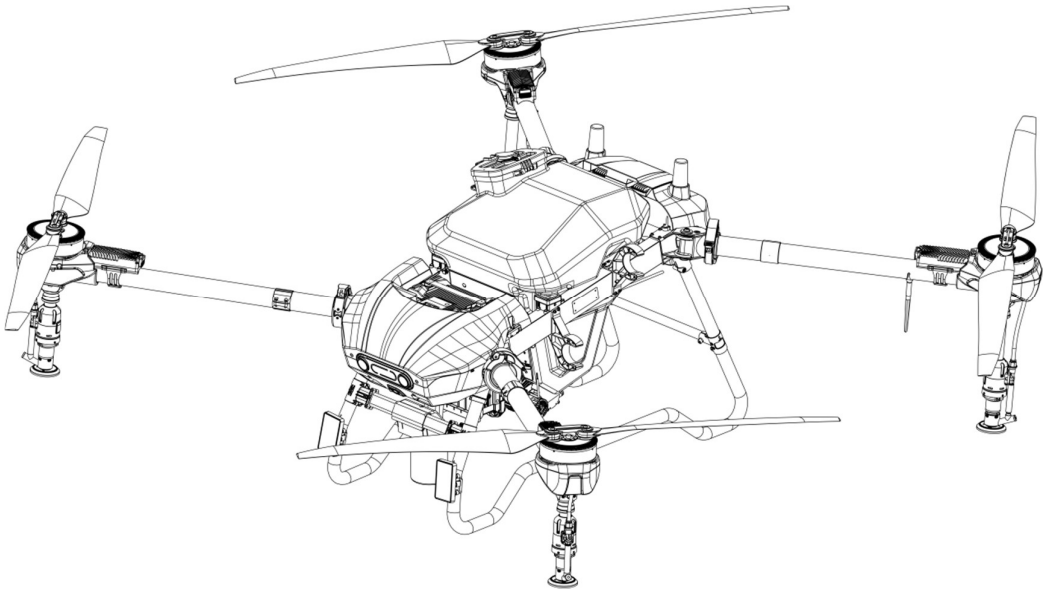
Model 3WWDZ-U70A

HD580 Agriculture Drone

User Manual



Heilongjiang Huida Technology Co., Ltd.

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Contents

1 Disclaimer

1. Before using this product, please read this user manual carefully. Once you activate this product, it is deemed that you have known, understood, acknowledged and accepted all the terms and contents herein.
2. Agricultural drones fall under the category of larger unmanned aerial vehicles, and their operation carries inherent risks. Huida Technology strictly prohibits the sale of drones to minors and will not assume any liability for the consequences resulting from the use of drones by individuals under the legal age.
3. Users are prohibited from operating the drone while under the influence of alcohol, drugs, or any form of anaesthesia, or if they are experiencing dizziness, weakness, nausea, or any other physical or mental condition that may impair their ability to fly the drone safely. Huida Technology will not accept liability for any consequences resulting from such actions.
4. During the application of agrochemicals, users must thoroughly read and follow the agrochemicals usage instructions, including personal protective measures as outlined. Huida Technology will not be held responsible for any damage or adverse effects caused to people, animals, or plants resulting from improper personal use of the agrochemicals.
5. This product is a multi-rotor agricultural drone, designed exclusively for use in agricultural, forestry, animal husbandry, and fishery operations, specifically for applications such as spraying and sowing. It is not recommended for any other purposes. Should any accidental outcomes arise from its use outside of the intended use specified herein, Huida Technology will not accept any liability for direct or indirect consequences.
6. This product must not be modified privately or used with non-Huida official accessories. Huida Technology will not assume any direct or indirect responsibility for the outcomes produced by such unauthorized modifications or the use of third-party accessories.
7. To enhance product functionality and user experience, this product is equipped with a data storage feature. Should you need to analyze the drone's data, you can export the operation data via the remote controller for analysis. This action is considered as a personal activity, and Huida Technology will not assume any liability arising therefrom.
8. To the fullest extent permitted by law, Huida Technology shall not be liable for any damages arising out of your failure to operate the product as per the instructions provided in the User Manual. Furthermore, Huida Technology disclaims any responsibility for indirect, consequential, punitive, incidental, special, or exemplary damages, including but not limited to those arising from your purchase, use, or inability to use the product.
9. During the use of the product, accidents may occur due to improper operation, the surrounding environment, network communications, or a combination of these and other factors. You acknowledge that such accidents are reasonable and acceptable risks inherent in the use of the product. Huida Technology will not assume any liability for such accidents.

10. To the fullest extent permitted by law, Huida Technology's liability to you for any damages, losses, and associated legal expenses is limited to the amount you paid to Huida Technology or Huida Technology's authorized dealers for the purchase of the Products.
11. In any case, the purchaser or user is obligated to adhere to the applicable laws, regulations, and policies of the country or region in which the product is used. Huida Technology disclaims any liability arising from the purchaser's or user's breach of such laws, regulations, or policies.
12. The laws of some jurisdictions may prohibit the exclusion of liability clauses, which means that your rights may vary depending on the laws, regulations, and policies of different countries or regions. However, this does not mean that the contents of this statement are necessarily invalid.
13. To the maximum extent permitted by law, Huida Technology reserves the right to the final interpretation and modification of the above terms. Huida Technology reserves the right to update, revise, or terminate the terms of the User Manual via the official Huida Technology website, Huida Agricultural Services App, or other channels, without the need for any further prior notification.
14. Secondary sales or transfers of a Huida agricultural drone, whether activated or inactive, following the initial purchase are considered your personal actions. Huida Technology has no right to interfere with such transactions and will not assume any liability for risks that may arise during the transfer process.
15. Compliance with Export Control Regulations. The export, re-export, or transfer of this product is governed by the export control laws of China and other relevant international export control regulations. Unless explicitly authorized by applicable export control authorities or permitted under the laws, your actions related to the use, sale, transfer, lease, or any other form of transaction involving this product do not contravene any embargo policies, do not involve prohibited end-users, and are exclusively for civilian applications. This product must not be utilized for military, nuclear, chemical, biological weapons, or missile-related purposes under any circumstances.
16. You are duty-bound to adhere to the relevant Chinese export control laws as well as any other applicable international export control regulations. You shall bear sole responsibility for any breaches of such laws that arise from your activities, including use, sale, transfer, rental, or any other actions related to the product.

Warning!

- Users are advised to thoroughly read the User Manual prior to operating the drone and associated products, and to obtain a UAS operation license qualification that is approved by Huida Technology, or as required by the laws, regulations, and policies of the country or region in which the products are being used. Failure to do so may result in improper operation of the drone and its ancillary products, which could lead to severe injury to yourself or others, as well as product damage and property loss. It is imperative to maintain a strong safety consciousness when operating this product. Furthermore, this product is not intended for use by children and individuals under the age of 16, individuals with limited civil capacity or legal incompetence, or persons with mobility impairments as defined by law. Users must operate this product in strict adherence to the guidelines outlined in the User Manual of Huida Technology and do not use any parts other than those provided by Huida Technology for product repairs.

2 Safety Tips

2.1 Flight Environment Requirements

1. Do not carry out spraying operations in windy conditions. Flight is prohibited in Beaufort force 5 winds and above.

   To prevent damage to people and property and ensure the spraying effect, it is recommended to conduct the spraying operation in an environment where the wind speed is 6 m/s or lower. For herbicides, drugs that are likely to cause drift damage/toxicity, it is recommended to perform spraying in an environment where the wind speed is 6 m/s or lower.
2. Avoid flight operations in adverse weather conditions, including fog which impairs visibility, wind speeds exceeding 7 m/s, as well as during rain or snowfall.
3. Select an open flying area that is not surrounded by high-rise structures. The presence of high-rise structures can obstruct GNSS signals, potentially causing the drone's RTK positioning system to fail, thus increasing the risk to flight safety.
4. Always fly within visual range and away from any obstacles, people, water, animals, etc.
5. Verify that the operation area and its immediate surroundings are free from electromagnetic interference sources, including high-voltage power lines, communication base stations, and transmission towers.
6. Flight is strictly prohibited above an altitude of 4,000 m.
7. Ensure that the GNSS signal is strong and the RTK antenna is not obstructed during flight.
8. Do not operate the drone indoors.
9. For night-time operations, activate the searchlight prior to commencing flight. Due to the reduced effectiveness of the visual system in low-light conditions, ensure the obstacle avoidance radar is engaged and exercise caution during flight.
10. Drone load capacity decreases with decreasing atmospheric pressure, with a 10% reduction in gross take-off mass for every 1 km increase in altitude (please note that it is not a 10% reduction in load capacity).
11. At altitudes exceeding 2,000 m above sea level, environmental factors can degrade the performance of the drone's smart battery and power system, thereby impacting overall flight performance. Exercise caution and vigilance during such operations to ensure safety.
12. The Huida Drone APP features intelligent software that dynamically restricts the maximum take-off mass based on the current flight environment. The mass of the loaded liquid must not exceed the established maximum limit. The Huida agricultural drone is equipped with a real-time load weighing system, which will prevent take-off and lock the drone if the load exceeds the allowable threshold.
13. Ensure that the GNSS signal is strong and the RTK antenna is not obstructed during operation.

2.2 Operation Precautions

1. Maintain a safe distance from the rotating propellers and motor at all times.
2. Adhere strictly to the specified maximum take-off weight and do not exceed this limit during flight to avoid danger.
3. Do not exceed the recommended maximum weight of the loaded liquid, otherwise flight safety may be compromised.
4. Fly within visual range.
5. Maneuvering a stick or otherwise stopping the motors during flight will result in the drone crashing. Please use this function only in case of emergency.
6. Do not answer phone calls during flight, and never operate the drone while under the influence of alcohol or drugs.
7. Please start the drone's flight back to its home point in case of low battery alert.
8. If the operating environment does not meet the working conditions of the radar module, the drone will be unable to autonomously avoid obstacles during automatic return; In such case, if the remote control signal remains stable, you can control the flight speed and altitude through the remote control.
9. Upon landing, turn off the drone prior to switching off the remote controller to avoid losing the remote control signal and causing the drone to start automatically.
10. Please maintain control over the drone during the entire flight process and do not overly rely on the information provided by the Huida drone App. The radar obstacle avoidance function will not be available in certain flight modes or flight environments. Please make sure you have a full view of the surrounding airspace, make rational judgments regarding flight conditions based on visual observation, to avoid obstacles in time, and set the appropriate flight and return altitude according to the flight environment.
11. In case there are high-voltage power lines within the operation area, please rationally plan the route and maintain a safe distance to prevent collision. In the event that the drone hits a power line, do not touch the drone with your hands as there is a danger of electric shock.

2.3 Emergency Propeller Stop

1. Do not stop the motor during flight, otherwise the drone will crash. Unless a special situation occurs (e.g. the drone may crash into a crowd), where an emergency stop of the motors is required to minimize injuries.
2. Emergency propeller stop: When holding the left and right joysticks outward for more than 0.5 seconds, the motor will unconditionally power off and come to a stop, and at this point, the drone will fall.

2.4 Flight Restriction and Laws and Regulations

1. Please consult Huida Technology for detailed data on flight restrictions and flight bans, or consult the local air traffic control department to comply with local laws and regulations. If necessary, users need to apply for authorization to use the drone from the relevant authorities.
2. All Huida agricultural drones in China are controlled to fly at an altitude of 30 m and below, please consult local laws and regulations if you are not in China.
3. All Huida agricultural drones in China are controlled to fly within a radius of 2,000 m, please consult the relevant local laws and regulations if you are not in China.
4. When using the Huida agricultural drone in non-China regions, please strictly comply with the laws and regulations of your respective country.

2.5 Electronic Fence

1. The electronic fence of Huida agricultural drone is turned on by default, which will restrict the drone's flight height, flight speed, and maximum flight distance.
2. You can set safety restrictions on the drone's flight height and the maximum flight distance (centred on the remote controller) in the Huida drone App settings.

Warning!

- The maximum altitude of agricultural drones in China is 30 m, and the maximum distance is 2 km.

2.6 No-fly Zone

1. According to the ICAO and national ATC regulations on airspace control and the management of drones, drones must be operated within the designated airspace. For flight safety reasons, the flight restriction function will be enabled by default, including no-fly zone restriction and electronic fence restriction, to help users use Huida agricultural drones more safely and legally.
2. No-fly zones include global ATC no-fly zones and user-defined no-fly zones, for drones, no-fly zones are not allowed to fly into.
3. The drone will automatically slow to a hover when approaching the no-fly zone boundary.
4. If the drone flies into the no-fly zone due to failure to receive positioning signal, it will land automatically once the signal restores, and after landing, it cannot take off in the no-fly zone.

Warning!

- When the GNSS is enabled, the drone is under the combined effect of no-fly zone and height restrictions. When GNSS is disabled, drones are only subject to height restrictions and will not actually fly above a maximum height of 30 m.

2.7 Agrochemical Use

1. Agrochemicals are toxic, please follow the agrochemical use regulations to ensure safe use.
2. When dispensing pesticides, please be cautious of agrochemical splashing to prevent harm to the human body caused by pesticide residues on the body.
3. Always use clean water to prepare spray mix. Always use filter when filling solution into spray tank to avoid clogging of spray tank filter. If there is any clogging, please clean it in time before using it again.
4. When applying agrochemical, ensure that the operator is positioned upwind to prevent the agrochemicals from drifting and posing a risk to human health.
5. When applying pesticides, be sure to wear personal protective equipment to avoid direct contact with the agrochemicals. After pesticide application, make sure to wash your skin thoroughly and clean the drone and remote controller.
6. The efficacy of agrochemicals is closely related to factors such as the liquid concentration, spraying flow rate, the altitude of the drone above the crops, wind direction, wind speed, temperature, and humidity. When applying pesticides, all of the above factors should be taken into account to achieve the best results.
7. Ensure that the agrochemical application process does not cause any harm to plants, animals within the spraying or drift range, or to the natural environment.
8. Polluting rivers and drinking water sources during the use of the pesticide is a serious violation of law.
9. Disposal of residual liquid: reasonable planning and arrangement should be made in order to minimize residual liquid. It is recommended to spray the residual liquid and cleaning liquid on the crops, and it is not recommended to overspray the crops if there is too much residual liquid.
10. It is prohibited to use strong acids, alkalis, high-temperature liquids, as well as agrochemicals expressly prohibited by national laws and regulations.

2.8 Ingress Protection Rating

1. Under normal operating conditions, the drone is dustproof, waterproof and corrosion resistant. Under controlled laboratory conditions, the airframe (excluding the smart battery) features IP65 (refer to the International Electrotechnical Commission IEC 60529 standard) level protection, and the airframe is splash-resistant.

2. Protection is not permanent and may deteriorate due to aging and wear caused by long-term use. Damage due to immersion in liquids is not covered by the warranty.
3. Circumstances in which protection may fail:
   - Deformed seal due to collision;
   - Cracking and breaking of the enclosure seal;
   - Failure to install or loosening of the port protection cover or waterproof rubber plug.

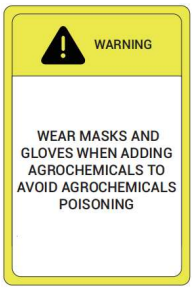
2.9 Drone Airframe Safety Warnings

Motor rotation direction warning sticker

Charging warning sticker

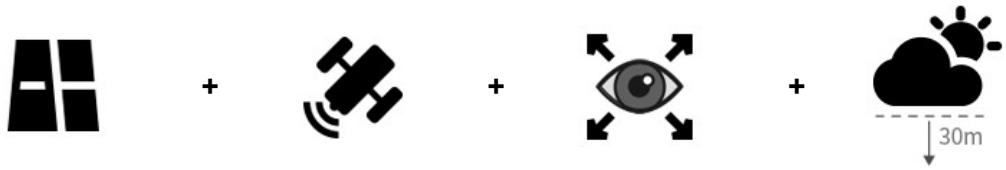
Arm locks warning sticker

Agrochemical container warning sticker



2.10 Safety Illustrations

2.10.1 Recommended Areas



Fly in open area | Strong GNSS signals | Visual Line of Sight (VLOS) | Fly below 30m

2.10.2 Areas Not Recommended

Avoid flying over or near crowds, power lines, tall buildings, airports and signal towers.

Radio transmission towers, high-voltage lines, and substations may interfere with the remote control signal and threaten flight safety. Therefore, ensure safety precautions are strictly observed during flight operations.

2.10.3 Prohibited Areas

DO NOT use the drone in adverse weather conditions such as heavy rain (precipitation rate exceeding 25 mm in 12 hours), fog, snow, lightning, or strong winds (wind speed of 8m/s and above).

2.10.4 Dangerous Behaviors

Flying in flight restricted zone

3 Product Overview

3.1 Introduction

The Huida Technology's cutting-edge third-generation 3WWDZ-U70A HD580 agricultural drone boasts an impressive 70-liter spray tank. It features a stable 4-axis truss structure design; standard configuration provides a pair of centrifugal nozzles, offering a maximum rate of up to 30 L/min. The drone can be fitted with a quartet of centrifugal nozzles, which together offer a maximum rate of 40 L/min. The innovative double spray disc design ensures a more uniform atomization process, with droplet sizes that can be finely tuned from 50 to 500 microns. This sophisticated feature markedly enhances both the operational efficiency and the quality of the application, resulting in superior performance.

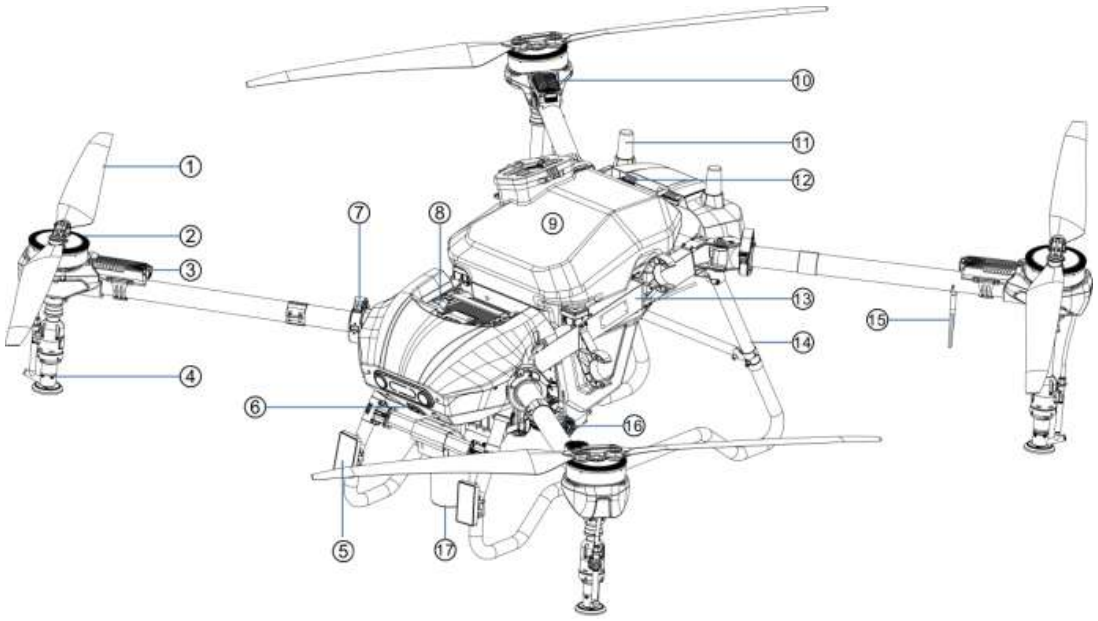
The HD580 model comes equipped with a standard front-facing 360° rotating obstacle avoidance radar, complemented by rear obstacle avoidance and terrain following radars for comprehensive protection. The virtual gimbal technology-supported monocular vision makes angle adjustable and low-light night vision possible. These enhanced safety configurations ensure a safer flight experience.

The newly enhanced intelligent remote controller features a vibrant 6-inch display and an integrated Huida Drone App, markedly refining the operational smoothness and stability. It is also equipped as standard with an RTK high-precision positioning module, capable of achieving centimeter-level route planning for enhanced accuracy. The remote control supports both built-in battery power and external battery supplies, offering a combined endurance of up to 8 hours to accommodate the demands of prolonged, high-intensity operations.

