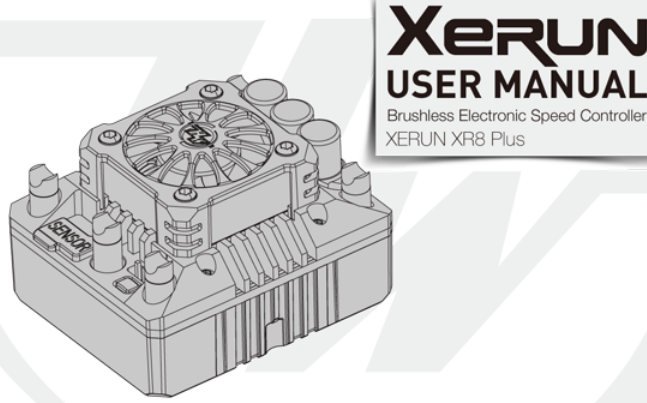


# 01 Introduction



Thank you for purchasing the XERUN XR8 PLUS, HOBBYWING's high performance sensored brushless motor electronic speed controller! Brushless power systems can be very dangerous. 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. Because we have no control over the use, installation, or maintenance of this product, no liability may be assumed for any damage or losses resulting from the use of the product. We do not assume responsibility for any losses caused by unauthorized modifications to our product.

# 02 Warnings

- Ensure all wires and connections are well insulated before connecting the ESC to related devices, as short circuit will damage your ESC.
Ensure all devices are well connected, in order to prevent poor connections that may cause your vehicle to lose control or other unpredictable issues like damage to the device.
Read through the manuals of all power devices and chassis and ensure the power configuration is rational before using this unit.
Please use a soldering iron with the power of at least 60W to solder all input/output wires and connectors.
Do not hold the vehicle in the air and run it up to full throttle, as rubber tires can "expand" to extreme size or even crack to cause serious injury.
Stop using the ESC when its casing temperature exceeds 90°C/194°F; otherwise the ESC may get destroyed and may also get your motor damaged. We recommend setting the "ESC Thermal Protection" to 105 C/221 F (this refers to the internal temperature of the ESC).
Always disconnect and remove batteries after use, as the ESC will continue to consume current if it's still connected to batteries (even if the ESC is turned off). Long-time contact will cause batteries to completely discharge and result in damage to batteries or/and ESC. This will not be covered under warranty.

