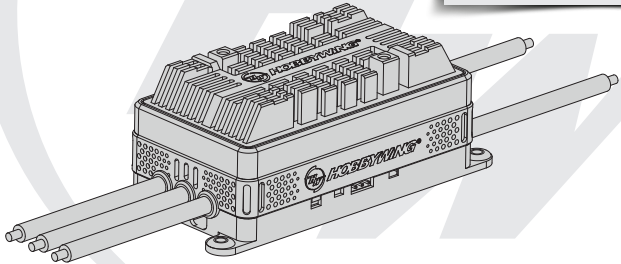


# USER MANUAL PLATINUM Brushless Electronic Speed Controller Platinum HV-200A-OPTO



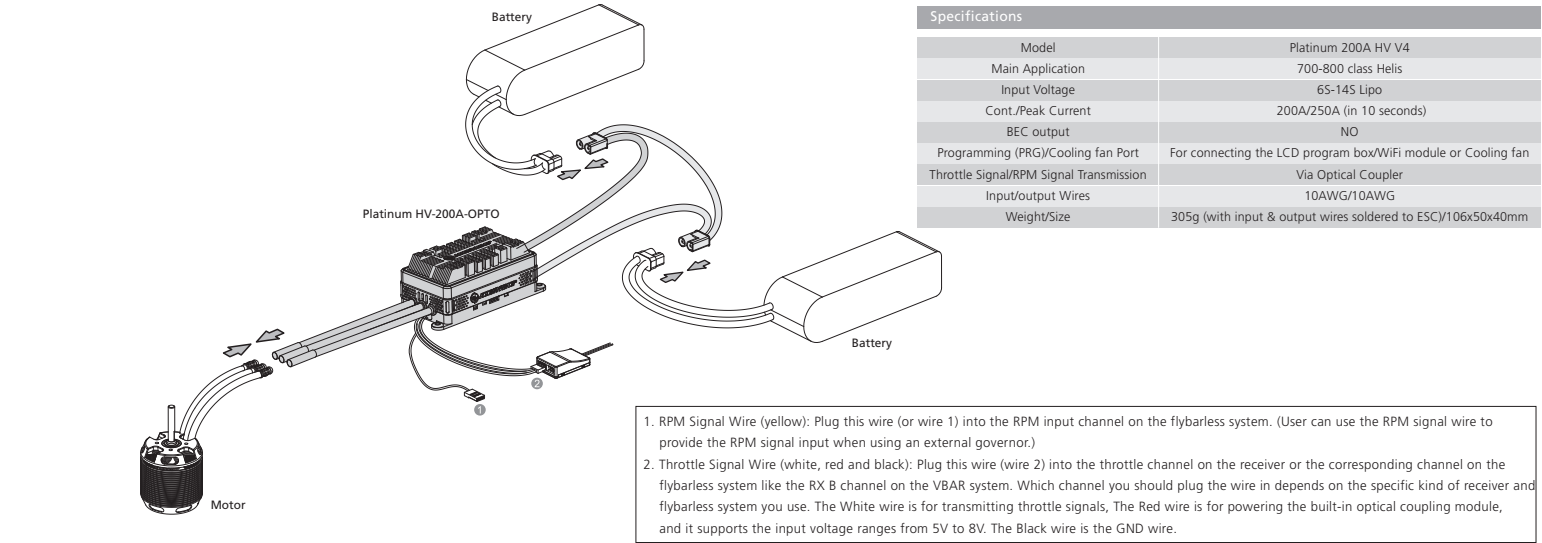
Thank you for purchasing this HOBBYWING product! Brushless power systems can be very dangerous. Any improper use may cause personal injury and damage to the product and related devices. We strongly recommend reading through this user manual before use. Because we have no control over the use, installation, or maintenance of this product, no liability may be assumed for any damages or losses resulting from the use of the product. We do not assume responsibility for any losses caused by unauthorized modifications to our product.

