

Declaration

Thanks for purchasing our Electronic Speed Controller (ESC). High power system for RC model can be very dangerous, so we strongly suggest you read this manual carefully. In that we have no control over the correct use, installation, application, or maintenance of our products, no liability shall be assumed nor accepted for any damages, losses or costs resulting from the use of the product. Any claims arising from the operating, failure of malfunctioning etc. will be denied. We assume no liability for personal injury, consequential damages resulting from our product or our workmanship. As far as is legally permitted, the obligation to compensation is limited to the invoice amount of the affected product.

Features

This series contains ESCs of 60A and 120A for cars and trucks.

- ★ Compatible with sensorless brushless motor, sensored brushless motor and brushed motor.
- ★ Use top quality electronic components such as IR™ (USA) super MOSFET and Rubycon™ (Japan) lowest resistance capacitor etc. to enhance the current endurance ability of the ESC.
- ★ Excellent start-up, acceleration and linearity features.
- ★ 2 running modes (Racing mode and Forward/Backward mode)
- ★ 4 steps of maximum reverse force adjustment.
- ★ Proportional ABS brake function with 4 steps of maximum brake force adjustment, 8 steps of drag-brake force adjustment and 4 steps of initial brake force adjustment.
- ★ 9 start modes (Also called "Punch") from "Very soft (Level 1)" to "Very aggressive (Level 9)".
- ★ Multiple protection features: Low voltage cut-off protection for lithium or nickel battery / Over-heat protection / Throttle signal loss protection / Motor blocked protection.
- ★ 8 steps of timing adjustment, and you can use this programmable parameter to adjust the timing value even for sensored brushless motor, while for ESC from other manufacturers, you must turn the rear cover of the motor to change the timing value.
- ★ Easily program with only one button and compatible with pocket-sized program card.

Specifications

Model	Xerun-60A-SD	Xerun-120A-SD
Continuous Current	60A	120A
Burst Current	360A	720A
Resistance	0.0006 ohm	0.0003 ohm
Suitable Car	1/10, 1/12 on-road or off-road cars / trucks for general race	1/8, 1/10, 1/12 on-road or off-road cars / trucks for competition race
Suitable Brushless Motor	> 5.5T or = 5.5T (note 1)	> 2.5T or = 2.5T (note 1)
Battery (note 3)	4-9 Cells Ni-xx (NiMH or NiCd) or 2-3 Cells Li-Po ★ For 4-6 Cell Ni-xx: You needn't change the original cooling fan coming with the ESC; ★ For 7-9 Cell Ni-xx: You must change the original cooling fan because it cannot work with such a high voltage, so please choose a high voltage fan or supply the fan from the receiver (+5V); (note 2)	
BEC Output	6V/2A	
Motor Type	Sensorless / Sensored Brushless Motor and Brushed Motor	
Dimension	44(L)×31(W)×22(H) (The height of the cooling fan is not included)	
Weight	37g(Without wires)	39g(Without wires)

[note 1:](#) The value of "T" number is tested under the following conditions:

a) The input is a 6 cells NiMH battery; b) The ESC is equipped with a cooling fan.

[note 2:](#) The cooling fan is directly supplied by the battery pack without any voltage regulation, so please keep in mind that the voltage of the battery CANNOT over the voltage limit of the fan.

[note 3:](#) For brushless motor, the ESC supports up to 9 cells NiMH/NiCd (or 3 cells Lipo) input; While for brushed motor, the ESC only supports up to 6 cells NiMH/NiCd (or 2 cells Lipo) input.

