Dahua Navigator X820 User’s Manual

V 1.0.0

ZHEJIANG DAHUA VISION TECHNOLOGY CO., LTD.

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Document Overview

The document is to comprehensively introduce the product function features, structure parameters, installation dismounting and flight guide etc.

Applied Model

X820

Application Objective

The main readers of the manual are terminal users.

Reading Guide

Chapter No.	Chapter Name	Main Content
1	Product Overview	It is to introduce the function features and application scenarios of the product.
2	Product Component	It is comprehensively to introduce the main components of the product. It is recommended to read the chapter before use, which is to understand the application methods of product structure and main components.
3	Flight Preparation	It is to introduce the complete flow of aircraft unlock before takeoff in details. It has to strictly conform to the installation debudding sequence of the chapter, install each component and make initial debugging before first use. If it is not the first time to use the device, you can select the installation content according to the dismounting situation last time, but it has to be confirmed that all the components (unnecessary steps excluded) listed in the chapter have been stably installed.
4	Enable Flight	It is to introduce the complete flow of aircraft formal lauch and landing in details. It has to complete the preparation steps listed in the chapter 3. It needs to confirm that all the inspection items including environment and the device itself have conformed to flight requirements before enabling flight. Please operate by strictly conforming to the steps described in the chapter, the operation sequence can't be reversed.
5	End Flight	It is to introduce the operation steps after aircraft landing in details. Please operate by strictly conforming to the steps described in this chapter, the operation sequence can't be reversed.
6	Upgrade	It is to introduce upgrade methods and attentions.

7	Appendix 1	It is to introduce the technical parameters.
8	Appendix 2	It is to introduce the indicator definition of the aircraft.
9	Appendix 3	It is to introduce the matching method among the components.
10	Appendix 4	It is to list the problems and its solutions when using the product.

Symbol Definition

The following symbol may appear in the document, please refer to the table below for the respective definition.

Symbol	Note
 Danger	It means highly potential danger. It will cause severe injury or casualties if it fails to avoid.
 Warning	It means moderate or low potential danger. It may cause slight or moderate injury if it fails to avoid.
 Caution	It means potential risk. It may cause device damage, weaker performace or other unpredictable consequences if it fails to avoid.
 Tips	It means that it can help you to solve some problem or save your time.
 Note	It means the additional information, which is the emphasis and supplement of the main body.

Document Material

The product includes the following document materials, you can seach according to your requirements:

- <Quick Start Guide>

It can be applied to the first flight. Please refer to <User Manual> for operation details when it is used for the second time or it has to use some other advanced functions.

Check the paper material affiliated in the packaging or log in www.dahuatech.com and search X820 to acquire more details.

- <User Manal> (the document it is)

It comprehensively introduces the product function features, structure parameters, installation dismounting and flight guide etc.

Log in www.dahuatech.com and search X820 to acquire more details.

Important Safeguards and Warnings

The following description is the correct application method of the device. Please read the manually carefully before use in order to prevent danger and property loss. It has to strictly conform to the manual during application and keep it properly after reading.

Danger

- Please fly the aircraft in the environment which meets flight conditions, keep away from no-fly zone.
- Please do not get close to the rotating component, which is to prevent personal injury.

Warning

- Please transport, use and store the product and all other components in the environment which satisfies the requirements.
- Please strictly conform to the flow operation described in the manual when dismantling the device, please do not dismantle other components unprofessionally.

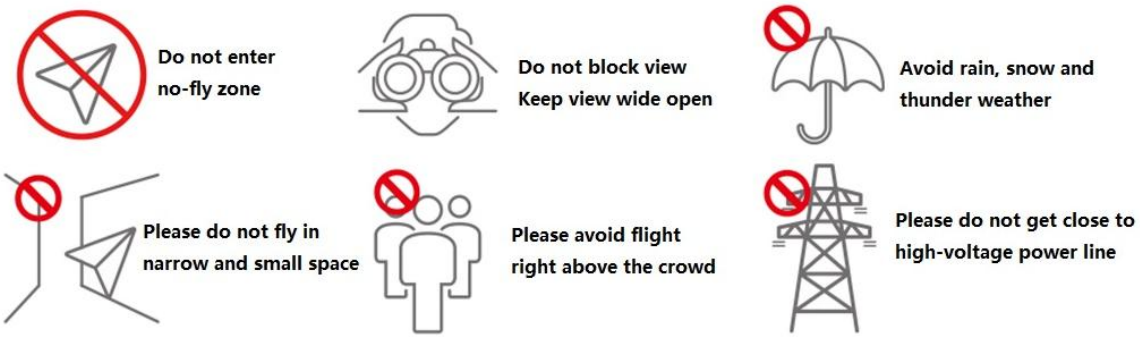
Caution

- Please do not touch the lens of PTZ camera directly, you can use hair drier to remove the dust or dirt on the lens surface.
- Please operate the device by strictly conforming to the steps described in the chapter, the operation sequence can't be reversed.
- It needs to understand the local laws and regulations before using the aircraft. Please apply to local authorities for flight permission if necessary.
- Please select open wide environment outdoors for the first flight. It is to unlock the aircraft and take off when the number of GPS satellites reaches more than 6.
- Please make sure the device antenna has been properly installed before enabling the power of remote control, ground station or aircraft, otherwise it may cause damage to internal module or make the control distance shorter.

Flight Environment

Warning

Please make flight in the environment which meets the following conditions:



- Keep away from no-fly zone, please do not enter no-fly zone.
- Keep view wide open, make sure the device is flying within view range, please do not block visual field
- Please do not fly the aircraft in rain, snow and thunder weather.
- Please do not fly in narrow and small space.
- Try not to fly right above the crowd, prevent personal injury.
- Please do not get close to high-voltage power line.

Power Requirements

Caution

- Please strictly conform to your local electrical safety codes.
- Make sure the power supply is correct before operating the device.
- The power source shall conform to the requirement of the Safety Extra Low Voltage (SELV) standard, and supply power with rated voltage according to the Limited Power Source requirement of IEC60950-1. Please note that the power supply requirement is subject to the device label.
- Prevent the power cable from being trampled or pressed, especially the plug, power socket and the junction extruded from the device.

Battery Attentions

Warning

- It has to use the exclusive power adapter to charge the device provided by Dahua Technology, otherwise it may cause damage to the battery or other unpredictable consequences.
- It has to charge the device at a temperature which is between 0 and 50℃.
- It has to distinguish positive and negative when charging the device, which is to prevent short circuit.
- Please do not place the device close to fire source or inflammables.
- Please do not charge and discharge the device in a situation where it is not guarded by people.
- Please do no use undesignated battery to the device.
- Please do not dismantle and destroy the battery without permission, water is not allowed to enter the device, damages caused by human is not covered by warranty.
- Please do not throw the battery into fire or make it exposed to the environment with high temperature.
- Please do not dismantle or modify the battery, or make the battery transformed.
- Avoid contact short circuit between positive and negative (Please do not place the battery together with the objects such as necklace and hairpin etc. when carrying or storing the battery).
- Please replace new battery in time when it is damaged.
- Please charge the battery or discharge it to 30%～40% of remaining battery if it won't be used for a long

time, and place it in a dry and cool environment.

- If the battery leaks and the liquid enters eyes accidentally, please do not rub your eyes, you should wash your eyes with clean water and see a doctor immediately.

Caution

- It is normal the battery heats up after it is running for a period of time, because the discharge power is quite big.
- It is normal the battery heats up when it is being charged.
- The cycle times of power battery is 300 in normal application situation.

Application Environment Requirements

- Please do not aim the device at strong light (such as lighting, sunlight and so on).
- Please transport, use and store the device in the allowed humidity and temperature range.
- Please do not let any liquid flow into the device.
- Please do not block the device ventilation.
- Please do not press, vibrate or soak the device.
- Please pack the device with default package or material with equivalent quality.

Operation and Maintenance Requirements

Warning

- Please do not dismantle the device unprofessionally.
- Please do not touch sensor CCD or CMOS directly, you can use hair drier to remove dust or dirt on the lens surface.
- Please use soft dry cloth or use clean soft cloth and dip a little mild detergent to clean the device.
- Please do not touch or wipe the lens surface directly.
- Please modify the user default password in time after login, which is to avoid being embezzled.
- Please use the accessories provided by manufacturer and it shall be installed and repaired by professional staff.
- Please avoid laser beam radiation to the surface when using laser beam device.
- Please do not provide two or more power supply modes to the device at the same time, otherwise it may cause damage to the device.
- Max 3 aircrafts are allowed to fly in the same area at the same time.

Disclaimer

- This manual is for reference only. Please refer to the actual product for more details.
- Minor differences might be found in user interface, and there might be deviation between the actual value of some data and the value provided in the manual due to the reasons such as the real environment is not stable. Please refer to the final explanation of the company if there is any doubt or dispute.
- All the designs and software are subject to change without prior written notice. The manual will be regularly updated according to the product upgrade without prior announcement.
- Please contact the supplier or customer service if there is any problem occurred when using the device.
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1 Product Introduction

1.1 Overview

This series product is a quadcopters unmanned aerial vehicle (UAV). It is designed for the public security, transportation; fire fighting, border defence, agricultural and forest area and energy source field. It provides aerial video surveillance total solotions.

This series product includes aircraft, airborne equipment, remote control, and ground control station (GCS).

- Aircraft: It consists of the navigation system, flight control system and power system.
- Airborne equipment: It consists of the PTZ control system, servo drive camera.
- Remote control: It consists of the remote control system, touch screen.
- GCS: It consists of the PC, image transmission system and ground control station software.

1.2 Features

Integrated Design

- The aircraft adopts integrated design, neat appearance. Just need to dismantle and install the propeller.
- The remote control integrates the remote control and touch screen together. It is easy to operate and has clear indicator.

Folded packages

- The aircraft arm can be folded repeatedly.
- The antennas can be folded repeatedly and dismantled, suitable to carry, transport and storage.

Quick Dismantle

- The propeller adopts quick dismantle design structure, easy to open or fold the aircraft arm, antenna.
- The PTZ camera adopts quick dismantle design structure, the installation screws are secured on the shock absorb plate in case the screw become loss.

HD Video

- The shock absorber board and shock absorber ball work together to guarantee PTZ camera stability.
- 30X optical camera is optional, professional HD video effect.
- IR thermal camera is optional, suitable for special environments such as fire scene, or in the night environment. It guarantees clear and HD video.
- The remote control has snapshot button and record button. Easy to operate and instantly start snapshot and record function.

Accurately Positioning

- Empennage has built-in GSP system. Its positioning is accurate and in time.

Wireless Transmission

- Aircraft has 4 antennas. Connect to the remote control, image transmission device to send and receive the radio wave signal.
- The remote control has 3 antennas. Connect to the aircraft, GCS to send and receive the radio wave

signal.

- The ground station connects to the large-size image transmission antenna. It is to receive image data from the camera.

Low Battery Level Protection

- When the low battery level triggers the aircraft to return to home, it can trigger low battery level protection such as alarm, return to home and landing.

Flight Log

The ground station automatically records the flight record logs.

Intelligent Battery

- Display remaining battery level. Battery has built-in power indicator light.
- The balanced recharge function. Automatically balance the battery cells and voltage to protect battery.
- Over recharge protection. Battery automatically stops recharging when the voltage is full.
- Sleep protection function. Battery automatically goes to sleep status when there is no operation within 5 minutes.
- Temperature protection function when recharge. The battery recharge temperature ranges from 0℃ to 50℃. Once the temperature is too high, battery automatically stops recharge otherwise it may result in battery damage.
- Communication function. The remote control and the GCS can get current remaining battery, voltage information.

Flight Control

- The aircraft adopts quadcopters system. It can switch among several flight modes and is easy to control the flight direction.
- Maximum taking off weight 10500g.

Electronic Fence

- Support electronic fence (e-fence) function in case the aircraft is out of the specified flight zone.
- Support customized e-fence settings.

2 Structures

This series product includes aircraft, airborne equipment, remote control, and ground control station (GCS).

This chapter introduces the structures of these four components. The detailed operations will be introduced in chapter 3.

Note

All figures listed below and all dimensions listed here for reference only. The figure and the dimensions may be slightly different from the user data due to measure position, measure accuracy, and position indicator. Please refer to the actual product for detailed information.

2.1 Aircraft

Please refer to chapter 3 to install the propeller and unfold the whole device.

2.1.1 Product Dimensions

The aircraft is shown as in Figure 2-1 (front view) and Figure 2-2 (top view).

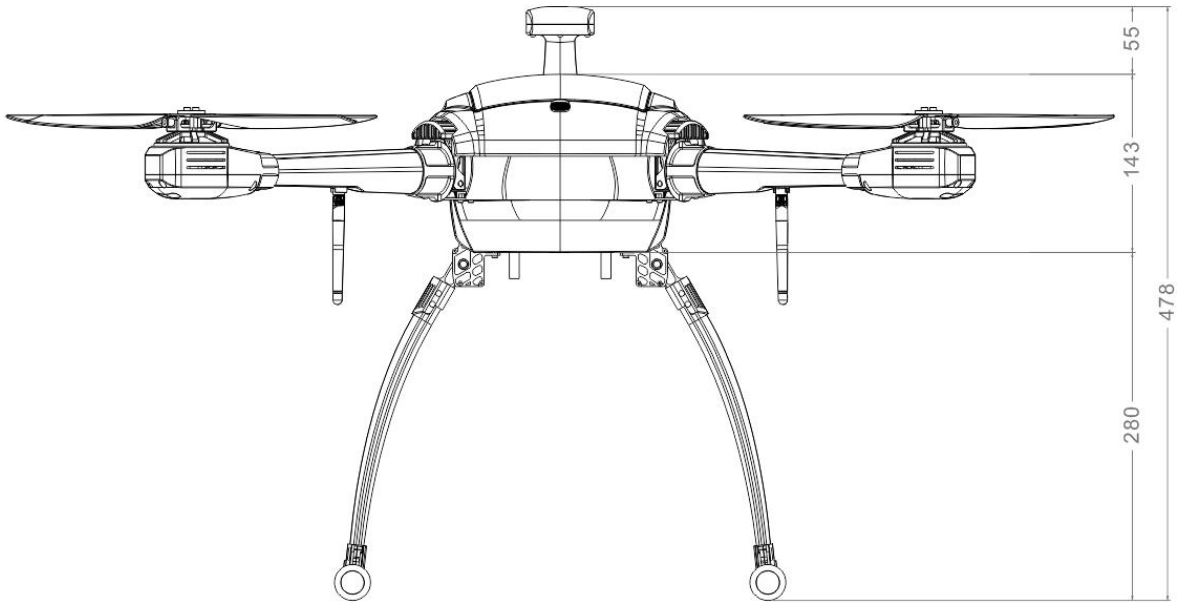


Figure 2-1

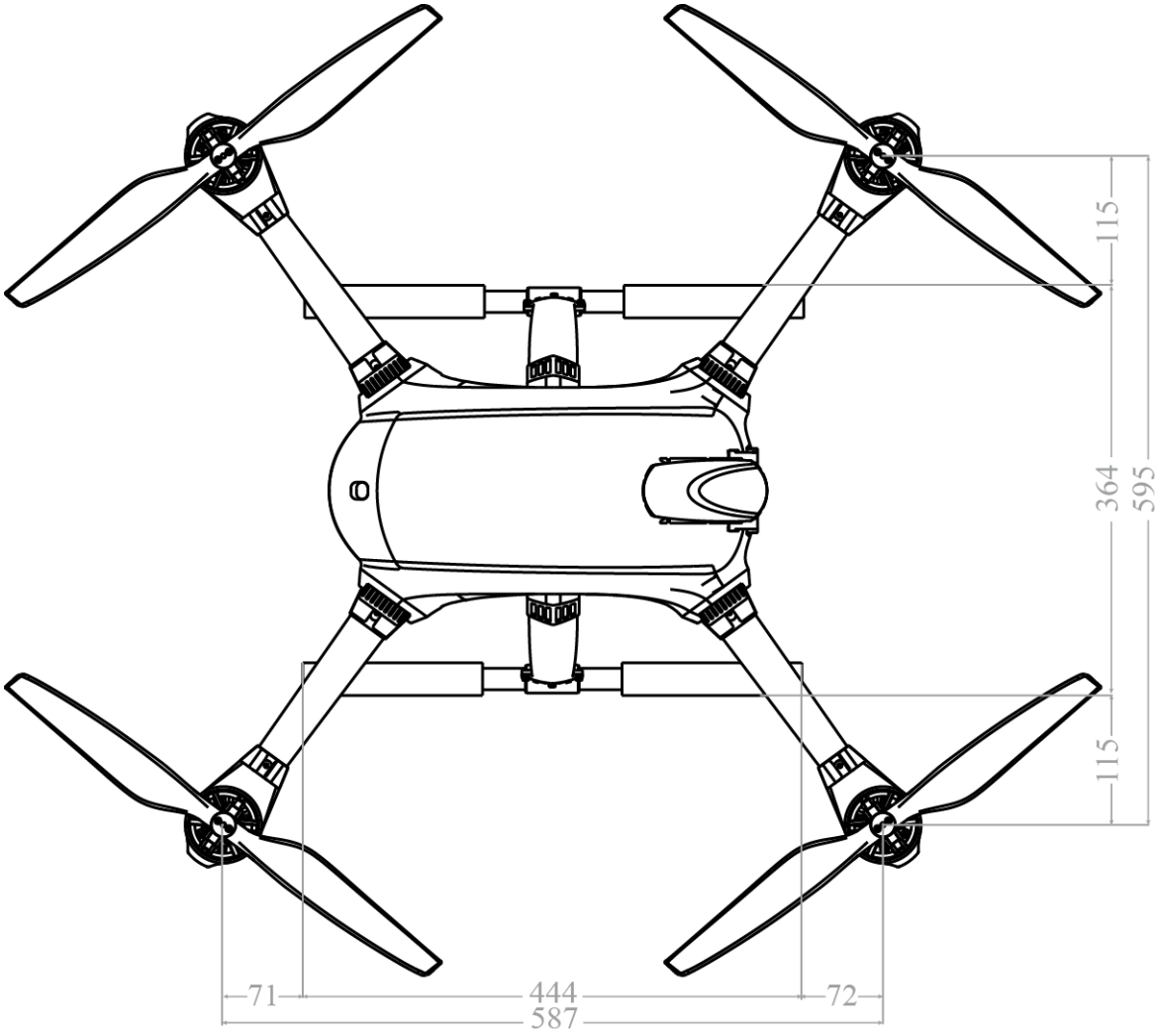


Figure 2-2

2.1.2 Structural Component

The aircraft components are shown as below. See Figure 2-3.

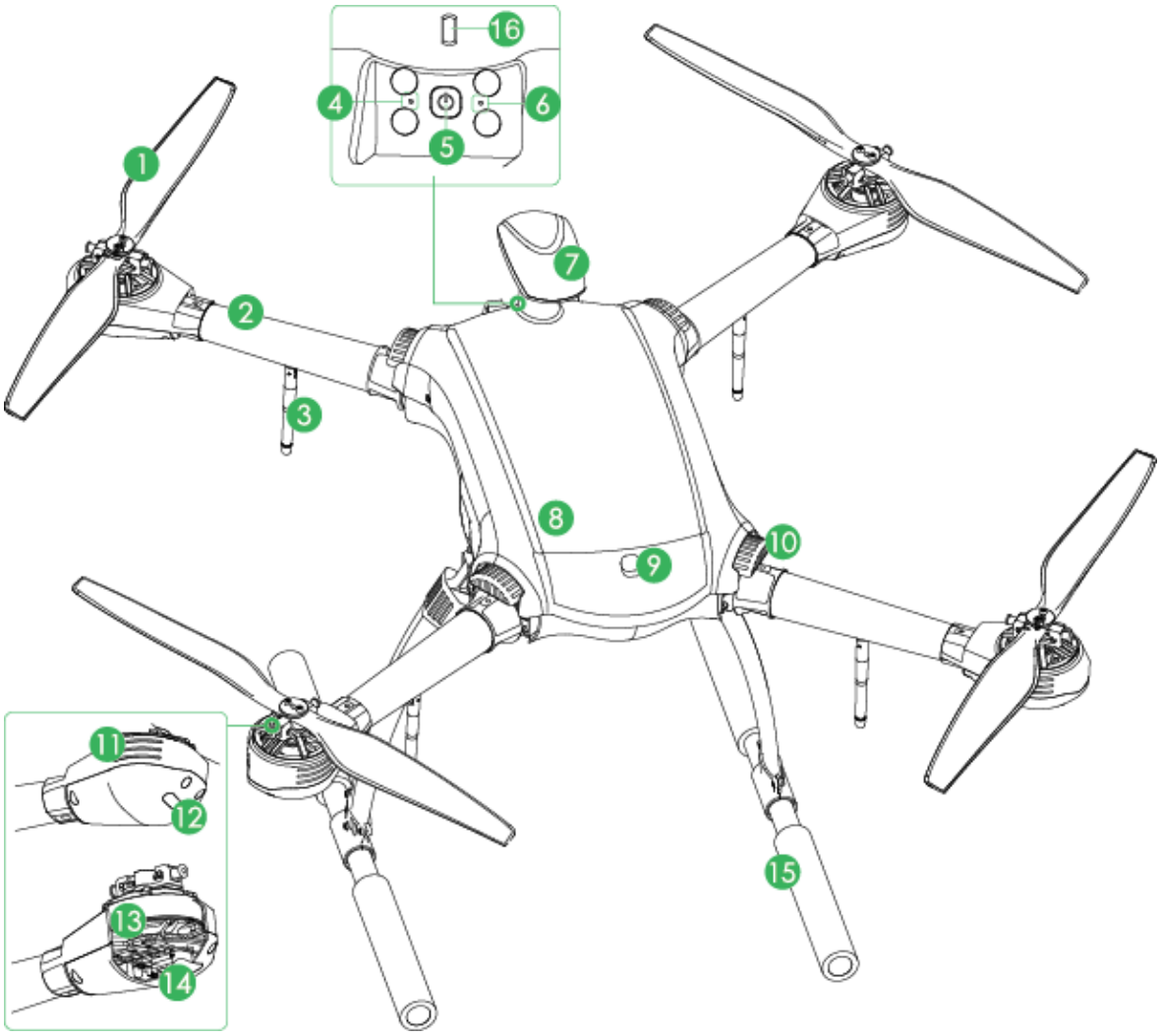


Figure 2-3

Please refer to the following table for detailed information.

No.	Name	Function
1	Propeller	High-speed revolution to turn the motor power to push the aircraft. There are two pairs of propellers and they have different structurers. Please adjust the installation positions according to the actual situation.
2	Arm	Fold or unfold.
3	Antenna	Fold or unfold. ● 2 antennas are to receive the remote control signal. ● 1 antenna is for wireless image transmission.
4	Reserved	Reserved
5	Power switch (with indicator)	Built-in indicator light. The light is green after connecting power to the aircraft.
6	Pair button	When the remote control, GCS and the aircraft loses remote connection, click it to pair again.
7	Empennage	Built-in GPS, compass.
8	Battery cover	Open to install or dismantle the battery.

No.	Name	Function
9	Cover buckle	Move the buckle to open the battery box cover.
10	Fold arm button	To fold the arm.
11	Heat emission hole	For ventilation purpose when the motor is working.
12	LED	Red/green lights. ● The adjacent two groups of the indicator lights are always red, corresponding to the head of the aircraft. ● The adjacent two groups of the indicator lights are always green, corresponding to the tail of the aircraft.
13	Motor	To keep the propeller rotate.
14	Speed control unit	Sine drive, sound ascended or descends speed performance.
15	Landing gear	Use remote control to open/close landing gear.
16	Aircraft status indicator	There are two modes: flashing or is always on. It displays five colors: red, yellow, blue, green, purple. It is to indicate system status, flight mode, upgrade status and etc. **Note** Refer to the appendix 2 for indicator light information and definition.

2.2 Airborne Equipment

The aircraft has various airborne equipments such as visible light PTZ camera, IR PTZ camera and speaker.

2.2.1 Visible Light PTZ Camera

2.2.1.1 Dimensions

The visible light PTZ camera front view is shown as below. See Figure 2-4.

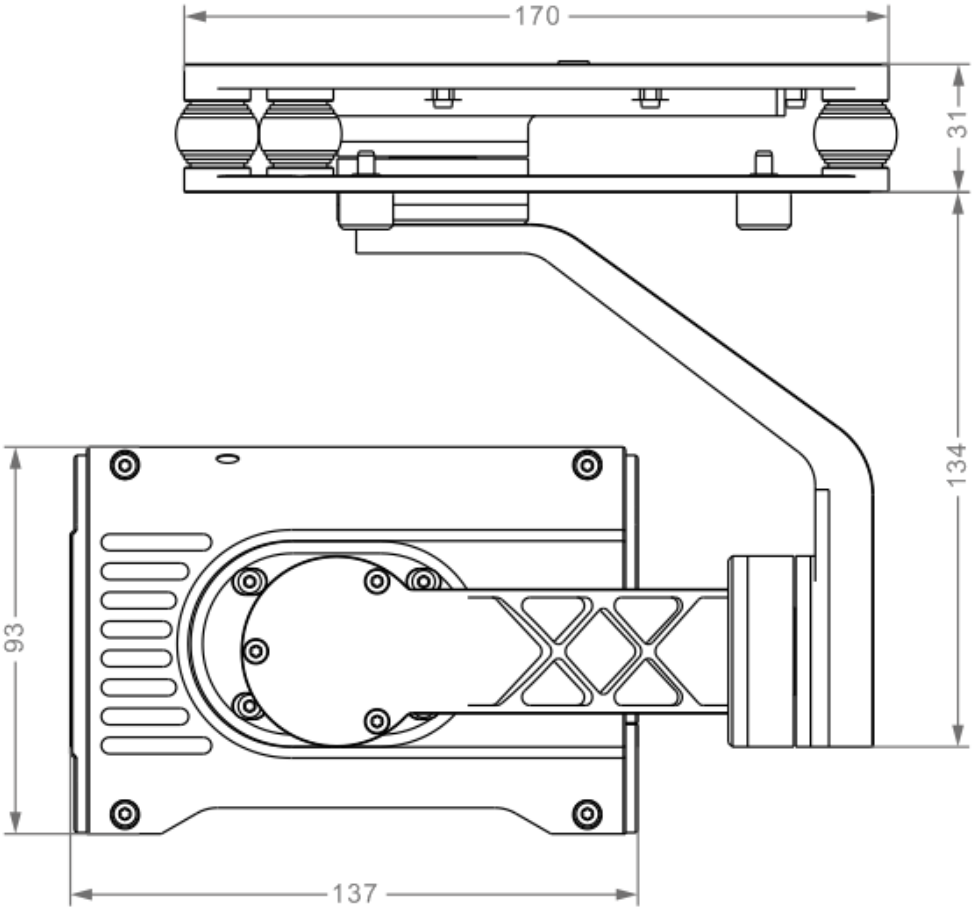


Figure 2-4

The visual light PTZ camera side view is shown as below. See Figure 2-5.

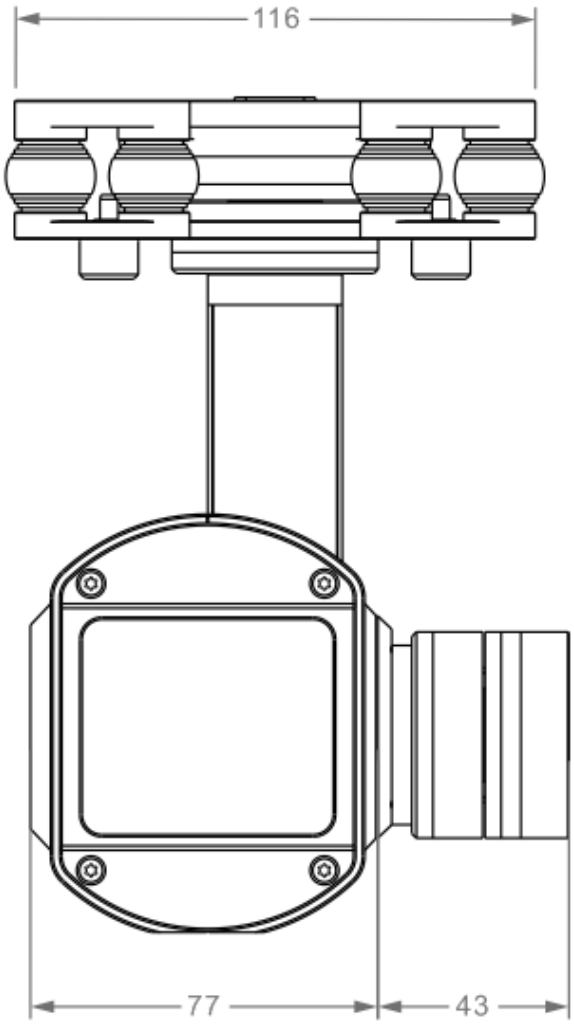


Figure 2-5

2.2.1.2 Structural Component

The visible light PTZ camera structure is shown as below. See Figure 2-6.

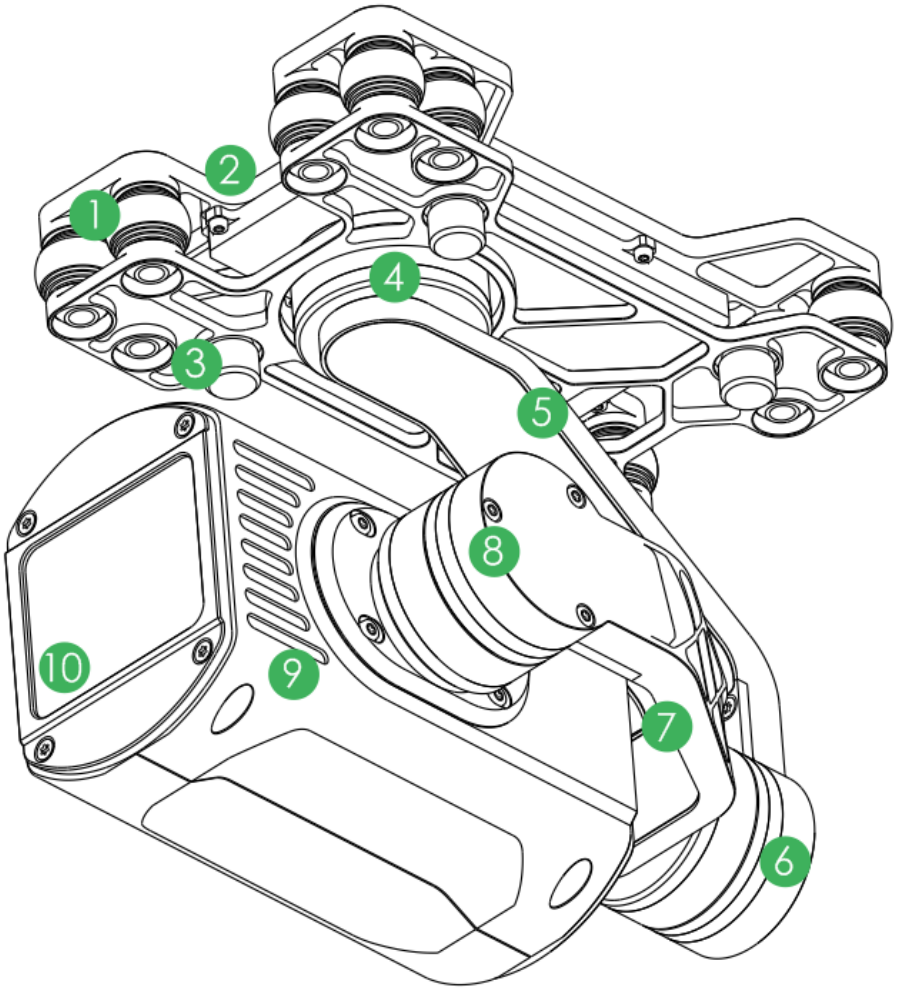


Figure 2-6

Please refer to the following table for detailed information.

No.	Name	Function
1	Shock absorber ball	It is to reduce the PTZ camera vibration during the flight to get clear video.
2	Shock absorber board	
3	Installation screw	Secure the PTZ camera on the aircraft.
4	Course motor	Control the camera horizontal direction.
5	Course rotation arm	
6	Motor	Control the camera horizontal pitch degrees.
7	Rotation arm	
8	Pitch motor	Control the camera tilt pitch degrees.
9	Camera	Shoot video.
10	Lens	

2.2.2 IR PTZ Camera

2.2.2.1 Dimensions

The IR PTZ camera front view is shown as below. See Figure 2-7.

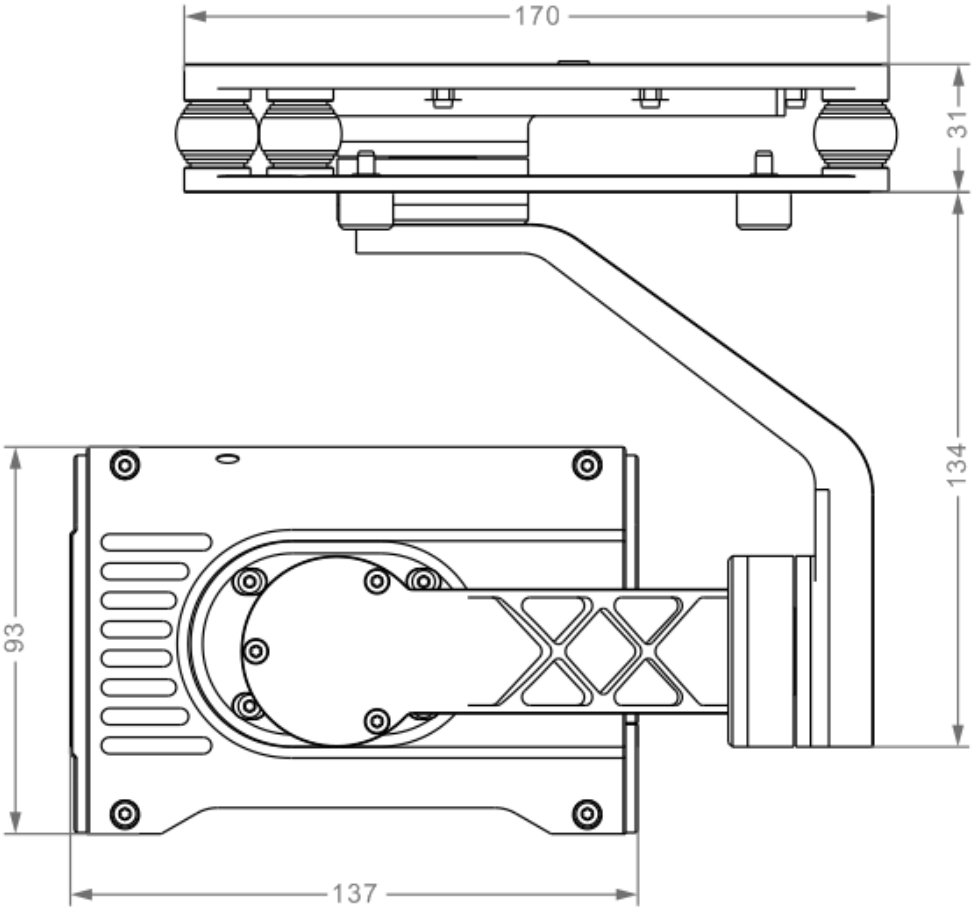


Figure 2-7

The IR PTZ camera side view is shown as below. See Figure 2-8.

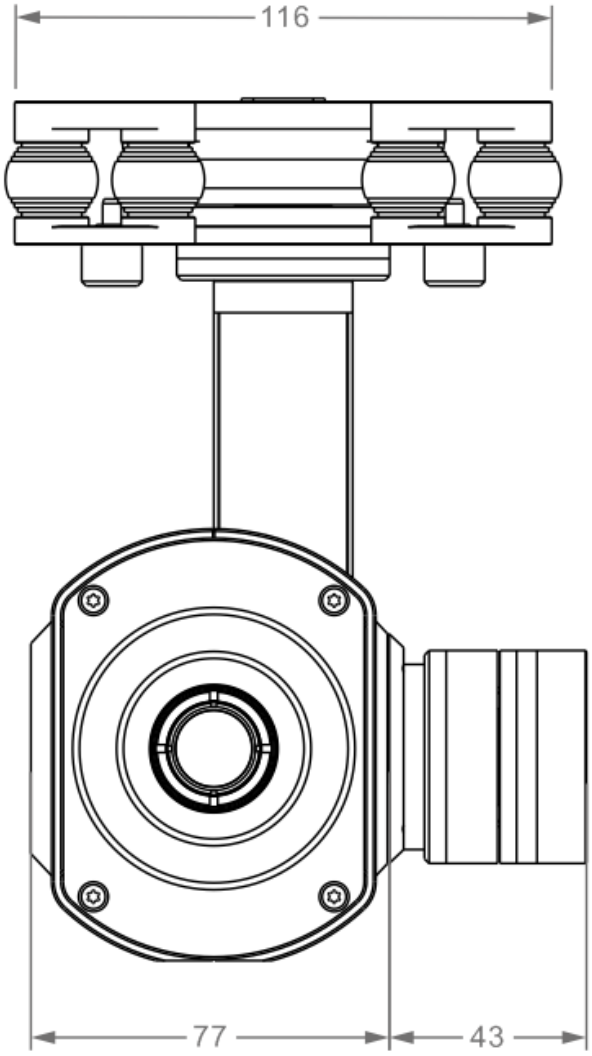


Figure 2-8

2.2.2.2 Structural Component

The structural component is shown as below. See Figure 2-9.