## 01 Features

- High performance microprocessor with a running frequency of up to 120MHz for excellent motor speed-governing and super soft startup.
- Microprocessor powered by independent DC regulator has better anti-interference performance, which greatly reduces the risk of losing control.
- The maximum motor speed can reach 210000 RPM (for 2 pole motor), 70000 RPM (for 6 pole motor) and 35000 RPM (for 12 pole motor).
- Multiple flight modes: Fixed-wing, Heli (Linear Throttle Response), Heli (Elf Governor), and Heli (Store Governor).
- Data logging records the standardized RPM, minimum voltage, maximum current and maximum temperature of the flight.
- \*Restart in auto rotation\* can manually interrupt the auto rotation and quickly restart the motor to avoid crashes caused by incorrect operations.
- WiFi module (sold separately) for programming the ESC wirelessly with your smart phone (ios or Android).
- Internal anti-spark circuitry effectively eliminates electric sparks produced when the ESC is powered on.
- Independent output port for RPM (that is: motor speed) signals.
- Separate programming port for ESC programming or parameter setting.
- Multiple protections like thermal shutdown protection, overload protection, over-current protection, etc.
- Online firmware upgrade via HOBBYWING multifunction LCD program box or WiFi module.

## 02 Begin to Use the New Brushless ESC

### 1 Connections

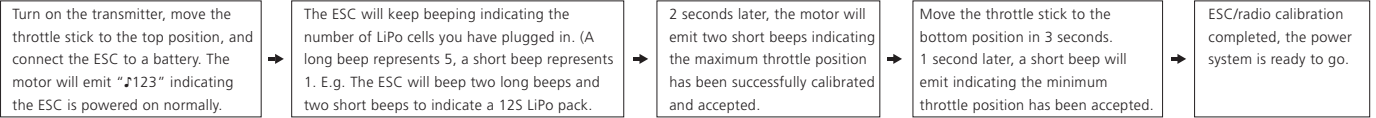


### 2 Throttle Range Calibration

**Attention!** The default throttle range of this ESC is from 1100μs to 1940μs, so you need to re-calibrate the throttle range when the first time you use this ESC or after you replace the transmitter.

**1.Connections before the Throttle Range Calibration:** As shown above (Wiring Diagram 1)

**2.ESC/Radio Calibration**



**ATTENTION!** During the ESC/Radio calibration, please set the throttle curve to NORMAL and ensure the corresponding throttle amounts to the maximum throttle endpoint and the minimum throttle endpoint on your transmitter are respectively 100% and 0%.

## 03 Programmable Item List

\*\*\*in the form below indicate factory defaults.

Programmable Items	Parameter Values						
	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7
1. Flight Mode	Fixed-wing	Heli (Linear Throttle Response)	*Heli (Elf Governor)	Heli (Store Governor)			
2. LiPo Cells	*Auto Calculate	6S	8S	10S	12S	14S	
3. Voltage Cutoff Mode	*Soft	Hard					
4. Cutoff Voltage	2.7-3.7V (*3.3V)						
5. BEC Output	No						
6. Start-up Time	4-25s (*15s)						
7. Governor Parameter P	0-9 (*3)	You can increase the governor sensitivity (P, I) if you think the governor feel is weak. However, extreme high sensitivity will cause unstable RPM. To be specific, the RPM will float up/down around the preset value.					
8. Governor Parameter I	0-9 (*5)						
9. Auto Restart Time	0-90s (*25s)						
10. Timing	0-30° (*15°)						
11. PWM Frequency	8Khz	15Khz	20Khz	*30Khz			
12. Brake Force/Amount	0-100% (*0)						
13. Motor Rotation	CW	CCW					
14. Restart Acceleration Time	1s	1.5s	*2s	2.5s	3s		
15. Con.Freewheel	Activate	Disable	This item can only be disabled in Fix-wing mode and Heli (Linear Throttle Response) mode.				

