SUNNYSKY®

航模无刷电子调速器 说明书

感谢您使用本产品！本产品功率强大，错误的使用可能导致人身伤害和设备损坏，强烈建议您在使用设备前仔细阅读本说明书并保存，严格遵守规定的操作程序。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的设计、外观、性能及使用要求。

01 安全须知

检验无线电接收装置上的正确设置，第一次测试电调和马达时不要在马达上安装螺旋桨或传动小齿轮。只有当您确认了无线电接收装置上的设置正确后方能安装螺旋桨或传动小齿轮。

- 不要使用裂开或被刺破的蓄电池组电池。
- 不要使用会变得过热的电池组。
- 不要使用短路电池或马达接线端。
- 电缆绝缘要用正确的绝缘材料。
- 使用正确的电缆连接器。
- 电池或伺服系统的数量不要超过电调的规定。
- 错误的电池极性损坏电调。

02 主要特性

1. 功率输出元器件(MOSFET)选用新一代的制作工艺，发热低，瞬间承受电流大，可靠性高。
2. 高性能 32 位处理器，运算能力更强，运行速度更快。
3. 超流畅的启动与精准的油门线性。
4. 效率高，电调更节能，续航时间更长。
5. SBEC 5.6V 和 7.4V 两档可调，持续 8A 电流供应，给舵机提供更强劲的动力(40A/60A/80A/100A/120A 具有 SBEC 可调)。
6. 多重保护：启动保护，过温保护，低压保护，缺相保护，信号丢失保护。
7. 自动识别马达进角，支持高 RPM 马达，可兼容市面上绝大多数马达。
8. 支持 LCD 编程，操作更简单方便(需单独购买 LCD 编程卡)。

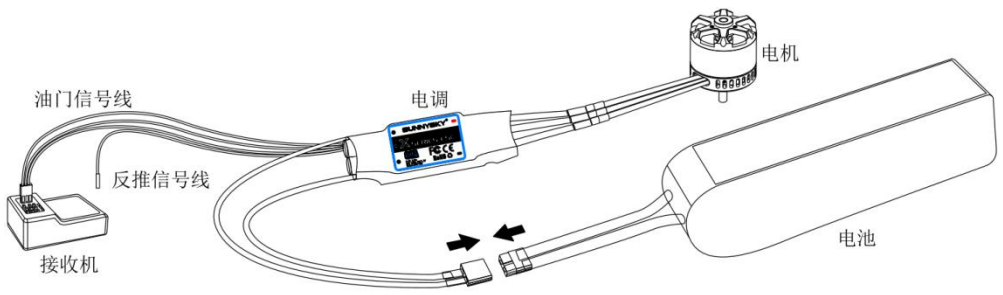
03 主要特性

型号	持续电流 (散热良好)	瞬间电流 (散热良好)	BEC	输入电压	重量 (供参考)	尺寸 (供参考)
40A SBEC	40A	55A	5.6V/7.4V-4A	5-12NC/2-4Lipo	37g	68×25×10mm
60A SBEC	60A	75A	5.6V/7.4V-8A	5-18NC/2-6Lipo	61g	70×35×12mm
80A SBEC	80A	95A	5.6V/7.4V-8A	5-18NC/2-6Lipo	89g	90×37×13mm
100A SBEC	100A	120A	5.6V/7.4V-8A	5-18NC/2-6Lipo	102g	90×37×13mm
120A SBEC	120A	140A	5.6V/7.4V-8A	5-18NC/2-6Lipo	105g	90×37×13mm

