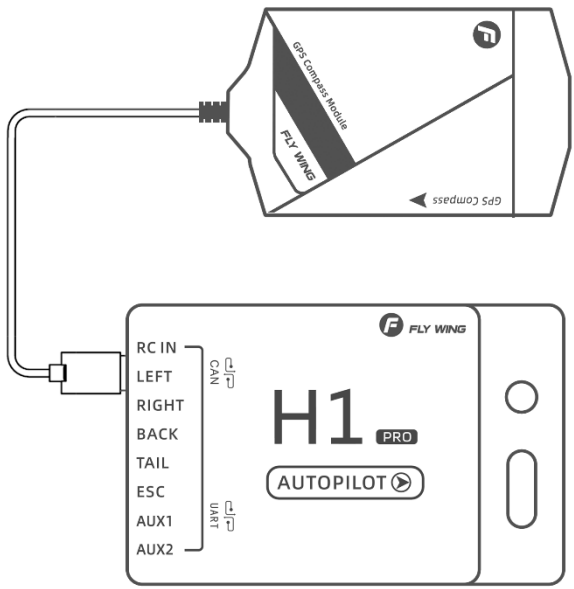
H1 PRO AUTOPILOT SYSTEM

User Manual

2025.11



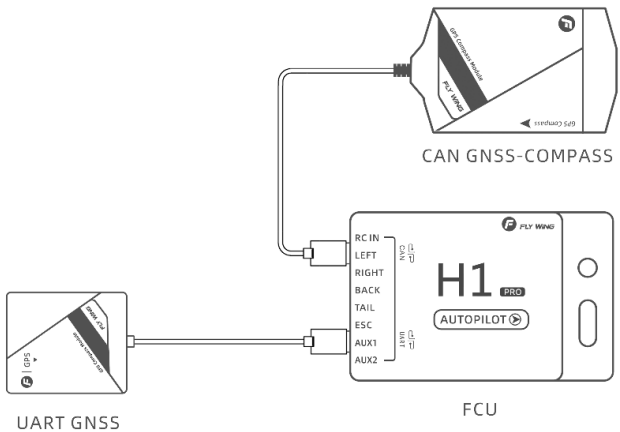
FLY WING

H1 PRO Introduction

Functional Overview

H1 PRO as the second generation cost-effective of the Flywing H series flight control system, has a built-in suspended independent IMU and can externally expand dual GNSS modules. It adopts the new generation of control and IMU algorithms, and provides a more stable experience and broader compatibility.

H1 PRO Control System consists of a main controller (built-in suspended IMU, barometer, compass), a serial GNSS module, and a CAN protocol GNSS-Compass module (with high-brightness LED indicator light).



System Composition

Working Principle

The main controller is the core module of the flight control system, integrating IMU, barometer, GNSS and compass modules; it can achieve precise altitude control and high-accuracy positioning functions; it provides support for multiple helicopter configurations (H3, HR3), and the GNSS module supports Beidou, GPS, GLONASS, and GALILEO. Uses the H1 PRO parameter tuning software to configure the parameters of the main controller, including installation, adjustment, and calibration of sensors.

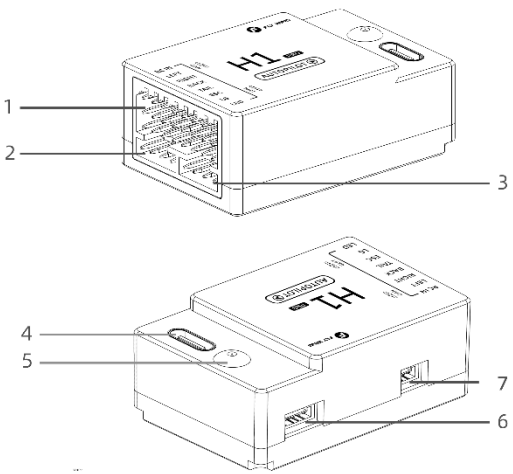
Description of Components and Ports

Main Controller

The main controller has the following features:

1. The main controller has a built-in CAN bus interface that works independently, as well as a serial port for GNSS backup. Its CAN port is used to connect the GNSS-Compass module.
2. The built-in IMU and barometer are used to measure the flight posture and altitude, and work with GNSS to achieve horizontal positioning of the helicopter, thereby enabling flight control.
3. The RCIN port supports multiple receiver types: S-BUS/PPM/i-BUS/WBUS/SUMD, and can support DSM2/DSMX through an external adapter. The ELRS port supports ELRS receivers.
4. H1 PRO flight controller supports the use of an external BEC (6V-13V) or a 2S lithium battery on the idle port of the receiver to power the entire system (including the servo) when using ESC without BEC function. During adjustment, the USB cannot power the receiver, servo, and GNSS module. Please connect to the power supply to debug the receiver and GNSS-Compass module.
5. LEFT/RIGHT/BACK ports are connected to the swash plate servo of the helicopter; Tail port is connected to the tail lock actuator (supports 1520us / 760us servo or PWM brushless ESC) of the helicopter; ESC port is connected to the PWM main brushless ESC; The AUX port is currently not functional.

Port Description of Master Controller:



1. Input/Output Interface
2. CAN Bus Interface
3. UART serial
4. USB-C flight controller adjust port
5. LED flight control status indicator light
6. 3S/4S/6S/12S lipo battery voltage detection

Install H1 PRO

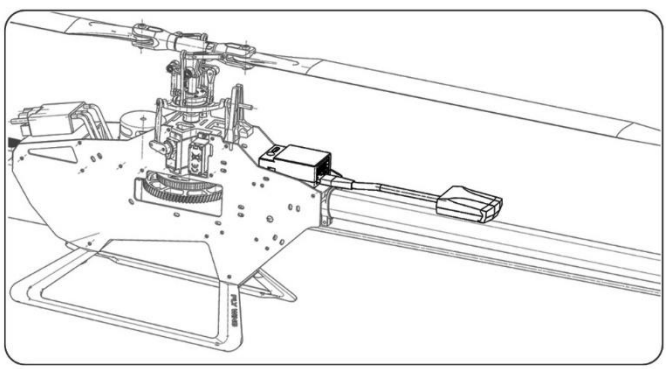
Overview

Installation Process

Please read this section carefully and follow the following steps to install and set up your flight control system to ensure that it works properly.

1. Ensure that the required modules for installation are complete and complete.
2. Watch instructional videos (www.Flywingrc.com)。
   - Watch the installation demonstration and module connection video, install the flight control system onto the helicopter and connect it correctly.
   - Watch the software tuning video, run the tuning software, and complete the parameter settings according to the software guidance and embedded instructions.
3. Check if the motor/ESC settings, transmitter channel settings, and protection functions are correctly set.
4. Confirm that all devices connected to the main controller are set up correctly.