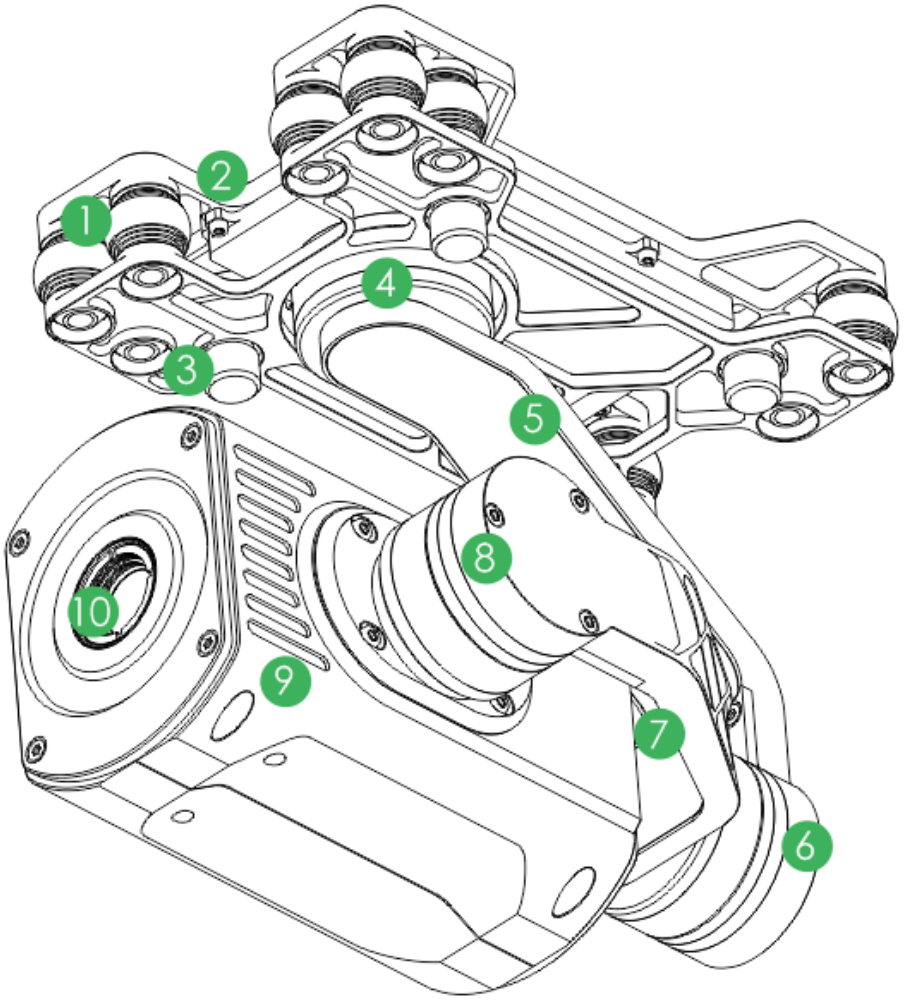


Figure 2-9

Please refer to the following table for detailed information.

No.	Name	Function
1	Shock absorber ball	It is to reduce the PTZ camera vibration during the flight to get clear video.
2	Shock absorber board	
3	Installation screw	Secure the PTZ camera on the aircraft.
4	Course motor	Control the camera horizontal direction.
5	Course rotation arm	
6	Motor	Control the camera horizontal pitch degrees.
7	Rotation arm	
8	Pitch motor	Control the camera tilt pitch degrees.
9	Camera	Shoot video.

2.3 Remote Control

2.3.1 Dimensions

The remote control front view l is shown as below. See Figure 2-10.

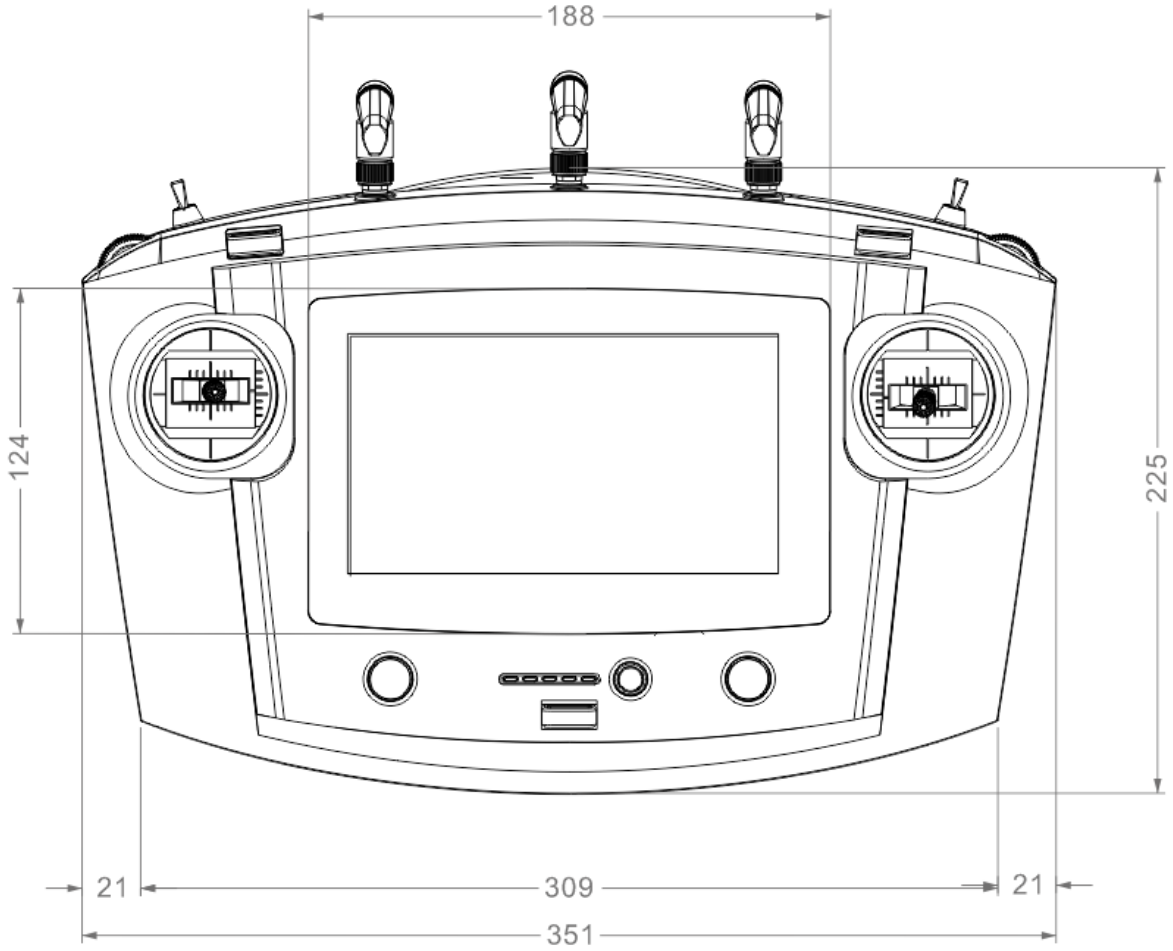


Figure 2-10

The remote control side view is shown as in Figure 2-11.

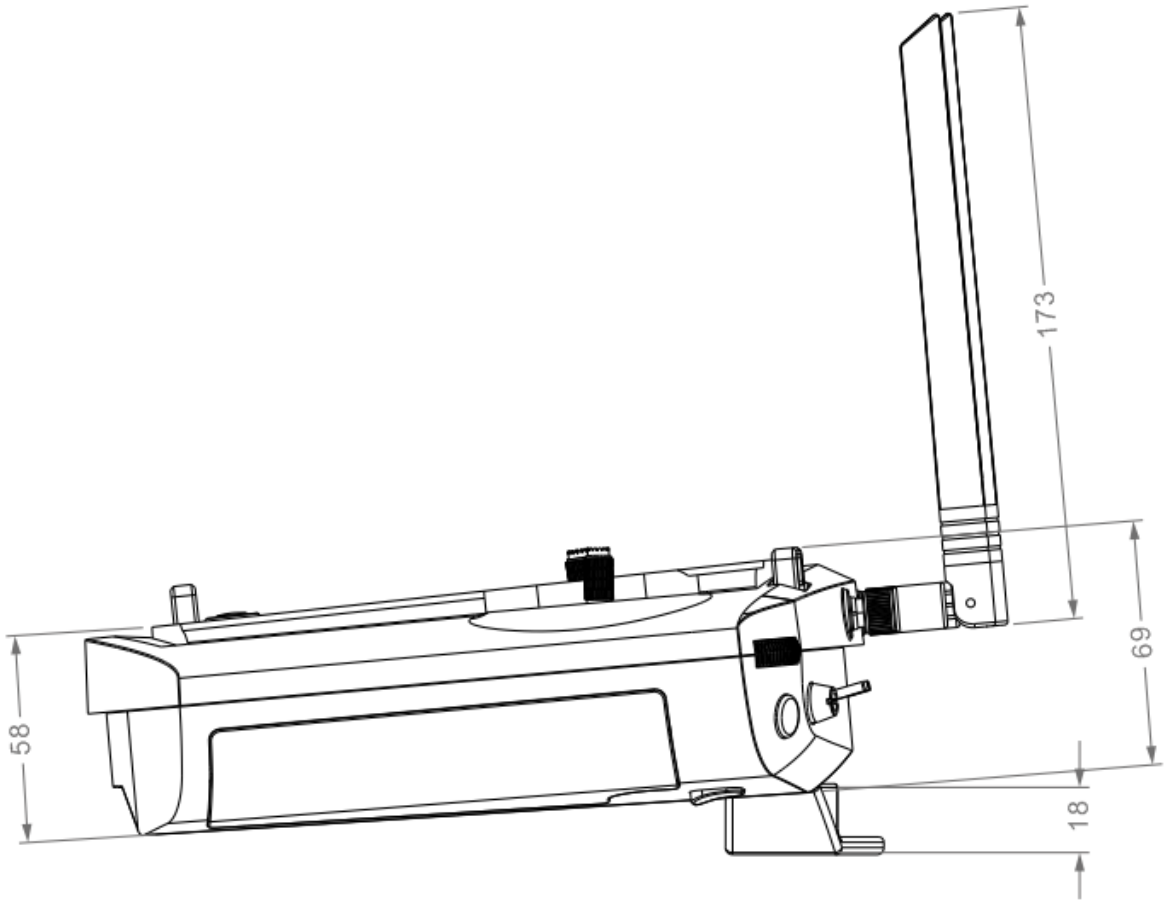


Figure 2-11

2.3.2 Structural Component

2.3.2.1 Front Panel

The front panel is shown as in Figure 2-12.

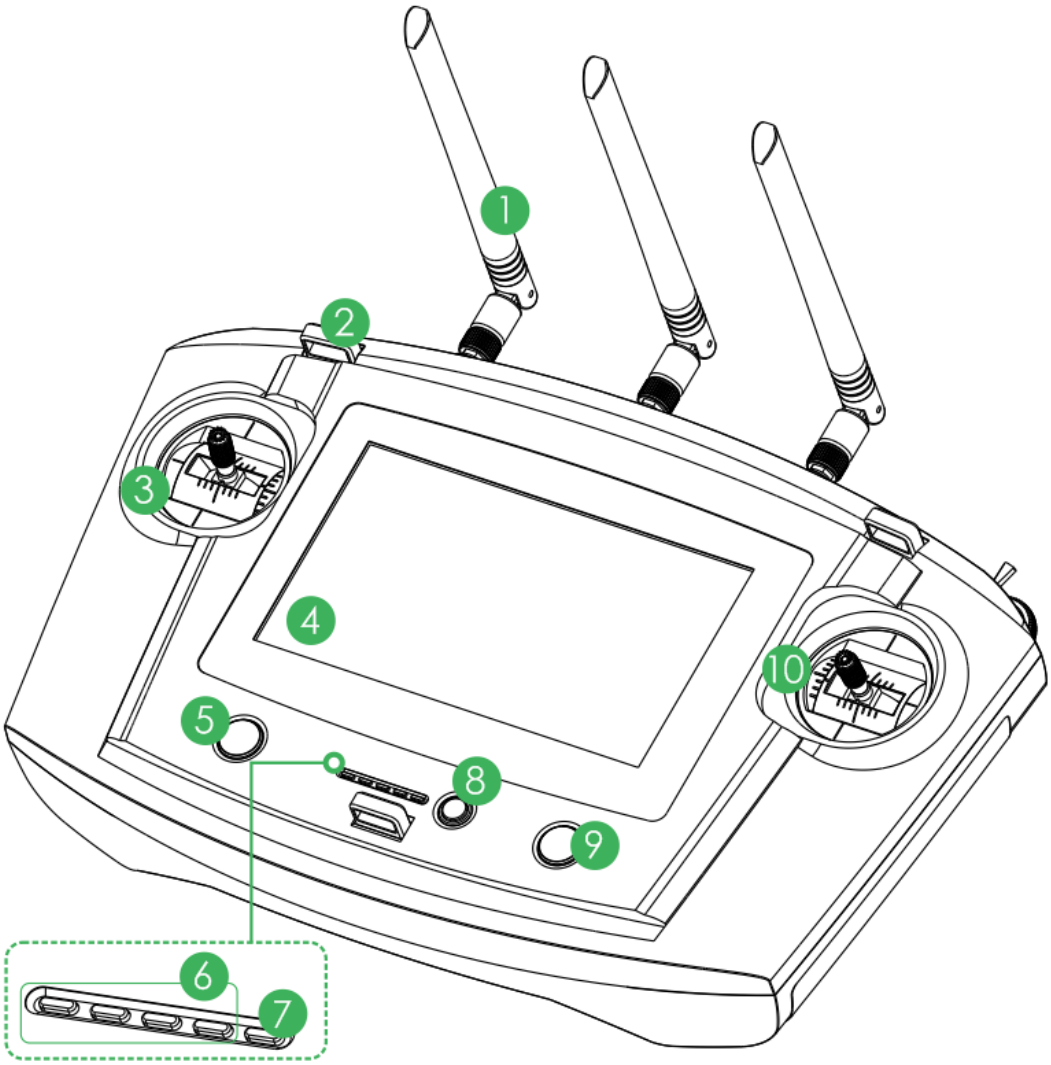


Figure 2-12

Please refer to the following table for detailed information.

No.	Name	Function
1	Antenna	Establish the remote control relationship with the aircraft and receive the video.
2	Hanger	Fix the hanger rope.
3	Left control stick	Control the aircraft flight status.
4	Touch screen	Set parameters and preview the video.
5	Landing gear button	Open or close the landing gear.
6	Battery indicator	Each bar presents the 25% battery power.
7	Charging indicator	The indicator light is on when connect the power to the recharge port. ● Red light is on: recharging. ● Green light is on: recharge is finish.
8	One-click return home	Control aircraft to automatically return to home.
9	One-click take off/landing button	Control aircraft to take off or landing. The take off height is 2 meters.

No.	Name	Function
10	Right control stick	Control the aircraft flight status.

2.3.2.2 Side Panel

The side panel components are shown as in Figure 2-13.

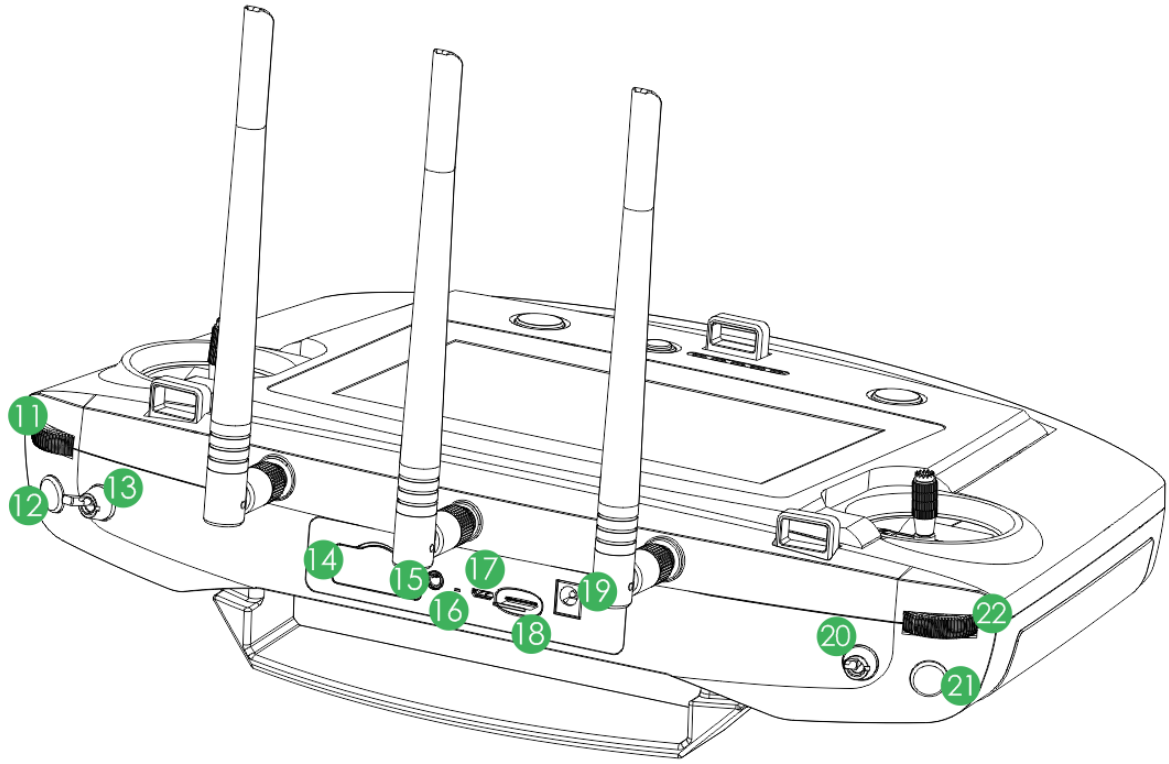


Figure 2-13

Please refer to the following sheet for front panel button information.

No.	Name	Function
11	PTZ course pulley	Control the camera horizontal shoot angle.
12	Snapshot	Shortly push the button to snapshot an image.
13	Flight mode lever	3-level lever to select flight mode. ● Upper level: intelligent flight mode. The aircraft flight according to the specified course. ● Middle level: flight at the specified height. When the throttle lever is at the default mode, the aircraft flight at the same height. ● Lower level: Hover at the specified position. When all levers are at the default mode, the aircraft hovers at the same position.
14	4G SIM slot	● Insert SIM card: Open the silica gel, the SIM card with the chip is facing down. Insert the card to the slot horizontally and then close the silica gel. ● Remove SIM card: open the silica gel, press the left button for the short time, system automatically pops up SIM card a little bit, and then remove the SIM card. Close the silica gel,.

No.	Name	Function
15	Audio output port	Connect to earphone, sound box and etc. It is to play audio.
16	Remote control reset	Reserved.
17	Micro USB port	Insert data cable to connect to PC. It is to transmit the data to the PC.
18	SD slot	● Insert SD card: The SD card with the chip is facing down. Insert the card to the slot horizontally. ● Remove SD card: Press SD card, system automatically pops up SD card a little bit, and then remove.
19	Power interface	Input DC 12V power.
20	PTZ mode lever	2-level lever. It is to select PTZ mode. ● Upper lever: Lock the course direction. No matter what the aircraft flight angles are, the PTZ camera is facing the same degree to shoot. ● Lower level: Follow the flight mode. The PTZ camera angle is changing according to the aircraft flight directions.
21	Record button	Press the button for a short time to record. Press it for a short time again to stop the record.
22	PTZ pitch pulley	Control the camera lens pitch angles.

2.3.2.3 Rear Panel

The rear panel is shown as in Figure 2-14.

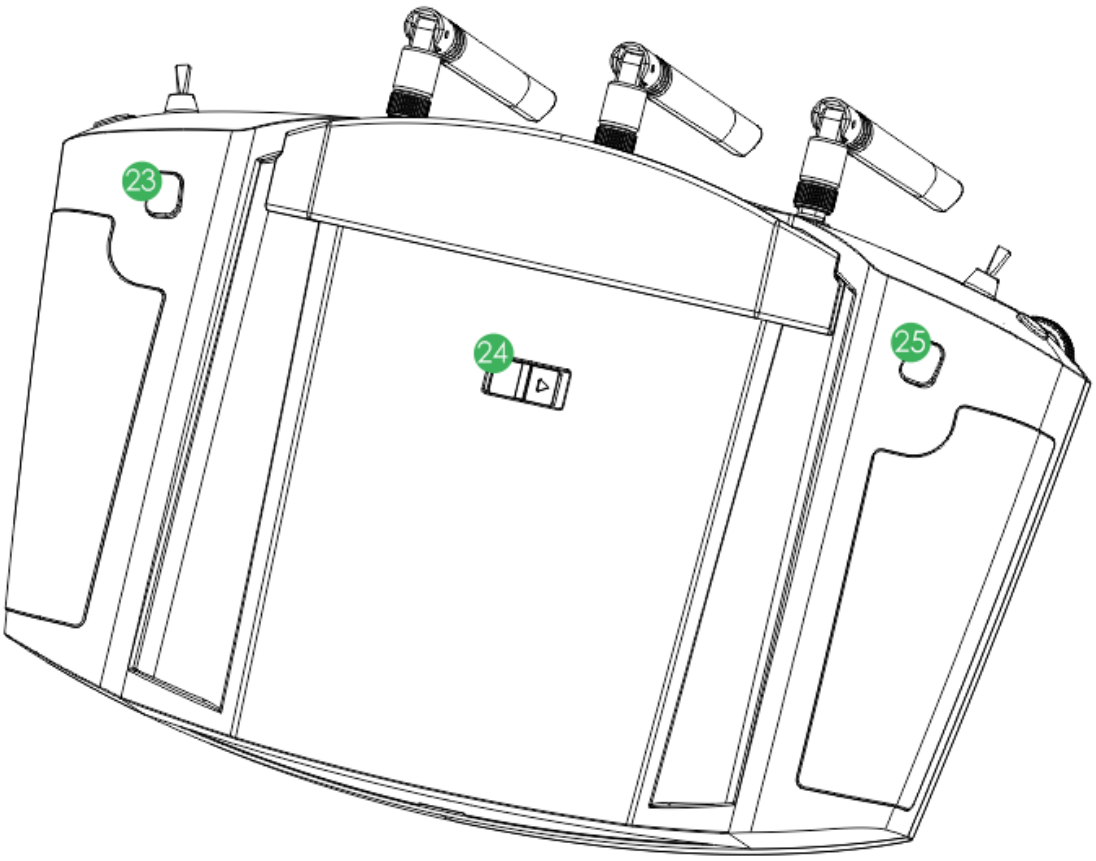


Figure 2-14

Please refer to the following table for detailed information.

No.	Name	Function
23	Zoom in button	● Press it for a short time, it is to zoom in the camera. ● Press it for a long time, it is to zoom in until the camera reaches the max rates.
24	Power switch	Open or close the remote control.
25	Zoon out button	● Press it for a short time, it is to zoom out the camera. ● Press it for a long time, it is to zoom out until the camera reaches the min rates.

2.3.3 Buttons

Note

Refer to chapter 4 for the joystick and flight mode lever button information.

2.3.3.1 Pulley wheel

- PTZ flight pulley wheel. It is to control the camera horizontal shoot angle. See Figure 2-15.
  - ✧ Pulley wheel to the left: PTZ to the right.
  - ✧ Pulley wheel to the right:PTZ to the left.

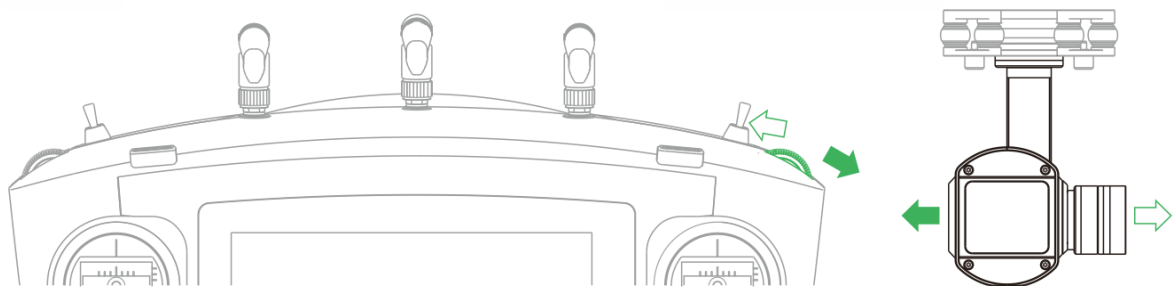


Figure 2-15

- PTZ pitch pulley wheel. It is to control the camera pitch angle. See Figure 2-16.
  - ✧ Pulley wheel to the left: Camera lens to the down side.
  - ✧ Pulley wheel to the right: Camera lens to the up side.

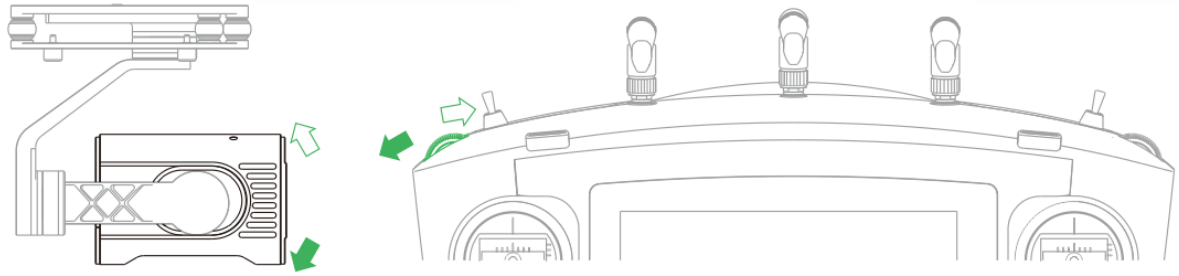


Figure 2-16

2.3.3.2 PTZ Mode Lever

Use PTZ mode lever to control the PTZ camera shoot angle. See Figure 2-17.

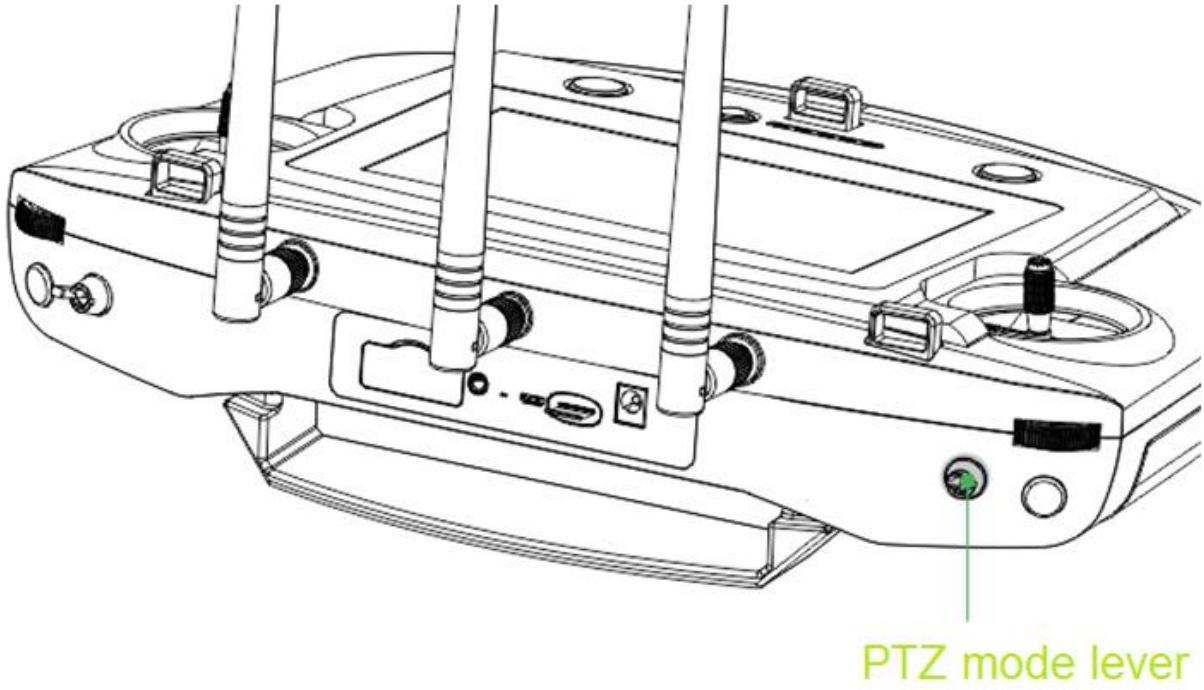


Figure 2-17

2-level lever:

- Upper lever: Lock the course direction. No matter what the aircraft flight angles are, the PTZ camera is facing the same degree to shoot.
- Lower level: Follow the flight mode. The PTZ camera angle is changing according to the aircraft flight directions.

2.3.3.3 Shoot

The record and snapshot button is shown as in Figure 2-18.

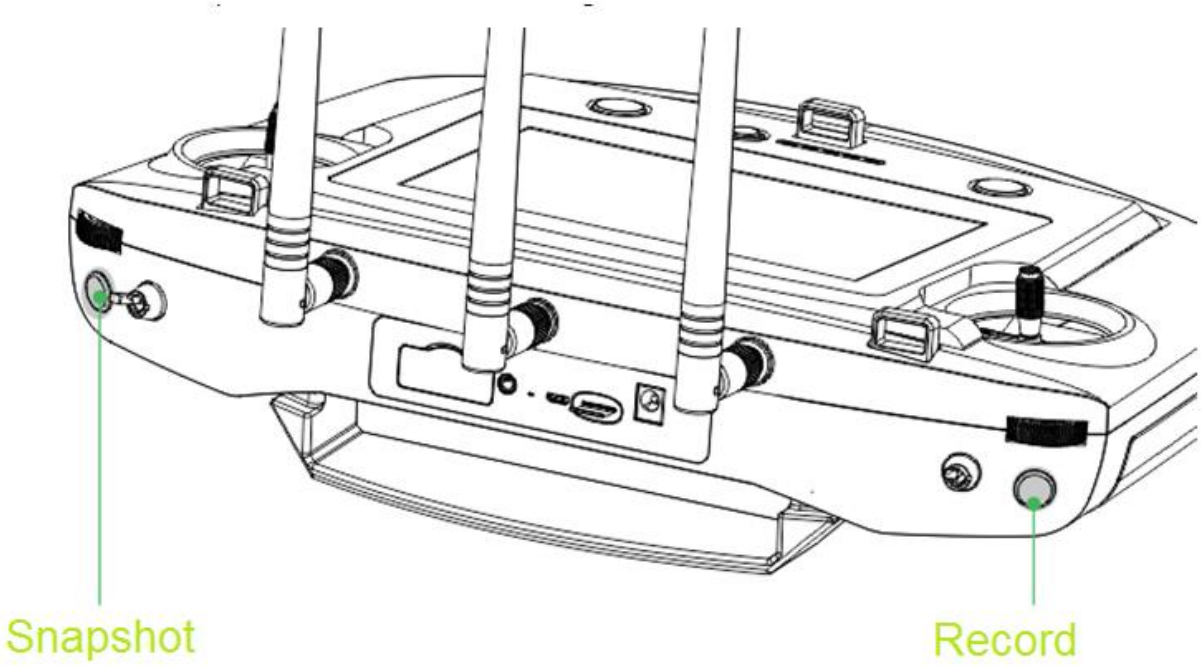


Figure 2-18

Snapshot: Press snapshot button for a short time to sanpshot an image.

Record: Press record button for a short time to begin recording video. Press it for a short time again to stop the record.

2.3.4 Operation Interface

After enable the remote control power, system enters the main interface.

The main interface includes the following function panes. See Figure 2-19

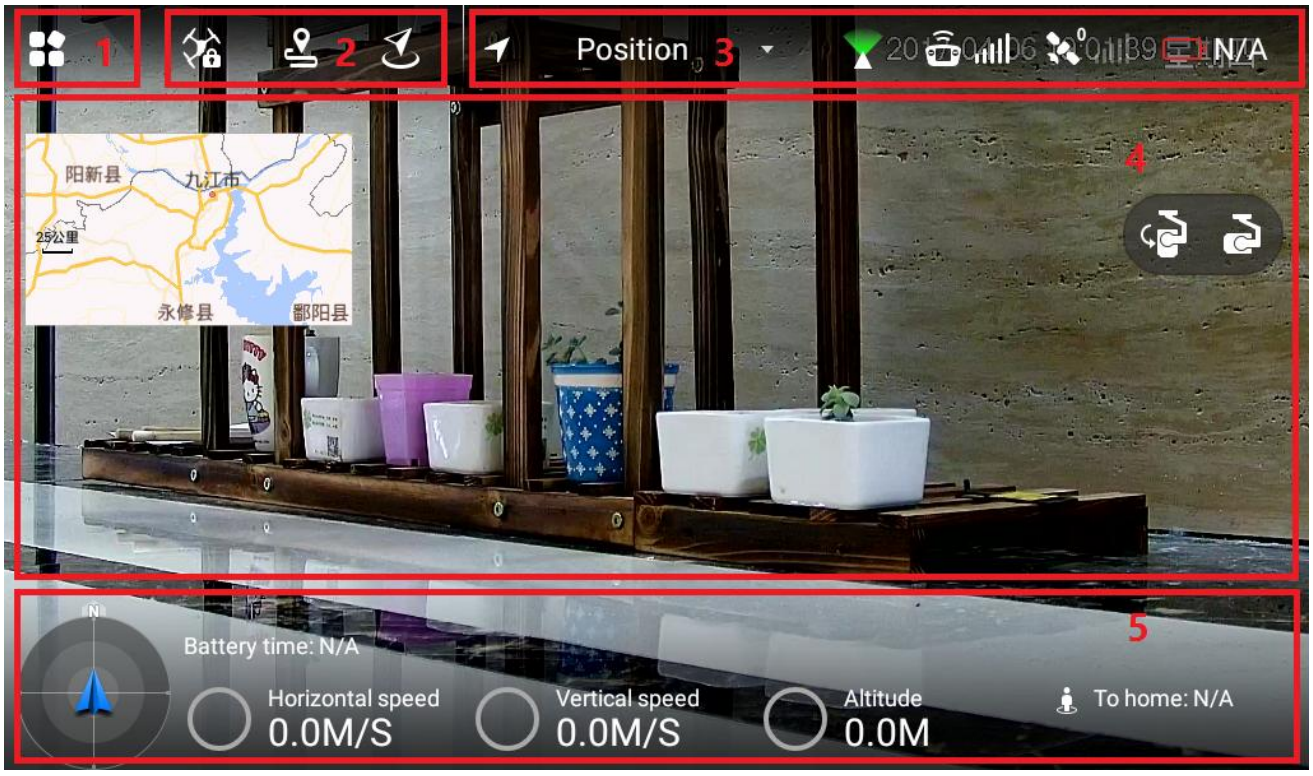


Figure 2-19

Tips

Pinch up any position on the preview interface to hide the setting menu, function bar and status bar. Pinch down any position on the preview interface to view them again.

SN	Name	Function
1	Menu	Click to go to the setting menu. Please refer to chapter 2.3.4.4 Settings for detailed information.
2	General functions	Set HOME position and lock mode. Please refer to chapter 2.3.4.3 General function buttons for detailed information.
3	Status bar1	Display flight mode, PTZ mode, remote control signal intensity, GPS satellite amount, signal intensity , remote control remaining power. Please refer to chapter 2.3.4.1.1 Status display bar 1 for detailed information.

