# E5 MAX

## 车模无刷电子调速器使用说明书

Brushless electronic speed controller manual

www.xc-bldc.com

## 免责声明

首先非常感谢您使用本产品！
车模无刷动力系统功率较大，错误的使用可能会造成设备损坏或人身伤害，
请在使用之前务必仔细阅读本声明，一旦使用即代表您同意本声明的全部条款。
请严格按照手册注意事项，使用本产品。
我们不承担使用本产品或非法改装、操作不当产生的任何责任，包括但不限于间接损失或连带责任。

## 注意事项

请在电子调速器与相关设备连接前，确保所有线束连接良好以及连接设备绝缘良好，避免因短路出现损坏电子调速器。
请在使用电子调速器前，仔细阅读相关动力设备及车架说明书，确保动力搭配合理，避免动力搭配不当导致电机超载，损坏电子调速器。

## 1. 产品规格

| 规格 | 规格描述 | 注意 |
|---|---|---|
| 电流 | 350A持续 | 逐波限流控制，高速有效限制峰值电流，避免损坏电机和传动系统。 |
| 供电 | 6~12S LiPo | 使用DC供电时要考虑其放电/刹车电力回收能力<br>如果供电能力有限，可适当降低运行参数(加速度和相应刹车选项)。 |
| 推荐电机 | 有感/无感方波无刷电机 | |
| 电机转速 | 当极对数为1时，电气转速等于机械转速<br>其它: 电气转速 = 机械转速×极对数<br>= KV值×母线电压×极对数<br>备注：最高支持电气转数24万转。 | 电机空转时转数非常高，需要注意安全。 |
| BEC供电 | 电压:6.0V/7.4V/8.4V，通过手机APP切换电压。<br>电流:持续8A，瞬间25A。 | |
| 风扇供电 | 温度大于55℃，开启风扇供电。<br>温度小于50℃，关闭风扇供电。 | 1. 风扇供电电压取自BEC<br>2. 当风扇出现短路保护时，控制器将对风扇停止供电，<br>1秒后重新对风扇恢复供电。 |
| 蓝牙通讯 | 1.使用手机APP可调节电调所有参数。<br>2.使用手机APP对电调进行固件升级。<br>3.电机运行数据观察界面，记录数据/实时数据查阅。 | |
| 尺寸规格/重量 | 93.80*60.60*53.60mm / ≈510g（含线束） | |

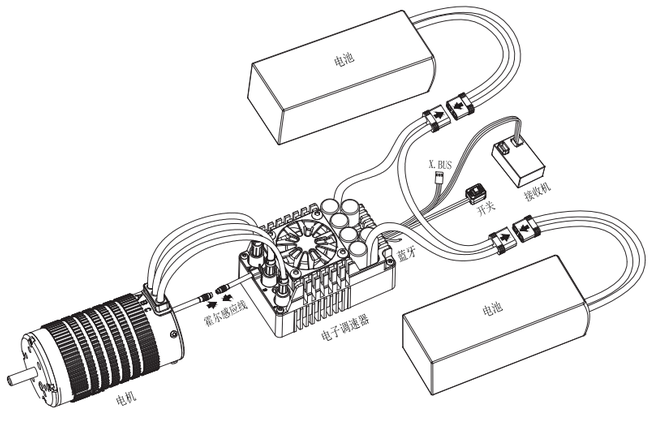
## 2. 产品特点

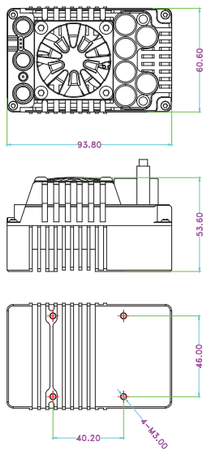
1. 精雕细琢的换相方案，无感丝滑换相。
2. 精准同步续流，减少MOS发热的同时无过度电流脉冲。
3. 单PWM周期电流检测限制，减少脉冲电流对电机的影响。
4. 智能散热，低温时风扇保持安静。
5. 蓝牙通讯，手机APP直接通讯，固件升级，参数设置随心所欲，方便又快捷。
6. 强大的手机APP运行数据观察界面，静态(电调记录数据)/实时数据(实时调试数据)一览无余。
7. 内置大功率DC/DC转换电路，BEC带载毫无压力。
8. 多重保护机制，低压/油门丢失/异常刹车/过温保护.....
9. 支持Turbo进角设置。
10. 不需要额外购买配件，即可实现对电调的全面控制。
11. 支持X.BUS协议，通过总线实时控制电调和读取运行数据，可用于机器人或其它自动化编程控制。
12.内置防打火电路，防止上电时产生火花，对接头的腐蚀。

