HOBBYWING®

X-Rotor Pro
H300A-24S-FOC-RTF-V2
U S E R   M A N U A L

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.

This ESC is an industrial-grade component for unmanned aircraft. If you have more specialized application requirements, please contact us.

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01 Safety Precautions

• This is a FOC-driven ESC and needs to strictly match the motor parameters. The unique program is only suitable for one motor + propeller configuration. It is not compatible with multiple configurations at any time. Please contact the manufacturer for use.
• Due to the uniqueness of the program of FOC-driven ESC, please do not use motors and propellers which do not match the program of ESC. Improper configurations may trigger ESC protection mechanisms, rendering the system inoperable.
• Do not install propellers when proceeding ground testing to avoid unnecessary danger.
• 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℃. 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 the two-phase wires.
• This ESC is equipped with CAN function. When using the CAN function, different ESCs on the same aircraft cannot have the same ESC ID and throttle channel. Otherwise, multiple ESCs will be recognized as the same.
• The ESC has no CAN terminal resistor.

02 Product features

• The program is specially optimized for the external rotor to improve throttle response speed, taking into account both response and reliability.
• 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, the protection level is IP55, and IP67 can be customized.
• ESC has two throttle modes: CAN digital throttle and PWM throttle. CAN+485 dual-bus throttle mode can be customized, enhance the operational reliability of the propulsion system.
• 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.
• Using shielded wire to improve anti-interference capability, and ensuring signal quality.
• FOC ESC, strict configuration of motor parameters, high efficiency, low noise, energy recovery, and excellent throttle linearity.
• The standard version adopts CAN communication, allowing real-time monitoring of data such as the input and output throttle, RPM, bus current, bus voltage, capacitor temperature, MOS temperature and ESC status. The communication protocol can be obtained by contacting the Hobbywing official.
• Compatible with throttle signals with a refresh rate of 50~500Hz, suitable for a variety of flight controllers.
• The ESC has built-in fault storage function, and the ESC can record flight faults such as overcurrent, stalled, throttle loss, overheat, etc., and can be read by connecting the ESC data cable through the DataLink data box (optional).
• You can use DataLink (optional) to upgrade the ESC program. For details, refer to the user manual of Datalink 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.
• The Intelligent Propeller Control function is customizable, this manual does not include the introduction to the customized ESC function.

03 Product Specifications

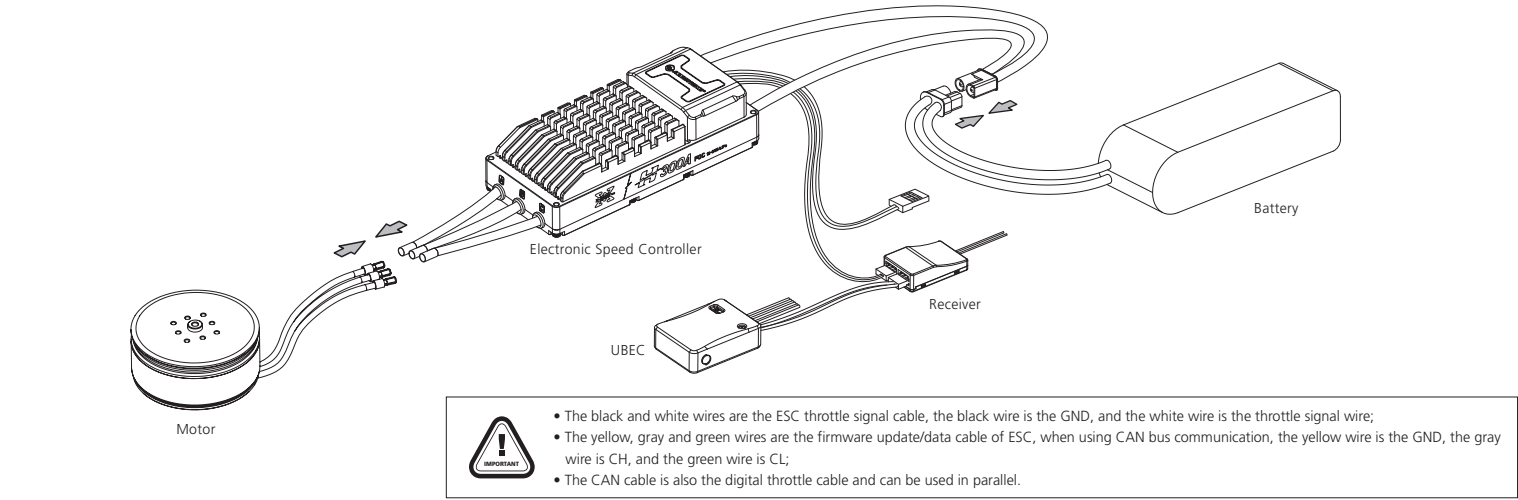| Model	Continuous current Cooling wind speed 7m/s	Specification	BEC	Voltage range	Weight (without wire)	volume (mm)
XRotor Pro-H300A-24S-BLDC-RTF -HW-H-V2	140A	300A	None	36-130V	800±5 g	175*76*47