Taking the tail variable pitch/HR3 inclined disc version helicopter as an example:



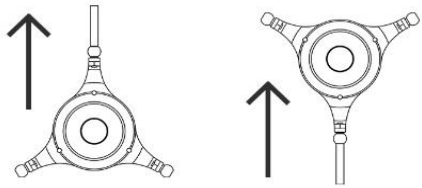
Installation Preparation

Relevant equipment

When using the H1 PRO, you need to prepare the helicopter, transmitter system, ESC, battery, and other equipment by yourself. Supported device types:

A. Supported helicopter type

H3 Swashplate Aileronless Helicopter; HR3 Swashplate Aileronless Helicopter.



H3 HR3

B. Receiver type

Supports various types of receivers. Regardless of which receiver is used, please ensure successful bind with the transmitter before use. Set according to the manual of the transmitter and perform calibration in the adjust software.

S-BUS receiver

For a standard S-BUS protocol receiver, if the transmitter has 9 channels, all functions can be used.

DSM2/DSMX receiver

For DSM2/DSMX receiver, an adapter is required for connection. When the transmitter has 9 channels, all functions can be used.

PPM receiver

For a PPM receiver, you need to set the fail-safe protection of the transmitter yourself. And the transmitter can only use the first 8 channels, the 9th channel is not available.

i-BUS / WBUS / SUMD receiver

For these receivers, you need to set the fail-safe function of the transmitter yourself.

ELRS receiver

When using an ELRS receiver, it is important to note that the receiver's RX is connected to the H1's TX; the receiver's TX is connected to the H1's RX。

The flight control has the function of automatically identifying whether there is a fail-safe function. If a standard S-BUS/DSM2/DSMX protocol receiver is provided, after the transmitter is turned off, the software's transmitter adjustment page should automatically display a red warning of "transmitter signal lost, fail-safe function activated," no additional fail-safe protection settings are required. For non-standard protocols, separate settings for fail-safe is required.

C. Power system

ESC:

H1 PRO supports PWM dedicated helicopter ESC. The ESC needs constant speed and soft start functions. It is recommended to use the Hobbywing Platinum series set, the parameters can be directly used by default, the calibration of throttle travel is not required.

Servo system:

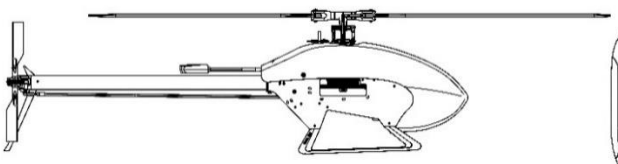
H1 PRO supports PWM protocol servos, a mainstream performance servo system is selected according to your helicopter type. The swashplate servo uses a wide frequency 1520us servo, and the tail servo supports servos with both wide frequency 1520us and narrow frequency 760us. The tail also supports PWM protocol (1100us-1900us) ESC equipped with a brushless motor for tail locking.

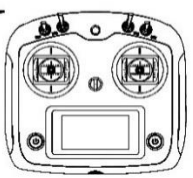
D. Battery

Battery type for H1 PRO: non-smart battery (3S/4S/6S/12S lipo battery).

Non-smart battery: Low-voltage protection function, only obtaining battery voltage information, and basic low-voltage protection function

This manual provides the instructions of installation and use with FW470L helicopter with variable pitch tail and FS-i6S Transmitter as examples.





Preparation of parameter software

Download Flywing H1 PRO Assistant software

Please access the download page of the official website: www.Flywingrc.com

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⚠ The flight parameter tuning software requires Windows 10 or above.

Installing and running the parameter tuning assistant

Flywing H1 PRO Assistant will help and guide you through the parameter settings of the H1 PRO flight control system.

Installation and operation on Windows system

Supports Win10 and Win11 (64-bit) operating systems.

1. Use a Type-C USB cable to connect the USB port on top of the flight controller to your PC.

2. Unzip the Flywing H1 PRO Assistant package.

3. Double-click the Flywing H1 PRO Assistant icon to run the parameter tuning software.

⚠ For safety, please remove the propeller before connecting the parameter tuning software.

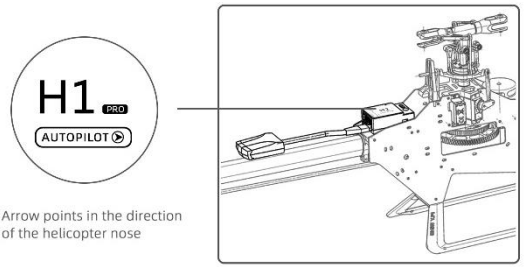
Starting installation

Be sure to strictly follow the installation requirements and correctly set parameters, otherwise it may not be able to fly or even cause serious safety accidents.

Installation of Flight Control System

Installing main controller

Install the main controller facing up and parallel to the fuselage, be sure to keep the Arrow mark pointing to the front of the helicopter, and position the flight controller as close to the helicopter's center of gravity (main shaft) as possible, then secure it to the fuselage with double-sided tape.



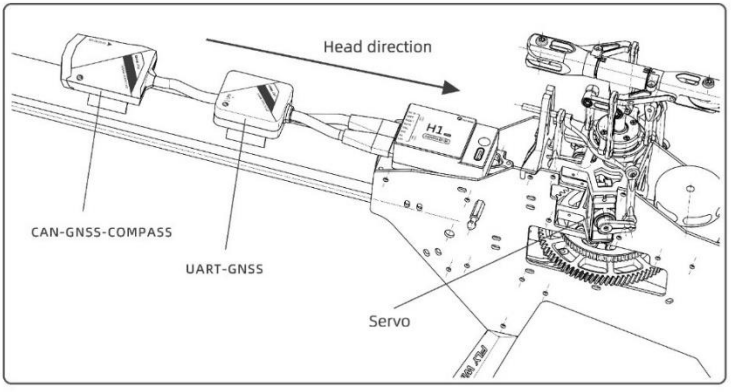
- Keep it facing up, do not invert it.
- If you need to use it in severe conditions, please ensure a proper keep.

- Install it in the position where there is a low-vibration as close as possible, keeping it parallel to the fuselage. The vibration of the location near the center of gravity of the helicopter is smaller.
- The flight control system is not waterproof, oil-proof, nor dust-proof. Regularly check and ensure the double-sided tape is securely installed.
- Regularly check and ensure the double-sided tape is securely installed.

