HOBBYWING®

X-Rotor USER MANUAL
Multi-Rotor
Brushless Electronic Speed Controller
XRotor 10A Mini

20161227

ATTENTION

CAUTIONS
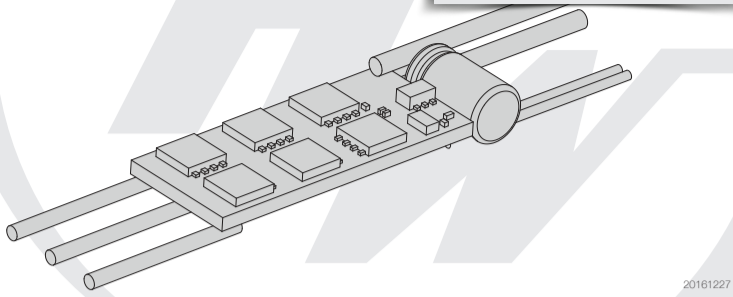
Thank you for purchasing this HOBBYWING product! Brushless power systems can be very dangerous. Any improper use may cause personal injury and damage to the product and related devices. We strongly recommend reading through this user manual before use. Because we have no control over the use, installation, or maintenance of this product, no liability may be assumed for any damage or losses resulting from the use of this product. We do not assume responsibility for any losses caused by unauthorized modifications to our product.
We, HOBBYWING, are only responsible for our product cost and nothing else as result of using our product.

01 Warnings

- Ensure all wires and connections are well insulated before connecting the ESC to related devices, as short circuit will damage your ESC.
- Ensure all devices are well connected, in order to prevent poor connections that may cause your aircraft to lose control or other unpredictable issues like damage to the device.
- Read through the manuals of all power devices and aircraft and ensure the power configuration is rational before using this unit.
- Please use a soldering iron with the power of at least 30W to solder all input/output wires and connectors.
- Stop using the ESC when its casing temperature exceeds 90℃/194℉, otherwise the ESC may get destroyed and may also get your motor damaged.
- Always disconnect and remove batteries after use, as the ESC will continue to consume current if it's still connected to batteries. Long-time contact will cause batteries to completely discharge and result in damage to batteries or/and ESC. This will not be covered under warranty.

02 Features

- Special core program for multi-rotor controllers meets various functional requirements against multi-rotors.
- Specially optimized software for excellent compatibility with multi-rotor motors.
- Compatible with "Regular" signal-receiving mode (that is the ESC can receive regular throttle signals range from 1100μs to 1900μs) and "OneShot" signal-receiving mode (that is the ESC can receive fixed throttle signals range from 125μs to 250μs).
- The twisted-pair design of the throttle signal cable effectively reduces the crosstalk produced in signal transmission and makes flight more stable.
- Compatible with various flight-controllers and supports a signal frequency of up to 500Hz in "Regular" signal-receiving mode.

03 Specifications

| Model	Con. Current	Peak Current (10s)	BEC	LiPo	Programmable Item (Inaccessible in OneShot Mode)	Weight	Size	Applications (For reference)
XRotor 10A-Mini-3S	10A	15A	No	2-3S	Timing (High/Intermediate)	7g	44.2x12.2x9.2 mm	250 Class (Multi-rotor)

Notes:
- For 250 class multi-rotors, we recommend using 1806/2204 size motors and 5-inch propellers. (Bigger propellers/motors may cause irreversible damage to ESCs; users will take the risk if they persist in using motors/propellers beyond the suggested range.)
- Users cannot change the signal-receiving mode during the powering-up process and the flight. If necessary, they need to change the mode on the flight controller (on the condition that the flight controller supports the "OneShot" signal-receiving mode), after that, disconnect the battery pack and then re-connect the pack, then the ESC will complete the mode change (the ESC will automatically re-detect the type of input throttle signals and then execute the corresponding signal-receiving mode).

04 User Guide

- After it's connected to the flight system, the ESC will automatically detect the input throttle signals every time it's powered on and then execute the corresponding signal-receiving mode.
- Users can calibrate the throttle range and change the timing advance in "Regular" signal-receiving mode.
- In "Regular" signal-receiving mode, users need to calibrate throttle range when they start to use new XRotor brushless ESCs or another transmitter.
- Users can change the timing setting when some abnormality occurs in ESC driving the multi-rotor motor or they need the motor to reach a higher RPM. (**Note:** Intermediate Timing is the default setting.)

