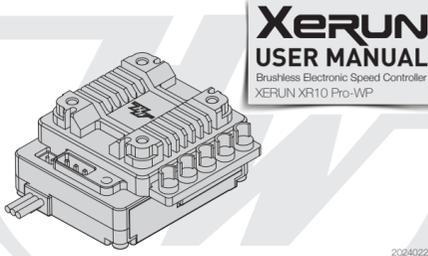


01 Introduction



Thank you for purchasing this HOBBYWING product! Please read this declaration carefully before use, once you use the product, we will assume that you have read and agreed with all the content. Brushless power systems can be very dangerous and any improper use may cause personal injury and damage to the product and related devices, so please strictly follow the instruction during installation and use. Because we have no control over the use, installation, or maintenance of this product, no liability may be assumed for any damages or losses resulting from the use of the product. We do not assume responsibility for any losses caused by unauthorized modifications to our product. We have the right to modify our product design, appearance, features and usage requirements without notification. We, HOBBYWING, are only responsible for our product cost and nothing else as a result of using our product. Regarding the possible semantic difference between two different versions of declaration, for users in mainland China, please take the Chinese version as standard; for users in other regions, please take the English version as standard.

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HW-SMA540DUL00

02 Warnings

- To avoid short circuits, ensure that all wires and connections are well insulated before connecting the ESC to related devices.
- Ensure all devices in the system are connected correctly to prevent any damage to the system.
- Read the manuals of all the items being used in the build. Ensure gearing, setup, and overall install is correct and reasonable.
- 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 rev it up to full throttle, as rubber tires can "expand" to extreme size or even crack to cause serious injury.
- Stop usage if the casing of the ESC exceeds 90°C / 194°F as this may cause damage to 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).
- The battery must be disconnected after use. There is a small draw even when the system is off, and will eventually fully drain the battery. This may cause damage to the ESC, and will NOT BE COVERED UNDER WARRANTY.

03 Features

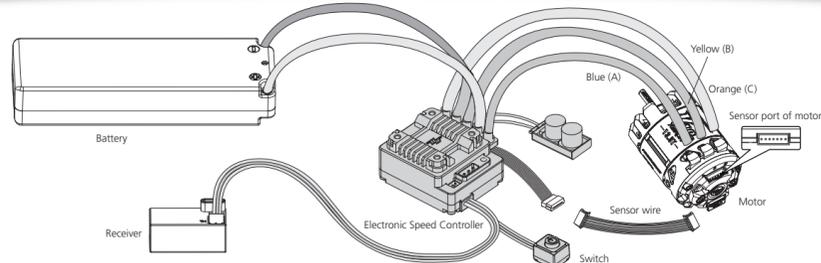
- 9 select-to-use profiles applicable to all 1/10 RC car racing.
- Excellent waterproof and dustproof performance, fearless of various weather conditions.
- Separate PRO-FAN port is able to power an external fan for maximize cooling performance or connect a LCD program box or OTA Programmer to the ESC.
- Variable frequency regulation of PWM & brake frequencies allows users to precisely regulate the driving & braking forces (of the motors).
- 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), reverse polarity protection (the external standard cappaack will still be damaged if battery reversal occurs).
- Data logging for recording the maximum ESC/motor temperature, motor RPM, and others in real time.
- Firmware upgrade via Hobbywing multifunction LCD program box or OTA Programmer (item sold separately).

04 Specifications

Model	XERUN XR10 Pro-WP
Cont./Peak Current	160A/200A
Motor Type	Sensored / Sensorless Brushless Motors
Applications	1/10 Touring/Buggy racing, 1/10 Drift/F1, Rally
Motor Limit	Touring Car: >4.5T Buggy: >5.5T
LiPo Cells	2S LiPo (Only 2S)
BEC Output	5-7.4V Adjustable, Continuous Current of 5A (Switch-mode)
Cooling Fan	Powered by the stable BEC voltage of 5-7.4V
Size	37.3x37.2x19.6mm (w/o fan)
Weight	95.6g (w/ wires)
Programming Port	PRO/FAN Port

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

05 Connections



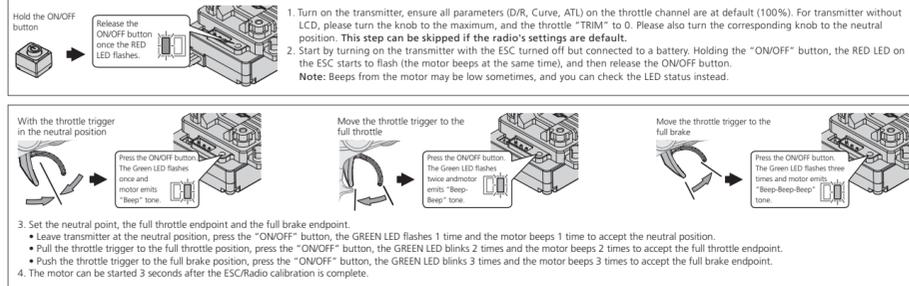
This is an extremely powerful brushless motor system. For your safety and the safety of those around you, we strongly recommend removing the pinion gear attached to the motor before performing calibration and programming functions with this system. It is also advisable to keep the wheels in the air when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

