

Thank you for purchasing our Electronic Speed Controller (ESC). High power system for RC model can be very dangerous; 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 or malfunctioning, etc, will be denied. We assume no liability for personal injury, property damage or 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.

## NOTE:

Be careful of the direction of battery slot, the chips may burn out if the direction is incorrect.

Do not overload (Please set the second item of the soft in normal scope).

If the ESC, servo and receiver use the same battery, see the data below please:

ESC	max battery voltage	max BEC current
12A	DC 12V	1.0A
18A-30A	DC 15V	2.0A
40A-80A	DC 23V	3.0A

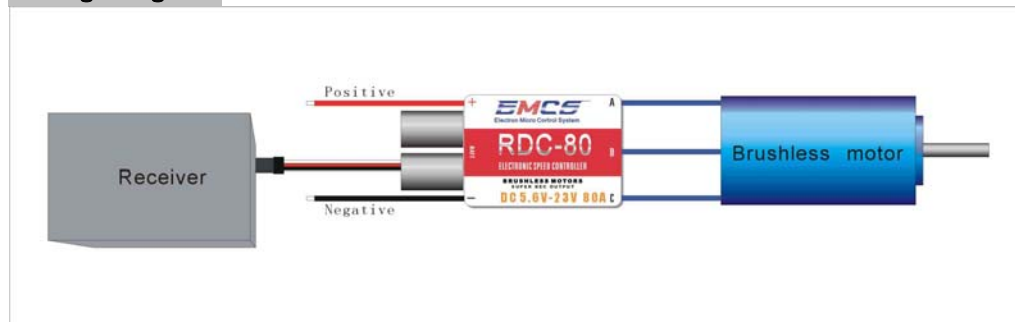
If the load current of BEC is larger than above, please connect the receiver and servo to another battery pack. The normal load current of mini servo and large servo are 0.4A and 0.5A separately.

When battery output large current, the voltage will reduce to a value smaller than the cutoff voltage (first item of the soft), especially for the Li-xx battery, resulting power cut off. Please add more batteries for current supply.

## Feature:

1. Startup forbidden when throttle position error
2. Learning throttle track
3. Alert and cut off output if no signal received
4. Global originative "6 phase (3 channel \* 2 arm) independent real-time over current and overload protection", reduce the chance of output MOSFET damage to lowest.
5. Over-heat detection and protection
6. Low voltage detection and protection
7. Multifunctional regulating the motor characteristics
8. Optionally connect to PC or programming card to set menu
9. Update hardware via PC software



## Wiring diagram:




## Brief introduction:

1. Battery types: Li-xx or Ni-xx
2. Automatic calculation of Li-xx battery number, single Li-xx battery cutoff voltage can be set as high(3.1V), middle(2.85V), and low(2.6V)
3. Voltage protection mode: reduce output power\cut off power output
4. Motor startup mode: normal\soft\very soft
5. Brake mode: off\low\middle\high
6. Timing: high\medium\low
7. Current cut sensitivity: highest\high\middle\low\off("off" means no current output protection, be careful of this function)
8. Linear test: ESC outputs throttle signal and test rotating speed, check the ESC's linearity.
9. Load and save settings: the software can save and load setting file
10. Hardware update: we provide on-line update for the hardware of ESC.  
(Item 8\9\10 needs ESC connecting to PC via USB and run "EMCS CONFIG" software)

## Begin to use your new EMCS ESC:

1. push the throttle stick to the top position , then switch on the transmitter.
2. connect the ESC to the battery pack, ESC then starts self-test process, after 1 second, the motor will emit a sound of "beep--", which means self-test is OK, later the ESC emits "beep-beep--" to confirm the top position of the throttle, pull the throttle stick to the bottom position  in 3 seconds, the ESC will emit a sound of "beep--" to confirm the bottom position of throttle, after that it will emit a tone of "1234", which means the plane can take off normally.