## 3. 连接说明以及注意事项

注：电机标识的ABC的三相位置，务必保证和电调的ABC三相位置对应连接
即：电调A与电机A相匹配，电调B与电机B相匹配，电调C与电机C相匹配

开关线：红黑
油门线：红色BEC+, 黑色BEC-，白色油门线
X.BUS线：红色BEC+，棕色BEC-，黄色X.BUS




*** 注意事项**

1. 电调输入线正级（+）、负级（-），切勿接反，如电调输入接反可能会导致电调损坏，如因接反损坏电调将不给予保修服务。
2. 如使用霍尔传感器，务必核对电机相线和霍尔接线。
3. 无温度传感器的电机，长时间大功率运行可能会烧毁。
4. 部分电机的机械结构不能支持高转速，若强行提高转速，电机可能毁坏。
5. 若长时间不使用，建议拔掉电调电源线。
6. **如对连接线路有修改，检查电路无误后再给油门，给油门时建议慢给，确认无误后再正常给油门。**

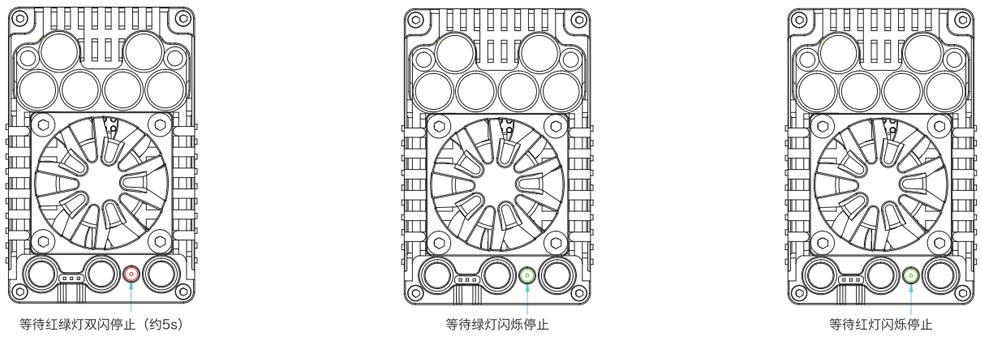
## 4. 开机流程

**步骤:**

1. 检查线路是否存在开路/短路/或接触不良
2. 检查电机是否卡顿
3. 插上电源线
4. 打开电源按钮

**当听到电池提示音(在灯光/声音提示部分的“正常开机”提示有相关描述)后说明开机正常，如果油门正常，便可正常进行油门操作。**

## 5. 油门校准




1. 电调关机 ->正方向，油门和刹车调到100%行程-> 扳机打到“刹车推满”的位置并保持-> 上电 -> 等待红绿灯双闪停止(约5s)。
2. 迅速(1s内)将扳机打到“油门加满”的位置并保持-> 等待绿灯闪烁停止。
3. 迅速(1s内)将扳机“回到中点”位置并保持 -> 等待红灯闪烁停止。

4. **设置成功提示:** 重复4次 (红绿灯亮 + 电机响（元音so,mi,do） + 红绿灯灭 + 0.2s空闲)。**设置失败提示:** 没有提示，正常开机。

## 6. 蓝牙通讯

**蓝牙名称的命名规则为“大致型号”+“-”+“电调编码ID”,比如 “XC_E5-1C89” ,其中“XC_E5”为大致型号,“1C89”为电调的16进制编码ID，以免出现两个名称一样的设备，默认密码“1234”。**

## 7. 设置项

| 项编号 | 项名称 | 项内容 | | | | 默认 |
|---|---|---|---|---|---|---|
| 1 | 运行模式 | 正转带刹车 | 正反转带刹车 | 直接正反转 | | 正反转带刹车 |
| 2 | 锂电池节数 | 自动识别 | 6 ~ 12S | | | 自动识别 |
| 3 | BEC电压 | 6.0V | 7.4V | 8.4V | | 6V |
| 4 | 低压保护阈值 | 不保护 | 2.9~3.6V | | | 3.2V |
| 5 | 转向 | CW | CCW | | | CW |
| 6 | 最大刹车强度 | 0~100% | | | | 60% |
| 7 | 最大倒车强度 | 0~100% | | | | 25% |
| 8 | 加速度 | 0~12级 | | | | 6级 |
| 9 | 拖刹力度 | 0~100% | | | | 0% |
| 10 | Turbo进角 | 0~26度 | | | | 26度 |
| 11 | Turbo延时 | 0~1s | | | | 1s |
| 12 | 初始PWM | 1~10% | | | | 3% |
| 13 | 散热风扇 | 温度控制 | | | 常开 | 温度控制 |
| 14 | 油门中位点区域 | 2~15% | | | | 10% |
| 15 | 电机极对数 | 1~64 | | | | 2 |
| 16 | X.BUS-ID | 0~15 | | | | 0 |

