



# HOBBYWING EZRUN MAX6 G2 Brushless Electronic Speed Controller User Manual

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**HOBBYWING EZRUN MAX6 G2 Brushless Electronic Speed Controller**



## Product Information

The Brushless Electronic Speed Controller EZRUN MAX6 G2 is a high-performance speed controller designed for use in 1/6 and 1/7 scale on-road, truck, and monster truck applications. It is suitable for both sensed and sensorless brushless motors and supports a motor limit of up to 4990/5690 size motors. With a voltage range of 3-8S LiPo, it provides a continuous current of 180A and a peak current of 1200A. The ESC features a built-in BEC with adjustable voltage output (6V/7.4V/8.4V) and a continuous current of 8A. The ESC comes with a cooling fan for efficient heat dissipation and measures 94.5(L) x 59.4(W) x 50.9(H)mm in size. It weighs approximately 428.5g (including input wires). The programming port allows for easy configuration using an iOS or Android smartphone with the HW LINK app.

## Disclaimer

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

## Warnings

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

## Features

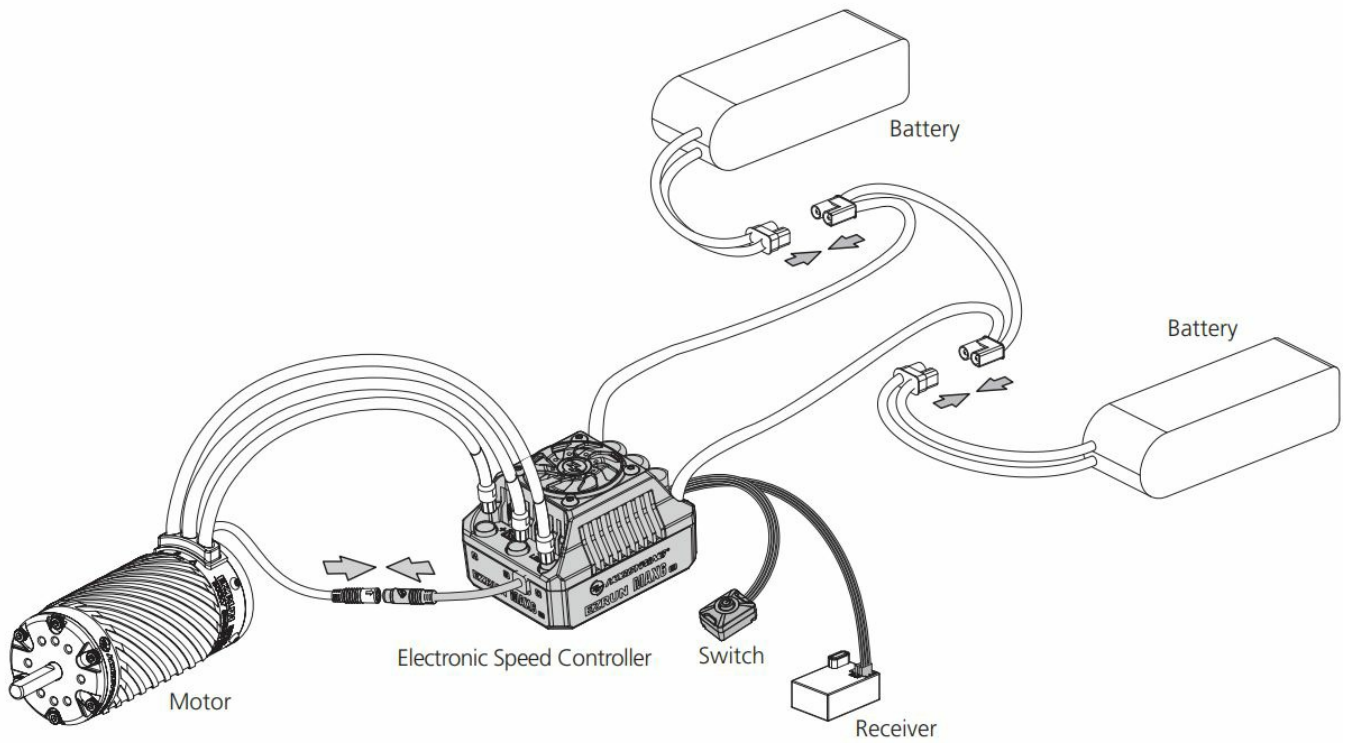
- The ESC uses a special process, coupled with an innovative waterproof design, to increase waterproofing and dust-proofing performance in different climates. It is easy to deal with the harsh conditions containing sediment, ice and snow, water accumulation.
- Built-in ultra-powerful switch mode BEC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