04 User Guide

1 Precautions

Warning! The throttle range of the ESC is solidified, cannot be calibrated.
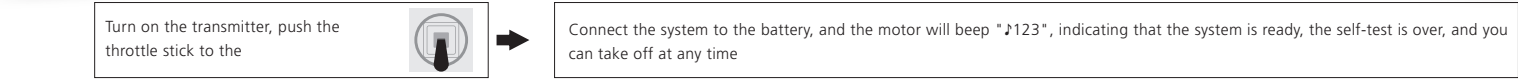Warning! The FOC ESC features a braking effect and regenerative voltage. Do not use power supply equipment that cannot absorb regenerative voltage during ESC testing or flight operations, as this may damage both the ESC and the power supply.
Warning! This ESC supports two throttle modes: PWM and CAN. The primary mode takes precedence, while the other serves as a backup. By default, the factory setting uses PWM throttle mode. If you require CAN throttle mode as the default, contact Hobbywing to obtain the corresponding configuration file.

2 Wiring method

Battery
Electronic Speed Controller
Receiver
UBEC
Motor

• 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 start-up process

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

06 Description of the protection function

This ESC is specially designed for industrial drones, without low-voltage protection and over-temperature protection.
1) Stall protection:
When the ESC detects a motor stall, it will completely shut down output after 2 seconds and repeatedly attempt to restart the motor. If the motor fails to restart, thoroughly troubleshoot the issue. The power output can only be resumed after the power is turned off and restarted, and the fault is eliminated.

2) Current protection:
When the instantaneous phase current is abnormal and over 630A, the ESC will shut down the output and keep trying to restart the motor. If the motor fails to restart multiple times, it can return to normal after being power on again.
3) Overheat warning:
This ESC has no over-temperature protection, and only prompts that the temperature is too high. When the MOS temperature is higher than 110°C or the capacitor temperature is higher than 100°C, it will send an over-temperature fault message through the data interface. When the ESC reports an over-temperature fault, if the temperature continues to rise, electronic components may be damaged. Please land the aircraft in time or reduce the throttle output.
4) Low voltage protection:
This ESC has no low-voltage protection. When the voltage is lower than 36V, some electronic components of the ESC will work abnormally. Please land the aircraft in time.
5) Throttle signal loss protection:
When the ESC detects that the throttle signal is lost, 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 ID Setup

If there is no requirement, the default factory ID of the ESC is 1, the throttle channel is 1, and the bus speed is 500Kbps.
This function can only be used after purchasing a DataLink data 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.
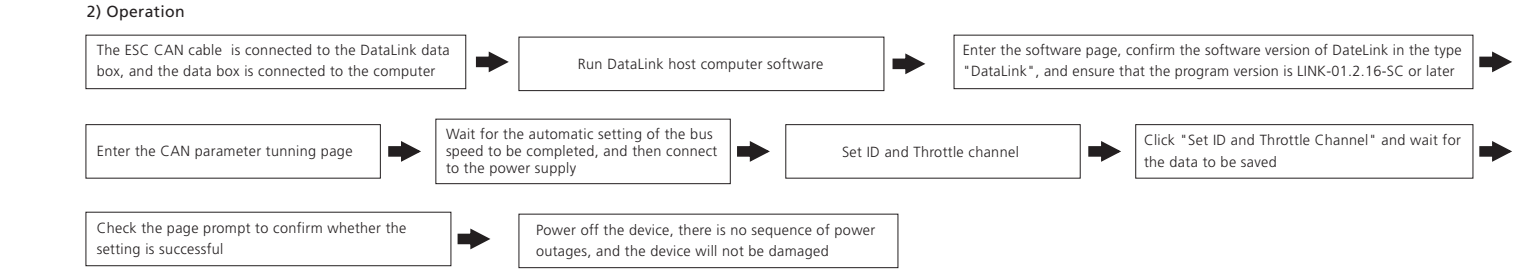1) Connection
ESC---->DataLink data box "yellow gray green"---->"- CH1 CL1";
Connect the data box to the computer via USB.
When changing the ID, please remove the propeller to avoid danger.
For the same aircraft, different ESCs cannot have the same ESC ID and throttle channel, otherwise when using the CAN function, different ESCs with the same ID and throttle channel will be recognized as one ESC.
2) Operation

The ESC CAN cable is connected to the DataLink data box, and the data box is connected to the computer	→	Run DataLink host computer software	→	Enter the software page, confirm the software version of DateLink in the type "DataLink", and ensure that the program version is LINK-01.2.16-SC or later	→
Enter the CAN parameter tunning page	→	Wait for the automatic setting of the bus speed to be completed, and then connect to the power supply	→	Set ID and Throttle channel	→	Click "Set ID and Throttle Channel" and wait for the data to be saved
Check the page prompt to confirm whether the setting is successful	→	Power off the device, there is no sequence of power outages, and the device will not be damaged			