3.2 List of Items

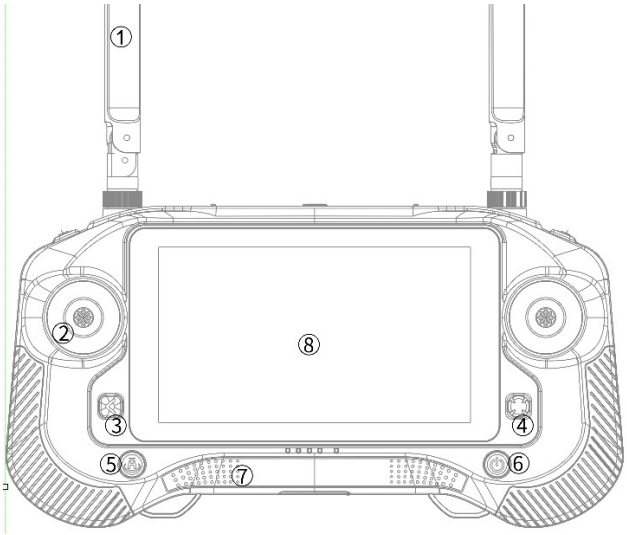
Description		Qty.
HD580 agricultural drone mainframe		1
HD402 Drone remote control kit	HD402 Remote controller	1
	402 Remote controller external 21700 battery	2
	HD402- Remote controller charging cradle	1
	Power adapter	1
	HD402 Remote controller GPS point device	1
	HD402 LORA antenna	1
HE102 smart battery		2
HE102 smart charger		1
HD580 agricultural drone user manual		1

3.3 Parts of drone

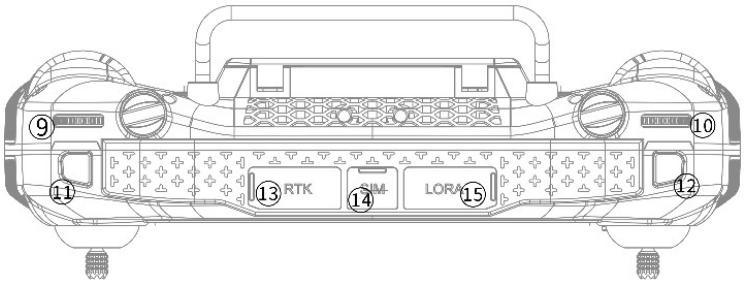


① Propeller
② Motor
③ Strobe
④ Centrifugal nozzle
⑤ Searchlight
⑥ Front FPV camera
⑦ Arm lock
⑧ Smart battery
⑨ Agrochemical container
⑩ Electronic speed controller
⑪ RTK antenna
⑫ Aerial-electronics module
⑬ Frame
⑭ Landing gear
⑮ Transmission antenna
⑯ Vane pump
⑰ Radar

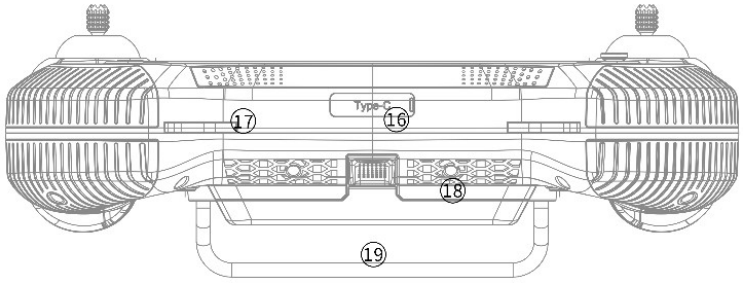
3.4 Parts of Remote Controller



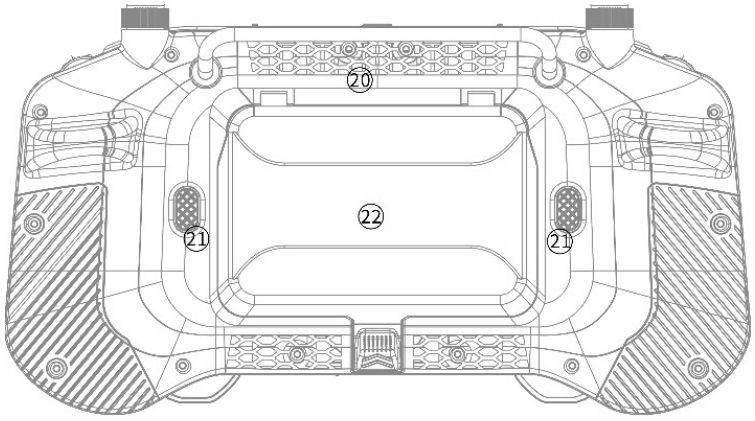
① Antenna
② Joystick
③ Return button
④ 5D button
⑤ Return To Home (RTH) button
⑥ Switch button
⑦ Megaphone speaker
⑧ Touchscreen



⑨ Thumb wheel 1
⑩ Thumb wheel 2
⑪ Obstacle avoidance radar switch
⑫ Spray switch
⑬ External RTK interface
⑭ SIM card slot
⑮ LORA interface



⑯ Type-C
⑰ Lanyard hole
⑱ Heat hole
⑲ Carrying handle

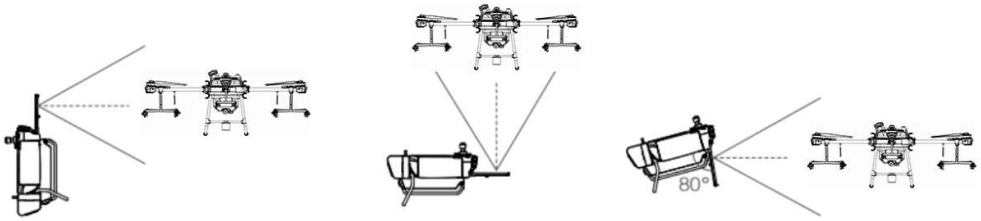


⑳ Heat hole
㉑ Custom key
㉒ Smart battery cover

3.5 Remote Controller Antenna Angle

By unfolding the remote controller's antenna and adjusting its position, operators can experience varying signal strengths depending on the antenna's placement. For optimal signal quality between the remote controller and the drone, it is recommended to position the antenna at an angle of either 80° or 180° relative to the back of the remote controller, ensuring the antenna plane is oriented towards the drone.

When maneuvering the drone, always keep the drone in optimal communication range. Adjust the orientation or distance between the operator and the drone in a timely manner to ensure that the drone is always within optimal communication range.

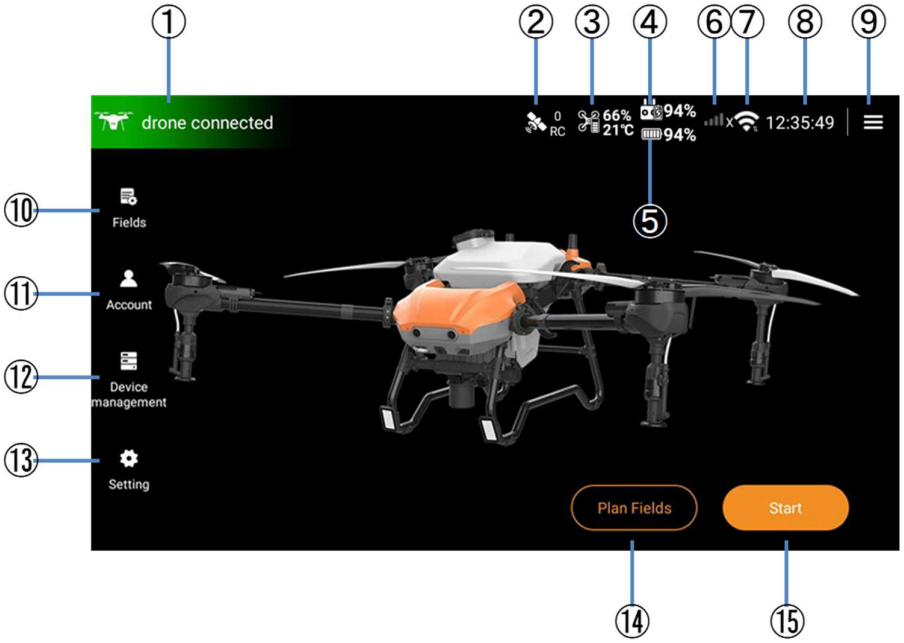


Warning!

- If you are using the RTK High Precision Positioning Module for RTK planning, you need to remove the module after planning is complete, otherwise it may affect the communication performance of the remote controller.

3.6 Huida Drone App

Huida Drone App is specially designed for agricultural applications, with a clear and simple interface, users can easily get started with text and voice prompts. During the operation process, users are provided with real-time updates on drone operation information, and can monitor the health status of all devices linked to the remote controller. In the event of any device anomalies, immediate feedback is sent to the user, ensuring timely response. Additionally, the app offers real-time data protection for plot data and tasks in progress, thereby ensuring that no user data is lost.



1. Drone and remote controller connection state

   Status: drone connected, drone not connected; real-time status of systems can be viewed in the drone connected status.
2. Number of satellites detected
3. State of charge of the drone's smart battery and the temperature of the smart battery
4. State of charge of remote controller built-in battery
5. State of charge of remote controller external battery
6. Network status
7. WIFI connection status
8. Current time
9. Setting button
10. Plot management: Manage the plot data planned by the user currently logged in the remote control locally.
11. Account: View my user information, team information, operation record statistics, operation record details.
12. Device management: View drone, remote controller, smart battery, charger, RTK mobile station, RTK module status, etc.
13. Settings: General settings and Android settings.
14. Plan plot: In the Plan Plot interface, you can choose the planning method as needed.
15. Start operation: Start operation to enter the home page of operation interface, the default mode is manual mode.

4 Product Use

4.1 Pilot Account Registration

4.1.1 Huida Agricultural Services App Installation

Search for "Huida Agricultural Services" on mobile phone "google play" to download Huida Agricultural Services App.

4.1.2 Account Registration

Through Huida Agricultural Services App or log in Huida Drone User Platform (https://drone.huidatech.cn) to register an account, query and download operation records and flight paths.

Warning!

- The platform account and password are shared between the Remote Controller App and the Huida Agricultural Services App. The Huida Agricultural Services App is only supported on Android.

4.2 Preparation before Use

4.2.1 Charging

4.2.1.1 Smart Battery Charging

Please use the standard HE202 all-in-one charger to charge the smart battery.

When using the generator to charge the smart battery, please connect the high power thick wire fast charging plug to charge. If you use a generator from another brand for charging, be mindful of the generator's output power to ensure compatibility.

Warning!

- For the initial charge of the smart battery, it is advisable to use low power setting (2000W) to facilitate slow charging until the battery is fully charged (100%).

4.2.1.2 Charging the 402 Remote Controller External Battery

Use the HD402 external battery charging cradle and power adapter to charge the external battery.

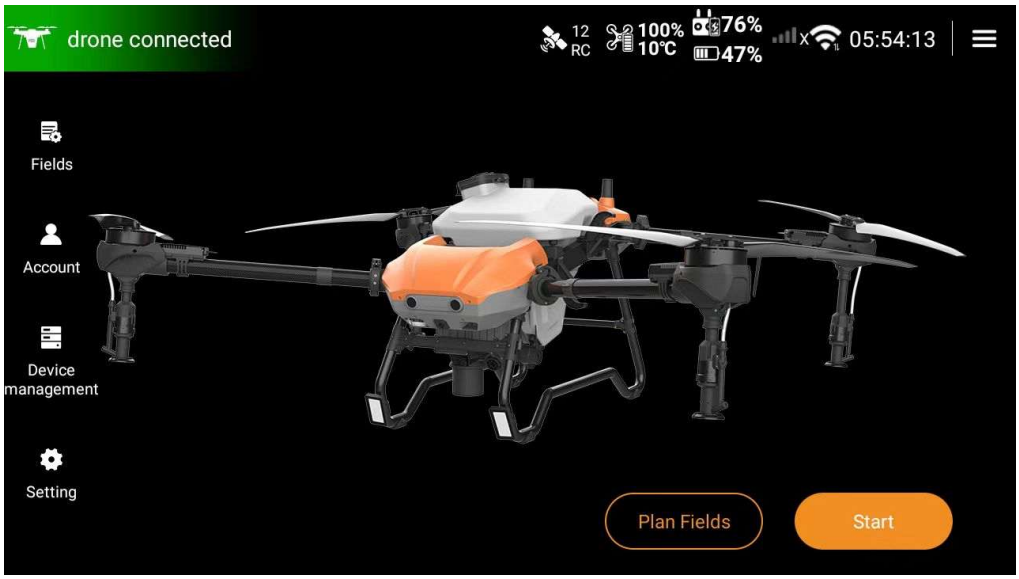
Remote controller charging cradle | Power adapter | AC power supply (100-240V)

4.2.2 Certifications

When using agricultural drones in non-Chinese territories, please observe local laws, regulations and relevant provisions, and the regulatory requirements for drones vary from country to country and region to region, e.g., in U.S., registration with the Federal Aviation Administration (FAA) is generally required, and for some agricultural drones that are used for commercial purposes, they may need to satisfy additional regulations and requirements, for example, appropriate flight permits are required. EU: from 1 January 2024, all drones sold and operated in Europe (both the open and specific categories) are mandated to be declared or CE marked in compliance with the requirements set forth by the UAS Directive. Japan: The use of drones requires compliance with Japan's Aviation Law and other relevant laws, and there are stringent limitations on the flight zones and altitudes for drone flights, and certain regions may necessitate prior submission of an application for a flight permit.

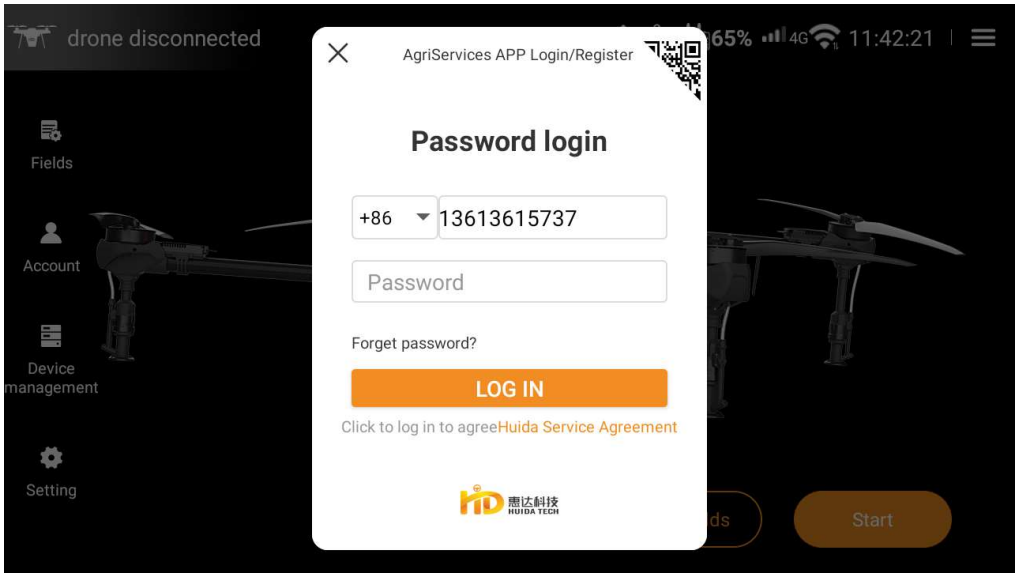
4.2.3 Drone Activation

1. Switch on the remote controller and connect it to the network;
2. Affix the smart battery in place and switch the drone on;
3. After the drone is successfully connected to the remote controller, log in the account of Huida Agricultural Services App via the remote controller "Account";



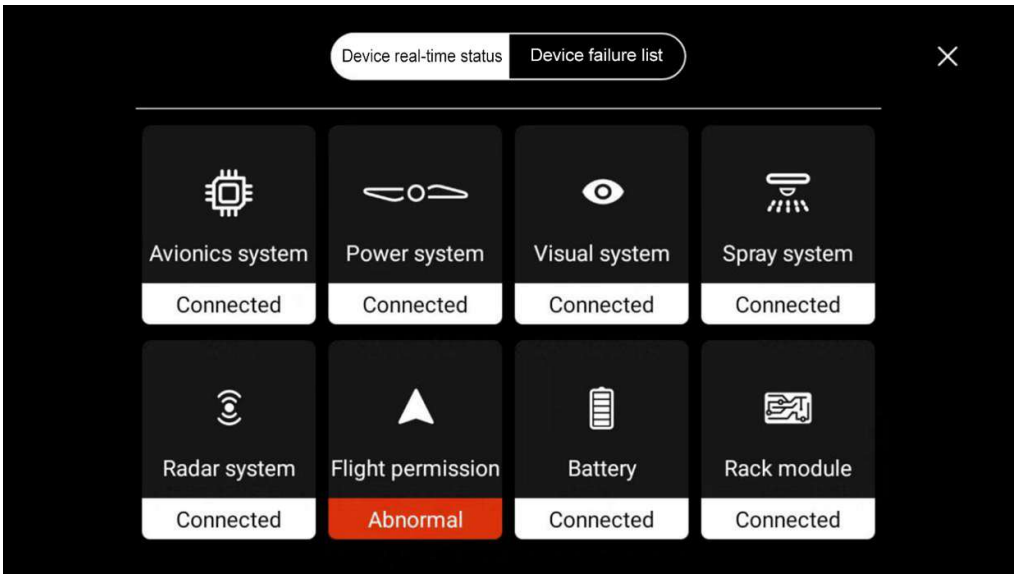
Warning!

- You need to select the area code of the corresponding country.

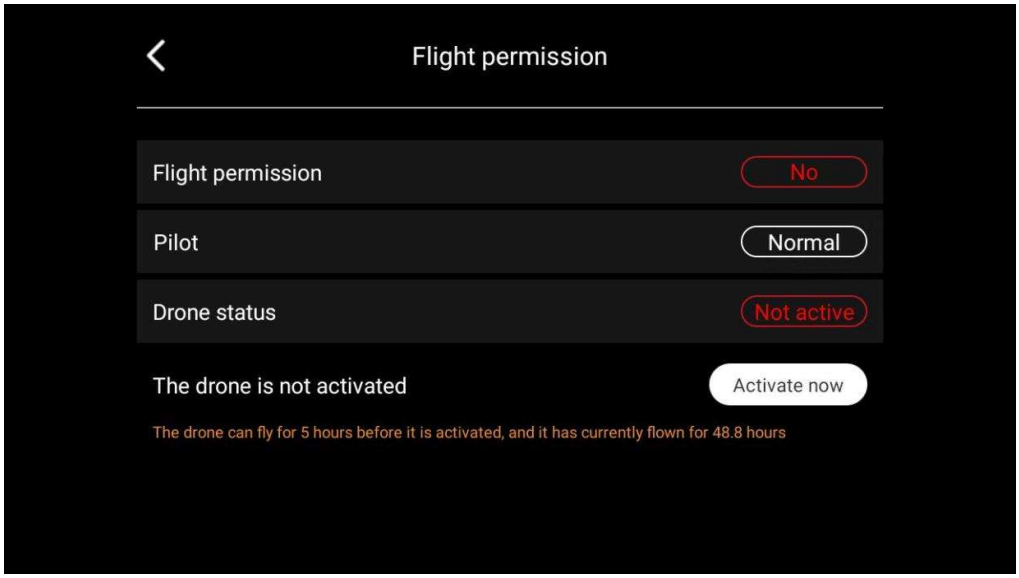


4. After logging in to your account, tap on "Drone Connected" to enter the Intelligent Detection screen.

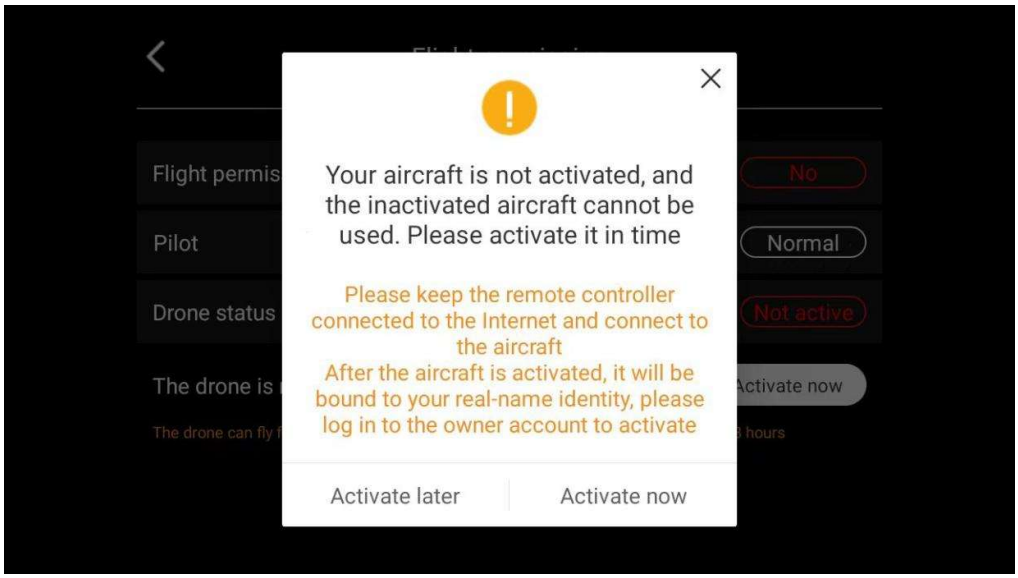
5. Tap "Flight Permission" in the Intelligent Detection interface.



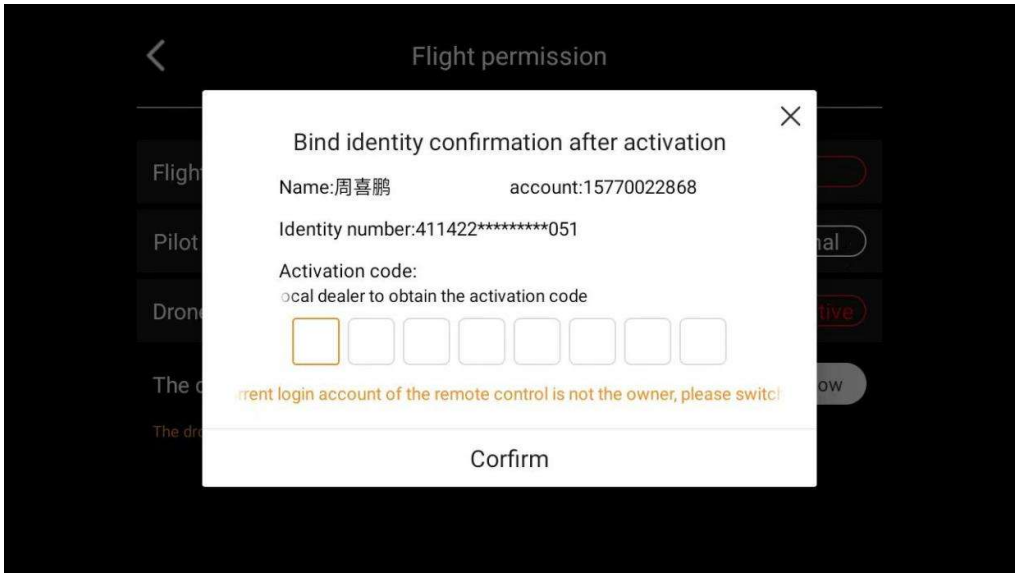
6. If the drone is not activated, it will show "Flight Permission" abnormal and "Drone Status" not active, tap "Activate Now" in this interface.



