T Series Agricultural Drone

Quick Guidance Manual V2.1

User Suggestion:

Top Peak Electronics Co., Ltd provide the below files:

1.Commodity List

2.T Series agricultural drones fast operation guidance

3.T Series agricultural drones user’ s manual (E version)

4.T Series agricultural drones aids APP using guidance(E version)

5.After sales guarantee

Suggest user check commodity list. Firstly read T Series agricultural drones fast operation guidance, get brief understanding of using procession, the detailed using method and features as well as functions, please check series agricultural drones user’ s manual (E version) for reference.

T Series Agricultural Drone Quick Guidance Manual

Introduction

T Series agricultural drone is technical maturity multi propeller drone, which owns the leading position in function, appearance, operation, safety. It is with a certain dangerous and destructiveness risk due to its principle and structure. Please strictly obey the safety indication and using guidance to operate. Otherwise, improper using of the unit will cause direct or indirect destroy or injury.

Related to the manual

The manual is for the user’ s operation guidance purpose, the photos, graphics, Icons and illustrations may be difference of the real unit, please refer to the actual items.

Due to product update and other reason, the file content will be updated occasionally, please read the manual content carefully before operate the unit.

The product implementation Standard abides with Q/TG 001-2018

Operation Notes:

Pesticide use

- Please wear protective tools while operation, to avoid human body touching pesticide directly
- To avoid use powder characteristic pesticide, otherwise, the unit spraying system using life will be descend.
- To mixed the pesticide or chemical, clean water must be used, otherwise, the Impurity materials will clogging nozzle or spraying system. Please keep strainer screen cleaning, if clogged with dirt, please clean out the dirt then using.
- After operation, please clean the remain pesticide in containers, make sure it not pollute the environment, harmless to human, animal and environment, pour to river or any places prohibited.
- Pesticide effect is closely related to concentration of pesticide solution, spraying rate, height of aircraft from crop, wind direction, wind speed, etc., Strictly abide by the safety instructions of pesticide producing enterprises. Do not use special working fluid. Consider all those factors before mixing the pesticide to achieve the expected working effect.

- Fly in an open field away from the crowd.
- Recommend flying below 2,000 meters.
- Fly aircraft in an environment of 0 °C to 40 °C.
- It is recommended to work in an environment where the wind force is less than 4 degree Do not fly in rain, fog, snow or other extreme weather.
- Flying Indoors is strictly prohibited.
- Before flying within the legal area, please consult the local flight management department to comply with the local laws and regulations.

Check before operation

- Make sure the electric capacity of each equipment is sufficient.
- Make sure all the parts are in good condition. If any parts are aged or damaged, please replace them before flying.
- Make sure the landing gear and work case are tightly installed and all the screws are locked.
- Ensure that the propeller is not damaged and installed firmly, the blades and arms are fully spread, and the arm nut is tightened.
- Ensure that the aircraft motor is clean and undamaged.
- Make sure the spray system is free of clogging and working properly. Please calibrate your compass before flying.

Operation

- Do not approach the rotating propeller or motor while working.
- Be Sure to pay attention to the danger of mechanism extrusion when folding.
- Be Sure to fly under the take-off weight of the standard operating load in case of danger.
- The operator must pass the professional training and examination. Do not operate this product without the training personnel.
- For Aircraft Equipment calibration, firmware upgrades, please ensure that the propeller has been removed.
- Check the frequency of the remote control of the aircraft, make sure the propeller of the aircraft has been removed, and keep the people and animals away from the motor during the frequency matching process.
- Do not operate this product when you are not in good condition, such as after drinking, tired, sick, etc. .
  the working environment does not meet the working condition of the radar module, the aircraft will not evade the obstacles when returning automatically. If the remote control signal is normal, the flight speed and altitude can be controlled by the remote control.
- When working, please be sure to open the remote controller and then connect the power supply. After landing, disconnect the power supply and then close the remote controller.
- Please maintain full control of the vehicle and do not rely solely on the information provided by the hand-held ground station.
- The obstacle avoidance function and terrain following function will not be available in a particular flight mode or flight environment. Please observe the attitude of the aircraft at all times and judge the flight condition reasonably in order to avoid obstacles in time.