## 04 Explanations for Programmable Items

**1. Flight Mode**

- 1.1 In “Fixed Wing” mode, the motor will start up when the throttle amount reaches 5% or above. There is no soft start-up, the motor responds to the throttle increase rapidly.
- 1.2 In “Heli (Linear Throttle Response)” mode, the motor will start up in a very soft way when the throttle amount reaches 5% or above. And it will accelerate to the RPM corresponds to the specific throttle amount in the preset start-up time (4~25s).
- 1.3 In “Heli (Elf Governor)” mode, the motor will start up when the throttle amount reaches 40% or above, it will start up in a very soft way. And it will complete the speed standardization and enter the speed-governing operation in the preset start-up time. In this mode, the motor will standardize its speed every time it starts up. Due to different discharge rates/capabilities of different batteries, the RPM you standardize each time may be a little different. In consequence, at the same throttle amount, the RPM may be a bit different when using different batteries.
- 1.4 In “Heli (Store Governor)” mode, the motor will start up when the throttle amount reaches 40% or above. It will also start up in a very soft way. And it will also complete the speed standardization and enter the speed-governing operation in the preset start-up time. In this mode, the motor will only standardize its speed the first time when it starts up. When performing RPM standardization for the first time, we recommend using a fully-charged battery with good discharge capability. After the RPM standardization, while you change another battery to fly your aircraft, at the same throttle amount, the RPM will always be the same as the RPM of the first flight. For consistent control feel, we recommend using this mode.

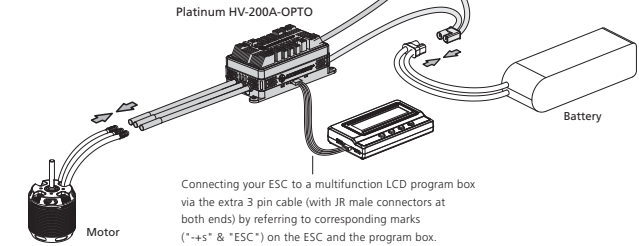
**Explanations for RPM Standardization**

- 1.1.The motor will enter the soft start-up when user switches the throttle amount from 0 to 40% or above (50% throttle is recommended). The pitch of main blades should be 0 degree during the soft start-up process, the RPM standardization completes when the soft start-up ends, and the ESC enters the speed-governing state. In “Heli (Store Governor)” mode, if user wants to re-standardize the speed, he needs to set the flight mode to “Heli (Elf Governor)” and save this mode first, and then reset the flight mode back to “Heli (Store Governor)”, then the ESC will re-standardize the motor speed when the motor rotates for the first time after the ESC is re-powered on.
  - 1.2. For ensuring the speed-governing effect, we recommend setting the throttle amount to 90% or below in both speed-governing modes (Heli Store Governor & Heli Elf Governor), so there will be sufficient compensating room to maintain the consistency of the RPM. We recommend replacing the motor or adjusting the gear ratio if the expected RPM still cannot be reached when the throttle amount exceeds 90%.  
(**Note:** You need to re-standardize the RPM after replacing the motor, blades, body frame or adjusting the gear ratio.)
  - 1.3. In “Heli Store Governor” mode, if you fly your aircraft with another battery pack that has poor discharge capability after the RPM standardization (with a pack which has good discharge capability), the pack has poor discharge capability may be get damaged.
- 2. LiPo Cells:** the ESC will automatically calculate the number of LiPo cells you have plugged in as per the “3.7V/Cell” rule if “Auto Calculate” is selected. Or user can set this item manually.
- 3. Voltage Cutoff Mode:** the ESC will gradually reduce the output to 50% of the full power in 3 seconds after the voltage cutoff protection is activated, if soft mode is selected. It will immediately cut off all the output when hard mode is selected.
- 4. Cutoff Voltage:** 2.7V-3.7V (custom), 3.3V (default).
- 5. BEC Output:** No.
- 6. Start-up Time:** 4-25s (adjustable), 1s (step), 15s (default).
- 7. Governor Parameter P:** Control the ESC maintaining the stability of the current motor speed.
- 8. Governor Parameter I:** Control the dynamic response. To be specific, control the supplement extent when the actual motor speed is below expectation. If you choose a very big value, then the supplement may be too much. If select a very small value, then the supplement may not sufficient.
- 9. Auto Restart Time:** the ESC will cut off its output when the throttle amount is between 25% and 40%. If you increase the throttle amount to above 40% within preset time period (0-90s), the motor will rapidly start up and accelerate to the speed (in 1s) corresponds to the specific throttle amount, complete the shutdown and restart up.If you move the throttle stick to over 40% beyond the preset time period, the ESC will enter the soft start-up process. (Note: This function only effects in “Heli Governor Elf/Store” mode.)
- 10. Timing:** 0-30° (adjustable), 1° (step) , 15° (default).
- 11. PWM Frequency:** 8KHz/15KHz/20KHz/30KHz (adjustable), 30KHz (default).
- 12. Brake Force:** 0-100% (adjustable), 1% (step), 0 (default).
- 13. Motor Rotation:** CW/CCW. User can adjust this item via a multifunction LCD program box.
- 14. Restart Acceleration Time:** 1s/1.5s/2s/2.5s/3s (adjustable), 2s (default). This item controls the time the motor accelerates from standstill to full speed after the Auto Restart is triggered and your helicopter restarts its flight.
- 15. Con. Freewheel:** User can decide this function “Activated” or “Disabled” in “Fixed Wing” mode or in “Heli (Linear Throttle Response)” mode. This item has been preset to “Activated” and cannot be adjusted in “Heli (Elf Governor/Store Governor) mode. This function can brings better throttle linearity.

