

THEA 160S Hybrid Agriculture Spraying Drone

User manual&Quick guideline

Disclaimer. 1

This product is a quadcopter. Please DO read the safety knowledge and installation instructions before using this product. To protect your legal rights, responsibilities and safety instructions; otherwise, it may cause property losses, safety accidents and personal safety hazards. Once you use this product, it means that you have understood, recognized and accepted all the terms and contents of this article and agreed to abide by these terms and the relevant policies and guidelines.

Personal injury, property damage, etc. (including direct or indirect damage) caused by the following reasons during flights, shall not be liable for compensation and legal responsibility.

- 1. The damage caused by pilots under drinking, taking drugs, drug anesthesia, dizziness, fatigue, nausea and other poor physical or mental conditions, pilot cause.
- 2. The personal injury, property damage, and legal liability caused by pilots' subjective intentions caused personal injury, property damage, and legal liability.
- 3. The Compensation for any mental damage caused by the accident.
- 4. The Damage caused by operators operating in prohibited areas such as nature reserves.
- 5. The product is not assembled or operated according to the correct guidance in this manual.
- 6. Other damages caused by self-modification or replacement of accessories or parts not manufactured by us, resulting in poor operation of the entire aircraft.
- 7. The damage caused by using products not produced by us or imitating Foxtech products.
- 8. Compensation for damages caused by pilot errors or errors in subjective judgment.
- 9. The aircraft's natural wear and tear (flight time of 100 hours or more), corrosion, and line aging have caused poor operation of the aircraft itself.
- 10. The crash by a low-voltage alarm and it's not landed.,
- 11. The damage caused by forced flight under an abnormal state (such as water, oil, soil, sand and other unidentified substances, uncompleted assembly, obvious failure of main components, obvious defects or missing parts), damage caused by forced flight.

Disclaimer. 2

- 12. Damage caused by flying under conditions that are not suitable for control, such as poor eyesight, and other conditions that are not suitable for control, The aircraft is in a magnetic field interference zone, a radio interference zone (such as near high-voltage power lines, large power equipment, radio and television transmission towers, mobile phone base stations, etc.), a no-fly zone specified by the government, or the pilot's vision is in backlight, blocked by obstacles, blurred vision.
- 13. Flying in bad weather, such as rain or wind (wind speed is over 4), snow, hail, etc.
- 14. The aircraft has encountered collisions, overturns, fires, explosions, lightning strikes, storms, tornadoes, rainstorms, floods, tsunamis, ground subsidence, ice subsidence, cliff avalanches, avalanches, hailstorms, mudslides, landslides, earthquakes, etc.
- 15. The damage of battery caused by the improper matching or use of the protection circuit, battery pack, and charger.
- 16. All flying and shooting without following the instructions.
- 17. The legal liability caused by the pilot's failure to comply with local laws and regulations, which causes personal and property losses, or damage to the ecological environment.
- 18. Damage and legal liabilities caused by pilots who recklessly conduct risky and unsafe flights without completing sufficient flight training.
- 19. Pilots try to fly in places that are prohibited by laws and regulations or related administrative units.
- 20. The pilot fails to comply with the official announcement of foxtech on the official website of, this product manual, the user's quick start guide and this disclaimer mentioned in the use methods and various precautions for losses and legal liabilities.

Precautions for the use of aircraft

- 1. Please stay away from unsafe factors such as obstacles, crowds, and high-voltage lines when flying.
- 2. Be sure to fly under a safe take-off weight to avoid danger.
- 3. Please check whether the propeller and motor are installed correctly and firmly, and make sure that the forward and reverse rotating propellers are installed in the correct position. Do not get close to or touch the rotating motor or propeller during testing to avoid injury from the propeller.
- 4. Avoid mutual influence or interference between wireless communication devices such as remote control transceivers, on-board WiFi devices, and other wireless devices.
- 5. Ensure that the remote control, batteries and all components have sufficient power supply.
- 6. Ensure to turn on the remote control first, and then start the aircraft. After landing, disconnect the aircraft and battery, and then turn off the remote control.
- 7. Please be sure to check whether the parts are in good condition. DO not fly if any parts are aging or damaged.
- 8. Do not use it in places with complex electromagnetic environments, such as near high-voltage lines, near large power equipment, near mobile communication base stations, and near TV broadcasting towers. This may affect the communication of this product, causing the remote control or image transmission communication to be abnormal, or affect the aircraft heading judgment and positioning accuracy.
- 9. Do not fly in severe weather such as strong wind, rain, sandstorm, etc.
- 10. Please read the instructions carefully, as well as related instructions and videos on the Internet before flying.

Requirements of flight environment

- 1. An open place with no tall buildings around as the flying field. if it's near buildings and trees, the GPS signal is relatively weak, and the GPS fixed-point function and GPS return-to-home function may be invalid.
- 2. Do not use in bad weather, such as strong wind (wind speed level 4 and above), heavy snow, rainy and foggy days.
- 3. Please stay away from obstacles, crowds, high-voltage lines, trees, water, etc, while flying.
- 4. DO not fly in places with complex electromagnetic environment (such as base stations or transmission towers around), so as not to force the controller to be interfered with.
- 5. Can't be used in antarctic and arctic
- 6. Do not fly in no-fly areas restricted by relevant laws or regulations.













