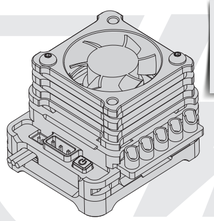
HOBBYWING®



XERUN USER MANUAL

Brushless Electronic Speed Controller

XERUN XD10 Pro

20210720

01 Introduction

Congratulations and thank you for your trust in Hobbywing product. By purchasing the XERUN XD10 Pro, you have chosen a high performance sensored brushless electronic speed controller! This speed controller is equipped with high-tech features to enhance your experience with Hobbywing brushless power systems. Improper usage and unauthorized modification to our product is extremely dangerous and may damage the product and related devices. Please take your time and read the following instructions carefully before you start using your speed control. We have the right to modify our product design, appearance, features and usage requirements without notification.
We, HOBBYWING, are only responsible for our product cost and nothing else as result of using our product.

02 Warnings

- To avoid short circuits, ensure that all wires and connections must be well insulated beforeconnecting the ESC to related devices.
- Ensure all devices are well connected to prevent poor connections and avoid damage to your electronic devices.
- Read through the manuals of all power devices and chassis and ensure the power configuration is rational before using this unit.
- Please use a soldering iron with the power of at least 60W to solder all input/output wires and connectors.
- Do not hold the vehicle in the air and rev it up to full throttle, as rubber tires can "expand" to extreme size or even crack to cause serious injury.
- Stop immediate usage once the casing of the ESC exceeds 90℃/194℉ as this may cause damage to both the ESC and motor. Hobbywing recommends setting the "ESC Thermal Protection" to 105℃/221℉ (this refers to the internal temperature of the ESC).
- Users must always disconnect the batteries after use as the current on the ESC is consuming continuously if it is connected to the batteries (even if the ESC is turned off). The battery will completely be discharged and may result in damage to the battery or ESC when it is connected for a long period of time. This WILL NOT be covered under warranty.

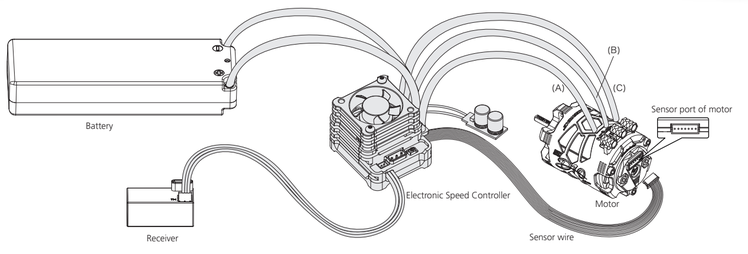
03 Features

- Built-in switch mode BEC with a maximum output of 10A and voltage adjustable from 5V to 7.4V (step: 0.1V) for usage with servos & other devices require different voltages.
- Separate PRG/FAN port is able to power an external fan for maximize cooling performance or connect a LCD program box or WiFi module to the ESC.
- Variable frequency regulation of PWM & brake frequencies allows users to precisely regulate the driving & braking forces (of the motors).
- Multiple protections: low-voltage cutoff protection, ESC and motor thermal protection, and fail safe (throttle signal loss protection),reverse polarity protection (the external standard cappack will still be damaged if battery reversal occurs).
- Data logging for recording the maximum ESC/motor temperature, motor speed/RPM, and others in real time.
- Firmware upgrade via Hobbywing multifunction LCD program box or OTA Programmer (item sold separately).

04 Specifications

Model	XERUN XD10 Pro
Cont./Peak Current	100A/800A
Motor Type	Sensored / Sensorless Brushless Motors
Applications	1/10th drift car
Motor Limit*	Brushless Motor Limit with 2S LiPo/6S NiMH: 8.5T
LiPo/NiMH Cells	2S LiPo/4-6S NiMH
BEC Output	5-7.4V Adjustable, Continuous Current of 5A (Switch-mode)
Cooling Fan	Powered by the stable BEC voltage of 5-7.4V
Connectors	Input End: No Connectors; Output End: 3.5mm male plug
Size	40.7x35.0x32.0mm (w/Fan)
Weight	95g (w/ wires)
Programming Port	PRG/FAN Port

05 Connections



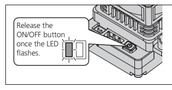
This is an extremely powerful brushless motor system. For your safety and the safety of those around you, we strongly recommend removing the pinion gear attached to the motor before performing calibration and programming functions with this system. It is also advisable to keep the wheels in the air when you turn on the ESC.

1. **Motor Wiring:** The motor wiring is different between the sensored and the sensorless; please only follow the introductions below.
   - Sensored Motor Wiring
     There is strict wiring order from the ESC to the motor, the three A/B/C ESC wires must connect to the three A/B/C motor wires correspondingly. Next, connect the ESC sensor port and the motor sensor port with the stock 6-pin sensor cable. 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.
   - Sensorless Motor Wiring
     Users do not need to be worried in regards to the connectivity with the A/B/C(ESC and motor) as there is no polarity. You may find it necessary to swap two wires if the motor runs in reverse.
2. **Receiver Wiring:** The throttle control cable on the ESC has to be plugged into the throttle (TH) channel on the receiver. The throttle control cable has an output voltage of 6V/7.4V to the receiver and steering servo, hence, no separate battery can be connected to the receiver. Otherwise, your ESC may be damaged.
3. **Battery Wiring:** Proper polarity is essential. Please ensure positive (+) connects to positive (+), and negative (-) connects to negative (-) when plugging in the battery! When reverse polarity is applied to the ESC from the battery, the external standard cappack will still be damaged.

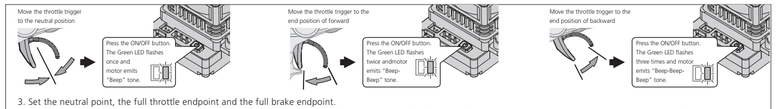
06 ESC Setup

1 ESC/Radio Calibration

Begin using your ESC by calibrating with your transmitter. We strongly recommend Hobbywing users to use the "Fail Safe" function on the radio system and set (F/S) to "Output OFF" or "Neutral Position". Example of calibrating Neutral range and Endpoint.



1. Turn on the transmitter, ensure all parameters (D/R, Curve, 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. Please also turn the corresponding knob to the neutral position.
2. Start by turning on the transmitter with the ESC turned off but connected to a battery. Holding the "ON/OFF" button, the RED LED on the ESC starts to flash (Note 2: the motor beeps at the same time), and then release the ON/OFF button immediately.
   Note: Beeps from the motor may be low sometimes, and you can check the LED status instead.



3. Set the neutral point, the full throttle endpoint and the full brake endpoint.
   • Leave transmitter at the neutral position, press the "ON/OFF" 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 "ON/OFF" 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 "ON/OFF" 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 maxim um 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 transmit ter.
4. The motor can be started 3 seconds after the ESC/Radio calibration is complete.

2 Power On/Off

Attention! The temperature of its Aluminum housing may be very high when there is heavy load. For precaution, we recommend users to have a fan blown towards the ESC.
(Start with the ESC turned off), press the ON/OFF button to turn on the ESC (the indication LED comes on); and press the ON/OFF button again to turn off the ESC (the indication LED dies out).
Note: Do not turn off the ESC when the motor is spinning. The sudden stoppage may result in unwanted damage to both the motor and ESC. If there is an emergency, battery plugs can be pulled out to switch the ESC off.