## 05 How to Program Your ESC

With a multifunction LCD program box

**ATTENTION:**  
After adjusting parameters, you need to power your ESC off and then on.  
Otherwise, those new parameters won't take effect.



ESC programming

Connect the LCD program box and a battery to your ESC as shown above.

Press the “OK” button to connect the program box to your ESC. The current firmware version will show up after the program box is successfully connected to the ESC.

Press the “ITEM” button to browse all the programmable items, and then press the “OK” button to enter any programmable item you want to set.

Press the “Value” button to browse all parameter values after entering the specific programmable item.

Press the “OK”button to save the new parameter value you just selected.

With a WiFi Module: Please refer to the user manual of the Hobbywing WiFi module.

## 06 Data Checking and Normal Start-up Process

Data Checking

The ESC will record the standardized RPM, minimum voltage, maximum current, maximum temperatures of the current flight but won't save these data, so you need to keep the ESC on if you want to check the information of the current flight.

Connect the LCD program box and a battery to your ESC as shown above.

Press the “OK” button to connect the program box to your ESC. The current firmware version will show up after the program box is successfully connected to the ESC.

Press the “R/P” button to browse all running information relates to the ESC.

- Notes:**
1. you can only check the standardized RPM in “Heli Store Governor” mode, this record won't disappear after you turn off the ESC.
  2. The recorded revs are electric revs. If the electric rev is R, the actual rev of blades=R ÷ Motor Poles ÷ 2 ÷ Gear Ratio x throttle amount(%).

Normal Start-up Process

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

After connected to a battery, the ESC will emit “123” indicating it's normally powered on.

The motor will emit several beeps to indicate the number of LiPo cells.


The motor emits a long beep indicating the ESC is ready to go.

During the normal running process, the Blue LED on the ESC will turn solid after the start-up completes. The Red LED will also come on at full throttle and it dies out at partial throttle. (Please refer to the following form for detailed instructions.)

Trouble(s)	Possible Causes	LED Status
Over-current protection is activated.	The current is above 350A.	Red LED turns on solid.
Throttle Signal Loss.	No throttle signal is received for over 0.25 second.	Red LED blinks once and repeats.
Abnormal power voltage.	Power voltage is not within 18.5-51.8V (or 6-14S).	Red LED blinks twice and repeat.
Thermal shutdown protection is activated.	The ESC temperature is over 110℃ (230℉)	Blue LED blinks once and repeats.
Low voltage cutoff protection is activated.	The voltage goes below the cutoff voltage.	Blue LED blinks twice and repeat.

Warning Tone	Possible Issue
*Beep beep, beep beep* (The interval is 1 sec)	Abnormal input voltage.
*Beep-beep-* (The short, single beep that repeats rapidly)	The throttle stick isn't moved to the bottom position (before use) or the throttle range is too narrow.

Multiple Protections	How to Protect
Start-up Protection	The ESC will monitor the motor speed 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 15%, you need to move the throttle stick back to the bottom position and then restart up the ESC.
Thermal Shutdown Protection	The ESC will gradually reduce the output but won't cut it off completely when the ESC temperature goes above 230 ℉. 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 158℉ when it's powered on. Otherwise, it cannot be started up. (Here we are describing the ESC's reaction in soft cutoff mode, while if in hard cutoff mode, it will immediately cut off the power.)
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 propellers or rotor blades. The ESC will resume the corresponding output after normal signals are received.
Overload Protection	The ESC will cut off the power/output or automatically restart itself when the load suddenly increases to a very high value. Possible cause to sudden load increase is that propellers are blocked.
Over-current Protection	The ESC will cut off the power when the current gets close to the short circuit current (of 350A). This protection may be activated by the burnt motor or some others.

