![HOBBYWING logo]

XERUN
USER MANUAL
Brushless Electronic Speed Controller
XERUN XR10 STOCK SPEC

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01 Introduction

⚠ ATTENTION
⚠ CAUTIONS
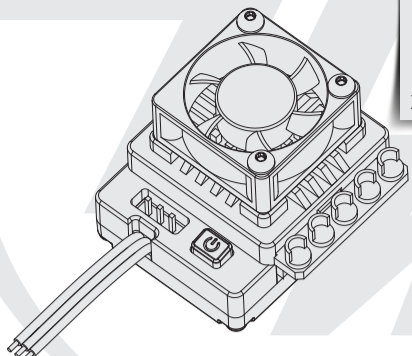
Congratulations and thank you for your trust in Hobbywing product. By purchasing the XERUN XR10 STOCK SPEC, you have chosen a high performance sensored brushless electronic speed controller! This speed controller is equipped with high-tech features to enhance your experience with Hobbywing brushless power systems. Improper usage and unauthorized modification to our product is extremely dangerous and may damage the product and related devices. Please take your time and read the following instructions carefully before you start using your speed control. We have the right to modify our product design, appearance, features and usage requirements without notification.

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02 Warnings

• To avoid short circuits, ensure that all wires and connections must be well insulated before connecting the ESC to related devices.
• Ensure all devices are well connected to prevent poor connections and avoid damages to your electronic devices.
• 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 50W to solder all input/output wires and connectors.
• Do not hold the vehicle in the air and rev it up to full throttle, as rubber tires can "expand" to extreme size or even crack to cause serious injury.
• Stop immediate usage once the casing of the ESC exceeds 90°C/194°F as this may cause damages to both the ESC and motor. Hobbywing recommends setting the "ESC Thermal Protection" to 105°C/221°F (this refers to the internal temperature of the ESC).
• Users must always disconnect the batteries after use as the current on the ESC is consuming continuously if it is connected to the batteries (even if the ESC is turned off). The battery will completely be discharged and may result in damage to the battery or ESC when it is connected for a long period of time. This WILL NOT be covered under warranty.
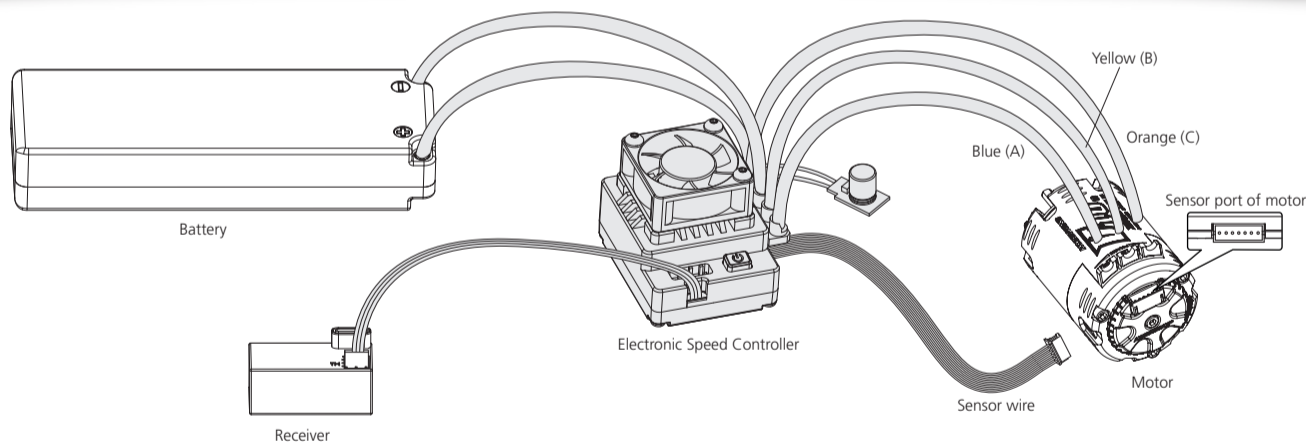
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03 Features