## Normal use of EMCS ESC:

1. Pull the throttle stick to the bottom position , switch on the transmitter.
2. Connect ESC to battery pack, ESC then starts self-test process, after 1 second the motor will emit a sound of "beep--", which means the self-test is OK, later it emits a tone of "1234", which means everything is ready, waiting for you push the throttle stick to start.
3. If there is no response, please check whether battery pack, battery link, motor link are good, whether the motor lacks phases or not.
4. If the motor emits a sound of "beep-beep--" 2 seconds after power on, 5 seconds later ,it emits "beep--,beep--,beep-beep-,beep-beep-.....", and then ESC enters programming mode. This means your ESC setting is incorrect, or the throttle channel is reversed. Please set the direction of throttle channel correctly.
5. If the motor emits "beep-beep-,beep-beep-,beep-beep-....."(every "beep-beep--" has a time interval of 2 seconds), which means the battery pack voltage is too high or too low, or voltage protection setting is incorrect, please check battery pack voltage and set correct cutoff voltage.

## Protection Function:

### 1.voltage protection:

ESC will check the battery voltage when power on, if the voltage is abnormal, ESC will emit an alert of "beep-beep-,beep-beep-,beep-beep--" (every "beep-beep--" has a time interval of 2 seconds), till the voltage become normal.

When the voltage protection mode is set as "cutoff": if the battery voltage becomes abnormal for

3 seconds during working, the ESC will cut off the power supply. Pull the throttle stick to bottom position, and then you can start the ESC for a few seconds to help the plane landing safely.

When the voltage protection mode is “reduce”: if the battery voltage becomes abnormal for 3 seconds during working, the ESC will reduce the output power to 20% of the full power to avoid crash. The ESC will recover the power after the motor is normal.

## 2. over-heat protection:

When the temperature of ESC is over 100°C, the ESC will stop the motor immediately. Pull the throttle stick to bottom position, and then you can start the ESC for a few seconds to help the plane landing safely.

## 3. throttle signal lost protection:

The ESC will reduce the output power if throttle signal lost for 1 second, if the signal is received during the power reduction process, the throttle control will be recovered, further lost for 3 seconds will cause its output to be cut off and emit “beep-beep-beep-, beep-beep-beep-, beep-beep-beep-...”(every “beep-beep-beep-” has a time interval of 2 seconds) to imply signal error, which helps you to find your lost plane in the field (PCM receiver will keep the normal control signal when it lost transmitter’s signal, so the ESC could not provide this sound). Some kind of receivers without squelch function may not emit “beep-beep-beep-, beep-beep-beep-, beep-beep-beep-...”, and it absolutely could not emit safe implication sound. If the bottom throttle signal is tested again by ESC, the ESC will emit a startup safe implication sound, and then the ESC can start again.

## 4. over current protection:

If the ESC is over current for a few seconds, it will reduce the output power, if the power after reduction is still overload, the ESC will cut off the output to prevent burn out. The ESC can start again after the throttle has already in the bottom position, to help the plane landing safely.

### Setting:

1. Cut off the main power of ESC, switch on the transmitter and receiver.



2. Push the throttle stick to top position

3. Connect the ESC to main power.

4. Waiting for implication sound.

5. The motor emits a sound of “beep-”, later the ESC emits a sound of “beep-beep-” to confirm the top position of throttle, after 5 seconds it enters menu setting mode:

“beep”, the first item, choose voltage protection mode

If the sound repeat twice while throttle stick does not change, it will enter the second item. If you want to choose sub-menu of that item, please push the throttle stick to middle position before the sound finishing



, waiting for a new sound like this:

“beep”: cut off

“beep-beep-”: reduce speed

If the throttle stick does not change, the sub-menu will repeat till the throttle stick pushed to the top



position, enter the main menu again. Pull the throttle stick to bottom position



at any time could stop the repeating, push the throttle stick to top position in 3 seconds shall restart the loop of



the menu, or the soft shall load those data, after the implication sound, the ESC can output power corresponding to the throttle.