## Specifications

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

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

## 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:**

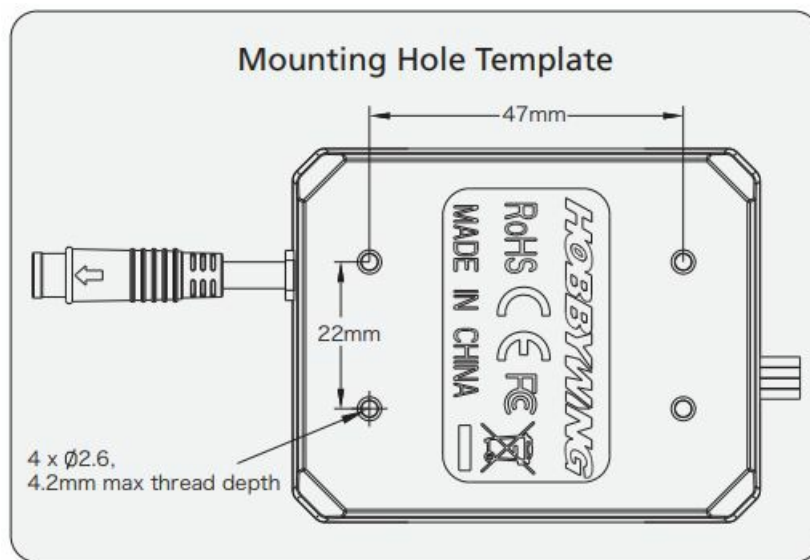
There are strict wire sequencing requirements for connecting the ESC to the motor, the three A/B/CESC wires must connect to the three A/B/C motor wires correspondingly, otherwise, it may damage the ESC. Next, connect the sensor cable of the esc and motor according to the arrow mark on the sensor connector. If you don't plug the sensor cable in, your ESC will still work in sensorless mode even if you're using a sensored motor.

Note: If the motor direction is reversed, change the parameter on item 4 "Motor rotation direction" to achieve the correct setting.

- **B. When connecting to a sensorless brushless motor:**

There are no wire sequencing requirements needed when using a sensorless brushless motor, you can swap two wires if the motor runs in opposite direction.

#### 2. Receiver connection:



Connect the ESC throttle cable to the throttle channel on the receiver. Since the throttle cable of esc will have BEC voltage output to the receiver and servo, please do not supply additional power to the receiver, otherwise the esc may be damaged. If additional power is required, disconnect the red wire on the throttle plug from the ESC.

### 3. Battery connection:

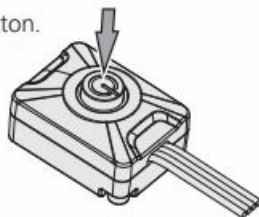
Make sure that the (+) pole of the ESC is connected to the (+) pole of the battery and (-) to the (-). If the connection is reversed, the ESC will be damaged and will not be covered by the warranty service.

## ESC Setup

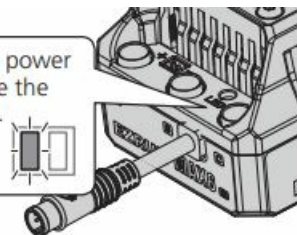
### Set the throttle range

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

Hold the power button.

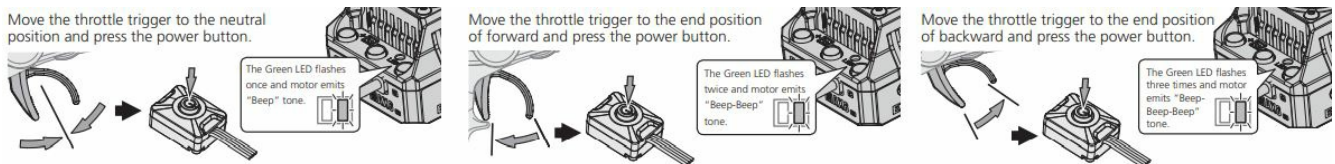


Release the power button once the LED flashes.



1. Turn on the transmitter, ensure all parameters (D/R, EPA, ATL) on the throttle channel are at default (100%). For transmitter without LCD, please turn the knob to the maximum, and the throttle "TRIM" to 0. (If the transmitter without LCD, turn the knob to the middle point). You don't need to do this step if the transmitter's settings are default, and you can start from the second step directly.
2. Start by turning on the transmitter with the ESC turned off but connected to a battery. Holding the "power" button, the RED LED on the ESC starts to flash (The motor beeps at the same time), and then release the "power" button immediately.

