

X Pro v2 无刷电子调速器说明书

感谢您购买朗宇无刷电子调速器。为了安全起见，我们强烈建议您在使用之前仔细阅读本使用手册。我们不承担因使用本产品或擅自对产品进行改造所引起的任何责任，包括但不限于对附带损失或间接损失的赔偿责任。我们有权在不经通知的情况下变更产品设计、外观、性能及使用要求。产品使用视为对所有内容的认可和接受。

注意事项

- 使用此产品的时候，时刻牢记安全第一；
- 马达连接好电池和电调的情况下，有可能意外启动而造成伤害，请谨慎连接；
- 连接电池前，如果需要对飞机或者直升机进行近距离操作，请先不安装螺旋桨或者断开小齿轮；
- 请遵守当地所有关于遥控飞行器的法律法规；
- 请勿在人群上面或者附近飞行；

主要特性

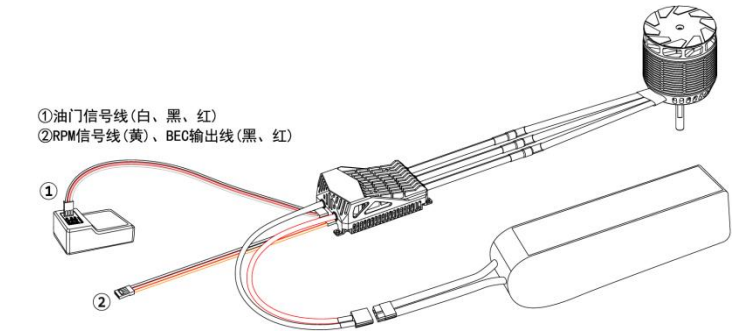
- 1.采用高性能 32 位 G4 处理器，运行频率高达 170MHz，运算能力极强，运行速度更快。
- 2.采用新一代制作工艺的功率输出元器件(MOSFET)，低发热，瞬间承受电流大，可靠性高。
- 3.自检功能：电调上电后会对电源短路，电机是否缺相，油门归零问题，电压范围进行自检。
- 4.双侧面开孔以及独特的散热风道设计，极大地增强了电调散热性能。
- 5.智能温控风扇，只有在温度超过 40 度时，风扇才会开启，确保了调机时的安静环境。
- 6.具有直升机定速功能，定速强度可调，易于操作。
- 7.具有熄火降落反悔时间选择功能，在设定的时间内可人工中断熄火降落过程并快速重启电机，避免因操控失误而坠机。
- 8.电调有独立的编程接口，可用手机 APP 为电调进行参数设定及升级，同时支持 Mikado VBCT/E/Rotorflight2/Jeti 遥控设备进行调参。
- 9.支持多重设备数据回传，包括 Mikado VBCT/E，Rotorflight2，Futaba SBUS2，Jeti，MSH Brain，iKon，方便用户实时查看数据。因支持多款遥控器回传，上电检测时间长为正常现象。
- 10.集成多彩炫酷 LED 灯，通过闪烁模式指示电调状态，支持多种颜色可选，满足用户喜好。
- 11.多重保护：上电电压异常保护，启动保护，温度保护，油门信号丢失保护，过负荷保护，低压保护，过流保护。

产品规格

型号	X105A SBEC	X125A SBEC	X155A SBEC	X130A HV SBEC	X200A HV SBEC	X300A HV SBEC
持续输出电流	105A	125A	155A	130A	200A	300A
峰值输出电流	125A	150A	180A	160A	260A	400A
电池节数	3-6S LiPo	3-8S LiPo	3-8S LiPo	6-14S LiPo	6-14S LiPo	6-14S LiPo
BEC 输出	6V-12V adjustable /10A	6V-12V adjustable /10A	6V-12V adjustable /10A	6V-12V adjustable /10A	6V-12V adjustable /10A	6V-12V adjustable /10A
CPU 频率	170MHz	170MHz	170MHz	170MHz	170MHz	170MHz
参数编程功能	LCD 编程卡 G2/安卓 LCD 编程卡 G2/安卓 &苹果 APP	LCD 编程卡 G2/安卓 LCD 编程卡 G2/安卓 &苹果 APP	LCD 编程卡 G2/安卓 LCD 编程卡 G2/安卓 &苹果 APP	LCD 编程卡 G2/安卓 LCD 编程卡 G2/安卓 &苹果 APP	LCD 编程卡 G2/安卓 LCD 编程卡 G2/安卓 &苹果 APP	LCD 编程卡 G2/安卓 LCD 编程卡 G2/安卓 &苹果 APP
遥控功能	支持	支持	支持	支持	支持	支持
定速功能	支持	支持	支持	支持	支持	支持
支持软件升级	支持	支持	支持	支持	支持	支持
防打火功能	/	/	/	支持	支持	支持
自动温控风扇	支持	支持	支持	支持	支持	支持
RGB 灯效	支持	支持	支持	支持	支持	支持
适用飞机型号	420-500	420-500	550-600	600-轻量化 700	600-轻量化 700	700-800
电调尺寸	75.2*37.8*25.5mm	75.2*37.8*25.5mm	75.2*37.8*25.5mm	85.7*48*24.2mm	85.7*48*24.2mm	105*57*45.6mm
电调重量	170g	185g	190g	240g	245g	325g