• 5 select-to-use profiles including zero-timing/blinky mode, stock mode particularly applicable to the Stock class of 1/10th touring car and buggy racing.
• Innovative double-switch design (a built-in electronic switch & an external detachable switch), the external switch is really handy when the car shell is installed on and the internal switch is no longer touchable.
• Built-in switch mode BEC with a maximum output of 6A and voltage adjustable between 6V and 7.4V for usage with high voltage servos.
• Small size makes the installation convenient, light weight of 28g (w/o wires) provides more weight margin when adjusting the balance of the chassis.
• Separate PRG/FAN port is able to power an external fan for maximize cooling performance or connect a LCD program box or WiFi module to the ESC.
• With the New WIFI express module from Hobbywing, users are able to program parameters, upgrade firmware and check relevant data during the event using either the Iphone or Andriod devices.
• New brakes and throttle functions: 100 levels of drag brake, 50 levels of initial brake force, 9 levels of maximum brake force, 20 levels of brake rate, and 30 levels of throttle rate.
• Adjustable brake mode, PWM and brake frequencies and for different competitions and control feel.
• Adjustable Turbo Timing & Boost Timing for different applications.
• Softening function (HOBBYWING-initiated) for milder or wilder driving control and better driving efficiency.
• Multiple protections: low-voltage cutoff protection, ESC and motor thermal protection, and fail safe (throttle signal loss protection).
• Data logging for recording the maximum ESC/motor temperature, motor speed/RPM, and others in real time.
• Firmware upgrade via Hobbywing multifunction LCD program box or WiFi Express (item sold separately).

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04 Specifications

Model	XERUN XR10 STOCK SPEC
Cont. / Peak Current	80A / 380A
Motor Type	Sensored / Sensorless Brushless Motors
Applications	Stock Class of 1/10th Touring Car and Buggy Racing
Motor Limit (*Note 1)	Brushless Motor Limit with 2S LiPo/6S NiMH: (Touring Car) T≥10.5T, (Buggy) T≥13.5T
LiPo / NiMH Cells	2S LiPo / 6S NiMH (Only)
BEC Output	6V/7.4V Switchable, Continuous Current of 3A (Switch-mode)
Cooling Fan	Powered by the stable BEC voltage of 6V/7.4V
Connectors	Input End: No Connectors; Output End: No Connectors
Size/Weight	31.5 x 25.6 x16.1mm (w/o fan) / 54.5g (w/ wires)
Programming Port	PRG/FAN Port (*powered by the built-in BEC)

Note 1: The recommended T counts are only applicable with the standard 3650/540 size (3 slot 2 pole) motors when ESCs are in blinky mode.

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05 Connections

Yellow (B)
Orange (C)
Blue (A)
Sensor port of motor
Battery
Sensor wire
Electronic Speed Controller
Motor
Receiver

⚠ ATTENTION 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. Motor Wiring
The motor wiring is different between the sensored and the sensorless; please only follow the introductions below.
• 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. 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.
• Sensorless Motor Wiring
Users do not need to be worried in regards to the connectivity with the A/B/C(ESC and motor) as there is no polarity. You may find it necessary to swap two wires if the motor runs in reverse.
2. Receiver Wiring
The throttle control cable on the ESC has to be plugged into the throttle (TH) channel on the receiver. The throttle control cable has a output voltage of 6V/7.4V to the receiver and steering servo, hence, no separate battery can be connected to the receiver. Otherwise, your ESC may be damaged.
3. External switch Connecting (Optional):
A detachable switch (stock accessory) is included in the product box. You only need to plug this switch into the 3-pin port marked with "SW" when you want to use external switch (instead of the built-in electronic switch).
3. Battery Wiring
Proper polarity is essential. Please ensure positive (+) connects to positive (+), and negative (-) connects to negative (-) when plugging in the battery! When reverse polarity is applied to the ESC from the battery, it WILL damage the ESC. This WILL NOT be covered under warranty!

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06 ESC Setup

① ESC/Radio Calibration

Begin using your ESC by calibrating with your transmitter. We strongly recommend Hobbywing users to use the "Fail Safe" function on the radio system and set (F/S) to "Output OFF" or "Neutral Position". Example of calibrating Neutral range and Endpoint. (*The operation is same when you're using the external switch.)

Release the ON/OFF button once the LED flashes.
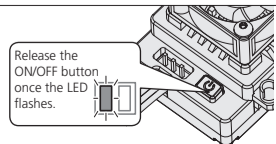
1. Turn on the transmitter, ensure all parameters (D/R, Curve, ATL) on the throttle channel are at default (100%). For transmitter without LCD, please turn the knob to the maximum, and the throttle "TRIM" to 0. Please also turn the corresponding knob to the neutral position. For FutabaTM transmitter, the direction of throttle channel shall be set to "REV", while other radio systems shall be set to "NOR". Please ensure the "ABS/braking function" of your transmitter must be DISABLED.
2. Start by turning on the transmitter with the ESC turned off but connected to a battery. Holding the "ON/OFF" button, the RED LED on the ESC starts to flash (Note 2: the motor beeps at the same time), and then release the ON/OFF button immediately.
Note 2: Beeps from the motor may be low sometimes, and you can check the LED status instead.