Fly in the visual range Fly height under 30 meters











Please stay away from crowds, trees, wires, tall buildings, airports and signal towers when flying. Radio towers, high-voltage lines, substations, and large pieces of magnetic metal may interfere with remote control signals and compasses, threatening flight safety











Do not fly in weather such as rain, heavy fog, snow, thunder and lightning, strong wind (wind speed of 10m/s and above).

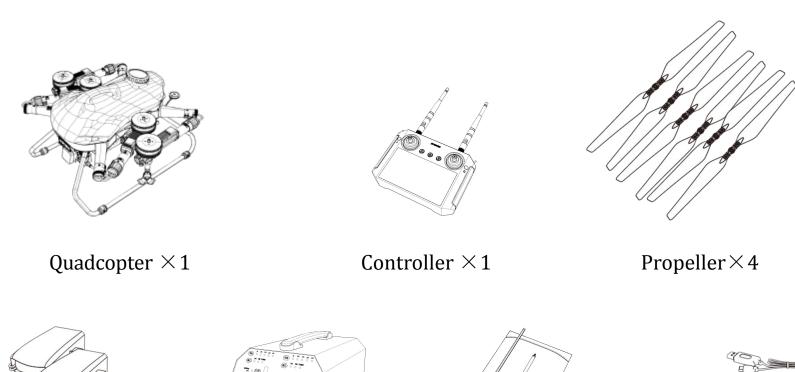




Do not fly in no-fly areas

Item list

Before using this product, please check whether the package contains all the following items. If anything is missing, please contact us.



7S battery X2

 $Charger\!\times\!1$



Tool kit $\times 1$



USB Flight control data cable \times 1 USB USB data cable \times 1

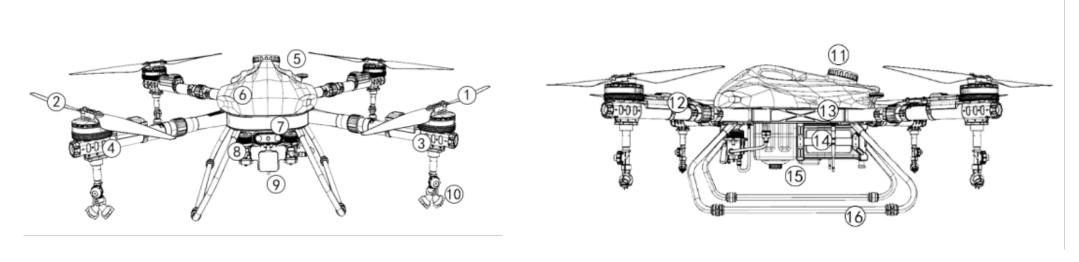


 $\begin{array}{l} \text{User manual} \times 1 \\ \text{Quick guideline} \times 1 \end{array}$

Know the aircraft

THEA 160S Agriculture Drone adopts a new design structure and embrace folding way, which is convenient for transportation and storage during operation.

The body frame is made of imported 3K carbon fiber material, it's is high strength and light weight. The body shell is made of imported PC explosion-proof material, which is dustproof, waterproof and anti-corrosion.



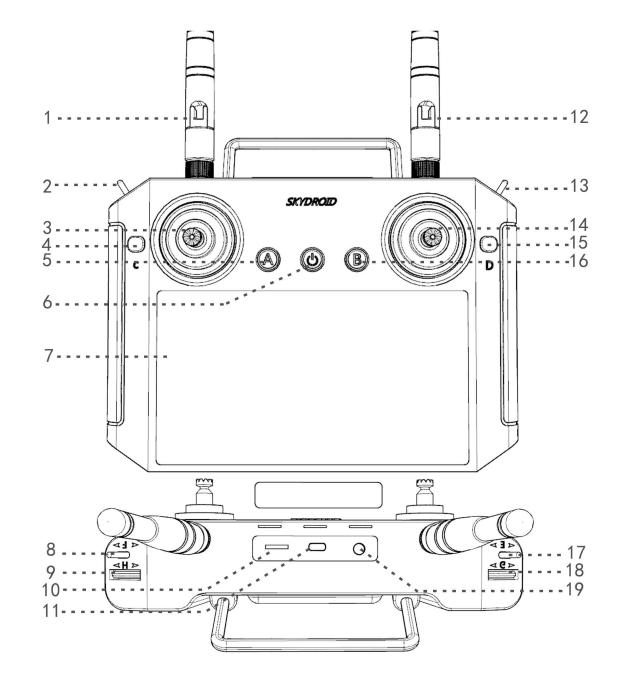
- 1. CW propeller
- 2. CCW propeller
- 3. CW motor
- 4. CCW motor
- 5. GPS Antenna
- 6. 22L Spray tank

- 7. FPV Camera
- 8. Water Pump
- 9. Obstacle Avoidance Radar
- 10. Pressure Nozzle
- 11. Pesticide Tank Cover
- 12. Drone Arm

- 13. Drone Body
- 14. Generator
- 15. Terrain Follow Radar
- 16. Landing Gear

Controller

- 1. Antenna
- 2. Mode button
- 3. Left joystick
- 4. Switch of obstacle avoidance radar
- 5. Switch of auto-return
- 6. Power
- 7. Displayer
- 8. A-B point button
- 9. Blank
- 10. SD card slot