SN	Name	Function
4	Preview window	Quickly switch video preview and map preview to display prompt information. Please refer to chapter 2.3.4.2 Preview for detailed information.
5	Status bar 2	Display remaining flight time, aircraft speed, height, distance from the HOME. Please refer to chapter 2.3.4.1.2 Status display bar 2 for detailed information.

2.3.4.1 System Status

2.3.4.1.1 Status display bar 1

The status display bar 1 is shown as below. See Figure 2-20.

Figure 2-20

Please refer to the following table for detailed information.

Icon	Name	Function
	Flight mode	Display current aircraft flight mode.
	PTZ mode	This icon has two statuses: ●  : When the PTZ lever is at the upper level, the PTZ camera has locked the course direction. No matter how aircraft angle changes, the PTZ camera is still facing the same direction to shoot. ●  : When the PTZ lever is at the lower level, the PTZ camera direction is following the flight mode. The shoot angle is changing according to the aircraft course angle.
	Remote control intensity	There are max 5 bars. The more the highlighted bar amount is, the stronger the remote control effect is .
	GPS satellite and the signal intensity	● The number on the left side is the GPS satellite amount. ● The GPS signal intensity is shown on the right. There are max 5 bars. The more the highlighted bar amount is, the stronger the remote control effect is .

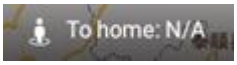
Icon	Name	Function
	Reaming power	When the remaining power is low, please complete the flight as soon as possible and replace the aircraft battery.

2.3.4.1.2 Status display bar 2

The status display bar 2 is shown as below. See Figure 2-21.

Figure 2-21

Please refer to the following table for detailed information.

Icon	Name	Function
	Aircraft direction	It is to indicate the aircraft direction on the geographic position.
	Battery time (remaining flight time)	When the flight time is running out, please complete the flight as soon as possible and recharge the aircraft. **Note** The flight time displayed here for reference only. The actual flgiht time may affect by the enviroment and etc. It may be different from the actual flight time.
	Horizontal speed	The aircraft forward and backward speed on the horizontal direction.
	Vertical speed	aircraft vertical ascend and descend speed
	Altitude	The aircraft relative altitude from the taking off position.
	Distance from the HOME	The aircraft distance from the HOME. The value displayed here is the project distance on the horizontal space.

2.3.4.2 Preview

Click the window on the top left corner; it is to switch between video preview mode and map preview mode.

 : Prompt information is displayed on the right side of the icon. Click the icon to view message list.

2.3.4.2.1 Video preview mode

The default preview mode is shown as in Figure 2-22.

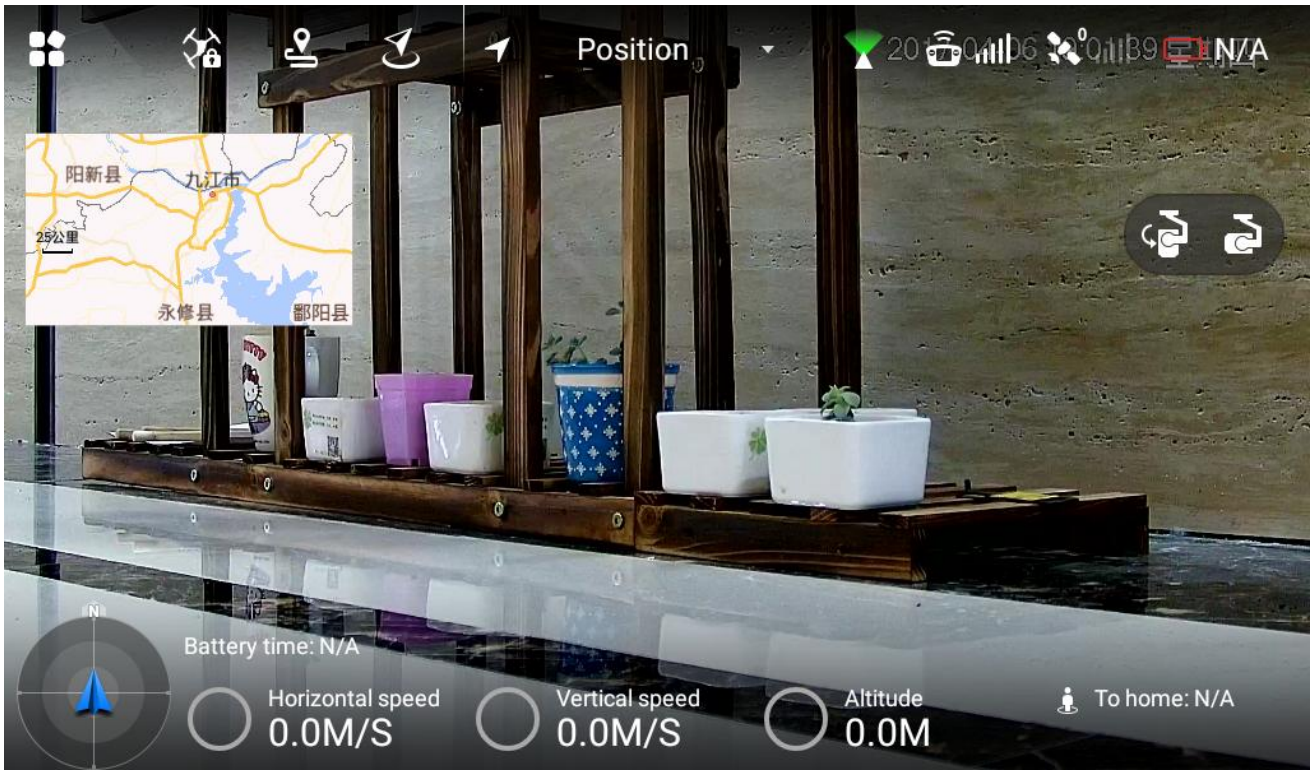


Figure 2-22

In this mode, the map is displayed in the small window at the top left corner of the preview interface. In this mode, the large window is to display the camera video outputting to the remote control.

2.3.4.2.2 Map Preview Mode

The map preview mode is shown as below. See Figure 2-23.

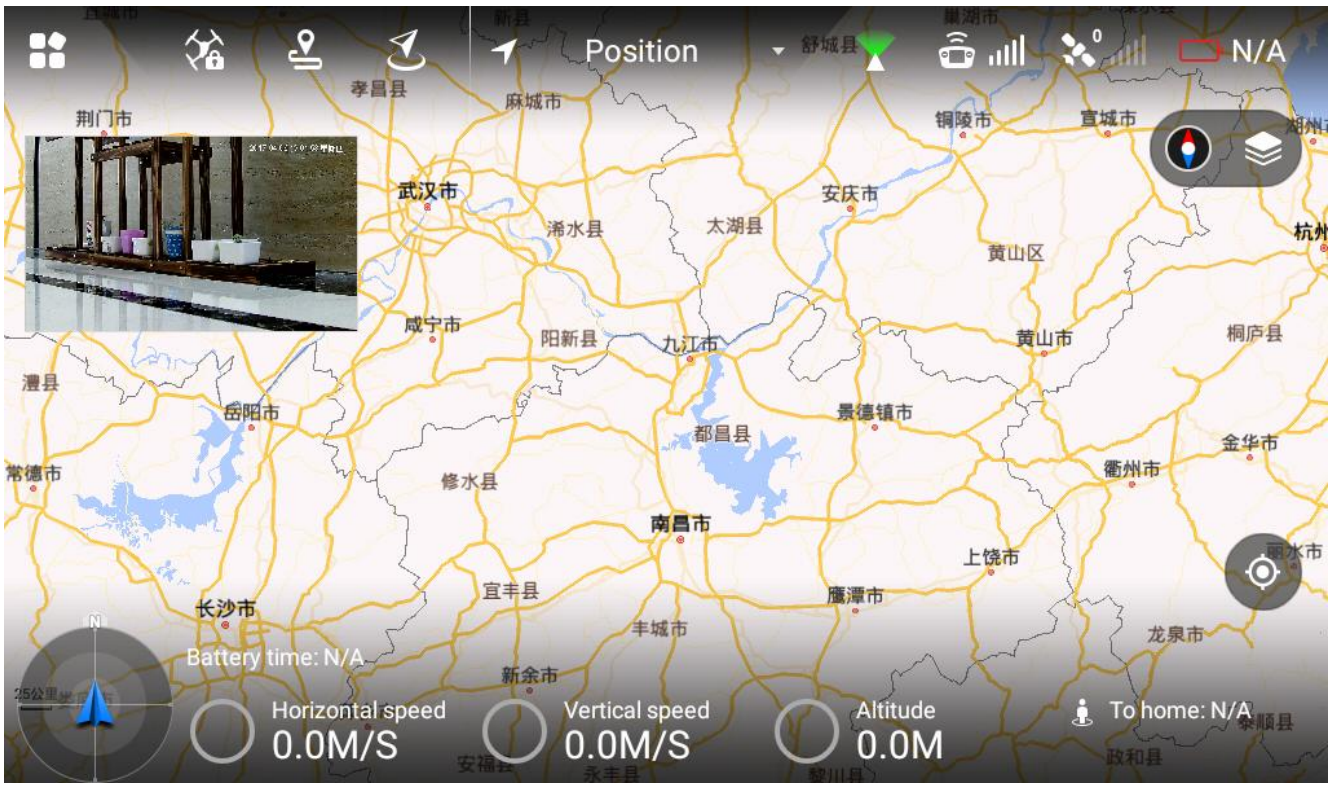


Figure 2-23

- In this mode, the video camera outputting to the remote control is displayed at the small window on the top left corner of the preview interface.
- In this mode, the large window displays the aircraft position on the map.

The function buttons on the map preview interface is listed below:

 : Lock map direction button. Current top direction is always the north. When the remote control has changed, the map rotates accordingly, while the east/south/west/north always maintains the previous direction.

 : Map display mode switch button. Switch to use map or the 2D image to display the map.

 : Using Aircraft as the center. Quickly switch to the aircraft current position and use its position as the center.

2.3.4.3 General function buttons

Lock Mode

Click it to select the aircraft lock mode on the pop-up dialogue box. See Figure 2-24.

Figure 2-24

2.3.4.4 Settings

Click  to go to setting interface.

The 1st menu	The 2nd menu	The 3rd menu	Function
Remote control	Control stick mode	-	There are two modes. Please refer to chapter 4.2.4 Manual Flight control for detailed information.
	Remote control calibration	-	Calibrate the remote control Please refer to chapter 3.9.2 Remote control calibration for detailed information.
	Remote control pair	-	Pair remote control, ground station, aircraft. Please refer to chapter 9 Appendix for detailed information.
Flight	Enable e-fence	-	Enable or disable e-fence Please refer to chapter 4.4.3.2 Enable e-fence for detailed information.
	E-fence	-	Set e-fence parameters and trigger actions Please refer to chapter 4.4.3.1 E-fence area settings for detailed information.
Preview	Preview image size	-	Set preview image size Please refer to chapter 4.4.4.1 Image transmission size for detailed information.
Camera	Photo	-	Set snapshot image size Please refer to chapter 4.4.4.2 Photo settings for detailed information.
	Video	-	Set video record size Please refer to chapter 4.4.4.3 Video settings for detailed information.
	Advanced	Image	Set brightness, contrast, saturation, sharpness, gamma. Please refer to chapter 4.4.4.4 Image settings for detailed information.
General	Aircraft firmware upgrade	-	Check firmware status and upgrade Please refer to chapter 4.4.4.1 Aircraft firmware upgrade for detailed information.
	APP upgrade	-	Check APP status and upgrade Please refer to chapter 6.2.1 APP upgrade for detailed information.
	Other	Geomagnetism calibration	Calibrate geomagnetism Please refer to chapter 3.9.5 Geomagnetic abnormality for detailed information.
		Accelerometer calibration	Calibrate accelerometer Please refer to chapter 3.9.3 Accelerometer calibration for detailed information.
		Offline map	Add or delete offline map. Please refer to chapter 6.2.2 Remote

The 1st menu	The 2nd menu	The 3rd menu	Function
			control offline map download and upgrade for detailed information.
		Brightness	Adjust laptop brightness. Please refer to chapter 4.4.4.5 Brightness adjustment for detailed information.
	Currently connected to SSID	-	Display currently connected aircraft.

On settings interface, click  to go back to the previous menu and click  to exit settings.

2.4 Ground Control Station (GCS)

2.4.1 Product Dimensions

The ground station front view is shown as below. See Figure 2-25.

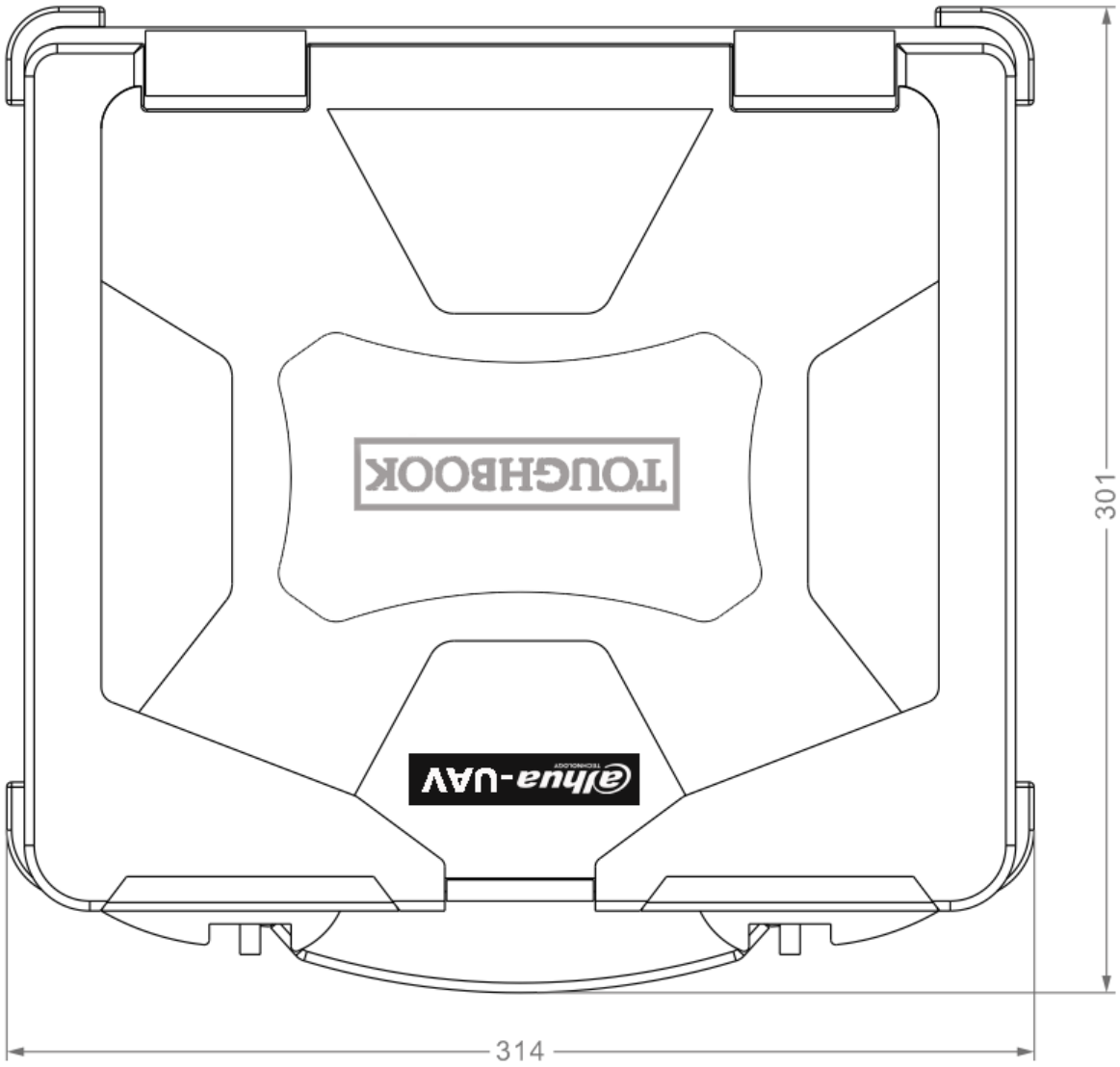


Figure 2-25

The ground station side view is shown as below. See Figure 2-26.

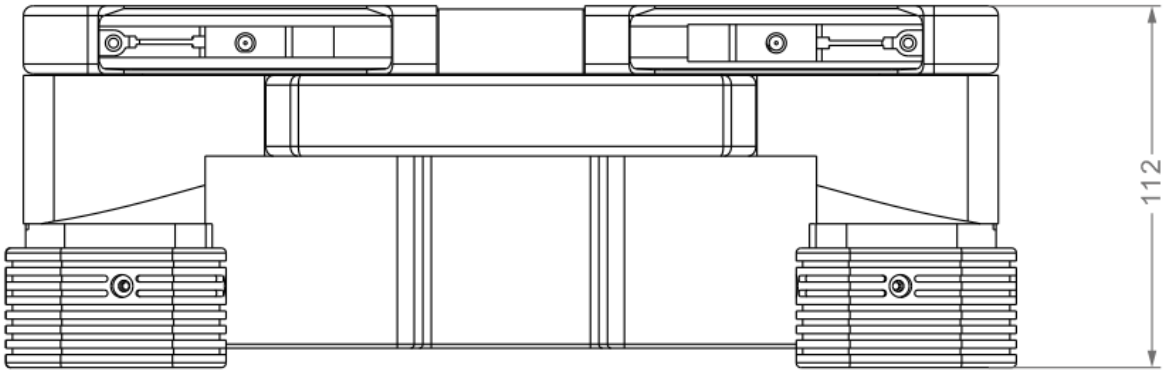


Figure 2-26

2.4.2 Structural Component

The ground structural component is shown as below. See Figure 2-27.

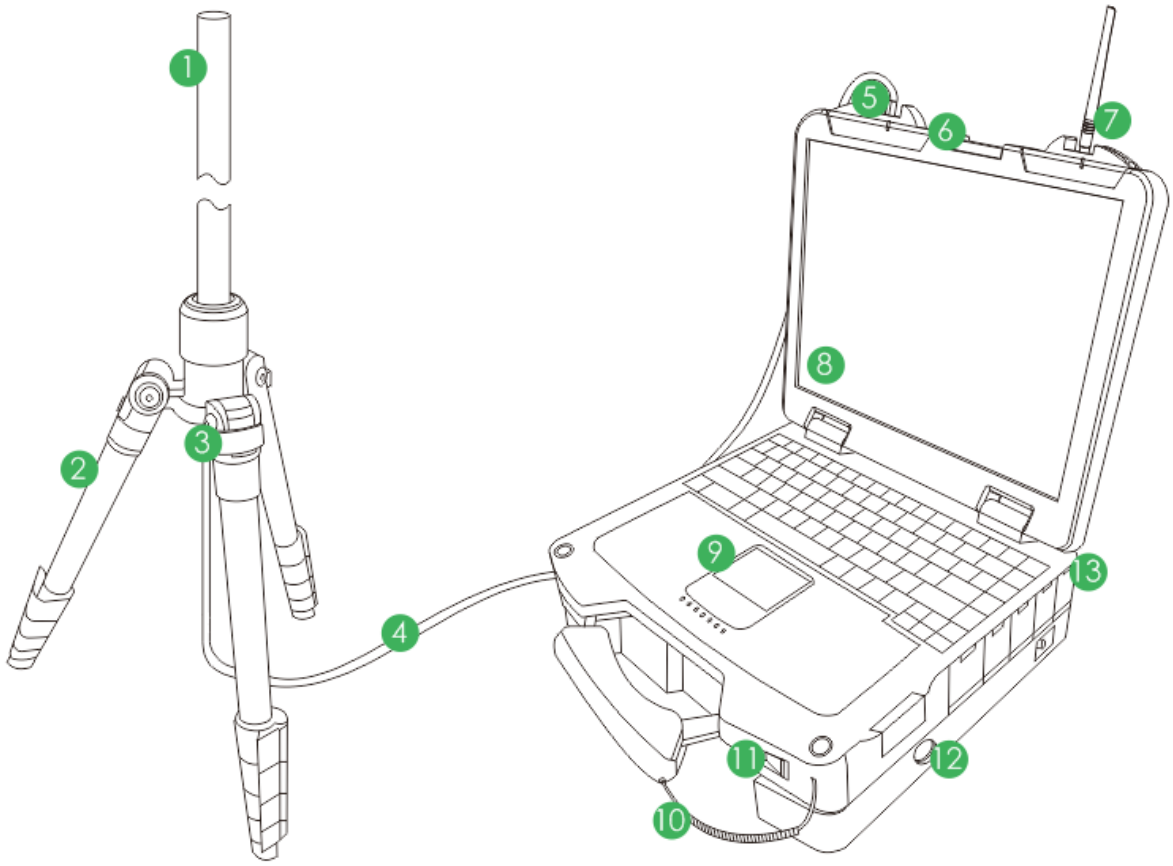


Figure 2-27

Please refer to the following table for detailed information.

SN	Name	Function
1	Image transmission antenna	It is to receive the image transmission signal from the aircraft.
2	Tripod	Fix the image transmission antenna
3	Height adjustment buckle	Adjust tripod height

SN	Name	Function
4	Antenna feeder	Connect the image transmission antenna with the ground control station.
5	Image transmission antenna port	Connect to image transmission antenna feeder.
6	Screen buckle	Press to open the ground control station
7	Relay antenna	For the data transmission between the ground control station and the remote control.
8	Touch screen	For operations on the ground station.
9	Touchpad	
10	Touch pen	
11	System boot up button	Boot up ground station OS. ● When device is off, push to the right to boot up. ● When device is on, push to the right and maintain for at least 3 seconds to shut down forcedly.
12	Image transmission button	Enable/disable ground control station image transmission system. ● When device is off, press once for a short time, the built-in red indicator light is on, the image transmission system is on. ● When device on, press once for a short time, the built-in red indictor light is off, the image transmission system is off.
13	Power port	Ground station recharge port

2.4.3 Operation GUI

Click  to open the Ground Control Station (GCS), enter the main interface.

GCS has the following function modules. See Figure 2-28.

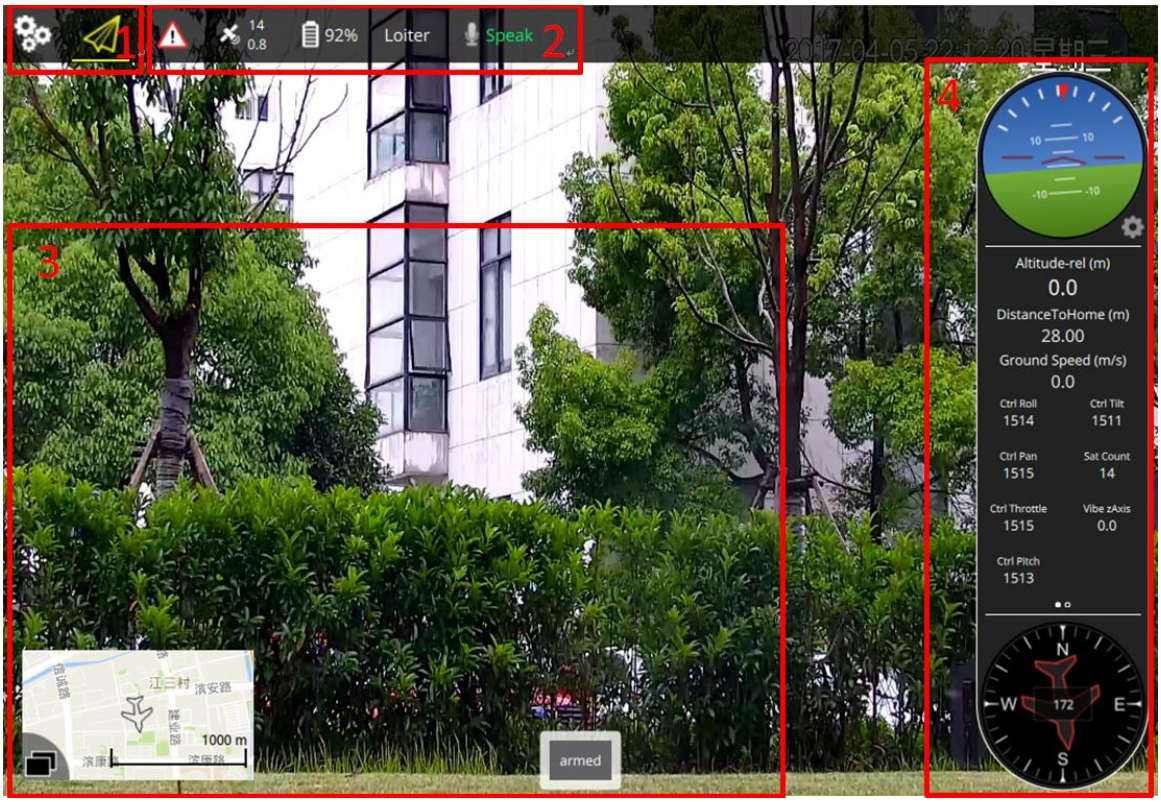


Figure 2-28

Please refer to the following table for detailed information.

SN	Name	Function
1	Setting menu	Set aircraft parameters and set preview interface. Please refer to chapter 2.4.3.1 Settings for detailed information.
2	Status display bar 1	It is to display preview alarm information, GPS status, battery status, flight mode. Please refer to chapter 2.4.3.2.1 Status display bar 1 for detailed information.
3	Preview window	Quickly switch video preview and map preview. Please refer to chapter 2.4.3.1.2 Preview for detailed information.
4	Status display bar 2	It is to display aircraft flight gesture, flight parameters, flight directions and etc. Please refer to chapter 2.4.3.2.2 Status display bar 2 for detailed information.

2.4.3.1 Settings

2.4.3.1.1 Aircraft settings

Click  to go to the aircraft setting interface.

The 1st Menu	The 2nd Menu	Note
Preview	Remote control	Set the mapping between the control stick and the channel.
	Flight mode	View aircraft flight mode.
	Battery	View aircraft battery status

The 1st Menu	The 2nd Menu	Note
	Security	View aircraft security parameters
Offline map	Add new task	Add a new offline map. Please refer to chapter 6.3.3.1 Download offline map for detailed information.
	Default Tile Set	System default offline map . When the network connection is OK, system automatically downloads current position map.
Pair frequency	-	Pair aircraft, ground control station, remote control. Please refer to chapter 9 Appendix system paring for detailed information. **Note** All corresponding components have completed the pair process. Usually user do not need to pair again.
Diagnosis	-	Diagnosis and repair the ground control station Please refer to chapter 3.9.1 Aircraft diagnosis for detailed information.
Options	-	Set offline map buffer Please refer to chapter 6.3.3.3 Set offline map disk buffer for detailed information.

2.4.3.1.2 Preview

Click  to enter preview interface.

Click the map preview window at the bottom left of the preview interface, it is to switch between the video preview and map preview mode.

Video Preview Mode

The system default preview mode is the video preview. See Figure 2-29.

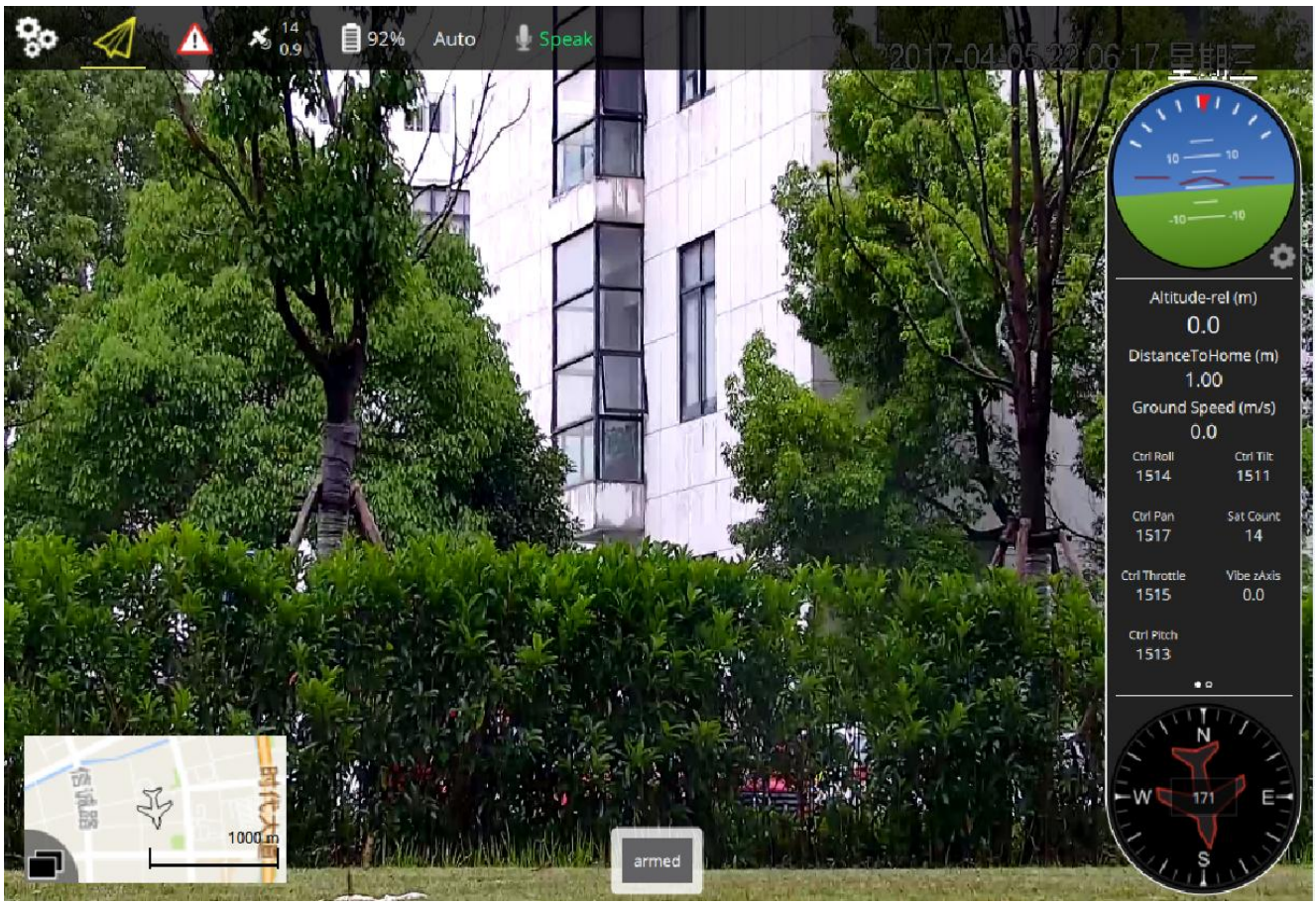


Figure 2-29

- In this mode, the map is displayed in the small window at the bottom left of the preview interface.
- In this mode, the large window displays video camera transmitting to the ground control station.

Note

- Armed: Aircraft armed button. The aircraft cannot take off since it is locked.
- Disarm: Aircraft disarmed button. The aircraft has unlocked and is ready to take off.

Map preview mode

The map preview mode is shown as in Figure 2-30.

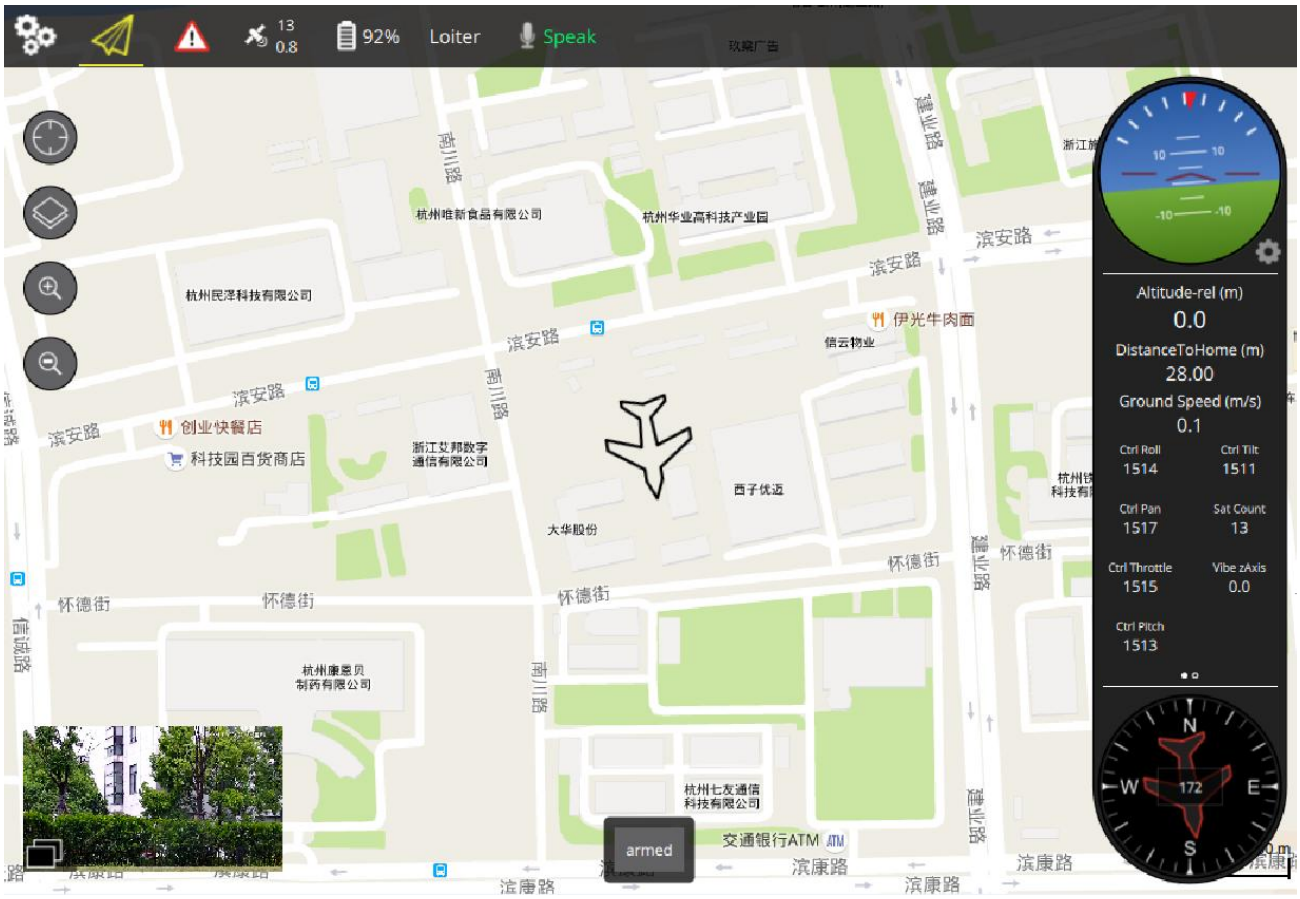


Figure 2-30

- In this mode, there is a small window at the bottom left of the preview interface. It is to display the video from the camera to the ground control station.
- In this mode, the large window is to display the aircraft position on the map.

In map preview mode, the function buttons are listed below:

-  Flight track button. Quickly switch to the aircraft current map position and use the aircraft current position as the center to follow up.
-  Map display mode switch button. Quickly switch the map. The map includes satellite map, topography map, and street map. It can clear flight track too.

2.4.3.2 System status display

2.4.3.2.1 Status display bar 1

The status display bar 1 is shown as in Figure 2-31.

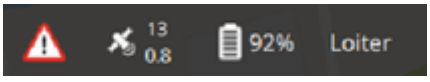
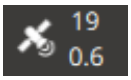
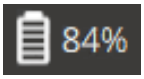
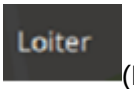


Figure 2-31

Please refer to the following table for detailed information.

Icon	Name	Function
	Alarm information	It is to view all alarm information on the main interface.

Icon	Name	Function
		Note When there is an alarm prompt, there is yellow framed alarm information on the preview interface. It lasts for 10 seconds and then disappear.
	GPS satellite amount and dilution precision	It is to check all parameters conform to the aircraft flight conditions or not. ● The number at the top right corner is the GPS satellite amount. When the GPS amount is equal to or larger than the 6, the aircraft is allowed to take off. ● The number at the bottom right corner is the GPS dilution precision. When the dilution precision is equal to or smaller than 1.4, the aircraft is allowed to take off.
	Reaming battery percentage	View aircraft remaining power. Please terminate the flight as soon as possible and replace the aircraft battery if the remaining battery percentage is too low.
 (Hover)	Flight mode	Display current aircraft flight mode. Please refer to chapter 4.1 Flight mode for detailed information. **Note** The displayed flight mode on the ground control station and remote control are the same.

