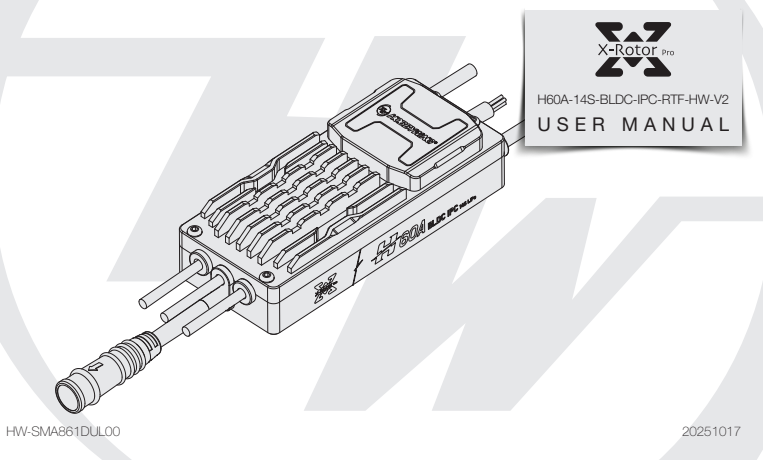




HW-SMA861DUL00

20251017



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 Precaution

- Before connecting the ESC to related components, please ensure that all contact terminals are well insulated to avoid short-circuit from causing damages to the ESC.
- Please be sure to connect all parts appropriately. If the connection is poor, you may not be able to control the aircraft normally, and may risk damages to the equipment.
- Before using the ESC, please carefully review the user manual of both the ESC and motor to ensure that the power system is properly configured to avoid causing damage to the ESC due to wrong configuration.
- If soldering is required for the input/output wire connectors of the ESC, ensure secure soldering connections and use a soldering device with sufficient power.
- Do not allow the external environment temperature of the ESC to exceed 65 C°. High temperatures will damage the ESC and may cause motor damage, resulting in a crash.
- The direction of the motor can be change by swapping the order of any two of the three-phase wires.
- This ESC is equipped with CAN function. When using the CAN function, Node IDs and throttle IDs of different ESCs on the same aircraft cannot be the same. Otherwise, multiple ESCs will be recognized as the same.
- The ESC has no CAN terminal resistor.

02 Feature of product

- This ESC has a propeller position control function. In order to use this function, it needs to be paired with a Hobbywing motor with a magnetic encoding board.
- Multi-rotor dedicated core program, the throttle response speed is greatly improved.
- A built-in memory chip that records the ESC running data in real time and provides the black box function.
- This ESC adopts nano-coating technology with a protection level of IP55, and IP67 can be customized.
- The microprocessor is powered by a dedicated voltage-stabilizing IC, which provides enhanced anti-interference capability and reduces the risk of malfunctions or loss of control.
- Uses shielded wires to improve anti-interference capability, which can shield external and self-interference, and ensure signal quality.
- BLDC square wave drive technology, good compatibility, one program can be compatible with a variety of motors.
- Using CAN communication, the input and output throttle, motor speed, bus current, bus voltage, capacitor temperature, MOS temperature, ESC status and other data can be monitored in real time. The communication protocol can be obtained by contacting Hobbywing official.
- Automatic timing adjusting, highly intelligent, under factory default settings can meet the requirements of most applications.
- Compatible with various flight controllers and throttle signals with a refresh rate of 50~500Hz.
- With DEO (Driving Efficiency Optimization) function, it has better throttle linearity and higher driving efficiency.
- You can use DataLink V2 box (optional) to upgrade the ESC program. For details, refer to the user manual of DataLink V2 box or contact the manufacturer.
- Upgrade ESC firmware through flight controller is supported (this function requires the cooperation of flight controller).
- Throttle pulse width 1100-1940μs, solidified pulse width, cannot be calibrated.

