

## (Boat Brushless ESC)



Thank you for purchasing our brushless electronic speed controller (ESC). Any improper operation may cause personal injury and equipment damage. This high power system for RC model can be dangerous, we strongly suggest users read the instruction carefully and completely. We will not assume any responsibility for personal injury, property damage, or any consequential damages resulting from our product.

## 01 Main features

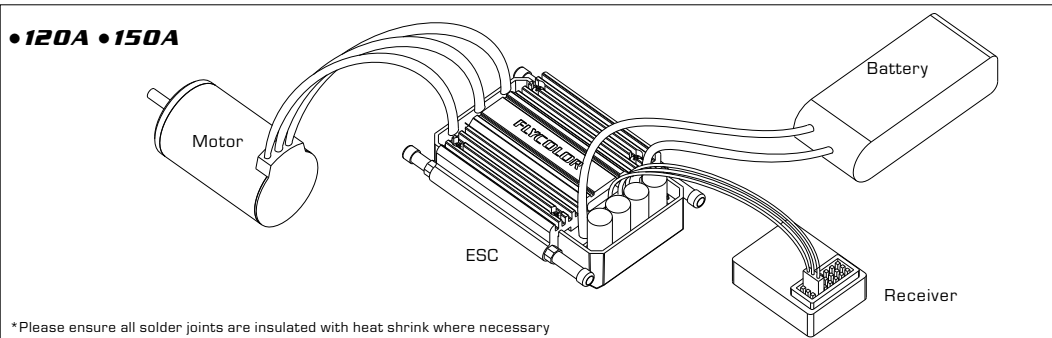
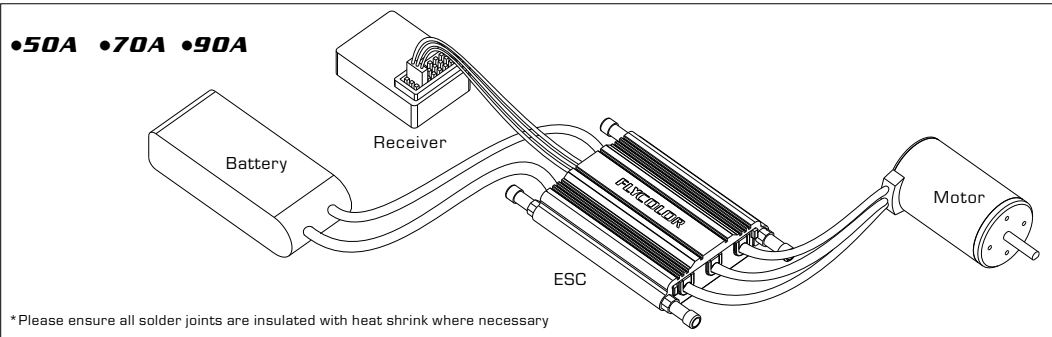
- Use powerful & high performance MCU. Users can set functions as their demand, fully embody Intelligent characteristics. Unique circuit design, strong anti-interference.
- Waterproof design(Note: if there is water in the ESC, Please dry the water at the connectors).
- Start mode can be set. throttle response fast, and it has a very smooth speed control linearity. Compatible with scale boat & racing boat.
- Low-voltage protection threshold value can be set.
- Built-in switch BEC, large power load with servo, lower power dissipation.
- Multiple protection functions: input voltage abnormal protection/ low-voltage cutoff protection, over-thermal protection and throttle signal loss protection, make the ESC more reliable.
- High power safety performance: wherever the throttle lever is, the motor will not start immediately.
- Over thermal protection: when ESC temperature is over 100 °C, output power will automatically reduce. When it's lower than 80°C output power will return to normal.
- Cycle menu setting, simple operation. Support setting with program box and transmitter.

