Thank you for purchasing Hobbyking Brushless Electronic Speed Controller (ESC). This series is designed for fixed wing and Helis. It features super smooth start up and throttle linearity, multiple protection, low cost and best performance at this level of product. This is not a toy, only for adult. Age under 14 should be supervised with adult. Please read this manual carefully before using this product for the sake of safety. Hobbyking has no control over the use, installation, application, or maintenance of these products, thus no liability shall be assumed nor accepted for any damages, losses of costs resulting from the use of this item.

Important Warnings

Hobbyking is not responsible for your use of this product, or any damage or injuries you may cause or sustain as a result of its usage.

Always place safety as priority when you use the product

An electric motor that is connected with battery pack and ESC may start unexpectedly and cause serious danger. Always treat them with enough respect.

We recommend you to remove the propeller when you working on the plane that with power source connected.

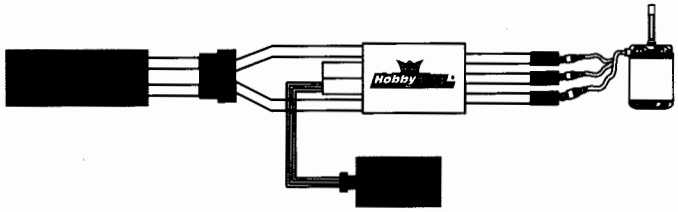
Observe all local laws when you fly a RC aircraft or other RC vehicles

Never fly over others or near crowds.

Wires Connection:

The speed controller can be connected to the motor by soldering directly or with high quality connectors. Always use new connectors, which should be soldered carefully to the cables and insulated with heat shrink tube. The maximum lengtb of the battery pack wires shall be within 6 inches.

- Solder controller to the motor wires.
- Solder appropriate connectors to the battery wires.
- Insulate all solder connectors with heat shrink tubes.
- Plug the "JR" connector into the receiver throttle channel.
- Controller Red and Black wires connects to battery pack Red and Black wires respectively.



Specification:

Type	Cont. Current(A)	Burst Current (A) 10 sec	Battery cell NiXX/Lipo	Weight (g)	BEC Output	Size(mm) W*L*H	User Program
12A BEC	12A	16A	5-12NC\2-4 Lipo	9	5.0V / 1A	21 x 22 x 7	yes
20A BEC	20A	30A	5-12NC\2-4 Lipo	20	5.0V / 2A	23 x 34 x 9	yes
30A BEC	30A	40A	5-12NC\2-4 Lipo	28	5.0V / 3A	25 x 43 x 9	yes
40A SBEC	40A	60A	5-18NC\2-6 Lipo	36	5.5V / 4A	25 x 52 x 10	yes
50A SBEC	50A	70A	5-18NC\2-6 Lipo	45	5.5V / 4A	31 x 58 x 11	yes
60A SBEC	60A	80A	5-18NC\2-6 Lipo	45	5.5V / 4A	31 x 58 x 11	yes
70A SBEC	70A	90A	5-18NC\2-6 Lipo	75	5.5V / 5A	36 x 62 x 16	yes
85A SBEC	85A	100A	5-18NC\2-6 Lipo	77	5.5V / 5A	36 x 62 x 16	yes

Features:

- Super smooth and accurate throttle linearity
- Safety thermal over-load protection
- Auto throttle shut down in signal lose situation
- Low Voltage Cutoff

Multiple Protection

1. Over-beat protection: Wben the temperature of ESC exceeds 110 deg C, the ESC will reduce the output power to allow it too cool.
2. Lost signal protection: The ESC will automatically cut power to the motor when it detects a lost of throttle signal for 2 seconds, then the motor will emit continuous beeping tone.

Mounting your ESC

1. Choose a location that has good airflow to offer best cooling to prevent overheating. DO NOT cover the side with the flat heat shield with hook and loop tape or any other material as this will greatly lower its effectiveness.
2. Mount the ESC with a combination of hook and loop tape or 2-sided foam tape.

THROTTLE CALIBRATION

1. Turn on your radio and keep throttle stick to the top position (100%)
2. Connect the battery pack to the ESC. Wait for about 2 seconds, the motor will beep four groups of two fast beep, pull the throttle to lowest position when you hear any of two fast beeps. The motor will also beep when you pull down the stick to lowest position, which indicates that your ESC has got the signal range of the throttle from your transmitter

.

