EZRUN
USER MANUAL
Brushless Electronic Speed Controller
EZRUN MAX6 G2

20230721   HW-SMA433DUL00-A0

01 Disclaimer

Thank you for purchasing this HOBBYWING product!
Please read the following statement carefully before use and, once used, it is considered to be an acceptance of all the contents. Please strictly observe and adhere to the manual installation with this product. Unauthorized modification may result in personal injury and product damage. We reserve the rights to update the design and performance of the Product without notice. Different languages are available. Chinese language will be available to the mainland of China while English language will be available to the rest of the world.
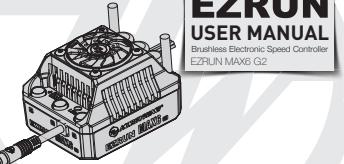
02 Warnings

- Before using this product, read the instruction manual carefully. Ensure that the equipment is used appropriately to avoid damaging the ESC. The wrong usage will overheat and damage the electronics.
- It is important to ensure that all wires soldered are properly secured to avoid short circuits from happening. A good soldering station is recommended to do such a job to avoid overheating the circuit board as well as to ensure connections are properly soldered.
- Even though the product has relevant protective measures, always use it in a safe manner in accordance with the operating environment noted in the manual (e.g, voltage, current, temperature and etc).
- Always remember to disconnect the battery each time after using it. Failure to do so will cause the battery to be completely discharged, resulting in an unpredictable danger.

03 Features

- The ESC uses a special process, coupled with an innovative waterproof design, to increase waterproofing and dust-proofing performance in different climates. It is easy to deal with the harsh conditions containing sediment, ice and snow, water accumulation.
- Built-in ultra-powerful switch mode BEC with a continuous current of 8A, an instant 25A, and support for 6V/7.4V/8.4V switching, supporting a wide range of powerful and high-voltage servos.
- Supports turbo timing setting, the timing response is remarkable when used with the matching motor(such as EZRUN 4990SD/5690SD G2).
- Multiple protection functions: battery low voltage protection, ESC and motor overheat protection, signal loss protection, current protection.
- The built-in (integrated in the switch) Bluetooth function allows for setting and upgrading the esc by directly connecting to the mobile app, without any additional devices, making it simpler and more convenient.
- Data logging function to view various running data on the HW LINK app.
- Supports the firmware upgrade of the ESC (The multi-function LCD G2 program box or OTA Programmer is needed to purchase), you can enjoy the latest functions.

04 Specifications

MODEL	EZRUN MAX6 G2
Cont. / Peak Current	180A / 1200A
Motor Type	Sensored / Sensorless Brushless Motor
Applications	1/6&1/7 On-road,Truck,Monster Truck
Motor Limit (Note*)	With 6S Lipo: KV< 2400
	With 8S Lipo: KV< 1700 4990/5690 size motor
Lipo Cells	3-8S Lipo
BEC Output	6V/7.4V/8.4V adjustable, continuous current 8A (Switch-mode)
Cooling Fan	A stable 6V or 7.4V or 8.4V from the built-in BEC
Size / Weight	94.5(L) x 59.4(W) x 50.9(H)mm / 428.5g (Included input wires)
Programming Port	iOS or Android smart phone (installed with the HW LINK app)

Note *: The range of KV value here is the recommended value under the standard application (combined with the rpm supported by the motor and the actual load of the whole vehicle), and does not represent the maximum rpm supported by esc.

05 Connections

Battery

Battery

Electronic Speed Controller   Switch

Motor

Receiver
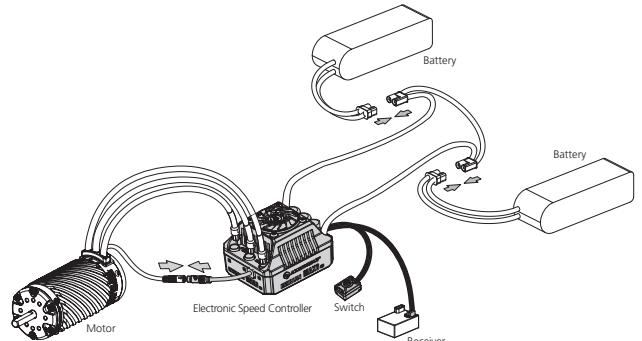
Refer to the wiring instructions and wiring diagram:
1. Motor connection:
There is a difference between connecting a sensored brushless motor and a sensorless brushless motor:
A. When connecting to a sensored brushless motor:
There are strict wire sequencing requirements for connecting the ESC to the motor, **the three A/B/CESC wires must connect to the three A/B/C motor wires correspondingly, otherwise, it may damage the ESC.** Next, connect the sensor cable of the esc and motor according to the arrow mark on the sensor connector. If you don't plug the sensor cable in, your ESC will still work in sensorless mode even if you're using a sensored motor.
Note: If the motor direction is reversed, change the parameter on item 4 "Motor rotation direction" to achieve the correct setting.
B. When connecting to a sensorless brushless motor:
There are no wire sequencing requirements needed when using a sensorless brushless motor, you can swap two wires if the motor runs in opposite direction.

