HD580 Agricultural Drone

User Manual

V1.0
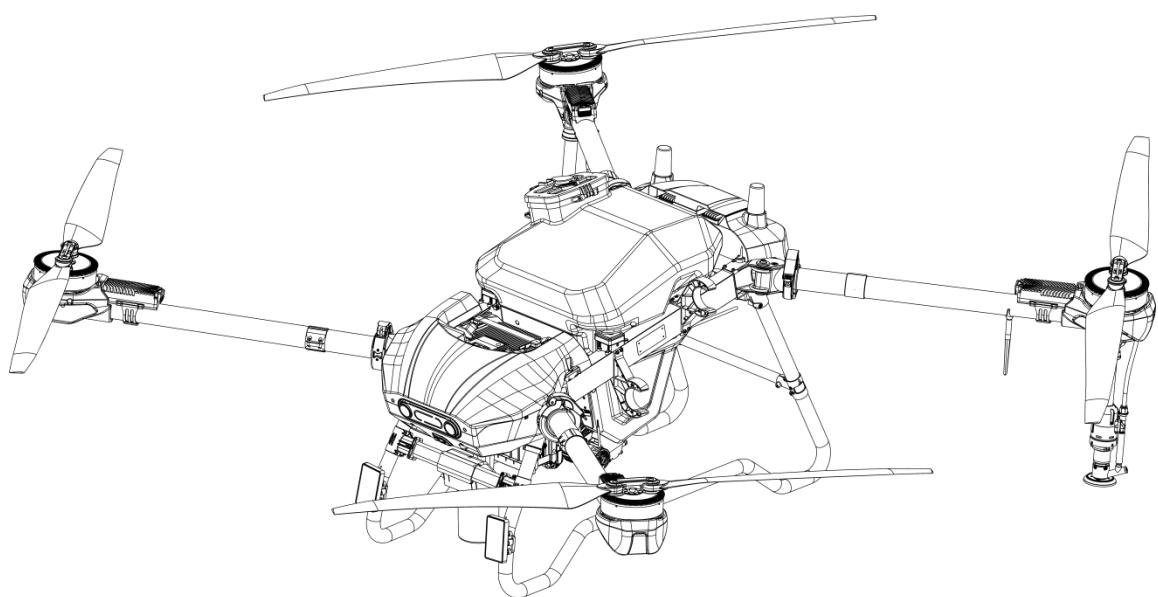
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1 Reading Tip

1.1 Symbol Explanation

This document uses the following illustrations to illustrate the classification of potential hazards that may result from improper operation.

☼ "Caution" icons indicate that failure to follow instructions may result in property loss or minor injury.

⚠ "Warning" icons indicate that failure to follow instructions may result in property loss, major accident or serious injury.

⚠ Read the entire User Manual and be familiar with the functions of the product

before operating it. Failure to operate this product correctly may cause serious injury to

yourself or others, or cause damage to the product and property loss. This product is

relatively complex and requires a period of familiarization before safe use, and some

basic knowledge before operation. This product is not suitable for children. Do not use

parts not provided or recommended by Huida Technology. Users must strictly follow

Huida Technology's instructions to install and use the product. This guide

Document contains safety, operation and maintenance instructions. Be sure to read all instructions and warnings in the User Manual carefully before assembly, setup and use.

1.2 Use Suggestion

Huida Technology provides users with the following documentation:

Item List

Disclaimer and Safe Operation Guidelines

User Manual

It is recommended that users use the "Item List" for verification. Read the "Disclaimer and Safe Operation Guidelines" and "User Manual" to learn how to use it. Make sure that before using this product, users are

familiar with the functions of each component of the product, and understand the information about flight restrictions, the emergency return process, and the relevant local laws and policies. If users have any questions when using this product, please contact Huida Technology or an agent authorized by Huida Technology.

1.3 Real-name Registration

According to the relevant regulations of the Civil Aviation Administration of China on real-name registration, please complete the registration through the Civil Aviation Administration's drone real-name registration system. For more information, please visit https://uom.caac.gov.cn

2 Security Summary

⚠ HD580 product use may involve certain safety risks and it is not suitable for people under the age of 18.

The safety summary chapter only contains part of the flight safety knowledge. Please be sure to read the entire contents of the "Disclaimer and Safe Operation Guidelines" and "User Manual" carefully.

1) Environment

Fly in an open field away from crowds.

Do not fly above an altitude of 4.5km.

Fly in an environment of 0℃ to 40℃ with good weather (not heavy rain, strong wind, or extreme weather).

Fly within legal areas. Before flying, please consult local flight authorities to comply with local laws and regulations.

Do not fly indoors.

2) Pre-flight inspection

Make sure each device has sufficient power.

Make sure to use genuine parts from Huida Technology and that all parts are in good condition. If any parts are aged or damaged, please replace them before flying.

Make sure the propeller is not damaged, deformed, safe and secure, the surface is clean and free of foreign matter, and is correctly installed on the motor.

Make sure the propellers and arms are fully extended and the arm

buckles are fastened.

Make sure the motor is clean and undamaged, installed tightly and can start normally.

Make sure the landing gear, spray tank and flight battery are installed securely.

Make sure the surfaces of the RTK antenna and image transmission antenna are clean and unobstructed.

When the APP prompts users to calibrate the compass, please calibrate it before flying.

Pilots and ground crew must wear helmets when operating and ensure they maintain a safe distance of more than 6m from the aircraft.

Ensure that the operation environment is clear of debris that may affect flight, such as plastic bags, empty fertilizer bags, plastic films and other objects that are easily blown away.

Make sure the Huida Drone APP is running to assist in the flight.

3) Operation

Do not get close to the propeller and motor while they are in operation. Make sure to maintain a safe distance of more than 6m.

Ensure that no third party personnel enters the operation area during the entire operation.

Make sure to fly within the maximum takeoff weight recommended by the APP to avoid danger.

Do not hang heavy objects under the aircraft. Any modification to the aircraft is strictly prohibited, otherwise it may cause flight instability or even crash.

Fly within visual line of sight (VLOS).

Executing an outward movement or stopping the motors in other ways while flying will cause the aircraft to fall. Please use this feature only in emergencies.

Do not answer phone calls during the flight, and do not operate the aircraft while under the influence of alcohol or drugs.

When the low battery warning occurs, please return as soon as possible.

After landing, turn off the aircraft first and then the Remote

controller to avoid losing the Remote controller signal and causing the aircraft to automatically start return mode.

Please maintain control of the aircraft throughout the entire process and do not rely solely on the information provided by the Huida Drone APP. Obstacle avoidance will not be available in certain flight modes or flight environments. Please maintain a good line of sight, rely on naked eye observation, reasonably judge the flight situation, avoid obstacles in a timely manner, and set the corresponding flight and return altitudes according to the flight environment.

If there are high-voltage wires in the operation area, please plan the route reasonably and keep a safe distance to avoid collision. If the aircraft hits the wires, do not touch the aircraft with hands, as there is a risk of electric shock.

4)Flight restrictions and local regulations

Before flying, please consult the local aviation control department to comply with local laws and regulations. If necessary, users need to apply to the relevant department for authorization to use the aircraft.

Control the flight altitude to 30m or below and comply with local laws and regulations during flight.

5)Protection level description

Under controlled laboratory conditions, the aircraft core module has an IP67 protection level. The protection is not permanent and may decrease due to aging and wear caused by long-term use. Damage caused by intrusion of liquids is not covered by the warranty.

Situations where protection may fail:

A collision occurs, and the seal is deformed;

Cracks and damage to the housing seal;

The interface protective cover or waterproof rubber plug is not installed in place or is loose.

6)Instructions for using pesticides

Minimize the use of powder chemicals and clean them promptly after use, otherwise the life of the spray system may be affected.

Pesticides are toxic, please use them with caution and operate safely

according to pesticide usage regulations.

When dispensing pesticides, please pay attention to the splashing of pesticide to prevent pesticide residues in the machine from causing harm to the human body.

When dispensing pesticides, use mineral-free water. After the dispensing is completed, it needs to be filtered and then added to the spray tank to prevent impurities from clogging the filter. When applying pesticides, if there is any blockage, please clean it in time before use.

When applying pesticides, be sure to ensure that personnel are in the upwind direction to avoid harm to the human body caused by falling pesticides.

When applying pesticides, please wear protective gear to prevent direct human contact with pesticides; after applying pesticides, please wash your skin, aircraft and Remote controller.

The effect of pesticides is closely related to the concentration of the liquid, spray flow rate, height of the aircraft from the crops, wind direction, wind speed, temperature, humidity, etc. The above factors should be taken into consideration when applying pesticides to achieve the best results. Make sure that no harm or impact is caused to humans, animals and the environment due to the above factors during the medication process.

When applying pesticides, it is strictly prohibited to pollute rivers and drinking water sources.

Disposal of remaining pesticide solution: Make plans in advance to reduce the remaining pesticide solution to the lowest level. The required pesticide preparation should be purchased and used according to the area of the plot. Spraying the remaining pesticide solution and cleaning solution onto the crops is the first step. Consideration should also be given to installing specialized piping equipment to handle cleaning solution.

It is prohibited to use strong acids, strong alkali, high-temperature liquids, and pesticides expressly prohibited by the state.

Fly in an open and
unobstructed

+

Good GNSS
signal

+

Fly within
visual

+

30 m

Control flight
altitude below
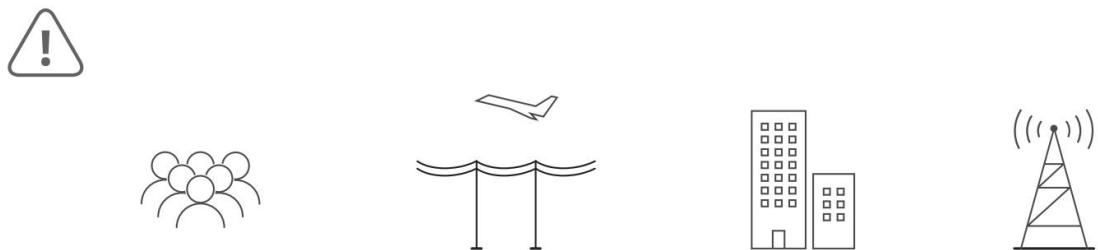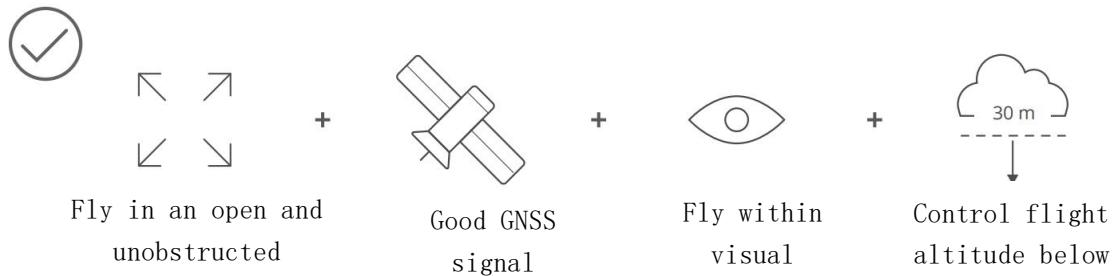
Please stay away from crowds, power lines, tall buildings, airports and signal tower lights when flying. Radio transmission towers, high-voltage lines, and substations may interfere with Remote controller signal products and threaten flight safety. Please pay attention to safety during flight.