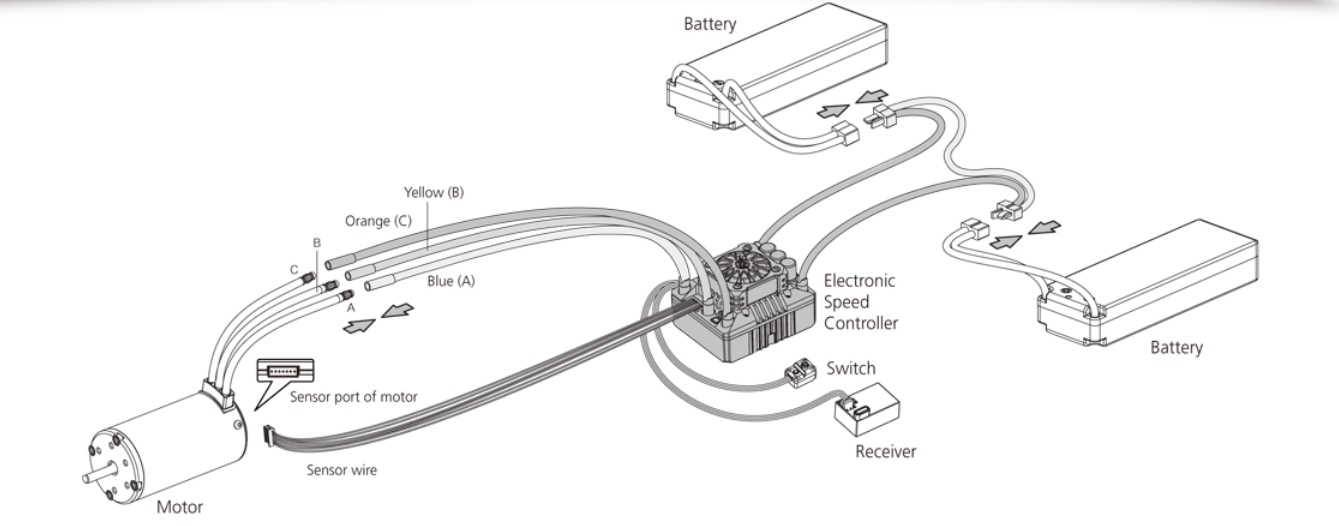
# 03 Features

- Compatible with sensored/sensorless brushless motors. In sensored mode, it's compatible with most popular sensored brushless motors on the market. In sensorless mode, it's compatible with 99% of brushless motors on the market.
Super internal switch-mode BEC with switchable voltage of 6V/7.2V and cont./peak current of 6A/15A for easily driving big torque servos and high voltage servos.
Highly reliable electronic switch avoids troubles which may happen to traditional mechanical switch due to dirt, water, dash and etc.
Aluminum cases build highly efficient heat dissipation system.
Separate programming port to easily connect the LCD program box to the ESC.
Proportional brake with 9 levels of Maximum Brake Force and adjustable Drag Brake Force range from 0 to 100%.
9 levels of acceleration/punch from "soft" to "aggressive" for different vehicles, tires and tracks.
Innovative "COAST" function will make the RC vehicle coast like a real car after you release the throttle trigger, avoid the sudden slow-down (this sudden slow-down often happens to motors with very strong magnetic force), and brings you the great control feel.
Capacitor Protection: Innovative Capacitor Protection effectively protects capacitors from exploding and causing irreversible damage to the ESC because of overload.
Multiple protections: motor lock-up protection, low-voltage cutoff protection, thermal protection, overload protection, and fail safe (throttle signal loss protection).
Advanced programming via the portable multifunction LCD program box.
Firmware upgrade via HOBBYWING multifunction LCD program box (item sold separately).

# 04 Specifications

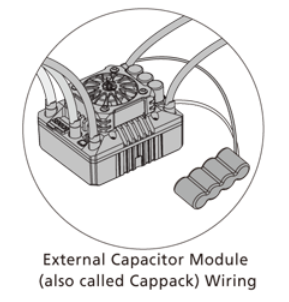
Table with 2 columns: Model (XERUN XR8 PLUS) and various specifications including Cont./Peak Current, Motor Type, Main Applications, Motor Limit, LiPo/NiMH Cells, BEC Output, Cooling Fan, Connectors, Size/Weight, and Programming Port.

