



Hornet Airplane ESC User Manual v3.0

Thank you for purchasing HTIRC Hornet Brushless Electronic Speed Controller(ESC). Please read and pay carefully attention to the following instructions before you start to work with all the related power devices and the controller. We have no control over the use, installation, application, or maintenance of our products, therefore no liability shall be assumed nor accepted for any damages, losses or costs resulting from the use of the product.

Features

- Extreme low output resistance, super current endurance.
- Multiple protection features: Low voltage cut-off protection / over-heat protection / throttle signal loss protection, etc.
- 2 Start modes: Normal/Soft.
- Compatible with fixed-wing aircraft and helicopter.
- Throttle range can be configured to be compatible with all transmitters.
- Smooth, linear and precise throttle response.

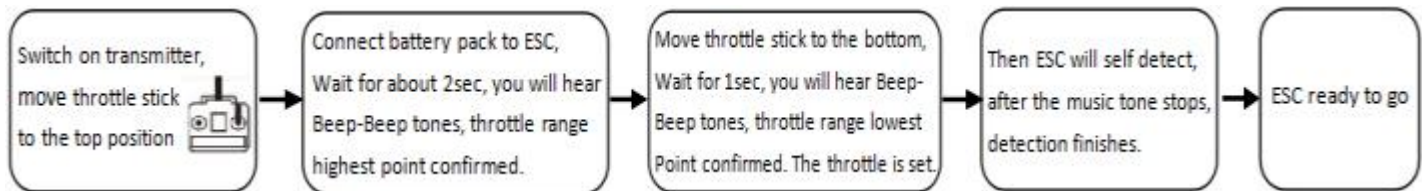
Warning!

- ▲ Do not use more battery packs than rated ones.
- ▲ Do Not use bad, damaged, cracked or bulged battery.
- ▲ Over-heat protection function built-in the ESC. when the temperature reaches 100°C during the operation of ESC, the rotate speed of the motor will immediately reduce; It will automatic recover when the temperature under 100°C.
- ▲ Please do not turn off the receiver when the ESC power on.
- ▲ Please disconnect the battery pack immediately when the model landing.
- ▲ Handle the model with extremely care and stay clear of the propeller.
- ▲ Do Not connect the ESC to just ‘any’ kind of power sources. Take care to ensure that the right polarity of NiCd, NiMH or Li-Poly power packs.
- ▲ Do Not connect the motor battery to the wrong polarity, or the ESC will be seriously damaged.
- ▲ Once the motor battery pack is connected, handle the model with extremely care.

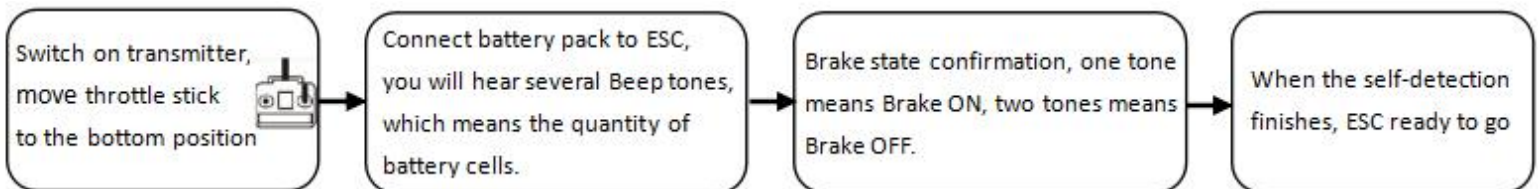
Specifications

Model	Current		BEC	BEC Output	Battery Cell		Size(mm)	Weight
	Cont.	Burst			Li-xx	Ni-xx	L*W*H	
Hornet 6A BEC	6A	8A	Linear	5V/0.5A	2-4LiPo	5-12NC	22*12*5	6g
Hornet 12A BEC	12A	15A	Linear	5V/1A	2-4LiPo	5-12NC	24*18*6.5	11g
Hornet 12A BEC	12A	15A	Linear	5V/2A	2-4LiPo	5-12NC	24*18*6.5	11g
Hornet 20A BEC	20A	30A	Linear	5V/2A	2-4LiPo	5-12NC	30*24*8.5	21g
Hornet 30A BEC	30A	40A	Linear	5V/2A	2-4LiPo	5-12NC	30*24*8.5	21g
Hornet 40A BEC	40A	50A	Linear	5V/3A	2-4LiPo	5-12NC	52*26.3*11	43g
Hornet 40A SBEC	40A	50A	Switch	5V/4A	2-6LiPo	5-18NC	52*25*11	43g
Hornet 50A SBEC	50A	60A	Switch	5V/4A	2-6LiPo	5-18NC	52*25*11	43g
Hornet 60A SBEC	60A	80A	Switch	5V/4A	2-6LiPo	5-18NC	52*25*11	43g
Hornet 80A SBEC	80A	100A	Switch	5V/6A	2-6LiPo	5-18NC	62*35*12	72g

Throttle Range Calibration



Normal Startup Procedure



- Battery cell counting: 2 short Beeps means 2 battery cells; 3 short Beeps means 3 cells, etc.
- Brake detecting: 1 long Beep mean Brake ON; 2 short Beeps means Brake OFF.