Installing GNSS-Compass (GPS) module

Please install the GNSS-Compass module according to the following requirements.

1. Fix the CAN-GNSS-Compass to the GPS mounting base with double-sided tape, and keep it level with the flight controller and then fix them on the tail boom.
2. If a backup UART-GNSS needs to be installed, it should also be fixed to the GPS mount with double-sided tape and kept it level with the flight controller and then fix them on the tail boom. The two GPS can be installed in any order.

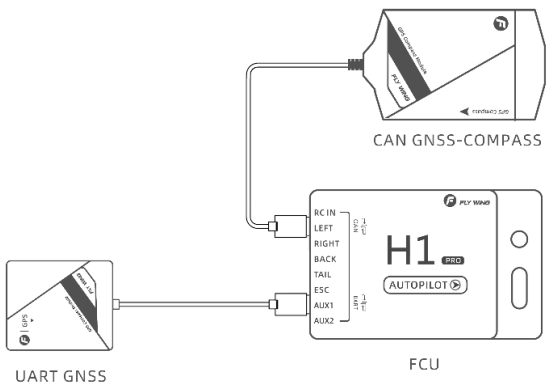


Use Requirements

1. Keep the side with the Flywing mark facing up, and the arrow pointing towards the helicopter nose, otherwise it will not fly properly.
2. Try to keep the surroundings free of tall buildings and trees, otherwise it will affect the CAN-GNSS-Compass module, resulting in poor searching effect of satellites.
3. A compass is a magnetically sensitive device and should be kept away from strong magnetic fields, strong electric fields, and strong electromagnetic fields (such as wires); keep it at least 15cm away from magnetic devices such as servos/ motors, otherwise, flight anomalies or even loss of control of the helicopter may occur. When the compass is interfered with or the course control is abnormal when the helicopter comes near certain objects, please move away as soon as possible.
4. During installation, it should be determined according to the type of helicopter and choose an appropriate GPS installation position to avoid interference with the compass during operation.
5. There will be no compass interference warning during loaded operation, and no dipping during flight.

Connection of flight control system

Complete the connection according to the instructions in the figure below, and use plastic cable ties to put wires in order and keep them neat.



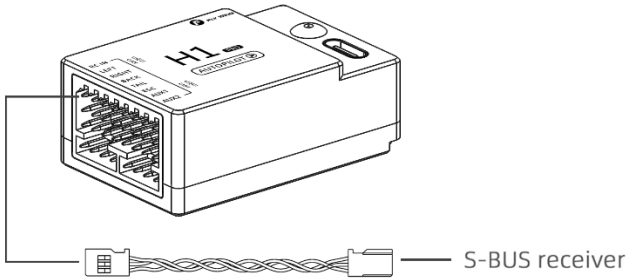
The metal shell of H1 PRO is GND, please do not connect the power supply on H1 PRO or on the carbon plate in contact with H1 PRO.

Connection of equipment on helicopter

When using H1 PRO, it is necessary to connect the receiver, ESC, servos, battery, and other related devices of helicopter, and set their parameters accordingly in the H1 PRO Assistant. Otherwise, it may be unable to fly and even lead to serious safety accidents.

Receiver

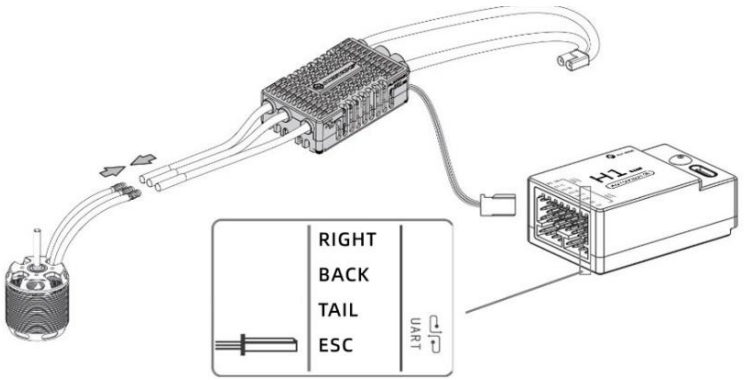
Except DSM2/DSM receivers, other receivers are connected to the RC IN port, and the slotted socket end is reserved for the signal line. DSM receivers require an additional adapter cable to be purchased and connected to the RC IN port; ELRS is connected to the side ELRS port.



Main ESC

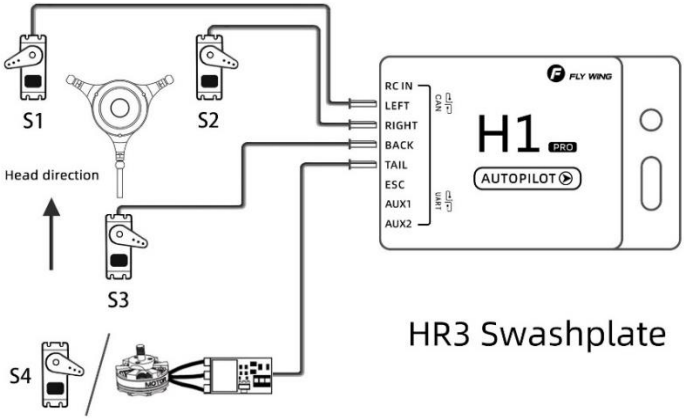
The connection is made with the Hobbywing Platinum ESC as an example:

1. Set the ESC to helicopter mode, other parameters can be set to default; insert the ESC PWM throttle line into the ESC port (keep signal line facing up), the ESC needs to support constant speed and soft start functions.

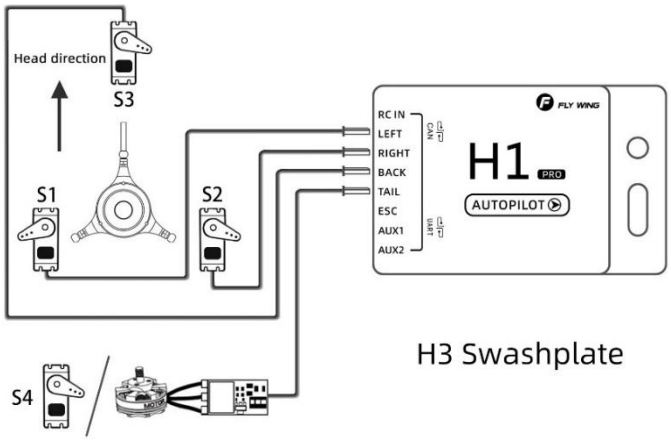


Swashplate/Tail Rotor（H3/HR3）

1. Swashplate supports PWM protocol wide-frequency servo; signal range: 1000-2000 us, neutral point of 1520us; servo voltage depends on ESC BEC voltage, please choose appropriate servo and BEC accordingly.
2. The tail supports 1520us servo /760us servo/tail motor; signal range of 1520us servo: 1000-2000us; signal range of 760us servo: 500-1000us; signal range of tail ESC PWM: 1000-2000us (Before selecting the correct protocol on the tail adjust page of the software, it is recommended not to insert the tail actuator).



