HOBBYWING®

X-Rotor Pro

H60A-14S-BLDC-RTF
USER MANUAL

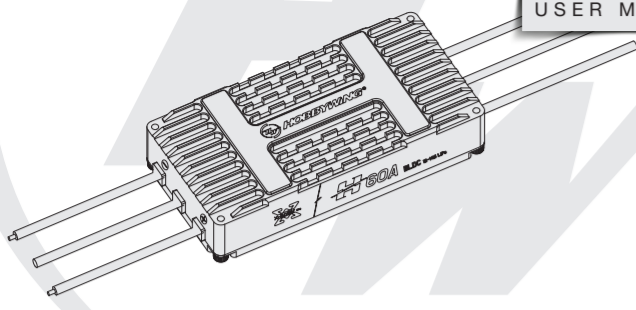20230417

ATTENTION

CAUTIONS

Thank you for purchasing this product! Please read the following statement carefully before use and, once used, it is considered to be an acceptance of all the contents. Please strictly observe and adhere to the manual installation with this product. Unauthorized modification may result in personal injury and product damage. We reserve the rights to update the design and performance of the product without notice.

01 Safety Precautions

- ESCs and related parts in the front, please make sure that all contact with the insulation well, a short circuit will destroy ESCs.
- Please connect parts carefully, if poor contact, you might not be able to control the aircraft normally, or devices damage and other unpredictable situation.
- Using this ESC, please check carefully the electric adjustment and motor specifications, to ensure that the power system reasonable collocation, to avoid mistake the collocation of lead to damage the electrically controlled.
- For input and output of electrically controlled do related welding line plug, please ensure that the welding, and use the full power of welding equipment.
- Do not set the ambient temperature of the electric switch to higher than 50℃, High temperature will cause damages to both the ESC and motor.
- The direction of the motor can be change by swapping the order of the two-phase wires.

02 Product Features

- The multi-rotor dedicated core program greatly improves the throttle response speed.
- This ESC adopts nano-coating technology, the protection level is IP55, and IP67 can be customized.
- The microprocessor is powered by an independent voltage regulator IC, which has better anti-interference ability and greatly reduces the possibility of loss of control.
- Using shielded wires, the throttle signal is fully isolated, shielding external and self-interference, and ensuring signal quality.
- BLDC square wave drive technology, good compatibility, a program can be compatible with a variety of motors.
- Using serial port communication, the input and output throttle, motor speed, bus current, bus voltage, capacitor temperature, MOS tube temperature and other data can be mastered in real time.
- Automatically adjust the timing, highly intelligent, using the factory default settings can meet the requirements of most applications.
- Compatible with throttle signals with a refresh rate of 50~500Hz, compatible with various flight controllers.
- Using DEO (Driving Efficiency Optimization) drive technology, it has better throttle linearity and higher drive efficiency.
- You can use DataLink (optional) to upgrade the ESC program. For details, refer to the Datalink instruction manual or contact the manufacturer.
- Support flight controller upgrade ESC firmware. (This function requires the cooperation of the flight controller)
- Throttle pulse width 1100-1940μs, supports throttle stroke calibration.

03 Product Specifications

Model	Continuous current Cooling wind speed 7m/s	Specification	BEC	Number of lithium battery cells(3.7V)	parameter options	Weight (no wire)	Physical dimension (mm)
XRotor-Pro-H60A-14S-BLDC-RTF-HW-H-V1	25A	60A	None	6-14S	Unable to change parameters	67g	75 x 35.5 x 20.3

Description of heat dissipation conditions:
The ambient temperature was 35°C during outdoor testing. The ESC was placed at the bottom of the motor base, and the heat sink of the ESC was exposed. The measured wind speed next to the ESC was about 7m/s. The temperature of the ESC will not rise further when it reaches 83°C.

04 User Guide

Throttle travel calibration:
Warning! Throttle stroke calibration is required after using the brushless ESC for the first time or after replacing the remote control device.
Warning! When the DEO function is turned on, closing the throttle has a braking effect and reverse-series voltage. Please do not use a power supply device that cannot absorb the reverse-series voltage for ESC testing, otherwise the ESC and power supply will be damaged.
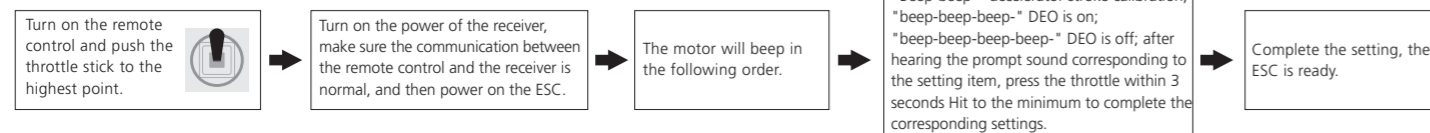
❶ Throttle stroke calibration wiring method

