



# AT ESC

## INSTRUCTION

---

fixed wing  
series

## CAUTIOUS

Thanks for purchasing T-Motor AT ESC product. Please read this declaration carefully before use, Brushless power systems can be very dangerous and any improper use may cause personal injury and damage to the product and related devices, here we assume you have read and agreed with all the instruction carefully, then follow it strictly. We do not assume responsibility for any losses caused by unauthorized modification to our product, including but not limited to liability for incidental or indirect losses.

## FEATURES

1. All components are original and genuine, ensuring first-class quality and high reliability of ESC.
2. Multiple protection functions such as abnormal input voltage protection, overload protection, start-up protection, overheat protection, and throttle signal loss protection, it effectively ensures the safety of flight.
3. Independent parameter setting interface, can be connected to AT DATA LINK device for parameter setting.
4. Led indicator for indicating the running status and possible troubles of ESC.
5. RPM signal output port for outputting the electrical RPM of the motor in real time.
6. Data logging can record the minimum voltage, maximum temperature, maximum current and standardized RPM of flight.
7. Maximum speed of motor can reach 210,000RPM (stage-2 motor) , 70,000RPM (stage-6 motor) , 35,000RPM (stage-12 motor).

## SPECIFICATIONS

MODE	INPUT VOLTAGE	CONTINUOUS CURRENT	INSTANTANEOUS CURRENT	BEC
AT 195A HV	6~14S	195A	240A (10s)	NO

## USER GUIDE

First use of your brushless ESC. (electronic speed controller)

Attention! Please re-set your remote control stroke throttle before your first use this ESC or replace transmitter, to make sure ESC is suitable for transmitter.

### Throttle setting process

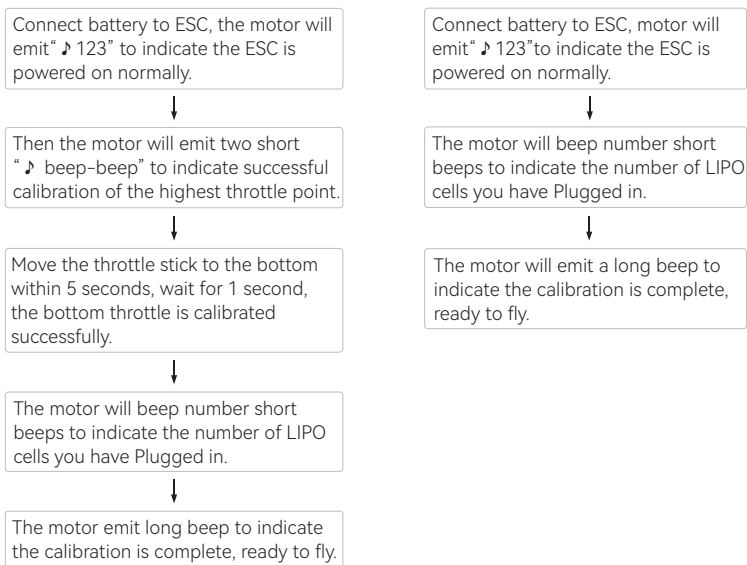
Turn on the transmitter, and then move the throttle stick to the top.



### Normal start-up process

Turn on the transmitter, and then move the throttle stick to the bottom.





**Attention!** The throttle range of the ESC is from 1100 $\mu$ s to 1940 $\mu$ s by default. You need to recalibrate the throttle range when the first time you use this ESC or replace other transmitter.

## ESC PROGRAMMING SETTING AND SPECIFICATION

1. USE AT DATA LINK to adjust ESC programming date (Need to purchase separately) .
2. ESC programming data setting
  - 2.1. Plug the wire of AT DATA LINK to the ESC port one the left side of link, the other end of the wire is plugged into the AT DATA LINK connector on the side of the ESC, connect the battery to ESC as well.
  - 2.2. Press "√" button to connect the program box to your ESC, the firmware version of the ESC will be displayed on the screen of the program box after the connection succeeds.
  - 2.3. After successfully entering Parameters page, press "≡" to browse program data, and press "±" to adjust parameter value(s).
  - 2.4. Press "√" save the new value(s) to your ESC after adjusting.
  - 2.5. After the programming, disconnect the LINK from the ESC, power the ESC back up to run the new set parameters.