7. Tap "Activate Now" in the pop-up window.



8. Enter the activation code and tap "Confirm".



Warning!

- The activation code is provided by the dealer. After activation, the current login account will be deemed as the owner, before activation, please make sure the login account is the owner account.

4.2.4 HE202 Charger Activation

HE202 charger can be activated only after drone activation.

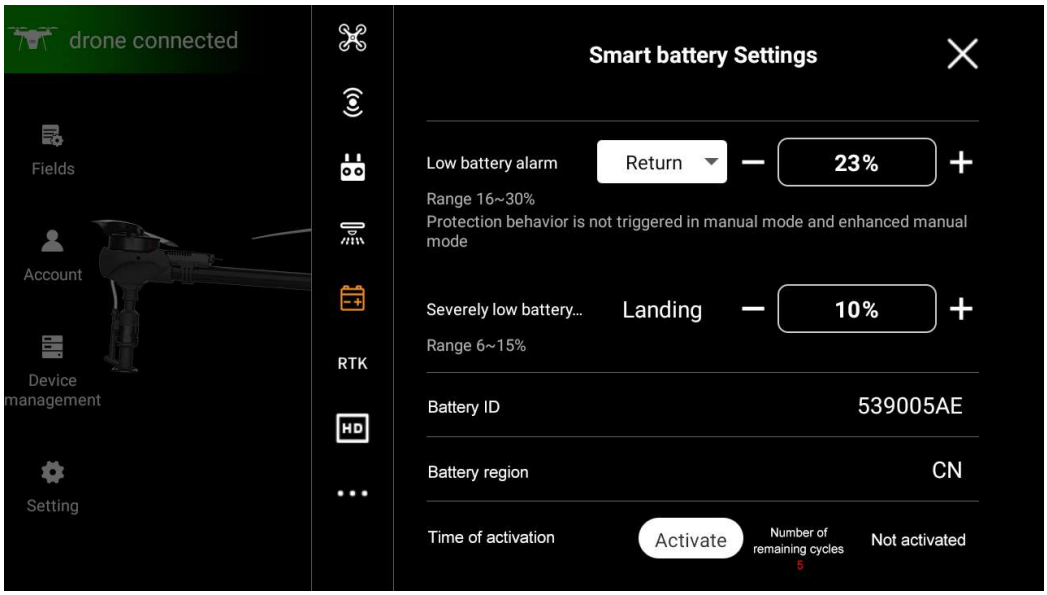
1. Connect the charger to power and switch on;
2. Switch on Bluetooth via the charger settings;
3. Search for the charger ID in the remote controller Bluetooth list and connect;

4. Tap "Device Engagement" - "Charger" - "Activate" on the homepage of Huida Drone App to complete the charger activation.

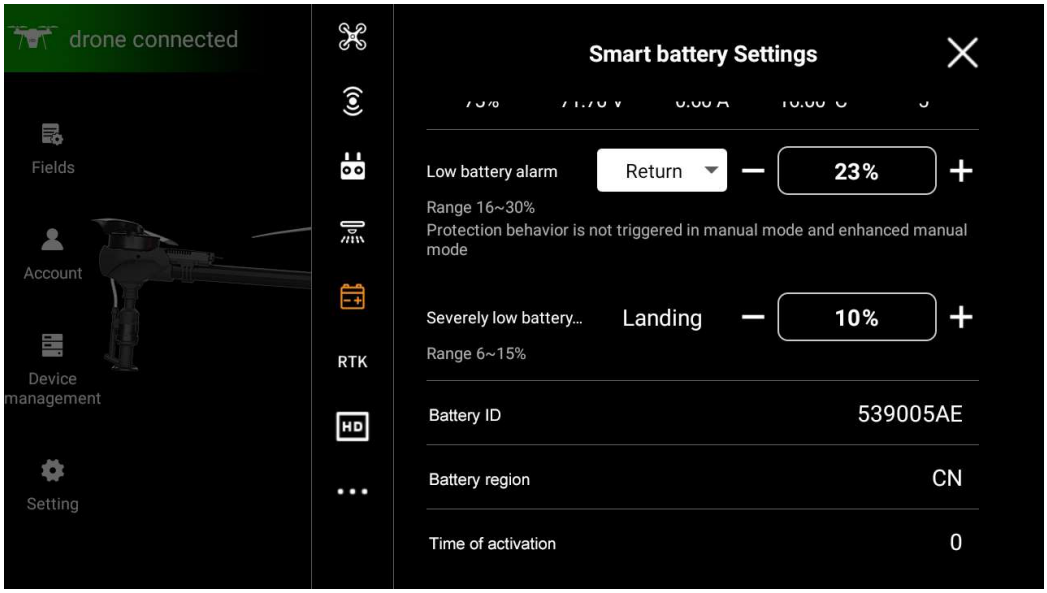
4.2.5HE102 Smart Battery Activation

Smart battery activation needs to be performed on the drone.

1. Make sure the remote controller is connected to the drone.
2. Access the Settings interface on the right-hand side of the Huida Drone App's homepage, and find the Smart Battery Settings button.
3. In the smart battery setting interface, tap the "Activate" button.



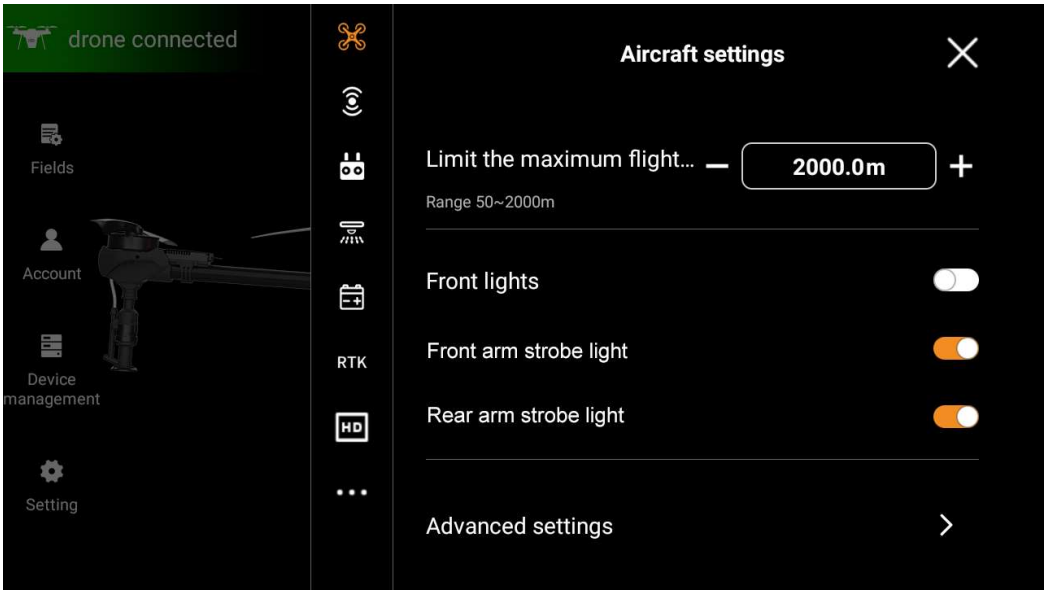
4. Follow the prompts to complete the smart battery activation, after activation, you can view the smart battery activation area and activation time in the smart battery setting interface.



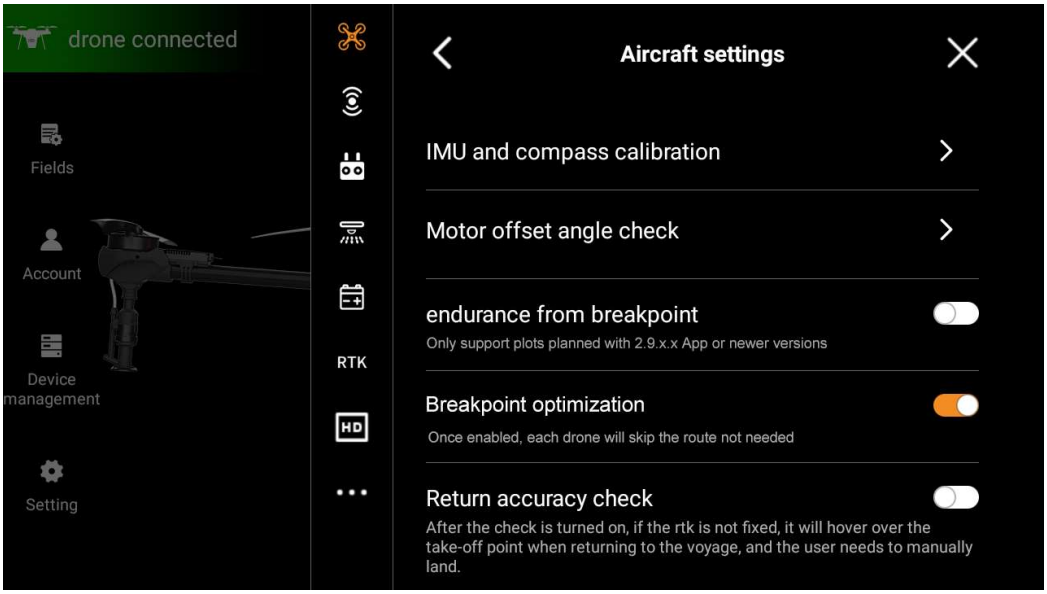
4.2.6 Calibrations

4.2.6.1 Magnetometer Calibration

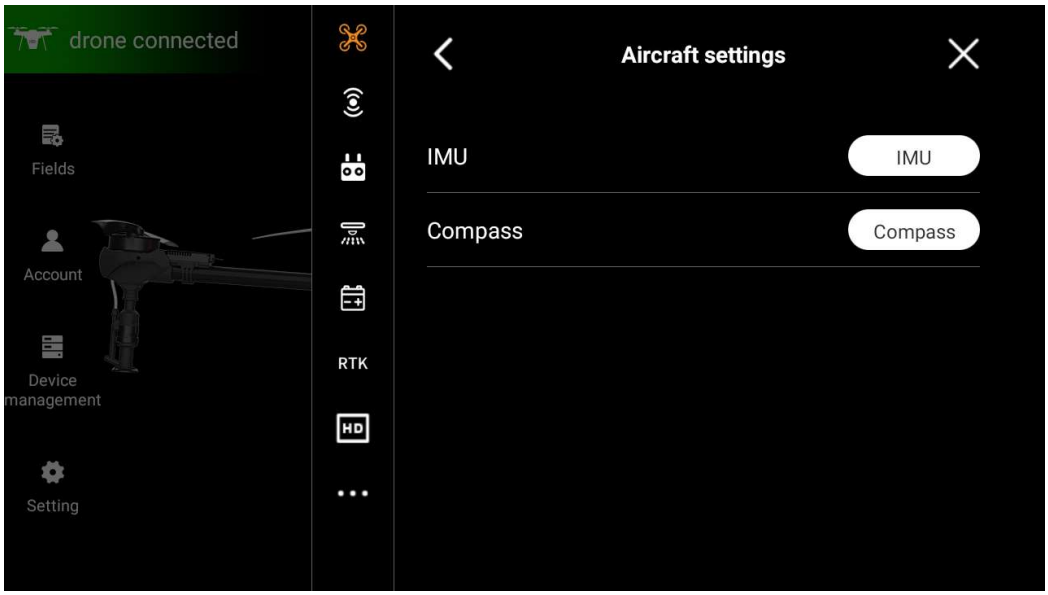
1. Access the Settings interface located on the right-hand side of the Huida Drone App's homepage, and find the Drone Settings button.
2. Tap "Advanced Settings" in the Drone Settings interface;



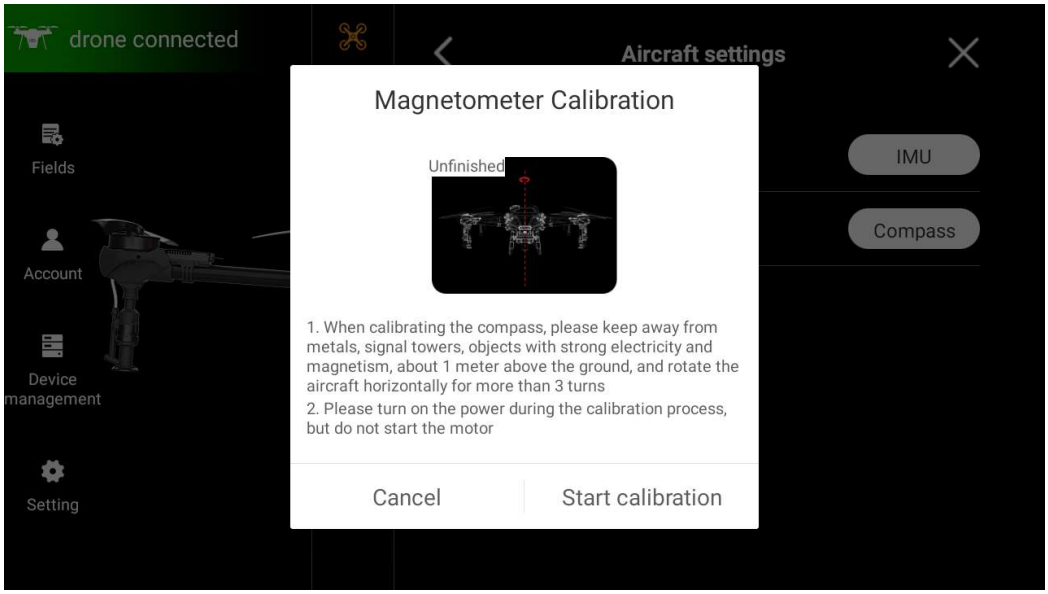
3. Tap "IMU and Magnetometer Calibration";



4. Tap "Magnetometer Calibration";



5. Follow the prompts on the interface, lift the drone up and turn it horizontally in the indicated direction. Once the remote controller displays "Calibration Successful", the calibration process is complete.

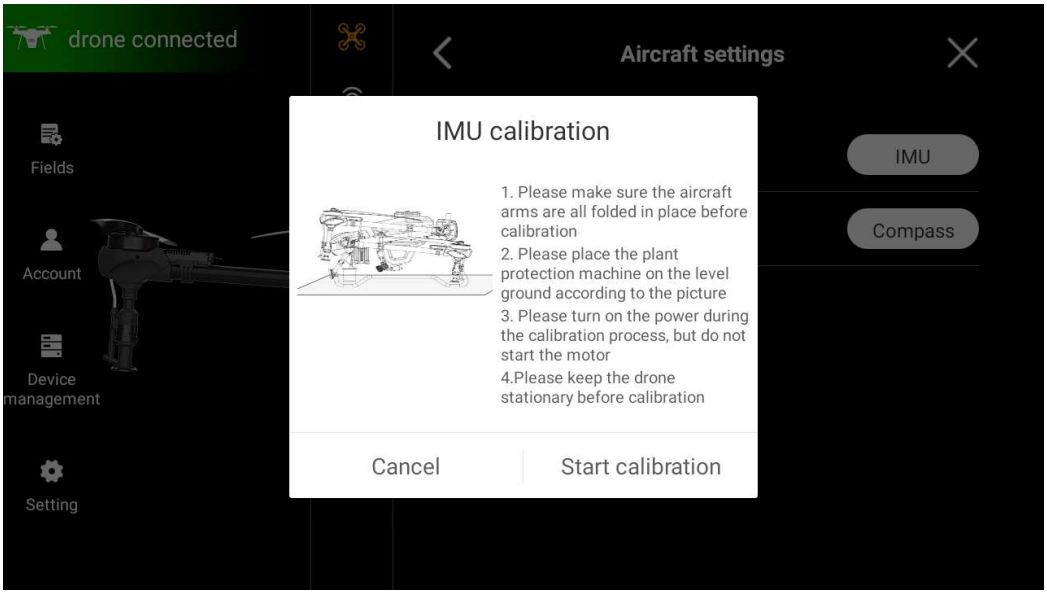


Warning!

- Magnetometer calibration is very important, the calibration result directly affects the flight safety, and failure to calibrate may cause the drone to fail.
- Calibrate the magnetometer away from metal, signal towers, objects with strong electricity and magnetic properties (e.g., mobile phones, watches, keys), and rotate the drone horizontally until calibration is successful.

4.2.6.2 IUM Calibration

1. Access the Settings interface located on the right-hand side of the Huida Drone App's homepage, and find the Drone Settings button.
2. Tap "Advanced Settings" in the Drone Settings interface;
3. Tap "IMU and Magnetometer Calibration";
4. Tap "IMU Calibration";



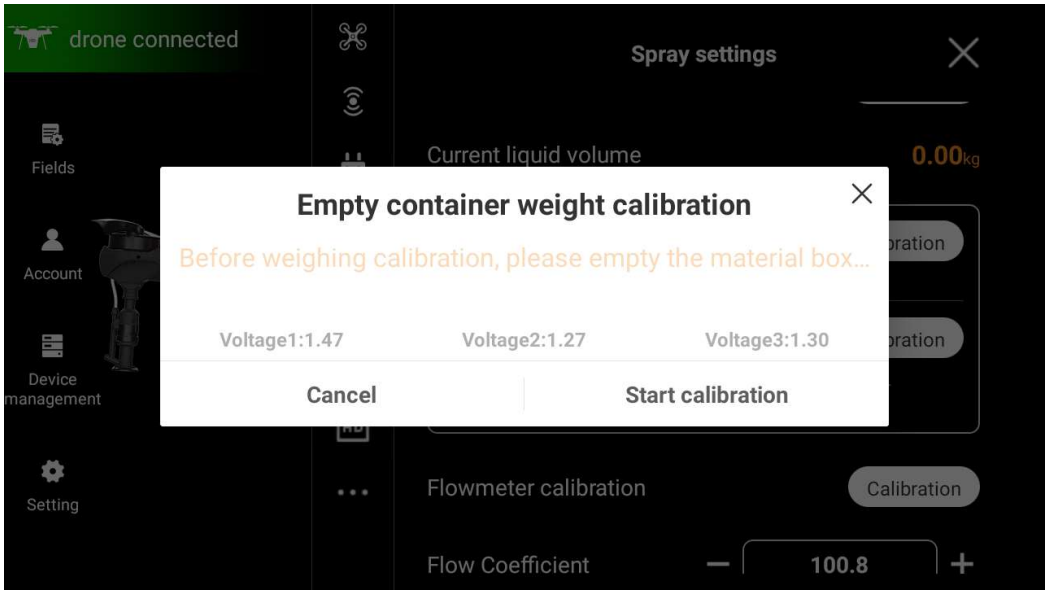
5. Tap "IUM Calibration" until the remote controller shows "Calibration Successful" prompt.

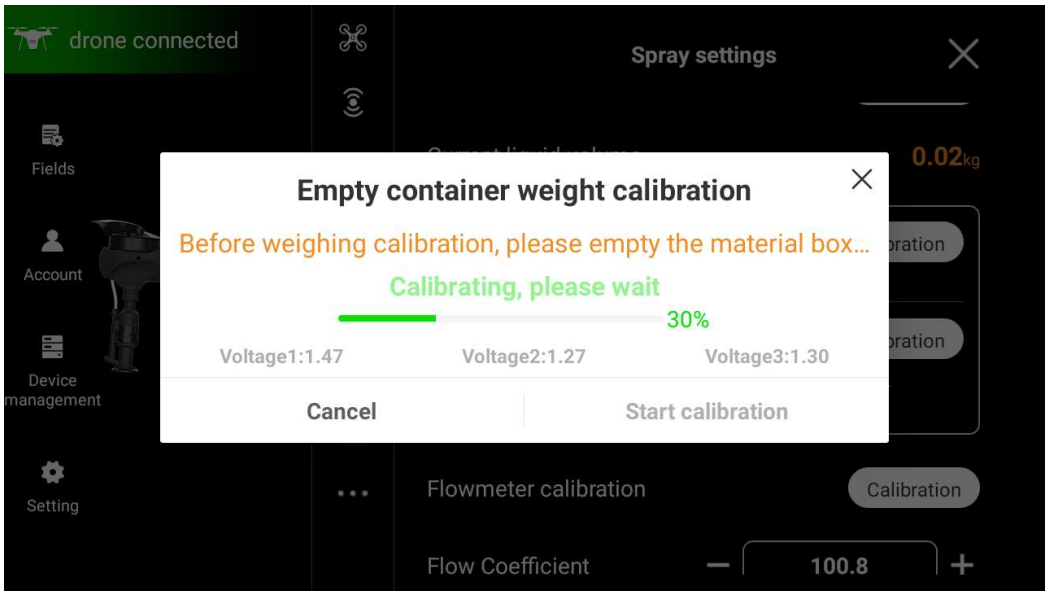
Warning!

- When calibrating IUM, the drone should be placed on a level ground.