Using the ESC

1. Turn on your radio and keep the throttle stick at the lowest position
2. Connect the battery pack to the ESC.
3. Motor emits two sets of audible tones in succession means the ESC is armed and ready to use. The first set of tone counting the cells of the battery the second set of means the status of the brake setting.

Entering the programming Mode

1. Turn on your radio and set the throttle stick to top positon (100%)
2. Plug the battery pack into your controller
3. Wait for 2 seconds, you will hear 4 groups of two sets of fast beeps, after this you will hear four single beeps to indicate you have successfully entered the programming mode

Programmable Items

1. Brake

a. Turn on your radio and set the throttle stick to top positon (100%)
b. Plug the battery pack into your controller
c. Wait for 2 seconds, you will hear 4 groups of two sets of fast beeps, after this you will hear four single beeps to indicate you have successfully entered the programming mode
d. When you hear _* _* _* _* means you are in the Brake menu, the default setup is OFF, if you want to turn on the brake pull the throttle stick to the lowest position.
e. The system will exit automatically and save the setting after finishing desired item. You only can setup one item at a time, if you want to program another item you need unplug the battery and power on the ESC again.

2. Battery Type : NiCad/NiMH/LiPo

a. Turn on your radio and set the throttle stick to top positon (100%)
b. Plug the battery pack into your controller
c. Wait for 2 seconds, you will hear 4 groups of two sets of fast beeps, after this you will hear four single beeps to indicate you have successfully entered the programming mode
d. When you hear ~ ~ ~ ~ means you are in the Battery Type menu, please choose your desired value by pulling the throttle stick to the lowest position.
e. The system will exit automatically and save the setting after finishing desired item. You only can setup one item at a time, if you want to program another item you need unplug the battery and power on the ESC again.

3. Low Voltage Protection Threshold (Cutoff Threshold)

a. Turn on your radio and set the throttle stick to top positon (100%)
b. Plug the battery pack into your controller
c. Wait for 2 seconds, you will hear 4 groups of two sets of fast beeps, after this you will hear four single beeps to indicate you have successfully entered the programming mode
d. When you hear *_ _* *_ _* *_ _* *_ _* means you are in the Low Voltage Protection Threshold menu, please choose your desired value by pulling the throttle stick to the lowest position.
e. The system will exit automatically and save the setting after finishing the desired item. You only can setup one item at a time, if you want to program another item you need unplug the battery and power on the ESC again.

1) For Li-xx packs- number of cells are automatically calculated and requires no user input apart from defining the battery type. This ESC provides 3 setting options for the low voltage protection threshold ; Low (2.8V)/ Medium (3.0V)/ High (3.2V). For example : the voltage Cutoff options for an 11.1V/ 3 cell Li-Po pack would he 8.4V (Low)/ 9.0V(Med)/ 9.6V(High)

2) For Ni-xx packs-low / medium / high Cutoff voltages are 50%/60%/65% of the initial voltage of the battery pack.. For example: A fully charged 6 cell NiMh pack's voltage is 1.44V x 6=8.64V,when "LOW" Cutoff voltage is set, the Cutoff voltage is: 8.64V x 50%=4.3V and when "Medium" of "High" is set, the Cutoff voltage is now 8.64V X 65%=5.61V.

4. Factory Setup Defaults:

Restore- Sets the ESC back to factory default settings;

Brake:	OFF
Battery type Detect:	LiPo with Automatic Cell
Low voltage Cutoff threshold:	Medium (3.0V/60%)
Timing Setup:	Automatic
Acceleration :	Soft Acceleration
Heli Mode :	RPM OFF
Motor Rotation:	Forward
Frequency :	16kHz
Low Voltage Cutoff Type:	Reduce power

5. Timing Setup

a. Turn on your radio and set the throttle stick to top positon (100%)
b. Plug the battery pack into your controller
c. Wait for 2 seconds, you will hear 4 groups of two sets of fast beeps, after this you will hear four single beeps to indicate you have successfully entered the programming mode
d. When you hear – – – – means you are in the Timing Setup menu, please choose your desired value by pulling the throttle stick to the lowest position.
e. The system will exit automatically and save the setting after finishing the desired item.