Mounting Hole Template
47mm

22mm

4 x ⌀2.6,
4.2mm max thread depth

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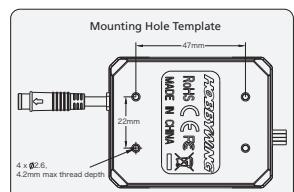
2. Receiver connection:
Connect the ESC throttle cable to the throttle channel on the receiver. Since the throttle cable of esc will have BEC voltage output to the receiver and servo, please do not supply additional power to the receiver, otherwise the esc may be damaged. If additional power is required, disconnect the red wire on the throttle plug from the ESC.
3. Battery connection:
Make sure that the (+) pole of the ESC is connected to the (+) pole of the battery and (-) to the (-). If the connection is reversed, the ESC will be damaged and will not be covered by the warranty service.

06 ESC Setup

1 Set the throttle range

When first use the ESC or the transmitter changes "TRIM" tune, D/R,EPA and other parameters, the throttle range is need to reset. We strongly recommend to open the fail safe function of the transmitter, set the no signal protection of throttle channel ("F/S") to close the output or set the protection value to the throttle neutral position. Thus the motor can stop running if the receiver cannot receive the signal of the transmitter. The calibrating steps of throttle is as follows:

Hold the power button.

Release the power button once the LED flashes.
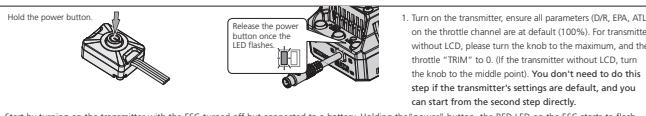
1. Turn on the transmitter, ensure all parameters (D/R, EPA, ATL) on the throttle channel are at default (100%). For transmitter without LCD, please turn the knob to the maximum, and the throttle "TRIM" to 0. (If the transmitter without LCD, turn the knob to the middle point). **You don't need to do this step if the transmitter's settings are default, and you can start from the second step directly.**

2. Start by turning on the transmitter with the ESC turned off but connected to a battery. Holding the "power" button, the RED LED on the ESC starts to flash (The motor beeps at the same time), and then release the "power" button immediately.
Note : Beeps from the motor may be low sometimes, and you can check the LED status instead.

Move the throttle trigger to the neutral position and press the power button.

The Green LED flashes once and motor emits "beep" tone.

Move the throttle trigger to the end position of forward and press the power button.

The Green LED flashes twice and motor emits "beep-beep" tone.

Move the throttle trigger to the end position of backward and press the power button.

The Green LED flashes three times and motor emits "beep-beep-beep" tone.

3. Set the neutral point, the full throttle endpoint and the full brake endpoint.
- Leave transmitter at the neutral position, press the "power" button, the RED LED dies out and the GREEN LED flashes 1 time and the motor beeps 1 time to accept the neutral position.
- Pull the throttle trigger to the full throttle position, press the "power" button, the GREEN LED blinks 2 times and the motor beeps 2 times to accept the full throttle endpoint.
- Push the throttle trigger to the full brake position, press the "power" button, the GREEN LED blinks 3 times and the motor beeps 3 times to accept the full brake endpoint.
Note:
- **The end position of forward: Pull the trigger to the maximum throttle position if it is pistol-style transmitter. Push the throttle to the top if it is board-style transmitter.**
- **The end position of backward: Push the trigger to the maximum brake position if it is pistol-style transmitter. Pull the throttle to the bottom if it is board-style transmitter.**
4. The motor can be started after the ESC/Radio calibration is complete.

