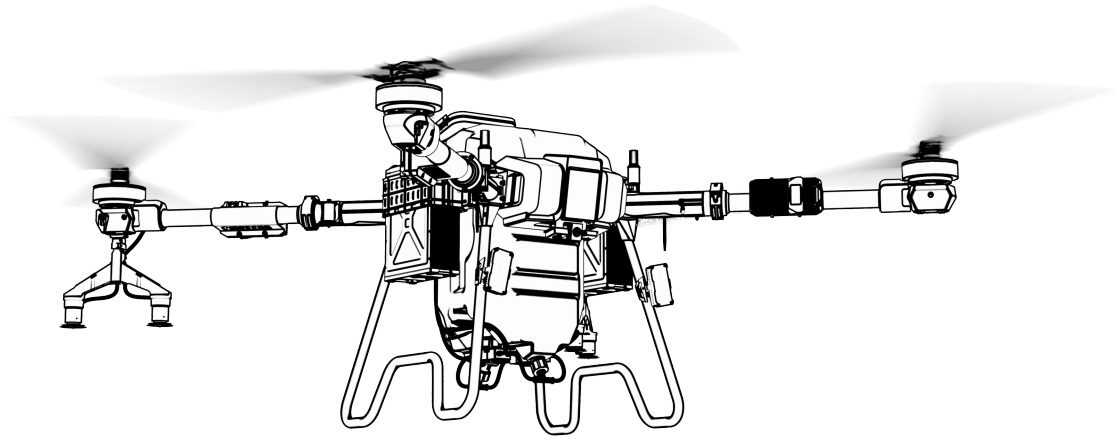
FP700

Agriculture Drone

User Manual V1.0



Yifei Technology Co., Ltd.

Usage Recommendation

We provides user with the following documents:

1. Packing List
2. FP700 Agriculture Drone User Manual
3. Agriculture Assistant APP User Manual

For detailed usage and functions, please refer to “FP700 Agriculture Drone User Manual". You can also follow us on YouTube Channel for tutorials and tips in the operation.

Foreword

The FP700 agricultural drone is a mature multi-rotor UAV, leading the industry in function, appearance, control, safety, and other aspects. Due to their mechanism and structure, multi-rotor drones present certain inherent risks during operation. Please strictly follow the safety tips and user manual during operation. Improper use of this product can result in direct or indirect losses and injuries.

Disclaimer

Please read this manual carefully before using the aircraft. Once the drone is used, it is deemed an acknowledgment and acceptance of all the terms within this disclaimer.
This drone is suitable for people 18 years of age and older. Topxgun is not responsible for the loss of personal property or personal injury resulting from the following:

1. The user does not assemble or use the drone as required by this manual.
2. The user operates the drone while under the influence of alcohol or drugs, or while fatigued or otherwise mentally or physically impaired.
3. The user actively or intentionally operates the drone to create damage.
4. The user modifies the drone using non-Topxgun accessories, resulting in malfunction of the drone.
5. Injury caused by the user's misoperation or subjective misjudgment.
6. Damage caused by normal wear and tear or circuit aging that prevents normal operation.
7. Damage caused by the user's operation of the drone while knowing that it is in an abnormal working condition.
8. The user still operates the drone under severe weather conditions such as typhoons, hail, and fog.
9. The user operates the drone in the magnetic interference area, radio interference area, and government no-fly area.
10. The user operates the drone in conditions of poor visibility or where the line of sight is obstructed.
11. Infringement resulting from the user obtaining any data or imagery through the operation of the drone, or any other infringing behavior.
12. Other losses that are not within the scope of the company's liability.

Safety Introductions

1. Pesticide Usage

- Wear protective clothing to prevent direct body contact with the pesticide while operating.
- Avoid using powder pesticides where possible, as they may reduce the service life of the spraying system.
- Always use clean water when preparing pesticides to avoid impurities blocking the strainer. Do not remove any filters. Clean any filter blockages before use.
- After using pesticides, please clean up the residual liquid promptly. Strictly avoid contaminating rivers and drinking water sources. Ensure disposal methods do not harm people, animals, or the surrounding environment.
- The effect of the pesticide is closely related to the concentration of the pesticide, the spraying rate, the altitude of the drone from crops, the wind direction, the wind speed, etc. The above factors should be taken into account comprehensively when using the pesticide in order to achieve the best effect.
- Strictly follow the safety instructions of the pesticide production company.
- Prohibit the use of non-approved liquids or fluids not specified for this system.
- During operations, pay attention to factors such as wind direction and pesticide toxicity, to prevent pesticide damage to adjacent plots due to mist drift.

2. Operating Environment

- Always fly in an open space, away from the crowd.
- Always operate the drone during daylight hours.
- Fly below the maximum permitted altitude according to local regulations. It is recommended to fly at an altitude of no more than 120 meters above ground level or your takeoff point.
- Fly in an environment with a temperature between 0°C and 40°C.
- It is recommended to fly in an environment with a wind speed below level 4.
- It is strictly forbidden to fly in rain, fog, snow or other extreme weather.
- It is strictly forbidden to fly indoors.
- Only fly in legally permitted areas. Before flying, please consult your local flight management department to comply with local laws and regulations.

3. Pre-operation Inspection

- Make sure that every device is fully charged.
- Make sure that all parts are in good condition. If any parts are worn or damaged, please replace them before the flight.
- Ensure the landing gear and tank are securely mounted, and all screws are tight.
- Make sure that the propellers are intact and firmly mounted, the propellers and arms are fully unfolded, and the arm locking mechanisms are securely fastened.
- Make sure the motors are clean and free of damage.
- Make sure the spraying system is free of blockage and works properly.
- Please calibrate the compass before the flight.
- If required by local regulations, ensure the Remote ID function is operating normally.

4. Operation

- Keep away from the rotating propellers and motors.
- When folding the drone, avoid crushing parts or pinching hazards.
- Do not exceed the take-off weight of 104.7 Kg to avoid danger.
- Operators must be professionally trained and pass the assessment, and the untrained personnel must not fly the drone.
- Make sure that the propellers are removed before calibrating the drone and upgrading the firmware.
- When the drone and the remote controller are in the frequency-connecting pairing process, make sure that the propellers are removed and that people and animals are far away from the motor.
- An operator should not operate this product under the influence of alcohol, fatigue, illness, etc.
- If the operating environment does not meet the working condition of the radar module, the drone will not avoid obstacles when it returns automatically. If the remote-control signal is normal, the flight speed and altitude can be controlled using the remote controller.
- When starting up, be sure to turn on the remote controller first, and then turn on the drone's power supply (connect/power on batteries). After landing, disconnect the

drone's power supply first and then turn off the remote controller.

- Please maintain control of the drone throughout the process and do not rely entirely on the information provided by the remote controller (RC).
- Obstacle avoidance and terrain-following functions may be unavailable in certain flight modes or environmental conditions. Please observe the attitude of the drone at all times and judge the flight condition reasonably to avoid obstacles promptly.

5. Flight Restrictions and Local Laws

The maximum control flight altitude is 20 meters in China. * Maximum controlled flight altitude limits vary by region. Regulations may differ in each country, please consult the local flight management department before taking off, to comply with local laws and regulations.

Special Note: Safety operation instructions include but are not limited to the above items.

Intellectual Property Rights

The intellectual property rights of this product and its manual belong to Topxgun Robotics Co., Ltd. Without written permission, any organization or individual may not copy, reproduce or distribute them in any form. If the quotation is required, the source should be indicated and the manual should not be modified, deleted or quoted contrary to its original intention.

About this Manual

This manual is used as a user's guide. Photos, graphics, charts and illustrations in the manual are only for explanatory and illustrative purposes and may differ from the actual product. Please refer to the actual product.

Due to product upgrades or other reasons, the content of this document will be updated from time to time. Unless otherwise agreed, it is without further notice.

Before using this product, please read this manual carefully.

Execution standard of this product: Q/TG_002-2024

All rights reserved by Topxgun (Nanjing) Robotics Co., Ltd.

Content

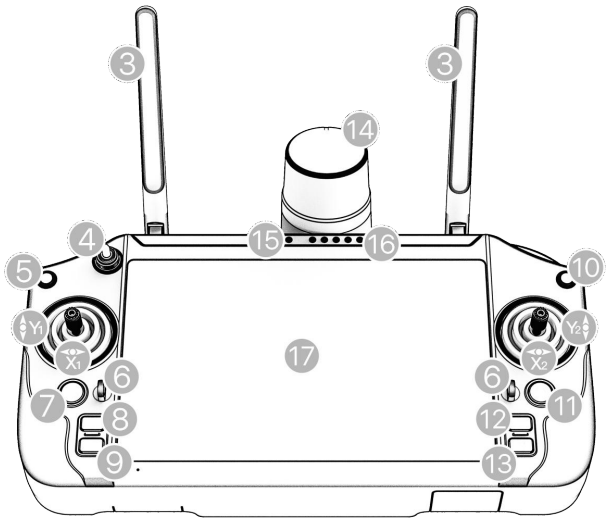
Disclaimer 1
Safety Operation Introduction 3
1. Product Overview 7
    1.1. Remote Control 7
    1.2. Smart Battery Introduction 15
    1.3. Charger (TC9002P) 19
    1.4. Spreader (Optional) 26
    1.5. Drone Introduction 35
2. Flight 42
    2.1. Flight Instruction 42
    2.2. Indicator Description 45
    2.3. Operation 46
    2.4. Function Introduction 51
3. Maintenance and Common Troubleshooting 61
    3.1. RC Maintenance & Precaution 61
    3.2. Drone Maintenance & Precaution 61
    3.3. Motor Maintenance & Precaution 61
    3.4. Propeller Maintenance & Precaution 62
    3.5. Battery Maintenance & Precaution 62
    3.6. Plug Maintenance & Precaution 65
    3.7. Spray System Maintenance & Precaution 65
4. Transportation Instructions 65
5. Hazards and Safety Checklist and Countermeasures 66
6. Appendix 67
    6.1. Specification Parameters 67

1. Product Overview

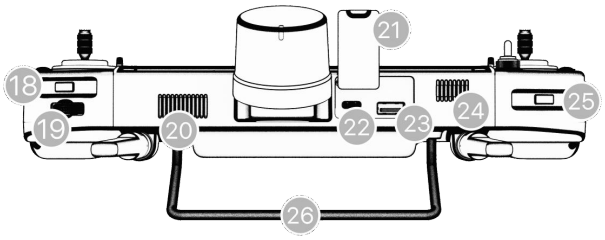
The FP700 agricultural drone has undergone several iterations of upgrades, and now reaches the leading level in practicality, reliability and safety. The drone is full-body waterproof, dust-proof and anti-corrosion. Some key modules, such as spraying system, radar system and power system, are IP67 rated ensuring easy cleaning and maintenance. The GNSS+RTK dual-redundant positioning system achieves centimeter-level high precision positioning, and also supports dual antenna anti-magnetic interference direction-finding technology. The drone is equipped with a wide-angle FPV camera and high-definition digital image transmission system, allowing users to observe the forward operating environment in real time.

1.1. Remote Control

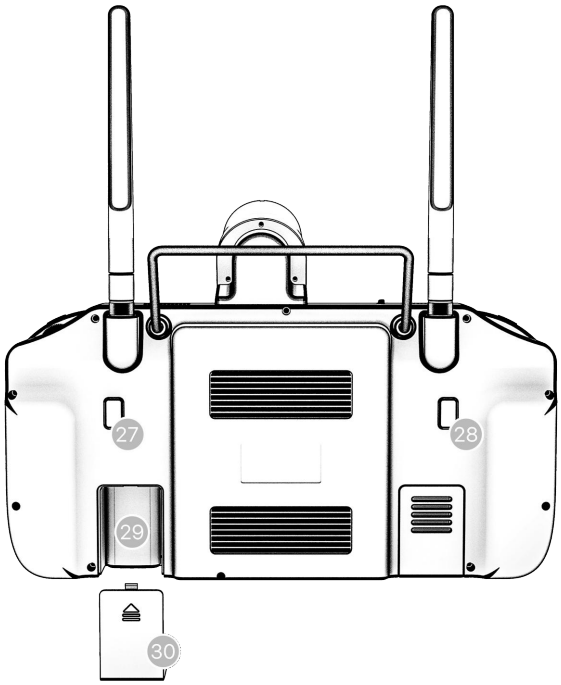
1.1.1. Component Definition



1-1



1-2



1-3

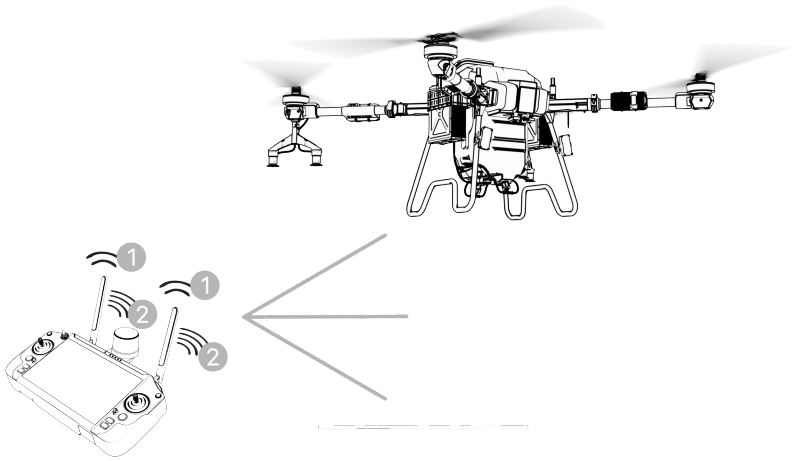
The Main Control Buttons of the Remote Control (American Mode)			
No.	**Component**	**Corresponding Function**	**Function Description**
Y1	Throttle	Left stick - up and down	The drone moves vertically (up and down)
X1	Yaw	Left stick - left and right	The drone rotates(left and right)
X2	Roll	Right stick - left and right	Fly left and right
Y2	Pitch	Right stick - up and down	Fly forward and backward
3	Antenna	Primary and auxiliary antenna	Transit the control signal, telemetry signal, telegraphic signal
4	Switch Mode Button	Toggle the switch	Switch between GPS mode and Attitude mode (Turn off by default, you can turn on in Setting)
5	Return Button	Return to the previous section	Return to the previous section in the Agriculture Assistant APP
6	Hanging Holes		For lanyard attachment
7	RTH (Return-to-home) Button	Long press for 2s, the Drone will return home	Long press the RTH button to activate the smart return mode
8	L1 Button	Customizable Button	Default to rudder switch button
9	L2 Button	Customizable Button	Default to obstacle avoidance radar switch button
10	Emergency Stop	Long press for 5s to lock the drone	Press for 5s to lock the drone in case of emergency

11	Power Button	Long press 3 seconds to turn on or turn off the RC	Long press to turn the RC on/off. When the RC is on, a short press can be used to turn the screen on/off
12	R1 Button	Functional button in APP	Adapt to the function buttons on the lower right corner of the APP (for example, continue operation, end operation, previous step, next step, etc.)
13	R2 Button	Functional button in APP	Adapt to the function buttons on the lower right corner of the APP (for example, continue operation, end operation, previous step, next step, etc. Special support for long press 3 seconds, equivalent to sliding unlock function)
14	RTK Point Maker	Mark point with RC	High-precision RTK point marking
15	Status Indicator	Remote control status indication	Refer to the “Indicator Status” chapter
16	Battery Indicator	Remote control battery level	Indicate the power level of the remote control
17	HD Touchable Display Screen	For interface display and touch selection	Operate the drone and display the drone status
18	FPV Switch Button	Switch FPV/Map Fullscreen	Switch between the FPV camera and the full-screen map
19	Centering wheel	Toggle the corresponding signal output of regulation	Supported only for industry applications
20	Air outlet	Remote control air outlet	Do not cover the air outlet of the RC when using
21	Sealing Cover	Protect RC interface	
22	Type-C Interface	Remote control charging and upgrading interface	Please use the specified charger
23	USB Interface	For external USB devices	
24	Heat Dissipation Outlet	Remote control heat dissipation outlet	Do not cover it when using
25	Spray Button	Turn on/off the pump	Turn on/off the pump in the manual mode
26	Handle	Convenient for users to hold and carry	
27	Customizable Button	Record the Point B in AB Point Mode by default; Change to the right line by default in the Manual+ Mode	Customizable
28	Customizable Button	Record the Point A in AB Point Mode by default; Change to the right line by	Customizable

		default in the Manual+ Mode	
29	Wireless Network Card Slot	For installing an external wireless network card	
30	Wireless Network Card Slot Cover	Protect the wireless network card	

1.1.2. Antenna Placement

The antenna of the RC adopts a foldable design, and the signal strength varies with the positions of the antenna. It is recommended to keep the antenna vertical to the ground when you control the drone. In this case, the signal is the strongest. The position or distance between the RC and the drone is adjusted in time to ensure that the drone is always in the optimal communication range. Therefore, the antenna of the RC should not point to the drone during the flight. The recommended operation is shown in Figure 1-4.

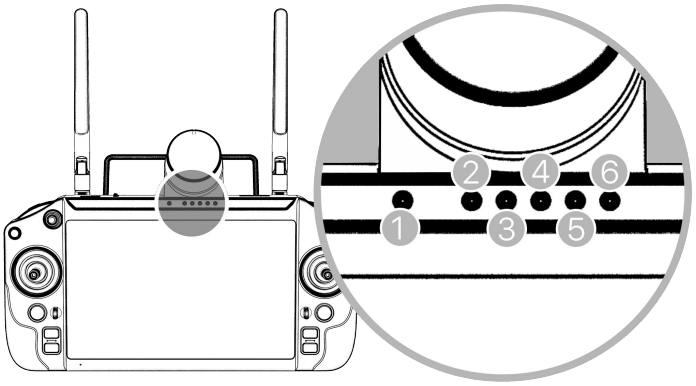


1-4 Signal Strength of the RC

1. Weak signal 2. Strong signal

Special Note: Do not fold the antenna during the flight to avoid obstruction between the RC and the drone, otherwise, the signal quality will be seriously reduced.

1.1.3. Indicator Status



1-5 Indicator Status

The RC status indicator shows the status of the RC. The indicator will give priority to link status and warning messages.

