

无刷电子调速器说明书

感谢您使用中特威科技有限公司设计、制造的无刷电子调速器(ESC)。我们强烈建议您在使用之前阅读本使用手册。深圳市中特威科技有限公司有权不经通知变更其产品，包括其外观和性能参数及使用要求；对其产品是否适合特定用途不作任何保证、申明或承诺。不承担因第三方产品相关修改所引起的任何责任，中特威科技有限公司也不承担因应用该产品而产生的任何责任，包括直接损失或间接损失的赔偿责任。

注意事项

- 检验无线电接收装置上的正确设置，第一次测试ESC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。
- 错误的电池极性会损坏电调。

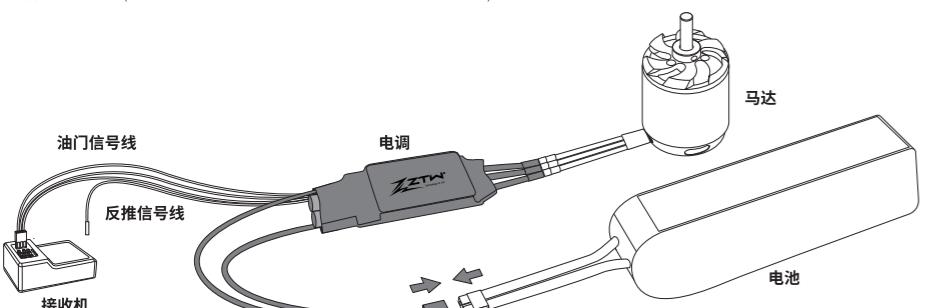
主要特性

1. 两边开孔加独特的导流风道结构，使得电调散热效果更好。
2. 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。
3. 高性能32位处理器，运算能力更强，运行速度更快。
4. 超流畅的启动与精准的油门线性。
5. 效率高，电调更节能，续航时间更长。
6. 具有普通启动/柔和启动两种模式，兼容普通固定翼与涵道飞机(涵道飞机请务必选择柔和启动模式)。
7. 多重保护：启动保护，过温保护，低压保护，过负荷保护，电流保护，信号丢失保护。
8. 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。
9. 具备独立参数编程线，可用LCD编程卡或手机App编程，操作更简单方便(需单独购买ZTW LCD编程卡或蓝牙模块)。
10. 具有数据回传功能，可实时发送数据：电流、电压、温度、转速、油门、电调状态，且可用手机App或LCD编程卡上实时查看以上数据。(65A以下电调无此功能)

