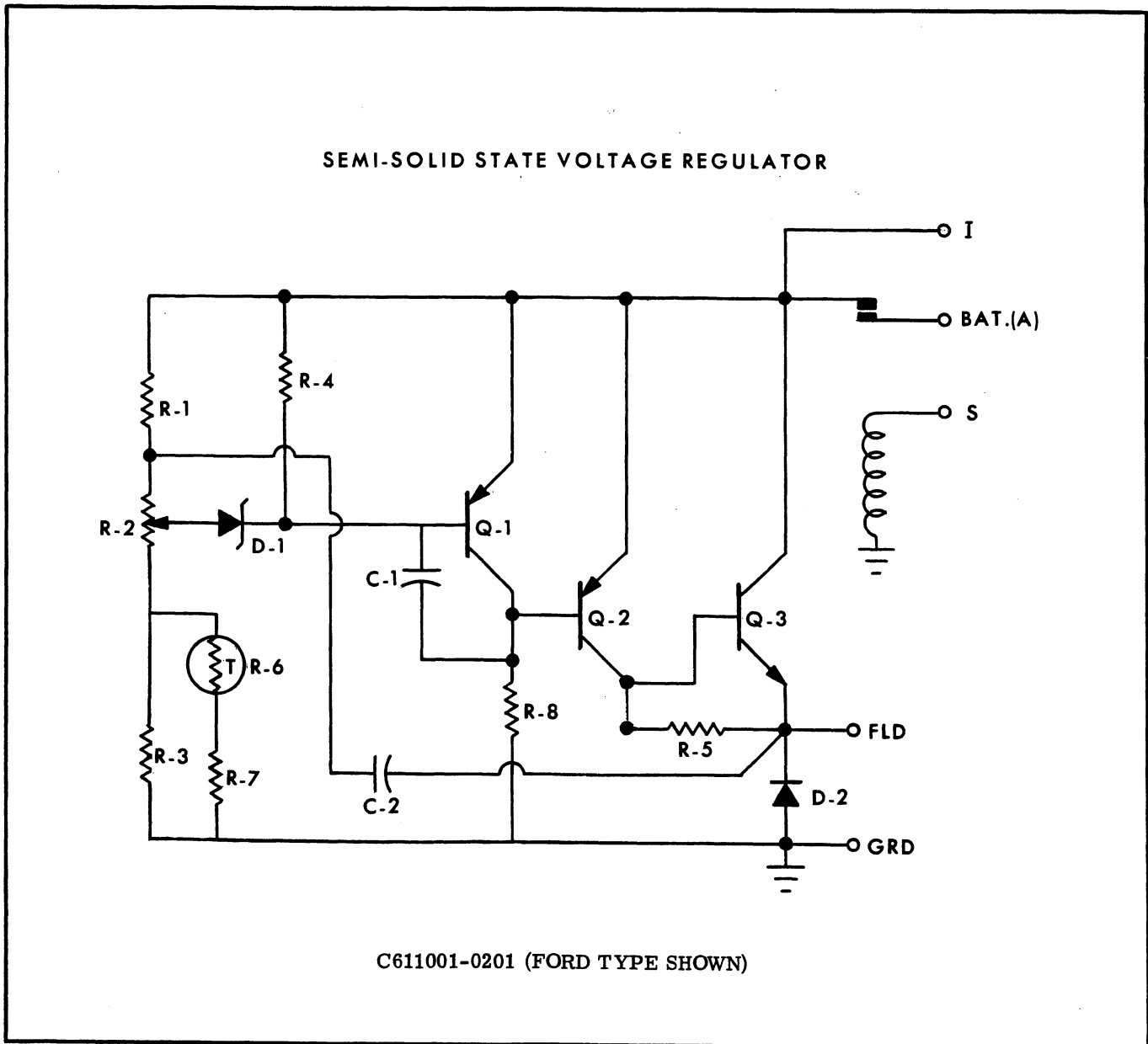


FIGURE 16

FIELD RELAY BENCH TEST

A 50 ohm potentiometer, a test light, and a voltmeter are used to check the voltage required to close the field relay. This test can be made with the voltage regulator on the aircraft or on the bench. Use a 12 volt battery.

TEST CONNECTIONS

1. Connect the potentiometer from the positive battery post to the "S" terminal of the regulator.
2. Connect the battery positive terminal to the regulator "A" terminal and the battery negative terminal to the regulator base.
3. Connect the voltmeter positive lead to the "S" terminal of the regulator and the negative lead to the regulator base.
4. Connect the test lamps from the regulator "I" terminal to the regulator base.