You only can setup one item at a time, if you want to program another item you need unplug the battery and power on the ESC again.

Automatic (7-30 deg) – ESC automatically detect the best motor timing

Low (7-22 deg) – Setting for most 2 pole motors.

High(22-30 deg)-setting for motors with 6 or more poles.

Note: For the beginner we recommend automatic timing to achieve best performance. For the multiple poles motor we recommend high timing to gain best efficiency.

6. Acceleration

a. Turn on your radio and set the throttle stick to top positon (100%)

b. Plug the battery pack into your controller

c. Wait for 2 seconds, you will hear 4 groups of two sets of fast beeps, after this you will hear four single beeps to indicate you have successfully entered the programming mode

d. When you hear V V V V V V V V means you are in the Star up Strength menu, please choose your desired value by pulling the throttle stick to the lowest position.

e. The system will exit automatically and save the setting after finishing the desired item. You only can setup one item at a time, if you want to program another item you need unplug the battery and power on the ESC again.

Soft —— Recommend for the plane with driving gears or helis

Normal- Recommend for the plane with driving gears or helis

Hard – Recommend for direct driving system

7. Heli Mode: RPM Off/Mode 1/Mode 2

a. Turn on your radio and set tbe throttle stick to top positon (100%)

b. Plug the battery pack into your controller

c. Wait for 2 seconds, you will hear 4 groups of two sets of fast beeps, after this you will hear four single beeps to indicate you have successfully entered the programming mode

d. When you hear _*_ _*_ _*_ _*_ means you are in the Heli Mode, please choose your desired value by pulling the throttle stick to the lowest position.

e. The system will exit automatically and save the setting after finisbing the desired item. You only can setup one item at a time, if you want to program another item you need unplug the battery and power on the ESC again.

RPM OFF: Default

Heli Mode 1: There is 5 seconds delay from start to full heading speed.

Heli Mode 2: There is 15 seconds delay from start to full heading speed.

Note: ESC Brake and Low Voltage Cutoff Type settings will automatically be reset to Brake Off and Reduce Power respective once the Heli mode is activated.

8. Motor Rotation: Forward/ Reverse

a. Turn on your radio and set the throttle stick to top positon (100%)

b. Plug the battery pack into your controller

c. Wait for 2 seconds, you will hear 4 groups of two sets of fast beeps, after this you willhear four single beeps to indicate you have successfully entered the programming mode

d. When you hear W W W W means you are in the Motor Rotation menu, please choose your desired value by pulling the throttle stick to the lowest position.

e. The system will exit automatically and save the setting after finishing the desired item. You only can setup one item at a time, if you want to program another item you need unplug the battery and power on the ESC again.

There are two ways to change the motor rotation: a) by swapping any two motor wires b) by programming with program card or radio.

9. Switching Frequency

a. Turn on your radio and set the throttle stick to top positon (100%)

b. Plug the battery pack into your controller

c. Wait for 2 seconds, you will hear 4 groups of two sets of fast beeps, after this you will hear four single beeps to indicate you have successfully entered the programming moded.

d. When you hear // // // // means you are in the Switching Frequency menu, please choose your desired value by pulling the throttle stick to the lowest position.

e. The system will exit automatically and save the setting after finishing the desired item. You only can setup one item at a time, if you want to program another item you need unplug the battery and power on the ESC again.

8kHz – In runner motor recommended

16kHz – out-runner motors recommended

10. Low Voltage Cutoff Type

a. Turn on your radio and set the throttle stick to top positon (100%)

b. Plug the battery pack into your controller

c. Wait for 2 seconds, you will hear 4 groups of two sets of fast beeps, after this you will hear four single beeps to indicate you have successfully entered the programming mode

d. When you hear _ _ _ _ means you are in the Low Voltage Cutoff menu, please choose your desired value by pulling the throttle stick to the lowest position.

e. The system will exit automatically and save the setting after finishing the desired item. You only can setup one item at a time, if you want to program another item you need unplug the battery and power on the ESC again.

