

01 Introduction

asing this HOBBYWING product! Please read this declaration carefullybefor Thank you for purchasing this Prober Vinice product Prease read this declaration calefully elev-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 naintenance 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 Trom the use of the product. We do not assume responsibility of 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 result of using our product. Regarding the possible semantic different 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.

High-Performance Product Notice:

Due to the specialized nature and high-performance requirements of the intended applications, this product has been engineered to operate beyond typical standards. Consequently, it does not follow standard warranty service options for damage incurred ration. Please review the warranty section of the website for terms itions and further details. HW-SMA542DUL00

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 revit up to full throttle, as rubber tires can "expand" to extreme size or even explode and cause serious injury • Stop usage if the casing of the ESC exceeds 90°C / 194°F as this may cause damage to both the ESC and motor. Hobbywing recommends setting the "ESC Thermal Protection" to 105°C / 221°F (this refers to the

nal 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

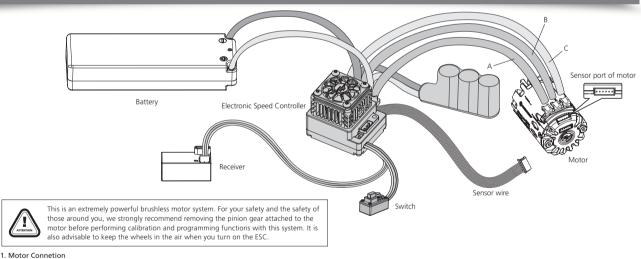
• Powerful hardware and software, designed for Drag Racing.

- Factory standard 10AWG silicone wires and super large capacitor module, everything is ready.
 RPM limit by throttle, Boost start rpm and end rpm are all finely adjustable, meeting the precise adjustment of the throttle by the driver.
 Multiple protection functions: low-voltage cutoff protection, ESC and motor thermal protection, and fail safe.
- The data recording function utilizes the OTA Bluetooth module to view various running data of the power system in the HW LINK App on mobile phones, making it easier for drivers to analyze the operation of
- Firmware upgrade via Hobbywing LCD Pro program box or OTA Programmer (item sold separately)

04 Specifications

Model	XERUN XR10 PRO DR
Cont./Peak Current	200A / 1200A
Motor Type	Sensored Brushless Motors
Applications	1/10th Drag Racing
Recommended Motor	3652/3662(540/550) size motors KV≤9800
LiPo Cells	25 Lipo
BEC Output	5-7.4V Adjustable, Continuous Current of 5A
Cooling Fan	Powered by the stable BEC voltage
Size	37.7x37.2x33.2mm(w/Fan&Fan Shroud)
Weight	137g(w/ wires)
Programming Port	Independent programming interface

05 Connections



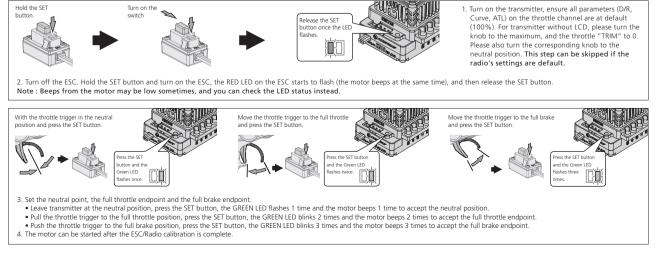
Sensored motor connection MUST connect A from the ESC to A on the motor, B to B, and C to C, with the sensor wire connected any variation of the motor to ESC connections may cause damage. Note: If the motor direction is reversed, change the parameter item "Motor Rotation" to achieve the correct setting.

- 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 eparate 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 3. Battery Connetion
- larity is essential. Please ensure positive (+) connects to positive (+), and negative (-) connects to negative (-) when plugging in the battery! If the connection is reversed, the ESC will be damaged and will not be covered by the warranty.