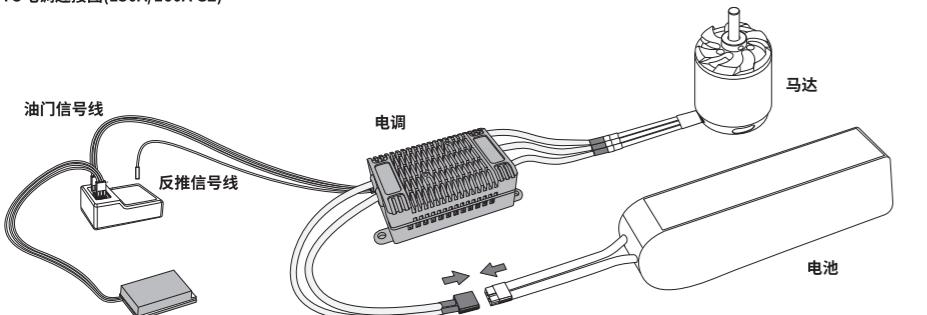
产品规格

Type	编号	持续电流 峰值电流 (A)	电池节数	重量 (g)	BEC输出	尺寸(mm) (长*宽*高)	支持编程卡
Mantis 25A SBEC G2	2025211	25A/35A	2-4S Lipo/LiHV	36	5V/6V/7.4V 4A	68*26*10	是
Mantis 35A SBEC G2	2035211	35A/45A	2-4S Lipo/LiHV	39	5V/6V/7.4V 4A	68*26*10	是
Mantis 45A SBEC G2	2045211	45A/55A	2-6S Lipo/LiHV	43	5V/6V/7.4V 4A	73*26*10	是
Mantis 65A SBEC G2	2065211	65A/75A	3-6S Lipo/LiHV	65	6V/7.4V/8.4V 8A	60*36*20	是
Mantis 85A SBEC G2	2085211	85A/95A	3-8S Lipo/LiHV	110	6V/7.4V/8.4V 8A	88*38*24	是
Mantis 105A SBEC G2	2105211	105A/115A	3-8S Lipo/LiHV	110	6V/7.4V/8.4V 8A	88*38*24	是
Mantis 125A SBEC G2	2125211	125A/135A	3-8S Lipo/LiHV	112	6V/7.4V/8.4V 8A	88*38*24	是
Mantis 130A HV G2	2130411	130A/150A	6-14S Lipo/LiHV	180	NONE	78*45*32	是
Mantis 160A HV G2	2160411	160A/180A	6-14S Lipo/LiHV	228	NONE	78.5*53.5*32	是

调速器连接线说明(线连接用热缩管收缩使其绝缘，避免短路烧毁调速器)

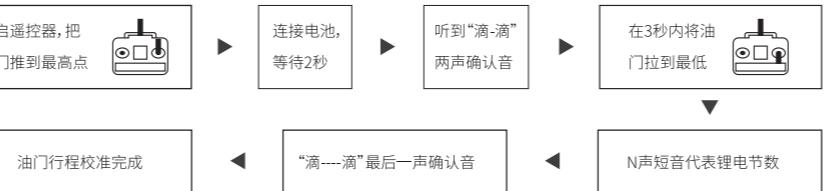


OPTO电调连接图(130A/160A G2)

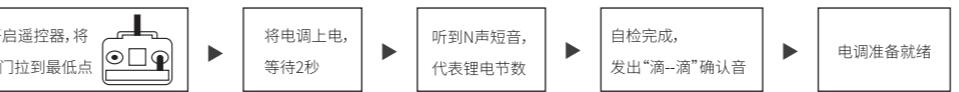


首次使用电调并设置油门行程

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



编程项简要说明(黑体字为出厂默认值)

1. 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信号接入油门通道，将1Pin信号接入接收机任意的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！

2. 刹车力度: 关闭/软/中度/最大

3. 进角: 自动/5度/10度/15度/20度/25度/30度

4. 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

5. SR功能(动能回收): 打开/关闭

效率更高，更节能，续航时间更长

6. 锂电节数: 自动/手动设置

自动：按单节电池3.8V计算电池节数

手动设置：根据不同电调电压范围进行手动设置

7. 低压保护点: 关闭/2.3V/2.5V/**3.0V**/3.2V/3.4V/3.6V

例如：使用4节锂电，设定为3.0V为低电压保住值，则低压保护阈值为： $3.0 \times 4 = 12.0V$

8. 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

9. BEC: **6.0V**/7.4V/8.4V

25A/35A/45A此三款电调BEC为5V/6V/7.4V可调，130A与160A HV G2此两款电调无BEC

10. 加速度: 普通/柔和

涵道飞机请务必选择柔和模式！

11. 启动力度: 低/中/高

编程参数表

提示音 设定项	“嘀”	“嘀,嘀”	“嘀,嘀,嘀”	“嘀,嘀,嘀,嘀”	“嘀—”	“嘀—嘀”	“嘀—嘀,嘀”
	1短音	2短音	3短音	4短音	1长音	1长1短音	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	5度	10度	15度	20度	25度	30度
马达转向	正向(CW)	反向(CCW)					
SR功能	打开	关闭					
锂电节数	自动计算	2S 3S 6S	3S 4S 8S	4S 6S 10S	6S 12S 14S	6S 12S 14S	6S 12S 14S
低压保护值	关闭	2.3V	2.5V	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	5V 6V	6V 7.4V	7.4V 8.4V				
加速度	普通	柔和					
启动力度	低	中	高				
恢复出厂默认							复位