2.4.3.2.2 Status display bar 2

The Status display bar 2 is shown as in Figure 2-32.

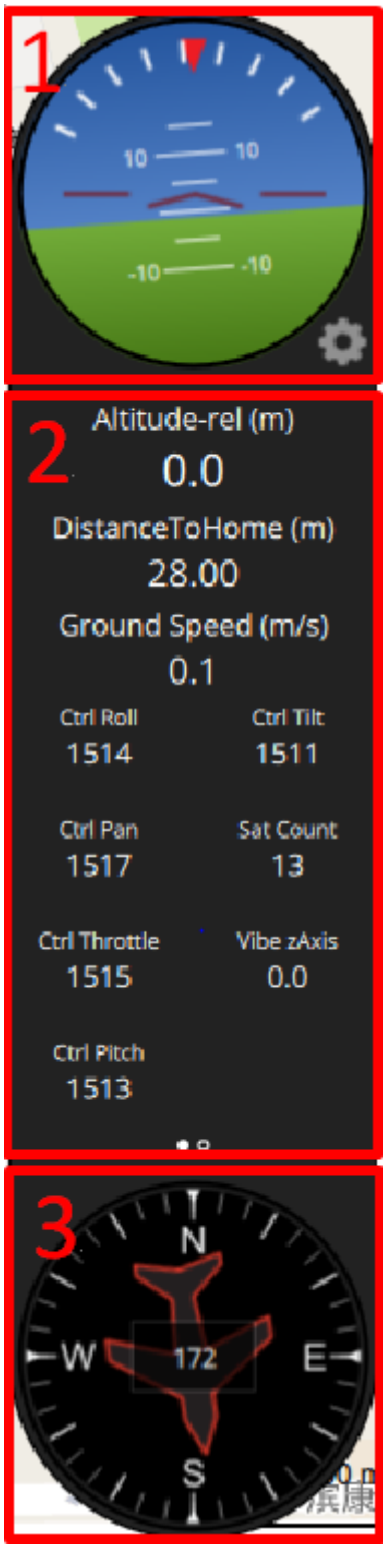


Figure 2-32

Please refer to the following table for detailed information.

Icon	Name	Function
1	Aircraft flight posture and control parameters settings	● Display aircraft realtime flight posture. Display pitch degree when the aircraft is rolling or pitch. ◇ Rolling pitch, each bar presents 15 degrees. ◇ Pitch: each small bar presents 5 degrees and each big bar presents 10 degrees.

Icon	Name	Function
		● Aircraft control parameters. ◇ Click  to set to display aircrasft real-time control parameters. ◇ Click OK to save the parameters.
2	Aircraft control parameters	Display aircraft control parameters.
3	Flight direction	Display aircraft course moving angles. ● The device uses N/S/W/E to present aircraft flight direction. ● The number in the middle of the tray is to display the aircraft moving angles. Each small bar presents 10 degrees. Each large bar presents 30 degrees.

3 Flight Preparation

Note

The following chapter is going to introduce complete flow in details before the aircraft unlocked and takes off.

Please select operation according to the actual situation after the first flight is over if it is not the used for the first time.

Caution

Please operate by strictly conforming to the steps described in this chapter; the operation sequence can't be reversed.

Please refer to Figure 3-1 for the flow of flight preparation phase.

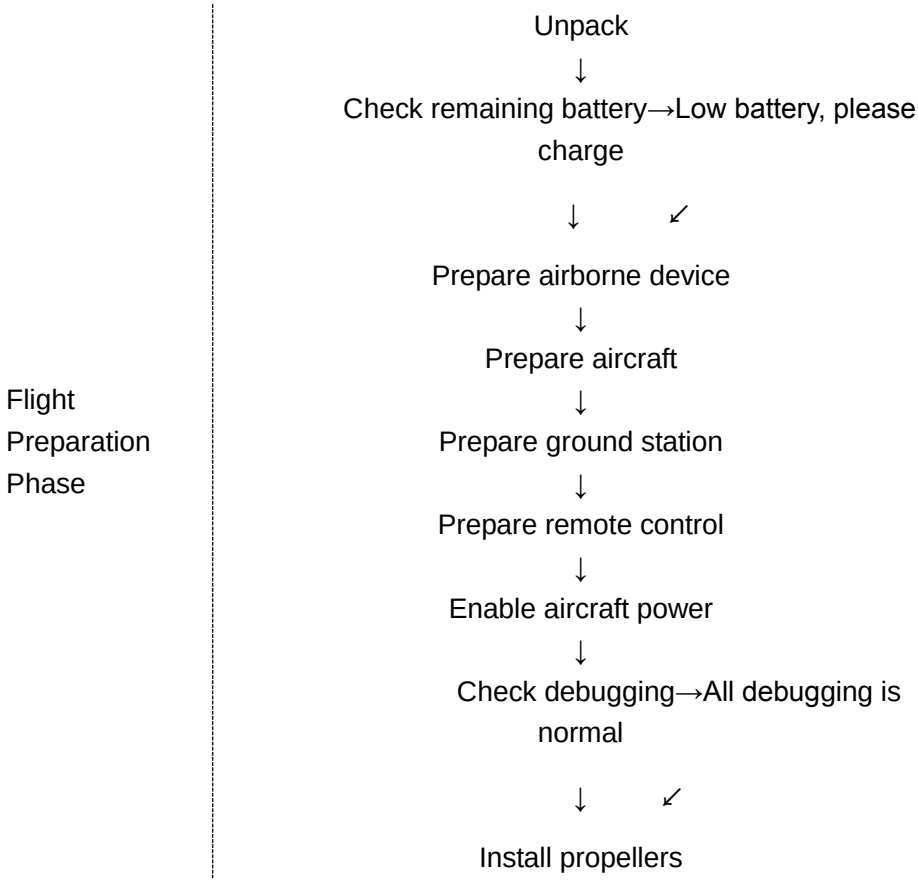


Figure 3-1

3.1 Unpack

Take out aircraft, battery, propellers, remote control and ground station from the packing box.

3.2 Check Remaining Battery

Check the remaining battery of aircraft battery, remote control and ground station, you can implement the subsequent steps after confirming that the battery reaches the standard.

Please refer to chapter 3.3 charging when the battery is low, please implement the sebsequent steps after charging.

3.2.1 Aircraft

3.2.1.1 Aircraft Battery Check

Short press the battery indication button on the aircraft battery and check the number of indicator lights which are on, which is shown in Figure 3-2.

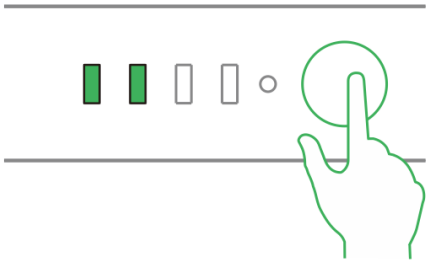


Figure 3-2

At normal temperature, the remaining battery is required to be ≥2.

The aircraft is required to take off with full battery when normal temperature is lower than -10℃.

3.2.1.2 Aircraft Remaining Battery

There are three statuses for each indicator light of the aircraft battery, which are normally on, flash and off.

The following table describes remaining battery percentage when the indicator light is in different status,

"●" means normally on, "◎" means flash and "○" means off, which is shown in Table 3-1.

SN	Indicator light status	Remaining battery percentage range
1	●●●●～●●●◎	100%～87.5%
2	●●●◎～●●●○	87.5%～75%
3	●●●○～●●◎○	75%～62.5%
4	●●◎○～●●○○	62.5%～50%
5	●●○○～●◎○○	50%～37.5%
6	●◎○○～●○○○	37.5%～25%
7	●○○○～◎○○○	25%～12.5%
8	◎○○○～○○○○	12.5%～0

Table 3-1

3.2.2 Remote Control

3.2.2.1 Remote Control Battery Check

Move the power switch to the arrow location, check the number of indicator lights which are on.

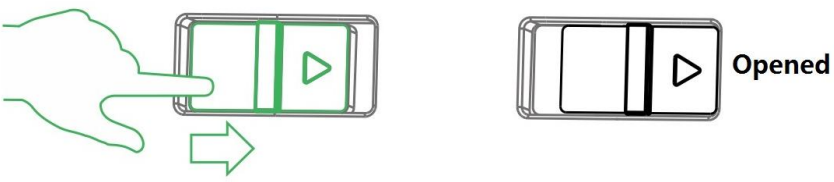


Figure 3-3

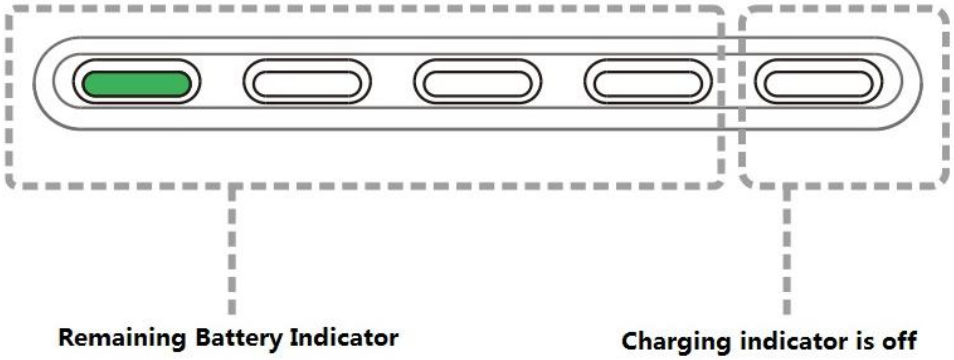


Figure 3-4

At normal temperature, the remaining battery is required to be ≥2.

The remaining battery is required to be ≥3 when the temperature is lower than -10℃.

3.2.2.2 Remote Control Remaining Battery

There are two statuses for each indicator light of remote control, which are normally on and off.

The following table describes remaining battery percentage when the indicator light is in different status, "●" means normally on and "○" means off, which is shown in Table 3-2.

SN	Indicator light status	Remaining battery percentage
1	●●●●～●●●○	100%～75%
2	●●●○～●●○○	75%～50%
3	●●○○～●○○○	50%～25%
4	●○○○～○○○○	25%～0

Table 3-2

3.2.3 Ground Station Battery Check

Move the system boot button to the right and the system starts up, which is shown in Figure 3-5.

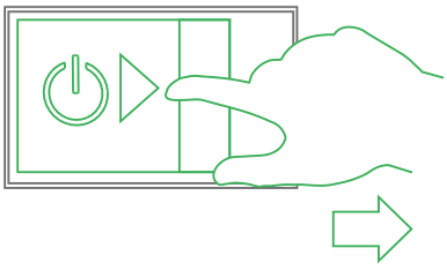


Figure 3-5

You can check remaining battery percentage on the upper right corner of the operating system, which is shown in Figure 3-6.

Figure 3-6

The remaining battery is required to be ≥ 30% at normal temperature.

The remaining battery is required to be ≥ 40% when the temperature is lower than -10℃.

3.3 Charging

Note

It doesn't need to implement the following chapter if the remaining battery is enough.

3.3.1 Aircraft Battery Charging

The whole charging period (from 0 to 100) is about 2 hours.

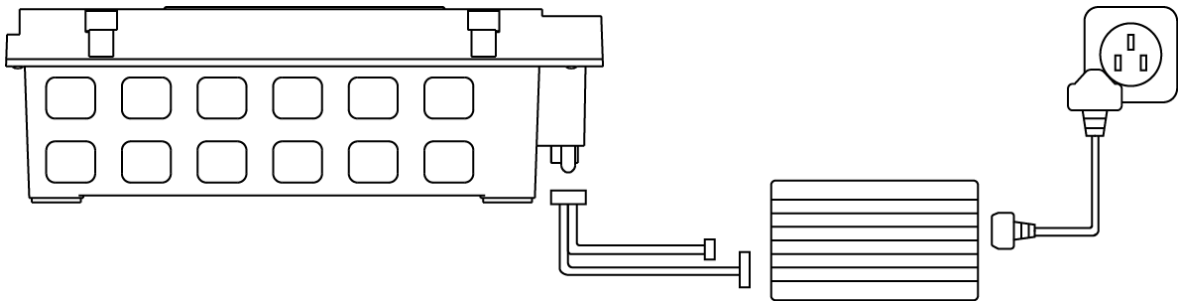


Figure 3-7

Step 1

Open the battery cover, unfasten the battery fixing band and take out battery.

Step 2

Connect charging adapter cable to the 6S balance port and charging power port of the charger, and connect the charger to AC power.

Step 3

Insert the battery into the battery port of the charging adapter cable.

Step 4

Rotate the black button and select CHR.

Step 5

Press the button. The value displayed by LED nixie tube bounces and flashes, and then turn the button to adjust current which is recommended to be 15A. Press the button again to select after adjustment is over.

Step 6

Short press the battery indicator light button once, and then long press it for 3 seconds, turn on the indicator light which displays battery.

Step 7

Long press the button to start charging and wait for the charger prompt. It means charging is completed when the charger beeps 5 times and LED nixie tube displays DONE.

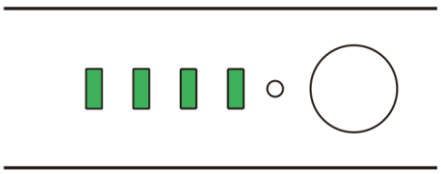


Figure 3-8

Step 8

First disconnect it from the power socket and then other cables after chargin is completed.

3.3.2 Remote Control Charging

The entire charging period (battery from 0 to 100) needs approximately 3.5 hours.

Please charge the remote control when its power is off.

Step 1

Connect the remote control to power adapter by charging cable.

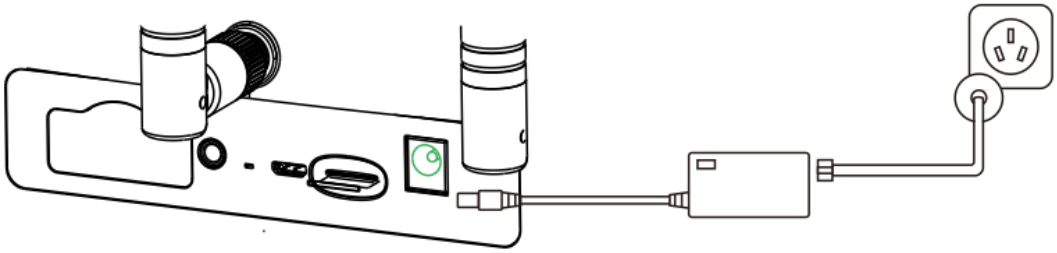


Figure 3-9

Step 2

Connect power adapter to AC power (AC 100V-240V).

Step 3

Check charging status: it means the remote control is charging when the indicator light is red and normally on. It means charging is done when the indicator light becomes green and normally on, which is shown in the following figure.

Figure 3-10

Step 4

First disconnect the remote control from the power socket and then all other cables after charging is done.

3.3.3 Ground Station Charging

The entire charging period (battery from 0 to 100) needs approximately 3.5 hours.

Step 1

Connect ground station to power adapter with charging cable.

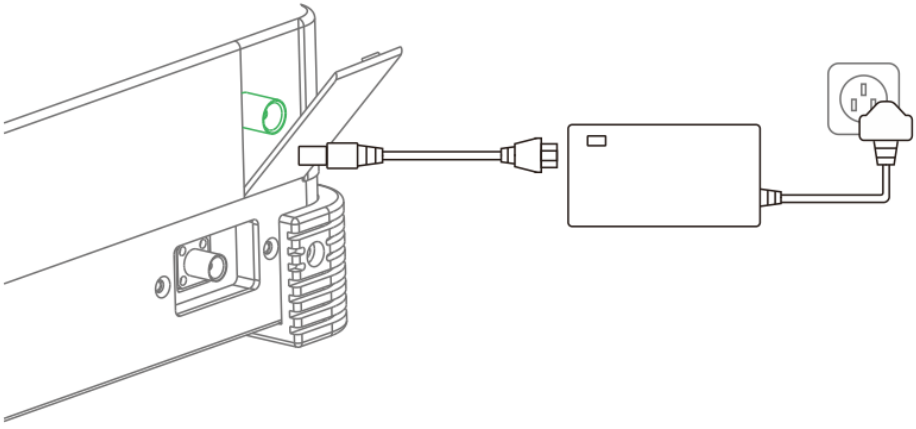


Figure 3-11

Step 2

Connect power adapter to AC power (AC 100V-240V).

Step 3

Check charging status: it means the ground station is charging when the indicator light on the right of ground station handle is orange and normally on. It means charging is done when the indicator light becomes green and normally on.

Step 4

First disconnect the ground station from power socket and then all other cables after charging is done.

3.4 Prepare Airborne Equipment

Note

The following chapter is optional for operation.

Please implement demounting step first and then connection step when the PTZ camera needs to be replaced.

It only needs to implement demounting step when the aircraft flies directly without PTZ camera.

3.4.1 Demount PTZ Camera

Step 1

Loosen four mounting screws, which is shown in the following figure.

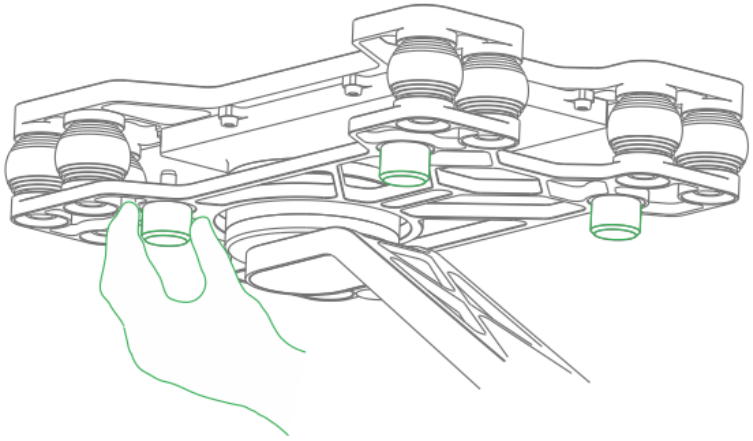


Figure 3-12

Step 2

Pull out the data cable.

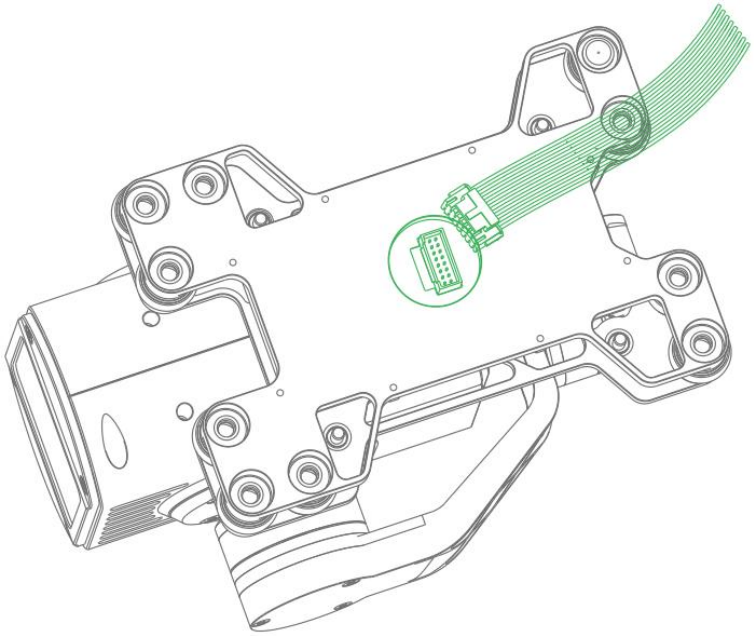


Figure 3-13

3.4.2 Install PTZ Camera

Step 1

Insert the port of aircraft bottom data cable into the upper port on the vibration damper plate of the PTZ camera.

Step 2

Align four mounting screws with the hole sites of aircraft bottom, tighten the screws.

3.5 Prepare Aircraft

3.5.1 Unfold Aircraft Arm

Unfold the aircraft arm to horizontal position. The arm is firmly stuck when you hear the sound of "click", which is shown in the following figure.

Note

It can implement the subsequent steps only when the arm is firmly stuck. Please contact our company when the arm is loose.

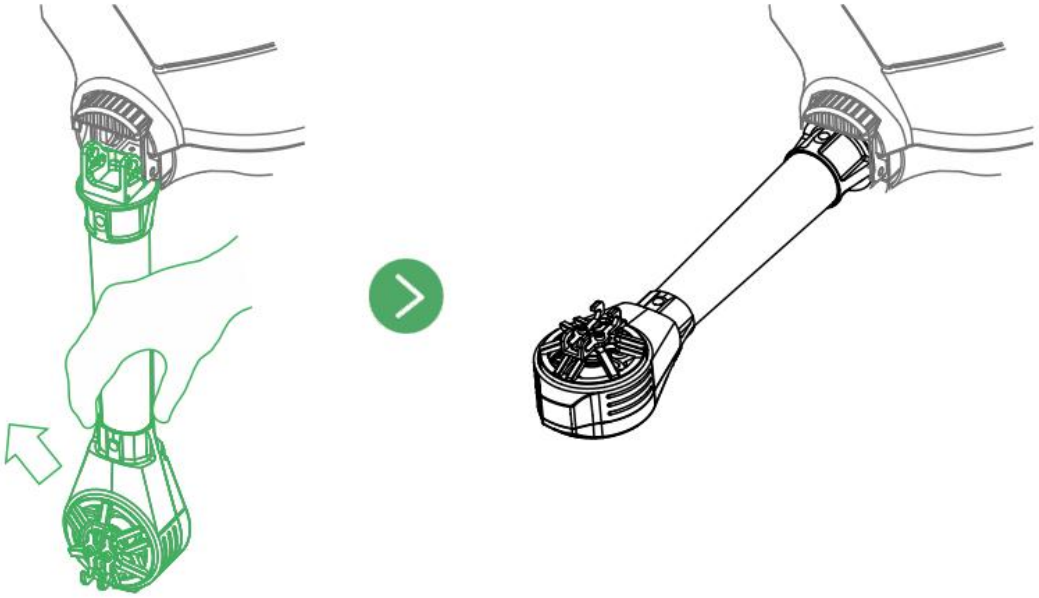


Figure 3-14

3.5.2 Open Antenna

Tips

It is recommended to unfold the antenna to vertical position, which can realize optimum communication effect.

Unfold the aircraft antenna, move it to vertical position and make it firmly stuck, which is shown in the following figure.

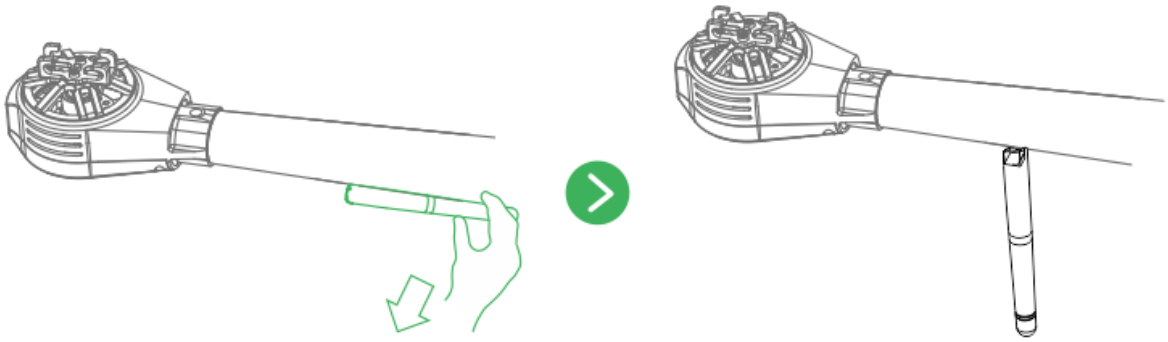


Figure 3-15

3.5.3 Install Aircraft Battery

Step 1

Move the button on the cover and then open the battery cover.

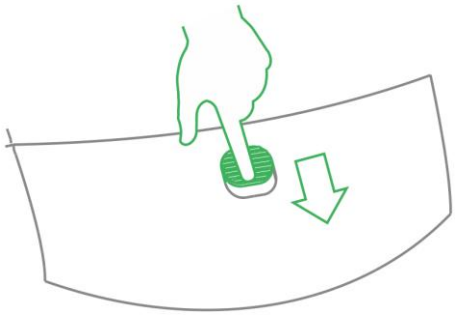


Figure 3-16

Step 2

Put the battery into the aircraft horizontally, fasten the fixing band firmly.

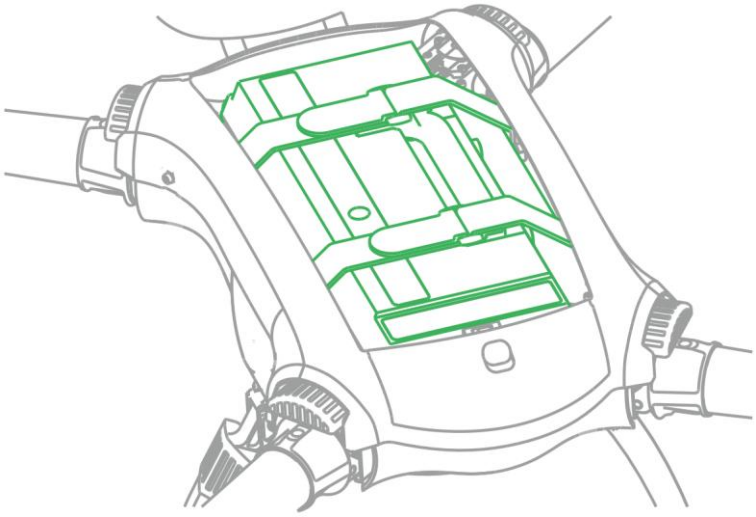


Figure 3-17

Step 3

Close the cover and move the button on the cover and lock it firmly.

3.6 Prepare Ground Station

3.6.1 Set up Antenna

Step 1

Open the tripod and adjust it to a proper height. Make sure it is stably installed on the horizontal plane.

Step 2

Tighten the two image transmission antenna firmly, insert it into the tripod and lock it firmly, which is shown in the following figure.

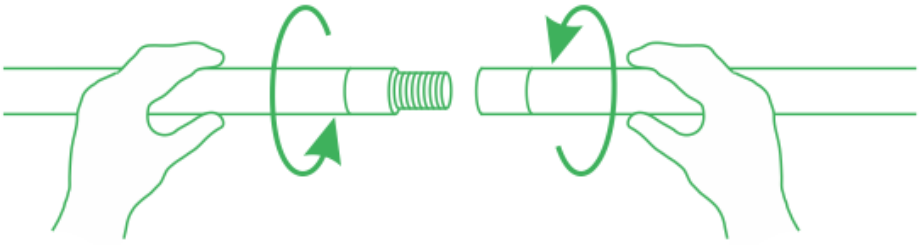


Figure 3-18

Step 3

Connect the cable of image transmission antenna to the port of image transmission antenna on the left of ground station, which is shown in the following figure.

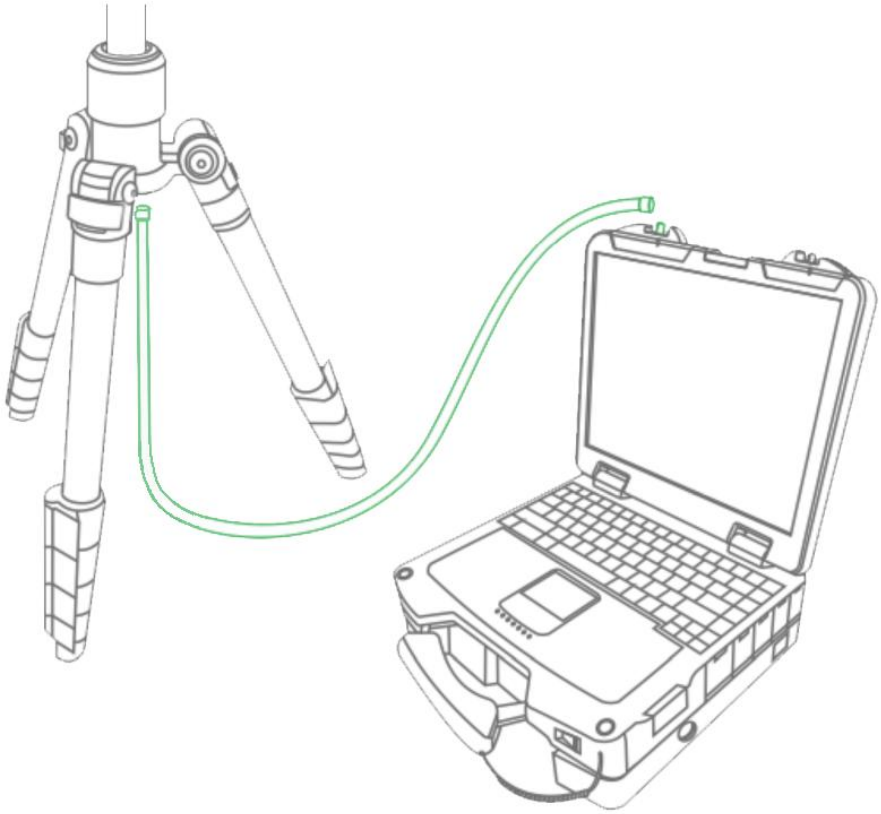


Figure 3-19

Step 4

Twist the relay antenna into the port on the right of ground station; adjust it to vertical position, which is shown in the following figure.

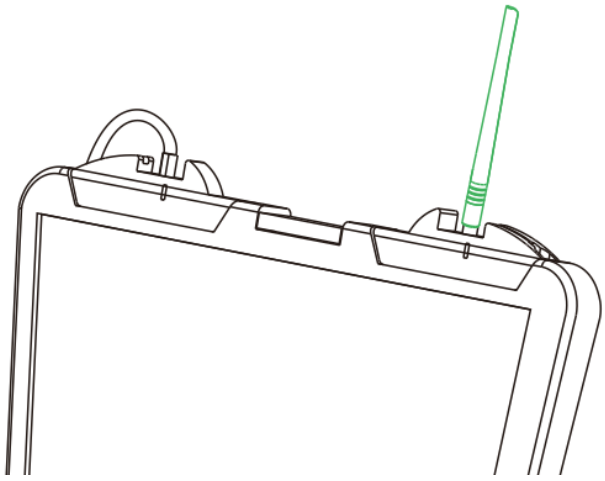


Figure 3-20

3.6.2 Enable Ground Station Power

Note

Please skip the chapter if the power is not turned off after checking remaining battery.

Step 1

Move the system boot button to the right and the system starts up.

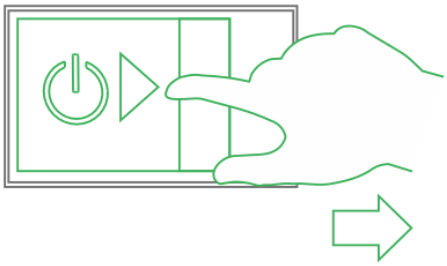


Figure 3-21

Step 2

Short press the image transmission button and the built-in red indicator light is on.

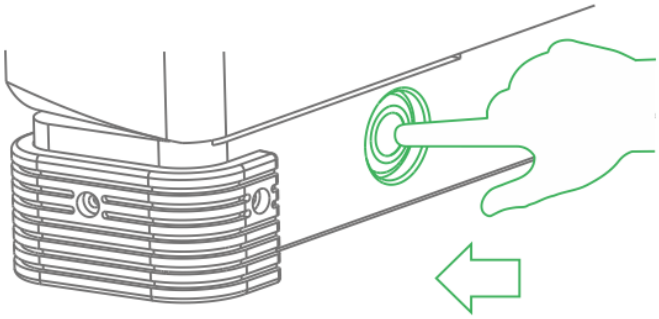


Figure 3-22

3.7 Prepare Remote Control

3.7.1 Install SIM Card, SD Card

Please purchase SIM card and data package, install SIM card if it needs to transmit the images realtime to extranet.

The storage capacity of remote control is about 3G, please select and install SD card according to the practical situation.

Note

The following chapter is optional for operation.

Both SIM card and SD card need to be configured on your own.

The recommended brand of SD card is SanDisk, which supports max 64G.

Please purchase the 4G SIM card which supports Telecom, Mobile and Unicom, and purchase data plan according to the practical situation of the local operator.

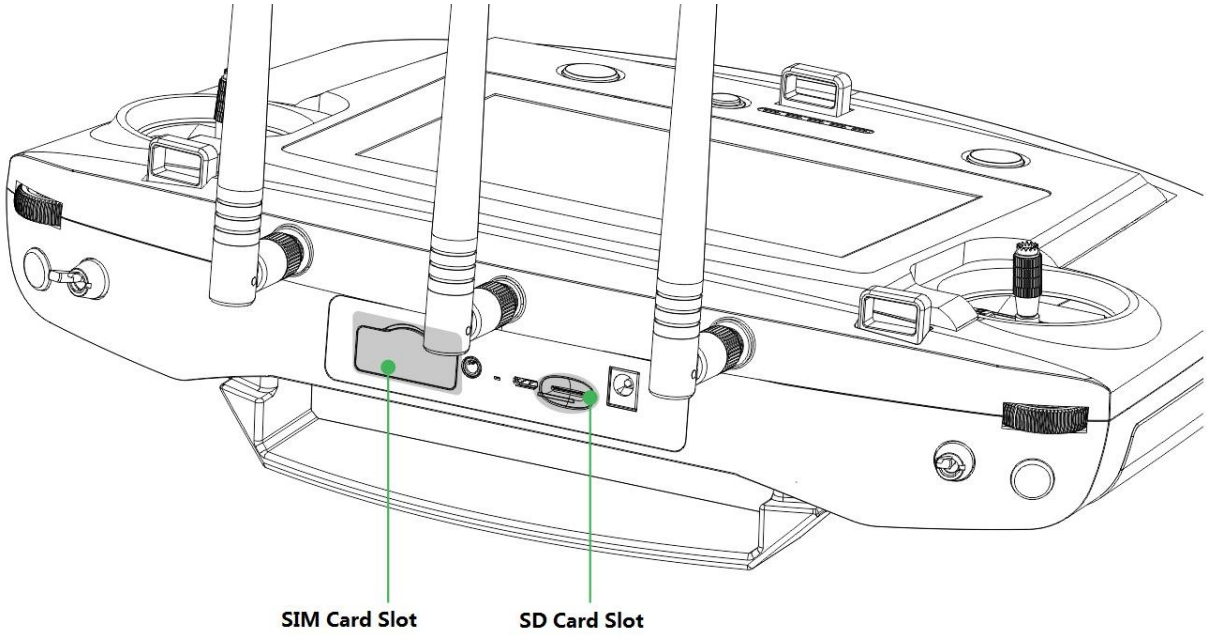


Figure 3-23

The installation steps are shown as follows:

Install SIM card: Open the silica gel cover on the side panel of the remote control, make the metal surface of the SIM card face downward, insert it into the SIM card slot horizontally and close the silica gel cover.

Install SD card: Make the metal surface of SD card face downward and insert it into the SD card slot of the remote control side panel horizontally.

3.7.2 Open Antenna

Open the antenna of remote control to proper location, which is shown in the following figure.

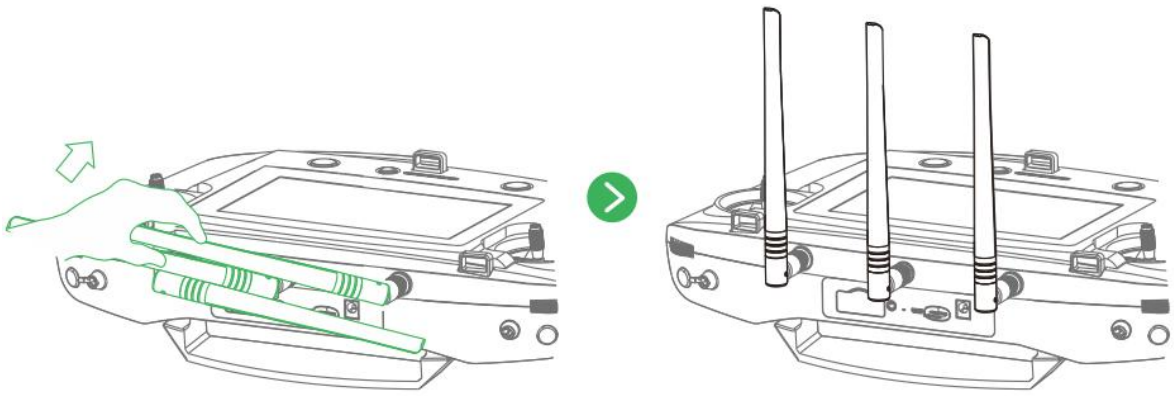


Figure 3-24

3.7.3 Enable Remote Control Power

Note

Please skip the chapter if the power is not turned off after checking remaining battery.