2 Power on/off and beep instructions

Switch instructions: short press power button to power-on, long press on power button to shut down.
Power-on beep description: Under normal circumstances, the ESC will emit a few "beep" to indicate the number of lithium cells. A short "beep-" means the #1, and a long "beep—" means the #5. For example: "beep—, beep-"means 6 cells, "beep—, beep-beep-beep-" means 8 cells.
Note: Motor beeping at the same time, the ESC light flashes synchronously. For example: when the motor makes a long beep, the esc flashes for a long time, and when the motor makes a short beep, the esc flashes for a short time.

3 Instruction for programmable items

The column of white words on black background in the following table are the default values of programmable items.

	Item	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7	Option 8	Option 9
1	Running Mode	Forward with brake	Forward / Reverse with Brake	Forward with reverse						
2	Lipo Cells	Auto	2S	3S	4S	5S	6S	7S	8S	
3	Cutoff Voltage	Disabled	Auto (low)	Auto (medium)	Auto (high)					
4	Motor Rotation	CCW	CW							
5	BEC Voltage	6.0V	7.4V	8.4V						
6	Max.Brake Force	12.50%	25%	37.50%	50%	62.50%	75%	87.50%	100%	Disabled
7	Max.Reverse Force	25%	50%	75%	100%					
8	Punch	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7	Level 8	Level 9
9	Drag Brake Force	0-100% (Adjust Step 1%), Default 0%.								
10	Initial Throttle Force	0.5%	1%	2%	3%	4%	5%	6%	7%	8%
11	Turbo Timing	0°	4°	8°	12°	16°	20°	24°		
12	Turbo Delay	Instant	0.05s	0.1s	0.15s	0.2s	0.3s	0.5s	0.7s	1.0s

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 the throttle 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 to reverse 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 the throttle 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. 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. When the voltage protection is entered, the red LED flashes in the "-, -, -". The three levels of low, medium and high here correspond to 2.8V/Cell, 3.1V/Cell and 3.4V/Cell respectively. For NiMH batteries, it is recommended to set this parameter to "Disabled".
4. 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 direction upon full throttle. In the event that this happens, you can set the "motor rotation direction" to the opposite direction; "CW" or "CCW".
5. 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.
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 braking power 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 to avoid 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, vehicle configuration, etc. An aggressive setting may cause the tire to slip, the starting current to be too large and adversely affect the electronics performace.

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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. Initial Throttle Force:
It also called as minimum throttle force. You can set it according to wheel tire and traction. If the ground is slippery, please set a small throttle force.
11. 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.
12. Turbo Delay:
When "TURBO DELAY" is set to "INSTANT", the Turbo Timing will be activated right after the throttle trigger is moved to the full throttle position. When other value(s) is applied, you will need to hold the throttle trigger at the full throttle position (as you set) till the Turbo Timing initiates.

4 Programming method

1) Program your ESC with a smart phone (installed with the HW LINK V2 app)
- Download and install the Hobbywing's official app "HW LINK V2" on your smart phone. For smart phones with the iOS operating system, please search "Hobbywing" in the App Store; for smart phones with the Android operating system, search "Hobbywing" in the Google Play or download it from our website or scan the following QR code to download it.
- Connect a battery to the ESC and turn it on, then open the Hobbywing official app "HW LINK V2" on your smart phone. It will ask if you want to connect "Bluetooth" or "WiFi" the first time when you open the app; at this point, please select "Bluetooth". You need to change the connection to "Bluetooth" after using the "WiFi" connection, you can click "Settings" (on the home page) and then "Select the connecting mode" to change the connection.
- A list of Bluetooth devices will pop out when you click the ESC icon on the upper right corner, then select the ESC you want to program to establish the Bluetooth connection between the ESC and smart phone. (Note: the default name & password of the Bluetooth device are HW_BLE**** & 888888 respectively.)
ESC Setup: Click 【Parameters】 on the home page to adjust the ESC parameters, click the ESC icon on the upper right corner to disconnect the Bluetooth connection between the ESC and smart phone after completing and saving the settings.
Firmware Updating: Click 【Firmware Update】 and then select the 【Available Version】 to select the firmware version you need, and then click "Update" to upgrade your ESC.
Note: If the firmware is updated from the new version to the old version, after the update is completed, it is necessary to reset the parameters in the 【Parameters】 interface and re-calibrate the throttle range to operate the system normally.

This independent programming port for connecting LED/LCD program box/OTA programmer.