💡 注：灰颜色为出厂默认选项参数。

保护功能

- 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。
- 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，最多降到全功率的 70%，以保证电机留有一定动力，避免摔机。
- 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。
- 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。
- 电流保护：当瞬时电流超过规定值以后，电调会立即切断动力输出，然后重启恢复动力输出，如再次出现电流超过规定值，则彻底切断动力输出。可能原因：负载过重或马达连线短路。

常见问题解答

出现的问题	可能的原因	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	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 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

Thank you for purchasing ZTW Mantis G2 Brushless Electronic Speed Controller (ESC). Please read this manual carefully before using this product for the sake of safety. ZTW Model have no control over the use, installation, application, or maintenance of these products, thus no liability shall be assumed nor accepted for any damages, losses of costs resulting from the use of this item.

Important Warnings

- ZTW is not responsible for your use of this product, or any damage or injuries you may cause or sustain as a result of its usage.
- 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 them with enough respect.
- We recommend you to remove the propeller when you working on the plane that with power source connected.
- Observe all local laws when you fly a RC airplane.
- Never fly over others or near crowds.

Key Features

- The holes on both sides of the ESC and the unique fan guard structure make the ESC better heat dissipation.
- Adopting new generation craft on the MOSFET, low heat generation, withstand large current instantly, and high reliability.
- Adopting high performance 32 bit microprocessor, stronger computing ability and faster running speed.
- Super smooth start-up and accurate throttle linearity.
- Higher driving efficiency and more energy-saving.
- Two modes: normal and soft acceleration. It is compatible with normal fixed-wing and EDF jet airplanes, please ensure to select the "Soft" acceleration when using EDF jet airplanes.
- Multiple protections: start-up, over-heat, low-voltage cutoff, overload, over-current and signal loss.
- Support high RPM motors, and compatible with most motors in the market.
- The ESC has a separate programming interface to connect with LCD programming card or App adaptor for parameter setting.(Extra ZTW App adaptor or LCD program card needed)
- The ESC has data returning feature, it can send data in real-time: current, voltage, temperature, RPM, throttle and ESC status. And you can check the data via ZTW App or LCD program box G2 in real-time.(The ESC under 65A doesn't have this feature)

