



# 深圳市飞盈佳乐电子有限公司

SHEN ZHEN FLYCOLOR ELECTRONIC CO.,LTD

**Shenzhen Flycolor electronic Co.,Ltd**

## **Manual for brushless motor electronic speed control (used for ship)**

Dear user,

Thanks for using the brushless motor intelligent power electronic speed controller(ESC) which designed and manufactured by Shenzhen FLYCOLOR electronic Co.,Ltd.. Improper use or operation may cause personal injury and equipment. Because this product will generate big power when you switch on it. We strongly suggest customer read the user manual carefully before using it and operate it according to the manual strictly. We don't assume any liability arising from the use of this product, including but not limited to incidental damages or consequential damages liability. Meanwhile, we don't assume any responsibility of the use of unauthorized removable and modify any liability arising from this product and caused by third-party products.

We have the right without notice to change the products, including appearance, performance parameters, and use requirements; do not make any guarantee, statement or promise for the product is suitable for the user's particular purpose.

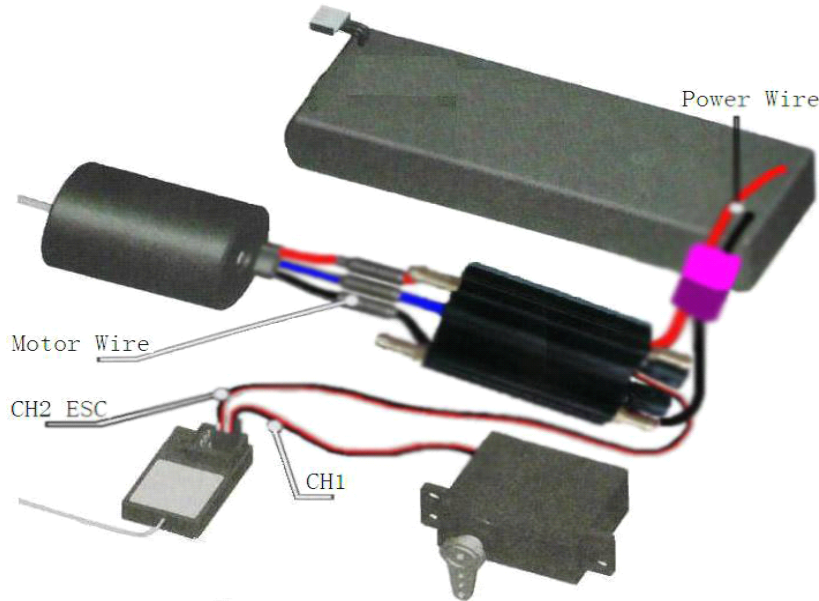
### **I. Main features:**

- Applies to multiple kinds of three-phase brushless motor in the drive market.
- Can operate normally without special setting.
- Motor operating parameters can be set by remote control or programming card with voice prompts, very simple and convenient.
- With multiple self-protection function: battery over low voltage, over thermal, throttle lost, motor blocked etc.
- Auto entrance angle , automatically adapt to various types of high-speed motor.
- Have a smooth, delicate feel of speed controlling, top-ranking of speed linear. the end of throttle can automatically correct.
- Battery cells can be automatic judged
- High quality components and water cooling system ensure that ESC expresses the strong capacity of resistance of flow (current overcurrent).

### **II.First start setting**

Warning: please set up the boat model before using , to make sure the quant won't encounter people or objects, and avoid occurring safety accident!

1. Connect the wire as the graphical representation, enter 2.

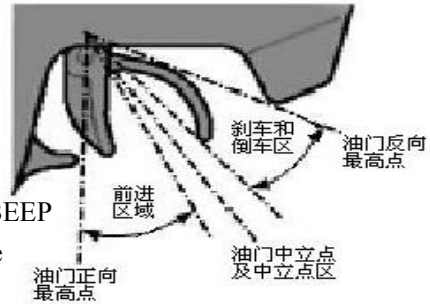


## 2. Set throttle trip

Firstly, the user must understand the performance of the remote control , the range and direction of throttle control. what's your purposes for the model you are handling. For different purpose it has different setting for the model.