Details are shown in the table below:

Indicator Status	RC Status	On/Off Status
Solid Red	RC is not connected to the drone	On
Solid Green	RC is connected to the drone properly	On
Flashing Cyan	RC is pairing (matching frequency)	On
Flashing Green	RC temperature is too high	On
Flashing Red	RC battery is low	On
Flashing Blue	The joystick is not in the middle position	On
Solid Red (when OFF)	Charging when the battery level < 10%	Off
Solid Yellow (when OFF)	Charging when the battery level 10%-90%	Off
Solid Green (when OFF)	Charging when the battery level > 90%	Off

1.1.4. Charging

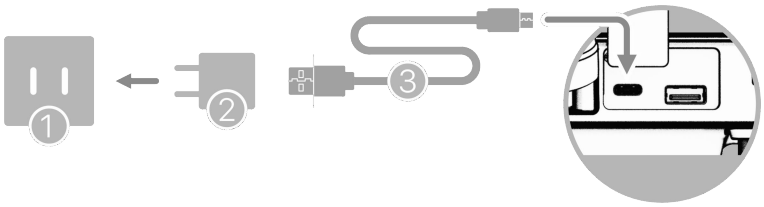


Figure 1-6

1. AC power supply 100-240V 2. USB charger 3. USB-C cable

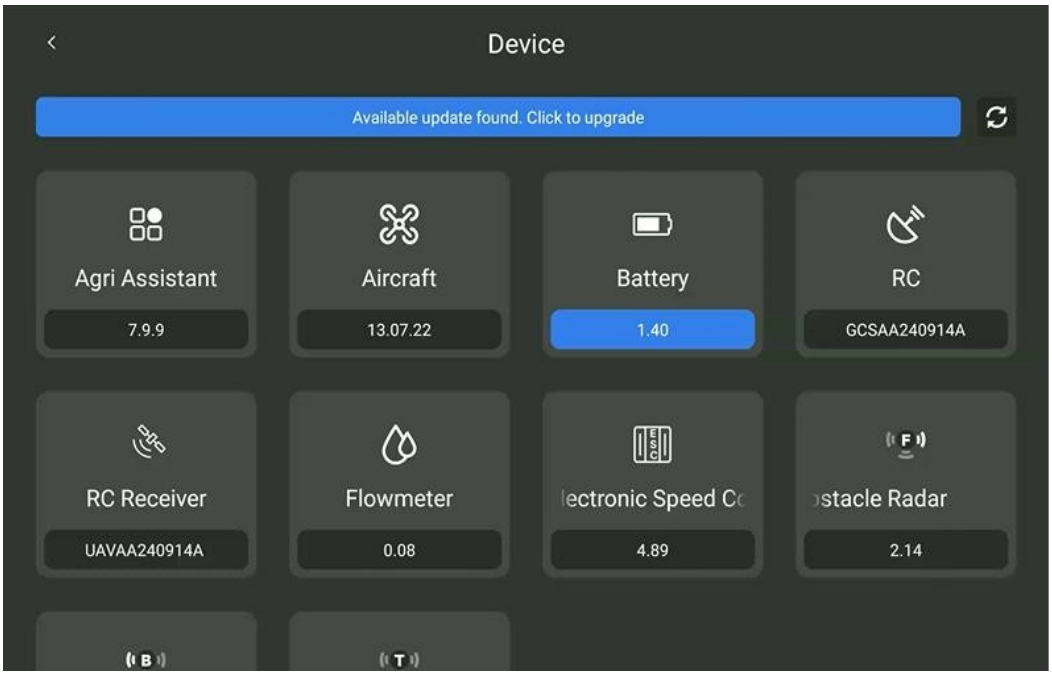
Special Note:

1. Please use the Type-C interface to charge the RC.
2. Fully charged for about 4 hours with the designated quick charger.
3. Please use the official charger when charging the RC. If not, it is recommended to use an FCC/CE-compliant, 5V 2A charger or a 9V 3A fast charger that complies with the QC2.0 protocol.
4. To ensure the best condition of the RC battery, please make sure to fully charge the RC every 3 months.
5. If the RC is found to have a peculiar smell, smoke or liquid leakage, etc., stop charging and send it back for inspection and identification in time.
6. Do not charge the RC when the ambient temperature exceeds 60°C.
7. Keep the RC away from infants' and toddlers' reach while charging. It is recommended not to leave it unattended.

1.1.5. Frequency matching (Pairing) procedures

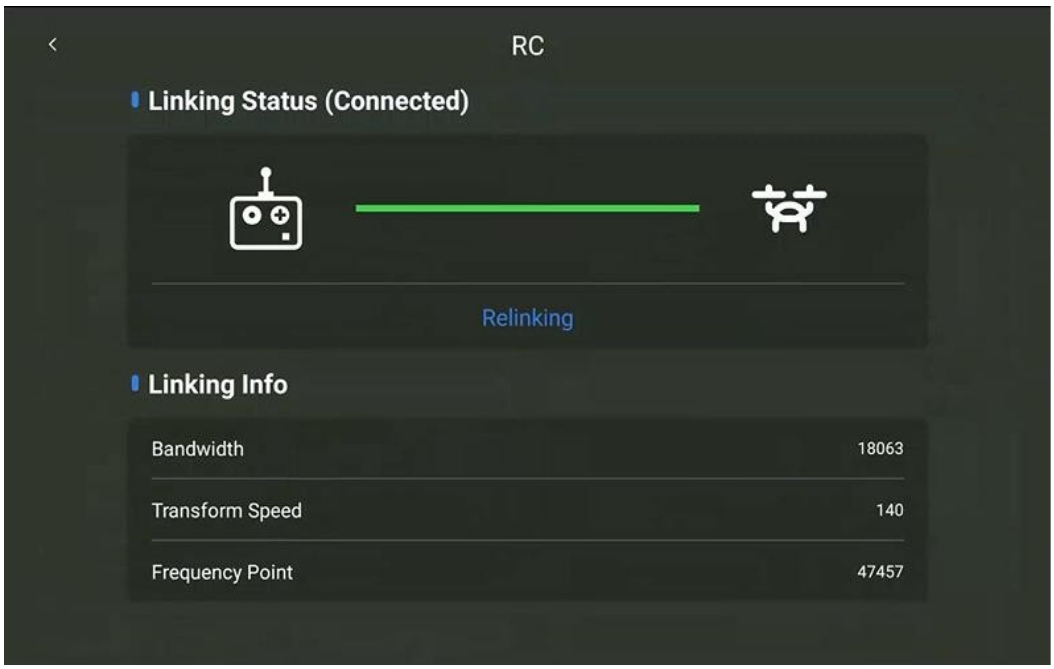
If the user purchases the drone as a whole set, the RC transmitter and the drone have been frequency-paired before dispatching and can be used directly after power-on. In other cases, use the following methods to match the frequency:

1. Turn on the RC parameter adjustment assistant, as shown below



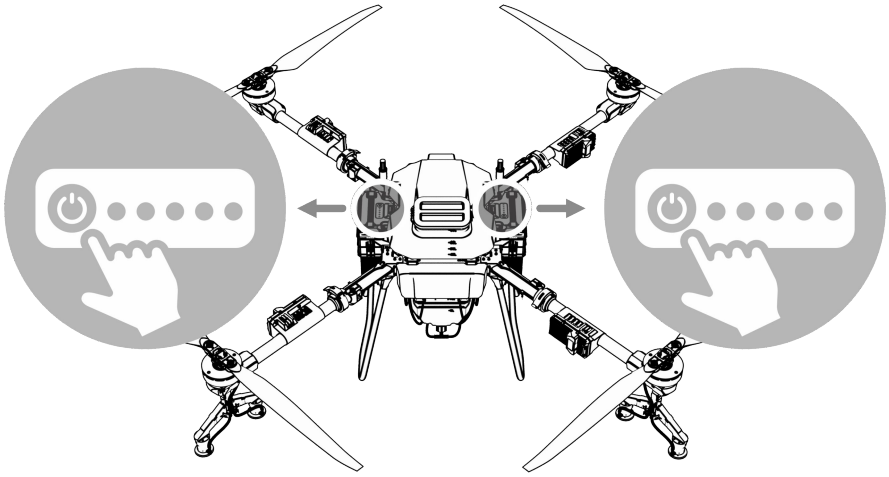
1-7

2. Click the “Linking” button, the indicator light of the RC will be flashing cyan. APP shows a pop-up of “frequency pairing” and there is a 30s time limit to turn on the RC



1-8

3. Long press the power button for 5 seconds until you hear a beep. “Pairing Succeed” will be shown on the APP interface. The RC indicator will be solid green. If you haven’t press the pairing button in 30 seconds, the pairing will be failed.



1-9

Special Notes:

1. Keep the distance between the RC and the receiver within 1m while pairing.
2. Ensure the propeller is removed from the drone during frequency pairing, and keep a safe distance from drone motors.

1.1.6. Specification Parameters

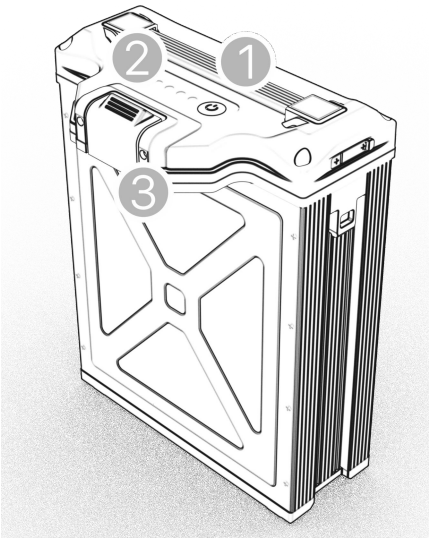
RC Data link	
Transmission Frequency Range	2.400-2.4835GHz
Signal Effective Distance (Outdoor, no obstruction, no interference	Maximum communication distance 10km, 3km image transmission (plant protection scenario)
Interference Recovery	<1s
Antenna Type	Omnidirectional antenna (2.5dBi)
Wi-Fi	
Protocol	IEEE 802.11a/n/ac, Wi-Fi compliant
Frequency	4.900 GHz ~ 5.845 GHz (5.0 GHz ISM Band)
Bluetooth	
Protocol Standard	Bluetooth 4.2
Frequency	2.400-2.4835GHz
FPV Camera	
Pixel	2 million
View Angle	Horizontal 86°

	Vertical 52°
Video Resolution	720p
Screen	
Screen Size	7 inch
Touching Mode	Capacitive
Screen Resolution	1920x1200
Other Parameters	
System	Android
Operating Temperature	-15℃~40℃
Storage Temperature	-25℃~60℃
Charging Environment Temperature	5℃~40℃
Battery Capacity	20000mAh @3.7V lithium battery
Charging Time	About 4h (using official fast charger)
Continuous Operating Time	Over than 6 hours
Weight	About 1120g

1.2. Smart Battery Introduction

The smart battery equipped with this model is a polymer lithium power battery, featuring a compact size, light weight and large capacity.

1.2.1. Components



1-10 Battery Component

1. Handle 2. Indicator Light 3. Charging port

1.2.2. Specification Parameters

Subject	Parameter
Typical Capacity	20000mAh
Nominal Voltage	53.2V
Maximum Charging Current	100A (Environment Temperature: 25±5℃)
Limited Charging Voltage	60.9V
Maximum Discharging Current	200A
Operating Temperature	5-40℃ (Charging) -10-40℃ (Discharging)
Storage Temperature	Long-term storage: -10 ℃ - 30 ℃ (Recharge/discharge maintenance recommended every 3 months) Short-term storage: -10℃-45℃
Weight	About 8.0kg

1.2.3. Indicator Status

1.2.3.1. Battery Status Display

Function	Precondition	Operation	LED Indicator	Note
Battery Level Checking	Sleep/Power off	0(short press)	Display the current battery level for 5s	The battery level will be displayed for 5s after a short press
Power On	Sleep/Power off	0-1(Short press+long press >1s)	0, display the current battery level;0-1,turn off the display. The LED indicators will light up one by one, then display the current battery level	0-1 MOS has been activated after power on
Power Off	Power on	0-1(Short press+ long	0, display the current battery level;0-1,turn	0-1 MOS has been deactivated after power

		press)	off the display. The LED indicators will go off one by one	off
RC Frequency Matching	Battery is activated and RC is on the pairing interface	In the power on status 2 (Long Press>5s)	The LED 3 and 4 will flash while matching. After the pairing is completed, LED indicators will revert to the original status	
Turn Off UPS	Battery is activated	Short press for 5 times, 0-0-0-0-0	0, display the current battery level	UPS is deactivated

Note: 0 means short press, 1 means long press, 2 means long press >5S.

1.2.3.2. Battery Level Display

Notes: "●" = solid on; "⊙" = flashing; "○" = off

LED5	LED1	LED2	LED3	LED4	Battery Level
○	●	●	●	●	95%-100%
○	●	●	●	◉	90%-94%
○	●	●	●	○	80%-89%
○	●	●	◉	○	70%-79%
○	●	●	○	○	60%-69%
○	●	◉	○	○	50%-59%
○	●	○	○	○	40%-49%
○	◉	○	○	○	20%-39%
◉	◉	○	○	○	< 20%

1.2.3.3. Charging Status

LED1	LED2	LED3	LED4	SOC
◉	◉	○	○	0-59%
◉	◉	◉	○	60%-79%
◉	◉	◉	◉	80%-100%

1.2.3.4. Error and Alarms

Item	LED Indicator	Description	Note
Upgrade	LED shows progress	LED shows progress	
High Charging Temperature Alarm	LED 5 flashes + LED 4 flashes 3x/s	Battery charging temperature is too high	Stop charging
Low Charging Temperature Alarm	LED 5 flashes + LED 4 flashes 2x/s	Battery charging temperature is too low	Stop charging
High Charging Voltage Alarm	LED 5 flashes + LED 3 flashes 3x/s	Battery charging voltage is too high	Stop charging
Overcurrent Charging Alarm	LED 5 flashes + LED 2 flashes 2x/s	Battery charging current is too large	Stop charging
Low Discharge Voltage Alarm	LED 5 flashes + LED 3 flashes 2x/s	Battery discharge voltage is too low	Stop charging
Short Circuit/ Overcurrent Alarm	LED 5 flashes + LED 2 flashes 3x/s	Battery discharge current is too large	Restores after one minute of unloading
Battery Failure Alarm	LED 5 solid on at power on	The battery cell voltage is less than 1.5V or the voltage difference is greater than 1V	It is strictly prohibited to disassemble by yourself, please contact the after-sales

Special Note:

1. Activate the battery only after it is well connected to the drone.
2. Disconnect the battery after it is turned off.
3. Charge the battery to 60% every 3 months to ensure a longer service lifetime.
4. Before using, ensure sufficient battery level. When the battery has not been used for a long time, please use the dedicated charger to discharge the battery to the storage voltage,

and then store it in a dry and ventilated environment.

5. This battery needs to be charged with a dedicated charger (TC9002P). In order to avoid accidents, please do not change the charger in any condition.

6. Do not use batteries if they emit odors, heat, or are deformed, discolored, or show any other abnormalities. If the battery is in use or charging, it should be immediately removed from the drone or charger. Stop using such batteries.

7. It is normal that the flight time will be shortened when the ambient temperature is lower than 10°C.

8. The battery surface should be cleaned in time after the operation to remove agrochemical residue and avoid corrosion.

9. The drone is strictly forbidden to be used in the environment of strong static electricity, magnetic field or high voltage power line.

10. It is strictly prohibited to pierce the battery case with nails or other sharp objects, or to hammer or step on the battery.

11. If the electrolyte enters eyes after the battery leaks, rinse the electrolyte out instead of rubbing the eye. Seek medical help immediately. Eyes will be injured if not treated in time.

12. It is strictly prohibited for non-professionals to disassemble the battery.

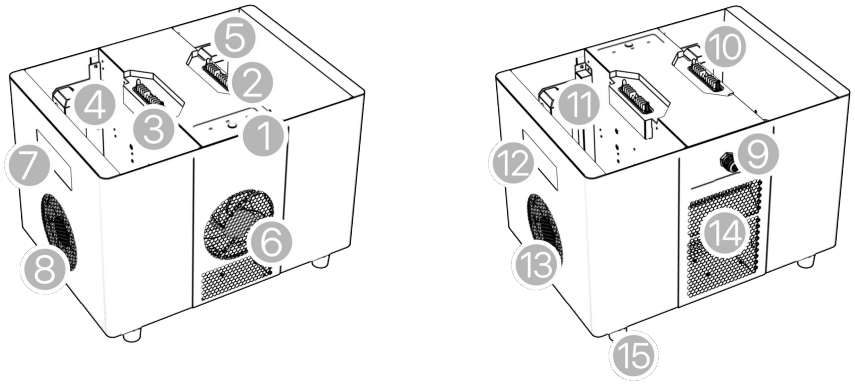
13. Keep away from fire sources when using batteries.

1.3. Charger (TC9002P)

TC9002P intelligent charger is a dual-channel lithium-polymer battery charger with a built-in cooling system. It can achieve constant power charging with a maximum charging current of 165A.

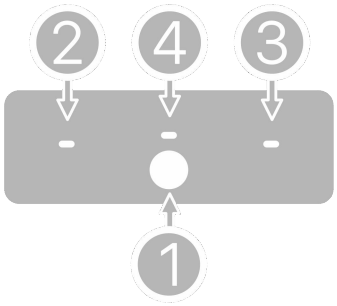
1.3.1. Components

The definition of the charger components is shown in Figure 1-11 & 1-12



1-11 Charger Components

1. Operational Panel	2,3.Battery Connector	4,5. Battery Support	6. Power cooling fan
7,13. Handle	8,12 Battery cooling fan	9. AC power input	10,11 Battery holder
14. Dust net	15. Shock-absorbing base		



1-12 Operational Panel

1. On/off button	2. Charging Status Indicator 1	3. Charging Status Indicator 2	4. Warning Indicator

1.3.2. Function Description

1.3.2.1. Indicator Light

1) **Power-on self-check:** Confirm that all terminals are correctly connected. When the charger power is turned on, both the charging status indicator and the alarm indicator light up. After a single beep, the lights go out, the self-test is completed, and the charging status indicator breathes normally. For the 220V system: 2 seconds on, 1 second off; for the 110V system: 1 second on, 1 second off.