Flight restrictions and local regulations

- Browse the CAAC's website: http://www.caac.gov.cn to get the latest list of flight restrictions.
- The maximum controlled flight altitude is below 20 meters. Please consult your local flight control department before take-off to comply with local laws and regulations.
- Enter the URL in your browser, open the https://uas.caac.gov.cn page, and authenticate your real name.

⚠Special Note: The Safety Operation Instruction includes but is not limited to the above points.

Product Overview

The T series agricultural plant protection drones is a convenient, efficient and economical folded four/six axis plant protection drones specially designed for agriculture. The downward airflow generated by the rotors is helpful for the penetration of medicament to crops and the control effect is good. The double water pump precision metering spraying system, which supports one-key setting of per mu dosage, is equipped with auxiliary operating system such as FPV, obstacle avoidance, which makes the sprayer easy and safe to operate the intelligent data platform based on 4g high-speed network can transmit the plant protection data efficiently, and the background system can analyze and process the data synchronously, which makes the management real-time visible and controllable.

1. Remote controller

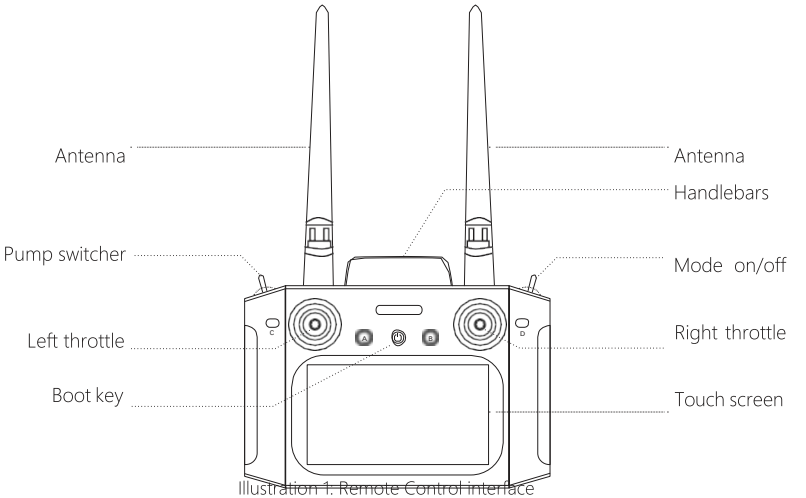


Illustration 1: Remote Control interface

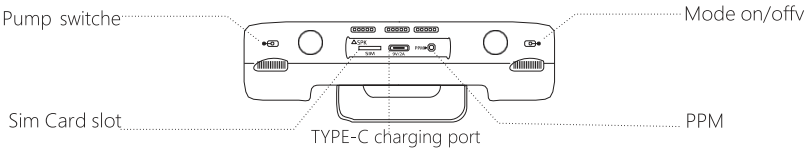


Illustration 2: Remote Control interface

Remote Control Parameter	Product Model：H12	Channel Number：12
	Working Voltage：4.2V	RF POWER: 20DB@CE23DB@FCC
	Frequency Band：2.400-2.483GHz	Hopping: New FHSS frequency
	hopping Upgrade: APP Online upgrade	Weight: 530g
	Size：190×152×94mm	Battery: 10000mmh
	Working time：6-20小时	Charging Jack: TYPE-C

Remote Controller Antenna Setting

The remote controller’ s antenna is foldable design, the signal strength is different while remote controller placed in different position. It is suggested to keep the antenna of the remote controller perpendicular to the ground when flying the aircraft. In this case, the signal strength is the maximum. The position or distance between the operator and the aircraft is adjusted in time to ensure that the aircraft is always in the best communication range. Therefore, in flight to avoid the remote control antenna pointed at the aircraft, as shown in figure 3.