# 05 Connections



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

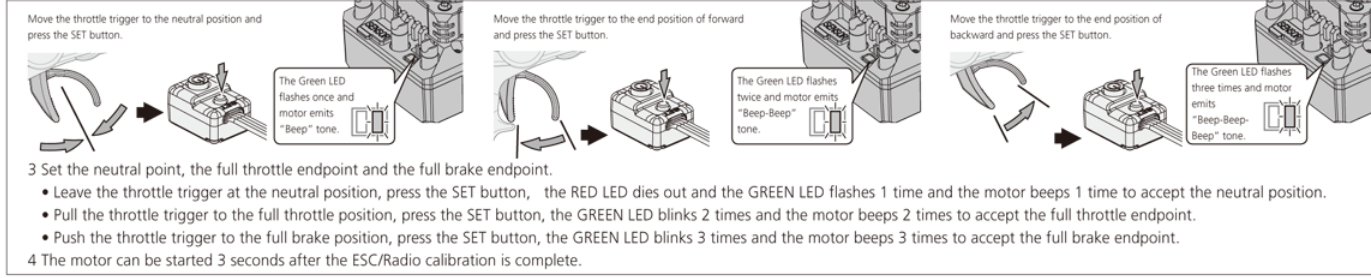
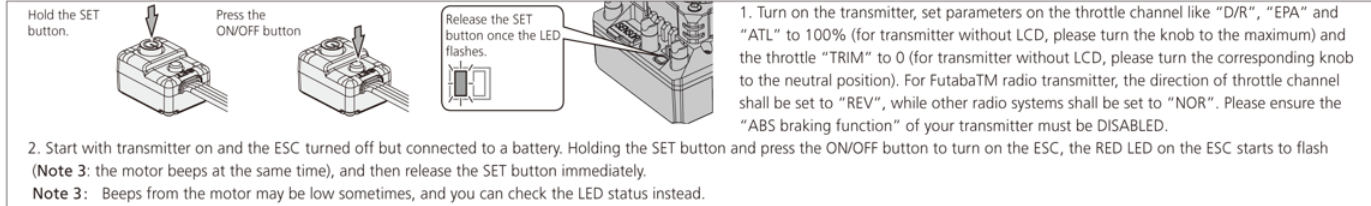
- 1. Motor Wiring: The sensored motor wiring is different from the sensorless motor wiring; please make sure that you will strictly follow the introductions below.
A. Sensored Motor Wiring: There is strict wiring order from the ESC to the motor, the three A/B/C ESC wires must connect to the three A/B/C motor wires correspondingly and then connect the ESC sensor port and the motor sensor port with the stock 6-pin sensor cable.
Note 1: 1) 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. 2) After you install the motor, if you find the car runs in reverse, then please correct the motor rotation in the 6th programmable item.
B. Sensorless Motor Wiring: There is no polarity on the A/B/C wires between ESC and motor, so do not worry about how you connect them initially. You may find it necessary to swap two wires if the motor runs in reverse.
2. Receiver Wiring: Plug the throttle control cable (also called R/C cable) into the ESC into the throttle (TH) channel on receiver. The red wire in the throttle control cable will output the BEC voltage of 6V/7.2V to the receiver and servo, so please do not connect any additional battery to the receiver. Otherwise, your ESC may get damaged.
3. External Capacitor Module (also called CapPack) Wiring (This operation is Optional): When using a 6S, if the capacitor temperature often goes above 85 C°, you need to connect an external capping (item sold separately) to the ESC, otherwise, the insufficient capability of the on-board/built-in capping may cause capacitors to swell or even explode and the ESC to work abnormally or even get damaged. Based on our test results, an external capping is needed by the following two types of vehicles.
External Capping Wiring Diagram (as shown on the right side). Connect a capping to the ESC input end and ensure red/positive (+) to red/positive (+), black/negative (-) to black/negative (-).
A. The vehicle weighs really heavy, the total weight (battery, ESC, motor, steering servo and etc. included) exceeds 7KG, for example, CEG-GST.
B. The vehicle weighs not heavy, but the chassis is designed for super high-speed (over 100km/h) races, for instance, Traxxas XO-1.
Note 2: For the above two kinds of vehicles, we strongly recommend using HOBBYWING EZRUN MAX6 ESC instead, because the MAX6 ESC has greater power output than XR8.
4. Battery Wiring: Proper polarity is essential here! Make absolutely sure positive (+) of ESC connects to positive (+) of battery, and negative (-) of ESC connects to negative (-) of battery when you plug in your battery! If reverse polarity is applied to your ESC from the battery, it will damage your ESC. This will not be covered under warranty!



# 06 ESC Setup

## 1 ESC/Radio Calibration

In order to make the ESC match the throttle range, you must calibrate it when you begin to use a new ESC, or a new transmitter, or after you change the settings such as the TRIM, D/R, EPA and other parameters of throttle channel on your transmitter, otherwise the ESC cannot work properly. We strongly recommend activating the "Fail Safe" function of the radio system and set it (F/S) to "Output Off" or set its value to the "Neutral position" to ensure the motor can be stopped when there is no signal received from the transmitter. About setting the throttle range, let's take Futaba™ transmitter as an example.



## 2 Power ON/OFF & Warning Tones

- 1. Power ON/OFF: Start with the ESC turned off, press the ON/OFF button to turn on the ESC. (Start with the ESC turned on) press and hold the ON/OFF button to turn off the ESC.
2. Warning Tones: Turn on the ESC in the normal way (that is to turn it on without holding the SET button); the motor will beep the number of LiPo cells you have plugged in. For example, 3 beeps indicate a 3S LiPo, 4 beeps indicate a4S LiPo, and 6 beeps indicate a 6S LiPo.

## 3 Programmable Items

Table with columns for Basic Setting, Option 1, Option 2, Option 3, Option 4, Option 5, Option 6, Option 7, Option 8, Option 9. Items include Running Mode, LiPo Cells, Cutoff Voltage, ESC Thermal Protection, Motor Thermal Protection, Motor Rotate, BEC Voltage, Brake Force, Reverse Force, Start Mode (Punch), and Advanced Settings (Drag Brake, Coast, Neutral Range, Drive Mode, Boost Timing, Turbo Timing, Turbo Delay).

