



Product Name	GAOTek Waterproof Pesticide Sprayer Drone
Product SKU	GAOTek-WD-278
Product URL	https://gaotek.com/product/gaotek-waterproof-pesticide-sprayer-drone/

Contact us: sales@gaotek.com

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Disclaimer

1. Before using this product, please read the "GAOTek Waterproof Pesticide Sprayer Drone User Manual" carefully. This User Manual has an important impact on you (including buyers and users) using this product safely and safeguarding your legitimate rights and interests. Once this product is activated and used, it is deemed that you have fully read, understood, understood, recognized, and accepted all the terms and contents.

2. This product is not suitable for use by persons under the age of 18 or persons with limited or no capacity for civil conduct or persons with mobility impairments as stipulated by law, nor is it suitable for use by persons who have not obtained the approval of GAOTek (or the current local laws and regulations, Used by persons with an unmanned aerial system operating license recognized by the policy. Please do not let children come into contact with this product. Please be particularly careful when operating in scenes where children are present.

3. This product is a multi-rotor drone, which is a plant protection drone manufactured by GAOTek. This drone is only suitable for the field of plant protection. Please be sure to read the " GAOTek Waterproof Pesticide Sprayer Drone User Manual" carefully before using the product to understand your legal rights, responsibilities, and safety instructions; otherwise, it may cause property damage, safety accidents, and personal safety hazards.

4. You promise to use this product only for legitimate purposes and within the scope permitted by law, and agree to the User Manual and any relevant policies and guidelines that GAOTek has formulated or may formulate in the future. You understand and accept that this product will automatically upload and save relevant flight records and data to GAOTek Server during use. If the flight records and data cannot be uploaded and saved due to your fault, resulting in the inability to complete the analysis of the flight records and data, GAOTek will not bear any responsibility.

5. To the maximum extent permitted by law, GAOTek will not be responsible for any losses caused by your failure to operate the product and will not be responsible for any indirect, consequential, punitive, or LIABILITY FOR INCIDENTAL, SPECIAL, OR PUNITIVE DAMAGES, INCLUDING LIABILITY FOR LOSSES INCURRED BY YOU CONNECTION WITH YOUR PURCHASE, USE, OR INABILITY TO USE THIS PRODUCT, EVEN IF YOU HAVE BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

6. You understand that accidents may occur during the use of any product due to single or comprehensive factors such as improper operation, surrounding environment, network communication, etc. You

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understand that the aforementioned accidents are reasonable and acceptable situations during the use of the product. , GAOTek does not assume any responsibility for such unexpected events.

7. In any case, you should abide by the relevant laws and regulations of the national 2 region where the product is used. GAOTek does not assume any liability arising from the purchaser or user's violation of relevant laws and regulations.

8. The laws of some countries may prohibit liability exemption clauses, so your relevant rights may be different in different countries, but this does not mean that the contents of this statement are necessarily invalid.

9. This product relies on GAOTek's original accessories. GAOTek does not assume any legal responsibility for any losses and injuries caused by not using original accessories.

10. Within the scope permitted by law, GAOTek has the final right to interpret and modify the above terms. GAOTek has the right to update, revise or terminate the terms through GAOTek official website, online APP, and other channels without prior n.



1. Safety Instructions

(1) Before using this product, you must ensure that you have passed the course training on drone flight operations in accordance with the laws and regulations of the country or region where the product is used, and have legally obtained the corresponding plant protection drone operator certificate. Otherwise, you are not allowed to use it. any operation with this product.

(2) Do not fly alone in the beginner stage. It is recommended to obtain guidance and assistance from an experienced drone operator before flying and to be accompanied and assisted by an experienced drone operator during the flight.

(3) Before flying, you should carefully observe the surrounding environment to ensure that the operating area is open and not blocked by tall buildings or objects; ensure that there is no electromagnetic interference such as high-voltage lines, communication base stations or transmitting towers in or near the operating area; ensure that the operating area is away from obstacles and crowds. And eliminate all possible unsafe factors around you. Do not fly indoors.

(4) Before flying or after the product firmware upgrade is completed, it is recommended that you test-run the drone without propellers to check whether the remote control equipment, motors and other modules are operating normally. After confirming that everything is normal, install the propellers to avoid safety accidents.

(5) Before flying, please make sure that all parts are in good condition and replace aging or damaged parts in a timely manner; ensure that all equipment has sufficient power; if you find that the power is insufficient during operation, you should return to the flight in time and replace the battery.

(6) Before flying, please ensure that the communication environment in the flight area of the product is good and stable. The product must be able to function normally in a continuous and stable RTK and 4G network environment.

(7) Before flying, please make sure that the aircraft firmware and Smart APP have been updated to the latest version.

(8) You should strictly abide by the relevant laws and regulations regarding plant protection drones in the place where the product is used, and ensure that the drones fly under the premise of legal compliance, including but not limited to flight altitude, flight area, flight visual distance, etc.

(9) This product is recommended to be operated in sunny/cloudy/cloudy weather with wind power not exceeding Level 3. It is prohibited to use it in rain, snow, frost, thunder, hail, sand and strong winds, or in bad weather or in environments with strong magnetism and other interference.



(10) If the ambient wind speed is too high, rain, snow, hail, and other weather changes occur during the flight, or other situations where the operation cannot be continued, the drone should be hovered immediately and return home; if conditions for return are not met, the drone should immediately find a safe location nearby. And after hovering, fly to the nearest safe location. 2

(11) Please strictly follow the "GAOTek Waterproof Pesticide Sprayer Drone User Manual" to fly within the safe take-off weight, and do not overload the machine to avoid danger.

(12) Please use clean, impurity-free water to prepare the medicine, and filter the prepared medicine before adding it to the medicine box to prevent impurities from clogging the medicine delivery tube.

(13) Care should be taken during dispensing and spraying operations. It is recommended to use protective equipment to ensure that the human body is not in direct contact with the medicine to avoid damage to the machine and the human body caused by splashing medicine.

(14) Before spraying, please ensure that the propeller is not damaged, has no foreign objects, and is firmly installed, the blades are fully extended, the drone motor is clean and intact, and the spraying system is not clogged and can work normally.

(15) Before spraying, please ensure that the take-off location and route are open and away from crowds, and set appropriate take-off/return altitudes based on the operating environment.

(16) During dispensing and spraying operations, care should be taken to protect the environment, and pollution of rivers and drinking water sources is strictly prohibited.

(17) When operating, be sure to ensure that the drone is always within visual range and observe whether there are obstacles around the drone at all times. If the obstacle fails to meet the working conditions of the obstacle avoidance module (the obstacle avoidance function is affected by the material, size, shape, and location of the obstacle), the UAV will not be able to automatically avoid the obstacle in this case. Please Immediately operate the drone to fly around obstacles with the manual remote control.

(18) High-speed rotating propellers are dangerous and should be used away from people, animals, or other obstacles; do not approach or use them. If other objects come into contact with the rotating propeller and motor, do not wear loose clothing to avoid getting entangled with the propeller and causing injury.

(19) Do not disassemble or disassemble this product or plug or remove circuits when the product is powered on.

(20) When the battery power of the remote control or drone is lower than 30%, please charge it in time to prevent equipment damage caused by deep over-discharge of the battery caused by long-term storage



of low power. When the drone is not in use, please keep the battery power at 40% - 60% for storage to prevent long-term storage of low power from causing deep over-discharge of the battery and damage to the equipment. The storage environment should be kept dry, ventilated, and clean.

(21) Before using other tools to transport this product, be sure to remove the battery from the drone and place the battery alone in a safe and flat environment.

(22) This product should be kept away from heat sources to avoid damage to the electronic accessories or other parts of the product and risks such as fire.

(23) It is strictly prohibited to use the human body or animals (no matter static or dynamic), or other substances containing hazardous properties as obstacles for obstacle avoidance tests. 3

(24) Please do not use non-original accessories. The use of non-original accessories may seriously affect the safe use and service life of the drone.

(25) While the product is in flight, do not turn off the communication equipment connected to the drone. Do not make calls while working, or operate a drone while under the influence of alcohol or drugs.

2. Product Description

2.1 Introduction

GAOTek Waterproof Pesticide Sprayer drone has a modular design, a stable and durable carrier platform, and diversified operating modes. Smart spraying, smart sowing, and other agricultural execution links can achieve high efficiency and high quality operations.

The aircraft is equipped with ground imitation radar, obstacle avoidance radar, and FPV as standard.

The spraying system comes standard with 12 high-pressure nozzles and two 5L brushless water pumps, which can spray more evenly, with a spray width of 8~10m, and a maximum flow rate of 7L/min. The spraying efficiency is increased to 12 hectares/hour.

The spreading width of the spreading system is 6~10 meters, and the efficiency is increased to 7 hectares/hour. The GAOTEK plant protection drone is dustproof, waterproof, and corrosion-resistant, and the overall protection level can reach IP55.

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The H12 remote control uses a new Qualcomm processor, equipped with an Android embedded system, and adopts advanced SDR technology and super protocol stack. The maximum communication distance is 3 kilometers. Equipped with a 5.5-inch high-brightness display, operation fluency and stability are significantly improved. The 10000mAh built-in battery has an overall battery life of up to 6-8 hours, fully meeting the needs of long-term, high-intensity operations.

2.2 Aircraft part name



1. Medicine box/hopper
2. Front casing
3. Machine arm
4. FPV camera
5. Obstacle avoidance radar
6. Ground defense radar
7. Smart battery
8. Propeller
9. Water pipes
10. Motor
11. High pressure nozzle

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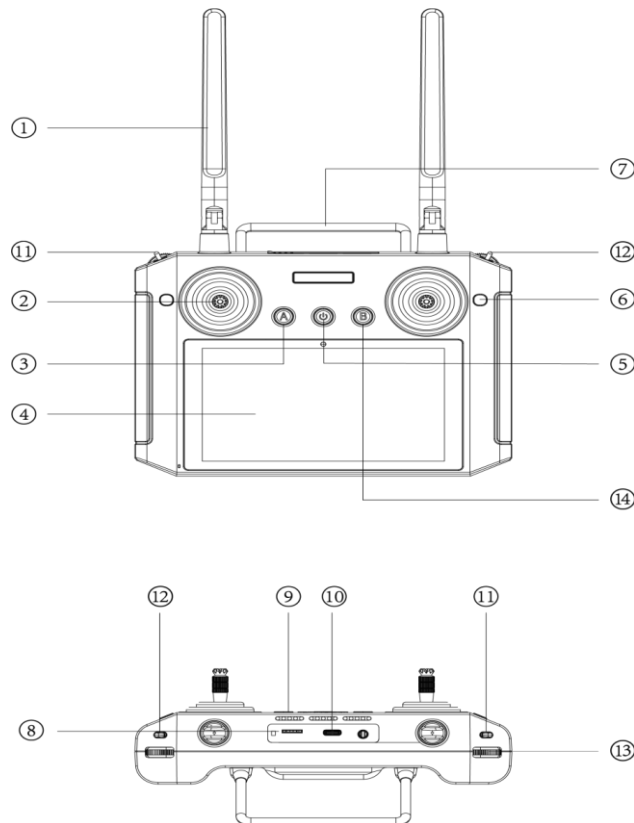


12. LED lights
13. Water pump
14. Aluminum alloy drone frame

The propellers of arms 1, 3, and 5 rotate counterclockwise (CCW), and the propellers of arms 2, 4, and 6 rotate clockwise (CW).

There are corresponding labels on the fuselage and arms, and their values represent the corresponding arm orientation numbers.

3. Remote Control Introduction





1. Antenna
Transmit aircraft control signals and image transmission signals.

2. Joystick
Control aircraft flight

3. Return
Short press the return button and the drone will execute the return command, and press it again to cancel the return.

4. Screen
Touch screen, click to make selections.

5. Power switch
Short press to unlock/lock the screen; long press to power on/off the remote control.

6. Spreading disc switch
Control the start and stop of the spreading disc in spreading mode

7. Handle
Fixed network dongle, easy to carry.

8. SIM card slot
SIM card can be inserted.

9. Speaker
Voice prompts.

10. Charging port
Charging and file transfer

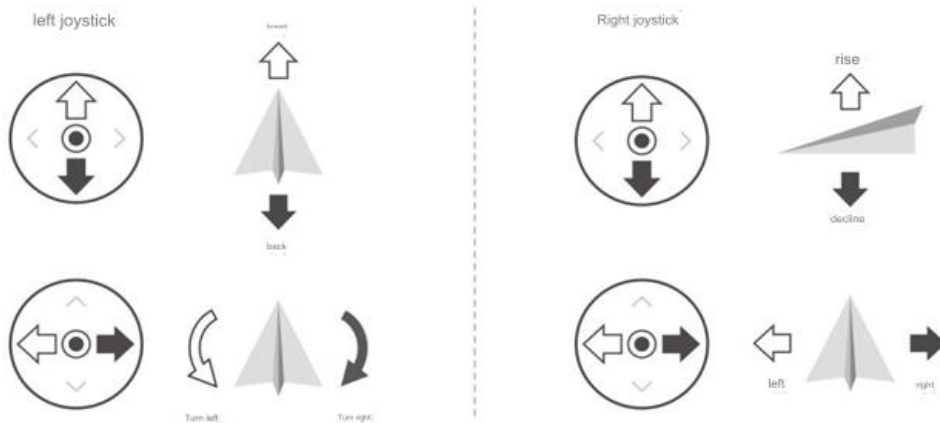
11. Airplane mode
Mode switching from left to right:
Attitude → GPS → AB operation

14. Spray mode: water pump and (centrifugal) nozzle switch
Spreading mode: hatch switch

3.1 Operating aircraft

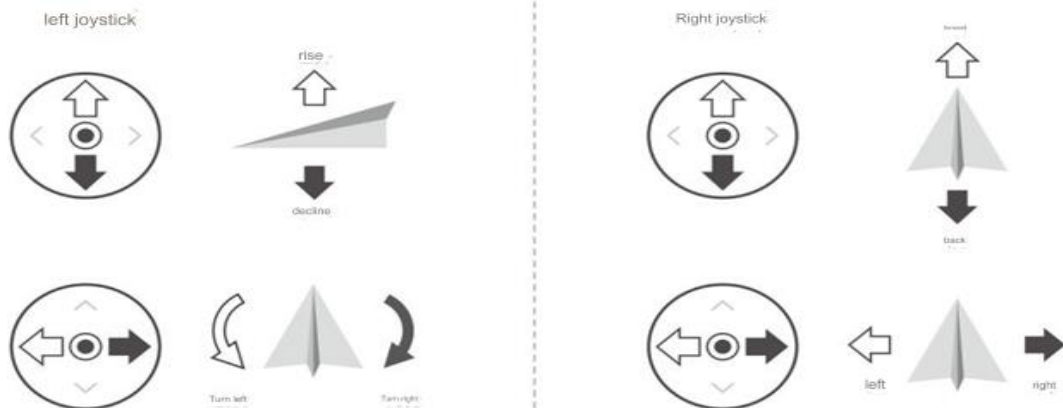
The remote control joystick modes are divided into the American hand, Japanese hand, and Chinese hand, as shown in the figure below:

Japanese hand





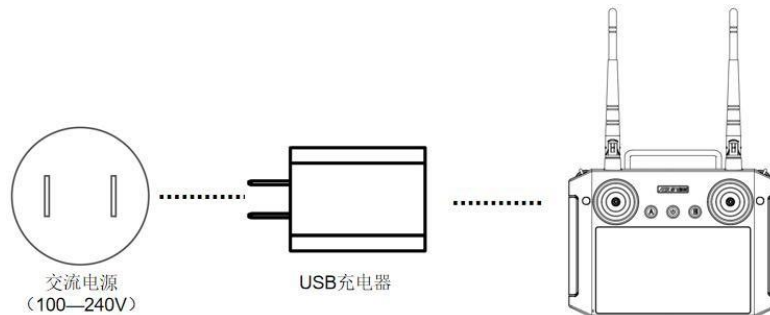
American hand



⚠ Drones are shipped from the factory as **American by default**.