≥6 m/s
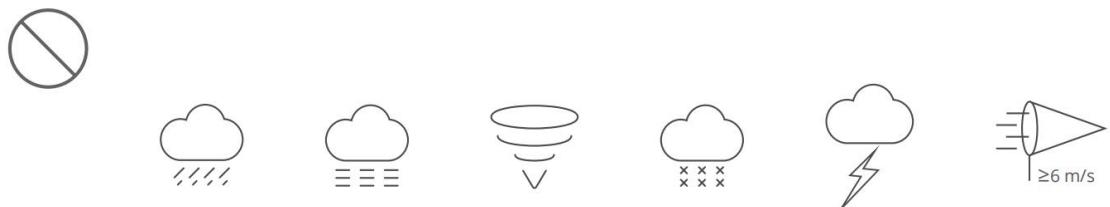
Do not fly in weather conditions such as heavy rain (precipitation of 25mm or more in 12 hours), heavy fog, snow, thunder and lightning, or strong winds (wind speed over 6m/s).
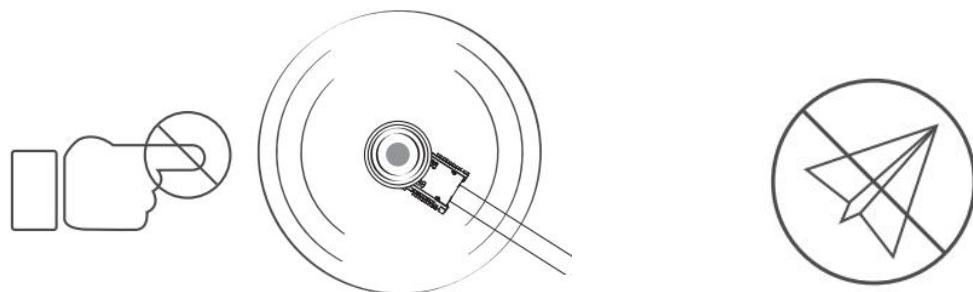
Safety distance >6m

Do not touch the rotating propeller. Otherwise, serious personal and property damage may occur.

No-fly zone

3 Product Overview

3.1 Introduction

HD580 agricultural drone newly developed by Huida Technology has a spray tank of up to 70L and a spread tank of up to 100L (maximum load 80kg). It has a four-axis stable architecture and comes standard with two centrifugal nozzles. The maximum flow rate of 2 centrifugal can reach 30L/min, the maximum flow rate of 4 centrifuges can reach 40L/min, the double-layer spray disc design makes the atomization more uniform, and the droplet size is adjustable, which comprehensively improves the operating efficiency and quality.

Newly upgraded smart Remote controller is equipped with a 6-inch high-brightness display and built-in Huida Drone APP, which further improves the smoothness and stability of operation. The standard RTK high-precision positioning module can realize centimeter-level route planning. It supports built-in battery and external battery power supply, with an overall battery life of up to 8 hours, fully meeting the needs of long-term, high-intensity operations.

Feature Highlights

HD580 agricultural drone adopts a folding frame structure, which achieves the best balance between strength and lightness. It can be quickly folded, making it easy to move and transport. The airborne high-precision RTK positioning module can realize centimeter-level high-precision positioning route flight , and also supports dual-antenna anti-magnetic interference direction finding technology; the front-mounted FPV high-definition camera can monitor the forward field of vision environment, check flight conditions in real time, and ensure flight safety.

The leading intelligent route operation mode can mark various obstacles inside and outside the plot, realize intelligent departure and fully autonomous operation; while adding the function of accurate prediction of pesticide-breaking points, it also realizes the optimal matching of pesticide and power level, making the unit power operation area larger, the operation more automated, and the operation efficiency

higher. It supports the intelligent endurance point function, so that novices can also achieve high battery utilization.

Two high-speed and large-flow centrifugal nozzles can achieve an optimal spray width of 12m according to actual measurements, with a maximum flow rate of 20L/min. The droplet size can be adjusted as needed, and is suitable for spraying operations in large fields and cash crops. And it can be expanded to 4 centrifugal modes, at which time the maximum flow rate can reach 40L/min, meeting the needs of ultra-large flow operations.

HD580 agricultural drone is dust-proof, waterproof, and anti-corrosion. The core components adopt three-layer protection. The overall protection level can reach IP65 (referring to the International Electrotechnical Commission IEC 60529 standard), and the fuselage is splash-proof.

3.2 Prepare the Remote controller

3.2.1 Power on and off

Press and hold the power button for about 2 seconds to turn the Remote controller on and off.

3.2.2 Remote controller power and charging

1) Install the Remote controller external battery

If users use an external battery to power the Remote controller, follow the steps below to install the battery.

Press the back cover opening button to open the back cover.

Insert the external battery of the Remote controller into the battery compartment and push it up to the top.

Close the lid.

💡 To remove the external battery, press and hold the battery unlock button, then push the battery down to remove it.

2) Check battery level

Users can check the current battery level through the Remote controller and the power indicator light of external battery:

Check the built-in battery power: After turning on the Remote controller, short press the power button once, and the power indicator light will display the current battery level.

Check the external battery power: Short press the power button of the external battery once, and the power indicator light on the external battery will display the current battery level.

3) Charge

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

Use a USB charger and USB-C cable to charge the Remote controller's built-in battery.
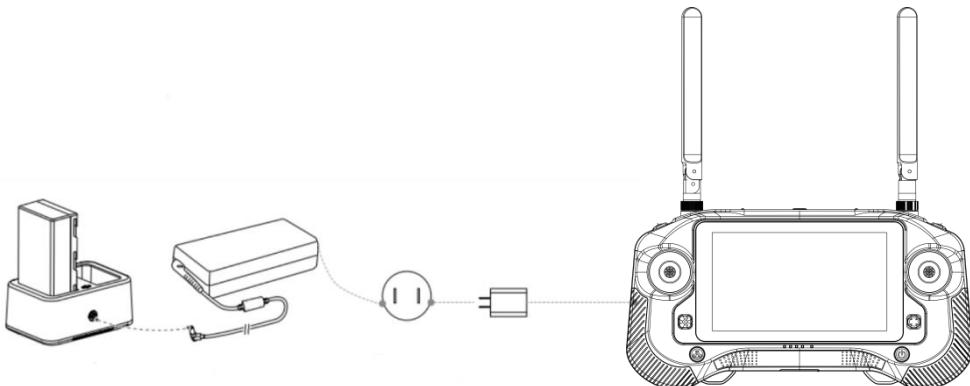
3.2.3 Install RTK marker

If users use RTK planning to plan the operation area, users need to insert the RTK marker into the USB interface of the Remote controller.
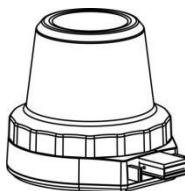
3.2.4 Adjust the antenna

Unfold the Remote controller antenna and adjust the antenna position. Different antenna positions receive different signal strengths. When the angle between the antenna and the back of the Remote controller is 80° or 180°, and the plane of the antenna is facing the aircraft, the signal quality between the Remote controller and the aircraft can be optimal.

When operating the aircraft, be sure to keep the aircraft within the best communication range. Adjust the orientation or distance between the operator and the aircraft in time to ensure that the aircraft is always within the best communication range.
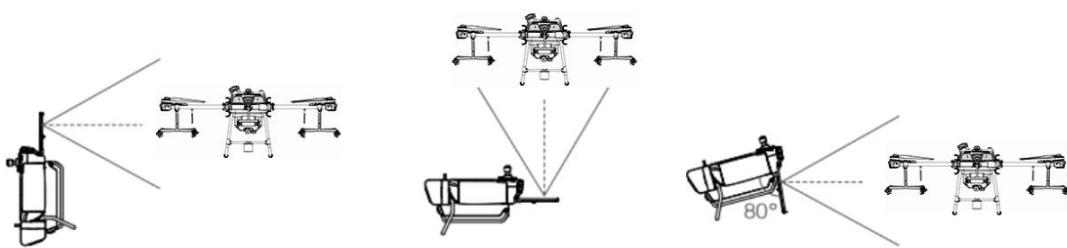
⚠ Do not use other communication devices in the same frequency band at the same time to avoid interference with the Remote controller signal.

If users use an RTK marker for RTK planning, users need to remove the module after the planning is completed, otherwise the communication performance of the Remote controller may be affected.

3.3 Prepare the Aircraft
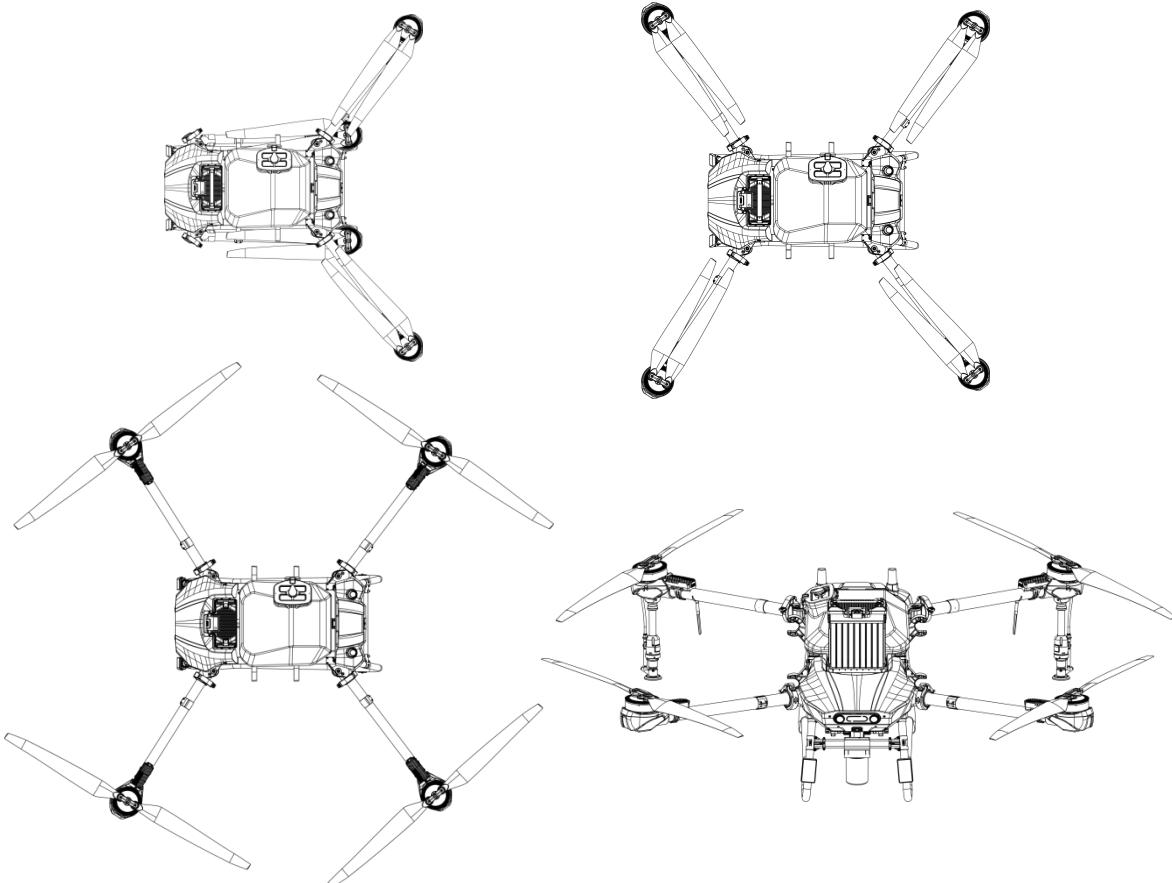
Unfold the M2 and M3 arms first, then the M1 and M4 arms in sequence; after all the arms are unfolded, make sure all 4 arm buckles are fastened.