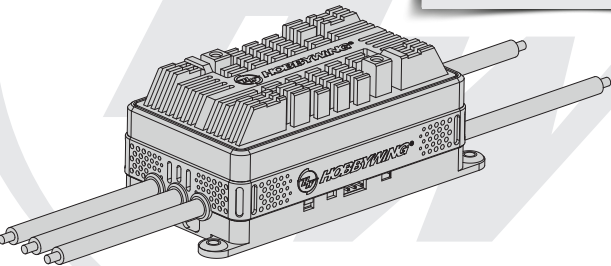


PLATINUM

空模无刷电子调速器

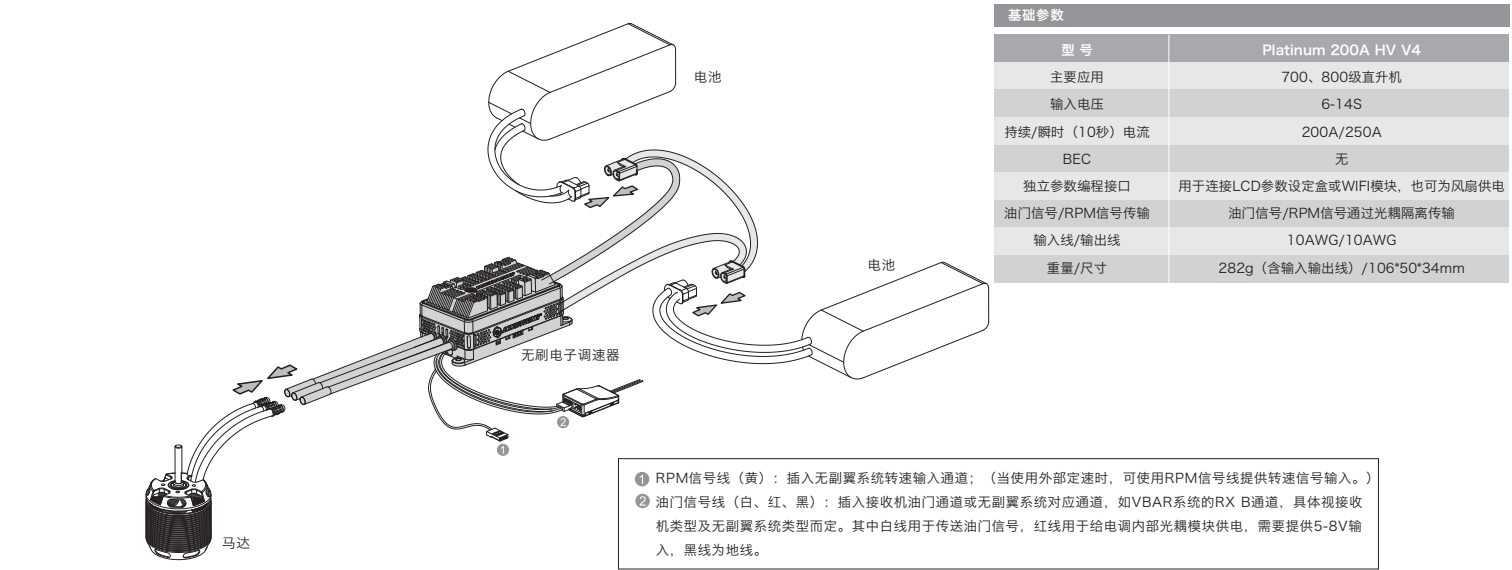
使用说明书

Platinum HV-200A-OPTO



02 首次使用空模无刷电子调速器

1 连接电子调速器



2 油门行程校准

强调！电调的油门行程出厂默认值为1100μs—1940μs,当首次使用电调或者更换其他遥控器使用时，均应重新设定油门行程。

1、油门行程校准接线方法如上图所示。

2、油门行程校准操作方法：

开启遥控器，将油门打到最高点，电调接上电池，马达鸣叫“♪ 123”提示音，表示上电正常

电调将继续鸣叫提示当前电池节数（长音哔—表示5，短音哔表示1，例如12S电池将鸣叫“哔—哔— 哔-哔-”）

继续等待2秒，马达发出“哔-哔-”双短鸣音，表示油门最高点已确认

3秒内将油门摇杆推到底，等待1秒，“哔-”一声提示油门最低点确认

校准成功，系统准备就绪，可随时起飞。

注意：进行油门行程校准时，请将油门曲线设置为normal，并确保遥控器油门最高点对应的油门值为100%，油门 最低点对应的油门值为0%。

03 可编程参数项目

下表中带 “\*” 的为出厂默认参数:

编程项目	参数值	1	2	3	4	5	6	7
1	飞行模式	固定翼 模式	直升机 线性油门模式	*直升机精灵定速模式	直升机存储定速			
2	锂电节数	*自动计算	6节	8节	10节	12节	14节	
3	低压保护模式	*软关断	硬关断					
4	低压保护阈值	2.7V-3.7V(默认是3.3V)						
5	BEC输出	无						
6	启动时间	4秒-25秒（默认15秒）						
7	定速参数 P	0-9(默认3)	当定速手感偏软，可尝试调高定速感度P，l，但感度过高会造成转速上下波动					
8	定速参数 l	0-9（默认5）						
