

# B & C Specialty Products Inc

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## INSTALLATION OF SB1B-14 VOLTAGE REGULATOR

- \* When mounting the SB1B-14, try to choose a location that will protect it from heat, vibration, and water. We recommend on the pilot side of the firewall, or inside the cabin somewhere close to the panel (linear regulators create no noise problem).
- \* Install the Standby Alternator ON warning light in your instrument panel. The light should be positioned within the pilots' peripheral vision (generally, a 45 degree angle in front of the pilot). It is best to install the lamp away from direct sunlight. If the lamp is in direct sunlight, be sure to test it on a sunny day to be sure that the lamp is visible while operating. The bulb is a MIDGET FLANGED #330 bulb. There is a small piece of heat shrink tubing in the plastic bag. Cut this into two (2) pieces and install onto the wires that go to the lamp. Remove the lens/lamp assembly by unscrewing the lens. Solder the wires onto the lampholder assembly and shrink the heat shrink tubing over the connection. Finally re-install the lens/lamp assembly.
- \* Refer to the SB1B-14 Outline Drawing / Wiring Diagram for wiring the regulator. Note that the SB1B-28 and SB1B-14 wiring diagrams are not the same. The wire to the ground stud is to provide a redundant ground to the regulator. A jumper between terminal #7 and the GROUND STUD will not provide this. If the case of the regulator is already grounded by the mounting screws (e.g. on a metal airplane), the ground stud does not need to be grounded with an additional wire. Make sure the failure of any single fastener or wire cannot leave the regulator without a ground.
- \* The SB1B-14 senses the bus voltage through Terminal #3 instead of Terminal #6. This gives the SB1B-14 a more accurate reading of bus voltage. Do not jumper Terminal 3 to Terminal 6 as it defeats this design feature. If terminal #3 is not connected to anything, the SB1B-148 will not work.
- \* **Be sure to use a 5 Amp circuit breaker on Terminal 6 of the regulator.** Connecting Terminal 6 directly to the bus or using so called □solid-state breakers□ (PTC thermistors) will damage the regulator if there is an over voltage trip.
- \* The regulator is pre-set at 13.0V. This is a specially selected voltage and does not normally need to be changed. If you need to adjust the output voltage of your alternator, just remove the 3/4" round plastic plug from the side of the regulator. Using a small screwdriver, turn the small screw clockwise to increase voltage, counter-clockwise to decrease the voltage (approximately 1 turn per .16 Volts). Use a digital voltmeter connected to the battery for this measurement.
- \* The SB1B-14 will operate without the Hall-effect current sensor attached. The Standby Alternator ON annunciator will illuminate normally but will not flash if the standby alternator output is over 20 Amps. If the current sensor is not used, other means must be used to assure that the standby alternator output is below 20 Amps.

## **OPERATION OF THE SB1B-14 VOLTAGE REGULATOR**

The SB1B-14 regulator is designed to control a standby alternator in a one-bus, one-battery system. The standby alternator's output is connected in parallel with the primary alternator's output. The SB1B-14 is on the same bus and senses the same voltage as the primary regulator. Both alternator's field switches are ON in normal operation. Since the set point of the primary regulator is above the set point of the SB1B-14, the bus voltage is normally high enough that the SB1B-14 has the field of the standby alternator turned OFF. Since the Standby Alternator ON annunciator reflects standby alternator field voltage, The Standby Alternator ON annunciator will be OFF.

If the bus voltage falls below 13.0 Volts for any reason, the SB1B-14 will energize the standby alternator field and turn ON the Standby Alternator ON annunciator. This can happen under a number of conditions, among which are:

1. Primary alternator failure
2. Primary regulator failure
3. Primary alternator broken or loose drive belt, broken electrical connections, or slipping drive coupling
4. Primary alternator too small
5. High electrical loads and low engine speed.

If the Hall-effect current sensor is installed and the electrical load is more than 20 Amps on the standby alternator, the Standby Alternator ON annunciator will flash, indicating the load should be reduced. This feature can be used to pre-flight test standby alternator operation. At run-up, turn OFF the primary alternator field switch. The Standby Alternator On annunciator will illuminate. Increase bus electrical loads and engine RPM until the Standby Alternator ON annunciator flashes. At this point, full standby alternator output has been verified. Decrease the electrical loads, reduce engine RPM, and turn the primary alternator field switch back ON.

The SB1B-14 has "smart" over-voltage protection. As long as the bus voltage is high enough that the Standby Alternator ON annunciator is OFF, the SB1B-14 over-voltage protection circuit is disabled. Should the primary system voltage go high enough to trip the primary alternator's over-voltage protection circuit, the standby alternator will not trip also. Once the primary system has been shut down, the SB1B-14 will energize the standby alternator normally. If the standby alternator field and annunciator are ON, the standby alternator over-voltage protection is enabled. Should the bus voltage go too high under these conditions, the standby over-voltage protection will shut down the standby alternator.

The SB1B-14 uses "crow bar" over voltage protection. Should the standby alternator output voltage exceed a predetermined limit, Terminal 6 of the regulator will be shorted to ground by a semiconductor, causing the standby alternator's field circuit breaker to trip. As soon as the current in the circuit drops to zero, the semiconductor is re-set and ready to operate again. A few minutes should be allowed before the circuit breaker is re-set to allow the circuit breaker time to cool. Should it trip a second time, assume that maintenance is required.