**1. 运行模式**

**选项1：正转带刹车**
此模式下，车辆仅能前进和刹车，但不能倒车，该模式通常用于竞赛。

**选项2：正反转带刹车**
此模式则提供了倒车功能，通常用于训练。
当油门扳机第一次推至反向区域时，电机只是刹车，不会产生倒车动作，当油门扳机快速回到中点区域并第二次推至反向区域时，如果此时电机已停止，则产生倒车动作，如果电机未停止，则不会倒车，仍是刹车，需要再次将油门回到中点并推向反向区。 这样做的目的是防止车辆行驶过程中因多次点刹而造成误倒车。

**选项3：直接正反转**
此模式采用单击式倒车方式，当油门扳机从中点区域推至反向区域时，电机就会产生倒车动作。该模式一般用于特种车辆。

**2. 锂电池节数**
根据实际所用锂电池节数设置正确的值。默认为自动判断。

**3. BEC电压**
BEC电压支持6V/7.4V/8.4V可调。一般6.0V适用于普通舵机，7.4V/8.4V适用于高压舵机，请根据所用舵机规格设置合适的值。
警告！设置的BEC电压请勿超过舵机最高工作电压，否则可能损坏舵机甚至电调。

**4. 低压保护阈值**
这项功能主要是防止锂电池过度放电而造成不可恢复的损坏。电调会时刻监视电池电压，一旦电压低于设定的阈值，数秒后将彻底切断动力输出，并产生一个10%的刹车力度，对于镍氢电池建议将此项参数设置为 “不保护” 。

**5. 转向**
用于设置电机的转动方向。由于有些车架结构设计差异，有可能出现给前进的油门车子却后退，此时可以将“转向”设置为相反的方向。

**6. 最大刹车强度**
本电调提供比例式刹车功能，刹车力度的大小和油门扳机的位置相关，最大刹车力是指油门扳机处于刹车极限位置时所产生的刹车力。请根据车辆的具体情况，选择合适的最大刹车力度。

**7. 最大倒车强度**
指油门扳机打到反向最大的位置所能产生的倒车强度，选择不同的参数值可以产生不同的倒车速度。一般情况下建议使用比较小的倒车速度，以免因倒车太快而导致失误。

**8. 加速度**
用于控制油门输出快慢，分0-12级可设置，设置值越大，则加速越快。需要根据场地、轮胎抓地特性、车辆配置等情况综合考虑。如设置过大可能会造成轮胎打滑、启动电流过大而对电机/电调/电池不利影响。

**9. 拖刹力度**
拖刹是指当油门扳机进入到中点区域内时，电机产生的刹车力，请根据车辆类型、配置、场地等情况选择合适的值。

**10. Turbo进角**
激爆进角，可以额外的提高电机转速。此模式是该进角的大小设置项，只有在全油门时才会开启，通常用于较长的直道上，释放出马达的最大功率。此值越大，电机的转速提升越多，同时运行电流越大，电机电调温度更高，故请合理设置此值。

**11. Turbo延迟**
触发Turbo所需要的持续全油门时长。当持续全油门的时间达到此设定值后，才能触发Turbo开启。

**12. 初始PWM**
设置开始转动时的转速和力度。

**13. 散热风扇**
选择温度控制，当电调温度大于55摄氏度，风扇开启，电调温度小于50摄氏度，风扇停止；选择常开，任何时候风扇都在运行。

**14. 油门中位点区域**
油门中立点区域宽度，请根据个人习惯进行调整。有些遥控器可能会发生中点漂移，导致车子缓慢前进或后退，出现此现象时，请把区域宽度设成更大值。

**15. 电机极对数**
用于设置电机极对数，上传的转速 = 电气转速/电机极对数，正确的设置电机极对数，可得到实际的机械转速。

**16. X.BUS-ID**
如果选择了X.BUS，则本项生效，总线支持16个电调从机。

## 8. 恢复出厂设置

**蓝牙恢复出厂设置/强制进boot:**
如果蓝牙密码丢失或者需要强制进入Boot，可按如下步骤进行.
step1.将调速信号线(白色线)短接到BEC+(红色线)
step2.开机上电
step3.当绿灯灭，红灯亮时
step4.取消短接。
此时程序就会进入Boot，进入Boot后，蓝牙参数将恢复出厂值(密码恢复为“1234”，名称恢复为出厂状态)，如果固件异常也可通过此种方案进入Boot升级固件。