04 连线示意图

※为避免短路和漏电，请确保连接处绝缘良好。

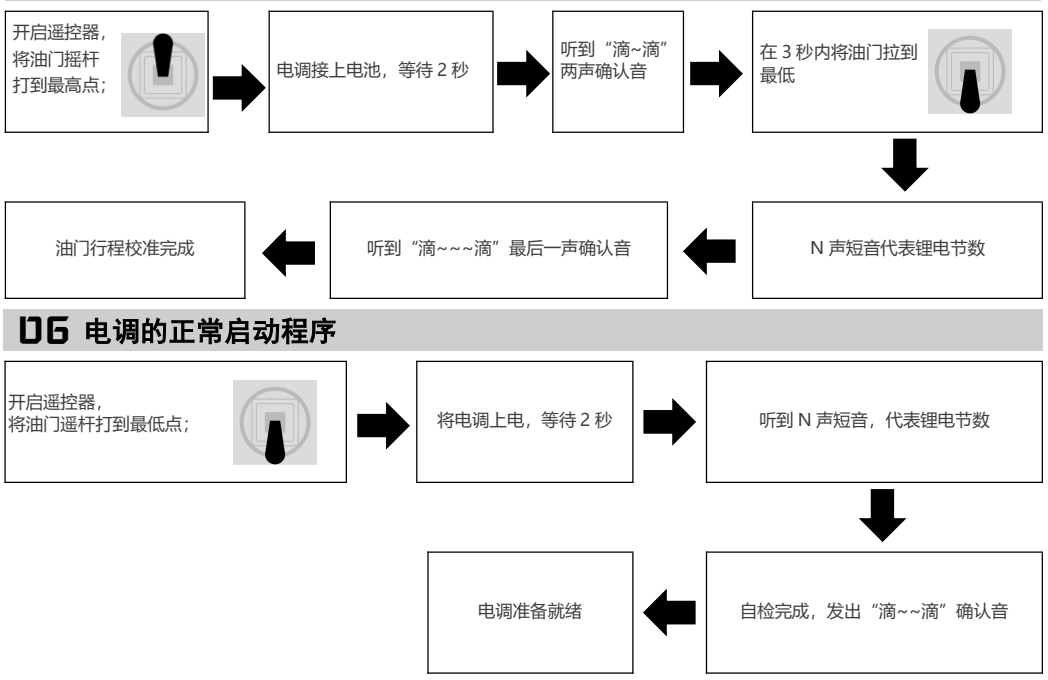
※线连接用热缩管收缩使其绝缘，避免短路烧毁调速器。



※每种规格的产品外观有差异，图片为代表型号仅供参考，以实物为准。

05 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它遥控器使用时，请务必先重新设定油门行程。



06 电调的正常启动程序

07 编程项简要说明(加粗字体为出厂默认值)

01、SMR 功能：**关闭**/打开
　通过切换电机正反向，快速停止。出厂默认是关闭，此时 1Pin 信号线完全无效。如需打开，通过 App 设置或遥控器编程打开 SMR 功能，将 3Pin 信号线接入油门通道，将 1Pin 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 SMR 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！
02、刹车力度：**关闭**/软/中度/最大
03、进角：**自动**/低/中/高 (分别为 5 度/15 度/25 度)
04、马达方向：**正向**/反向
　正向：电机默认旋转方向
　反向：将电机旋转方向更改
05、SR 功能：打开/**关闭**
　效率更高，更节能，续航时间更长
06、锂电节数：**自动**/2S/3S/4S/5S/6S
07、低压保护点：**3.0V**/3.2V/3.4V/3.6V
　例如：使用 3 节锂电，设定为 3.0V 为低电压保住值，则低压保护阈值为：3*3.0=9.0V
08、保护方式：**降低功率**/立即关断
　降低功率：当达到预设的低压保护阈值时，电调减少输出功率至 70%
　立即关断：当达到预设的低压保护阈值时，电调立即关断输出功率
09、BEC：**5.6V**/7.4V
　40A、60A、80A、100A、120A 电调 BEC 电压输出可设置 5.6V/7.4V
10、加速度：**普通**/柔和

08 电子调速器编程设置模式

首先将遥控器油门拉杆推至最高位置，打开遥控器电源，将电池组连接到调速器，2 秒后电机“滴~滴滴”声响，停 3 秒，发出 123 特殊声音，表示进入编程模式。设置音按以下顺序滚动播放：