Enable remote control power: move the power button of remote control to the arrow location which is shown in the following figure.

Figure 3-25

3.7.4 Confirm Remote Control Mode

It is mode 2 by default, please set in "Setup > RC Setting > Stick Mode" if it needs to switch mode, which is shown in the following figure.

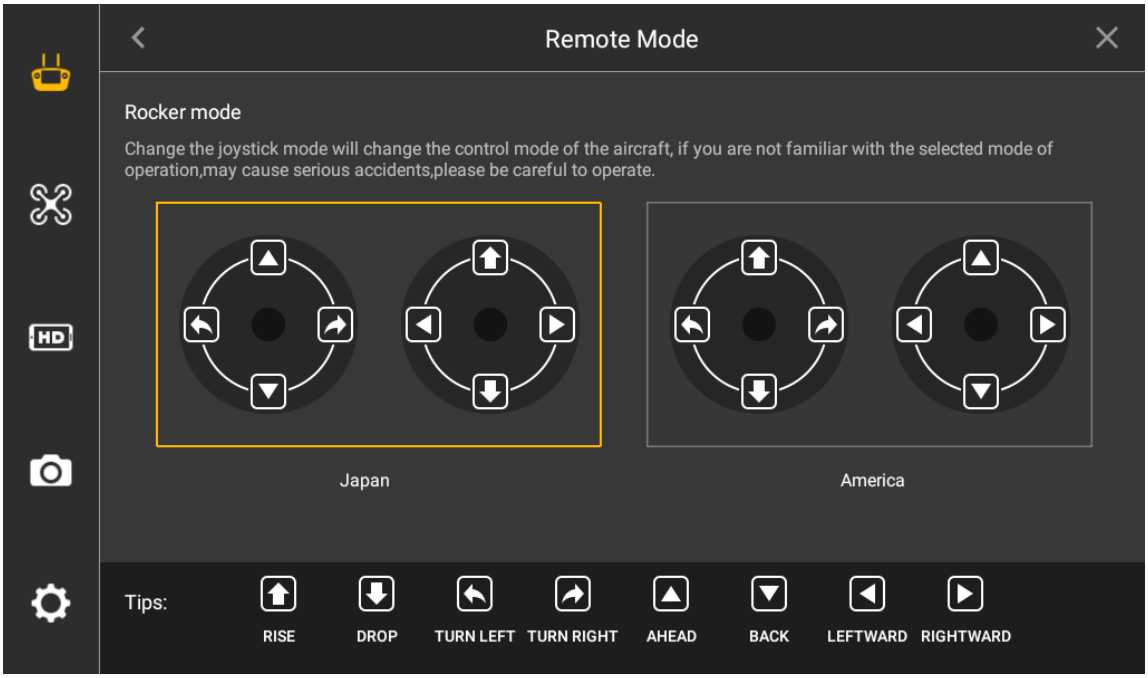


Figure 3-26

Please refer to "4.2.4 Manual Flight Control" for remote control mode and its corresponding relations.

3.8 Enable Aircraft Power

There is a power switch below the aircraft tail, first short press once and then long press for 3 seconds, it means successful power-on when the power indicator light becomes green.

Note

Please always keep the aircraft level and static after power on and when it needs to implement other operations without prompt from the ground station, otherwise it may result in initialization failure.

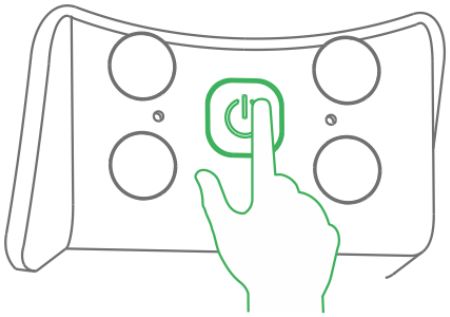


Figure 3-27

3.9 Check and Debugging

Warning

It can implement the subsequent steps only after checking and debugging all the items listed in the chapter below; besides, the remote control and ground station prompts that each status is normal and the aircraft indicator light is green and flashes.

Tips

It is recommended to set the display image of remote control and ground station as video preview mode before taking off.

Check operation condition. Please debug each component to make it operate normally when both the remote control and ground station prompt abnormity.

It is going to list common calibration items, abnormities and its solutions in the following chapter.

3.9.1 Aircraft Diagnosis

Abnormities

When there is no image transmission or data transmission display on the ground station.

Exact Operation

Step 1

Select "Aircraft Setting > Diagnosis" to enter diagnosis interface, which is shown in the following figure.

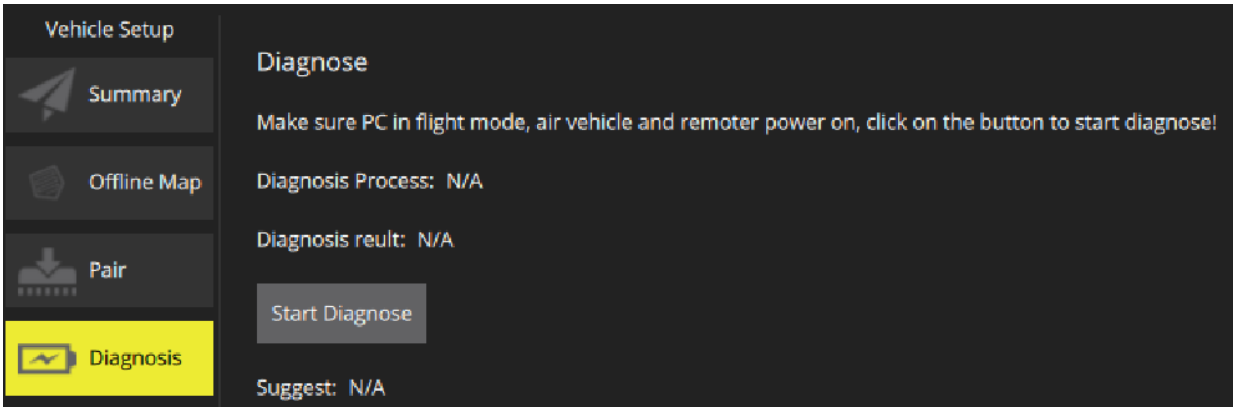


Figure 3-28

Step 2

Click "Start Diagnosis" and the system enters self-diagnosis.

Step 3

It will display diagnosis advice after diagnosis is completed. The "Start Diagnosis" button becomes yellow, which is shown in the following figure.

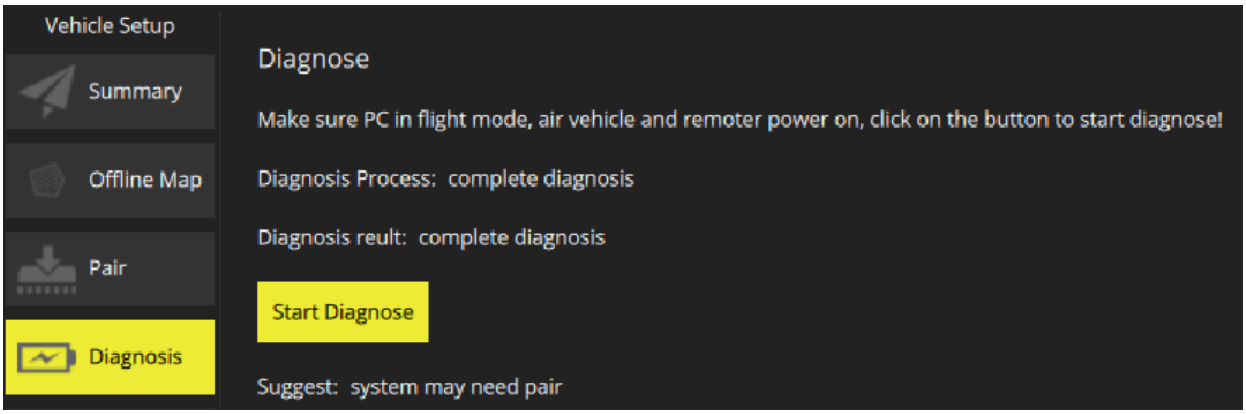


Figure 3-29

Step 4

Adjust the device according to the "Advice" and make the ground station display information of image transmission or data transmission.

3.9.2 Remote Control Calibration

Select "Setup > RC Setting > RC Calibration" to enter the RC calibration interface, which is shown in the following figure.

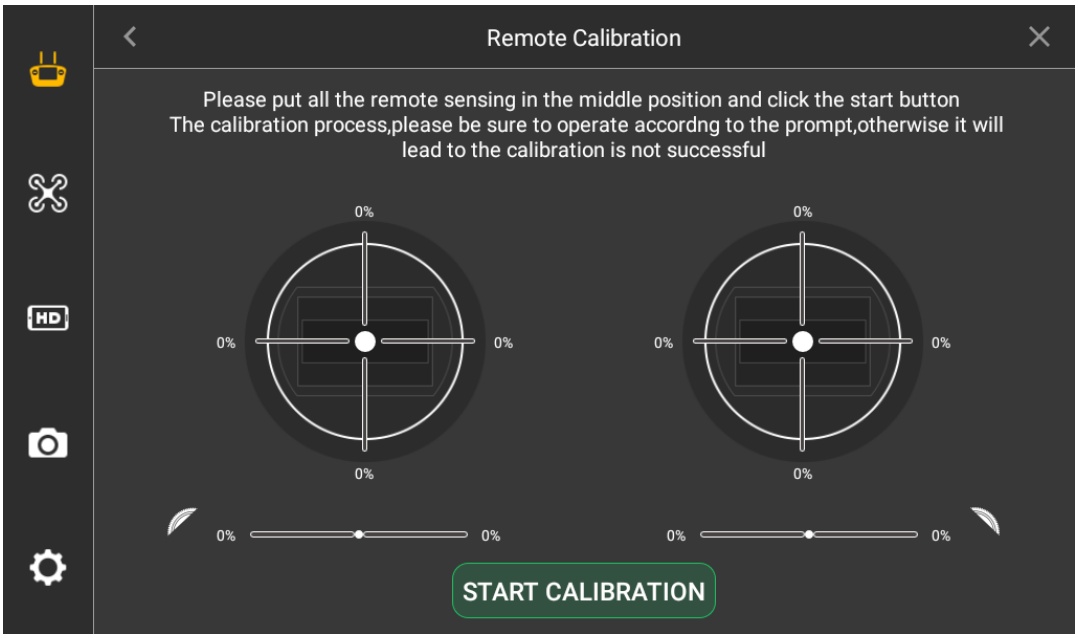


Figure 3-30

The exact steps are shown as follows:

Step 1

Move both the left and right sticks back to the middle.

Step 2

Click "Start Calibration".

Step 3

Turn two sticks and turn to the max end of each direction for several times.

Step 4

Slide the rolling wheels on both sides, slide to the max end of two directions for several times.

Step 5

Click "Complete Calibration" after turning the rolling wheels and sticks.

3.9.3 Accelerometer Calibration

Select "Setup > General > Other > Accelerometer Calibration" to enter the interface of accelerometer calibration, which is shown in the following figure.

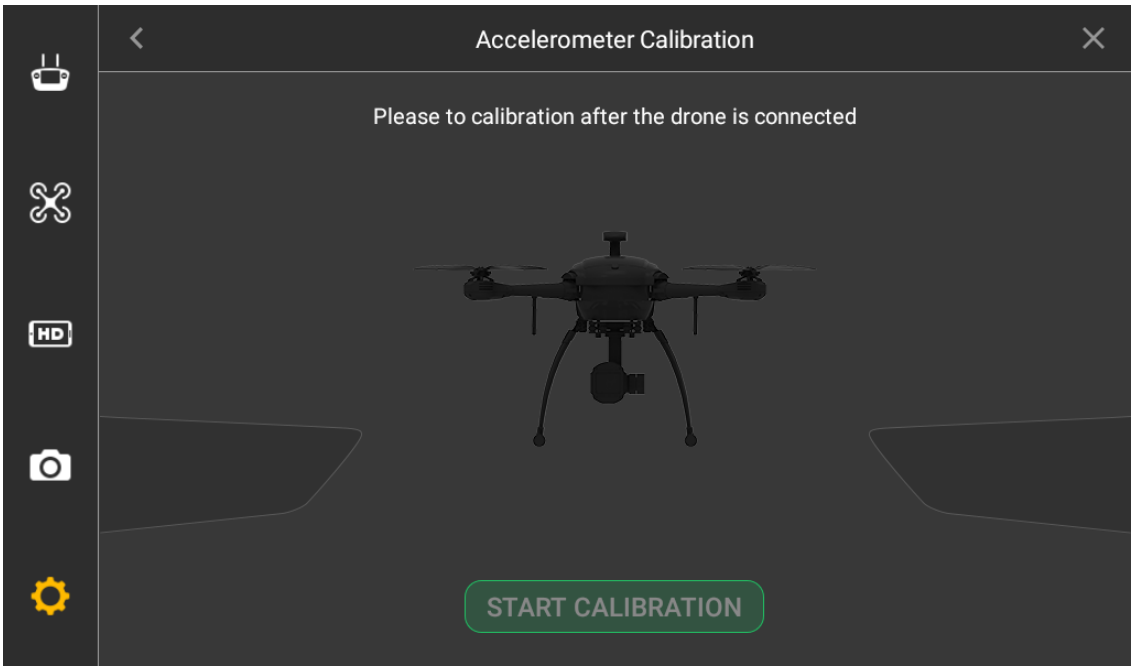


Figure 3-31

Place the aircraft on the flat surface, click "Start Calibration".

The remote control will prompt "Calibration Success" if it is successfully calibrated.

The remote control will prompt "Calibration Failure" if it fails to calibrate. Click "Retry" till it is successfully calibrated.

3.9.4 Initialization Failure

Abnormity Prompt

Both remote control and ground station prompt "Initialization Failure".

Possible Reasons

After power on, it may result in initialization failure if you move the aircraft before taking off

Solutions

Power on the aircraft again after the power is cut off, and keep the aircraft level and static during initialization.

Please contact our company if initialization fails for several times.

3.9.5 Geomagnetic Abnormity

Abnormity Prompt

Aircraft indicator●●● flashes.

Both remote control and ground station prompt "Geomagnetic Abnormity".

Possible Reasons

The use position has changed a lot, which means the geographical location is quite far away from the last geographical location where the aircraft is used, causing big change for geomagnetic field.

There is other more intensive magnetic field in the environment or it is changed suddenly, affecting

geomagnetic field.

Solution

Step 1

Select "Setup > General > Other > Geomagnetic Calibration" on the remote control and enter the interface of geomagnetic calibration, which is shown in the following figure.

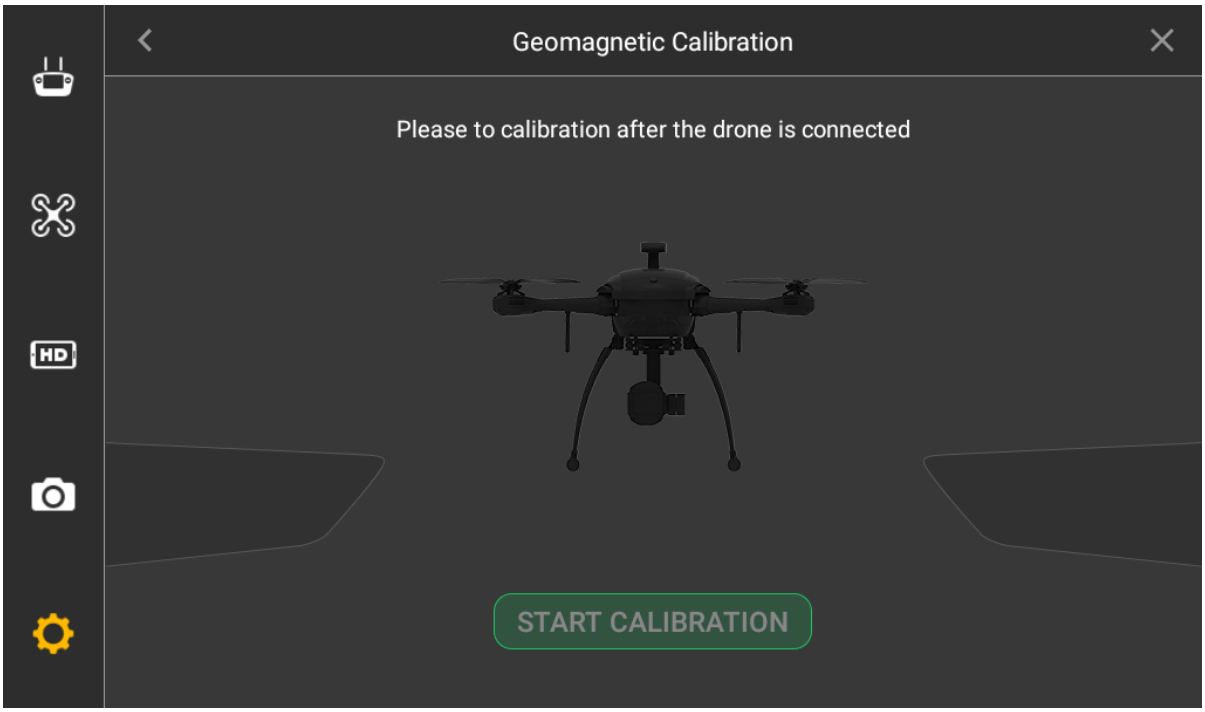


Figure 3-32

Step 2

Click "Start Calibration".

Step 3

Keep the aircraft level and rotate it for one circle horizontally, which is shown in the following figure.

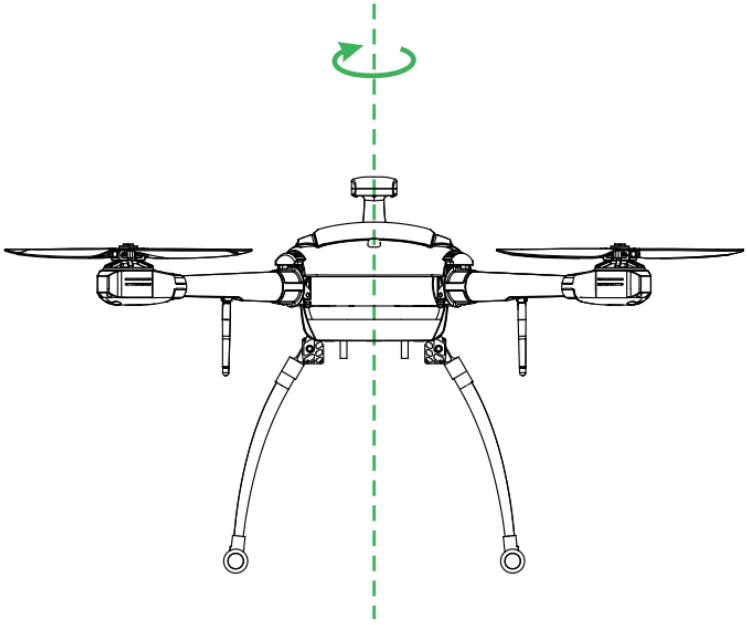


Figure 3-33

Step 4

Keep the aircraft vertical and rotate it for one circle vertically, which is shown in the following figure.

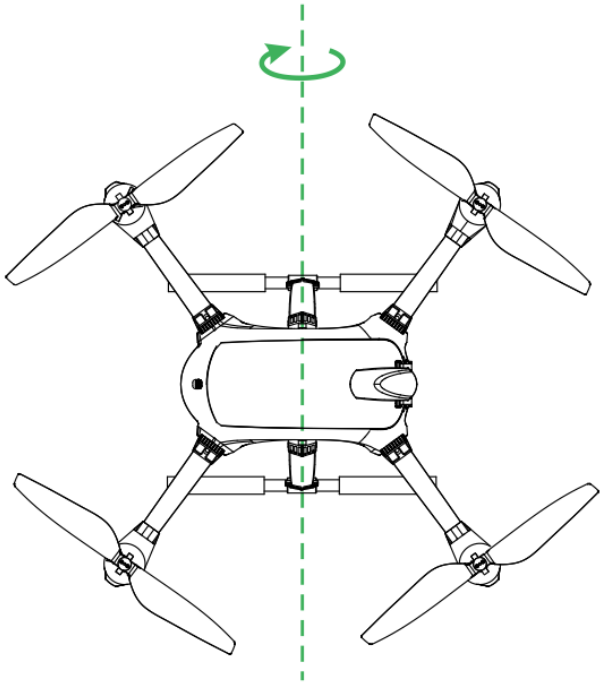


Figure 3-34

It will prompt geomagnetic calibration success if it is successfully calibrated.

It will prompt geomagnetic calibration failure if it fails to calibrate, then you can repeat step 2, 3 and 4 to calibrate again.

3.9.6 GPS Satellites Insufficient

Abnormity Prompt

The displayed number of satellites for remote control and ground station is less than 6.

Possible Reasons

The flying environment is not wide open enough, which is severely blocked.

There is some other interference around the surroundings.

Solution

Move the aircraft to a wider area and wait for 30s.

3.10 Install Propellers

Step 1

Press the spring buckle on both sides of the propeller center, which is shown in the following figure.

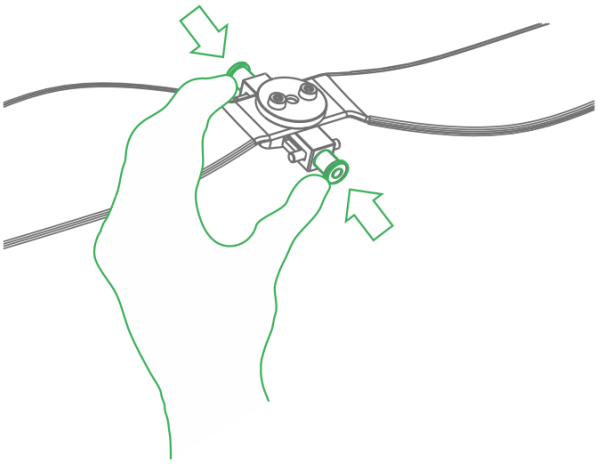


Figure 3-35

Step 2

Buckle the latch on the motor, which is shown in the following figure.

Note

The structure of two pairs of propellers are different, you can adjust to the adjacent motor position to install if it fails to buckle.

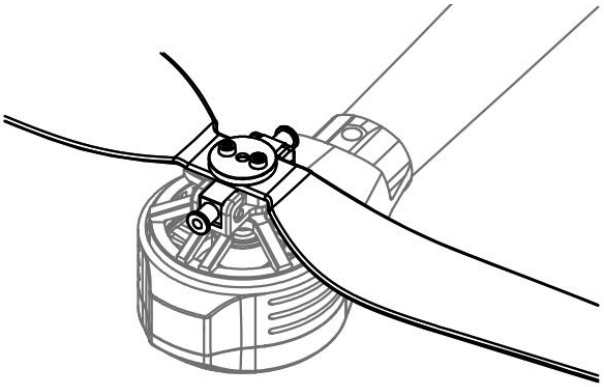


Figure 3-36

4 Enable Flight

Note

This chapter will introduce the complete flow of formal takeoff and landing of the aircraft in details.

Danger

Please do not get close to the rotating propellers or motor, which is to avoid personal injury.

Warning

Please make sure to check the following items carefully before enabling flight for your personal and property safety.

The flight preparations listed in chapter 3 are all completed.

All the components have been correctly and stably installed.

Make sure each spare part is in good condition, please do not fly the aircraft if some part is aged or damaged.

The flight environment meets the requirements listed in the important safeguards and warnings.

Note

Please do not block the ventilation next to heat emission hole when the motor is operating.

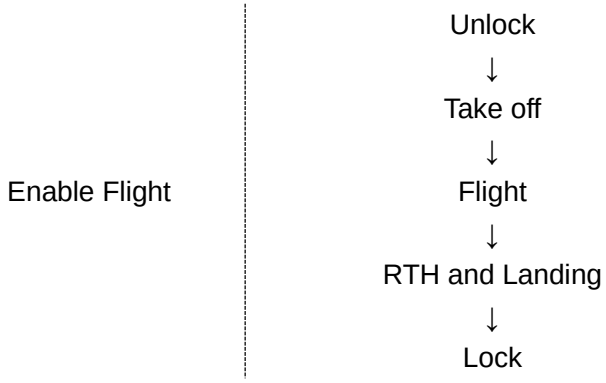


Figure 4-1

4.1 Flight Mode

It can control flight mode via driving lever during flight phase, which is shown in the following figure.

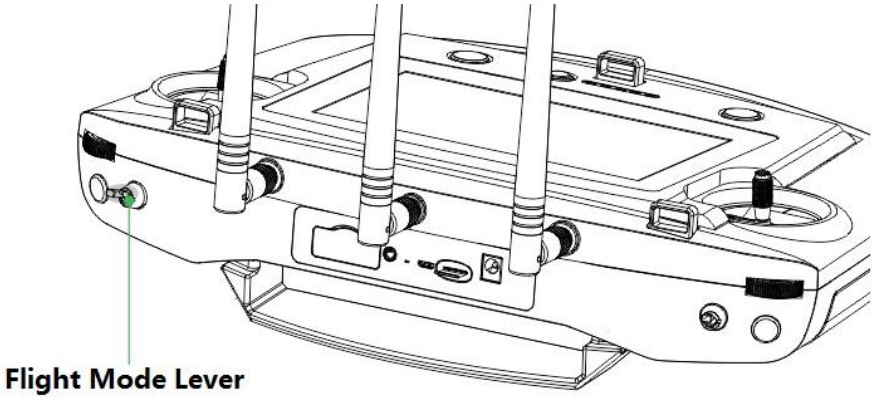


Figure 4-2

Three-level driving lever:

Upper level: Smart fight mode. The aircraft will fly automatically according to the pre-set flight route.

Medium level: It is the fixed height flight mode in the manual flight mode. The aircraft will maintain the current flight height when the throttle stick is in the middle.

Lower level: Fixed point flight mode in the manual flight mode. The aircraft will maintain the current location when all the sticks are located in the middle.

The chapter will introduce manual and smart flight mode respectively.

It can switch between these two modes, for example, you can use one-key takeoff and landing buttons in the manual flight mode.

4.2 Manual Mode

4.2.1 Flow Introduction of Manual Flight

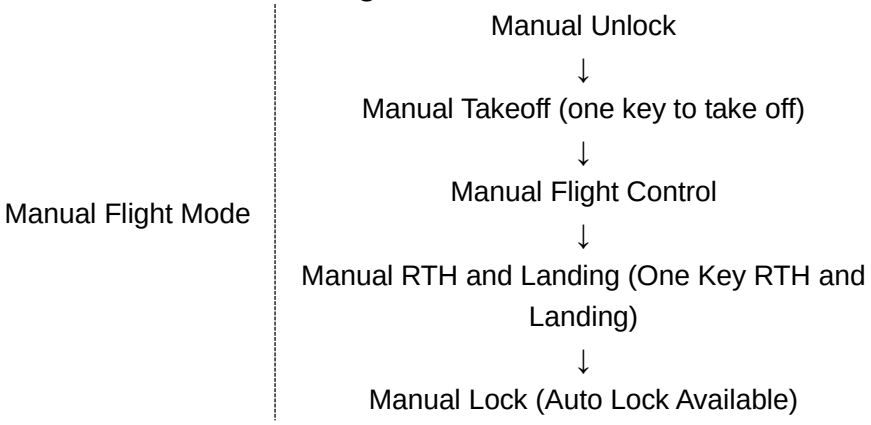


Figure 4-3

4.2.2 Unlock Flight Control

Move the left stick to lower left, meanwhile move the right stick to lower right (or move the left stick to lower right, meanwhile move the right stick to lower left), and keep the status for 2s. At this moment the propellers are unlocked and start to rotate. Move all the sticks back to middle, which is shown in the following figure.

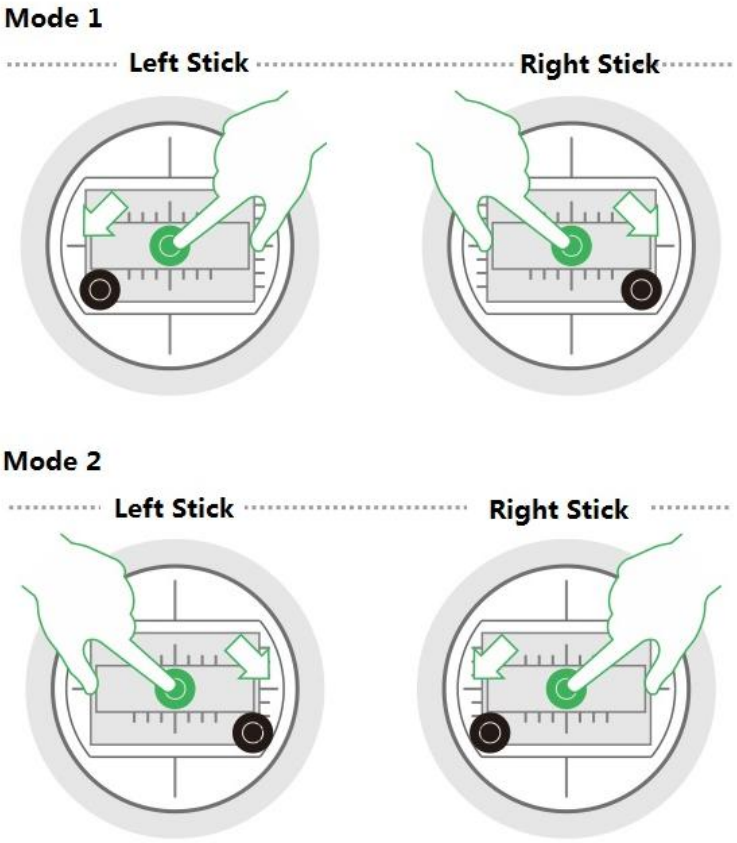


Figure 4-4

Note

If there is obvious difference about rotating speed among the propellers, then move the left stick to lower left and meanwhile move the right stick to lower right (or move the left stick to lower right, and meanwhile move the right stick to lower left), and then keep the status till the propellers stop rotating. Turn off the aircraft and contact our company.

The aircraft will be automatically locked if it stays on the ground and fails to take off within 10s after it is unlocked.

4.2.3 Manual Takeoff

Slight push the throttle to mid-point or higher, which is shown in the following figure.

Figure 4-5

4.2.4 Manual Flight Control

Here it can set remote control mode and control flight direction of the aircraft.

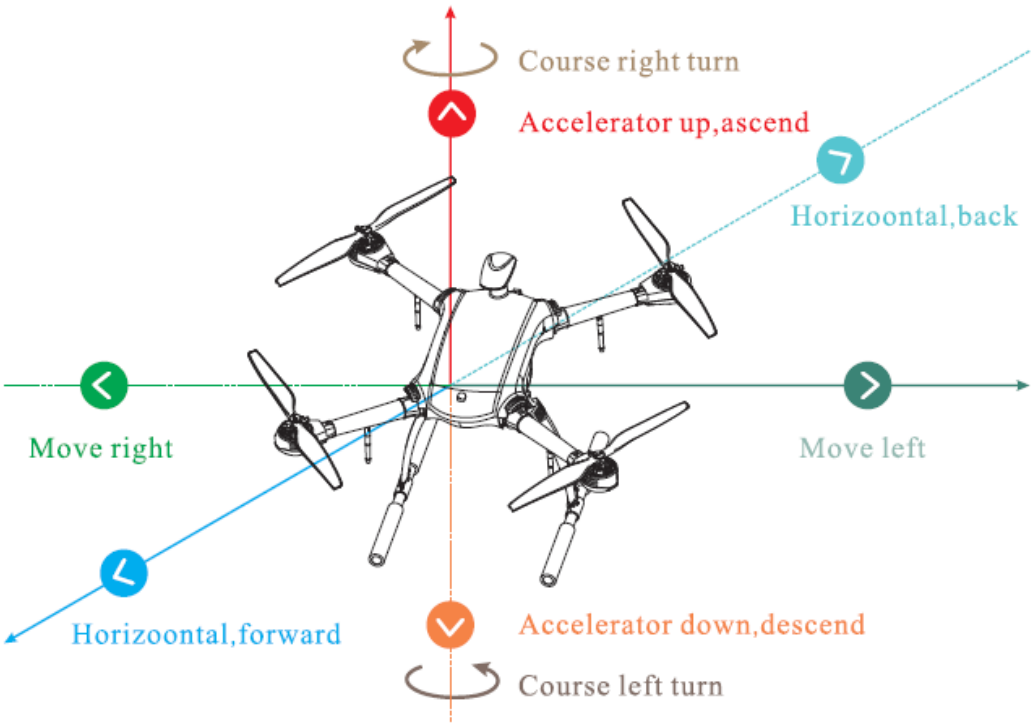


Figure 4-6

The stick presets two remote control modes.

It is mode 2 by default, please modify in “Setup > Remote Control Setting > Stick Mode” if it needs to switch to mode 1.

- Mode 1:
  - ✧ Moving the left stick up and down to control aircraft's forward and backward horizontally.
  - ✧ Moving the left stick left and right to control aircraft's left and right turn horizontally.
  - ✧ Moving the right stick up and down to control aircraft's ascend and descend respectively.

- Moving the right stick left and right to control aircraft's left and right movement horizontally.

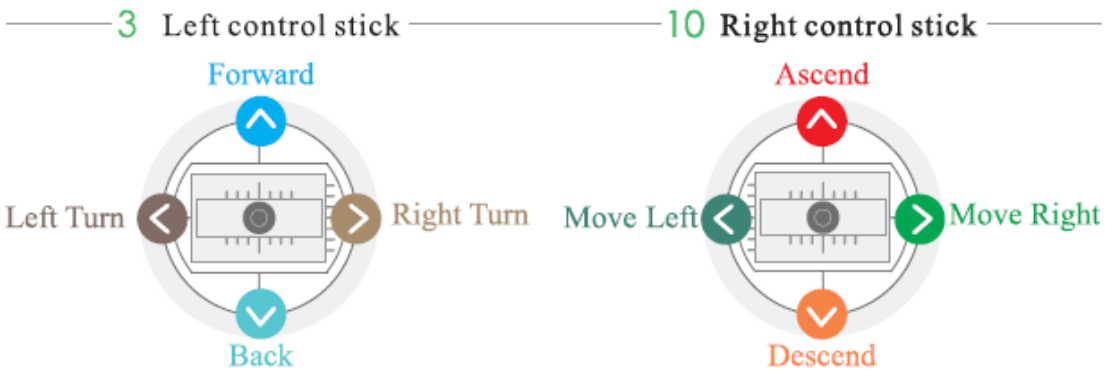


Figure 4-7

- Mode 2:
  - Moving the left stick up and down to control aircraft's ascend and descend respectively.
  - Moving the left stick left and right to control aircraft's left and right turn horizontally.
  - Moving the right stick up and down to control aircraft's forward and backward horizontally.
  - Moving the right stick left and right to control aircraft's left and right movement horizontally.

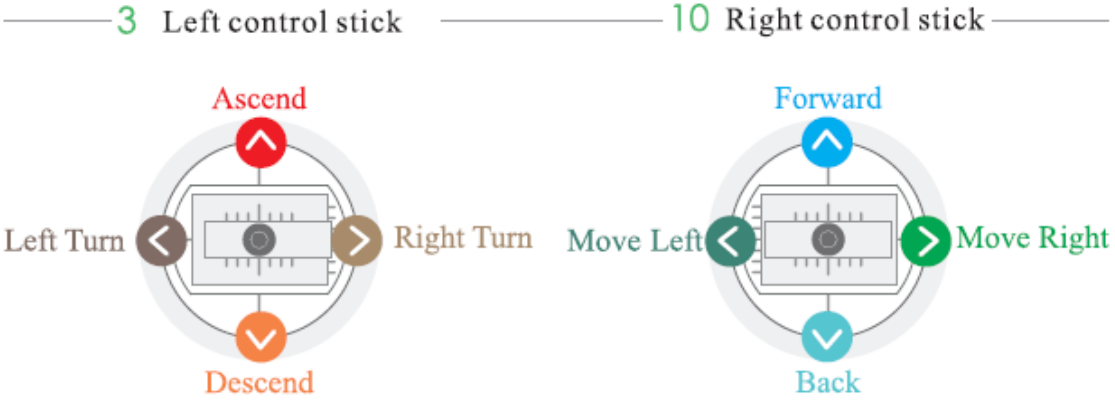


Figure 4-8

4.2.5 Manual RTH and Landing

Step 1

Manual RTH: Control the aircraft to hover over the proper landing point.