Begin To Use The New ESC**1. Connect the ESC, motor, receiver, battery and servo according to the following diagram**

"+" and "-" wires on the ESC are connected with the battery pack, and #A, #B and #C are connected with the motor wires. The "SET" button is used for programming the ESC. The "Fan" connector is used to supply the cooling fan. The control cable of the ESC (trio wires with black, red and white color) is connected with the throttle channel of the receiver (Usually CH2).

a) Brushless Motor Wiring

★ Connected with sensed brushless motor

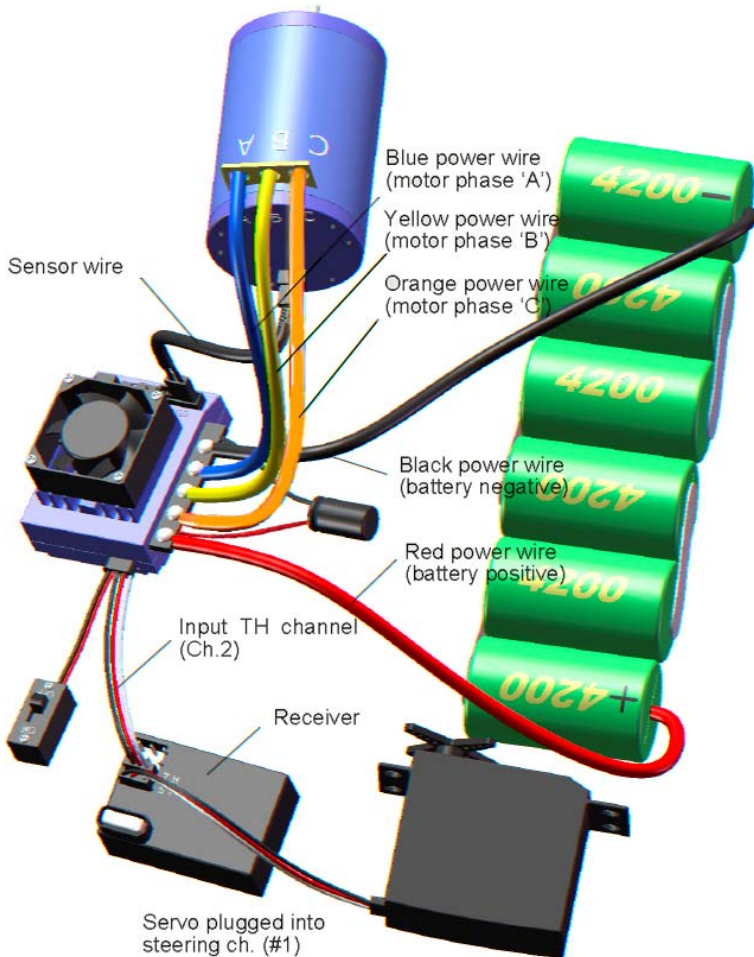
When using brushless motor with Hall Sensor, it is necessary to connect the sensor wires to the "SENSOR" socket on the ESC, and ESC can automatically identify the motor type (sensored or sensorless) by detecting the signal coming from the SENSOR socket.

WARNING! When using sensed brushless motor, the #A, #B, #C wires of the ESC MUST connect with the motor wire #A, #B, #C respectively. Do not change the wires sequence optionally!

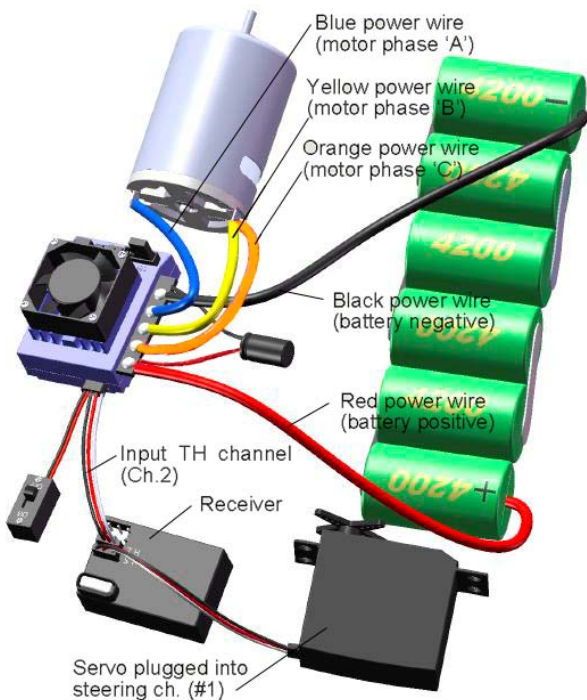
★ Connected with sensorless brushless motor

When using brushless motor without Hall Sensor, the #A, #B, #C wires of the ESC can be connected with the motor wires freely (without any order). If the motor runs in the opposite direction, please swap any two wire connections.

