

EZRUN USER MANUAL

Brushless Electronic Speed Controller
EZRUN MAX4 HV

2021 1230

01 Disclaimer



Thank you for purchasing the EZRUN MAX4 HV ESC from Hobbywing! 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 welded.
- 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 caused 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 10A, an instant 25A, and support for 6V/7.4V/8.4V switching, supporting a wide range of powerful and high-voltage servos.
- Equipped with the most advanced and safe electronic switches. The traditional mechanical switch protects and prevent dust, humid and other harsh environments, contact rust, and violent impact (such as flying slope landing) caused by the automatic closure of mechanical switches and other issues.
- Built-in fire-proof circuitry to protect the battery plug, while effectively avoiding damage to the case from electrical sparks (fingers).
- Multiple protection functions: battery low voltage protection, ESC and motor overheat protection, signal loss protection, current protection.
- Support LED program card, LCD program box, OTA programmer (Note: optional) to set the parameters of the ESC.
- Real-time data recording function to view various running data on the HW LINK app using the OTA Bluetooth module.

04 Specifications

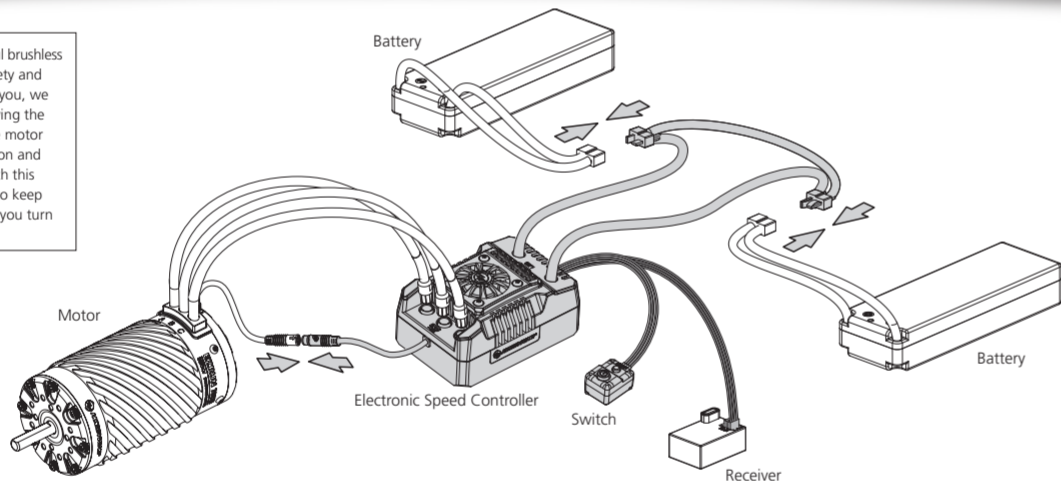
MODEL	EZRUN MAX4 HV	
Cont./ Peak Current	300A / 2000A	
Motor Type	Sensored and sensorless brushless motor	
Applications	1 / 5 off-road, trucks (heavy loads)	
Motor Limit (Note*)	With 12S Lipo: KV < 600	7012S size motor
Lipo Cells	6-12S Lipo	
BEC output	6V / 7.4V / 8.4V adjustable, continuous current 10A (Switch-mode)	
Cooling Fan	A stable 6V or 7.4V or 8.4V from the built-in BEC	
Size/Weight	125(L) x 85(W) x 61.7(H)mm / 775.4g	
Programming Port	Shared with fan interfaces	

Note*: The Kv value here is only a conventional recommended value, which needs to be determined in combination with the rpm supported by the motor and the actual load of the vehicle.

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.



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/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.

Note: If the motor direction is reversed, change the parameter on item 4 "Motor Rotation" 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 reverse.
- 2. Receiver connection:**

Connect the ESC throttle cable to the throttle channel on the receiver. Since the red line in the throttle cable outputs 6V/7.4V/8.4V voltage 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 line on the throttle cable.
- 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:

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).
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 after the ESC/Radio calibration is complete.

2 Power on/off and beep instructions

Switch instructions: short press ON/OFF key to power-on, long press on ON/OFF key 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—" means 7 cells, "beep—beep—" means 10 cells, "beep—beep—, beep-beep—" means 12 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 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	6S	7S	8S	9S	10S	11S	12S	
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%	5%	10%	20%	40%	60%	80%	100%	

- 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, and the "Auto" only recognizes the even number of Lipo batteries, such as 6S / 8S / 10S / 12S; The odd number of Lipo batteries, such as 7S/9S/11S, will not be recognized. This is to avoid mis-calculation during actual use, for example, 7S Lipo without power may be incorrectly calculated as fully charged 6S Lipo. Therefore, this parameter value needs to be manually set when using odd number of Lipo batteries.
- 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 performance.
- 9. Drag Brake:**

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.

4 Programming method

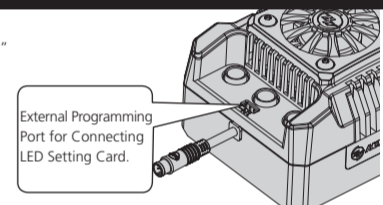
- 1. The LED program card is used to set the parameters:**

Connect the program card to the ESC and power up. Using the "ITEM" and "VALUE" buttons on the program card to quickly select and change the values. Press "OK" to save the parameters.
- 2. Use LCD program box to set parameters:**

This ESC allows LCD program box to set parameters or LCD program box connecting to the computer to set parameters and update firmware (Use HOBBYWING USB LINK software). You need to connect your ESC and the LCD program box via a cable with two JR male connectors and turn on the ESC, after a few seconds, the esc will establish communication with the LCD program box, and then press any key on the program box to enter the parameter interface. You can adjust the setting via "ITEM" & "VALUE" buttons, and press the "OK (R/P)" button to save new settings to your ESC.
- 3. Use OTA Programmer to set parameters:**

Connecting the OTA Bluetooth module to the programming port / fan port of the ESC, then use mobile phone to install HOBBYWING HW LINK App to set parameters or update firmware.
- 4. Data Logging**

Connecting the OTA Bluetooth module to the ESC and establishing communication, you can view the real-time data in running and historical record data (graph) in the [Data Log] menu in HW link app.



The program box needs to be connected to the fan interface. Otherwise, it will not work!

5 Factory reset

Below are several ways to recover factory parameters:

- 1) The SET button:**

When the throttle trigger is in the neutral position, press and hold the SET button continuously for about 8 seconds, the red and green lights will flash at the same time, indicating that the factory reset is successful and needs to be re-powered before it can be run.
- 2) The LED program card:**

Once the LED program card is connected to the ESC, press the "RESET" key and then press "OK" to save to restore the factory settings.
- 3) The LCD program box:**

Once the LCD program box is connected to the ESC, the "Restore Default" item is selected by the ITEM option and saved by pressing the OK (R/P) button to restore to the factory settings.
- 4) The OTA Bluetooth module:**

After the OTA module is connected, go to the Parameter Settings and click the "Reset" button to restore to the factory settings.

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 matching motor (such as EZRUN-70125SD) is used. When non Hobbywing matching 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 "Runing 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 "Runing Mode" is set to incorrectly; 3. Contact the distributor to handle the repair.
LED displays three end horizontal lines all the time — — — when connecting LED program card; Or displays "Connecting ESC" when connecting LCD program box.	The program box is connected incorrectly to the ESC.	Connect the program box with the correct interface, which to the fan port.
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.