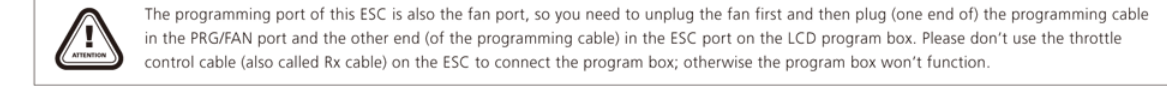
Note 4: 1) Fwd=Forward, Rev=Reverse, Brk=Brake
2)The 14th, 16th and 17th items are reserved items. Most 4 pole motors on the market are suffering from the severe sensor interference now, for these motors, the "full sensored" mode can easily cause drive errors and further result in abnormal operation of the ESC and motor or even get them burnt, so these functions have been temporarily shut down in the current version of ESC firmware. HOBBYWING will release some new 4 pole motors that can ensure the ESC works in "full sensored" mode soon, users can get access to those functions through firmware upgrade then.

- 1. Running Mode: Option 1: Forward with Brake. The vehicle can go forward and brake but cannot reverse in this mode. This mode is usually for racing. Option 2: Forward/Reverse with Brake. This mode provides the braking function, it's usually for training. "Forward/Reverse with Brake" mode adopted the "DOUBLE-CLICK" method, that is your vehicle only brakes (won't reverse) when the 1st time you push the throttle trigger forward (away from you) (1st push). If the motor stops when you quickly release the throttle trigger and then re-push the trigger quickly (2nd push), the vehicle will reverse. If the motor does not stop, then your vehicle won't reverse but brake, you need to push the throttle trigger one more time. The vehicle only reverses after the motor stops. This method is for preventing vehicle from being accidentally reversed.
2. LiPo Cells: We strongly recommend setting this item manually instead of using the default setting "Auto Calculation (which means calculating the LiPo cells automatically)". The ESC can identify 2S, 4S and 6S LiPo packs when setting this item to "Auto Calculation". After you power on the ESC, if the battery voltage is below 8.8V, it will be identified as a 2S; if the voltage is from 8.8V to 17.6V, it will be identified as a 4S; if the voltage is above 17.6V, and it will be identified as a 6S.
Note 5: You need to set this item to "Auto Calculation." when you use a NiMH pack or a 5S LiPo, AND customize the "Low Voltage Cutoff" threshold.
3. Cutoff Voltage: Sets the voltage at which the ESC lowers or removes power to the motor in order to protect the LiPo battery from irreversible damage caused by over discharge. The ESC will monitor the battery voltage all the time, it will immediately reduce the power to 50% and cut off the output 10 seconds later when the voltage goes below the cutoff threshold. The RED LED will flash a short, single flash that repeats (☆, ☆, ☆) to indicate the low-voltage cutoff protection is activated. If you use a NiMH pack, then please set the "Cutoff Voltage" to "Disabled".
Option 1: Disabled. The ESC won't cut off the power due to low voltage after you select this option. We do not recommend using this option when you use any LiPo battery, otherwise you will irreversibly damage it. However, for avoiding losing power in racing due to low voltage, we recommend using this option (this still may cause damage to your battery pack). You need to select this option when you use a NiMH pack.
Option 2: Auto. The ESC will automatically calculate the corresponding cutoff voltage as per the number of LiPo cells it detects and the "3.1V/cell" rule. For example, if the ESC detects a 4S LiPo, then the cutoff voltage for the battery shall be 3.1x4=12.4V.
Option 3: Customized. The customized cutoff threshold is a voltage for the whole battery pack (adjustable from 5.0V to 20V). 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 3V, then you need to set this item to 12V.
Note 6: please set this item to CUSTOMIZED when you use a 5S LiPo.
4. ESC Thermal Protection: The ESC will automatically cut off the output and the GREEN LED will flash a short, single flash that repeats (☆☆, ☆, ☆) when the temperature gets up to the value you preset and activates the ESC thermal protection. The output won't resume until the temperature gets down.
Warning! Never set the ESC Overheat protection to DISABLED unless in some special situations like racing, otherwise you may damage your ESC and even damage your motor.
5. Motor Thermal Protection: The motor will automatically cut off the output and the GREEN LED will flash a short, double flash that repeats (☆☆☆, ☆, ☆☆) when the temperature gets up to the value you preset and activates the motor thermal protection. The output won't resume until the temperature gets down.
Warning! Never set the Motor Overheat protection to DISABLED unless in some special situations like racing, otherwise you may damage your ESC and even damage your motor. For non-HOBBYWING motor, different thermal sensor may cause the ESC to trigger the Motor Thermal Protection early or later. In this case, please set the Motor Overheat Protection to DISABLED and check the motor temperature with an infrared thermometer (or bare hand if you don't have the device, but be careful all the time) regularly.
6. Motor Rotate: Pull the throttle trigger with the motor shaft faces you, the motor spins counter clockwise if this item is set to CW; the motor spins clockwise if it's set to CCW. In general, the vehicle goes forward when the motor rotates counter clockwise. However, some chassis manufacturers design their products base on the completely different theories, so your vehicle may go backward when the motor spins counter clockwise. In that case, you need to set this item to CW instead.
7. BEC Voltage: Option 1: 6.0V. It's applicable to ordinary servos. Do not use this option with high voltage servos; otherwise your servos may not function normally due to insufficient voltage. Option 2: 7.2V. It's applicable to high voltage servos. Do not use this option with ordinary servos; otherwise your servos may be burnt due to high voltage.
8. Brake Force: This ESC provides the proportional braking function; the braking effect is decided by the position of the throttle trigger. It sets what percentage of available braking power is applied with full brake. Large amount will shorten the braking time but it may damage your pinion and spur. Please select the most suitable brake amount as per your car condition and your preference.