3.2 Charge

Plug the Type-C data cable into the charging port of the remote control, plug the USB end into the adapter, and then connect to the power supply.



When using it for the first time, be sure to fully charge the remote control.

⚠ The charging equipment provided by GAOTek must be used for charging. If the user uses other equipment for charging without authorization, resulting in product failure or damage, the user will bear the corresponding responsibility. The device is not waterproof. Do not pour water or soak the remote control during charging and use. The user will bear the corresponding responsibility for product failure or damage caused by water entering the device.

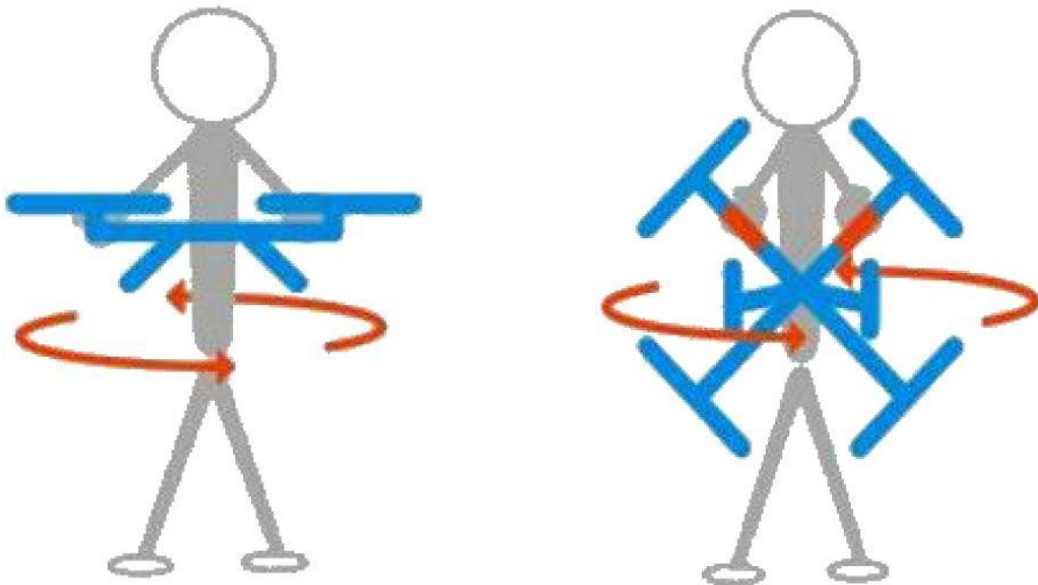


4. Plane preparation

4.1 Magnetic compass calibration

After the installation and inspection work is completed, you can go to the field for test flight testing. A magnetic compass calibration must be done before the test flight. Calibration Methods are as below:

1. Connect the remote controller, enter the flight calibration page in the APP, click the geomagnetic calibration button, the LED indicator light turns green, and enter the horizontal calibration mode.
2. Rotate and calibrate the aircraft horizontally until the LED indicator turns blue and enters vertical calibration mode.



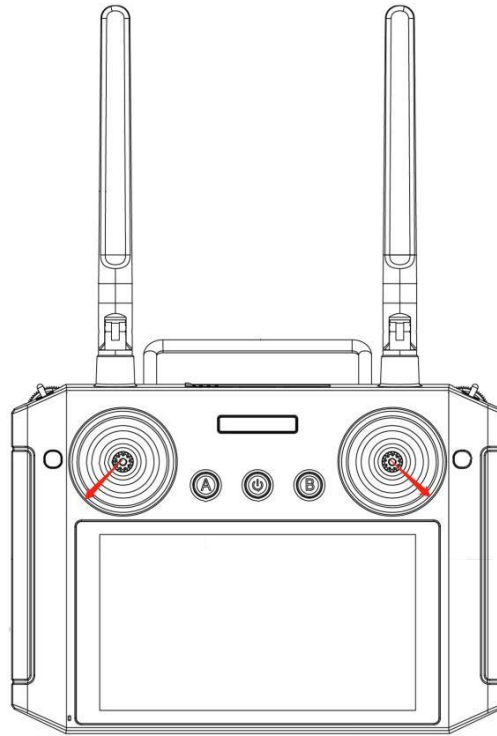
3. Point the machine head vertically upward and then rotate it. If the blue LED indicator light turns off and flashes, calibration is successful. If the LED indicator light turns red and stays on, the calibration fails and needs to be recalibrated.



5. Feature

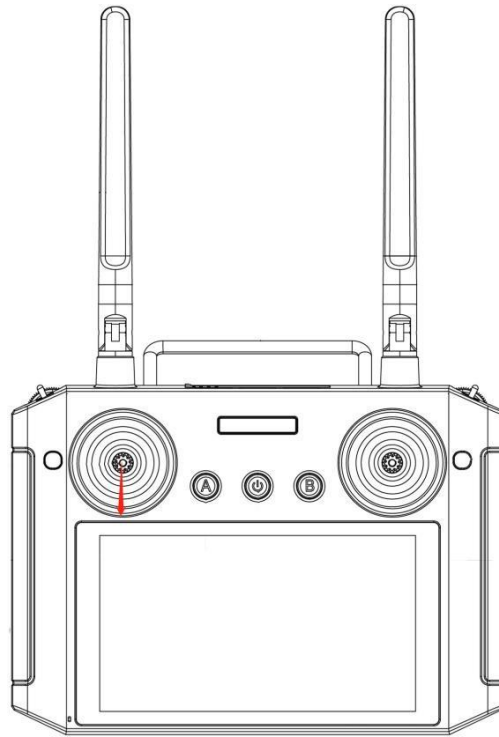
5.1 Unlock/Lock

Unlock: After the star search is good and there is no alarm display on the APP, use eight operations on the remote control to unlock the aircraft. After unlocking, the propellers will start to rotate.

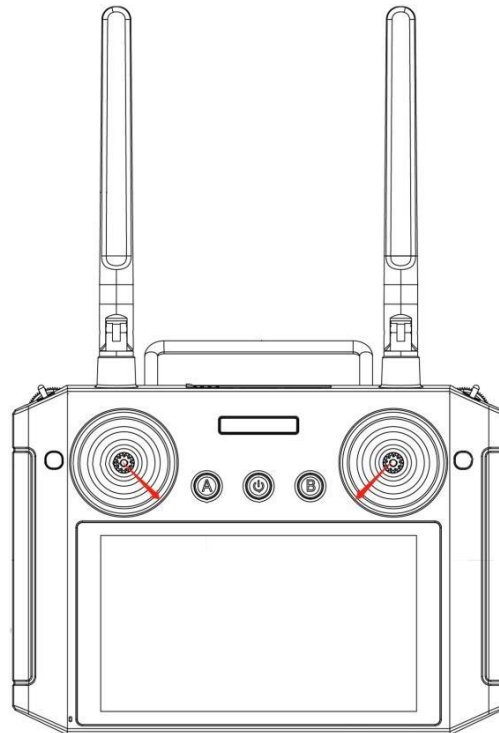


Lock:

- (1) After the aircraft lands, it will automatically lock when the throttle is lowered.



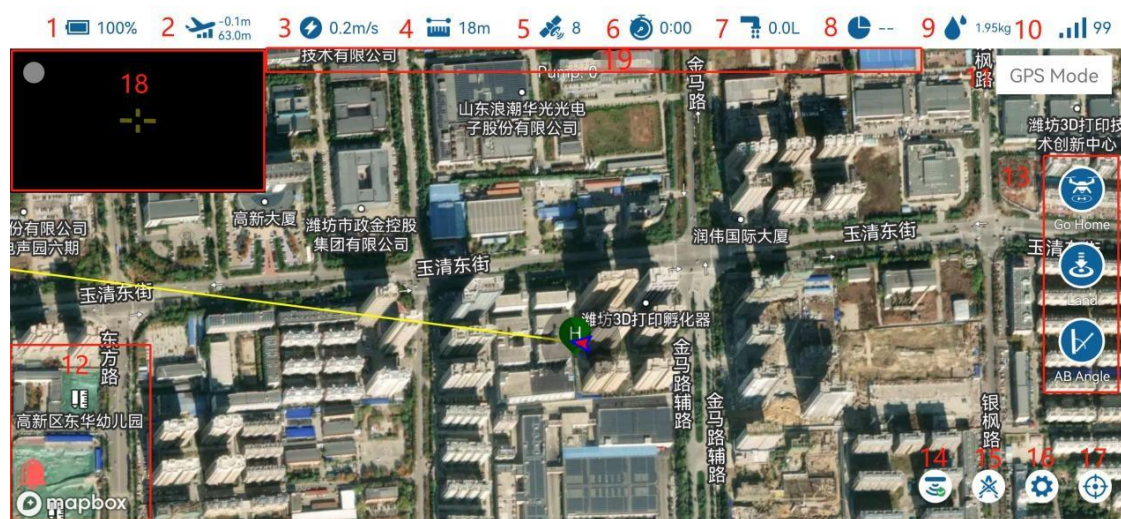
(2) Inside eight plus lock



Warning: The internal lock is effective at all times. It can also be locked while in the air. It is only used in emergencies.



6. APP page



- 1 : Battery level, click to display detailed information.
- 2 : Altitude information, the upper part is the height above the ground and the lower part is the altitude.
- 3 : Flight speed, horizontal speed.
- 4: Distance from home, distance from HOME point.
- 5: GPS star number, click the GPS star number icon to display satellite/radar information.
- 6: Flight time, restart when power is off.
- 7: Flow rate information, the flow rate of the liquid after turning on the water pump, unit L/min, click to adjust the speed of the centrifugal nozzle.
- 8 : Operating acres, the operating dosage of the current operating acres.
- 9 : Weighing module weight display.
- 10 : Signal quality, the quality of information communicated between the remote controller and the aircraft.
- 11 : Mode display bit, showing the current flight mode of the aircraft
- 12: Notification information bit, some notification information will be displayed through this box, and if there is no information, it will not be displayed.
- 13 : Command operation position, from top to bottom, return to home, landing, AB angle.
- 14 : Obstacle avoidance and ground defense switch button.

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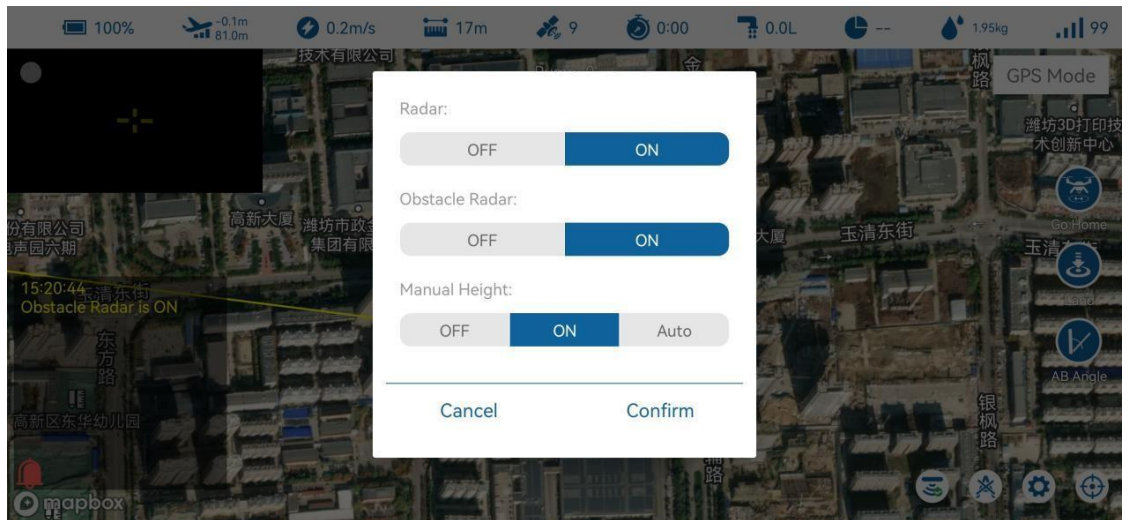
15 : Clear AB point.

16 : Enter the setting interface.

17 : One-click centering. 18:
FPV image.

19 : Alarm display bit, which displays the current alarm status of the flight control, such as voltage alarm, medicine outage alarm, etc. If there is no alarm information, it will not be displayed

6.1 Ground imitation/obstacle avoidance radar



Imitation ground radar:

It is installed in the medicine box and cannot be used during spreading operations. Imitation m ground height 1~10mThe modes are divided into three modes: off, controllable, and automatic. Controllable mode: The height can be adjusted at will. After the adjustment is completed, ground simulation will continue according to the current height. Automatic mode: Fly. according to the set altitude, and will return to the original altitude after adjustment.

Obstacle avoidance radar:

Detection distance

Safety distance: 8m

Note: When the distance from the starting point to the target point is $\leq 3\text{m}$, the obstacle avoidance function is not available.

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7. Manual work

- (1) Unlock takeoff
- (2) Turn on the water pump and sprinklers
- (3) free flight

8. AB Point Operation Mode

8.1 AB point operation

(1) Click the Clear AB point button in the manual operation interface of the APP or quickly toggle the F key of the AB point switch on the remote control 6 times

(dial the right to the left and then to the right once) to clear the last AB point information, ensure that there is no AB point inside the aircraft (if AB point exists, the LED will flash purple).

(2) Take off manually and fly to the first starting point. Dial the F key from the empty space (right side) to point A (middle). At this time, the coordinates of point A are recorded. After the point A recording is successful, the APP will announce that the point A recording is successful, and the LED light will flash 1 Purple light.

(3) The plane flies to point B. The water pump will automatically turn on during the flight. Dial the F key from point A (middle) to point B (left) to record the coordinates of point B. After the point B record is successful, the APP will announce that the point B record is successful. , the LED light will flash purple 2 times.

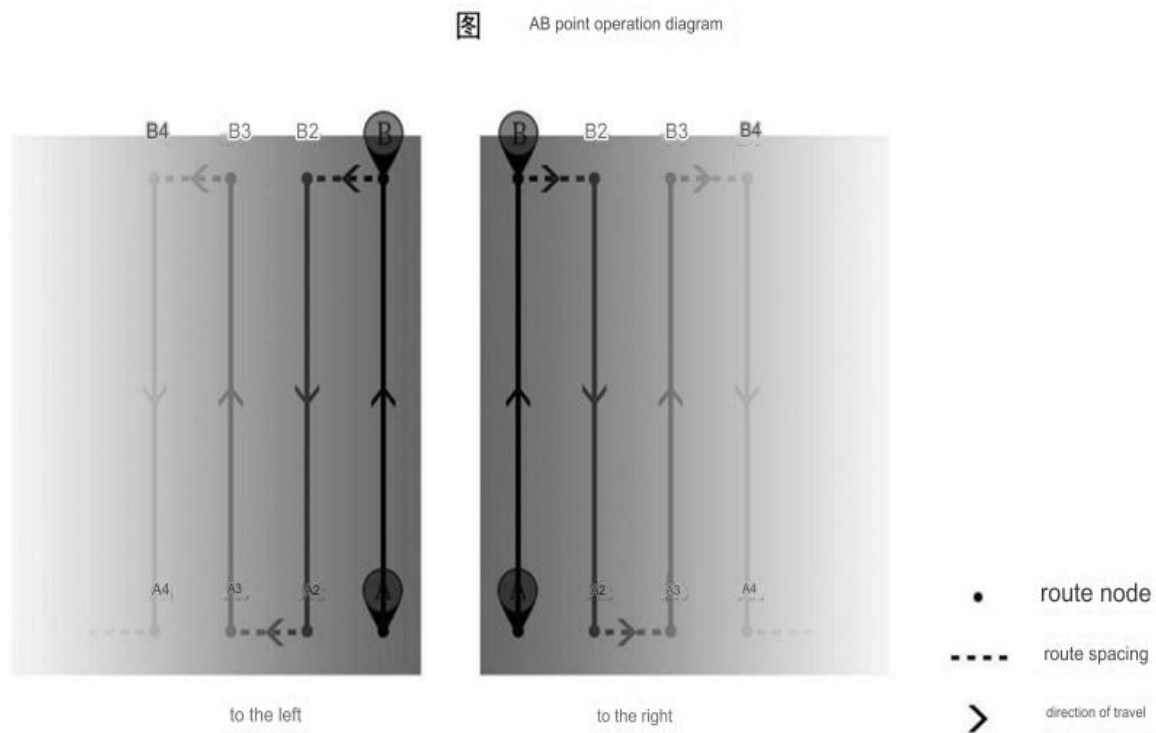
After the recording is completed, set the E key of the mode switch to the AB mode, and then the roll channel will give a left/right full-stick motion. At this time, the AB mode will start to be executed, and the aircraft will change lines to the left/right to continue the operation.