08 Read fault data

The ESC has a built-in fault storage function, which can store power-on times, flight time, and fault times information, which is convenient for flight fault analysis.
This function needs to use DataLink data 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 data box firmware version requirements: LINK-01.2.16-C or later; 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.
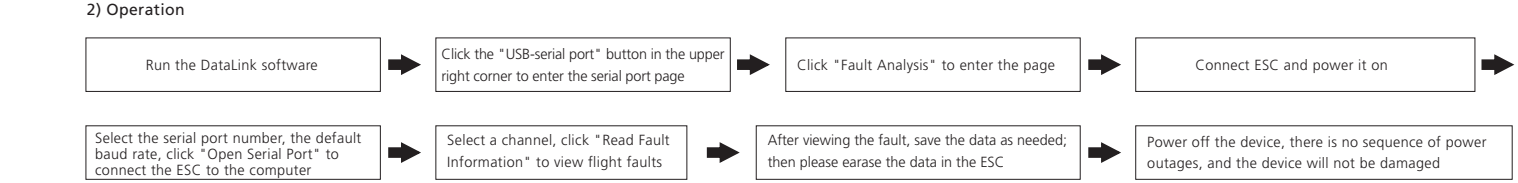The DataLink box has three power supply methods (+5V), via USB data cable, serial port assistant or external power supply cable. You can choose one of the power supply methods, and you don't need to connect all the power supply at the same time.
Note: For detailed steps, please refer to the DataLink user manual.
1) Connection
Serial port assistant ----> DataLink data box "GND 5V TX RX" ----> "— + RX2 TX2" (please click here for the corresponding cable sequence);
ESC---->DataLink data box "yellow gray green"---->"—CH2 CL2", multiple ESCs can be used in parallel.
2) Operation

Run the DataLink software	→	Click the "USB-serial port" button in the upper right corner to enter the serial port page	→	Click "Fault Analysis" to enter the page	→	Connect ESC and power it on
Select the serial port number, the default baud rate, click "Open Serial Port" to connect the ESC to the computer	→	Select a channel, click "Read Fault Information" to view flight faults	→	After viewing the fault, save the data as needed; then please earase the data in the ESC	→	Power off the device, there is no sequence of power outages, and the device will not be damaged

09 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 data box, special DataLink software package for upgrade, and USB data cable.
DataLink data box version requirements, LINK-01.2.16-SC 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
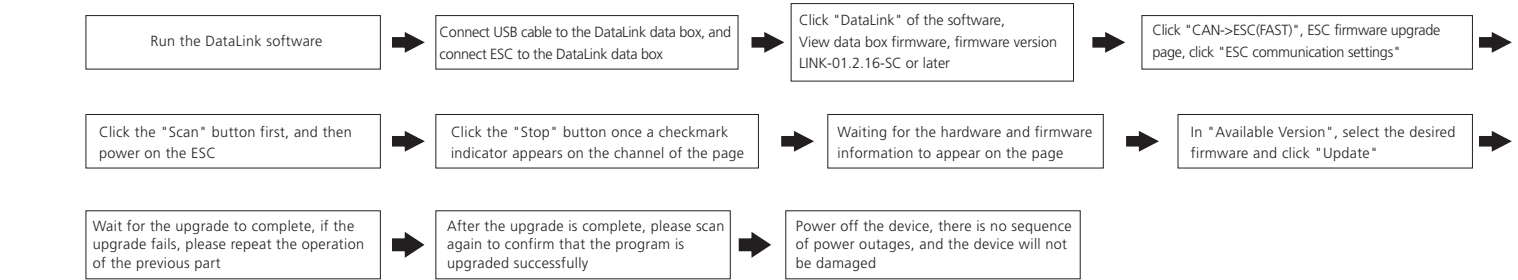Connect the computer and the DataLink data box with the USB data cable;
ESC---->DataLink data box "yellow gray green"---->"—CH1 CL1";
2) Firmware acquisition
It can be obtained at the place of purchase, Hobbywing official website, dealers, Hobbywing sales and Hobbywing after-sales offices.
Note: It can only be upgraded from the existing program, besides, software and hardware cannot be upgraded together.
3) Operation

Run the DataLink software	→	Connect USB cable to the DataLink data box, and connect ESC to the DataLink data box	→	Click "DataLink" of the software, View data box firmware, firmware version LINK-01.2.16-SC or later	→	Click "CAN->ESC(FAST)", ESC firmware upgrade page, click "ESC communication settings"
Click the "Scan" button first, and then power on the ESC	→	Click the "Stop" button once a checkmark indicator appears on the channel of the page	→	Waiting for the hardware and firmware information to appear 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 operation of the previous part	→	After the upgrade is complete, please scan again to confirm that the program is upgraded successfully	→	Power off the device, there is no sequence of power outages, and the device will not be damaged		

10 Common failures and prompt sounds

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 than 36V	"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 130V	"Beep 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 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	Motor phase loss	1. Check phase connection 2. Check motor 3. Return to factory for repair