5 Factory reset

Restore the default values (only the ESC parameters) with a smart phone (installed with the HW LINK app):
After entering the app and establishing the Bluetooth connection between the ESC and smart phone, click "Factory Reset" in "Parameters" to factory reset your ESC. After that, please re-calibrate the throttle range.

07 Explanation for LED status

1. The run status indication:
1) The throttle trigger is in the neutral point and the LED lights are off.
2) When advancing, the red light is constantly on, and when the throttle is at full throttle, the green light is on.
3) When reversing, the red light is constantly on; If the reversing force is set to 100%, the green light is also lit when the throttle is at the maximum of the reverse.
2. What the LED means when the relevant protection function is triggered:
1) The red light flashes (single flash, "☆, ☆, ☆"): enters the low voltage protection state.
2) The green light flashes (single flash, "☆, ☆, ☆"): enters the esc overheat protection state.
3) The green light flashes (double flash, "☆☆, ☆☆, ☆☆"): enters the motor overheat protection state.
Note: Motor overheat protection is effective only when Hobbywing supporting motor (such as EZRUN 5690SD/4990SD G2) is used. When non Hobbywing supporting motor is used, there is no motor overheat protection function.
4) The green light flashes (three flashes, "☆☆☆, ☆☆☆, ☆☆☆"): enters the current protection state.
5) The green light flashes (five flashes, "☆☆☆☆☆, ☆☆☆☆☆, ☆☆☆☆☆"): enters the capacitor overheat protection state.

08 Trouble Shooting

Troubles	Possible Causes	Solution
The light does not turn on after power-up, the motor does not start, and the fan does not work.	1. The battery voltage is not output to the ESC; 2. The switch is damaged.	1. Check the battery,and whether the connection between battery and esc is good and whether the plug is soldered well; 2. Replace the switch.
The motor does not start after power-up, with a "beep-beep-, beep-beep-" warning tone accompanied by a flashing red light (approximately 0.5 seconds for each set of two-tone intervals) .	The battery pack voltage is not within the range of support.	Check the battery voltage or change the battery for test.
After power on, the red light flashes quickly.	1. The throttle signal is not detected by the ESC; 2. The neutral point of the ESC is not calibrated correctly.	1. Check if the throttle wire is plugged into the correct channel. Check if your transmitter is turned on. Check if the receiver ok. 2. Recalibrate the throttle travel.
The car is going in the reversed direction when the forward throttle is applied.	The transmission on the car kit is different	Set the parameter item "Motor Rotation" to the opposite direction.
The motor suddenly stopped or significantly reduced the output in running.	1. Possible interference; 2. The ESC enters into low-voltage protection state; 3. The ESC enters into overheat protection state.	1. Check the cause of the interference in the receiver and check the battery level of the transmitter; 2. Replace the battery if red light keeps flashing; 3. The green light continues to flash for temperature protection, please continue to use after the ESC or motor temperature is reduced (it is recommended to reduce the load on the vehicle).
The motor stuttered and unable to start.	1. The motor is connected incorrectly; 2. ESC fault (partial power pipe MOSFET burned out).	1. Check the plugs and the solder points and whether the sequence of A, B and C wires is correct.; 2. Contact the dealer to handle the repair.
Going forward normally, but not reverse.	1. The neutral point of the remote control throttle channel deviates from the brake area; 2. The parameter item "Runnig Mode" is set incorrectly; 3. The ESC is damaged.	1. Recalibrate the esc,when the throttle trigger is at the neutral point, the esc lights are off; 2. The parameter item "Runnig Mode" is set to incorrectly; 3. Contact the distributor to handle the repair.
The throttle travel setting could not be completed.	The ESC did not receive the correct throttle signal.	1. Check whether the throttle cable is correctly connected to the receiver. 2. If the servo works normally,you can connect the throttle cable of esc to the steering channel to have a test, or change the transmitter/receiver system for test directly.
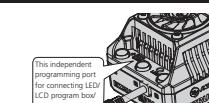
FCC Warnning:

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection againstharmful interference in a residential installation. This equipment generates, uses and can radiateradio frequency energy and, if not installed and used in accordance with the instructions, maycause harmful interference to radio communications. However, there is no guarantee thatinterference will not occur in a particular installation. If this equipment does cause harmfulinterference to radio or television reception, which can be determined by turning the equipmentoff and on, the user is encouraged to try to correct the interference by one or more of thefollowing measures:

• Reorient or relocate the receiving antenna.

• Increase the separation between the equipment and receiver.

• Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

• Consult the dealer or an experienced radio/TV technician for help.

Caution: Any changes or modifications to this device not explicitly approved by manufacturer could void your authority to operate this equipment.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1)This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 0cm between the radiator and your body.

EZRUN
车用无刷电子调速器
使用说明书
EZRUN MAX6 G2

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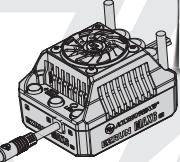
01 声明

⚠ 感谢您购买本产品！无刷动力系统功率强大，错误的使用可能造成人身伤害到设备损坏。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而引起的任何责任，包括但不限于对附带损失或间接损失的赔偿责任；同时，我们不承担因擅自对产品进行修改所引起的任何责任。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。

02 注意事项

- 电调与相关连接部件连接前，请确保所有电线和连接部件绝缘良好，短路会损坏电调。
- 请务必经连接好各部件，若连接不良，您可能不能正常控制赛车，或出现设备损坏等其他不可预知的情况。
- 使用此电调前，请认真查看各动力设备以及车架说明书，确保动力搭配合理，避免因错误的动力搭配导致电机超载，最终损坏电调。
- 高速运行中，因车子轮胎会"膨"到极致，故而请勿将车子腾空然后起全油门，否则，轮胎运行故障会引起严重伤害。
- 勿使电调外部温度超过90℃/194℉，高温将会毁坏电调并且可能导致电机损坏。
- 使用完毕后，切记断开电池与电调的连接。只要接着电池，即使开关未开电调也会一直消耗电流，长时间连接会导致电池最终完全放电，进而导致电池或电调出现故障；我们不对因此而造成的任何损害负责。

03 产品特色

- 电调采用灌封工艺，加上新型防水有感接口，使之具备出色的防水防尘性能，在各种气候条件下，轻松应对含有泥沙、冰雪、积水的复杂路面。
- 内置强大的开关模式BEC，持续电流达到8A，瞬间达到25A，且支持 6V/7.4V/8.4V 切换，轻松驱动各种强力舵机及高压舵机。
- 支持Turbo进角设置，搭配好盈套装电机（如EZRUN 4990SD/5690SD G2）使用时，进角效果显著，轻松超越对手。
- 多重保护功能：电池低压保护、电调及电机过热保护、油门失控保护、堵转保护、电流保护等。
- 电调内置（集成在开关中）蓝牙功能，直连手机即可对电调进行设置和升级，无需其它额外设备，更加简单方便。
- 数据记录功能，在HW LINK App上即可查看电调各种运行数据。
- 支持电调固件升级，享用最新功能。

04 产品规格

型 号	EZRUN MAX6 G2
持续/峰值电流	180A / 1200A
支持电机类型	有感无刷电机、无感无刷电机
主要适用车型	1/6&1/7平路车、卡车、大脚车
推荐无刷马达KV（备注*）	使用6S锂电时：KV≤2400
	使用8S锂电时：KV≤1700 4990/5690尺寸电机
电池节数	3-8S Lipo
BEC输出	6V / 7.4V / 8.4V可调，持续电流8A（开关稳压方式）
风扇取电方式	从内置BEC取得稳定的6V/7.4V或8.4V
尺寸/重量	94.5(长) x 59.4(宽) x 50.9(高)mm / 428.5g（含输入线重量）
参数设定接口	手机APP

备注*：这里的KV值范围是在标配应用下（结合了电机所支持的转速以及整车实际负载）的推荐值，并不代表电调能支持的最大转速。

05 连接电子调速器

电池
电池
电子调速器
开关
接收机
电机
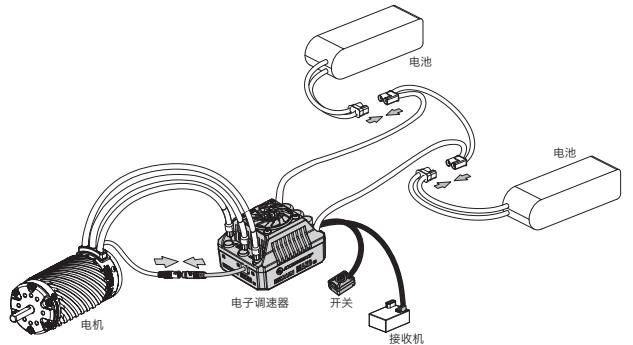
请参照接线说明及接线图正确接线：
### 1、连接电机：
连接有感无刷马达与无感无刷马达的方式有差异，请务必遵照如下接线方式：
A. 连接有感无刷马达时：
电调与马达相连有严格的线序要求，**电调的#A/#B/#C必须与电机的#A/#B/#C三线严格一一对应，否则可能损坏电调**，然后将电机与电机的感应线按照感应接口上的箭头标识对接起来。
  备注：若装上电机后，车子前进与后退反向，请更改参数项第4项"电机转动方向"，实现电机转向调整。
B. 连接无感无刷马达时：
电调与马达相连无严格的线序要求，电调的#A/#B/#C可以与电机的三线随意对接，若出现转向相反，任意交换两条马达线。