06 ESC Setup

Set throttle range

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



1A	Running Mode	Forward	Forward with Brake		Forward/ Reverse with Brake			Forward and Reverse		/erse	
1B	Max. Reverse Force		25%		50%			75%			100%
1C	Cutoff Voltage	Disabled Auto (3.5V/Cell)		Cell)	ell)			3.			
1D	ESC Thermal Protection	Disabled		10	15°C/221	۱°F	125°C/257°F		:		
1E	Motor Thermal Protection	D	sabled		10	5°C/221	۱°F	125°C/257°F		:	
1F	BEC Voltage							5.0V-7.4V Adjustable (Step			
1G	Motor Rotation		CCW			CW					
2A	Throttle Rate Control							1-30 Adjustable (Step:			tep: '
2B	Throttle Curve	l	inear		C	ustomiz	ed				
2C	Neutral Range							3%-10)% Adju	ustable (Step:
2D	Initial Throttle Force							1%-10	0% Adj	ustable	(Step
2E	PWM Drive Frequency	1K	2K		4K	8K	12K	16	<	24K	
2F	Softening Value							0-30	0° Adjus	table (S	tep:
2G	Softening Range	0%	10%	20%	% 25%	30)% 3	5% 40	0%	45%	5
2H	RPM Limit By Throttle				500	ORPM-	180000RP	M (Step:	5000RF	M)	
21	RPM Limit Range							0%-90	% (Ste	p: 10%	6)
2J	Max RPM Limit				500	00RPM-	225000RF	PM (Step:	5000R	PM)	
ЗA	Drag Brake Force							0%-100%	Adjusta	ble (Ste	p: 19
ЗB	Max. Brake Force				0%-100% A			0% Adj	ustable	(Step	
ЗC	Brake Rate Control							1-2	0 Adjus	table (S	tep: '
ЗD	Brake Frequency	0.5K	1K		2K	4K	8K	12	<	16K	
ЗE	Brake Control	l	inear		1	radition	al	Н	ybrid		
4A	Boost Timing							0-64	4° Adjus	table (S	tep: '
4B	Boost Timing Activation		Auto			RPM					
4C	Boost Start RPM							2000-12	0000RP	'M (Step	: 100
4D	Boost End RPM				1000	ORPM-2	00000RPN	1 Step: 1	000RPIv	1(10000	-100
4E	Boost Increase Rate					(19	°-32°)/0	1s (Step:	1°)		
5A	Turbo Timing							0-64	4° Adjus	table (S	tep: '
5B	Turbo Delay	Instant	0.05s	0.1s	0.15s	0.2s	0.25s	0.3s	0.35s	0.4	s
5C	Turbo Increase Rate	1deg/0.1	2de	eg/0.1s	3deg/0.1	s 5d	eg/0.1s	8deg/0.1	s 12d	eg/0.1s	16
5D	Turbo Decrease Rate	1deg/0.1	5 2de	eg/0.1s	3deg/0.1	s 5d	eg/0.1s	8deg/0.1	s 12d	eg/0.1s	16
	1B 1C 1C 1E 1F 2A 2B 2C 2D 2E 2F 2G 2H 2I 3B 3C 3D 3E 4A 4B 4C 4D 5E 5C	1BMax. Reverse Force1CCutoff Voltage1DESC Thermal Protection1EMotor Thermal Protection1FBEC Voltage1GMotor Rotation2AThrottle Rate Control2BThrottle Curve2CNeutral Range2DInitial Throttle Force2EPWM Drive Frequency2FSoftening Value2GSoftening Range2HRPM Limit By Throttle2IRPM Limit Ronge2JMax RPM Limit3ADrag Brake Force3BMax. Brake Force3CBrake Rate Control3DBrake Rate Control4ABoost Timing4BBoost Start RPM4DBoost Increase Rate5ATurbo Timing5BTurbo Increase