“嘀”	SMR 功能	1 短音
“嘀-嘀”	刹车力度	2 短音
“嘀-嘀-嘀”	进角	3 短音
“嘀-嘀-嘀-嘀”	马达转向	4 短音
“嘀——”	SR 功能	1 长音
“嘀——嘀”	电池节数	1 长音 1 短音
“嘀——嘀-嘀”	低压保护值	1 长音 2 短音
“嘀——嘀-嘀-嘀”	电压保护类型	1 长音 3 短音
“嘀——嘀-嘀-嘀-嘀”	BEC 输出	1 长音 4 短音
“嘀——嘀——”	加速度	2 长音
“嘀——嘀——嘀”	恢复出厂默认	2 长音 1 短音

注：一声长嘀相当于五声短嘀。
在听到某个提示音后，2S 内将油门摇杆打到最低，则进入该设定项，马达会循环鸣叫，在鸣叫某个提示音后将油门摇杆打到最高点，则选择该提示音所对应的设定值，接着会听到 123 特殊确认音，表示设置成功。

例如：设置马达转向，听到“滴滴滴滴”四短音，表示进入马达转向菜单，在 2S 内将遥控器油门打到最低，听到“滴”一短音代表正向(CW)，“滴滴”两短音代表反向(CCW)，如想设置为反向(CCW)，则在听到“滴滴”两短音时将油门拉杆打到最高，会听到 123 特殊确认音，表示设置成功，2 秒内将油门拉杆打到最低位置。(如果听到确定音之后，超过 2 秒油门仍在最高位，则重新进入编程模式)重复以上操作，设置您所需要的各种功能。
退出设定：参数设置成功后，立即将油门拉杆打到最低位置，即表示退出设定。

09 编程参数表

提示音 / 设定项	“嘀” 1 短音	“嘀-嘀” 2 短音	“嘀-嘀-嘀” 3 短音	“嘀-嘀-嘀-嘀” 4 短音	“嘀—” 1 长音	“嘀—嘀” 1 长 1 短音	“嘀—嘀-嘀” 1 长 2 短音
SMR 功能	关闭	打开					
刹车力度	关闭	软刹车	中度刹车	最大刹车			
进角	自动	低	中	高			
马达转向	正向(CW)	反向(CCW)					
SR 功能	打开	关闭					
电池节数	自动	2S	3S	4S	5S	6S	
低压保护值	关闭	NIMH50%	NIMH60%	3.0V	3.2V	3.4V	3.6V
电压保护类型	降低功率	立即关断					
BEC 输出	5.6V	7.4V					
加速度	普通	柔和					
恢复出厂默认	复位						

注：灰色为出厂默认选项参数。

10 保护功能

1、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、螺旋桨被其他物体阻挡、减速齿卡死等。
2、温度保护：当电子调速器工作温度超过 110 度时，电调将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 70%，以保证电机留有一定动力，避免摔机。
3、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。
4、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。

11 常见问题解答

出现的问题	可能的问题	解决方法
接通电调后有自动检测电池节数声音，但马达不能启动	电调没有油门行程设置	-对电调进行油门行程设置
马达不工作，连接电池后马达未发音乐声，伺服系统也未运行	-电池组与电调之间接触不良 -没有接通电源 -焊接不牢固(接头易断) -电池电缆极性错误 -电调信号线与接收机连接极位相反 -电调有问题	-清理连接器终端或替换连接器 -用刚充满电的电池组替换 -再次焊接电缆连接 -检查并确认电缆极性 -检查连接在电调上的信号线以确保处于正确极性 -更换电调
马达不工作，连接电池后马达未发出音乐声，但伺服系统在运行接通电调后马达不工作，发出警报音（两声滴滴响后有短暂停顿）	-电调与马达之间接触不良 -马达线圈被烧 -焊接不牢固（接头易断） -电池组电压超出正常范围	-检查连接器终端或替换连接器 -替换马达 -再次焊接电缆连接 -更换为刚充满电的电池组 -检查电池组电压
接通电调后马达不工作，发出警报音（持续地滴滴响）	通电后油门拉杆不在最小位置	-将油门拉杆移至最小位置
接通电调后马达不工作，电调发出两声长响之后，有两声更长点的滴滴响	被颠倒的油门通道导致电调进入程序设计模式	-进入发射器上的伺服系统倒转菜单并倒转油门通道
马达反向运行	电调与马达之间错误的电缆连接	-交换电调与马达之间三条电缆连接中的任意两条或者通过电调程序设计模式进入马达旋转功能并改变预设参数
飞行过程中，马达停止运行	丢失了油门信号	-检查无线电接收装置是否操作得当 -检查电调和接收机信号线路及发送频道和电调信号线之间确保有足够的隔离来防止干扰 -在电调的信号线上安装一个磁环