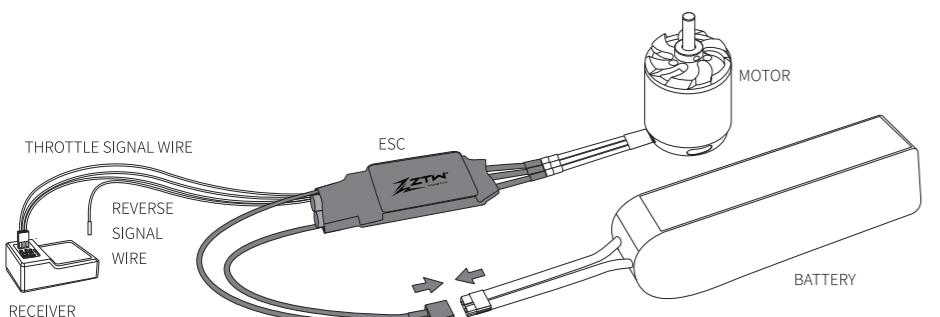
Specification

Type	PN#Model	Cont./Burst Current(A)	Battery cell Lipo/LiHV	Weight (g)	BEC	Size(mm)	User Program
Mantis 25A SBEC G2	2025211	25A/35A	2-4S Lipo/ LiHV	36	5V/6V/7.4V 4A	68*26*10	Yes
Mantis 35A SBEC G2	2035211	35A/45A	2-4S Lipo/ LiHV	39	5V/6V/7.4V 4A	68*26*10	Yes
Mantis 45A SBEC G2	2045211	45A/55A	2-6S Lipo/ LiHV	43	5V/6V/7.4V 4A	73*26*10	Yes
Mantis 65A SBEC G2	2065211	65A/75A	3-6S Lipo/ LiHV	65	6V/7.4V/8.4V 8A	60*36*20	Yes
Mantis 85A SBEC G2	2085211	85A/95A	3-8S Lipo/ LiHV	110	6V/7.4V/8.4V 8A	88*38*24	Yes
Mantis 105A SBEC G2	2105211	105A/115A	3-8S Lipo/ LiHV	110	6V/7.4V/8.4V 8A	88*38*24	Yes
Mantis 125A SBEC G2	2125211	125A/135A	3-8S Lipo/ LiHV	112	6V/7.4V/8.4V 8A	88*38*24	Yes
Mantis 130A HV G2	2130411	130A/150A	6-14S Lipo/LiHV	180	NONE	78*45*32	Yes
Mantis 160A HV G2	2160411	160A/180A	6-14S Lipo/LiHV	228	NONE	78.5*53.5*32	Yes

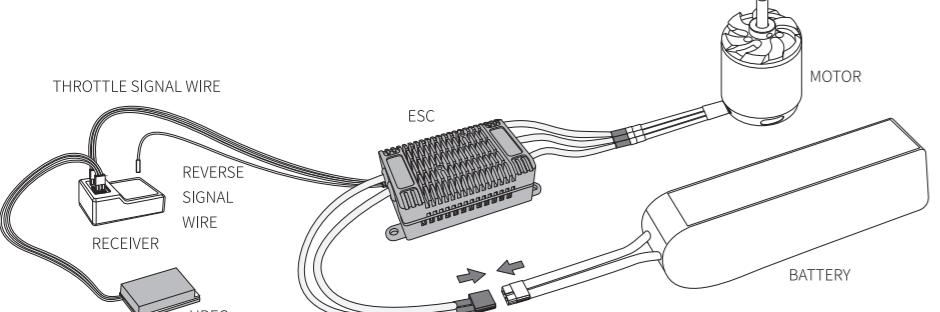
Wires Connection

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.

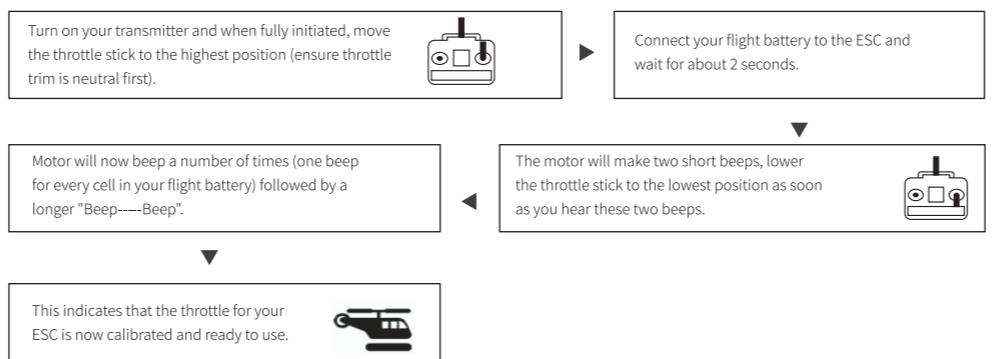
- Solder controller to the motor wires.
- Solder appropriate connectors to the battery wires.
- Insulate all solder connectors with heat shrink tubes.
- Plug the "JR" connector into the receiver throttle channel.
- Controller Red and Black wires connects to battery pack Red and Black wires respectively.