When the buckle fastens the machine arm, users can feel a relatively large resistance. Press hard to lock the buckle.

Unfold the propellers individually.

Gently insert the battery into the battery compartment until users hear the battery click into place.

⚠ Make sure the battery is properly installed. Make sure the battery power is turned off when removing or inserting the battery.

To remove the battery, press the battery retaining buckle and then pull the battery upward to remove it.

If users need to fold the arms, please fold them in the order of M2 and M3 first, then M1 and M4, and make sure the arms are clamped into the storage clips on the side of the aircraft, otherwise the arms may be damaged.

3.4 Aircraft Components Name
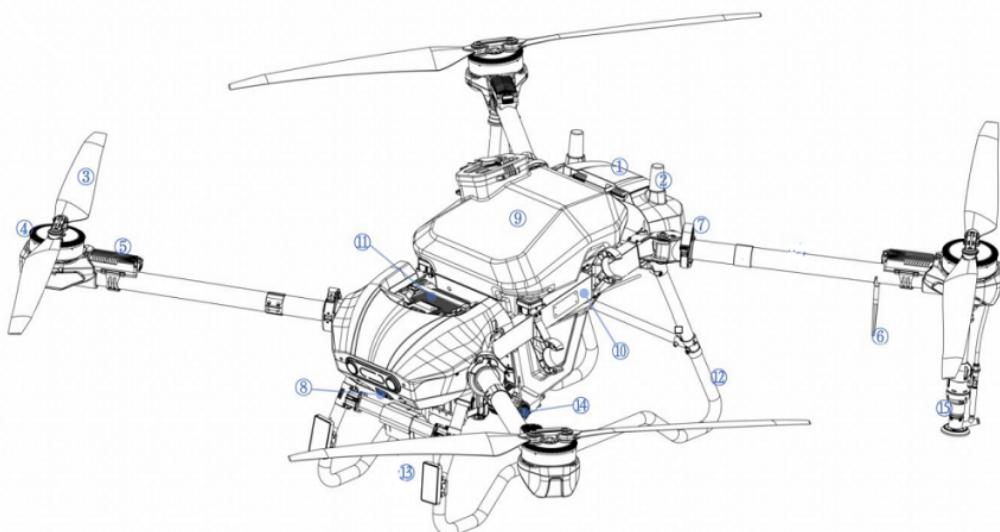
1	Avionics module	2	RTK antenna
3	Propeller	4	Motor
5	ESC	6	Transmission antenna
7	Arm lock	8	Front FPV camera
9	Spray tank	10	Rack
11	Smart battery	12	Tripod
13	Navigation lights	14	Impeller pump
15	Centrifugal nozzle	16	Arm carbon tube

3.5 Remote Controller Components Name

1	Antenna
2	Joystick
3	Back button
4	Five-dimensional button
5	Return button
6	Switch
7	Speaker sound hole
8	Touch screen display
9	Reserved thumbwheel
10	Operation flow adjustment thumbwheel
11	Spray switch1
12	Spray switch2
13	External RTK interface
14	SIM card slot
15	LORA interface
16	TYPE-C interface
17	Lanyard hole
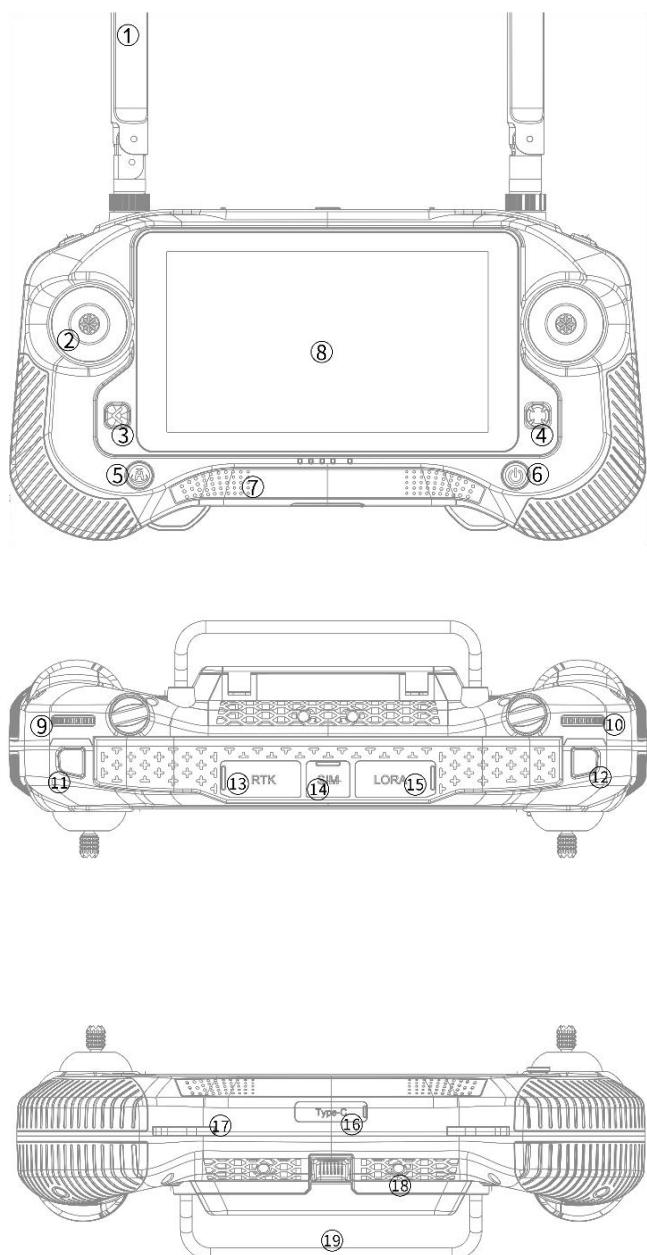
18	Vents
19	Handle
20	Air outlet
21	Customizable buttons
22	Battery cover
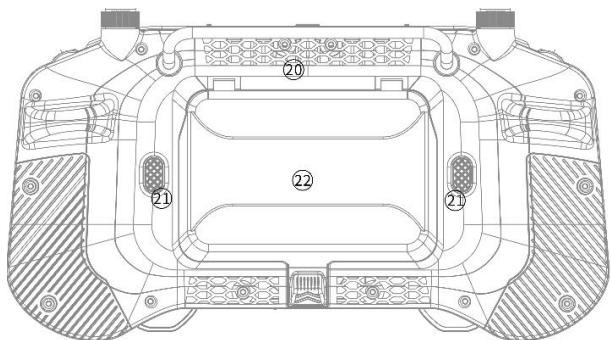
3.6 Activation

A new aircraft needs to be activated. Please turn on the Remote controller and aircraft power in turn, run the Huida Drone APP, and follow the instructions on the Remote controller display. An Internet connection is required during the activation process.

Turn on the Remote controller and aircraft power in turn.

Wait for the aircraft to complete the power-on self-test and automatically connect to the Remote controller. The Remote controller status indicator will light up green to indicate a successful connection with the aircraft.

Run the Huida Drone APP, click "Activate Aircraft" on the homepage, and follow the on-screen instructions to complete the activation of the aircraft.

During the activation process, follow the on-screen instructions to complete the real-name registration.

4 Flight Safety

4.1 Operating Environment Requirements

To avoid personal injury and property damage and to ensure the effectiveness of the operation, please operate in an environment with a wind speed of less than 6m/s. For herbicides, fungicides and insecticides that are prone to drift damage/toxicity, it is recommended to operate in

an environment with a wind speed of less than 3m/s.

Do not fly in bad weather, such as strong winds (wind speed 6m/s or above), rain (rainfall 25 mm or above in 12 hours), snow, fog, etc.

Choose an open area without tall buildings around as the flight site. Tall buildings will block the GNSS signal, causing the aircraft's positioning to deteriorate or even fail to locate.

When taking off, landing and flying, please pay attention to obstacles such as utility poles, high-voltage lines and trees, and stay away from roads, water, people and livestock.

Always fly within visual range and stay away from any obstacles, people, livestock, water, etc.

There should be no electromagnetic interference such as high-voltage lines, communication base stations or transmission towers in or near the operation area.

Do not fly above an altitude of 4.5km.

The flight load capacity will decrease with increasing altitude. For every kilometer increase in altitude, the take-off weight will decrease by 10%.

When flying above an altitude of 2km, the aircraft's battery and power system performance will deteriorate due to environmental factors, and flight performance will be affected. Please fly with caution.

Huida Drone APP will display the loading weight of the spray tank. The maximum weight of the material loaded by the user should not exceed the recommended value, otherwise it may affect flight safety.

Ensure that the GNSS signal is good and the RTK antenna is not blocked during operation.

Do not operate the aircraft indoors.

4.2 Flight Limit

Huida Technology has always emphasized flight safety. To this end, Huida Technology provides a variety of technical means to assist users in safely using the aircraft in compliance with local regulations. It is strongly recommended that users download and install the latest firmware in the assistant software to ensure that the flight restriction function can be used normally. The flight restriction function includes:

4.2.1 No-fly zone

No-fly zones include, but are not limited to, major airports, major cities/regions, and temporary event areas around the world.