2) **Battery charging status indicator**

LED Flashing Status	Sound	Meaning	Note
Off	/	No battery is connected to the corresponding charging port	No battery detected Note: When the battery is protected at low temperature (cell temperature <3 degrees) and high temperature (cell temperature >70 degrees), because the battery does not turn on the MOS, the charger cannot detect the battery voltage, and the channel light is also off.
Solid Yellow	/	The battery is connected and waiting for charging	
Breathing Green	/	The battery is in the slow charging state	Charge start or stop phase; when only one module is active
Fast Flashing Green	/	The battery is in the quick charging state	
Solid Green	/	The battery has finished charging	
Continuous Yellow Single Flash	/	The battery temperature is too low, and the charging current is limited	C Check battery current limiting flag
Continuous Yellow Triple Flash	/	The battery temperature is too high, and charging is prohibited	Check the battery overtemperature protection flag
Red Single Flash	D.D.D…	The battery is not plugged in properly or the battery is not official or the communication is abnormal	No communication but voltage detected, or communication present but no voltage
Red Triple Flash	D.D.D…	The battery BMS is faulty	Battery low temperature protection and high

			temperature protection are excluded
Solid Red	D.D.D…	Output overvoltage, other hardware faults	Need to power it on again
Solid Blue	/	Battery type is not compatible, charging is prohibited	

3) Charger warning indicator

LED Flashing Status	**Sound**	**Meaning**	**Note**
Yellow Single Flash	/	Charger temperature is too high	Self-directed derating
Yellow Double Flash	/	Input voltage is under voltage	Self-directed derating
Yellow Triple Flash	/	Input voltage is high	Charge normally
Red Signal Flash	D.D.D…	Ambient temperature is too high or fan malfunction	Stop charging
Red Double Flash	D.D.D…	Fault in charger input voltage (Under-voltage protection)	Stop charging
Red Triple Flash	D.D.D…	Fault in charger input voltage (Over-voltage protection)	Stop charging
Solid Red	D.D.D…	Output over-voltage or other hardware faults	Stop charging, power off and restart to
Solid Blue	/	Only one power module is working	/

4) Activation indicator

When the battery is not connected and the power button is pressed, the activated and deactivated indicators are as follows:

Status	**Sound**	**Battery Status Indicator**	**Warning Indicator**	**Operating indicator**
Deactivated	/	Solid White	Solid White	FLASH
Activated	/	OFF	OFF	FLASH

1.3.2.2. Charging Logic

Dual-Charging Mode: The two power modules built into the charger charge the corresponding batteries on each side, and the charging current is determined according to the battery's demand.

Single-Charging Mode: When only one battery is connected, one of the built-in power modules in the charger charges the battery. When the charger has only one AC input connected but two batteries are inserted, **it first fully charges the battery with the higher state of charge before charging the battery with the lower state of charge.**

1.3.2.3. Cooling System Working Logic

During the charging process, if the charger detects that the battery temperature or the charging board temperature is too high, the cooling fan will be activated. The fan speed is intelligently adjusted based on the temperature.

1.3.2.4. Charging Steps

Step1: Insert the power cable to the charger's power port, and insert the other connector to the AC power supply (200-240V, 50/60Hz).

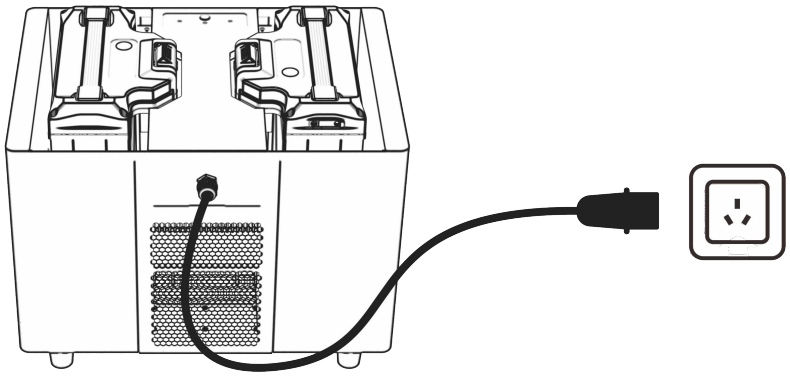


Figure 1-13 Charger Power Cable Connect

Step2: Put the battery into the charger. Please pay attention to the direction of the connector. Check that there are no foreign objects at the bottom of the charger. After placing

it, check whether the battery is properly seated and the connector is aligned.

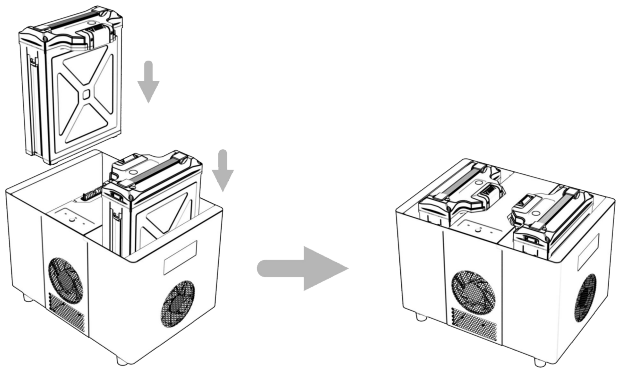


Figure 1-14 Battery Placement

Step3: After making sure that all wires are connected correctly, press the “Start/Stop” button on the operation panel, and the charger will start self-check and then begin charging if conditions are normal. If an error occurs during the self-test process, please refer to the indicator status descriptions.

Step4: After charging is complete (indicated by solid green channel light), press the "Start/Stop" button on the operation panel to stop the process, then turn off the AC power supply, and finally unplug the battery. Please follow the rules below for plugging/unplugging batteries during charging:

Battery State	**Channel Indicator State**	**Plug or Unplug Battery Instruction**
Fully charged	Solid Green	Unplug battery directly
Charging	Green Flashing	If plugging or unplugging is needed, please press the start/stop button first. Plugging or unplugging directly is prohibited

Notes:

- Do not use the product in direct sunlight, high humidity, high temperature, dust, vibration or thunder/lightening.
- Products should be kept away from dangerous substances such as high pressure, heat source, corrosive agent, flammable gas, etc., and must be used at appropriate ambient temperature (5-45°C is recommended).
- The product should be placed horizontally and stably, ensuring good ventilation and heat

dissipation conditions during operation.

- When charging, please strictly follow the battery safety instructions and cautions.

- Before connection, please ensure that all ports and input lines of modules and batteries have no obvious defects such as blockage, damage, breakage or short circuit.
- Before use, please ensure that the power supply line has enough capacity to avoid overheating or even fire caused by insufficient capacity, especially when two or more pieces of equipment are used at the same time.
- Do not pull out the input wire or battery when the charger is working. Pull out the battery in time after charging.
- Be sure to place the battery in place before starting charging.
- The cooling box has a limited load-bearing capacity. Do not load the battery for transportation, otherwise the battery and charger may be damaged.
- This charger is only applicable to the battery of this drone. If the user uses the charger for purposes other than those listed in the manual, the Company shall not assume any responsibility.
- Do not leave the charger unattended when it's working. If any function is not normal, please stop charging immediately.
- In case of fire, do not use liquid extinguisher to avoid electric shock. Use dry powder extinguisher correctly.

1.3.3. Specification Parameters

Subject	Parameter
Input Voltage	AC 220-240V/50-60Hz
Input Power	9000W
Charging Current	Max 165A
Charging Mode	Constant power charging
Working Temperature	-5°C - 45°C
Working Humidity	0% - 75%
Storage Temperature	-10°C - 70°C
Storage Humidity	0% - 75%
Voltage Detection	Support
Protection	Over-current protection Over-temperature protection Over-voltage protection Short circuit protection

Communication Interface	Bluetooth/CAN

1.4. Spreader (Optional)

1.4.1. Introduction

As an important functional accessory for agricultural drones, the spreader is indispensable. Compared to traditional manual spreading methods which suffer from low efficiency, high cost, and poor uniformity, the drone spreader significantly improves efficiency, reduces costs, and enhances application quality. The centrifugal spreader uses a high-speed rotating disc to evenly distribute particles, characterized by a wide spread width and simple adjustment. It features a built-in quantitative feeding wheel, allowing real-time discharge rate adjustment based on the preset dosage per unit area and flight speed for precise control.

Scenario application: Aerial seeding of rice, wheat, etc.; grassland supplementary seeding; solid particle fertilizer application; aquaculture feed broadcasting, etc.

1.4.2. Spreading System Assembly

1.4.2.1. Preparation

Since the spraying system and the spreading system share the FP700 platform, the spraying system components need to be removed before installing the spreading system. The replacement process takes less than 10 minutes.

Safety Warning: Always power off the drone completely and remove the batteries before attempting to switch payloads!

1.4.2.2. Disassemble the Tank

1. Remove the two plugs of the spray/spread on the HUB module and pull the wire out of the cabling holder on the tank.

Notes: Prevent agrochemical (neither liquid nor solid) from the port during the removal.

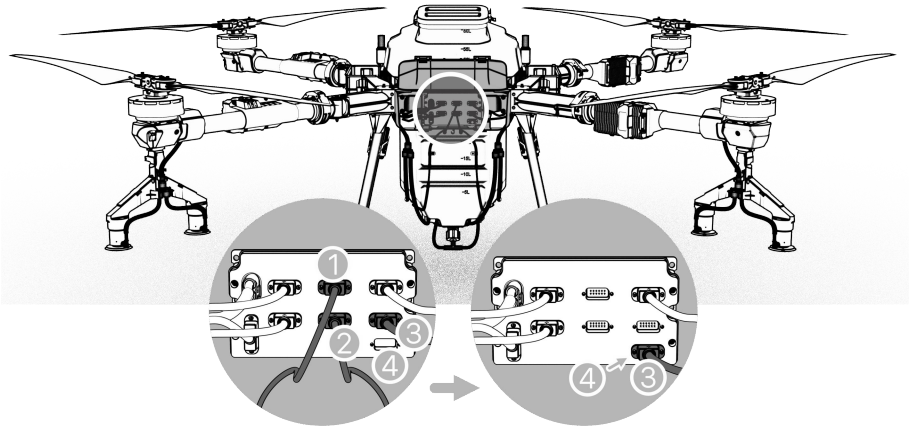


Figure 1-15

2. Unplug the quick disconnect connector of the pipe on both sides of the drone to remove the pipe between the pump and the nozzle.

Notes: If you need to switch the spraying system to spreading system, it is recommended to apply some liquid on the head of the pipe for lubrication.

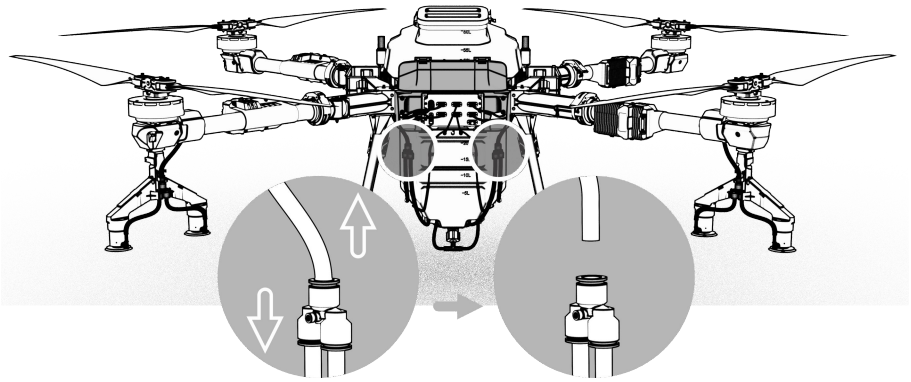


Figure 1-16

3. Remove the tank up straight from the drone.

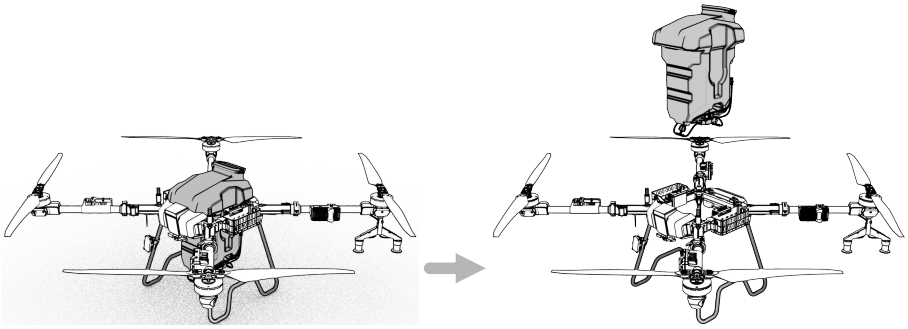


图 1-17

Notes: Do not scratch the surrounding wire during the tank removal. When storing the removed tank, protect the pump, cables, and connectors from impact, water, and moisture.

1.4.2.3. Spreading System Assembly

1. Tilt the spreader into the body frame as shown in the figure. Do not scratch the surrounding wiring. Adjust the tank to make sure its supported by four weight sensors. Prevent agrochemical (neither liquid nor solid) from the port during the installation.

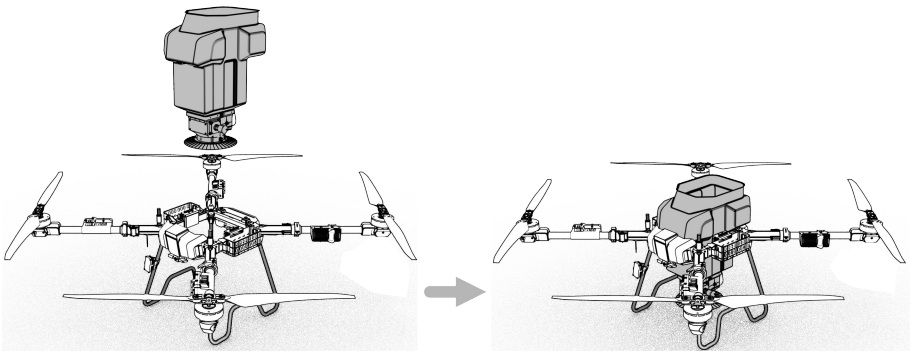


Figure 1-18

2. As shown below, wiring harness No. 1 (blanking roller harness) and wiring harness No. 2 (blanking roller harness) are inserted into position No. 1 and position No. 2, and wiring harness No. 3 (swing disk drive motor) is inserted into position No. 3.

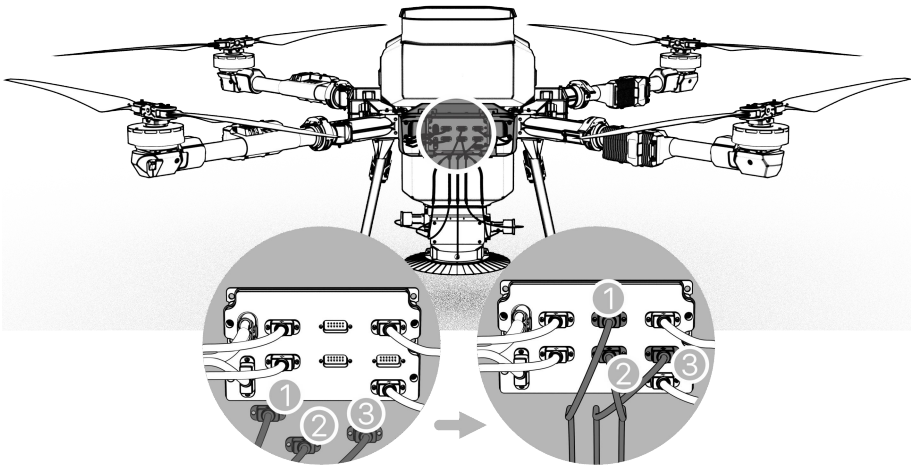


Figure 1-19

1.4.3. Spreader Basic Operation

1.4.3.1. Usage

1. Turn on the remote control and the drone according to the instruction.
2. Enter the Agriculture Assistant APP after power-on is complete.
3. For the first time use of spreading system, please enter the setting interface. Choose the corresponding spreader type in the operation mode list.
4. In the spreader settings interface, choose the appropriate feed roller type and material type according to the actual operational requirements.

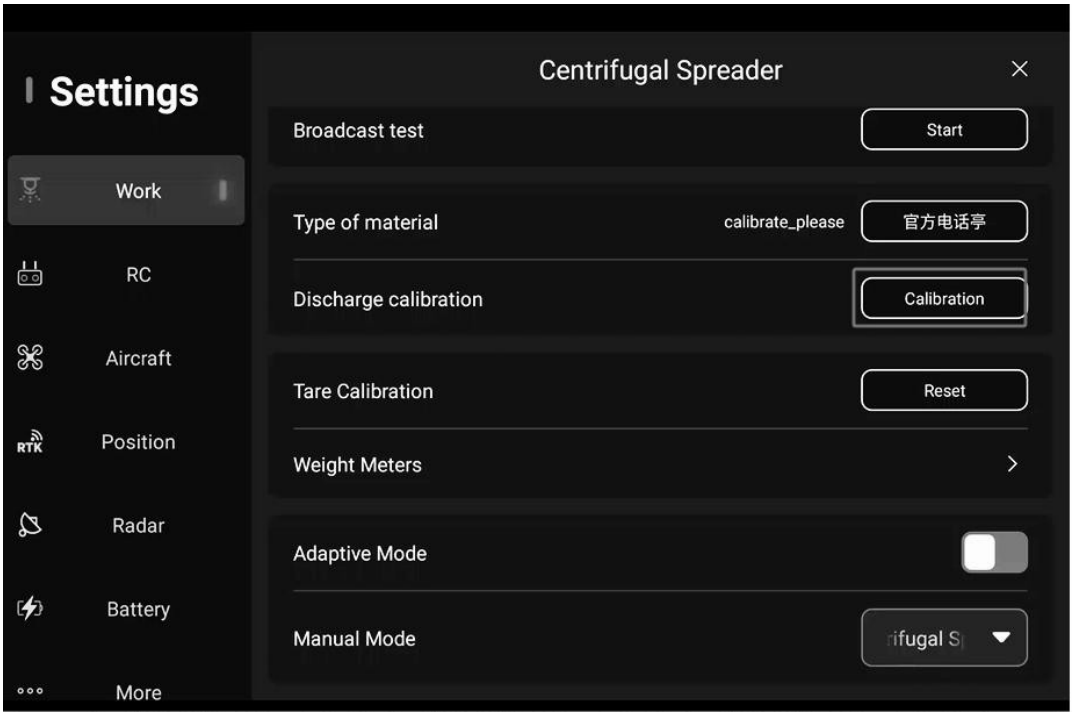


Figure 1-20

5. Set the dosage (e.g., kg/ha or lbs/acre), route spacing (swath width), and operating height in the parameter setting interface. Parameters vary by scenario; adjust based on materials and conditions, and conduct tests to achieve optimal results.