4.2.6.3 Empty Container Weight Calibration

The container needs to be emptied before calibration.

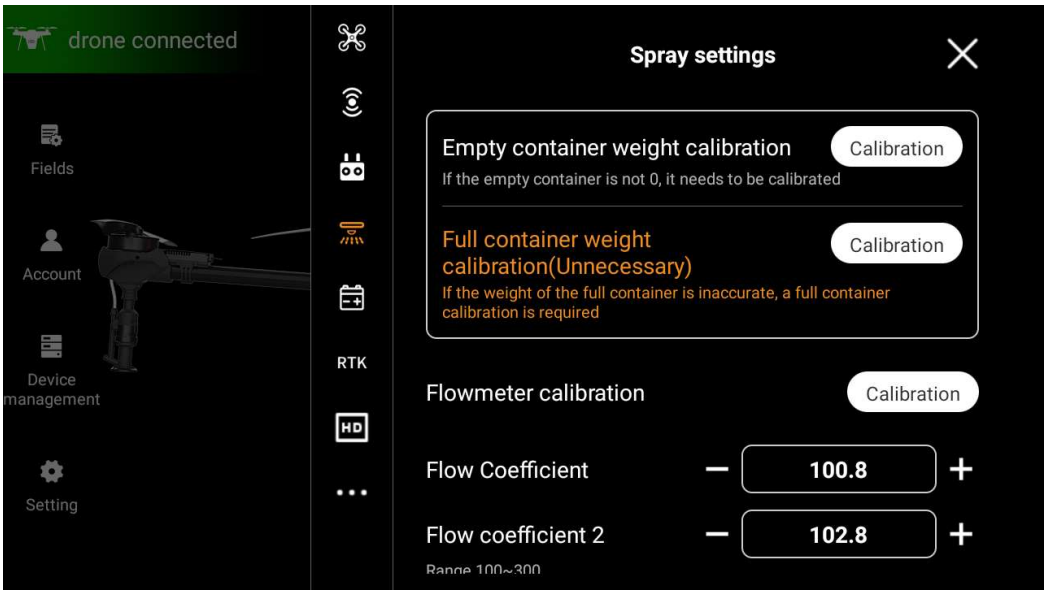




4.2.6.4 Flowmeter Calibration

Please calibrate the flowmeter before spraying with the drone for the first time to avoid inaccurate spray dosage due to inaccurate flow rate.

1. Add more than 20L of fresh water to the agrochemical container;
2. Access the Settings interface on the right-hand side of the Huida Drone App's homepage, and find the Spray Settings button;
3. Find Flowmeter Calibration, tap "Calibrate";



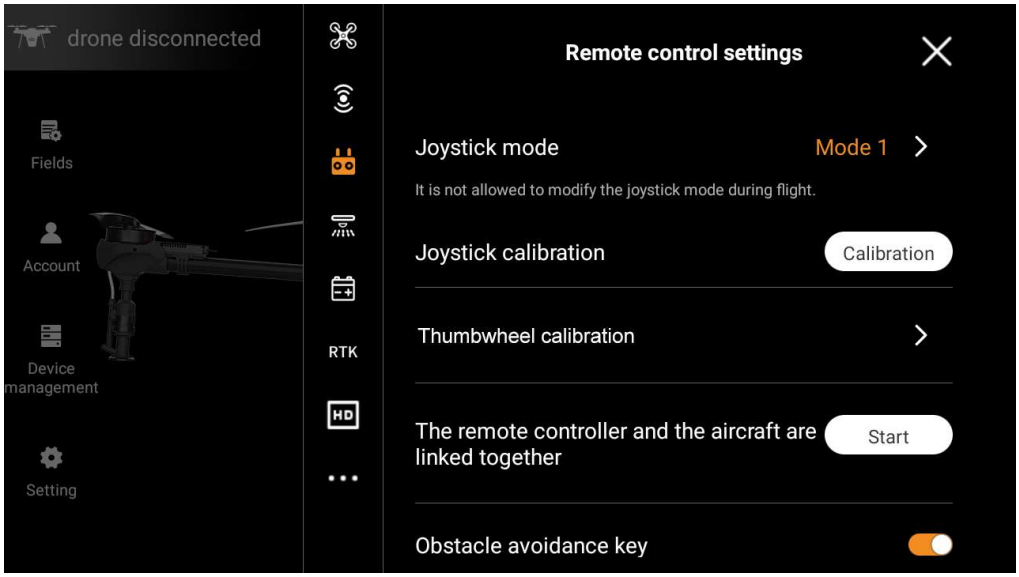
4. Follow the prompts to complete the flowmeter calibration.

Warning!

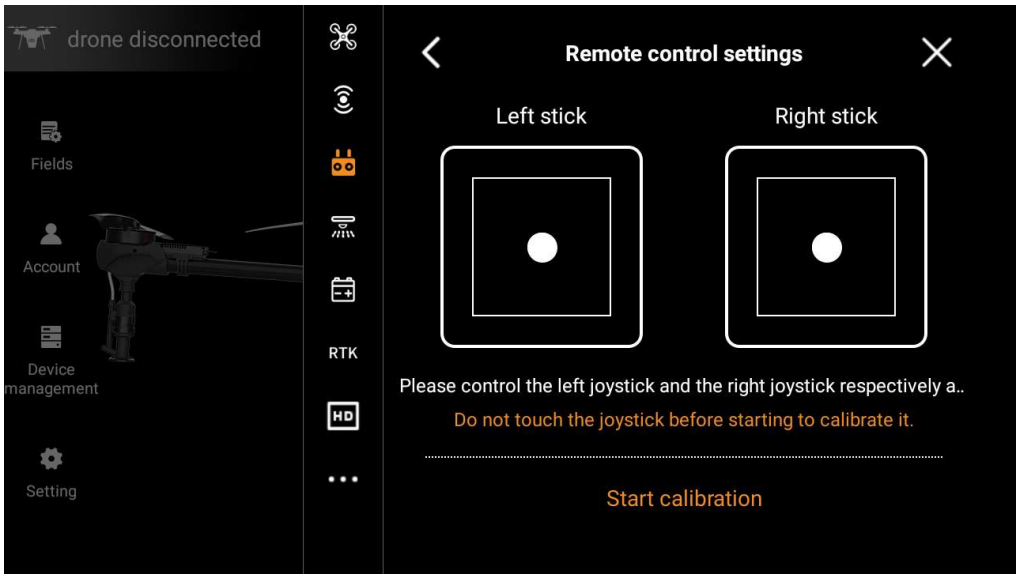
- The flowmeter needs to be recalibrated if you find that the flow rate is not accurate.
- Recalibration of the flowmeter is required when replacing operating system accessories.

4.2.6.5 Joystick Calibration

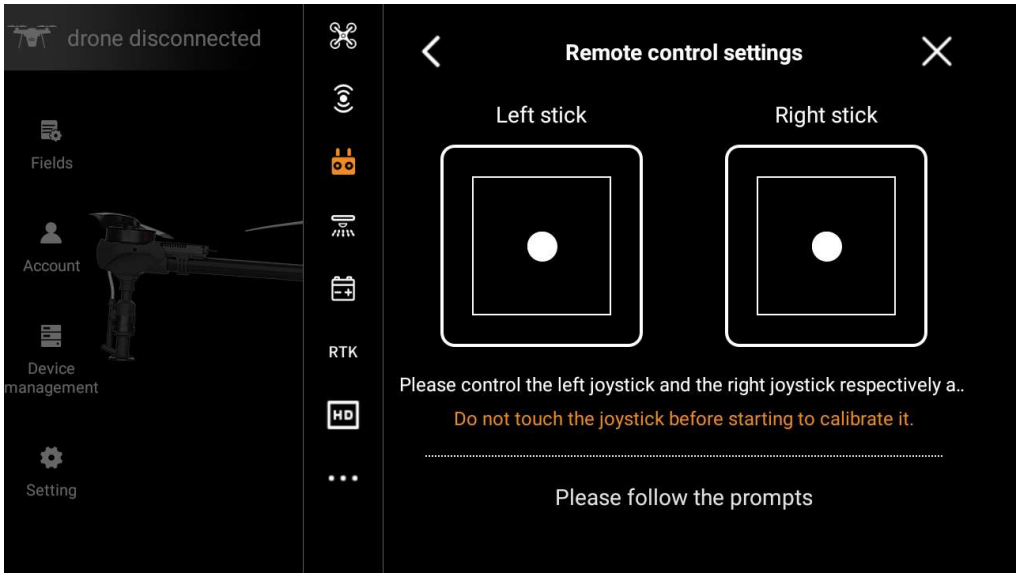
1. Access the Settings interface on the right-hand side of the Huida Drone App's homepage, and find and tap the Remote Controller Settings button to go to Remote Controller Settings page.



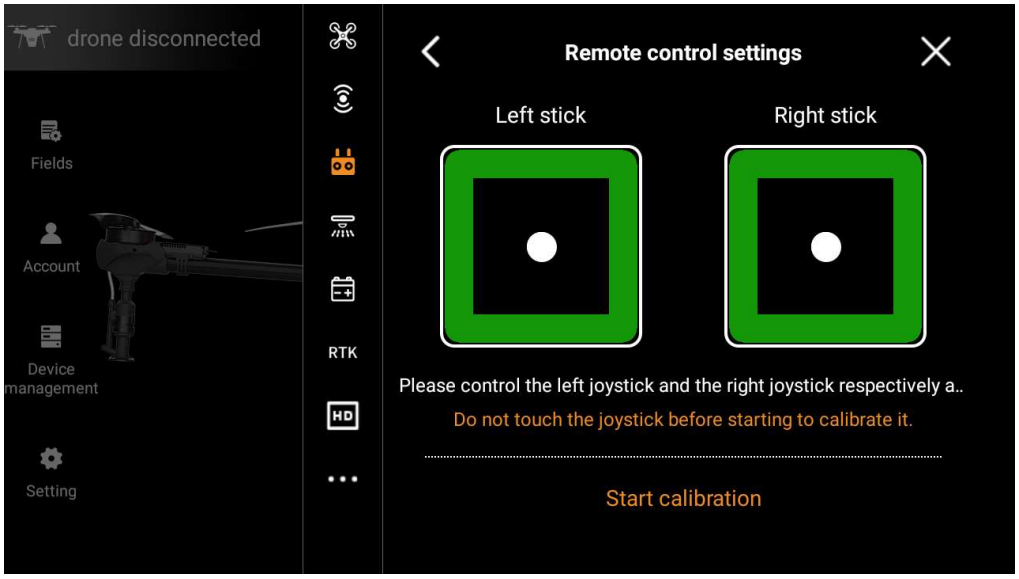
2. Tap "Calibrate" to enter the joystick calibration page, and tap "Start Calibration" below.



3. Follow the instructions on the interface to maneuver the left and right joysticks.



4. The joysticks are considered as being calibrated when the square rings are completed in green.

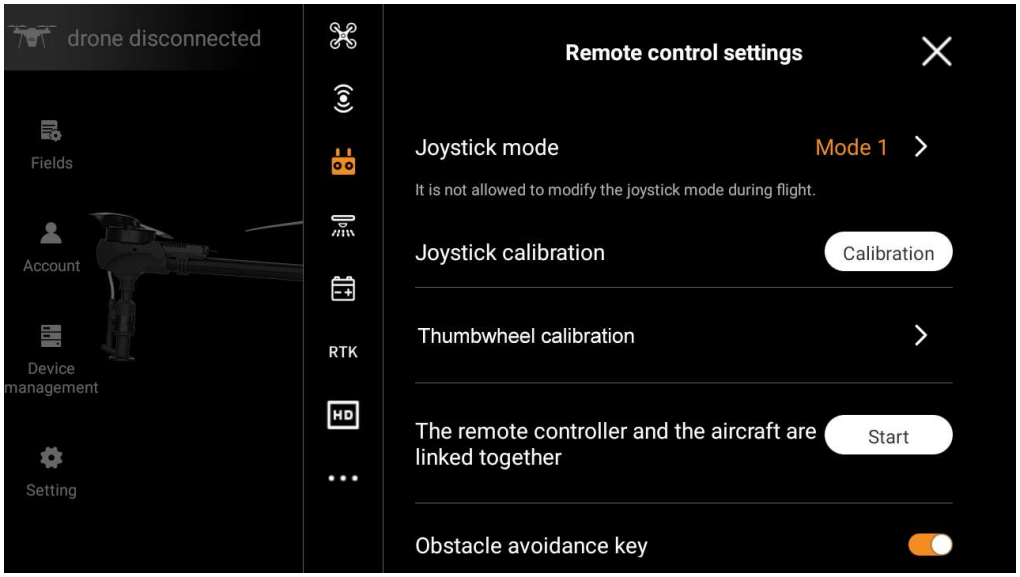


Warning!

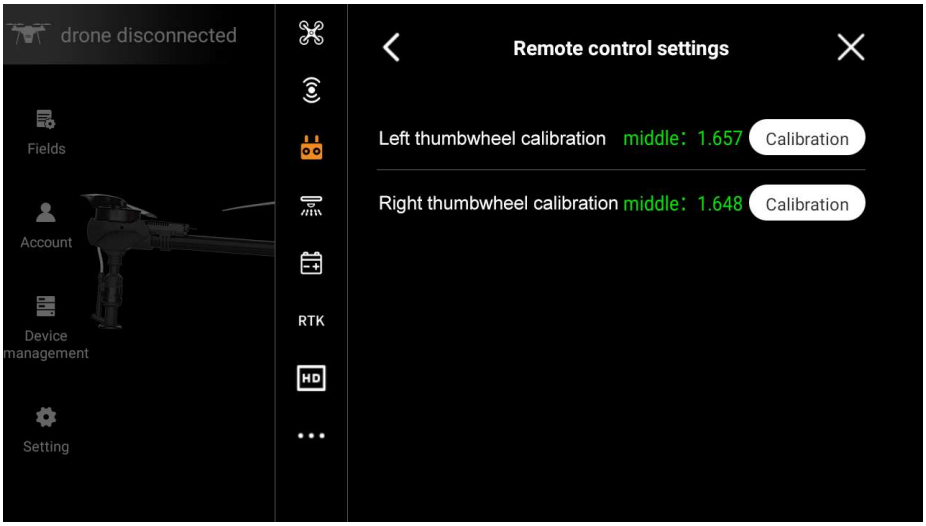
- The remote controller has been calibrated at the factory. Should you notice any discrepancy in the lever movement during operation, you can rectify the issue by recalibrating the joysticks.
- When calibrating the joystick, please make sure the drone is not powered on first.

4.2.6.6 Thumb Wheel Calibration

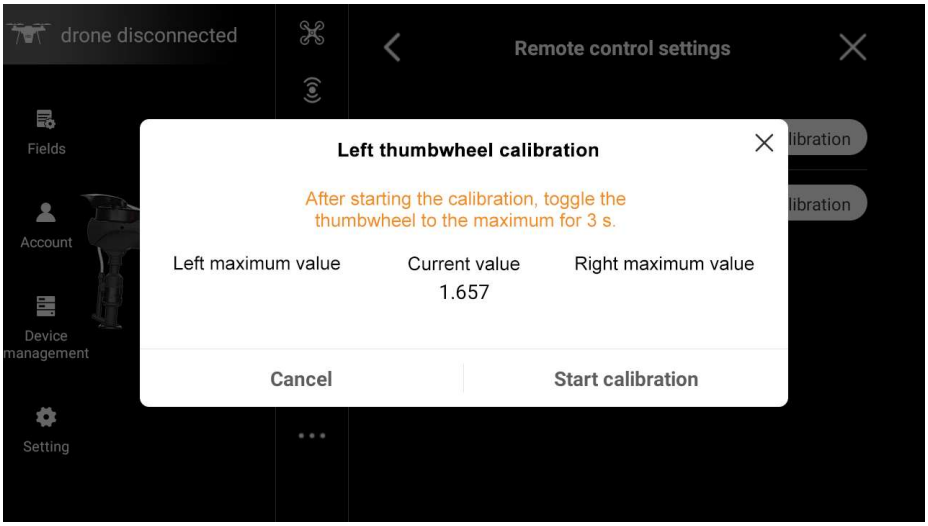
1. Access the Settings interface on the right-hand side of the Huida Drone App's homepage, and find and tap the Remote Controller Settings button to go to Remote Controller Settings page.

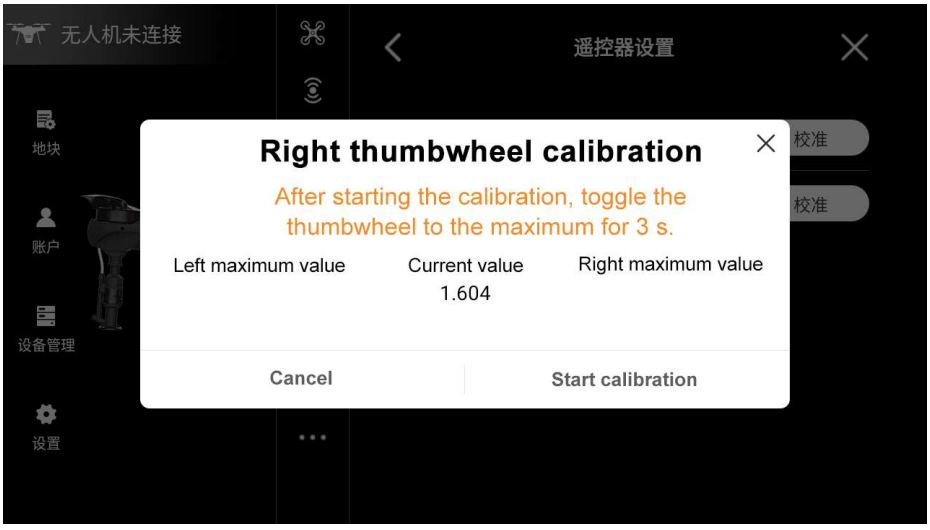


2. Tap "Thumb Wheel Calibration" to enter the thumb wheel calibration interface, and then tap "Calibration".



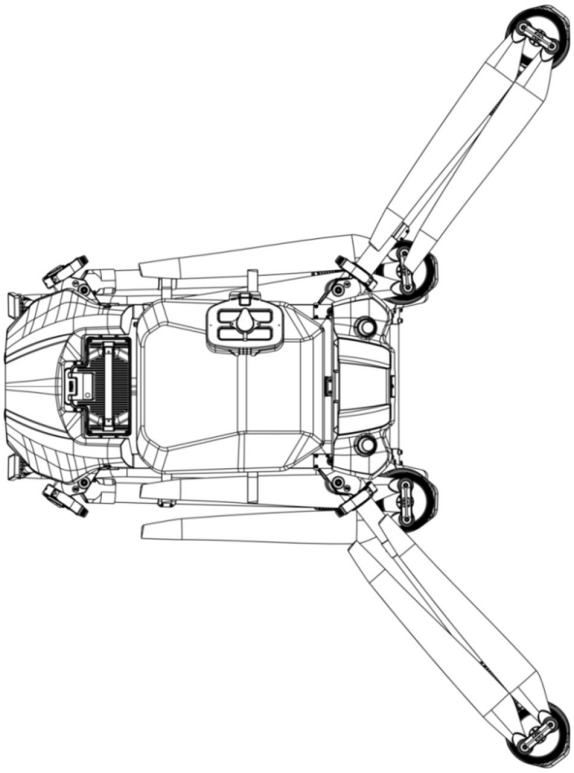
3. Tap "Start Calibration" and follow the prompts to complete the calibration.