9	熄火降落重启时间	0秒-90秒（默认25秒）						
10	进角	0° -30° （默认15° ）						
11	PWM频率	8K	15K	20K	*30K			
12	刹车力度	0-100%（默认0）						
13	电机转向	正转	反转					
14	熄火重启加速时间	1秒	1.5秒	*2秒	2.5秒	3秒		
15	同步整流	开	关	(该项仅在固定翼模式、直升机油门线性模式下可选择关闭)				

!

ATTENTION

!

CAUTION

感谢您购买本产品！无刷动力系统功率强大，错误的使用可能导致人身伤害和设备损坏，为此的我们强烈建议您在使用设备前仔细阅读本说明书，并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设计、外观、性能及使用要求。

01 产品特点

- 使用运行频率高达120MHz的高性能微处理器，具备更优异的定速和缓启动性能；
- 微处理器采用独立的稳压IC供电，具有更好的抗干扰能力，大大降低失控的可能性；
- 支持马达最高转速可达210000RPM(2极马达)、70000RPM(6极马达)、35000RPM（12极马达）；
- 具有“固定翼模式/直升机线性油门模式/直升机精灵定速模式/直升机存储定速模式”等多种飞行模式；
- 具有飞行数据记录功能，可记录单次飞行的标定转速、最低电压、最大电流、最高温度数据；
- 具有熄火降落重启时间选择功能，可人工中断熄火降落过程并快速重新启动马达，避免因操作失误而坠机；
- 支持WIFI无线调参，通过手机端(苹果&安卓)软件可完成所有参数设置（需要wifi模块）；
- 内置防打火电路，有效消除上电瞬间产生的电火花；
- 具有转速（RPM）信号输出接口；
- 具备独立参数设定接口，用于连接LCD参数设定盒进行参数设定；
- 具备启动保护、温度保护、过负荷保护、电流保护等多重保护功能，有效延长电调使用寿命；
- 支持在线升级电调固件（需要LCD参数设定盒或WIFI模块）。