Parameters	Value				Factory default parameter
① Flight mode	Fix wing	Helicopter	external governor		Fix wing
② Lipo cells	Auto calculation	6~14S			Auto calculation
③ Voltage cutoff model	Soft cutoff	Hard cutoff			Soft cutoff
④ low voltage protection value	Turn off	2.8V~3.8V			Turn off
⑤ Response Time	0~21				2
⑥ Governor Parameter P	0~9				4
⑦ Governor Parameter I	0~9				5
⑧ Auto Restart Time	0s~90s				25s
⑨ Restart Acceleration Time	1s~3s				1s
⑩ Brake Type	N/A	Normal	Proportional		N/A
⑪ Brake Force	0~100%				0%
⑫ Timing	0°~30°				18°
⑬ Motor Rotation	CW	CCW			CW
⑭ DEO Start up	ON	OFF			ON
⑮ Start-up Force	1~7				7

## PROGRAMMABLE PARAMETERS & EXPLANATIONS

### 1. Flight Model

**1.1 Fixed wing** : suitable for fixed wing flight & multi-rotors aircraft, in the mode, the motor only starts up when the throttle amount reaches 5% or above, quick throttle response.

**1.2. Helicopter (Linear Throttle/External Governor)** : this model is applicable to helicopters which do not use any kind of speed-governing devices or helicopter which use external governors. If you select this mode, the "response time" will turn to soft start-up enable/disable. and it will run in either way as below:

1) when setting to "soft start-up enable" (with the response time is set to any value between 1 to 21), then the motor will start up in a soft way and then quickly accelerate to speed corresponds to the current throttle amount after the soft start up completes.

2) when setting to "soft start-up enable" (with the response time is set to 0), then the motor will respond to throttle input rapidly.

### 2. LiPo Cells

Both auto & manual calculation available. The ESC will automatically calculate the number of LiPo cells you have plugged in as per the "3.7V/Cell" rule if "Auto Calc." is selected; and we recommend setting this item manually when you're using a LiFe or LiHV battery, if the

ESC self-test process chirps the wrong number of battery sections, you can adjust this to correct the detection.

### 3. Voltage Cutoff Type

**Soft Cutoff** : if this item is selected, the ESC will gradually reduce the output to 50% of the full power when the voltage cutoff protection is activated.

**Hard Cutoff** : if this item is selected, the ESC will cut off the output immediately when the voltage cutoff protection is activated.

### 4. Cutoff Voltage

This item is adjustable between 2.8V and 3.8. It is the voltage of one cell, if you're using a 6S LiPo, then the final cutoff voltage of your battery is: the value you set \*6.

### 5. Response Time

This item is for adjusting the throttle respond, the higher the value, the slower the throttle response.

### 6. Governor Parameter P

This item is for controlling the ESC compensate the amount of the motor speed during the process of maintaining the speed-governing effect; the higher the value, the bigger the amount; and vice versa. This function functions together with the Governor Parameter I.

### 7. Governor Parameter I

The ESC compensates the speed when the speed falls below or exceeds the set over-expected value. This parameter is used to adjust the size of the degree of compensating rotation. A parameter that is too large will cause overcompensation and a parameter that is too small will cause under compensation.

### 8. Auto Restart Time

This function is effective only in the "Helicopter (Elf Governor)" mode and the "Helicopter (Store Governor)" mode.

### 9. Restart Acceleration Time

This item is adjustable between 1s and 3s. It controls the time the motor needs for starting from standstill and accelerating to the full speed when you want to rapidly restart the motor.

### 10. Brake Type

**10.1. Normal Brake** : After selecting this option, if you move the throttle stick to the bottom position, then the ESC will brake the motor as per the preset brake force.

**10.2. Proportional Brake** : After selecting this option, the throttle range on the transmitter is between 20% to 100%, the corresponding ESC throttle output is between 0% and 100%. When the throttle range on the transmitter is between 20% and 0%, the corresponding brake force is between 0 and 100%.

### 11. Brake Force

This item is for only effective in the "Normal Brake" mode. When moving the throttle stick to the bottom position, it controls the brake speed (it's the speed that motor comes to a

standstill from rotation). The higher the value, the more powerful the brake force and the shorter the time (from rotation to standstill) .

