

Battery Charge-Leads: The battery charge leads provide both a way to charge each battery and a way to monitor each battery's voltage. The charge-leads have a Futaba male on one end and a JR male on the other end. The Futaba male should be inserted into the TurboReg and the JR male should be inserted into the Ernst charge jacks. The charge-leads can be extended with either Futaba or JR extensions.

As with any common ground system, most chargers are unable to charge both batteries at once. It is highly recommended that you charge only one battery at a time if you are unsure if your charger will have problems with a common ground system.

Calculating The Regulator's Current Capability: The TurboReg is a linear charger and linear chargers can only handle a maximum wattage based on their heat dissipation capability. The TurboReg is a 28 Watt regulator. **FOR MAXIMUM CURRENT CAPABILITY THE REGULATOR SHOULD BE SET TO ITS HIGHEST VOLTAGE.** The actual current the regulator can handle is based on both the input voltage and the output voltage. The regulator's 17.5-amp current handling is based on an input voltage of 8.4 volts and an output voltage of 6.4 volts. If you have some other combination of input and output voltages you can calculate how much continuous current the regulator can handle. The maximum amount of current the regulator can supply is about 20 amps even if you calculate you can handle more continuous current based on your input and output voltages. You can use the following formula where V_{in} is the input voltage and V_{out} is the output voltage and I_c is the continuous current capability:

$$I_c = 28 / (V_{in} - V_{out} - 0.45)$$

An example might help clarify this. If you were using a 2-cell lithium pack the fully charged voltage of the pack is 8.4 volts. If you set the output voltage of the regulator at 5.2 volts then, using the equation:

$$I_c = 28 / (8.4 - 5.2 - 0.45) = 28 / 2.75 = 10.2 \text{ amps}$$

Additional information, technical help, set-up hints and FAQs can also be found at www.Smart-Fly.com

Quest Engineering & Development, Inc.

6125 South Ash Ave, Suite B-8

Tempe, AZ 85283

Ph: (480) 460-2652 Fax: (480) 460-2653

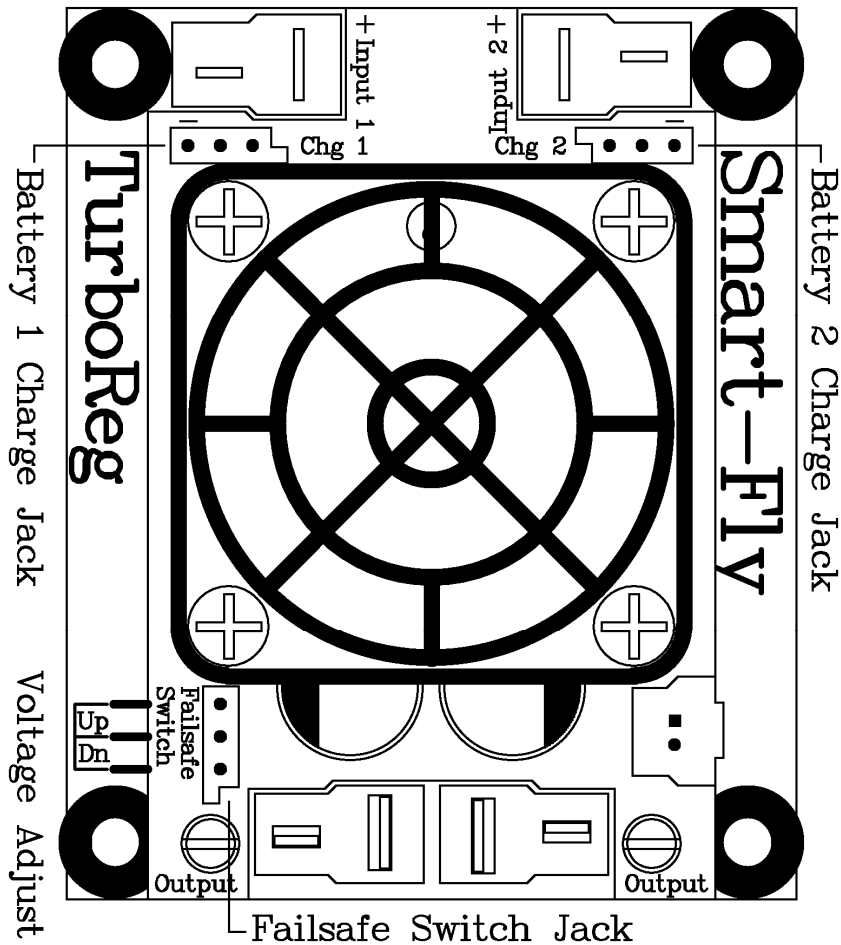


***TurboReg* User Guide**

Thank you for purchasing the Smart-Fly TurboReg!