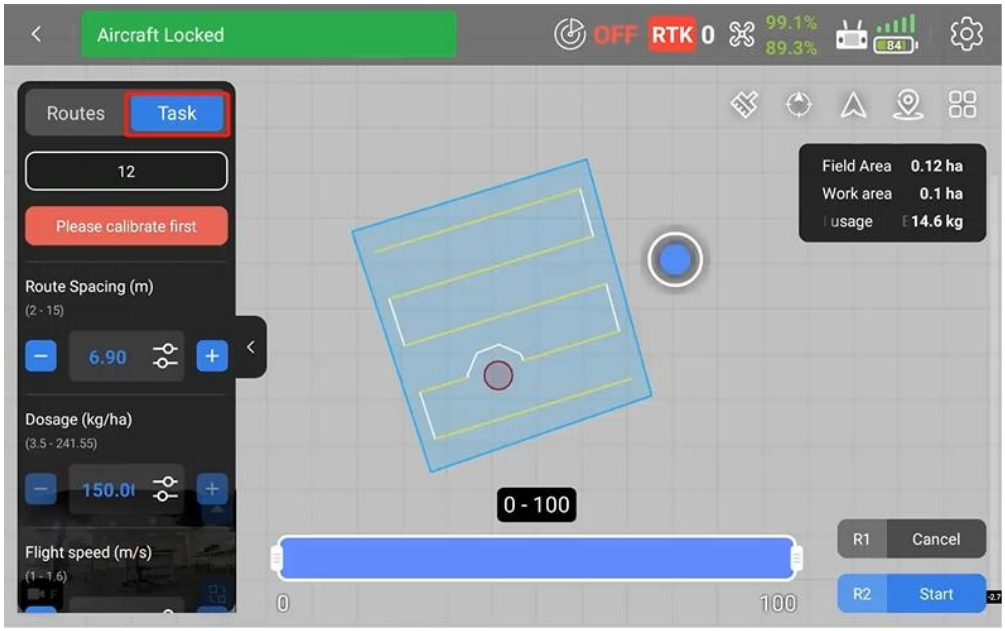


Figure 1-21

Notes:

1. Ensure granular material is dry before operation.
2. If you change the granule or rolling feeder, please operate the calibration.

1.4.3.2. Spreader Calibration

Preparation:

1. Please prepare the granule before the calibration. Place the drone on the level surface, and completely empty the container.
2. Select the type of rolling feeder and granule type. If the granule is used for the first time, click "+" to name it.

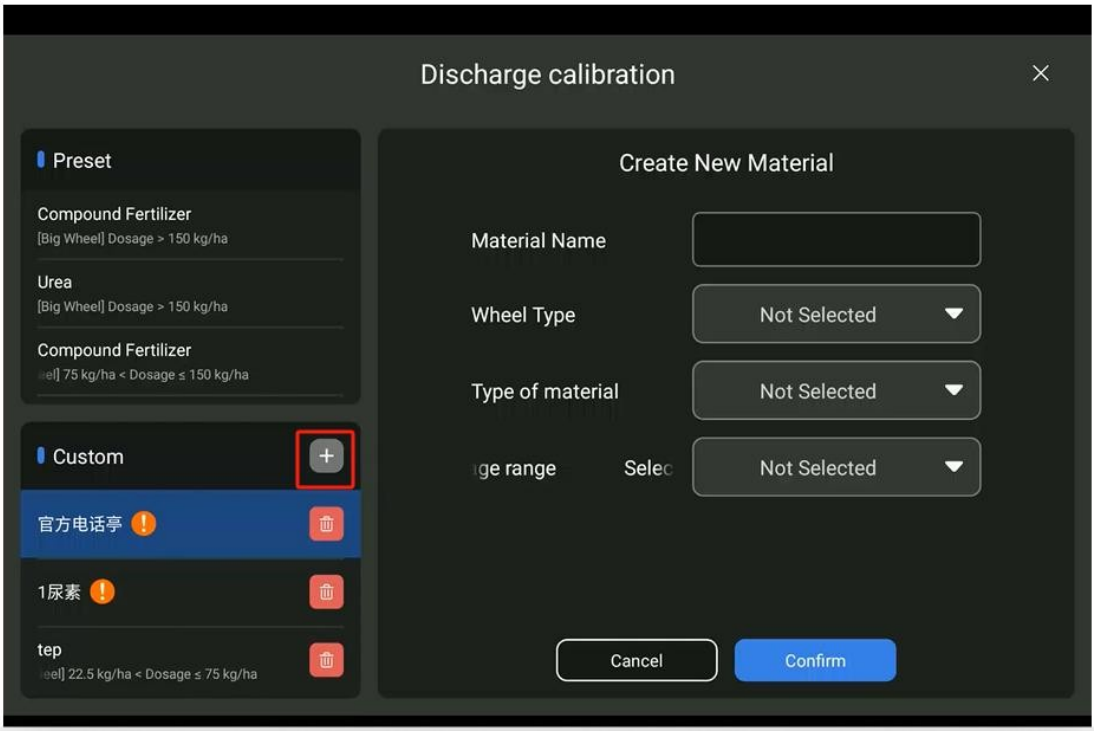


Figure 1-22

3. Tap 'Calibration' in the material calibration section to enter the calibration interface. Follow the App guidance carefully. Here are the steps:

Step1. Place the drone on a plain surface and make sure the container is empty.

Notes: If the drone is not placed on a plain surface and the offset angle is large, the

next steps of calibration cannot be operate**.** Please adjust the angle of the drone before clicking the "Next" button.

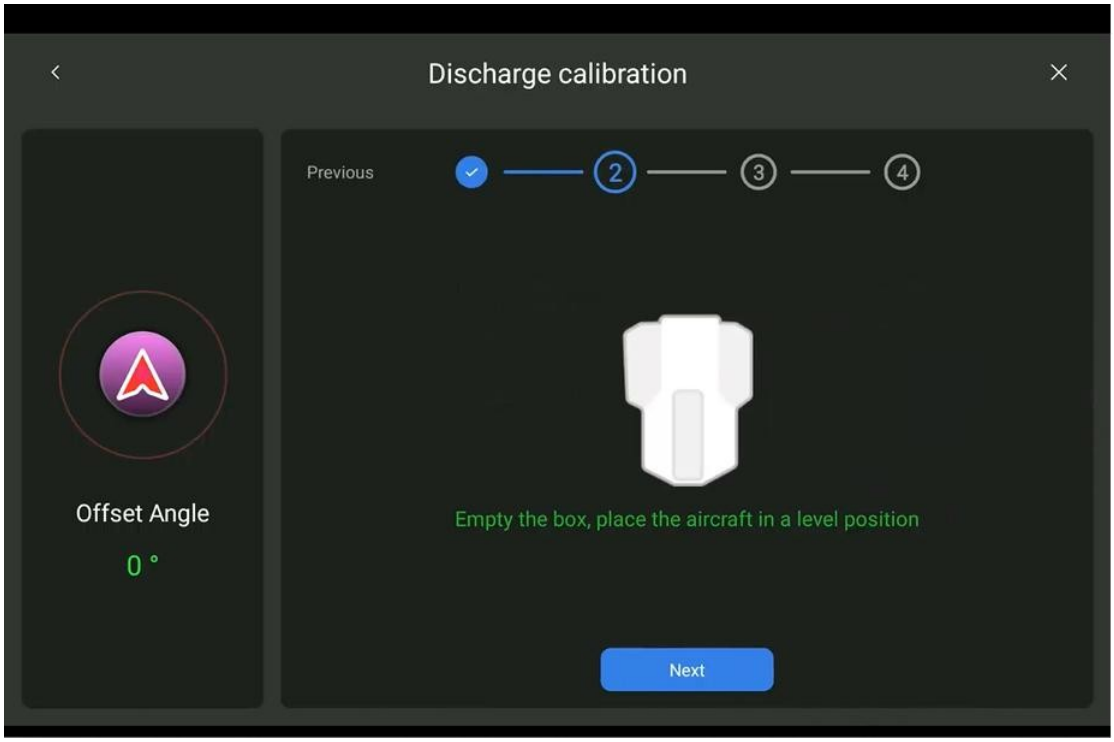


Figure 1-23

Step2. Click ‘Tare’

Notes: If the tare calibration has been completed before, click "Skip".

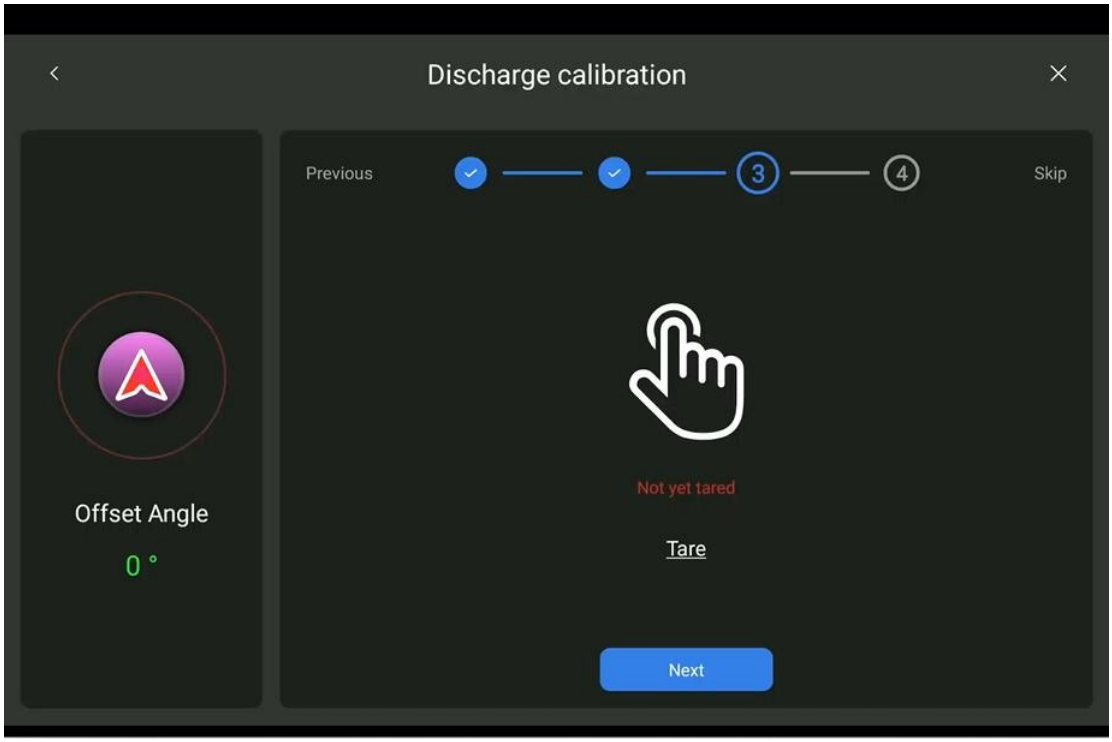


Figure 1-24

Step3. Fill the container. Click “Calibration” after filling it, the calibration will start automatically.

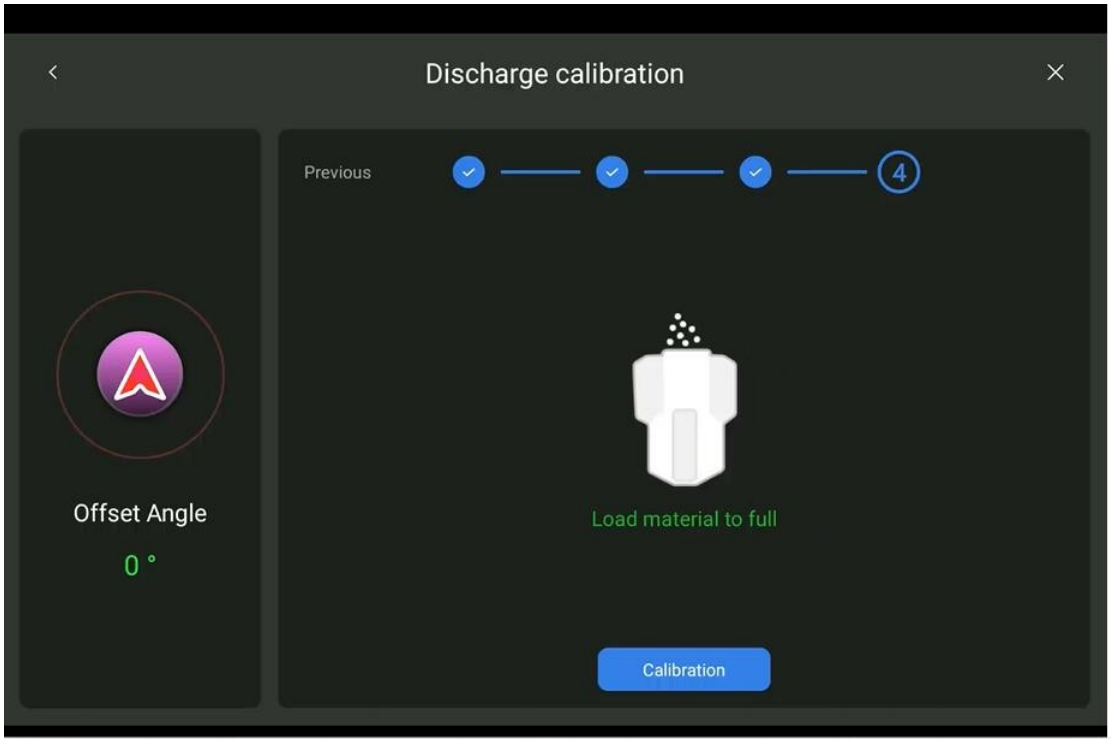


Figure 1-25

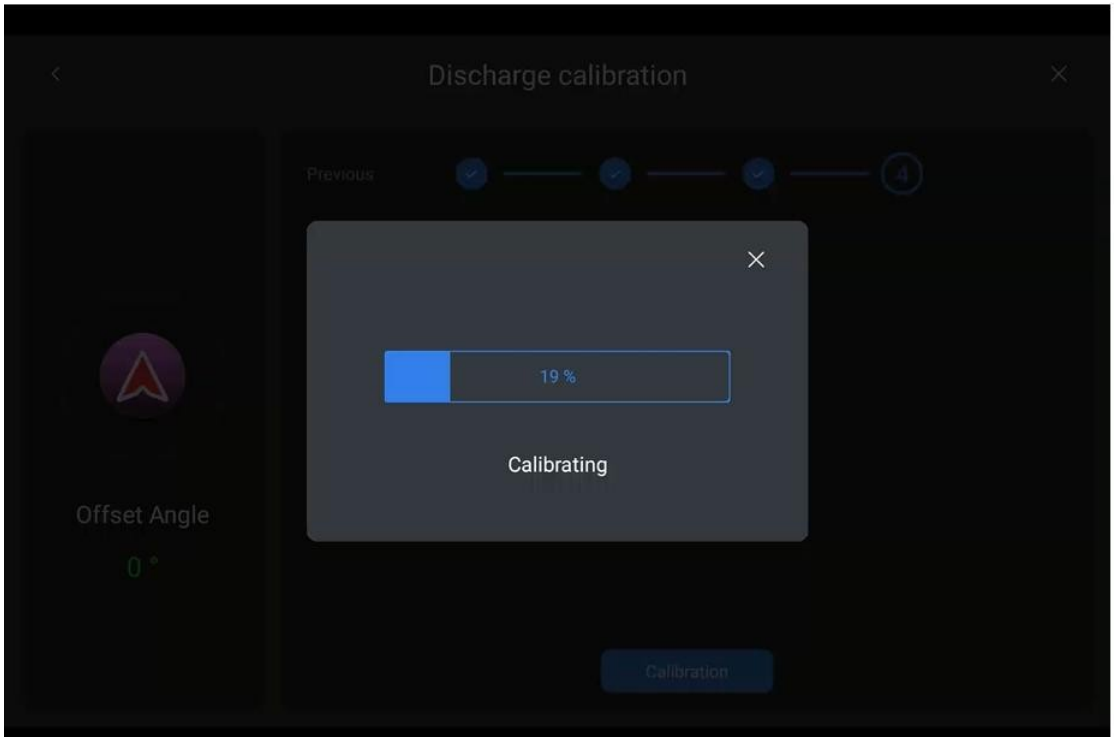


Figure 1-26

Notes: Do not touch the drone during the calibration.

Step4. The calibration coefficient will pop up when the calibration is completed.