## 02 Specification

Model	A-SW050006	A-SW070006	A-SW090006	A-SW120006	A-SW150006
Cont. Current	50A	70A	90A	120A	150A
Burst Current	300A	420A	540A	720A	900A
LiPO Cells	2-6S	2-6S	2-6S	2-6S	2-6S
BEC Type	Switch BEC	Switch BEC	Switch BEC	Switch BEC	Switch BEC
BEC Output	5.5V/5A	5.5V/5A	5.5V/5A	5.5V/5A	5.5V/5A
Weight	90g	101g	102g	155g	169g
Dimension (Exclude water pipe)	57*49*18mm	57*49*18mm	57*49*18mm	76*56*25mm	76*56*25mm
Application	Boat length < 55cm	Boat length < 70cm	Boat length < 100cm	Boat length < 120cm	Boat length < 135cm

## 03 Wiring Diagrams

Note: We strongly advise the use of battery connections that do not allow reverse polarity, or ESC will be damaged. Please disconnect the battery and ESC, if not use for a long time.



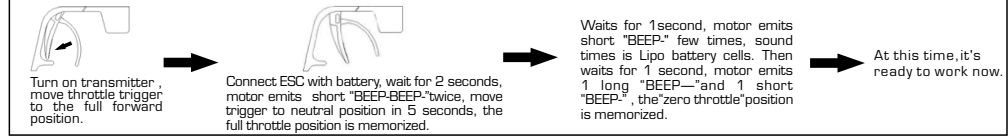
## 04 Operation Instruction

### 1 Set throttle range

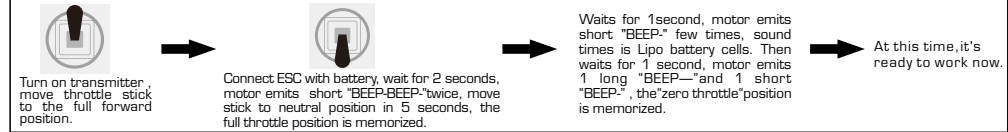
Advise set throttle range when first time to use Flycolor ESC.

The feature of Flycolor ESC is that set the best throttle range according to different transmitter, then ESC can get the most smoothly throttle linear through throttle range of transmitter. To make ESC get and memorize throttle output signal. The process only do once, you need do this process again after changing transmitter.

Operation procedure with Pistol Transmitter

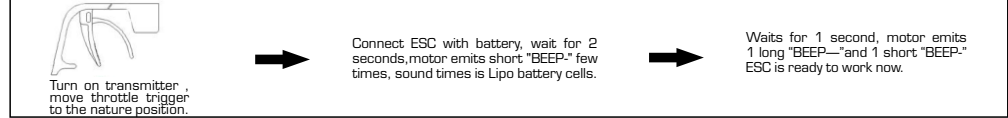


Operation procedure with Stick Transmitter

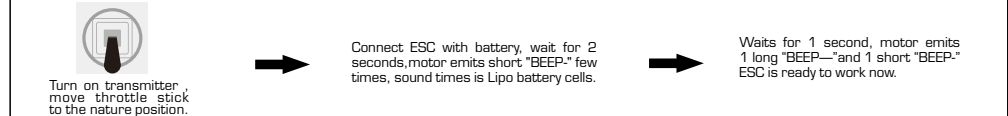


### 2 Normal working mode

Operation procedure with Pistol Transmitter



Operation procedure with Stick Transmitter



## 05 Programming

### 1 Programming with transmitter

#### 1. Enter programming mode :

- 1 Turn on transmitter, move throttle to the full forward position.
- 2 Connect ESC with battery, wait for 2 seconds, motor emits short "BEEP-BEEP"-twice, it means power up normally.
- 3 Wait for 5 seconds, motor emits special tone "12321", it has entered programming mode.

#### 2. Select setting options:

After entering programming mode, you will hear 5 groups tone which emits in a loop as following sequence. After motor emits a group of tone, move the throttle to the neutral (pistol transmitter) / the full down throttle position (the stick transmitter), it enters this option. (Note: there is a special tone "12321" before the loop tone, "12321" is the start of selecting option.)

- 2.1 Running Mode (1 short tone) "beep-"
- 2.2 Motor direction adj. (2 short tone) "beep-beep-"
- 2.3 Low voltage protection (3 short tone) "beep - beep - beep -"
- 2.4 Start Mode (Punch) (4 short tone) "beep-beep- beep-beep -"
- 2.5 Timing (1 long tone) "beep -"

Note: Usually, 1 long tone "beep-" equals to 5 short tone "beep-", for example: 1 long tone "beep-" and 1 short tone "beep-" equals to 6.