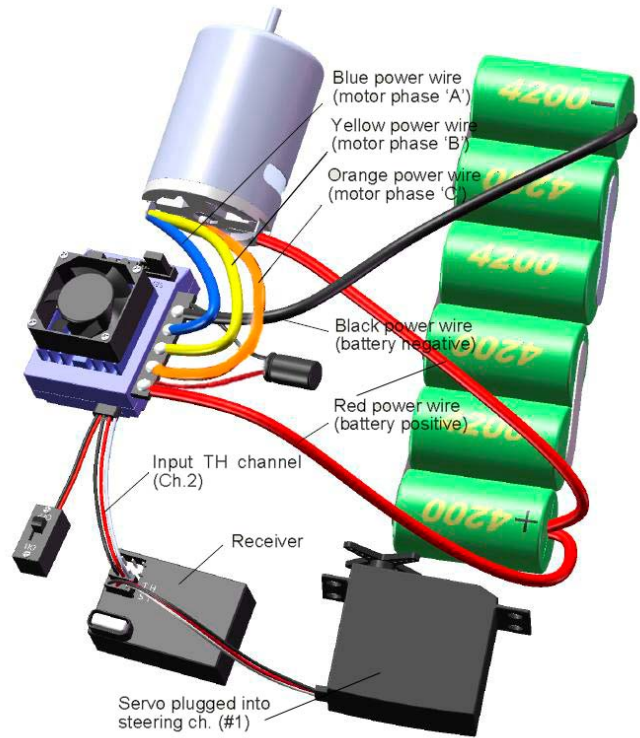
Note: For SENSORLESS motor, you can also set the throttle channel of your transmitter to the "Reverse" direction, and then the motor will run oppositely. Please calibrate the throttle range again after changing the direction of throttle channel. Please keep in mind that this method is ONLY available for SENSORLESS motor.



Picture A: Wiring with a brushless motor



Picture B: Wiring with a brushed motor Forward and backward mode (with brake)



Picture C: Wiring with a brushed motor Maximum output mode (Forward only without brake)

b) Brushed Motor Wiring

WARNING! When using a brushed motor, the input can ONLY be 2 cells lithium battery pack or 4-6 cells NiMH/MiCd battery pack. And you must set the programmable item No.10---"Motor Type" correctly according to the wiring method you are choosing; otherwise the ESC or the motor may be damaged.

★ Dual-directions mode (It is also called Forward / Backward mode or Forward / Reverse mode)

Use this mode to go forward and backward, but the output power is less than the single-way mode (Forward only). This mode is suitable for daily training.

★ **Maximum output mode (Also called Single-Way mode, Forward-Only mode)**

Use this mode to get the largest output power. Please keep in mind that the brake function is invalid for this mode.

For brushed motor, please use the suitable spark-eliminating capacitor to reduce the electromagnetic interference and extend the life of the carbon-brush.

2. Throttle Range Setting (Throttle Range Calibration)

In order to make the ESC fit the throttle range, you must calibrate it when you begin to use a new ESC, or a new transmitter, or change the settings of neutral position of the throttle stick, ATV or EPA parameters, etc. Otherwise the ESC cannot work properly.

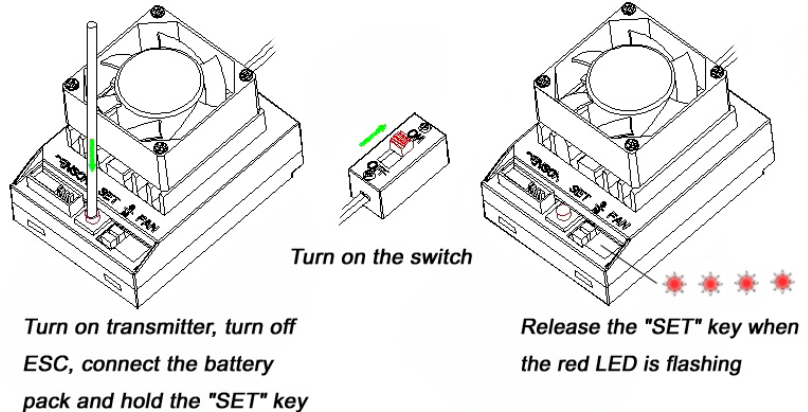
There are 3 points need to be set, they are the top point of "forward", "backward" and the neutral point.