This manual takes you through the installation and operation of the Smart-Fly *TurboReg* regulator. The *TurboReg* provides the highest power density of any available regulator for giant scale aircraft. The *TurboReg* provides the user with battery redundancy, failsafe operation with remote on/off switch and an adjustable regulator. Its dual battery inputs have isolation between the batteries so in case of a catastrophic failure of one battery, the other can continue to supply power to the aircraft. The *TurboReg* has dual regulation elements for redundancy and all input and output power connectors are Deans UltraPlugs to handle the high current the *TurboReg* is capable of handling. The *TurboReg*'s output voltage is continuously adjustable from 5.2 volts to 6.5 volts (factory set to its highest value) and can supply 17.5 amps continuous current when the input voltage is 8.4 volts and the regulator is set to an output voltage of 6.4 volts.

Warning: When the failsafe switch is used to turn the regulator on and off the regulator will draw a slight amount of current (approximately 5mA per day/battery) even when in the off position. If you are going to let the aircraft sit for an extended period you should unplug the batteries from the *TurboReg*.



Battery Inputs: The *TurboReg* has two battery inputs. Each input can supply 12 amps of continuous current to the unit. The inputs are isolated from each other so that in case of catastrophic battery failure the bad battery cannot affect the good battery. The unit can be used with a single battery input if desired. The isolation results in a 0.45V drop which results in a regulator dropout voltage of approximately 0.50V at 10 amps.

The unit can be turned on and off by either using a heavy-duty mechanical switch between the batteries and the *TurboReg*, such as the Smart-Fly SuperSwitchHD or the optional failsafe-switch can be used.

Regulator Outputs: The *TurboReg* provides two battery outputs. The two outputs are wired in parallel and it does not matter which output you use if you use only one output. If you are using the *TurboReg* with one of the

Smart-Fly PowerExpanders, both outputs can be used to tie to the PowerExpander to provide redundancy in the unlikely event that one of the cables should have a failure.

Adjusting the Output Voltage: The *TurboReg* comes from the factory set to its highest setting, approximately 6.6 volts. The regulator's output voltage is adjusted by momentarily (less than a second) shorting one of the adjustment pins to the center pin. This can be done with any metal object such as a screwdriver. To increase the voltage, short the pin designated "Up" to the center pin momentarily. To decrease the voltage, short the pin designated "Down" to the center pin momentarily. If you hold the pins shorted for longer than one second the voltage will increase or decrease at a rate of about one quarter volt a second.

Mounting: The *TurboReg* is mounted using the grommet and eyelets. Standard servo screws that you would use to mount a high-torque servo work well for this application.

Care and Feeding: Since the *TurboReg* uses a fan to provide active cooling of regulation elements some care must be taken to insure there are no loose items in the aircraft that could lodge in the fan and stop it from operating properly. The unit should not be exposed to excessive dirt and dust. The fan should be checked periodically for any noticeable change in its operation including the fan becoming noisier or a reluctance to start. The fan is a computer-grade bush-less fan and should operate for hundreds of hours with proper care.

Optional Failsafe-switch and Charge Package

An optional failsafe-switch and charge package is available for the *TurboReg*. This package contains a failsafe-switch, a slide switch or pin & flag switch, charge leads and charge jacks.

Failsafe-switch: The *TurboReg* can be used with an optional failsafe-switch. The regulator may be used without the failsafe switch by leaving the switch disconnected. The advantage of a failsafe-switch is that if the switch or wiring to the switch fail, the regulator will stay on until you unplug it from the batteries.

The regulator will draw a slight amount of current (approximately 5mA per day) even when in the off position. If you are going to let the aircraft sit for an extended period you should unplug the batteries from the TurboReg.