Different levels of flight restrictions will be applied in different no-fly zones, including but not limited to: warnings, prohibited takeoffs, flight altitude restrictions, forced landings in no-fly zones, etc.

All flight-related functions will be affected to varying degrees when the aircraft is close to or in a no-fly zone, including but not limited to: when approaching a restricted flying zone, the aircraft will be decelerated, flight missions cannot be set, and ongoing flight missions will be interrupted.

4.2.2 Height and distance limit

1)Height limit

Keep the flight altitude below 30m, and keep the aircraft away from any tall buildings when flying.

Distance limit

The default maximum flight distance is 1km, and the maximum flight distance can be set to 2km. If the flight distance is too long, the remaining battery power of the aircraft may not be enough to return the aircraft, so please fly with caution.

4.3 Pre-flight Inspection

Make sure each device has sufficient power.

Make sure to use genuine parts from Huida Technology and that all parts are in good condition. If any parts are aged or damaged, please replace them before flying.

Make sure the propeller is not damaged, deformed, safe and secure, the surface is clean and free of foreign matter, and is correctly installed on the motor.

Make sure the propellers and arms are fully extended and the arm buckles are fastened.

Make sure the motor is clean and undamaged, installed tightly and can start normally.

Make sure the landing gear, spray tank and flight battery are

installed securely.

Make sure the surfaces of the RTK antenna and image transmission antenna are clean and unobstructed.

When the APP prompts to calibrate the compass, please calibrate it before flying.

Pilots and ground crew must wear helmets when operating and ensure a safe distance of more than 6m from the aircraft.

Make sure users are clear of debris in the operating environment that may affect flight, such as plastic bags, empty fertilizer bags, plastic films and other objects that are easily blown up.

Make sure the Huida Drone APP is running to assist with flight.

4.4 Calibrate Weigh Scale and Flow Meter

4.4.1 Calibrate the weigh scale

1)The following situations require weighing scale calibration:

First time use

After replacing the seed tank or spray tank.

The error between the actual operation area and the theoretical operation area is more than 10%.

2)Calibration steps

Empty the spray tank or seed tank.

Enter the APP operation interface, click Settings > Spray Settings/Spread Settings, and click the "Calibration" button to the right of the weighing scale calibration.

Click "Start Calibration" and the system will automatically perform calibration. Wait about 5 seconds and the calibration results will be displayed.

If the calibration fails, the system will prompt the reason for the failure. Follow the prompts to eliminate the fault and then recalibrate and wait for the calibration to be successful.

4.4.2 Calibrate the flow meter

1)The following situations require flow meter calibration:

First time use

Replace the solution with a different viscosity.

The error between the actual operation area and the theoretical

operation area is more than 15%.

2)Calibration steps

Add about 20L water to the spray tank.

Enter the APP operation interface, click Settings > Spray Settings, and click the Calibrate" button on the right side of flow meter calibration.

Click "Start Calibration", the system will automatically perform calibration and display the calibration results.

If the calibration is successful, normal spraying operations can be carried out.

If the calibration fails, the system will prompt the reason for the failure. Follow the prompts to eliminate the fault and then recalibrate and wait for the calibration to be successful.

4.5 Calibrate IMU and Compass

1)The following situations require IMU or compass calibration:

First time use.

The APP prompts that the IMU or compass needs to be calibrated.

It is recommended to calibrate the IMU and compass for long-distance transportation of more than 200km.

2)IMU calibration steps

Enter the APP operation interface, click Settings > Aircraft Settings, slide to the bottom, select "Advanced Settings", and select "IMU and Compass Calibration".

Place the aircraft horizontally and still, click the "IMU Calibration" button on the APP, the system will automatically perform calibration and display the calibration results.

If the calibration fails, the system will prompt the reason for the failure. Follow the prompts to eliminate the fault and then recalibrate and wait for the calibration to be successful.

3)Compass calibration steps

Enter the APP operation interface, click Settings > Aircraft Settings, slide to the bottom, select "Advanced Settings", select "IMU and Compass Calibration", and click "Compass Calibration"

Lift the aircraft to about 1.2m above the ground, then spin and fly

2-3 circles horizontally. If the APP prompts that the calibration is successful, the calibration is completed.

If the calibration fails, the user can try to tilt the aircraft and then rotate the aircraft horizontally. If the APP prompts that the calibration is successful, the calibration is completed.

If calibration still fails, restart the compass calibration.

4.6 Start/Stop the Motor

1)Start motor

Execute the Combined Sticks Command (CSC) below and hold it for 2 seconds to start motor. After the motor starts, release the joystick immediately and take off as soon as possible. If aircraft cannot take off immediately, do not execute the stick bend action to start the motor, otherwise the aircraft may become unbalanced, drift, or even take off automatically, causing personal injury or property damage.
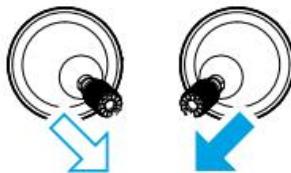
2)Stop motor

The motor can be stopped by:

After pulling down the throttle stick to make the aircraft land, pull the throttle stick to the lowest position and hold it. The motor will stop after 3 seconds.

Throttle stick (left stick for Mode 1)

⚠ High-speed rotating propellers are dangerous. When using them, keep a safe distance from the aircraft and keep the aircraft away from crowds, animals or other obstacles.

Before the aircraft motor stops, be sure to keep the Remote controller in your hand and ensure that the aircraft is fully under control.

During flight, do not stop the motors, otherwise the aircraft will crash. Unless there is a special situation (such as the aircraft may crash into crowds), it is necessary to stop the motors urgently to minimize damage.

After landing, please turn off the aircraft first, then turn off the Remote controller.

4.7 Basic Flight

4.7.1 Take off

Place the drone in a conspicuous and safe location on the operation plot, with the tail facing people .

After adding liquid pesticide or spreading material into the spray tank, close the lid tightly.

Turn on the Remote controller power switch , make sure the Huida Drone APP is running normally, and then turn on the aircraft. Make sure the aircraft is connected to the Remote controller normally.

Users must wear helmets and maintain a safe distance of more than 6m from the aircraft.

If users use RTK positioning, make sure the RTK function switch is turned on and select the correct RTK signal source (RTK mobile base station or network RTK service) . If users do not use RTK data, users can turn off the "RTK detection" function, otherwise the aircraft will not be able to start the motor when there is no RTK data.

Wait for the satellite search to ensure that the GNSS signal is good and the RTK positioning status is normal. After the RTK positioning is fixed, the inner eight poles are moved to start the motor. (If starting the motor fails , there will be a reason prompt or alarm on the APP interface. Follow the prompts to troubleshoot and try again. Just try again).

After the motor starts, push the throttle lever upward immediately to let the aircraft take off smoothly.

Choose the corresponding operation mode for operation as needed.

⚠ When flying for the first time that day, users need to confirm the Remote controller stick control and the aircraft response policy. If the

aircraft shakes or does not respond to stick movements during flight, please land immediately and eliminate the cause of the fault.

4.7.2 Safe parking

When users need to descend, make sure users have exited the operation. users can manually control the aircraft and slowly pull down the throttle stick to make the aircraft slowly descend to a flat ground.

After landing, pull the throttle stick to the lowest position and hold it for more than 3 seconds until the motor stops.

Make sure the motors are stopped before turning off the aircraft, and then turn off the Remote controller.

⚠ During flight, if the APP prompts that the aircraft battery is in a low battery state, users should fly the aircraft to a safe area and land as soon as possible, and then replace the battery; if the APP prompts that the aircraft battery is in a severely low battery state, the aircraft will automatically land on the spot.

During the automatic landing of the aircraft, if users need to use the stick to adjust the position of the aircraft, be sure to do so with caution.

5 Aircraft

5.1 Flight Gear

The aircraft has two flight gears: normal and attitude. Normal gear is used by default. If attitude mode is allowed in the APP, it can be switched through the flight gear switch on the Remote controller.

Normal (P) gear: Able to achieve precise hovering and positioning of the aircraft, and centimeter-level positioning can be obtained when using RTK.

Attitude (A)gear: Unable to achieve Fixed-point hovering, only attitude stabilization is provided. The flight speed of the aircraft in attitude mode is related to environmental factors such as wind speed.

Attitude Mode Notes

In attitude mode, the aircraft is easily disturbed by external factors, which will cause drift in the horizontal direction. Therefore, the aircraft itself cannot hover at a fixed point in this mode, and the user

needs to manually control the Remote controller to achieve hovering.

In this mode, the aircraft will not be able to locate itself and the control difficulty will be greatly increased. If users use this mode, users must be familiar with the behavior of the aircraft in this mode and be able to control the aircraft skillfully. When using it, do not fly the aircraft for a long distance to avoid the risk of losing judgment of the aircraft's attitude due to the long distance.

At the same time, users should avoid flying in environments with poor GNSS satellite signals, obstructions (such as near tall buildings), and narrow spaces to avoid passively entering attitude mode and causing flight accidents.

5.2 Operation Mode

The operation modes include route operation, AB operation, manual operation and enhanced manual operation mode. Users can select the corresponding operation mode for spraying or spreading according to different operation scenarios. See 7.4 operation mode chapter for more details.

5.3 Operation Recovery

If users exit the route operation or AB operation midway, the aircraft will record the breakpoint and the user can continue the operation through the operation recovery function. The operation recovery function is mainly used to replenish materials in the spray tank, replace the aircraft battery, or avoid obstacles during the operation.

5.3.1 Record breakpoints

During route operation or AB operation, if the GNSS signal is good, the following operations will cause the aircraft to record a breakpoint. If the GNSS signal is weak, the aircraft will enter attitude mode, exit the current operation, and record the position when the last GNSS signal was good as the breakpoint.

Click the "Pause" button in the lower right corner of the APP;

The aircraft enters the return process in any way;

The Remote controller's pitch or roll stick is moved;

When an obstacle is detected, the aircraft brakes suddenly and enters obstacle avoidance mode;

The aircraft has reached the flight limit or is about to enter a no-fly zone;

The spray tank is pesticide-free;

The aircraft triggers a low battery alarm;

When the connection between the aircraft and the Remote controller is disconnected, if "continue operation after loss of connection" is not turned on in the aircraft settings, the breakpoint will be recorded when the aircraft performs the behavior after loss of connection;

When something goes wrong with the spraying/spreading equipment.

⚠ Ensure good GNSS signal during the use of this function, otherwise breakpoints may not be recorded or returned to accurately.

The system will update the breakpoint each time any of the above conditions are met.

5.3.2 Continue the operation

Exit the operation through any of the above methods, and the aircraft will record the interruption coordinate point (i.e. breakpoint).

After the aircraft performs required operations (such as replacing the battery, refilling pesticide, or controlling the aircraft away from obstacles, etc.), control the aircraft to the appropriate position.