3 Programmable Items

Section	Item	Programmable Items	Parameter Values
General Setting	1A	Running Mode	Forward with Brake / Forward/ Reverse with Brake / Forward and Reverse
	1B	Max. Reverse Force	25% / 50% / 75% / 100%
	1C	Reverse Delay	0-5S (Adjust Step 0.5S)
	1D	Cutoff Voltage	Disabled / Auto (3.3V/Cell) / 3.0-7.4V Adjustable (Step: 0.1V)
	1E	ESC Thermal Protection	Disabled / 105℃/221℉ / 125℃/257℉
	1F	Thermal Protection	Disabled / 105℃/221℉ / 125℃/257℉
	1G	BEC Voltage	5V-7.4V Adjustable (Step:0.1V)
	1H	Remote Off	Disabled / Enabled
	1I	Motor Rotation	CCW / CW
	1J	Phase-AC Swap	Disabled / Enabled
Throttle Control	2A	Throttle Rate Control	1-30 Adjustable (Step: 1)
	2B	Throttle Curve	Linear / Customized
	2C	Neutral Range	3%-10% (Adjust Step1%)
	2D	Initial Throttle Force	1-15 (Adjust Step 1)
	2E	Coast	0-15 (Adjust Step 1)
	2F	PWM Drive Frequency	1K / 2K / 4K / 8K / 12K / 16K / 24K / 32K / 40K / 48K / Customized
	2G	Softening Value	0-30° Adjustable (Step: 1°)
	2H	Softening Range	0% / 10% / 20% / 25% / 30% / 35% / 40% / 45% / 50% / 55% / 60% / 65% / 70% / 75%
Brake Control	3A	Drag Brake Force	0%-100% Adjustable (Step: 1%)
	3B	Max. Brake Force	0%-100% (Adjust Step 1%)
	3C	Initial Brake Force	=Drag brake / 0%-50% Adjustable (Step:1%)
	3D	Brake Rate Control	1-20 Adjustable (Step: 1)
	3E	Brake Curve	Linear / Customized
	3F	Brake Frequency	0.5K / 1K / 2K / 4K / 8K / 12K / 16K / 20K / 24K / Customized
Timing	4A	Boost Timing	0-64° Adjustable (Step: 1°)
	4B	Boost Timing Activation	RPM / Auto
	4C	Boost Start RPM	500-35000RPM (Step: 500RPM)
	4D	Boost End RPM	3000-60000RPM (Step: 500RPM)
	5A	Turbo Timing	0-64° Adjustable (Step: 1°)
	5B	Turbo Delay	Instant / 0.05s / 0.1s / 0.15s / 0.2s / 0.25s / 0.3s / 0.35s / 0.4s / 0.45s / 0.5s / 0.6s / 0.7s / 0.8s / 0.9s / 1.0s
	5C	Turbo Increase Rate (deg/0.1sec)	Instant / 3deg/0.1s / 6deg/0.1s / 9deg/0.1s / 12deg/0.1s / 15deg/0.1s / 18deg/0.1s / 21deg/0.1s / 24deg/0.1s / 27deg/0.1s / 30deg/0.1s
	5D	Turbo Decrease Rate (deg/0.1sec)	Instant / 3deg/0.1s / 6deg/0.1s / 9deg/0.1s / 12deg/0.1s / 15deg/0.1s / 18deg/0.1s / 21deg/0.1s / 24deg/0.1s / 27deg/0.1s / 30deg/0.1s

Note: Item 4C (Boost Start RPM) & item 4D (Boost End RPM) are not programmable if item 4B (Timing Activation) is set to "Auto".