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SUNNYSKY®

User Manual
Brushless ESC for airplane

Thank you for using our product. Any improper operation may cause personal injury or damage the product and relevant equipments. This high power system for RC model can be dangerous ,we strongly recommend reading the user manual carefully and completely. We will not assume any responsibility for any losses caused by unauthorized modifications to our product. We have the right to change the design,appearance, performance and usage requirements of the product without notice.

01 IMPORTANT WARNINGS

Check the correct settings on the radio receiving device,and do not install propellers or transmission gears on The motor during the first test of the electric harmonic generator.Only when you confirm that the settings on The wireless receiver are correct can you install the propeller or transmission pinion.

- Do not use cracked or punctured battery packs.
- Do not use battery packs that can become overheated.
- Do not use short-circuit battery or motor terminals.
- The correct insulation material should be used for cable insulation.
- Use the correct cable connector.
- The number of batteries or servo systems should not exceed the specifications of the ESC.
- Incorrect battery polarity damage to the ESC.

02 KEY FEATURES

1. Utilizes powerful next generation MOSFET with a low thermal signature,high peak current threshold and reliability.
2. Features high performance 32bit microprocessor as standard. Stronger computing ability and faster processing rates.
3. Super smooth start up and throttle throughout the power range.
4. Higher driving efficiency and more energy-saving.
5. Adjustable SBEC output voltage, 5.6V/7.4V. (40A/60A/80A/100A/120A have SBEC adjustable).
6. Multiple protection protocols: start-up, over-heat, low-voltage cutoff, signal loss, phase loss etc.
7. Supports wide range of high RPM type motors commonly found in today's market.
8. Supports LCD programming,with simpler and more convenient operation(requires separate Purchase of LCD programming card).

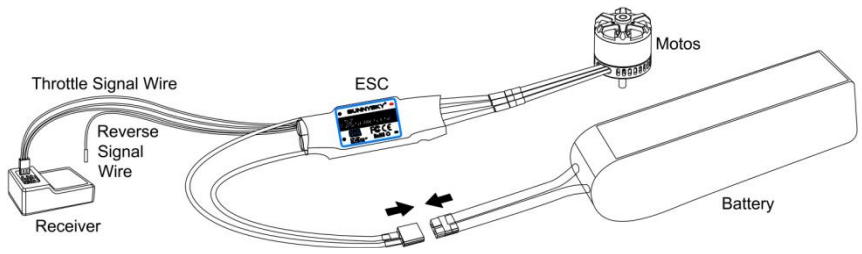
03 SPECIFICATION

Type	Cont Current	Burst Current	BEC Output	Input Voltage	Weight (For reference)	Size (For reference)
40A SBEC	40A	55A	5.6V/7.4V-4A	5-12NC/2-4Lipo	37g	68×25×10mm
60A SBEC	60A	75A	5.6V/7.4V-8A	5-18NC/2-6Lipo	61g	70×35×12mm
80A SBEC	80A	95A	5.6V/7.4V-8A	5-18NC/2-6Lipo	89g	90×38×13mm
100A SBEC	100A	120A	5.6V/7.4V-8A	5-18NC/2-6Lipo	102g	90×38×10mm
120A SBEC	120A	140A	5.6V/7.4V-8A	5-18NC/2-6Lipo	105g	90×38×10mm

04 CONNECTION DIAGRAM

The speed controller can be connected to the motor by soldering directly or with high quality connectors. Always use new connectors, which should be soldered carefully to the cables and insulated with heat shrink tube. The maximum length of the battery pack wires shall be within 6 inches.