Step 2

Manual landing: Reduce the throttle to make the aircraft land slowly.

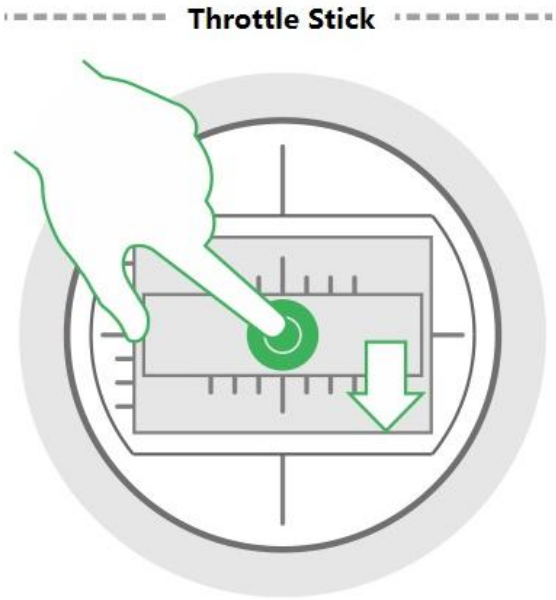


Figure 4-9

4.2.6 Manual Lock

Move the left stick to lower left and move the right stick to lower right at the same time (or move the left stick to lower right and move the right stick to lower left at the same time).

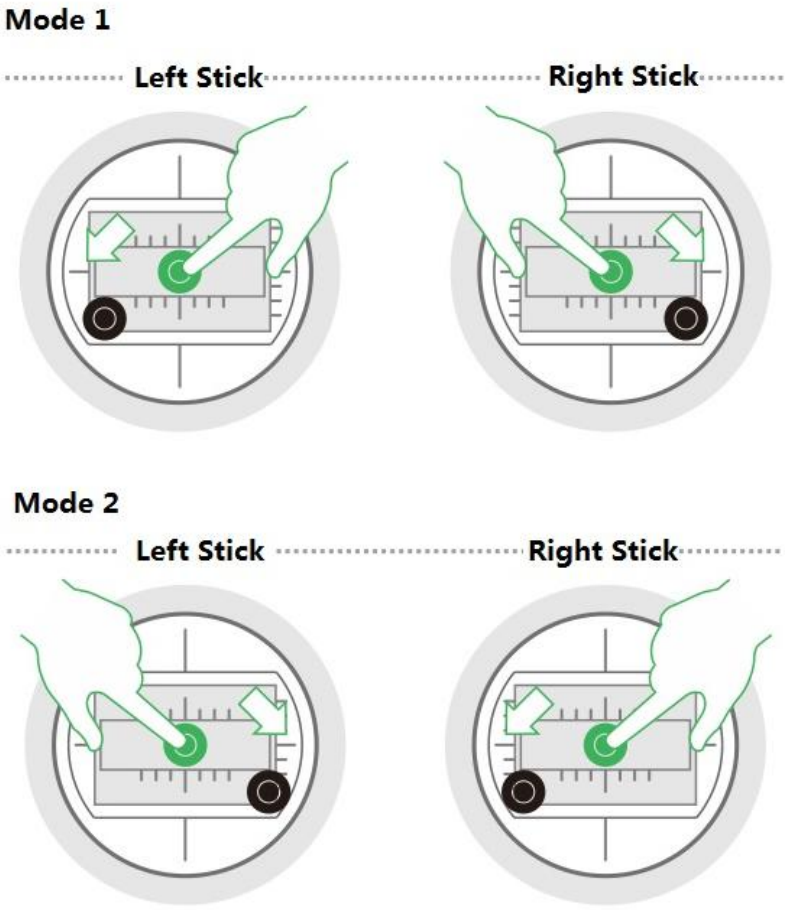


Figure 4-10

4.3 Intelligent Mode

4.3.1 Flight Route

4.3.1.1 Auto Takeoff

First unlock flight control, and then short press the button of takeoff and land on the front panel of the remote control, the aircraft will take off automatically and begin flight according to the pre-set route.

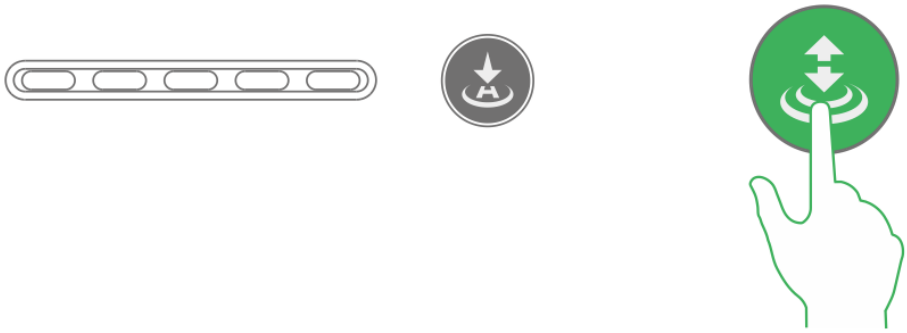


Figure 4-11

4.3.1.2 Auto RTH and Landing

Note

The landing under the condition with low battery or in the uncontrollable situation has been introduced in other chapter, the chapter will only introduce the landing modes in other situations.

Step 1

Auto RTH: Short press the RTH button on the front panel of the remote control, the aircraft will return to HOME point.

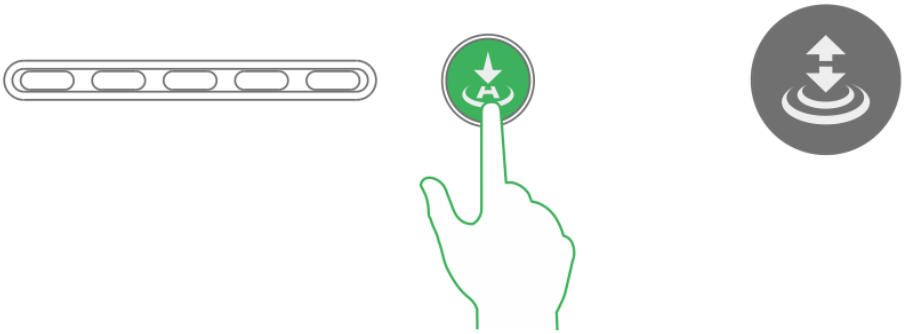


Figure 4-12

Step 2

Auto landing: Short press the takeoff and landing button on the front panel of the remote control, the aircraft will land automatically in the current position.

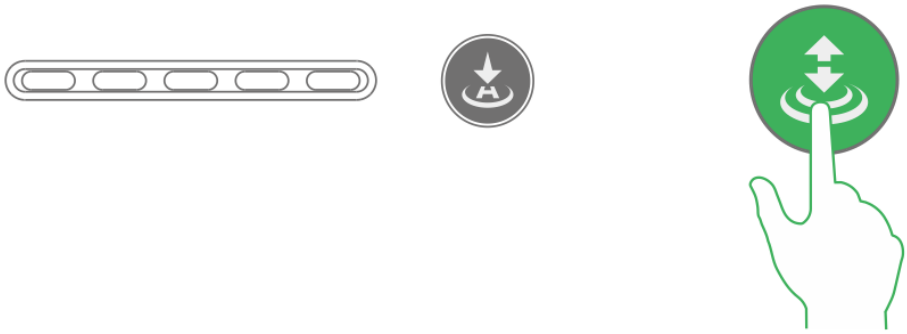


Figure 4-13

4.3.1.3 Auto Lock

Move the throttle stick to the lowest position and keep it for more than 2 seconds.

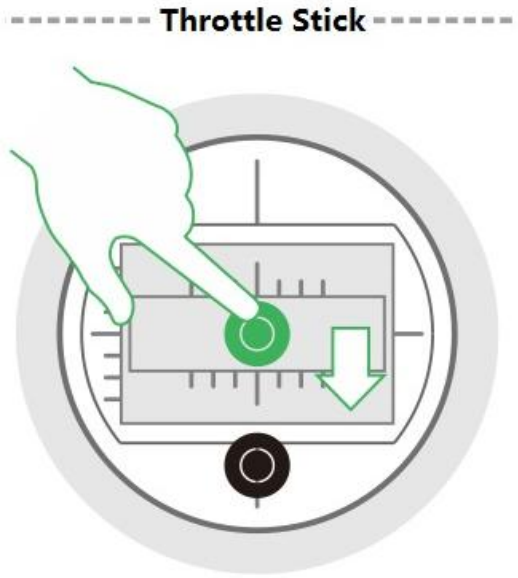


Figure 4-14

4.3.2 Intelligent Flight Mode

Intelligent flight mode includes waypoint and circle.

- Waypoint flight: Set waypoint flight mission according to requirement. Move the flight mode stick to intelligent mode after the aircraft takes off, select proper flight mission and click "Start Mission".
- Circle (Point of interest) flight: Set circle flight mission according to requirement. Move the flight mode stick to intelligent mode after the aircraft takes off, select proper flight mission and click "Start Mission".

Note

- When the flight mode stick of remote control is moved to any mode (Point, elevation or intelligent mode), you can set waypoint flight or point of interest flight and save flight mission.
- The aircraft is allowed to implement flight mission only when the flight mode stick of remote control is moved to the intelligent mode (Mode F).
- It can realize waypoint flight or point of interest flight only after the aircraft takes off, it can't be realized on the ground.

Click the button on the main interface of the remote control, and enter the interface of intelligent mode, which is shown in the following figure.

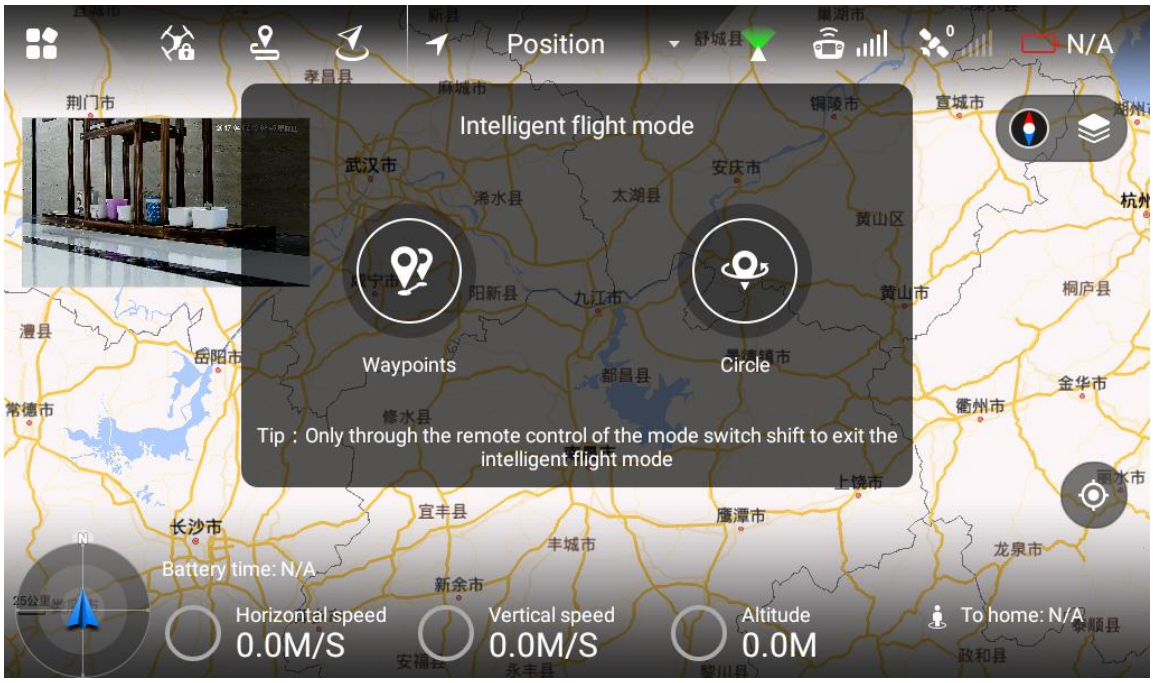


Figure 4-15

4.3.2.1 Waypoint Flight

Step 1

Select "Waypoint" and enter the interface of waypoint flight, which is shown in the following figure.

Note

You can check total route length, estimated flight time and set "Cycle Flight" at the bottom of the interface.

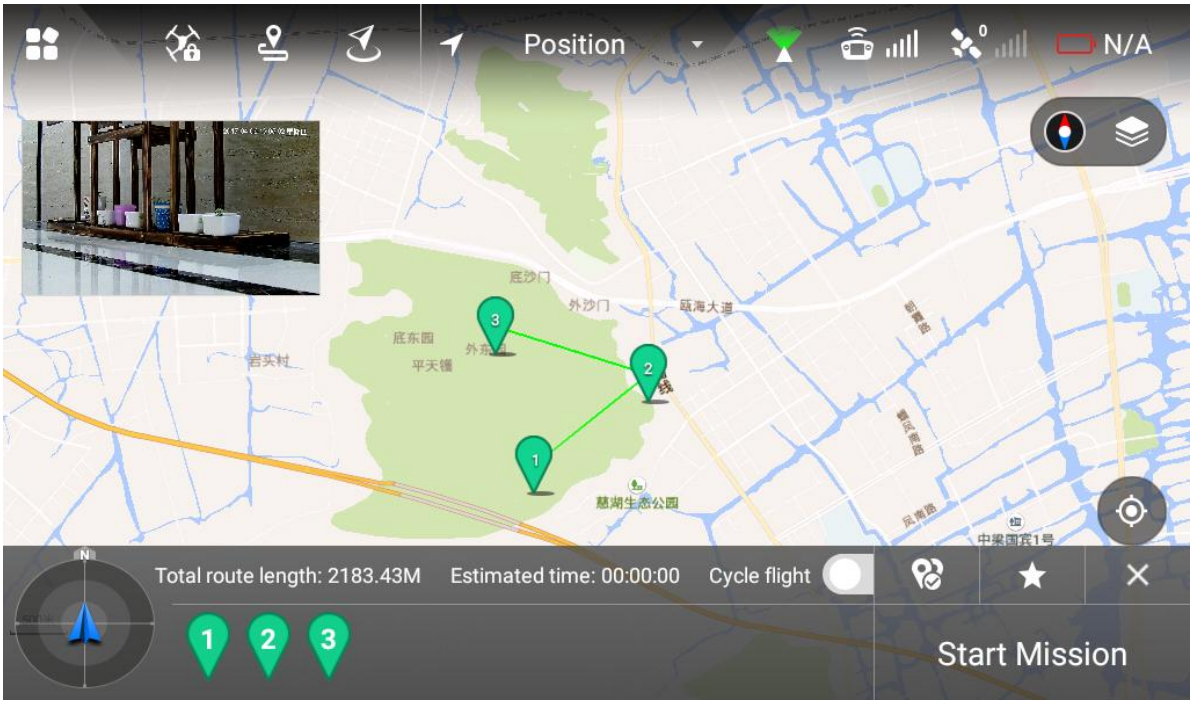


Figure 4-16

Step 2

Click the map and the position can be set as waypoint, several waypoints can be connected together and form a route.

Note

You can check total route length, estimated flight time and set "Cycle Flight" at the bottom of the interface.

Step 3

Click waypoint and it will become red, then waypoint setting interface will display on the right of the interface, which is shown in the following figure.

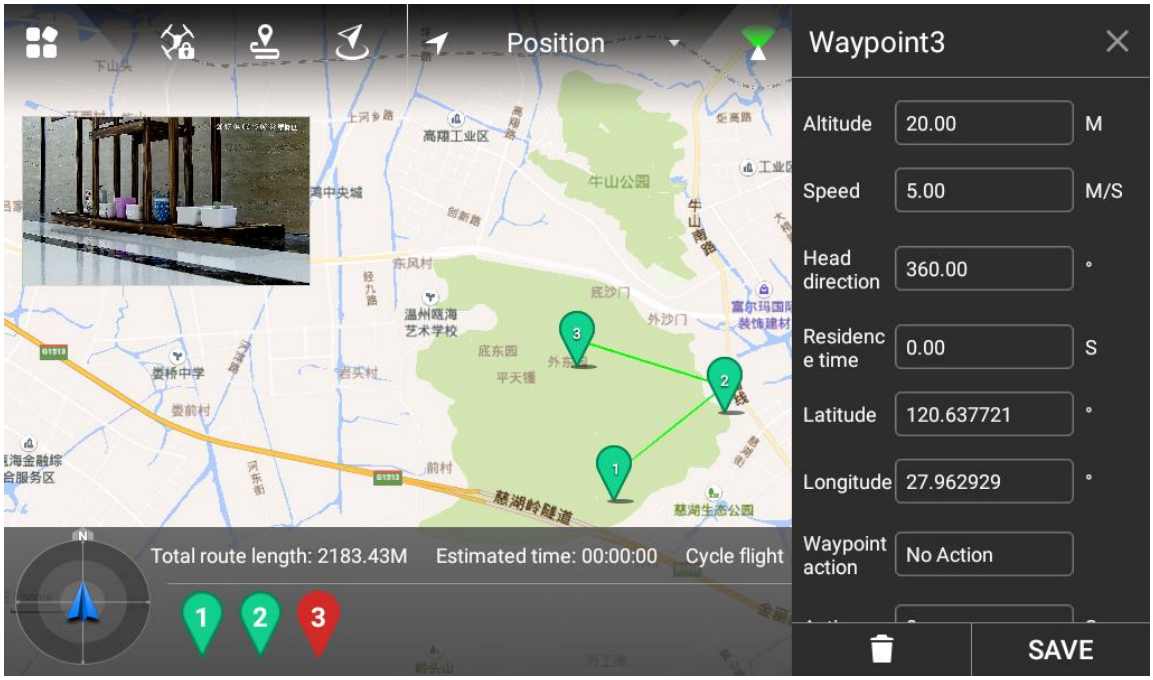


Figure 4-17

Set waypoint parameters, please refer to Table 4-1 for more details about parameters.

Parameter	Note
Altitude	Set flight altitude of waypoint.
Speed	Set flight speed of waypoint
Nose direction	Set the nose direction of waypoint according to requirement during flight.
Dwell time	Set hovering time after the aircraft reaches some waypoint.
Latitude	• It can auto acquire latitude and longitude of the waypoint when adding the waypoint. • Manually set waypoint latitude and longitude, waypoint position will skip to manual setting after setting is done.
Longitude	
Waypoint action	• No waypoint action: it is not to set waypoint action. • Shutter: it will take photos after the aircraft arrives at the waypoint.

Parameter	Note
Action cycle	• Action cycle setting is invalid when the waypoint action selects "No Waypoint Action". • When waypoint action selects "Shutter", input time. The aircraft arrives at the waypoint and it will take a photo after a period of time. **Note** Action cycle has to be less than or equal to dwell time.

Table 4-1

Step 4

Click "Save" to make config valid.

Note

Click to set waypoint parameters in batches, meanwhile it can modify or delete several waypoints.

Step 5

Click to input mission name, click "Save" and you can check saved flight missions in the list.

Note

Click to enter flight mission interface, refer to the following operations:

- Add mission: Click the icon to enter setting interface of waypoint, set waypoint flight mission and save it according to actual requirements.
- Download mission: Click the icon to automatically download the currently saved flight route. You can modify the waypoint according to actual requirement and save it into the remote control.
- Select mission; Click the icon and select the mission on the interface, select one or more, delete mission.

4.3.2.2 Point of Interest

Step 1

Select "Point of Interest" and enter the setting interface, which is shown in the following figure.

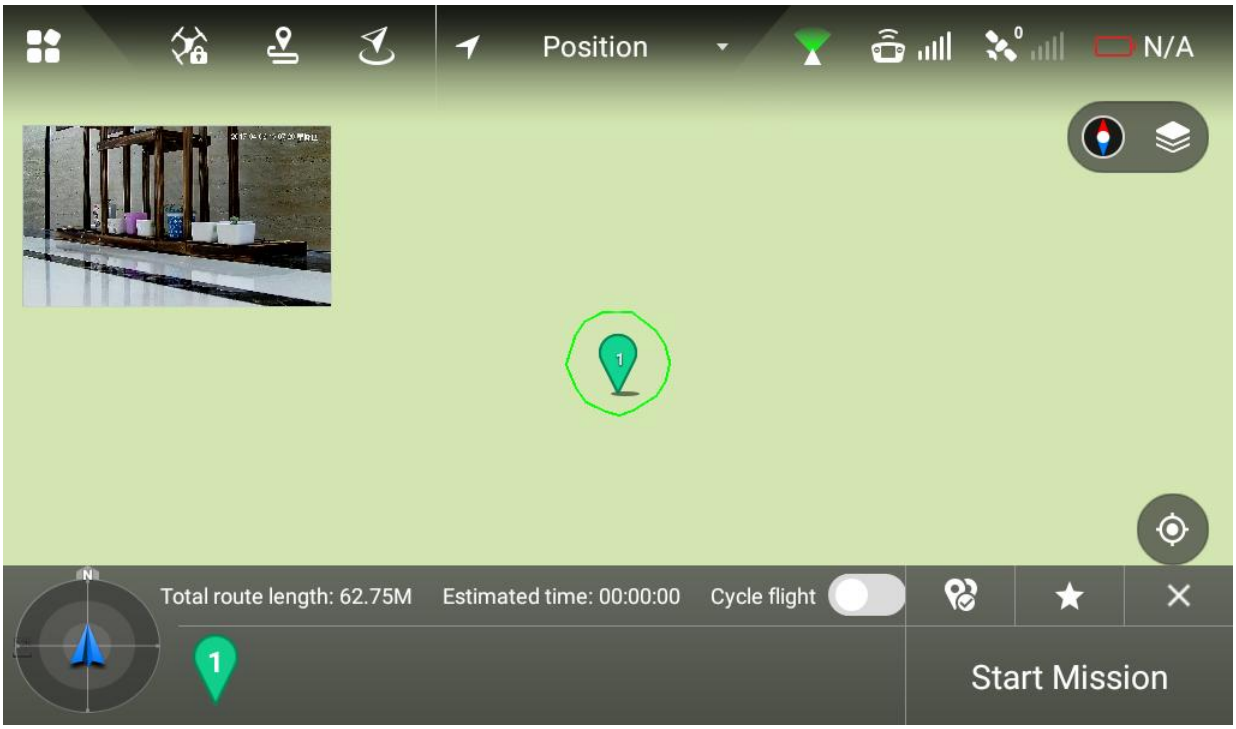


Figure 4-18

Step 2

Click the map and the position can be set as point of interest.

Step 3

Click point of interest, the point icon will become red, setting interface of interest point will be displayed on the right of main interface, which is shown in the following figure.

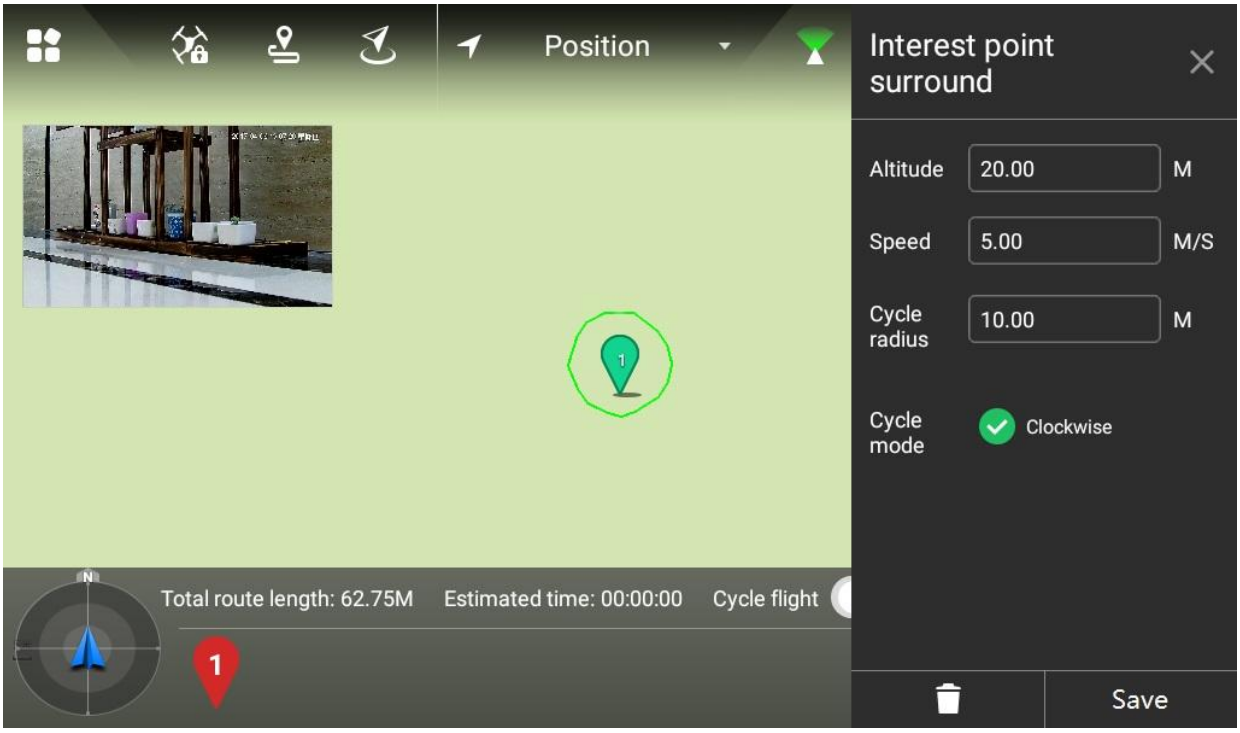


Figure 4-19

It is to set the parameters of interest point, please refer to Table 4-2 for more details about parameters.

Parameter	Note
Altitude	Set flight altitude of interest point.
Speed	Set flight speed of interest point.
Cycle radius	Set flight radius of aircraft flying around interest point.
Cycle mode	Select the flight direction of aircraft flying around interest point, clockwise optional.

Table 4-2

Step 4

Click "Save" to make config valid.

Note

It can only set one interest point for each flight mission.

Step 5

Click ☆ to input mission name, click "Save" to save flight mission.

4.3.3 Intelligent Lock Mode

Step 1

Click  and it will pop out a dialog box, then you can select lock mode of the aircraft.

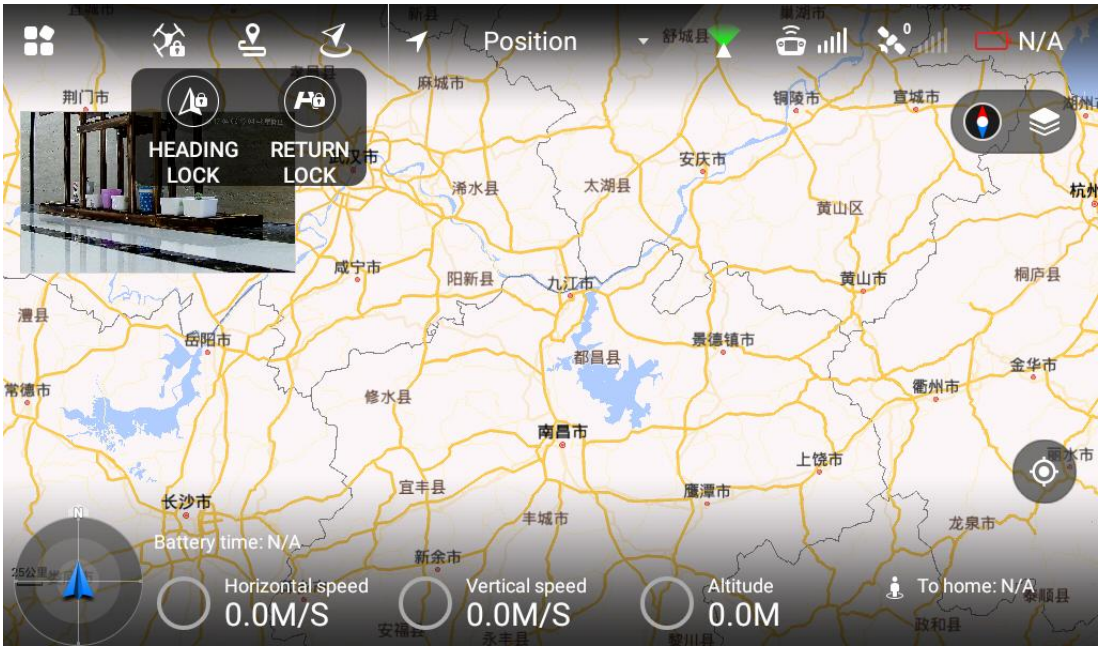


Figure 4-20

There are two types of intelligent lock modes, which are course lock and home lock.

- Select "Course Lock": Click it to lock the current nose direction as the aircraft's forward direction. During the following flight process, the aircraft course has nothing to do with the nose direction, the aircraft will always move forward according to the locked nose direction.
- Select "Home Lock": Click it and the aircraft course has nothing to do with the nose direction, always take the straight line direction which is far away from HOME point as forward direction and the

straight line direction which is close to HOME point as backward direction.

- Click "Home Lock" and the icon becomes yellow, and it will prompt "Home Lock Enable", which is shown in the following figure.
  Click "Course Lock" and the icon becomes yellow, and it will prompt "Course Lock Enable".

Figure 4-21

4.4 Intelligent Protection Mechanism

4.4.1 Low Battery

There are totally three prompts of aircraft low battery for the remote control, and each prompt is more serious than the previous one.

- Level one low battery, remote control prompt message: "Low Voltage Alarm", along with alarm sound.
- Level two low battery, remote control prompt message: "Serious low voltage home", along with alarm sound, first ascend to 12m and then return to HOME point.
- Level three low battery, remote control prompt message: "Serious low voltage landing", along with alarm sound, meanwhile the aircraft trigger landing mode.

4.4.2 Out of Control

- The aircraft may run into the following uncontrollable situations:
  - ✧ The antenna of aircraft or remote control is damaged, and it fails to receive and send signal.
  - ✧ Intensive magnetic field arises in the ambient environment, which interferes the aircraft and remote control.
- Solutions:

Out of control auto return: ascend the aircraft to 120m first and then return to HOME point.

4.4.3 Electronic Fence

4.4.3.1 Fence Area Setting

It is to draw the area of electronic fence.

Step 1

Select "Setup > Flight Control Setting > Fence Setting". The system will display the interface of "Fence Setting", which is shown in the following figure.

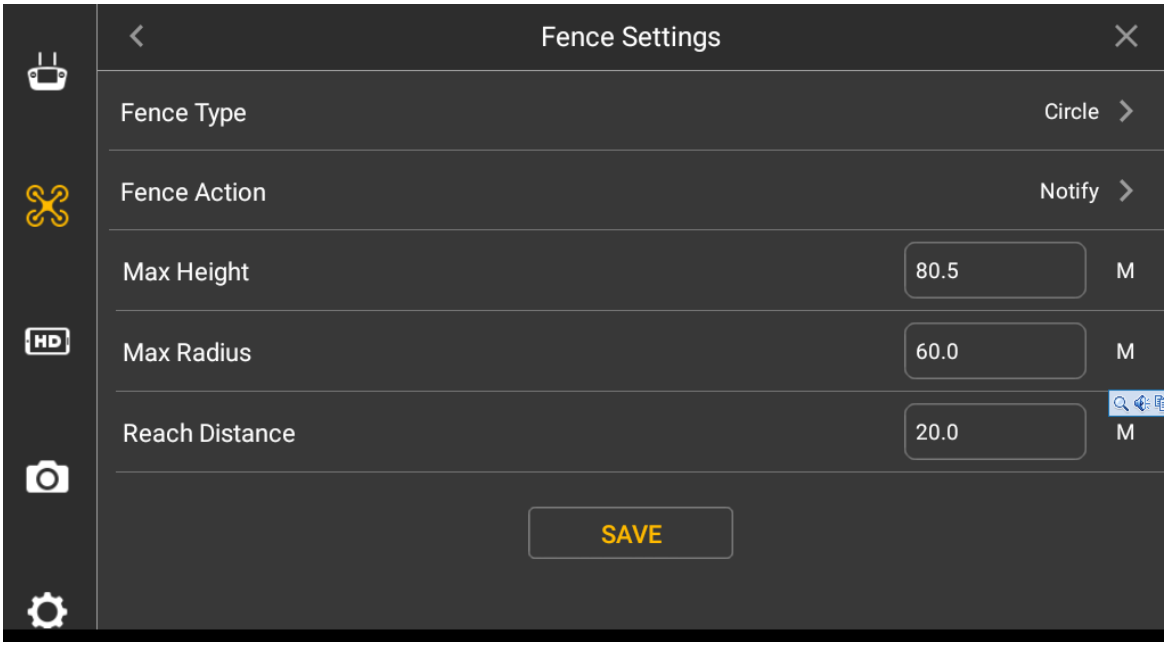


Figure 4-22

Step 2

Select "Fence Type".

Figure 4-23

- ALT (Limited altitude): it is to limit the max flight altitude of the aircraft, there is no limit to the flight distance.
- Circle: Take HOME as circle center and the set value as radius, the aircraft is restricted to fly within the circle, and there is no limit to the altitude.
- ALT+Circle: Take HOME as circle center and set value as radius, the set height is considered as max flight altitude, the aircraft is restricted to fly within the cylindrical area.

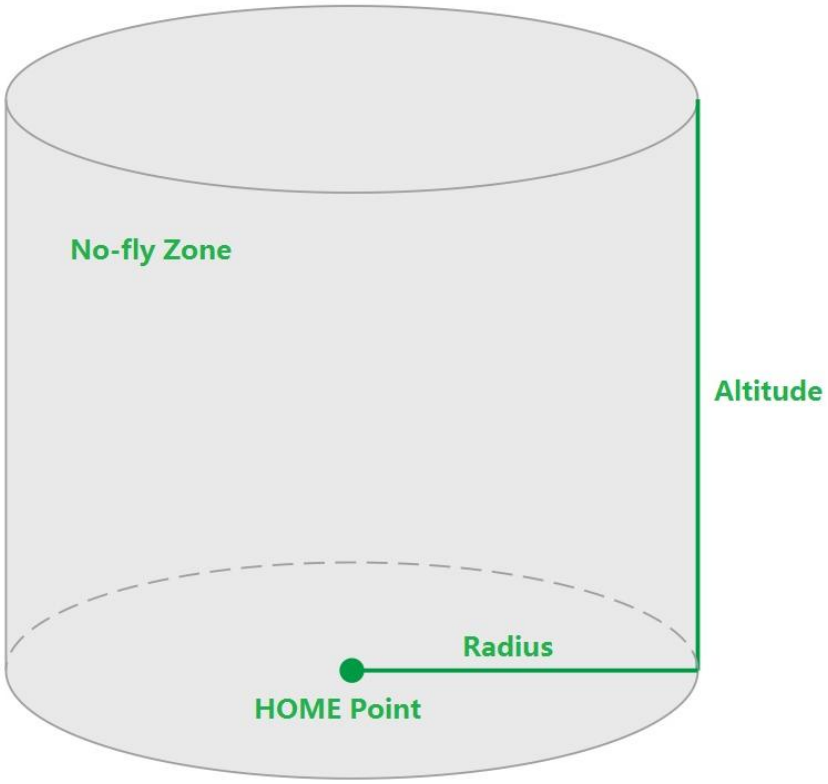


Figure 4-24

Step 3

Set fence action.

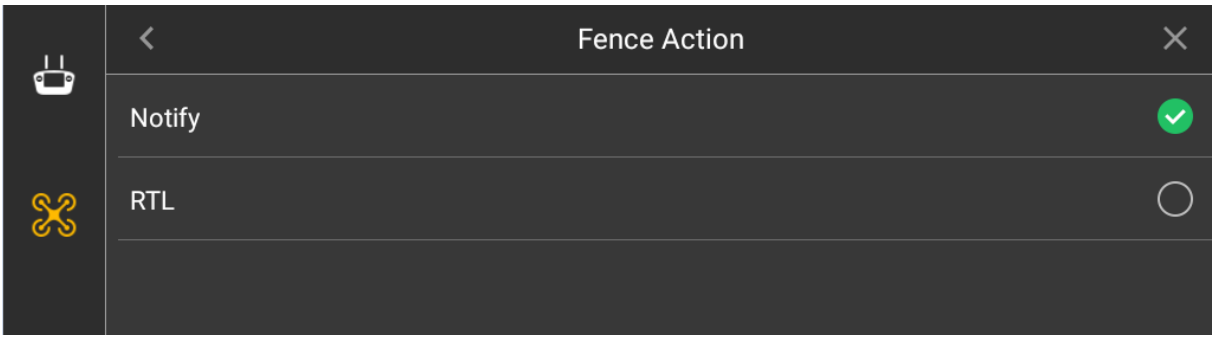


Figure 4-25

- Report only: It only prompts on the preview interface, but it doesn't trigger RTH.
- RTH: The aircraft will auto return after it exceeds the fence trigger distance.