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TEST PROCEDURE

1. Slowly rotate the potentiometer toward the "resistance out" position while observing test lamps and voltmeter.
2. When test lamp comes on observe voltmeter.
3. Slowly rotate the potentiometer toward the "resistance in" position while observing the test lamps and voltmeter.
4. When test lamp goes off observe voltmeter.

TEST CONCLUSIONS

Contact should close (test light comes ON) at not less than 2.5 volts on both types or more than 6 volts on the Ford type or more than 9.6 volts on the Electrodelta type. If the contacts close with less than 2.5 volts on both types, or greater than 6 volts on the Ford type or greater than 9.6 volts on the Electrodelta type, replace the regulator.

Contacts should open (test light goes off) at not less than 0.5 volts.

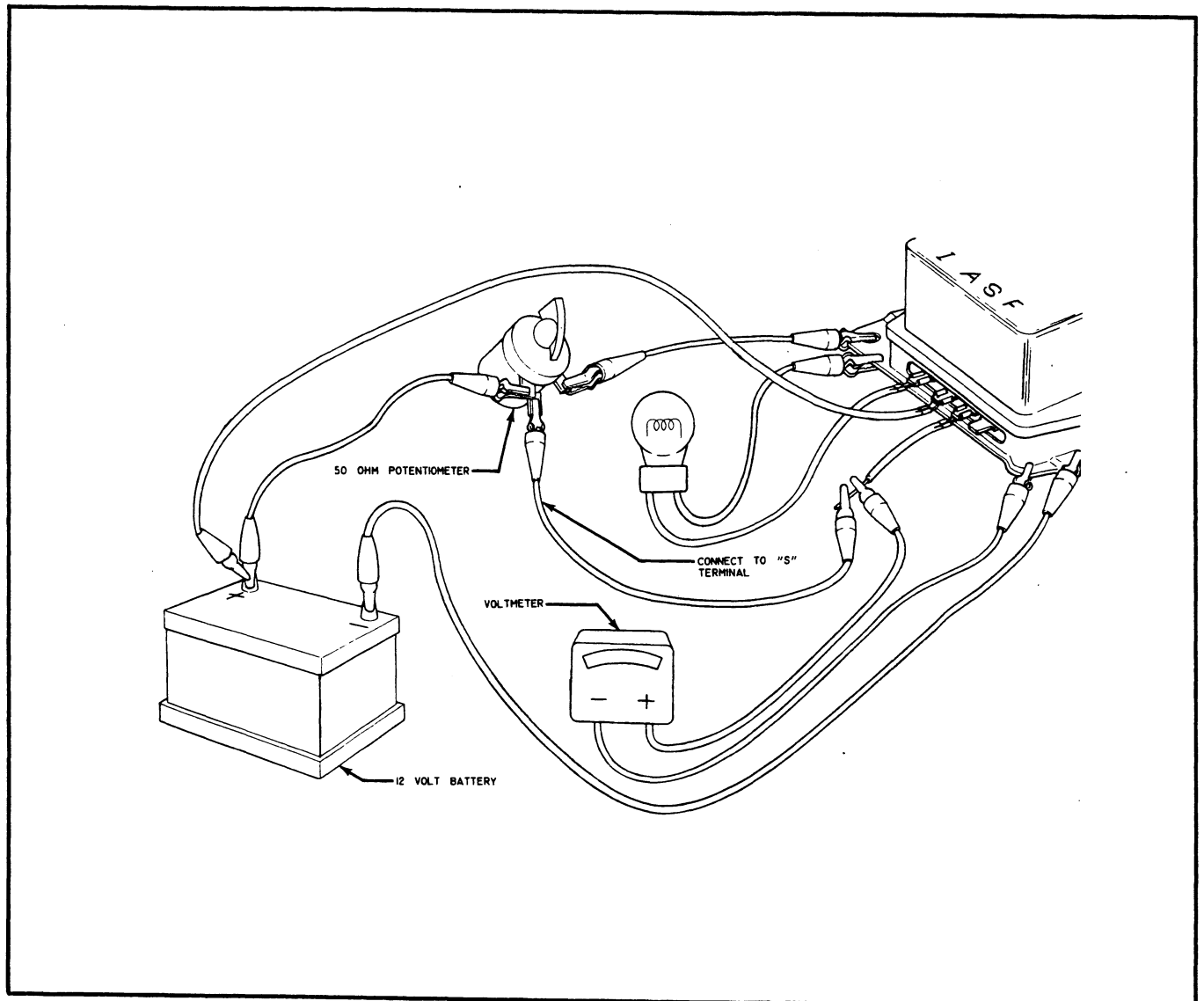


FIGURE 17