- Motor Connection**
Sensored motor connection MUST connect A from the ESC to A on the motor, B to B, and C to C, with the sensor wire connected any variation of the motor to ESC connections may cause damage.
Note: If the motor direction is reversed, change the parameter item "Motor Rotation" to achieve the correct setting.
- Receiver Connection**
The throttle control cable on the ESC has to be plugged into the throttle (TH) channel on the receiver. The throttle control cable has an output voltage of 5-7.4V to the receiver and steering servo, hence, no separate battery can be connected to the receiver. Otherwise, your ESC may be damaged if additional power is required, disconnect the red wire on the throttle plug from the ESC.
- Battery Connection**
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, the external standard cappaack will be damaged.

06 ESC Setup

1 Set the Throttle Range - ESC Calibration Process

You must calibrate throttle range when you begin to use a new ESC, the transmitter has been replaced, or the Throttle TRIM has been adjusted, otherwise the ESC cannot work correctly. We strongly recommend users to use the "Fail Safe" function on the radio system and set (FS) to "Output OFF" or "Neutral Position". The throttle calibration steps are below:



2 Power On/Off

Short press the power button to turn on the ESC in the off state, and long press the power button to turn off the ESC. Attention! To prevent accidental shutdown in racing, pressing the power button cannot shut down the esc while the motor is running, if there is an emergency, battery plugs can be pulled out to turn off the ESC.

3 Programmable Items

Section	Item	Programmable Items		Parameter Values													
General Setting	1A	Running Mode	Forward with Brake	Forward/ Reverse with Brake	Forward	Reverse											
	1B	Max. Reverse Force	25%	50%	75%	100%											
	1C	Cutoff Voltage	Disabled	Auto (3.5V/Cell)			3.0-7.4V Adjustable (Step: 0.1V)										
	1D	ESC Thermal Protection	Disabled	105°C/221°F	125°C/257°F												
	1E	Motor Thermal Protection	Disabled	105°C/221°F	125°C/257°F												
	1F	BEC Voltage					5.0V-7.4V Adjustable (Step:0.1V)										
	1G	Smart Fan	Disabled	Enabled													
	1H	Remote Off	Disabled	Enabled													
	1I	Motor Rotation	CCW	CW													
	1J	Phase-AC Swap	Disabled	Enabled													
	Throttle Control	2A	Throttle Rate Control					1-30 Adjustable (Step: 1)									
2B		Throttle Curvature	-10~10 Adjustable (Step: 1)					Customized									
2C		Neutral Range					3%-10% Adjustable (Step: 1%)										
2D		Initial Throttle Force					1-15 Adjustable (Step: 1)										
2E		Coast					0%-15% Adjustable (Step: 1%)										
Brake Control	2F	PWM Drive Frequency	1K	2K	4K	8K	12K	16K	24K	32K	Customized						
	2G	Softening Value								0-30° Adjustable (Step: 1°)							
	2H	Softening Range	0%	10%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%	70%	75%	
	3A	Drag Brake Force									0%-100% Adjustable (Step: 1%)						
	3B	Drag Brake Rate		Auto							1-20 Adjustable (Step: 1)						
	3C	Max. Brake Force									0%-150% Adjustable (Step: 1%)						
	3D	Brake Rate Control									1-20 Adjustable (Step: 1)						
	3E	Brake Frequency	0.5K	1K	2K	4K	8K	12K	16K			Customized					
	3F	Brake Control		Linear		Traditional		Hybrid									
	4A	Boost Timing										0-64° Adjustable (Step: 1°)					
Timing	4B	Boost Timing Activation		RPM		Auto											
	4C	Boost Start RPM									500-35000RPM (Step: 500RPM)						
	4D	Boost End RPM									3000-60000RPM (Step: 500RPM)						
	5A	Turbo Timing									0-64° Adjustable (Step: 1°)						
	5B	Turbo Delay	Instant	0.05s	0.1s	0.15s	0.2s	0.25s	0.3s	0.35s	0.4s	0.45s	0.5s	0.6s	0.7s	0.8s	0.9s
5C	Turbo Increase Rate	1deg/0.1s	2deg/0.1s	3deg/0.1s	5deg/0.1s	8deg/0.1s	12deg/0.1s	16deg/0.1s	20deg/0.1s	25deg/0.1s	30deg/0.1s	Instant					
5D	Turbo Decrease Rate	1deg/0.1s	2deg/0.1s	3deg/0.1s	5deg/0.1s	8deg/0.1s	12deg/0.1s	16deg/0.1s	20deg/0.1s	25deg/0.1s	30deg/0.1s	Instant					

Note: 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. The vehicle only brakes on the first time you push the throttle trigger to the reverse/brake position. If the motor stops when the throttle trigger returns to the neutral position and then re-push the trigger to reverse position, 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 position and push it to reverse again. This method is for preventing vehicle from being accidentally reverse.

