

Tech - Aero Designs

“FlexReg” PLR5-DR2 Quickstart Guide

Thank you for purchasing the Tech-Aero Designs FlexReg PLR5-DR2. This dual, redundant regulator FlexReg combines two programmable failsafe switch regulators into one easy to use configuration. It protects your model from losing power to the receiver and servos due to the loss of any one critical component, such as a supply battery, the connecting wires or even one of the two regulators (although this is a very small possibility). Even if the ON/OFF switch contacts experience a failure, both of the regulators will continue to operate as long as they have battery power to operate from. The switch handles no current at all when the regulators are on and is not in the path for current delivery to the flight pack.

Each regulator has its own regulated power connector to the receiver. Normally, the output from the “primary” regulator (regulator #1, the one wired directly to the integrated switch/DSC) would connect to the power connection on the receiver and the 2nd regulator would connect to any spare servo channel on the receiver. If no spares are available, a “Y” connector can be used to joining both power outputs into one to connect to the power connector of the receiver. Either way, a common power bus is created to provide clean, regulated voltage at up to 10A peak current load combined. Each regulator section is still independently programmable for as many as 32 points over a voltage range from 5.75 to 6.65V +/- 1% accuracy. This allows you to fine tune the regulated voltage to the receiver and servos. The factory setting of both of the regulators is 6.2V, which may be changed with the separately available E-Z Set programmer. It is also possible to adjust voltages with your own voltmeter and a spare servo extension. Contact Tech-Aero support for details on how to do this.

Please refer to Figure 1 for all configuration references. An important note is that both regulators in the device must be programmed to the same voltage (within 0.01 volts) in order to equally share the current load to the servos under typical flight conditions. Tech-Tip #0601 at <http://www.tech-aero.net> has a full discussion of the configuration options for redundant power systems. The factory configuration for the PLR5-DR2 is for a load sharing, **Balanced Redundant Supply** at 6.20 volts +/- .01V. This can easily be changed to a different voltage or to achieve a **Hot Standby Redundant Supply** configuration using the E-Z Set programmer.

With a Hot Standby Redundant Supply configuration, the effective peak current load is limited to 5A. The 10A peak load is possible only with a properly matched Balanced Redundant Supply configuration and only when both batteries are working. Neither configuration should be operated continuously at peak currents. For best results, the average operating current should not exceed 2.5A per regulator device. At the factory default of 6.20V and with freshly charged 2 cell LiPo or LiIon batteries, an average 2.5A load would equate to slightly over 5 watts of power dissipation for each device. At higher output voltages the power dissipation in the regulator will be *less* than when it is operated at lower programmed voltages. When more voltage is sent to the servos, the product of voltage times current at the servo motor provides more power for the controls surfaces.