Step 4

It is to set radius and altitude.

Step 5

Set trigger distance.

For example: When the fence type is set as radius + altitude, the radius is set as A meters and altitude is set as B meters, and if the trigger distance is set as C meters, then it will trigger RTH or landing when the aircraft is (A-C) meters away from the HOME point horizontally or flight altitude exceeds (B-C) meters, the aircraft will implement the action of RTH or landing.

4.4.3.2 Enable Electronic Fence

It is to enable electronic fence after setting fence area.

Select "Setup > Flight Control Setting", enable electronic fence on the right of the "Fence Enable".

Figure 4-26

4.4.4 Remote Control Parameter Setting

4.4.4.1 Image Transmission Size

It is to set resolution, frame rate and max bandwidth of preview image according to requirements.

Step 1

Select "Setup > Flight Control Setting > Preview Setting" and enter the preview setting interface, which is shown in the following figure.

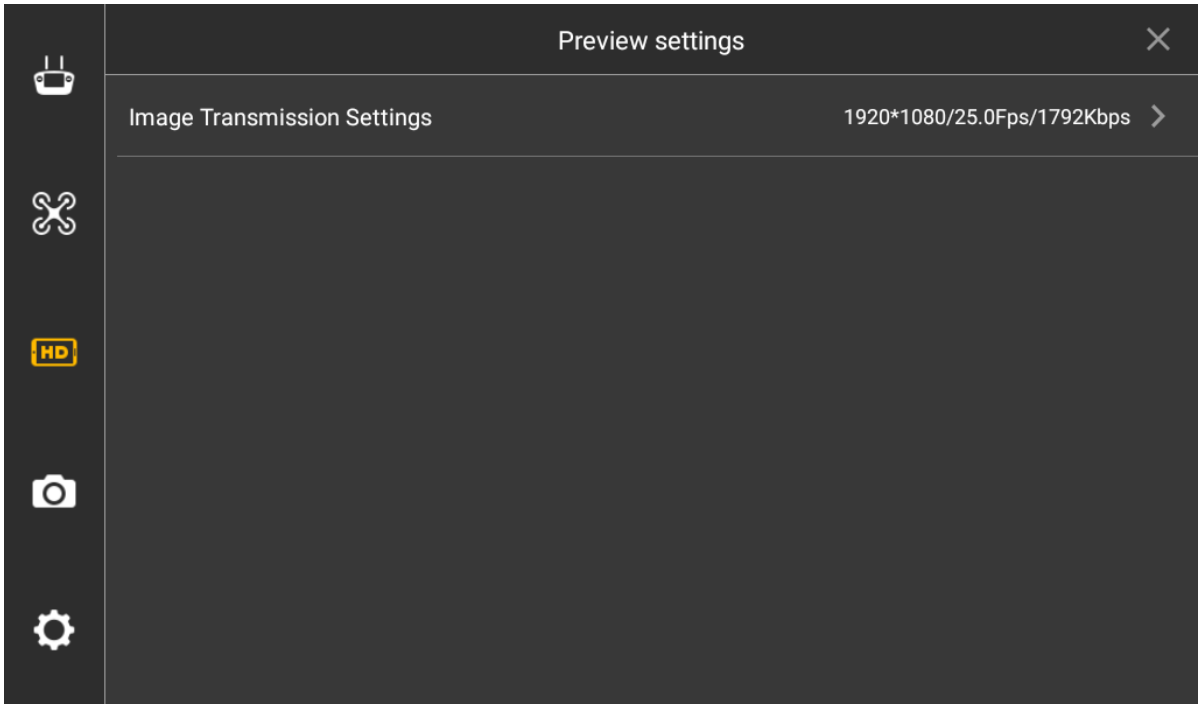


Figure 4-27

Step 2

Select "Image Transmission Setting". The system will display the interface of "Image Transmission Setting", which is shown in the following figure.

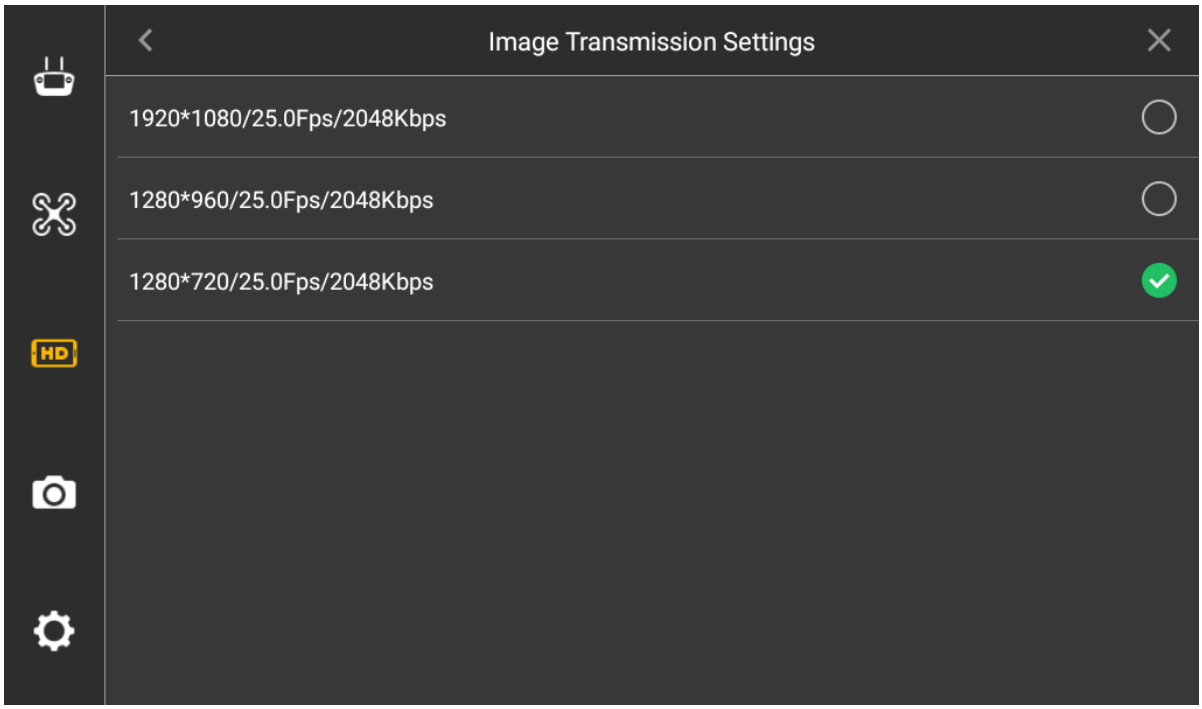


Figure 4-28

Step 3

Image transmission size is set by default, no need to select.

So far, the setting of image transmission size has been completed.

4.4.4.2 Photo Setting

It is to set the resolution, frame rate and max bandwidth of the photo which is taken by PTZ camera according to requirements.

Step 1

Select "Setup > Camera Setting > Photo Setting" and the system will display the interface of "Photo Setting", which is shown in the following figure.

Step 2

Click some line and then the end icon becomes green and checked, which makes it valid immediately.

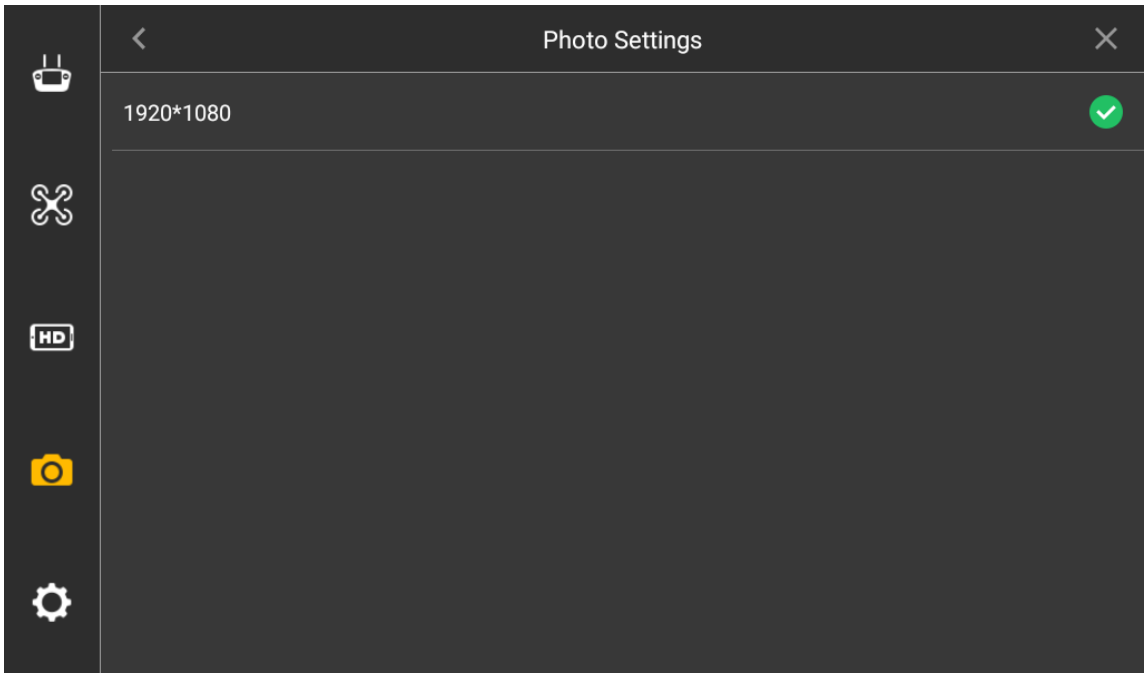


Figure 4-29

Click some line, the end icon of the selected parameter line becomes green and checked, which makes it valid immediately.

4.4.4.3 Video Setting

It is to set the resolution, frame rate and max bandwidth of the video recorded by PTZ camera.

Select "Setup > Camera Setting > Video Setting", and the system displays the interface of "Video Setting", which is shown in the following figure.

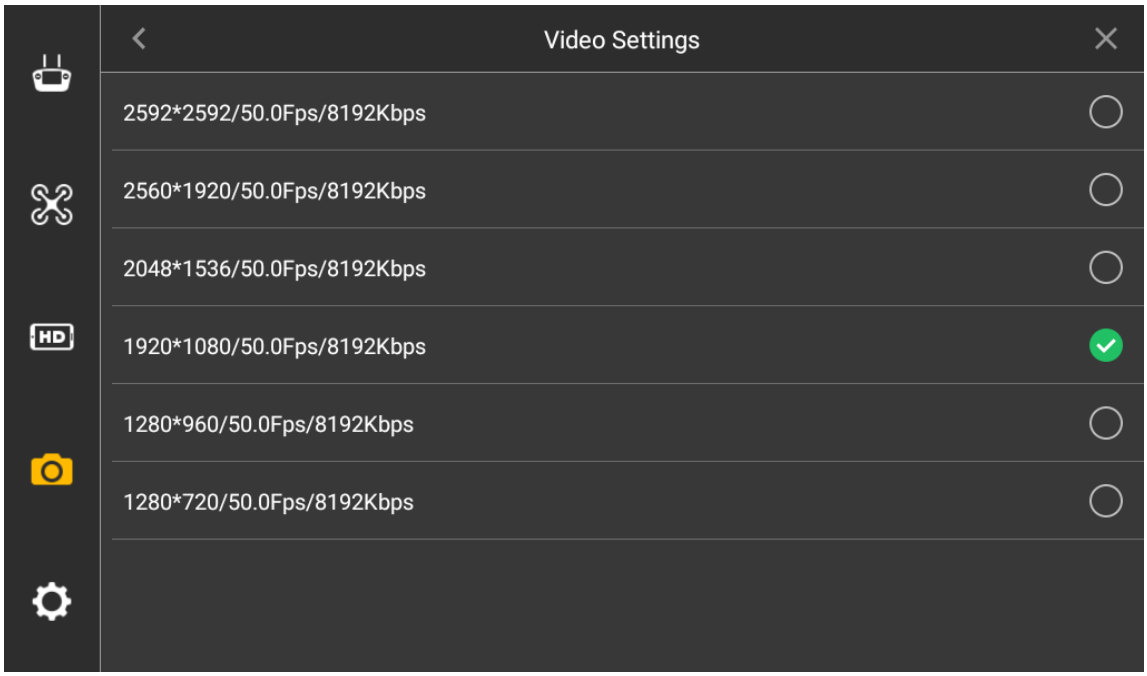


Figure 4-30

Click some line, and the end icon of the selected parameter line becomes green and checked, which

makes it valid immediately.

4.4.4.4 Image Setting

It is to set the brightness, contrast, saturation, sharpness and gamma value of the preview image of PTZ camera.

Step 1

Select "Setup > Camera Setting > Advanced Setting > Image Setting", and the system will display the interface of "Image Setting", which is shown in the following figure.

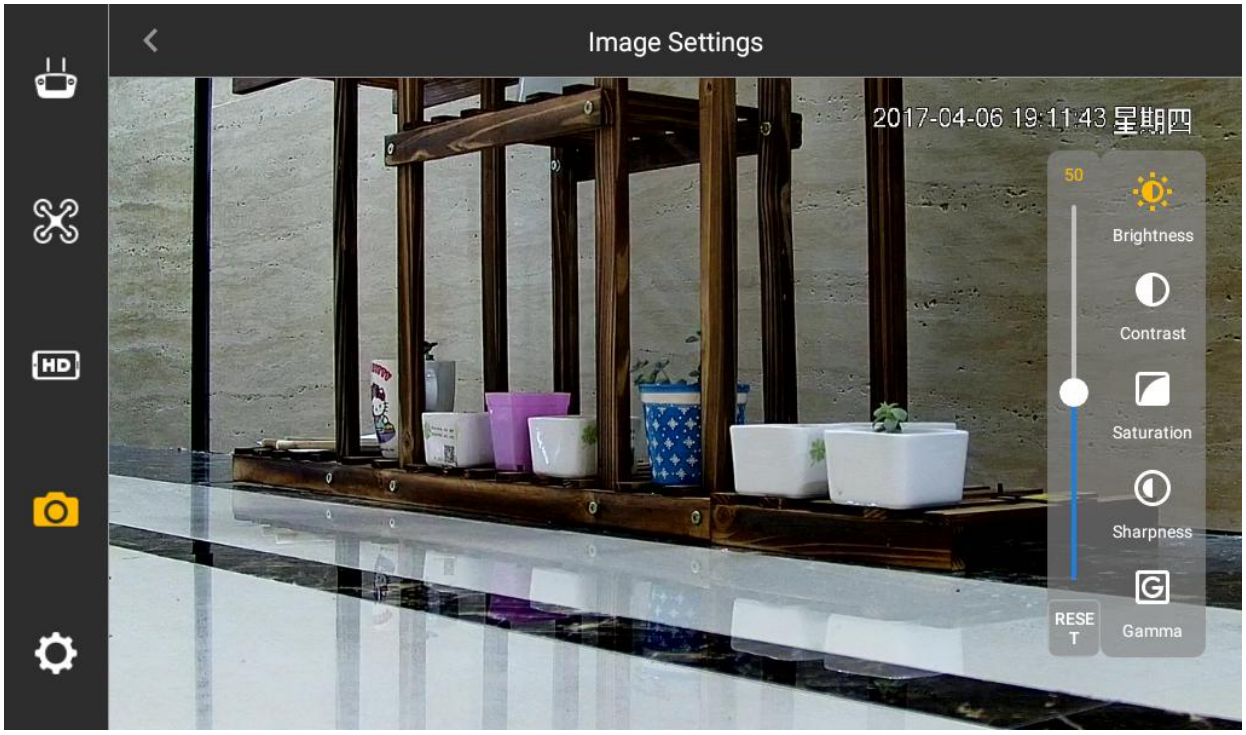


Figure 4-31

Step 2

It is to set the parameter items on the right of the interface.

- Brightness: It is to adjust the overall brightness of the image, it can adjust the value when the overall brightness of image is too bright or too dark.
- Contrast: It is to adjust the image contrast. It can adjust the value when the image overall brightness is proper but the image contrast is not enough.
- Saturation: It is to adjust the bright degree of the color, which will not affect the overall brightness of the image.
- Sharpness: it is to adjust the image resolution and sharpness degree of image edge.
- Gamma: it is to optimize brightness and contrast, and adjust slight brightness and darkness layer of the image.

Step 3

It is to set parameter value via sliding method, and it is valid immediately.

4.4.4.5 Brightness Adjustment

It is to set the overall display brightness of the remote control touch screen.

Select "Setup > General Setting > Other > Brightness Adjustment", and the system will display the interface of "Panel Setting".

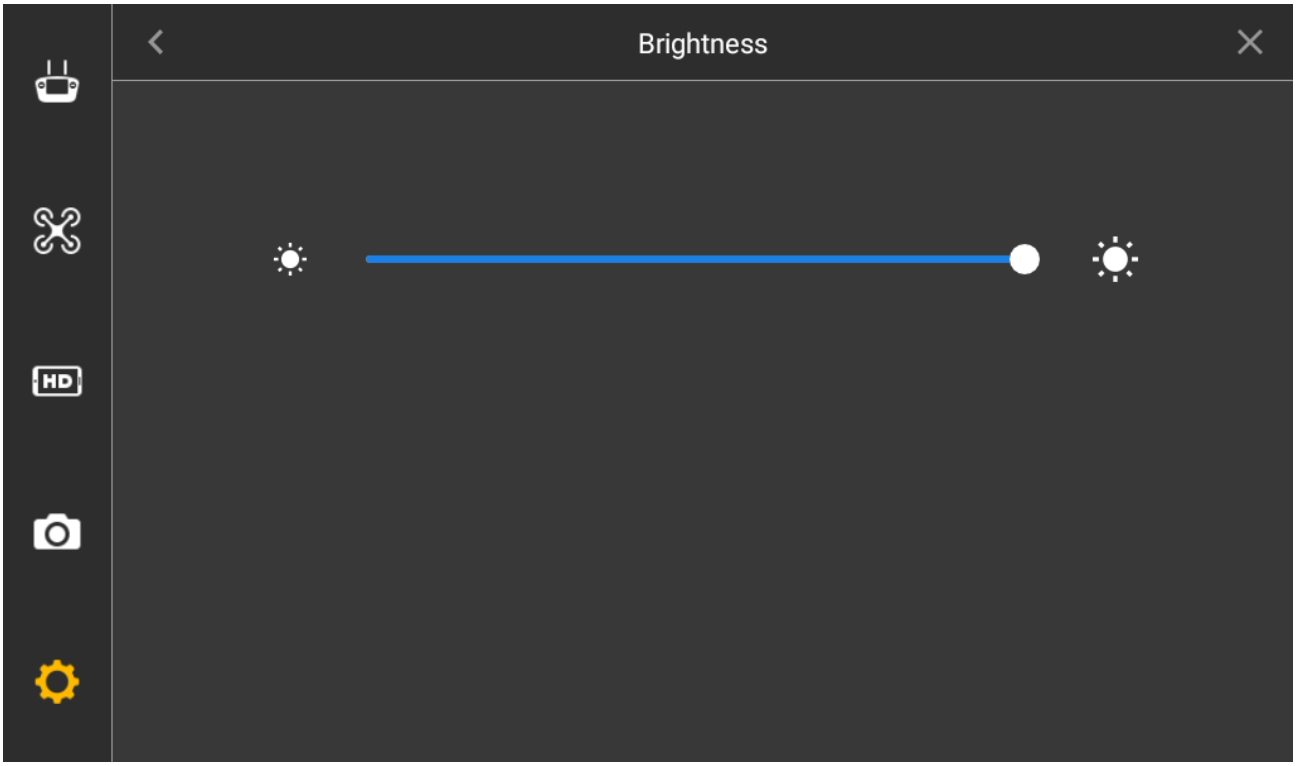


Figure 4-32

5 End Flight

Note

- The chapter is going to introduce the operation steps after aircraft landing in details.
- Please operate according to the following flows to make sure normal application for the next time. Some of the operations are not necessary, please select according to the actual situation.

End Flight

Turn off power
↓
Take out batter
↓
Dismantle airborne equipment
↓
Fold aircraft
↓
Fold image transmission antenna
↓
Take out other components

Figure 5-1

5.1 Turn off Power

Caution

It has to turn off the aircraft power first and then turn off the power of remote control and ground station.

Step 1

Find the power switch below the aircraft wing and short press it once, then long press it for 3 seconds, it means aircraft power has been turned off when the built-in indicator light of the switch is off.

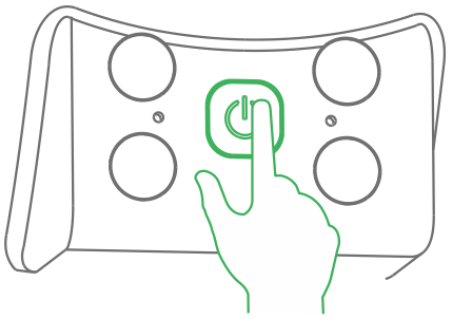


Figure 5-2

Step 2

Move the power switch on the rear panel of the remote control to the other side, it means remote control power has been turned off when the indicator light of remote control front panel is off.

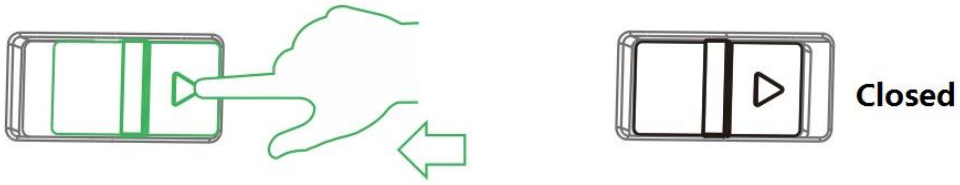


Figure 5-3

Step 3

Short press the image transmission switch of the ground station, it means the image transmission of ground station is turned off when the built-in red indicator light is off.

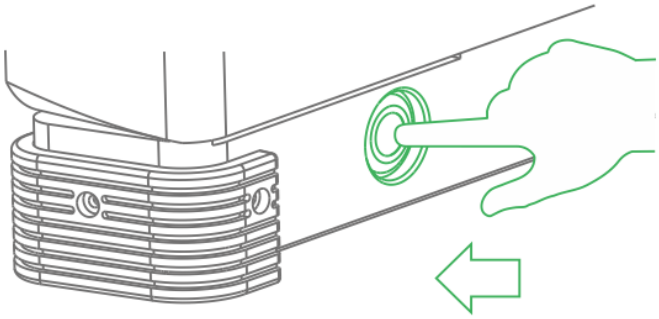


Figure 5-4

Step 4

Turn off the operating system on the ground station. It means the operating system is turned off when the ground station screen is off.

5.2 Remove Aircraft Battery

Step 1

Move the buckle on the aircraft cover and open the cover, which is shown in the following figure.

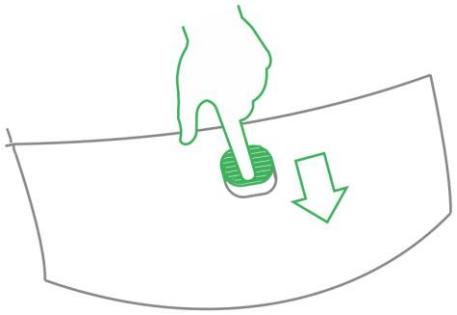


Figure 5-5

Step 2

Unfasten the fixing band and take out the battery, which is shown in the following figure.

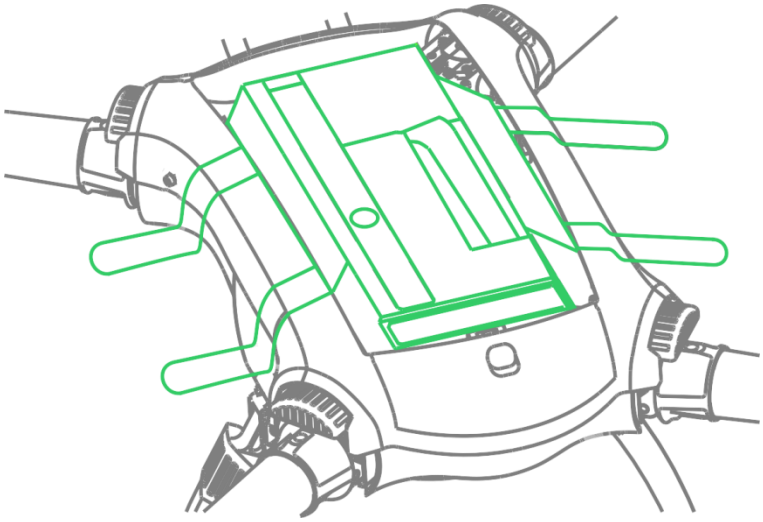


Figure 5-6

5.3 Dismantle Airborne Equipment

Step 1

Loosen four mounting screws, which is shown in the figure below.

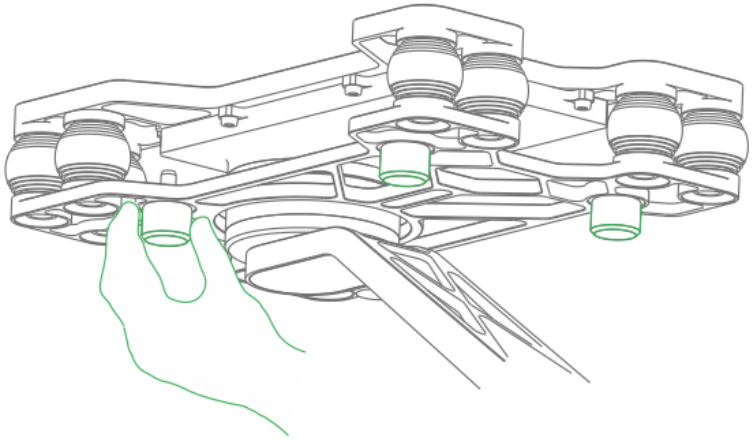


Figure 5-7

Step 2

Pull out USB cable, which is shown in the figure below.

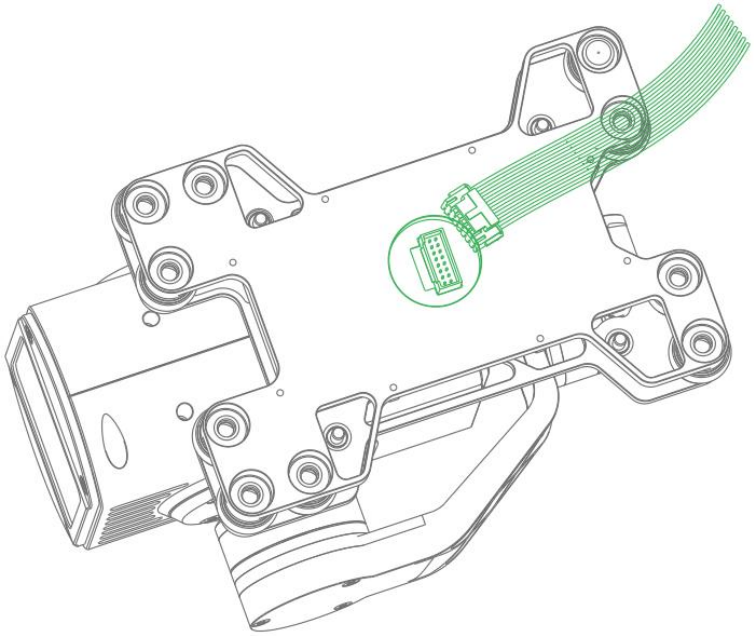


Figure 5-8

5.4 Fold Aircraft

Step 1

Press the spring fastener on both sides of the propeller center, remove the propeller, which is shown in the following figure.

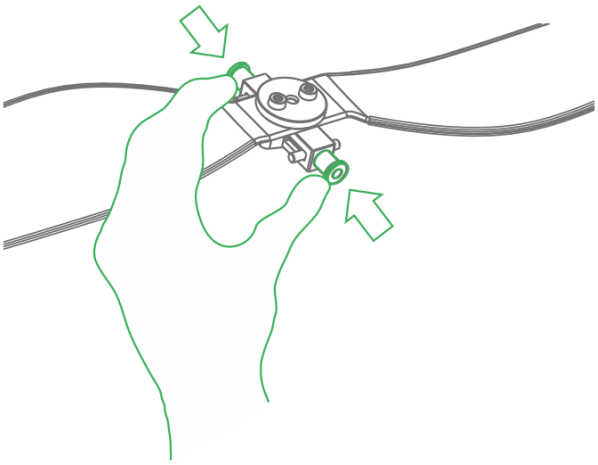


Figure 5-9

Step 2

Fold up the antenna and make it press close to the aircraft arm, which is shown in the following figure.

Figure 5-10

Step 3

Use hands to hold the aircraft arm, meanwhile press the button to fold the arm downward and make it close to the landing gear, which is shown in the following figure.

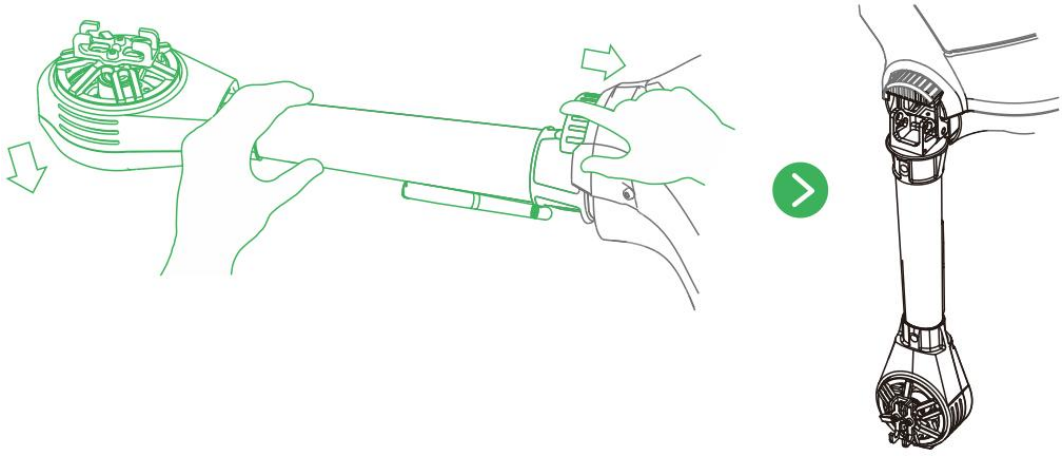


Figure 5-11

5.5 Dismantle Image Transmission Antenna

Step 1

Take down antenna feeder.

Step 2

Take out the image transmission antenna from the tripod and unfold it into two sections.

Step 3

Put away the tripod.

5.6 Copy Camera SD Card Video

Note

Only visual camera supports SD card installation, it doesn't need to implement the step for thermal camera.

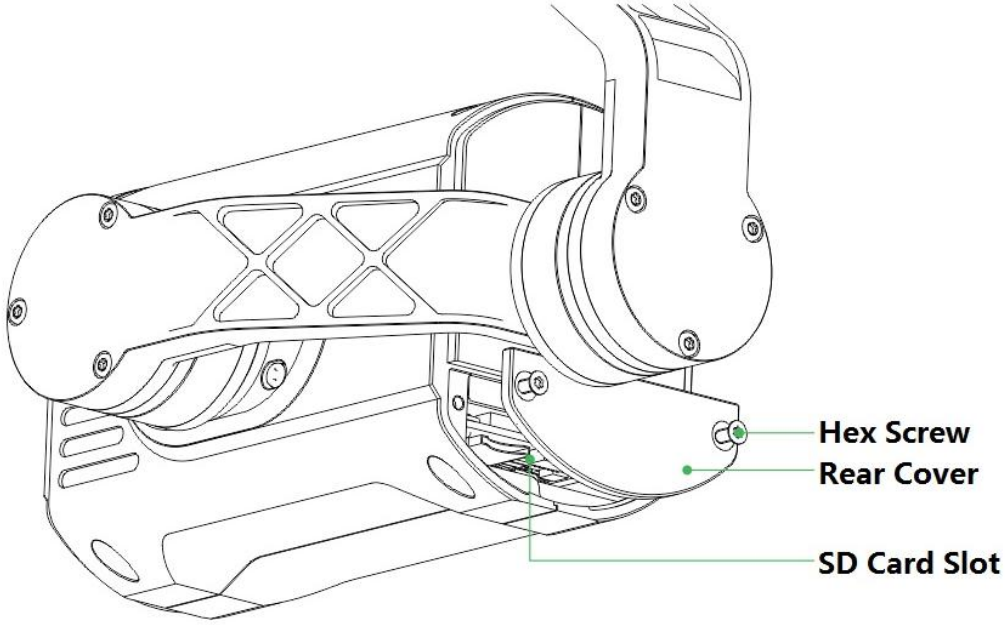


Figure 5-12

Step 1

Take out the hex screwdriver from the accessory bag, loosen the two screws on the rear panel of the camera and take down the rear cover.

Step 2

Slightly press the SD card and it will pop out. Pull out the SD card.

Step 3

Insert the SD card into the card reader, and connect the card reader to computer.

Step 4

Copy the SD card video into the computer via card reader and save it.

5.7 Remove Other Components

- Remove SIM card: Open the silicon gel cover on the side panel of the remote control, pull out SIM card and put the silicon gel cover back in place.
- Fold remote control antenna: Fold the antenna and make it close to the front panel of remote control.

6 Upgrade

The chapter is mainly to introduce the upgrade methods for the device.

6.1 Aircraft Firmware Update

Note

- The aircraft firmware update is realized on the remote control.
- The aircraft, ground station and remote control have to be enabled and connected during firmware update, which is to make frequency matched.

Step 1

Insert the SD card with firmware update package into the SD card slot of the remote control.

Step 2

Select "Remote Control > Setup > General Setting". It will display "Update Now" on the right of "Firmware Update", which is shown in the following figure.

Figure 6-1

Step 3

Select "Update Now" and it will automatically update and display update progress.

Note

It will display "The Latest Version" on the right of "Firmware Update" if it didn't insert SD card.

6.2 Remote Control Update

6.2.1 APP Update

Step 1

Insert the SD card with APP update package into the SD card slot of the remote control.

Step 2

Select "Setup > General Setting". It will display the current APP version number or update software on the right of "Remote Control APP Update", which is shown in the following figure.

Figure 6-2

- It doesn't need to update when it displays the version number, and it means the current APP is the latest version.
- It can select update when it displays "Update Now".

Step 3

Select "Update Now". It will automatically update and display update progress.

6.2.2 Remote Control Offline Map Download and Update

Store the offline map data package which needs to be downloaded into the SD card, and transmit it to the remote control via SD card, then it will display update prompt on the corresponding interface.

Step 1

Select "Setup > General Setting > Other Setting > Offline Map". The system will display the interface of "Offline Map', which is shown in the following figure.