- 9. Reverse Force: Different reverse amount will bring different reversing speed. For the safety of your vehicle, we recommend using a low amount.
10. Start Mode / Punch: You can choose the punch from level 1 (very soft) to level 9 (very aggressive) as per the track, tires, grip, your preference and etc. This feature is very useful for preventing tires from slipping in the starting-up process. In addition, "level 7", "level 8 and "level 9" have strict requirement on battery's discharge capability. It may affect the starting-up if the battery discharges poorly and cannot provide large current in a short time. The car stutters or suddenly loses power in the starting-up process indicating the battery's discharge capability is not good; you need to reduce the punch or increase the FDR (Final Drive Ratio).
11. Drag Brake: Drag brake is the braking power produced when releasing the throttle trigger to neutral zone. This is to simulate the slight braking effect of a neutral brushed motor while coasting. (Attention! Drag brake will consume much power, so please apply it cautiously.)
Note 7: The drag brake will be void (even if you set it to any value besides 0) if the following "Coast" is not "0%".
12. Coast: It allows the motor to gradually lower RPM when reducing the throttle from full or near full speed back to neutral. The vehicle will not abruptly slow when the throttle is reduced to return to the neutral position. The bigger the value, the more the "COAST" will be felt. Example, COAST of 0 deactivates, and a COAST of 20% would be the maximum amount of COAST.
What is COAST? When a vehicle is operated with smaller pinions and larger spur gears the vehicle tends to create a feel of braking known as "gear brake". HOBBYWING COAST technology is to allow the car to roll (coast) as if the vehicle was geared with a larger pinion. The Coast function brings better and smoother control feelings to racers. Also some drivers will refer to this feel as how the traditional brushed motors felt --- they "COASTED" more because the armature with the wire on it was heavy and harder to stop spinning - in the brushless motor the rotor being relatively light stops spinning more abruptly.
13. Neutral Range: Adjust the throttle neutral zone as per your preference (as shown). Because the neutral position on some transmitters is not stable and it can cause the vehicle to go forward/backward slowly, so please set the throttle neutral width to a bigger value when this issue happens.
14. Drive Mode: Option 1: Sensored/Sensorless Hybrid. The ESC drives the motor in sensored mode during the low-speed start-up process, after that the ESC will switch to driving the motor in sensorless mode. Option 2: Full Sensored. You can select this option only when using a HOBBYWING matching motor (that means HOBBYWING new 1.8th motor without Hall sensor interference), the control feeling will be better, the efficiency of the power system will be higher, and the turbo timing of the ESC can be activated to get the maximum boost power.
Warning! 1) Do not select this option if you use a non-HOBBYWING matching motor, especially when it's a 4 pole sensorless motor, otherwise you may damage the ESC and the motor. 2) If you select this option but you forget to plug the motor sensor cable in or you connect your ESC to a sensorless motor, then the ESC will be unable to drive the motor.
15. Boost Timing: Boost Timing is adjustable from 0 degree to 15 degrees, it has three effects: 1) Compatible with different motors. Some motors may adjust this abnormality with the default Boost Timing (0), you need to adjust the timing to a proper degree and then they will work fine. 2) Fine tune the maximum RPM of the motor through adjusting this Boost Timing. The bigger the timing, the higher the RPM, and the more electric energy it will consume. 3) Make the motor operate at the optimum efficiency point through adjusting this Timing.
Attention: After you adjust the Timing, you need to check the actual effect first and then decide if it's necessary to make the adjustment.
16. Turbo Timing: Turbo Timing is adjustable from 0 degree to 15 degrees, the corresponding turbo timing (you set) will initiate at full throttle. It's usually activated on pretty long straightaway and makes the motor unleash its maximum potential.
17. Turbo Delay: Turbo delay is the time from the throttle stick/trigger is moved to the full throttle position and keeps at that point to the moment Turbo Timing is really activated. If you set this item to "INSTANT", then the Turbo Timing will be activated right after the throttle stick/trigger is moved to the full throttle position. If set it to any other values, then you need to keep the throttle stick/trigger at the full throttle position for a while (as you set) till the Turbo Timing initiates.
Note 8: "Turbo Timing" and "Turbo Delay" only function when you set the "Drive Mode" to "Full Sensored".