The following pictures show how to set the throttle range with a **Futaba™** transmitter.

A) Switch off the ESC, turn on the transmitter, set the direction of throttle channel to "REV", set the "EPA/ATV" value of throttle channel to "100%", and disable the ABS function of your transmitter.

B) Use a pen or screw driver to hold the "SET" key and then switch on the ESC, and release the "SET" key as soon as possible when the red LED begins to flash.

(Refer to the picture on the right side)

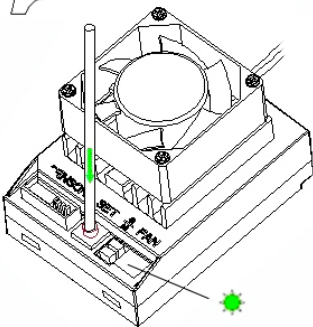
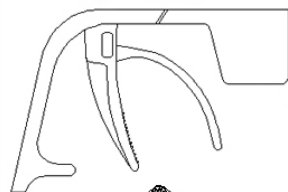


C) Set the 3 points according to the steps shown as the pictures on the right side.

- ★ The neutral point
- ★ The end point of forward direction
- ★ The end point of backward direction

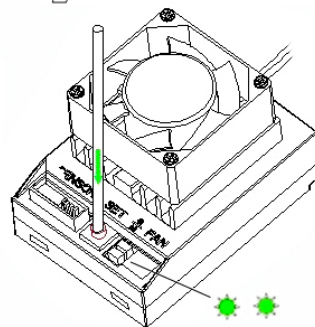
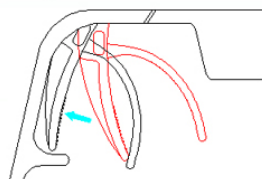
D) When the process of calibration is finished, the motor can be started after 3 seconds.

Move the throttle stick to the neutral position



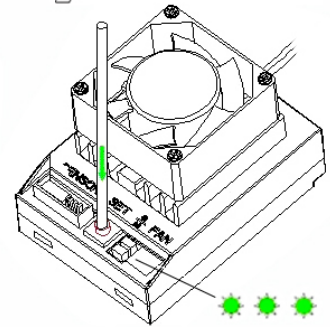
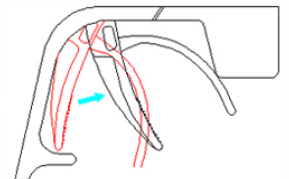
Press "SET" key, the Green LED flashes once and motor emits "Beep" tone

Move the throttle stick to the end position of forward.



Press "SET" key, the Green LED flashes twice and motor emits "Beep-Beep" tone

Move the throttle stick to the end position of backward.



Press "SET" key, the Green LED flashes thrice and motor emits "Beep-Beep-Beep" tone

3. The LED Status In Normal Running

- ★ In normal use, if the throttle stick is in the neutral range, neither the red LED nor the green LED lights.
- ★ The red LED lights when the car is running forward or backward and it will flash quickly when the car is braking.
- ★ The green LED lights when the throttle stick is moved to the top point (end point) of the forward zone or backward zone.

Alert Tones

1. Input voltage abnormal alert tone: The ESC begins to check the input voltage when power on, if the voltage is out of the normal range, such an alert tone will be emitted: "beep-beep-, beep-beep-, beep-beep-" (There is 1 second interval between every "beep-beep-" tone).
2. Throttle signal abnormal alert tone: When the ESC can't detect the normal throttle signal, such an alert tone will be emitted: "beep-, beep-, beep-" (There is 2 seconds interval between every "beep-" tone).