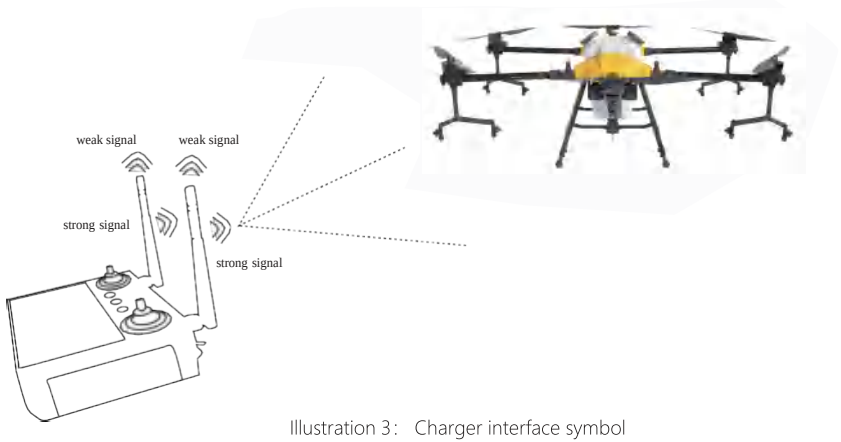


Illustration 3： Charger interface symbol

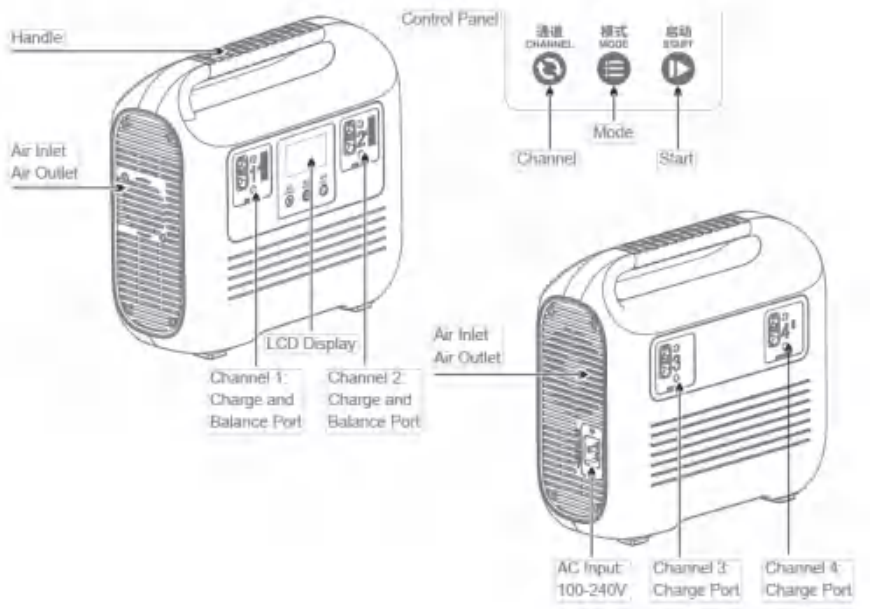
遥控器主要控制按键（美国手为例）

Channel	function	control switch	description
1	Throttle	Left throttle up and down	Rise and down
2	Direction	lift throttle–L & R	Turn left and right
3	Roll over	Right throttle-L & R	Left-right remove
4	Pitching	Right throttle–up & down	Move forward, move back
5	Mode Shift	Mode switch	Follow instructions on the screen
6	One key back	Main screen	Follow instructions on the screen
7	AB point recording	Main screen	Follow instructions on the screen
8	AB Point execution	Main screen	Follow instructions on the screen
9	Radar switch	Main screen	Follow instructions on the screen
10	Spray switch	Pump switch	Follow instructions on the screen

2. Charger

With CAN communication integrated, PC3000H is a smart charger for smart batteries, ordinary lithium batteries and LiHV batteries(4.35V). It can connect with up to four batteries at the same time. The maximum output power is up to 3000W, and users can choose between four modes of Fast Charge/ Standard Charge/Charge/Storage.

The charger can recognize the batteries instantly and charge automatically with customized CAN communication. PC3000H makes charging a more convenient and straightforward experience.