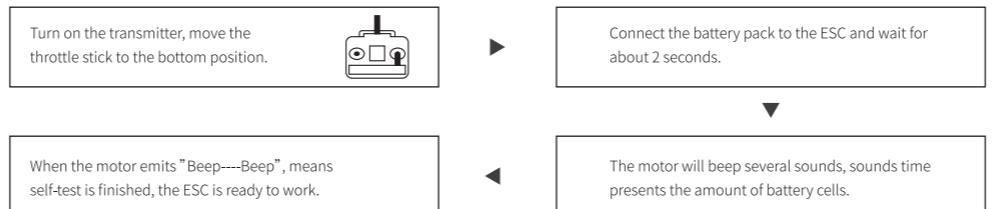
OPTO ESC Connection(130A/160A G2)



Throttle Calibration



Normal Startup Procedure



Programming Items(The option written in bold font is the default setting)

1. 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 LCD programming card 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 RVS 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!

2. Brake Type: OFF/Soft/Mid/Hard

3. Timing: Auto/5°/10°/15°/20°/25°/30°

4. Motor Rotation: CW/CCW

5. SR function: ON/OFF

The synchronous rectification function makes ESC with higher driving efficiency and more energy-saving.

6. Battery cells: Auto/Set this item manually

Auto: When the "Auto" is selected, the ESC will automatically calculate the number of Lipo cells as per 3.8V/Cell.

7. Low Voltage Cutoff Threshold: OFF/2.3V/2.5V/**3.0V**/3.2V/3.4V/3.6V

For example: using 4 lithium batteries and setting 3.0V as the low voltage cutoff value, then the low voltage protection threshold is: $4 * 3.0 = 12.0V$

8. 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.

9. BEC: 6.0V/7.4V/8.4V

The 25A/35A/45A ESC's BEC is 5V/6V/7.4V, the Mantis 130A/160A G2 doesn't have built-in BEC.

10. Acceleration: Normal/Soft

Please ensure to select the "Soft" acceleration when using EDF jet airplanes.

11. Start-up Power: Low/Mid/High

Entering The Programming Mode

- Turn on the transmitter, move the throttle stick to the top position.
- Connect the battery pack to ESC.
- Wait for 2 seconds, the motor will emit special tone like "beep-beep beep"
- Wait for another 3 seconds, the motor will emit special tone like "123", which means program mode entered.

Programmable Items

After entering program mode, you will hear 11 tones in a loop with the following sequence.

Tones

1. "beep"
2. "beep.beep"
3. "beep.beep.beep"
4. "beep.beep.beep.beep"
5. "beep- -"
6. "beep- -beep"
7. "beep- -beep.beep"
8. "beep- -beep.beep.beep"
9. "beep- -beep.beep.beep.beep"
10. "beep- -beep- -"
11. "beep- -beep- -beep"

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

Programmable items

SMR Function	(1 short tone)
Brake Type	(2 short tone)
Motor Timing	(3 short tone)
Motor Rotation	(4 short tone)
SR Function	(1 long tone)
Battery cells	(1 long 1short)
Low Voltage Cutoff Threshold	(1 long 2short)
Low Voltage Cutoff Type	(1 long 3 short)
BEC Voltage	(1 long 4 short)
Acceleration	(2 long tone)
Restore Factory Setup Defaults	(2 long 1 short)

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Motor Rotation	(4 short tone)
SR Function	(1 long tone)
Battery cells	(1 long 1short)
Low Voltage Cutoff Threshold	(1 long 2short)
Low Voltage Cutoff Type	(1 long 3 short)
BEC Voltage	(1 long 4 short)
Acceleration	(2 long tone)
Restore Factory Setup Defaults	(2 long 1 short)

Programmable items

SMR Function	(1 short tone)
Brake Type	(2 short tone)
Motor Timing	(3 short tone)
Motor Rotation	(4 short tone)
SR Function	(1 long tone)
Battery cells	(1 long 1short)
Low Voltage Cutoff Threshold	(1 long 2short)
Low Voltage Cutoff Type	(1 long 3 short)
BEC Voltage	(1 long 4 short)
Acceleration	(2 long tone)
Restore Factory Setup Defaults	(2 long 1 short)

Programmable items

SMR Function	(1 short tone)</td
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