

## LR3-14/28 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 not be running, 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. In this case, check the engine ground strap, battery ground strap, and regulator ground wire 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 reference (-) for the following measurements.

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 lightly loaded breaker or 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 operate but low voltage warning and over-voltage protection will be lost.

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. The voltage should be approximately 1.2 volts less than the voltage on pin 6. A difference significantly less than 1.2 volts between pins 4 and 6 may indicate an open field circuit from pin 4 through the alternator to ground (-). Voltage differences of several volts could indicate a bad regulator. 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. If an open field circuit is suspected, the 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. Typically the field resistance of the alternator will be between 3 and 10 Ohms from the male field terminal blade to alternator case.

Field terminal voltage: \_\_\_\_\_ volts      Alternator field resistance: \_\_\_\_\_ Ohms

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

Alternator AB@ lead voltage: \_\_\_\_\_ volts

7. 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 popular area of difficulty is poor system grounds.

Noise problems are also difficult to find. A few tips to help with curing noise problems follow:

1. A unitized grounding system helps prevent noise problems by preventing voltage differences between different ground points.
2. The battery acts as a noise filter in the system. Poor connections to the battery or a battery that is going bad can add to or even cause noise problems.
3. Shielding of low level audio leads (especially microphone leads or headset leads) is required. Sometimes the shields in the cables can separate from repeated flexing. Try checking shield continuity with an ohmmeter or substituting another headset, microphone, etc..
4. Wire routing may be important in some installations. Separation of noise carrying conductors such as AP@ leads from other wiring may help. 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.
5. The best plan is to stop the noise at its source. Once the noise is A 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, call us. If we cannot help you find the problem, we may know someone who can.

Happy flying.

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