HR3 Swashplate



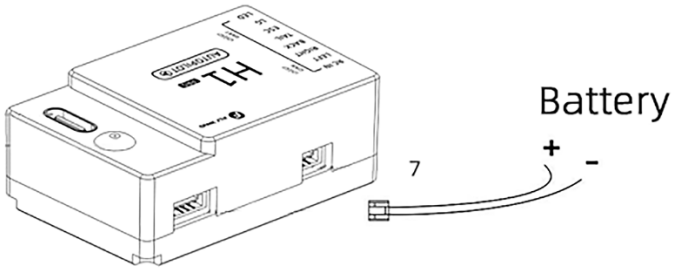
H3 Swashplate

AUXprot

No function available at the moment.

Battery voltage detection

The flight control supports voltage detection of 3S/4S/6S/12S batteries. Please connect the detection line in parallel with the helicopter's main power supply to the voltage detection port on the side of the flight control.

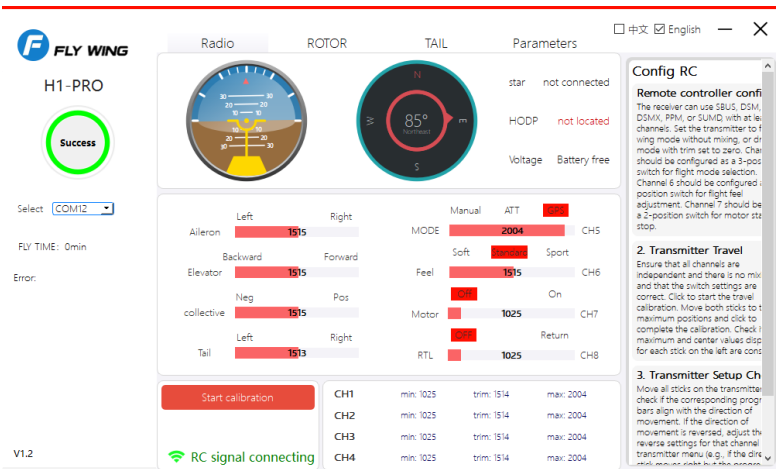


Setting and Calibration of Flight Control System

Please follow the software guidelines and embedded instructions to complete the parameter setting process as follows:

Software Home Page

On the right side of this page, the current flight control version, total flight duration, and error warning are displayed; At the top is the page switching button, corresponding to the Radio page, Rotor page, Tail page, and Parameters; The second line displays the real-time attitude;heading angle, ;number and accuracy of satellites; The third line displays the values of each channel; The fourth line is travel calibration and channel value display; The current language is displayed in the upper right corner and can be changed.



Transmitter adjustment

1. The fifth channel of the transmitter is for flight mode, it needs to be set to a three-position switch: high-position is GPS mode, middle is Altitude mode, and low is Acro mode.
2. The sixth channel of the transmitter is for Flight sensitivities mode and it needs to be set to a three-position switch: high-position for Sport mode, middle for Standard mode, and low for Soft mode. This mode will affect both the helicopter's head speed and flight sensitivity.
3. The seventh channel of the transmitter is the Motor Switch. After the flight control is unlocked, it is used to control the start and stop of the motor. It needs to be set as a two-position switch with the high-position for starting the motor and the low-position for stopping the motor.
4. The eighth channel of the transmitter is for RTH mode and it needs to be set to a two-position switch. High-position is for return to home, and low is for turning off return mode.

⚠
- After setting up, turn off the transmitter and check if the software prompts "Lost of RC signal". If there is a prompt, the return function for loss of control is normal.
- If there is no prompt, check whether it is a standard protocol such as SBUS. If the protocol cannot be changed, you need to set the fail-safe function of the transmitter by yourself (after the signal is lot, the fifth channel is in GPS mode, the seventh channel is in the motor start, and the eighth channel is in the RTH on).

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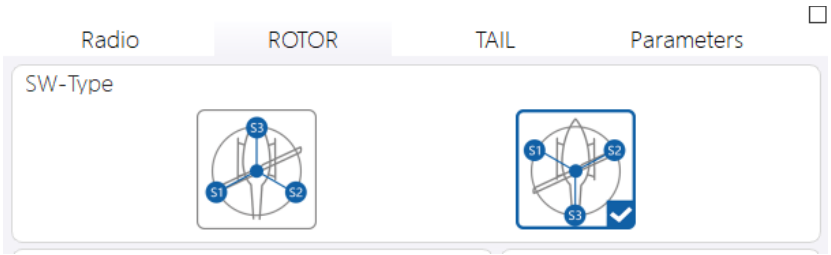
5. After completing the channel settings, click "Start Calibration"; rotate both joysticks simultaneously by a circle, and click the button when the software gives a prompt of "Click to Write Parameters". When the button changes back to "Start Calibration", the calibration of transmitter is completed. At this time, the right side of the button will display the min/trim/max values for Transmitter CH1-CH4. Check if the errors of all the min values are less than 20, or else you need to recalibrate or check the channel travel of transmitter.