04 可编程参数项目说明

- 1、飞行模式
- 1.1 固定翼模式下，油门达到5%启动电机，无缓启动，油门响应迅速；

1.2 直升机线性模式下，油门达到5%启动电机，马达以超柔和方式启动，在设定的缓启动时间内加速至当前油门应有转速；

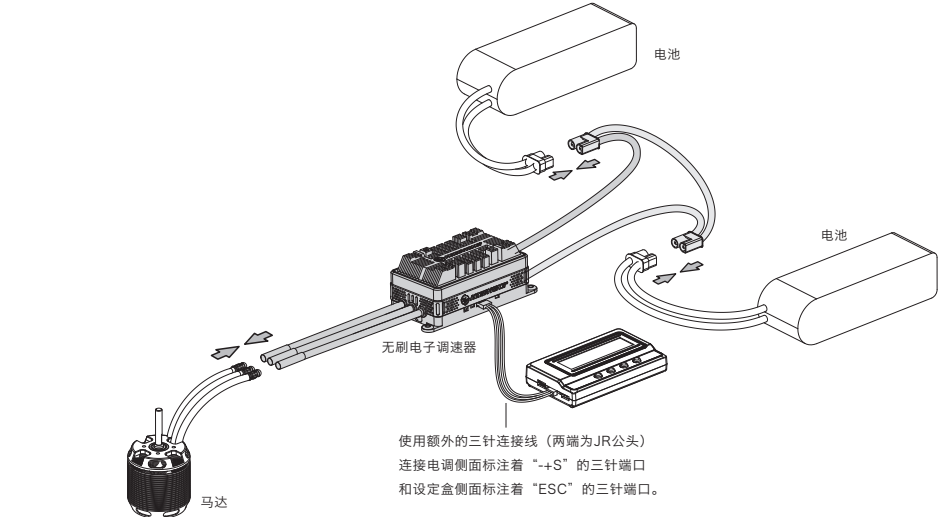
1.3 直升机精灵定速模式下，油门达到40%启动电机，马达以超柔和方式启动，在设定的缓启动时间内完成转速标定进入定速运行状态。该模式下每一次上电启动都会进行转速标定，由于电池放电能力等差异，将导致每一次标定的转速有细微区别，最终将导致在同一个油门值下，使用不同的电池会有转速上的细微差别，但并不影响定速效果。

1.4 直升机存储定速模式下，油门达到40%启动电机，马达以超柔和方式启动，在设定的缓启动时间内完成转速标定进入定速运行状态。该模式下仅第一次上电启动会进行转速标定，第一次转速标定建议使用状态较好的电池，标定完成后，更换不同电池再次飞行，在同一油门值下的转速将与第一次飞行时一致，为保持手感一致性，建议使用该模式。
- 关于转速标定：
- 将油门从0切换至≥40%（建议使用50%油门），马达将进入缓启动阶段，缓启动期间需保持主桨螺距为0°，缓启动结束后转速标定完成，电调进入定速运行状态。直升机存储定速模式下，若需重新标定转速，需先将飞行模式设置为直升机精灵定速模式并保存，然后再次设置为直升机存储定速模式，重新上电后电机首次运转过程中将进行转速标定；
  - 为保证定速效果，建议在定速飞行模式下的油门范围不超过90%，确保有足够的补偿空间维系马达转速恒定，若超过90%油门仍未达到理想转速，建议更换马达或更换齿比；（更换马达、齿比、桨、机架后均需重新标定转速）
  - 直升机存储定速模式下，使用性能较好的电池完成转速标定后，若使用性能较差的电池飞行，可能对该电池造成损害。
- 2、锂电节数：选择自动计算，将按单节电池3.7V计算电池节数，也可手动设置电池节数；
- 3、低压保护模式：软关断，触发低压保护后3秒内输出功率将逐渐降低为总功率的50%；硬关断，立即断开输出；
- 4、低压保护阈值：2.7V-3.7V自定义，默认为3.3V；
- 5、BEC输出：无；
- 6、启动时间：4-25秒可调，调节步长为1秒，默认为15秒；
- 7、定速感度P：控制电调维持当前转速的稳定程度；
- 8、定速感觉l：当转速低于预期值时，电调将进行转速补偿。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；
- 9、熄火降落重启时间：当油门在25%-40% 之间时，电调输出关闭，0-90s的范围油门再次高于40%，电机将快速启动加速到当前油门值（加速时间1秒）应有转速，完成熄火重启，如果时间超过设置值，将退出熄火降落，油门再次高于40%将恢复正常缓启动。（该功能仅在直升机定速（精灵/存储）模式下有效）
- 10、进角：0-30° 可调，步长为1°，默认为15°；
- 11、PWM频率：8K/15K/20K/30K可选择，默认为30KHz；
- 12、刹车力度：0-100%可调，步长为1%，默认为0；
- 13、电机转向：正转\反转，连接设定盒更改该项参数可改变电机转向；
- 14、熄火重启加速时间：1-3秒可调，步长为0.5秒，默认2秒。该参数控制熄火重启时马达从静止加速到全速所需的时间；
- 15、同步整流：当飞行模式为固定翼\直升机线性时，可选择开启\关闭，当飞行模式为直升机定速（精灵\存储）模式时，固定为开启，开启同步整流将带来更好的油门线性。