Battery

Electronic Speed Controller

Receiver

UBEC

Motor
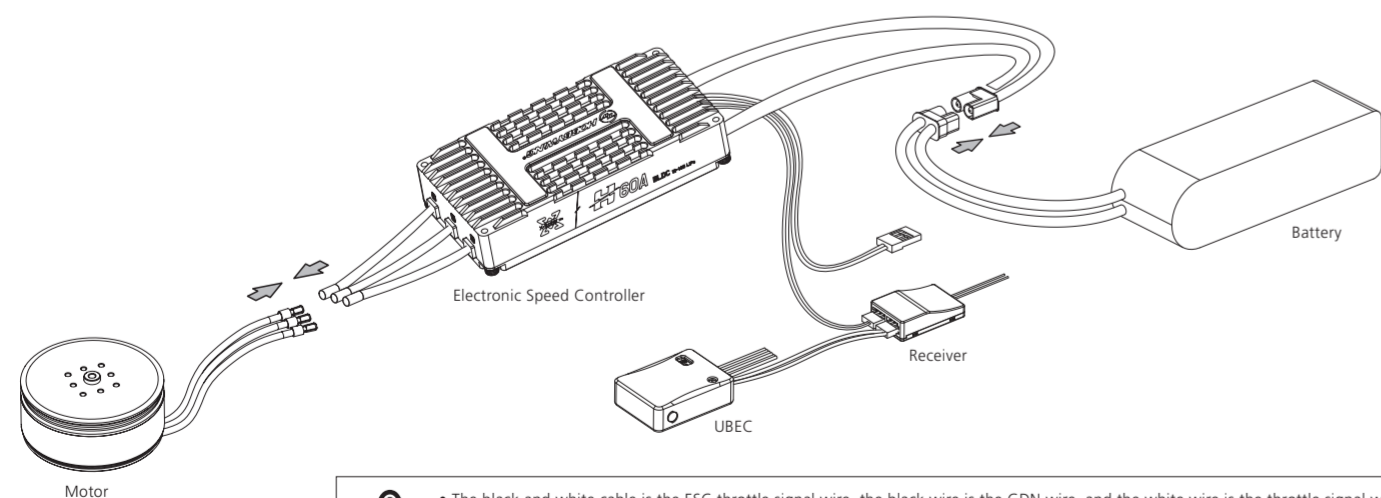
⚠ IMPORTANT
- The black and white cable is the ESC throttle signal wire, the black wire is the GDN wire, and the white wire is the throttle signal wire;
- The yellow, gray and green wires are the ESC data and upgrade wires. The yellow is the GND wire, the gray wire is the positive pole (reserved), and the green wire is the RX of the UART.

❷ Parameter setting operation method

Warning! Please remove the propeller when performing throttle stroke calibration to avoid accidents!

| Turn on the remote control and push the throttle stick to the highest point. | → | Turn on the power of the receiver, make sure the communication between the remote control and the receiver is normal, and then power on the ESC. | → | The motor will beep in the following order. | → | "Beep-beep-" accelerator stroke calibration; "beep-beep-beep-" DEO is on; "beep-beep-beep-beep-" DEO is off; after hearing the prompt sound corresponding to the setting item, press the throttle within 3 seconds Hit to the minimum to complete the corresponding settings. | → | Complete the setting, the ESC is ready. |

05 Normal boot process

| Turn on the remote control, push the throttle stick to the lowest point. | → | Connect the system to the battery, and the motor will beep "♪123", indicating that the power system is ready, the self-test is over, and you can take off at any time. |

06 Protection function description

This ESC is specially designed for industrial drones, without low-voltage protection and over-temperature protection.

1) Power-on protection:
When the motor fails to start normally within two seconds after the accelerator is increased, the ESC will shut down the power output, and the throttle stick must be placed at the lowest point again before it can be restarted. (The reason for this can be
Poor connection between the ESC and the motor or disconnected individual output wires, motor stalled, propeller blocked, etc.).

2) Stall protection:
When the ESC detects that the motor is jammed, the ESC will completely turn off the output and repeatedly try to restart the motor. If the motor still cannot be started, please land the aircraft as soon as possible. The power output can only be resumed after the power is turned off and restarted, and the fault is eliminated.

3) Current protection:
When the instantaneous current abnormality reaches close to 360A, or close to the short-circuit current, the ESC will completely turn off the output and repeatedly try to restart the motor, and it will return to normal after power on again.

4) Overheat protection:
This ESC has no over-temperature protection, it only prompts that the temperature is too high and when the temperature is higher than 110°C, it will send information through the data interface. When the temperature of the ESC is higher than 130°C, electronic components may be damaged. Please land the aircraft in time or reduce the throttle output.

5) Low voltage protection:
The ESC has no low-voltage protection. When the voltage is lower than 18V, some electronic components of the ESC will work abnormally. Please land the drone in time.