1A. Running Mode
Option 1: Forward with Brake
Racing mode. It has only forward and brake functions.
Option 2: Forward/ Reverse with Brake
This option is known to be the "training" mode with "Forward/ Reverse with Brake" functions. Hobbywing has adopted the "DOUBLE-CLICK" method, that is your vehicle only brakes on the 1st time you push the throttle trigger forward (brake) (1st push). The motor stops when you quickly release the throttle trigger and then re-push the trigger quickly (2nd push), only then the vehicle will reverse. The reverse function will not work if your car does not come to a complete stop. The vehicle only reverses after the motor stops. This method is for preventing vehicle from being accidentally reversed.
Option 3: Forward and Reverse
This mode is often used by special vehicles (rock crawler). It adopts the "SINGLE-CLICK" method. The vehicle will reverse immediately when you push the throttle trigger forward (brake).
1B. Max. Reverse Force
The reverse force of the value will determine its speed. For the safety of your vehicle, we recommend using a low amount.
1C. Reverse Delay
This parameter is used to adjust and set the delay time when the reverse output is being applied; When the motor is at a standstill, the reverse output will be activated once the delay time of the value is reached.
1D. Cutoff Voltage
Sets the voltage at which the ESC lowers or removes power to the motor in order to either keep the battery at a safe minimum voltage (for LiPo batteries). The ESC monitors the battery voltage all the time, it will immediately reduce the power to 50% (in 3 seconds) and cut off the output 40 seconds later when the voltage goes below the cutoff threshold. The RED LED will flash a short, single flash that repeats (☆, ☆, ☆) to indicate the low-voltage cutoff protection is activated. Please set the "Cutoff Voltage" to "Disabled" or customize this item if you are using NiMH batteries.
Option 1: Disabled
The ESC does not cut the power off due to low voltage. We do not recommend using this option when you use any LiPo battery as you will irreversibly damage the product. You need to select this option when you are using a NiMH pack.
Option 2: Auto
The ESC calculates the corresponding cutoff voltage for the battery shall be 6.6V.
Option 3: Customized
The customized cutoff threshold is a voltage for the whole battery pack (adjustable from 3.0V to 7.4V).
1E. ESC Thermal Protection
The output from the ESC will be cut off with the value you have preset.
The GREEN LED flashes (☆, ☆, ☆) when the ESC temperature reaches to the preset value. The output will not resume until the ESC temperature gets down.
Warning! Please do not disable this function unless you're in a competition. Otherwise the high temperature may damage your ESC and even your motor.
1F. Motor Thermal Protection
The GREEN LED flashes (☆☆, ☆☆, ☆☆) when the motor temperature reaches to the preset value. The output will not resume until the motor temperature gets down.
Warning! Please do not disable this function unless you're in a competition. Otherwise the high temperature may damage your motor and even your ESC. For non-Hobbywing motor, the ESC may get this protection activated too early/late because of the different temperature sensor inside the motor. In this case, please disable this function and monitor the motor temperature manually.
1G. BEC Voltage
BEC voltage can be adjusted between 6.0-7.4V. 6.0V is applicable to common servo. If use high-voltage servo , set to higher voltage according to voltage marking of servo.
1H. Remote Off
Option 1: Enabled
Users can simply push and hold the brake trigger for 6 seconds. This option allows the user to turn off the ESC without pushing the ON/OFF button switch.
Option 2: Disabled
Users must turn off the ESC by pressing the ON/OFF switch button from the ESC.
1I. Motor Rotation/Direction
With the motor shaft faces you (the rear end of the motor is away from you), increase the throttle input, the motor (shaft) will rotate in the CCW/CW direction if the "Motor Rotation /Direction" set to "CCW/CW". Generally, the vehicle runs forward when the motor (shaft) rotates in the CCW direction. However, some vehicles only run forward when the motor rotates in the CW direction due to the different chassis design. In that case, you only need to set the "Motor Rotation/Direction" to "CW).
1J. Phase-AC Swap
If the A/C wire of ESC connect to A/C wire of motor with crossed way (A wire of ESC connects to C wire of motor, C wire of ESC connects to A wire), set this item as Enable.
2A. Throttle Rate Control
This item is used to control the throttle response. It can be adjustable from 1 to 30 (step: 1), the lower the throttle rate, the more the limit will be on the throttle response. A suitable rate can help driver to control his vehicle properly during the starting-up process. Generally, you can set it to a high value to have a quick throttle response if you are proficient at throttle control.
2B. Throttle Curve
The throttle curve parameter reconciles the position of the throttle trigger (in throttle zone) and the actual ESC throttle output. It is linear by default and we can change it to non-linear via adjusting the throttle curve. For example, if adjust it to +EXP, the throttle output at the early stage will be higher (than the output when the curve is linear); if it is adjusted to –EXP, the throttle output at the early stage will be lower (than the output when the curve is linear).
2C. Neutral Range
As not all transmitters have the same stability at "neutral position", please adjust this parameter as per your preference. You can adjust to a bigger value when this happens.
2D. 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. Some motors have strong cogging effect with lower FDR number. When you push throttle a little bit, the motor will not rotate until a higher throttle point than the default initial throttle point. When we have this parameter, we can use the transmitter trim to check the above issue and then adjust the best initial throttle point by increasing the ITF a little. The control feeling will be smoother if you find the best point. Normally the number will be not over 5%.
2E. Coast
The RPM of the motor will be lowered gradually when throttle is reduced. The vehicle will not reduce speed abruptly when the throttle is reduced to return to the neutral position. The bigger the value, the more the "COAST" will be felt. Example, COAST of 0 deactivates, and a COAST of 20% would be the maximum amount of COAST.
What is COAST?
When a vehicle has a larger final drive ratio, the tendency of having a "drag" feel is higher. The "COAST" technology is to allow the car to roll (coast) even when the final drive ratio is high. The Coast function brings better and smoother control feeling to racers. Some drivers will refer to this to the traditional brushed motors.
Note: The "Coast" will be void (even if you set it to any value besides 0) if the above "drag brake" is not "0%".
2F. PWM Drive Frequency
The acceleration will be more aggressive at the initial stage when the drive frequency is low; a higher drive frequency is smoother but this will create more heat to the ESC.If set this item to "Customized", then the PWM frequency can be adjusted to a variable value (which ranges from 0K to 32K) at any 0-100% throttle input, Please choose the frequencies as per the actual test results of your vehicles.
2G. Softening Value
It allows users to fine-tune the bottom end, change the driving feel, and maximize the driving efficiency at different track conditions. The higher the "Softening Value ", the milder the bottom end. In Modified class, drivers often feel the power of the bottom end is too aggressive. Little throttle input usually brings too much power to the car and make it hard to control at the corners,so HOBBYWING creates this softening function to solve the issue.
Note: You can increase the motor mechanical timing accordingly after you set the softening value. Every time you increase the softening value by 5 degrees, you can increase the mechanical timing by 1 degree. For example, if you set the softening value to 20 degrees, then you can increase the mechanical timing by 4 degrees. Please note that you will never increase the mechanical timing by over 5 degrees.
2H. Softening Range
It's the range to which "Softening Value" starts and ends. For example, 0% to 30% will be generated when the user pre-programs the "Softening Range" at a value of 30%.
3A. Drag Brake
It is the braking power produced when releasing from full speed to neutral position. This is to simulate the slight braking effect of a neutral brushed motor while coasting. It's not recommended for buggy and monster truck.
(Attention! Drag brake will consume more power and heat will be increased, apply it cautiously.)
3B. 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.
3C. Initial Brake Force
It is also known as "minimum brake force". It is the force when pushing throttle trigger from neutral zone to the initial brake position. To get a smoother braking effect, the default is equal to the drag brake.
3D. Brake Rate Control
It's adjustable from 1 to 20 (step: 1), the lower the brake rate, the more limit on the brake response. A suitable rate can aid the driver to brake his vehicle correctly. Generally, you can set it to a high value to have a quick brake response.
3E. Brake Curve
This item is used for regulating the relation between the throttle range in brake zone and the brake force. The default setting is linear. You can change it to non-linear via a LCD program box and a PC (HOBBYWING USB LINK software needs to be installed on the PC.) for different braking effect.
3F. Brake Frequency
The brake force will be larger if the frequency is low; you will get a smoother brake force when the value is higher.If set this item to "Customized", then the brake frequency can be adjusted to a variable value (which ranges from 0K to 16K) at any 0-100% throttle input, Please choose the frequencies as per the actual test results of your vehicles.

4A. Boost Timing
It is effective within the whole throttle range; it directly affects the car speed on straightaway and winding course. The ESC adjusts the timing dynamically as per the RPM (when "Boost Timing Activation" set to "RPM") or throttle amount (when "Boost Timing Activation" set to "Auto") in the operation. The Boost Timing is not constant but variable.
4B. Boost Timing Activation
Option 1: RPM
In RPM mode, the ESC adjusts the Boost Timing dynamically as per the motor speed (RPM). The actual Boost Timing is 0 when the RPM is lower than the Boost Start RPM. The Boost Timing changes as per the RPM when the RPM change is between the Boost Start RPM and the Boost End RPM. For example, if the Boost Timing is set to 5 degrees and the Boost Start RPM is 10000, the Boost End RPM is 15000. The Boost Timing corresponds to different RPM is shown below. When the RPM is higher than the Boost End RPM, the actual Boost Timing is the value you had previously set.

RPM (Motor Speed)	<10000	10001-11000	11001-12000	12001-13000	13001-14000	14001-15000	>15000
Actual Boost Timing	0 Degree	1 Degree	2 Degrees	3 Degrees	4 Degrees	5 Degrees	5 Degrees

Option 2: Auto
In Auto mode, the ESC adjusts the Boost Timing dynamically as per the throttle amount. Only at full throttle, the actual Boost Timing is the value you had previously set.
4C. Boost Start RPM
This item defines the RPM at which Boost Timing is activated. For example, when the Boost Start RPM is set to 5000, the ESC will activate the corresponding Boost Timing when the RPM goes above 5000. The specific value is determined by the Boost Timing and the Boost End RPM you had previously set.
4D. Boost End RPM
This item defines the RPM at which Boost Timing (you specifically set) is applied. For example, when Boost Timing is set to 10 degrees and the Boost End RPM to 15000, the ESC will activate the Boost Timing of 10 degrees when the RPM goes above 15000. The ESC will adjust the Boost Timing accordingly as per the actual RPM when the RPM goes below 15000.
5A. Turbo Timing
This item is adjustable from 0 degree to 64 degrees, the corresponding turbo timing (you set) will initiate at full throttle. It's usually activated on long straightaway and makes the motor unleash its maximum potential.
5B. 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.
5C. Turbo Increase Rate
This item is used to define the "speed" at which Turbo Timing is released when the trigger condition is met. For example, "6 degs/0.1sec" refers to the Turbo Timing of 6 degrees that will be released in 0.1 second. Both the acceleration and heat is higher when the "Turbo increase rate" is of a larger value.
5D. Turbo Decrease Rate
After the Turbo Timing is activated and the trigger condition turns to not be met (i.e. vehicle slows down at the end of the straightaway and gets into a corner, full throttle turns to partial throttle, the trigger condition for Turbo Timing turns to be not met), if you disable all the Turbo Timing in a moment, an obvious slow-down like braking will be felt and cause the control of vehicle to become bad. If the ESC can disable the Turbo Timing at some "speed", the slow-down will be linear and the control will be improved. **Warning!** Boost Timing & Turbo Timing can effectively improve the motor efficiency; they are usually used in competitions. Please take some time to read this manual and then set these two items carefully, monitor the ESC & motor temperatures when you have a trial run and then adjust the Timing and FDR accordingly as aggressive Timings and FDR may cause your ESC or motor to be burnt.