**参数恢复出厂设置:**
如果想要将参数恢复出厂设置，点击APP参数页面的默认即可。

## 9. 灯光/声音提示说明

| 分类 | 类型描述 | | 灯光提示 | 声音提示 | 备注 |
|---|---|---|---|---|---|
| 基本提示 | 油门未归0 | | 红灯快闪 | 短音哔-- | 急促闪红灯。 |
| | 油门丢失 | | 红灯慢闪 | 长音哔---- | 慢闪红灯，周期为2S。 |
| | 电压检测 | 欠压保护 | 红×1-绿×2 --- 红×1-绿×2 --- | 长音哔×1-短音哔×2--- | 在MOSFET检测之前不响，检查输入电压，或者检查设置的电池节数是否正确。 |
| | | 过压保护 | 红×1-绿×3 --- 红×1-绿×3 --- | 无 | 电压过高，检查实际的电池是否超过了电调的最大支持范围。 |
| | MOS温度过高，运行超过125℃/开机超过110℃ | | 红×1-绿×4 --- 红×1-绿×4 --- | 长音哔×1-短音哔×4--- | MOS管温度过高，待到温度降到100摄氏度以下即可恢复正常运行。 |
| | 电容温度过高，运行超过105℃/开机超过100℃ | | 红×1-绿×5 --- 红×1-绿×5 --- | 长音哔×1-短音哔×5--- | 电容温度过高，待到温度降到100摄氏度以下即可恢复正常运行。 |
| 油门参数 | 油门参数异常 | | 红×1-绿×7 --- 红×1-绿×7 --- | 长音哔×1-短音哔×7--- | 如果将控制油门回中点，还会出现异常提示，需要启动油门校准流程。 |
| 霍尔异常 | 霍尔输出逻辑异常 | | 红×1-绿×8 --- 红-×1绿×8 --- | 长音哔×1-短音哔×8--- | 重新拔插霍尔线，如果异常还在，可能是电机内部霍尔出现问题，需拔掉霍尔线。 |
| 油门校准 | 油门校准提示 | 校准低范围 | 红绿 - 红绿 - 红绿--- | 无 | 如果中途校准不规范或不成功，则退出校准流程进入正常开机流程。 |
| | | 校准高范围 | 绿 - 绿 - 绿--- | 无 | |
| | | 校准中点油门 | 红 - 红 - 红--- | 无 | |
| | | 校准成功提示 | (红绿---)×4 | (声音so-mi-do ---)×4 | |
| 正常运行 | 正常且无油门动作 | | 绿---绿--- | 无 | |
| | 油门执行 | 正常油门 | 油门越大，绿灯闪烁越快 | | |
| | | turbo进角开启 | 绿灯常亮 | | |
| | 刹车 | | 红灯亮起 | 无 | 松开刹车，红灯灭。 |
| Boot | 开机强制进Boot | | | 无 | 按蓝牙恢复出厂设置/强制进Boot操作 |
| | Boot运行中 | | 绿灯: 亮2S --- 灭2S --- | 无 | CPU进入Boot区 |
| | | | 红灯: 红 --- 红 --- | | CPU进入Boot区，进行程序升级。 |
| 正常开机 | 正常开机提示电池节数 | | 五进制提示灯光信号，长音时红灯亮，短音时绿灯亮。 | do,mi,so<br>+<br>五进制提示声音 | do, mi, so：五进制数前标<br>五进制定义:<br>长音哔等于5节，短音哔等于1节.<br>示例：提示8节理电池,<br>do, ri, mi+长音x1 + 短音x3 |
| 故障提示 | 电调自检异常 | | 红×2 --- 红×2 --- | 无 | 拔掉电机线再上电，如果还有异常，需要返厂检修。 |
| | | | 红×2 - 绿×1 --- 红×2 - 绿×1 --- | 无 | |
| | | | 红×2 - 绿×2 --- 红×2 - 绿×2 --- | 无 | |

***注：1.红灯对应长音，绿灯对应短音。**
**2.为了节电，所有响声只能持续响5分钟，如果故障恢复后，下个5分钟可重新生效。**

# E5 MAX

## User Manual

Brushless Electronic Speed Controller

www.xc-bldc.com

## Disclaimer

First of all thank you very much for using this product!
This product has high power and incorrect use may cause equipment damage or personal injury. Please read this statement carefully before using this product. Once this product is used, it means that you agree to all the terms of this statement. Please use this product strictly in accordance with the instructions in this manual. We do not assume any liability arising from misuse, illegal modification or improper operation of this product, including butnot limited to indirect losses or joint and several liabilities.