### Set throttle with gun-type remote control

Cut off the main power supply of ESC, turn on the power supply of transmitter and receiver. Pull the transmitter throttle to the end(Max of the throttle),connect the main power of ESC and wait for 2S ,the motor will make 3 sound of BEEP like“ $\$ \$ \_ \$ \$ \_ \$ \$$ ”.When hearing the third sounds, please loose the throttle to the middle (if you set full throttle, pull to the highest of reverse direction.)When motor makes 1 sound  $\$$  ,the set of throttle trip has finished and stored in the ESC. Wait for 2S, motor will make single sound for many times. After the single sound, It will make 2 continuous sound  $\$ \$$  .At this time, it shows ESC has been ready. Motor can work by increasing the throttle



### Set throttle with Panel-type remote control

●Cut off the main power supply of ESC, turn on the power supply of transmitter and receiver. Pull the transmitter throttle to the end(Max of the throttle),connect the main power of ESC and wait for 2S ,the motor will make 3 sound of BEEP like“ $\$ \$ \_ \$ \$ \_ \$ \$$ ” (it shows the Max throttle is ensured by ESC.)When hearing the third sounds, please loose the throttle to the middle (if you set full throttle, pull to the highest of reverse direction.)When motor makes 1 sound  $\$$  ,the set of throttle trip has finished and stored in the ESC.Wait for 2S, motor will make single sound for many times. After the single sound, It will make 2 continuous sound  $\$ \$$  .At this time, it shows ESC has been ready. Motor can work by increasing the throttle.



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: If losing the signal of receiver during the operation, the output of motor will be cut off in 1S and makes sound of BEEP “ $\phi$ \_\_” with interval 1S.

( but PCM receiver lose the signal of transmitter , it will keep the normal control signal, ESC won't provide the sound through motor at this time.)

※ For gun-type remote control and panel-type remote control , ESC support the set of half throttle trip .It can set the Maximum –Minimum. The maximum – every position where between middle throttle and the Max position.(when using the panel remote control without being back to the middle automatical ,the residence time of the maximum throttle setting should wait for the end of the sound of battery test. For security, if the throttle is pushed when the throttle is lower the middle the throttle, the present position should be as the lowest position. Please pay attention to it.)

## III. Start up

》 a Push the throttle to the lowest ( two-way throttle back to the middle)

If ESC has connected in circuit, please check if ESC connects battery pack. If connected battery pack, please disconnect the battery pack.

》 b Connect ESC with battery pack.

》 c Wait for 2S, motor will make the N times sound of BEEP “ $\phi$ \_\_”(N=LiPo cells),( “\_\_” means pause a while after the sound  $\phi$  .

Shows the power supply voltage of ESC is in the appropriate range. If there is no sound, shows the voltage of ESC's battery pack isn't in the specified range. For example, ESC's voltage is 2-6S, if it's lower than 2S or higher than 6S, ESC won't make sound.

》 d “N” times sound , motor will make continuous 2 short sound  $\phi$   $\phi$

ESC enter the process of remote control throttle trip automatic practice. It can operate with starting by controller.

## IV. Set the alteration of main options

》 1 When starting with factory default parameter, it won't enter “4 set alteration of main options”.

》 2 The processing of altering ESC's parameter is as following:

》 3 If ESC has connected in the circuit, please check if ESC has connected battery pack.

If connected battery pack, please disconnect battery pack first.

》 4 Push the throttle of remote control to the Max position in the forward direction and keep in this position. Connect the disconnected battery pack in the circuit again , wait for 2S.

\*1 Motor makes the sound of BEEP “ $\phi$   $\phi$  \_\_  $\phi$   $\phi$  \_\_  $\phi$   $\phi$  \_\_”

\*2 Motor makes the sound of BEEP “ $\phi$   $\uparrow$   $\phi$   $\downarrow$  \_\_  $\phi$   $\uparrow$   $\phi$   $\downarrow$  \_\_  $\phi$   $\uparrow$   $\phi$   $\downarrow$  \_\_”