**Note:** Beeps from the motor may be low sometimes, and you can check the LED status instead.



### 3. Set the neutral point, the full throttle endpoint and the full brake endpoint.

- Leave transmitter at the neutral position, press the “power” button, the RED LED dies out and the GREEN LED flashes 1 time and the motor beeps 1 time to accept the neutral position.
- Pull the throttle trigger to the full throttle position, press the “power” button, the GREEN LED blinks 2 times and the motor beeps 2 times to accept the full throttle endpoint.
- Push the throttle trigger to the full brake position, press the “power” button, the GREEN LED blinks 3 times and the motor beeps 3 times to accept the full brake endpoint.

#### Note:

- The end position of forward: Pull the trigger to the maximum throttle position if it is pistol-style transmitter. Push the throttle to the top if it is board-style transmitter.
- The end position of backward: Push the trigger to the maximum brake position if it is pistol-style transmitter. Pull the throttle to the bottom if it is board-style transmitter.

### 4. The motor can be started after the ESC/Radio calibration is complete.

## Power on/off and beep instructions

- **Switch instructions:** short press power button to power-on, long press on power button to shut down.
- **Power-on beep description:** Under normal circumstances, the ESC will emit a few “beep” to indicate the number of lithium cells. A short “beep-” means the #1, and a long “beep—” means the #5. For example: “beep—, beep-” means 6 cells, “beep—, beep-beep-beep-” means 8 cells.

**Note:** Motor beeping at the same time, the ESC light flashes synchronously. For example: when the motor makes a long beep, the esc flashes for a long time, and when the motor makes a short beep, the esc flashes for a short time.

## Instruction for programmable items

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

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

## 1. Running Mode:

### 1. Option 1: Forward with brake

The vehicle can only move forward and has brake function. This is also commonly acceptable at races.

### 2. 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.

3. **Option 3: Forward and Reverse** When the throttle trigger is pushed from neutral to reverse point, the motor reverses. This mode is generally used in special vehicles.

## 2. **Lipo Cells:**

Set the correct value according to the actual number of Lipo batteries used. The default is automatically calculated.

## 3. **Low Voltage Cut-Off:**

This function is mainly to prevent excessive discharge of lithium batteries causing damage. The ESC monitors the battery voltage at all times, and once the voltage falls below the set threshold, the power output is reduced and the power output is completely cut off after a few seconds. When the voltage protection is entered, the red LED flashes in the “-, -, -”. The three levels of low, medium and high here correspond to 2.8V/Cell, 3.1V/Cell and 3.4V/Cell respectively. For NiMH batteries, it is recommended to set this parameter to “Disabled”.

## 4. **Motor Rotation:**

Setting the rotation of the motor. Due to some differences with the drivetrains on different car kits, it is possible to that the car will go in the opposite direction upon full throttle. In the event that this happens, you can set the “motor rotation direction” to the opposite direction; “CW” or “CCW”.

## 5. **BEC Voltage:**

BEC voltage support 6V/7.4V/8.4V. Generally, 6.0V is suitable for standard servos, while 7.4V/8.4V is suitable for high-voltage servos. Please set according to the servo specifications.

**WARNING!** Do not set the BEC voltage above the maximum operating voltage of the servo, as this may damage the servo or even the ESC.

## 6. **Max. Brake Force:**

This ESC provides proportional braking function; the braking effect is decided by the position of the throttle trigger. It sets the percentage of available braking power when full brake is applied. Large amount will shorten the braking time but it may damage your pinion and spur gear.

## 7. **Max. Reverse Force:**

Refers to the reversing speed. Selecting different parameter values can produce different reversing speed. It is recommended to use a smaller reversing speed to avoid errors caused by reversing too quickly.

## 8. **Punch:**

Set in 1-9 stages, the higher the set value, the faster the acceleration. Kindly take into consideration according to the site, tire grip characteristics, vehicle configuration, etc. An aggressive setting may cause the tire to slip, the starting current to be too large and adversely affect the electronics performance.

## 9. **Drag Brake Force:**

Refers to the brake force generated by the motor when the throttle trigger returns to neutral position. Choose the appropriate value according to the type of vehicle, configuration, site, etc.