## Cautions

Before connecting the ESC to related equipment, please ensure that all wires are well connected and the connecting equipment are in well insulated protection to avoid damaging the ESC due to short circuit.
Before using the ESC, please carefully read the instructions of the matching power equipment and frame to ensure a reasonable power combination, thereby avoiding improper power combination that may lead to motor overload and damage to the ESC.

## 1. Specifications

| Item | Description | Cautions |
|---|---|---|
| Current | 350A Continuous Current | Current control is similar to wave-by-wave current limiting which effectively limit peak current to avoid motor damage. |
| Power supply | 6~12S LiPo | When using DC power supply, discharge/brake energy recovery capacity should be considered.<br>If output is limited, reduce value of parameters (acceleration and braking options) properly. |
| Recommended motor | Sensored or sensorless square wave brushless motors | |
| Motor speed | When the number of pole pairs is 1, the electrical speed is exactly equal to the mechanical speed.<br>Others: Electrical speed = Mechanical speed × Number of pole pairs = KV value × Bus voltage × Number of pole pairs<br>Note: max electric speed 240,000rpm. | Speed of the motor is very high when idling. Stay safe. |
| BEC | Voltage: 6.0V/7.4V/8.4V, it can be switched through the mobile APP.<br>Current: 8A continuously, 25A short-term. | |
| Fan | Temperature > 55℃, powersupply to the fan turns on.<br>Temperature < 50℃, powersupply to the fan turns off. | 1. The fan powered by BEC<br>2. When a short-circuit current occurs to the fan, the power will be cut off. Power recovered in 1 second. |
| Bluetooth | 1. All parameters of the ESC can be adjusted by using the mobile APP.<br>2. The ESC firmware can be upgraded by using the mobile APP.<br>3.Motor operation data observation: data log and real-time data. | |
| Dimension | 93.80(L)*60.60.00(W)*53.60(H)mm / ≈510g (with wire) | |

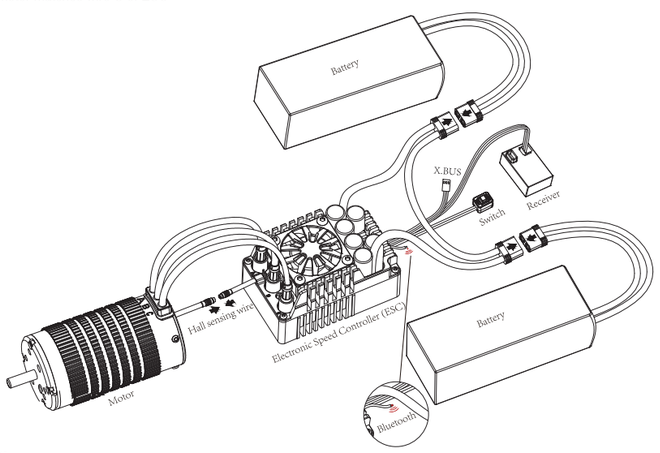
## 2. Features

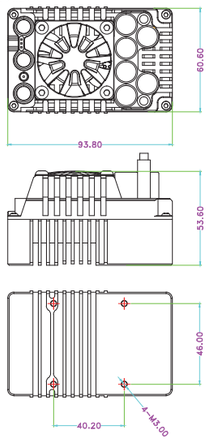
2.1 Meticulously proved commutation scheme, even in sensorless mode.
2.2 Active freewheeling technology can reduce MOS heating while avoiding excessive current pulses.
2.3 Current limiting in each PWM cycle reduces the impact of pulse current on the motor.
2.4 Intelligent heat dissipation, the fan stays quiet at low temperatures.
2.5 Built-in Bluetooth connects Mobile APP for firmware upgrade and parameter setting.
2.6 Mobile APP data observation interface for viewing ESC recording data (static data) and real-time debugging data.
2.7 High-power DC/DC conversion circuit makes BEC a potent loading capacity.
2.8 Full protection: low voltage, over voltage, throttle loss, abnormal braking, over temperature etc.
2.9 Turbo timing available.
2.10 No need to buy additional modules, you can completely control the ESC.
2.11 Supporting X.BUS protocol, real-time control of ESC and reading of operation data through Bus. It can be used for robot control or other automated programming control.
2.12 Built-in antispark circuit, protects battey and ESC connectors from spark damage

## 3. Connections

Remark: A/B/C of Motor and ESC must be connected correspondingly,
That is: Wire A of motor matches wire A of ESC, wire B of motor matches wire B of ESC, wire C of motor matches wire C of ESC

