B&C Specialty Products
123 E 4th Street
Newton, KS 67114
(316) 283-8000
www.BandC.com

BC201-1 Troubleshooting Guide

This troubleshooting guide is not intended to be exhaustive of all possible charging system failures. Following this procedure will, however, locate the most common system problems encountered by B&C's technical staff. When calling for additional factory support, the information gained from these checks should be readily available to aid B&C's technician to narrow the field of possibilities as quickly as possible. Please use the provided blanks to record the various measurements.

Refer to the wiring diagram furnished with the regulator and use a high impedance (preferably digital) volt/ohmmeter (DVM) to make the following checks. Please note that the engine should <u>not</u> be running and the mags should be OFF, and there should be no auxiliary power applied to the aircraft electrical system.

1. Turn all switches OFF. Use the lowest resistance scale on the DVM. Check resistance between the battery negative (-) terminal and both pin 7 of the regulator and the engine case. Measurements over 0.5 Ohm to either would be cause for investigation; should this be detected, check the engine ground strap, battery ground strap, and regulator ground wire(s) for loose or contaminated connections, broken conductors or bad crimp joints. If these measurements are less than 0.5 Ohm, any of these three points may be used as ground reference (-) for the measurements that follow.

   Resistance from battery to pin 7: ____Ohms; from battery to engine case: ____Ohms

2. Turn ON the battery master and alternator field switches. Measure the voltage on the battery bus and on pin 3 of the regulator. The voltages should be equal within 0.2 volts. A difference of greater than 0.2 volts may be caused by using a breaker as the source for pin 3 that supplies another device of considerable load. Change to a breaker dedicated to pin 3 and the low voltage lamp. It is recommended that pin 3 NOT be jumpered to pin 6. If pin 3 has no voltage, the regulator will not operate.

   Bus voltage: ____volts   Pin 3 voltage: ____volts

3. Measure the voltage on pin 6 of the regulator. It should be within 0.5 volts of the bus voltage. A difference of greater than 0.5 volts may be caused by poor contacts in the field breaker or field switch, or poor crimp joints/loose screw terminals in the wiring between the bus and pin 6. Absence of voltage on pin 6 will prevent the regulator from operating.

   Pin 6 voltage: ____volts

4. Check the voltage on pin 4 of the regulator. If the bus voltage is 13.0V or less, the pin 4

voltage should be approximately 1.2 volts less than the voltage on pin 6. A difference of significantly less than 1.2V between pins 4 and 6 may indicate an open field circuit from pin 4 through the alternator windings to ground. Voltage differences significantly greater than the above could indicate a bad regulator unless the bus voltage is greater than 13.0V. Systems with batteries that have a high resting voltage (such as $LiFePO_4$ batteries) may have a lower voltage on pin 4. An ideal pin 4 voltage would be approximately 10.9 to 11.4 volts on a 12.6 volt bus and 23.5 to 24.0 volts on a 25.2 volt bus.

Pin 4 voltage: ____volts

5. Move to the engine compartment. Without disconnecting the field connector, measure the field voltage on the alternator. Use a thin probe or small gage wire wrapped around the probe to reach through the connector body and measure the voltage on the male blade coming out of the alternator. It should measure within 0.5 volts of the measurement on pin 4 of the regulator. A lack of voltage may indicate an open circuit between pin 4 of the regulator and the field terminal, or a damaged regulator.

   If an open field circuit is suspected, the battery and alternator switches may be turned OFF, the alternator field connector removed, and a resistance measurement made between the connector and pin 4 of the regulator. Look for near 0 Ohms. Field resistance of the alternator may also be checked at this time by measuring from either male field terminal blade to alternator case; typically, this should measure between 3 and 10 Ohms. Values other than these may indicate a broken field wire, or heavily worn alternator brushes and slip rings, respectively.

   Field terminal voltage: ____volts   Alternator field resistance: ____Ohms

6. With the switches ON, check the voltage between the alternator output post (or “B” lead) and ground. It should be battery voltage. If not, check the wiring between the alternator “B” lead and the battery positive (+) terminal. Look for loose or contaminated connections, broken wires, or an open breaker or fuse.

   Alternator “B” lead voltage: ____volts

If all of the voltages in the first 6 steps are close to the value specified, the charging system should be operative. If not, check for a broken or loose alternator belt or it’s possible on some installations that the engine speed will have to be near run-up RPM or more for the system to provide useable output.

Intermittent problems are the hardest to find. Temporarily bring small test wires into the cockpit from 2 or 3 of the above points to allow monitoring them with the DVM during periods of system failure. Double check all screw terminals for security. Try a 5-pound pull test on all crimp joints and make sure that the terminal is crimped on the wire, not the insulation. In composite aircraft a common area of difficulty is poor system grounds.

Noise problems can also be challenging. To manage system noise problems, consider the following:

Correct (or prevent) noise problems by using a unitized grounding system, such as a "ground block." This averts small voltage differences between different ground points – a common source of electrical noise (and erratic behavior in associated devices).

The battery acts as a noise filter in the system. Poor connections to the battery, or a battery in the initial stages of failing, can add to or even cause noise problems.

Shielding of low-level audio leads (especially microphone leads or headset leads) is a necessity. Sometimes the shields in the cables can separate from repeated flexing. Try checking shield continuity with an ohmmeter or substituting another headset, microphone, etc.

Wire routing is important. Separate noise carrying conductors (like "P" leads) from other wiring. Running noisy wiring parallel to other wiring in the same bundle is asking for trouble; wires at 90 degrees to one another, however, do not couple noise.

Stop the noise at its source. Once the noise is "loose", it can be difficult to filter it out of all affected systems. Try to locate the offending item and correct the problem at that point. Switching off the alternator, the mags (first one then the other), or any other electrical equipment that generates noise should help to find the offender.

B&C is always ready to assist our customers with technical problems during construction and thereafter. The safety of our friends and reliability of our products are top priority. If this guide has not solved your problem, please feel free to contact us –

Phone: 316-283-8000 (Monday – Friday, 9:00am to 4:30pm Central time)

E-mail: tech@bandc.com

Happy flying!