电调安装孔尺寸图

47mm
22mm
4 x ∅2.6，螺纹深4.2mm
RoHS CE FC 🗑
MADE IN CHINA

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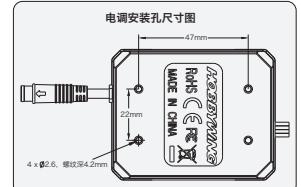
2. 连接接收机：
将电调的油门控制线接入接收机的油门通道（即TH通道）。因电调油门线会输出BEC电压给接收机及舵机，所以请勿给接收机额外供电，若需要额外供电，请断开电调油门线中的红色线。

3. 连接电池：
电调的输入线有极性之分，接入电池时，请确保电调的（+）极与电池的（+）极相连，（-）与（-）相连。如果电调接反将被损坏，因接反而导致电调损坏是不享有保修服务的。

06 设置电子调速器

警告！本系统功率非常强劲，为了您及周边他人的安全，我们强烈建议您在校准及设定该系统前拆下电机小齿，并在车轮悬空的情况下开启电调上的控制开关！

1 设定油门行程

强调：电调第一次使用前或遥控器更改过油门通道"TRIM"微调、D/R、EPA等参数后，均需重设油门行程，不然可能会导致电调无法使用或误动作。另外我们建议将遥控器油门通道的无信号保护（"F/S"）功能设置为关闭输出方式或将保护值设置为中点位置，使得当接收机无法收到遥控器信号后，电机能够停止运转。油门校准步骤如下图所示：

步骤如下图所示：

持续按住电源键

红灯LED闪烁时，立即松开按键
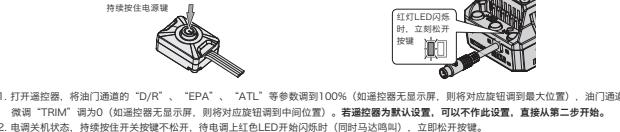
1. 打开遥控器，将油门通道的"D/R"、"EPA"、"ATL"等参数调到100%（如遥控器无显示界，则将对应旋钮调到最大位置），油门通道的中点微调"TRIM"为0（如遥控器无显示界，则将对应旋钮调到中间位置）。**若遥控器为默认设置，可以不作此设置，直接从第二步开始。**
2. 电调关机状态，持续按住开关按键不松开，待电调上红色LED开始闪烁时（同时马达鸣叫），立即松开按键。

板机置于中点，按一下按键。
板机置于正向最高点，按一下按键。
板机置于反向最高点，按一下按键。

按一下按键，绿灯闪烁一下
按一下按键，绿灯闪烁两下
按一下按键，绿灯闪烁三下
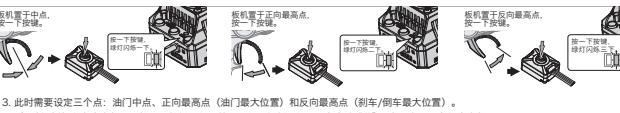
3. 此时需要设定三个点：油门中点、正向最高点（油门最大位置）和反向最高点（刹车/倒车最大位置）。
  1）油门扳机置在中点位置，按一下按键，红灯熄灭，绿灯闪烁1次，马达鸣叫"哔"1声，表示已存储中点位置；
  2）油门扳机打到正向最高点，按一下按键，绿灯闪烁2次，马达鸣叫"哔-哔"2声，表示已存储油门正向最高点；
  3）油门扳机打到反向最高点，按一下按键，绿灯闪烁3次，马达鸣叫"哔-哔-哔-"3声，表示已存储油门反向最高点。
4. 油门行程校调完毕，待自检完成后，电机即可正常操作。