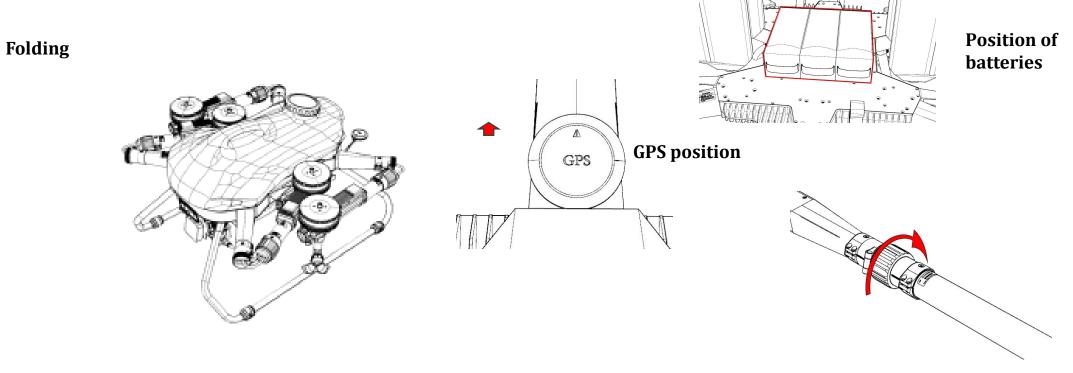


- 11. Charge port
- 12. Antenna
- 13. A-B point record
- 14. Right joystick
- 15. Switch of terrain radar
- 16. Switch of waterpump
- 17.Mode button
- 18. Blank
- 19. 3.5mm interface

Preparation

Installation before flying, take out the aircraft, please check whether the aircraft is damaged during transportation, and confirm whether all the accessories of the aircraft are equipped with.

Adjust the GPS of the aircraft horizontally, the direction of the GPS arrow points towards forwardly, then tighten the screws of the fixing parts.

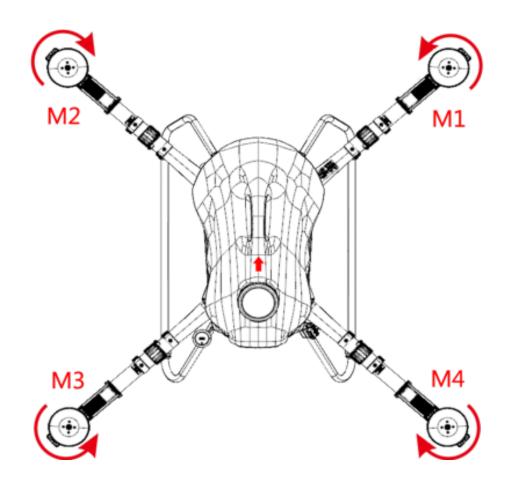


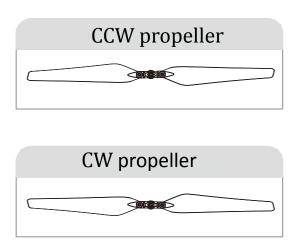
Unfolding the arms, tighten the screws of folding parts.
(PS: Ensure tightening the screws after going throught the rivet, make sure every folding part is tightened.

Note: Pay attention to clean up foreign bodies (such as sand, dust, etc.) on the folding part while using.

Installation of propeller

While installing, please check the rotation (CW/CCW) of propellers, then fix and screw them in matched motors(CW/CCW motor) with M4 screws which are packed with propelles.





Note: Please ensure the correct rotation of propellers and motors, in case of bring damage to the aircraft.

Operation basics

Controller control method:

Please refer to right pictures to understand movement of the aircraft:

Default setting is "Amercian hand", please refer to the left ones.

If needed to change to "Japanese hand", please change it in setting => Joystick mode, then refer to right ones.

"Amercian hand"

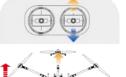
Movement head of the aircraft



Rise/down



Rise/back



ise/back



Righ dive/left dive



Horizontal rotation



"Japanese hand"

















Agri Assistance, 1

Flight safety notice

It's very important for protecting the safety of surrounding people and the environment with necessary safety instruction of flight.

- 1. Flying in an open field: pay attention to obstacles such as telephone poles and high-voltage lines while flying, and stay away from water, crowds and animals.
- 2. Flying within visual sight: Please keep the aircraft within visual sight at all times, and avoid flying behind tall obstacles that may block the line of sight.
- 3. Full control during the flight: Even when using the route operation mode, A-B point operation mode, and automatic return to home, please keep the remote control in your hand to control the aircraft at any time.
- 4. Controlling the flying height: To ensure the flight safety of the aircraft and civil aviation, please control the height of the aircraft within 30 meters. If there are no-flying or flying height restrictions below 30 meters in your area, please follow those regulations.

Agri Assistand APP downland, only for Android



Scan QR code or enter the website in browser http://d.firim.top/m3y2



Agri Assistance, 2

Connect APP: Power the controller and the aircraft => Open "Agri Assistance" => Open Bluetooth => Select and connect the controller accordingly, all data will be displayed after matched successfully.

1. Homepage, switch the mode of	"Ground plan" and "Star	t"
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2. Connection status.	14.Zoom the transmission.

