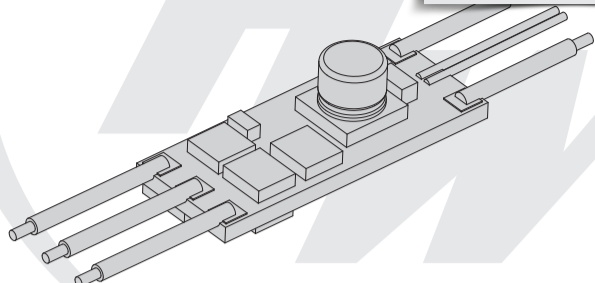# HOBBYWING®

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

20161227

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

- Read through the manuals of all power devices and aircraft and ensure the power configuration is rational before using this unit, as incorrect configuration may cause the ESC to overload and be damaged.
- Ensure all wires and connections must be well insulated before connecting the ESC to related devices, as short circuit will damage your ESC. And ensure all devices are well connected, (please use a soldering iron with enough power to solder all input/output wires and connectors if necessary,) as poor connection may cause your aircraft to lose control or other unpredictable issues such as damage to the device.
- Do not use this unit in the extremely hot weather or continue to use it when it gets really hot (around 105℃/221°F). Because high temperature will cause the ESC to work abnormally or even damage it.
- Users must always disconnect the batteries after use as the current on the ESC is consuming continuously if it's 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.

02 Features

- Well-designed core program with all parameters adjusted to the optimum saves all the trouble of parameter adjustment.
- Smaller size & lighter weight for smaller-size multirotors/drones.
- Electric/motor speed of over 300,000RPM supported. (Note: here it is in 2 poles.)
- One-Shot125 signal-receiving mode with a real-time signal frequency of up to 3800Hz supported.
- DEO (Driving Efficiency Optimization) technology significantly reduces the ESC temperature, improves the throttle response, and strengthens the stability and flexibility of multi-rotors.
  (Note: this ESC is quite suitable for QAVs.)
- Active braking (brought by DEO technology) for quicker deceleration when reducing the throttle amount.
- Compatible with various flight controllers and supports a PWM signal frequency of up to 621Hz in "Regular" signal-receiving mode.
- Intelligent motor lock-up protection for protecting the motor and the ESC.

03 Specifications

| Model	Con. Current	Peak Current (10s)	BEC	LiPo	Weight	Size
XRotor 10A Micro	10A	15A	No	2-3S	6.5g	25.9 x 10.7 x 5.5 mm

Notes:
- This XRotor ESC supports the PWM signal frequencies of 50 to 621Hz in regular signal-receiving mode, the throttle high level ranges from 704 to 2400μs (1100~1940μs by default). And the ESC supports throttle calibration.
- This XRotor ESC supports the signal frequencies of 50 to 3800Hz in One-Shot signal-receiving mode, the throttle high level ranges from 75 to 300μs (125~250μs by default). And the ESC supports throttle calibration.
- Users need to re-calibrate the throttle range after they change the (throttle) signal frequency.

04 User Guide

- After connected to the flight system, the ESC will automatically detect the input throttle signals every time after it is powered on and then execute the corresponding signal-receiving mode. 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 (under the condition that the flight controller supports the "One-Shot125" signal-receiving mode) first, and then disconnect and re-connect the battery, then the ESC will complete the mode change.
- If users' flight controllers support throttle calibration, HOBBYWING recommend calibrating the throttle range when they start to use a new XRotor brushless ESC; if not, it is fine to use the default. And they can use the transmitter to calibrate the throttle range if a severe "out of sync" issue happens to the motor(s).

1 Motor Wiring

Electronic Speed Controller

Motor

Battery

Receiver

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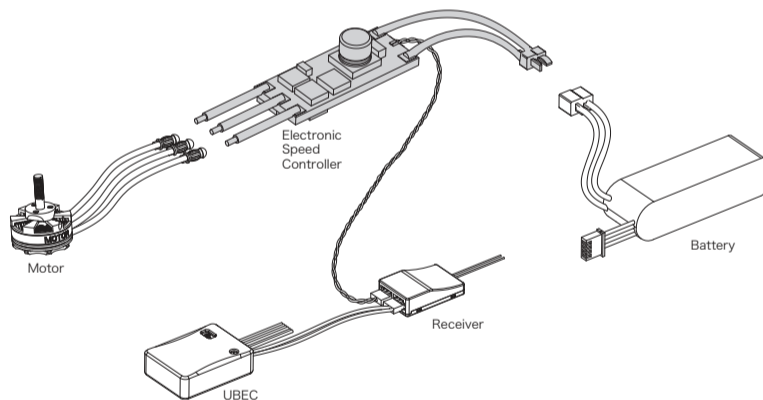
This is an extremely powerful brushless motor system. We strongly recommend removing your propellers for your own safety and the safety of those around you before performing calibration and programming functions with this system.

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

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.)

Over-load Protection: the ESC will cut off the power/output when the load suddenly increases to a very high value. Normal operation will not resume until the throttle stick is moved back to the bottom position. The ESC will automatically attempt to restart when the motor and the ESC are out of sync.

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.

Motor Lock-up Protection: the ESC will cut off its output to the motor immediately when it detects the motor is locked up, and then try to restart the motor. It will cut off the output completely and stop attempting to restart the motor if the motor is locked up for over 2 seconds. 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.

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 correctly plugged into the TH channel on the receiver.
The ESC was unable to start the motor after it was powered on, or the throttle calibration failed.	"Beep beep beep…" (The motor beeps rapidly)	The entire throttle range is too narrow.	Refer to the manual of your transmitter and re-calibrate the throttle range.