Program ESC with the transmitter

1. Switch on transmitter, move throttle stick to the top position
2. Connect the motor, receiver and battery pack
3. Wait for 2sec, you will hear Beep-Beep 2 tones, which means program mode is entered. Then you will hear another 3 groups of Beep-Beep 2 tones which program setting is entered.

- | | | |
|-------------------------|---------------------------|--------------------|
| 1) Beep- | Brake | (1 short beep) |
| 2) Beep-Beep- | Battery type | (2 short beeps) |
| 3) Beep-Beep-Beep- | Cutoff threshold | (3 short beeps) |
| 4) Beep-Beep-Beep-Beep- | Positive/Reverse rotation | (4 short beeps) |
| 5) Beep-- | Startup mode | (1 long beep) |
| 6) Beep--Beep- | Cutoff mode | (1 long & 1 short) |
| 7) Beep--Beep-Beep- | Timing | (1 long & 2 short) |
| 8) Beep--Beep-- | Heli governor mode | (2 long beeps) |
| 9) Beep--Beep--Beep- | Set all to default | (2 long & 1 short) |

4. When you hear the expected Beep, move the throttle stick to the bottom position at any time, you will enter the setting item. You will hear tones in loop, set the value matching to a tone(as below showing) by moving throttle stick to the top position when you hear the tone, then a special tone emits, which means the value is set and saved. Power-off will exit program setting mode directly, or you may keep waiting and then select other items as the same steps.

Items \ Tones	Beep	Beep-Beep	Beep-Beep-Beep
	1 short tone	2 short tones	3 short tones
Brake	OFF	ON	
Battery type	Li-ion / Lipo	NiMH/NiCd	
Cutoff threshold	2.8V	3.0V	3.2V
Positive/Reverse rotation	Positive	Reverse	
Startup mode	Normal	Soft	
Cutoff mode	Soft-cut	Cut-off	
Timing	Automatic	7°	30°
Heli governor mode	OFF	ON	
Factory default setting	Factory default setting		

Programmable Items

1. Brake Setting: OFF/ON
2. Battery Type: Lipo/NiMH
3. Low Voltage Protection Threshold (Cutoff Threshold): Low/Medium/High
- 1) For Li-xx batteries, the cells of a battery pack is calculated automatically. Low / medium / high cutoff voltage for each cell is: 2.8V / 3.0V / 3.2V. For example: the voltage cutoff options for an 11.1V/ 3 cells Li-Po battery pack would be 8.4V (Low)/ 9.0V(Mid)/ 9.6V(High)
- 2) For Ni-xx batteries, low / medium / high cutoff voltages are 0%, 50% and 65% of the startup voltage. 0% means without low voltage cut-off protection. For example, for a 6-cell NiMH battery pack, fully



charged voltage is $1.44V \times 6 = 8.64V$, when "Medium" cut-off threshold is set, the cut-off voltage is $8.64 \times 50\% = 4.3V$.

4. Startup Mode: Normal/Soft. (300ms/1.5S)

Normal is preferred for fixed-wing aircraft. Soft is preferred for helicopter. The acceleration of the Soft Mode is slow by taking 1.5S from zero throttle to full throttle. (If the throttle is closed and then opened again within 3 seconds after the initial startup, the restart-up will be temporarily changed to normal mode, so as not to cause crash by slow throttle response.)

5. Motor Rotation: Normally, there are two ways to change the motor rotation.

- 1) by swapping any two motor wires.
- 2) by programming the setting parameter value of the ESC if when motor has welded with ESC .

6. Low Voltage Protection Mode.

- 1) Reduce Power: Lower the output power when the voltage reaches preset lowest value.
- 2) Cutoff: Stop the output power immediately when the voltage reaches preset lowest value.

7. Timing:

Automatic: (7~30 degree)

Low: (7 degree)

High: (30 degree)

Normally, automatic timing is suitable for various types of motors. Please try each Timing to get the best driving effects. In order to get higher speed and bigger output power, please choose High timing. After changing the timing setting, please test your RC model on ground before taking off!

8. Heli Governor mode: when Governor Mode ON, the settings of Brake & Low Voltage Protection Mode will be reset to OFF and Reduce Power automatically.

9. Restore Factory Default Setting:

- 1) Brake Type: Brake Off
- 2) Battery Type: LiPo with Automatic Cell detective
- 3) Low Voltage Cut-off Type: Reduce Power
- 4) Cut-off Voltage Threshold: 3.0V/cell
- 5) Soft Start: Enabled
- 6) Timing: Automatic
- 7) Switching Frequency: 8 kHz
- 8) Heli Governor mode: RPM OFF

Cautions!

Warning! Model aircraft equipped with high power motor can kill. High power motor systems can be very dangerous! High currents can heat wires and batteries, causing fires and burning skin or anything. Follow the wiring connection carefully! Always fly at the approved field. Never fly over or near spectators. Even though this controller is equipped with a safety arming program, you should still be cautious when connecting the main battery.