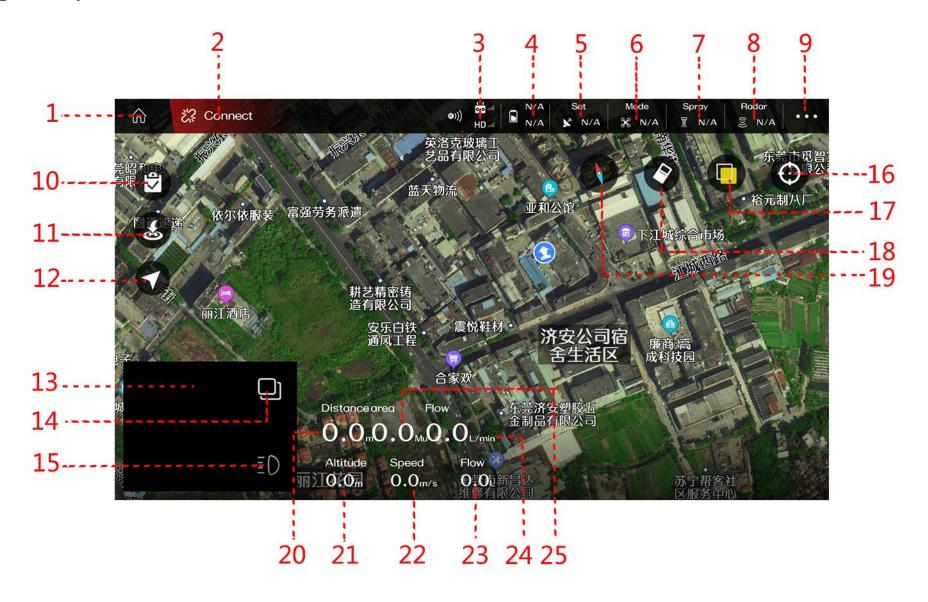
3. Transmission signal between control	oller and aircraft.	15.Button of LED light.
O .		0

4. Power indicator, check the voltage of batteries.	16. Location.
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5. GPS signal, it must be over 16, then to start flight.	17. Switch the map.
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- 6. Mode of aircraft. 18. Wipe up the orbit.
- 7. Button of spray, can adjust the spary mode and rate. 19. Compass.
- 8. Terrain radar, set the height of terrain.(The radar should be equipped with). 20.Fly distance.
- 9. Parameter menu. 21.Fly height.
- 10. Mission list.
- 11. Return to take-off point. 23. Spray volume
- 12. Switch mode. 24.Spray rate
- 13. Image and video transmission display, it needs to connect via OTG cable. 25.Fly area

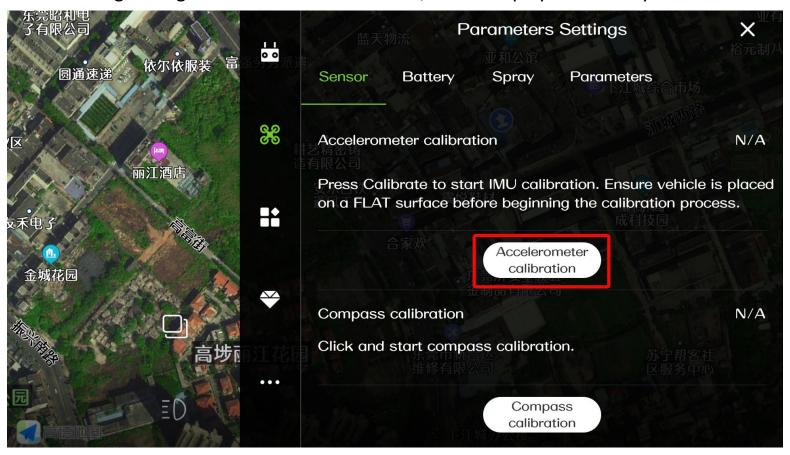
Home page of fly status



Calibration of flying

Accelerometer calibration

Power the aircraft with self-check => enter APP => Click the menu and find sensor => Click "Accelerometer calibration" as below picture => Keep in static and wait for flasing LED light for 3~5 sec in calibration, APP is displayed normally.

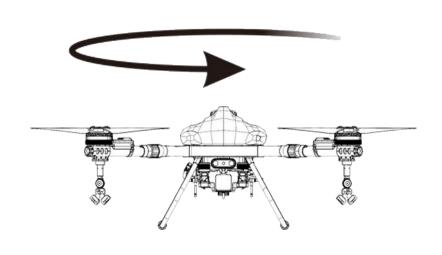


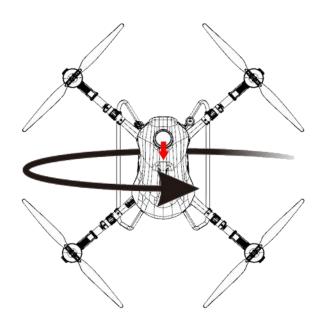
Calibration of flying

Compass calibration

Power the aircraft with self-check, wait for GPS signal to calibrate the compass. There are 2 methods to do it.

- 1. Enter APP => Open menu and find sensor => Click "Compass calibration" => When the LEG light is flashing, it means the calibration is started.
- 2. Push the button of mode up and down for 6 times quickly. => When the LEG light is flashing, it means the calibration is started.