Product features

Customizable for CAN communication Maximum

Output Power of up to 3000W LCD switchable

between English & Chinese

Battery Voltage Meter
Support up to 4 packs of 12S or 14S LiPo/LiHV batteries

Four modes of Fast Charge, Standard Charge, Charge and Storage

Maximum protection: short circuit, reverse polarity

& over-temperature protection

OPERATIONS

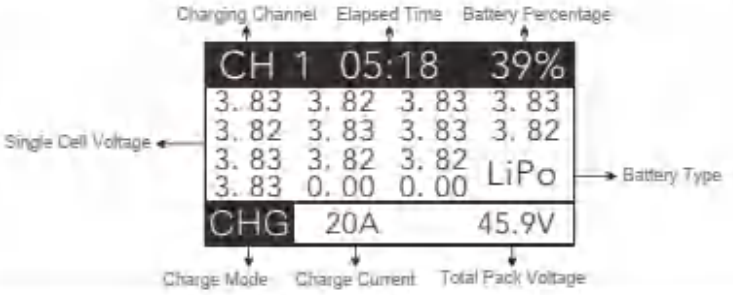
Please make sure the AC power is well-grounded before using, and strictly follow the operating procedures below:
The charger can connect up to 4 batteries.
1)Power on: connect AC power, and the charger will beep once, the fan will start to rotate during self-check;
2)Select the language:
Initial Use: short-press the MODE button, choose the preferred language in the interface, then press the START button to confirm.
Routine charging: long-press the MODE button for 10 seconds to enter the language selection interface.

After choosing the desired language, press and hold the START button to confirm.

3) Select the battery type: Press and hold both the MODE & START buttons simultaneously for three seconds to select the battery type: LiPo or LiHV.
4) Connect the Battery: please follow the diagram below to connect the battery. (The charger will automatically detect the battery cells)

5) Select the Charge Mode: Fast Charge, Standard Charge or Charge, and long-press the START button for three seconds to start charging.
Note: 12S and 14S batteries cannot be charged simultaneously under the Charge and Standard Charge modes; short-press the START button to stop charging or exit the abnormal state.

Fast Charge Mode: It can detect the voltage and charge the connected batteries automatically with higher voltage first.
Standard Charge Mode: The batteries connected to Channels 3&4 will be charged simultaneously first; after that, batteries on Channels 1&2 will be charged simultaneously.
Charge Mode: It charges the lowest-voltage battery first until all the four batteries are equal in voltage. After that, all the batteries will be charged at the same time.



3. Drone Aircraft

Whole Unit Compostion

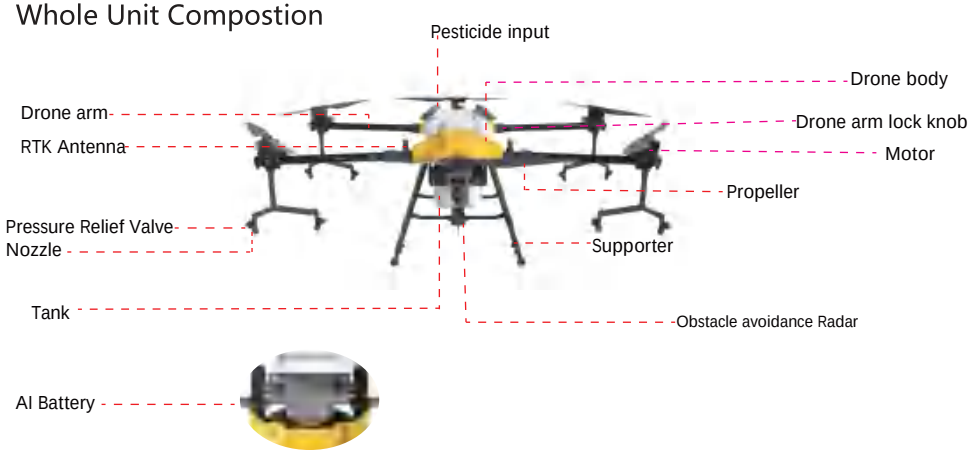


Illustration 5： Front view photo

Illustration 6： Front view photo

The deployment of the Mechanical Arm

1, the agricultural plant protection drone from the box,
2, Deploy the arm in place,
3, lock the rotation screw tightly

