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.

Servo Power LEDs
The servo power LEDs show the servos are getting voltage greater than 5.4V. If the regulator output drops below 5.4 volts the LEDs will go out. The most probably cause of the regulator output going below 5.4 volts is that the voltage at the inputs (Deans connectors) is going below 5.9 volts. Possible causes of the inputs going below 5.9 volts would be low batteries, wiring that is not up to handling the current causing excessive voltage drop or bad solder connections on the connectors.

Receiver Power LEDs
The receiver power LEDs show the receiver is getting voltage greater than 4.75V. If the receiver regulator output voltage drops below 4.75 volts the LEDs will go out. There are two possible causes of the receiver voltage going below 4.75 volts. First the load the receiver is presenting to the regulator is greater than one amp causing the regulator output to droop. This could be caused by directly plugging something into the receiver that is overloading the circuit. The second cause of the receiver regulator going below 4.75 volts is the input voltage to the receiver regulator has dropped below 5.4 volts. This means the input voltage on the Deans connectors is probably below 5.9 volts for some reason.

Optional Failsafe-switch
The PowerSystem Eq6 supports the addition of a failsafe switch (optional package). The PowerSystem Eq6 supports 2-cell lithium packs, ion or poly. When using the failsafe-switch, the switch lead is plugged into the input marked “Sw” near the bottom left of the servo connections as shown on the reference drawing.

Smart-Fly can supply two types of failsafe switches. First is the standard slide switch that most people are familiar with. This is a small slide switch without a charge jack. The second failsafe-switch is the Pin&Flag switch, where a pin, with a flag on in, is inserted into the switch to turn the system off. To fly, the pin is pulled out of the switch. The advantage of the Pin&Flag switch is that the system cannot accidentally be turned off, as can be the case with a slide switch. The failsafe switch lead can be extended using a standard Futaba extension.

The PowerSystem Eq6 also supports charging the batteries through the two charge connections denoted by the “Chg 1” and “Chg 2” next to the battery input ports. The optional failsafe-switch package includes two charge leads and two Ernst charge jack mounts. The charge leads have a Futaba male on one end and a JR male on the other end. You may use these by plugging either end into the PowerSystem Eq6 and the other end into the charge jack holder.

The charge jacks on the PowerSystem Eq6 can also be used to connect to a battery meter. One thing to keep in mind when using a battery meter and the failsafe-switch is that the jacks are not switched off when the unit is off so the battery meter will continue to draw power when the unit is turned off.

Ignition Cutoff
A separate manual, “PowerSystem Eq6 Ignition Cutoff User Guide” is supplied to instruct you on the setting up and use of the Ignition Cutoff. The Cutoff channel is determined electronically by programming which of the six programmable channels you want to control the Ignition Cutoff.

Calculating The Servo Regulator's Current Capability
The actual continuous current the servo regulator can handle is based on both the input voltage and the output voltage. The regulator's 7.5-amp current handling is based on an input voltage of 8.4 volts and an output voltage of 6.0 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 15 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 Vin is the input voltage and Vout is the output voltage and Ic is the continuous current capability:

$$Ic=18/(Vin-Vout)$$

An example might help clarify this. If you were using a 3-cell lithium pack in an electric, the fully charged voltage of the pack is about 12 volts. If you set the output voltage of the regulator at 6 volts then, using the equation:

$$Ic=18/(12.0-6.0) =18/6.0 = 3.0 \text{ amps}$$

Additional information and technical help can be found at www.Smart-Fly.com

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Smart-Fly

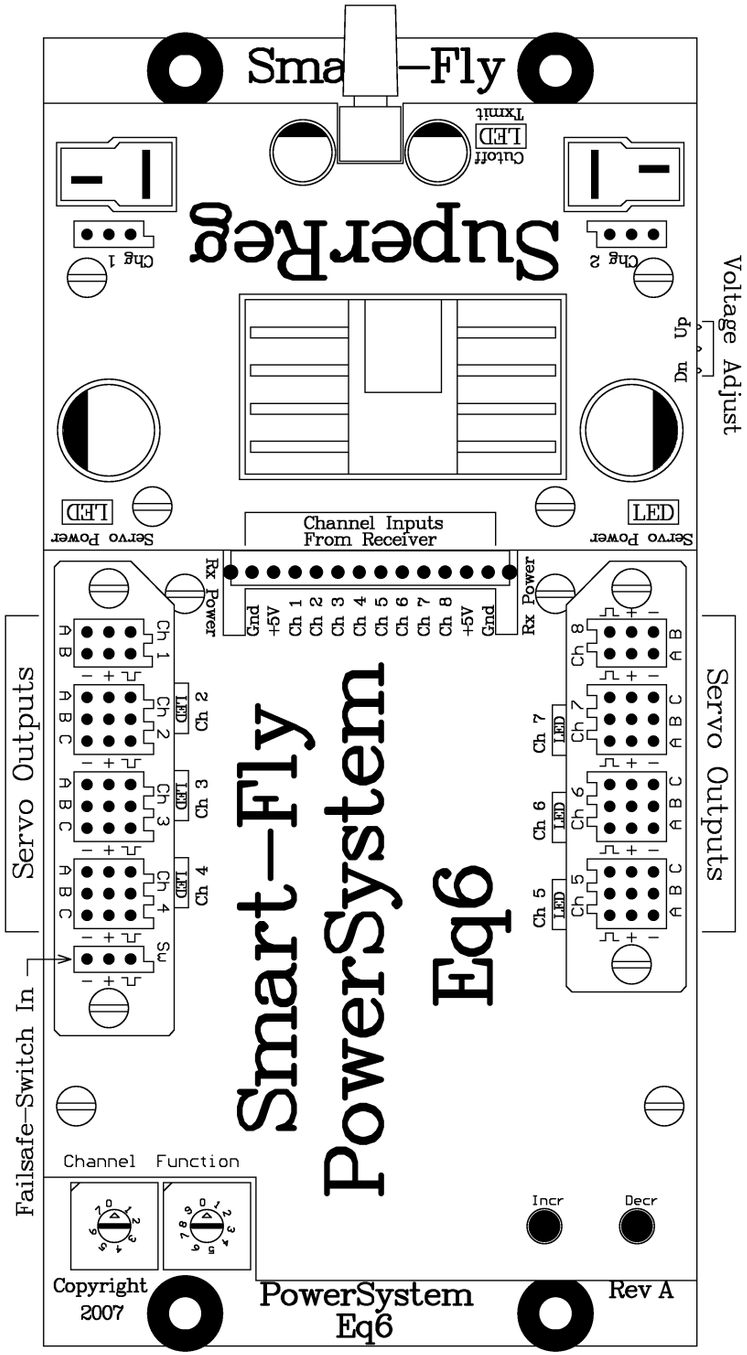
PowerSystem Eq6

User Guide

Thank you for purchasing the Smart-Fly PowerSystem Eq6!

This manual takes you through the installation and operation of the Smart-Fly PowerSystem Eq6. The PowerSystem Eq6 regulates lithium packs to 6.0 volts for your servos while supplying a clean, regulated voltage to your receiver. It also features a built-in Ignition Cutoff transmitter with remote, optically isolated receiver. Features of the PowerSystem Eq6 are:

- **For use on 85cc to 140cc gas engine planes**
- **Light weight, 3.7oz, 108g**
- **Compact design, footprint is 6.0” x 3.0”**
- **Inputs protect against cell failure or power shorts**
- **Adjustable (5.5V-6.5V), 7.5 amp continuous, 15 amp peak servo regulator**
- **Filtered and regulated 5.0V power to the receiver**
- **LED power indicators for input and receiver power**
- **6 channels with servo matching capabilities**
- **Full filtration of all signals in and out of the unit**
- **Integrated Ignition Cutoff**



Receiver Mounting
The receiver mounts in the center of the unit. 3M dual-lock mounting tape has been supplied to mount the receiver. This tape's holding power is extremely strong so it is recommended that the whole 1"x2" piece not be used. Instead it is recommended that you cut some 1"x ½" strips and use these on either end of the receiver. You want to keep the pigtails away from the regulator heat-sink. You may want to move the receiver down on the unit, especially end-loading receivers. The dual-lock can loosen up over time but the receiver will still be firmly locked. If this happens a small piece of foam under the receiver between the two pieces of dual-lock will remedy this situation.