Enter main options 1~6

BEEP “ $\phi$  \_\_  $\phi$  \_\_  $\phi$  \_\_” 3 times, main option 1

BEEP “ $\phi$   $\phi$  \_\_  $\phi$   $\phi$  \_\_  $\phi$   $\phi$  \_\_” 3 times, main option 2

BEEP “ $\phi$   $\phi$   $\phi$  \_\_  $\phi$   $\phi$   $\phi$  \_\_  $\phi$   $\phi$   $\phi$  \_\_” 3 times, main option 3

BEEP “ $\phi$   $\phi$   $\phi$   $\phi$  \_\_  $\phi$   $\phi$   $\phi$   $\phi$  \_\_  $\phi$   $\phi$   $\phi$   $\phi$  \_\_” 3 times, main option 4

BEEP “ $\phi$   $\phi$   $\phi$   $\phi$   $\phi$  \_\_  $\phi$   $\phi$   $\phi$   $\phi$   $\phi$  \_\_  $\phi$   $\phi$   $\phi$   $\phi$   $\phi$  \_\_” 3 times, main option 5

BEEP “ $\phi$   $\uparrow$  \_\_  $\phi$   $\uparrow$  \_\_  $\phi$   $\uparrow$  \_\_” 3 times, main option 6

\*3 When you hear the sound of the main option that you want to set, please loose the throttle to the middle, enter “the sub option of this main option”.

\*4 “ prompt tone chart”, every sub option makes 3 sounds as the order in the chart. Don't move the throttle, it will make sound in the 3 sub options circularly. When hearing the sound that you wanted sub option . Push the throttle to



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the Max in the forward direction. When making 1 sound “ \$ \_ ” , shows this sub option has set successfully.

Keep the throttle in the Max position and back to the main option.

\*5 Set 1~6 options as this procedure.

\*6 Push the throttle to the minimum (the Maximum of the reverse direction). Back to the middle after the short sound.

Note: “\*2” in “》4” , when hearing the third sound, please push the rocker to the lowest throttle. The parameter of ESC will restore factory default. It's effective to restore the disordered parameter. When hearing the 2 short sound “ \$ \_ ” , shows it restores factory default( don't set other options) , you can operate with the mode that manufacturer setted.

The chart of prompt tone

Prompt sound projects	1 short beep	2 short beep beep	3 short beep beep beep	4short beep beep beep beep	5 short beep beep beep beep	1 rising tone ↑	2 rising tone ↑↑	3 rising tone ↑↑↑	4 rising tone ↑↑↑↑
Operation mode	Forward with brake	Forward and Reversible with brake	Direct Forward and Reversible						
4.Neutral range	6%	9%	12%						
Battery low-voltage protection	Non Protection	2.6V	2.8V	3.0V	3.2V	3.4V			
6.start up acceleration	1 level	2 level	3 level	4 level	5 level	6 level	7 level	8 level	9 level
5.reverse Force	25%	50%	75%	100%					
6.entrance angle setting	0 degree	5 degree	10 degree	15 degree	20 degree	25 degree	30 degree	automatic	

## Use programming card

Use programming card to set the ESC is the most ideal and convenient choice, only insert the signal line of ESC into the programming card, select the item you want to change (see table above),press [OK] ,VALUE window displays "S". (To restore the last option press the [RESET] then click [OK] ).

Setting (programming) item description and term explanation

### ★ 1 Operation mode

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Forward with brake: can only move forward, when throttle reverse, it is brake. without reversing. this mode is mainly used for racing.

Positive and negative rotation with brake: reverse function is available. when push the throttle from forward direction to the reverse zone, Ship model is in the braking state, the throttle must return to the middle, And the motor stops operating then reversing, this mode is mainly used for training..

Direct positive and negative rotation: When push the throttle from the middle point region to the reverse zone, the motor reverses immediately..

## ★ 2 Designated region in the throttle

The designated region of the throttle are 6%, 9%, 12%, you can choose according to personal preference after experiments

## ★ 3 Battery low voltage protection

To prevent the lithium battery from over-discharge damage, the ESC will monitor the battery voltage all the time during operation, once the battery voltage is below the set value, the motor output will be cut off.