Option 3: Forward and Reverse
The motor will reverse immediately when the throttle trigger is pushed to reverse position. This mode is generally used in special vehicles.

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

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 50% (in 2 seconds) and cut off the output 40 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 for the battery shall be 7.0V.

Option 3: Customized

The customized cutoff threshold is a voltage for the whole battery pack (adjustable from 3.0V to 7.4V).

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-Hobbywing 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

BEC voltage can be adjusted between 5.0-7.4V. Set a reasonable value according to the working voltage of the servo.

1G. Smart Fan

This esc has a fan control function. If this item is set to "Disabled", the fan will continue to run after the ESC is powered on; if this item is set to "Enabled", the fan will start running after the internal temperature of the ESC exceeds 50°C/122°F.

1H. 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.

1I. Motor Rotation/Direction

With the motor shaft faces you (the rear end of the motor is away from you), increase the throttle input, the motor (shaft) will rotate in the CCW/CW direction if the "Motor Rotation / Direction" set to "CCW/CW". Generally, the vehicle runs forward when the motor (shaft) rotates in the CCW direction. However, some vehicles only run forward when the motor rotates in the CW direction due to the different chassis design. In that case, you only need to set the "Motor Rotation/Direction" to "CW".

1J. Phase-AC Swap

If the A/C wire of ESC connect to A/C wire of motor with crossed way (A wire of ESC connects to C wire of motor, C wire of ESC connects to A wire), set this item as Enable.

Warning! When A#/B#/C wire of ESC connect to A#/B#/C wire of motor correspondingly, do not set to Enable. Otherwise it will damage the ESC and motor.

2A. Throttle Rate Control

This item is used to control the throttle response. The higher the throttle rate, the more aggressive the throttle will be applied. A suitable rate can help driver to control the vehicle properly during 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 Curvature

This parameter is used to set the throttle curve. The larger the curvature setting, the more aggressive the throttle will be applied in the previous stage; the smaller the curvature setting, the softer the throttle will be applied in the previous stage. As shown in the schematic diagram of the curve on the right.

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. Initial Throttle Force

It is 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. Some motors have strong cogging effect with low FDR, if there is any cogging with very light throttle input, you can try to increase the initial throttle force.

2E. Coast

This function allows the motor to naturally and smoothly reduce rpm/speed, and the vehicle will not experience sudden deceleration during the throttle release process. The higher the value, the stronger the "coasting" feeling.

What is COAST?

When a vehicle has a larger final drive ratio, the tendency of having a "drag" feel is higher. The "COAST" technology is to allow the car 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:

The Coast setting will not work if the drag brake is not set to 0%.

2F. 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. If set this item to "Customized", then the PWM frequency can be adjusted to a variable value at any 0-100% throttle input. Please choose the frequencies as per the actual test results of your vehicles.

2G. 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 softer 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, this is HOBBYWING's solution to help bottom end traction.

Note: you can increase the motor mechanical timing accordingly after you set the softening value. Every time you increase the softening value by 5 degrees, you can increase the mechanical timing by 1 degree. For example, if you set the softening value to 20 degrees, then you can increase the mechanical timing by 4 degrees. Please note that you will never increase the mechanical timing by over 5 degrees.

2H. Softening Range

It's the range to which "Softening Value" starts and ends. If set to 30% then the softening range will be from 0 throttle to 30% throttle.

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 normal 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, use it cautiously.)

3B. Drag Brake Rate

This parameter is used to control the speed of the drag-brake response. Setting a suitable value can improve the drag braking effect of the vehicle, thus, improving drivability to suit each user. The value can be adjusted up to 20 levels. Increasing the value will result in a greater drag brake effect. The other "Auto" option is available as well to choose from. "Auto" will intelligently adjust the drag brake acceleration according to the current speed. The faster the current speed, the smaller the drag brake rate, vice versa.

3C. Max. Brake Force

This ESC provides proportional braking, 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.

3D. Brake Rate Control

It's adjustable from 1 to 20 (step: 1). The larger the setting value, the greater the brake rate, that is, the faster the braking. 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 Frequency

The brake force will be larger if the frequency is low; you will get a smoother brake force when the value is higher. If set this item to "Customized", then the brake frequency can be adjusted to a variable value at any 0-100% throttle input. Please choose the frequencies as per the actual test results of your vehicles.

3F. 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 is a traditional brake method, just like the previous 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: 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 turns. 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 Boost Start 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 Degrees	3 Degrees	4 Degrees	5 Degrees	5 Degrees

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