- Solder controller to the motor wires.
- Solder appropriate connectors to the battery wires.
- Insulate all solder connectors with heat shrink tubes.
- Plug the "JR" connector into the receiver throttle channel.
- Controller Red and Black wires connects to battery pack Red and Black wires respectively.



※There are differences in the appearance of each specification of product.The image represents the model for reference only, and the actual product shall prevail.

05 THROTTLE CALIBRATION

(Important: Please make the throttle calibration for the first time using ESC!!!)

Turn on the transmitter, move the throttle stick to the top → Connect the battery pack to the ESC and wait for about 2 seconds. → Hearing two confirmation sounds of "beep~beep" → Then move the throttle stick to the bottom position in 3 seconds. ↓

The motor will beep several sounds, sounds time presents the amount of battery cells. → When the motor emits "Beep----Beep", means the ESC is ready to work. → Means the ESC is ready to work.

06 NORMAL STARTUP PROCEDURE

Turn on the transmitter, move the throttle stick to the bottom position. → Connect the battery pack to the ESC and wait for about 2 seconds. → The motor will beep several sounds, sounds time presents the amount of battery cells. ↓

When the motor emits "Beep----Beep", means self-test is finished. → The ESC is ready to work.

07 PROGRAMMING ITEMS (Bold font is the factory default value)

01、SMR Function: **OFF** / ON
This function supports switching the motor rotation to decelerate when the airplane landing to the ground.
The factory default is OFF, the 1Pin signal wire is completely invalid at this time.
If you need to turn it on, using Phone App or transmitter to program it "ON", plug the 3Pin signal wire into the throttle channel, and plug the 1Pin signal wire into any 2-stage switch channel of the receiver, then turn on the transmitter 2-stage switch. The SMR 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!
02、Brake Type: **OFF** / Soft / Mid / Hard
03、Timing: **Auto** / Low / Mid / High(5°/15°/25°)
04、Motor Rotation: **CW** / CCW
CW: Default rotation direction of motor.
CCW: Change the direction of motor rotation.
05、SR function: ON / **OFF**
The synchronous rectification function makes ESC with higher driving efficiency and more energy-saving.
06、Battery cells: **Auto** / 2S / 3S / 4S / 5S / 6S
07、Low Voltage Cutoff Threshold: OFF / NIMH50% / NIMH60% / **3.0V** / 3.2V / 3.4V / 3.6V
For example: using 3 lithium batteries and setting 3.0V as the low voltage cutoff value, then the low voltage protection threshold is: 3*3.0 = 9.0V.
08、Low Voltage Cutoff Type: **Reduce Power** / Cut Off Power
Reduced power: When the voltage drops to the set low-voltage protection threshold, the ESC will reduce power to 70%.
Cut Off power: When the voltage drops to the set low-voltage protection threshold, the ESC will cut off the power immediately.
09、BEC: **5.6V** / 7.4V
40A、60A、80A、100A、120A ESCs have adjustable SBEC 5.6V/7.4V, the default set is 5.6V.
10、Acceleration: **Normal** / Soft.

08 ENTERING THE PROGRAMMING MODE

1.Turn on the transmitter, move the throttle stick to the top position.
2.Connect the battery pack to ESC.
3.Wait for 2 seconds, the motor will emit special tone like " beep-beep beep" .
4.Wait for another 3 seconds, the motor will emit special tone like "123", which means program mode entered.
After entering program mode, you will hear 11 tones in a loop with the following sequence.

Tones	Programmable items	
"beep"	SMR Function	1 short tone
"beep-beep"	Brake Type	2 short tone
"beep-beep-beep"	Motor Timing	3 short tone
"beep-beep-beep-beep"	Motor Rotation	4 short tone
"beep——"	SR Function	1 long tone
"beep——beep"	Battery cells	1 long 1short
"beep——beep-beep"	Low Voltage Cutoff Threshold	1 long 2 short
"beep——beep-beep-beep"	Low Voltage Cutoff Type	1 long 3 short
"beep——beep-beep-beep-beep"	BEC Voltage	1 long 4 short
"beep——beep——"	Acceleration	2 long tone
"beep——beep——beep"	Restore Factory Setup Defaults	2 long 1 short

Note: 1 long "beep- -" = 5 short "beep".

