

Grayson Hobby

Manual for 20A Brushless ESC

Basic Features:

1. Voltage Range:4V-12V
2. 2-3 lipo,
3. Internal Resistance:0.0025ohm
4. 12 FETS
5. 3AMP BEC
6. Lipo LVC 75% of initial startup voltage
7. Size: 45x24x9mm
8. Continuous working current:20A
9. Burst: 25A (10 Seconds Max)
10. Temperature-protection:100 Celsius Degree
11. PWM: 8K
12. Max RPM 20,000 with Outrunner motors

Additional Features:

1. Soft start
2. Start disabled if the throttle is in the wrong position.
3. Auto detect of the throttle
4. Auto shut down of the power if the signal is lost.
5. Auto calibration of the motors
6. If there is no response on the receiver, the input will be automatically shut off

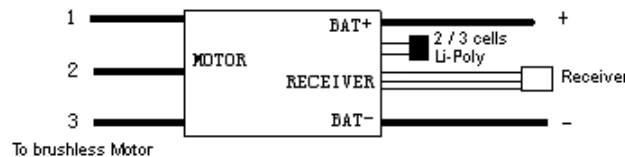
The 20A ESC can be used with 4-10 NiCd/MiMh or 2-3 cell Lipo batteries and will automatically detect them. The BEC is functional with up to 3 Lipo cells. The only programmable feature on this ESC is the brake. The brake defaults to OFF. If you don't need to program the brake function, your ESC is plug and play and ready for use up to 3 cell Lipo or 10cell NiCd/NiMh.

CAUTION: Secure the aircraft and stay clear of the propeller attached will damage the motor.

CAUTION: Running the motor at high RPM without a propeller attached will damage the motor.

Connecting the Motor:

Note the wiring diagram below:



1. Solder an appropriate connector on the battery + (red) and battery – (Black) leads. We recommend Deans Ultra or Anderson Power Pole connectors. If using a polarized connector, make sure the polarity matches your batteries, and make sure your connector can handle 60 amps of current.

2. Connect the three motor wires to your brushless motor (ignore the wire colors). If the motor spins in the wrong direction, swap any two of the motor wires to reverse the direction. Grayson Hobby recommends using gold plated spring connectors (also known as bullet connectors) between the motor and the speed control to facilitate swapping the wires. Make sure to cover the bullet connectors with heat shrink tubing.
3. Plug the servo connector into the appropriate channel on your receiver. Most receivers use channel 3 for the throttle, but some use channel 1. Consult the manual for your receiver for details. The red wire on the servo connector is positive (+), the brown or black wire is negative (-), and the orange or white wire is the signal.
4. Install your ESC in a location in your airplane that receives good cooling airflow. Keep the motor and battery wires away from your receiver and antenna.

Battery Elimination Circuit (BEC)

This Electronic Speed Controller (ESC) contains a Battery Elimination Circuit (BEC) which may be used to power your receiver and servos under certain conditions. This will allow you to eliminate the separate onboard radio battery pack, and reduce the weight of your

aircraft. The BEC may not be used simultaneously with and onboard radio battery pack. You must use one or the other, but not both. Up to 4 servos can be used when the voltage is 7.4V or less. With 11.1V, 3 servos can be used.

If you are not using the BEC function, you must clip the red (+) wire on the ESC receiver lead.

(Grayson Hobby Tip) Use a servo extension between the ESC and RX. Clip the red extension wire to instead of the ESC wire so you will maintain the warranty and best of all, you can use the BEC on your next project.

Cutoff Voltage:

- Cutoff voltages are auto-set
- Lipo 75% of initial startup voltage
- 0.8V per unit for NiMh selection

If the proper cell type and cell number is selected, the ESC will cut off at **75%** of the initial voltage. For example, when using a 2s lipo when fully charged, the initial voltage is 4.2V [4.2V x 2 (2S pack) = 8.4V.] ESC cut off at $8.4 * 0.75 = 6.3$ per pack or 3.15V each cell.

If the cells are not fully charged or if there is any other reason causing the voltage to be lower than 4.2V a cell in some circumstance the LVC will be lower than 3.0V a cell.

PACKS MUST BE FULLY CHARGED BEFORE USE

To Enter Programming Mode:

1. Connect the motor and receiver to the ESC.
2. Remove battery power from the ESC.
3. Set the throttle stick to full power and then turn on the transmitter.
4. Reconnect battery power to the ESC.
5. If you are using a separate receiver battery pack instead of using the BEC, connect the receiver battery pack and turn it on.
6. Secure the airplane and stay clear of the propeller
7. A sequence of one to three beeps will be followed.
8. The table below summarize the simple options for the choices:

-	1 Beep	Lipo self protection
--	2 Beep	Ni-Mh/NiCd self protection
---	3 Beep	Brake Mode

9. Move the throttle stock to the full down position if you confirm the option.
10. You should have only one choice between the lipo self-protection of NiMh/NiCd self-protection.

11. Once you confirm your choice, you will hear a sharper tone indicating this choice has been saved.
12. If you want to change the brake setting, repeat steps 2-10.

CAUTION: At this point the throttle is armed. If you advance the throttle stick the motor will run. If you are not ready to fly, unplug the motor battery and then turn the transmitter off. Always turn the transmitter on (and the receiver if you are using a separate receiver battery) and be sure it is set at idle position before connecting the motor battery.

All of your selected programming will be saved in the ESC. There is no need to program again unless you wish to change a setting.

Note: If the motor rotates in the wrong direction, simply switch any two of the three wires from the speed controller to the motor.