注：电调尺寸、重量不含散热风扇。

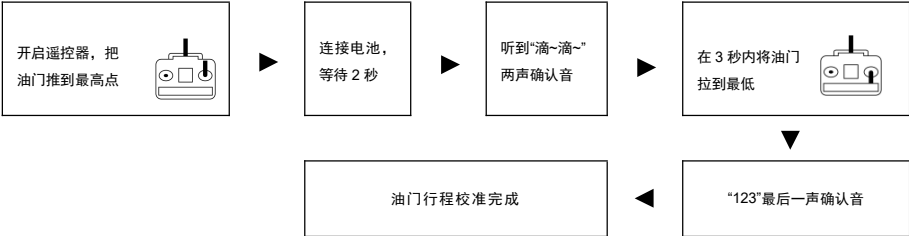
连接线示意图



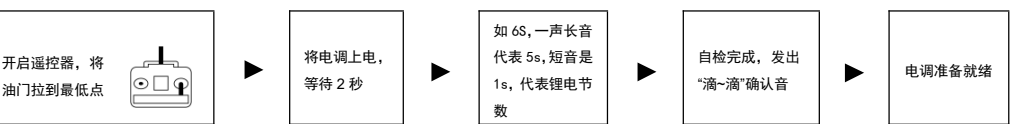
- ①油门信号线(黑、红、白)：插入接收机油门通道或无副翼系统油门通道，具体视接收机类型及无副翼系统类型而定。其中白线用于传送油门信号，红线和黑线为 BEC 线。
- ②RPM 信号线(黄)：插入无副翼系统转速输入通道，当使用陀螺仪定速时，可使用该 RPM 信号线提供转速信号输入。其中黄线为 RPM 线，红线和黑线为 BEC 线。

首次使用电调并设置油门行程

温馨提示：在首次使用本电调或更换其他遥控器使用时，请务必先重新设定油门行程。



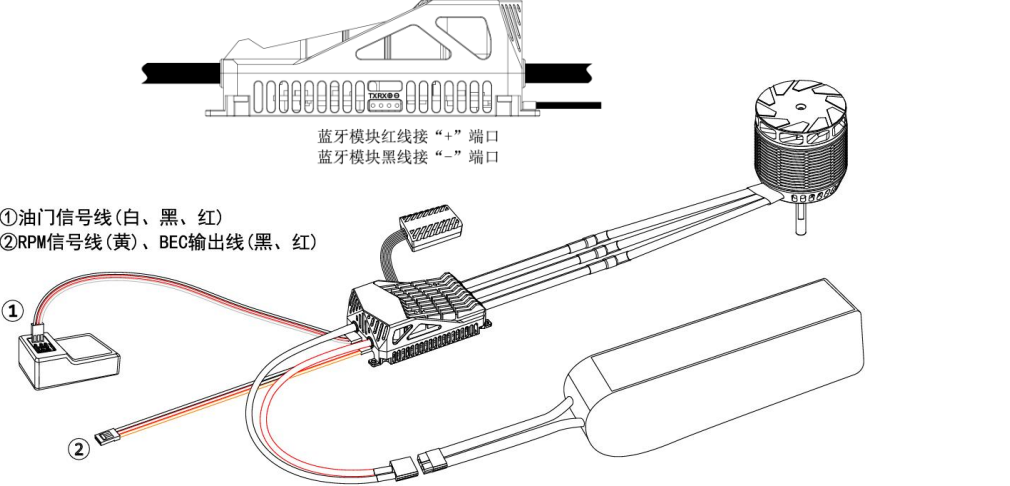
电调的正常启动程序



参数设定与电调运行数据查看方法

本电调可通过手机 APP 进行参数设定，同时查看电调的实时数据：包括电流，电压，电调温度，油门，电调状态码等，以满足不同的飞行需求。使用手机 APP 调参及查看实时数据。

A：接线示意图



B：操作步骤

- 1.根据上面接线示意图将电调与蓝牙模块连接，并将电调连接电池。蓝牙模块的红线对应正极，黑线对应负极进行连接。
- 2.下载并安装好手机 APP，打开 APP 并且连接到蓝牙，即可进行参数设置及实时数据的查看。
- 3.每次更改完参数后，需要重新上电，新更改的参数才会生效。

提示：使用前请关闭油门或者断开一根电机线，再上电，让电调出于自检不通过，保证风扇接口有电！

可编程参数项及说明

1.可编程参数项对应可编程参数设定值表	
飞行模式(Govmode)	ESC-StoGov；Ext-Gov；* Fixed-Wing
低电压保护点(Cutoff Volt)	OFF；2.7V；* 3.0V ；3.2V；3.4V；3.6V
进角(Timing)	* Auto ；Low；Middle；High
BEC 输出(BEC Voltage)	6.0V-12.0V(默认 8.4V)
电机转向(Motor Rotate)	* CW ；CCW
定速参数 P(GovParamP)	* 4 ；1-10
定速参数 I(GovParamI)	* 3 ；1-10
加速度(Acceleration)	* Fast ；Normal；Slow；Very Slow
自动重启时间(ARTime)	OFF；* 90S ON
启动力度(Startup Power)	* Low ；Middle；High
刹车类型(Brake Type)	* Normal ；RVS
刹车力度(Brake Force)	* 0% ；0%-100%
SR 功能(SR Function)	ON；* OFF
电量记录校正(Cap Correction)	* 0% ；0%-10%
LED 灯颜色(LED Colour)	Red；Yellow；Orange；Green；Jade Green；* Blue ；Cyan；Purple；Pink；Whinte
温控风扇(Temp Fan)	* ON ；OFF
电机极对数(Pole Pairs)	* 1 ；1-30
齿轮 1(Gear1)	* 1 ；1-255
齿轮 2(Gear2)	* 1 ；1-255
带“*”的为出厂默认设置	
2.可编程项目说明	