(5) To exit the AB mode switch, move the E key to the middle (GPS mode)/left side (attitude mode) to exit the AB mode (at this time, the AB point F key is still at point B, and it is recommended to restore it to the default position). If you want to re-record the AB point, you need to click the Clear AB point button in the manual operation interface of the APP



to clear the last AB point. At this time, the 2 flashing purple lights of the AB point will go out, indicating that the clearing is successful.

(6) After returning from the current AB operation, if you need to continue spraying at the AB breakpoint, you do not need to clear the AB point. You only need to take off in the GPS mode. After the mode switch E key is set to the AB mode (right side), the aircraft will automatically fly upward. Execute the action at the breakpoint location Industry.



8.2 Adjust route length

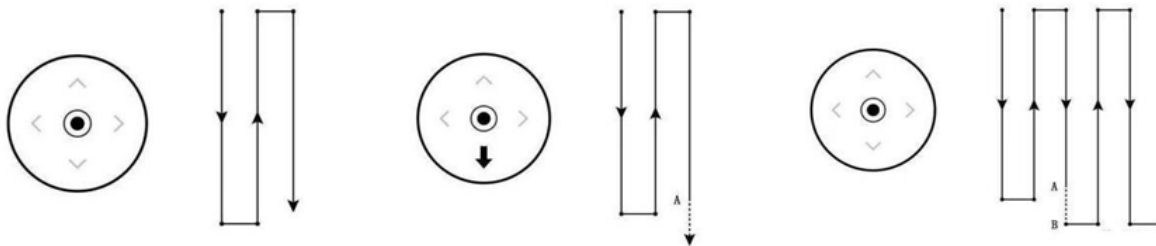
In order to adapt to irregular land parcels, the AB point length can be adjusted in real time through the pitch rod during flight. The adjustment operation is as follows:

AB point extension: When the aircraft flies almost to the edge, move the pitch lever (push or pull, the far end is push, the near end is push)

(pull), the aircraft will move forward slowly at a speed of 2m/s. When it almost reaches the extended position, the pitch stick returns to the center and the aircraft stops.

Then start copying the corresponding route, and point AB is extended.

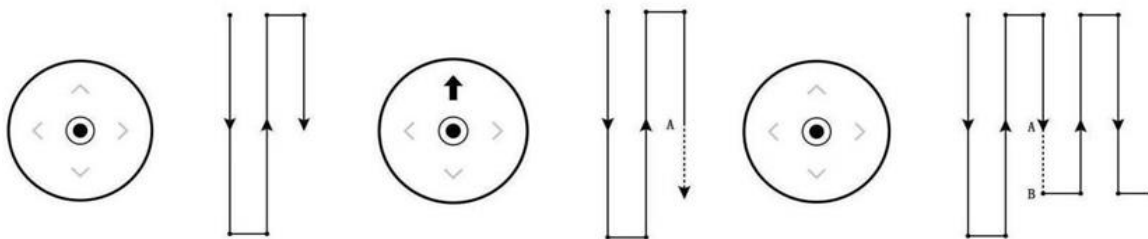
图 AB point operating route extended



AB point shortening: When the aircraft flies close to the shortened position, move the pitch lever (push or pull, pull at the far end, push at the near end), the aircraft will slowly advance at a speed of 2m/s, and when it reaches the In the extended position, the pitch stick returns to the center, the aircraft stops, and then begins to copy the corresponding route, and point AB is shortened.

8.3 Adjust height

图 AB point operation route shortened



During flight, when the throttle is in the middle position, it will fly at a fixed altitude (with a radar, it will fly at a relative altitude to imitate the ground), and when the throttle is pushed up, it will fly at a fixed altitude.

The altitude increases, and when the throttle is pulled down, the altitude decreases

8.4 Adjustment direction

During flight, the nose of the aircraft is locked in the neutral position. If the direction is pushed to the left, the nose will turn left. If the direction is pushed to the right, the nose will turn right.

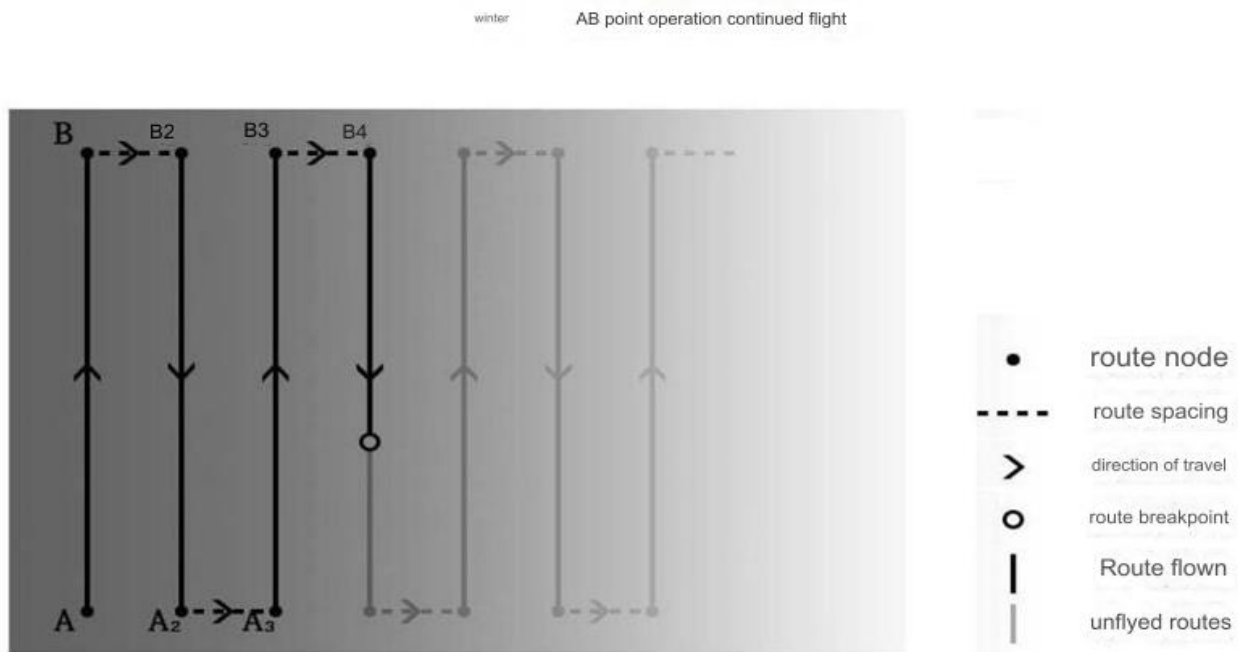


9. AB mode breakpoint continued spraying

When flying in AB mode, the current flight has a low dosage of medicine or low voltage and returns. After refilling the medicine and replacing the battery, it is necessary to continue the previous flight.

AB point. Then follow the steps below to perform AB breakpoint continued spraying.

After returning from the current AB operation, if you need to continue spraying at the AB breakpoint, you do not need to clear the AB point. You only need to take off in GPS mode. After the mode switch E key is set to AB mode (right), the aircraft will automatically fly to the last breakpoint. Click the location to execute the job.



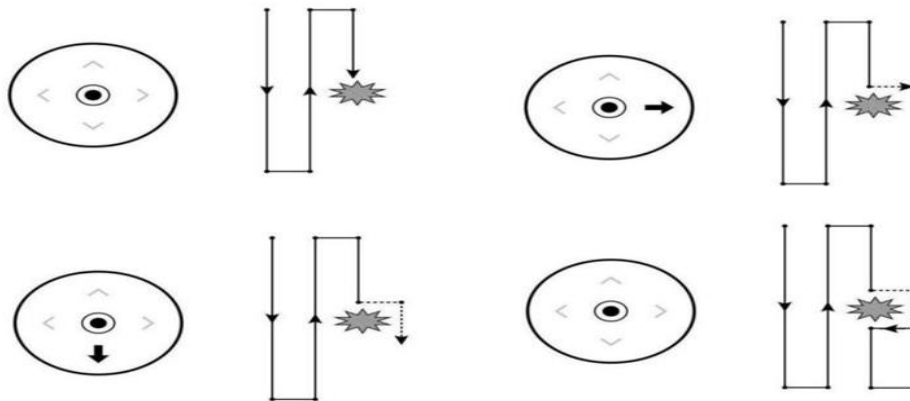
9.1 AB mode obstacle avoidance

(1) Manual obstacle avoidance

When the aircraft is performing AB operations, when it encounters an obstacle in front, first dial the roll lever, the aircraft will enter the manual operation mode, and then translate in the direction of the dialed roll lever. After translating to a safe offset, it can Operate the pitch stick to avoid obstacles, and then return all pole positions to the center. The aircraft will automatically return to AB mode and then proceed with subsequent operations.



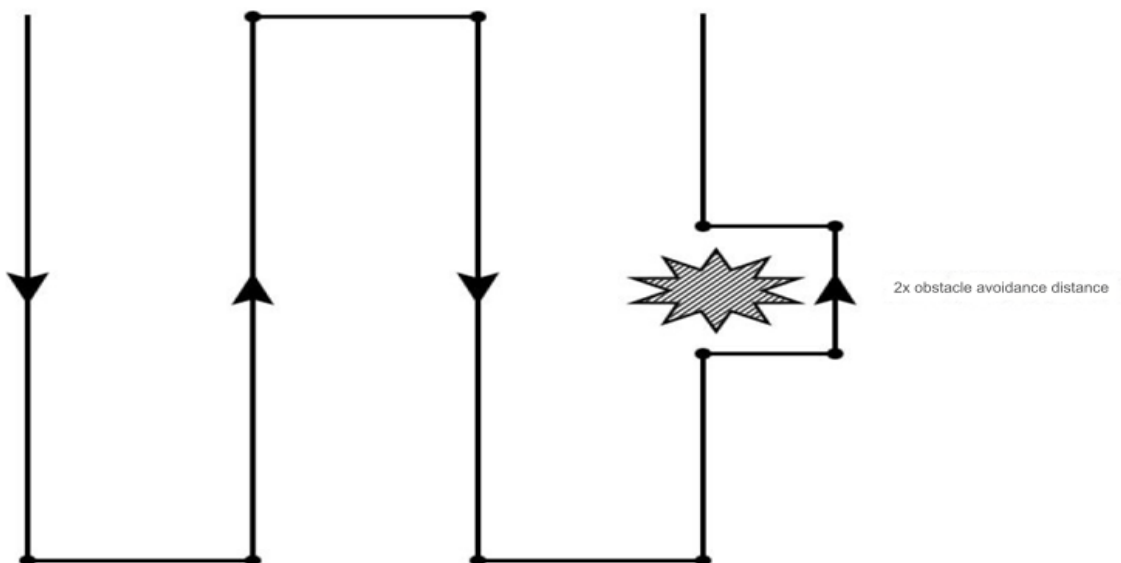
图 AB point operation manual obstacle avoidance



(2) Automatic obstacle avoidance

If the aircraft is equipped with an obstacle avoidance radar, when the radar detects obstacles ahead/rear, the aircraft will automatically choose to hover/circle based on the obstacle avoidance actions set on the APP. If hovering is selected, the aircraft will automatically hover when encountering an obstacle, and then the remote control can be directly pressed to enter the manual obstacle avoidance mode; if detouring is selected, the aircraft will translate to one side until there are no obstacles in front. Then fly forward with 2 times the obstacle avoidance distance+ 5 meters, as shown below:

winter AB Point operation radar obstacle avoidance





9.2 AB-T mode

In order to facilitate the use of AB mode operations in fields that are not at right angles, the AB-T mode is added to the AB mode. Can

By adjusting the angle of point AB when setting points, the aircraft route can be changed to adapt to more complex land parcels.

AB-T operation process:

- (1) To re-run AB points, click the Clear AB point button in the manual operation interface of the APP to clear the last AB point information and ensure that there are no AB points inside the aircraft (if the AB point exists, the LED will flash purple).
- (2) Take off manually and fly to the first starting point. Dial the F key from the empty space (right side) to point A (middle). At this time, the coordinates of point A are recorded. After the point A recording is successful, the APP will announce that the point A recording is successful, and the LED light will flash 1 Purple light.
- (3) After point A is successfully recorded, rotate the machine head in situ and aim at another ground edge except the AB direction. Click the AB angle button to record the angle of point A.
- (4) The aircraft flies to point B. The water pump will automatically turn on during the flight. Dial the F key from point A (middle) to point B (left) to record the coordinates of point B. The APP will broadcast after the recording of point B is successful. Point B is recorded successfully

The LED light will flash purple 2 times.

(5) After successfully recording point B, rotate the machine head in situ and aim at another ground edge except the direction AB. Click the AB angle button to record the angle of point B.

(6) After the recording is completed, set the E key of the mode switch to the AB mode, and then the roll channel will give a left/right full stick action. At this time, the AB mode will start to be executed, and the aircraft will change lines left/right to continue operation.

(7) To exit the AB mode switch, move the E key to the middle (GPS mode)/left side (attitude mode) to exit the AB mode (at this time, the F key of the AB point channel is still at point B, and it is recommended to restore it to the default position). If you want to re-record the AB point, you need to click the Clear AB point button in the manual operation interface of the APP to clear the last AB point. At this time, the 2 flashing purple lights of the AB point will go out, indicating that the clearing is successful.

(8) After returning from the current AB operation, if you need to continue spraying at the AB breakpoint, you do not need to clear the AB point. You only need to take off in the GPS mode. After the mode switch E key is set to the AB mode (right side), the aircraft will automatically fly upward. Execute the job at the breakpoint location.