Reduce Power – Lower the power output

Hard Cutoff – Immediately shut down the power once the voltage reaches the preset value

Programming Tone Reference Table

Programmable Item/Tones	Option
Throttle Calibration	
(Within the first 4 Sec) •• •• •• ••	
1 Brake	
_* _* _* _*	Brake On/Off *
2 Battery type	
~ ~ ~ ~	NiCad/NiMH
~~ ~~ ~~ ~~	*Lipo
3 Low Voltage Cutoff Threshold	
* * * * * * * *	Low2.8v/50%
* ** ** ** *	*Medium3.0v/60%
* ** ** ** *	High3.2v/65%
4 Restore Factory Setup Defaults	
— — — —	Restore
5 Timing Setup	
- - - -	*Automatic(7-30°)
-- -- -- --	Low(7-22 °)
--- --- --- ---	High(22-30 °)
6 Acceleration	
V V V V V V V V	*Soft
V V V V	Normal
V V V V V V V V	Hard
7 Heli Mode	
* * * *	*Rpm off
** ** ** **	Heli Mode 1
*** *** *** ***	Heli Mode 2
8 Motor Rotation	
W W W W	*Forward/Reverse
9 Switching Frequency	
// // // //	8KHz
\\ \\ \\ \\	*16KHz
10 Low Voltage Cutoff Type	
- - - -	*Reduce Power
— — — —	Hard Cutoff

Frequently Asked Questions

Q: Motor does n't work, but there are audible tones signal the number of cells after powering up ESC
Possible cause: The ESC throttle calibration has not set up.
Possible Solution: Set up the ESC throttle calibration.

Q: Motor does n't work and no audible tone emitted after connecting the battery. Ser not working either.
Possible cause:
1. Poor/loose Connection between battery Pack and ESC;
2. No power;
3. Poor soldered connections (dry joints);
4. Wrong battery cable polarity;
5. ESC throttle cable connected to receiver in the reverse polarity.

Possible Solution: Check all the connections make sure you are doing it right.

Q: Motor does not work but servos do
Possible Cause:
1. Poor / loose connection between ESC and motor;
2. Burnt motor coils;
3. The battery pack voltage exceeds the acceptable range;
4. Throttle stick is not at the lowest position;
5. The ESC throttle calibration has not set up.

Possible Solution:
1. Clean connector terminals or replace connectors;
2. Replace motor;
3. Re-solder the cable connections;
4. Replace with a freshly charged battery pack,Check battery pack voltage.

Q: Motor does not work but beeps like in the programming mode
Possible Cause: Reversed throttle channel caused the ESC to enter the programming
Possible Solution: Enter the servo reverse menu on your transmitter and reverse the channel.
Note: For Futaba radios set the throttle channel to Reverse.

Q: Motor runs in reverse rotation
Possible Cause: Wrong cables polarity between the ESC and the motor.
Possible Solution: Swap any two of the three cable connections between the ESC Motor or access the Motor Rotation function via the ESC programming mode and the pre-set parameters.

Q: Motor stops running in flight.

Possible Cause:

1. Lost throttle signal;
2. Battery Pack voltage has reached the Low Voltage Protection threshold;
3.Possible bad cable connection.

Possible Solution:

1. Check proper operation of the radio equipment. Check the placement of the ESC and the Receiver and check the route of the receiver's aerial and ESC cables to ensure there is adequate separation to prevent RF interference.Install a ferrite ring on the ESC's throttle cable;
2. Land the model immediately and replace the battery pack;
3. Check and verify the integrity of the cable connections.

Q: Motor restarts abnormally ESC Overheats

Possible Cause:

1. Possible RF Interference at the flying field;
2. Inadequate Ventilation;
3. Servos drawing too much current and over loading the ESC;
4. Over sized motor or prop.

Possible Solution:

1. The normal operation of the ESC may be susceptible to surrounding RF interference. Restart the ESC to resume normal operation on the ground to verify recurrence. If the problem persists, test the operation of the ESC at a different flying field;
2. Relocate the ESC to allow better ventilation;
3. Use servos tbat are adequately sized for the ESC. The maximum BEC current drawn should be within the BEC limits;
4. Reduce Prop size or resize the motor.