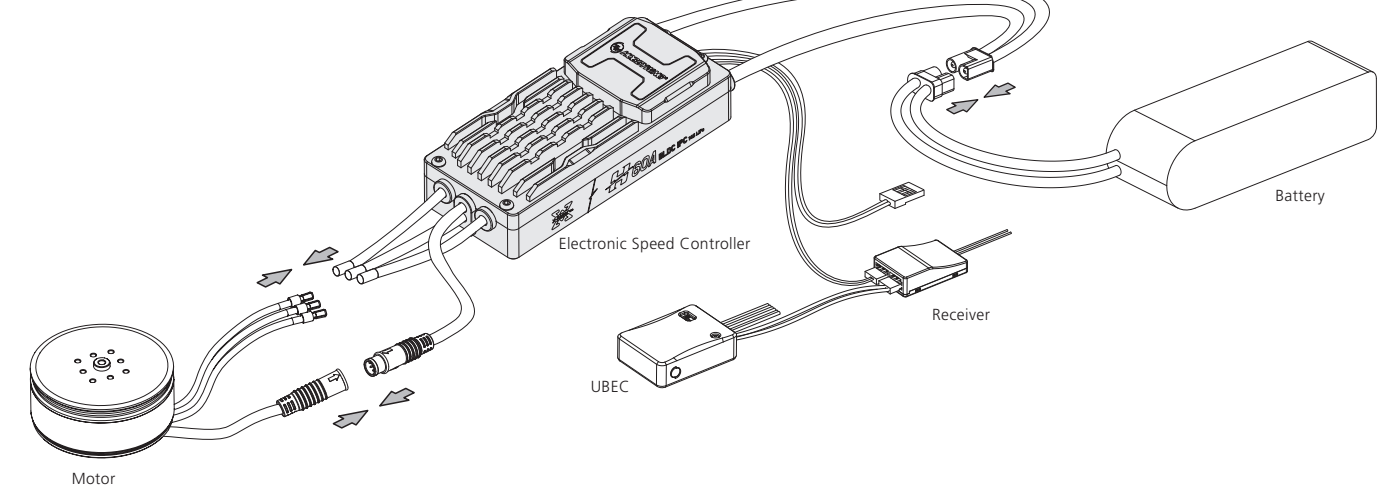
03 Product specification

Model	Continuous current Cooling wind speed 7m/s	Specification	BEC	Number of lithium battery cells (Standard voltage 3.7V)	Weight (without wire)	volume (mm)
XRotor Pro-H60A-14S-BLDC-IPC-RTF-HW-V2	30A	60A	None	12~14S	65g	78.5*32.5*18.8

04 User Guide

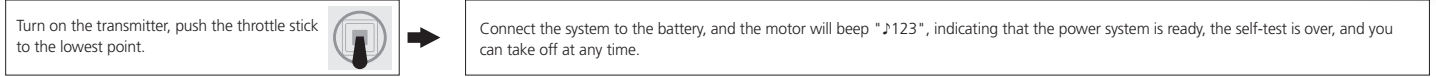
Warning! This ESC has PWM throttle mode and CAN digital throttle mode. One is set as priority, the other is as backup. The default priority mode is PWM, if need CAN to be priority mode, please contact Hobbywing official for configuration file.

Warning! Upon configuring the propeller position control function, the motor will rotate for 30s at most during calibration. Please remove the propellers before configuring to avoid accidental injury.



- The black and white wires are the ESC throttle signal cable, the black wire is the GND, and the white wire is the throttle signal wire;
- The yellow, gray and green wires are the firmware update/data cable of ESC, when using CAN bus communication, the yellow wire is the GND, the gray wire is CH, and the green wire is CL;
- The CAN cable is also the digital throttle cable and can be used in parallel.

05 Normal boot process



06 Protection function description

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

1) Startup protection:

The ESC will enter self-check mode after being powered on. If the self-check is successful, the motor will emit a string of beeping sound indicates that the ESC and motor is operational. If the self-check fails, there will be no beeping sound indicating operational, and the motor cannot be driven. (The reason for this may 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 a motor stall, it will attempt to output for 2s. If the stall continues during this time, the ESC will completely shut off output and will not attempt to restart the motor. If the motor fails to restart, thoroughly troubleshoot the issue. The power output can only be resumed after the ESC is re-powered, and the fault is eliminated.

3) Over-current protection:

When the instantaneous current is abnormal and exceeds 360A, the ESC will turn off the output and continuously attempt to restart the motor. If multiple restart attempts fail, re-powering the propulsion system is required to restore normal operation.

4) Over-temperature warning:

The ESC has no over-temperature protection. When the MOSFET temperature exceeds 110°C or capacitor temperature exceeds 100°C, an over-temperature warning will be reported through data interface, but the motor will not stop or reduce output. When there is a over-temperature warning, if the ESC continues the over-temperature or temperature continues to go up, it may lead to components damage and burning, please land your aircraft in time or reduce throttle output.

5) Low-voltage limit:

This ESC has no low-voltage protection. Some electronic components of the ESC will work abnormally when the voltage falls below 18V. Please land the aircraft immediately.

6) Throttle signal loss protection:

When the ESC detects that the throttle signal is lost, the output will be turned off immediately 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 ID Setting

If there is no requirement, the default factory Node ID of the ESC is 1, the throttle ID is 1, and the bus rate is 500KHz.

This function can only be used after purchasing a DataLink V2 box separately.

Before using this function, ensure that the computer system has installed Microsoft Visual C++ 2013 software in advance, otherwise it cannot operate normally.