5 ESC Programming

1) Program your ESC with a multifunction LCD program box
You can program this XD10 Pro ESC via a multifunction LCD program box or via a multifunction LCD program box & a PC (HOBBYWING USB LINK software needs to be installed on the PC). Before programming, you need to connect your ESC and the LCD program box via a cable with two JR male connectors and turn on the ESC; the boot screen will show up on the LCD. Press any button on the program box to initiate the communication between your ESC and the program box. Seconds later, "CONNECTING ESC" will be displayed, and indicates the following parameters. You can adjust the setting via "ITEM" & "VALUE" buttons, and press the "OK" button to save new settings to your ESC.
2) Program your ESC with a OTA Programmer
The XD10 Pro ESC can also be programmed via a WiFi module along with smart phone devices (HOBBYWING WiFi LINK software needs to be installed on the smart phone). Before programming, users will need to plug the programming cable on the OTA Programmer into the programming port on ESC and switch on the ESC. For detailed information about ESC programming via OTA Programmer, please refer to the user manual of Hobbywing's OTA Programmer.
Attention! This ESC has a separate programming port. Please don't use the throttle control cable (also called Rx cable) on the ESC toconnect the program box; otherwise the program box won't function.

3) Data Checking
The ESC is able to record the maximum ESC temperature, maximum motor temperature, minimum battery voltage and maximum motor speed in operation. It automatically saves the recorded data to the designated area when you turn off the ESC after a run. You can check those data via a multifunction LCD program box whenever necessary. Users need to switch on the ESC after connection between the program box and the ESC has been established. Press the "R/P" button on any "item" page followed by pressing the "R/P" button again multiple times. The following 5 item pages will be displayed circularly: Mode → ESC Temperature → Motor Temperature → Min Voltage→ Max RPM.
Attention!
- Press the "VALUE" button on any data-recording page can get you into the next preset mode. Please note that improper operation will get you into other preset mode(s).
- Press the "ITEM" button on any data-recording page can get you to the parameter setting page of the current preset mode; press the "R/P" button if you want to return to tthe data-recording page.

6 Factory Reset

- **Restore the default values with a multifunction LCD program box**
  After connecting the program box to the ESC, continue to press the "ITEM" button on the program box until you see the "RESTORE DEFAULT" item, and press "OK" to factory reset your ESC.
- **Restore the default values with a OTA Programmer (& HW Link APP)**
  After connecting the WiFi module to the ESC, open the HOBBYWING WiFi LINK software on your smart phone, select "Parameters" followed by "Factory Reset" to reset the ESC.

07 Explanation for LED Status

1. During the Start-up Process
- The RED LED turns on solid indicating the ESC doesn't detect any throttle signal or the throttle trigger is at the neutral position.
- The GREEN LED flashes rapidly indicating the neutral throttle value stored on your ESC may be different from the current value stored on the transmitter. When this happens, re-calibrate the throttle range.

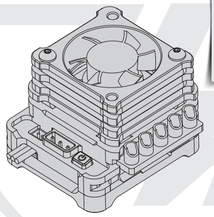
2. In Operation
- The RED LED turns on solid and the GREEN LED dies out when the throttle trigger is in the throttle neutral zone. The RED LED will blink slowly (to confirm with ROAR's Sportman (or Zero Timing) rules) if the total value of Boost Timing and Turbo timing is 0.
- The RED LED dies out and the GREEN LED blinks when your vehicle runs forward. The GREEN LED turns solid when pulling the throttle trigger to the full (100%) throttle endpoint.
- The RED LED dies out and the GREEN LED blinks when you brake your vehicle. The GREEN LED turns solid when pushing the throttle trigger to the full brake endpoint and setting the "maximum brake force" to 100%.
- The RED LED dies out, the GREEN LED blinks when you reverse your vehicle. The GREEN LED turns solid when pushing the throttle trigger to the full brake endpoint and setting the "reverse force" to 100%.

3. When Some Protection is Activated
- The RED LED flashes a short, single flash and repeats "☆, ☆, ☆" indicating the low voltage cutoff protection is activated.
- The GREEN LED flashes a short, single flash and repeats "☆, ☆, ☆" indicating the ESC thermal protection is activated.
- The GREEN LED flashes a short, double flash and repeats "☆☆, ☆☆, ☆☆" indicating the motor thermal protection is activated.
- The RED & GREEN LEDS flash a short, single flash and repeats "☆, ☆, ☆" at the same time indicating the drive mode has been automatically switched to sensorless mode from senored mode because of abnormal sensor signal when pairing the ESC with a sensored motor.

08 Trouble Shooting

Trouble(s)	Possible Causes	Solution(s)
The ESC was unable to start the status LED, the motor, and the cooling fan after it was powered on.	1. No power was supplied to the ESC. 2. The ESC switch was damaged.	Check if all ESC & battery connectors have been well soldered or firmly connected.
The ESC was unable to start the motor, but the RED LED on the ESC turned on solid.	The throttle cable was reversely plugged into the TH channel or plugged into wrong channel on the receiver.	Plug the throttle cable into the throttle channel (CH2) by referring to relevant mark shown on your receiver.
The vehicle ran backward when you pulled the throttle trigger towards you.	1. The (ESC-to-motor) wiring order was incorrect. 2. Your chassis is different from popular chassis.	1. Swap any two (ESC-to-motor) wires if you are using a sensorless motor. 2. There is nothing you can do if you are using a sensored motor and your chassis is different from popular chassis.
The motor suddenly stopped or significantly reduced the output in operation.	1. The receiver was influenced by some foreign interference. 2. The ESC entered the LVC protection. 3. The ESC entered the thermal shutdown protection.	1. Check all devices and try to find out all possible causes, and check the transmitter's battery voltage. 2. The RED LED keeps flashing indicating the LVC protection is activated, please replace your pack. 3. The GREEN LED keeps flashing indicating the thermal protection is activated, please let your ESC cool down before using it again.
The motor stuttered but couldn't start.	1. Some soldering between the motor and the ESC was not good. 2. The ESC was damaged (some MOSFETS were burnt).	1. Check all soldering points, please re-solder if necessary. 2. Contact the distributor for repair or other customer service.
The vehicle could run forward (and brake), but could not reverse.	1. The throttle neutral position on your transmitter was actually in the braking zone. 2. Set the "Running Mode" improperly. 3. The ESC was damaged.	1. Recalibrate the throttle neutral position. No LED on the ESC will come on when the throttle trigger is at the neutral position. 2. Set the "Running Mode" to "Fwd/Rev with Brk ". 3. Contact the distributor for repair or other customer service.
The motor got stuck or stopped when increasing the throttle during the starting-up process.	1. Poor discharging capability of the pack. 2. The RPM of the motor was too high, or the FDR was too low. 3. Set the "Punch/Start Mode" to a high level.	1. Change another pack with great discharging capability. 2. Change a low-speed motor, or increase the FDR. 3. Set the punch/start mode to a low level.
The RED & GREEN LEDS on the ESC flashed rapidly at the same time when the throttle trigger was at the neutral position.	(When pairing with a sensored motor) the ESC automatically switched to sensorless mode when it detected incorrect signal from Hall sensor.	1. Check if the sensor cable is loose or poor contact issue exists. 2. Hall sensor inside the motor is damaged.
The motor stuttered but couldn't start.	1. The (ESC-to-motor) wiring order was incorrect. 2. The ESC was damaged.	1. Check if the wiring order is A-A, B-B, and C-C. 2. Contact the distributor for repair or other customer service.