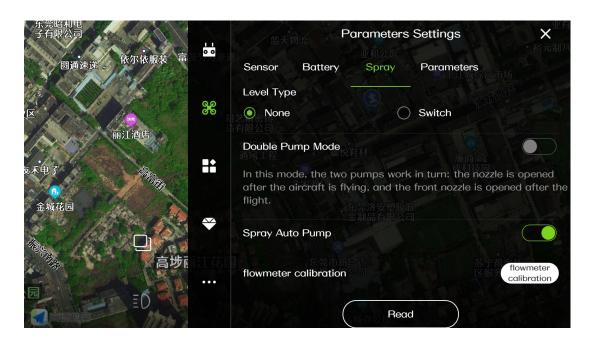


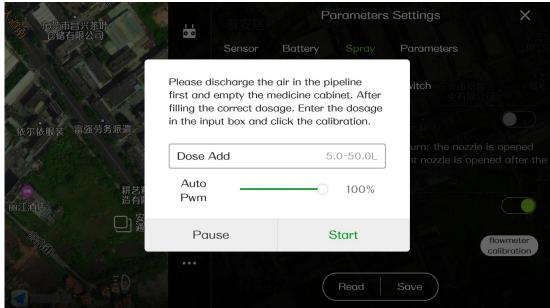
calibration: LED light is flashing **Yellow**, lifting up the aircraft for rotating 360° horizontally untill **Green** light is flashing. Then turn to aircraft vertically (GPS arrow)towards the ground and rotating 360°. When it flashes **Yellow**, **Green and Red**, it means the calibration is succeeded. **Repower the aircraft**.

Calibration of flowmeter

Power the aircraft with self-check => enter APP => Click the menu and find Spray => Click "Read" => Click "Flowmeter calibration" as below picture.

=> Fullfill the tank with 5L water => Enter "5L" in the blank => Click "Start" => Open the switch of spray to outlet the air => When it's out of water, the calibration is finished. Refer to below picture.





Fly operation

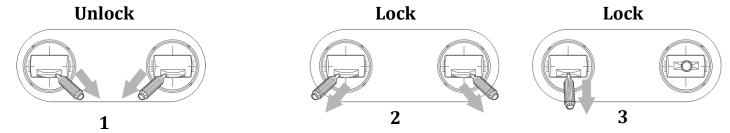
Take off

Please install propellers and all fly data are normal, unlock the aircraft with joysticks as picture 1 " \lor " to start motors. Push up left joystick " \uparrow " to take off.

Landing

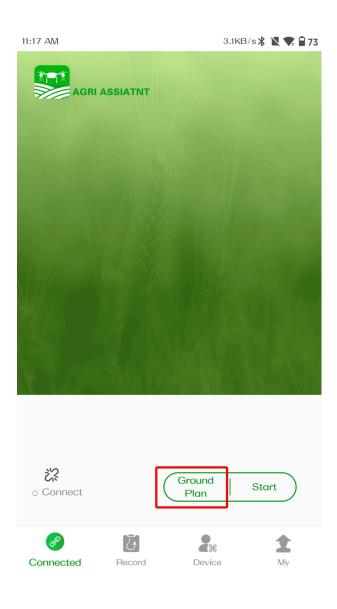
Pull down left joystick "↓" until the aircraft is landed. After landed, there are 2 methods to stop motors.

- 1. After landed, pull down left joystick "↓" to the bottom, pull joysticks as picutre 2 "✓" "\" to stop motors gradually, release joysticks until heard notice.
- 2. After landed, pull down left joystick "↓" as picture 3 to the bottom for 3 seconds to stop motors, release joysticks until heard notice.



- If do not take off, please do not unlock the aircraft to start the motor, check if the flight modes and status are normal.
- High-speed rotating propellers are dangerous. When using the aircraft, keep a safe distance and keep the aircraft away from crowds, buildings or other obstructions.
- Make sure to keep the controller in your hand and ensure that the aircraft is fully controlled before the aircraft motors are stopped.
- During the flight, do not stop the motors, otherwise the aircraft will crash. Unless special circumstances occur, the motor needs to be stopped urgently to minimize damage.
- After landed, disconnect the aircraft from the power source before turning off the controller. In the same way, the controller must be turned on before power the aircraft.

Ground plan



Enter App, click "Ground Plan"

Located the aircraft and pilot, clock the button of mission list as below picture. It's used for planning the graound, so as to do spray work by aircraft efficiently.



Ground plan

My ground: Select planned grounds do mission again(no need to change specs).

Around ground: Select the planned grounds aroundly.

Add new plot: Add a new ground to do spray work.

It can distribute the spray work based on planned grouds, then start to spray.

Or, if a new ground needs to be added, click "

New Plot", then it show 3 methods as below pictures.

Handheld GPS(RTK) point device: Connect mobilephone with GPS device (Open OTG), then start to add boundary points according to ground.

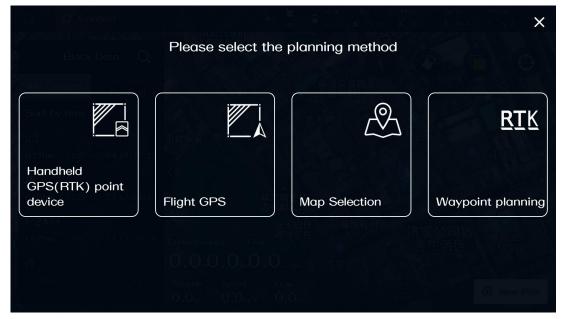
Flight GPS: Operate the aircraft to add boundary points according to ground.

Map selection: Choose the mapping points of APP to add boundary points according to ground.

Waypoint planning: Use RTK kit and latest firmware of flight control, then add ground with 3D points.