- 1.飞行模式(Govmode):**电调可以设置三种飞行模式：
电调定速：适用于使用本电调进行定速飞行的直升机飞行器，该模式下油门高于 30%(包含 30%6)才启动电机，电机以超柔方式启动，完成缓启动后转速稳定进入定速运行状态。每次从其他模式调整至该模式时需要做一次转速标定才可以正常运行定速功能，以后保持在该模式下就不需要反复做转速标定了。
陀螺仪定速：适用于不使用任何定速设备的直升机或者使用陀螺仪的直升机飞行器，该模式下油门高于 5%(包含 5%)才启动电机，电机以超柔方式启动，在缓启动完成后以较快的油门响应加速至当前油门值；
固定翼模式：适用于固定翼飞行器，选择该模式后，油门离于 5%启动电机，以固定的油门响应速度跟随摇杆加减速，响应较快，**默认设置为此模式。**
- 2.低电压保护点(Cutoff volt):**支持 OFF/2.7V/3.0V/3.2V/3.4V/3.6V，6 档可调。该值为单节电池的电压值，若您使用的是 6 节锂电池，那最终的保护电压即为设置的值 X6。**默认设置为 3.0V。**
- 3.进角(Timing):**调节电调驱动电机的进角，自动/低/中/高可调，默认为自动。
- 4.BEC 输出(BEC Voltage):**设置电调内置 BEC 的输出电压，6-12V 可调，调节步进为 0.2V。**默认设置为 8.4V。**
- 5.电机转向(Motor Rotate):**设置电机转向，连接好电机与电调以后，默认电机为正转，则设置为反转后电机将反转，若默认电机为反转，则设置为反转后电机将正转，**默认设置为正转。**
- 6.定速参数 P(GovParamP):**控制电调在维持定速过程中补转的程度，数值越大，出现转速不足或转速过高时回归目标转速的程度就越大，该功能需要配合定速感度 I 设置，1 到 10 档可调，**默认设置为 4 档。**
- 7.定速参数 I(GovParamI):**当转速低于或超过设置的过预期值时，电调会进行转速补偿。该参数用于调整补转的程度大小。参数过大将造成补转过度，参数过小将引起补转不足，1 到 10 档可调，**默认设置为 3 档。**
- 8.加速度(Acceleration):**四档 Fast/Normal/Slow/Very Slow 可调，**默认设置为 Fast。**
- 9.自动重启时间(ARTime):**该功能仅在“电调定速”模式下有效。在设定的时间内将油门摇杆从 30%以上推至 25%~30%之间任意位置后，再推回 30%以上，电调从输出关闭状态可以不经过缓启动快速起动电机并将电机加速至油门摇杆当前油门值应有的转速(加速率为设定的快速重启加速时间)完成熄火重启。油门低于 25%、或者将油门摇杆保持在 25%-30%的时间内超过设定的反悔时间，熄火降落反悔时间设置都将不生效，油门再次高于 30%以后电调将执行“电调定速”模式下默认的启动过程，**默认设置为 90s 开启。**

10.启动力度(Startup Power):低/中/高档三档可调，**默认设置为低档。**

11.刹车类型(Brake Type):

普通刹车(Nomal):设置该功能时，油门遥感归零后，电调将按照设置的刹车力度使电机停转，**默认设置为普通刹车。**

反转刹车(RVS):通过切换电机正反向，快速停止。将 3Pin 信号线接入油门通道，将 RPM 信号线接入接收机任意的 2 段开关通道，打开遥控器 2 段开关，此时反转功能开启，拨动遥控器 2 段开关即可调整电机正反向。

警告：此功能只能在 50%油门以下才有效，且只允许在飞机降落至地面使用，否则有可能引起电调烧毁！

12.刹车力度(Brake Force):设定普通刹车功能下油门归零以后，电机停转的速度，数值越大，电机刹停的力度就越强，电机从旋转到停止的时间也越短。0%-100%可调(步长为：1%)**默认设置为 0%；(该功能仅在普通刹车模式下有效)**

13.SR 功能(SR Function):同步整流，可使电调工作效率更高，更节能，续航时间更长，**默认设置为关闭。**

14.电容校正(Cap Correction):当电调记录的电池消耗值与实际电池消耗值不同时，可以应用容量调整来纠正差异。该值的范围从-10%到 10%。**默认值为 0%。**

15.LED 灯颜色(LED Colour):多种颜色可调，用于显示电调运行状态以及故障提示，**默认设置为蓝色。**

16.温控风扇：当此功能开启(ON 时，上电后智能风扇自动检测温度，只有当温度超过 40 度时自动开启，40 度以下不启动；此功能关闭(OFF)时，上电后风扇直接启动，**出厂默认为开启(ON)。**