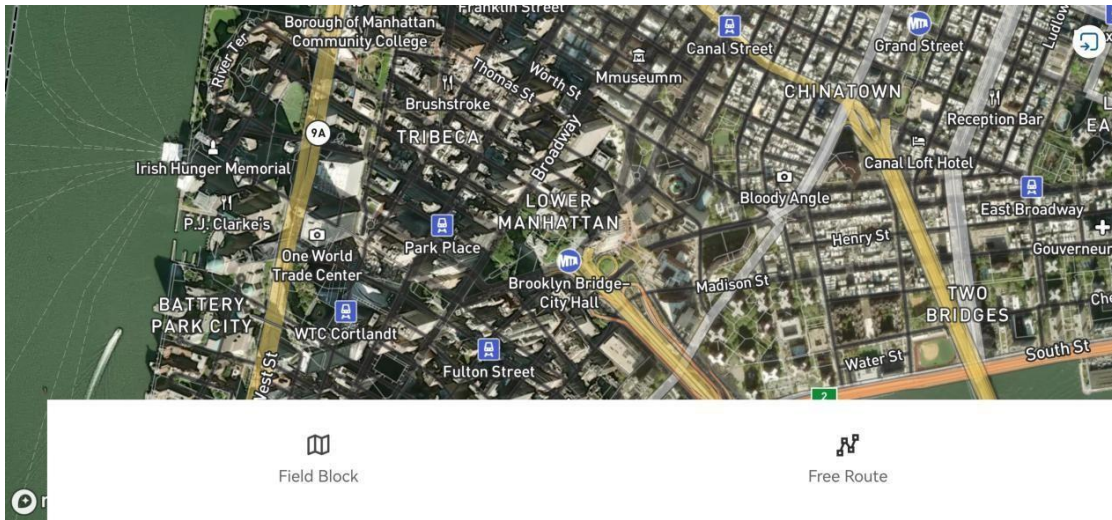
10. Autonomous route mode

10.1 Land plot mapping

Before automatic operation, it is necessary to map the plot boundary of the operation and the intermediate obstacle information.

Click Surveying and Mapping to enter the surveying and mapping page:

Select the type of land you want to map:



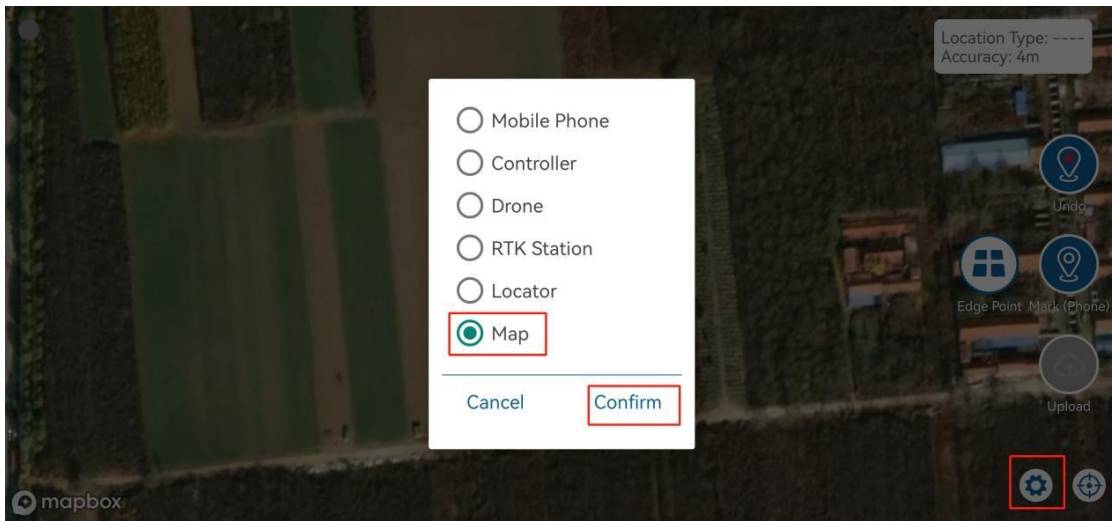
Polygonal plot: For the entire field plot, survey and map the boundaries of the plot, and then plan the route to operate within the plot.

Free route: For irregular spraying needs, such as spraying irregular fruit trees and needing to stay spraying above the tree, etc.

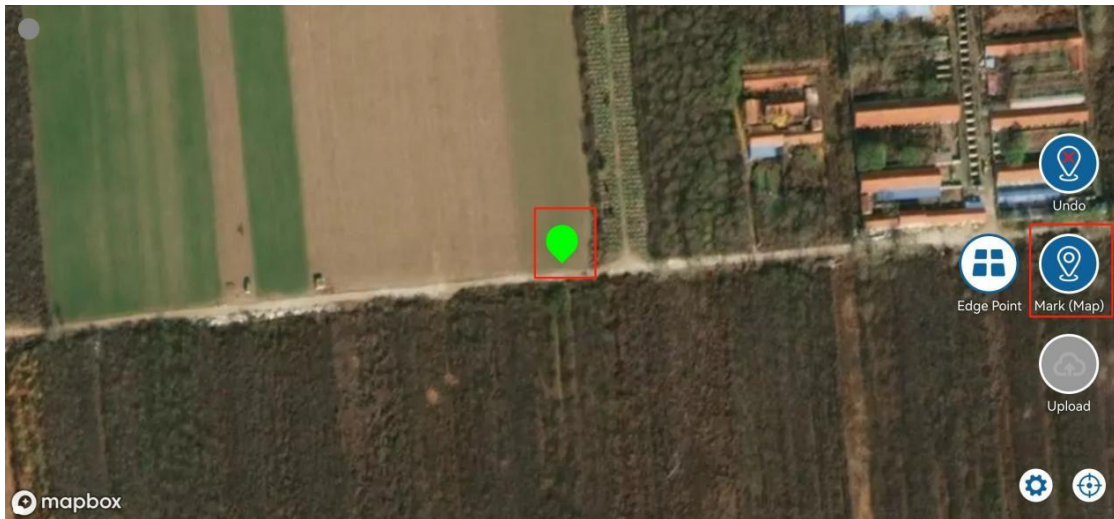
APP supports 6 land surveying and mapping methods including mobile phone/remote control/aircraft/RTK base station/doctor/map

The following uses map point selection as an example to describe how to conduct land surveying and mapping.

- (1) Click on the mapping icon to select the polygonal parcel
- (2) Click Settings to select the dotting method map.



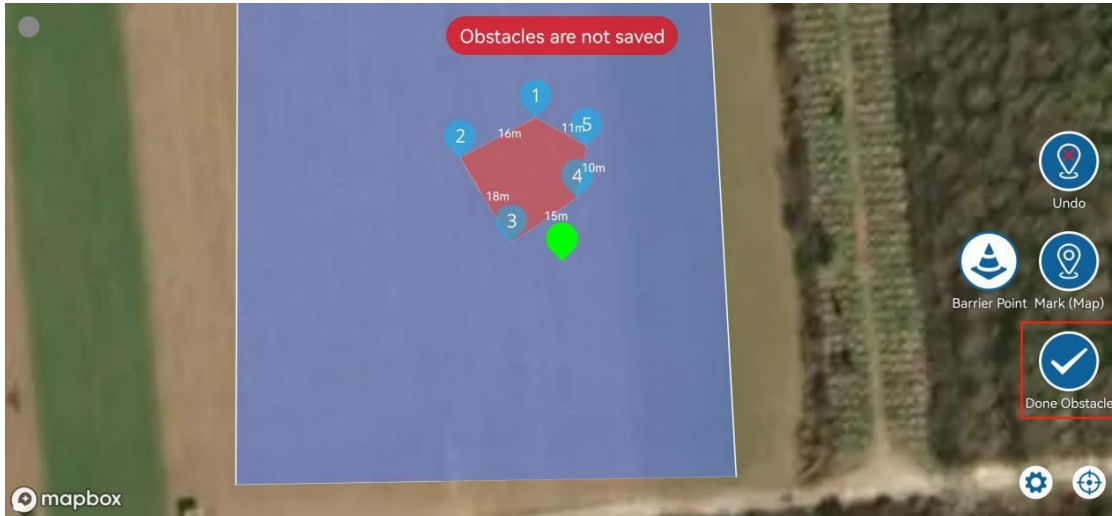
(3) Drag the map location and click the dot icon to do the dots.





(4) Switch polygonal obstacle points, drag the map position, click the dot icon to click, click the obstacle point to fine-tune the position or delete it, and click the end icon when finished.



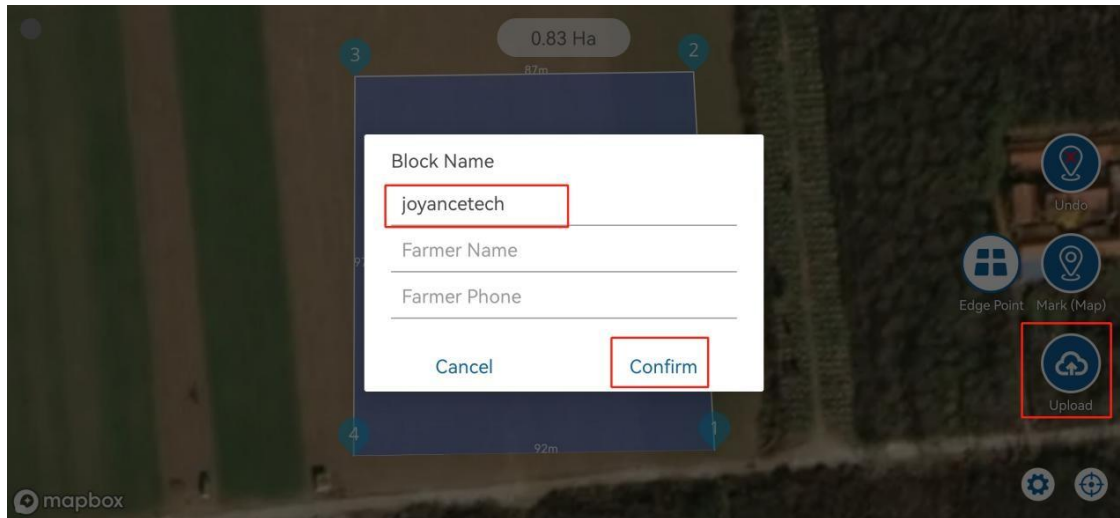


- (5) Switch the circular obstacle point, drag the map position, click the dot icon to click, click the circular obstacle to fine-tune and delete the position, click the diameter adjustment icon to adjust the diameter of the obstacle.





- (6) After completing the plotting, switch the plotting type icon to the plot boundary point, then click Upload and fill in the plot name and other information. Click Confirm, save successfully, and complete surveying and mapping.



Notice:

The plots surveyed will be automatically uploaded to the server when there is a network connection. There is no plot data locally. When there is no network, it will be saved locally first. After the network is connected, opening the APP will automatically upload it to the network. If the customer is working in an environment without network, the plot needs to be downloaded to the local area first when there is a network.

Download method: Homepage→Management→Plot Management→Download.

Functions such as modifying, deleting, sharing, cutting, and copying plots are also here.

10.2 Autonomous work

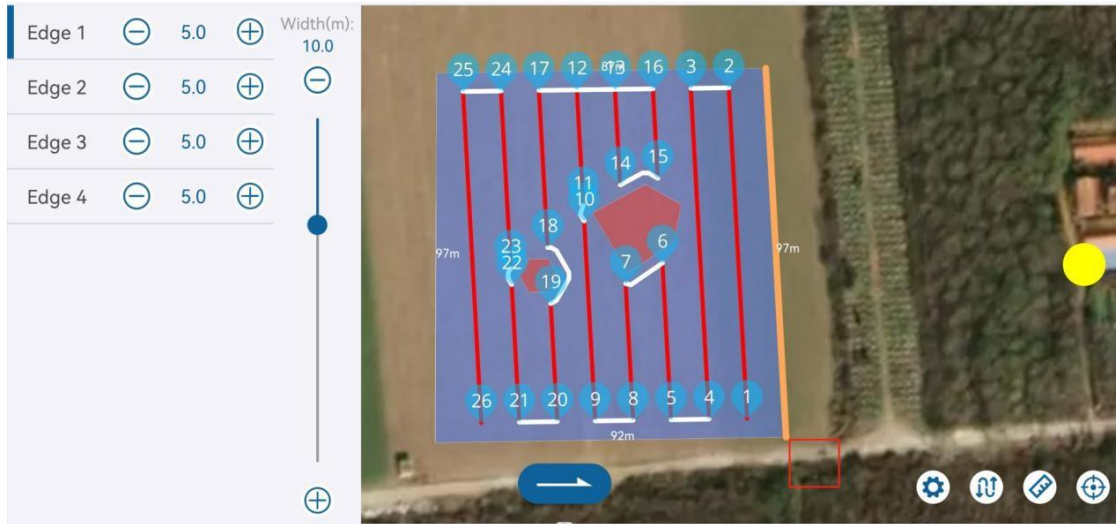
- (1) Click the automatic job icon on the home page.
- (2) Select the parcel in the list and click Next.



(3) Adjust the route width and the safety distance of the plot (generally, the default value of 5m is enough).



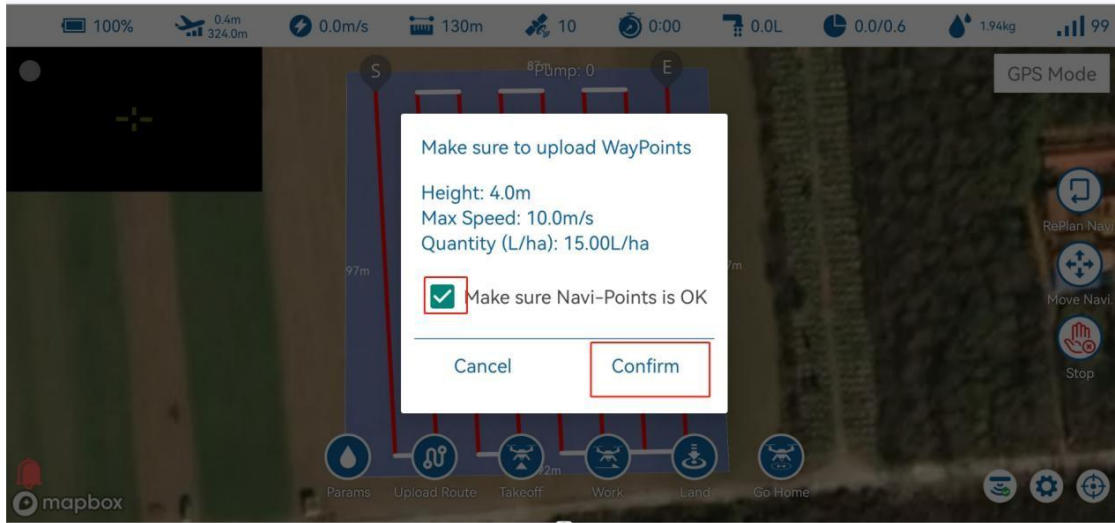
(4) Click outside the corner of the plot to adjust the starting point. Click on the boundary line to adjust the course direction and make it parallel to it.



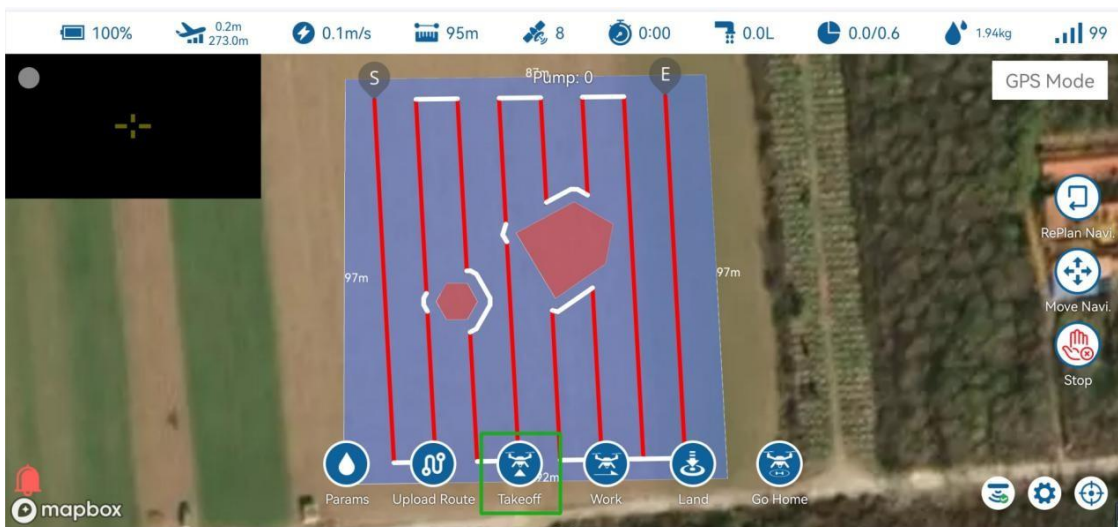
(5) Click Next to enter the operation interface, click Parameter Settings, and adjust the flight altitude, speed, and mu usage.