GPS accuracy: Waypoint > Handheld **GPS(RTK)** > Flight **GPS** > Map selection





Add New Plot

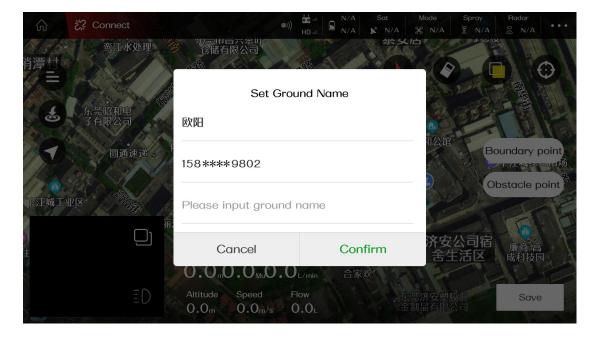
Set ground name: Enter ground name, time, crop type to identify spray works.

Boundary point: Set the points of boundary. **Obstacle point:** Set the points of obstacles.

New plot adding: After setting the name of the plot, click OK, and use the boundary point button to dot the work area. To form an area, it needs three boundary points at least, which can be deleted by a single point boundary point, and long press to drag the boundary point to reselect(The boundary points cannot be crossed).

After adding the pressure boundary points, click Save to save the plot. The plot tasks that have been planned and

After adding the necessary boundary points, click Save to save the plot. The plot tasks that have been planned and saved can be found in the task list.





Add New Plot

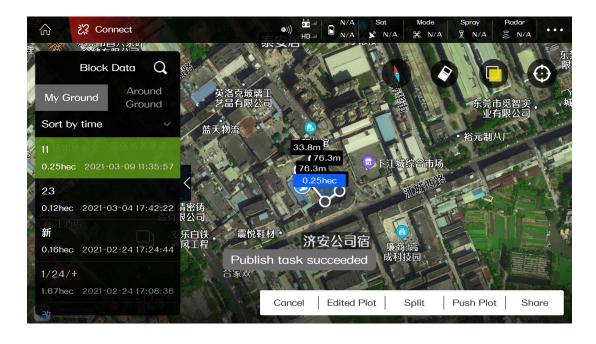
Edited plot: Edit the planned plots for times.

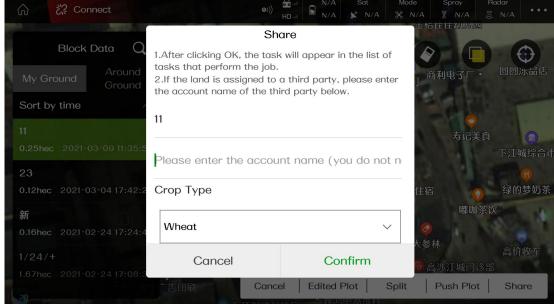
Split: Split the planned plots for more aricraft to do spray work.

Push plot: To share the planned plots.

Share: Distribute the planned plots to groud list, then start to spray.

Planned plots are needed to "Share", enter name(refet to below pictures) to save plot information, then find it in ground list. If needed to distribute to thir-party, account for thirty-party are needed, then find it in ground list after distributed. Also, it can choose different crop type to identify, it's easy to do spray work again next times.







Enter APP, click "Start"

Locate the aircraft and the pilot, click ground list as below. To select grounds to do spray work by the aircraft.



Help point: Adding point to correct positioning deviation while do second spray works.

Route adjust: Adjusting the specs of flight line

Start: Start to do spray work according to planned plot.

Spacing: Adjusting the distance of each flight line, it's relavant to spray width.

Indentation: Adjusting the distance between flight line and boundary.

Obstacle boundary distance: Adjusting the distance between flight line and obstacle boundary.

Route type: The methods of obstacle avoidance, turn back, detour or reverse.

Route setting: Adjusting of the whole route.





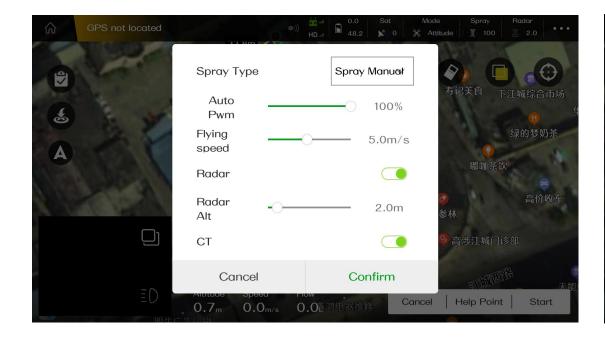
After setting the route, click "Start", it will pop out a window of setting.

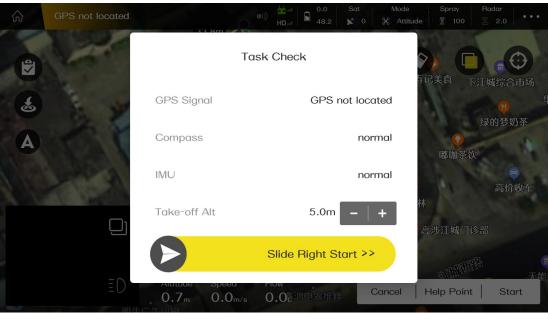
Spray type: Set modes of spray, spray manual, accurate spray, linkage spray.

Flying speed: $0\sim10$ m/s.

Adjust radars and CT(Coordinated turn)

Click "Confirm", after uploaded the route and set the height of take-off. Slide the bar to the right to start auto-spray work. If it's not take-off, slide the bar to right, the aircraft will take off automatically and start spraying. If it's take-off, slide the bar to right, the aircraft will start spraying automatically.



