XIONG CAI TECH 雄才科技

XC202-E8 User Manual
Brushless Electronic Speed Controller

⚠ Disclaimer

First of all, thank you very much for using this product!
This product has high power and incorrect use may cause equipment damage or personal injury. Please read this statement carefully before using this product. Once this product is used, it means that you agree to all the terms of this statement. Please use this product strictly in accordance with the instructions in this manual. We do not assume any liability arising from misuse, illegal modification or improper operation of this product, including but not limited to indirect losses or joint and several liabilities.

⚠ Cautions

Before connecting the ESC to related equipment, please ensure that all wires are well connected and the connecting equipment are in well insulated protection to avoid damaging the ESC due to short circuit.
Before using the ESC, please carefully read the instructions of the matching power equipment and frame to ensure a reasonable power combination, thereby avoiding improper power combination that may lead to motor overload and damage to the ESC.

1. Specifications:

Item	Description	Remark
Current	Continuous current: 160A 320A current will trigger short circuit protection	Current control is similar to wave-by-wave current limiting which effectively limit peak current at high speed to avoid motor damage.
Power supply	3~6S LiPo	When using DC power supply instead of pure battery power supply, its discharge and the power recovery capability of the automatic brake itself must be considered.If the power supply capacity is limited, the operating parameters (such as acceleration and corresponding braking options, etc.) can be appropriately modulated.
Recommended moto	Sensored or sensorless square wave control of brushless motors	
Motor speed	Supports 240,000 RPM electrical speed.. When the number of pole pairs is 1, the electrical speed is exactly equal to the mechanical speed. Others: Electrical speed = Mechanical speed × Number of pole pairs = KV value × Bus voltage × Number of pole pairs	Just ensure that the electrical speed does not exceed 240,000 RPM.
Power supply for BEC	Voltage: 6.0V/7.4V/8.4V, it can switch the voltage through the mobile APP software Current: 6A continuously, 15A short-term	
Power supply for fan	Temperature> 55℃, powersupply to the fan turns on. Temperature < 50℃,powersupply to the fan turns off. When there is a large current abnormality, the controller turns off the fan power supply.	1. The fan power supply comes from BEC 2. When a short-circuit current occurs in the fan, the power supply will enter the test mode. If the power supply is abnormal after repeated five times, the fan power supply will be turned off, but the ESC can still work normally.
Bluetooth	1. All parameters of the ESC can be adjusted by using the mobile APP 2. The ESC firmware can be upgraded by using the mobile APP 3.Others	
Dimension	59.80 (L) *48.20 (W) *35.90 (H) mm	

2. Features:

2.1 Verified motor commutation design for smooth non-inductive commutation and excellent performance at low speed without induction.
2.2 Using precise synchronous freewheeling technology, it can reduce MOS heating while avoiding excessive current pulses.
2.3 Single PWM cycle current detection limit to reduce the impact of pulse current on the motor.
2.4 Intelligent heat dissipation, the fan stays quiet at low temperatures.
2.5 The mobile APP is connected to the ESC via Bluetooth, making parameter setting convenient and fast.
2.6 By the mobile APP data observation interface, it can make ESC recording data (static data) and real-time debugging data (real-time data) intuitive.
2.7 High-power DC voltage variable circuit.
2.8 Multiple protection functions, low voltage/throttle loss/abnormal braking/over-temperature protection, etc.
2.9 Support turbo timing setting.

3. Connections:
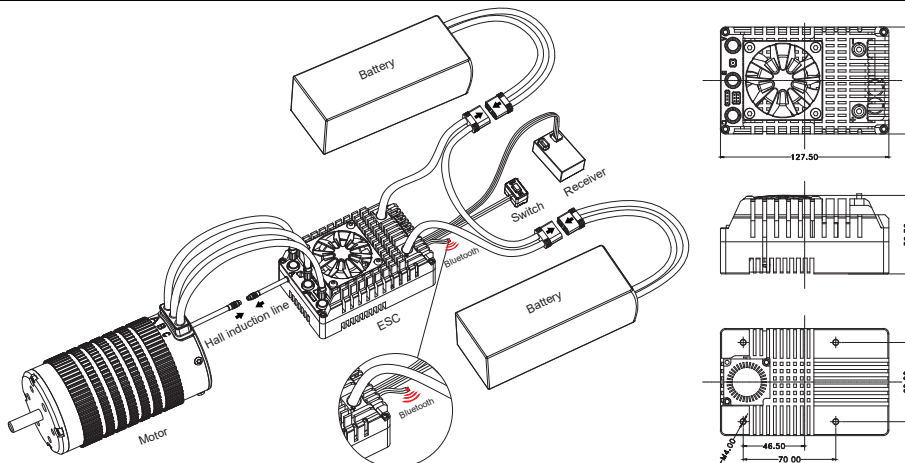
*Precautions:

1. Please do not connect the ESC power input wires DC+ and DC- in reverse. If the two input wires are connected reversely, the ESC may be damaged. If the ESC is damaged in this case, the relevant warranty service will not be provided.
2. If a Hall sensor is used, be sure to check the motor phase wires and Hall wiring.
3. For motors without temperature sensors, long-term high-power operation may cause burnout.
4. The mechanical structure of some motors cannot support high speeds. If the speed is forcibly increased, the motor may be damaged.
5. If it will not be used for more than 1 hour, it is recommended to unplug the power wires of the ESC.
6. If the wiring diagram is modified, you must check & make sure that the circuit is correct before applying the throttle. It is recommended to apply the throttle slowly, and then apply the throttle normally after confirming that it is correct.

