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BC217-1A 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 Terminal 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 Terminal 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 Terminal 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 Terminal 3 that supplies another device of considerable load. Change to a lightly loaded breaker or a breaker dedicated to Terminal 3 and the low voltage lamp. It is recommended that Terminal 3 not be jumpered to Terminal 6. If Terminal 3 has no voltage, the regulator will not operate.

Bus voltage:_____ volts Terminal 3 voltage:_____volts

3. Measure the voltage on Terminal 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 Terminal 6. Absence of voltage on Terminal 6 will prevent the regulator from operating.

Terminal 6 voltage:_____volts

4. Check the voltage on Terminal 4 of the regulator. The voltage should be approximately 1.2 volts less than the voltage on Terminal 6. A difference significantly less than 1.2 volts between Terminals 4 and 6 may indicate an open field circuit from Terminal 4 through the alternator to ground (-). Voltage differences of several volts could indicate a bad regulator. An ideal Terminal 4 voltage would be approximately 10.9 to 11.4 volts on a 12.6 volt bus and 23.5 to24.0 volts on a 25.2 volt bus.

Terminal 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 Terminal 4 of the regulator. A lack of voltage may indicate an open circuit between Terminal 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 Terminal 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, if the alternator is spline driven, check that the spline drive shear coupling is not sheared. Note that on spline drive alternators the engine speed must be at or above run-up RPM before checking for useable output.

Note

During the following tests, if the annunciator is always ON or always OFF, check the annunciator circuit by removing the wire from Terminal 5 of the regulator. The lamp should be OFF with the wire disconnected and should illuminate if the wire is connected to ground.

If the lamp circuit works properly but the lamp still remains fixed either ON or OFF all the time with the lamp wire connected to Terminal 5, assume that the lamp driver is bad in the regulator. Have the regulator repaired or replaced.

If the charging system seems to be generating power, but the STBY ALT ON annunciator will not flash above 20 amps output, check the following:

8. With the Battery and Standby Alternator Master switches ON but the engine not running, check the voltage between terminals 1 and 7 of the regulator. The voltage should be 10.0, " 0.1 volts. If it is not within tolerance, remove the wire from Terminal 1 and re-check the voltage. If it is still not within tolerance the regulator may be bad. If the voltage is now in tolerance, suspect a bad current sensor or shorted sensor wire.

9. If the voltage originally measured in step 8 was in tolerance, divide the measurement by 2. This value should be the voltage measured between terminals 2 and 7 of the regulator. If the voltage measured is not close to 5.0 Volts, suspect the current sensor in the standby alternator output lead.

10. If the measurements in Steps 8 and 9 are satisfactory, prepare to monitor the voltage between terminals 2 and 7 of the regulator with the engine running. Move the aircraft to a safe location for a 2000 RPM runup. Start the engine. Minimize the bus loads and bring the engine RPM up to approximately 2000. Switch OFF the primary alternator. Wait for the STBY ALT ON annunciator to illuminate. At light bus loads this could take a minute or two. Note the voltage between Terminals 2 and 7 of the regulator and begin switching ON

additional bus load. The monitored voltage should increase at the rate of 0.056 Volts for each Amp of standby alternator load.

a) If the voltage does not change, verify standby alternator output with the ship=s ammeter or a clamp-on ammeter probe. If the standby output is verified and there is still no change in the monitored voltage, suspect a bad current sensor.

b) If the voltage decreases instead of increasing, the 10 Ga. current sensor wire is connected backward. Reverse the connection and re-run the test.

c) If the voltage increases at approximately the correct rate, continue adding load until the voltage is greater than 6.2 volts. At or above this voltage, the lamp should be flashing. If not suspect a bad regulator.

Intermittent problems are the hardest to find. Temporarily bring small test wires into the cockpit from 2 or 3 points in question 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. Running transmitter feed lines close to and in parallel with other wiring can cause a problem. Normally, problems will only be encountered if there is a mismatch and therefore a high SWR in the antenna system. If noise or charging system breaker tripping occurs during Comm transmit only or when the transponder is on only, check the corresponding antenna system carefully or separate the transmission line from other wiring.

6. The best plan is to stop the noise at its source. Once the noise is Aloose@, 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.