HOBBYWING®



XERUN
车用无刷电子调速器
使用说明书
XERUN XD10 Pro

20210720

01 声明

ATTENTION

CAUTIONS

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和设备损坏。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，短路会毁坏电调。
- 请务必仔细连接好各部件，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。
- 若需对电调的输入输出线，插头做相关焊接时，为保证焊接牢靠，请使用至少60W功率的焊接设备进行焊接。
- 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加至全速，否则，轮胎可能爆裂而引起严重伤害。
- 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；建议将电调的内部过温保护阀值设为105℃/221℉。
- 使用完毕后，切记断开电池与电调的连接。如电池未断开，即使电调开关处于关闭状态，电调也会一直消耗电能，长时间连接电池最终会被完全放电，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！**

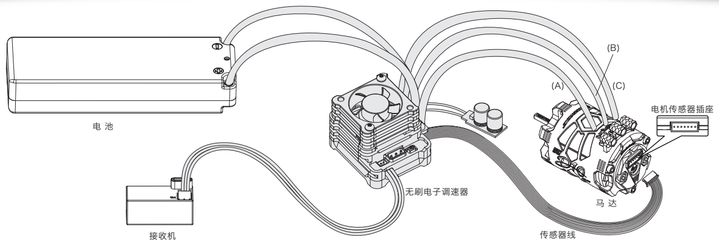
03 产品特色

- 内置强大的开关模式BEC，最大电流10A，支持5-7.4V线性调整（调整量0.1V），更好的适应不同电压要求的舵机及设备。
- 独立的参数编程插口，连接LCD编程盒或OTA Programmer模块时无需从接收机中拔出油门线，更加便捷，该插口亦可为第2个风扇进行供电。
- 油门驱动和刹车频率的变频调节，满足车手对马达前进动力和制动力进行精准调节的要求。
- 多重保护功能：电压过低保护、电机及电调过热保护、油门失控保护。电池防反接保护(常规外挂电容包仍会因电池接反而损坏！)
- 数据记录功能：可以用LCD编程盒或HW Link读出电调和电机最高温度、最高转速等数据，便于车手对动力系统运行情况进行分析。
- 支持电调固件升级（需另购多功能LCD编程盒或OTA Programmer模块），享用最新功能。

04 产品规格

型 号	XERUN XD10 Pro
持续/峰值电流	100A/800A
支持电机类型	有感无刷电机和无感无刷电机
主要适用车型	1/10漂移
适用的电机	使用2S锂电：≥8.5T
电池节数	4-6节镍氢电池或2S锂电池
BEC输出	5V-7.4V可调（调整量0.1V），持续5A（开关稳压）
风扇取电方式	内置BEC取电
插头	输入：无插头，输出：3.5mm 公头
尺寸	40.7x35.0x32.0mm（含风扇高度）
重量	95g（含线重量）
参数设定接口	独立编程口

05 连接电子调速器



ATTENTION

本系统功率强劲，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. 连接马达：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：

- 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，用6针感应线把电调与电机的感应口对接。若有感无刷马达未接上感应线，则电调会工作在无感模式，相当于电调连接无感无刷电机。

- 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即可。

2. 连接接收机：将电调的油门控制排线插入接收机的油门通道（即THROTTLE通道）。因为排线中的红线输出6V/7.4V电压给接收机及舵机，所以请勿给接收机额外供电，否则可能损坏电调。

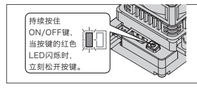
3. 连接电池：电调的输入线有极性之分，插入电池时，请确保电调的(+)极与电池的(+)相连，(-)极与(-)相连。如果电调接反电，常规的外挂电容包扔会损坏。

06 设置电子调速器

1 设定油门行程

电调第一次使用或遥控器更改过油门“TRIM”微调、D/R、EPA等参数后，均需重设油门行程，不然可能会导致无法使用或误动作。

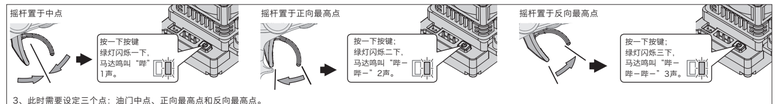
另外我们强烈建议同时开启遥控器的失控保护功能，将遥控器油门通道的无信号保护（“F/S”）功能设置为关闭输出方式或将保护值设置为油门中立点位置，使得当接收机无法收到遥控器信号后，电机能够停止运转。油门校调步骤如下图所示：



1、电调接上电池，打开遥控器，将油门通道的“D/R”、“EPA”、“ATL”等参数调到100%（如遥控器无显示屏，则将对应旋钮调到最大位置），油门通道的中点微调 “TRIM”调为0（如遥控器无显示屏，则将对应旋钮调到中间位置）。

2、持续按住开关按键不松开等待几秒钟，直到电调上红色LED开始闪烁（同时马达鸣叫），立即松开按键。

备注：马达鸣叫声音可能较小，在这种情况下，观察LED状态即可。



3、此时需要设定三个点：油门中点、正向最高点和反向最高点。

1）油门摇杆留在中点位置，按一下开关按键，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）油门摇杆打到正向最高点，按一下开关按键，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）油门摇杆打到反向最高点，按一下开关按键，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；

备注：正向最高点：枪控时为油门扣到最大，板控时油门推到顶部最大；反向最高点：枪控时为油门推到最大，板控时油门拉到底调最大。

4、油门行程校调完毕，三秒钟后，电机即可正常操作。

2 开关机及鸣音说明

特别提醒：电调大负荷运行后，铝外壳温度很高，为防止关机时烫伤手指，我们建议让电调自然冷却一再分钟后再按键关机，若已经安装外置开关，可利用外置开关关机，或使用遥控器进行关机（1G参数项设为开启时，油门摇杆保持最大行程到车8秒，电调将会关闭）。在关机的状态下，轻按一下开关按键，电源指示灯点亮，电调开始工作，再按一下开关按键，则指示灯灭，电调关闭。