17.电机极对数(Pole Pairs):此值是计算螺旋桨实际转速所必需的，该值通常在电机的参数表中说明，**默认设置为 1。**

18.齿轮 1(Gear1):1-255。**默认设置为 1。**

19.齿轮 2(Gear2):1-255。**默认设置为 1。**齿轮 1 计算；齿轮 2/齿轮 1 即可。

定速功能与遥控回传说明

1.电调定速说明

通过转速标定，建立电机转速-油门值对应曲线，然后在遥控器上将油门值设置为某一个固定值，即输出该油门值对应转速，并在电机负载变化时维持该转速不变。

注：电调出厂默认为电调定速模式，首次使用需要标定转速，标定转速后，以后电调断电再重新上电就不需要再执行转速标定，电调会储存上次标定的转速。若从直升机模式调整到其它模式并保存，再回到直升机模式，电调存储的电机转速就会被清除，因此需要再一次执行转速标定。

2.转速标定过程

- ①转速标定前先做油门行程校准(若该电调已做过油门校准无需重复操作)。
- ②主旋翼螺距设为 0 度。
- ③遥控器油门在最低值，等待电调自检完成。
- ④随后将油门推至 50%，主旋翼会开始缓慢加速旋转(因主旋翼螺距为 0 度，直升机不会升空)，主旋翼转速稳定后，将油门摇杆推至最低，直升机主旋翼开始减速停转，转速标定完成。
- ⑤如果是 M4/M4MAX 不用标定，可直接选择直升机类型。其它直升机要先选择 Other，再进行标定。

3.如何计算主旋翼 100%油门转速

①首先通过手机 APP 查看标定的最高转速，如下图

(该值为电机在 100%油门下所能达到的最大电气转速)：

②主旋翼 100%油门转速=MAX RPM÷(电机极数÷2)÷齿比

假如电机为 10 极，电机为 10 级，电机齿为 13T，主齿为 120T。即齿比为 9.23。

根据如下公式可得主旋翼 100%油门下的转速。

公式：主旋翼 100%油门转速=MAX RPM÷(电机极数÷2)÷齿比

图中主旋翼 100%油门转速即为 145000÷(10÷2)÷(120÷13)约为 3140 转。

如果 3D 飞行时的主旋翼需要保持 2500 转，则需要设定的定速油门为 2500÷3140 约得 0.8，需要设定油门值为 80%。

③您也可以直接在手机 APP 设置电机极对数和齿比得出主旋翼 100%油门转速。

(1)转速标定完成后，连接手机 APP 并选择如左图手机 APP 界面。

(2)滑动屏幕对马达极数进行选择，再按 Save 键后可对马达齿比进行选择，

再按 Save 键显示出的转速即为主旋翼 100%油门转速。

4.遥控回传使用说明

①当使用 Mikado BECT/E，Futaba SBUS.2，Jeti 遥控器时，请将数据回传线与电调的 RX 端口相连接。

②当使用 Rotorflight2 时，请将数据回传线与电调的 TX 端口相连接。

保护功能说明

1.上电电压异常保护

电调连接电池或电源时，会检测输入的电压，若输入电压不在电调的工作电压范围，则判断上电电压异常，进入保护状态，并闪灯鸣叫提示。

2.启动保护

当推油门启动后，如在两秒内未能正常启动电机，电调将会关闭电机，油门需要重新设置，才可以重新启动。可能原因：电调与电机接线断开或接触不良、螺旋桨被其它物体阻挡、减速齿卡死等。

3.温度保护

当电子调速器工作温度超过 110 度时，电调将会自动降低输出功率进行保护，但不会将输出功率全部关闭，最多降到全功率的 70%，以保证电机留有一定动力，避免排机。

4.油门信号丢失保护

当电调检测到油门信号丢失 1 秒后，将自动减少对马达的输出功率，然后油门信号丢失超过 2 秒，电调将自动关断马达。如果在降功率过程中油门信号恢复，电调可以立即恢复油门控制。这样在瞬间信号丢失情况下(2 秒以下)，电调并不会进行油门保护；只有当遥控信号确实长时间丢失，才进行保护，但电调不是立即关闭输出，而是有一个逐步降低输出功率的过程，给玩家留有一定的救机时间，兼顾安全性和实用性。

5.过负荷保护

当负载突然变得很大时，电调会切断动力，或自动重启，出现负载急剧增加的原因通常是马达堵转。

6.低压保护

当电调工作电压低于设定的保护电压时，电调会逐渐降低输出功率进行保护，但不会将输出功率全部关闭，最多只降到全功率的 50%，保证仍有动力可以降落，更换新电池重新上电后恢复正常。

7.过流保护

使用过程中，若电流超过规定值以后，电调会立即切断输出，然后快速恢复动力，再次超过规定值将彻底切断动力不再恢复，断电重连后恢复正常。有可能是因为过载，马达烧了等原因造成的。