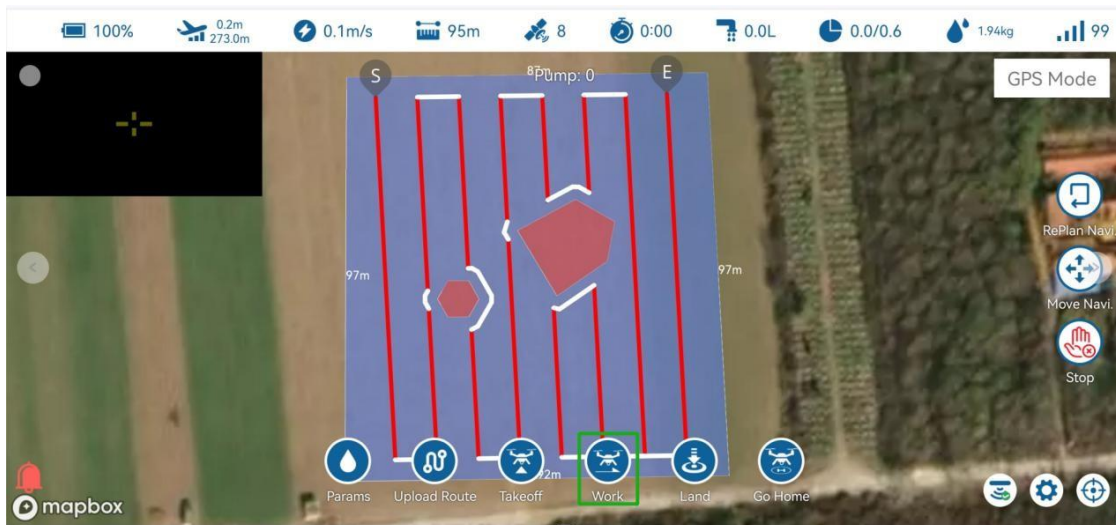
(6) Click to upload the route, confirm that the waypoints are correct, and click Confirm.



(7) Click to take off, and the aircraft will automatically unlock and take off to the set altitude (default setting is 5m).



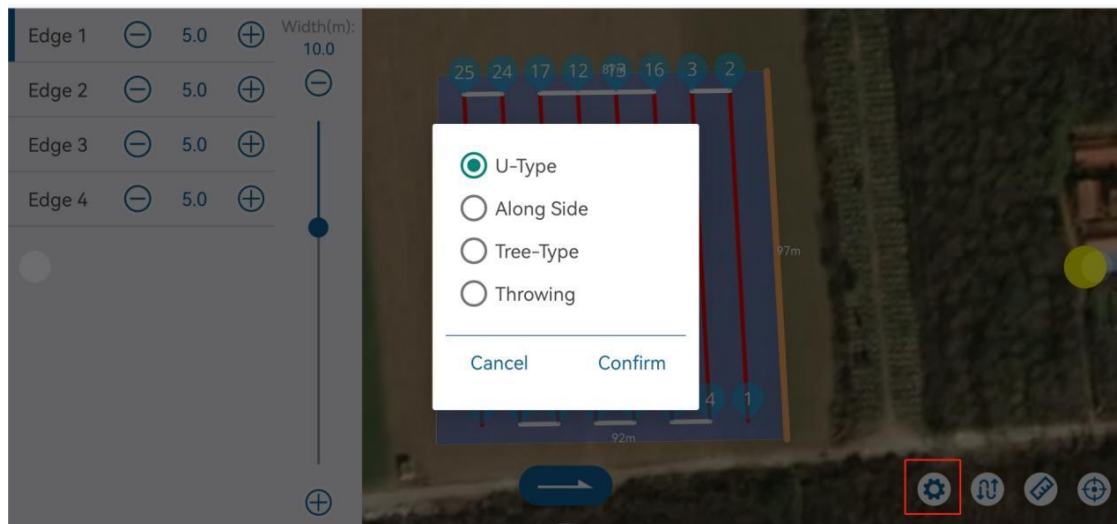
- (8) Click on the operation, the aircraft will fly to the first point and automatically turn on the water pump and nozzle for operation.



- (9) If you need to stop the aircraft, click the screen to make an emergency stop, or switch the mode switch (E) to attitude mode and then switch to GPS mode.
- (10) Return: Manually return to home or use the return-to-home switch (A) on the remote control to return to home.
- (11) Return to the breakpoint: If the operation page does not exit, you can directly click Takeoff → Operation, and the aircraft can continue operations from the breakpoint.
- (12) If you have exited, re-operate (1) (2), choose to continue the last job, and then operate (5) (6) (7) (8).

10.3 Optional functions when working autonomously:

(1) Route type settings:



Click on the route type to select 4 types of routes. Generally, the first type of normal operation and the second type of side operation are used.

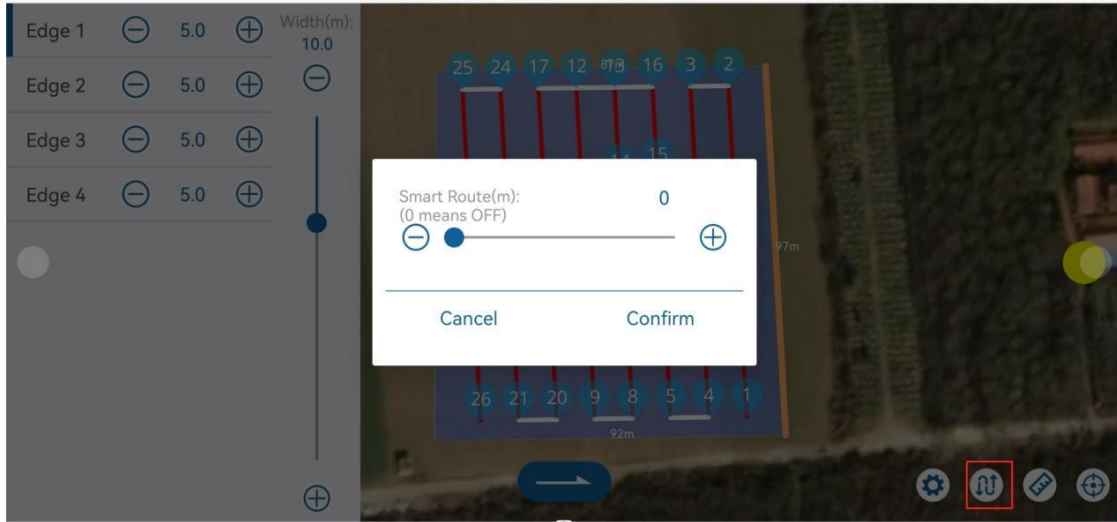
Bow route: Plan a bow-shaped route back and forth on the land.

Edge route: a route around the edge of the plot, used for edge sweeping

Fruit tree route: For the whole row of fruit tree operations, you can add 1/2/3/4 at the end of the tree row on one side, and the trees on the other side.

Dot 5/6/7/8 at the end of the row. When planning the fruit tree route, 1-8, 2-7, 3-6, 4-5 will be automatically connected to form a line and the flight path will be planned

(2) Intelligent mileage planning



Click the smart mileage button to set the maximum flight mileage for a single flight. After the setting is completed, the route will be

Line segmentation, ending this flight route at a waypoint close to the starting point within the set maximum flight mileage.

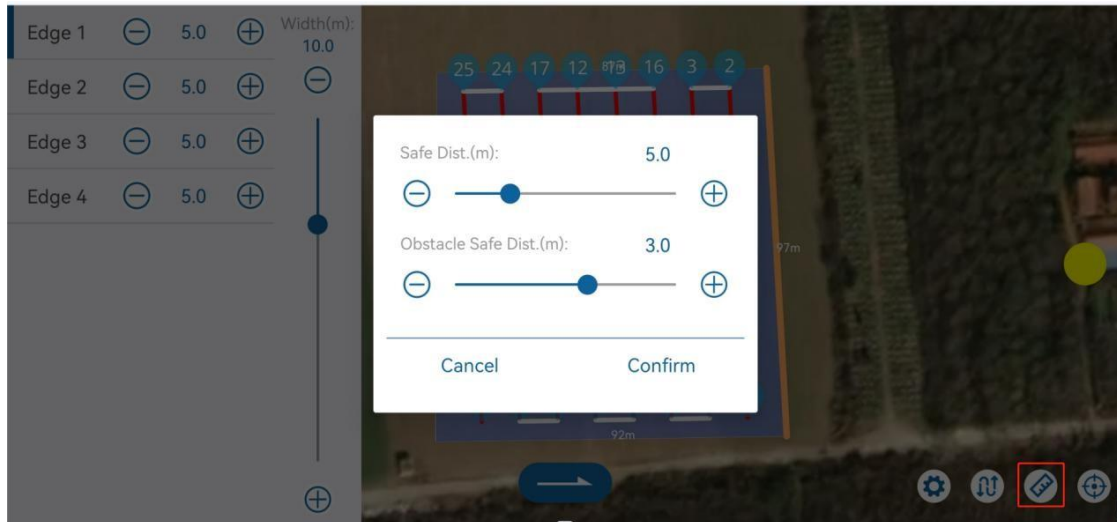
Drones will

When the hover/return action is performed, the next flight will start from a nearby location after the next flight takes off. Reasonable setting of this function can ensure.

Each flight ends at a location close to the starting point, and the next flight does not need to carry a load to fly far away. If the smart mileage

Set to 0 to turn off the intelligent planning function, as shown below:

(3) Route safety distance and obstacle safety distance

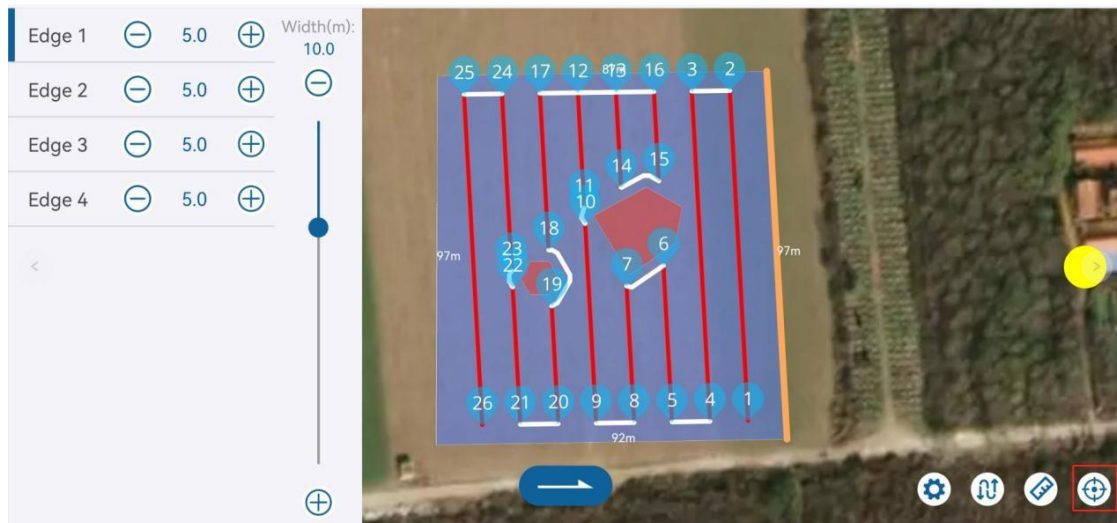


Click the safety distance button to uniformly set the safety boundary distance and obstacle boundary safety distance. border safety distance

The distance represents the inward distance of the route, and the obstacle boundary safety distance represents the outward expansion distance of the route near the obstacle.

(4) Centered

Click Center to center the map location.



(5) Delete some waypoints

In the actual operation process, there may be several routes in the middle of a plot that are not used for operation. You can delete the route points by

The method is to delete routes that are not used for operations. The specific operation is: click the waypoint serial number icon of the deleted route, and in the pop-up prompt box Enter the end point number of the deleted route in , and then confirm, as shown below:

Before deletion



After deletion



11. Autonomous flight - fruit tree mode

The fruit tree mode is to divide the longitude, latitude, and height (divided into relative heights) of each tree through a mapping aircraft (or using an aircraft to do points). degree and altitude) are measured and planned into a route. You can set whether to spray the route and the hover spraying time of the waypoint. also
You can map land parcels in advance to generate usable routes, save them as .cvs or .kml files and import them into the APP for use.

- (1) Enter the surveying and mapping interface, select the free route to start plotting, or select the import button in the upper right corner to import the generated route.
- (2) Mark the path to be flown. Free-route drones will fly according to the mapped path.
- (3) Enter the automatic operation interface, select the free route that has been surveyed and mapped, and set the spray switch and hover time of the free route. Wait for the parameters. After the settings are completed, upload the route and execute the operation.

12. APP-Management

12.1 Equipment management

Multiple drones can be added, and detailed information such as flight sorties, operating area, and operating time can be viewed.

Click on Equipment Management to see all the user's aircraft, operating acres, flight sorties, and operating hours. These statistical data are calculated from the date these aircraft are registered in this account.

If the user has device management rights, he or she can see all the aircraft under this account.

If the user does not have device management rights,

You will only see aircraft assigned to the user by the manufacture

All activated drone numbers for this account can be displayed in the device management list.

Click the device number to enter the base of the aircraft.

This details.

- **Name:** The name can be modified;
- **Assign pilots:** If the user has equipment management rights, the selected aircraft can be assigned to subordinate employees; if the user is the administrator of the team, the selected aircraft can be assigned to subordinate team members; Aircraft status: 4 statuses: offline, locked, online, and working;
- **Offline:** The drone is not powered on;
- **Online:** The drone is powered on but not flying; **Operation:** The drone is in flight operation;
- **Locked:** The drone is locked by the manufacturer/operator, and the locked drone cannot take off;
- **Transfer:** Aircraft can be transferred between operator accounts. Click on the transfer below the picture, and then scan the transferred operator's account
You can transfer the aircraft to the other party by using the user's QR code.
- **Flight records:** You can see the operation records of the current numbered drone, and you can also filter the conditions of time, team, (select team members) individuals, and regions according to your needs to display what you need.

Select the flight record in the list to enter the flight record details interface. You can replay the flight path and replay the status of the aircraft during flight.

12.2 Team management

In order to better manage the plant protection service team and optimize data statistics in more detail, we have established a team management model.

All plots in the team are shared, and job data can be shared. Enter the team management interface and create a team at the bottom of the chart.

Create your own team in the team, as shown below;

Click Create Team, enter a name and the creation is complete.

The team leader can be added as a team member by scanning the member QR code, and the team members can also scan the team QR code to join the team.

12.3 Land management

The plots that have been surveyed can be seen in plot management. When the plot needs to be modified, enter plot management, as shown below. The plots in the plot list include personal surveying plots, plots shared by other team members, and plots shared by other employees of the operator company.

You can perform the following operations on the selected land parcels: Modification: You can modify the shape of the plot and add calibration points and obstacles.

Delete: Delete plot information.

Share: Share the plot to another account.

Cut: Cut the current plot arbitrarily into multiple small plots.