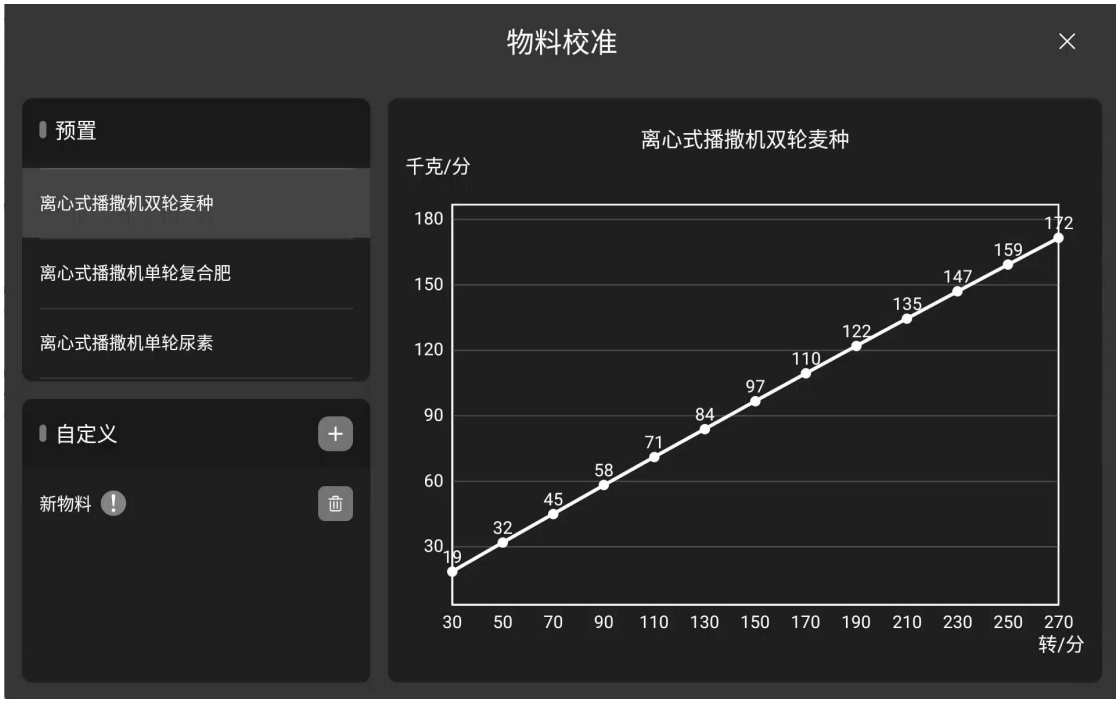


Figure 1-27

Notes: If the calibration fails, please repeat the calibration according to the above steps.

1.4.3.3. Spreading Test

There is a spreading test function in the setting interface. Users can click the Start button before operation to make sure the rolling feeder and the fan work properly.

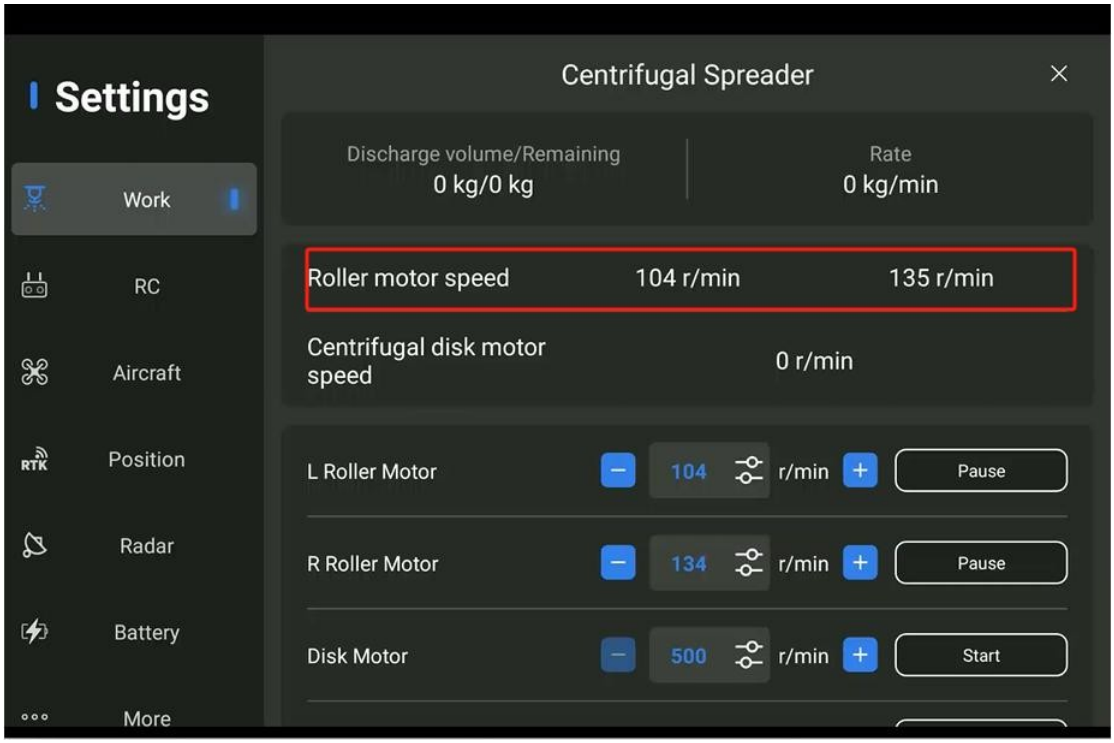


Figure 1-28

1.5. Drone Introduction

1.5.1. Functional Features

The FP700 agricultural drone has the following features:

1. Constructed with professional carbon fiber materials for lighter weight and higher strength. Foldable arms facilitate easy transportation.
2. The quickly removeable spraying and spreading system, along with the pluggable battery make mode changing easier, enhancing operational efficiency.
3. Equipped with a high-precision GNSS navigation system and IMU sensor for accurate positioning, ensuring safety and reliability.

4. With the dual-channel high-flow metering pump, it offers a large flow and high spraying accuracy.
5. With four rear-mounted wind-pressure centrifugal nozzles, it provides excellent atomization and strong penetration.
6. Supports centrifugal and air-blowing spreading system optionally, allowing users to choose the most suitable spreading system based on actual needs.
7. The Agriculture Assistant APP supports smart route planning so that the drone can operate autonomously. It helps to make the pilot's work easier.
8. Features an onboard aerial surveying and mapping system for rapid field mapping
9. Environmentally friendly with no exhaust emissions, aligning with energy-saving, eco-friendly agricultural development. It's easy to maintain, with low usage and maintenance costs.

1.5.2. Drone Components

Drone components are shown in the figure below.

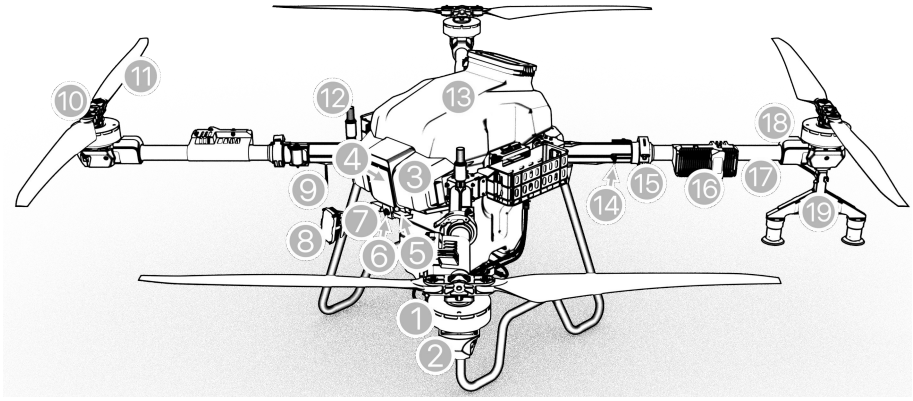


Figure 1-29

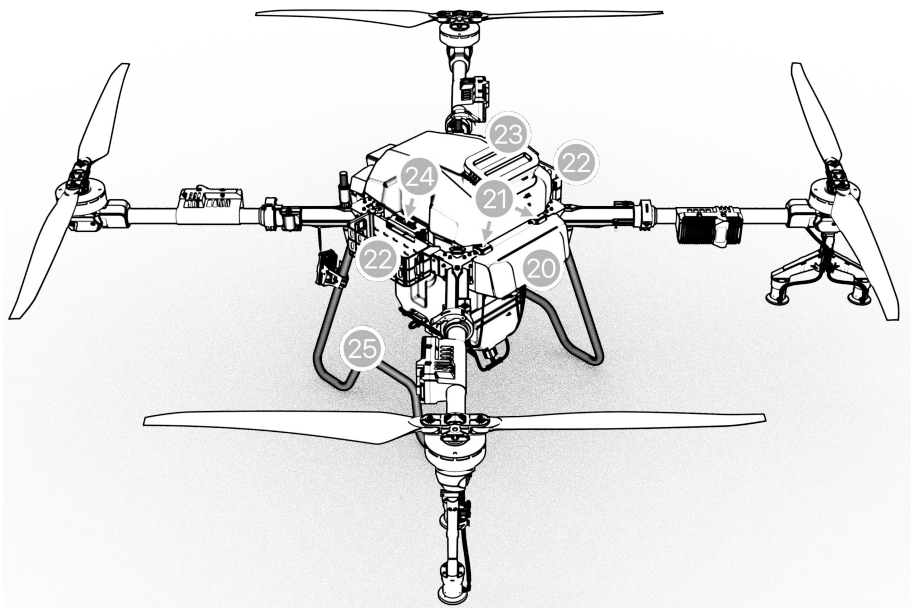


Figure 1-30

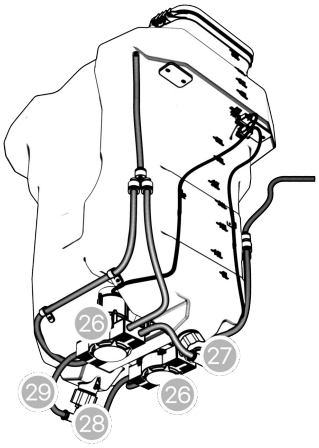


Figure 1-31

1. Motor	2. Motor Cover	3. Nose Cover	4. Front Obstacle Avoidance Radar	5. Terrain Following Radar	6. Front FPV Camera
7. Mapping Radar	8. Light (Optional)	9. Receiver Antenna	10. Propeller Clamp	11. Propeller	12. RTK Antenna
13. Liquid /Spreader Tank	14. Main Folding Arm	15. Folding Arm Clamp	16. ESC	17. Auxiliary Arm	18. Wire Protecting Cover
19. Centrifugal Nozzle and Support	20. Tail Cover	21. Weight Sensor	22. Battery Basket	23. Tank Inlet	24. Power Distribution Board
25. Landing Gear	26. Metering Pump	27. Tank Outlet	28. Tank Outlet 2	29. Water Pipe	

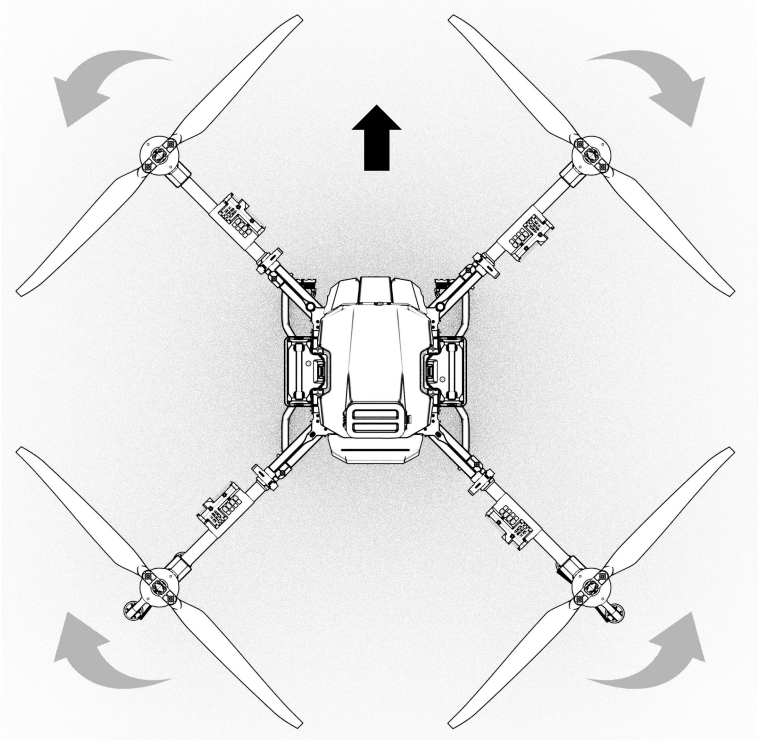


Figure 1-32

Notes: Verify propeller rotation direction for FP700

The propellers on arm 1 and arm 3 rotate clockwise, while on arm 2 and arm 4 rotate counterclockwise. See Figure 1-32.

1.5.3. Preparation

1.5.3.1. Unfold Arms

Step1： Take the FP700 drone out of the box.

Step2： Horizontally rotate the propellers to release them from any transport holders.

Step3： Unfold the arms carefully. See Figure 1-33.

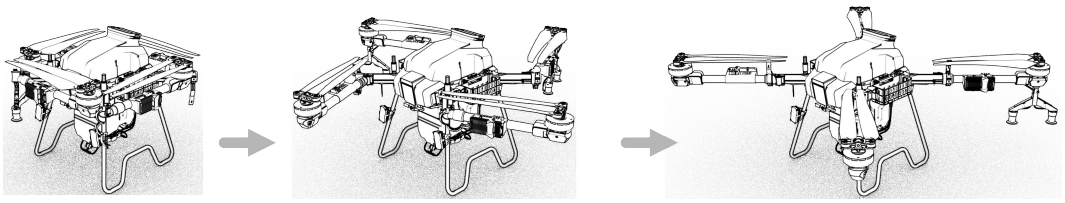


Figure 1-33 Arm Unfolding

Step4： Make sure the clamping component is tightened, as shown in Figure 1-34.

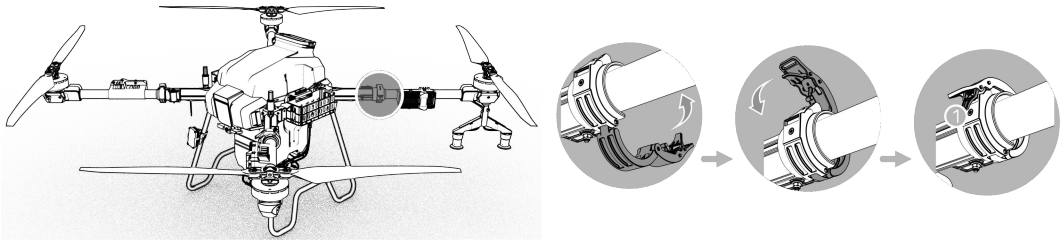


Figure 1-34 Arm Clamp

Step5： Unfold the propellers to 180°, as shown in Figure 1-35.

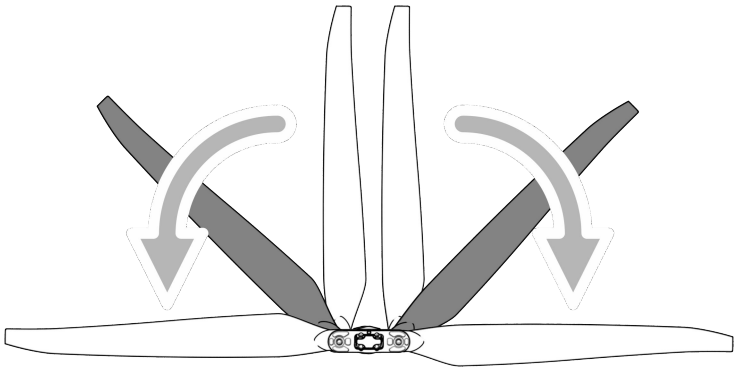


Figure 1-35 Unfold the Propellers

Notes: Be careful with your hands during the above process.

1.5.4. Battery Installation

Be sure to use the official Topxgun batteries designed for the FP700 and check the battery level before flying.

Step 1: Place two smart batteries separately into the battery guide rails on both sides of the drone.

Step 2: Ensure the batteries are properly seated and the connectors align. Push firmly until the battery latches click into place, visually confirming they are secure. See Figure 1-36.

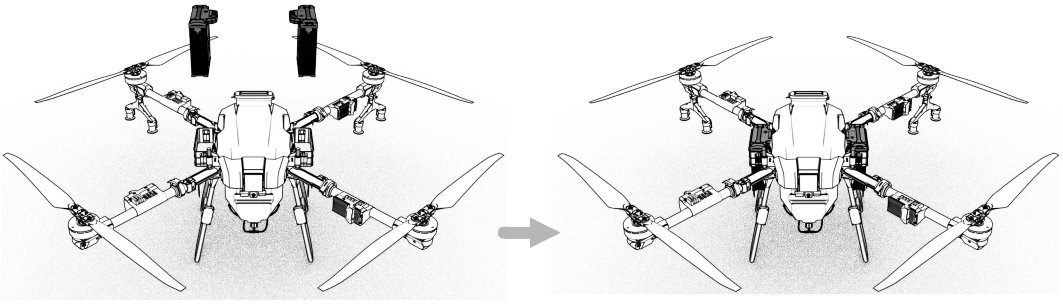


Figure 1-36 Insert the battery

1.5.5. Calibration

1.5.5.1. Magnetic Compass Calibration

(Compass calibration is crucial when flying in a new location or if the app prompts.)

Method 1: Via Remote Control

Step 1: Place the drone on level ground. Pull down the throttle.

Step 2: Quickly toggle down "Flight Mode Switch" to the down position ("S") and toggle it up to the up position (“G”) repeatedly (approx. 6-10 times) until the drone status indicator lights flash blue.

Step 3: Horizontal Rotation: Keep the drone level, nose forward. Slowly rotate the drone clockwise horizontally for at least one full circle (360°). If the status lights change to flashing green, proceed to Step 4. If they turn solid green for ~4 seconds, calibration is complete.

Step 4: Vertical Rotation: Lift the drone horizontally for more than 45° to the ground. Slowly rotate the drone clockwise for at least one circle until the status indicator shows solid green for 4s. The calibration is completed.

Step 5: If the status lights turn solid red, calibration failed. Move to a different location (away from metal/magnetic interference) and repeat Steps 2-4. See Figure 1-37.