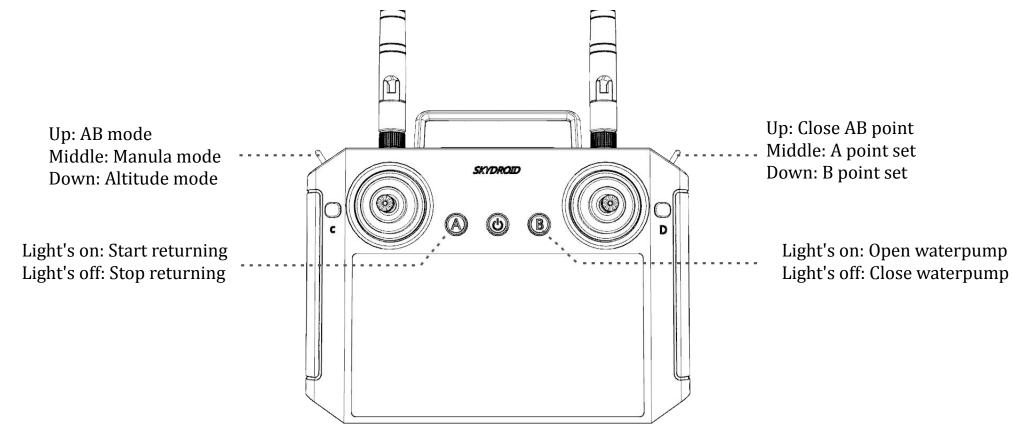


Manual spray mode

Manual spray: Please push the rod to manual mode to do spray work, open the switch of waterpump and the aircraft will start spraying.

In the auto-spray work, after it's out of solutions, the light will flasing Yellow, Green and Red, then it will be hovering and recording the point. At this time, any control will be not available, please switch the rod of modes, altitude mode or manual mode.

Then operate the aircraft to the point of taking off manual, or choose one-key return.



A-B point mode

Power the controller abd the aircraft, push "AB mode" up and down for 6 times quickly and stay on "AB mode", the light will flash Yellow, Green and Red, then wipe up AB points.

Operate the aircraft to the ground, switch to "AB mode" and enter AB point spray.

Frirstly, fly to A point as below picture according to different spray work, then swtch to "A point", the light will flash Yellow, it means A point is set successfully. Secondly, fly towards B point and switch to "B point", the light will flash Green it means B point is set successfully.

Lastly, pull the left joystick to choose direction.

①Left spray, pull left joystick to the left for 3 seconds

②Right spray, pull left joystick to the right for 3 seconds

After pulling, the aircraft will start spraying automatically. Please keep on eyes on the work, as there is no limitation of terrain during AB points spray.

Left spray

Right spray

point

Apoint

After it's out of solutions, the light will flasing Yellow, Green and Red, then it will be hovering and recording the point.

At this time, any control will be not available, please switch the rod of modes, altitude mode or manual mode. Or choose one-key return.

Fulfilling the tank, switch to AB mode, then the aircraft will continue spray at breaking point automatically.

Flight parameters

Regardding parameters of the aircraft, they can be adjusted accordingly. Click "Read" and load current parameters please save them after changed, otherwise it won't be saved.

Parameter like, max. speed, angle, back altitude, spray width, etc, it can be set accordingly.

Work End Action:

Back: The aircraft will be back to take-off point after finished mission according to setting height.

Hang: The aircraft will be hovering after finished mission, which needs manual operation to return back to take-off point.

U Open:

It's for turning without stop while going to next rows, which can save battery.

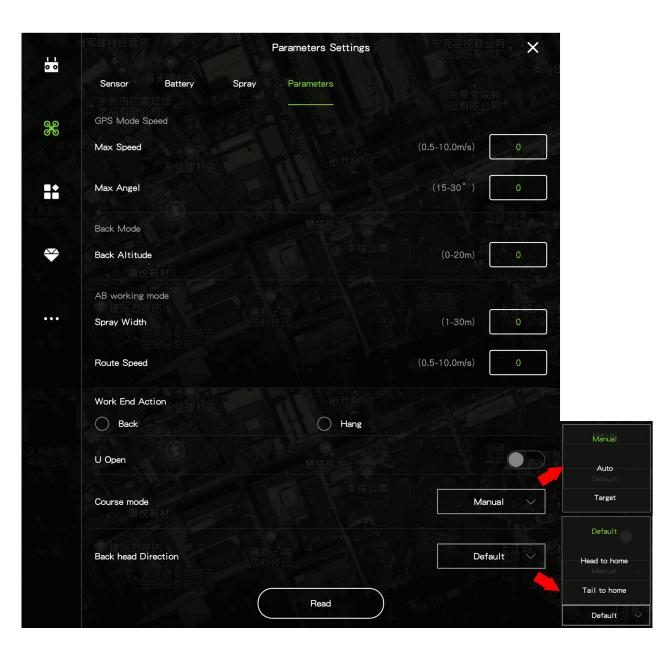
Course mode:

- a) Manual: Keep same route, but the head of aircraft is handle by pilot.
- b) Auto: The head of aircraft is towards to the flight automatically.
- c) Target: To head of aircraft is towards to next target automatically.

Back head direction:

Default: Keep same head direction.

Head to home: The head towards take-off point when it's return back. Tail to home: The tail towards take-off point when it's return back.



Engine instruction

Controller indicators:

(1)Button of switch: Switch of engine work.

(2)LED-Red light: Off work.

(3)LED-Yellow light: Idling.

(4)LED-Green light: Engine start and running.