6) Throttle signal loss protection:
When the ESC detects that the throttle remote control signal is lost for more than 0.25 seconds, it will immediately turn off the output to avoid greater losses caused by the continued high-speed rotation of the propeller. After the signal is restored, the ESC will immediately Restore the corresponding power output.

07 Software upgrade

There are two ways to upgrade the software: computer upgrade and flight control upgrade. It supports online upgrade of multiple ESCs at the same time. The upgrade port is Uart-ESC (the square wave ESCs are all slow upgrades).
The flight control upgrade requires the cooperation of the flight control, which is not explained here.
This function needs to use DataLink data box, special DataLink software for upgrade package, and USB data cable. .
DataLink data box version requirements, LINK-01.2.10-U or later; DataLink software contact Hobbywing to obtain.
Note: Before using this function, please ensure that the computer has installed Micosoft Visual C++ 2013 software, otherwise it cannot be used. An upgrade package usually only contains one program for one ESC, for other ESCs, please obtain a new upgrade package. For details, please refer to the DataLink user manual.

1) Connection
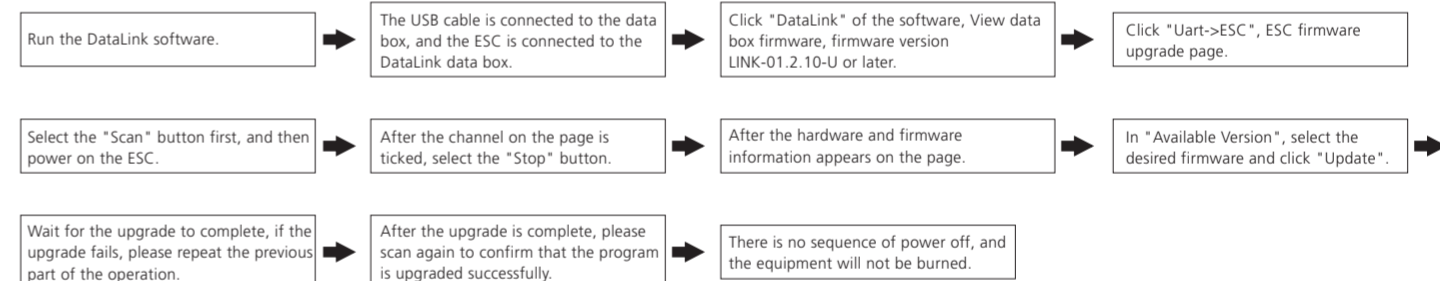Connect the computer and the DataLink data box with a USB cable;
ESC---->DataLink data box "yellow red green"---->"— ☐ D", any channel of D1-D8 is acceptable.

2) Software acquisition
It can be obtained at the place of purchase, Hobbywing official website, Hobbywing sales, and Hobbywing after-sales service.

Note: It can only be upgraded from the existing program, and software and hardware cannot be upgraded together.

3) Operation

Run the DataLink software.	→	The USB cable is connected to the data box, and the ESC is connected to the DataLink data box.	→	Click "DataLink" of the software, View data box firmware, firmware version LINK-01.2.10-U or later.	→	Click "Uart->ESC", ESC firmware upgrade page.
Select the "Scan" button first, and then power on the ESC.	→	After the channel on the page is ticked, select the "Stop" button.	→	After the hardware and firmware information appears on the page.	→	In "Available Version", select the desired firmware and click "Update".
Wait for the upgrade to complete, if the upgrade fails, please repeat the previous part of the operation.	→	After the upgrade is complete, please scan again to confirm that the program is upgraded successfully.	→	There is no sequence of power off, and the equipment will not be burned.	

08 Common failures and workaround

Warning tone description

SYMPTOM	TONE	POSSIBLE CAUSES	POSSIBLE SOLUTIONS
Motor fails to start after power on	"Beep beep beep" rapid monotone	Throttel is not reset to zero	Push the throttle to the lowest point or recalibrate the throttle point.
Motor fails to start after power on	"Beep, Beep, Beep" (1 second for each interval)	No throttle signal input on the receiver throttle channel.	Check if transmitter and receiver is normal. Check if wiring of throttle channel is normal.
Voltage below 18V after power on	"Beep, Beep, Beep" (1 second for each interval)	Battery voltage is too low.	Replace with a full-charged battery.
Voltage velow 63V after power on	"Beep, Beep, Beep" (1 second for each interval)	Battery volatage is too high.	Replace with a suitable and fully-charge battery.
Motor stops or restarts during operation		Motor is not compatible with the ESC.	Replace motor, or propeller.
No sound during self-test, motor is operating	No sound during self-test, motor is operating	Abnormal drive.	1. Replace ESC; 2. Return to factory for repair.
Motor fails to start normally, accompanied by "jam" vibration	No sound during self-test, motor is not operating	Loss of motor phase.	1. Check phase connection; 2. Check motor; 3. Return to factory for repair.