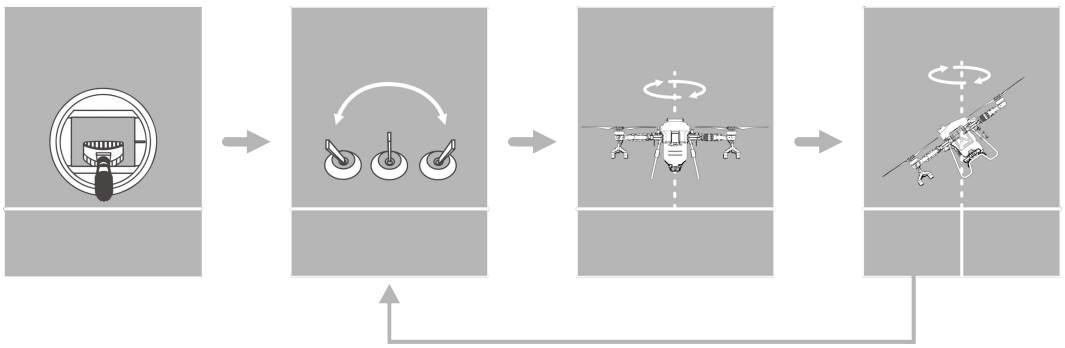
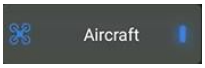


Figure 1-37 Compass Calibration

Method 2: Via App

Step1： In the Agri Assistant App, navigate to **Settings,** Tap  in top right corner to get into settings, then tap 

to get into flight settings.

Step2： Tap 

to get into magnetic compass setting, tap [calibration], and the drone navigation light will flash blue.

Step3: Perform the horizontal and vertical rotations as described in Method 1 (Steps 3 & 4), following any visual prompts in the app.

Compass Calibration Notes:

1. Remove propellers before calibration.
2. Calibrate outdoors in an open area, away from strong magnetic fields (large metal objects, rebar, vehicles, power lines).
3. Do not carry personal electronic devices (phones, keys) near the drone during calibration.
4. Do not calibrate indoors.

1.5.5.2. **Flowmeter Calibration** (Spraying System)

(Essential for accurate spraying, perform before first use or when needed.)

Preparation: Ensure the spraying system is installed and the tank has some clean water.

Press "" of the RC at top right corner to run the pump and purge air from the pipelines.

Procedure: Navigate to **Settings -> Work** in the App -> Tap "**Flowmeter Calibration**"

Recalibrate Flowmeter If:

1. Changing to liquid with significantly different viscosity.
2. Observed application rate differs >10% from the target rate.
3. Spray pump or flowmeter components are replaced.

2. Flight

2.1. Flight Instructions

According to the regulations of the International Civil Aviation Organization (ICAO) and national air traffic control on airspace control and the regulation of drones, drones must fly in the prescribed airspace. For flight safety, the flight restriction function, including altitude and distance restrictions and no-fly areas, is enabled by default to help users operate the product safely and legally.

When GNSS is available, the no-fly area affects the flight together with altitude and distance restriction. The drone flyable airspace is the intersection of restricted airspace. Without GNSS, the drone flight height is not limited by Agriculture Assistant APP.

2.1.1. Altitude and Distance Restriction

Height limit is used to limit the flight height of a drone and maximum radius is used to limit the flight distance. The maximum flying altitude of the drone on delivery is 30 meters. See Figure 2-1.

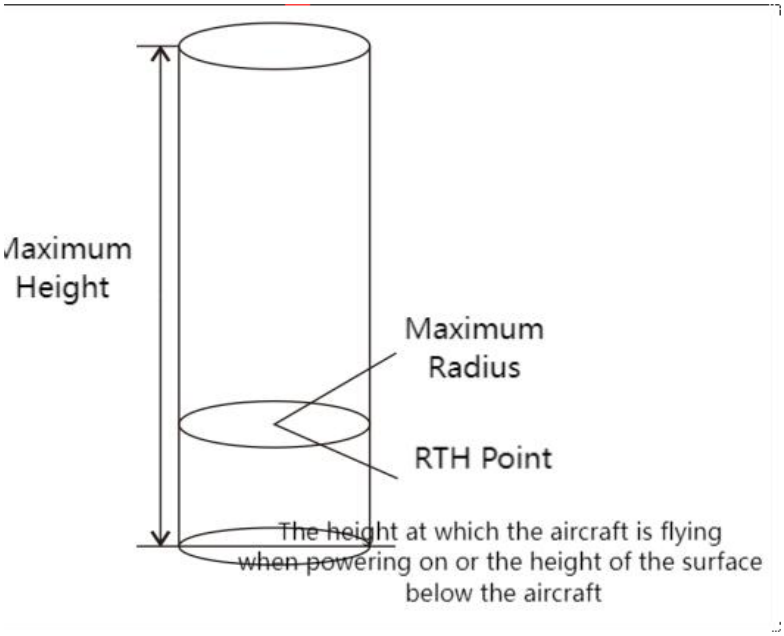


Figure 2-1 Altitude and Distance Restriction

GNSS State	Flight Mode	Flight Limit		Notification
With GNSS	GPS Mode & Autonomous Mode	Max Altitude	20m	Warning
		Max Radius	999m	Warning
	Attitude Mode	Max Altitude	20m	Automatically switch to GPS mode with warning
		Max Radius	999m	Automatically switch to GPS mode with warning
Without GNSS	Attitude Mode	Max Altitude	No limit	No warning
		Max Radius	No limit	No warning

2.1.2. No-Fly Zone and Restricted Area

2.1.2.1. No-Fly Zone

The area includes airport restricted flight areas and special flight restricted areas. For more details, please refer to special flight restricted areas defined by local authorities.

2.1.2.2. Restricted Area (when GNSS is available)

Areas are temporary restricted for flying due to emergencies: such as forest fires, large-scale events, etc.. The restricted area can be a circle or a polygon. The drone is not allowed to fly within the no-fly zone. See Figure 2-2.

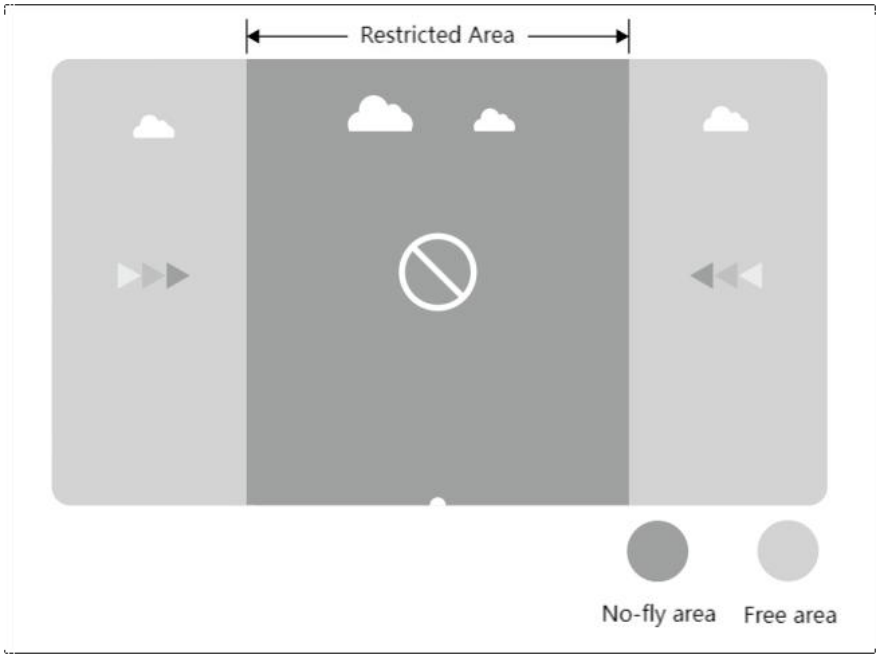


Figure 2-2 No-Fly Zone and Restricted Area

When GNSS Signal Is Normal		
Area	**Special Area with Flight Restriction**	**Status Indicator Light for the Drone**
No-fly Zone	The motors can not be activated.	Red light solid on for 5s and off in 1s
	If the drone flies without GNSS, it will land automatically immediately after GNSS is available, and the motor stops automatically after landing.	
Close to No-fly Zone	Distance to the no-fly zone <120m. The drone flight speed will slow down with flashing lights and alarming.	Red light solid on for 5s and off in 1s
Fly Zone	The drone can fly normally. No flight restrictions.	No Warning

Notes:

For flight safety, avoid operating near airports, highways, railway stations, urban centers, etc., unless explicitly authorized. If operation in such areas is necessary, apply for temporary airspace authorization from the relevant authorities. Contact support for potential software unlocking after approval is granted.

2.2. Indicator Description

On the first test flight, it is recommended to understand the meaning of the flight status indicators to ensure a safe flight.

No.	Status	Content	Indicator Display
1	Normal	Power on Self-check is completed GPS satellite searching	Flash yellow for twice
2		Preparation is completed, waiting for take-off	Solid yellow
3		Taking-off and flying	Head direction, solid red; Tail direction, solid green
4		Mode switch	Flash green for 5s
5		Magnetic compass calibration (Horizontal)	The indicator flashes yellow twice per second
6		Magnetic compass calibration (Vertical)	The indicator flashes green twice per second
7		Magnetic compass calibration succeeds	Solid green for 4s
8	Abnormal	Magnetic compass calibration failed	Solid red for 4s
9		Self-check failed	Solid red
10		Low Voltage/Volume Level I	Flash red slowly
11		Low Voltage/Volume Level II	Solid red
12		IMU failure	Solid red
13		Barometer failure	Solid red
14		GNSS failure	Solid red
15		Independent magnetic compass failure	Solid red
16		Motor failure	Solid red
17		Remote controller out of control	Solid red

2.3. Operation

2.3.1. Inspection Before Flight

Please check the following points to avoid flight accidents.

1. Place the drone in the open operation area and the user should face the tail.
2. Make sure that the battery of the drone is installed properly.
3. Before flying, it is necessary to turn on the remote controller before plugging in the battery of the drone.
4. Ensure the battery of the drone and the remote controller are adequately charged, also the agrochemical required for spraying is sufficient.
5. Make sure that the motors and propellers rotate in the correct direction and the structure is stable. All arms and propellers of the drone have been fully extended, and the arm sleeves have been tightened.
6. Make sure that the spraying pipes are free of blockage and leakage, and the nozzles can spray water normally. If there is no liquid sprayed out during spraying test, please turn on the pressure relief valve on the side of the nozzles manually. After discharging the air, turn off the pressure relief valve, and the nozzles can be used for operation.

2.3.2. Drone Lock & Unlock

2.3.2.1. Unlock

The unlocking operation is shown in Figure 2-3. When you unlock the drone, the motors rotate in the sequence of No. 1, No. 2, No. 3 and No. 4. When motor No. 1 starts, push the throttle slightly up and all the motors will start at the same time.

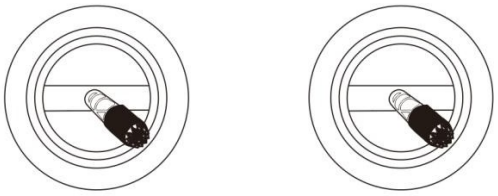


Figure 2-3 Unlock

2.3.2.2. Lock

The drone supports two active locking methods:

- Perform the operation shown in Figure 2-4 to lock the drone.
- After landing, keep the throttle stick at the lowest position for at least 3 seconds; the drone will automatically lock the motors.

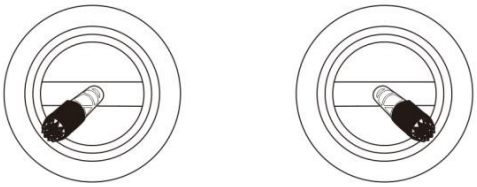


Figure 2-4 Unlock

2.3.3. Take Off and Land

2.3.3.1. Take Off

Step1： Turn on the RC (Short press, then long press power button).

Step2： Turn on the power supply of the drone.

Step3： Operator stands ≥10m from drone. Check App for good GNSS/RTK signal and no red warning lights.

Step4： Execute the unlock command, the drone motors will start one by one, then slowly push up the throttle stick to take off.

Step5： Once at desired altitude, center the throttle stick. The drone should hover, maintaining position and altitude (in GNSS mode). as shown in Figure 2-5.

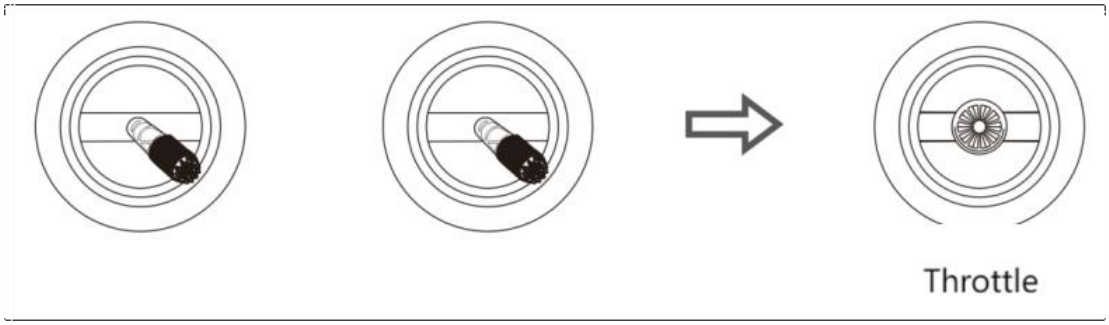


Figure 2-5 Unlock and Take Off

2.3.3.2. Land

Step 1: Fly the drone over the designated clear, flat landing spot.
Step 2: Slowly pull the throttle stick downwards. The drone descends vertically.
Step 3: After the drone touches down, continue holding the throttle stick at the minimum position until motors stop (auto-lock after ~3 seconds), or execute the Lock command as shown in Figure 2-6.

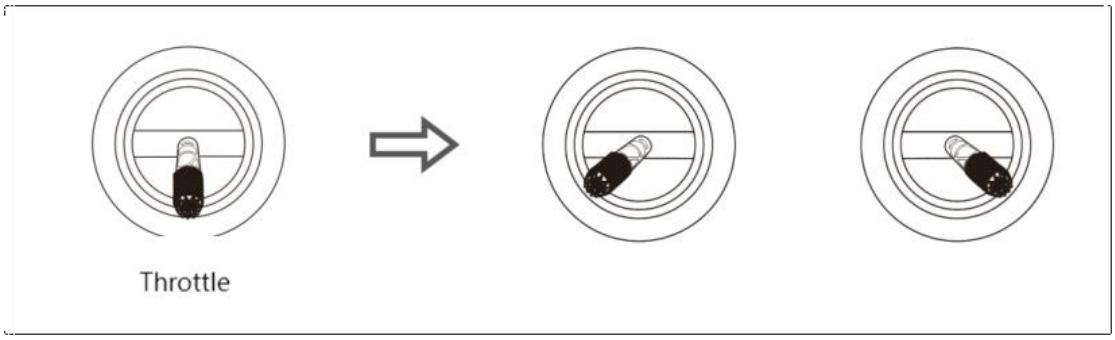


Figure 2-6 Lock and Land

Notes:

1. For the first test flight, the flight altitude shall not exceed 4m.
2. Do not fly beyond the visual range for the first test flight.
3. If there is light flashing showing an alert or there is a warning on the interface of the Agriculture Assistant APP during the flight, please land immediately and check the drone according to the plant protection assistant warning information.

2.3.4. GNSS Operation Mode (M+ Mode)

2.3.4.1. Mode Introduction

GNSS operation mode has the features of being easy-to-use and quick-to-start, which is suitable for the operation in small, irregular and complex fields. In GNSS mode, the maximum flying speed of the drone is 10m/s. The spraying speed of the liquid is related to the flying speed. The faster the drone flies, the greater the flow rate is. When the drone hovers, the flow shuts down automatically.

2.3.4.2. Operation Steps

Step 1: Before take off, press "" button to start the testing spray, to check if there is air in the pipeline.

Step 2: Take off manually and fly the drone to the desired starting position for the operation..

Step 3: Press "" button to begin application. Manually fly the drone to cover the target area using the control sticks. Press the button again to stop application.

Note: During the operation, make sure that the drone is in the visual range.

2.3.5. Autonomous Operation Mode

2.3.5.1. Mode Introduction

Users can survey the field and mark the obstacle, and set the border point using the field surveying function of the Agriculture Assistant APP. The App calculates optimal flight paths for efficient, automated coverage. Ideal for larger or complex-shaped fields. The operation route of fully autonomous operation mode is shown in Figure 2-8. The dotted line shows the line spacing. It can be set in the Agriculture Assistant APP.

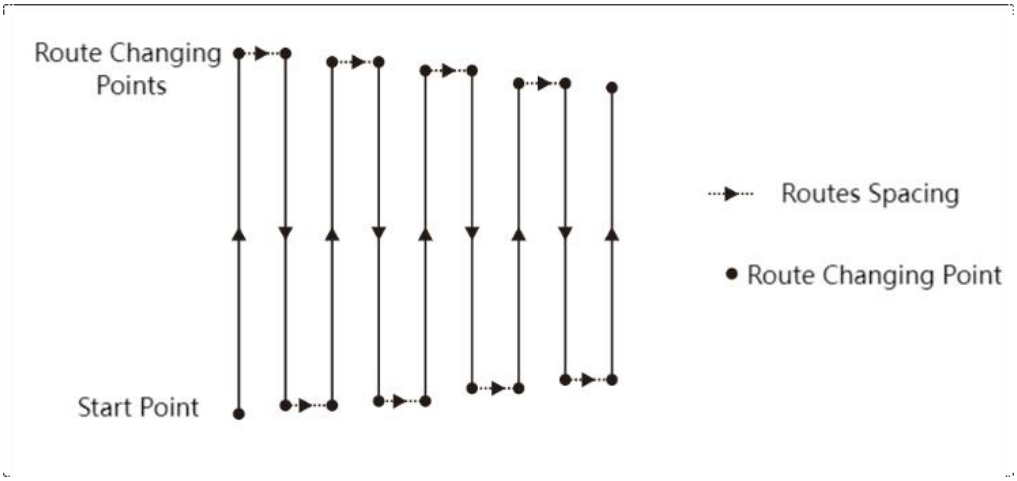


Figure 2-7 Autonomous Operation Route

2.3.5.2. Field Mapping Steps

Step1. Run the Agriculture Assistant APP and there will be three options (GPS mapping mode, drone mapping mode and RTK hand-held marker mapping mode), you can choose according to the actual situation.

Step2. Set a name for the field.

Step3. Mark the border points: Select the points at each corner of the borderline.