Protection Function

1. Low voltage cut-off protection: If the lithium battery pack's voltage is lower than the threshold for 2 seconds, the ESC will cut of the output power. Please note that the ESC cannot be restarted if the voltage of each lithium cell is lower than 3.5V.
For NiMH/NiCd battery packs, if the voltage of the whole NiMH/NiCd battery pack is higher than 9.0V, it will be considered as a 3 cells lithium battery pack; If it is lower than 9.0V, it will be considered as a 2 cells lithium battery pack. For example, a NiMH battery pack is 8.0V, and the threshold is set to 2.6V/Cell, so it will be considered as a 2 cells lithium battery pack, and the low-voltage cut-off threshold for this NiMH battery pack is $2.6 \times 2 = 5.2V$.
2. Over-heat protection: When the temperature of the ESC is over 95°C for 5 seconds, the ESC will cut off the output power. You can disable over-heat protection function for competition race.
3. Throttle signal loss protection: The ESC will cut off the output power if the throttle signal is lost for 0.2 second.

Trouble Shooting

Trouble	Possible Reason	Solution
After power on, motor doesn't work, no sound is emitted	The connections between battery pack and ESC are not correct	Check the power connections Replace the connectors
After power on, motor can't work, but emits "beep-beep-, beep-beep-" alert tone. (Every "beep-beep-" has a time interval of 1 second)	Input voltage is abnormal, too high or too low.	Check the voltage of the battery pack
After power on, motor can't work, but emits "beep-, beep-, beep-" alert tone. (Every "beep-" has a time interval of about 2 seconds)	Throttle signal is abnormal	Check the transmitter and the receiver Check the signal wire from the throttle channel of your receiver
The motor runs in the opposite direction	The wire connections between ESC and the motor need to be changed	Swap any two wire connections between the ESC and the motor.(Attention: This method is only available for sensorless brushless motor)
The motor suddenly stops running while in working state	The throttle signal is lost	Check the transmitter and the receiver Check the signal wire from the throttle channel of your receiver
	The ESC has entered the Low Voltage Protection Mode	Replace the battery pack
Random stop or restart or irregular working state	Some connections are not reliable	Check all the connections: battery pack connections, throttle signal wire, and motor connections, etc.
	There is strong Electro - Magnetic interference in flying field.	Reset the ESC to resume normal operation. If the function could not resume, you might need to move to another area to run the car.

Optional Accessories for Upgrade

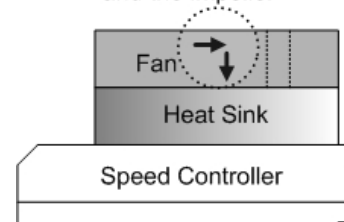
We provide the following optional accessories for upgrade your power system:

1. **High voltage cooling fan (12V):** This fan is necessary when you use a battery pack more than 6 cells of NiMH/NiCd. It is located on the heat sink of the ESC to cool the ESC with downward airflow. The picture on the right side shows the installation.

WARNING! Please note the original fan sold with the ESC can **ONLY** work with a 2 cells lithium battery pack or 4-6 cells NiMH / NiCd battery pack. Please **NEVER** use it with a 3 cells lithium battery pack or NiMH / NiCd battery pack more than 7 cells, otherwise it may be destroyed.

Please check the label of the fan carefully to confirm its working voltage before using it.