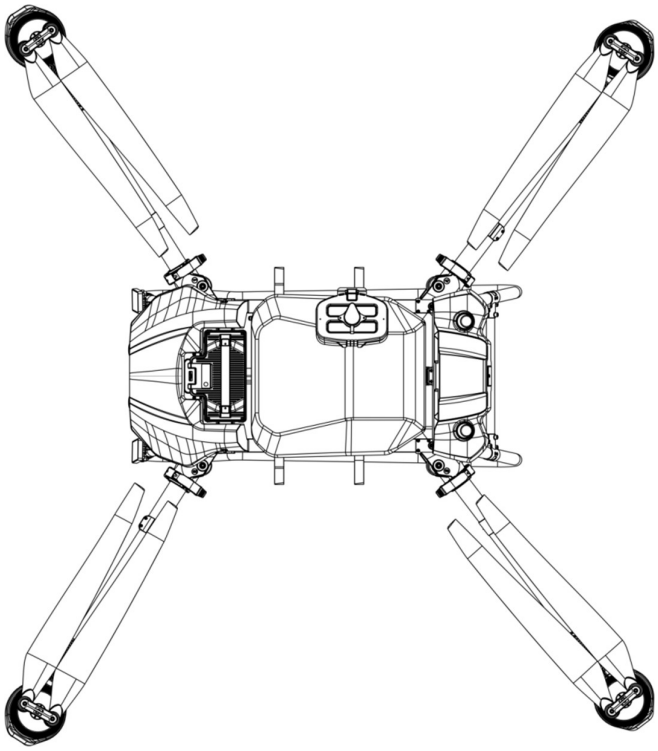


4.2.7 Precautions before Use

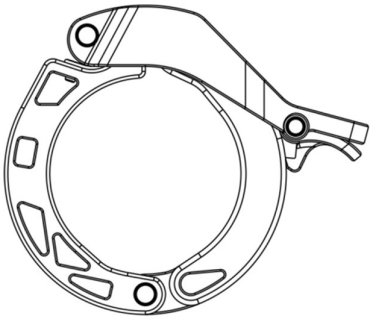
1. Be sure to unlock and unfold the arm before unfolding the arms;
2. Unfold the No. 3 and No. 4 arms first, and tighten the joint locks;



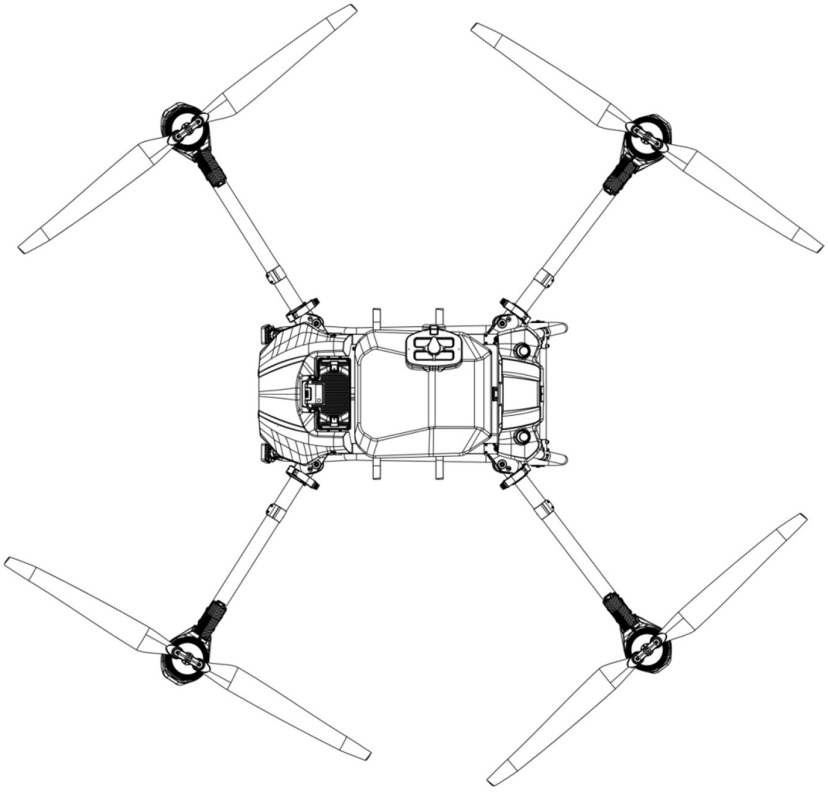
3. Unfold the No. 1 and No. 2 arms first, and tighten the joint locks;



4. Check and make sure that all joint locks are tightened;
5. When tightening the arm locks, you will encounter significant resistance, press down firmly and tighten the locks.



6. Unfold the propellers separately

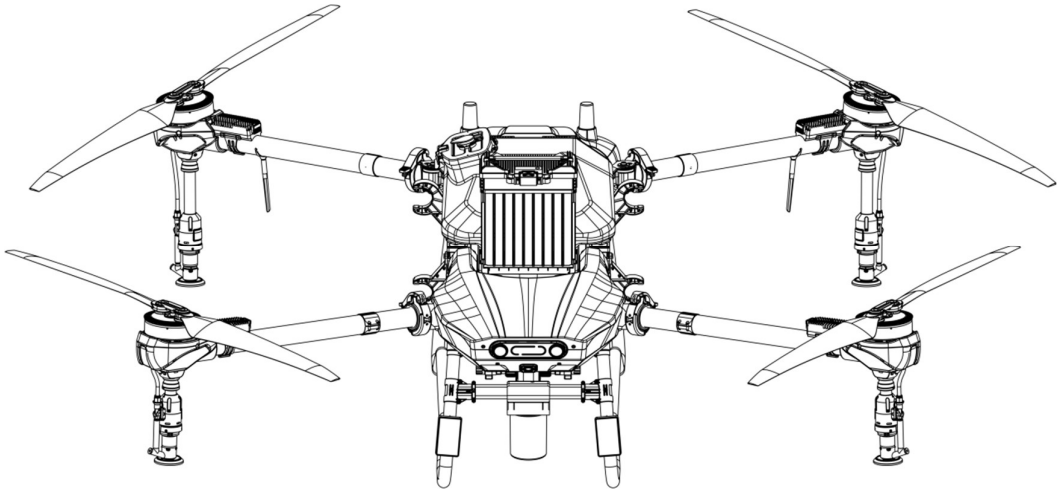


7. Installing the smart battery

   Fit the battery into the battery holder gently until you hear a "click".

Warning!

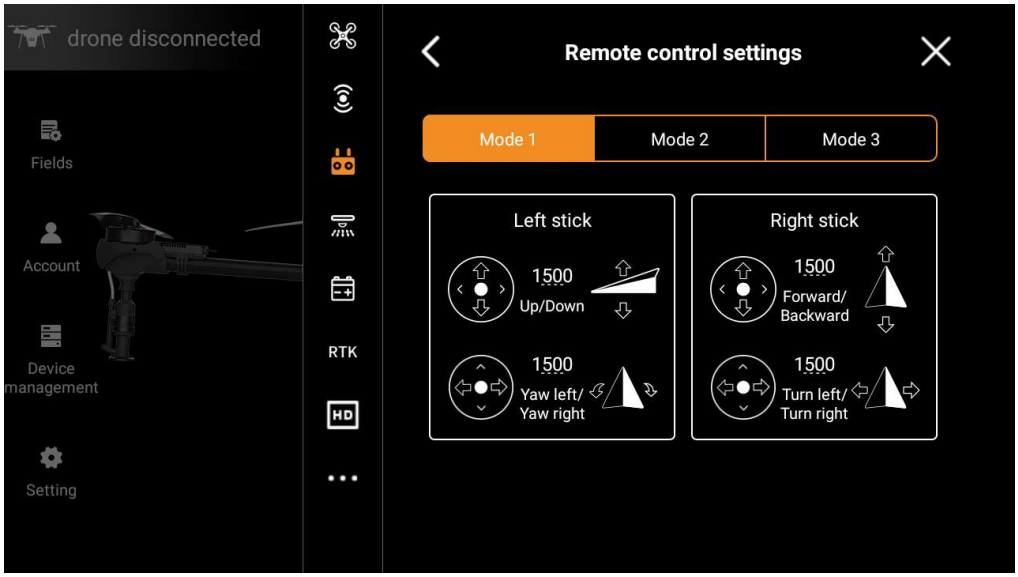
- Ensure that the battery is switched off when it is fitted into the holder.



4.3 Drone Operations

4.3.1 Drone Manoeuvring

There are three joystick control modes available: Mode 1, Mode 2, and Mode 3.

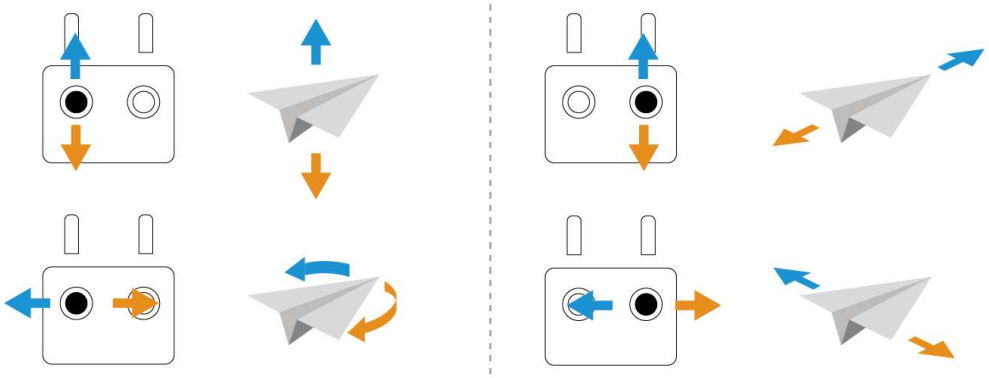


The default control mode of the remote controller from the factory is Mode 1, and this manual uses Mode 1 as an example to explain the control mode of the remote controller.

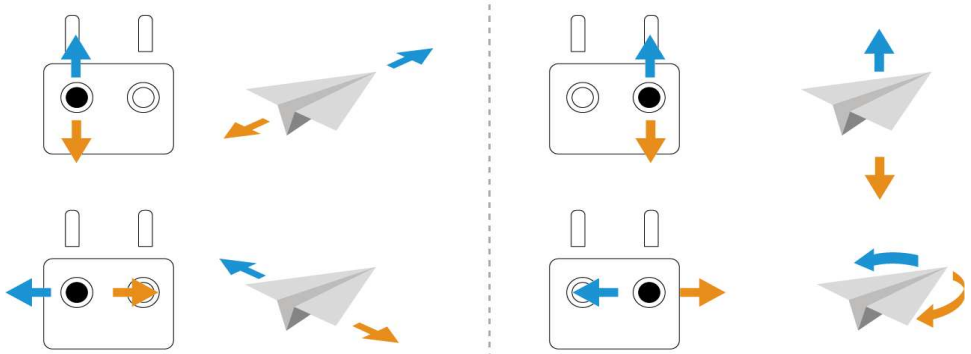
Warning!

- Do not unlock for takeoff until you are certain of the joystick mode.
- Joystick control should be set in the first place to match your personal operating preference.

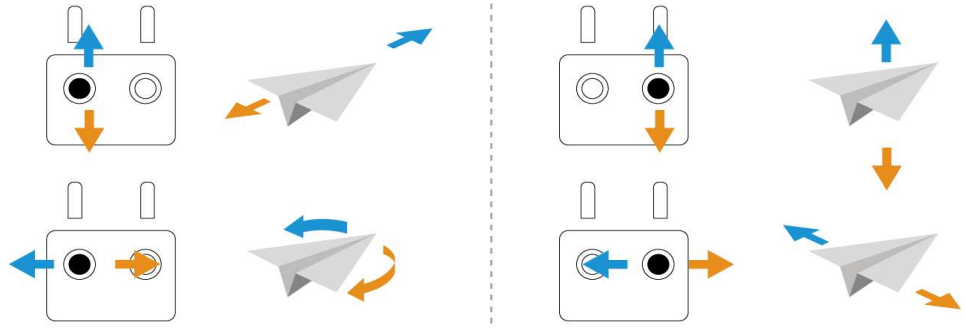
Mode 1



Mode 2



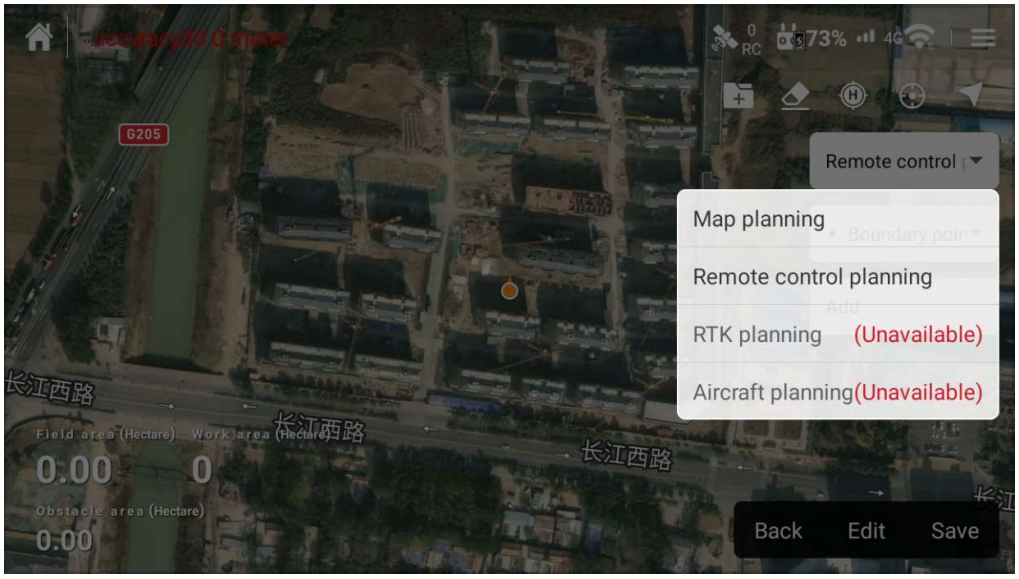
Mode 3



4.3.2 Plot Management

4.3.2.1 Plot Planning

The Huida Drone App offers four ways to plan plots: RTK planning, drone planning, remote controller planning, and map planning.

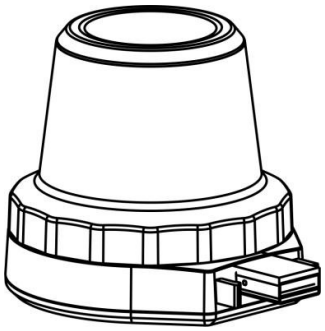


RTK Planning

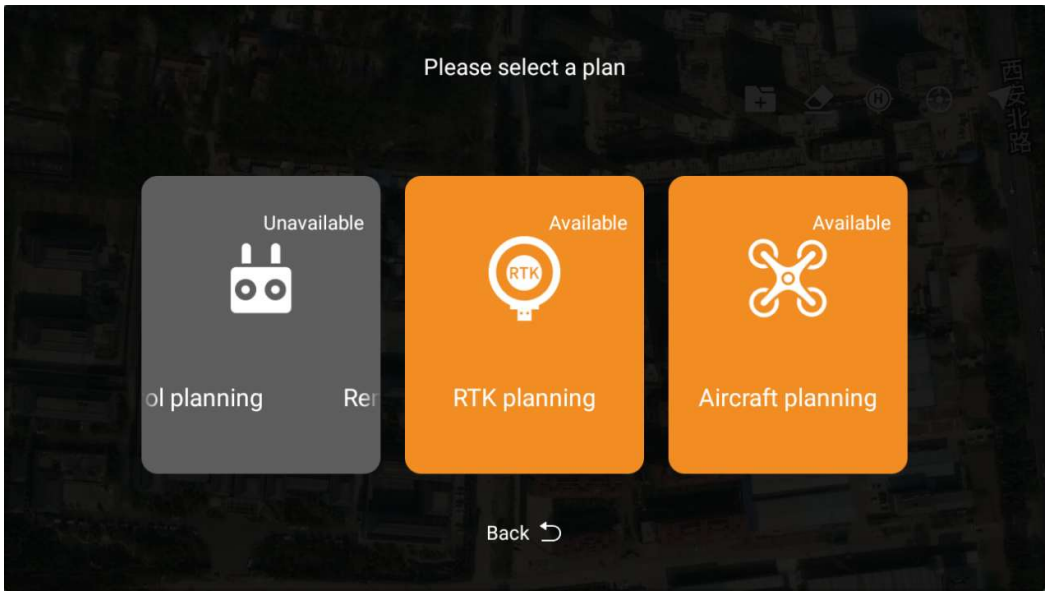
When implementing RTK planning, the RTK high-precision positioning module must be installed on the remote controller for accurate measurements.

1. Install the RTK high-precision positioning module;

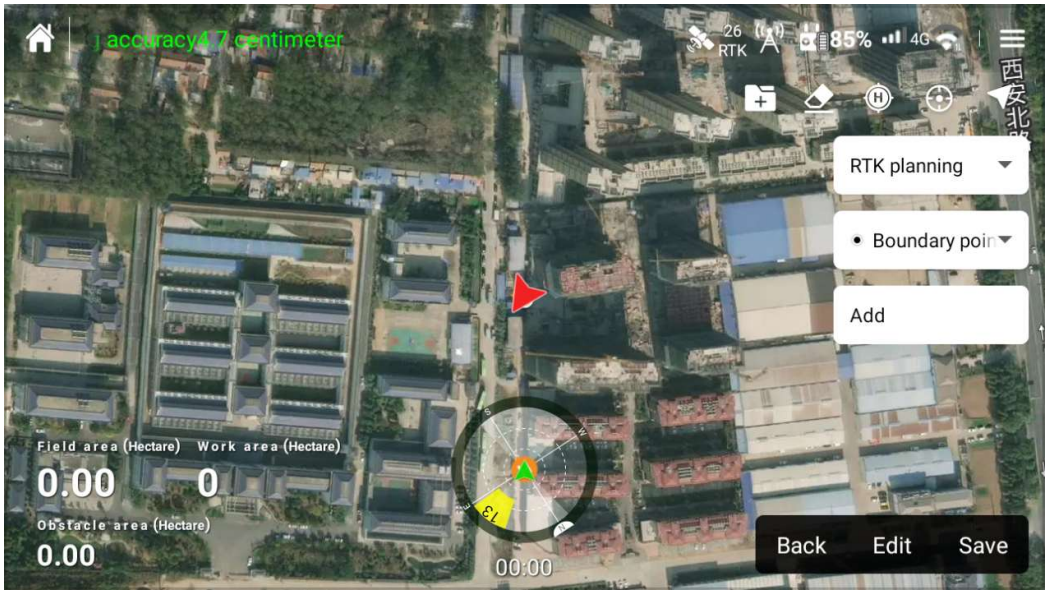
If you use RTK planning to plan the operation area, you need to connect the RTK high-precision positioning module to the USB port of the remote controller.



2. Tap "Plan Plot" on the Huida Drone App homepage, and select "RTK Planning";



3. Wait until the RTK positioning status bar at the top left of the interface turns green, and the accuracy for GPS point position determination is less than 50cm;



4. Hold the remote controller to the position as desired, and then tap the "Add" button on the Huida Drone App to add waypoints, planning the plot boundaries and obstacles.

Warning!

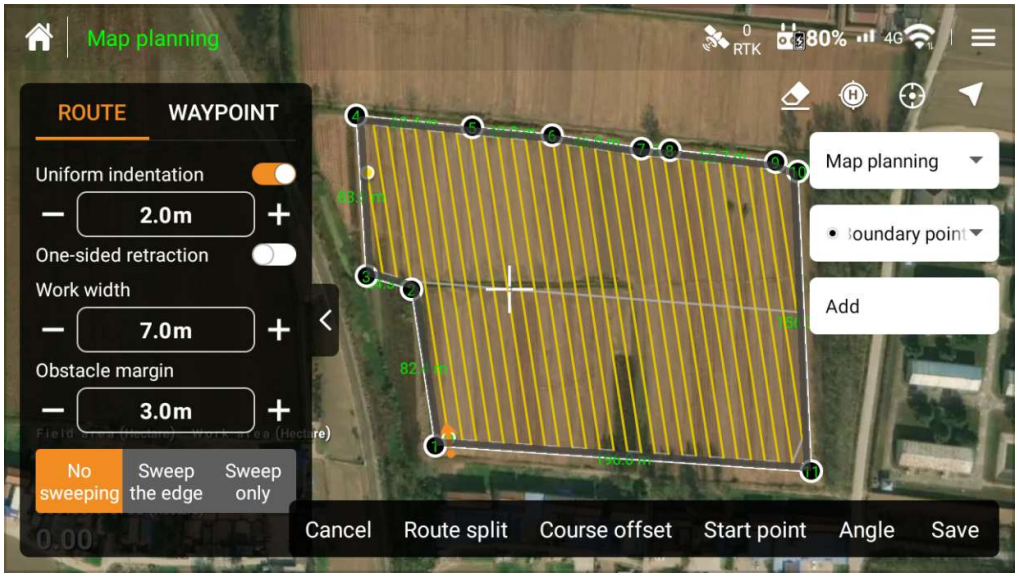
- For your safety, always ensure that the drone is powered off when using RTK planning function.

Drone Planning

1. Tap "Plan Plot" on the Huida Drone App homepage, and select "Drone Planning";
2. Maneuver the remote controller to the position as desired, and then tap the "Add" button on the Huida Drone App to add waypoints, planning the plot boundaries and obstacles.

Map Planning

1. Enter the homepage of Huida Drone App, tap "Plan Plot", randomly select one of the available planning methods, enter into the planning plot interface, and select "Map Planning" via the planning method selection button;
2. Swipe the screen to adjust the reticle to the position as desired, and then tap the "Add" button on the Huida Drone App to add waypoints, planning the plot boundaries and obstacles.



Warning!

- Map planning requires that there are no obstructions within the plot and that the plot boundaries are clearly visible.
- If map planning is adopted, waypoints for the plots can be precisely adjusted using the drone or remote controller before commencing operations.

Remote Controller Planning

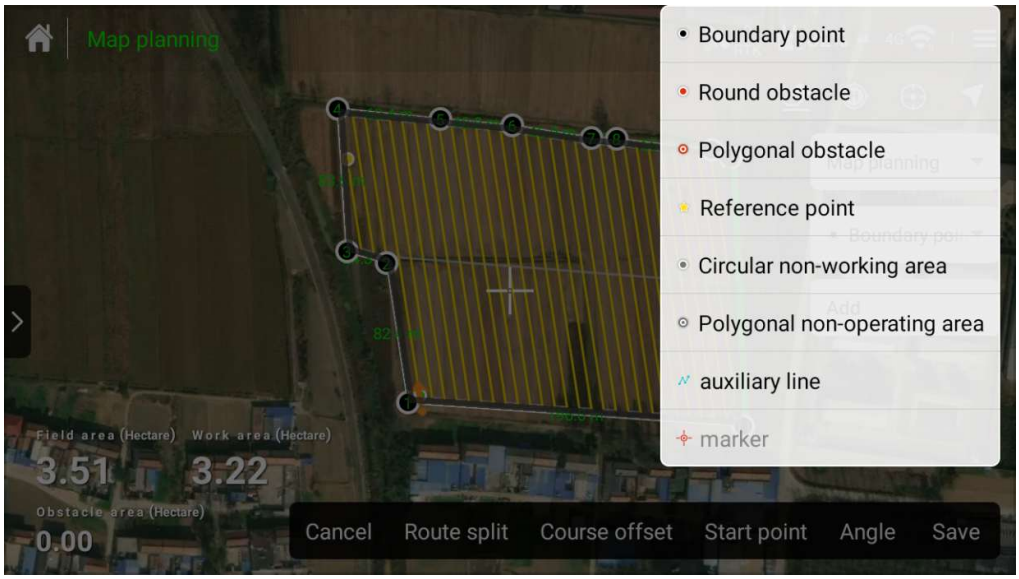
The planning method is the same as the RTK planning method, please refer to the RTK planning method.

