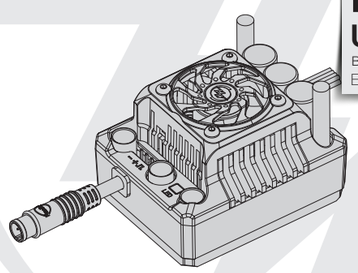
HOBBYWING®

EZRUN USER MANUAL

Brushless Electronic Speed Controller

EZRUN MAX8 G2



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01 Disclaimer

Thank you for purchasing the EZRUN MAX8 G2 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.

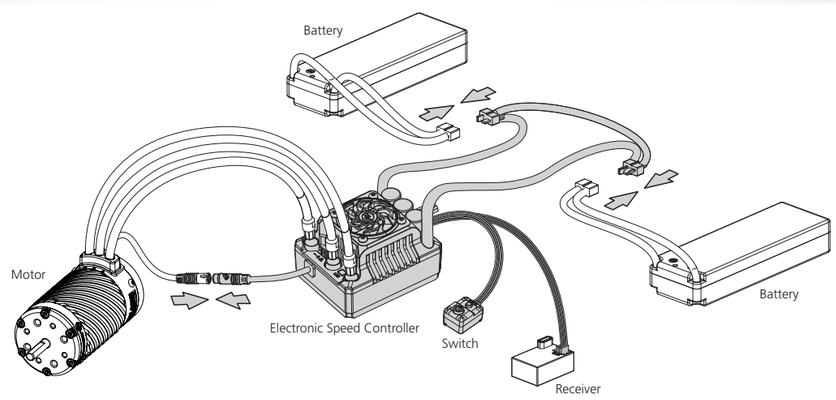
03 Features

- 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 6A, an instant 15A, 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.
- Support the 32 degree turbo timing setting. When used with the matching motor (such as EZRUN 4278SD), the maximum rpm can be increased by about 25%, easily win your rival.
- Multiple protection functions: battery low voltage protection, ESC and motor overheat protection, signal loss protection, current protection.
- Support LED program card, LCD G2 program box, OTA programmer (Note: optional) to set the parameters of the ESC.
- Real-time data logging to view various running data on the HW LINK app using the OTA Bluetooth module.
- Support the firmware upgrade of the ESC (The multi-function LCD G2 program box or OTA Programmer is needed to purchase), you can enjoy the latest functions.

04 Specifications

MODEL	EZRUN MAX8 G2
Cont. / Peak Current	160A / 1050A
Motor Type	Sensored and sensorless brushless motor
Applications	1/8 On-road, Short course truck, Monster truck
Motor Limit	With 4S Lipo: KV≤3000; With 6S Lipo: KV≤2400 4278 size motor
Lipo Cells	3-6S Lipo
BEC Output	6V / 7.4V / 8.4V adjustable, continuous current 6A (Switch-mode)
Cooling Fan	A stable 6V or 7.4V or 8.4V from the built-in BEC
Size / Weight	60 x 48 x 40.5mm / 192g
Programming Port	Shared with fan interfaces

05 Connections



Refer to the wiring instructions and wiring diagram:

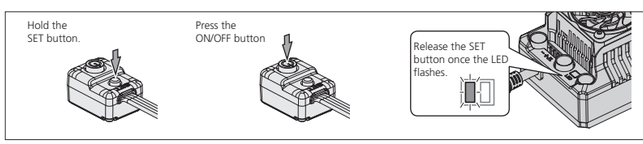
1. Motor connection:
   There is a difference between connecting a sensored brushless motor and a sensorless brushless motor:
   A. When connecting to a sensored brushless motor:
   There are strict wire sequencing requirements for connecting the ESC to the motor, the three A/B/C ESC wires must connect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

WARNING! 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.

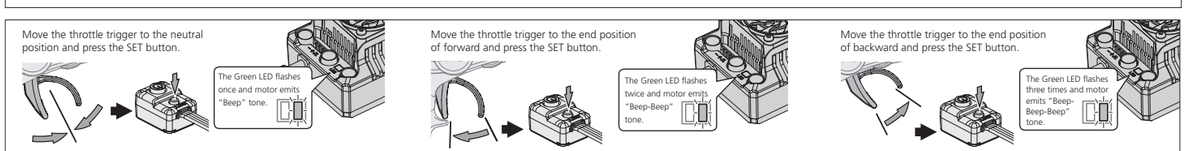
1 Set the throttle range

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. For example: "beep-beep-beep" means 3 cells, "beep-beep-beep-beep" means 4 cells.
Note: Motor beeping at the same time, the ESC light flashes synchronously.

3 Instruction for programmable items

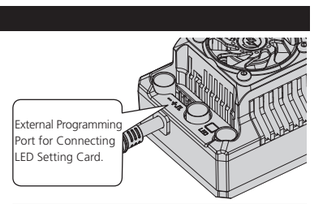
The column of white words on black background in the following table are the default values of programmable items.