To select the return route of the aircraft, the user can select a breakpoint on the right side of the operation interface, or select a return point in the display list.

Click the "Continue" button in the lower right corner of the APP, the aircraft will fly to the breakpoint or the selected return point, and then continue the operation. The smart start function is supported when returning. The aircraft will return to the breakpoint through the added transfer point, or automatically bypass the added obstacles.

💡 If a transfer point is added before continuing the operation, click "Continue" and the aircraft will pass through the transfer point and reach the breakpoint after taking off.

If users call back the "in progress" plot, the transfer points added before the operation will be invalid. If users want to avoid obstacles, users can add transfer points again before continuing the operation.

After turning on the obstacle avoidance function, the aircraft will

detect obstacles when flying back to the breakpoint or return point. If the aircraft triggers obstacle avoidance hovering, the user needs to manually use the stick to control the direction of the aircraft, see "manual obstacle avoidance" below for more details.

5.3.3 Manual obstacle avoidance

During route operations and AB operations, if the aircraft triggers obstacle avoidance hovering, or other emergency situations occur (such as abnormal aircraft behavior), the user can control the flight direction of the aircraft through the Remote controller to manually avoid obstacles or handle emergency situations.
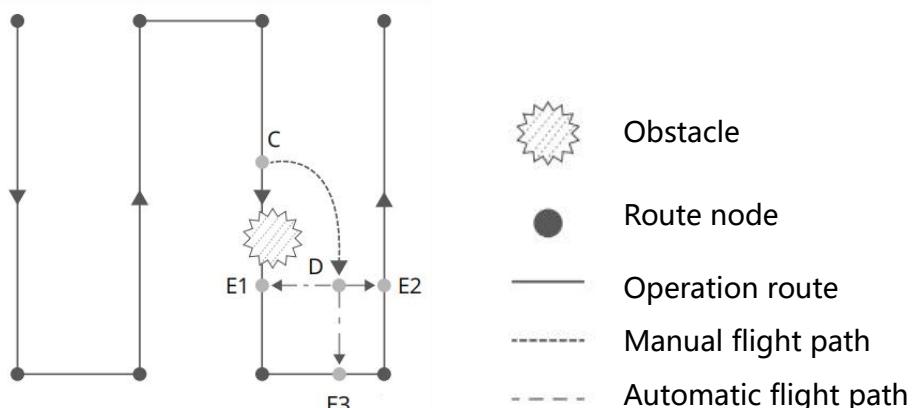
1)Exit route operation or AB operation

During the operation, if there are obstacles on the operation route that need to be avoided, control the left and right direction of the aircraft through the Remote controller (the Remote controller has a roll stick and a stick action), the aircraft will automatically exit the operation and record the breakpoint C, and then start to switch to manual operation mode.

2)Bypass obstacles

After switching to manual operation mode, the user can control the aircraft to bypass obstacles through the Remote controller, and fly to point D from point C when exiting the operation.

3)Continue operation

During the process of continuing the operation and returning to the original operation route, if an emergency occurs (such as obstacles on the return route, etc.), the above operations can be repeated.

⚠ The number and location of optional return points are related to the aircraft position and operation mode. For example, during route operations, there is no return point E3 on the non-spraying route. Please make your selection according to the APP prompts.

Ensure the safety of the aircraft, be sure to confirm that the aircraft has completed bypassing obstacles before continuing the operation, otherwise it will be dangerous.

When dealing with other emergencies, ensure that the aircraft returns to normal and then manually fly the aircraft to the correct position before continuing the operation.

In the list of breakpoints and return points displayed in the APP, select one of the return points E1, E2, and E3, and click the "Continue" button. The aircraft will fly from point D to the selected return point along the path perpendicular to the operating route, and then continue operation.

5.4 No-pesticide Warning

The aircraft will calculate the no-pesticide point based on the remaining pesticide threshold set by the user, the current pesticide amount in the spray tank, the current state of the aircraft and the operation parameters, and display it on the map. The user can set the aircraft behavior to hover or return after the spray is finished in the APP.

After materials are added to the spray tank or seed tank, this function is automatically turned on and the "no-pesticide point" icon is displayed on the map in real time.

5.5 Automatic Return

The aircraft has functions such as intelligent return, low battery return and loss of control return.

Home point: When armed and the GNSS signal is good, the aircraft's current position will be recorded as the home point.

Return: The process of the aircraft automatically returning to the return point is called return.

5.5.1 Intelligent Return

Smart RTH can be activated by pressing the RTH button on the Remote

controller. The process is the same as that of Failure RTH, except that the user can control the aircraft's altitude to avoid obstacles by using the sticks. After pushing the pitch stick or roll stick to exit Smart RTH, the user automatically regains control.

5.5.2 Low Battery Return

If the behavior after reaching low battery is set to return home in the smart battery settings of the APP, when the aircraft battery reaches the low battery threshold during flight, it will automatically suspend the operation and enter the return process. During the return process, the user can use the stick to control the height of the aircraft to avoid obstacles. After pushing the pitch stick or roll stick to exit smart return, the user automatically regains control.

If the behavior after reaching low battery is set to alarm in the smart battery settings of the APP, the aircraft will not enter low battery return.

5.5.3 Return after Loss of Control

Users can set the behavior of the aircraft after the Remote controller signal is lost in the APP to return to home, hover or land. If set to return home, when the aircraft successfully records the home point and the Remote controller signal is lost for more than 3 seconds, the flight control system will control the aircraft to fly back to the most recently recorded home point. If the Remote controller signal returns to normal during the return process, the return process will continue, but the user can control the flight through the Remote controller, and can cancel the return process by pressing the stick and regain control.

5.5.4 Safety Precautions for Automatic Return

1)GNSS signal

When the GNSS signal is poor (GNSS icon is red) or GNSS is not operation, automatic return cannot be used.

2)Landing protection function

The aircraft performs an automatic return process. When it reaches the home point, the aircraft triggers the landing protection function and remains hovering. The user can control the aircraft to a suitable ground through the Remote controller to ensure a safe landing.

⚠ When using RTK positioning and RTK is operation normally, the aircraft will land directly to the ground and will not enter the landing protection process.

When returning home out of control, the aircraft will land directly to the ground and will not enter the landing protection function.

5.6 Low Power Protection and Low Voltage Protection

The aircraft has low battery alarm, severe low battery alarm and low voltage alarm functions.

If the APP displays a low battery alarm, fly the aircraft to a safe area and land as soon as possible, and then replace the battery. If the behavior after reaching low battery is set to return, the aircraft will automatically return after a low battery alarm appears in the APP.

If there is a severe low battery alarm or severe low voltage alarm in the APP, the aircraft will automatically land on the spot. The user cannot cancel the landing, but can control the horizontal direction of the aircraft through the Remote controller.

🔅 The low battery threshold can be set in the APP.

5.7 RTK Function

The aircraft comes standard with airborne RTK. Compared with the compass module, the dual-antenna direction finding technology on the airborne side not only has higher accuracy, but also provides strong anti-electromagnetic interference capabilities, ensuring reliable operational flight in environments with strong magnetic interference such as high-voltage lines and metal buildings. Dual-antenna direction finding will be automatically enabled when the GNSS signal is good.

The aircraft cooperates with mobile base stations or network RTK services to obtain centimeter-level positioning, improving the accuracy of agricultural plant protection. The specific usage is as follows:

5.7.1 Enable/disable RTK function

Before each use of RTK positioning, check to ensure that the method of receiving RTK signals (mobile base station or network RTK service) is correctly selected. Otherwise, RTK positioning cannot be used. Enter the APP operation interface>Settings>RTK settings to view and set.

If users do not use RTK data, turn off the "RTK Detection" option,

otherwise the aircraft will not be able to take off without RTK data.

5.7.2 Use with mobile base stations

Refer to the documentation of the relevant equipment to complete the frequency matching between the aircraft and the base station and the installation of the base station.

Turn on the base station and wait for satellite search. When the RTK status icon above the APP operation interface is green, it means that the aircraft has acquired and used the RTK data of the base station.

5.7.3 Use with network RTK service

The network RTK service uses the Remote controller instead of the base station to connect to the designated network RTK server to send and receive RTK data. Please keep the Remote controller turned on and connected to the Internet at all times during use.

Make sure the Remote controller shows that the device is connected to the Internet.

Enter the APP operation interface > Settings > RTK Settings, and select the RTK signal source as "network RTK".

Wait for a connection to be established with the network RTK server. When the RTK status icon above the operation interface turns green, it means that the network RTK data has been acquired and used.

5.7.4 Customized network RTK service

When using a third-party service provider's network RTK service, follow the instructions below to set it up.

Make sure the Remote controller shows that the device is connected to the Internet.

Enter the APP operation interface>Settings>RTK settings, and select the RTK signal source as "Customized network RTK".

When using it for the first time, click "Edit", enter server-related parameters, and click "OK" when completed.

Wait for the connection to the server to be established. When the RTK status icon above the operation interface is green, it means that network RTK data has been obtained and used.

5.8 Flight Indicator Light and Night Light

5.8.1 Indicator light

The aircraft arms M1 to M4 are equipped with LED lights.

The LED lights on the arms M1 and M2 are nose indicator lights. During flight, the red light is always on to indicate the direction of the aircraft nose;

The LED lights on arms M3 and M4 are aircraft status indicator lights, which flash to represent the aircraft equipment status.

When the aircraft is not taking off, all indicator lights are off. When the aircraft is on the ground and the motors are running, the LED lights start to light up and flash as described above.

Definition of LED lights for M3 and M4

Unlock successfully, lock successfully	Green light stays on for 1 second
Unlock failed	Red light stays on for 1 second
IMU fierce vibration, abnormal data, IMU not calibrated	Yellow light flashes slowly
Remote controller signal lost	Yellow light flashes slowly
No GNSS	Red light flashes slowly
With GNSS	Green light flashes slowly
After enabling the RTK function, RTK does not locate	Yellow light and green light flash alternately
The compass data is abnormal and the compass is not calibrated.	Red lights flash alternately
IMU level calibrating	Yellow light stays on
IMU calibration successful	Green light stays on for 1 second
IMU calibration failed	Red light stays on for 1 second
Compass leveling	Green light stays on
Compass calibration successful	Green light stays on for 1 second
Compass calibration failed	Red light stays on for 1 second
Remote controller pairing	Yellow light stays on
Remote controller pairing successful	Green light stays on for 1 second
Remote controller pairing failed	Red light stays on for 1 second

5.8.2 Night light

Users can choose to equip the aircraft with night lights to improve the operation safety at night. Enter the Huida Drone APP operation interface and turn on or off the night lights in the settings.

💡 Do not shine the night lights directly into eyes to avoid potential eye damage from the strong light.