8.断线保护

电机和电调没接好，需要检查电调和电机的接头是否连接好或者焊接是否焊好。

鸣叫报警音说明

保护情况	报警音	LED 指示灯
1.油门信号丢失	"哔-哔-"(每隔 2s)	蓝色，跟随提示音闪烁
2.温度保护	"哔哔-哔哔-"(每隔 2s)	蓝色，跟随提示音闪烁
3.低压保护	"哔哔哔-哔哔哔-"(每隔 2s)	蓝色，跟随提示音闪烁
4.上电油门不归零	"哔-哔-"(每隔 200ms)	蓝色，跟随提示音闪烁
5.电压不在支持范围	"123-123"(每隔 200ms)	蓝色，跟随提示音闪烁

制造商：珠海市朗宇电动科技有限公司

地址：珠海市香洲区科融路 33 号 802 室

电话：0756-8800516

网址：www.rcsunnysky.com

SUNNYSKY®

X Pro v2 Brushless ESC User Manual

Thank you for purchasing the brushless electronic speed controller. We strongly recommend carefully reading this user manual before use for safety reasons. We do not assume any liability for any damages caused by the use of this product or unauthorized modifications to the product, including but not limited to compensation for any consequential or indirect losses. We reserve the right to change product design, appearance, performance, and usage requirements without prior notice.

Safety Precautions

- Always place safety as priority when you use the product;
- An electric motor that is connection with battery pack and ESC may start unexpectedly and cause serious danger.Always treat a powered system with respect;
- Always remove the propeller or disengage the pinion gear before the battery connected if you need to working on a plane or helicopter at short range ;
- Please observe all local laws regarding the flying of remote control aircraft;
- Never fly over or near crowds;

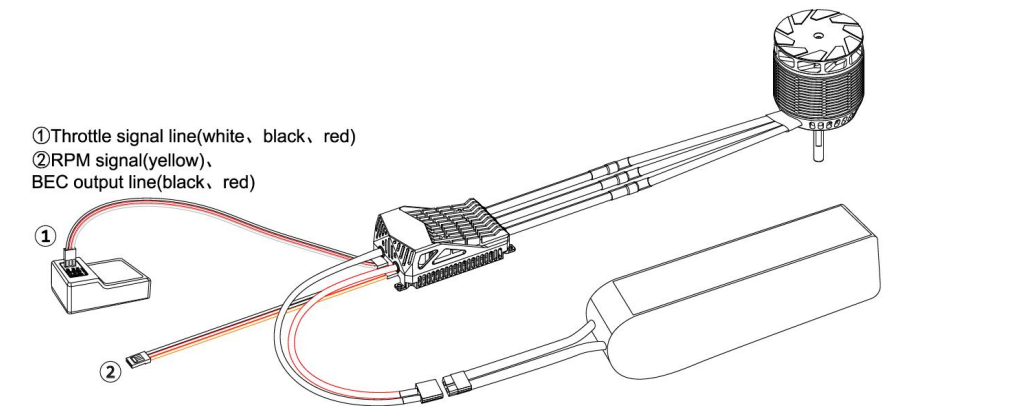
Main features

- 1.Equipped with high-performance 32-bit G4 processor with operating frequency of up to 170MHz;
- 2Adopting new generation of power MOSFET,it features low heat generation,high instantaneous current endurance and high reliability ;
3. Self-check function: After power-on,the ESC will automatically self-check for power supply short circuit,motor phase loss,throttle zeroing,and voltage range ;
- 4.The special and unique case design greatly increase the heat dissipation area and significantly enhance the heat dissipation performance of the ESC ;
5. The smart temperature controlled fan will only start when only start when the temperature exceeds 40 degrees,ensuring a quiet environment during the adjustment ;
6. With helicopter speed governor function,the constant speed sensitivity can be adjusted and is easy to operate ;
- 7.Equipped with the time selection function for stall landing,it can be manually adjustable within the time set to avoid a crash due to handling errors ;
8. The ESC has an independent programming interface,it supports parameter adjustment via phone App/Mikado VBCT/E/Rotorflight2/Jeti remote control devices ;
9. With telemetry function for mikado VBCT/E,Rotorflight2,Futaba SBUS2,Jeti,MSH Brain,and iKon,allowing users to check data in real time ;
- 10.Equipped with colorful LED lights,and indicate the ESC status through flashing modes ;
11. Multiple protections:abnormal power-on voltage,start-up,temperature,throttle signal loss,over-load,low-voltage,over-current ;

Product Specifications

Model	X105A SBEC	X125A SBEC	X155A SBEC	X130A HV SBEC	X200A HV SBEC	X300A HV SBEC
Continuous current	105A	125A	155A	130A	200A	300A
Peak current	125A	150A	180A	160A	260A	400A
Input voltage	3-6S LiPo	3-8S LiPo	3-8S LiPo	6-14S LiPo	6-14S LiPo	6-14S LiPo
BEC Output	6V-12V adjustable /10A	6V-12V adjustable /10A	6V-12V adjustable /10A	6V-12V adjustable /10A	6V-12V adjustable /10A	6V-12V adjustable /10A
CPU 频率	170MHz	170MHz	170MHz	170MHz	170MHz	170MHz
Programming Way	LCD Programming Card G2/Android &iOS APP/VBCT/E/RF2/Jeti	LCD Programming Card G2/Android &iOS APP/VBCT/E/RF2/Jeti	LCD Programming Card G2/Android &iOS APP/VBCT/E/RF2/Jeti	LCD Programming Card G2/Android &iOS APP/VBCT/E/RF2/Jeti	LCD Programming Card G2/Android &iOS APP/VBCT/E/RF2/Jeti	LCD Programming Card G2/Android &iOS APP/VBCT/E/RF2/Jeti
Remote sensing	Support	Support	Support	Support	Support	Support
Constant speed	Support	Support	Support	Support	Support	Support
Support software upgrades	Support	Support	Support	Support	Support	Support
Anti-sparking	/	/	/	Support	Support	Support
Automatic Temperature control fan	Support	Support	Support	Support	Support	Support
LED Light	Support	Support	Support	Support	Support	Support
Applications	420-500	420-500	550-600	600-Lightweight700	600-Lightweight700	700-800
Size	75.2*37.8*25.5mm	75.2*37.8*25.5mm	75.2*37.8*25.5mm	85.7*48*24.2mm	85.7*48*24.2mm	105*57*45.6mm
Weight	170g	185g	190g	240g	245g	325g

