Tech - Aero Designs

Tech-Tip #0901 – Programming the FlexReg without the E-Z Set

Building a homebrew FlexReg programmer

This Tech-Tip is being provided as a convenience to those modelers who have the skills necessary to build and operate the electronic equipment mentioned within. Please read this entire Tech-Tip before attempting the procedures being explained. Failure to follow these steps properly may result in damage to the FlexReg or to other equipment. Under no circumstances is Tech-Aero Designs responsible for any such damage. Programming any of the PLR5 regulator products is easily accomplished with the E-Z Set combination programmer, however it is not necessary to purchase an E-Z Set if you have access to an accurate digital voltmeter (DVM) and can handle some wiring. All that the E-Z set does is package up a pair of momentary ON switches with a 3 ½ digit DVM and provide the correct wiring to the leads that connect to the FlexReg. To roll your own basic, homebrew version of the E-Z set programmer, you will need a pair of servo extensions that you don't mind parting with and have some electronic soldering skills. The tools you will need are a pair of sharp side cutters, a small soldering iron and some electronic solder. The parts you will need are a pair of color coded banana plugs that will allow you to solder a wire to them and which will fit the sockets on your DVM that are normally used with the extensions that it was sold with.

Step 1
Cut off the male connectors of both servo extension leads and discard them. One of the remaining leads will need to have the plastic shroud that protects the pins removed to expose all three pins inside. Be very careful doing this, as it is easy to damage the pins inside. A pair of sharp side cutters should work well. This lead becomes the extension lead that will later be plugged into the programming port, and the plastic shroud will not fit over the plastic housing on the programming port of the FlexReg.

Step 2
Take the extension that still has the protective shroud over the pins and cut off either the white or orange or yellow wire. This is the signal wire for various servo brands and isn't needed on this lead. You should have the red wire and either a brown or black wire remaining at this point.

Using the side cutters, carefully strip off about ¼" of insulation at the end of the red and black/brown wires. These need to be soldered to the banana plugs: black/brown wire to the black plug, red wire to the red plug. This will be the Voltage Monitor Lead that will be used to connect the power output of the FlexReg to the DVM, so you must exercise great care to prevent shorting the banana plugs together whenever the leads are connected to the FlexReg. Otherwise it may be damaged. Also, you must be certain that the DVM is properly connected and set to measure DC volts, *not current*, otherwise damage to the FlexReg and possibly the DVM may result. If you are not sure of how to operate a DVM as a voltmeter, then it is strongly suggested that you do *not* attempt to make your own homebrew FlexReg programmer.

Step 3
Strip about ¼" of insulation from the ends of all three wires on the extension that has had the protective shroud clipped off. Using the soldering iron, tin the exposed wire with some solder, just so

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that when handled later the wires do not fray. Keep the exposed, tinned wires separated from each other for now, and always keep them away from anything else electrical. Plug in the exposed pins into the programming port (never plug this into any other part of the regulator wiring!). The correct orientation is for the black or brown wire (i.e. the Ground wire) to be associated with the connector pin that is closest to the center of the regulator board, and with the orange or yellow or white wire closest to the edge.

Step 4
Connect the PLR5 RX PWR connector to the Voltage Monitor Lead and connect a battery to the PLR5 Battery connector. When the PLR5 is switched on, the DVM will display the voltage setting.

Step 5
Simply tap the Ground wire against the Red wire to substitute as the "UP" button that the E-Z Set has. Conversely, tap the Ground wire against the Yellow/Orange/White wire to substitute as the "DOWN" button on the E-Z Set. Do not worry about accidentally mixing up which wires you touch together on the programming lead. You can not hurt the FlexReg this way, however damage can easily result if any of these exposed wires are allowed to touch other electrical connections.

Programming the FlexReg
From here on, the directions are the same as for using the E-Z Set (an excerpt follows):

You simply tap the down button to go down (as low as 5.75V) or the up button (as high as 6.65V). These upper and lower range settings are + or - 1% accuracy or better. The FlexReg units each have 32 unique settings available and you may pick any of the points on the scale. If you press and hold a programming button for about 2 seconds, the programmer will fast forward in the direction of the button being held. If you tap the button, the changes will go one step at a time. There is no wrap-around, so when the limit is reached in either the up or down direction, the change to the output voltage is halted until you reverse the direction with the other button. When you are satisfied with the setting, simply turn the FlexReg off and the setting is automatically saved.

The default factory setting for FlexReg products is 6.20V +/- .01V. It's not a concern if you observe variations of up to 0.01V between regulators that you may be trying to match voltage outputs, since there is a small tolerance error in the meter and with each regulator, however in most cases you will be able to get matching settings between two regulators to match and display the same exact reading. Getting within 0.01V is sufficient to get a close balance of current delivery between batteries in a dual redundant configuration.