Warning!

- The accuracy of remote controller planning is lower than that of RTK planning.
- For your safety, always ensure that the drone is powered off when using remote controller planning function.

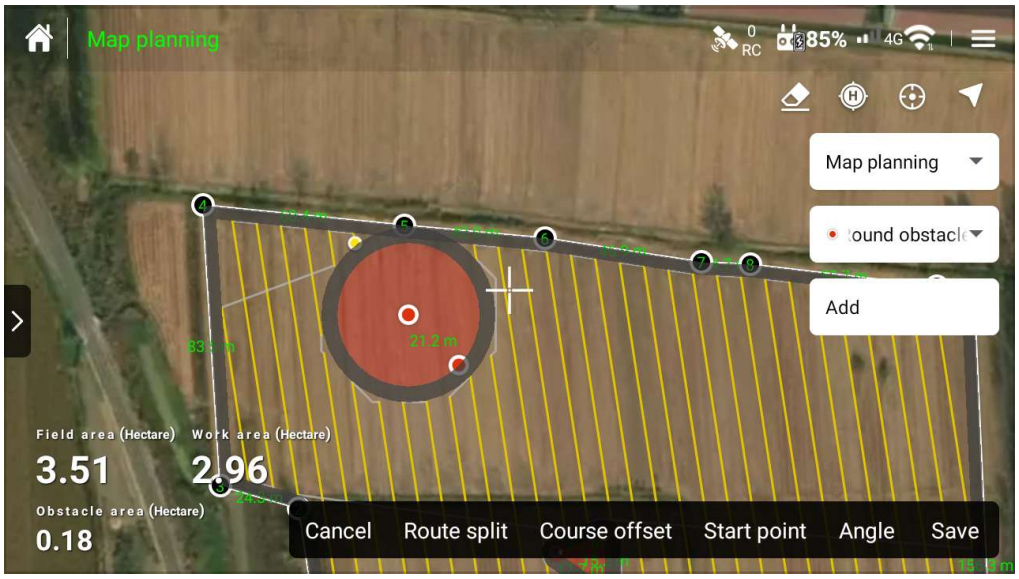
4.3.2.2 Waypoint Types

Huida Drone App provides 8 types of waypoints, which are: boundary points, circular obstacles, polygonal obstacles, reference points, circular no-fly zones, polygonal no-fly zones, auxiliary lines, and markers.



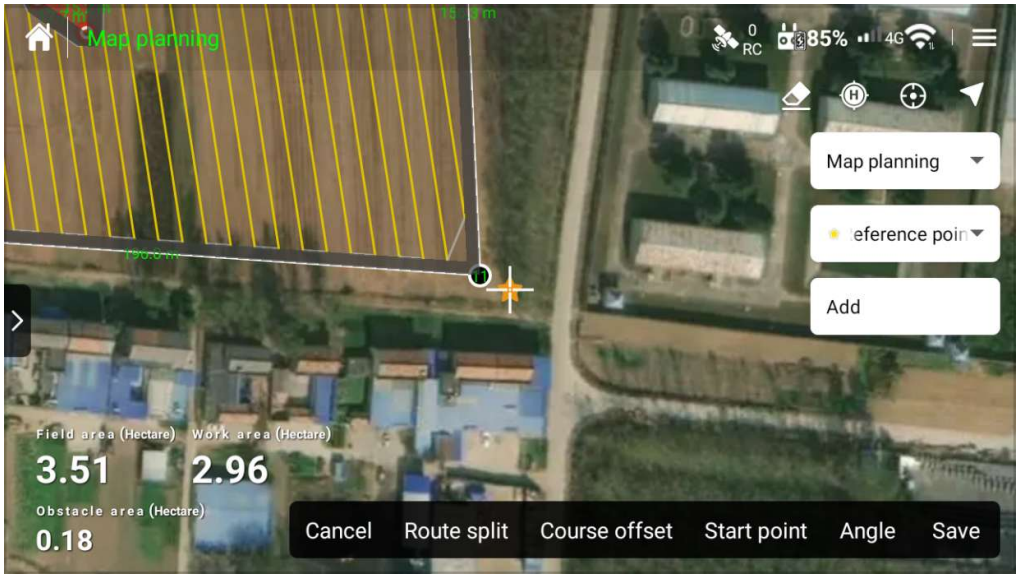
Boundary points: a polygonal set of points that define the plot boundary

Circular obstacle: add a circular obstacle with an adjustable radius to the operation plot



Polygonal obstacle: add multiple obstacle points, and draw a polygonal obstacle in the order of the obstacle points.

Reference point: for route correction, it is recommended to choose a fixed marker as the reference point.



Circular no-fly zone: add a circular no-fly zone with adjustable radius in the plot.

Polygonal no-fly zone: add multiple no-fly points in the plot, and draw a polygonal no-fly zone according to the order of no-fly points.

Auxiliary line: add two auxiliary points outside the plot to form an auxiliary line.

Marker: mark the points in the plot that need to be marked.

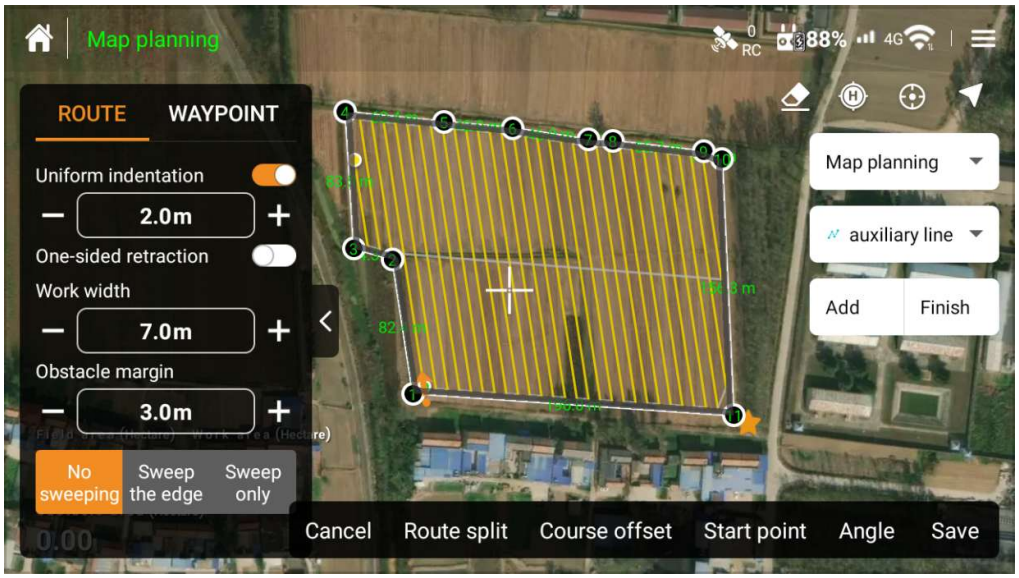
4.3.3 Editing Plot

4.3.3.1 Editing Waypoint Route

Adjust Indent: By default, a consistent indent is applied, ranging from a minimum of 0 to a maximum of 10 m, with a standard setting of 2 m. You can tap to select the desired edge line of the plot, and adjust the one-side indent.

Operation line spacing: The default spacing is set at 7 m, with options ranging from 1.5 m to 40 m.

Obstacle margin: By default, the margin is set to 3 m, with options ranging from 0 m to 6 m.



Line direction adjustment: precise direction tuning is supported with a sliding feature, allowing for a 1-degree fine-tuning at each point.

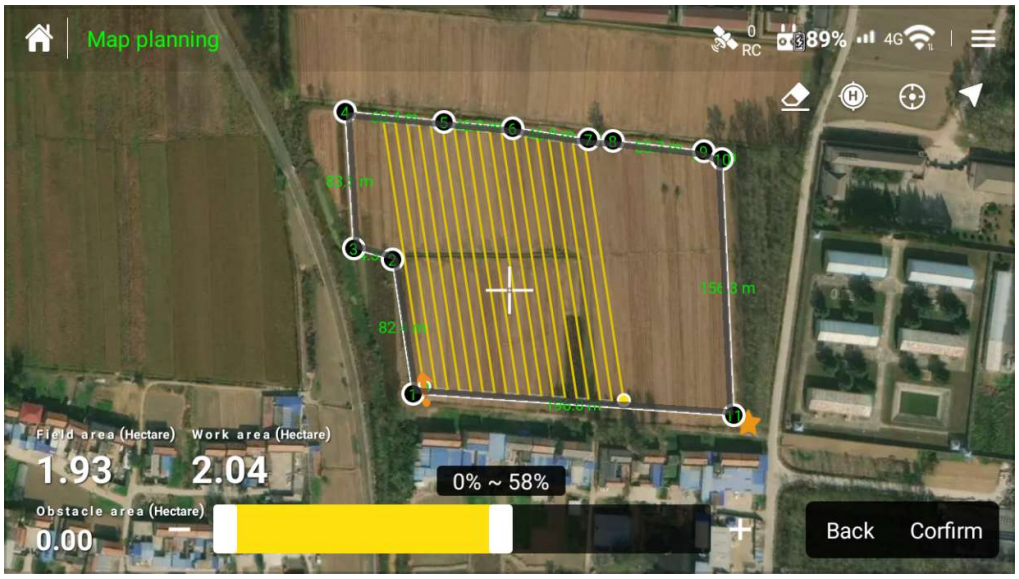
Quick adjustment of route direction: tap the target plot edge line, the waypoint route will be parallel to that edge line.

Setting start point: according to the position of the take-off and landing points, select a rational starting position to initiate the operation into the route.

Route splitting: The route splitting function allows the splitting of route segments that are not needed currently, while retaining those that are needed for operation.

Warning!

- Route splitting is based on a percentage of the route's length, not a percentage of the plot size.



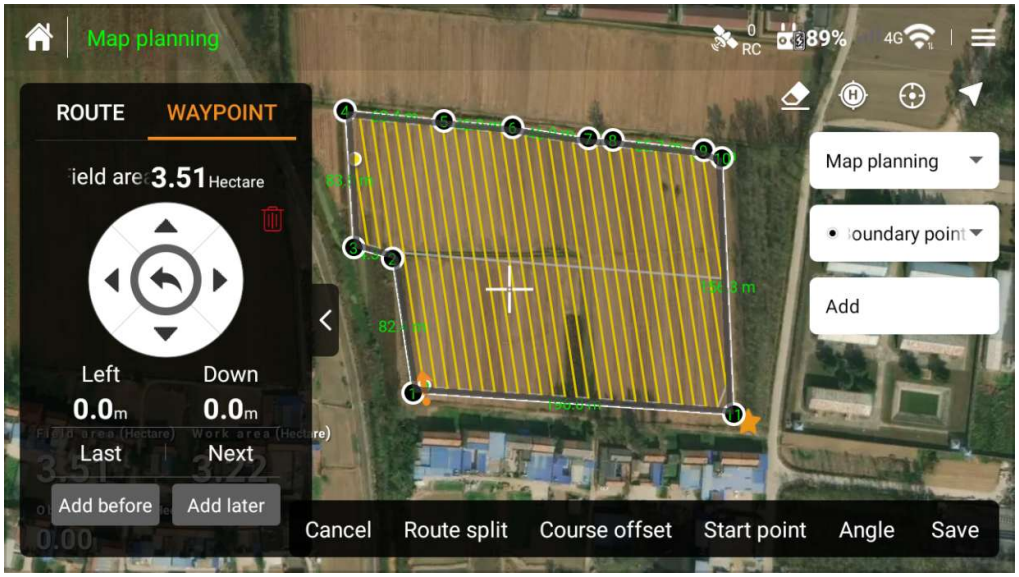
4.3.3.2 Editing Waypoints

Editing Boundary Points

Move boundary points: Drag or fine-tune with buttons to move the position of the plot boundary points, and the route will be automatically re-planned in real time after moving the boundary points.

Delete boundary points: Delete unwanted boundary points, after deletion, the route will be automatically re-planned in real-time.

Add boundary point: Upon adding a new boundary point, the route will promptly undergo an intelligent re-planning process.



Editing Obstacles

Add obstacles: reference can be made to planning circular obstacles and non-circular obstacles respectively

Delete obstacle points: Select an obstacle point and tap "Delete" to delete the obstacle point.

Delete circular obstacles: tap to select a circular obstacle, and tap "Delete" to delete the circular obstacle.

Move obstacle points: tap to select an obstacle point, drag or fine-tune the button to move the obstacle point to the target position.

After the obstacle is edited, the route will be intelligently re-planned in real-time.

Editing Reference Point

Add reference point: select a relatively fixed and iconic point as reference point to facilitate subsequent route corrections, ensuring greater convenience and precision.

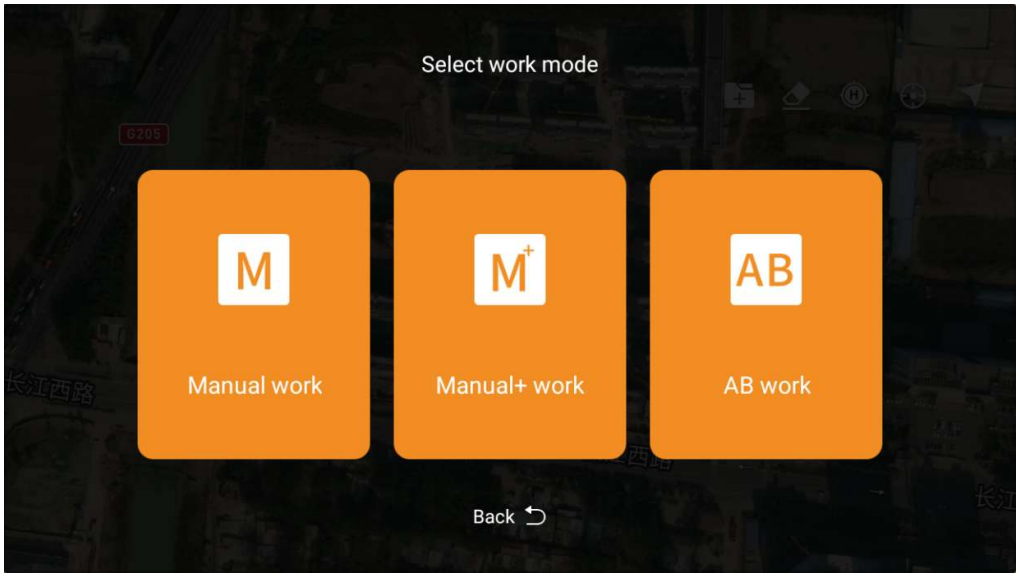
Delete reference point: tap the reference point and tap "Delete" to delete the reference point.

Undo Operation

If you want to withdraw the operation of adding, deleting or moving, tap "Undo" button to complete the undo operation.

4.3.4 Operation Mode

The HD580 agricultural drone comes with autonomous operation mode, AB operation mode, manual mode, and manual+ mode, which can be easily switched on Huida Drone App.



4.3.4.1 Manual Mode

For small plots or plots with too many obstacles and complex terrain, manual operation mode is advisable. In this mode, the drone's flight path is controlled via manual input on the remote control joystick, and the spraying function must be activated manually. It is not recommended to operate the drone out of sight, as doing so may pose flight safety risks.

Warning!

- In manual operation mode, the operation area and other data can be recorded only after "Start" button is pressed.

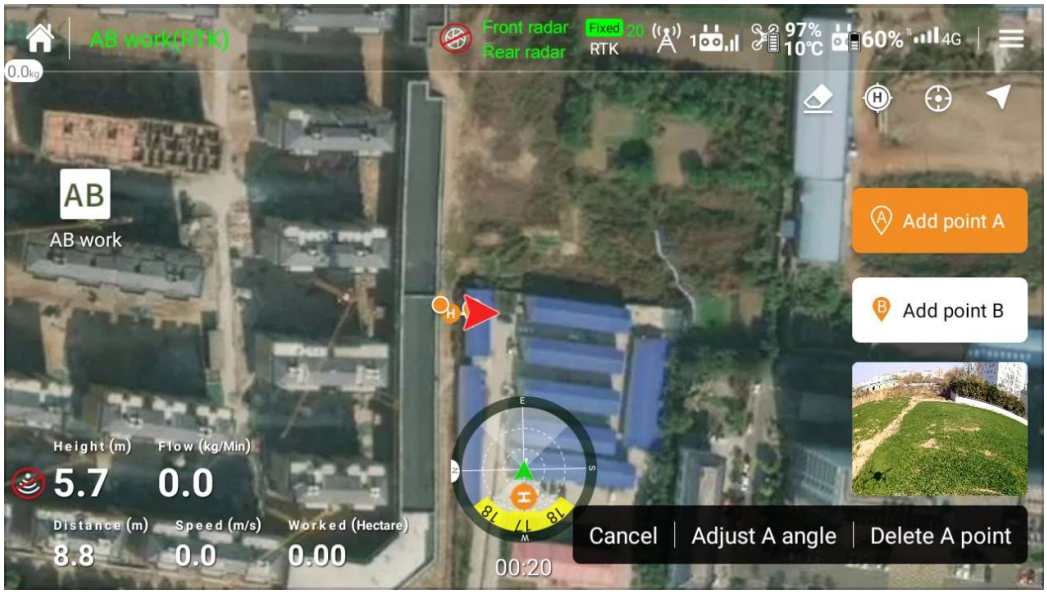
4.3.4.2 Manual + Mode

For medium to large plots that are obstacle-free and relatively uniform, manual+ mode is also an option. Fly the drone to the intended route, align the nose with the route, set the spraying dosage, flight speed, operation line spacing, relative crop height, and then tap "Start". Next, push the joystick forward to fly the drone to the plot, and tap "Left Traverse" or "Right Traverse" as necessary to execute the traverse action. Then, guide the drone to return and repeat the aforementioned steps to complete the operation.

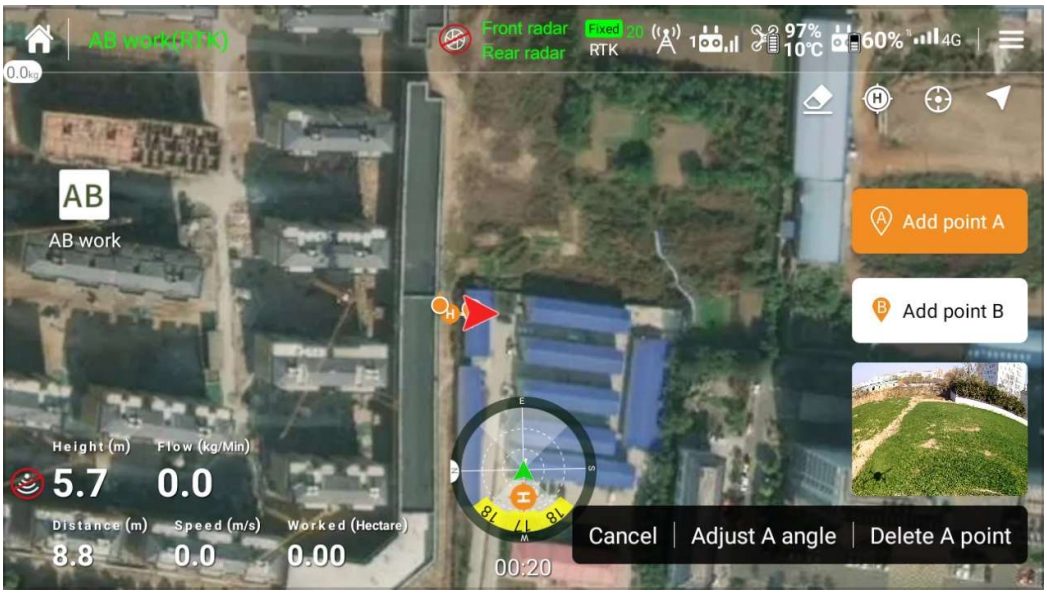
4.3.4.3 AB Operation Mode

Users can perform A-B mapping through the intelligent planning operation system of the Huida drone App. When establishing points A and B, adjust the orientation of each point to ensure they are parallel to the plot's edge. Subsequently, input the number of routes required to cover the entire plot, and the App will analyze the data to compute and generate the optimal routes for intelligent planning. Upon the completion of planning, the drone will automatically swift itself to AB operation mode and perform the task along the routes that have been intelligently mapped out.