Receiver Connections
The receiver servo outputs are connected to the pigtails coming out of the PowerSystem Eq6 in the area marked "Channel Inputs From Receiver" on the reference drawing. The two channels on the end ("Chan 1" and "Chan 8") have power connections to the receiver in addition to the signal connection. It is recommended that if you have a receiver that has less than eight channels that you still use both the end connections as this will provide you with power redundancy to the receiver in event that a power or ground lead should fail.

CAUTION: Do not plug any receiver pigtails into the battery input of your receiver if it supports Direct Servo Control. Doing so will disable your receiver while the pigtail is plugged in as the receiver will think its in DSC mode.

The unit will accommodate both end-loading receivers and top-loading receivers. All signals coming from the receiver into the PowerSystem Eq6 are RF filtered. This prevents noise from the servos from going out the receiver connectors into the receiver. If not all channels are going to be used then the unused pigtail can be tucked away.

Connections Directly To Receiver
If you want to connect a device directly to the receiver instead of going through the PowerSystem Eq6, make sure the current draw of the receiver and the device is less than one amp. We recommend you do not connects servos directly to the receiver

There are several reasons that a device might be connected directly to the receiver instead of going through the PowerSystem Eq6. The most likely would be if you had a nine or ten channel receiver and needed to use the extra channels. Items such as jet ECUs and smoke pump control do not draw much current and could be used. As long as the combined current draw of the receiver and servo does not exceed one amp this will work just fine.

Servo Connections
Servos are connected to the PowerSystem Eq6 along the two rails on either side of the receiver. The servo connectors are universal in that they will work with Futaba or JR connectors. When using a JR connector be careful to observe the polarity of the connection. The ground lead (black on Futaba, brown on JR) is indicated by the "minus" sign, the positive power lead (red on Futaba and JR) is indicated by the "plus" sign and the signal line (white on Futaba, orange on JR) is indicated by the "top hat" symbol.

All receiver channels have each servo signal output individually buffered. If a servo were to short its signal wire, the other servos on that channel would not be affected. All the channels have two servo outputs.

The unit also RF filters each signal output and matches line impedance resulting in a cleaner signal down long servo leads. The impedance matching reduces the electrical "ringing" that can occur on long servo leads. Ringing can generate RF interference and can reduce receiver range.

Servo Adjustment Programming
The PowerSystem Eq6 supports servo programming on six of its eight channels. Programming is done using the "CHANNEL" and "FUNCTION" selector switches and the two push-button switches marked "INCR" and "DECR". Each of the three servos on the six channels can independently be reversed and the center and two endpoints set. Two separate manuals are provided to instruct on how to do the servo programming. The "PowerSystem Eq6 Technical Programming Reference" provides the technical description of how the programming is done. The "PowerSystem Eq6 Programming Example Guide" takes you through a couple programming examples to get you familiar with the steps necessary to program the servos.

Power Connections
Lithium batteries should be used with this unit. Power is supplied to the unit through the two Deans Ultra plug male connectors. The power inputs are protected from each other in case of a dead cell or short. There is a 0.47 drop between the input and the regulator due to the input protection. It is highly recommended that you use two battery packs for redundancy and to provide extra current to the unit. Each input can supply 12 amps of power to the unit.

Servo Regulator Heatsink
The servo regulator has a large heatsink on it. This dissipates the heat the regulator generates from regulating the voltage down from the battery voltage to the output voltage the regulator is set to. It is very important not to obstruct this heatsink so air can flow around and away from it keeping the regulator temperature within its operating range. The transistor that regulates the voltage can operate to 175 degrees Centigrade. The heatsink can get very hot under normal operating conditions.

Adjusting The Output Voltage
The regulator comes from the factory set to its lowest setting, approximately 5.5 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