## 4 ESC Programming

Program your ESC with a multifunction LCD program box
You can program this XERUN XR8 PLUS through a multifunction LCD program box or a PC (HOBBYWING USB LINK software needs to be installed on the PC). Before the programming, you need to connect your ESC and the LCD program box through a cable with two JR male connectors and turn on the ESC, then 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, The "CONNECTING ESC" will be displayed, a few seconds later, the program box will display the current mode like profile 1 and then the 1st programmable item like Running Mode. You can adjust the setting through "ITEM" & "VALUE" buttons, and then press the "OK" button to save new settings to your ESC.



## 5 Factory Reset

- Restore the default values with the SET button: Press and hold the SET button for over 3 seconds anytime when the throttle trigger is at the neutral position (except during the ESC calibration) can factory reset your ESC. RED & GREEN LEDs flash simultaneously indicating you have successfully restored all the default values within your ESC. Once you power the ESC off, and then back on, your settings will be back in the default mode.
• Restore the default values with a multifunction LCD program box: After connecting the program box to the ESC, continuously press the "ITEM" button on the program box until you see the "RESTORE DEFAULT" item, and then press "OK" to factory reset your ESC.

# 07 Status of LEDs

- 1. During the Start-up Process: 1) The RED LED keeps flashing rapidly indicating the ESC doesn't detect any throttle signal or the neutral throttle value stored on your ESC may be different from the current value stored on the transmitter. 2) The GREEN LED flashes "N" times indicating the number of LiPo cells you have connected to the ESC.
2. In Operation: 1) RED & GREEN LEDs die out when the throttle trigger is in the throttle neutral zone. 2) The RED LED turns on solid when your vehicle runs forward. The GREEN LED will also come on when pulling the throttle trigger to the full (100%) throttle endpoint. 3) The RED LED turns on solid when you brake your vehicle, the GREEN LED will also come on when pushing the throttle trigger to the full brake endpoint and setting the "brake amount/maximum brake force" to 100%. 4) The RED LED turns on solid when you reverse your vehicle.
3. Some Protection is Activated: 1) The RED LED flashes a short, single flash that repeats (☆, ☆, ☆) indicating the low voltage cutoff protection is activated. 2) The GREEN LED flashes a short, single flash that repeats (☆☆, ☆, ☆) indicating the ESC thermal protection is activated. 3) The GREEN LED flashes a short, double flash that repeats (☆☆☆, ☆, ☆☆) indicating the motor thermal protection is activated. 4) The RED & GREEN LEDs flash a short, single flash that repeats (☆☆, ☆, ☆) at the same time indicating the drive mode has been automatically switched to sensorless mode from sensored mode because of abnormal sensor signal when pairing the ESC with a sensorless motor.

# 08 Trouble Shooting

Table with columns: Trouble(s), Possible Causes, and Solution(s). Troubles include ESC unable to start, motor not starting, ESC unable to start after power on, vehicle running backward, motor stopped/reduced output, motor stuttered, vehicle running forward/brake but not reverse, car running slowly, LCD program box stuck, and GREEN/RED LEDs flashing rapidly.