## 10. **Initial Throttle Force:**

It also called as minimum throttle force. You can set it according to wheel tire and traction. If the ground is slippery, please set a small throttle force.

## 11. **Turbo Timing:**

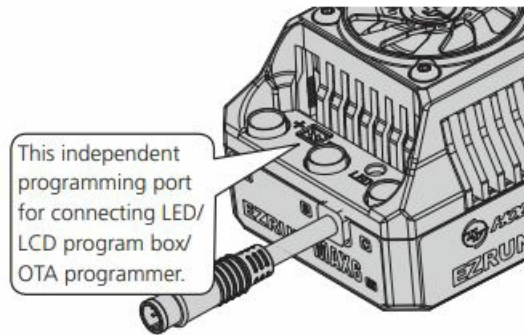


The Turbo timing can additionally increase the motor rpm. It will initiate at full throttle. It is usually used on a long straight road to release the maximum power of the motor. The higher this value is, the more the rpm of the motor will increase, and the greater the running current will be, the higher the temperature of the motor and esc. Therefore, please set this value reasonably.

## 12. Turbo Delay:

When "TURBO DELAY" is set to "INSTANT", the Turbo Timing will be activated right after the throttle trigger is moved to the full throttle position. When other value(s) is applied, you will need to hold the throttle trigger at the full throttle position (as you set) till the Turbo Timing initiates.

## Programming method



### 1. Program your ESC with a smart phone (installed with the HW LINK V2 app)

- Download and install the Hobbywing's official app "HW LINK V2" on your smart phone. For smart phones with the iOS operating system, please search "Hobbywing" in the App Store; for smart phones with the Android operating system, search "Hobbywing" in the Google Play or download it from our website or scan the following QR code to download it.
- Connect a battery to the ESC and turn it on, then open the Hobbywing official app "HW LINK V2" on your smart phone. It will ask if you want to connect "Bluetooth" or "WiFi" the first time when you open the app; at this point, please select "Bluetooth". You need to change the connection to "Bluetooth" after using the "WiFi" connection, you can click "Settings" (on the home page) and then "Select the connecting mode" to change the connection.
- A list of Bluetooth devices will pop out when you click the ESC icon on the upper right corner, then select the ESC you want to program to establish the Bluetooth connection between the ESC and smart phone. (Note: the default name & password of the Bluetooth device are HW\_BLE\*\*\*\* & 888888 respectively.)

**ESC Setup:** Click Parameters on the home page to adjust the ESC parameters, click the ESC icon on the upper right corner to disconnect the Bluetooth connection between the ESC and smart phone after completing and saving the settings.

**Firmware Updating:** Click Firmware Update and then select the Available Version to select the firmware version you need, and then click "Update" to upgrade your ESC.

**Note:** If the firmware is updated from the new version to the old version, after the update is completed, it is necessary to reset the parameters in the Parameters interface and re-calibrate the throttle range to operate the system normally.

## Factory reset

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



## Explanation for LED status

### 1. The run status indication:

1. The throttle trigger is in the neutral point and the LED lights are off.
2. When advancing, the red light is constantly on, and when the throttle is at full throttle, the green light is on.
3. When reversing, the red light is constantly on; If the reversing force is set to 100%, the green light is also lit when the throttle is at the maximum of the reverse.

### 2. What the LED means when the relevant protection function is triggered:

1. The red light flashes (single flash, “☆, ☆, ☆”): enters the low voltage protection state.
2. The green light flashes (single flash, “☆, ☆, ☆”): enters the esc overheat protection state.
3. The green light flashes (double flash, “☆☆, ☆☆, ☆☆”): enters the motor overheat protection state.

**Note:** Motor overheat protection is effective only when Hobbywing supporting motor (such as EZRUN 5690SD/4990SD G2) is used. When non Hobbywing supporting motor is used, there is no motor overheat protection function.

4. The green light flashes (three flashes, “☆☆☆, ☆☆☆, ☆☆☆”): enters the current protection state.
5. The green light flashes (five flashes, “☆☆☆☆☆, ☆☆☆☆☆, ☆☆☆☆☆”): enters the capacitor overheat protection state.

## Trouble Shooting

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

## FCC Warning

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

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

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

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

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

## Documents / Resources



[HOBBYWING EZRUN MAX6 G2 Brushless Electronic Speed Controller](#) [pdf] User Manual  
HW6197, EZRUN MAX6 G2, EZRUN MAX6 G2 Brushless Electronic Speed Controller, Brushless Electronic Speed Controller, Electronic Speed Controller, Speed Controller