1) Connection

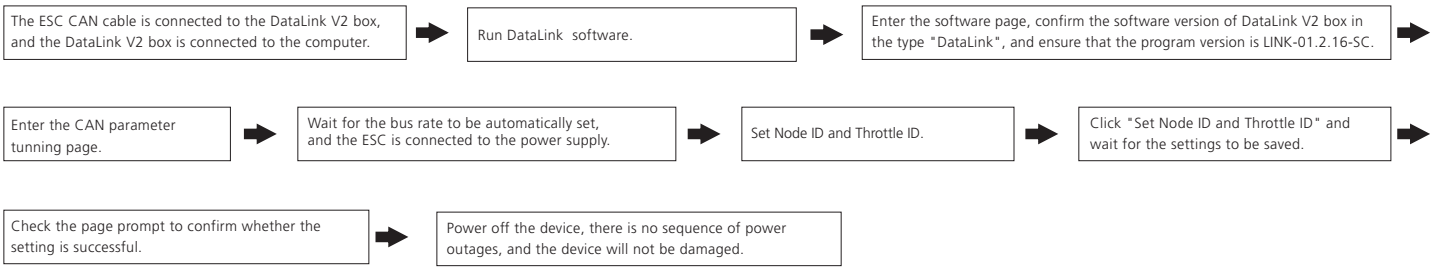
ESC---->DataLink V2 box "yellow gray green"---->"— CH1 CL1";

Connect the data box to the computer via USB.

When changing the ID, please remove the propeller to avoid danger.

Node IDs and Throttle IDs of different ESCs on one aircraft must not be the same. Otherwise, when using the CAN function, multiple ESCs with the same Node ID or Throttle ID will be recognized as one ESC.

2) Operating diagram



08 Firmware upgrade

Firmware upgrade is divided into two ways: computer online upgrade and flight controller remote upgrade. It supports online upgrade of multiple ESCs at the same time, and the upgrade port is CAN-ESC (Fast).

Flight controller remote upgrade needs to cooperate with the flight controller, this manual does not include this part.

This function needs to use DataLink V2 box, special DataLink software package for upgrade, and USB data cable.

DataLink V2 box version requirements, LINK-01.2.16-5C or later, DataLink software can be obtained from Hobbywing official website, distributors, Hobbywing sales, and Hobbywing after-sales.

Note: Please ensure that the computer system has installed Microsoft Visual C++ 2013 software before using this function, otherwise it cannot be used. An upgrade package usually only contains one program for one type of ESC. For other ESCs, please re-obtain the upgrade package for the corresponding ESC.

1) Connection

Connect the computer and the DataLink V2 box with the USB data cable.

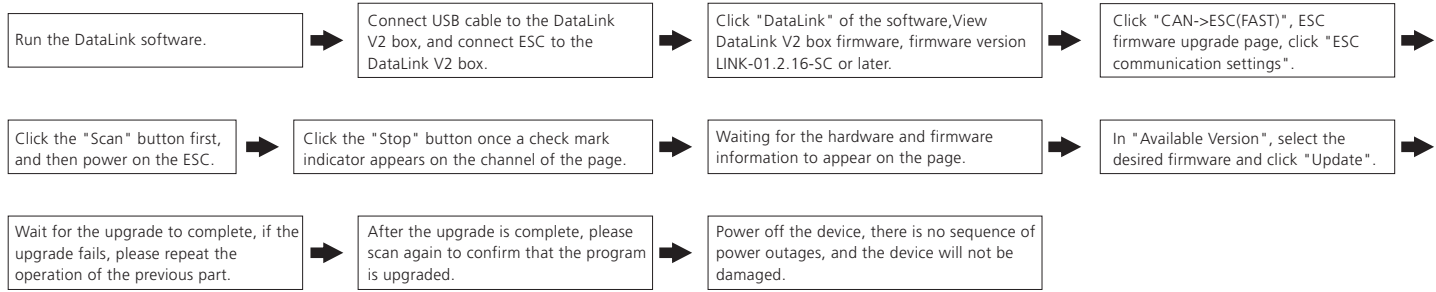
ESC---->DataLink V2 box "yellow gray green"---->"— CH1 CL1";

2) Firmware acquisition

It can be obtained at the place of purchase, Hobbywing official website, dealers, Hobbywing sales and Hobbywing after-sales offices.

Note: The upgrade can only be made from the existing firmware. Only the software can be upgraded, and the hardware can not.

3) Operating diagram



09 Fault data read

The ESC has a built-in fault storage function to store the times upon powering-on, flight time, and fault times information. It is convenient for flight fault analysis. This function needs to use DataLink V2 box, serial port assistant, and DataLink software.

Note: DataLink software can be obtained from Hobbywing official website, dealers, Hobbywing sales, and Hobbywing after-sales.