(right column)

Move the throttle trigger to the neutral position
Press the ON/OFF button. The Green LED flashes once and motor emits "Beep" tone.

Move the throttle trigger to the end position of forward
Press the ON/OFF button. The Green LED flashes twice andmotor emits "Beep-Beep" tone.

Move the throttle trigger to the end position of backward
Press the ON/OFF button. The Green LED flashes three times and motor emits "Beep-Beep-Beep" tone.

3. Set the neutral point, the full throttle endpoint and the full brake endpoint.
• Leave transmitter at the neutral position, press the "ON/OFF" 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 "ON/OFF" 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 "ON/OFF" button, the GREEN LED blinks 3 times and the motor beeps 3 times to accept the full brake endpoint.
4. The motor can be started 3 seconds after the ESC/Radio calibration is complete.

② Power On/Off

Attention! The temperature of its aluninum housing may be very high when there is heavy load. For precaution, we recommend users to have a fan blown towards the ESC.
(Start with the ESC turned off), press the ON/OFF button to turn on the ESC (the indication LED comes on); and press the ON/OFF button again to turn off the ESC (the indication LED dies out).
Note 3: Do not turn off the ESC when the motor is spinning. The sudden stoppage may result in unwanted damages to both the motor and ESC. If there is an emergency, battery plugs can be pulled out to switch the ESC off.

③ Programmable Items

Section	Item	Programmable Items	Parameter Values									
General Setting	1A	Running Mode	Forward with Brake	Forward/ Reverse with Brake	Forward and Reverse							
	1B	Max. Reverse Force	25%	50%	75%	100%						
	1C	Cutoff Voltage	Disabled	Auto	3.0-8.0V Adjustable (Step:0.1V)							
	1D	ESC Thermal Protection	105°C/221°F	125°C/257°F	Disabled							
	1E	Motor Thermal Protection	105°C/221°F	125°C/257°F	Disabled							
	1F	BEC Voltage	6.0V	7.4V								
	1G	Remote Off	Enabled	Disabled								
	1H	Sensor Mode	Full Sensored									
Throttle Control	2A	Throttle Rate Control	1-30 Adjustable (Step: 1)									
	2B	Throttle Curve	Linear	Customized								
	2C	Neutral Range	4%	6%	8%							
	2D	Coast	0%-20% Adjustable (Step: 1%)									
	2E	PWM Drive Frequency	1K	2K	4K	8K	12K	16K				
	2F	Softening Value	0-25° Adjustable (Step: 1°)									
	2G	Softening Range	0%	10%	20%	25%	30%	35%	40%	45%	50%	
Brake Control	3A	Drag Brake	0%-100% Adjustable (Step: 1%)									
	3B	Max. Brake Force	0%	12.5%	25%	37.5%	50%	62.5%	75%	87.5%	100%	
	3C	Initial Brake Force	=Drag brake	0%-50% Adjustable (Step: 1%)								
	3D	Brake Rate Control	1-20 Adjustable (Step: 1)									
	3E	Brake Curve	Linear	Customized								
	3F	Brake Frequency	0.5K	1K	2K	4K						
	3G	Brake Control	Linear	Traditional	Hybrid							
Timing	4A	Boost Timing	0-64° Adjustable (Step: 1°)									
	4B	Boost Timing Activation	RPM	Auto								
	4C	Boost Start RPM	500-35000 RPM Adjustable (Step: 500RPM)									
	4D	Boost End RPM	3000-60000 RPM Adjustable (Step: 500RPM)									
	5A	Turbo Timing	0-64° Adjustable (Step: 1°)									
	5B	Turbo Delay (sec)	Instant	0.05	0.1 / 0.15	0.2 / 0.25	0.3 / 0.35	0.4 / 0.45	0.5 / 0.6 / 0.7 / 0.8	0.9	1.0	
	5C	Turbo Increase Rate (degree/0.1sec)	6	12	18	24	30	Instant				
	5D	Turbo Decrease Rate (degree/0.1sec)	6	12	18	24	30	Instant				

Note 4: Item 4C (Boost Start RPM) & item 4D (Boost End RPM) are not programmable if item 4B (Timing Activation) is set to "Auto".