SET ITEM VALUE

Moving the throttle stick to the bottom position within 2 seconds after one kind of following tones, this item will be selected. After the programmable item selected, then you will hear several tones in loop as follows on each programmable item, set the value matching to a tone by moving throttle stick to top position when you hear the tone, then the motor will emit special tone like "123", means this value is set and saved.
For example: If you want to set the motor rotation, when you hear four short tones of "Beep", moving the throttle stick to the bottom position within 2 seconds, means you enter the motor rotation menu. One short tone of "Beep" is forward direction(CW), two short tones of "Beep" is reverse direction(CCW). If you want to set to reverse direction(CCW), moving the throttle stick to the top position when you hear the two short tones of "Beep", then you will hear a special confirmation tone like "123", which means the "CCW" is set and saved. Keeping the throttle stick at top, you will go back to programming mode and you can select other items; or moving the stick to bottom within 2 seconds will exit program mode directly).

09 PROGRAMMING TONE REFERENCE TABLE

Items \ Tones	"beep"	"beep-beep"	"beep-beep-beep"	"beep-beep-beep-beep"	"beep—"	"beep—beep"	"beep—beep-beep"
	1short tone	2short tone	3short tone	4short tone	1long	1long 1short	1long 2short
SMR Function	OFF	ON					
Brake Type	OFF	Soft Brake	Mid Brake	Hard Brake			
Motor Timing	Auto	Low	Mid	High			
Motor Rotation	CW	CCW					
SR Function	ON	OFF					
Battery Cells	Auto	2S	3S	4S	5S	6S	
Low voltage Cutoff Threshold	OFF	NIMH50%	NIMH60%	3.0V	3.2V	3.4V	3.6V
Low Voltage Cutoff Type	Reduce Power	Cut off Power					
BEC Voltage	5.6V	7.4V					
Acceleration	Normal	Soft					
Restore Factory Default Sets	Restore						

Note: Gray is the factory default option parameter.

10 PROTECTION FUNCTION

1.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.
2.Over-heat protection: When the temperature of the ESC is over about 110℃, 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.
3.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 recovers during power down, the ESC will immediately resume 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 certain amount of time to save the plane, taking into account safety and practicality.
4.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.

11 TROUBLE SHOOTING

Trouble	Possible Reason	Action
After powering up, ESC emits the sound of battery cells, but motor can't run.	ESC doesn't set throttle range.	-Set throttle range again.
After powering up, motor doesn't run and doesn't emit any sound.	-Bad connection between ESC and battery. -Bad soldering cause bad contact. -Low voltage of the battery. -Quality problem of ESC.	-Clean the connectors or replace them, check the connection polarity. -Solder the wires again. -Check battery pack, use full-charged battery. -Change ESC.
Motor does n't work and no audible tone emitted after connecting the battery. Servos are not working either.	-Poor/loose Connection between battery Pack and ESC. -No power. -Poor soldered connections. -Wrong battery cable polarity. -ESC throttle cable connected to receiver in the reverse polarity.	-Check all the connections make sure you are doing it right.
Motor does not work but servos do.	-Poor / loose connection between ESC and motor. -Burnt motor coils. -The battery pack voltage exceeds the acceptable range. -Throttle stick is not at the lowest position. -The ESC throttle calibration has not set up.	-Check all the connections make sure you are doing it right. -Change a new motor. -Solder the wires again. -Check the battery pack, use full-charged battery. -Set throttle range again.
When the ESC is powered on, the motor does not work and an alarm sound (continuously beeping) will sound.	The throttle stick is not in the bottom position after power on.	Move the throttle stick to the bottom position.
Motor runs in reverse rotation.	Wrong cables polarity between the ESC and the motor.	Swap any two of the three cable connections between the ESC and the Motor or access the Motor Rotation function via the ESC programming mode and change the pre-set parameters.
Motor stops running in flight.	Lost throttle signal	-Check proper operation of the radio equipment. -Check the placement of the ESC and the Receiver and check the route of the receiver's aerial and ESC

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