2 开关机及鸣音说明

开关机说明： 关机状态下短按电源按键开机；开机状态下长按电源按键关机。
开机鸣音说明： 在正常情况下开不开机，电机会发出几声"哔"鸣音表示锂电节数。一声短音"哔-"代表数字1，一声长音"哔一"代表数字5。例如："哔一，哔一"表示6节锂电，"哔一，哔-哔-哔-"表示8节锂电。
备注：电机鸣叫的同时，电调灯同步闪烁。如：电机一声长音的同时电调灯长闪一下，电机一声短音的同时电调灯短闪一下。

3 编程项目说明

下表中黑底白字的选项为可编程项目的默认值。

编程项目		参数项								
编号	参数名称	参数1	参数2	参数3	参数4	参数5	参数6	参数7	参数8	参数9
1	运行模式	正转带刹车	正反转带刹车	直接正反转						
2	锂电池节数	自动判别	2S	3S	4S	5S	6S	7S	8S	
3	电池低压保护阈值	不保护	自动（低）	自动(中)	自动(高)					
4	电机转动方向	CCW	CW							
5	BEC电压	6.0V	7.4V	8.4V						
6	最大刹车力度	12.50%	25%	37.50%	50%	62.50%	75%	87.50%	100%	禁用刹车
7	最大倒车力度	25%	50%	75%	100%					
8	启动加速度	1级	2级	3级	4级	5级	6级	7级	8级	9级
9	拖刹力度	0-100%，调整量为1%，默认0%								
10	初始启动力度	0.5%	1%	2%	3%	4%	5%	6%	7%	8%
11	Turbo进角	0°	4°	8°	12°	16°	20°	24°		
12	Turbo延迟	立即	0.05秒	0.1秒	0.15秒	0.2秒	0.3秒	0.5秒	0.7秒	1.0秒

1. 运行模式（Running Mode）：
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
此模式刚提供了倒车功能，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（Lipo Cells）：
根据实际所用锂电池节数设定正确的值。默认为自动判断。

3. 电池低压保护阈值（Low Voltage Cut-Off）：
这项功能主要是防止锂电过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，将减低动力输出，数秒后将彻底切断动力输出。当进入电压保护后，红色 LED 会以"☆一，☆一，☆一"方式闪烁。这里的低/中/高三档分别对应2.8V/Cell、3.1V/Cell、3.4V/Cell。对于镍氢电池，建议将此项参数设置为"不保护"。

4. 电机转动方向（Motor Rotation）：
用于设置电机的转动方向。由于有些车架结构设计差异，有可能出现给前的油门子子前后退，此时可以将"电机转动方向"设置为相反的方向。

5. BEC电压（BEC Voltage）：
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电压值请勿超过电机舵机最高工作电压，否则可能损坏舵机甚至电调。

6. 最大刹车力度（Max. Brake Force）：
本电调提供比例刹车功能，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. 最大倒车力度（Max. Reverse Force）：
指油门扳机打到反向最大的位置所能产生的倒车力度，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. 启动加速度（Start Mode / Punch）：
用于控制油门输出快慢，分1-9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。如设置过大可能造成轮胎打滑、启动电流过大而对电机/电调/电池不利影响。

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9. 拖刹力度（Drag Brake Force）：
拖刹是指当油门扳机进入到中点区域时，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. 初始启动力度（Initial Throttle Force）：
也叫做最小启动力度，是指在油门初始位置作用于电机上的启动力，可根据轮胎、场地抓地力设置需要的启动力度；如果场地太滑，请设置较小的启动力度，以免打滑。

11. Turbo进角（Turbo Timing）：
激爆进角，可以理解为进角的大小设置项，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，故请合理设置该功能。

12. Turbo延迟（Turbo Delay）：
是指触发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。

4 编程方法

该电调内置了蓝牙模块，支持直接使用手机APP进行电调设置和固件升级，具体方法如下：
- 移动端下载好盈官方APP：HW LINK V2，iOS直接在App Store中搜索Hobbywing即可找到；Android在Google Play中查找 Hobbywing即可找到，或从Hobbywing官网下载。
- 给电调通电并开机，然后在移动端进入官方APP：HW LINK V2。首次进入APP，会提示选择蓝牙连接或是WiFi连接，此处选择蓝牙连接。使用WiFi连接后如果要切换为蓝牙连接请点击"系统设置"中的"选择连接方式"改变设置。
- 点击APP内右上方的电调标识，会弹出附近可连接的蓝牙设备，点选所需设定的电调蓝牙名称以连接（蓝牙出厂默认名称：HW_BLE****，出厂默认密码：888888）
  参数设置： 点击APP首页【参数设置】即可调整电调参数，设置完成并保存后点击右上方的电调图标以断开连接。
  固件升级： 点击APP首页【固件更新】，点击【可用版本】栏目来选择需要更新的目标版本，然后点击下方的固件更新即可。
  注意： 若电调固件从新的版本本往旧的版本更新时（从上往下），在更新完成后，必须在【参数设置】界面进行重置等参数操作，然后重新校准油门行程方可正常运行。