4. Start the process:

Steps:
1. Check whether the circuit is open, short, or in poor contact.
2. Check whether the motor is stuck.
3. Plug in the power cable.
4. Turn on the power button.

When you hear the battery prompt tone (described in the "Normal Startup" prompt in the light/sound prompt section), the startup is normal. If the throttle is normal, you can perform the throttle operation normally.

5. Set the throttle range:

Throttle range:

Type	Low range	High range	Default
Low range	800us	1200us	1100us
Neutral range	1400us	1600us	1500us
High range	1800us	2200us	1900us

Step:
1. Turn off the ESC -> Set the throttle to the low range and keep it as [800us ~ 1200us] -> Power on -> Wait for the red and green lights to stop flashing (flashing for about 5 seconds).
2. Quickly (within 1s) push the throttle to the high range and keep it as [1800us ~ 2200us] -> wait for the green light and the light to flash till stop.
3. Quickly (within 1 second) push the throttle to the neutral range and keep it as [1400us ~ 1600us] -> wait for the red light to flash till stop.
Sign for successful setting: Repeat 4 times {red and green lights on + motor sounds (so, mi, do) + r ed and green lights off + 0.2s interval}.
Sign of failure setting: No indicating, boot normally.

6. Bluetooth:

The naming rule of Bluetooth name is "approximate model" + "-" + "ECC code ID", for example, where "XC_E8-1C89" is the approximate model, and "1C-89" is the hexadecimal code ID of the ESC. Even if the user sets the Bluetooth name by himself, the ESC code ID is still retained to avoid two devices with the same name.

7. Configurable items:

Seq	Item	Description				Default
1	Running mode	Forward with brake	Forward&Reverse and Brake	Forward with reverse		Forward&Reverse and Brake
2	LipoCells	Auto	3 ~ 6S			12S
3	Cutoff Voltage	Disabled	2.8V	3.0V	3.2V	3.0V
4	Motor Rotation	Forward	Reverse			Forward
5	BEC voltage	6.0V	7.4V	8.4V.		6.0
6	Max.Brake Force	0~100%				60%
7	Max.Reverse Force	0~100%				25%
8	Punch	0~12 level				6 level
9	Drag Brake Force	0~100%				0%
10	Turbo Timing	0~26degree				26 degree
11	Turbo Delay	0~1s				1s
12	Initial PWM	0~10%				1%

1. Running Mode:
    Option 1: Forward with brake
        The vehicle can only move forward and has brake function. This is also commonly acceptable at races.
    Option 2: Forward/Reverse and Brake
        This option is known to be the "training" mode with "Forward/Reverse with Brake" function. The vehicle only brakes on the first time you push thethrottle trigger to the reverse/brake zone. If the motor stops when the throttle trigger return to the neutral zone and then re-push the trigger toreverse zone, the vehicle will reverse, if the motor does not completely stop, then your vehicle won't reverse but still brake, you need to return thethrottle trigger to the neutral zone and push it to reverse zone again. This method is for preventing vehicle from being accidentally reversed.
    Option 3: Forward and Reverse
        When the throttle trigger is pushed from neutral to reverse point, the motor reverses. This mode is generally used in special vehicles.
2. Lipo Cells:
    Set the correct value according to the actual number of Lipo batteries used. The default is automatically calculated.
3. Low Voltage Cut-Off:
    This function is mainly to prevent excessive discharge of lithium batteries causing damage. The ESC monitors the battery voltage at all times, and once the voltage falls below the set threshold, the power output is reduced and the power output is completely cut off after a few seconds,and generates a 10% braking force. ForNiMH batteries, it is recommended to set this parameter to "Disabled".
4. Motor Rotation:
    Setting the rotation of the motor. Due to some differences with the drivetrains on different car kits, it is possible to that the car will go in the opposite directionupon full throttle. In the event that this happens, you can set the"motor rotation direction" to the opposite direction; "CW" or "CCW".
5. BEC Voltage:
    BEC voltage support 6V/7.4V/8.4V. Generally, 6.0V is suitable for standard servos, while 7.4V/8.4V is suitable for high-voltage servos. Please set according to the servo specifications. WARNING! Do not set the BEC voltage above the maximum operating voltage of the servo, as this may damage the servo or even the ESC.
6. Max. Brake Force:
    This ESC provides proportional braking function; the braking effect is decided by the position of the throttle trigger. It sets the percentage of available brakingpower when full brake is applied. Large amount will shorten the braking time but it may damage your pinion and spur gear.
7. Max. Reverse Force:
    Refers to the reversing speed. Selecting different parameter values can produce different reversing speed. It is recommended to use a smaller reversing speed toavoid errors caused by reversing too quickly.
8. Punch:
    Set in 1-9 stages, the higher the set value, the faster the acceleration. Kindly take into consideration according to the site, tire grip characteristics, vehicleconfiguration, etc.
    An aggressive setting may cause the tire to slip, the starting current to be too large and adversely affect the electronics performance.
9. Drag Brake Force:
    Refers to the brake force generated by the motor when the throttle trigger returns to neutral position. Choose the appropriate value according to the type of vehicle, configuration, site, etc.
10. Turbo Timing:
    The Turbo timing can additionally increase the motor rpm.It will initiate at full throttle. It is usually used on a long straight road to release the maximum power of the motor. The higher this value is, the more the rpm of the motor will increase, and the greater the running current will be, the higher the temperature of the motor and esc. Therefore, please set this value reasonably.
11. Turbo delay:
    It refers to the duration of continuous full throttle required to trigger Turbo. When the full throttle time reaches this set value, Turbo can be triggered to turn on.
12. Initial PWM:
    Also called minimum starting force, it refers to the starting force acting on the motor at the initial position of the throttle. The required starting force can be set according to the tires and site grip. If the venue is too slippery, set a smaller starting force to avoid slipping.