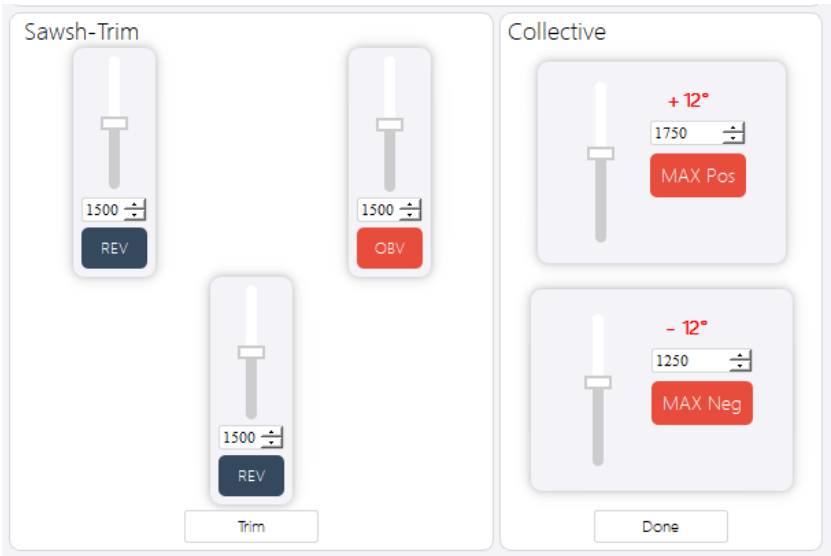
Setting of Rotor Head

1. After selecting the helicopter type on the homepage, choose the correct swashplate type on the rotor head page:



- The swashplate types of helicopter are divided into H3 and HR3;

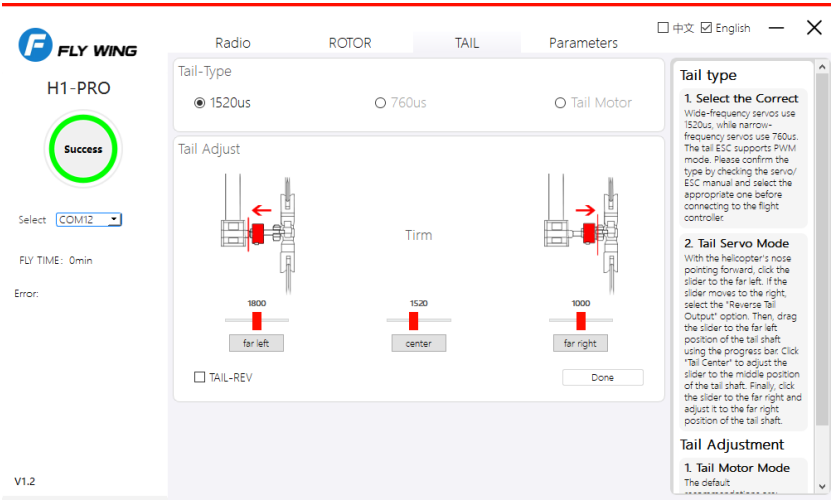
2. Click " Trim" .Drag the slider in the swashplate leveling zone to perform horizontal calibration of the helicopter swashplate, ensuring that the swashplate is relatively level with the main shaft holder, relatively vertical to the main shaft, and make sure the pitch should remain at 0°.
3. Click "MAX Pos" and "MAX Neg" .Drag the slider on the pitch adjustment page to adjust the maximum positive and negative pitch of the helicopter. It is recommended that both positive and negative pitches be around 12 °.



Tail Setting

1. Enter the tail setting page; in the tail type Zone, select the correct tail type: 1520us tail servo, 760us tail servo, tail Motor, and then plug in the signal line of the tail actuator.

2. In the tail adjustment zone, click the “far left”. At this time, the helicopter nose pointing forward, and the tail pitch ring moves to the left (the tail rotor blades blow air to the right); drag the setting slider to move the tail pitch ring to the left most mechanical limit.
3. Click the “far right”, the tail pitch ring moves to the right (the tail rotor blades blow air to the left); drag the slider to move the tail pitch ring to the left most mechanical limit.
4. If the direction is incorrect, please Click on the "TAIL-REV" option in the bottom left corner;
5. Click the “center” button, the tail pitch ring returns to the middle position; drag the setting slider to move the tail pitch ring to the middle position of the tail axis.
6. After completing all settings, click "Done" button to complete settings on this page.



Parameters page

1. Compass calibration, see system function page in this manual.
2. It is recommended to enable low-battery return flight. The helicopter will automatically return under the low voltage condition; it supports 3S/4S/6S/12S battery voltage detection.
3. For other parameters, please refer to the advanced parameter explanation in the appendix page.

Functions of H1 PRO System

Compass calibration

For the first use, the Compass must be calibrated, otherwise the system may fail, which may affect flight safety. A Compass is easily affected by strong electric fields, strong magnetic fields, and strong electromagnetic fields which can cause the Compass to malfunction and even result in flight accidents. Frequent calibration can keep the Compass working in optimal condition.

Calibration precautions

1. Do not calibrate it near strong magnetic fields, strong electric field zones, or large metal objects, such as magnetite, parking lots, or buildings with underground steel reinforcements.
2. Please do not carry ferromagnetic materials such as keys, watches, speakers, etc. during calibration.
3. If the compass is calibrated indoors, it is best to recalibrate it outdoor before outdoor flight to prevent compass anomalies during flight due to magnetic field differences between the two zones (indoor environments are likely to be exposed to magnetic substances such as speakers).
4. When there may be steel-like substances affecting the compass, please move the helicopter to another location.

Calibration Steps

Please select an open area and calibrate the compass according to the steps below. For more information on compass calibration, please watch:

Method 1: Use transmitter for calibration

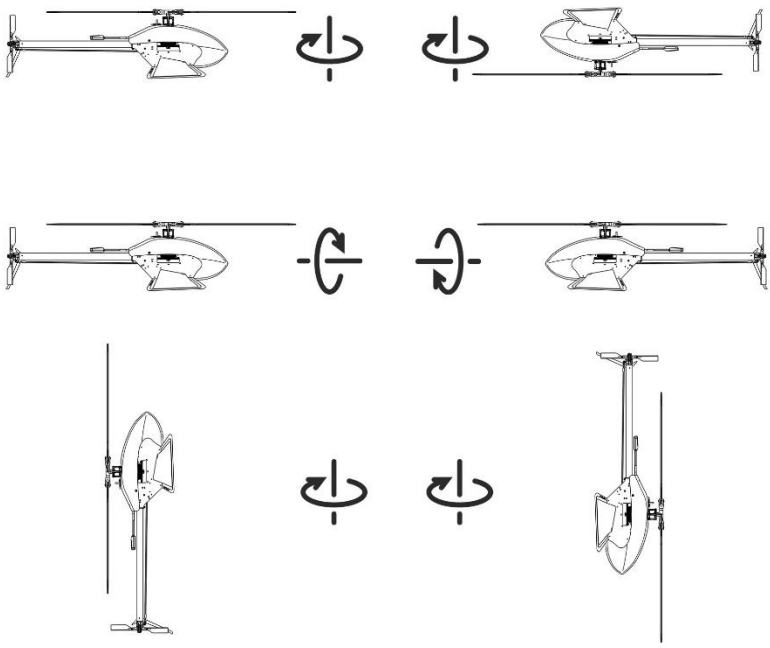
1. Turn the transmitter's flight mode switch to GPS mode position, then quickly switch over to Intelligent Trick position, and then switch back to GPS mode. Repeat this process more than 3 times, and finally stay in GPS mode. Wait a few seconds, the GPS light will start flashing in red, and the system enters the compass calibration state.
2. Flip each side of the helicopter at least 2 times, the GPS status light will gradually change from red and normally on to green. Finally, when the GPS light is normally on and then is off, indicating that the calibration is completed, and the flight control will automatically restart; during the restart, the LED light will flash

quickly in red, then go off for a few seconds, and finally flash quickly in red and blue, indicating the restart is completed.