1A. Running Mode
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" functions. Hobbywing has adopted the "DOUBLE-CLICK" method, that is your vehicle only brakes on the 1st time you push the throttle trigger forward (brake) (1st push). The motor stops when you quickly release the throttle trigger and then re-push the trigger quickly (2nd push), only then the vehicle will reverse. The reverse function will not work if your car does not come to a complete stop. The vehicle only reverses after the motor stops. This method is for preventing vehicle from being accidentally reversed.
Option 3: Forward and Reverse
This mode is often used by special vehicles (rock crawler). It adopts the "SINGLE-CLICK" method. The vehicle will reverse immediately when you push the throttle trigger forward (brake).
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. Cutoff Voltage
Sets the voltage at which the ESC lowers or removes power to the motor in order to either keep the battery at a safe minimum voltage (for LiPo batteries). The ESC monitors the battery voltage all the time, it will immediately reduce the power to 30% (in 3 seconds) 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. Please set the "Cutoff Voltage" to "Disabled" or customize this item 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. You need to select this option when you are using a NiMH pack.
Option 2: Auto
The ESC calculates the corresponding cutoff voltage as per the number of LiPo cells it detects and the "3.3V/cell" rule. For example, if the ESC detects a 2S, the cutoff voltage for the battery shall be 6.6V.
Option 3: Customized
The customized cutoff threshold is a voltage for the whole battery pack (adjustable from 3.0V to 8.0V). Please calculate the value as per the number of LiPo cells you are using. For example, when you use a 2S and you want the cutoff voltage for each cell is 2.8V, you will need to set this item to 5.6V.
1D. 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.
1E. 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-Hobby wing 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.
1F. 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: 7.4V
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.
1G. Remote Off
Option 1: Enabled
Users can simply push and hold the brake trigger for 6 seconds. This option allows the user to turn off the ESC without pushing the ON/OFF button switch.
Option 2: Disabled
Users must turn off the ESC by pressing the ON/OFF switch button from the ESC.
1H. Sensor Mode
Full Sensored
The power system will work in the "sensored" mode at all times. The efficiency and drivability of this mode is at the highest.
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 at 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) and will not be as smooth.
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. 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 20% would be the maximum amount of COAST.

What is COAST?

When a vehicle has a larger final drive ratio, the tenancy 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 5: The "Coast" will be void (even if you set it to any value besides 0) if the above "drag brake" is not "0%".

2E. 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.

2F. 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 create this softening function to solve the issue.

2G. 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%.

3A. Drag Brake

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. It's not recommended for buggy and monster truck.

(**Attention!** Drag brake will consume more power and heat will be increased, apply it cautiously.)

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. Initial Brake Force

It is also known as "minimum brake force". It is the force when pushing throttle trigger from neutral zone to the initial brake position. To get a smoother braking effect, the default is equal to the drag brake.

3D. 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.

3E. Brake Curve

This item is used for regulating the relation between the throttle range in brake zone and the brake force. The default setting is linear. You can change it to non-linear via a LCD program box and a PC (HOBBYWING USB LINK software needs to be installed on the PC.) for different braking effect.

3F. 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.

3G. Brake Control

Option 1: Linear

Hobbywing has recommended using this mode under all circumstances. The braking effect is a bit weaker in this mode than in Traditional brake mode, but it's easy to control and brings great control feel.

Option 2: Traditional

This brake mode is the same as to the XERUN series of ESCs, the brake force is stronger.

Option 3: Hybrid

The ESC switches the brake mode between Linear and Traditional as per the vehicle speed to prevent the slide (between tires and track) from affecting the braking effect.

Note 6: Please select the right mode for your vehicle as per the track condition, motor performance, and etc.

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 RPM (when "Boost Timing Activation" set to "RPM") or throttle amount (when "Boost Timing Activation" set to "Auto") in the operation. The Boost Timing is not constant but variable.