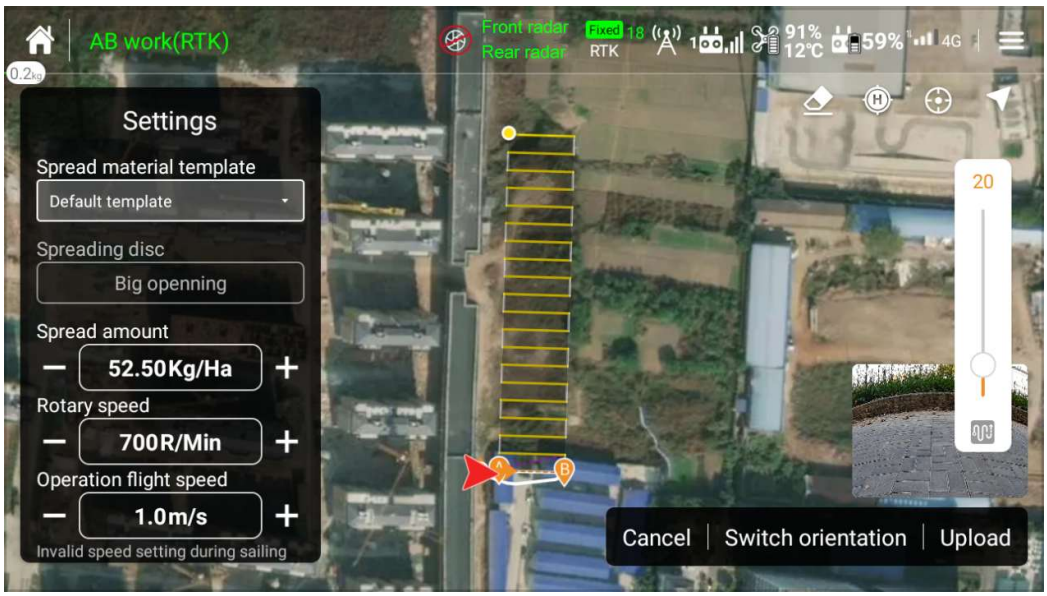
1. Add point A



2. Add point B



3. Set the number of routes and operation parameters



4. Tap "Upload" to synchronize the data between the remote controller and the drone, then tap "Execute"; AB operation will start after confirming on the operation self-check confirmation screen.

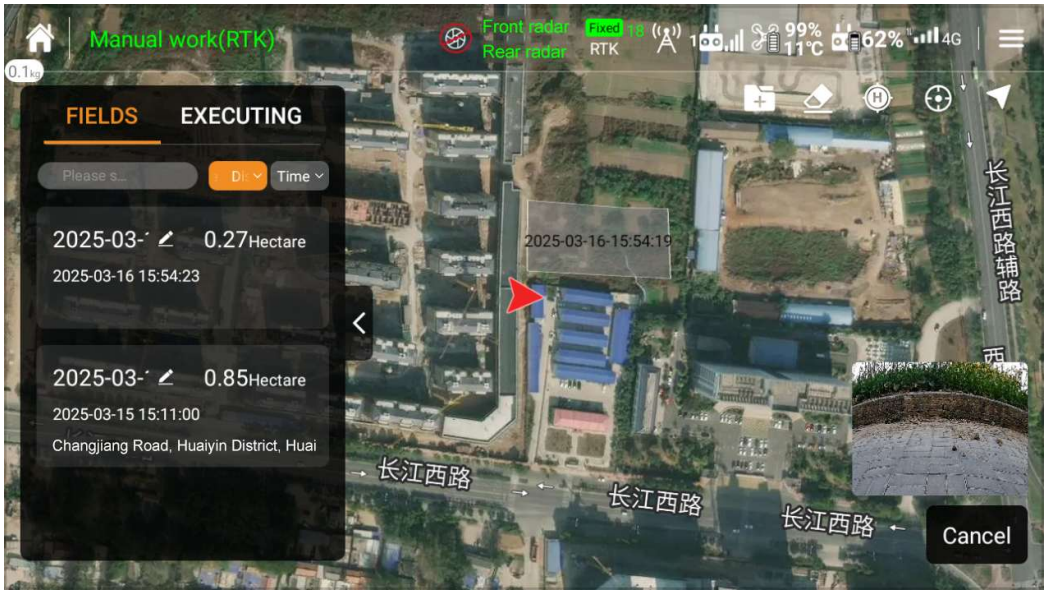
Warning!

- In AB operation mode, obstacle planning is not allowed, and for plots with obstacles, it is recommended to use the fully autonomous mode to plan the plots before operation.

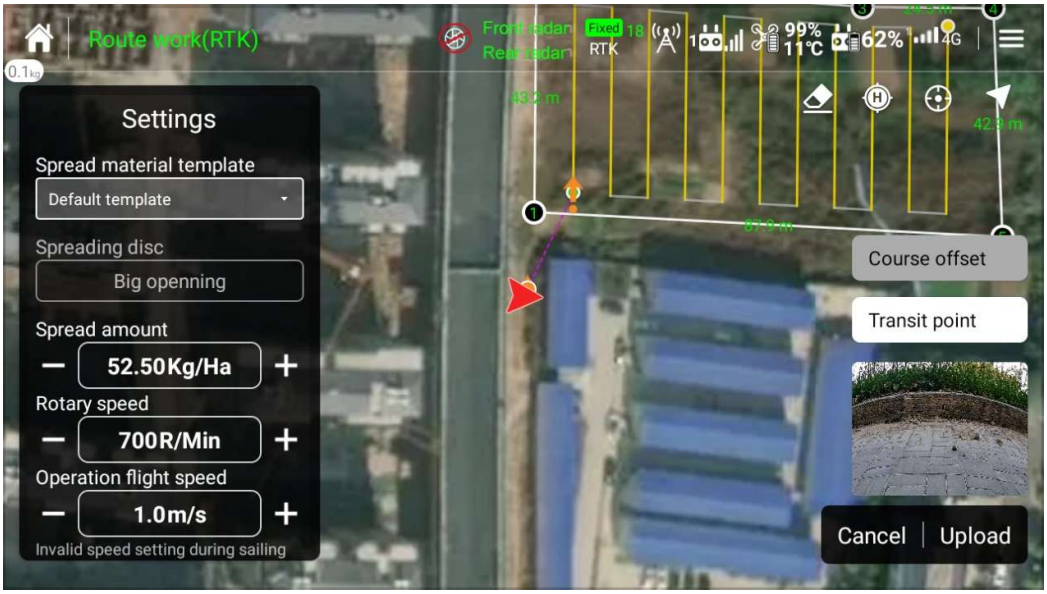
4.3.4.4 Autonomous Operation Mode

1. Tap "Start Operation" on homepage of Huida Drone App, to enter the homepage of manual operation;

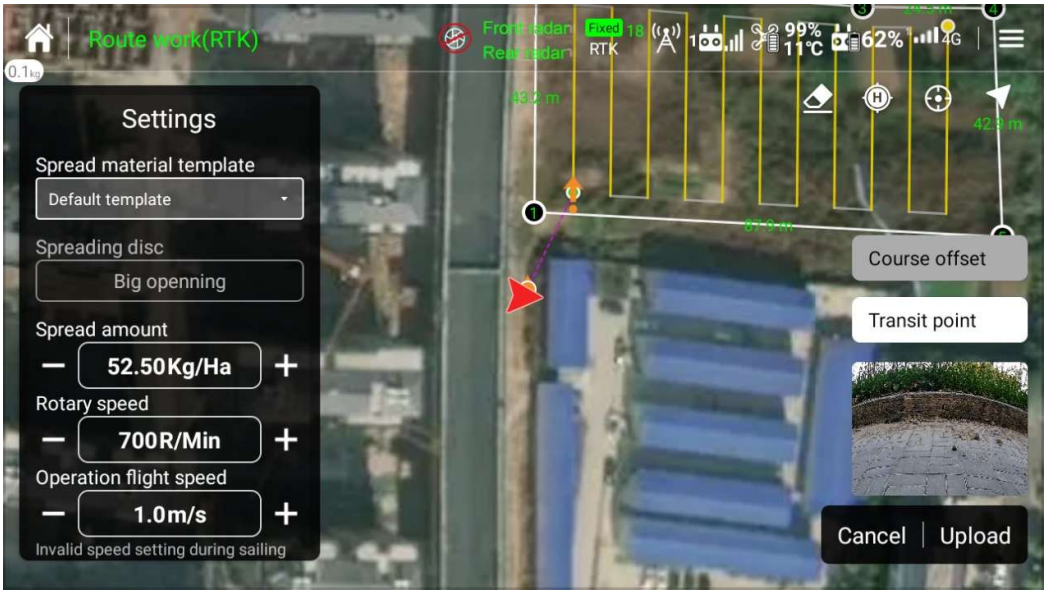
2. Invoke the target plot



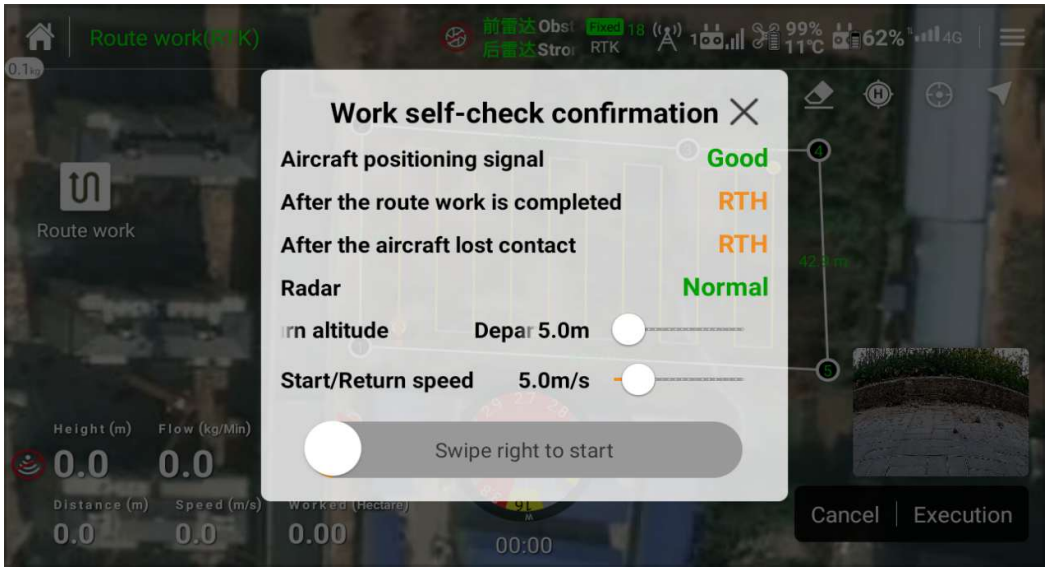
3. After that, the drone will switch itself into fully autonomous operation mode; then set the operation parameters as required.



4. Once the operation parameters are set, tap Upload to synchronize the data between the remote controller and the drone, and then tap "Execute".



5. After confirming the information in the operation self-check confirmation interface, slide the slider to the right to start the operation along the route.



4.3.5 Other Features

4.3.5.1 Automatic Return

Return point

The departure point is the default return point

Return without Carrying Agrochemical

HD580 agricultural drone supports behavior setting after the agrochemical is exhausted, either to hover or return; if you choose to return, the drone will automatically fly back to the return point after the agrochemical is exhausted. During the returning process, you can take over control of the drone by maneuvering any joystick.

Return with Low Battery

HD580 agricultural drone supports low battery behavior setting, either to hover or return; if you choose to return, the drone will automatically fly back to the return point once a low battery warning is triggered. During the returning process, you can take over control of the drone by maneuvering any joystick.

Return in the Event of Communication Loss

HD580 agricultural drone supports behavior setting in case of lost communication, either to hover or return; if you choose to return, the drone will automatically fly back to the return point when it detects that it has lost connection with the remote controller for more than 5 s, and if the communication restored during returning, you can take over the control of the drone by maneuvering any joystick.

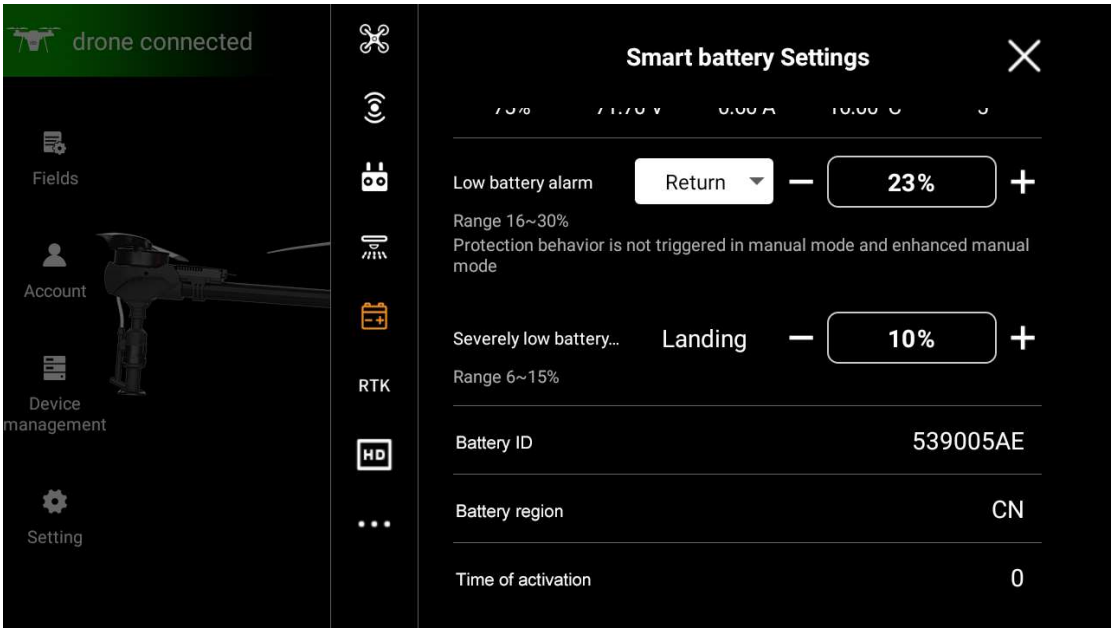
Note: If the automatic return is triggered in the autonomous operation mode, the drone is capable of avoiding the planned obstacles within the plot.

4.3.5.2 One-tap Return

One-tap return can be triggered by long-pressing the return button on the remote controller for 2-3 s; once triggered, the Huida Drone App will prompt first before the drone returns automatically, and you can take over the control of the drone by maneuvering any joystick.

4.3.5.3 Low Battery and Battery Drain Protection

HD580 drone is equipped with low battery alarm, battery drain alarm and low voltage alarm.



1. If the App triggers a low battery alarm, you should fly the drone to a safe area and land as soon as possible, then replace the battery. If the low battery behavior is set to Return, the drone will prompt to return automatically first once the App triggers a low battery alarm. Subsequently, it will proceed to return to its take-off point autonomously. If the low battery behavior is set to Hover, the drone will hover and await further instructions from the operator upon the App displaying a low battery alarm.

Warning!

- Operators can set the battery percentage threshold that activates the alarm in the Huida Drone App, and it is recommended to set it conservatively to ensure flight safety.

2. In the event of a critical low battery or a significant low voltage alarm, the drone will autonomously execute an emergency landing procedure, during which the operator is unable to intervene in the landing sequence.

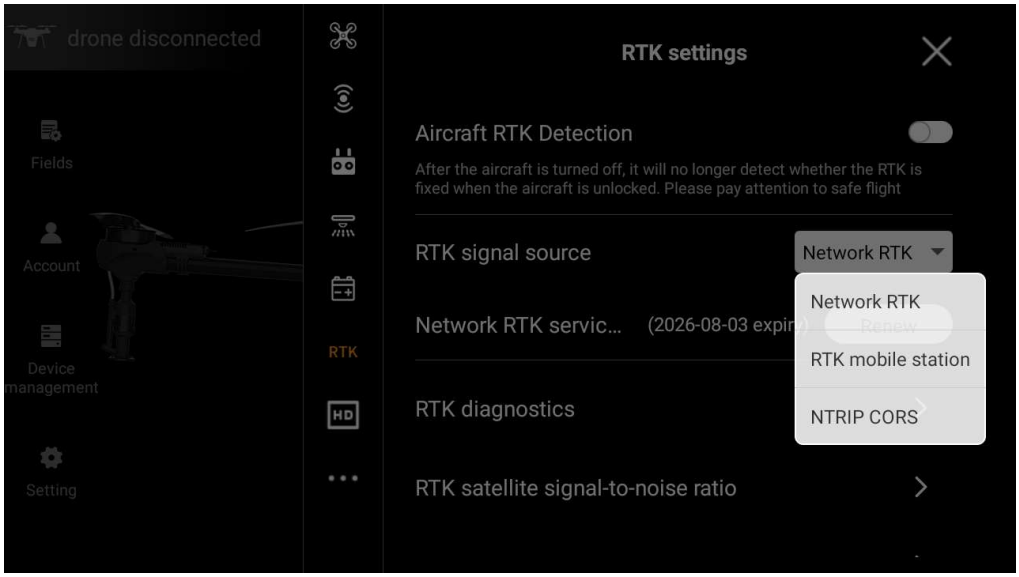
Warning!

- Operators can set the battery percentage threshold that activates the alarm in the Huida Drone App, and it is recommended to set it conservatively to ensure flight safety.

4.3.5.4 RTK Function

HD580 agricultural drone is equipped with a high-precision RTK module, the dual-antenna direction-finding technology outperforms the traditional magnetometer module in terms of accuracy and robustness against electromagnetic interference. It ensures reliable flight operations even in environments with significant magnetic disturbances, such as near high-voltage lines and metal structures. Dual-antenna direction finding is automatically activated when the GNSS signals are available.

HD580 agricultural drone leverages network RTK, RTK base stations, and NTRIP CORS services to achieve centimeter-level positioning precision, thereby enhancing the accuracy of agricultural spray applications for plant protection purposes. The instructions are as follows:



Network RTK

Enter Settings page on the right edge of Huida drone App homepage, locate and tap the RTK settings button, and then select "Network RTK" as the RTK signal source.

Once the connection with the network RTK server is successfully established, the RTK status icon positioned at the top of the operation interface will illuminate, indicating that the network RTK data has been successfully retrieved and is now in use.

RTK Mobile Station

Refer to the HD201 user manual to complete the frequency pairing between the drone and the base station and the setup of the base station.

NTRIP CORS

To use CORS base station, you need to configure IP address, port number, mount point, user name and password to retrieve CORS base station information, at this point, the remote controller needs to be connected to the network or equipped with SIM card.

RTK On/Off

Before initializing RTK positioning, confirm that the drone's RTK function is on and the RTK signal reception method (either RTK mobile station or network RTK service) is properly set. Otherwise, RTK positioning will not be available.

Warning!

- The drone will not be able to take off when the drone is using RTK but RTK positioning is not available.

4.3.5.5 Radar Settings

Terrain-following radar

When turned on, the drone can automatically adjust the flying height relative to crops; when the terrain following radar is turned off, the flying height relative to crops will be fixed according to the height of the take-off point.

Terrain-following sensitivity

The more sensitive it is, the stronger the feedback will be for small ups and downs, but it is not recommended to turn on the sensitivity too much for flat land.

Obstacle avoidance

Regardless of whether the obstacle avoidance switch is activated, the App will display any obstacles detected by the radar. The drone will automatically avoid obstacles when the switch is turned on, but not when it is turned off.

Autonomous obstacle avoidance

Only available in autonomous operation and AB operation mode, during autonomous obstacle avoidance, this feature can be exited by manually maneuvering the joysticks

Obstacle avoidance radar tone

Upon encountering obstacles at varying distances, the remote controller will alert the user with distinct auditory signals corresponding to the proximity of the obstacles.

Rear radar

The rear radar affords obstacle detection capability while the drone is flying backwards.

Obstacle avoidance radar sensitivity

The more sensitive the obstacle avoidance radar, the higher the probability of misjudgment.

Radar detection distance

20-90 m

Radar alarm distance

When the drone encounters obstacles on its front, back, left, and right sides, it will display the distance from the obstacles within the specified alarm range, alerting the user through a color-coded system that corresponds to the proximity of the obstacles.

Fade out time

The radar dome is rendered semi-transparent when no obstacles are detected for a duration exceeding the predefined time limit, facilitating clear visibility of other operational information.

Radar dome display size

The radar dome size on Drone App operation page can be adjusted.

Warning!

- You can turn off the obstacle avoidance radar function when false positives are frequent and no actual obstacles are confirmed to be present; however, it is advisable to keep it active under normal circumstances.
- The radar system has a detection blind spot, please fly with caution.
- If the obstacle is outside the detection range, the drone cannot sense the obstacle, accordingly, cautious flight is recommended.
- Detection distances of radar module may vary for obstacles of differing sizes and materials. Beyond the effective detection range, the obstacle sensing function may be compromised or fail.
- If the bottom of the drone is nearly level with the top of an obstacle or higher, and the obstacle is close to the drone, the drone may fail to detect the obstacle. Therefore, cautious flight is recommended.
- To ensure operational safety, it is recommended that objects such as power lines and diagonal wires be manually designated as obstacles during plot planning.
- Obstacle detection may not work for small obstacles, diagonal wires, and objects that are flush with the drone's tripod, so please fly with caution. Manual control of the drone is required when necessary to prevent flight accidents.
- Please maintain control over the drone throughout the flight, and do not rely solely on the information provided by the radar module and the App. Please make sure you have a full view of the surrounding airspace, make rational judgments regarding flight conditions based on visual observation, to avoid obstacles in time.

4.3.5.6 Returning to breakpoint

With this function on, the drone App will calculate the optimal route based on the breakpoint location and drone position, etc. to reduce the distance the drone will fly with full load. Before starting operation, you can switch on this function, and you can also turn on/off the function in the Drone Settings - Advanced Settings interface after the drone has landed.

5 Maintenance

After the operation, the relevant spraying accessories and drone surface should be cleaned in time, and regular maintenance should be carried out.