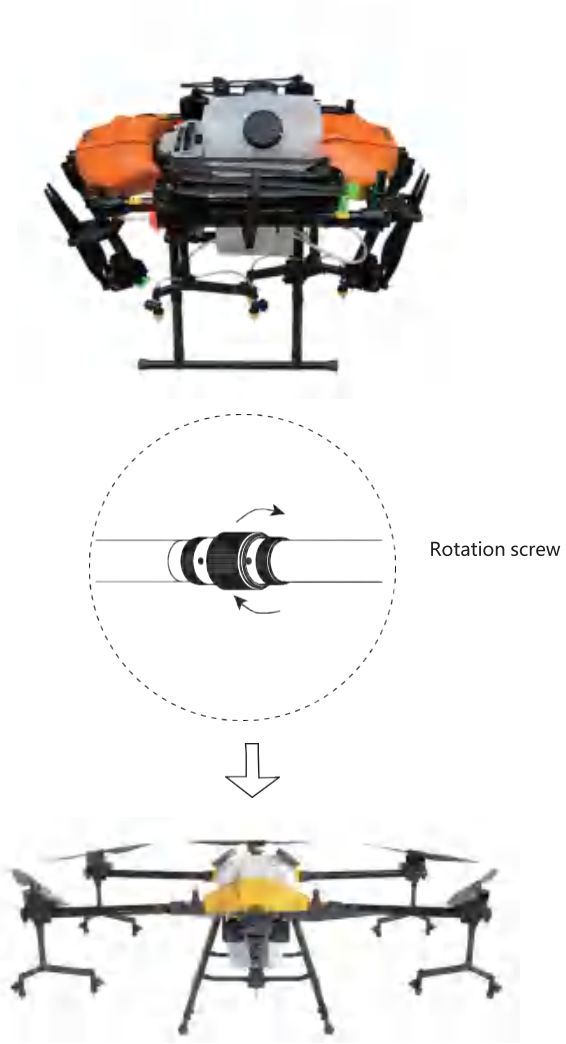


Illustration 7： Arm spread

Install Propeller

Propellers are foldable propellers, directly expand to 180 ° that’ s enough

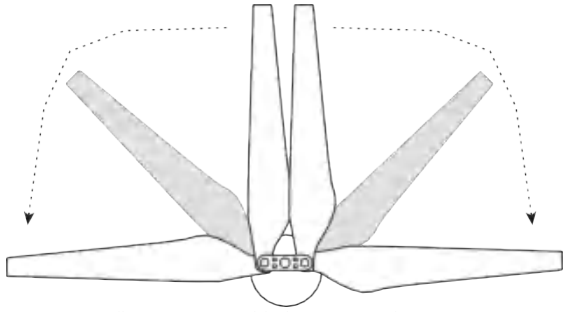


Illustration 8： Folded parts spreading

Alignment of the device

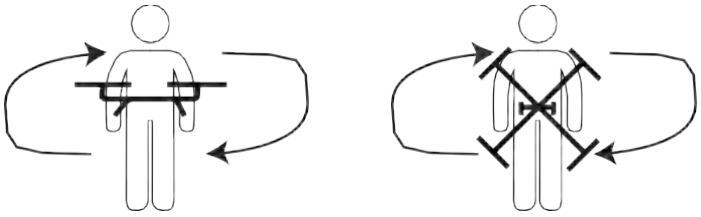
1) IMU alignment

Align the aircraft horizontally by clicking the "IMU Alignment" button and completing the alignment in 3 seconds. If the alignment is at an angle of inclination or if the body is wobbling, it needs to be recalibrated.

2) Magnetic compass alignment

Click on the "magnetic compass calibration" button, LED yellow light is always on, enter the level of calibration. As shown in figure, the aircraft will be placed horizontally, the drone head clockwise rotation to the LED green light is always on, enter the vertical calibration. As shown, the calibration is completed by rotating the camera head down and alternately blinking red, green, and yellow along the clockwise direction.

3) Flight Control Support Remote Control Rod single side calibration accelerometer and magnetic compass, please refer to T series product user manual for details.



Notes:

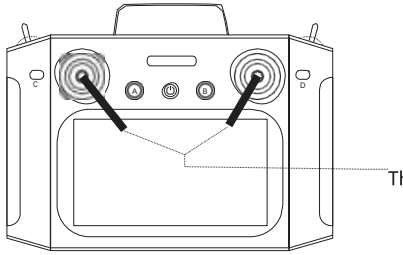
a. The magnetic compass needs to be recalibrated when the flight place is changed.

b. Please check if there is strong magnetic interference before calibration.