4B. Boost Timing Activation

Option 1: RPM

In RPM mode, the ESC adjusts the Boost Timing dynamically as per the motor speed (RPM). The actual Boost Timing is 0 when the RPM is lower than the Boost Start RPM. The Boost Timing changes as per the RPM when the RPM change is between the Boost Start RPM and the Boost End RPM. For example, if the Boost Timing is set to 5 degrees and the Boost Start RPM is 10000, the Boost End RPM is 15000. The Boost Timing corresponds to different RPM is shown below. When the RPM is higher than the Boost End RPM, the actual Boost Timing is the value you had previously set.

RPM (Motor Speed)	<10000	10001-11000	11001-12000	12001-13000	13001-14000	14001-15000	>15000
Actual Boost Timing	0 Degree	1 Degree	2 Degree	3 Degree	4 Degree	5 Degree	5 Degree

Option 2: Auto

In Auto mode, the ESC adjusts the Boost Timing dynamically as per the throttle amount. Only at full throttle, the actual Boost Timing is the value you had previously set.

4C. Boost Start RPM

This item defines the RPM at which Boost Timing is activated. For example, when the Boost Start RPM is set to 5000, the ESC will activate the corresponding Boost Timing when the RPM goes above 5000. The specific value is determined by the Boost Timing and the Boost End RPM you had previously set.

4D. Boost End RPM

This item defines the RPM at which Boost Timing (you specifically set) is applied. For example, when Boost Timing is set to 10 degrees and the Boost End RPM to 15000, the ESC will activate the Boost Timing of 10 degrees when the RPM goes above 15000. The ESC will adjust the Boost Timing accordingly as per the actual RPM when the RPM goes below 15000.

5A. Turbo Timing

This item is adjustable from 0 degree to 64 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

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

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 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.

4 Preset Modes

In order to make one firmware applicable to all different racing conditions, there are five "easy-to-select" preset modes (as shown below). Users are able to change the settings of the modes provided (and rename those modes) as per his control feel, track, and etc. For example, the name can be changed from "Open-BL 13.5T" to "TITC2016_STOCK 13.5T" to indicate the race was ran with a 13.5T motor at 2016 TITC. This can be saved for future reference as well.

Preset Modes for Different Racing:

Mode #	Modes/Profiles	Applications
1	Zero Timing	All Stock racing requiring users to use Zero timing (/blinky) program on their ESCs.
2	Stock-13.5T	13.5T Open Stock class of 1/10th touring car racing
3	Stock-17.5T	17.5T Open Stock class of 1/10th touring car racing
4	Crawler	1/10th rock crawler
5	Drift	1/10th drift car

Default Settings of Different Preset Modes:

Section	Item	Programmable Item	Zero Timing	Open-BL 13.5T	Open-BL 17.5T	Crawler	Drift
General Setting	1A	Running Mode	For/Brake	For/Brake	For/Brake	For/Rev	For/Brake
	1B	Max. Reverse Force	25%	25%	25%	100%	25%
	1C	Cutoff Voltage	Auto	Auto	Auto	Auto	Auto
	1D	ESC Thermal Protection	105℃/221F	105℃/221F	105℃/221F	105℃/221F	105℃/221F
	1E	Motor Thermal Protection	105℃/221F	105℃/221F	105℃/221F	105℃/221F	105℃/221F
	1F	BEC Voltage	6.0V	6.0V	6.0V	6.0V	6.0V
	1G	Remote Off	Enabled	Enabled	Enabled	Disabled	Enabled
	1H	Sensor Mode	Full Sensored	Full Sensored	Full Sensored	Full Sensored	Full Sensored
Throttle Control	2A	Throttle Rate Control	30	30	30	20	20
	2B	Throttle Curve	linear	linear	linear	linear	linear
	2C	Neutral Range	6%	6%	6%	6%	6%
	2D	Coast	0%	0%	0%	0%	0%
	2E	PWM Drive Frequency	2K	4K	4K	4K	4K
	2F	Softening Value	0Deg	0Deg	0Deg	0Deg	0Deg
	2G	Softening Range	0%	0%	0%	0%	0%
Brake Control	3A	Drag Brake	0%	5%	5%	100%	0%
	3B	Max. Brake Force	100%	87.5%	87.5%	100%	75%
	3C	Initial Brake	=drag Brake	=drag Brake	=drag Brake	=drag Brake	=dragBrake
	3D	Brake Rate Control	20	20	20	20	10
	3E	Brake Curve	linear	linear	linear	linear	linear
	3F	Brake Frequency	1K	1K	1K	1K	1K
	3G	Brake Control	Traditional	Linear	Linear	Traditional	Traditional
Timing	4A	Boost Timing	0 Deg	30 Deg	30 Deg	0 Deg	0 Deg
	4B	Boost Timing Activation	RPM	Auto	Auto	RPM	RPM
	4C	Boost Start RPM	6000	4000	2000	6000	6000
	4D	Boost End RPM	22500	12000	8000	22500	22500
	5A	Turbo Timing	0 Deg	25 Deg	35 Deg	0 Deg	0 Deg
	5B	Turbo Delay (sec)	0.3	0.2	0.1	0.3	0.3
	5C	Turbo Increase Rate (deg/0.1sec)	12	24	24	12	12
	5D	Turbo Decrease Rate (deg/0.1sec)	24	18	18	24	24

