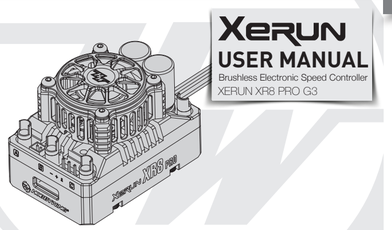
HOBBYWING®



XERUN USER MANUAL

Brushless Electronic Speed Controller

XERUN XR8 PRO G3

20230530

HW-SMA534DUL01-A1

01 Disclaimer

Thank you for purchasing this HOBBYWING product! This is a powerful brushless system. 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 and strictly abide by the specified operating procedures. We shall not be liable for any liability arising from the use of this product, including but not limited to reimbursement for incidental or indirect losses. Meanwhile, we do not assume any responsibility caused by unauthorized modification of the product. We have the right to change the product design, appearance, performance and use requirements without notice.

02 Warnings

- Please connect all parts properly. Poor connection or short circuit will damage the device and you would not control the vehicle normally.
- Please check power devices and instructions to ensure the matching of power is reasonable.
- The external temperature of the ESC cannot exceed 90℃/194℉. High temperature will destroy the ESC and the motor. Open the overheat protection function of the ESC.
- Please remember to disconnect the battery and the ESC. If not, the ESC will consume electric energy and the battery will be completely discharged which will lead to the failure of battery or ESC. We are not responsible for any damage caused by this!

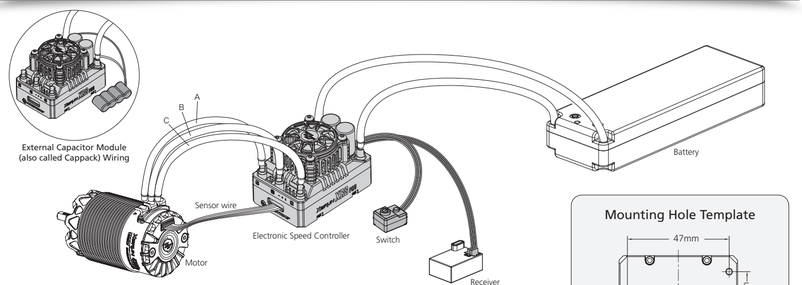
03 Features

- Built-in 3 common profiles, suitable for all 1/8 Racing, select and use instantly. (e.g. Zero timing-Blinky mode, 1/8 Off-Road Racing, 1/8 On-Road Racing mode).
- There are 32 built-in adjustable parameters to set various power requirements. The parameters can be imported and exported, which is convenient for drivers to communicate with and learn from each other.
- Support the firmware upgrade of the ESC (The multi-function LCD G2 programming box or OTA Programmer is needed to purchase). You can enjoy the latest functions.
- Built-in switch mode BEC with a maximum output of 12A and 6V/7.4V adjustable for usage with servos & other devices require different voltages.
- The built-in reverse connection protection circuit of the ESC avoid the damage to the ESC due to reverse connection.
- Data logging function to view various running data on the HW LINK app using the OTA Bluetooth module.

04 Specifications

Mode	XERUN XR8 PRO G3
Cont./Peak Current	200A / 1080A
Motor Type	Sensored / Sensorless Brushless Motors
Applications	1/8 Off-road,On-road Racing & 1/10 Short course truck,Monster truck
Motor Limit	With 3S Lipo: KV=< 4000 3660 Size motor With 4S Lipo: KV=< 3000 4268 Size motor
LiPo Cells	2-4S Lipo
BEC Output	6V/7.4V Adjustable, Continuous Current: 6A(Switch-mode)
Cooling Fan	Powered by built-in BEC
Size/Weight	54.8(L) x 36.8(W) x 38.8(H)mm / 102.8g
Programming Method	Multifunction LCD G2 Program Box, OTA Programmer

05 Connections



Please connect the wire correctly according to the instructions and drawing:

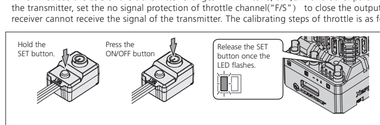
1. **Motor Wiring:**
   There is difference between connection of sensored brushless motor and sensorless brushless motor. Please according to the following wiring method:
   A. **Connect sensored brushless motor:**
   There is strict wiring order from the ESC to the motor, **the three A/B/C ESC wires must connect to the three A/B/C motor wires correspondingly, otherwise, it may damage the ESC**. 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.
   Note: If the forward and backward is reverse after installing the motor, please modify "no. 1J" parameters "Motor Rotation" to change the direction.
   If the 1K parameter item "Phase-AC Swap" is set to "Enabled", then the # A of the esc needs to be connected to the # C of the motor.
   B. **Sensorless Motor Wiring:**
   Users do not need to be worried in r egards to the connectivity with the A/B/C(ESC and motor) as ther e is no polarity. You may find it necessary to swap two wir es if the motor runs in reverse.
2. **Receiver Wiring:**
   Insert the throttle control flat cable of ESC into the throttle channel (i.e. THROTTLE channel) of the receiver. Since the red line in the flat cable outputs BEC voltage to the receiver and steering servo. **Please do not supply additional power to the receiver, otherwise the electric adjustment may be damaged. If additional power is required, disconnect the red wire on the throttle plug from the ESC.**
3. **Battery Wiring:**
   Please sure that the (+) pole of the ESC is connected to the (+) of the battery, and the (-) pole is connected to the (-). If connect reversely, the ESC cannot start up. (Add the picture of connecting battery here.)
4. **External Capacitor Module (also called Cappack)Wiring (Optional):**
   Generally, for 1/8 Buggy and 1/10 vehicles, there is no need for external capacitor pack; But for 1/8 on-road racing, due to the high load current, it is necessary to solder the standard capacitor pack to the input end of the esc (which can be soldered together with the input wires to the gold plug of the esc), as shown in the figure above.
   Warning! Make sure that the red/positive (+) of the capacitor pack is connected to the red/positive (+) of the esc, and the black/negative (-) is connected to the black / negative (-). Do not connect them incorrectly, otherwise the capacitor pack will be damaged.

06 ESC Setup

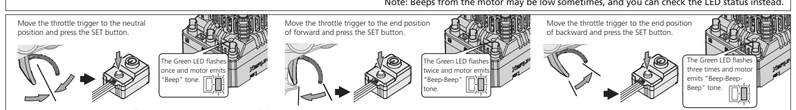
Warning! This is an extremely powerful system. For your safety and the safety of those around you, we strongly recommend removing the pinion gear attached to the motor before calibrating and setting this system. It is also advisable to keep the wheels in the air when you turn on the ESC.

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:



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!**
2. Start by turning on the transmitter with the ESC turned off but connected to a battery. Holding the"SET" button then press the "ON/OFF" button, the RED LED on the ESC starts to flash (The motor beeps at the same time), and then release the "SET" 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 "SET" 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 "SET" 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 "SET" 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 3 seconds after the ESC/Radio calibration is complete.

2 Power on/off and Beep illustration

1) Illustration of power on/off: Short press the ON/OFF key to turn on the ESC in the off state, and long press the ON/OFF key to turn off the ESC.
2) Beep illustration when turn on the ESC: When turn on ESC under normal conditions (i.e. it is started without pressing the SET key), the motor will emit several Beeps to indicate the LiPo cells. For example, "Beep, Beep, Beep" means 3S, "Beep, Beep, Beep, Beep" means 4S.

