BRUSHLESS ESC INSTRUCTIONS

Thanks for purchasing HUMMINGBIRD brushless speed controllers manufactured by HIFEI Technology Co., Ltd. HUMMINGBIRD series ESC are specifically designed for multi-rotor copters and drones.

Please read the instruction carefully before running.

Safety

The ESC is used for R/C multi-rotor copters, which are not toys. ONLY adults can run it correctly according to this instructions, young children must use it with guardianship of adults.

Please keep the propeller away from your body and others all the time when the battery is connected.

Before begin the running, turn on the transmitter **BEFORE** powering on the receiver.

When finish the running, power off the receiver **BEFORE** turning off the transmitter.

Never disconnect the battery pack while the brushless motor is running, as this could cause damage to the speed controller and/or motor. And such damage would not covered under manufacturer's WARRANTY.

Never fly over others or near crowds

Features

- 32-bit Microprocessor with up to 80MHz frequency.
- Active FreeWheeling optional
- Motor PWM frequency 8-32K Hz
- Signal Refresh Rate up to 1000Hz
- Throttle resolution up to 1uS
- Timing Advance Setting
- Read-to-fly with preset parameters

Specifications

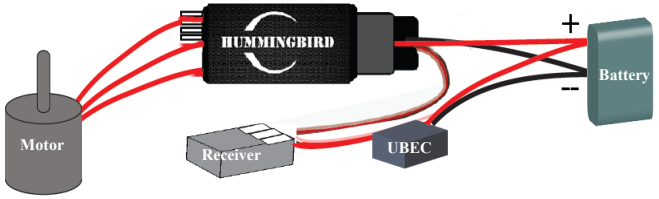
ESC	Voltage	Current / Max	BEC	Size (mm)	Weight
45A-H-6s	2-6s Lipos	45A/70A	NO	58x27x17	39g
60A-H-6s	3-6s Lipos	60A/80A	NO	71x27x15	39g
80A-H-6s	3-6s Lipos	80A/90A	NO	71x27x15	52g
75A-H-12s	4-12s Lipos	75A/90A	NO	89x35x21	107g

Install your ESC

Please solder good quality connectors to ESC's motor wires and power wires before connect ESC to motor and battery. When connect power wires to battery, it is **IMPORTANT** to correctly connect positive to positive, and negative to negative.

Swap any two motor wires' connecting can change the rotation direction.

In order to prevent and reduce any signal disturbance generated by ESC hardware, please install the ESC far away from receiver.



Calibrate throttle of TX

Note: In the following 3 situations, it is required to calibrate the throttle range of transmitter.

-When it is the first time to use a new speed controller.

-When change a new TX or RX, or a set of new radio system.

-When upgrade the ESC into a new version of firmware.

1st: Connect ESC to motor, plug receiver lead of ESC to throttle channel of RX.

2nd Push joystick of transmitter to max throttle position, power on TX.

3rd: Power on receiver, connect ESC to battery. Motor emits three beeps in drop tones. ♩ ♩ ♩

4th: In the following, motor will emit four long beeps in flat tones. ♩♩♩♩

After any one beep of the four long beeps, pull joystick to zero immediately.

5th: Then motor emits two beeps in up tones. ♩♩

Calibrating is completed, it's ready to fly.

Parameters features

Active FreeWheeling	Timing Advance
Option 1: Off	Option 1: Middle
Option 2: On *	Option 2: High *

Note: Hummingbird ESC has two programmable features, Active FreeWheeling and Timing Advance.

The parameters with * behind are default settings.

ESC is preset with the default settings in factory.

Active FreeWheeling

Active FreeWheeling comes in when, instead of running at partial throttle through the FET body diodes, as one FET switches off, the "freewheeling" diode switches on to allow the "freewheeling" current to flow through it instead of it's body diode. Since the resistance of the FET is much lower than its body diode, so much less heat is dissipated. ESC's that are equipped with active freewheeling are able to operate over a wider range of throttle percentages due to the more efficient switching methodology that is used. This means that you can run lower head speeds without having to re-gear or worry about your ESC blowing up!

Features:1) Obviously reduce the heat of ESC when running.
2) Power reservation to extend the flight.
3) Greatly improve the dynamic performance of motor
4) Particularly suitable for application in Multi-rotor and Heli.

Note: It's strongly recommend to switch on the AFW setting.

Timing advance

'Middle timing' adjusts the timing at the range of 5º~20º, recommended for most brushless motors. It gives a good balance of power and efficiency;

'High timing' adjusts the timing at the range of 15º~30º, recommended for higher pole count motors. (such as 8, 10, 12, 14 poles or higher brushless outrunner motor).

Program the ESC

It's very simple to change setting of Hummingbird ESC by jumper. Jumpers are provided with ESC.

Note: a: Before change the setting, please disconnect ESC from battery firstly.

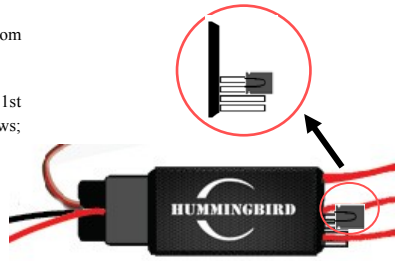
b: With no jumpers plugged in ESC, it indicates ESC are with default settings.

Switch off the AFW

Step **①:**Disconnect the ESC from battery;

Step ②: Connect the jumper to the 1st and 2nd pins as right picture shows; AFW is switched off.

Step ③: Connect ESC to battery.



Middle Timing Advance

Step ①: Disconnect the ESC from battery;

Step ②: Connect the jumper to the 3rd and 4th pins as right picture shows; Timing is changed to Middle.

Step ③: Connect ESC to battery.