#### 3. Select parameter:

Goes into some one setting option, motor will emit tone in a loop, move the throttle to the forward full position after a certain tone, so the parameter of this option has selected, then motor emits special tone "1212", this parameter has stored. (If don't select other options, move throttle to the nature position in 3 seconds, then motor emits special tone "765765", exit the program mode. If go on selecting other options, please return to procedure 2, and select other options).

\*Shadow parts are factory default value

	1 short tone	2 short tone	3 short tone	4 short tone	1 long tone	1 long1 short	1 long2 short	1 long3 short	1 long4 short
Running Mode	Forward	Forward & Reverse							
Motor direction adj.	CW	CCW							
Low voltage protection	Non-protection	2.6V	2.8V	3.0V	3.2V	3.4V			
Start Mode (Punch)	Level 1	Level 2	Level 3	Level 4	Level 5				
Timing	0°	3.75°	7.5°	11.25°	15°	18.75°	22.5°	26.25°	

#### 4. Exit programming

There are 2 ways to exit programming mode:

- 4.1 After hearing the tone "f1212", move throttle to the throttle neutral position, motor emits special tone "f765765", it exits programming mode.
- 4.2. Turn off power can exit programming mode. saved setting data are the setting before turning off.

## 2 Programming with program card

It's the easiest way to set with programming card. Operation is as following: insert signal wire to the interface in programming card , select the options that you want ( see in the above chart), press [OK] , after VALUE screen displaying "S" , this option sets successfully . If want to reset the option to factory setting, please press [RESET] , then press [OK] .

(Please see the instruction of program card for more detail)

## 06 Programmable Items

### 1. Running Mode

(1) Forward only (Unidirectional)

This mode is mainly used for special application, such as competition.

(2) Forward & Reverse (Bidirectional)

When pushing the throttle into reverse, the RC boat will run in reverse after the motor stop running. This mode is mainly used for most of the application, such as training etc.

### 2. Motor direction adjustment

(1) CW

(2) CCW

Motor direction adjustment, convenient users change motor rotation without changing motor wire.

### 3. Low voltage protection

(1) Non-protection ; (2) 2.6V; (3) 3.2V; (4) 3.2V; (5) 3.2V; (6) 3.4V

The low voltage protection it's mainly for LiPO battery; For NiMH, we advise you select non- protection.

### 4. Start Mode (Punch)

(1) Level 1 ; (2) Level 2 ; (3) Level 3; (4) Level 4; (5) Level 5 ;

5 levels linear throttle acceleration startup, the lever higher, the speed faster.

### 5. Timing

(1) 0° ;(2) 3.75°; (3) 7.5°; (4) 11.25°; (5) 15°; (6) 18.75°; (7) 22.5°; (8) 26.25°;

Low ( 0° / 3.75° / 11.25° / 15° / 18.75° ) --set for most inner rotor motor.

High ( 22.5° / 26.25° ) --set for 6 poles and more than 6 poles outer rotor motor.

In most cases, 15° timing is suitable for all types motor .But to improve efficiency, we advise to set low timing for 2 poles motor( most inner rotor motors), set high timing for 6 poles or more than 6 poles motors(most outer rotor motors) . For high speed motor , set high timing. Some motors need special timing setting, if you're not sure, please use timing degree recommended by motor manufacturer or set 15° .

Note: After changing timing degree, please test it successfully before playing it in the water.

## 07 Protection Functions

Startup protection	After connecting with battery, if throttle is not in the zero throttle position, motor will emit urgent short tone ,if not detect the signal ,motor will emit urgent short tone every 2 second time, you can not start motor until detect the zero throttle position.
Low voltage protection	If battery input voltage is lower than low voltage protection threshold, ESC will reduce output power (equal to 50% throttle), keeps 5 seconds and motor stops. Move throttle to the zero throttle position to restart motor. This process can work repeated.
Over heat protection	When ESC temperature is higher than 100 °C, it will reduce output power (throttle will be limited below 50%) for protection, leave some power for motor to land , when temperature is lower than 80 degree celcius, ESC recover to normal running mode.
Signal losing protection	When motor running, if ESC detect throttle signal losing, ESC will cut off output to avoid damage caused by rotating propeller. Output power will return normal if throttle signal recover.