3 Progammable Items

Type	ID	Item	Parameters
General Setting	1A	Running Mode	For/Brake / For/Rev/Brake / For/Rev
	1B	Reverse Force	25% / 50% / 75% / 100%
	1C	LiPo Cells	Auto Calculate / 2 Cells / 3 Cells / 4 Cells
	1D	Cutoff Voltage	Disabled / Auto (3.5V/Cell) / Customized
	1E	ESC Thermal Protection	Disabled / Enabled
	1F	Motor Thermal Protection	Disabled / Enabled
	1G	BEC Voltage	6.0V / 7.4V
	1H	Smart Fan	Disabled / Enabled
	1I	Sensor Mode	Full Sensored / Sensored/Sensorless Hybrid
	1J	Motor Rotation	CCW / CW
	1K	Phase-AC Swap	Disabled / Enabled
Throttle Control	2A	Throttle Rate Control	1-30 (Adjust Step 1)
	2B	Throttle Curve	Linear / Customized
	2C	Neutral Range	3%-10% (Adjust Step 1%)
	2D	Initial Throttle Force	1-15 (Adjust Step 1)
	2E	Coast	0-15 (Adjust Step 1)
	2F	PWM Drive Frequency	2K-32K (Adjust Step 1K)
	2G	Softening Value	0-30° (Adjust Step 1°)
	2H	Softening Range	0% / 10% / 20% / 25% / 30% / 35% / 40% / 45% / 50% / 55% / 60% / 65% / 70% / 75%
	2I	RPM Limit	Unlimited / 10000RPM-88000RPM (Adjust Step 1000RPM)
Brake Control	3A	Drag Brake	0%-100% (Adjust Step 1%)
	3B	Max. Brake Force	0%-100% (Adjust Step 1%)
	3C	Brake Rate Control	1-20 (Adjust Step 1)
	3D	Brake Control	Traditional / Disc Brake
	3E	ABS Force	0%-20% (Adjust Step 1%)
	3F	Disc Brake Curvature	-10-10 (Adjust Step 1)
	3G	Brake Frequency	0.5K / 1K-16K (Adjust Step 1K)
Timing	4A	Boost Timing	0-48° (Adjust Step 1°)
	5A	Turbo Timing	0-48° (Adjust 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)	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 / Instant
	5D	Turbo Decrease Rate (deg/0.1sec)	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 / Instant

1A: Running Mod
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" 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
This mode is often used by special vehicles. The vehicle will reverse immediately when you push the throttle triggle to the reverse zone.
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: Lipo Cells:
Auto Calculation is the default setting. If Lipo batteries are often used with the same cell count,we would recommend setting the Lipo cells manually to avoid the incorrect "Calculation"(For example,the esc may take a not fully charged 3S Lipo as a fully 2S Lipo) ,which may cause the low-voltage cutoff protection to not function ideally.
1D: Cutoff Voltage:
The ESC will monitor the battery voltage all the time, once the voltage is lower than the threshold value, the ESC will reduce the power to 50% instantly and cutoff the power output in 40 seconds. When enters into voltage protection, the RED LED will single flash that repeats (☆, ☆, ☆, ☆.....). Please set the "Cutoff Voltage" to "Disabled" or customized protection threshold value 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. It is suggested to set to "Disabled"(But the battery would be damaged due to overcharged)
Option 2: Auto
The ESC calculates the corresponding cutoff voltage as per the number of LiPo cells it detects and the "3.5V/cell" rule. For example, if the ESC detects a 4S, the cutoff voltage protection threshold value is 3.5x4=14.0V.
Option 3: Customized
The customized cutoff threshold is a voltage for the whole battery pack (adjustable from 5.0V to 13.6V). Please calculate the value as per the number of LiPo cells you are using. For example, when you use a 4S and you want the cutoff voltage for each cell is 3.0V, you will need to set this item to 12V（3.0*4）
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:
It supports 6.0V/7.4V adjustable. 6.0V is applicable to common servo. If use high-voltage servo, set to higher voltage according to voltage marking of servo.
Note: 1. Do not set the BEC voltage above the maximum operating voltage of the servo, as this may damage the servo or even the ESC.
2. Due to the characteristics of the BEC circuit, there is a voltage difference between the BEC output voltage and the input voltage,when the BEC voltage is set to 7.4V and 2S Lipo is used,the BEC cannot stably output 7.4V (will decrease as the battery voltage decreases) .Therefore,it is recommended to use 7.4V BEC when matching with 3S Lipo and above.
1H: Sensor Mode:
Option 1: Full Sensored
If use XERUN 4268/74-G2/G3 motor, it can set to full sensor mode. The power system will work in the "sensored" mode at all times. The efficiency and drivability of this mode is at the highest. And Boost、Turbo timing can be used and get erupting power.
Option 2: Sensored/Sensorless Hybrid
This is universal driving mode of current 1:8 power system. The ESC operates the motor in sensored mode during the low-speed start-up process, followed by switching to operating the motor in the "sensorless" mode when the RPM is increased.
1I: Motor Rotation:
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.
Warning! When #A/#B/#C wire of ESC connect to #A/#B/#C wire of motor correspondingly, do not Set to Enable. Otherwise it will damage the ESC and motor.
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.
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 15% would be the maximum amount of COAST.
The advantages of 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 2K 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.
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%.
2I: RPM Limit:
It is used to set the max. RPM value of the motor. Set corresponding values according to the motor and competition rules.
Note: The rpm limit value here is the rpm corresponding to the 2 pole motor,when using a 4 pole motor (such as 4268 motor), the corresponding rpm shall be divided by 2.
3A: Drag Brake Force:
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.
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: 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.
3D: Brake Control
Option 1: Traditional
In this mode, just like traditional braking method we currently use, due to its braking force being affected by the motor speed, can cause the braking not being linear/smooth.
Option 2: Disc Brake
This is an innovative braking method from HOBBYWING, the braking force is not affected by the motor speed, with better braking linearity and stronger braking force.
3E: ABS Force
This parameter is used to adjust the braking force maintained after the motor stops rotating. The larger the value, the greater the braking force. Setting this value appropriately according to the traction can help improve the situation of wheel lockup and sliding, as well as help control the off-road vehicle's attitude on the hill.
Note: This parameter only takes effect when the "Brake Control" is set to "Disc Brake".
3F: Disc Brake Curvature
This parameter is used to set the braking curve in disc brake mode. The higher the curvature, the greater the braking force in the front section; The smaller the curvature, the smaller the braking force in the front section. It can be set according to personal control habits.
Note: This parameter only takes effect when the "Brake Control" is set to "Disc Brake".
3G: 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, please choose the frequencies as per the actual test results of your vehicles.
Note: This parameter only takes effect when the "Brake Control" is set to "Traditional".