Note: The dimensions of the speed regulator do not include the approximate dimensions of the radiator fan.
Connection Diagram:

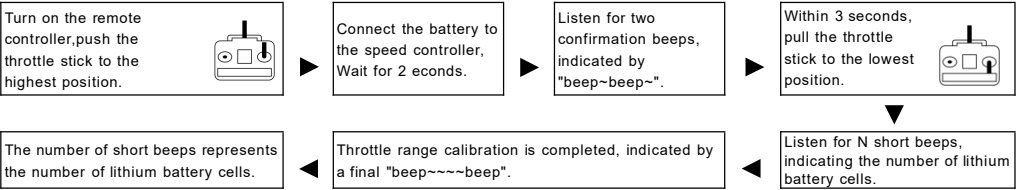


- ①Throttle Signal Wire (Black, Red, White):Plug into the rotational or aileronless system throttle,depending on the type of receiver and aileronless system. The white wire is used to transmit the throttle signal,,while the red wire and black wire are connected in parallel to the output terminal of the internal BEC(i.e,BEC voltage output wire and ground wire).
- ②RPM Signal Wire (Yellow,red,black): Insert into the rotational speed input channel of the aileronless system;(When using external constant speed,it can be used to provide rotational speed signal input.). The yellow wire is RPM signal,the red and black are BEC wire.

First-time Use of the Speed Controller and Throttle Range Setting

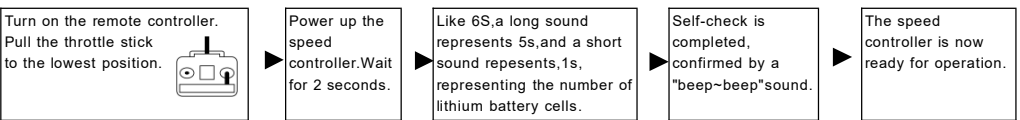
Important Note: When using the speed controller for the first time or when switching to a different remote controller, it is essential to

reconfigure the throttle range.



Please follow these steps carefully to ensure proper throttle range calibration.

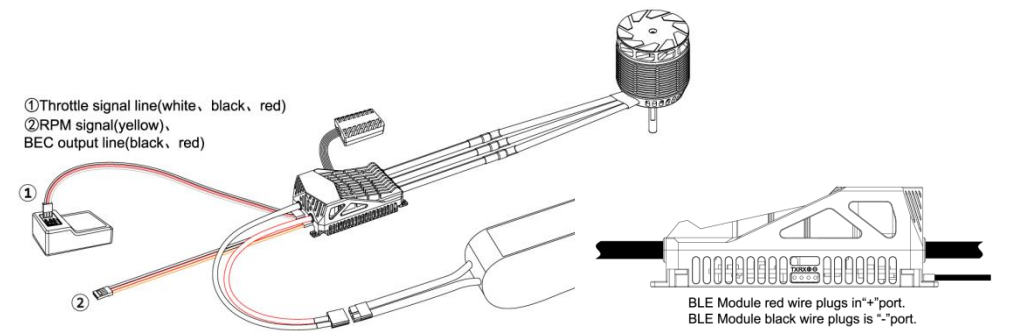
Normal Startup Procedure for the Speed Controller



Please ensure that you follow this startup procedure to ensure the proper functioning of the speed controller.

Using Mobile phone APP to set the ESC parameters and view real time data

A: Wire connection diagram



B: Operation Steps

1. Connect the ESC to the Bluetooth module and battery correctly base on above wire connection diagram.
2. Download and install the corresponding mobile app (e.g., SUNNYSKY Mobile App) on your smartphone. Open the app and connect to the Bluetooth module. Once connected, you can proceed with parameter setting and real-time data viewing.
3. After each parameter change, it is necessary to re-power the speed controller for the new settings to take effect.

Note:Please turn off the throttle or disconnect one motor wire,then turn on the power to let the ESC self-check is failed,ensuring the fan port is powered.