Step4. Mark the obstacle: If there are obstacles in the field, click the obstacle point and select the shape. Click on the turning points of the obstacle shape to set it as an obstacle point, and then click "OK" after the obstacle points setting is completed.

Step5. Calibration point settings: after editing the operation area, calibration points need to be added. Calibration points are used for map rectification. When setting calibration points, make sure the reference object is easy to identify; the surrounding area is clear and suitable for the drone to take off. The operation area setting is completed when the calibration point is set.

2.3.5.3. Autonomous Operation Steps

Step1： After the Agriculture Assistant APP is connected to the drone, click to expand the land/task list in the main interface.

Step2： Select a field (or a field in the task list) and click to use the field.

Step3： Place the drone at the calibration point of the operation area, click on “Calibrate”, then click “Calibrate Drone Position”.

Step4： After the field is chosen, set the following parameters one by one: route angle, turning mode, route inner contraction, obstacle point spacing, altitude, dosage, ways of bypassing obstacle area.

Step5： According to the route condition, select the routes ready to be sprayed (all routes are selected by default).

Step6： Click “Start Operation” on the operation interface.

Step7： Slide to unlock (please set the RTH height and take off height), and the drone will take off automatically and execute the planned route.

Step8： Complete the operation (also can be finished manually during operation) and then generate the operation report.

Notes:

1. Maintain visual line of sight during autonomous operations.
2. Altitude can typically be adjusted manually during autonomous flight using the throttle stick; centering the stick often returns to the planned altitude.

2.4. Function Introduction

2.4.1. Remaining Payload Volume

2.4.1.1. Introduction

The FP700 is equipped with weight sensors to measure the real-time remaining payload (liquid or granules) in the tank, displayed in the App. This allows operators to plan refills efficiently and potentially choose optimal breakpoint locations based on remaining payload and route progress. This can reduce the time when drone is flying to the breakpoint and not operating, which will improve the operation efficiency.

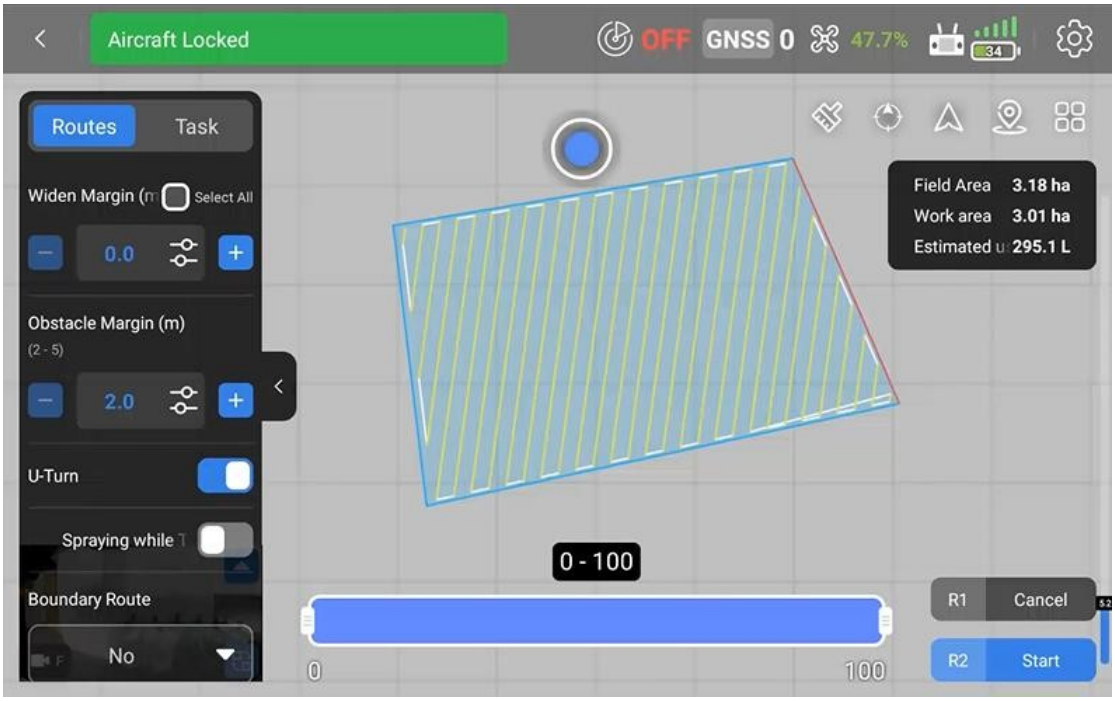


Figure 2-8

2.4.2. Breakpoint Resume Operation

2.4.2.1. Introduction

If an operation is interrupted (e.g., empty tank, low battery, manual pause, obstacle avoidance), the drone records a breakpoint. The Breakpoint Resume function allows the drone to return to or near this point and continue the mission automatically.

2.4.2.2. Record the Breakpoint

During the operation, the drone will record the breakpoint and resume the operation at the breakpoint in the following situations:

1. Insufficient liquid in the tank.
2. When the low voltage protection function is enabled and the Level II warning is triggered.
3. Pitch or roll stick on the RC is pulled/pushed.

4. When the drone enters the RTH mode.
5. When the drone has obstacle avoidance radar and has detected the obstacle, which leads to an automatic brake.
6. When the location signal or heading signal is weak, the drone will automatically exit the operation mode and enter the protection mode, and record the current coordinate as the breakpoint.

Notes:

1. Any condition above is met, the drone will update the breakpoint.
2. The following actions can be set for the drone according to the operating environment after no remaining liquid: hover, raise 2m and hover, RTH and no action.

2.4.2.3. Return to The Breakpoint

The steps for returning to the breakpoint are as follows:

Step1： Hover the drone manually in any open place and ensure there is no obstacle between this position and the breakpoint.

Step2： Click 'Breakpoint' or 'Back Point' in the Agriculture Assistant APP.

Step3： The drone automatically rises or descends to the operating altitude and returns to the breakpoint.

Step4： Resume the set route and continue the operation.

2.4.2.4. Return to The Back Point

If there is any obstacle on the way back to the breakpoint, you can choose "Back Point" to return to avoid the obstacle.

Step 1: After the operation is paused, you can fly the drone manually to bypass the obstacle.

Step 2: The app will display the positions of "Back Point 1" and "Back Point 2" in real time. When the horizontal flight speed is lower than 1m/s, the Back Point button will be displayed on the right;

Step 3: Click on one of the Back Points according to the map and actual situation.

Step 4: After clicking one of the points, the drone will fly to it and continue the operation;

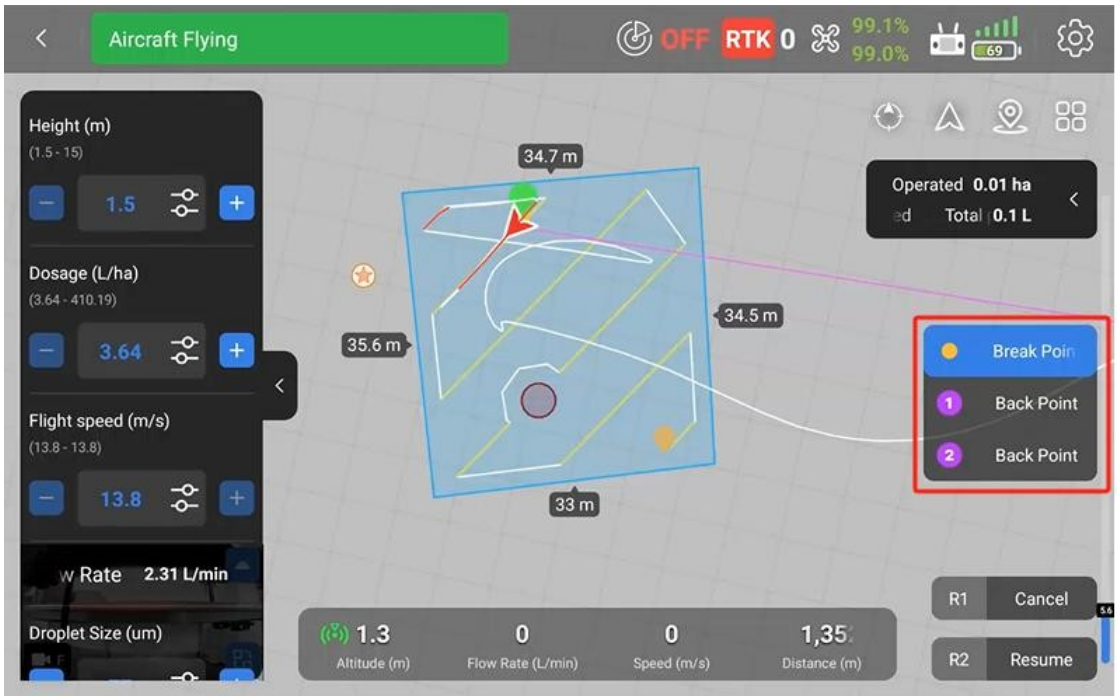


Figure 2-9

2.4.3. Terrain Following

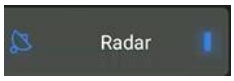
2.4.3.1. Introduction

The terrain-following radar allows the drone to maintain a relatively constant height above the ground or crop canopy, ensuring consistent application even over uneven terrain. Optimal working range is typically 1-30 meters.

2.4.3.2. Terrain Settings

For both plain and mountainous terrain, the drone adopts different tracking strategies and the user needs to set the simulated scene of the flight according to the actual operating terrain.

Setup Steps:

Step1： Tap  in the top right corner of App, then tap 

to get into radar settings.

Step2： According to the terrain situation, select "**plain**" or "**mountain**" on the right side of the column "Terrain Settings".

Notes:

1. Radar module housing should not be crushed causing deformity.
2. Keep the radar antenna cover clean and wipe the surface regularly with a soft damp cloth depending on the frequency of use.
3. When flying the drone over an object surface with a slope, the correlation between simulated slope and flight speed is shown below:

10°(flight speed <2m/s)

6° (flight speed < 4m/s)

3° (flight speed < 6m/s).

2.4.4. Low Battery Protection

The drone has a low battery level protection function. The user can set the warning threshold, which is the battery level in percentage in the Agriculture Assistant APP. When the value is reached, the drone will act according to the setting. The action can be set as: hover, land, return, no action (only light flashing).

2.4.4.1. Level 1 Protection

As the Level I protection, the drone indicators flash red. The protection will be triggered after the indicators flash for 10s. The factory default Level I low power threshold is 30%, and the protective action is "no action". At the same time, the Agriculture Assistant APP sends voice notification “Level I Low Battery”.

2.4.4.2. Level 2 Protection

As the Level II protection, the drone indicators flash red. The protection will be triggered after the indicators flash for 10s. The factory default Level II low power threshold is 10%, and the protective action is "auto-landing". At the same time, the Agriculture Assistant APP sends voice notification “Level II Low Battery”.

Notes:

1. When Level I warning occurs, fly the drone to the safe area and land as soon as possible.
2. It is necessary to avoid the Level II warning as much as possible to avoid accidents.
3. After the low battery protection action is triggered, the drone can only be switched to attitude mode or RTH mode.
4. When the drone lands automatically, the protection mode can be quit by switching to attitude mode.

2.4.5. Lost Control Protection

2.4.5.1. RTH Description

When the GPS signal reaches the seven satellites for the first time during taking-off or flight and the signal quality is good, the drone will record the current location as the RTH point. The process of the drone returning automatically to the RTH point is called RTH.

2.4.5.2. Protection Logic

When the drone is in good GNSS signal, the compass work normally, and the RTH point has been successfully recorded. If the remote controller’s signal is lost for any reason during the operation, the protection action will be triggered. The protection actions include landing, hovering and RTH.

Notes:

1. When the RC is well connected, RTH can be canceled by toggling the RC switch to "S", and the drone can be controlled manually.

2. When the RC is well connected, RTH can be canceled by long-pressing the “ ”button for 2s.

2.4.6. Obstacle Avoidance Radar

The FP700 is equipped with a new 4D millimeter wave radar for obstacle detection, which is unaffected by ambient light and dust. When the working conditions are met, the radar can detect the obstacles in front of and behind the drone. The maximum detection distance can be up to 100m. When obstacles are detected, the drone will self-stop to ensure safety during the operation. The obstacle avoidance function is enabled by default and can be turned off in the Agriculture Assistant APP.

2.4.6.1. Detection Range

The detection range of the radar module is shown in the following figures. The vertical direction is ±60° and the horizontal direction is ±30°. If any obstacle is beyond the detection range, the radar module cannot detect it so the pilot should operate carefully.

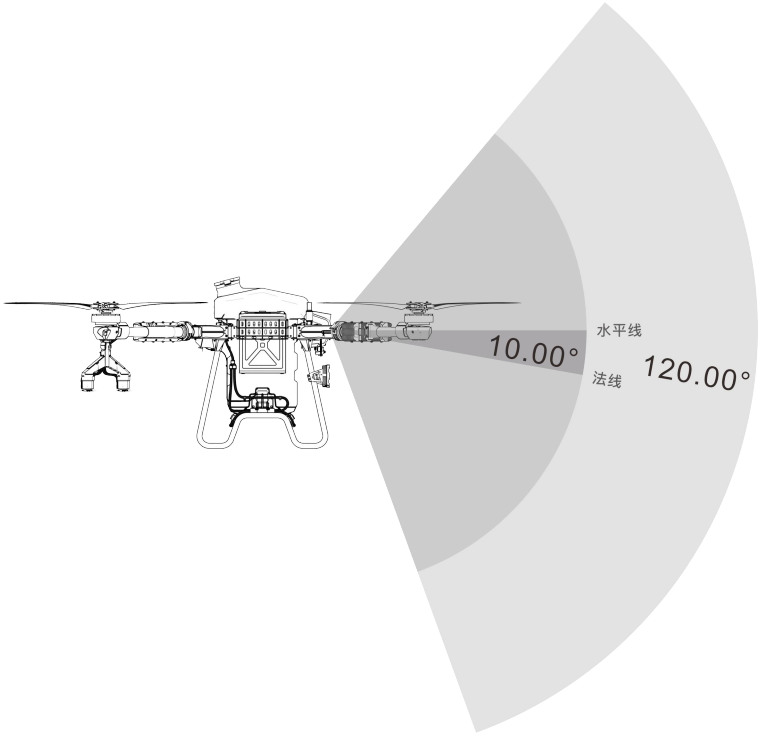


Figure 2-10 Vertically

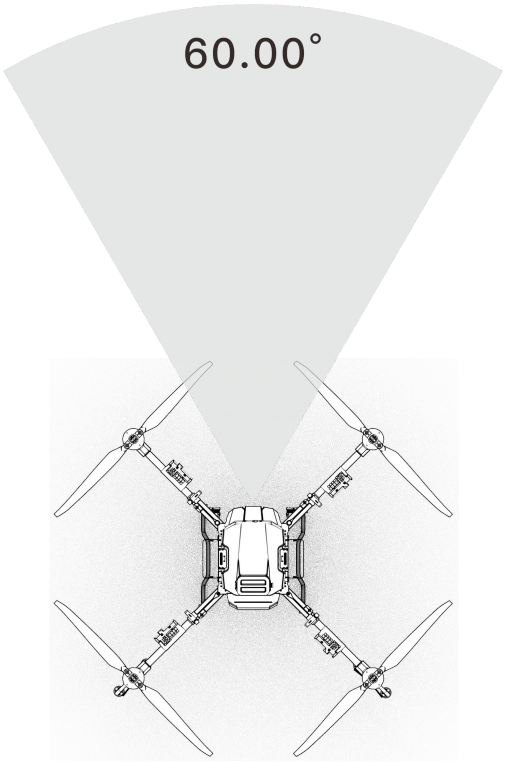


Figure 2-11 Horizontally

2.4.6.2. Drone Emergency Braking System

The distance between drone and the obstacle is X

Status 1	Status 2	Status 3
X≥30M	30M≥X≥8M	X < 8M

Status 1 - Far Distance (>30m): When the obstacle distance ≥30m, the drone will not brake and the APP will not display any warning.

Status 2 - Warning Zone (8m - 30m) Entering the yellow warning zone, the drone slows down to 2m/s and maintain it. The APP will show the distance between the drone and the obstacle in the yellow zone.

Status 3 - Danger Zone (<8m): Entering the red warning zone, the drone will brake urgently and enter the Safe Mode. In the Safe Mode, the drone will remain to hover and cannot be operated to fly towards the direction of the obstacle. The APP will display the obstacle distance in the red zone. Flying the drone to the opposite direction of the obstacle will exit the Safe Mode.

Special Status - Sudden Obstacle: If any obstacle appears suddenly during the flight, the drone will stop with maximum braking force.

2.4.6.3. Obstacle Circumvent (Bypass)

Equipped with an industry-leading vehicle-level radar, the FP700 agricultural drone possesses excellent spatial awareness. When obstacles are detected in the forward or backward flight direction, it can autonomously plan a path to bypass the obstacle from the left or right without the need for manual intervention.

To activate this feature: Open the "Obstacle Circumvent" on the “Radar Setting” page (default closed) in the Agriculture Assistant APP.

2.4.6.4. Obstacle Avoidance Notes

1. The obstacle function will not be activated if the drone is in "S" flight mode or the drone is landing.
2. After the obstacle avoidance function is turned on, to ensure sufficient braking distance, the maximum flying speed is 13.8m/s.
3. The obstacles can not be detected when the vertical FOV is greater than 15°or less than -15°.
4. The obstacle avoidance function will not be activated during taking-off, landing or line changing.
5. When the obstacle disappears, the drone will be in the protection mode for 2s, after which it will gradually lift the speed limit.

2.4.6.5. Description of Typical Obstacle Avoidance Scenarios

Trees, Poles: obstacle avoidance radar can detect the obstacle within 25m, and continuously show warning with the distance. When the distance is less than 20m, the drone will brake automatically to ensure safety.

Wires: Taking the 1.5cm-diameter wire as an example, as the reflection of the wire is poor,

the radar is able to detect the wire 10m away while the drone is flying right towards the wire at a speed of 3m/s. The thinner the wire or the higher the flight speed is, the poorer the obstacle avoidance effect will be. Fly with extreme caution near wires.