Flight control LED: Red and green light flashing quickly---Yellow light flashing quickly---Blue light flashing quickly---Green light flashing quickly---Green light normally on---Automatic restart

GPS LED: Red light normally on---Orange light normally on---Yellow light normally on---Green light normally on---Automatic restart

3. During the restart process, the helicopter must be placed on the ground and kept stationary for waiting for the flight control self-test (do not hold the helicopter in your hand).



Method 2: Use software for calibration

1. Open the software Parameters page, connect the helicopter battery, click the "Start " button in the compass calibration module on the top of the page, and start calibration according to the prompts.
2. Flip each side of the helicopter at least 2 times, the GPS status light will gradually change from red and normally on to green. Finally, when the GPS light is off, indicating that the calibration is completed, and the flight control will automatically restart; during the restart, the LED light will flash quickly in red,

then go off for a few seconds, and finally flash quickly in red and blue, indicating the restart is completed.

3. During the restart process, the helicopter must be placed on the ground and kept stationary and waiting for the flight control to self-initialized/ self-test (do not hold the helicopter in your hand).

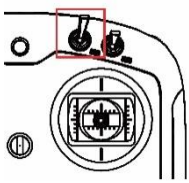
Cases for Recalibration

- Abnormal compass data; the helicopter slowly rotates by a circle horizontally, and the status indicator light turns red and flashes slowly.
- The flight location is far from the location where the last compass calibration was performed.
- Change in mechanical structure of the helicopter.
- Severe drifting during flight, or inability to fly in a straight line, or hovering in circles.

Flight Functions

Flight Mode

Flywing is designed with multiple control modes for users. In different control modes, there are different flight performances of the helicopter. You can check the current control mode through Flywing H1 PRO Assistant. The following figure shows the FS-i6S transmitter receipt system as an example.



GPS positioning mode:

GPS status: The helicopter uses GNSS signals for positioning, and can realize automatic positioning at any flight altitude and automatic return to base.

Altitude mode:

It does not adopt the GNSS for positioning, only provides altitude stabilization. If there is good GNSS satellite signal recorded before takeoff, the return flight can be achieved.

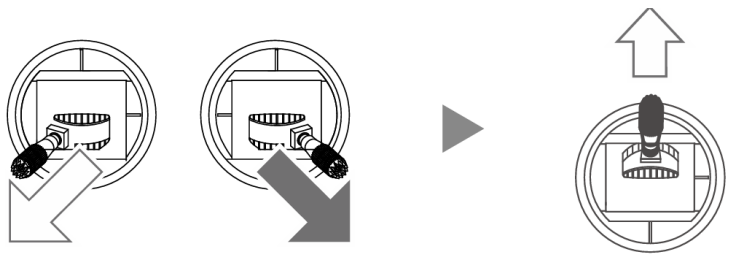
ACRO Mode:

The acro mode is similar to traditional gyroscopes and does not provide fixed height and self stabilization functions; The joystick controls the angle change speed of the Helicopter, and the more push rods, the faster the roll; Release the joystick, the helicopter will not return to a horizontal angle; The pitch is directly controlled by the transmitter joystick, and it is recommended for experienced player to use it.

Flight control

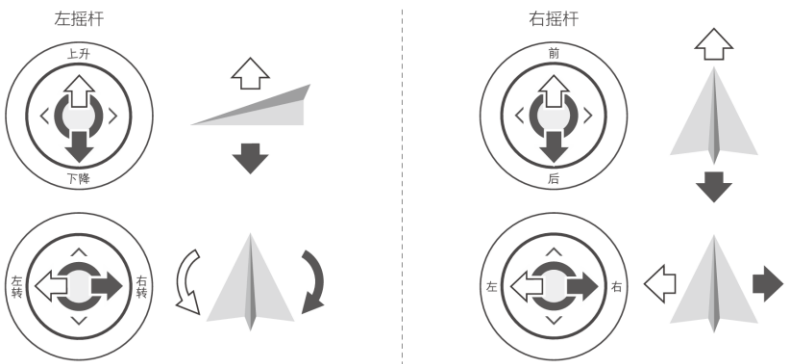
Manual takeoff:

M1/M2 Transmitter: Unlocks the helicopter by moving the joystick outward as shown in the figure below. After the LED light changes from normally on to flashing, release both joysticks, quickly turn the motor start switch to the start position, and the motor will slowly accelerate. When the motor has finished accelerating and the speed is stable, push the throttle lever up to make the helicopter take off.



Attitude control:

Taking Mode 2 (left-hand throttle) as an example.



Manual landing:

Pull down the throttle joystick, and wait for the helicopter to land stably, then quickly turn off the motor, then slowly release the joystick and wait for the motor to stop rotating.

Flight protection

One-click return:

The process that the helicopter automatically returns to the last recorded returning point is called Return Flight. Each time the helicopter is unlocked, the flight control will refresh the returning point. Toggle the CH8 switch to initiate the return flight. The return flight function can work normally only when there is good GNSS signal.

Return when out of control:

When there is a good GPS signal, the compass is working normally, and the returning point is successfully recorded, if the wireless signal is interrupted for more than 3 seconds, the flight control system will control the helicopter to return to the most recently recorded returning point. If the wireless signal returns to normal during the return flight, the return process will continue, but the user can first switch the transmitter to return and then turn off the return function to cancel this return.

Low-battery return:

When the battery voltage is below the set value for more than 10 seconds, there is good GPS signal, the compass is working normally, and the returning point is successfully recorded, the control system will control the helicopter to fly back to the most recently recorded returning point. The user can turn the transmitter to the return position and disable return to cancel current return flight. If the battery runs out of power during the return flight, there may be a risk of crashing; please set the return voltage reasonably according to the flight plan, flight distance and altitude to prevent unnecessary hazards due to insufficient battery voltage.

- It is recommended to wait for one more minute after the satellite search is completed to make the returning point more accurate before unlocking and taking off.
- If the helicopter is within 10 meters of the returning point:

  When the altitude is above 5 m, the helicopter will return to base while maintaining the current altitude.