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6 Remote Controller

6.1 Remote Controller Joystick Mode

Before using the Remote controller stick to control the aircraft, users need to clarify the current aircraft stick mode to ensure flight safety. The Remote controller stick modes are divided into Mode 1, Mode 2 and Mode 3, as shown in the figure below.

Mode 1
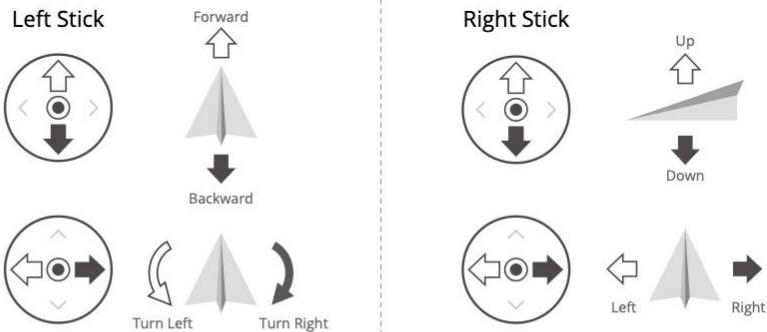
Mode 2
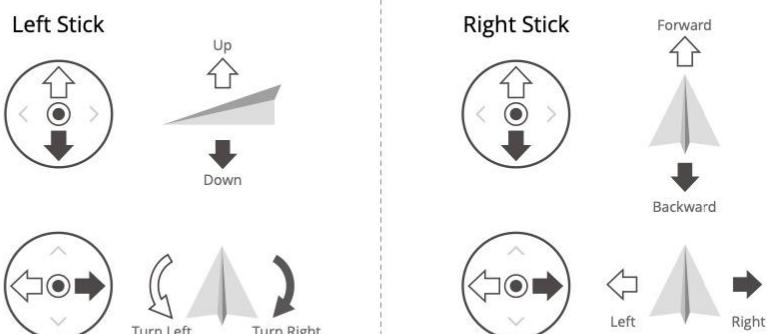
Mode 3
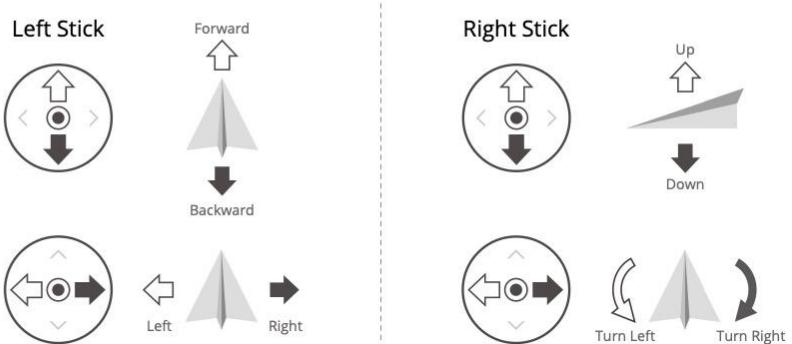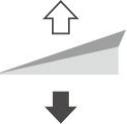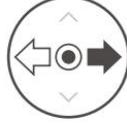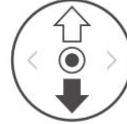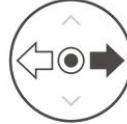
This manual uses Mode 1 as an example to explain how to control the Remote controller.

Joystick return to center/neutral position: The joystick of the Remote controller is in the middle position.

Joystick amount: The amount by which the Remote controller joystick deviates from the joystick center position.

Remote controller	Aircraft	Control method

Left joystick		The throttle stick is used to control the aircraft's ascent and descent.
		Push the stick up to raise the aircraft. Pull the stick down to lower the aircraft. The aircraft's altitude remains constant in the middle position (automatic altitude setting).
		When the aircraft takes off, the throttle lever must be pushed up past the middle position before
Left joystick		The yaw stick is used to control the heading of the aircraft.
		If users push the stick to the left, the aircraft will rotate counterclockwise. If users push the stick to the right, the aircraft will rotate clockwise.
		The rotation angle is zero when in the neutral position, and
Right joystick		The pitch stick is used to control the aircraft's forward and backward flight.
		Push the stick up, the aircraft tilts forward and flies forward.
		Pull the stick down, and the aircraft tilts back and flies backward.
		In the neutral position, the aircraft's front and rear
Right joystick		The roll stick is used to control the aircraft to fly left and right.
		Move the stick to the left, the aircraft will tilt to the left and fly to the left.
		Pull the stick to the right, the aircraft will tilt to the right and fly to the right. In the neutral position, the left and

6.2 Remote controller Joystick Calibration

The Remote controller has been calibrated before leaving the factory. In daily use, if the rocker does not return to the center or has a large offset, users can calibrate the rocker.

Calibration process:

Enter the APP operating interface>Settings>Remote controller Settings and click the "Calibrate" button;

Follow the APP prompts and move the left and right joysticks to their maximum stroke;

After the APP prompts that the calibration is successful, complete the calibration.

6.3 Remote controller Pairing

At the time of factory release, the Remote controller has been paired with the built-in receiver of the aircraft. Upon powering on, it is ready to use. If replacing the Remote controller, re-pairing is required before use.

Pairing process:

Turn on the Remote controller, run the Huida Drone APP, and then turn on the aircraft power;

Enter the APP operation interface > Settings > Remote controller settings and click the "Pairing" button;

Lift the aircraft's No. 4 arm and tilt the aircraft forward over 20°;

If the pairing succeeds, the APP prompts "Aircraft is connected"; if the pairing fails, users need to re-enter the pairing state to perform the pairing.

7 Huida Drone APP

Huida Drone APP is designed for agricultural applications. Users can get real-time information about the status of the aircraft, operating system, and other devices connected to the Remote controller. The APP has a built-in intelligent planning operation system. Users can use the system to intelligently plan plots in the APP, and the aircraft will automatically perform operations.

7.1 Main Interface
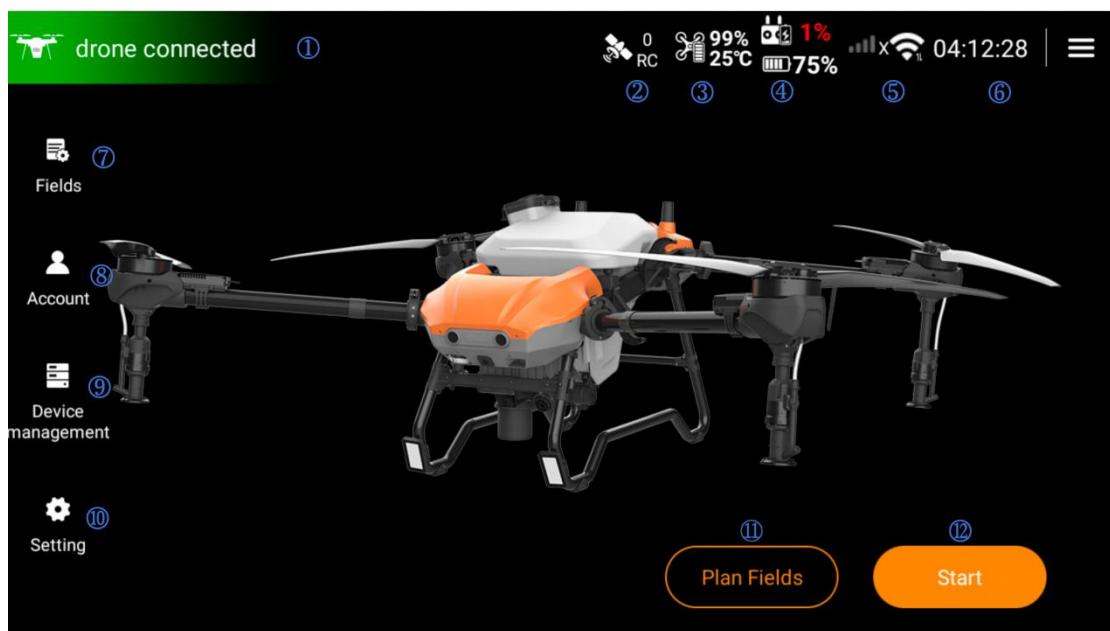
1)Aircraft and Remote controller connection status

Included status: Aircraft connected, Aircraft not connected

2)RTK marker access status

Display the satellite number searched by the Remote controller GPS or RTK marker

3)Flight battery power

Display the flight battery power in real time.

4) Remote controller battery power

Display the remaining battery power of the Remote controller in real time.

5)network connection status

Display the network connection status of SIM card and WIFI respectively.

6)Time

Display the current time.

7)Plot management

Manage the plot data planned by the currently logged-in local user on the Remote controller.

8)Account

Users can view their account information, team information, operation record statistics and details.

9)Device management

Manage aircraft, Remote controller, battery, charger, RTK mobile station, RTK module, firmware update, etc.

10)Settings

General settings

11)Plan plots

The plot information planning carried out before the route operation can plan the operation plot information, obstacle information, non-operation area information, etc., including aircraft planning, RTK planning and map planning.

12)Start operation

Click the "Start" button to enter the operation interface, where users can check the aircraft status and perform operation operations. The default is manual operation mode, which can be switched to different operation modes such as route operation, AB operation, auxiliary manual operation and manual operation.

7.2 Plan Plots

7.2.1 Add plots

Click the "Plan Plots" button on the main interface to enter the operation interface. The following is an explanation of adding a plot.
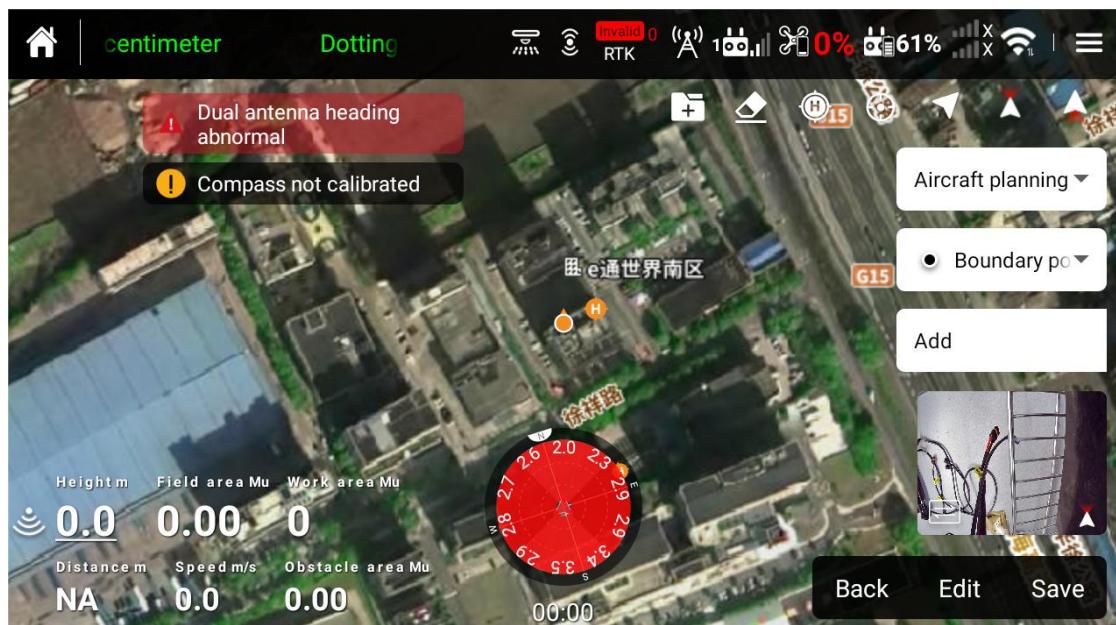
1)Select a planning method and add plots.