Lock and Unlock the remote controller

1)Unlock

according to the diagram to unlock, unlock the motor into the idle state.

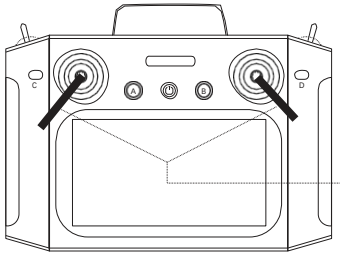


Throttle position(as showed)

2)Lock

a. Lock immediately upon starting the motor in any flight mode, performing the stroke operation shown in figure will cause the motor to stop immediately.

Note: In case of emergency during the flight of aircraft, please perform the stroke operation in figure to prevent accidents.



Throttle position(as showed)

b. Automatic lock all flight modes have automatic landing identification function, will automatically control stop, while flight pull throttle to the minimum lever will not cause motor stop.

4.Flight mode introduction

4.1 Gesture mode

The gesture mode is suitable for the central control user. During the flight, IMU, GPS, magnetic compass and barometer working together. gesture mode can be automatically switched according to the GPS signal control mode, no GPS or signal is not good to use fixed altitude flight, when GPS signal is good can be fixed height and position. The gesture mode has no imitative function.

1) Working conditions.

Because of the need of GPS module, the attitude mode must wait for the completion of the satellite search and the positioning accuracy to meet the requirement. As shown below, when the LED indicates that the GPS status is general, good GPS or RTK positioning, you can unlock or enter the mode in this mode.

GPS identification	lamp status display	priority
GPS not connected/GPS not received signal	red light three flash 3 times	low
GPS SIGNAL IS POOR	red light double flash 2 times	low
GPS SIGNAL GENERAL,	red light double flash low	low
GPS SIGNAL IS GOOD	red light not flash	low
RTK positioning	yellow light single flash	

The flight control can only be unlocked in attitude mode, other modes can not be unlocked. After entering attitude mode, the LED green light flashes.

2) Operation Instructions

GPS search is over, positioning success, the remote control switch change to 5 channel mode to the attitude mode position, after the lever to unlock, less than 50% of the throttle motor at idle speed, more than 50% of the throttle to push the throttle to take off, throttle lever to 50% of the position, the aircraft fixed height. When the aircraft is in motion, the remote control all joysticks back, the aircraft will automatically brake suspension. The specific functions of the throttle are listed in the table below

Channel 1	controls the roll angle of flight
Channel 2	controls the Pitch Angle of flight
Channel 3	controls the rise and fall of the aircraft, when the throttle is in the middle, the flight chess is in a constant altitude
Channel 4	which controls the rotation rate of the Yaw Direction of the aircraft

4.2 Manual working Mode

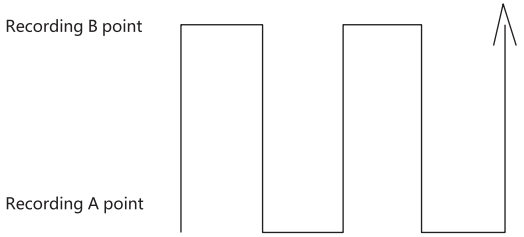
Manual working Mode also known as GPS mode, IMU, GPS, magnetic compass and barometer work in flight. The mode has a mimic function.

1) . Working conditions. Working Conditions and attitude patterns are the same. The lock can not be unlocked in this mode. You need to unlock in gesture mode and then switch to that mode. After entering the manual operation mode, the LED green light double flash.

2) . Operating instructions after unlocking in attitude mode, the remote controller switches the 5-channel mode switch to manual operation mode position, the throttle lever to 50% position, the aircraft fixed altitude fixed point. When the aircraft is in motion, the remote control all joysticks back, the aircraft will automatically brake suspension.

4.3 AB point working mode

AB execution, U job through AB point set by the user, as shown in figure.



1) Before using this mode

the working condition should be connected with the software of parameter adjustment to set up the channel.