12.4 Land operation records

The historical operation record of the current plot can be viewed by entering the plot operation record. Click on the plot operation information in the plot operation record list to enter the plot operation details page; the plot area, operations, operation progress, operation status, and drug dosage at the top of the picture are the integration of all data on this plot of land.

Plot details: Enter the plot details page;

Flight records: records of flights into this area;

Associate to task: associate the record of this land to the task. 'Task' is a list task in task management (see details

Operator account task management);

Also: In the land plot operation record list, press and hold a land parcel in the list for 2 seconds, and a quick link to the task will appear.

Filter: You can use the start time to the end time or select a team to filter the land operation

records you need.

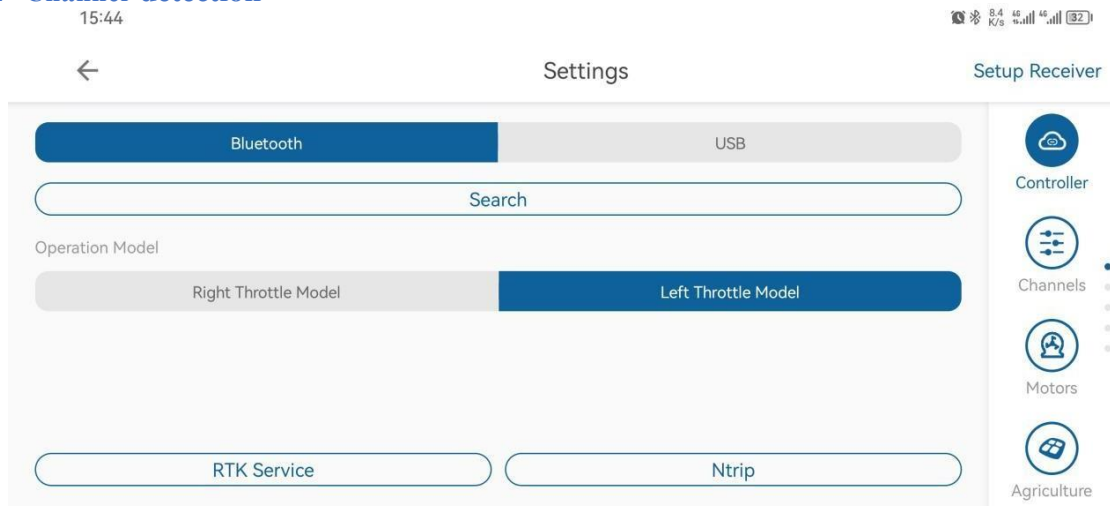
13. Detailed explanation of APP setting items

Setting functions include configuring the drone's remote control settings, plant protection settings, remote control channel check, motor check, flight calibration and reading flight logs, etc.

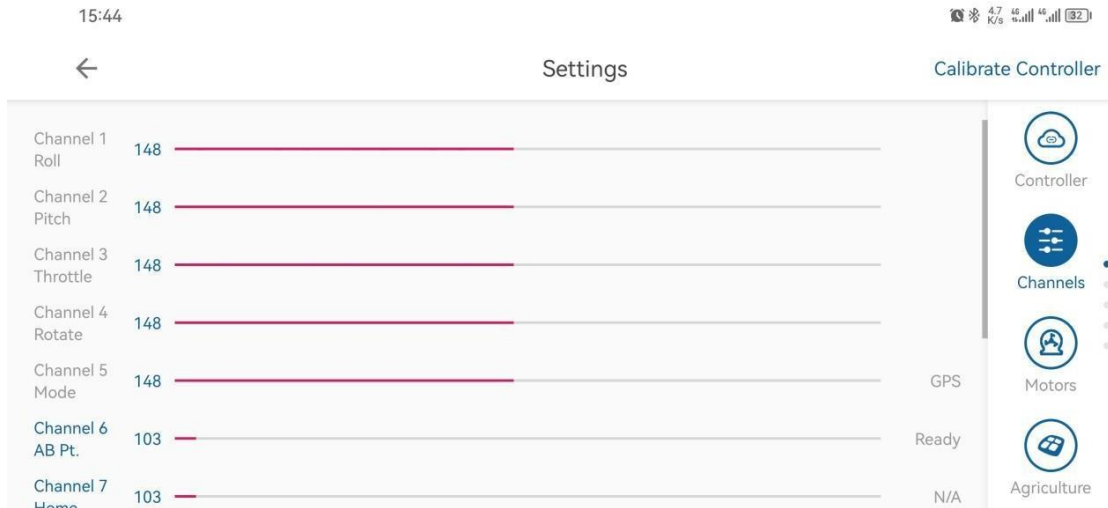
13.1 Remote control settings

Use H12 to open the APP and connect automatically. The default operation method is American hand (left hand throttle).

13.2 Channel detection



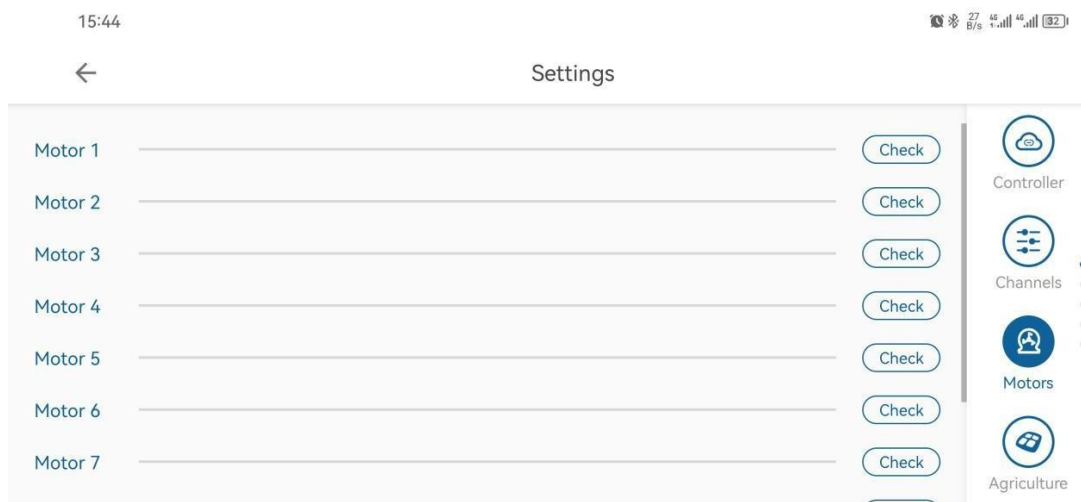
Channel detection is used to test whether the remote controller and the drone are connected properly, and to determine whether the remote controller is working properly. When the user flips the switch on the remote control and shakes the joystick, he or she will see the corresponding channel change on the ground station.



The display data corresponding to the channel display is as follows:

- (1) Channel 1234: The green line is at the 150 position; the maximum value is 1200, the minimum value is 100; Channel 2 is the reverse channel;
- (2) Channel 5: If in manual stabilization mode (GPS mode), it should be 150; if in attitude mode, it should be 110; in AB point mode, it should be 190, and the three values are 110, 150, and 190 respectively;
- (3) Channel 678: The default position should be 110; the three values are 110, 150, and 190 respectively;

13.3 Motor inspection



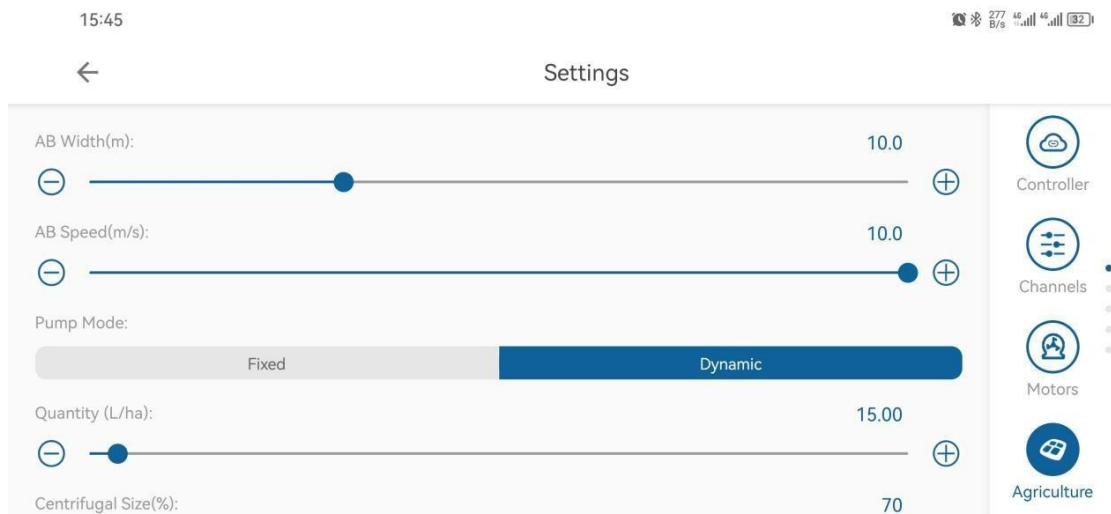
Motor check is used to check whether the drone's motor is working properly (the oil-driven direct drive does not have the motor check function). Click the check button corresponding to

each motor, and the drone's motor will rotate. At the same time, the motor speed will be displayed on the progress bar to judge the working condition of the motor. Up to 8 motors can be checked.

During the inspection, you need to check the following points:

- (1) The steering direction of the motor is counterclockwise for odd-numbered motors and clockwise for even-numbered motors.
- (2) Motor speed, observe whether the motor speed is consistent

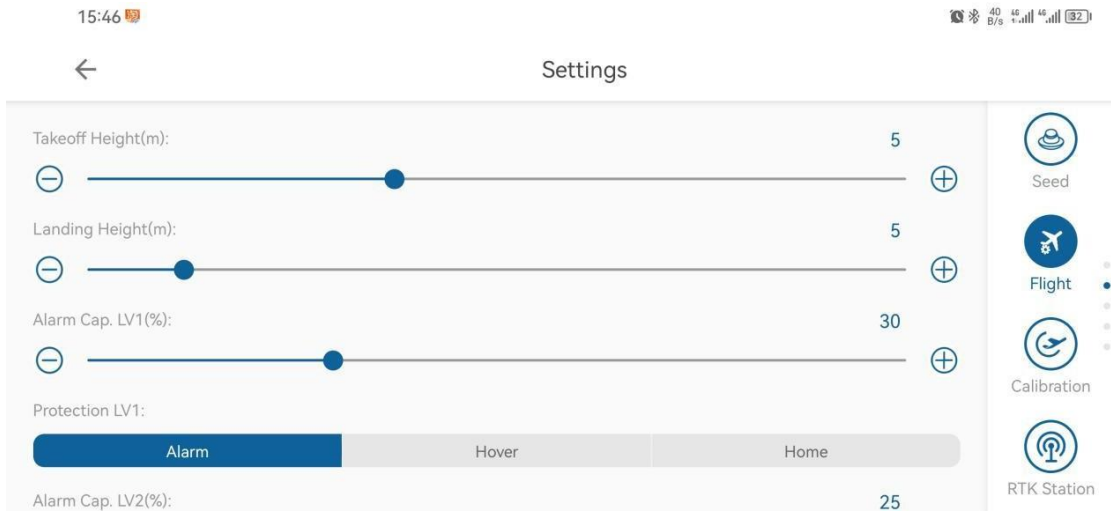
13.4 Plant protection settings



In the plant protection settings, the user can adjust the spray width, flight speed (maximum speed), and set the spray flow rate in two ways (the working power percentage of the water pump motor is from 0-100 when the fixed setting is selected; the working power percentage of the water pump motor is from 0-100 when the speed is selected) mu usage when the aircraft's speed is maximum)

Users can adjust parameters by dragging the slider, or fine-tune parameters by clicking the plus and minus signs. . There are many places to adjust parameters on the ground station, which can be set using these two operating methods.

13.5 Flight settings



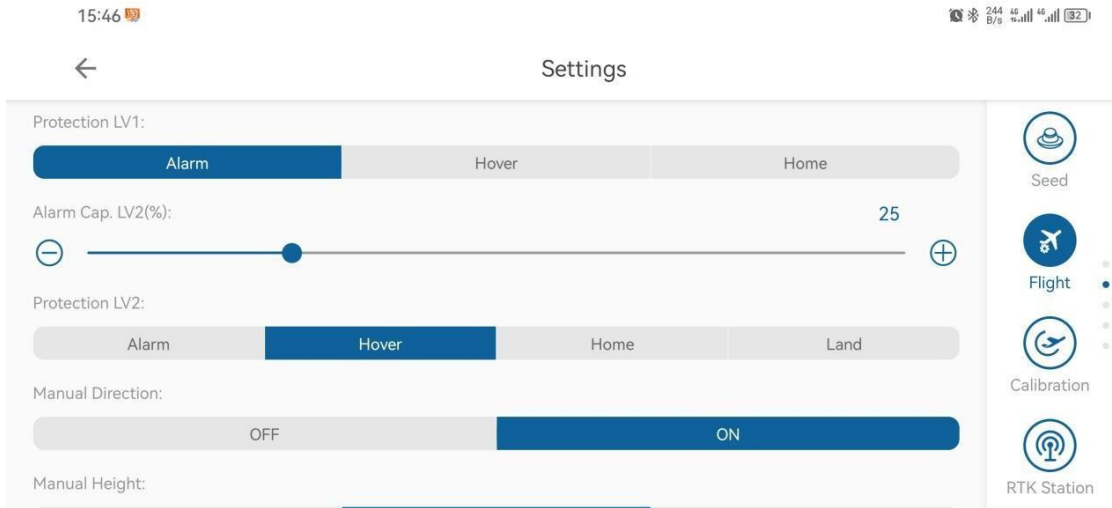
Default factory parameters

Automatic takeoff altitude : 5

Return altitude : 5

Voltage alarm threshold : 30% (level one alarm)

Protection measures : APP prompts



Default factory parameters

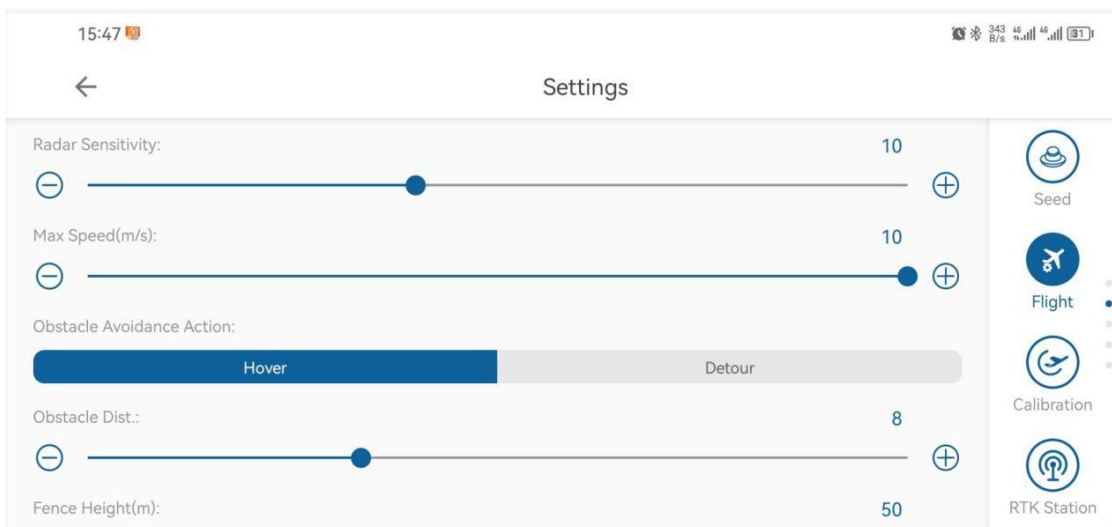
Voltage alarm threshold : 30% (level one alarm)