Programmable Parameter Items and instructions

1. Govmode	ESC-StoGov / Ext-Gov / *Fixed-Wing
2.Cutoff Volt	OFF / 2.7V / *3.0V / 3.4V / 3.6V
3. Timing	*Auto / Low / Middle / High
4. BEC Voltage	6.0V-12.0V / *Default 8.4V
5. Motor Rotate	*CW / CCW
6. GovParam P	*4 / 1-10
7. GovParam I	*3 / 1-10
8. Acceleration	*Fast / Normal / Slow / Very Slow
9. ARTime	OFF / *90s ON
10.Startup Power	*Low / Middle / High
11.Brake Type	*Normal / RVS
12.Brake Force	*0% / 0%-100%
13.SR Function	ON / *OFF
14.Cap Correction	*0% / 0%-10%
15.LED Colour	Red / Yellow / Orange / Green / Jade Green / *Blue / Cyan / Purple / Pink / White
16.Temp Fan	*ON / OFF
17.Pole Pairs	*1 / 1-30
18.Gear 1	*1 / 1-255
19.Gear 2	*1 / 1-255

Note: The option marked with "*" is the factory default setting.

Programmable parameters description

- 1、Govmode:
ESC Store Governor mode:Suitable for helicopters flying at a fixed headspeed.The throttle in this mode has to be more than 30%(including 30%)before staring the motor.The motor starts in an ultra-smooth manner.After the soft,the governor will be activated.
Gyroscope Governor mode:Suitable for helicopters without any governor or helicopters using external governors.The throttle has to be higher than 5%(including5%)before starting the motor.After the slow start is completed,the motor will start off with a smoother manner,followed by a faster throttle response accelerated to the current throttle value.
Fixed-wing mode:Suitable for fixed-wing aircrafts.In this mode,the throttle has to be more than 5%(including 5%)to start the motor and the throttle response is rapid, default setting for this mode.
- 2、Low Voltage Cutoff Threshold:
OFF / 2.7V / 3.0V / 3.2V / 3.4V / 3.6V adjustable,the voltage means each cell voltage.For example if you use 6 cells Lipo battery,then the low voltage threshold value is 6 x set voltage value,default is 3.0V.
- 3、Timing:
Adjust the ESC timing with the range of 0° ~30° ,the default setting is Auto.
- 4、BEC Voltage:
The ESC is built-in with a BEC of 6-12V and has the capability to adjust 0.2V per step, the default setting is 8.4V.

- 5、Motor Rotate:
This item is for setting the rotation sirection of the motor,and 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.
- 6、GovParam P:
This parameter is for controlling the ESC to 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 needs to be combined with the Governor parameter I. 1-10 Adjustable,and the default setting is 4.
- 7、GovParam I:
When the speed falls below, or exceeds the value set, the speed is compensated by the ESC.This parameter is used to resize the degree of rotation. Too

- large parameters will cause excessive make-up, and too small parameters will cause insufficient replacement. 1-10 Adjustable, and the default setting is 3.
- 8、Acceleration:
Fast / Normal / Slow / Very Slow adjustable,the default setting is Fast.
- 9、ARTime:
This feature is only available in ESC Store Governor mode. It is the time set to push the throttle from more than 30% to 25% to 30% throttle range, and then push back more than 30%. The parameter will not take effect when the throttle range is below 25% or between 25%-30% beyond the set ting.The ESC will execute the ESC Store Governor mode of the default start-up process only if the throttle range is above 30%, the default setting is 90s ON.
- 10、Startup Power:
Low / Middle / High adjustable, the default setting is Low.
- 11、Brake Type:
1.1 Normal Brake:When"Normal Brake" is turned on, after the throttle trigger return to zero position, it will make the motor stop running according to the parameter of brake force set, the default setting is Normal brake.
1.2 Reverse Brake:Plug the 3Pin signal wire into the throttle channel, and plug the RPM signal wire into any 2-stage switch channel of the receiver, then turn on the transmitter 2-stage switch. The Reverse Brake function is turned on now, you can change the forward and reverse directions of the motor by flipping the 2-stage switch of the transmitter.

- Warning:**This function can only be effective when the throttle is below 50%, and it is only allowed to be used when the airplane is landing on the ground, otherwise it may cause the ESC to burn!
- 12、Brake Force:
After throttle trigger is pulled to zero position, the higher value means the stronger brake force, and it will take shorter time to make the motor from running to standstill. 0%-100% adjustable, 1% as 1 step, the default setting is 0%.(This function only valid under normal brake mode.)
 - 13、SR Function:
The synchronous rectification function makes the ESC with higher driving efficiency and more energy-saving, and support longer flight time, the default setting is OFF.
 - 14、Cap Correction:
When the battery consumption value recorded by the ESC is different with the actual battery consumption, the capacity adjustment can be applied to correct the discrepancy. This value ranges from-10% to 10%, the default setting is 0.
 - 15、LED Colour:
Multiple colors adjustable, and it is used to display the ESC operation status and errors, the default setting is Blue.
 - 16、Temp Fan:
When this function is turned on, the smart fan automatically detects the temperature after power-on, and automatically starts only when the temperature exceeds 40 degrees, but does not start below 40 degrees; when this function is turned off, the fan starts directly after power-on. The default setting is ON.
 - 17、Pole Pairs:
This value is necessary for calculating the actual RPM of the propeller, and it is usually indicated in the motor parameter table, the default setting is 1.
 - 18、Gear 1:
The range is 1-255, and the default setting is 1.
 - 19、Gear 2:
The range is 1-255, and the default setting is 1, Gear Ratio = Gear 2 / Gear 1.