AB record setting: open the software to enter "advanced"-> "plant protection function" ->control setting; "AB Record", in the drop-down frame menu on the right mapping channel selection channel.

AB execution setup: Flight Control Supports AB execution setup in two ways.

Mode 1(recommended): Open the software to enter the "basic" -> remote controller setting -> "flight mode" in three drop-down frame menu in any one of the settings for AB execution.

Method 2: Open the software to enter the "advanced"-> "Plant Protection Function"-> "AB Execution" , in the right side of the drop-down frame mapping channel selection channel. You can not unlock under this mode.

2) Operation Instructions

Step 1: Clear AB point back and forth quickly dial AB point record channel, LED light red-green-yellow alternate flash means success. If you want to fly to the break point, skip this step.

Step 2: Switch to AB work mode remote control switch to 5 channel mode switch to AB work mode position.

Step 3: Record point a hovering in AB mode, dial the AB recording lever to second gear. After recording, the LED flashes yellow for 2 seconds.

Step 4: Record Point B hovering in AB mode, dial the AB recording lever to the third gear. After recording, the LED flashes green for 2 seconds.

Step 5: Select the direction to dial the roller bar to choose the direction, to the left-dial roller bar is left, to the right-dial Roller Bar is right. This step is performed on the assumption that the AB point from the last record has been cleared, otherwise this step will be skipped as it was done on the previous AB job.

Step 6: Break Point continued spray while the AB point record is not cleared, switch to AB mode of operation, will continue operate with the break point and direction to continue operations. During AB operation, the remote control can control the aircraft manually.

3) Parameter setting flight control supports parameter adjustment software and APP to set the banner and speed of AB job. ADJUSTMENT SOFTWARE SETTINGS: enter the adjustment software "advanced"-"plant protection function"-"AB work" setting banner and speed.

4) AB Point Extension Shortens flight control support during flight lengthens and shortens AB point. From Point A to point B: Push the pitch bar up, point B elongates, push the pitch bar down, point B shortens; from Point B to point a, push the pitch bar up, point a shortens, push the pitch bar down, point go backward shorten.

4.4 Route operation mode

route operation mode, that is, planning the plot through the mobile phone APP, adjusting the route by the flight control autonomous operation.

1) Work conditions:

After the search is completed and the positioning accuracy is satisfied (the LED red light does not flash or the red light flashes single) , click the operation on the operating interface of the APP, set the parameters, and then the flight control automatically unlocks and takes off. After entering route operation mode, the LED green light flashes four times.

2) The Operation Instruction:

Detailed operation sees the APP Operation Instruction Manual.

4.5 Automatic return mode

automatic return mode provides safety for long-distance flight and loss of control protection.

1) Work conditions:
After the search is completed and the positioning accuracy is satisfied (no red LED flash or red light single flash) , the flight control will automatically record the current position as the return point every time the user unlocks the lock. While it enter the automatic return mode, the green LED flash.

2) Operation description:
Instructions the auto-return mode can be triggered by clicking the return button on the remote control screen APP to slide the lock or when the flight control enters the out-of-control protection. If the aircraft is more than 2 meters from the return point, the aircraft will automatically rise to the set altitude (if the current altitude is greater than the set return altitude, then return to the current altitude) . After reaching the re-entry point, the aircraft will hover in the air for about 3 seconds, after which it will land slowly. At this point, the aircraft's flight status can be controlled by the remote control lever (but the throttle lever does not work) , which is convenient for the aircraft to find a more suitable landing point. Until the vehicle is completely on the ground, the vehicle will automatically lock. If the aircraft is less than 2 meters from the point of re-entry, the aircraft will land in place and lock automatically.

Note: auto-return premise is that the return point of the aircraft has been recorded, if you need to use the auto-return, please complete the GPS search before unlocking, can see the appendix LED three-color light indication status and significance. When the aircraft is very close to people, it is recommended not to change into the automatic return mode, in order to avoid accidents.

Maintenance

After the drone use of each day, until the aircraft returned to normal temperature, and then do the whole machine and remote control for cleaning. Cleaning of aircraft immediately after completion of operation is prohibited.