在此独立可编程接口连接LED设定卡/LCD G2设定盒/蓝牙模块。

5 恢复出厂参数设定

利用APP恢复出厂"设置（仅复位电调参数），方法如下：
进入APP连接电调后，点击APP内参数设置中的恢复出厂设置完成出厂设定复位。恢复出厂设置后，请重新设置油门行程。

07 电调状态指示灯说明

1. 运行状态指示：
  1）油门扳机处于中点区域，红绿灯均熄灭。
  2）前进时，红灯恒亮：当油门处于前进最大时，绿灯也亮起。
  3）倒车时，红灯恒亮：若倒车力度设置为100%则当油门处于倒车最大时绿灯也亮起。

2. 相关保护功能触发时，LED含义：
  1）红灯持续闪烁（单闪，"☆，☆，☆"）：进入低压保护状态。
  2）绿灯持续闪烁（单闪，"☆，☆，☆"）：进入电调过热保护状态。
  3）绿灯持续闪烁（双闪，"☆☆，☆☆，☆☆"）：进入电机过热保护状态。
  备注： 只有使用好盈配套电机（如EZRUN 5690SD/4990SD G2）时，电机过热保护才生效，当使用非好盈配套电机时，则无电机过热保护功能。
  4）绿灯持续闪烁（三闪，"☆☆☆，☆☆☆，☆☆☆"）：进入电流保护状态。
  5）绿灯持续闪烁（五闪，"☆☆☆☆☆，☆☆☆☆☆，☆☆☆☆☆"）：进入过热保护状态。

08 故障快速处理

故障现象	可能原因	解决方法
上电后指示灯不亮、电机无法启动、风扇不转。	1. 电池电压没有输入到电调；2. 电调开关损坏。	1. 检查电池好坏以及电池与电调的连接是否良好；2. 更换开关。
上电后电机无法启动，发出"哔-哔一、哔-哔一"警示音且伴有红灯闪烁（每组双音间隔约0.5秒）。	电池组电压不在电调所支持范围内。	检查电池组电压。
上电完成锂电节数检测后（闪N次绿灯），红灯快速闪烁。	1. 电调未检测到油门信号；2. 电调油门中点与遥控器不匹配。	1. 检查油门线是否插反、遥端是否插错、控差是否有开启；2. 微调遥控器油门中点，重新校准油门行程。
遥控器正向加油门时，车子反而倒退。	该车架架同主流车架的电机转向不一致。	将参数项"电机转动方向"设置为相反方向即可。
电机转动过程中，突然停转或功率输出显著降低。	1. 接收机遇到干扰；2. 电调进入电池低压保护状态；3. 电调进入过温保护状态。	1. 检查接收机出现干扰的原因，检查遥控器遥电池电量；2. 红灯持续闪为电压保护，请更换电池；3. 绿灯持续闪烁为温度保护，请等电调或电机温度降低后继续使用（建议减小整车负载）。
电机抖动，无法启动。	1. 电调与电机ABC线序错误；2. 电调和电机连接不良；3. 电调故障（部分功率管MOSFET烧坏）。	1. 按照A-A,B-B,C-C顺序排线；2. 检查各插头及焊接点，必要时重新焊接；3. 联系经销商处理维修事宜。
前进正常，但无法倒车。	1. 遥控器油门通道中点偏离到刹车区域；2. 参数项"运行模式"设置错误；3. 电调损坏。	1. 重新校准油门行程，使遥控器油门扳机置于中位时，电调上的指示灯不亮；2. 参数项"运行模式"设置为"正反转带刹车"；3. 联系经销商处理维修事宜。
无法完成油门行程设定。	电调未接收到正确的油门信号。	1. 检查有无接错通道、油门线有无接反；2. 接收机是否被损坏，可以将油门线接到别的电机通道进行测试。