Protection measures : APP prompts, aircraft hovering

Manual control direction : On

Manual height control

Default factory parameters

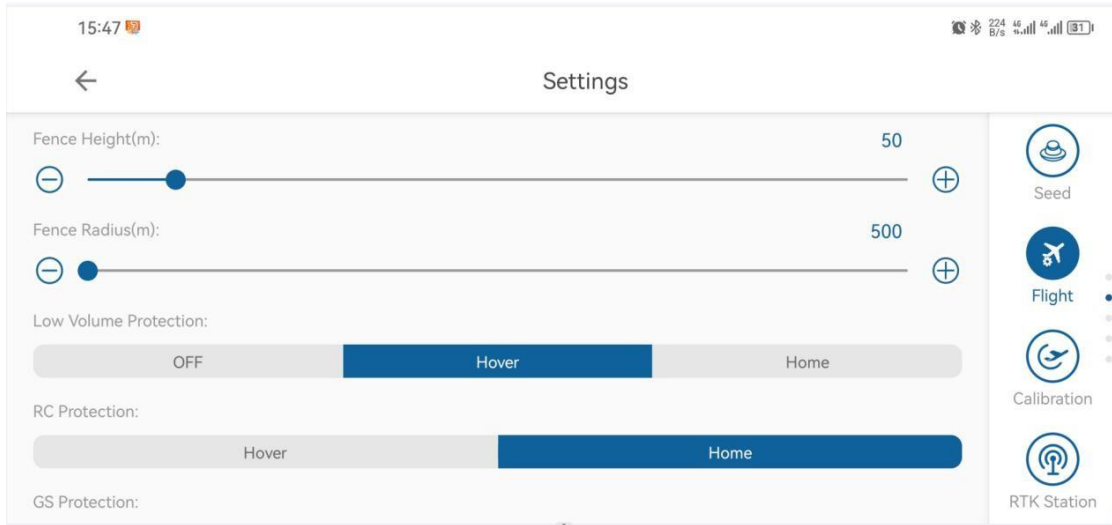


Ground defense radar sensitivity : 10

Maximum speed: 10

Obstacle avoidance action: hover

Obstacle distance: 8



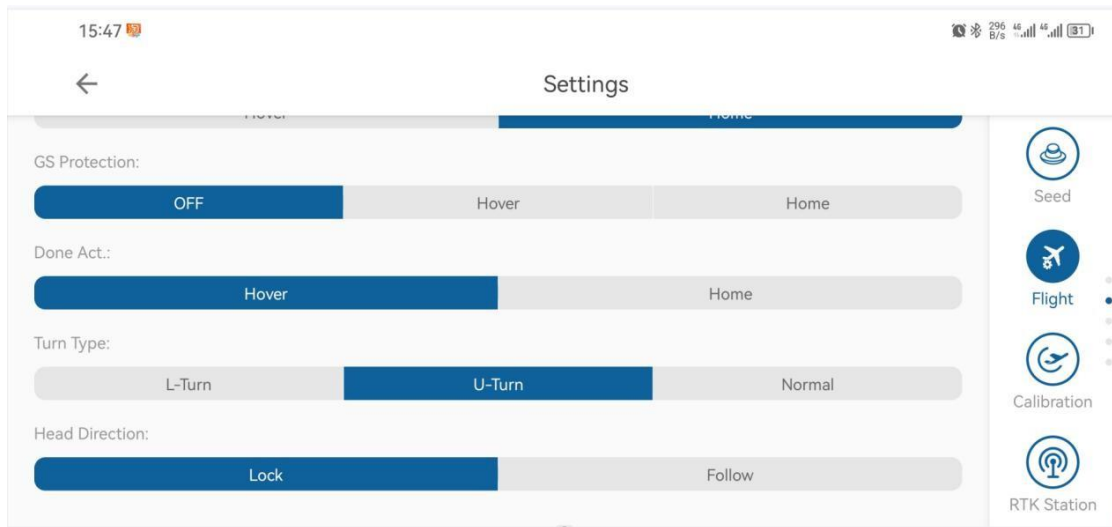
Default factory parameters

Fence height: 50

Fence Radius: 500

Medication withdrawal protection: hover

Remote control failure protection: return to home



Default factory parameters

Ground station failure protection: closed

Job completion action: hover

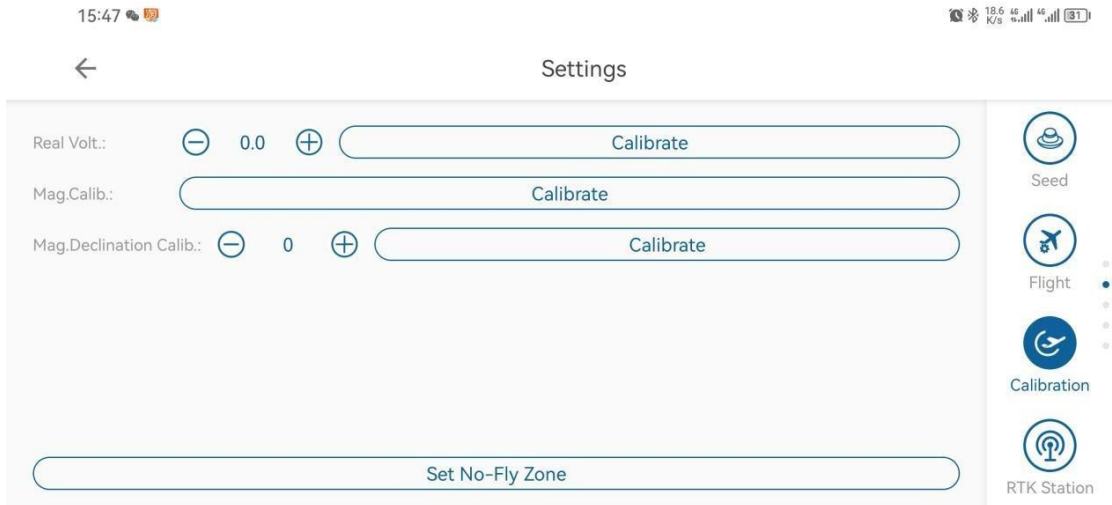
Turn type: U-Turn

Head direction: Lock

- **Automatic takeoff altitude** : the altitude that the aircraft will reach in automatic takeoff mode.
- **Return altitude** : the lowest altitude of the aircraft in the automatic
- return-to-home one-key return mode. If the current aircraft is lower than this altitude, it will first rise. If it is higher than this altitude, it will return directly and then descend.
- **Voltage alarm threshold and protection measures** : Set a reasonable voltage alarm
- threshold. When the voltage is lower than this threshold, the corresponding voltage protection action will be triggered.
- **Manual direction control**: You can manually change the direction of the aircraft
- nose during the route . On by default.
- **Manual height control** : You can manually adjust the height at any time during the route. Controllable by default.

- **Ground defense radar sensitivity** :Use this sensitivity in ground defense situations. With increased sensitivity, the aircraft will respond more sensitively when encountering terrain undulations.
- **Maximum speed** : the maximum speed of manual flight in GPS mode.
- **Obstacle avoidance action** : When obstacle avoidance is enabled, you can choose to hover/circle around obstacles.
- **Fence radius/height** : The aircraft can fly within the circle with the take-off point as the center and the fence radius as the radius. When it exceeds the range, it will alarm and return. Taking the ground at the take-off point as 0, the upward direction cannot exceed the height of the fence. If it exceeds the height, the return will be triggered.
- **Medication cut-off protection** : Medication cut-off protection is triggered when the dose is low during operation, and it can hover/return.
- **Remote control loss of control protection**: If the remote control loses control during manual flight, the corresponding protection will be triggered. During automatic route operation, the operation will continue without triggering the protection.
- **Ground station failure protection** : In automatic operation mode, if the ground station link fails, corresponding protection actions will be triggered.
- **Operation completion action** : This action is triggered after the route operation is completed and can hover/return.
- **Obstacle avoidance distance** : If an obstacle is encountered during flight, the corresponding obstacle avoidance action (hovering/detouring) will be performed after entering the obstacle avoidance distance.
- **Turn Type** : Right-angle turns take the longest and are smooth turns. U-turns take the least time, turn quickly, and have a large turning angle. Regular turns are somewhere in between.

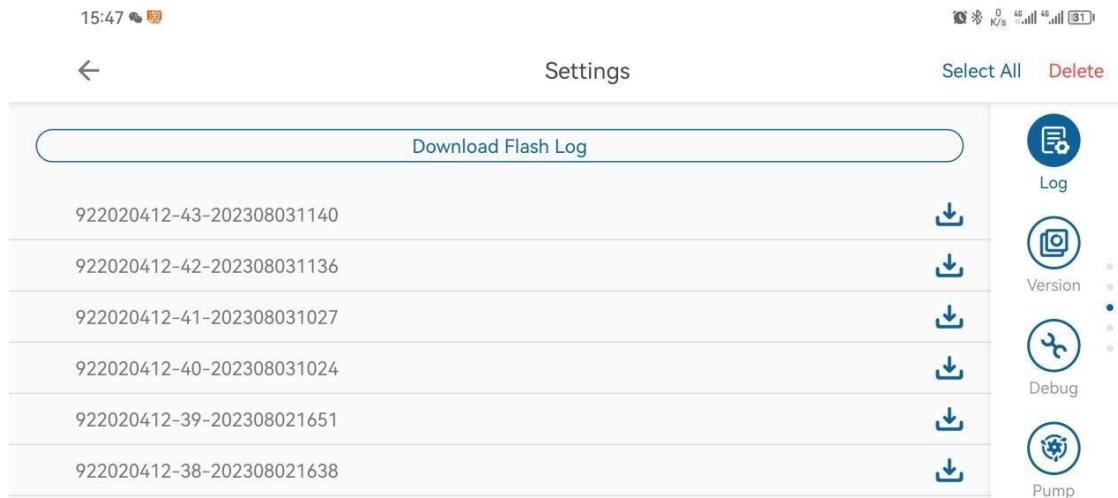
13.6 Flight calibration



The main contents on the flight calibration page include battery calibration, geomagnetic calibration, horizontal calibration, and magnetic declination calibration.

- Battery calibration:** When the battery display is incorrect, you can use this function to adjust the voltage to restore the correct display; the calibration voltage can be the voltage displayed by the battery in the battery manufacturer's software or the voltage displayed by the measuring appliance, and then click Calibrate. The power in the debugging and flight pages will become the calibration voltage.
- Geomagnetic Calibration:** Magnetic Compass Calibration
- Magnetic declination calibration:** In the case of magnetic interference, after geomagnetic calibration, you still need to check whether the aircraft will yaw when flying in AB point mode or fully autonomous mode, and adjust the angle according to the situation to allow the aircraft to fly straight forward.

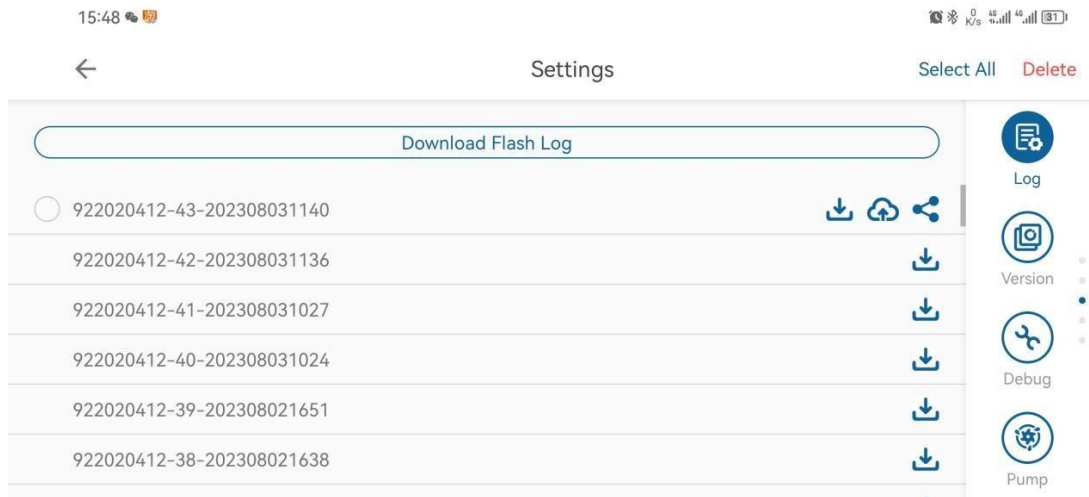
13.7 Flight log



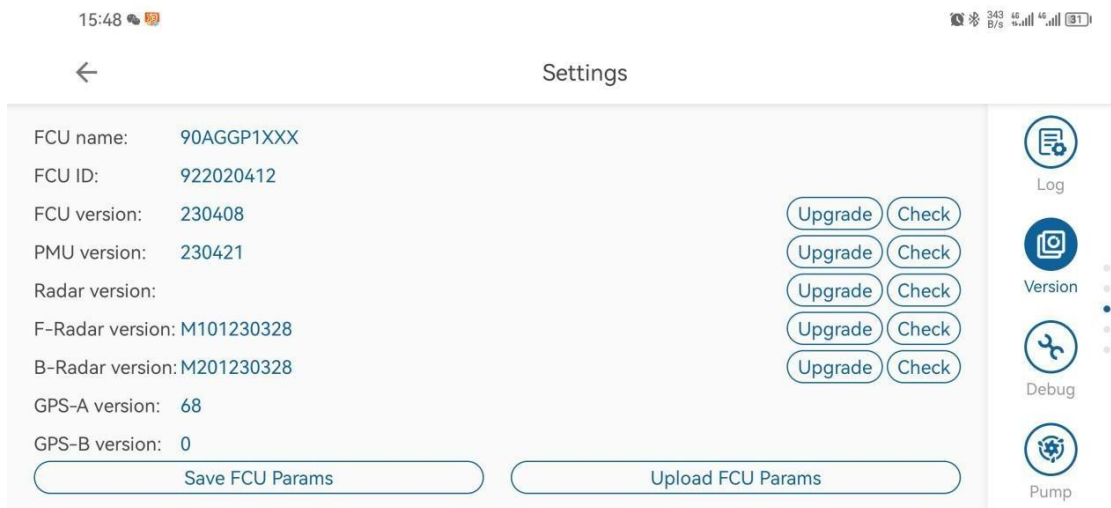
The log page is used to read the flight log on the drone to help drone developers better discover drone problems.

Note: The logs can only be read when the drone is parked on the ground and the propellers are locked to avoid danger.

All log files stored in the flight controller will be displayed in the log list. Look at the file name. The first part is the flight controller number, the second part is the flight number, and the third part is the log file time. The first button after each log is the download button, which can read the log from the flight controller to the APP locally. When the reading is completed, two more buttons will appear after the log. The upload button: uploads the log to the cloud server. The manufacturer can obtain the log file from the cloud platform. Share buttons can be sent to others via social software.