## 12. Timing

This item is for adjusting the ESC timing, it's adjustable between 0 and 30°.

## 13. Motor Rotation

This item is for setting the rotation direction of the motor, it's "CW" by default. After connecting the motor to the ESC, (if the motor rotates clockwise); when setting this item to "CCW", the motor will rotate counterclockwise; (if the motor rotates counterclockwise), when setting this item to "CCW", the motor will rotate clockwise.

## 14. DEO Technology/Freewheeling

With this item enabled, the throttle linearity will be great.

## 15. Start-up Force

This item is for adjusting the start-up force of the motor (during the start-up process). The higher the value, the larger the start-up force.

## LED INDICATOR,WARNING TONES & PROTECTIONS

Protection mode	Warning tone	LED status	Cause
The input voltage is abnormal	"BB、BB、BB、BB..."	The red led flashes along with beeps	The input voltage is out of the regulated range
The throttle signal lost	"B、—、B、—、B、—..."	The red led flashes along with beeps	The ESC doesn't detect any throttle signal input
The throttle stick is not moved to the bottom position	"B、B、B、B..."	The red led flashes along with beeps	The ESC detect the throttle is about 0%
The throttle range is too narrow	"B、B、B、B..."	The red led flashes along with beeps	You set the throttle range is too narrow during ESC calibration
The ESC thermal protection is activated	NO	The blue led flashes once and repeat	The internal temperature of the ESC goes above the regulated temperature range
The low-voltage cutoff protection	NO	The blue led flashes twice and repeat	The operating voltage goes below the protection cutoff voltage
The over current protection	NO	The red led turns on solid	The operating current goes above the regulated value

## 二、Protections

### 1. Power-on Abnormal Voltage Protection

The ESC will measure the input voltage when it's connected to a battery or power supply.

If the input voltage is not within the regulated range, it will take the voltage as an abnormal voltage and then activate the protection, flash Red LED and beep a series of beeps.

## **2. Start-up Protection**

The ESC will monitor the motor speed (RPM) during the start-up process. When the speed stops increasing or the speed increase is not stable, the ESC will take it as a start-up failure. At that time, if the throttle amount is less than 15%, the ESC will automatically try to restart up; if it is larger than 20%, then you need to move the throttle stick back to the bottom position and then restart up the ESC. (Possible causes of this problem: poor connection/disconnection between the ESC and motor wires, propellers are blocked, etc.) .

## **3. ESC Thermal Protection**

The ESC will gradually reduce the output but won't cut it off completely when the ESC temperature goes above 110. For ensuring the motor can still get some power and won't cause crashes, so the maximum reduction is about 50% of the full power. The ESC will gradually resume its maximum power after the temperature lowers down. In addition, the ESC temperature cannot exceed 70 when it's powered on. Otherwise, it cannot be started up but flashes Blue LED and beeps a series of beeps to indicate the ESC temperature is too high. (Here we are describing the ESC's reaction in the "Soft Cutoff" mode, while if in the "Hard Cutoff" mode; it will immediately cut off the power.)

## **4. Throttle Signal Loss Protection**

When the ESC detects loss of signal for over 0.25 second, it will cut off the output immediately to avoid an even greater loss which may be caused by the continuous high-speed rotation of propeller. The ESC will resume the corresponding output after normal signals are received.

## **5. Overload Protection**

The ESC will cut off the power/output and automatically restart itself when the load suddenly increases to a very high value. If the load still remains high or the motor still remains out of sync, then it will completely cut off the power/output.

## **6. Low-voltage Cutoff Protection**

When the operating voltage goes below the preset cutoff voltage, the ESC will gradually reduce the output but won't cut it off completely. For ensuring the motor can still get sufficient power to land the aircraft safely, so the maximum reduction is about 50% of the full power. You need to change another fully charged battery to resume the operation when the low-voltage cutoff protection is activated.

## **7. Over-current Protection**

During use, the ESC will cut off the output immediately if the current exceeds the regulated value and then resume it quickly; the ESC will cutoff the output completely and won't resume it if the regulated value is exceeded again.

If you encounter any problem in use, please contact local distributor or T-MOTOR for technical support.