	Item	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7	Option 8	Option 9
1	Running Mode	Forward with brake	*Forward / Reverse with Brake*	Forward with reverse						
2	Lipo Cells	*Auto*	2S	3S	4S	5S	6S			
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(LED Box)	*0%*	5%	10%	20%	40%	60%	80%	100%	
9	Drag Brake Force(LCD Box / OTA)	0-100%(Adjust Step 1%), Default 0%.								
10	Initial Throttle Force	0.5%	*1%*	2%	3%	4%	5%	6%	7%	8%
11	Turbo Timing	*0°*	4°	8°	12°	16°	20°	24°	28°	32°
12	Turbo Delay	Instant	0.05s	0.1s	0.15s	*0.2s*	0.3s	0.5s	0.7s	1.0s

1. Running Mode:
   Option 1: Forward with brake
   The vehicle can only move forward and has brake function. This is also commonly acceptable at races.
   Option 2: Forward/Reverse and Brake
   This option is known to be the "training" mode with "Forward/Reverse with Brake" function. The vehicle only brakes on the first time you push the throttle trigger to the reverse/brake zone. If the motor stops when the throttle trigger return to the neutral zone and then re-push the trigger to reverse zone, the vehicle will reverse, if the motor does not completely stop, then your vehicle won't reverse but still brake, you need to return the throttle trigger to the neutral zone and push it to reverse zone again. This method is for preventing vehicle from being accidentally reversed.
   Option 3: Forward and Reverse
   When the throttle trigger is pushed from neutral to reverse point, the motor reverses. This mode is generally used in special vehicles.
2. Lipo Cells:
   Set the correct value according to the actual number of Lipo batteries used. The default is automatically calculated, and the "Auto" option will not recognize 5S， this is to avoid mis-calculation during actual use,for example, 5S Lipo without power may be incorrectly calculated as fully charged 4S Lipo. Therefore, this parameter value needs to be manually set when using 5S Lipo.
   Note: The "2S" option here is only reserved in the parameter table, due to the circuit characteristics and the suitable application of this esc, 2S Lipo is not recommended.
3. Low Voltage Cut-Off:
   This function is mainly to prevent excessive discharge of lithium batteries causing damage. The ESC monitors the battery voltage at all times, and once the voltage falls below the set threshold, the power output is reduced and the power output is completely cut off after a few seconds. When the voltage protection is entered, the red LED flashes in the "-, -, -". The three levels of low, medium and high here correspond to 2.8V/Cell, 3.1V/Cell and 3.4V/Cell respectively. For NiMH batteries, it is recommended to set this parameter to "Disabled".
4. Motor Rotation:
   Setting the rotation of the motor. Due to some differences with the drivetrains on different car kits, it is possible to that the car will go in the opposite direction upon full throttle. In the event that this happens, you can set the"motor rotation direction" to the opposite direction; "CW" or "CCW".
5. BEC Voltage:
   BEC voltage support 6V/7.4V/8.4V. Generally, 6.0V is suitable for standard servos, while 7.4V/8.4V is suitable for high-voltage servos. Please set according to the servo specifications.
   WARNING! Do not set the BEC voltage above the maximum operating voltage of the servo, as this may damage the servo or even the ESC.
6. Max. Brake Force:
   This ESC provides proportional braking function; the braking effect is decided by the position of the throttle trigger. It sets the percentage of available braking power when full brake is applied. Large amount will shorten the braking time but it may damage your pinion and spur gear.
7. Max. Reverse Force:
   Refers to the reversing speed. Selecting different parameter values can produce different reversing speed. It is recommended to use a smaller reversing speed to avoid errors caused by reversing too quickly.
8. Punch:
   Set in 1-9 stages, the higher the set value, the faster the acceleration. Kindly take into consideration according to the site, tire grip characteristics, vehicle configuration, etc. An aggressive setting may cause the tire to slip, the starting current to be too large and adversely affect the electronics performace.
9. Drag Brake Force
   Refers to the brake force generated by the motor when the throttle trigger returns to neutral position. Choose the appropriate value according to the type of vehicle, configuration, site, etc.
   Due to different devices for setting this esc, there are two different display contents, as follows:
   When the LED program box is used, there are 8 option values for the drag brake force that can be adjusted, see the row of "Drag Brake Force (LED Box)" in the above table.
   When using LCD program box or OTA Bluetooth module, the drag brake force is 0-100% adjustable, and the adjust step is 1%, see the row of " Drag Brake Force (LCD Box / OTA)" in the above table.
10. Initial Throttle Force
    It also called as minimum throttle force. You can set it according to wheel tire and traction. If the ground is slippery, please set a small throttle force.
11. Turbo Timing
    The Turbo timing can additionally increase the motor rpm.It will initiate at full throttle. It is usually used on a long straight road to release the maximum power of the motor. The higher this value is, the more the rpm of the motor will increase, and the greater the running current will be, the higher the temperature of the motor and esc. Therefore, please set this value reasonably.
12. Turbo Delay
    When "TURBO DELAY" is set to "INSTANT", the Turbo Timing will be activated right after the throttle trigger is moved to the full throttle position. When other value(s) is applied, you will need to hold the throttle trigger at the full throttle position (as you set) till the Turbo Timing initiates.

4 Programming method

1. **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. **The LCD G2 program box is used to set the parameters:**
   This ESC allows LCD G2 programming box to set parameters or LCD G2 programming box connecting to the computer to set parameters and with two JR male connectors and 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 andturn on the ESC; the boot screen will show up on the LCD G2 . 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, andpress the "OK(R/P)" button to save new settings to your ESC.
3. **The OTA Bluetooth module is used to set the parameters:**
   Attach the OTA Bluetooth module to the ESC, and install the HOBBYWING HW LINK app on your phone for parameter settings.
4. **View the ESC data after running:**
   After connecting the OTA Bluetooth module to the esc and establishing communication, You can view the real-time running data 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 G2 program box:
   Once the LCD G2 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 supporting motor (such as EZRUN-4278SD) is used. When non Hobbywing supporting motor is used, there is no motor overheat protection function.
   4) The green light flashes (three flashes, "☆☆☆, ☆☆☆, ☆☆☆"): enters the current protection state.
   5) The green light flashes (five flashes, "☆☆☆☆☆, ☆☆☆☆☆, ☆☆☆☆☆"): enters the capacitor overheat protection state.

08 Trouble Shooting

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