　　Select "Boundary Point" and the planning method defaults to map planning. Drag the map and click "Add" to add a boundary point at the location of the crosshair on the map interface. If users choose RTK planning or aircraft planning, users need to hold the Remote controller to the corresponding location or control the aircraft to fly to the corresponding location, and then click Add.

　　If users need to edit the added points, click to select and drag the points to move, or click the delete button to delete.

2)Mark obstacles

　　Select "Obstacle", drag the map to locate the crosshair in the corresponding position, and click "Add" to mark the obstacle boundary point.

　　Three or more obstacle boundary points form an obstacle plot.

　　Select "Circular Obstacle", click "Add", and a red circle will appear at the crosshair. After clicking on the center of the circle to select it, drag to adjust the position of the obstacle; after clicking on the small red dot on the circumference to select it, drag to adjust the radius of the obstacle.

3)Set up the route

　　After planning the plot, the route is automatically generated. The green dot on the route indicates the starting point of the route, and the

yellow dot indicates the end point of the route. The following settings can be made for the route:

Modify the starting route: Double-click a boundary line to adjust the route direction to be parallel to the boundary line. Click a point on the boundary line to switch the starting point of the starting route.

Operation row spacing: Set the distance between generated routes.

Land Retraction: Set the distance that the route shrinks inward relative to the boundary of the operating area; select Single-side Retraction to set the distance that the route shrinks inward relative to the selected boundary line.

Obstacle margin distance: adjust the distance between the route and the edge of the obstacle.

Route division: Set the route division point to perform route operations in sections.

4)Click Save and name the operation route. After saving, users can view the newly added plot in the plot list.

7.2.2 Edit plots

After selecting the plot in the plot list, click Edit to edit the plot, which is the same as the operation in planning the plot. In addition, the "plot cutting" function can also be used to divide the plot into multiple operation areas and set operation parameters respectively. After editing is complete, click Save.

7.3 Start the Operation

Click the "Start" button on the main interface to enter the operation interface.

1) Return to homepage

Return to the homepage of Huida Drone APP.

2) Status prompt bar

Displays the current status of the aircraft, and displays the operating mode during normal flight operations. Text prompts will appear in this column for low battery, low pesticide, low number of satellites, or other sudden real-time status.

3) Operation scenario

Field or fruit tree scenes can be switched.

4) Operation status icon

Display the real-time on or off status of spreading or spraying operations.

5) RTK status

Real-time display of RTK status, including fixed, single point, and unfixed, and displayed in green, yellow, and red respectively.

6) RTK base station

Real-time display of RTK base station, mobile base station, and network RTK connection status, including connected and unconnected, displayed in white and gray respectively.

7) Remote controller connection status

Display the wireless connection status between the Remote controller and the aircraft in real time, and display the signal strength in the form of a signal grid. Front 1, 2, and 3 respectively represent different joystick modes.

8)Remote controller battery

The Remote controller battery level is displayed in real time as a percentage. When the battery level is lower than 20%, it will be displayed in red numbers to remind users to charge it in time.

9)network connection status

Display the Internet connection status in real time, and display the network status of SIM1, SIM2 and WIFI connection respectively.

10)Remaining material display

Real-time display of the volume or weight of the remaining material.

11)Setting

Click to enter and set parameters for the flight platform, Remote controller, operating system, battery and other systems.

12)Map operation shortcut buttons

It includes a map route deletion button, an aircraft map centering button, a map fixation and map movement switching button, a front and rear FPV interface switching button, etc.

13)Operation mode switch button

The aircraft operation mode can be switched, including manual operation, assisted manual operation, and AB operation.

14)Plot List

Displays a list of planned plots that can be used for operation calls.

15)One-click takeoff/landing button

Autonomous take-off and landing buttons.

16)Real-time flight and operational data

Real-time display of aircraft speed, altitude, distance, flow rate and operating area data.

17)Image/map toggle button

One-click switch between FPV image interface and map interface

18)Start button

Click the start button in manual operation mode to start calculating the operation area.

7.4 Operation Mode

7.4.1 Route operation

After completing plot planning and route planning, users can directly

call plots to perform route operations. Or users can select and call plots from the plot list on the operation interface to perform route operations.

Operating procedures:

1)Place the aircraft near the operating area, users face the aircraft tail, and turn on the Remote controller and the aircraft in sequence.

2)Enter the APP operation interface, click the Plot List button on the left side of the screen, select the corresponding plot in the plot list, and click the Call button.

3)In the operation settings menu, relevant operation parameters can be set.

4)Route adjustment

If there is a deviation between the planned plot and the actual operation area, users can click "Correct Offset" and adjust the plot position through the fine-tuning button.

Drag the map to add a transfer point where the crosshair is. The transfer point can be used in conjunction with the smart departure feature to adjust the departure route to avoid obstacles that were not marked when planning the plot.

5)Click Execute, check the aircraft status and operation settings, set the appropriate departure/return altitude and speed, then slide the slider, the aircraft will automatically take off and perform the operation.

The departure/return altitude and speed set here are synchronized with the parameters in the aircraft settings. If users modify any setting, the value of the other will also be updated synchronously.

When users click "Execute" to automatically take off and start the operation, the aircraft will reach the first waypoint according to the set departure altitude.

If users call the operation after manual takeoff, the aircraft will reach the first waypoint according to the current altitude.

Ensure that there is open space near the take-off point and set appropriate departure/return altitudes according to the operating environment.

During the operation, the aircraft will not start the operation when flying along the transitional routes between the spraying operation routes and non-operation areas, and will automatically start the operation when flying on other routes. Users can adjust the operation amount, flight speed, relative crop height, etc. in real time on the APP interface.

During the operation, the user can pause the operation by moving the roll stick or pitch stick. The aircraft will hover in place and record the breakpoint. At this time, the user can freely control the aircraft. After that, click the "Continue" button in the lower right corner of the APP, the aircraft will fly to the selected return point and then continue the operation. When flying back to the breakpoint, be sure to pay attention to flight safety.

Users can set the after-operation action of the aircraft in the APP.

7.4.2 AB point operation

Select AB point operation in the operation interface/operation mode. The aircraft can fly and operate along a specific route after dotting. During the operation, the operation efficiency can be adjusted in real time on the APP interface. This mode is suitable for operations in large areas with few obstacles and regular plots.

Operating procedures:

1)Set operation parameters

Set parameters such as operation amount, flight speed, operation row spacing, relative crop height, etc.

2)Record points A and B

Fly the aircraft to point A or B and hover, press the A or B button on the APP interface, and point A or B will appear on the map, indicating that the recording is successful. If users need to adjust the angle, users must adjust the angle of point A after recording point A, and then record point B and adjust the angle of point B.

⚠ While flying from point A to point B, the aircraft will automatically spray pesticides.

Be sure to record point A first, then point B, and the distance between

points A and B must be over 5m.

If there is no pesticide in the spray tank or the flight speed is over 0.4m/s, points A and B cannot be recorded.

After the A and B points are recorded, the position cannot be adjusted. If adjustment is required, a new A and B point operation must be started again.

When recording points A and B, try to ensure that the AB direction is parallel to one side of the polygon of the operation area to achieve the best operation effect.

3）Adjust the angles of points A and B

After successfully recording point A or B, click the A or B angle button on the APP interface, and then move the yaw lever of the Remote controller. The yaw angle of the aircraft is the angle of point A or B. A dotted line will be displayed on the map to represent this angle. Click the A or B angle button again to set the current angle to the angle of point A or B.

4）Select route direction

After successfully recording points A and B, the APP will generate a rightward route R or Rn by default. Click this button to switch the direction and generate route L or Ln.
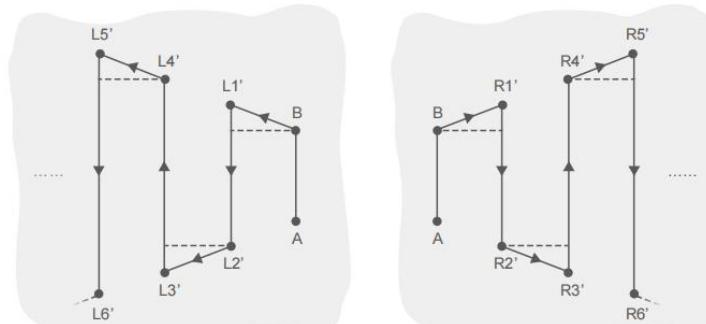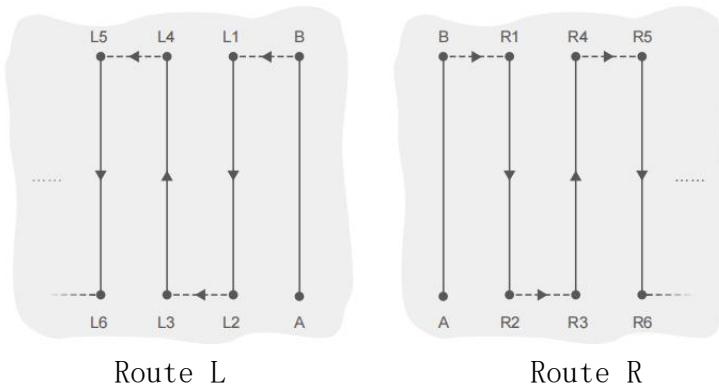
        Route L   Route R

Route Ln   Route Rn

5）Execute operation

Click the execute button and slide the slider to automatically execute the operation.

⚠ During operation, ensure that the aircraft is within the achievable range.

During operation, ensure that the GNSS signal in the operating area is good, otherwise the operation task will not be successfully completed.

If users use the pitch or roll stick to control the aircraft during operation, the aircraft will automatically switch to manual operation mode and hover after responding to the corresponding joystick action. If users need to continue the AB point operation, click "Continue" in the lower right corner of the APP, and the aircraft will fly back to the operation route from the current position.

During the operation, the aircraft will automatically start the operation when flying on a route parallel to AB, and will automatically close the operation when flying on other routes.

7.4.3 Manual operation

This mode is suitable for operations in irregular areas or small areas. After selecting manual operation in the operation mode search page, the aircraft enters manual operation mode.