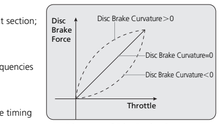


Diagram of Disc Brake Curvature

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 throttle amount in the operation. The Boost Timing is not constant but variable.
5A: Turbo Timing:
This item is adjustable from 0 degree to 48 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 (deg / 0.1sec):
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 (deg/0.1sec):
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.
Note: Only when paired with the Hobbywing matching motor (such as XERUN 4268 G3), Boost and Turbo can achieve a maximum 48 degree effect.
Parameters 5A-5D only has function when you set the "Drive Mode" to "Full Sensored".

4 Preset modes

In order to make one firmware applicable to all different racing conditions, there are 3 groups of preset modes in the ESC. Users are able to change the settings of the modes provided and match suitable gear ratio. Plug-and -screw. Users can change the settings as per the control feel, track, and rename the setting mode. For example, the name can be changed from "1/8 Off-Road" to "NC2020-1900" to indicate the NC2020 uses 1900KV. This can be saved for future reference as well.

Preset Modes for Different Racing:

Mode #	Modes/Profiles	Applications
1	Zero Timing	Applicable for various STOCK Racing that the ESC must use Zero Timing (Blinky Mode)
2	1/8 Off-Road	Applicable for 1/8 Off-Road / Truck Racing
3	1/8 On-Road	Applicable 1/8 On-Road Racing

5 Programming:

Here is the method of setting parameters of ESC:
Note! This ESC has a separate programming port. Please don't connect the throttle control cable to the setting card, otherwise the setting card cannot work.
1) LCD G2 programming box set the parameters: (Please refer to the instructions of LCD G2 programming box for detailes)
This ESC allows LCD G2 programming box to set parameters or LCD G2 programming box connecting to the computer to set parameters (Use HOBBYWING USB LINK software). Before programming, you need to connect your ESC and the LCD G2 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 (R/P)" button to save new settings to your ESC.