Rate	1B Max. Reverse Force Image: Cutoff Voltage 1C Cutoff Voltage Image: Cutoff Voltage 1D ESC Thermal Protection Image: Cutoff Voltage 1E Motor Thermal Protection Image: Cutoff Voltage 1F BEC Voltage Image: Cutoff Voltage 1G Motor Rotation Image: Cutoff Voltage 2A Throttle Rate Control Image: Cutoff Voltage 2B Throttle Curve Image: Cutoff Voltage 2C Neutral Range Image: Cutoff Voltage 2D Initial Throttle Force Image: Cutoff Voltage 2E PWWM Drive Frequency Image: Cutoff Voltage 2G Softening Range 0% 2H RPM Limit By Throttle Image: Cutoff Voltage 2I Max RPM Limit Range Image: Cutoff Voltage 3A Drag Brake Force Image: Cutoff Voltage 3B Max. Brake Force Image: Cutoff Voltage 3B Boost Timing Activation Image: Cutoff Voltage 4B Boost Start RPM Image: Cutoff Voltage 4A Boost Increase Rate Image: Cutoff Voltage 4B Boost Increase Rate Image: Cutoff Voltage 4B Boost Increase Rate Image: Cutoff Voltage	1B Max. Reverse Force 25% 1C Cutoff Voltage Disbed 1D ESC Thermal Protection Disbed 1E Motor Thermal Protection Disbed 1F BEC Voltage CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC	1BMax. Reverse Force $2 \forall \forall$	1BMax. Reverse Force 25% 34% 1CCutoff Voltage 0 0 1	18Max. Reverse Force 25% 50% 1CCutoff Voltage 0 isabled 35% 35% 1DESC Thermal Protection 0 isabled 155% 1055% 1EMotor Thermal Protection 0 isabled 1055% 1055% 1FBEC Voltage CCW 105% 105% 105% 2AThrottle Rate Control CCW 105% 10% 10% 10% 2BThrottle Curve 11% 21% $4K$ $8K$ 2CNeutral Range 0% 10% $4K$ $8K$ 2EPWM Drive Frequency $1K$ $2K$ $4K$ $8K$ 2FSoftening Value 10% 20% 25% 30 2HRPM Limit By Throttle 10% 21% 25% 30 2HRPM Limit Range 0% 10% 25% 30 3ADrag Brake Force 10% 10% 21% $4K$ 3BMax. Brake Force 10% $1K$ $2K$ $4K$ 3BBrake Control 10% $1K$ $2K$ $4K$ 3BBrake Control 10% $1K$ $2K$ $4K$ 3BBoost Timing $0.5K$ $1K$ $2K$ $4K$ 3ABoost End RPM 10% 10% 10% 10% 3ABoost End RPM 10% 10% 10% 10% 3ABoost End RPM 10% 10% 10% 10% 3ABoost End RPM 10% 10% 10% </td <td>1BMax. Reverse Force$25\%$$50\%$1CCutoff VoltageDisabled$I = I = I = I = I = I = I = I = I = I =$</td> <td>18Max. Reverse Force$25\%$$50\%$$12$10Cutoff Voltage$0$ isable-105 C/2 I T$125$10ESC Thermal Protection0 isable-105 C/2 I T$125$16Motor Thermal Protection0 isable-105 C/2 I T$125$16Motor Rotation$C U U U U U U U U U U U U U U U U U U U$</td> <td>1BMax Reverse Force$25\%$$50\%$$75\%$1CCutoff VoltageDisabled$IUS OL25TF$$125°O257F$1DESC Thermal Protection$Disabled$$IUS OL22TF$$125°O257F$1FBEC Voltage$IUS