## ★ 4 Start acceleration

9 levels in total, the default is 6 levels , select the appropriate acceleration, according to the area and personal habit, the higher level the faster start, but a high requirement for the discharge capacity of the battery,(if high level with insufficient battery capacity, it may cause abnormal start, then please reduce the level.) it's difficult to operate.

## ★ 5 Maximum reverse force

4 kinds of options: 25%, 50%, 75%, 100%, different option has different reverse force, it is recommended to use a less option, to avoid collision because the strength is too big to control hard when reversing.

## ★ 6 Entrance angle setting

0 degrees, 5 degrees, 10 degrees, 15 degrees, 20 degrees (the default), 25 degrees,30 degrees, automatic optional

The role of this function:

- ▶ Compatible with different motors, this motor can't operate normally in the default entrance angle, need to adjust into the right entrance angle before work properly.
- ▶ By adjusting the entrance angle, you can fine-tune the motor output speed, the higher the entrance angle, the higher maximum output speed, and power consumption is greater.
- ▶ By adjusting the entrance angle, the motor can work in the best efficiency point.
- ▶ Auto entrance angle can adjust entrance angle automatically between 0-30 degree according to the motor speed ,user can use this angle as it's simple setting.

## Announcements

- When controlling the system, please note if the ESC is approved by CE.
- Properties of electrical or mechanical like bad technology may cause the unconscious operation of the motor, loose parts may cause serious personal injury or property damage.
- The ESC is specifically used for RC(remote control) model. Manned aircraft is prohibited
- Do not reverse the power supply batteries' polarity of ESC when connecting(+side and -side flip).if the polarity of the battery pack connected to the ESC reverse, it will cause irreparable damage.
- Electronic equipment is sensitive to moisture, if the ESC is wet , please do some dry processing or contact us to give guidance.
- The ESC must connect to standard power strictly, if the voltage of the power is too high, the ESC will be damaged, if

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too low, it won't work normally.

● When turning off the battery of receiver, please note: Depending on the receiver you are using, it will send false throttle signal to the ESC, which will shorten the lifetime of the motor.

● Protect the ESC from mechanical load, vibration, dust and pollution.

● The length of motor cable should be as short as possible, can not exceed stated maximum length of the cable between the batteries and the ESC. The inside wiring of the battery pack must be as short as possible. Embedded way connected to the battery pack.

● Although some ESC use On/Off Switch to separate from the battery, but it can't completely insulate with the battery. the function of the ESC can be revealed with full use. Only in good handling state can protect and monitor the circuit

● In the case of motor fault(like coil short circuit),controller's over-temperature sensors responds is very slow in the prevention of damage. turn off the motor Immediately to prevent permanent damage to the ESC.

Note: Keep in mind that the circuit monitor can not detect each of the abnormal operation, like the broken of motor cable. if the motor's stop current higher than the controller's peak current, the stall motor will hinder current limiter. For example, if you connect 80A ESC with 20A motor, although the motor is stalling, the current monitor can not detect excess current.

● Interference

We think that some interference is related to the types of motor. The the occurrence of interference is related to different manufacturers of motor.

## 5. Tips should be pay attention and fault handling table

Failure phenomenon	Possible reason	Solution
when power on, motor does not work,come with "BEEP--,BEEP--"warning sounds.( Each group of dual sounds' time interval is 1second)	The battery packs' voltage is not in the normal range	Check the battery voltage
increase the throttle of remote control in the forward direction,Ship move in the opposite direction	1.The ESC output lines and motor Line are connected in wrong order 2.Maybe the problem of positive and negative control Settings	1.If it is senseless motor, exchange every two of the three connect line,or solve the problem as below. 2. Change the positive and negative control Settings
Motor suddenly stopped in the process of running	1. Receivers meet interference 2. The ESC is on the condition of battery low voltage protection or temperature protection	1.Rule out interference and power on to start up again 2.Replace the battery, use again until the temperature drop.
When motor startup quickly increase the throttle , motor come with the problem like Stick or pause	1. The battery discharge ability is not enough 2. Motor running speed is too high, reduction ratio is too small 3. The ESC start acceleration set is too high	1. Replace a high ability battery 2. Exchange to low speed motor or improve the reduction ratio. 3. Set the ESC start acceleration softer.