  When the altitude is below 5 m, the helicopter will climb to an altitude of 5 m and return.
- If the helicopter is more than 10 meters away from the returning point:

When the altitude exceeds 15 m, the helicopter will maintain its currentaltitude and return.

When the altitude is below 15 m, the helicopter will climb to 15 m and return.

- When the LED yellow light is flashing slowly or the GNSS is not working, return flight cannot be achieved.
- When the current is not GPS mode or the return flight has been canceled manually, return flight cannot be achieved.
- During the return flight, the helicopter cannot avoid obstacles, so it is necessary to choose a suitable site for flight before takeoff.
- The landing process is divided into two stages:

  When the helicopter flies over the returning point, it will descend rapidly, and at this time, the transmitter cannot control its movement.When the altitude is about 5 m, its speed will be reduced. At this time, you can use the transmitter to control it to move forward, backward, and left or right and choose a suitable landing location.

Coordinated turn

Coordinated turn is a flight control algorithm technique that allows an helicopter to maintain its stability and maneuverability during a turn. It can solve the problems of poor coordination between airspeed and the longitudinal axis of the helicopter, large turning radius, obvious side slide, and strange attitude in the horizontal turning control method. Greatly improves the flight attitude of the helicopter. The setting location is in the Advanced Parameter---Self-Stabilizing GPS Parameter page.

This function is effective in GPS mode and attitude mode by default, and invalid in intelligent Acro mode. That is, when the helicopter is moving at high speed, you can control the yaw through moving it to the left or right, the flight control system will automatically control the helicopter to make the corresponding flip.

Soft takeoff/ landing

This function allows the flight control to completely control the vertical speed during takeoff and landing. When the altitude reaches 1 m, it switches to transmitter scale for control. It can solve the problem of poor simulation due to too quick takeoff of the scale helicopter. During takeoff, except for the throttle lever, the direction

control of other joysticks is not affected. The setting location is in the Advanced Parameter---Self-stabilizing GPS Parameter page, where either of the two functions can be turned on or off individually. For precautions, refer to the detailed explanation of advanced parameters in the Appendix.

Flight restrictions and no-fly zones

Helicopters must fly within the designated airspace according to the regulations of the International Civil Aviation Organization and the air traffic control regulations of various countries regarding airspace control, as well as the management regulations for helicopters. For flight safety considerations, users are requested to consciously comply with local laws and regulations to use the product more safely and legally.

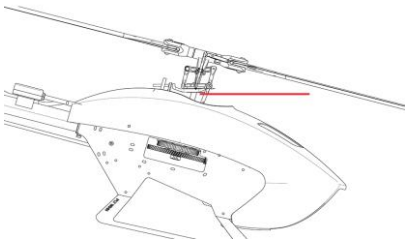
Inspection of Flight Control System

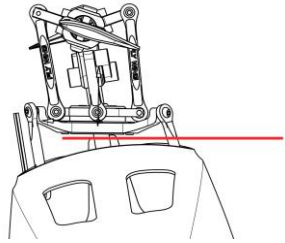
Hardware Check

Installation and Component Inspection

1. Each module is installed correctly and securely.
2. The wiring of the electric regulator and receiver is correct and secure.

   Work Status Check.
3. Whether the mode switch corresponds to the flashing of the status LED indicator.
4. Check whether the GNSS-Compass working status indicator light is flashing correctly.
5. Check whether the sensor parameters are normal and the calibration is conducted as prompted.
6. Shake the helicopter before takeoff to check if it is always level and whether corrections are accurate.





Software Inspection

Parameter Tuning Inspection Process

1. Are the installation parameters of the helicopter set correctly?
2. Are the installation parameters of the main controller set correctly?
3. Check whether the voltage protection and fail-safe settings are correct.

Flight Safety

Safety Summary

Flywing strongly recommends that users enjoy the fun of flying in a safe and reasonable environment. Necessary flight safety awareness is very important for the safety of you, the people around you, and the environment. The user should ensure a sufficient understanding of the helicopter and being aware of all emergency procedures.

1. Environment

- Fly in open areas away from crowds, ground traffic roads, ground facilities or property, airports, other aircrafts, or obstacles.
- The flight altitude is determined by the helicopter's performance. High altitude environment will affect the battery and power system, leading to the performance reduction of a helicopter. Therefore, please make sure to understand the performance of your helicopter and fly with caution.
- The ambient operating temperature range of the flight control system module: -10 to 55 ℃ (under the condition without direct sunlight exposure).
- Fly in good weather (not rainy, windy, or extreme weather), during the day or in good lighting conditions.
- Fly within legal zones.

2. Inspection

- Ensure that all devices are in sufficient battery level.
- Ensure that the propellers should be not damaged and securely installed.
- Ensure that all parts of the helicopter should be clean and intact.
- Ensure that all modules of the flight control system are securely installed and do not directly contact other metals and conductive materials; the installation position and orientation are correct; the connections are normal and secure with no loose plugs, and the wires are organized and fixed properly. Do not pull the wires forcefully when handling connectors.

3. Operation

- Do not approach the rotating propeller and motor.
- Fly within the visual line of sight.
- Do not transport hazardous materials and prohibited items.
- Do not approach the rotating propeller and motor.
- Fly within the visual line of sight.
- Switching the control switch of CH7 motor during flight will cause the helicopter to crash. Please use this function only under emergency.
- During the flight, please do not make or receive telephone calls or send SMS, and do not operate the helicopter when taking alcohol or drugs.
- Please return as soon as possible when there is a low battery (or low voltage) warning.
- The helicopter will not automatically avoid obstacles during the automatic return flight. If the transmitter signal is normal, you can cancel the return flight through the transmitter.
- After landing, turn off the helicopter first and then the transmitter to avoid signal loss of the transmitter and triggering the return flight mode.
- Do not use the product to throw or launch any hazardous items at buildings, people, or animals.

4. Maintenance

- Regularly check the status of each module in the flight control system.
- The flight control system can be stored in a dry environment at a temperature of 5℃ ~ 35℃ without heat sources, vibrations, strong magnetic fields, and strong electric fields nearby for a long time.
- Do not store it at high places to avoid accidental falls, which may cause equipment damage or malfunction.

5. Flight restrictions and local regulations

- Flying is strictly prohibited in no-fly zones.
- It is recommended to control the flight altitude below 120 m, and the flight shall strictly comply with local laws and regulations.

Disclaimer and Warning

The product is not a toy and is not suitable for individuals under 18 years of age. Please keep the product out of reach of children, and be especially careful when operating in scenes where children are present.