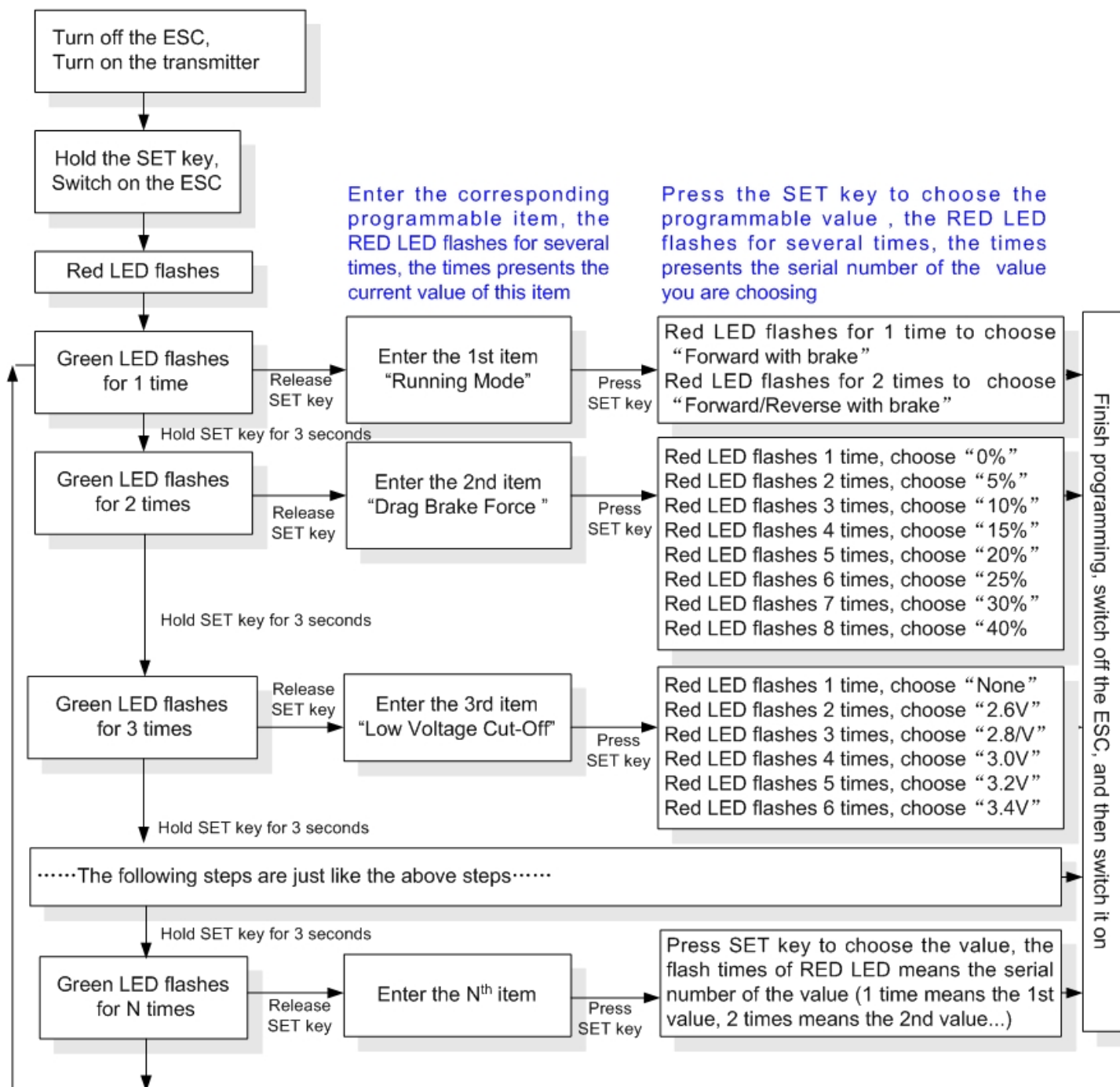
Mark: Direction of the airflow and the impeller



2. Supper capacitors module with extreme lowest resistance.
3. Program card.

Program The ESC

1. Program Method



Note:

- ★ In the program process, the motor will emit “Beep” tone at the same time when the LED is flashing.
- ★ If the “N” is bigger than the number “5”, we use a long time flash and long “Beep---” tone to represent “5”, so it is easy to identify the items of the big number.

For example, if the LED flashes as the following:

“A long time flash + a short time flash” (Motor sounds “Beep---Beep”) = the No. 6 item

“A long time flash + 2 short time flash” (Motor sounds “Beep---BeepBeep”) = the No. 7 item

“A long time flash + 3 short time flash” (Motor sounds “Beep---BeepBeepBeep”) = the No. 8 item

.....

And so on.