Switch wire: red and black
Throttle wire: red: BEC+, black: BEC-, white: throttle
X.BUS wire: red: BEC+, brown: BEC-, yellow: X.BUS




***Precautions:**

1. Please do not connect the ESC input wires DC+ and DC- in reverse. Reverse connection may damage ESC. If the ESC is damaged in this case, the relevant warranty service will not be provided.
2. If a Hall sensor is used, be sure to check the motor phase wires and Hall wiring.
3. For motors without temperature sensors, long-term high-power operation may cause burnout.
4. The mechanical structure of some motors cannot support high speed. If the speed is forcibly increased, the motor may be damaged.
5. If not used for more than 1 hour, it is recommended to unplug the power wires of the ESC.
6. If there are any modifications to the connection line, check the circuit carefully before putting in use. It is recommended to open the throttle slowly and confirm that there are no errors before advancing it normally.

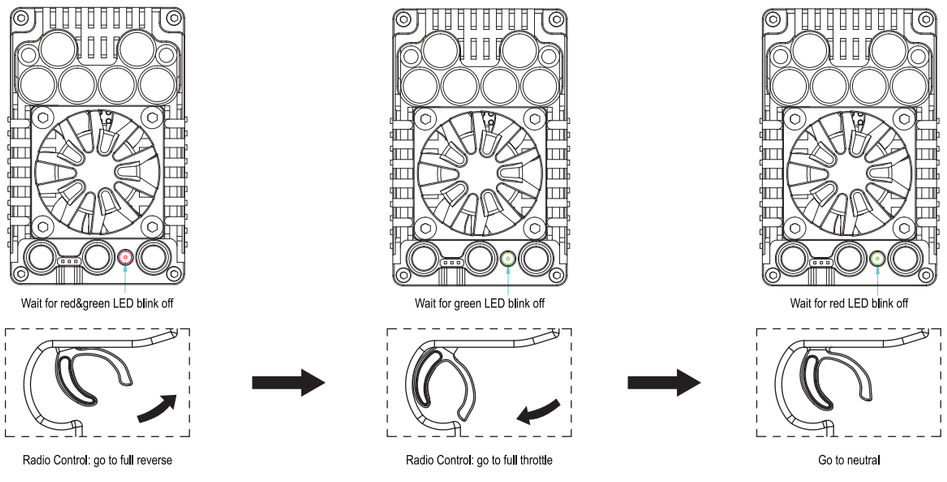
## 4. Start the process

**Steps:**

1. Check whether the circuit is open, short circuit or in poor contact.
2. Check whether the motor is stuck.
3. Plug in the power cable.
4. Turn on the power button.

When you hear the battery prompt tone (described in the "Normal Startup" prompt in the light/sound prompt section), the startup is normal. If the throttle is normal, you canperform the throttle operation normally.

## 5. Set the throttle range




1. ESC power off– go to full reverse--ESC power on–wait for red/green LED blink off
2. Go to full throttle quickly, wait for green LED blink off
3. Go to neutral throttle quickly, wait for red LED blink off

4. Prompt for success setting: prompt repeats four times(red light and green light on + motor beep"so, mi, do" + red/green lights off + 0.2s vacancy); prompt for failure setting: no signs, ESC powers on.

## 6. Bluetooth

The naming rule of Bluetooth name is "general model" + "-" + "ESC code ID", for example, where "XC_E3-1C89", XC_E3 is the general model, and "1C-89" is the hexadecimal code ID of the ESC. Even if the user sets the Bluetooth name by himself, the ESC code ID is still retained to avoid two devices with the same name， Default password "1234".

## 7. Configurable items

| Seq | Item | | Description | | Default |
|---|---|---|---|---|---|
| 1 | Running mode | Forward with brake | Forward&Reverse and Brake | Forward with reverse | Forward&Reverse and Brake |
| 2 | Lipo Cells | Auto | 6 ~ 12S | | Auto |
| 3 | BEC voltage | 6.0V | 7.4V | 8.4V | 6V |
| 4 | Cutoff Voltage | Disabled | 2.9~3.6V | | 3.2V |
| 5 | Motor Rotation | Forward | Reverse | | Forward |
| 6 | Max.Brake Force | 0~100% | | | 60% |
| 7 | Max.Reverse Force | 0~100% | | | 25% |
| 8 | Punch | 0~12 level | | | 6 level |
| 9 | Drag Brake Force | 0~100% | | | 0% |
| 10 | Turbo Timing | 0~26 degree | | | 26 degree |
| 11 | Turbo Delay | 0~1s | | | 1s |
| 12 | Initial PWM | 1~10% | | | 3% |
| 13 | Cooling Fan | Temperature Control | | Always ON | Temperature Control |
| 14 | Neutral Range of Throttle | 2~15% | | | 10% |
| 15 | Motor Pole Pairs | 1~64 | | | 2 |
| 16 | X.BUS-ID | 0~15 | | | 0 |