备注：为防止误关闭，在电机运转时，点击开关按键无法关机，仅在马达停止运转时才可关机。当遇紧急情况无法关机时，请直接断开电池电源线，长时间不使用也请断开电源。

3 编程项目说明

类 别	编 号	设定项名称 (Programmable Items)	设 定 项 值 (Parameter Values)
一般设置 General Setting	1A	运行模式 Running Mode	正转带刹车 Forward with Brake / 正反转带刹车 Forward/ Reverse with Brake / 直接正反转 Forward and Reverse
	1B	最大倒车力度（Max. Reverse Force）	25% / 50% / 75% / 100%
	1C	倒车延时 （Reverse Delay）	0-5秒 （调整量为0.5秒，0秒时LCD显示为Disabled）
	1D	低压保护阈值 （Cutoff Voltage）	不保护 （Disabled） / 自动 （3.3V/节） Auto (3.3V/Cell) / 3.0-7.4V （调整量为0.1V）
	1E	电机过热保护（Motor Thermal Protection）	不保护（Disabled） / 105℃/221℉ / 125℃/257℉
	1F	电机过热保护（Motor Thermal Protection）	不保护（Disabled） / 105℃/221℉ / 125℃/257℉
	1G	BEC电压（BEC Voltage）	5.0-7.4V（调整量为0.1V）
	1H	遥控关机（Remote Off）	关闭（Disabled） / 开启（Enabled）
	1I	电机转动方向（Motor Rotation）	CCW逆时针（CCW） / CW顺时针（CW）
	1J	AC线交换（Phase-AC Swap）	关闭（Disabled） / 开启（Enabled）
油门控制 Throttle Control	2A	油门加速度控制（Throttle Rate Control）	1-30（调整量为1）
	2B	正向油门曲线（Throttle Curve）	线性（Linear） / 自定义（Customized）
	2C	油门中点范围（Neutral Range）	3%-10%（调整量为1%）
	2D	初始启动力度（Initial Throttle Force）	1-15（调整量为1）
	2E	自动油门（Coast）	0-15（调整量为1）
	2F	PWM 驱动频率（PWM Drive Frequency）	1K / 2K / 4K / 8K / 12K / 16K / 24K / 32K / 40K / 48K / 自定义（Customized）
	2G	柔化值（Softening Value）	0-30 （调整量1度） 0-30° Adjustable (Step: 1°)
	2H	柔化行程（Softening Range）	0% / 10% / 20% / 25% / 30% / 35% / 40% / 45% / 55% / 60% / 65% / 70% / 75%
刹车控制 Brake Control	3A	拖刹力度（Drag Brake Force）	0%-100%（调整量为1%）
	3B	最大刹车力度（Max. Brake Force）	0%-100%（调整量为1%）
	3C	初始刹车力度（Initial Brake Force）	= 拖刹力度（=Drag brake） / 0%-50%（调整量为1%）
	3D	刹车加速度控制（Brake Rate Control）	1-20 可调 （调整量为1）
	3E	刹车油门曲线（Brake Curve）	线性（Linear） / 自定义（Customized）
	3F	刹车频率（Brake Frequency）	0.5K / 1K / 2K / 4K / 8K / 16K / 20K / 24K / 自定义（Customized）
进角设置 Timing	4A	Boost进角（Boost Timing）	0-64度可调（调整量1度）
	4B	Boost 进角开启方式（Boost Timing Activation）	转速（RPM） / 自动（Auto）
	4C	Boost起始转速（Boost Start RPM）	500RPM-35000RPM（调整量为500RPM）
	4D	Boost结束转速（Boost End RPM）	3000RPM-60000RPM（调整量500RPM）
	5A	Turbo 进角（Turbo Timing）	0-64度可调（调整量1度）
	5B	Turbo 延迟 (秒) Turbo Delay	立即 Instant / 0.05秒 0.05s / 0.1秒 0.1s / 0.15秒 0.15s / 0.2秒 0.2s / 0.25秒 0.25s / 0.35秒 0.35s / 0.4秒 0.4s / 0.45秒 0.45s / 0.5秒 0.5s / 0.6秒 0.6s / 0.7秒 0.7s / 0.8秒 0.8s / 0.9秒 0.9s / 1.0秒 1.0s
	5C	Turbo 释放速度 Turbo Increase Rate	3度/0.1秒 3deg/0.1s / 6度/0.1秒 6deg/0.1s / 9度/0.1秒 9deg/0.1s / 12度/0.1秒 12deg/0.1s / 15度/0.1秒 15deg/0.1s / 18度/0.1秒 18deg/0.1s / 21度/0.1秒 21deg/0.1s / 24度/0.1秒 24deg/0.1s / 27度/0.1秒 27deg/0.1s / 30度/0.1秒 30deg/0.1s / 立即全部释放 Instant
	5D	Turbo 关闭速度 Turbo Decrease Rate	3度/0.1秒 3deg/0.1s / 6度/0.1秒 6deg/0.1s / 9度/0.1秒 9deg/0.1s / 12度/0.1秒 12deg/0.1s / 15度/0.1秒 15deg/0.1s / 18度/0.1秒 18deg/0.1s / 21度/0.1秒 21deg/0.1s / 24度/0.1秒 24deg/0.1s / 27度/0.1秒 27deg/0.1s / 30度/0.1秒 30deg/0.1s / 立即 Instant

备注：4B设置为“自动”方式时，表格中4C、4D再项为不可设置项。

1A：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

此模式则提供了倒车功能，通常用于训练。“正反转带刹车”模式采用“双击式倒车”方式，即油门摇杆在第一次从中点区域推至反向区域时，电机只是刹车，不会产生倒车动作；当油门摇杆快速回到停止才会倒车，中立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，此时如果电机已经这样做的目的是防止车辆行驶过程中因多次点刹而造成误 倒车。

选项3：直接正反转

此模式采用单击式倒车方式，即油门摇杆从中点区域推至反向区域时，电机立即产生倒车动作。

1B：最大倒车力度(Max. Reverse Force)：

指油门摇杆打到反向最大的位置所能产生的最大倒车力度，选择不同的参数值可以产生不同的倒车速度（一般情况下推荐使用比较小的倒车速度，以免因倒车太快而导致失误）。

1C：倒车延时（Reverse Delay）：

此参数用于调整倒车延迟时间的长短；倒车延时开启时，马达停止后，倒车油门持续时间到设定值时，马达才会执行倒车动作。

1D：电池低压保护阈值（Cutoff Voltage）：

这项功能主要是防止锂电池过度放电而造成不可恢复的损坏。如果开启了电压保护，运行中电调会时刻监视电池电压，一旦电压低于设定的阈值，在3秒内动力输出将逐步降为正常功率的50%，40秒后动力将完全关闭。当进入电压保护后，红色 LED 会以“☆－，☆－，☆－”方式闪烁。若使用NiMH电池，请设为“不保护”或自定义保护阈值。

选项1：不保护

设为不保护时，电调不会因为低压而切断动力。使用锂电时，不建议设为“不保护”，否则电池可能因为放电过度而损坏。比赛时为了避免进入保护状态而导致动力下降或切断，建议设置为“不保护”（但有可能因为过放而损坏电池）。

选项2：自动

当设置为“自动” 时，保护值为 6.6V。

选项3：自定义

自定义设置时，低压保护阈值范围为3.0-7.4V（针对整个电池组而言）。

1E：电调过热保护(ESC Thermal Protection)：

启用该功能后，电调温升达到厂方预设特定值时自动关闭输出，且绿灯闪烁，直到温度降低才恢复输出。电调过热保护时，绿灯闪烁方式为单闪：☆- ，☆-，☆-，☆-.....

警告！ 若非比赛场合，请勿关闭电调过热保护，否则可能因为过热而损坏电调，并且可能导致电机损坏。

1F：电机过热保护(Motor Thermal Protection)：

启用该功能后，电机温度上升达到厂方预设特定值时电调自动关闭输出，且绿灯闪烁，直到电机温度降低才恢复输出。电机过热保护时，绿灯闪烁方式为双闪：☆☆-，☆☆-，☆☆-，☆☆-.....

