

EXPBUS 2

Alternator Over Voltage Protection

Purpose, Installation and Operation

Purpose:

In the typical aircraft with an electrical system there is an alternator to charge the battery and for operation of the systems who depend on electricity. Components like gauges, electronic attitude indicators and avionics. All of these systems have a voltage operation range that is fairly small and can't deal with voltages that are higher than specification from the manufacturer.

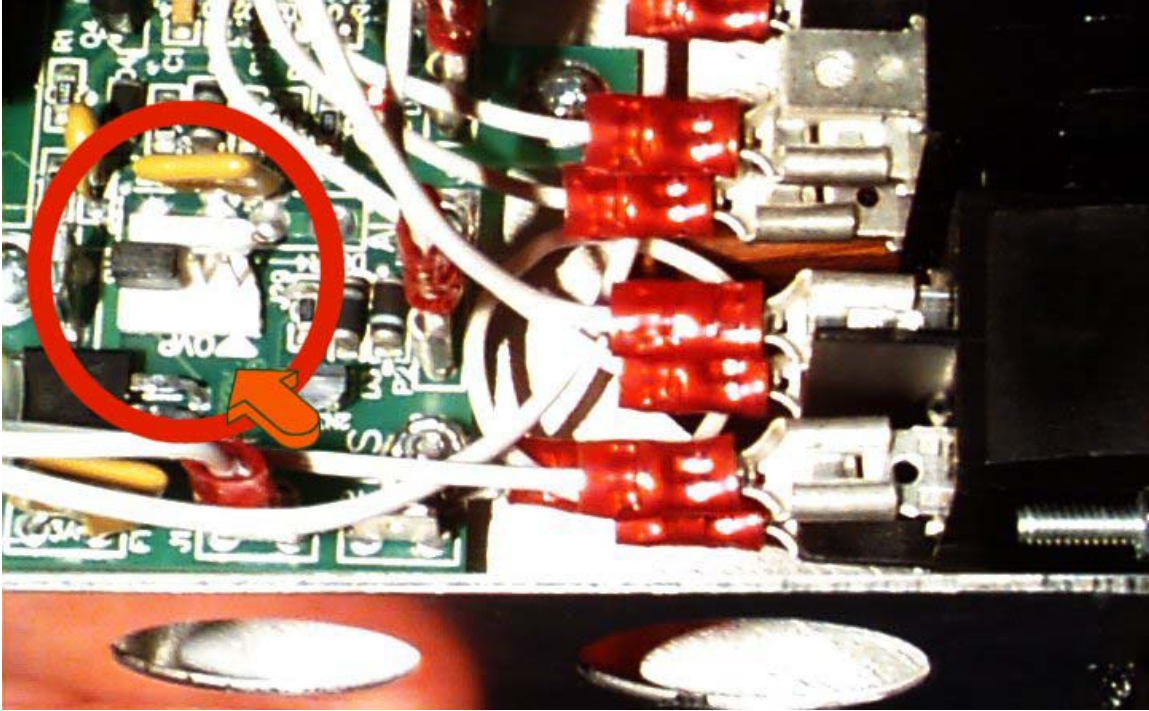
The typical condition that an electrical system will see where the system voltage is too high will be from a dysfunctional voltage converter, although other conditions can case this situation. In any case the system needs to shut the alternator down to prevent over voltage of the system components. This can be down manually by the pilot by noticing the volt meter in the panel (if equipped) and shutting the alternator field off with a switch. Typically by the time the pilot notices the condition, damage to the sensitive electronics has already happened, even if the aircraft is equipped with an over voltage indicator lamp and not an OVP device. The EXP BUS 2 is equipped with a circuit that continuously monitors the voltage at the Battery Terminal and in the event that it detects a voltage over the threshold, it shuts the output to the alternator field off, so that the alternator will stop outputting and the system will operate off the battery alone. This happens automatically and in milliseconds to prevent damage to the expensive electronics onboard

Installation:

Installation is simple and straight forward. For most installations there will be nothing done by the builder other than connect the circuits according to the EXP BUS 2 installation manual. The builder needs to make sure for normal operation that the small black shunt jumper is installed on pins 3 and 4, which will enable the OVP feature. To disable the OVP feature the builder may remove this shunt jumper and the alternator field will be energized when ever the ALT field switch is in the on position and no Over Voltage protection will occur. There are two optional choices for the installer in the case of the Over Voltage Protection circuit. They both involve the connector J29 which is shown in the illustration. The white arrow on the PCB indicates pin 1 on the connector. As you can see in the illustration, there is a jumper across pins 3 and 4.

The first option is for a remote mountable indicator lamp or LED. There is a LED(D7) on the EXP BUS 2 board that shows when the OVP has tripped and disabled the alternator field. A optional lamp can be remote mounted so as to be seen by the pilot in normal flying conditions. If the field line becomes shorted and the 5 amp protection device trips, this will be indicated on the Indicator Module but if the OVP trips this will be indicated by the LED(D7) or this optional lamp installed. The installer may connect an LED between pin 1 and GND or a grain of wheat type bulb between pin 2 and GND for an indication of the OVP feature, being careful to use a very low wattage lamp, like a grain of wheat bulb. When the indicator lamp is on, there is output to the alternator field. When the lamp goes out, then the OVP has tripped and shut the field off.

The second option is the installation of a remote mounted switch to reset the OVP protection feature. To do this the installer must connect a normally closed momentary pushbutton to pins 3 and 4 of the J29 connector, in place of the black shunt jumper. When the circuit is closed the OVP feature is enabled and armed, when the circuit is open the OVP is disabled and reset.



Operation:

Under normal operations there never will be a need for the pilot to do more than turn the ALT Field on with the Master Switch. The user has manual control over the alternator field via the ALT Field switch. In addition to Over Voltage Protection; this line also has a 5amp short protection in cases where the field control line becomes shorted or the regulator/alternator malfunctions and shorts the field line.

If the Over Voltage Protection circuit trips and shuts the field off, you will have to service the problem that caused the condition and then reset the circuit by one of the following means; disconnect the battery with the engine off, or remove the black shunt jumper momentarily then replace, or in the case of the optional OVP reset button, the pilot pushes the button for a short moment then releases. There will be indication that the field is tripped off by the small LED on the main board(not typically visible in flight) or by the optional remote indicator lamp/LED that may be installed. The pilot would also have indication from the lack of a positive amperage reading on the amp meter.