5.1 Cleaning after Operation

The agrochemical solution is corrosive and can lead to erosion of the equipment, thereby reducing its lifespan. To mitigate this risk, it is advisable to clean the drone thoroughly after each use once it has returned to room temperature post-operation. The detailed cleaning steps are as follows:

1. Fill the agrochemical container with soapy water and activate the spray manually to flush out the system, removing any agrochemical residue.
2. Repeat with clean water until all the clean water is drained from the system. This prevents residual liquid damage during transport or storage.
3. Clean the body with a soft cloth, then gently use a soft brush or damp cloth to clean the surface, and finally dry with a cloth to remove all moisture.

5.2 Drone Maintenance

To maintain optimal performance and mitigate safety risks, regular inspection and maintenance of the drone are essential. Follow these procedures:

1. Check the propellers for cracks and damages, and replace any compromised propellers promptly.
2. Check whether the propellers are loose. Tighten any loose propellers and replace spacers as necessary.
3. Check the surface of the propellers for adhered material, clean with a wet cloth if any.
4. Rotate the motor to check for vibration or unusual noise. Address any such issues by replacing the power system immediately.
5. Shake the motor to ensure the angle remains stable. If the angle shifts, readjust the motor and secure with the appropriate screws.
6. Check the motor's enamel wire for damage. If damaged, replace the power system promptly.
7. Disassemble the impeller pump to assess impeller wear. Replace the pump if significant wear is detected.
8. Verify the integrity of all spraying system connections. Replace any faulty seals immediately.

9. Check whether the screws on the airframe for any looseness or missing.
10. Check whether the tripod, airframe, arm, motor, antenna and other parts are firmly installed.
11. Check each part's connecting plug for firmness, oxidation, and check the smart battery interface for deformation.
12. Check the body and components for damage or cracks. Replace any damaged parts promptly.
13. Clean the fish eye camera and radar surfaces if dirty, using a damp cloth as needed.
14. For devices with lithium batteries (including smart batteries), for example, remote controls, they need to be charged to 50%-60% every two months during prolonged storage periods.

5.3 Smart Battery Maintenance

1. Check the heat dissipation ports of the smart battery for foreign matter., if detected, clean the ports immediately.
2. Maintain the battery's charge between 50% and 60% during storage to preserve its longevity. Avoid storing the battery at low power for extended periods.
3. For batteries that will not be used for an extended time, activate the battery by recharging and discharging it every 3 months to ensure the battery remains active.
4. If the smart battery is observed to be bulging, leaking, deformed, or showing visible damage, stop use immediately and contact Huida Technology's authorized dealers or service centers for assistance.
5. Do not transport smart batteries that exhibit potential safety hazards, including bulging, leaking, or visible damage.
6. Do not charge the smart battery in a wet state.
7. When the drone is powered on, do not plug or unplug the smart battery to avoid connector damage.
8. Treat the smart battery with care - hold and place it gently and never attempt to disassemble it privately.

5.4 Storage and Transport

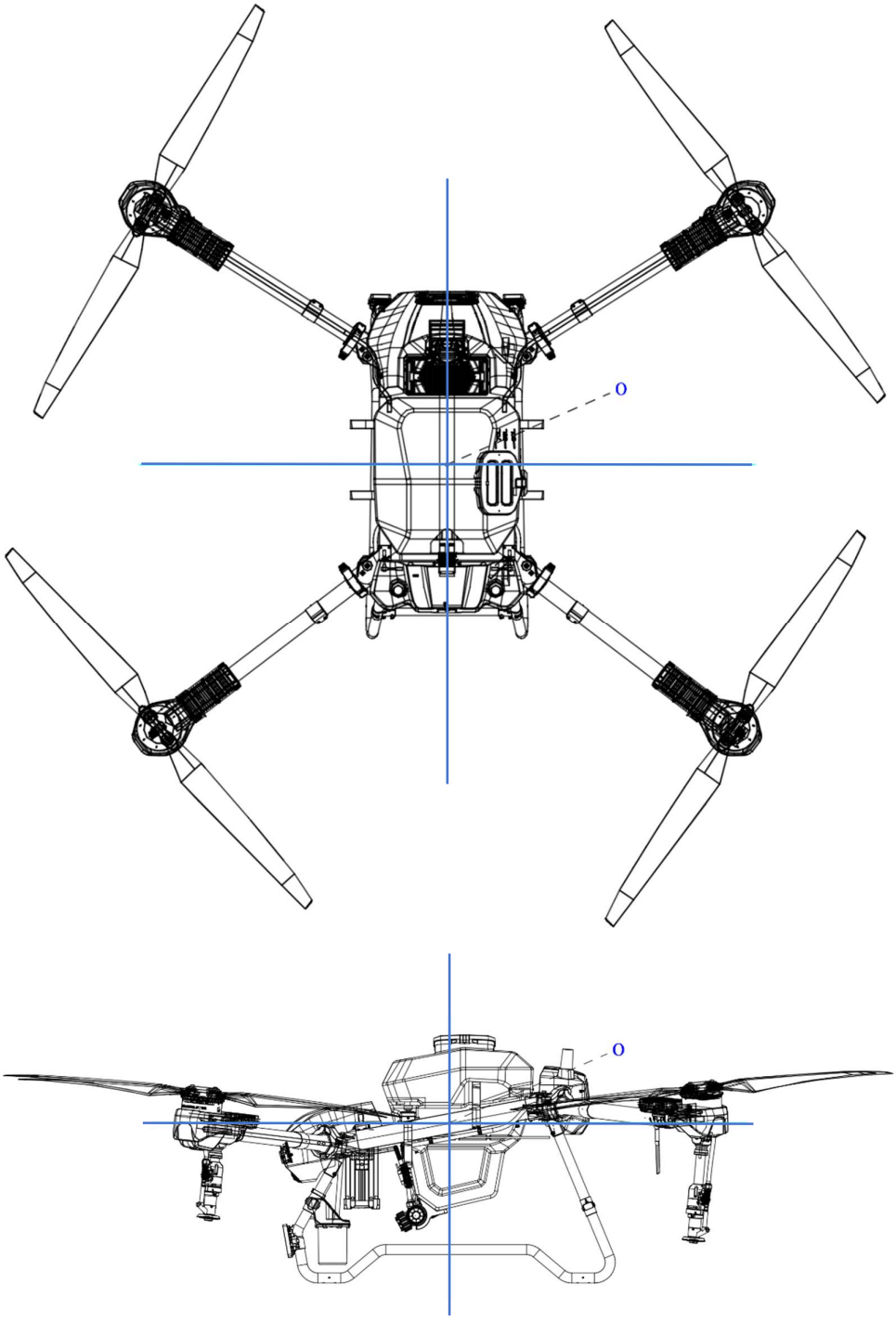
1. Prior to transporting, ensure that the drone and its smart battery are disconnected and stored separately.
2. For the transport of the smart battery, it is recommended to use the original battery box provided.
3. Before transporting the drone, fold the arms and propellers of the drone and use the propeller holder to fix it in place. Additionally, employ the safety belt to secure the drone's airframe, ensuring that the entire unit remains stable and immobile during transport.

4. Store the battery, drone, remote control, charger and other equipment in a dry environment with a temperature of 10°C-30°C. Avoid storing these items in locations prone to water leaks or high humidity.
5. When storing batteries, it is critical to avoid stacking them.

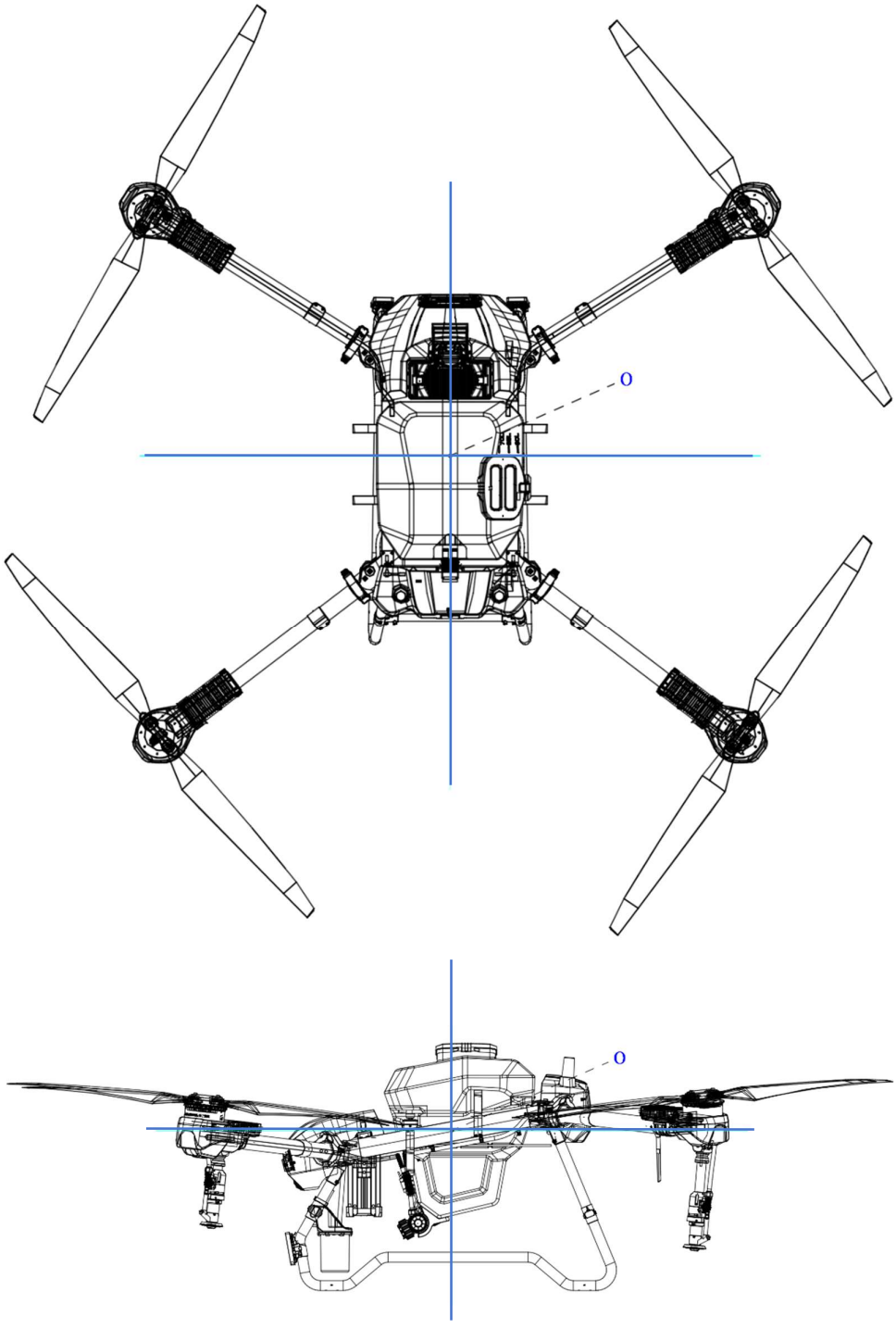
6 Appendix

6.1 Drone Centre of Gravity

Drone airframe coordinate system and geometric centre (O-point) position (spraying full load)



Drone airframe coordinate system and geometric centre (O-point) position (no load)



6.2 Troubleshooting Instructions

Module	Alarm Sources	Error Description	Solution
Power system	Motor	Motor blocked, stop flight immediately	Locate the blocked motor according to the prompted motor serial number. Check the propellers for any sign of entanglement and the motor for foreign objects. Should the issue persist, please contact your nearest authorized dealer for assistance.
		Motor overload, halt the flight immediately	Locate the overloaded motor by the prompted motor serial number Please check the propellers for any signs of tangling, deformation, or breakage, and examine the motor any foreign objects that may be obstructing its operation. Should the issue persist, please contact your nearest authorized dealer for assistance.
	Electronic speed controller (ESC)	Risk of motor over-temperature	Locate the overloaded motor by the prompted motor serial number Allow the drone to cool down to prevent overheating before resuming flight operations Should the issue persist, please contact your nearest authorized dealer for assistance.
		ESC high voltage abnormality	Locate the overvoltage ESC by the prompted ESC serial number. Check if the battery voltage is too high If the problem persists, please contact your nearest distributor
Battery	Battery	Battery and flight control communication abnormality	Please re-insert the battery and make sure that the battery connector is free of foreign objects. Please replace the battery to check whether the battery is damaged Please check whether the gold finger of the distributor board is deformed or damaged. Please check whether the connection between the power distribution board, agrochemical container control box assembly and avionics module is normal under the power-off state. If the problem persists, please contact your nearest distributor

Module	Alarm Sources	Error Description	Solution
		Battery authentication failure	Please confirm whether it is an authentic and original battery Please check whether the gold finger of the distributor board is deformed or damaged. Please re-insert the battery and make sure that the battery connector is free of foreign objects. Please replace the battery to check whether the battery is damaged If the problem persists, please contact your nearest distributor
		Severe low battery voltage	Please check whether there is any abnormality in the voltage of each cell of the battery. If the problem persists, please contact your nearest distributor
Avionics system	IMU	Inertial Measurement Unit (IMU) disconnected	Please restart the drone Please perform IMU calibration If the problem persists, please contact your nearest distributor
		Inertial Measurement Unit (IMU) status not initialized	Please leave the drone for 10 s, if the problem still exists, please restart the drone. Please perform IMU calibration If the problem persists, please contact your nearest distributor
	Magnetometer	Magnetometer disconnected	Magnetometer disconnected, please check in the powered-off state and make sure the avionics module is correctly installed, then turn on the drone to see if there is any abnormality If the problem persists, please contact your nearest distributor
		Magnetometer interference	Please make sure there is no interference in the flight environment and calibrate the magnetometer Please check in the shutdown state; please make sure the avionics module is correctly installed, then turn on the drone to see if there is any abnormality If the problem persists, please contact your nearest distributor
	RTK	RTK board disconnected	Please restart the drone after 2 min of power failure If the problem persists, please contact your nearest distributor
		RTK dual-antenna baseline abnormality	Please restart the drone If the problem persists, please contact your nearest distributor

Module	Alarm Sources	Error Description	Solution
	Image transmission module	Loss of image transmission signal	Please restart the drone Please upgrade the drone firmware to the latest version If the problem persists, please contact your nearest distributor
Remote controller	Image transmission module	Signal-to-noise ratio is too low on the antenna side of the remote controller	Please check for any channel interference in the Image Transmission Settings page, and if detected, attempt to switch to a different channel. Check for interference sources in the vicinity, including signal towers and WIFI hotspots. Please make sure there is no obstruction between the remote controller and the drone. Please check whether the remote controller's antenna connection is secure and normal If the problem persists, please contact your nearest distributor
		The remote control can not receive signals from the drone	Please check for any channel interference in the Image Transmission Settings page, and if detected, attempt to switch to a different channel. Check for interference sources in the vicinity, including signal towers and WIFI hotspots.
		If the drone fails to receive joystick signals	Please make sure there is no obstruction between the remote controller and the drone. Please try to calibrate the remote control joystick If the problem persists, please contact your nearest distributor
Spraying system	Water pump ESC	Water pump not connected	Water pump not connected, please restart the drone Please disconnect the water pump's connecting pipe with the drone powered off, and then attach it to other water pumps for cross-testing to verify the integrity of the pump in question. Please check the connecting wires between the water pump and the agrochemical container control box assembly for any signs of looseness or breakage. Please inspect the water pump - agrochemical control box assembly with the drone powered off Whether the spraying system works properly. If the problem persists, please contact your nearest distributor

Module	Alarm Sources	Error Description	Solution
		Water pump ESC self-test failed	Water pump ESC self-test failure, please restart the drone Please disconnect the water pump's connecting pipe with the drone powered off, and then attach it to other water pumps for cross-testing to verify the integrity of the pump in question. Please check the connecting wires between the water pump and the agrochemical container control box assembly for any signs of looseness or breakage. Please inspect the water pump - agrochemical control box assembly with the drone powered off Whether the spraying system works properly. If the problem persists, please contact your nearest distributor
Radar	Radar	Radar ESC temperature too low	Make sure the ambient temperature is normal Please check whether the connection between the radar- agrochemical container control box assembly and avionics module is normal under the power-off state. If the problem persists, please contact your nearest distributor
		Radar ESC temperature too high	Make sure the ambient temperature is normal Please check whether the connection between the radar- agrochemical container control box assembly and avionics module is normal under the power-off state. If the problem persists, please contact your nearest distributor

6.3 List of Risks and Hazards and Countermeasures

Operation of the 3WWDZ-U70A agricultural drone carries inherent risks if not conducted in accordance with specified operational requirements, or if the drone is not operated with caution. **Below are the identified risks and corresponding countermeasures:**

S/N	Parts	Countermeasures	Remarks
1	Propeller	Maintain a safe distance (more than 15 m) when the propeller is rotating	
2	Motor	Maintain a safe distance of 0.5 m or more from a rotating motor without a propeller, and 15 m or more from a rotating motor with a propeller	
3	Agrochemical container	Used agrochemical containers may contain agrochemical residues, and should not be used for drinking water or grooming.	
4	Agrochemicals	Agrochemicals should be applied in accordance with the instructions for use or the guidance of an agronomist.	
5	Battery	Batteries must be operated following the prescribed usage procedures to avoid overcharging and overdischarging.	
6	Charger use	The charger must be operated in strict accordance with the operating instructions and kept away from flammable and explosive substances during use, and fire-fighting equipment should be readily available in proximity.	
7	During flight	Flight operations in downtown areas are prohibited; During field operations, maintain a safe distance (over 15 m) from crowds.	
8	During agrochemical spraying	Keep the operation area away from the farming area, at least 60m away depending on the weather conditions.	

6.4 Technical parameters

Flight parameters

Model	3WWDZ-U70A
Structure layout	4-axis
External dimensions	3305mm x 3577mm x 850mm (arms and propellers unfolded) 3305mm x 3577mm x 850mm (arms unfolded and propellers folded) 1270mm × 880mm × 880mm (arms folded)
Maximum wheelbase	2628mm
Maximum take-off weight	140kg (spray)
No-load mass (including battery)	67.5KG
Agrochemical container capacity	70L
RTK positioning	Horizontal ±10 cm, vertical ±10 cm
No-load hovering time	15.5min
Full-load hovering time	5.8min

Power system

Motor KV rating	46 (r/min)·V
Motor dimension	140*34*mm
Motor rated power	4650w X 4
Rated RPM	2000r/min
Main rotor diameter	1575mm (62in)
Number of main rotor	4
Main rotor material	Carbon fiber

Energy system - smart battery

Battery model	HE102 secondary lithium battery pack
Charging voltage	78.3V
Charging current	5C
Discharging current	10C
Battery capacity	30000mAh
Single cell voltage	3.8V
Number of battery cells	18
Battery voltage	68.4V
Working temperature	0~45°C
Charging temperature:	5~65°C / Discharge temperature: -20~60°C
Battery weight	13.3KG
Battery mounting method	Quick plug battery

Energy system - smart charger

Charger model	HE202 All-in-one charger
Charger input voltage	110Vac-230Vac
Charger output voltage	78.3V (Maximum)
Charger output current	140A (Maximum)

Input frequency range	47Hz-63Hz
Output power	9000W (Direct connection with generator)/ 2000W (Direct connection with mains)
Output channel	1
Protection function	Over-temperature, over-voltage, under-voltage, short-circuit protection function
Operating ambient temperature	-5°C~40°C
Weight	17.6KG

Spraying system

Agrochemical container volume	70L
Agrochemical container material	LLDPE
Nozzle type	Centrifugal nozzle
Total nozzles	Centrifugal nozzles 2/4
Nozzle length	1910mm
Spraying swath	4.5m-10.3m
Atomized particle size	Centrifugal nozzle 50μm-500μm
Water pump type	Magnetic drive vane pump
Number of water pumps	2
Maximum flow rate	Two centrifuges 30L/Min Four centrifuges 40L/Min

Remote control system

Model	HD402
Data transmission and positioning	LTE-FDD: B1/B3/B5/B8
	LTE-TDD: B34/B38/B39/B40/B41
	WCDMA: B1/B8
	EVDO/CDMA: BC0
	GSM: 900/1800 MHz
	WLAN: 2.4/5 GHz 802.11a/b/g/n
	Bluetooth: BT 2.1+EDR/3.0/4.1 LE/4.2 BLE
	GNSS: BeiDou/GPS/Galileo/GLONASS
	Radio: 2KM
Image transmission	2.4/5.8G dual-frequency
	SRRC:>3Km
	CE:>3Km
	FCC:>2.5 km (drone flying 2.5m, without interference)
GPS point device	GNSS: BeiDou/GPS/Galileo/GLONASS
	Positioning accuracy:
	DGNSS 0.5m
	RTK 0.02 m +1ppm
Display	6-inch touch LCD with 1280*720 resolution
Working temperature	-20~50°C
Charging ambient temperature	0~45°C
Built-in battery life	5h
External battery life	2h
Number of external batteries	2

Charging power	External: 33.6W/8.4V/4A*2 Built-in: 65W Max
Charging method	External: cradle Built-in: TYPE-C

Sensing system - camera

Front monocular	*Virtual gimbal camera*
Resolution	1920*1080
Field of view	Horizontal 80°, Vertical 120°
Night vision	Support

Sensing system - radar

Set height range	Height measurement range: 1-60m
Set height range:	0.5-30m
Obstacle avoidance range	Obstacle avoidance distance (horizontal): 1-50m View-angle coverage (3db) : horizontal 50°, vertical 10° Use conditions: drone flight relative height above 3m and speed <13.8m/s Safety distance: 2.5m (distance between the propeller tip and the obstacle after the drone brakes and hovers stably)

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