DataLink V2 box firmware version requirements: LINK-01.2.16-C; serial port assistant requirements: USB to TTL protocol; DataLink software requirements: fault storage version. It can be obtained on the official website, WeChat official account or after-sales service.

The DataLink V2 box has three power supply methods (+5V), via USB data cable, serial port assistant or external power supply cable. You can choose one of the power supply methods, and you don't need to connect all the power supply at the same time.

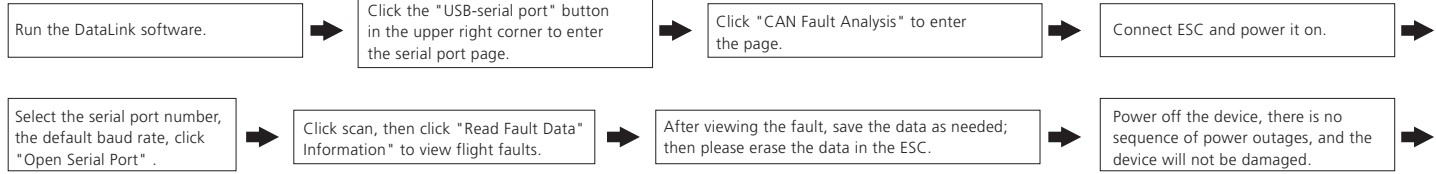
Note: For detailed steps, please refer to the DataLink V2 box user manual.

1) Connection

Serial port assistant ----> DataLink V2 box "GND RX TX 5V"---->"— TX2 RX2 +" (please click here for the corresponding line sequence);

ESC---->DataLink V2 box "yellow gray green"---->"— CH1 CL1", multiple ESCs can be used in parallel.

2) Software operation



10 Instructions for the use of fixed propeller function

This function requires the use of DataLink V2 box, dedicated DataLink host computer software, dedicated parameter configuration file, and USB-TTL module.

Note: Please confirm that the USB-TTL module driver has been installed correctly; the DataLink V2 box version requirement is LINK-01.2.16-5C or higher; before using this function, please ensure that the computer has installed Microsoft Visual C++ 2013 software. If it is not installed, it will not work. Please refer to the DataLink V2 box user manual for details.

1) Connection

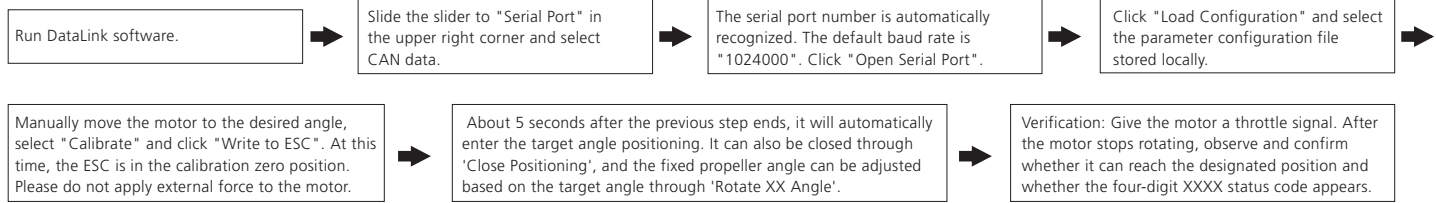
USB-TTL module connects the computer and DataLink V2 box;

- Connect the ESC three-phase wire to the motor (no sequence), and the 5pin connector is correctly connected to the motor magnetic encoding board;
- ESC CAN signal line ---->DataLink V2 box "yellow gray green" ---->"— CH1 CL1";
- USB-TTL module ---->DataLink V2 box, TTL-USB TX is connected to DataLink V2 box RX, TTL-USB RX is connected to DataLink V2 box TX.

2) Software acquisition

The PC software and configuration files can be obtained at the place of purchase, Hobbywing official website, Hobbywing sales, and Hobbywing after-sales service.

3) Operation



11 Common Faults and Prompt Sound

Warning tone description.

SYMPTOM	tone	POSSIBLE CAUSES	POSSIBLE SOLUTIONS
Motor fails to start after power on.	"Beep beep beep..." rapid single-tone.	Throttle is not reset to the bottom position.	Push the throttle to the lowest 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.
The power-on voltage is lower than18 V.	"Beep Beep, Beep Beep..." (1 second for each interval).	Battery voltage is too low.	Replace with a suitable and full-charged battery.
The power-on voltage is higher than 63 V.	"Beep Beep, Beep Beep..." (1 second for each interval).	Battery voltage is too high.	Replace with a suitable and fully-charge battery.
Motor stops or restarts during operation.		The 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 can spin.	Abnormal driving.	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.

Resources & Specifications

Visit www.hobbywing.com/products/xrotor-pro-h60a-14s-blcd-ipc for more details about XRotor Pro H60A 14S BLDC IPC FOC Drone ESC