2) Use OTA Programmer to set parameters (Please refer to instructions of OTA Programmer for details)
This ESC allows OTA Programmer connecting to the computer, that is, plug the programming wire of OTA Programmer to the programming port. Then use mobile phone to install HOBBYWING HW LINK App to set parameters.

3) The OTA Bluetooth module:
1) The ESC is able to record the Maximum Temperature of ESC and Motor, Minimum Battery Voltage and Maximum Motor RPM in running.
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 G2 program box. Users need to switch on the ESC after the esc is connected with the program box. Long Press the "OK(R/P)" button on any "item" page, then press the "ITEM" button, the following 5 item pages will be displayed: Mode → ESC Temperature→ Motor Temperature → Min Voltage→ Max RPM
2) The ESC running data is read through the OTA Bluetooth module.
After connecting the OTA Bluetooth module to the esc and establishing communication, you can view not only the four extreme value data recorded above, but also the real-time running data and historical record data (graph) in the [Data Log] menu in HW link app.

6 Factory reset

Here is the method of restore factory reset:
1) Restore the default values with a multifunction LCD G2 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(R/P)" to factory reset your ESC.
2) Restore the default values with a OTA Programmer (Use HW Link mobile phone App)
Connect OTA Programmer to the ESC, enter into 【Parameters】, click "reset" to factory reset your ESC.

07 Explanation for LED status

1. During the Start-up Process
- The red light flashes quickly while the motor beeps: the esc has not detect the neutral of the throttle. (the neutral of the throttle does not match the transmitter)
- The GREEN LED flashes "N" times indicating the number of LiPo cells you have connected to the ESC.

2. In Operation
- The throttle triggle is at the neutral:
  1) In the normal mode(Non blinky mode),the RED LED turns on soild.
  2) In the blinky mode(Non RPM limit mode), the boost timing and turbo timing are 0, the RED LED will blink.
- Forward: 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.
- Brake: 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 "Max. Brake Force" to 100%.
- Backward: 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 GREEN LEDS flash a short, single flash and repeats "☆☆☆, ☆☆☆, ☆☆☆" indicating that the load of ESC is heavy, the Over-Current protection is activated.
- The GREEN LEDS flash a short, single flash and repeats "☆☆☆☆☆, ☆☆☆☆☆, ☆☆☆☆☆" indicating that the temperature of ESC and capacitor is too high, the thermal protection of capacitor is activated.

08 Trouble Shooting

Troubles	Possible Causes	Solutions
The LED isn't on and the motor cannot start. The fan doesn't work.	1. The battery voltage was not output to the ESC. 2. The ESC switch was damaged. 3. The positive and negative pole of the ESC is connected reversely.	1.Check whether there is poor welding of power input gate and reweld it. 2. Replace the switch. 3.Reconnect as per right poles.
The motor cannot start and emit Bi-Bi-, Bi-Bi-, with the green LED flashing (the interval between the Bi-Bi- and Bi-Bi- is 1 seconds)	The battery voltage is not within the normal range.	Check the battery voltage.
Power on and inspect LiPo(Green LED flashes N times). The motor does not rotate.	1. If the red light flashes rapidly and the motor beeps synchronously, it indicates that the esc has not detected the neutral of the throttle. 2. If the red light remains on, it means that the esc has not detected any throttle signal.	1. Move the throttle trigger to the neutral point and re-calibrate the throttle range. 2. Check whether the throttle wire and the channel is plugged correctly, and whether the transmitter is turned on.
The vehicle ran backward when you pulled the throttle trigger towards you.	The rotation direction of this car frame is different from mainstream	Set the rotation direction of the motor to "CW" direction.
The motor suddenly stopped or significantly reduced the output in operation.	1. The receiver was influenced. 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 welding points and reweld if necessary. 2. Contact the dealer for repair.
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. 2. Set the "Running Mode" to "Fwd/Rev with Brk ". 3. Contact the distributor for repair or other customer service.
Connect LCD G2 program box, display "CONNECTING ESC" all the time.	The programming port of ESC is used incorrectly.	Connect the LCD G2 program box with the correct interface
The throttle travel setting (calibration) 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.