Before using the product, please read this document carefully. This statement has an important impact on the safe use of the product and your legal rights.

The product is the flight control system of a helicopter and will provide safe and reliable flight control under the conditions of normal power supply and all components intact. Visit http://www.flywingrc.com for the latest instructions and warnings. Flywing reserves the right to update this disclaimer. The latest disclaimer is subject to the version on the official website of www.flywingrc.com.

Be sure to carefully read this document before using the product to understand your legal rights, responsibilities, and safety instructions; otherwise, it may result in property loss, safety accidents, and personal safety hazards. Once you use the product, it is deemed that you have understood, acknowledged, and accepted all the terms and contents of this statement. The user shall be responsible for his or her actions and all consequences arising therefrom. The user undertakes to use the product only for legitimate purposes and agrees to these terms and any related policies or guidelines that Flywing may establish.

To the maximum extent permitted by laws, under no circumstances shall Flywing be liable for any indirect, consequential, punitive, incidental, special, or penal damages, including losses incurred due to your purchase, use, or inability to use the product (even if Flywing has been advised of the probability of such damages).

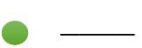
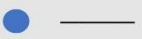
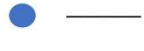
In compliance with laws and regulations, Flywing Airline reserves the final right of interpretation of the above terms. Flywing Airline reserves the right to update, revise, or terminate the terms and content of this notice without prior notice. Before the termination of the download service in this guideline, this notice will remain effective for a long time.

Appendix

LED Flight Status Indicator

Flashing Speed Explanation

- – – – – slow flashing, once every half second or so.
- -------- Fast flashing, once every quarter of a second or so.
- ..... Rapid flashing, very fast flashing.
- _____ Normally on.

Mode	H2 LED Status	GPS LED Status	Content
GPS mode			Locked, searching for satellite positioning
			Main GPS satellite positioning completed, unlocking available.
			Dual GPS satellite positioning completed, unlocking available.
			Unlock status
			Abnormal battery voltage
Attitude/ Intelligent trick mode			Locked, searching for satellite positioning
			Main GPS satellite positioning completed unlocking available.
			Dual GPS satellite positioning completed unlocking available.
			Unlock status
			Abnormal battery voltage
Return mode			RTL Return Flight Mode
Compass calibration			Calibration progress: 0-25%
			Calibration progress: 25-50%
			Calibration progress: 50-75%
			Calibration progress: 75-99%
			Calibration completed
Fault status			Abnormal acceleration
			Compass malfunction
			Remote control malfunction
			Other faults

Explanation of Advanced Parameters in Details

Parameter explanation is on the right side of the software:

1. Throttle:

This setting adjusts the throttle value for the main motor in the standard flight mode with governor active. A setting of 70% is generally recommended. For heavy scale helicopters, it is advised to increase this to 80% for improved power. If using a Hobbywing Platinum series ESC, it can be connected directly to the flight controller without requiring throttle calibration or mode configuration. If the ESC

parameters have been previously modified, please reset the ESC to its default Mode 3 (Heli Governor Mode).

2. Pitch gain:

   If the helicopter exhibits a porpoising (wave-like) motion during high-speed forward flight, it is recommended to increase the gain. If severe nodding occurs during hover, the pitch gain should be reduced. If the gain is already below 20% and the nodding persists aggressively, the issue may stem from seized internal bearings in the blade grips or jitter in the swashplate servos.

3. Roll gain:

   Also known as aileron gain. If the helicopter exhibits severe left-right oscillations during hover, reduce this value. Otherwise, it can generally be left at the default setting. Increasing this value enhances the responsiveness and precision of lateral (side-to-side) control.

4. Tail gain:

   When the tail of the Helicopter exhibits slight wagging or high-frequency vibrations, and adjusting the speed does not resolve the issue, you can slightly increase this value for slight wagging or decrease it for high-frequency vibrations. If the tail wagging is significant and adjusting this parameter does not improve the situation, the issue likely stems from mechanical issues in the helicopter, primarily due to missing thrust bearing shims inside the tail rotor grips.

5. Stabilize:

   A higher value allows the helicopter to return to a level attitude more quickly, and it only takes effect in self-stabilization mode.

6. AltHold gain:

   If the helicopter experiences severe vertical oscillations, reduce this value. If reducing it below 20% does not resolve the issue, the problem likely stems from a mechanical fault in the helicopter itself. If the helicopter exhibits a regular, slow vertical oscillation with an amplitude of 20-30 cm, the issue is likely caused by a stuck bearing in the rotor head, and adjusting this value will not fix the problem.

⚠ 1. Due to the altitude being estimated by a barometer and not measured by the laser radar or ultrasonic radar, the judgment of altitude during gentle takeoff and landing is not accurate. This function may be invalid in strong wind conditions or for the helicopters with high vibration due to altitude estimation errors. That is, the slow flight function is ineffective even when the helicopter is 1 meter above the ground (the flight control system

thinks it is still far from the ground), or incorrectly judges the distance to the ground is 1 m when the helicopter is actually 2-3 m above the ground, causing the flight slow down even at a height of 2 m.

2. The fail-safe effect depends on the mechanical performance and power of the helicopter, and each fail-safe action will be accompanied by altitude loss to varying degrees. Please set the altitude for fail-safe according to the actual situation of the helicopter. To avoid a crash caused by insufficient altitude for fail-safe.

Technical Specifications

Helicopter type	HR3/H3 Aileronless Swashplate
Battery type	3S, 4S, 6S, 12S lithium polymer battery
Receiver type	S-BUS / PPM / i-BUS / WBUS / SUMD/ELRS; DSM2/DSMX should be provided with an adapter
Supporting PC	Win10，Win11（64-bit）
Rated power	2W
Voltage input range	6V-13V，ESC BEC power supply
Ambient temperature	-10° C to 55° C
Dimensions	Main FCU： 48 mm*31 mm*18.5 mm CAN GPS ： 47 mm*30 mm*14 mm UART GPS: 37 mm*30 mm*13.5 mm
Weight	Main FCU : 34 g; CAN GPS: 33 g; UART GPS: 21.5 g
Maximum flight angle	Soft : 25°; Standard: 35°; Sport : 40°
Hovering accuracy (GPS Mode)	Vertical direction: ± 0.5 m, horizontal direction: ± 1.5 m

This manual is subject to updating without notice.

You can query the latest version of the "User Manual" on the official FLYWING website.

http://www.flywingrc.com

If you have any comments or suggestions, you can leave a message on the official website.