The Fixed Speed Function Settings

1.Fixed speed description

- By speed calibration, the motor speed-throttle value corresponding curve is established. The throttle value is set to a fixed value on the remote control, the output of the throttle value corresponds to the speed, and the motor load changes to maintain the same speed.
Note:The factory default setting is ESC store governor mode, you need to do the speed calibration for the first time, and the ESC will stores the motor speed throttle value corresponding curve after the speed calibration.
If adjusting to any other mode from this mode and saving the "Motor RPM-Throttle" curve, and then adjusting back to this mode, the "Motor RPM-Throttlr" curve saved by the ESC will be cleared, and you need to do the speed calibration once again.

2.Speed calibration process

- ①Need to do the throttle calibration first before the speed calibration (if already done, just skip this step).
 - ②Make sure the main rotor pitch is at 0 degrees.
 - ③Pull the throttle stick to the minimum position, waiting for the esc self-check process.
 - ④Push the throttle to 50%, the rotor of the helicopter will start to slowly accelerate (the main rotor pitch is zero degrees, the helicopter will not lift off) and wait for the acceleration to complete, When the rotor speed is stable, push the throttle stick to the minimal position.
 - ⑤Speed calibration is finished.
- 3.How to Calculate the main rotor RPM at 100% throttle**
①Connecr Out APP after the speed calibration is completed to find the records as shown:
The values in the figure is just an example, depending on the actual display values.
This value is the maximum electrical speed that the motor can achieve at 100% throttle.
②For example, if motor has 10 poles, using 13 motor teeth with main teeth of 120T, the gear ratio is around 9.23.

- And Formula:
100% throttle speed of the main rotor = MAX RPM ÷ (motor poles ÷ 2) ÷ gear ratio
Then the main rotor 100% throttle speed is 145000 ÷ (10 ÷ 2) ÷ (120 ÷ 13) is around 3140 RPM.
If the main rotor during 3D flight requires to be maintained at 2500 RPM, the fixed speed throttle needs to be set at 2500 ÷ 3140 to get about 0.8, the throttle value needs to be set at 80%.
③You can set motor poles and the gear ratio (GR) via our APP to get the speed of the main rotor at 100% throttle.
(1)Connect the ESC to Our APP after the speed is calibrated, and then enter the interface as shown above.
(2)Select options related to "motor poles", scroll screen select gear ratio (GR) by, then press "Save" will show the speed of the main rotor at 100% throttle.
- 4.Telemetry Instruction**
(1)When using Mikado VECT/E, Futaba SBUS.2, or Jeti transmitter, please connect the telemetry wire to the ESC's RX port.
(2)When using Rotorflight2, please connect the telemetry wire to the ESC's TX port.

Protection Function

- 1.**Abnormal power-on voltage protection:**The ESC enters a protective state once the input voltage detected is not in the operating voltage, Prompting LED light to flash.
- 2.**Start-up Protection:**If the motor fails to start normally within 2 seconds after pushing the throttle to start, the ESC will cut off the output power, and you need to make the throttle calibration again, then ESC can be restarted. Possible reasons: disconnection or poor connection between ESC and motor, the propeller or motor is blocked by other objects, the gearbox is damaged, etc.
- 3.**Over-heat protection:**When the temperature of the ESC is over about 110°C, the ESC will automatically reduce the output power for protection, but will not fully shut down the power, reduce it to 70% of the full power at most to ensure the motor has enough power to avoid crashes.
- 4.**Throttle Signal Loss Protection:**The ESC will reduce the output power if throttle signal is lost for 1 second, will cut off output to the motor if the throttle signal is lost over 2 seconds. If the throttle signal restored during power down, the ESC will immediately restored throttle control. In this way, the ESC will not protect when the signal loss less than 2 seconds, only when the signal lost is over 2 seconds or longer time. And the ESC will reduce the output power gradually instead of cutting off it immediately, so the player has enough of time to save the plane, taking into account safety and practicality.
- 5.**Over load Protection:**The ESC will cut off power or restart automatically when the load increased a lot suddenly, possible reason is the motor blocked.
- 6.**Low Voltage Protection:**When the operating voltage of the ESC have exceeded the protection voltage set, power will be gradually reduced for safety, but will not be turned off, These will still be up to 50% of power, to ensure that the motor has the power to land.
- 7.**Over-current Protection:**When the peak current exceeds the specified value, the ESC will immediately cut off the output power, and then restart to restore the power. If the current exceeds the specified value again, the output power will be completely cut off. Possible reason is overload, burnt motor and so on.
- 8.**Break Protection:**if there is a break in the connection between the motor and ESC. Check the motor is fully connected, check connectors or solder joints are as they should be.

Explanations for Warning Tones

Problem	Alarm sound
1.Throttle Signal Loss	"Beep-Beep" (repeated every 2 seconds)
2.Temperature Protection	"Beep Beep-Beep Beep" (repeated every 2 seconds)
3.Low Voltage Protection	"Beep Beep Beep-Beep Beep Beep" (repeated every 2 seconds)
4.Throttle Not at Zero on Power-Up	"Beep-Beep" (repeated every 200 milliseconds)
5.Voltage Out of Supported Range	"1-2-3-1-2-3" (repeated every 200 milliseconds)

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