**1. Running Mode:**
**Option 1: Forward with brake**
The vehicle can only move forward and has brake function. This is also commonly acceptable at races.
**Option 2: Forward/Reverse and Brake**
This option is known to be the “training” mode with “Forward/Reverse with Brake” function. The vehicle only brakes on the first time you push thethrottle trigger to the reverse/brake zone. If the motor stops when the throttle trigger return to the neutral zone and then re-push the trigger toreverse zone, the vehicle will reverse, if the motor does not completely stop, then your vehicle won’t reverse but still brake, you need to return thethrottle trigger to the neutral zone and push it to reverse zone again. This method is for preventing vehicle from being accidentally reversed.
**Option 3: Forward and Reverse**
When the throttle trigger is pushed from neutral to reverse point, the motor reverses. This mode is generally used in special vehicles.
**2. Lipo Cells:**
Set the correct value according to the actual number of Lipo batteries used. The default is automatically calculated.
**3. BEC Voltage:**
BEC voltage support 6V/7.4V/8.4V. Generally, 6.0V is suitable for standard servos, while 7.4V/8.4V is suitable for high-voltage servos. Please set according to the servo specifications.
WARNING! Do not set the BEC voltage above the maximum operating voltage of the servo, as this may damage the servo or even the ESC.
**4. Low Voltage Cut-Off:**
This function is mainly to prevent excessive discharge of lithium batteries causing damage. The ESC monitors the battery voltage at all times, and once the voltage falls below the set threshold, the power output is reduced and the power output is completely cut off after a few seconds,and generates a 10% braking force. ForNiMH batteries, it is recommended to set this parameter to “Disabled”.
**5. Motor Rotation:**
Setting the rotation of the motor. Due to some differences with the drivetrains on different car kits, it is possible to that the car will go in the opposite directionupon full throttle. In the event that this happens, you can set the“motor rotation direction” to the opposite direction; “CW” or “CCW”.
**6. Max. Brake Force:**
This ESC provides proportional braking function; the braking effect is decided by the position of the throttle trigger. It sets the percentage of available brakingpower when full brake is applied.
Large amount will shorten the braking time but it may damage your pinion and spur gear.
**7. Max. Reverse Force:**
Refers to the reversing speed. Selecting different parameter values can produce different reversing speed. It is recommended to use a smaller reversing speed toavoid errors caused by reversing too quickly.
**8. Punch:**
Set in 1-9 stages, the higher the set value, the faster the acceleration. Kindly take into consideration according to the site, tire grip characteristics, vehicleconfiguration, etc.
An aggressive setting may cause the tire to slip, the starting current to be too large and adversely affect the electronics performance.
**9. Drag Brake Force:**
Refers to the brake force generated by the motor when the throttle trigger returns to neutral position. Choose the appropriate value according to the type of vehicle, configuration, site, etc.
**10. Turbo Timing:**
The Turbo timing can additionally increase the motor rpm.It will initiate at full throttle. It is usually used on a long straight road to release the maximum power of the motor. The higher this value is, the more the rpm of the motor will increase, and the greater the running current will be, the higher the temperature of the motor and esc. Therefore, please set this value reasonably.
**11. Turbo delay:**
It refers to the duration of continuous full throttle required to trigger Turbo. When the full throttle time reaches this set value, Turbo can be triggered to turn on.
**12. Initial PWM:**
Also called minimum starting force, it refers to the starting force acting on the motor at the initial position of the throttle. The required starting force can be set according to the tires and site grip. If the venue is too slippery, set a smaller starting force to avoid slipping.
**13. Cooling Fan:**
At “Temperature Control”, Fan will only start when ESC temperature is above 55 Celsius degrees, Fan stays off when temperature is below 50 Celsius degrees;
At “Always ON”, fan will run all the time
**14. Neutral Range of Throttle:**
Neutral range could be adjusted according to usage habits. Neutral range may deviate in some radio control, leading to move forward or reverse slowly. If this happens, neutral range needs to be set larger.
**15. Motor Pole Pairs:**
For setting pole pairs. Motor Rotation speed=Electrical Speed / Pole Pairs, To get the precise mechanical rotational speed, the pole pairs must be set correctly.
**16. X.BUS-ID:**
If X.BUS is selected, this item will take effect, and the bus supports 16 ECSs.