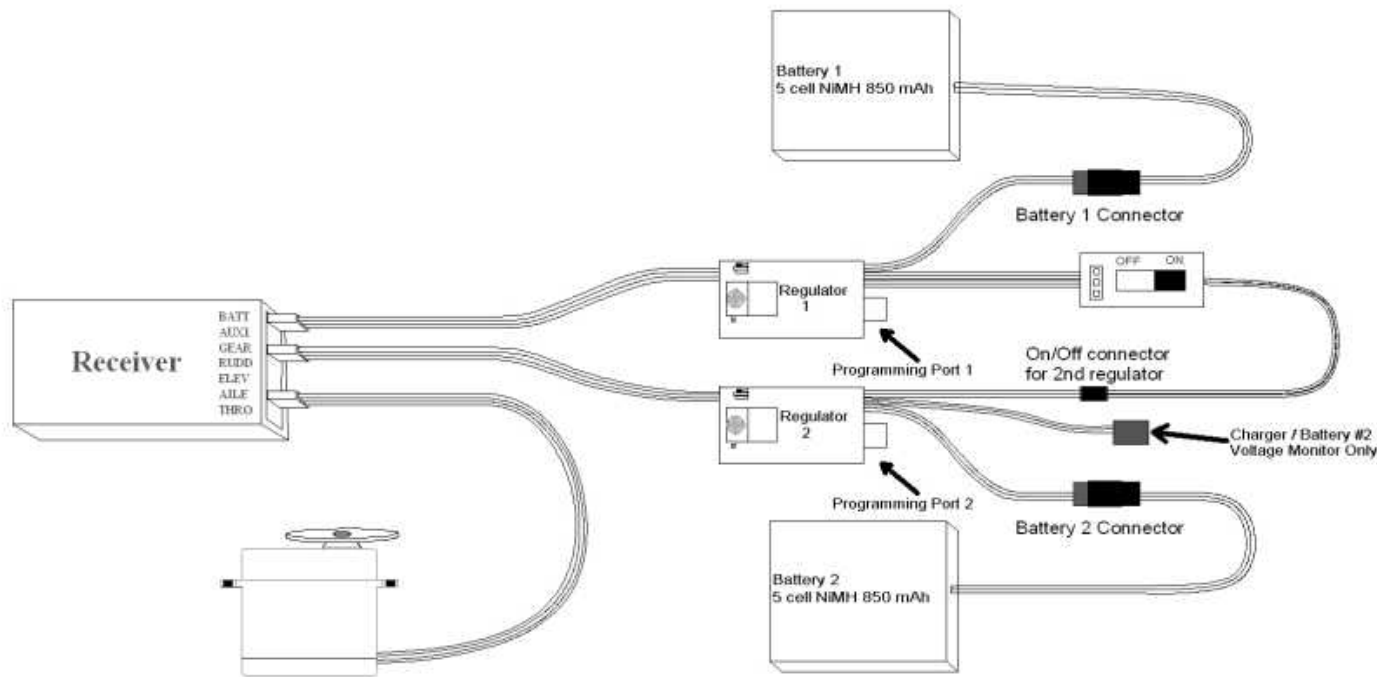
In practice, even very energetic “3D” flying with up to 6 or 7 digital servos of about 200 oz-in torque rating per regulator device will not come close to exceeding these recommendations, unless there is something binding or interfering with normal servo movement. However, use of NiCad or NiMH batteries of greater than 6 cells or using LiPo or LiIon batteries of greater than 2 cells can lead to overheating and is not a supported configuration. In general, there is no advantage to using more than 5 cell NiCad or NiMH packs, unless you wish to operate servos at higher than 6.20V.

For normal operation as a redundant power system, plug one battery into the Battery 1 connector and plug the 2nd battery into the Battery 2 connector. Typically, these batteries would be the same chemistry and same capacity. Although this is not required, it does make it easier to track when it is time to re-charge. Power to the receiver and servos is controlled by the single ON/OFF switch; no other switch is necessary.

When using the DSC function of your radio, be sure that the RX PWR #1 lead connects to the receiver power connector that also supports the DSC function. Not every radio supports DSC, so please check with the instructions

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provided by the manufacturer. The DSC cord from your radio transmitter plugs into the PLR5-DR2 DSC/Charger connection.



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Figure 1

The DSC/Charger connection may also be used to perform pre-flight checks of the condition of battery #1. You may use a typical hobby type expanded scale voltmeter (ESV) or you may use the Tech-Aero “E-Z Set” Programmer. The condition of Battery #2 can be checked with a meter connected to the Charger #2 connector. For convenience, the DSC/Charger or the Charger #2 connection may also be used with a battery charger that is matched to the battery chemistry (NiCad or NiMH), battery voltage and capacity. Switch the PLR5-DR2 off for battery charging. Please follow all of the safety precautions and battery charging instructions for your batteries and battery charger. Note that some chargers will not function properly when charging both batteries simultaneously, due to the common ground connection of the dual regulator design. Please do not charge LiIon or LiPo batteries with the PLR5-DR2 attached.

Mount the PLR5-DR2 with the topside of each regulator board exposed to air in the model cabin (regulator chip visible). Use a piece of 1/4” or thicker foam padding placed underneath and fasten with a Velcro strip around the mid-section. Do not over tighten the Velcro strip! Make it just snug enough to press the unit lightly into the foam padding beneath and also be sure that the strap does not cover up the body of the regulator chip.

A single FlexReg PLR5-DR2 configured as a Balanced Redundant Supply may be used in typical model airplanes up to about 105” wingspan, weighing less than 25 lbs and utilizing 10 or fewer high torque digital servos. However it is important to note that if there is a single battery failure for example, then the average current capacity and peak load capacity will be cut in half. In nearly every case, it would still be possible to continue the flight under those conditions, but the model may be operating with diminished control effectiveness and also thermally stress the PLR5-DR2 more than would be wanted. For this reason, to take full advantage of the redundant power aspects of the PLR5-DR2, it is recommended that the model size be limited to less than 90” wingspan and 15 lbs weight, unless additional capacity is installed through use of a 2nd PLR-DR2. For more advanced user requirements, a full technical manual is available at the Tech_Aero website at <http://www.tech-aero.net>.