8. Recover factory parameters:

How to restore Bluetooth to factory settings:
   If the Bluetooth password is lost, you can short the speed control signal line to the BEC, then turn it on, and the Bluetooth module will automatically restore the factory settings (the password will be restored to 1234, and the name will be restored to the factory state). Finally, shut down and power on again.

How to restore parameters to factory settings:
   If you want to restore the parameters to factory settings, just click the default item on the APP parameter page.

9. LED status & beep instructions:

Item	Type description		Light cue	Sound cue	remark
Basic information	The throttle has not returned to 0		Red-Green x0 -- Red-Green x0 --	Simultaneous beep	
	Throttle lost		Red-Green x1 -- Red-Green x1 --	Simultaneous beep	
	Voltage detecting	Low voltage protection	Red-Green x2 -- Red-Green x2 --	Simultaneous beep	No sound before MOSFET detection
		Over voltage protection	Red-Green x3 -- Red-Green x3 --	Nill	
	The MOS temperature is too high, operating temp. > 125 ℃/ startup temp. > 110 ℃		Red-Green x4 -- Red-Green x4 --	Simultaneous beep	
	The capacitor temperature is too high, operating temp. > 125 ℃/ startup temp. > 110 ℃		Red-Green x5 -- Red-Green x5 --	Simultaneous beep	
	The motor temperature is too high, operating temp. > 125 ℃/ startup temp. > 110 ℃		Red-Green x6 -- Red-Green x6 --	Simultaneous beep	
throttle parameters	Abnormal throttle parameters		Red-Green x7 -- Red-Green x7 --	Simultaneous beep	
Abnormal hall	Hall output logic abnormality		Red-Green x8 -- Red-Green x8 --	Simultaneous beep	
	Throttle calibration	Calibrate low range	Red-Green - Red-Green - Red-Green -	Nill	If the calibration process is irregular or unsuccessful, the ESC will exit the calibration process and enter the normal boot process.
		Calibrate high range	Green --- Green--- Green	Nill	
		Calibrate neutral throttle	Red --- Red--- Red	Nill	
		Calibration success	4 x (Red-Green-----)	4×(sound do-ni-mi ---)	
Normal operation	The ESC is normal and the throttle is not being adjusting.		Green---Green---	Nill	
	Throttle operation	Normal throttle	The bigger the accelerator, the faster the green light flashes.		
		Turbo timing is on	Steady green light		
	Brake		Steady red and green lights	Nill	Release the brake, both the red and green lights will turn off
Boot	Forcefully enter boot after startup		Steady red & green light	Nill	Short the speed control signal line to BEC+, turn it on and enter Boot; the red and green lights are both steadily on. After disconnected the short circuit, the Boot program runs normally.
	During Boot operation		Green light: On for 2S -- Off for 2S -- Red light: red -- red --	Nill	The duration of the red light on = the time of the flash operation
Normal startup	Prompt for the number of battery cells after normal startup		Red --- Red ---	do, ri, mi - quinary prompt sound	do, ri, mi: prefix of quinary number Quinary definition Long tone = 5 cells, short tone = 1 cell Example: 8-cell lithium battery prompt sound do, ri, mi + long tone x1 + short tone x3
Fault warning	MOS self-test abnormality	MOS open circuit	Red - Red - Green × 0 --- Red - Red - Green × 0 ---	Nill	
		MOS short circuit	Red - Red - Green × 1 --- Red - Red - Green × 1 ---	Nill	
	Abnormal current sampling circuit		Red - Red - Green × 2 --- Red - Red - Green × 2---	Nill	

*Note: The red light corresponds to long tones, and the green light corresponds to short tones.