Notes:

1. When using the radar module, follow the local radio regulations and legal requirements.
2. For obstacles of different sizes and materials, the effective working range of the radar module will vary. For example, when detecting pedestrian, power cables, dry branches or conifers, the effective detection distance will decrease. Please operate carefully.
3. Radar modules are suitable for flat terrain and may cause false alarms on steep slopes.
4. False alarms possible when flying very low (<1.5m) over surfaces.
5. Never disassemble the radar module by yourself. Otherwise, the improper installation might cause malfunction of the radar.
6. Do not crush or squeeze the housing of the radar module.
7. Radar modules can be used normally on rainy days, and radar detection performance might decrease by 10-20%.

2.4.7. RTK

2.4.7.1. Introduction

The positioning accuracy of RTK can reach centimeter level, which improves the precision of plant protection operation. When RTK is started and GNSS signal is good, the drone will start the dual antenna direction finding function, which not only has higher directional accuracy, but also backs up with the magnetic compass directional function to further improve flight reliability.

2.4.7.2. RTK Sky Side Settings

The FP700 typically uses Network RTK via the RC's internet connection (default source often "Qianxun" or similar). No special configuration is required.

Pay special attention to:

1. Always keep the remote control open and connected to the Internet during use.

2. Take off only when the RTK status is Fixed Solution.

3. Maintenance and Common Troubleshooting

3.1. RC Maintenance & Precaution

- The RC needs to be wiped regularly to keep it clean. Keep the RC from water, agrochemical and dust.
- Please fold the antenna after use to avoid damage.
- If the drone cannot hover and keeps flying in one direction when the control stick is at the central position, the control stick of the RC needs to be calibrated.

3.2. Airframe Maintenance & Precaution

- Delicate electronic components are inside the drone. Do not soak the drone in water when cleaning.
- Regular inspection of components is required. Make sure the screws are fastened at all the joints.
- During transportation, make sure to properly fold the arms so that the motor base is placed on the folding structure.
- If the structural parts (such as frames, arms, landing gears) are damaged, please contact the after-sales service for replacement.
- If there are other faults, please refer to the APP self-check system prompts or contact the corresponding technicians.

3.3. Motor Maintenance & Precaution

The working environment of agricultural plant protection drone motors is harsh. Water mist, liquid and agrochemical residue are the main factors causing damage. Therefore, it is necessary to:

- Clean the housing of the motor with a warm cloth after the operation. Remove the residue on the surface, and do not flush the inside of the motor with high-pressure

water. Prevent water from leaking into the motor, which will shorten the service life.

- Check the motor regularly. When the resistance of the motor is high, the sound is abnormal or the gap between the motor and the motor base becomes large, please contact after-sales immediately and maintain according to the instructions by the after-sales.

3.4. Propeller Maintenance & Precaution

- If the propeller cracks or is damaged, please replace it in time. Otherwise, it will not have enough lifting power and the drone will be unstable, which will cause safety problems.
- Pay attention to the marking on the propellers when installing them. Motor No.1 and No.3 should match "CCW" propellers, and motor No.2 and No.4 should match "CW" propellers.
- Clean up agrochemical residues after finishing the operation.
- Insert the propeller into the propeller holder during transportation.

3.5. Battery Maintenance & Precaution

3.5.1. UPS

The FP700 agriculture drone adopts a 2025 new flight control system with built-in backup battery, which can maintain the normal operation of the flight control system for 5 minutes after the main power battery is powered off, effectively avoiding the waste of flight control restart and GNSS star search time.

3.5.1.1. Specification Parameters

No.	Item	Specification Parameters
1	Cell Type	Rechargeable Lithium-Ion Battery
2	Individual Cell Voltage	3.7V
3	Capacity	2500mAh
4	Discharge	-20℃~55℃

5	Charge	0℃~45℃
6	Storage (Within 3 Months)	-5℃~35℃

3.5.1.2. Notes

- When the agricultural drone is not used for a period of time, please connect the drone to the battery once a month for no less than 20min, in order to prevent the battery from discharging.
- Dissemble the battery is strictly forbidden.
- It is strictly forbidden to throw the battery into the fire, otherwise, it may explode.
- Batteries should not be immersed in liquids such as freshwater, seawater, beverages, etc..
- Using damaged batteries is prohibited.

3.5.2. Power Battery

- Avoid charging at a temperature of above 45°C.
- If the battery falls from height, it might cause a short circuit or even combustion.
- Make sure the battery is firmly connected to the drone, otherwise it may affect the performance of the drone.
- If corrosion or discoloration is found in the battery plug or the drone, wipe them with absolute alcohol in time and contact the after-sales department and follow the instructions.
- Check if batteries have dents, scratches and deformation on the surface regularly. Serious mechanical damage may lead to the risk of short circuits or combustion.
- Make sure all wires are not damaged. Severely damaged wires may cause short circuits or combustion.

Storage Notes:

- For storage of a large number of batteries, it is recommended to keep 30cm between

each storage unit.

- Please avoid direct sunlight for more than 10min under any storage condition.
- Battery storage environment should be maintained at room temperature (15°C -35°C). Long-term storage above 35°C will accelerate the aging of the battery.Long-term storage at 0°C - 15°C may shorten the service time, but after several times of use at room temperature, the normal condition can be restored.
- Battery storage should avoid a humid environment. Keep storage environment dry and not ventilated.
- Battery storage locations should not be places where large items are often moved in and out to prevent accidental collisions.

Transportation Notes:

- It is recommended to use a temperature-resistant or flame-retardant box with a cover to store batteries. It is recommended to use the shockproof and tilt-proof sponge in the original box in other packages.
- Avoid putting the charging and discharging cables on the edge of the box to prevent accidentally being crushed, otherwise, it will lead to a short circuit when being used.
- During the operation, if the batteries are placed in a vehicle, ventilation should be guaranteed and avoid direct sunlight. The place exposed to direct sunlight in a sealed vehicle may have a temperature of above 80°C, which may cause the battery to burn.

Emergency Notes:

Adequate sand, fire extinguishers, and heat-insulating gloves should be prepared in places where batteries are stored, transported, or used. When smoking and burning of batteries are found, the following measures should be taken immediately:

1. Battery is just starting to smoke (or has a burnt odor): Determine the part where a short circuit happens immediately. Lift the battery handle or charge-discharge cable (with heat-insulating gloves if necessary) and quickly drag the battery into the open room or outdoor. Completely bury the whole battery with sand (the charge-discharge cable needs to be buried in if there is smoking). Be careful to wait until the battery has completely cooled down before taking it out (otherwise the battery may continue to smoke).
2. Batteries emit heavy smoke: immediately use sand and fire extinguishers to extinguish or

bury the burning batteries while relocate the surrounding batteries and other flammable objects. If the surrounding flammable and explosive objects (liquids) cannot be removed, immediately use large quantities of water for rapid fire extinguishing and cooling.

3. Batteries are on fire: immediately use a large amount of water, fire extinguishers and sands to extinguish the fire (disconnect the power supply of surrounding electrical equipment first) while removing the surrounding batteries and other flammable material.

Notes: When using fire fighting equipment to extinguish fire, strictly follow the requirements and specifications of the local Fire Fighting authorities.

3.6. Plug Maintenance & Precaution

- The plug must be inserted completely when it is connected, otherwise, it will heat the plug and affect flight.
- The power plug and battery plug should be replaced if they have turned black or sparked.

3.7. Spray System Maintenance & Precaution

- Fill the water tank, pipe and nozzle with clean water to clean them when the operation is finished.
- Avoid mixing herbicides and pesticides, otherwise, it will be harmful to plants.
- In the case of long-term storage or transportation of the drone, always empty the tank.
- It is forbidden to run the water pump at high speed on an empty tank for long time.
- Avoid using powders and high-concentration emulsifiers to avoid blocking the spray pipe.

4. Transportation Instructions

Packaging method: The drone will be placed in the package box with flexible supporting material embedded in the package box while shipping.

Always fold arms/propellers securely and protect the drone during transport

Package Size: 1083mm*1083mm*905mm as shown below.

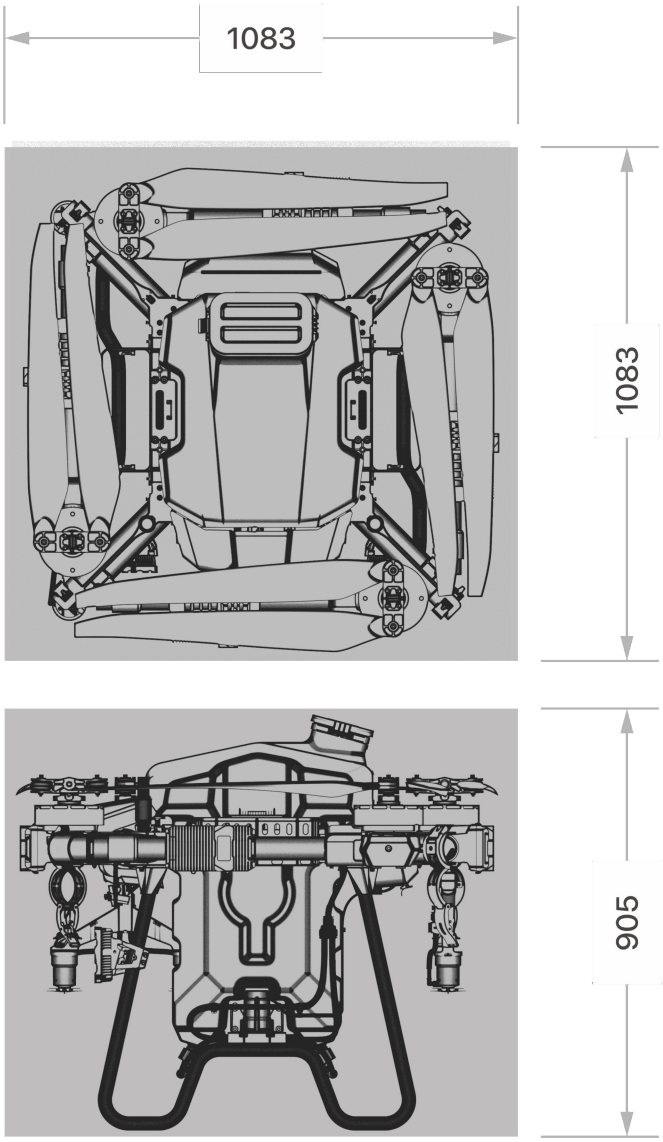


Figure 4-1

5. Hazards and Safety Checklist and Countermeasures

No.	Hazards	Countermeasures
1	Foldable Structure	When folding or unfolding the drone, be aware of the hand pinch hazard sign and keep your fingers away from the folding structure.
2	High-speed Rotating Propeller	Keep a safe distance from the drone and keep it away from people, animals or other obstacles during operation.
3	Charger During Charging	Place in a dedicated charging area and environment. Ensure good ventilation. When the charger is connected to power, make sure the charger is grounded.
4	Liquid Tank	Flush it with clean water after use and cover it with the lid, and store in a safe place.

5	Battery	Please strictly follow the relevant safety regulations and battery instructions, and be sure to pay attention to safety. Do not use the battery when it emits odor, heat, deformation, discoloration or any other abnormal phenomenon. If the electrolyte gets into the eye after the battery leaks, do not rub, rinse with water, and seek medical attention immediately.
6	Agrochemical	When using agrochemical, pay attention to the risk of different kinds of agrochemical. Fully understand the using methods in advance.
7	Flight Conditions	Do not fly in adverse weather, such as strong wind (wind speed >8m/s), heavy rain (rainfall >25 mm/12 hours), snow, fog, etc.

6. Appendix

6.1. Specification Parameters

Specification	Parameter
Package	
Package Size	1100*1100*930mm (Including peripheral waterproof film)
Net Weight	42.8kg
Gross Weight	56.9kg
Body Frame	
Symmetrical Motor Wheelbase	2200mm
Arm Length	850mm
Spraying Mode	

Dimension (Folded State)	948*919*855mm
Dimension (Unfolded State)	2960*1705*855mm (With unfolded propellers)
Dimension (Unfolded State)	1705*1695*855mm (Without propellers and nozzle, antenna included)
Nozzle Length (Working State)	1739mm (Maximum nozzle center distance)
Seeding Mode	
Dimension (Folded State)	948*919*907mm
Dimension (Unfolded State)	2960*1705*907mm (With unfolded propellers)
Dimension (Unfolded State)	1705*1695*907mm (Without propellers and nozzle, antenna included)
Power Motor	
Model	PX60
Stator Dimensions	136x30mm
KV value	68RPM/V
Power	10kW (Single motor)
Maximum Thrust	About 59kg (Single motor)
Weight	1905g (Single motor excluding propeller components, motor base, including power connectors)
Number of Motors	4
Power ESC	

Operating Voltage	51.8V (14S LiPo)
Rated Working Current	77A
Rated Power	4000W
Foldable Propeller	
Material	Nylon Carbon Fiber Composite Material
Diameter	56inch, 1426mm
Pitch	20inch
Weight	925g (Including propeller clamp components)
Spraying System	
Spraying Tank	
Rated Capacity	60L
Weight	6.3kg (Including liquid pump and other accessories)

Pump	
Pump Type	Metering peristaltic pump
Number of Channels	2
Maximum Flow Rate	20L/min (Single pump)
Measurement Error	< 5%
Centrifugal Nozzle	
Rated Voltage	51.8V
Protection Level	IP67
Maximum Atomization Capacity	10L/min (Single pump)
Spray Range	6~10m
Recommended Spray Range	8m
Recommended Operating Temperature	0℃-40℃
Atomization Particle Size	30μm~500μm
Seeding System SP-6 (Optional)	
Tank Capacity	80L
Maximum Payload	65Kg
Weight	7.0kg (Including the tank, spreader and other components)

Feeding Mode	Ration by rolling feeder
Seeding Mode	Centrifugal disc spreading mode
Seed Range	5-10m
Recommended Operating Temperature	0℃-40℃
Package Size	840*580*480mm
Transport System (Optional)	
Empty Weight	About 2.0kg
Payload Capacity	60kg
Cable Length	15m(Standard Configuration)
Automatic Landing Unhooking	Support
Working Temp	0℃-40℃
Application Scenarios	Limited to use in agriculture, forestry, animal husbandry and fishery scenarios

Radar	
Terrain Following Radar	
Frequency	76GHz-77GHz
Protection Level	IP67
Height Range	1-30m
Range Accuracy	0.1m
4D Obstacle Avoidance Radar	
Detection Range	1-150m
Using Condition	Flight relative altitude > 2.0m
Safe Distance	4.0m
Avoidance Direction	Front
Autonomous Obstacle Avoidance	Supported, autonomously avoids obstacles to the left right or above .
Protection Level	IP67
FPV Camera	
FOV	Horizontal 86°, Vertical 52°
Resolution Ratio	Default 720P, maximum optional 1080P
Flight Parameter	

Drone Weight (With Battery)	59.6kg (Spraying mode) 61.5kg (Spreading mode)
Rated Take Off Weight	119.6kg (Spraying mode) 126.5kg (Spreading mode)
Maximum Take Off Weight	＜150kg
Hover Accuracy (GNSS signal Properly)	Horizontal ± 1.0m, Vertical ± 0.5 m
	Horizontal ± 10 cm, Vertical ± 10 cm (RTK started)
	Vertical ± 0.1m (Radar Started)
Hover Time*	≥6.0min (Take-off weight 119.6kg &2*20Ah batteries) ≥15.0min (Take-off weight 59.6kg &2*20Ah batteries)
*The hover time is measured near sea level, when the wind speed is less than 3m/s, and the ambient temperature is 25℃.	
Maximum Flight Speed	13.8m/s
Maximum Operation Speed	10m/s
Operational Hourly Productivity	28.8ha/h (Take operation speed 10m/s, spread range 8m as example)
Distance Limit	1000m

Maximum Take-off Altitude	2000m
Recommended Operating Ambient Temperature	0℃-40℃
Flight Control System	
Model	TIA2025
Input Voltage	30-60.9V
Rated Power	20W (Excluding peripherals such as radar, water pump, etc.)
Interface Type	CANBus, RS485, PWM, USB 等
Protection Level	IP67 (after fastening the outer joint)
Operation Environment	-10℃-45℃
Remote Control	
Model	TC2S
Frequency	2.400-2.4835GHz
Signal Effective Distance (no interference, no obstruction)	Maximum communication distance: 10km; image transmission distance: 3km (plant protection environment)
RTK High Accuracy Mapping	Support
Mapping Accuracy	RTK started(in fixed solution): horizontal: ±0.1m; vertical: ±0.1m

Screen Size	7inch
Battery Voltage	3.7V (Rechargeable lithium battery)
Battery Capacity	20000mAh
Time of Duration	6-8h
Weight	About 1120g
Size	280x195x101mm
GNSS System	
Hover Accuracy (RMS)	RTK not started: horizontal: ±0.6m; vertical ±0.3 m
	RTK started (in fixed solution): Horizontal: ±0.1m; vertical: ±0.1m
Orientation Accuracy (RMS)	0.4°
Charger (TC9002P)	
Input Power	AC 220V~240V
Input Voltage Frequency	50/60Hz

Output Voltage	DC 61.0V (Max)
Output Current	165A (Max)
Output Power	9000W (Max)
Number of Channel	Dual Channel
Net Weight	18.7kg
Gross Weight	19.6kg
Size	430*320*300mm
Package Size	480*370*350mm
Secondary Lithium-ion Battery (ZAB1420-03)	
Voltage	53.2V
Capacity	20000mAh
Discharge Rate	10C
Charge Rate	5C
Protection Level	IP56 (With batteries installed to the drone)
Battery Life	1000 cycles (Capacity will be attenuated, no limit to use)

Weight	About 8.1kg (With 2 batteries installed during flight)
Size	139*240*316mm
Secondary Lithium-ion Battery (TB1420S)	
Voltage	52.5V
Capacity	20000mAh
Discharge Rate	8C
Charge Rate	4C
Protection Level	IP56 (With batteries installed to the drone)
Battery Life	1000 cycles (Capacity will be attenuated, no limit to use)
Weight	About 8.1kg (With 2 batteries installed during flight)