Alarm tone: (To judge the abnormal cases via alarm tone )

1. Alarm tone of signal loss : when ESC detects no signal , motor will emit the alarm tone "BEEP- BEEP -BEEP-" (alarm tone emits every 2 seconds)

2. Alarm tone of throttle not in the zero throttle position: throttle not in the zero throttle position, motor will emit "BEEP-BEEP-BEEP-BEEP-BEEP-" ( urgent single short tone).

## 08 Safety Cautions

- Please don't remove or modify any components on ESC, or it may cause permanent damage or data losing.
- First time to test ESC and motor, if not sure of the setting of receiver is correct or not, please don't install propeller and driving gear.
- Please don't use broken, short-circuited and over-heated battery pack.
- Please don't use substandard cables and cords and connectors.
- Battery cells and servos number can't be exceed ESC standard.
- Please mind battery polarity, wrong polarity connection will damage ESC.
- Please don't put ESC in a moist and glare place.
- Please don't remove battery when motor is rotating, it will cause the huge peak current and ESC burning.
- Please install ESC in the ventilated place, don't wrap anything around the ESC.

## 09 Trouble Shooting

Troubles	Possible causes	Solutions
After powering up, motor doesn't run and doesn't emit any sound.	Bad connection between ESC and battery.	Clean the connectors or replace them, check the connection polarity.
	Signal wire connects with wrong polarity of receiver.	Check signal wire and make sure the right polarity.
	Bad soldering cause bad contact.	Solder the wires again.
	The wrong polarity connection between each battery.	Check battery pack, connect the wire again.
	Quality problem of ESC.	Change ESC.
After powering up, ESC emits the sound of battery cells, but motor can't run.	ESC doesn't set throttle range.	Set throttle range again.
After powering up, ESC works ,but motor can't run and doesn't emit any sound. After powering up ESC, motor doesn't run and emits warning tone "BBEP-BEEP" (a short stop after "BBEP-BEEP")	Bad connection between ESC and motor, or bad soldering.	Check the connectors or replace the connectors or solder the motor wire again.
	Bad motor.	Change motor.
	ESC is low-voltage protected , battery voltage is out of the acceptable range.	Check the voltage of battery pack and use full-charged battery to replace.
After powering up, motor doesn't work and emits warning tone "BEEP-" (a short stop after "BEEP-")	No output throttle signal from receiver.	Check if right connection between signal wire and receiver throttle channel. Check transmitter and receiver, make sure there are signal outputs.
After powering up, motor doesn't work and emits continuous warning tone "BEEP-"	Throttle doesn't in the zero position.	Push the throttle to the zero position, or set throttle range again.
After powering up, motor doesn't work .ESC emits 2 long "BEEP" and 2 short "BEEP".	The positive and negative of throttle channel is wrong. So ESC enters programming mode.	Refer to the user instruction of transmitter, adjust the setting of throttle channel.
Motor rotates in the opposite direction.	The wrong sequence of connection wires between motor and ESC.	1. Exchange random 2 of the 3 connection wires between ESC and motor. 2. Change motor rotation direction via transmitter or programming card.
Motor stops during running	Battery voltage is lower than low-voltage protection threshold and low-voltage protection mode is cutoff output.	1. Set right low-voltage protection threshold. Run with full-charged battery pack. Choose reduce power as Low-voltage protection .If power is decreasing during running, please sail back soon. 2. Make sure your boat in the range available to control with your transmitter. 3. Attention to the voltage of transmitter, if it will run out of the battery, please sail back soon.
	Loss throttle signal	1. Check if the transmitter operation correct. 2. Check if transmitter match with receiver. 3. Strong electromagnetic interference around the used environment, try to turn off and power up again, to see if it recovers normal work, if the problem come up again and again, please change to another field.
	Bad connection between wires	Check the connectors of battery pack, battery wires , motor wires connections are good.



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