警告！ 若非比赛场合，请勿关闭电机过热保护，否则可能毁坏电机并且导致电调损坏。对于非好盈电机，可能因电机内置温度感应器与好盈电机存在差异而出现电调过早或过晚保护现象，此时请关闭电机过热保护功能，并人工监视电机的温度。

1G：BEC输出电压（BEC Voltage）：

BEC电压支持5.0-7.4V 区间可调，一般6.0V适用于普通舵机；若使用高压舵机可设置为更高电压，具体设置压请参照舵机电压标识；

1H：遥控关机（Remote Off）：

设为“Enabled”时，开启使用遥控器关闭电调功能，只需油门摇杆保持最大行程刹车约6秒，电调则会关闭；设为“Disabled”时，关闭使用遥控器关闭电调功能。

1I：电机转动方向（Motor Rotation）：

电机轴正面朝向使用者面部（即电机尾部远离使用者面部），遥控器正向加大油门时，若设置成 CCW，电机轴逆时针转动；若设置成 CW，电机轴顺时针转动。一般电机逆时转动，车子前进，但有可能因车架厂家设计为顺时钟转动才是前进，出现此情况时，设置成CW即可。

1J：AC线交换（Phase-AC Swap）：

因车架布线需要，电调A/C线与电机A/C线交换连接（即电调A线与电机C线连接，电调C线与电机A线连接）时，把此项设为开启(Enabled)即可；警告！电调的#A/#B/#C与电机的#A/#B/#C三线一一对应连接时，请勿设为开启(Enabled)，否则将损坏电调及电机。

2A：油门加速度控制（Throttle Rate Control）：

此参数用于控制油门输出快慢，设置适合的油门加速度可以辅助车手在车辆启动时对油门的控制，避免当快速加油时，出现轮胎打滑、启动过于暴力造成弯内不好控制、启动瞬间电流过大而对电机/电调/电池不利等结果。加速度我们分为30个档位可调整，当设为 1时，则油门加速较慢，对于快速加油门时的输出有较多的限制；设置值越大，则加速越快，对油门输出的限制越少。一般情况下，对于能够熟练控制油门的车手，可以设置较高的加速度，以减小电调对油门响应的限制。

2B：正向油门曲线（Throttle Curve）：

该参数调整正向油门摇杆和电调实际输出油门值之间的对应关系。默认是为线性的，但是我们可以通过设置油门曲线调整成非线性的，比如调成+EXP 的曲线，这样头段输出就比线性时要大，头段的输出就会更有力；如果调为 - EXP 的曲线，则头段输出就比线性时小，这样头段输出比较柔和。

2C：油门中点范围（Neutral Range）：

该参数调整油门中点区域范围以适合不同的遥控器和车手操控习惯。有些品质欠佳的遥控器中点位置容易漂移，导致车子缓慢前进或后退，出现此现象时， 请把区域宽度设成更大值。

2D：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。

2E：自动油门/滑行（Coast）：

从全油门或近全油门处松开油门扳机时，该功能允许电机自然平滑地降低转速，在扳机松开过程中车子不会出现突然减速。“自动油门”设置的值越大， “滑行”感就越强烈。例如，设置到0%时，无自动油门或滑行功能；设置到15%时，感受到的滑行感最为强烈。

自动油门/滑行的优势：

当使用齿槽效应很强的电机时，车子容易自主产生一种刹车感，也就是大家所知的“齿轮刹车或自动刹车（ gear brake）”，这降低了车辆的操控感。好盈创新的“自动油门”技术允许车子缓行/滑行，显著改善了操控手感。

注意！： 若“托刹力度”参数值非0%，则自动油门/滑行功能关闭。

2F：PWM驱动频率（PWM Drive Frequency）：

驱动频率降低，在油门初段可以提供更强劲的爆发力；驱动频率升高可以使马达驱动更平滑，驱动噪音更小，但同时也导致电调的开关损耗加大，发热量增加。若设置为“自定义”，支持PWM频率的变频调节，即自定义各油门段的频率。具体使用频率，请以车子在车场实测效果为准。

2G：柔化值（Softening Value）

在 MODIFY 比赛中，通常我们会觉得油门头段动力过于暴力，油门给一点点动力就已经过强，在过弯中很不易操控，为此好盈首创的柔化功能，就是将头段的动力特殊柔化处理，可极大的提高车手操控性， “柔化值”是指柔化处理的强度大小，此值设置得越大，则柔化效果越明显。

备注：设定柔化值后，可以适当把马达的机械进角加大，建议柔化值每增加5度，可以增加一度机械进角，如柔化值为20度，可以把机械进角增加4度;所增加的机械进角最多不要超过5度。

2H：柔化行程（Softening Range）

是指产生柔化效果的油门行程大小，例如设置为 30% ,则是指油门从 0%--30% 这段油门行程将会产生柔化效果。

3A：拖刹力度（Drag Brake）：

拖刹又名自动刹车，是指当油门摇杆收油后处于中点区域内时，电调对电机产生的刹车力，这样做可以辅助手指去控制刹车，有效降低刹车的控制难度，常用于平跑车减速入弯及出弯等场合。

注：越野及大脚车不太适用。

3B：最大刹车力度（Max. Brake Force）：

本电调提供比例式刹车功能，刹车力度的大小和油门摇杆的位置相关，最大刹车力是指油门摇杆处于刹车极限位置时所产生的刹车力。请根据车辆和赛道具体情况及个人的使用习惯，选择合适的最大刹车力参数。

3C：初始刹车力度（Initial Brake Force）：

也叫做最小刹车力度，是指在刹车初始位置作用于电机上的刹车力，默认值是等于拖刹力度，以便形成柔顺的刹车效果。如果初始刹车力设置得较大，可以达到类似点刹的效果。

3D：刹车加速度控制（Brake Rate Control）：

这个参数用于控制刹车油门输出快慢。设置适合的刹车油门加速度则可以辅助车手对刹车力度的控制，避免刹车过猛。加速度我们分为20个档位可调整，当设为 1时，则对刹车响应有较多的限制。设置值越大，对刹车油门的限制越少。一般情况下，对于能够熟练控制刹车的车手，可以设置较高的加速度，以减小电调对刹车油门响应的限制。

3E：刹车油门曲线（Brake Curve）：

该参数调整刹车油门行程和刹车力度的对应关系。默认为线性的，也可以通过连接电脑使用 USB Link 软件调为非线性的，达到分配刹车力量前或靠后的效果。

3F：刹车频率（Brake Frequency）：

刹车频率降低可以使马达输出更强劲的刹车力度；刹车频率升高可以使马达输出更平滑的刹车力度。若设置为“自定义”，支持刹车频率的变频调节，即自定义各油门段的频率。具体使用频率，请以车子在 车场实测效果为准。

4A：Boost进角(Boost Timing)：

此进角在整个油门行程范围内有效，直接影响弯路和直路的速度。当设定了此值后，电调在运行过程中的实际进角是根据转速大小（4B设为“转速”）或油门量（4B设为“自动”）而动态变化的，并非固定的常量。

4B：Boost进角开启方式（Boost Timing Activation）：

选项1：转速

设为“转速”方式时，Boost进角值根据当前转速来动态分配。当转速低于起始转速时，则Boost 实际开启值为0，在转速处于起始转速和结束转速之间时，Boost 是根据当前转速的大小来动态变化的。

例如，假设 Boost Timing 设置为5度，起始转速为10000，结束转速为15000，则各个转速下的Boost 进角值如下表所示。如果转速高于结束转速时，则Boost实际开启值则为Boost设置值。