A. Fill the container with water or soapy water and spray thoroughly. Repeat three times.
B. Remove the filter screen, nozzle filter screen and nozzle from the tank and clean it to ensure that there is no blockage, and then soak it in clean water for 12 hours.
C. To ensure the integrity of the whole drone unit structure, user can directly water washing the whole unit. It is recommended to wash the body with a spray gun, clean the body with a soft brush or wet cloth, and dry the water stains with a dry cloth.
D. If the motor, propellers, radiator surface has dust, pharmaceutical attached, it is recommended to clean the surface with a wet cloth, and then dry cloth wipe water stains.
E. Wipe the surface of the remote control and the display with a clean wet cloth (wrung out of moisture) .

FCC Statement：

Warning:
Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user’s authority to operate the equipment.

NOTE:
This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions : (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

FCC Statement:
This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
– Reorient or relocate the receiving antenna.
– Increase the separation between the equipment and receiver.
– Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
– Consult the dealer or an experienced radio/TV technician for help.

LED Tricolor indication status

Flight Pattern identification	Lamp Status Indicator	Priority
Gesture (increased stability, height)	green Light, single flash	low
GPS MODE (angle, speed)	green Light, double flash	low
Functional Mode (looping, cruising, agriculture, etc)	green Light, triple flash	low
Smart Direction engaged	green Light, double flash	low
Self-driving mode (ground station control, return	green Light fast flash	middle
GPS identification	**Lamp Status Indicator**	**Priority**
GPS NOT CONNECTED/GPS not receiving signal	Red Light, triple flash	low
GPS signal is poor	Red Light, double flash	low
GPS signal is general	Red Light, single flash	low
GPS signal's good	Red Light, not flash	low
RTK positioning	Yellow Light, single flash	
Low voltage alarm	**light status sign**	**Priority**
Code One	Yellow Light, triple flash	low
Code two	Yellow Light, fast flash	high
Two-sided magnetic label	**Lamp Status Indicator**	**Priority**
Horizontal Alignment	Yellow light always on	middle
Vertical Alignment	green light always on	middle
Alignment Failure	Red light always on	middle
Alignment success	Alternate red, green, yellow	middle
Spherical magnetic label	**Lamp Status Indicator**	**Priority**
Calibrating	Alternate red, green, yellow	middle
alignment success	Lights are back on	middle
ACCELEROMETER calibration mark	**Lamp Status Indicator**	**Priority**
Calibrating	Alternate red, green, yellow	middle
Calibration successful	green light is always on	middle
Abnormal state identification	**Lamp Status Indicator**	**Priority**
Remote Control Out of Control	Red light fast flash	high
Magnetic Compass interference/anomaly	Alternate red, green,	high
GPS lost star/anomaly	Alternate red, green,	high
IMU's moving too much/abnormal	Alternate red, yellow,	high
Other status flags	**Lamp Status Indicator**	**Priority**
Powering up. Initiating	Alternate red, green, and yellow	high
Unlock the ID	Alternate red, green, and yellow	high
Unlock failed	Red Light is always on	high

C30 Feature & Parameter

Package	
Packing size:	110×115×95cm
Net Weight （Air way Carton）：	50kg
Gross Weight （Include full unit）	110kg
Frame	
Symmetrical Motor Wheelbase:	1950mm
Out shape size：	2050*1610*780mm
Motor	
Motor No.:	36190
KV:	110kv
Max pull force:	29kg
Tank	
Volume:	30L
Standard Volume:	30L
Nozzle	
Model No:	XR11001.5VS/XR11002VS
Quantity:	8
Max flow volume:	10L/min
Spray width:	7-9m
Atomized Particle	130-250um
Foldable Rotor	
Material:	Polymer + carbon fiber
Diameter:	36inch
Screw pitch：：	120inch
Battery:	
Battery Qty:	14S
Voltage:	53.2
Discharge rate:	25C
Battery Capacity:	28000mAH
Weight:	8.9KG
Flight parameters	
Whole unit weight(none Battery)：	27.8KG
Max takeoff weight:	68KG
Hovering accuracy（GNSS good signal）：	Horizontal：±0.8m Vertical：±0.5m
Full load Hovering time:	22min
Max flight speed:	10m/s
Recommended Flight Temperature	0-50℃