“beep-beep-”, the second item, choose battery type

“beep”: Li-xx

“beep-beep-”: Ni-xx

“beep-beep-beep-”, the third item, choose battery cutoff voltage

“beep”: low (single Li-xx battery cutoff voltage is 2.6V, single Ni-xx battery cutoff voltage is 0, which means no protection)

“beep-beep-”: medium (single Li-xx battery cutoff voltage is 2.85V, single Ni-xx battery cutoff voltage is 45% of the original voltage)

“beep-beep-beep-”: high (single Li-xx battery cutoff voltage is 3.1V, single Ni-xx battery cutoff voltage is 60% of the original voltage)

“beep-beep-beep-beep-”, the fourth item, choose ESC startup mode

“beep”: normal startup

“beep-beep-”: soft startup

“beep-beep-beep-”: very soft startup

“beep-beep-beep-beep-beep-”, the fifth item, choose brake mode.

“beep”: no brake

“beep-beep-”: lowest brake, lasting for 3 seconds. If there is a power output request during this process, brake mode will be canceled right away.

“beep-beep-beep-”: middle brake, lasting for 3 seconds. If there is a power output request during this process, brake mode will be canceled right away.

“beep-beep-beep-beep-”: high brake, lasting for 3 seconds. If there is a power output request during this process, brake mode will be canceled right away.

“beep-beep-beep-beep-beep-beep-”, the sixth item, choose timing mode

“beep”: low

“beep-beep-”: middle

“beep-beep-beep-”: high

“beep-beep-beep-beep-beep-beep-”, the seventh item, choose current cut sensitivity mode.

“beep”: highest

“beep-beep-”: high


“beep-beep-”: middle


“beep-beep-beep-”: low



“beep-beep-beep-beep-”: off


! The main menu will loop till the throttle stick changes.

! When the throttle stick lies in middle position, the ESC gets value, push the throttle stick to top

position  , the ESC shall emit a tone of “1” representing setting finishing, and then it will enter main menu.

! Pull the throttle stick to the bottom position  can quit the menu.

! Pull the throttle stick to bottom position  , and then push it to top position  in 3 seconds shall enter menu again.

! You can set all the items in one loop, pull the throttle stick to bottom position  when setting finishing, an implication sound will emit and the ESC could be started.

### Factory default setting:

- Voltage protection mode: reduce
- Battery type: Li-xx
- Battery Low voltage protection threshold: medium
- ESC startup mode: normal
- Brake type: off
- Timing: middle
- Current cut sensitivity: middle

### Trouble shooting

Trouble	Possible reason	Action
After power on, motor can't work, no sound is emitted	The connection between battery pack and ESC is not OK	Check the power connection. Replace the connector.
After power on, motor can't work, such an alert tone is emitted: “beep-beep-,beep-beep-,beep-beep-”(each “beep-beep-” has a time interval about 2 seconds)	Input voltage is abnormal, too high or too low	Check the voltage of battery pack
After power on, motor can't work, such an alert tone is emitted: “beep-beep-beep-,beep-beep-beep-,beep-beep-beep-”(each “beep-beep-” has a time interval about 2 seconds)	throttle signal is abnormal	Check the receiver and transmitter Check the cable of throttle channel
After power on, motor can't work, such an alert tone is emitted:“beep-beep-”, 3 seconds later such an alert tone is emitted:“beep-,beep-,beep-beep-,beep-beep-,beep-beep-beep-...”	The direction of throttle channel is reversed	Set the direction of throttle channel correctly

The motor runs in opposite direction	The connection between ESC and the motor need to be changed	Swap any two connections between ESC and motor
The motor stop running while in working state	Throttle signal is lost	Check the receiver and transmitter Check the cable of throttle channel
	ESC has entered Low Voltage Protection mode	Land RC model as soon as possible, and then replace the battery pack.
	Over current or over-heat protection	Check whether the motor is overload
	Some connections are not reliable	Check all the connections: battery pack connection, throttle signal cable, motor connections, etc
Stochastic restart or abnormal work state	There is strong elector-magnetic interference in flying field	The normal function of the ESC may be disturbed by strong Electro-Magnetic interference. If so, by following the instruction manual. In case the function could not be resumed, please use the ESC in other places