In this operating mode, the flow rate and droplet size can be set, and the maximum flight speed can be limited. At this time, users can control the aircraft to the area where the operation is required, and then start the operation through the operation button on the Remote controller. During operation, the operation flow rate can be adjusted through the Remote controller buttons.

7.4.4 Enhance manual operation

The operation mode button on the operation interface can select to enhance manual operation.

In this mode, the operating amount, droplet size, flight speed, relative crop height and operating row spacing can be set. When changing

rows, users can use the buttons on the left or right side of the interface to make the aircraft automatically fly left or right by one operation row spacing. The aircraft automatically turns on the operation when it has speed in the forward and backward flight directions, and automatically turns off the operation when flying left and right.

⚠ If the height-setting function is turned on, the relative height of the aircraft to the crops will remain unchanged as long as the operation conditions are met.

After turning on "Heading Lock", the aircraft's route is locked to the current nose direction. Users can control the aircraft to fly in all directions, but the aircraft's heading is uncontrollable.

During operation, the operation amount, flight speed, and relative crop height can be adjusted, but the operation row spacing cannot be adjusted.

8 List of Hazards and Risks and Countermeasures

Agricultural drones are not used in accordance with the operating requirements or are operated blindly, there will be hidden dangers. The specific dangerous situations and countermeasures are as follows:

Dangerous areas	Responses
Propeller	Keep a safe distance (more than 10m) when the propeller is rotating .
Motor	Keep a safe distance (more than 0.5m) when the motor is rotating without propellers installed ; keep a safe distance (more than 10m) when the motor is rotating with propellers installed .
Pesticide tank	Used pesticide boxes have pesticide residues and cannot be used to hold drinking water or the water inside cannot be used for washing .
Pesticides used	Pesticides should be used in accordance with the pesticide instructions or the guidance of technicians from the Plant Protection Department .

During operational flight	It is prohibited to fly in downtown areas; stay away from crowds and keep a safe distance (more than 10m) when operation in the field.
During pesticide spraying operation	The operation area is far away from the bee breeding area, and a distance of at least 60m is maintained according to the prevailing climate conditions.

9 Troubleshooting Instructions

Huida Drone APP will alarm about faults during use and prompt solutions.

Module	Alarm source	Wrong description	Suggested solutions
Power system	ESC	The input voltage of the ESC is too low. Continuing to fly will pose a greater safety risk.	1)Please wipe the battery interface and the rear interface board interface of the aircraft with a wet wipe, then restart the aircraft to see if the problem is eliminated; 2)If the problem still exists, please check whether the plugs at both ends of the ESC power adapter cable on the front arm of the ESC are loose or have water in them when the power is turned off, and re-plug or clean the plugs; 3)If the wire is corroded or damaged, please replace it; 4)If the problem persists, please replace the ESC or the aircraft rear interface board.
		ESC temperature is too high	1)Please cool down and clean the ESC casing, then restart the aircraft; 2)If the problem still exists after cleaning, please contact Huida agent for replacement.
		The ESC communication is abnormal. Continuing the flight poses a great safety risk.	1)Please check whether the plugs at both ends of the ESC communication cable are loose or have water seepage, and re-plug or clean the plugs; 2)If the ESC communication cable is corroded or damaged, please replace it.
	Motor	The motor is blocked and continuing to fly poses a great safety risk	1)Please check whether the motor is not rotating smoothly or the propeller is damaged or deformed. If so, please contact Huida agent to replace the motor or propeller; 2)If there are no problems mentioned above, please try restarting the aircraft.

		The motor output power is too high and continuing to fly poses a greater safety risk.	1) Please check whether the motor is not rotating smoothly or the propellers are damaged and deformed. If so, please contact Huida's agent to replace the motor or propellers; 2) If there is no problem as mentioned above, please try to restart the aircraft.
Avionics Module	IMU	The attitude sensor is abnormal and is not allowed to continue flying.	1) Please try to restart the aircraft or upgrade the aircraft to the latest firmware; 2) If the problem persists, please contact Huida's agent to replace the avionics module.
	Compass	The compass is abnormal and the flight is not allowed to continue.	1) Please try to restart the aircraft or upgrade the aircraft to the latest firmware; 2) If the problem persists, please contact Huida's agent to replace the avionics module.
	RTK	RTK positioning data is abnormal, please fly with caution	1) Please try to restart the aircraft or upgrade the aircraft to the latest firmware; 2) If the problem still exists, please contact Huida agent to replace the avionics module.
		The RTK secondary antenna signal is abnormal, and the RTK positioning and orientation functions are unavailable.	1) Please place the aircraft in an open and unobstructed environment; 2) Please check whether both ends of the RTK feeder are properly installed or corroded. If corroded, please contact a Huida agent to replace the cable; 3) If the problem still exists, please move the aircraft to another venue to avoid interference; 4) If the problem still exists, it may be caused by ionospheric flicker. Please shut down the aircraft and try again after 10 minutes; 5) If the problem still exists, please contact Huida's agent and try to replace the RTK sub-antenna

			first. If the problem persists, then replace the RTK module.
	Image transmission	The image transmission signal is poor and flights are not allowed.	1) Please try to restart the aircraft; 2) Please avoid obstruction between the Remote controller and the aircraft; 3) Please put the Remote controller antenna up; 4) If the problem persists, please contact a Huida agent to check the aircraft image transmission antenna or Remote controller.
Spraying system	Spraying system	The pump motor self-check is abnormal and cannot operate	1) Please try to restart the aircraft; 2) Please check whether the battery is installed properly; 3) Please check whether the plugs at both ends of the water pump signal line are loose or water has entered; 4) If the water pump signal wire is corroded or damaged, please replace the wire; 5) If the problem still exists, please contact Huida agent to replace the water pump motor; 6) If the problem persists, replace the interface board.

		The flow meter connection is abnormal, and the spray flow control accuracy is poor	1) Please check whether the plugs at both ends of the flow meter connection line are loose or have water in them, and re-plug or clean the plugs; 2) If the flow meter connection line is corroded or damaged, please contact Huida agent to replace the line; 3) If the problem persists, replace the flow meter.

10 Storage, Transportation and Maintenance

10.1 Storage and transportation

⚠ If aircraft transportation is required, please ensure that the battery has been removed from the aircraft, and fold the propellers and tighten them into the storage clips on the side of the aircraft before transportation.

If long-term storage or long-distance transportation is required, please remove the battery and spray tank from the aircraft, and make sure there is no liquid in the spray system.

10.2 Maintenance

In order to ensure that the product is in the best condition and reduce safety hazards, it is recommended to check and maintain the aircraft parts regularly. Please visit the official website to read the "Disclaimer and

Safe Operation Guidelines" and "Maintenance Manual and Warranty Terms" to learn about product cleaning, maintenance operations.

11 Specification Parameters

1)Parameters

Model	3WWDZ-U70A
Structure	Four axis
Dimensions	3305x3577x850mm (The arms are unfolded and the propellers are unfolded） 1270mm×880mm×880mm (Arm folding）
Maximum wheelbase	2628mm
Weight	69kg(inc.Battery) 54.5kg(excl.Battery)
Tank Capacity	70L
Hover accuracy	Enable RTK Positioning: Horizontal ±10 cm, vertical ±10 cm
Max configurable flight radius	2000m
No-load hover time	16min
Full load hover time	6min

2)Power System

Motor KV value	46(r/min)·V
Motor size	140*34mm
Motor rated power	4650W X 4
Rated speed	2000r/min
Main rotor diameter	1575mm(62in)
Number of main rotors	4
Main rotor material	Carbon fibre

3)Spraying System

Medicine box volume	70L
sprinkle type	Centrifugal sprinkle
Total number of nozzles	2/4 centrifugal nozzles
Maximum spray width	12 meters (operating height 3.5m±0.5m, flight speed 5m/s)

Atomized particle size	Centrifugal nozzle 50μm-500μm
Pump type	Magnetic Impeller Pump
Number of pumps	2
Maximum flow	30L/Min two centrifuges 40L/Min four centrifuges

4)Remote Controller System

Model	HD402
Image transmission	2.4/5.8G Dual band SRRC:>3Km CE:>3Km FCC:>2.5 KM (open space without interference,aircraft height 2.5m)
RTK module	GNSS: GPS/BeiDou/GLONASS Positioning accuracy: 0.5m +1ppm(RTK)
Monitor	6-inch touch LCD screen, resolution 1280*720
external batteries	2
Total battery life	》8hours
Charging power	External:33.6W/8.4V/4A*2

5) Camera System

Front	FPV camera
maximum resolution	1920*1080

Note:

When the flight speed is less than 5m/s and the spray width is less than 8m, the minimum pesticide application rate is 37.5L/ha.

When the flight speed exceeds 5m/s and the spray width exceeds 8m, the minimum pesticide application rate for this product is 15L/ha, otherwise it will affect the drone's operational endurance.

For product details, please visit the following URL to download the User Manual

www.huidatech.cn

The content may be updated without prior notice.

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FCC Statement

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and

(2) This device must accept any interference received, including interference that may cause undesired operation

FCC Radiation Exposure Statement for drone:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator& your body.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protec tion against har mful interference in a residential installation. This equipment generates,uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

—Reorient or relocate the receiving antenna.

—Increase the separation between the equipment and receiver.

—Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

—Consult the dealer or an experienced radio/TV technician for help.

RF Exposure Statement for remote controller:

This device meets the government's requirements for exposure to radio waves. This device is designed and manufactured not to exceed the emission limits for exposure to radio frequency (RF)energy set by the Federal Communications Commission of the U.S. Government.

The exposure standard for wireless devices employs a unit of measurement known as the Specific Absorption Rate, or SAR. The SAR limit set by the FCC is 1.6 W/kg. *Tests for SAR are conducted using standard operating positions accepted by the FCC with the device transmitting at its highest certified power level in all tested frequency bands. Although the SAR is determined at the highest certified power level, the actual SAR level of the device while operating can be well below the maximum value. This is because the device is designed to operate at multiple power levels so as to use only the poser required to reach the network. In general, the closer you are to a wireless base station antenna, the lower the power output.

For body worn operation, this device has been tested and meets the FCC RF exposure guidelines for use with an accessory that contains no metal and the positions of the device a minimum of 0mm from the body. Use of other enhancements may not ensure compliance with FCC RF exposure guidelines. If you do not use a body-worn accessory, position of the device a minimum of 0mm from your body when the device is switched on at its highest certified power level in all tested frequency bands.

The FCC has granted an Equipment Authorization for this device with all reported SAR levels evaluated as in compliance with the FCC RF exposure guidelines. SAR information on this device is on file with the FCC and can be found under the Display Grant section of http://www.fcc.gov/oet/fccid after searching on FCC ID: 2BBNT-HD402.