5 ESC Programming

1) Program your ESC with a multifunction LCD program box.

You can program this XR10 STOCK SPEC ESC via a multifunction LCD program box or via a multifunction LCD program box & a PC (HOBBYWING USB LINK software needs to be installed on the PC). Before programming, you need to connect your ESC and the LCD 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" button to save new settings to your ESC.

2) Program your ESC with a WiFi Module

The XR10 STOCK SPEC ESC can also be programmed via a WiFi module along with smart phone devices (HOBBYWING WiFi LINK software needs to be installed on the smart phone). Before programming, users will need to plug the programming cable on the WiFi module into the programming port on ESC and switch on the ESC. For detailed information about ESC programming via WiFi module, please refer to the user manual of Hobbywing's WiFi Express.

External Programming Port for Connecting Program Card or WiFi module.

Attention! This ESC has a separate programming port. Please don't use the throttle control cable (also called Rx cable) on the ESC to connect the program box; otherwise the program box won't function.
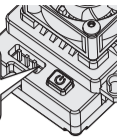
3) Data Checking

The ESC is able to record the maximum ESC temperature, maximum motor temperature, minimum battery voltage and maximum motor speed in operation. 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 program box whenever necessary.

Users need to switch on the ESC after connection between the program box and the ESC has been established. Press the "R/P" button on an "item" page followed by pressing the "R/P" button again multiple times. The following 5 item pages will be displayed circularly: Mode → ESC Temperature→ Motor Temperature → Min Voltage→ Max RPM.

Attention!

• Press the "VALUE" button on any data-recording page can get you into the next preset mode. Please note that improper operation will get you into other preset mode(s).

• Press the "ITEM" button on any data-recording page can get you to the parameter setting page of the current preset mode; press the "R/P" button if you want to return to the data-recording page

6 Factory Reset

• **Restore the default values with a multifunction LCD program box**

After connecting the program box to the ESC, continue to select the "ITEM" button on the program box until you the "RESTORE DEFAULT" item, and press "OK" to factory reset your ESC.

• **Restore the default values with a WiFi module (& WiFi Link)**

After connecting the WiFi module to the ESC, open the HOBBYWING WiFi LINK software on your smart phone, select "Parameters" followed by "Factory Reset" to reset the ESC.

07 Explanation for LED Status

1. During the Start-up Process

• The RED LED turns on solid indicating the ESC doesn't detect any throttle signal or the throttle trigger is at the neutral position.

• The GREEN LED flashes rapidly indicating the neutral throttle value stored on your ESC may be different from the current value stored on the transmitter. When this happens, re-calibrate the throttle range.

2. In Operation

• The RED LED turns on solid and the GREEN LED dies out when the throttle trigger is in the throttle neutral zone. The RED LED will blink slowly (to confirm with ROAR's Sportman (or Zero Timing) rules) if the total value of Boost Timing and Turbo timing is 0.

• 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.

• The RED LED dies out and the GREEN LED blinks when you brake. The GREEN LED turns solid when pushing the throttle trigger to the full brake endpoint and setting the "maximum brake force" to 100%.

• 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

• RED LED flashes a short, single flash and repeats "☆, ☆, ☆" indicating the low voltage cutoff protection is activated.

• 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.

• RED & GREEN LEDS flash a short, single flash and repeats "☆, ☆, ☆" at the same time indicating the drive mode has been automatically switched to sensorless mode from senored mode because of abnormal sensor signal when pairing the ESC with a sensored motor.