OL22TF$$125°O257F$1GMotor Thermal Protection$OIS OL22TF$$125°O257F$1FBEC Voltage$IUS OL22TF$$125°O257F$1GMotor Rotation$CCW$$IUS OL22TF$$125°O257F$2AThrottle Rate Control$IUS OL22TF$$125°O257F$2BMotor Rotation$CCW$$IUS OL22TF$$125°O257F$2GNeutral Range$IUS IUS OL22TF$$125°O257F$2GSoftening Value$IUS IUS OL22TF$$125°O257F$2GSoftening Value$IUS IUS OL22TF$$125°O257F$2GSoftening Value$IUS IUS OL22TF$$125°O257F$2GSoftening Range$1K$$2K$$4K$$8K$2GSoftening Range$0\%$$10\%$$2V$$30\%$$35\%$$40\%$2IRPM Limit Range$0\%$$10\%$$2V$$25\%$$30\%$$35\%$$40\%$2IRPM Limit Range$V$$V$$V$$V$$V$$V$$V$3BMax RPM Limit$V$$V$$V$$V$$V$$V$$V$3GBrake Force$V$$V$$V$$V$$V$$V$$V$3GBrake Rate Control$U$$V$$V$$V$$V$<td>1BMax. 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Reverse Force 25% 50% 12 10Cutoff Voltage 0 isable -105 C/2 I T 125 10ESC Thermal Protection 0 isable -105 C/2 I T 125 16Motor Thermal Protection 0 isable -105 C/2 I T 125 16Motor Rotation $C U U U U U U U U U U U U U U U U U U U$	1BMax Reverse Force 25% 50% 75% 1CCutoff VoltageDisabled $IUS OL25TF$ $125°O257F$ 1DESC Thermal Protection $Disabled$ $IUS OL22TF$ $125°O257F$ 1FBEC Voltage $IUS OL22TF$ $125°O257F$ 1GMotor Thermal Protection $OIS OL22TF$ $125°O257F$ 1FBEC Voltage $IUS OL22TF$ $125°O257F$ 1GMotor Rotation CCW $IUS OL22TF$ $125°O257F$ 2AThrottle Rate Control $IUS OL22TF$ $125°O257F$ 2BMotor Rotation CCW $IUS OL22TF$ $125°O257F$ 2GNeutral Range $IUS IUS OL22TF$ $125°O257F$ 2GSoftening Value $IUS IUS OL22TF$ $125°O257F$ 2GSoftening Value $IUS IUS OL22TF$ $125°O257F$ 2GSoftening Value $IUS IUS OL22TF$ $125°O257F$ 2GSoftening Range $1K$ $2K$ $4K$ $8K$ 2GSoftening Range 0% 10% $2V$ 30% 35% 40% 2IRPM Limit Range 0% 10% $2V$ 25% 30% 35% 40% 2IRPM Limit Range V V V V V V V 3BMax RPM Limit V V V V V V V 3GBrake Force V V V V V V V 3GBrake Rate Control U V V V V <td>1BMax. Reverse Force$25\%$$50\%$$75\%$$75\%$1CCutoff VoltageDisable$4uto (3.5V/C4)$$105^{-}/221^{+}$$125^{-}/257^{-}$$125^{-}/257^{-}$1EMotor Internal Protection$Disable$$105^{-}/221^{+}$$125^{-}/227^{+}$$125^{-}/257^{-}$$125^{-}/257^{-}$1FBEC Voltage$CUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU$</td>	1BMax. Reverse Force 25% 50% 75% 75% 1CCutoff VoltageDisable $4uto (3.5V/C4)$ $105^{-}/221^{+}$ $125^{-}/257^{-}$ $125^{-}/257^{-}$ 1EMotor Internal Protection $Disable$ $105^{-}/221^{+}$ $125^{-}/227^{+}$ $125^{-}/257^{-}$ $125^{-}/257^{-}$ 1FBEC Voltage $CUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU$