(5)LED-Blue light: Fufill of backup battery.

Displayer:

(6) RPM: Engine rotating speed.

(7) Vol: Current voltage.

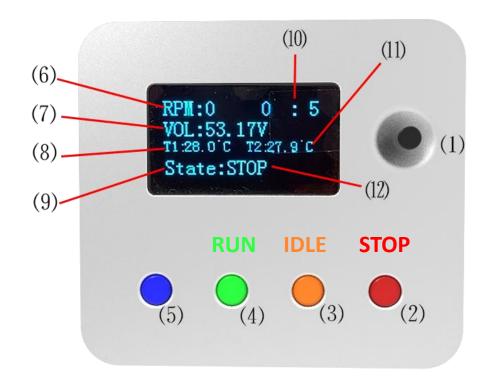
(8)T1: Current temp. of left cylinder

(9)State: STOP/IDLE/RUN

(10)Engine working hour

(11)T2: Current temp. of right cylinder

(12)Current working status.

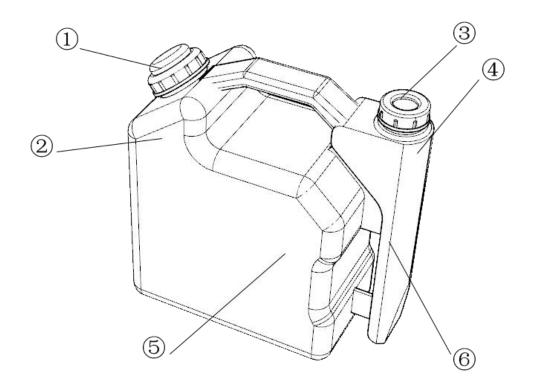


Mixed gasoline

- ①Inlet of gasoline: #92/#95 gasoline
- ②Gasoline tank
- ③Inlet of motor oil: FD grade fully synthetic 2T two-stroke motor oil
- 4)Motor oil tank
- ⑤Scale of motor oil.
- ⑥Scales(20:1、25:1、40:1、50:1)

Before 10 hours, please mix the gasoline and motor oil in "40:1" scale in advance.

FORBITS: It will cause serious jams in carburetor if used different brands or grades lubricants.



Pre-check before starting

- 1, Please check outlet is fixed tightly, the leakage of connection of outlet.
- 2, Please check if there are leakage of gas tubes.
- 3, Check if the ratio of mixed oil is correct, and whether the fuel is clean and free of impurities.
- 4, Check if the indicator is normal.
- 5, Check the voltage of battery is over 70V (18S 10000mAh, XT60 connector)

- 1, Connect the controller and power on, switch to idle, LED light Yellow, LCD displayer status is IDLE. There is a buzzing sound when powering on.
- 2, Pull the starter and release it after engine started. If it's not started with for 2 times, please close the choke and pump the oil for 1 sec, the start the engine after open the choke. **Please disconnect the starter after engine started.**
- 3, If pump too much oil, it will cause jams in the engine. It needs to take out sparks, then outlet the oil via started. If it's not work, please reconnect the starter and restart it.
- 4, If the engine is not work, please refer to error list to clear the fault.

Opertation

If it's cool start, it needs pump oil for carburetor. Firstly, connect the power cable and pull up the rod of choke, keeping it in close, then start the engine working. Please release the starter when there is a buzzing, then pull down the rod of the choke to keep it open, then press the button.

- 1, Please keep running in idling for pre-heating with 1min while it's cool start, otherwise no need. (There will be "BeeBeeBee" indicator while connect to starter)
- 2, When it's under idling or funning, the air cooling will be started automatically when the temp. of T1/T2 is over 50°C. We can check if it's normal before the outlet valve.
- 3, Switch to running status, LED is "Green" (Note: Pleaes DO NOT switch it while the starter is connected.)
- 4, Check the voltage in **Blue light**, if it's flashing **blue**, it mean the voltage is not enough and keep it in running status. If it's **Blue** always, we can start to fly the drone.
- 5, During the flight, the voltage will be floating in proper range with altitude changes. If the voltage is down to 52V quickly, please land and check the drone at once to keep a safe flight.
- 6, While landing with backup battery, it's up to capacity of batteries and loading, please DO NOT disconnect the batteries when the engine is not in "OFF" status.
- 7, After landed, please switch to idle for 30S, then shut down the engine. At this time the cooling system will be fully stop granually until the temperature of T1&T2 are down to 50° C.

(There is a button for switching working status on the right of LCD screen. Short press is for switching status. Long press for 3 seconds, the engine will stop working from idling/running.)

Turn off the engine:

After landed, switch to idle (Yellow LED) for 1min for fully cooling. Then switch to turn off (Red LED). After every spray work, please clean the dust and oil on the surface to keep cleaning, please pour the rest mixed oil to another container to ensure there is no any oil in gas tank, which can avoid accident.

Maintenance:

- 1, Please check and clean the carbon deposits on spark plug on time. The gaps between spark plug is needed also, normal value is 0.6-0.7mm.
- 2, Clean carburetor on time, it can avoid insufficient supply of oil while operation and overheat of engine, this can shorten service lift and damge the engine in severe cases.
- 3, Please check backup batteries on time, such as balance of voltage of each sector battery, please use balanced charger to keep the balance of voltage.
- 4, If it's not used for long time, take out the spark plug, then add 10g 2T motor oil, rotate the engine for 5 circles and install the plug.