08 Trouble Shooting

Trouble(s)	Possible Causes	Solution(s)
The ESC was unable to start the status LED, the motor, and the cooling fan after it was powered on.	1. No power was supplied to the ESC. 2. The ESC was damaged.	Check if all ESC & battery connectors have been well soldered or firmly connected.
The ESC was unable to start the motor, but the RED LED on the ESC turned on solid.	The throttle cable was reversely plugged into the TH channel or plugged into wrong channel on the receiver.	Plug the throttle cable into the throttle channel (CH2) by referring to relevant mark shown on your receiver.
The vehicle ran backward when you pulled the throttle trigger towards you.	1. The (ESC-to-motor) wiring order was incorrect. 2. Your chassis is different from popular chassis.	1. Swap any two (ESC-to-motor) wires if you are using a sensorless motor. 2. There is nothing you can do if you are using a sensored motor and your chassis is different from popular chassis.
The motor suddenly stopped or significantly reduced the output in operation.	1. The receiver was influenced by some foreign interference. 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 soldering points, please re-solder if necessary. 2. Contact the distributor for repair or other customer service.
The vehicle could run forward (and brake), but could not move.	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. No LED on the ESC will come on when the throttle trigger is at the neutral position. 2. Set the "Running Mode" to "Fwd/Rev with Brk ". 3. Contact the distributor for repair or other customer service.
The motor got stuck or stopped when increasing the throttle at starting up.	1. Poor discharging capability of the pack. 2. The RPM of the motor was too high, or the FDR was too low. 3. Set the "Punch/Start Mode" to a high level.	1. Change another pack with great discharging capability. 2. Change a low-speed motor, or increase the FDR. 3. Set the punch/start mode to a low level.
The RED & GREEN LEDS on the ESC flashed rapidly at the same time when the throttle trigger was at the neutral position.	(When pairing with a sensored motor) the ESC automatically switched to sensorless mode when it detected incorrect signal from Hall sensor.	1. Check if the sensor cable is loose or poor contact issue exists. 2. Hall sensor inside the motor is damaged.
The motor stuttered but couldn't start.	1. The (ESC-to-motor) wiring order was incorrect. 2. The ESC was damaged.	1. Check if the wiring order is A-A, B-B, and C-C. 2. Contact the distributor for repair or other customer service.

09 Guidance

1 Recommended Power Configuration

T Count	KV	FDR (1/10th Touring Car)*	FDR (1/10th Buggy)*	Applications
10.5T	3800KV	4.5 − 5.5	6.5 − 8.0	1/10th Drift, Stock class racing.
13.5T	3000KV	4.0 − 5.0	6.5 − 7.5	1/10th Stock class racing (popular racing in Europe and Asia).
17.5T	2300KV	3.0 − 4.5	5.5 − 7.0	1/10th Stock class racing (popular racing in USA).
21.5T	1900KV			1/10th rock crawler and Stock class racing.
25.5T	1500KV			1/10th rock crawler and Stock class racing.

Note 7: All the above FDRs are the FDRs recommended for 1/10th scale vehicles using a 2S LiPo battery, zero-timing ESC firmware with Boost Timing & Turbo Timing not activated. In general, the FDR should be increased accordingly when the Boost timing & Turbo Timing is activated.

2 Basic rules on power system adjustment for OPEN STOCK class of touring car racing

Note: this section is applicable to the situation when the motor limit is regulated and the ESC timing is not regulated.

1) You can get a higher top end speed via the following methods:

• Decrease the FDR (by using a bigger pinion within the reasonable range)

• Increase the Timing. If you only want to increase the top end speed on straightaway, you can increase the Turbo timing. If you want to increase the speed at different sections of the entire track, you can increase the Boost timing.

• Change another battery with higher discharge capability.

2) You can get a higher acceleration via the following methods:

• Increase the FDR (by using a smaller pinion within the reasonable range).

• Increase the throttle acceleration.

• Increase the Boost Timing.

• Decrease the Boost Start RPM & the Boost End RPM.

• Decrease the Turbo Delay.

• Increase the Turbo Increase Rate.

3) You can get a lower motor temperature and a longer run time via the following methods:

• Increase the FDR (by using a smaller pinion within the reasonable range)

• Decrease the Timing

• Increase the Boost Start RPM & the Boost End RPM.

• Increase the Turbo Delay.

• Decrease the Turbo Decrease Rate.

Note: Please adjust the FDR and other parameters slightly (feel and test the ESC and motor temperatures after every adjustment.), keep trying different settings until you get the "satisfactory" speed and the acceptable motor/ESC temperature. You can also save the "setting" for future reference or use.