Note: The default firmware for ESC is Blinky Mode(zero timing), so there is no timing options (4A-5D). If you need to use the timing, you can update the firmware with the timing options through the mobile app or compute

1A. Running Mode

Option 1: Forward with Brake Flacing 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 return 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 reversed. Option 3: Forward and Reverse

- nediately when the throttle trigger is pushed to reverse position. This mode is generally used in special vehicles The motor will reverse 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 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 ($\dot{x}, \dot{x}, \dot{x}$) 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 prese
- The GREEN LED flashes ($\dot{\alpha}, \dot{\alpha}, \dot{\alpha}$) 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 (会会, 会会, 会会) when the motor temperature reaches to the preset value. The output will not resume until the motor temperature gets dow 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 activate the motor thermal protection too early or late due to the differences in the temperature sensors. In this case, please disable this function and monitor the motor temperature manually. 1F. BEC Voltage
- BEC voltage can be adjusted between 6.0-7.4V. 6.0V is applicable to common servo. If use high-voltage servo , set to higher voltage according to voltage marking of serv 1G. 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).
- 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 2B. Throttle Curve
- The throttle curve parameter reconciles the position of the throttle trigger 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)
- 2C. Neutral Range This parameter adjusts the range of the throttle neutral area to suit different transmitters and driver habits. If the neutral position of the transmitter is unstable, causing the car to move slowly forward or backward, or ve difficulties calibrating the neutral range, the setting can be raised to correct the issue.
- 2D. 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. Some motors have strong cogging effect with lower FDR , if there is any cogging with very light throttle input, you can try to increase the initial throttle force.
- 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. 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 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, 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 degree
- 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%.
- 2H. RPM Limit By Throttle This parameter refers to the maximum motor rpm allowed within the throttle range, associated with item 2I (RPM Limit Range).
- 2I. RPM Limit Range Refers to the throttle range corresponding to the limited motor rpm. For example, if the item 2H (RPM Limit By Throttle) is set to 2000, and this item is set to 30%, it means that the maximum motor rpm limited within tle range is 20000
- 2J. Max RPM Limit
- Refers to the maximum motor rpm limit with the whole throttle range 3A. Drag Brake
- It is the braking power produced when releasing from the throttle 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. 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 guick brake response
- 3D. 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. 3E. Brake Control
- Option 1: Linea 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.



8.0-7.4V Adjustable (Step: 0.1V)): 1%) 32K

50% 55% 60% 65% 70% 75%

300000RPM

300000RPM o: 1%)

Customized

Timing Rate OORPM)

0000),2000RPM(100000-200000)

0.45s 0.5s 0.6s 0.7s 0.8s 0.9s 1.0s 16deg/0.1s 20deg/0.1s 25deg/0.1s 30deg/0.1s Instant 16deg/0.1s 20deg/0.1s 25deg/0.1s 30deg/0.1s Instant

Instant

Option 2: Traditional

This brake mode is the same as to other standard 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 actual boost timing during the operation is adjusted based on the parameter item 4B. The Boost iming 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 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. **Option 3: Timing Rate**

- , the boost timing is turned on according to the value set by the parameter item 4E(Boost Increase Rate)
- 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.
- 4E. Boost Increase Rate Used to set the speed of the Boost response. Release a certain degree every 0.1 seconds until fully released. For example, if the parameter is set to 4 °/0.1s and the Boost timing is set to 40 degrees, the Boost ing will be released at a speed of 4 degrees/0.1s, and after 1 second, all 40 degrees will be released.
- 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 rigger at the full throttle position (as you set) till the Turbo Timing will be activated rigg 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, "3 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 ESC & 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.

3 Preset Modes

In order to make one firmware applicable to all different racing conditions, there are ten "easy-to-select" preset modes. Users are able to change the settings of the modes provided (and rename those modes) as per the control feel, track, and etc. For example, the profile name can be changed to "TITI2024_MOD_4.5" to indicate the race was ran with a 4.5T motor at 2024 TITC. This can be saved for future reference as

4 ESC Programming

- . Program your ESC with a multifunction LCD program box pro
- Connect the interface marked with "-+n" on the esc to the interface marked with "ESC" on the program box using a separate programming cable(a cable with JR plugs at both ends included in the program box packaging), then connect the esc to the battery and turn it on. Click on [Parameter Settings] to set the esc
- 2. Using the OTA Programmer for parameter settings Insert the programming cable of the OTA Programmer into the programming interface of the esc, and use your phone to install the HW Link APP to set the esc 3. Read the running data of esc 1) Click on the [Data record] on the homepage of the LCD box pro to read the four extreme values of the highest temperature of the esc, the highest temperature of
- 2) By using the OTA Bluetooth module, you can view the extreme values recorded above, real-time data, and historical data (curve chart) under the [Data Log] menu in the HW LINK App on your phone. 4. Upgrade of firmware for esc
- 1) Using the LCD box pro or OTA programmer, download and install the HW LINK App on your phone, click on the [Firmware Update] button on the APP homepage to upgrade the firmware of the esc. 2) Connect to the computer through the LCD box pro, download and install Hobbywing USB LINK software on the computer, and use this software to upgrade the firmware for esc. Attention: After the firmware update is completed, it is necessary to reset the parameters in the [Parameters] interface in order to display the corresponding parameters of the firmware