Programmable Items list

Programmable Items	Programmable Value								
	1	2	3	4	5	6	7	8	9
Basic Items									
1. Running Mode	Forward Only with Brake	<i>Forward/Reverse with Brake</i>							
2. Drag Brake Force	0%	5%	10%	15%	20%	25%	30%	40%	
3. Low Voltage Cut-Off Threshold	Non-Protection	2.6V/Cell	2.8V/Cell	3.0V/Cell	3.2V/Cell	3.4V/Cell			
4. Start Mode(Punch)	Level1	Level2	Level3	Level4	Level5	Level6	Level7	Level8	Level9
Advanced Items									
5. Max Brake Force	25%	50%	75%	100%					
6. Max Reverse Force	25%	50%	75%	100%					
7. Initial Brake Force	= Drag Brake Force	0%	20%	40%					
8. Neutral Range	6% (Narrow)	9% (Normal)	12% (Wide)						
9. Throttle Neutral Range (Only for sensorless motor)	0.00 °	3.75 °	7.50 °	11.25 °	15.00 °	18.75 °	22.50 °	26.25 °	
10. Motor Type	Brushless	Brushed/Reverse	Brushed /Forward Only						
11. Over-heat Protection	95 Degree	Non-Protection							

Attention: The italics texts in the above form are the default settings.

2. Programmable Values

2.1. Running Mode: This item is only available for brushless motor. With “Forward with Brake” mode, the car can go forward and brake, but cannot go backward, this mode is suitable for competition; “Forward/Reverse with Brake” mode provides backward function, which is suitable for training.

Note: “Forward/Reverse with Brake” mode uses “Treble-click” method to make the car go backward. when you move the throttle stick from forward zone to backward zone for the first and second time (The 1st and the 2nd “click”), the ESC begins to brake the motor, the motor speeds down but it is still running, not completely stopped, so the backward action is NOT happened now. When the throttle stick is moved to the backward zone again (The 3rd “click”), if the motor speed is slowed down to zero (i.e. stopped), the backward action will be occurred. The “Treble-Click” method can prevent mistakenly reversing when the brake function is frequently used in steering.

By the way, in the process of braking or reversing, if the throttle stick is moved to forward zone, the motor will regain forward running at once.

2.2. Drag Brake Force: Set the amount of drag brake applied at neutral throttle to simulate the slight braking effect of a neutral brushed motor while coasting.

2.3. Low Voltage Cut-Off: The function is mainly to prevent the lithium battery pack from over discharging. When using lithium battery pack, please set the suitable value for low-voltage protection as your like. **WARNING: Never use the default value “Non-protection” for lithium battery!** The ESC detects the battery’s voltage at any time, if the voltage is lower than the threshold, the output power will be cut off.

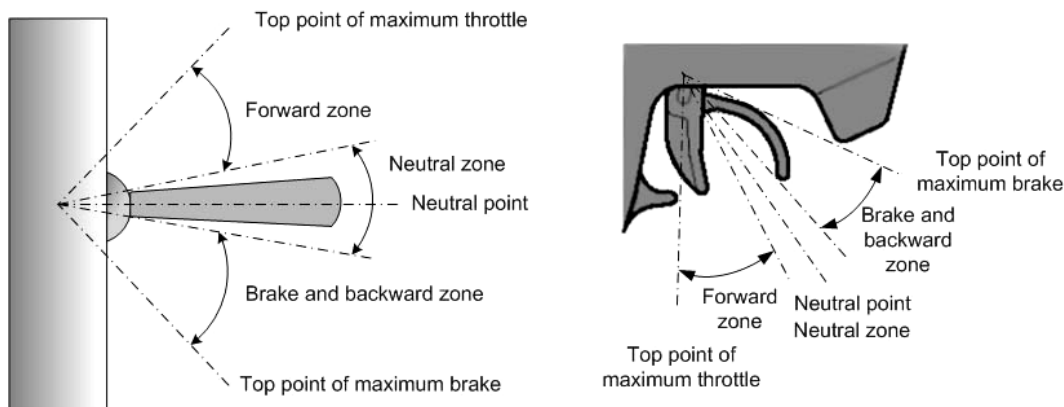
2.4. Start Mode (Also called “Punch”): Select from “Level1” to “Level9” as your like, Level1 has a very soft start effect, while level9 has a very aggressive start effect. From Level1 to Level9, the start force is increasing. Please note that if you choose “Level7” to “Level9” mode, you must use good quality battery pack with powerful discharge ability, otherwise these modes cannot get the burst start effect as you want. If the motor cannot run smoothly (the motor is trembling), it may caused by the weak discharge ability of the battery pack, please choose a better battery or increase the gear rate.