1 Motor Wiring

Electronic Speed Controller
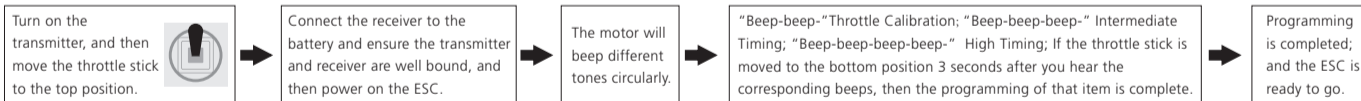
Motor

Battery

Receiver

UBEC
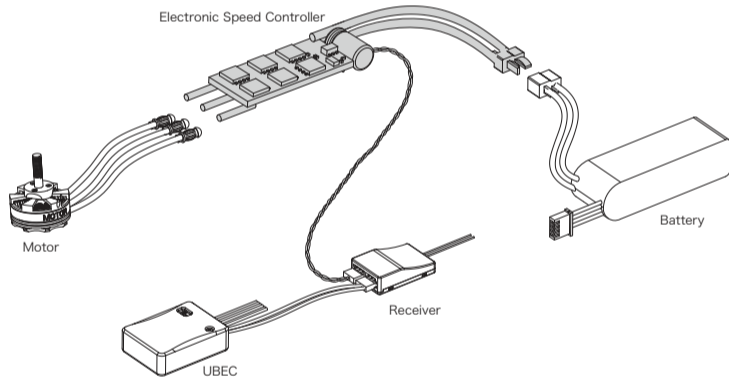
IMPORTANT This is an extremely powerful brushless motor system. We strongly recommend removing your propellers for your own safety and the safety of those around you before performing calibration and programming functions with this system.
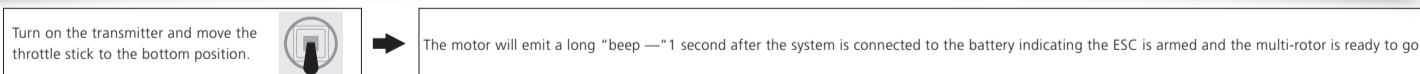
2 Throttle Range Calibration

Turn on the transmitter, move the throttle stick to the top position. → Connect the receiver to the battery, ensure the transmitter and receiver are well bound, and then turn on the ESC. → After the motor emits two short "Beep-beep", move the throttle stick to the bottom position in 3 seconds. → Throttle Calibration completed

3 ESC Programming

Turn on the transmitter, and then move the throttle stick to the top position. → Connect the receiver to the battery and ensure the transmitter and receiver are well bound, and then power on the ESC. → The motor will beep different tones circularly. → "Beep-beep-"Throttle Calibration; "Beep-beep-beep-" Intermediate Timing; "Beep-beep-beep-beep-" High Timing; If the throttle stick is moved to the bottom position 3 seconds after you hear the corresponding beeps, then the programming of that item is complete. → Programming is completed; and the ESC is ready to go.

IMPORTANT Generally speaking, intermediate timing is applicable to most motors and it brings higher efficiency but less heat to the motors and speed controllers. High timing can increase the RPM of the motor, but it also increases the motor temperature. Please perform a test flight on the ground and ensure everything is functioning properly first, then fly your aircraft into the sky.

05 Normal Start-up Process and Protections

Turn on the transmitter and move the throttle stick to the bottom position. → The motor will emit a long "beep —"1 second after the system is connected to the battery indicating the ESC is armed and the multi-rotor is ready to go.

Start-up Protection: The ESC will shut down the motor if it fails to start the motor normally within 2 seconds by increasing the throttle value. In this case, you need to move the transmitter throttle stick back to the bottom position and restart the motor. (Possible causes of this problem: poor connection/ disconnection between the ESC and motor wires, propellers are blocked, etc.)

Motor Lock-up Protection: ESC will cut off its output to motor immediately when it detects the motor is locked up, and then try to restart the motor. It will cut off the output completely if the motor is locked up for over 1 second. In this condition, you can only restart the ESC and resume its output through pulling the throttle stick to the bottom position first and then pushing the stick upward.

Throttle Signal Loss Protection: When the ESC detects loss of signal for over 0.25 second, it will cut off the output immediately to avoid an even greater loss which may be caused by the continuous high-speed rotation of propellers or rotor blades. The ESC will resume the corresponding output after normal signals are received.

06 Trouble shooting

Trouble	Warning Tone	Possible Cause	Solution
The ESC was unable to start the motor.	"Beep beep beep…" (The motor beeps rapidly)	The throttle stick is not at the bottom position.	Move the throttle stick to the bottom position or re-calibrate the throttle range.
The ESC was unable to start the motor.	"Beep, beep, beep......" (Time interval is 2 second)	No output signal from the throttle channel on the receiver.	Check if the transmitter and receiver are well bound, the throttle cable has been properly plugged into the TH channel on the receiver.
The ESC was unable to start the motor.	"Beep beep beep…" (The motor beeps rapidly)	The entire throttle range is too narrow.	Re-calibrate the throttle range.