5 Factory Reset

- Restore the default values with a multifunction LCD program box pro
- After connecting the program box to the FSC. Click on [Parameter Settings] and select the [Reset Parameters] to restore the factory settings
- Restore the default values with a OTA Programmer (& HW Link App) After connecting the OTA Programmer to the ESC, open the HOBBYWING HW Link App 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 RED LED turns on solid 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 will blink when the throttle trigger is in the neutral zone, it is Blinky Mode, which means the timing value is zero. If the timing value is not zero, the RED LED will turn on solic
 The RED LED blinks when your vehicle runs forward. The GREEN LED turns solid when pulling the throttle trigger to the full (100%) throttle endpoint.
- The GREEN LED blinks when you brake your vehicle. The GREEN LED turns solid when pushing the throttle trigger to the full brake endpoint and setting the "maximum brake force" to 100%. • The GREEN LED blinks when you reverse your vehicle. The GREEN LED turns solid when pushing the throttle trigger to the full reverse endpoint and setting the "reverse force" to 1009 3. When Some Protection is Activated
- The RED LED flashes a short, single flash and repeats "\$\phi, \$\phi, \$\phi, \$\phi"\$ indicating the low voltage cutoff protection is activated
- The GREEN LED flashes a short, single flash and repeats "北, 太, 太, 市 indicating the SOT objection is activated.
 The GREEN LED flashes a short, single flash and repeats "北, 太, 太, 太, 市 indicating the ESC thereal protection is activated.
 The GREEN LED flashes a short, double flash and repeats "太, 太, ☆, ☆, ☆, ☆☆" indicating the motor thermal protection is activated.
- The 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

	Possible Causes	Solutions
The LED isn't on and the motor cannot start.	 The battery voltage was not output to the ESC. The ESC switch was damaged. 	1. Check whether there is poor welding of power input gate and reweld it. 2. Replace the switch.
The motor cannot start and emit Bi-Bi-, Bi-Bi-, with the green LED flashing (the interval between the Bi-Bi- and Bi-Bi- is 1 seconds)	The battery voltage is not within the normal range.	Check the battery voltage.
Power on and Red LED flashes rapidly. The motor does not rotate.	 The ESC does not detect the throttle signal. The neutral point of the ESC does not match with the transmitter. 	 Check whether the throttle wire and the channel is plugged correctly, and whether the transmitter is turned on. Move the throttle trigger to the neutral point and recalibrate the throttle range.
The vehicle is going in the reversed direction when the forward throttle is applied.	The default/popular motor rotation direction does not match your car frame.	Adjust the parameter "Motor Rotation".
The motor suddenly stopped or significantly reduced the output in operation.	 The receiver was influenced by some foreign interference; The ESC entered the LVC protection; The ESC entered the thermal shutdown protection. 	 Check all devices and try to find out all possible causes, and check the transmitter's battery voltage; The RED LED keeps flashing indicating the LVC protection is activated, please replace your pack; 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.	 The (ESC-to-motor) wiring order was incorrect Some soldering between the motor and the ESC was not good; The ESC was damaged (some MOSFETS were burnt). 	 Check the wiring order; Check all soldering points, please re-solder if necessary; Contact the distributor for repair or other customer service.
The vehicle could run forward (and brake), but could not reverse.	 The throttle neutral position on your transmitter was actually in the braking zone; Set the "Running Mode" improperly; The ESC was damaged. 	 Recalibrate the throttle neutral position; Set the "Running Mode" to "Fwd/Rev with Brk "; Contact the distributor for repair or other customer service.
The motor got stuck or stopped when increasing the throttle during the starting-up process.	 Poor discharging capability of the pack; The RPM of the motor was too high, or the FDR was too low; The Throttle Rate Control is set too high. 	 Change another pack with great discharging capability; Change a low-speed motor, or increase the FDR; Set the Throttle Rate Control 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.	 Check if the sensor cable is loose or poor contact issue exists; Hall sensor inside the motor or the ESC is damaged.