2.5. Maximum Brake Force: The ESC provides proportional brake function. The brake force is related to the position of the throttle stick. Maximum brake force refers to the force when the throttle stick is located at the top point of the backward zone. A very large brake force can shorten the brake time, but it may damage the gears.

2.6. Maximum Reverse Force: Sets how much power will be applied in the reverse direction. Different value makes different reverse speed.

2.7. Initial Brake Force: It is also called “minimum brake force”, and it refers to the force when the throttle stick is located at the initial position of the backward zone. The default value is equal to the drag brake force, so the brake effect can be very smoothly.

2.8. Throttle Neutral Range: Please see the following illustrations to adjust the neutral range as your like.



2.9. Timing: This parameter is only available for brushless motor. There are many differences among structures and parameters of different brushless motors, so a fixed timing ESC is difficult to compatible with all brushless motors. It is necessary to make the timing value programmable. Please select the most suitable timing value according to the motor you are just using. Generally, higher timing value brings out higher power output, but the whole efficiency of the system will be slightly lower down.

Please note that the “timing” value will be available for both sensed and sensorless brushless motors.

2.10. Motor Type: Select brushless or brushed motor according to the motor in your car. **WARNING: You must set this programmable item correctly according to the wiring method you are using.**

2.11. Over-Heat Protection: If the function is activated, the output power will be cut-off when the temperature of the ESC or the internal temperature of the motor is up to 95°C for more than 5 seconds. When the protection happens, the Green LED will light.

★ **When the ESC is over-heat:** The Green LED flashes as “☆-----☆-----☆-----”.

★ **When the motor is over-heat:** The Green LED flashes as “☆-☆-----☆-☆-----☆-☆-----”.

Note: The motor over-heat protection function is only available for the motor made by the same manufacturer of the ESC. For motors made by other manufacturers, this function maybe not available or the protection point is not 95 degree, please disable the over-heat protection function in such a case.

3. Reset All Items To Default Values

At any time when the throttle is located in neutral zone (except in the throttle calibration or parameters program process), hold the “SET” key for over 3 seconds, the red LED and green LED will flash at the same time , which means each programmable item has be reset to its default value.

4. Set The ESC By Using Program Card

Program card is an optional accessory which needs to be purchased separately. It has a friendly user interface. The process of programming the ESC becomes quite easy and fast with this pocket sized device. When the programmable value needs to be changed, please just plug the control wires of the ESC (trio wires with black, red and white color) into the socket of the program card (The socket is on the right corner, and marked with ⊖⊕⊔), and then connect the main battery pack to the ESC, each item’s value will be shown on the program card. Use “ITEM” and “VALUE” buttons to select the programmable items and new values, and then press “OK” button to store the new settings into the ESC.



Suggestion About The Combo of ESC And Motor

T	KV/ Power	Gear Rate 1/10 On Road	Gear Rate 1/10 Off Road	Suitable ESC	Application
3.5T	9100KV/600W	9.6-11.0		120A	1/10 On-road top class competition
4.5T	7300KV/450W	8.4-10.0		120A	1/10 On-road normal competition
5.5T	6000KV/400W	8.0-9.4	10.0-12.0	120A	1/10 On-Road game, 1/10 Off-road top class competition
6.5T	5200KV/350W	7.4-8.4	9.0-11.0	120A	1/10 On-Road game, 1/10 Off-road top class competition
8.5T	4000KV/300W	6.0-7.0	8.0-9.6	60A	1/10 On-Road game, 1/10 Off-road normal competition
10.5T	3300KV/300W	5.0-6.0	7.5-8.5	60A	Normal race and exercise
13.5T	2700KV/300W	4.5-5.5	7.0-8.0	60A	Normal race and exercise
17.5T	2300KV/300W	4.5-5.5	7.0-8.0	60A	Normal race and exercise