## 8. Recover factory parameters

**How to restore Bluetooth to factory settings:**
If the Bluetooth password is lost or if you need to forcibly enter Boot, please follow the instruction:
Step 1: Connect ESC wire(the white wire) to BEC+(red wire)
Step 2: Turn on ESC
Step 3: Disconnect from BEC when green light off and red light on
Step4. Remove short circuiting
When boot activated, the status of Bluetooth will restore to factory value(password will be restored to “1234” , and the name will be restored to the factory state), then restart ESC,
If there is a hardware error, Boot can be activated in this way to upgrade hardware.
**How to restore parameters to factory settings:**
If you want to restore the parameters to factory settings, just click the default button on the APP parameter page.

## 9. LED status & beep instructions

| Item | Type description | | Light cue | Sound cue | Remark |
|---|---|---|---|---|---|
| Basic information | Throttle not zeroed | | Red light flashes quickly | Short tone "beep" | Red light flashes quickly |
| | Throttle signal lost | | Red light flashes slowly | Long tone "beep" | In cycle of 2s |
| | Voltage detection | Low voltage protection | (Redx1 Greenx2) … | Long tone "beep"x1,<br>Short tone "beep"x2 | Check the input voltage or setting of number of cells if no "beep" before MOSFET detecting. |
| | | Over voltage protection | (Redx1 Greenx3) … | Nil | Voltage is too high, check whether the voltage is over the withstand value of ESC |
| | The MOS temperature is too high,<br>operating temp. > 125 ℃ / startup temp. > 110 ℃ | | (Redx1 Greenx4) … | Long tone beepx1,<br>short tone beepx4 | The temperature of MOS is too high. ESC can resume normal operation when the temperature drops below 100 degrees Celsius |
| | The capacitor temperature is too high,<br>operating temp. > 105 ℃ / startup temp. > 100 ℃ | | (Redx1 Greenx5) … | Long tone beepx1,<br>short tone beepx5 | The temperature of capacitor is too high. ESC can resume normal operation when the temperature drops below 100 degrees Celsius |
| Throttle parameters | Abnormal throttle parameters | | (Redx1 Greenx7) … | Long tone beepx1,<br>short tone beepx7 | If there is still an abnormal promp when positioming throttle to neutral point, throttle calibration process needs to be initiated. |
| Hall sensing abnormality | Hall output logic abnormality | | (Redx1 Greenx8) … | Long tone beepx1,<br>short tone beepx8 | Re-plug Hall wire. If the abnormality persists, it may be a problem with the internal Hall of the motor, and the Hall wire needs to be unplugged. |
| Throttle parameter | Throttle calibration prompt | Calibrate low range | (Red Green) … | Nil | If the calibration process is irregular or unsuccessful, the ESC will exit the calibration process and enter the normal Startup process. |
| | | Calibrate high range | (Green) … | | |
| | | Calibrate neutral throttle | (Red) … | | |
| | | Calibration success | (Red Green) x4 | (so-mi-do) x4 | |
| Normal operation | All normal and no action to throttle | | (Green) … | Nil | |
| | Throttle operation | Normal | The greater the accelerator, the faster the green light flashes | | |
| | | Turbo timing is on | Green light remains on | | |
| | Braking | | Red light is on | Nil | Red light off when release brake |
| Boot | Entering boot forcibly | | | Nil | Follow the process of Bluettoth factory reset |
| | Boot in progress | | Green light: On 2s&Off 2s | Nil | CPU enter Boot mode |
| | | | Red light remains flashing | | CPU enter Boot, program upgrade in progress |
| Normal startup | Prompt for the number of battery cells after normal startup | | Quinary prompt light signal, long tone with red light on, short tone with green light on | do, mi, so<br>+<br>quinary prompt sound | do, mi, so: prefix of quinary number<br>Quinary definition<br>Long tone = 5 cells, short tone = 1 cell<br>Example: 8-cell lithium battery prompt sound<br>do, ri, mi + long tone x1 + short tone x3 |
| Fault warning | ESC self check abnormality | | (Redx2) … | Nil | Disconnect the motor wires, power on. if it is still abnormal,return it for maintenance |
| | | | (Redx2 Greenx1) … | Nil | |
| | | | (Redx2 Greenx2) … | Nil | |

***Notes:**
1. Red light matches long tone, gree light matches short tone.
2. For saving power, all "beep" lasts for 5mins; if all fault recovered, it takes effect again in next 5 mins.
3. Ellipsis"..." in light cue represents repetition of previous action.