13.8 Version Information

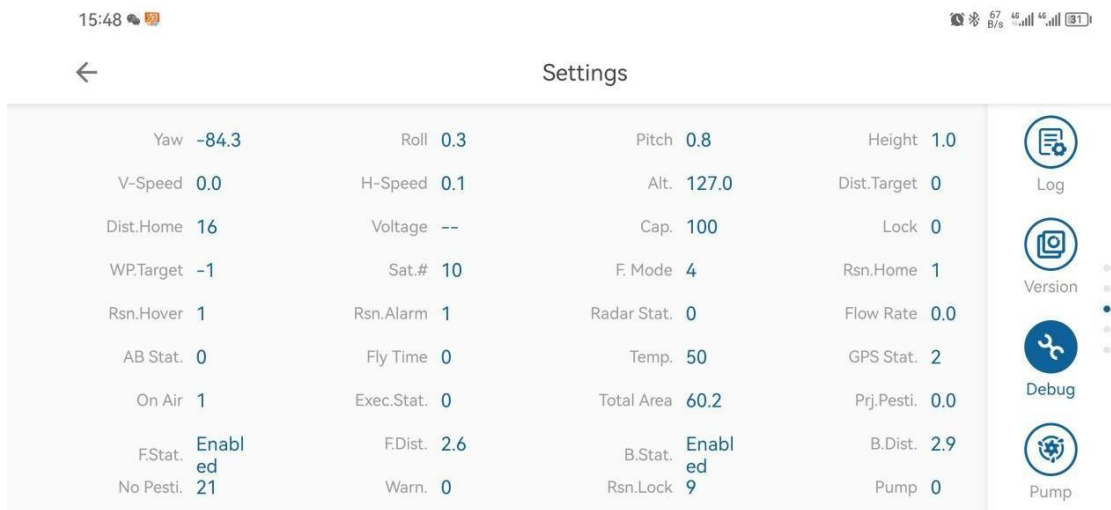


- The version information is used to display the ground station version, flight control firmware version, serial number and other information. You can also check for updates and upgrade other firmware versions such as ground station software and flight control firmware here.

- After the aircraft is powered on, open the APP and connect to the remote control, it will

automatically prompt whether there is an update. If there is an update, the user can go to the version information page to click Check, download the latest version of the firmware and then upgrade and install it directly. After the installation is successful, unplug the aircraft battery and reconnect it. After restarting the aircraft, update other firmware.

13.9 Debug

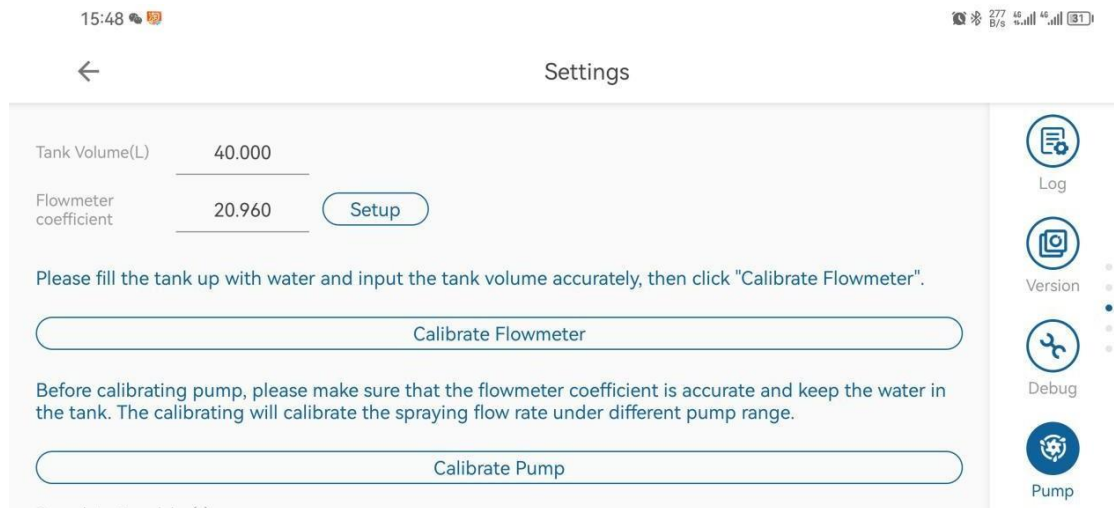


The debugging page displays some flight control information in more detail.

13.10 Inker settings

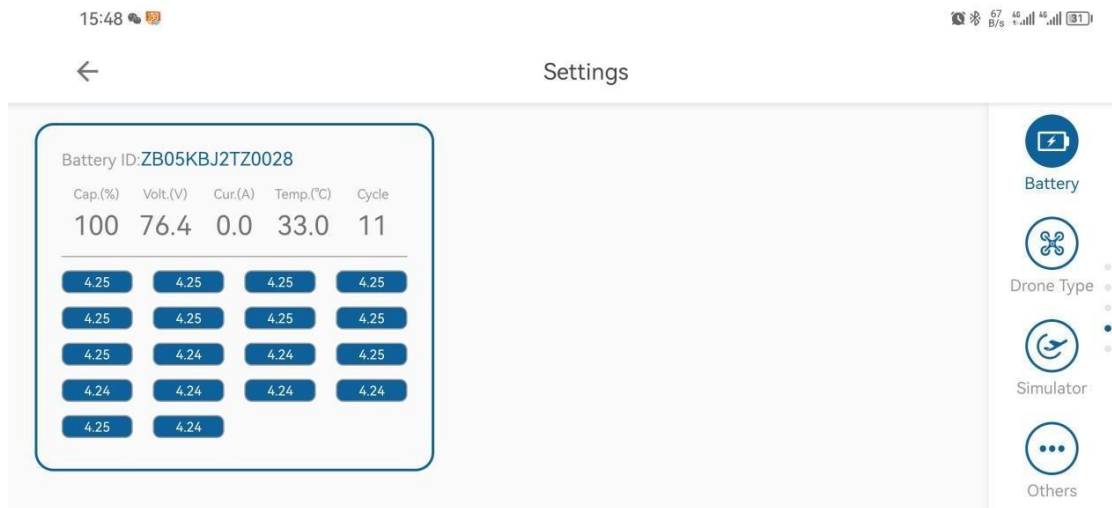
Turn on Bluetooth and connect the dotting device to Bluetooth. If the connection is successful, the location information of the dotting device will be displayed.

13.11 Flowmeter/Pump Calibration



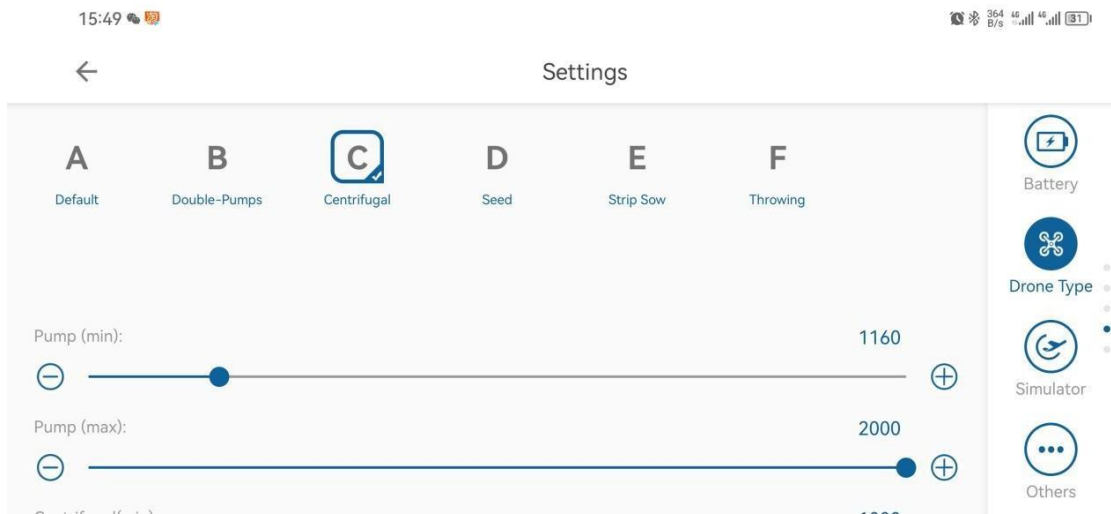
Users do not need to calibrate and are prohibited from modifying the data on this page.

13.12 Smart battery



Display the smart battery power and voltage. Temperature and other related information.

13.13 Work machine type



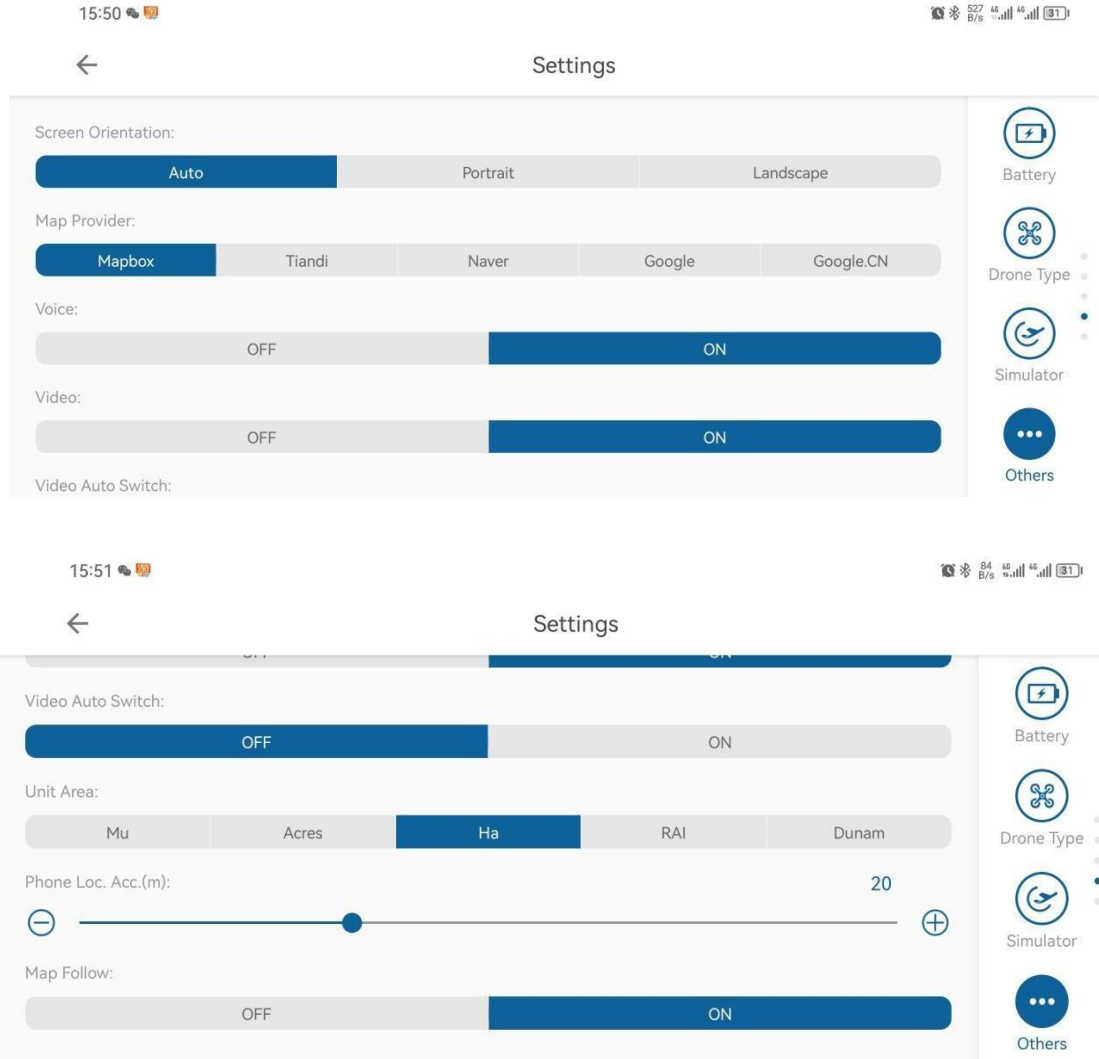
When spraying, choose model A (high-pressure nozzle)

When spraying, choose model C (centrifugal nozzle)

When spreading, choose model D (spreader).

Note: It is forbidden to select other models, otherwise it will cause abnormal operation.

13.14 Other settings



This page can set the screen orientation, map type, voice switch, FPV display, area unit, mobile phone point accuracy (disabled), map following, etc. Customers can set it as needed.

14. Technical specifications

Based in New York City & Toronto, GAO Tek Inc. is ranked as one of the top 10 global B2B technology suppliers. GAO ships overnight within the U.S. & Canada & provides top-notch support thanks to its 4 decades of experience.

Flight control system

Flight control model: VKAG_V9

Modules included: FMU, PMU, GPS, RTK, LED, CANHUB

Positioning mode: GPS (BDS, GPS, GLONASS)/RTK Working temperature: -10-50°C

Rack

Rotor diameter: 762 Folding size: 620*860*520mm

Expanded size: 1150*1150*520mm

Power system Stator size: 96*16mm

KV value: 110rpm/V Rated power: 1000W

Maximum working voltage: 60.9V Foldable propeller: 3090

Flight parameters

Takeoff weight without load: 17KG Fully loaded take-off weight: 27KG

Hover accuracy with RTK enabled: ± 10 cm horizontally, ± 10 cm vertically

Hover accuracy without network RTK enabled:

± 60 cm horizontally, ± 60 cm vertically Power battery model: JTB1216 (16000mAh-50.4v)

Maximum power consumption: 4000W

No-load hover time: 18min Full load hover time: 9.5min Maximum pitch angle: 20°

Maximum operational flight speed: 10m/s Maximum tolerable wind speed: sustained wind level 4, gust level 5.

Maximum take-off altitude: 2000m (load ≤ 15 kg)

Recommended working environment temperature: 0°C to 40°C

Homework medicine box

Rated volume: 10L Maximum volume: 10.2L

Rated working pressure of the whole machine: 0.2-0.4MPa

Medicine box material: PP

Flow meter

Flowmeter type: impeller flowmeter

Flow measurement error: $\leq \pm 5\%$ Flow measurement range: 0.5-10L/min

Water pump

Waterpumptype: brushless diaphragm pump

Water pump flow: 5L/min Number of water pumps: 1

Maximum system working flow: 3L/min

Centrifugal nozzle (none)

Quantity: 2 pieces

Recommended opening: $\leq 70\%$ Power: 50~150W

Flow: 5L/min

Droplet diameter: 50~100 μm

High pressure nozzle (standard configuration)

Model: VP11002 (standard configuration) Flow: 3L/min

Droplet diameter: 100~200 μm

Charger

Input voltage: AC100~230V

Input frequency: 50/60Hz Input current: 11.36A Output voltage: 50.4V Output current: 25A

Rated power: 2.5KW

Functions: overvoltage protection, overcurrent protection, short circuit protection, startup delay, shutdown delay, battery communication, USB upgrade.

JTB1830 secondary lithium-ion battery pack

Battery model: JT1216 Battery voltage: 44.4V Nominal capacity: 16000mAh

Charging voltage: 50.4 (maximum) Charging current: $\text{Max} \leq 25\text{A}$ Discharge voltage: 39.6~50.4V

Working temperature (discharge): 10°C

-60°C

Working temperature (charging): 10°C

-60°C

Storage temperature: 0°C-30°C Weight: 4.8kg

Appearance dimensions (length, width and height): 160*90*210m

Imitation ground radar

Operating frequency: 24.00 GHz to 24.20

GHz

Equivalent isotropic radiated power (EIRP): 25dbm

Working power consumption: 1.4-1.8W Height measurement range: 0.1-30 meters

Accuracy: $\pm 0.2\text{m}$

Imitation ground slope: $\leq 25^\circ$

Obstacle avoidance radar

Protection level: IP66

Working frequency: 77GHz frequency band dynamic target detection

Equivalent isotropic radiated power (EIRP): 29dbm

Working power consumption: 2.5w power, 5~32v wide voltage

Perceptible distance: 2-30 meters Viewing angle (FOV):

Vertical $\pm 7.5^\circ$

Horizontal 112°

Safety distance: 8 meters

(Identify the distance between the obstacle and the obstacle after hovering)

Conditions of use: The flight height is higher than 1.5 meters, the flight speed is less than 6m/s, and the ground slope is less than 10°

Obstacle avoidance direction: front and rear obstacle avoidance



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