转速(RPM)	<10000	10001-11000	11001-12000	12001-13000	13001-14000	14001-15000	>15000
Boost 实际开启值	0度	1度	2度	3度	4度	5度	5度

选项2：自动

设为“自动”方式时，Boost进角值根据当前油门量来动态分配。只有全油门时，Boost实际开启值才为Boost设置值。

4C：Boost 起始转速 (Boost Start RPM)：

此项用于设置开启Boost进角所需的起始转速。例如，设为5000时，转速达到5000以上则会开启相应的进Boost进角，具体开启大小根据所设Boost进角及结束转速动态分配。

4D：Boost结束转速(Boost End RPM)：

此项用于设置开启当前所设Boost进角所需的结束转速。例如，Boost进角设置为10度，结束转速设置为15000时，转速达到15000以上时，Boost则会开启10度，转速低于15000转时，则根据转速动态分配Boost进角大小。

5A：Turbo 进角值 (Turbo Timing)：

激爆进角。这个是进角的大小设置项，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。

5B：Turbo全油门延迟时间(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。

5C：Turbo 释放速度 (Turbo Increase Rate (deg/0.1sec))：

当Turbo 触发条件满足后，Turbo开始以此设定的速度开始释放，例如， “6度/0.1秒”表示0.1秒内释放的度数越多，则Turbo释放得越快，车子加速度也越快，当然马达的发热量也越高。

5D：Turbo 关闭速度 (Turbo Decrease Rate (deg/0.1sec))：

当Turbo 被开启后，如果触发条件不满足后，比如直路尾减速入弯，这时从全油门变为非全油门，Turbo开启条件不满足，如果瞬间将Turbo全部关闭，将会产生一个非常明显的减速，如同被刹车一样，导致车子操控性变差。如果以一定的速度关闭Turbo ，则降速会变得比较线性，车子的操控性得到提升。

警告！开启Boost 进角和Turbo进角能够有效提升马达的输出功率，通常用于竞赛。请事先仔细查看说明书及参考设定，并在试车时监控马达及电调的温度，调整合适的进角设定及最终齿比，过激的进角设定及最终齿比会导致电调或马达烧毁。

5 编程方法

有以下几种方法对电调进行参数项设置：

1、利用LCD编程盒进行参数设置（详情请参阅LCD编程盒说明书）

此电调支持使用LCD编程盒或利用LCD编程盒连接到电脑端来设置参数（使用HOBBYWING USB LINK软件），用一条两端带JR公头的排线将电调和编程盒连通后，然后给电调接上电源，LCD 设定盒将显示出开机界面，按LCD设定盒上任意按键，设定盒和电调开始建立通信，并显示“CONNECTINGESC”，等待几秒后，将显示出当前的模式名，随后显示出第一个设置参数。使用“ITEM” 和 “VALUE” 按键即可更改设置参数，按“OK”键可将设置参数存入电调。

2、利用OTA Programmer模块进行参数设置（详情请参阅OTA Programmer模块说明书）

此电调支持OTA Programmer模块连接到电调，即把OTA Programmer模块的编程线插到电调的编程口，再使用手机安装HOBBYWING HW Link APP来设置参数。

注意！ 此电调编程接口为独立编程口；不要使用电调上的油门控制线连接设定卡，否则设定卡无法工作。

6 恢复出厂参数设定

有以下几种恢复出厂参数方法：

1、利用LCD多功能编程盒恢复出厂设定：

编程盒与电调连通后，通过“ITEM”选项选到“RESTORE DEFAULT”项，然后再按下“OK”保存，即可恢复出厂设置。

2、利用OTA Programmer模块（使用HW Link APP）恢复出厂设定：

OTA Programmer模块与电调连通后，进入【参数设定】项目，点击“恢复出厂设置”按钮即可恢复出厂设置。

07 电调状态指示灯（LED）说明

1、启动阶段

- 红灯恒亮：电调未检测到油门信号或油门处于中点位置。
- 绿灯快速闪烁：电调油门中点与控不匹配，重新校准油门行程。

2、行程阶段：

- 油门摇杆处于中点区域：红色LED熄灭，绿色LED熄灭。如果此时Boost进角和Turbo 进角加起来总共为0度，则红色LED 慢闪，以便符合ROAR 的 Sportman （即Zero Timing）竞赛规则。
- 前进时：红色LED熄灭，绿色LED闪烁；当油门处于正向最大（100%油门）时，绿色LED恒亮。
- 刹车时：红色LED熄灭，绿色LED闪烁；当油门处于反向最大且最大刹车力度设为100%时，绿色LED恒亮。
- 倒车时：红色LED熄灭，绿色LED闪烁；当油门处于反向最大且最大倒车力度设为100%时，绿色LED恒亮。

3、相关保护功能触发时，LED状态含义：

- 红灯持续闪烁（单闪，“☆，☆，☆”）：电调进入低压保护状态。
- 绿灯持续闪烁（单闪，“☆，☆，☆”）：电调温度过高，电调进入过热保护状态。
- 绿灯持续闪烁（双闪，“☆☆，☆☆，☆☆”）：电机温度过高，电调开启电机过热保护功能。
- 红绿灯同步闪烁（单闪，“☆，☆，☆”）：接有感电机时，有感运行模式出现问题，已自动切换至无感模式。

08 故障快速处理

故障现象	可能原因	解决方法
开机后指示灯不亮，电机无法启动，风扇不转	1、电调无输入电压，或电池接反 2、电调开关损坏	检查电源输入端是否有焊接不良情况，并重新焊好
上电后红色LED恒亮，电机无法启动	电调油门线插反或通道插错	将电调的油门排线按正确方向插到接收机的“油门（Throttle）”通道（通常为CH2）。
遥控器正向加大油门，车子反而倒退	1、电调输出线和电机线连接的线序错误 2、该车架同主流车架的电机转向不一致	1、如果是无感电机，将电机三条线中任意两条互换即可。 2、如果是有感电机，则无法通过更换线序实现电机反转，电调默认程序无法适配此特殊车架。
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，检查发射机器电池电量。 2、红灯持续闪烁为电压保护，请更换电池。 3、绿灯持续闪烁为温度保护，请等电调温度降低后继续使用。
电机抖动，无法启动。	1、电调和电机连接的插头有虚焊。 2、电调故障（部分功率管MOSFET烧坏）。	1、检查各焊接点，必要时重新焊接。 2、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有区域。 2、参数项 “运行模式”设置错误。 3、电调损坏。	1、重新校调油门通道中点，使遥控器油门摇杆置于中位时，电调上的指示灯不亮。 2、参数项 “运行模式”需设置为 “正反转带刹车” 3、联系经销商处理维修事宜。
电机启动时快速加大油门，电机有卡住或停顿的现象	1、电池放电能力不够 2、电机转速过高，减速比过小 3、电调启动加速度设置过高	1、更换放电能力强的电池。 2、更换为低速电机，减速比过小 3、将电调启动加速度（Punch）设置得柔和一些。
油门在中点时，红绿灯同时快速闪烁	接有感电机时，电调检测到霍尔传感器信号有错误，已自动切换至无感模式	1、查看感应线是否有松动或接触不良。 2、马达内部的霍尔（HALL）感应器损坏。
电机抖动，无法启动	1、电调与电机之间接线错误。 2、电调故障	1、查看接线是否正确，应确保为A-A、 B-B、 C-C。 2、联系经销商处理维修事宜。