05 参数设定方法

1 设定盒调参

1.1 参数设定接线图



使用额外的三针连接线（两端为JR公头）  
连接电调侧面标注着“+S”的三针端口  
和设定盒侧面标注着“ESC”的三针端口。

1.2 参数设定方法

按上图连接电调与设定盒，将电调连接电池

↓

按“OK”键连接设定盒与电调，连接成功后将显示当前软件版本代号

↓

按“ITEM”键浏览参数设定项，按“OK”键进入该设定项

↓

进入设定项后，按“VALUE”键循环浏览参数值

↓

选好参数值后，按“OK”键保存参数

↓

!

ATTENTION

更改任意参数后，电调均需重新上电后，新参数才生效。

2 wifi无线调参

请参见无线wifi模块使用说明书。

06 电调运行信息查看

电调会记录单次飞行的标定转速、最低电压、最大电流、最高温度信息，断电后信息将不会保存，查看单次飞行信息需保持电调处于供电状态。

按上图连接电调与设定盒，将电调连接电池

→

按“OK”键连接设定盒与电调，连接成功后将显示当前软件版本代号

→

按“R/P”键循环浏览电调运行信息

→

备注：1、标定转速仅在定速存储模式下可查看，且记录不会因断电而消失；  
2、记录的转速为电气转速，例如电气转速为R，实际桨转速=R÷电机级对数÷齿比 x 油门百分比。

07 正常开机过程

开启遥控器，将油门摇杆打到最低点

→

电调接上电池，鸣叫“♪ 123”提示音，表示上电正常

→

马达发出N声短鸣音“哔-”，表示锂电节数

→

马达发出一声长鸣音“哔——”，表示系统准备就绪，随时可以起飞

→

备注：当电调正常运行时，启动完成后蓝灯常亮，油门打到100%时红灯同时常亮，未达到全速红灯灭。（详细灯色含义请见第八项灯色含义说明）

08 灯色含义、警示音及保护功能说明

灯色含义说明			保护功能	保护方式
电调状态	事件	闪烁模式	启动保护	启动过程中，电调会检测电机转速，当转速出现停止上升或者转速提升不稳定的情况，则判断启动失败，若此时油门小于15%，电调会自动尝试重新启动；若此时油门大于15%，需将油门归零后重新启动； 当电调工作温度超过 110 摄氏度时，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%，以保证马达仍有动力。避免因动力不足而摔机。温度下降后，电调会逐渐恢复最大动力；上电时电调温度不可超过70度，否则无法启动。（以上为软关断保护方式，若选择硬关断，则直接切断动力）
过流保护	电流过大 >350A	红色灯常亮	温度保护	
油门信号丢失	0、25s以上没有油门信号	红色灯闪烁1次，持续循环	油门信号丢失保护	当电调检测到油门遥控信号丢失0.25秒以上即立即关闭输出，以免因螺旋桨继续高速转动而造成更大的损失。信号恢复后，电调也随即恢复相应的功率输出。
电源电压异常	电源电压不在6-14s内	红色灯闪烁2次，持续循环	过负荷保护	当负载突然变得极大时，电调会切断动力，或自动重启。出现负载急剧增大的原因通常是螺旋桨卡死。
温度保护	电调温度超过110度	蓝色灯闪烁1次，持续循环	过流保护	当电流接近短路电流时（350A），电调会切断动力；触发原因可能为电机烧毁等情况。
电池低压保护	电压低于设定的保护电压点	蓝色灯闪烁2次，持续循环		
警示音说明				
提示音	问题			
“哔哔、哔哔”（间隔1秒）	输入电压不正常			
“哔-哔-”（急促单音）	油门未归零（油门摇杆未置于最低位置）、或油门行程过小			