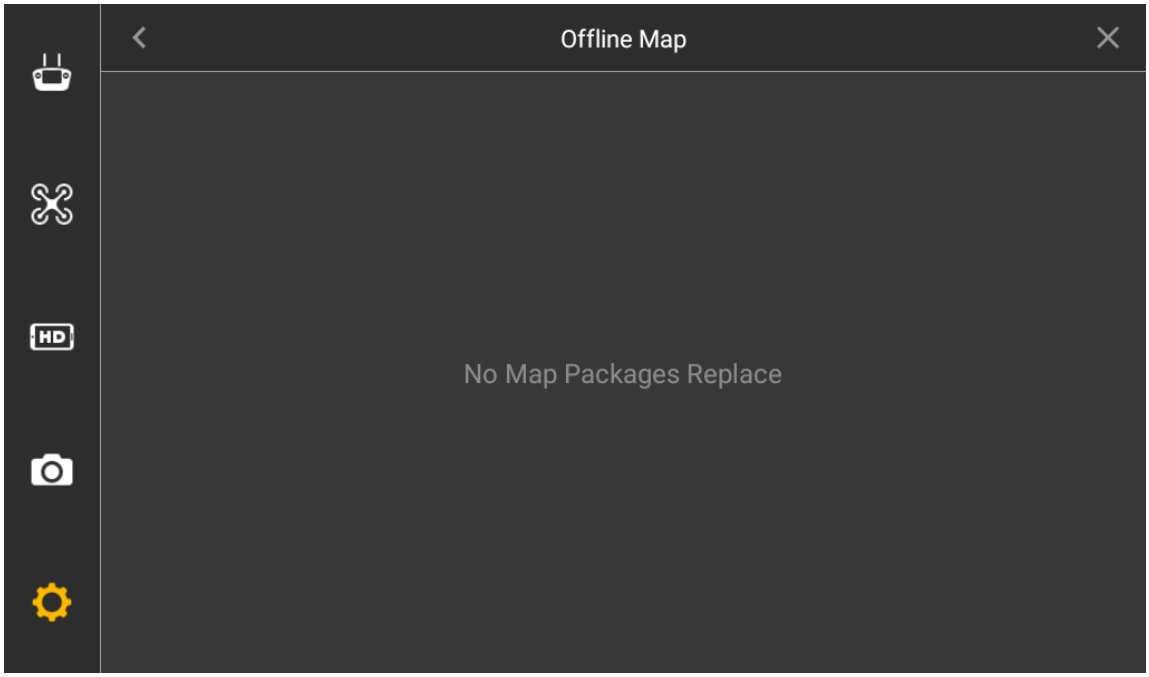


Figure 6-3

Step 2

Insert the SD card with offline map data package into the SD card slot of the remote control, it will automatically update offline map interface and display the city list whose maps are stored in the SD card, which is shown in the following figure.

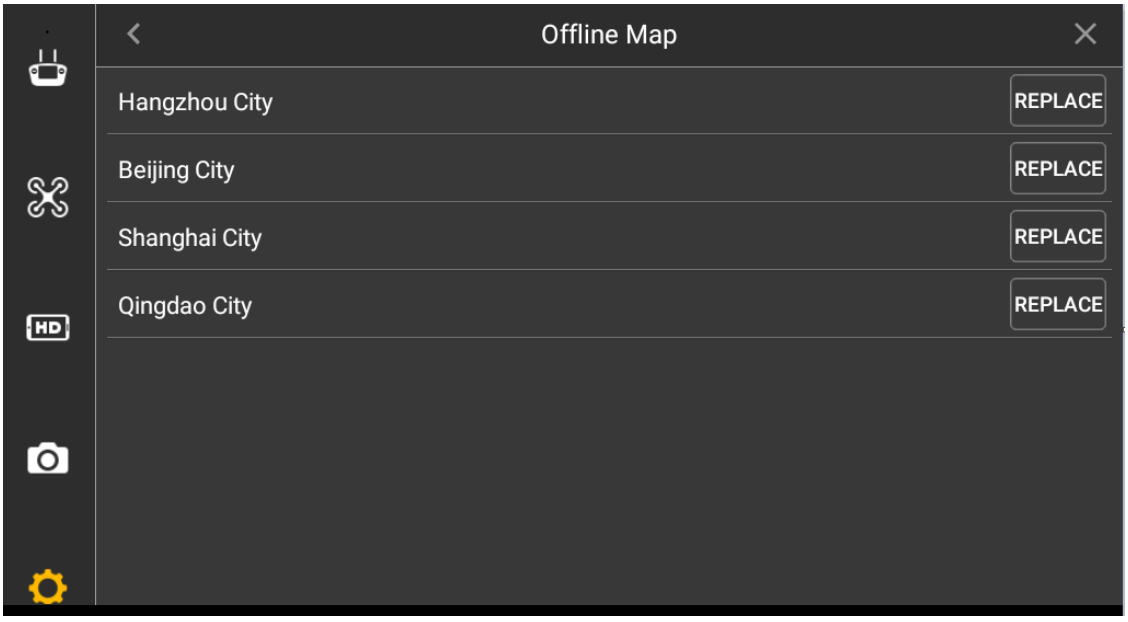


Figure 6-4

Step 3

Select the city which needs to be updated, click "Replace" button to update the city map immediately, which is shown in the following figure.

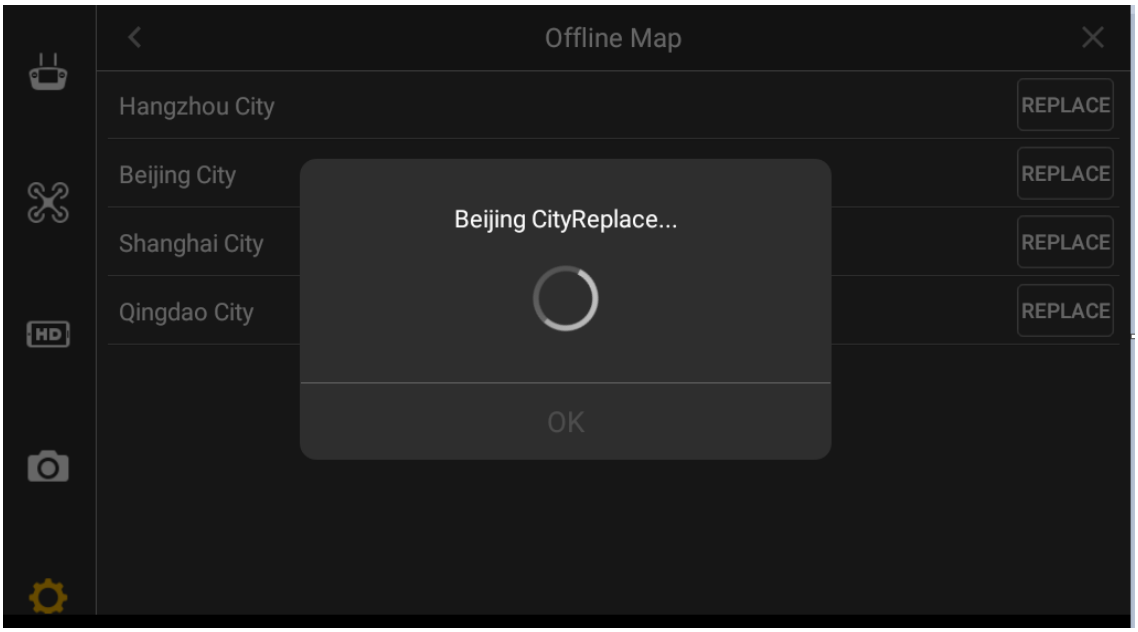


Figure 6-5

Step 4

The interface will prompt "Beijing city map is successfully imported, please use it after rebooting APP" after update is completed, click "OK".

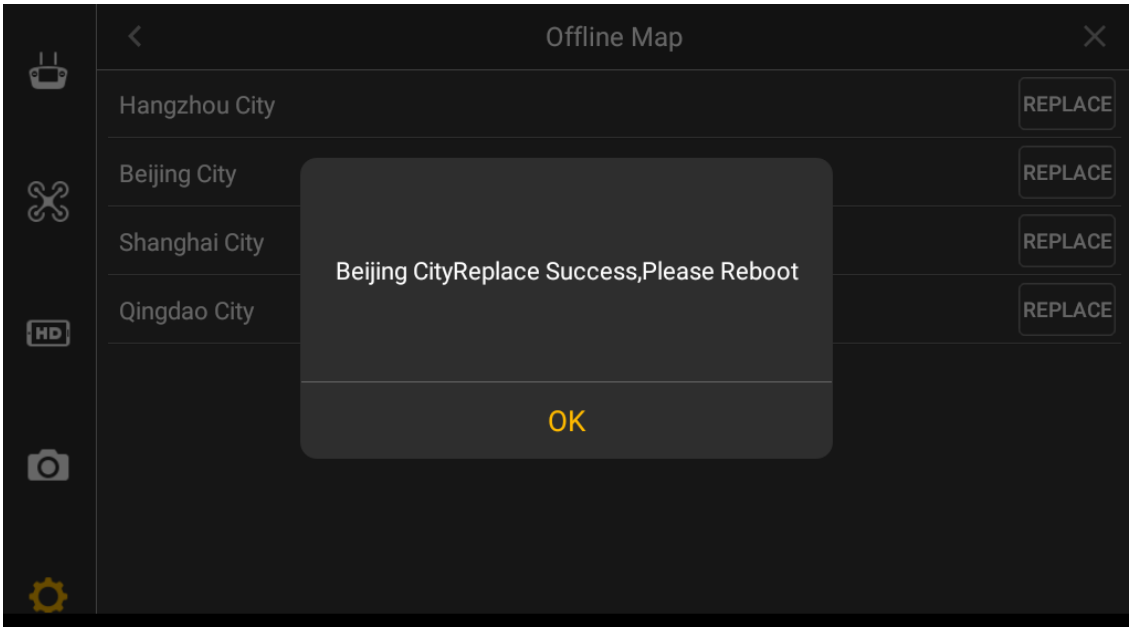


Figure 6-6

Step 5

Select "Setup > General Setting", Click "Reboot" at the bottom of the interface. The preview interface of remote control map is Beijing city map after it is successfully rebooted.

Note

It can replace offline map of only one city every time.

6.3 Ground Station Update

6.3.1 Ground Station Software Update

Step 1

Insert the USB flash disk with software installation package needed by customer into the USB interface of the ground station.

Step 2

The system displays the software update prompt, which is shown in the following figure.

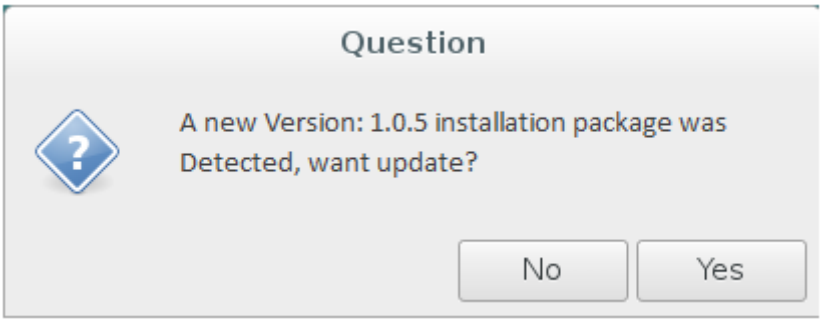


Figure 6-7

Step 3

Select "Yes" and the ground station will enter the status of auto update.

Please select "No" if you don't want to update software.

6.3.2 Ground Station Map Update

Step 1

Insert the USB flash disk with map installation package needed by customer into the USB interface of the ground station.

Step 2

The system displays the map software update prompt, which is shown in the following figure.

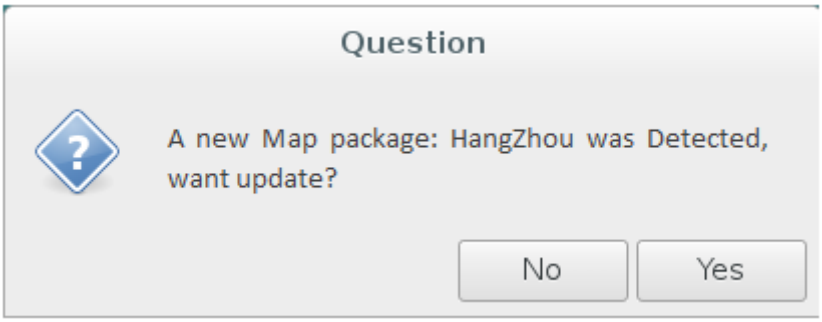


Figure 6-8

Step 3

Select "Yes" and the ground station will enter the status of auto update.

Please select "No" if you don't want to update software.

6.3.3 Ground Station Offline Map

Note

The network has to be well connected when updating offline map.

6.3.3.1 Download Offline Map

It is to set scale range of the offline map which needs to be downloaded according to the requirement.

Step 1

Select " Aircraft Setup > Offline Map > Add New Mission", the system will display the interface of "Offline Map".

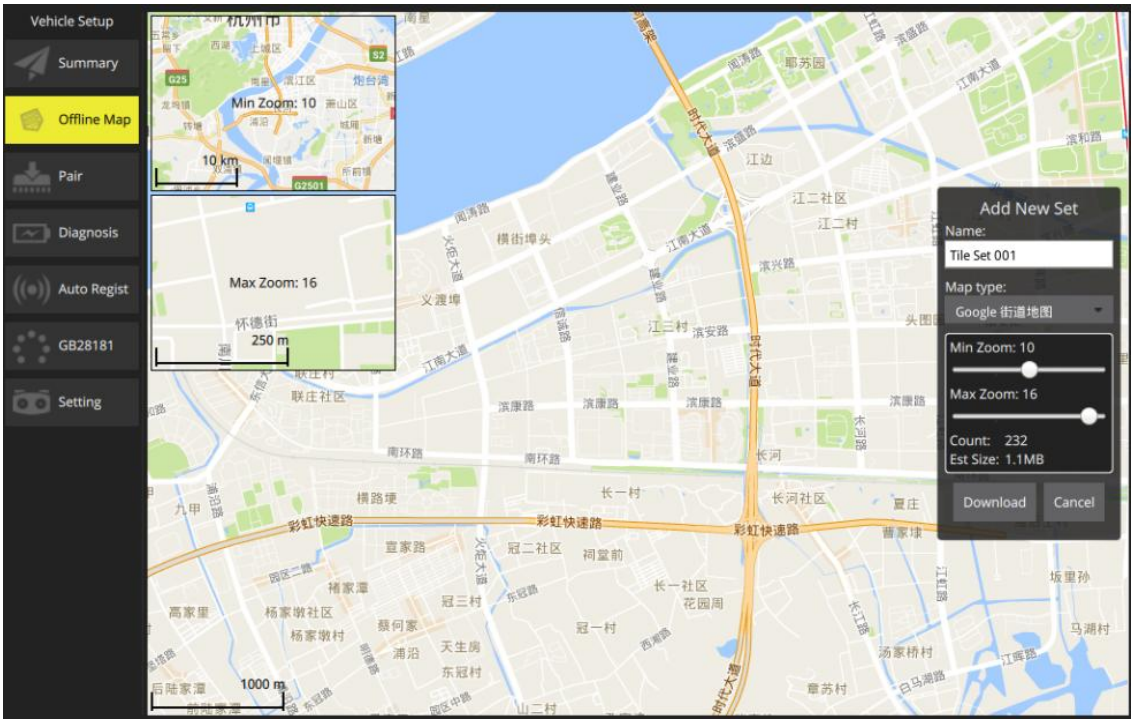


Figure 6-9

Step 2

It is to set parameters of offline map, please refer to Table 6-1 for more details about parameters.

Parameter	Note
Mission name	Input mission name.
Map type	Select map type according to actual requirement.
Min	The min level value of offline map, range from 3 to 17. **Note** ● The min level value is not allowed to exceed max level value. ● Each level value is corresponding to different map scale. The higher the level value is, the bigger the map scale becomes.
Max	Max level of offline map, range from 3 to 17.
Quantity	It is to set the interval value of max and min level, automatically calculate the quantity of pictures. **Note** The offline map is displayed by mutually overlaying several pictures.

Parameter	Note
Estimated memory	It is to set the max, min level interval value, automatically calculate the internal storage of the map.

Table 6-1

Step 3

Click "Download" to download the configured offline map.

Note

The size of downloaded offline map is the size displayed by the screen.

Users can check the downloaded offline maps in the "Offline Map" page.

6.3.3.2 Delete Offline Map

Select "Aircraft Setup > Offline Map", click the downloaded offline map and enter the setting interface, which is shown in the following figure.

Caution

"Default Tile Set" is the default offline map of the system, which can't be deleted.

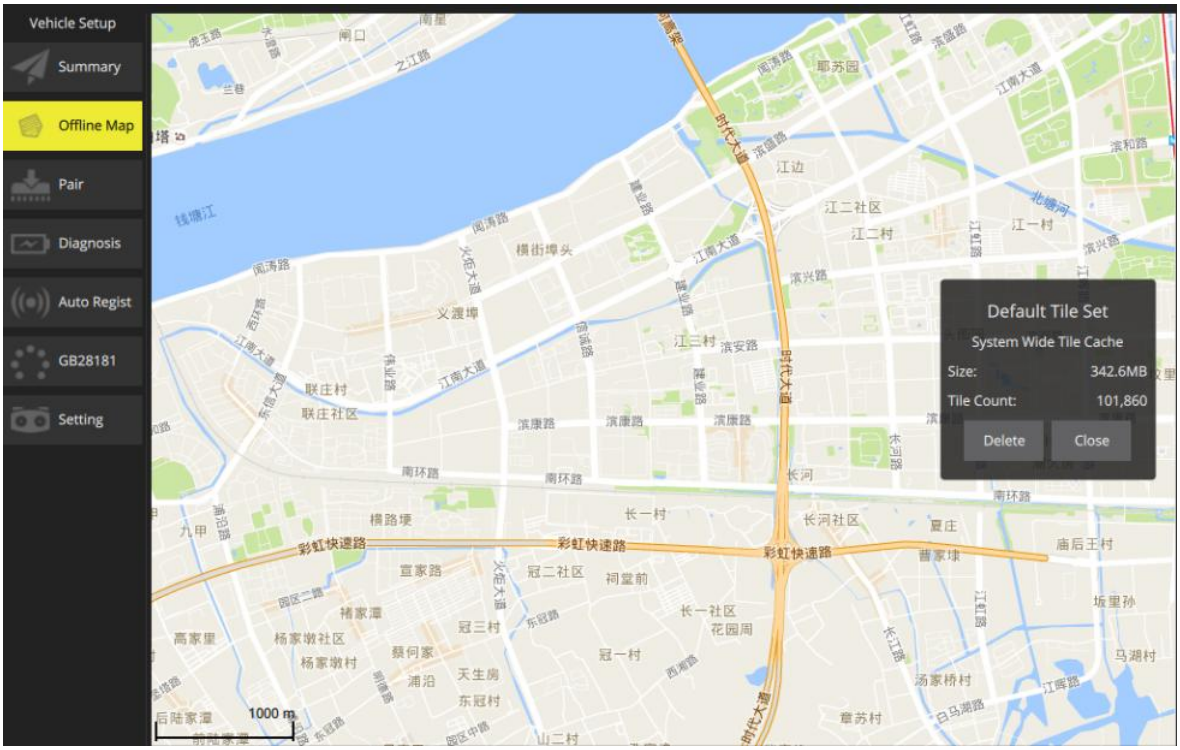


Figure 6-10

Parameter	Note
Zoom level	It is the min, max level value set by offline map.
Total	Max, min level interval value, automatically calculate the map internal storage and the quantity of overlayed pictures.

Click "Delete" to delete the displayed offline map.

6.3.3.3 Set Offline Map Disk Cache

It is to set the map disk cache which needs to be stored.

Step 1

Select "Aircraft Setup > Offline Map". The system will display the interface of "Offline Map".

Step 2

Select the 选项 on the lower right corner of the page, enter the setting interface of disk cache, which is shown in the following figure.

Refer to the setting below, select "Save" to make setting valid.

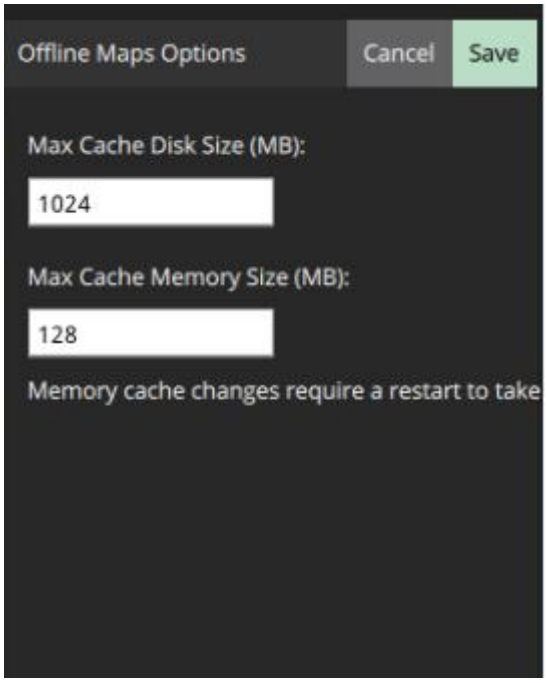


Figure 6-11

Parameter	Note
Max disk cache	It is to set the max disk cache, default is 1024.
Max memory cache	It is to set max memory cache, default is 1282.

Please select "Cancel" if it is to cancel setting.

7 Appendix Ⅰ Main Technical Parameters

Parameter Item		Parameter Value
Model		Dahua Navigator X820
UAV System Environment Adaptability	Operating temperature	-20～60°C
	Operating humidity	Operating humidity 95% non-condensation
Aircraft	Wheel base	820mm
	Aircraft type	4 rotor wing
	Arm mechanical feature	Foldable
	Landing gear	Retractable via remote control
	Rack (battery and load excluded, only power system included)	3315g
	Weight	6315～10500g
	Satellite positioning module	GPS
	Max flight altitude	No less than 5000m
	Battery	6S LiPo 22000mAh intelligent battery
	Max hovering time	35min（Mounted with PTZ camera）
Power System	Propeller wing material	Carbon fiber
	Propeller wing dimension	18×6.5 inch
	Propeller wing mechanical feature	Quick demount
Flight Control	Hovering accuracy (comparative accuracy)	● Horizontal：±0.2m ● Vertical：±0.5m (weaker than 3 wind scale (gentle breeze) ）
	Wind resistance capacity	7 wind scale (moderate gale)
	Max attitude angle velocity	● Flight course：150°/s ● Pitch：250°/s
	Max attitude	35°

Parameter Item		Parameter Value
Model		Dahua Navigator X820
	angle	
	Cruising speed	10m/s
	Built-in function	● Fixed elevation, fixed point, autonomous cruise and several other flight modes ● Auto takeoff and landing ● Low voltage protection ● LED and ground station APP prompt ● Auto RTH ● Preset no-fly zone ● Electronic fence
PTZ	Weight (load included	1.1kg
	Angle control accuracy	±0.01°
	Max controllable rotation speed	● Course：±130°/s ● Pitch：±130°/s
	Controllable rotation range	● Course：±168° ● Pitch：-90° to +45°
	Installation mechanical feature	Quick mount and demount
	Built-in function	● Two working modes: ◇ Course follow mode ◇ Attitude lock mode ● Built-in independent IMU module ● X820 exclusive servo drive module ● Ethernet video transmission and camera PTZ control
Visual Camera (6MP, 30x optical zoom)	Sensor	1/1.8" 6Mp CMOS
	Max resolution	2592（H）×2592（V）
	View angle	61.2°～2.3°
	WDR	≥100dB
	Video compression standard	H.264/H.265/MJPEG
	Frame rate	30fps@5M/3M，60fps@1080p
	Iris	F1.5～F4.3
	Focal length	6～180mm（30x optical zoom）
	Digital NR	3D
	SNR	≥55dB（AGC Off，Weight ON）
	Min illuminance	● Color：0.005Lux@F1.5 ● B&W：0.0005Lux@F1.5
	Backlight	BLC/HLC

Parameter Item		Parameter Value
Model		Dahua Navigator X820
	compensation mode	
	Day/night switch	Auto/Manual
	WB	Auto/Manual/Tracking/Outdoors/Indoors/Outdoors Auto/Sodium Lamp Auto/Sodium Lamp
	Electronic shutter	Support auto electronic shutter (1/3～1/30， 000s), manual electronic shutter (1/3～1/30，000s).
	Storage	128GB MicroSD
Thermal camera (temperature measuring type)	Detector type	Uncooled vanadium oxide focal plane detector
	Detector pixel	640*512
	Video coding	H.264M/H.264H/M-JPEG, support 720P image output
	Pixel size	17μm
	Spectral range	7.5μm～13.5μm
	Thermal sensitivity	≤40mK
	Lens focal length	19mm
	Distance (human: 1.8m*0.5m, detection, recognition, identification)	640m, 160m, 80m
	Distance (vehicle: 2.3m*2.3m, detection, recognition, identification)	2000m, 500m, 250m
	Temperature measuring range	Low temperature mode: -40°C to 160°C. High temperature mode: -40°C to 550°C
	Temperature measuring error	Max(±2℃，±2%)
	Temperature measuring function	Support realtime multi preset temperature measuring, temperature alarm, temperature correction, temperature measuring unit setting, temperature realtime analysis, historical temperature information query and so on.
	Storage	128GB MicroSD
Integrated remote control	Features	Remotely display integrated design
	Remote control	≥5km

Parameter Item		Parameter Value
Model		Dahua Navigator X820
	distance	
	Remote control dimension	350×228×85mm
	Battery	2S LiPo, 7800 mAh
	Output port	micro USB, headset interface
	Operating screen and system	● Screen size：7" (Multi-point capacitance） ● Resolution： 1024*600 ● OS： Android 5.1
	Network	WiFi IEEE802.11 b/g/n
	Storage	128GB MicroSD
Ground Station	Image transmission distance	Max 10km
	Data transmission distance	Max 10km
	Protection level	IP65 compliance, anti-seismic/impact resistance/wide temperature, keyboard waterproof.
	Display screen	13.1 inch touch screen, resolution 1024*768, 1200cd/m²
	Internal memory	4GB
	Storage	500 GB HDD（SATA）
	Protocol	Support GB/T 28181
Integrated remote control &ground station software	Software function	● Parameter setting ● Cruising mission auto planning ● Flight path template import and export ● Auto takeoff and landing ● Video map realtime switch ● Intelligent flight mode： ◇ Flight course lock ◇ Home point lock ◇ Point of interest ◇ Waypoint ● Mission record ● Video playback ● 3D map

Table 7-1

8 Appendix Ⅱ Aircraft Status Indicator

The aircraft status indicator over the power switch is turned on after the aircraft is enabled. Different colors and statuses mean differently. Please refer to the Table 8-1 for the corresponding relations.

Please do understand the contents listed in the table below before flight, which is to help you quickly understand the aircraft status or positioning problem during flight. The actual operation methods will be specifically introduced in other chapters.

Phase	Indicator color and status	Implication		Operation
Launch	●●● ●●● ●●●……	Self-check and preheating		Wait
	● Normally on	System self-check report error		-
	● ● ●……	Aircraft in no-fly zone		Move the aircraft out of no-fly zone. **Note** Please refer to "3.9 Check Debugging" for the flight area.
Compass calibration	● Normally on	Compass horizontal calibration		Wait
	● Normally on	Compass vertical calibration		Wait
	●● ●● ●●……	Compass calibration failure		Manually calibrate compass
Frequency matching	● Normally on	Frequency successfully matched		-
Flight	● ● ●……	Take off normally		-
	●●● ●●● ●●●……	-	Disconnected to remote control for more than 3s.	-
	●●● ●●● ●●●……		Low battery warning	-
	●●●● ●●●● ●●●●……		Critical low battery warning	-
	●●●● ●●●● ●●●●……	-	Disconnected to remote control for more than 3s	-
	●●●● ●●●● ●●●●……		Low battery warning	-
	●●●●● ●●●●● ●●●●●……		Critical low battery warning	-
	●●● ●●● ●●●……		Disconnected to remote control for	-

Phase	Indicator color and status	Implication		Operation
			more than 3s.	
	●●● ●●● ●●……		Low battery warning	-
	●●●● ●●●● ●●●●……		Critical low battery warning	-
	●●● ●●● ●●●……	Return	Image transmission disconnected	-
	●●●● ●●●● ●●●●……		Disconnected to remote control for more than 3s.	-
	●●●● ●●●● ●●●●……		Low battery warning	-
	●●●●● ●●●●● ●●●●……		Critical low battery warning	-
	●●● ●●● ●●●……		Disconnected to remote control for more than 3s.	-
	●●● ●●● ●●●……		Low battery warning	-
	●●●● ●●●● ●●●●……		Critical low battery warning	-
Firmware upgrade	●● ●● ●●……	Firmware upgrade in progress		Wait
	● Normally on	Upgrade failed		Check upgrade step, upgrade again
	● Normally on	Upgrade succeeded		-

Table 8-1

9 Appendix Ⅲ System Pairing

Caution

The frequency of aircraft, remote control and ground station has been matched before factory delivery.

Abnormity

It needs to pair again when both the remote control and ground station fail to control the aircraft remotely.

Exact Operations

Step 1

Use frequency pairing needle and long press the frequency matching button (on the right of power switch) of aircraft for 3 seconds.

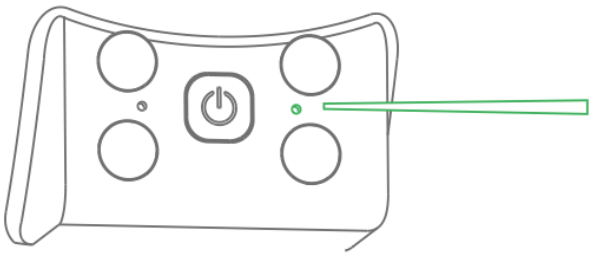


Figure 9-1

Step 2

Select "Aircraft Setup > Pair" on the ground station. The system will display the interface of "Pair', which is shown in the following figure.

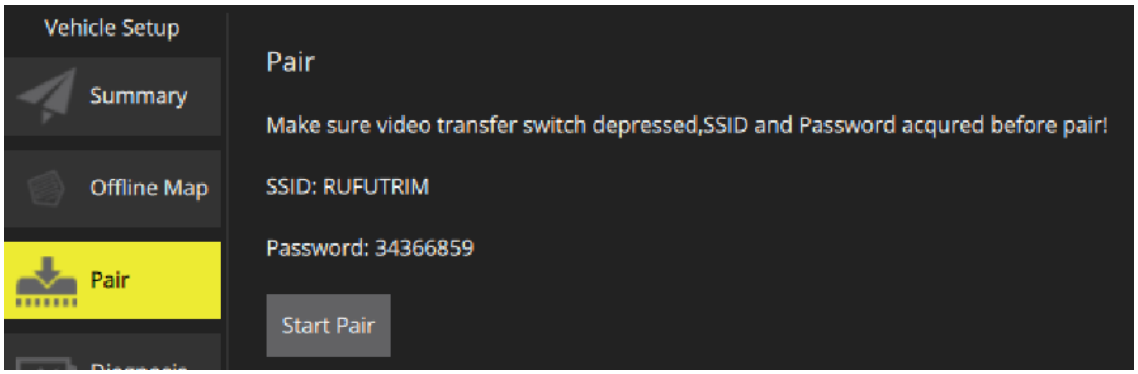


Figure 9-2

Step 3

Select "Setup > Remote Control Setting > Remote Control Pair" on the remote control. The system will display the interface of "Remote Pair", which is shown in the following figure.

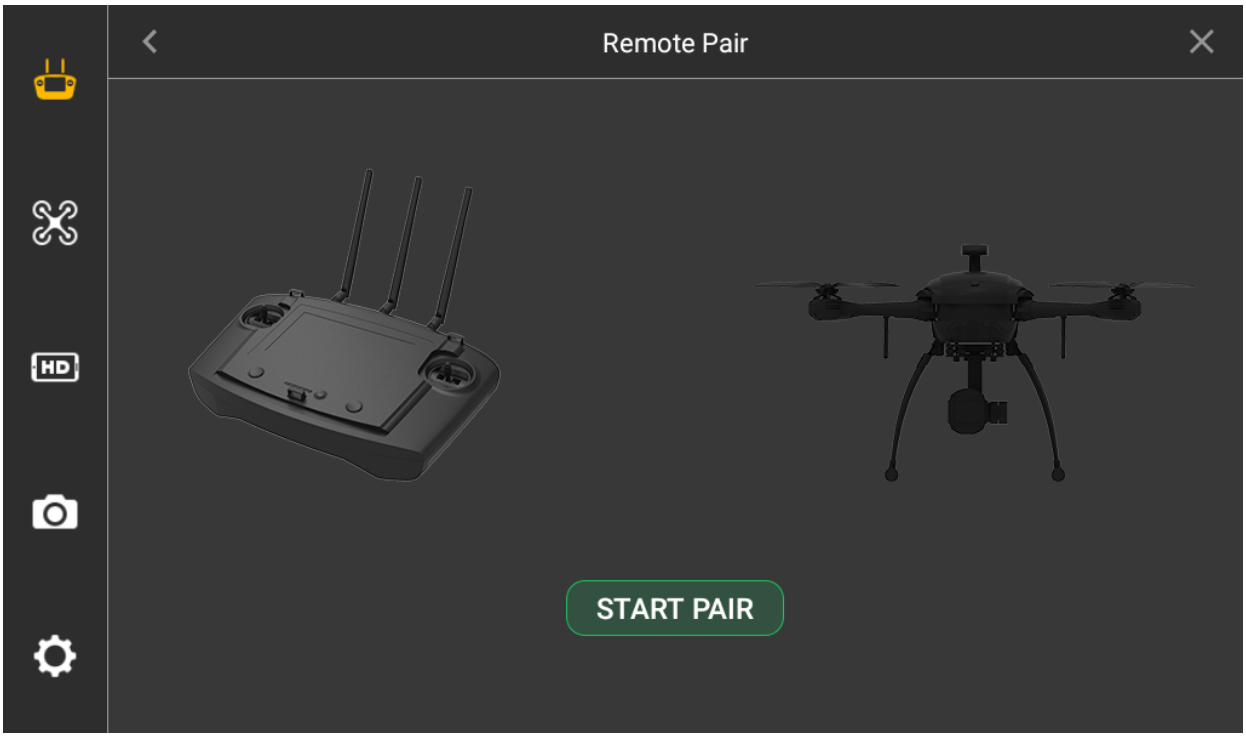


Figure 9-3

Step 4

The system will automatically implement frequency pairing when clicking "Start Pair" on both the remote control and ground station.

Step 5

It means frequency pairing of system is successful when the ground station prompts "Pairing Success" and remote control prompts "Remote Control Pairing Success".

10 Appendix Ⅳ FAQ

10.1 Aircraft FAQ and Its Solutions

The aircraft runs into gale, then it causes water ripple and jitter to the image.

Avoid the PTZ facing wind in gale weather.

10.2 Remote Control FAQ and Its Solutions

Response speed of remote control touch screen becomes slow and other abnormities.

Select "Setup > General Setting > Poweroff" on the ground station, and it will pop out the dialog box of poweroff and restart, long press to select restart.

Figure 10-1

No response to remote control

Long press the reset button of ground station for over 3 seconds, the touch screen will restart after shutdown.

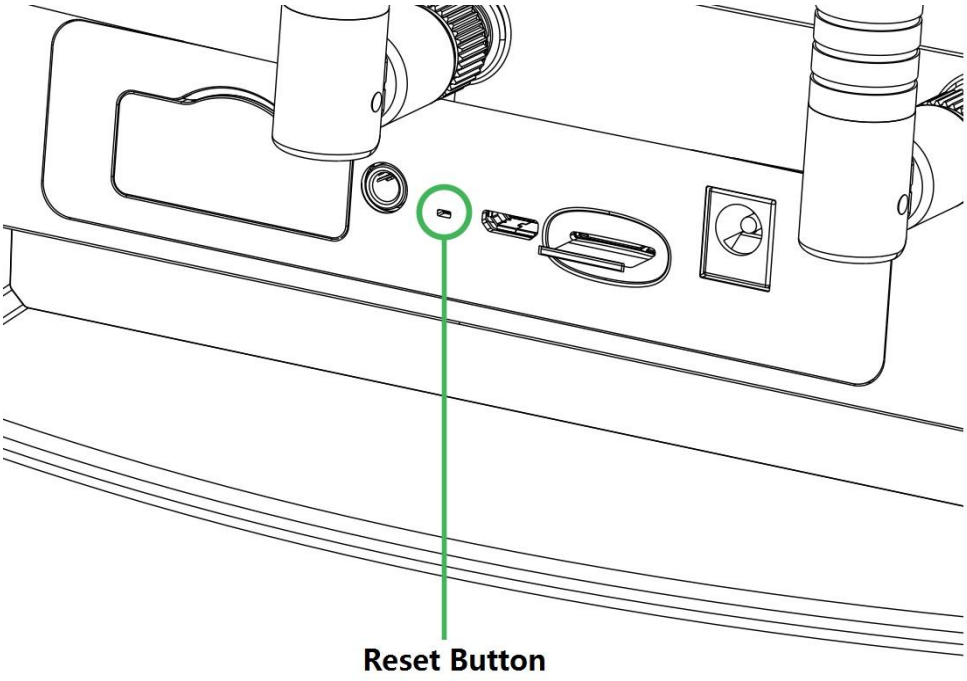


Figure 10-2

10.3 Ground Station FAQ and Its Solutions

Image transmission becomes unsmooth when the aircraft is over the ground station

Manually adjust the angle of relay angle of the ground station, which is to solve the unsmoothness of image transmission.

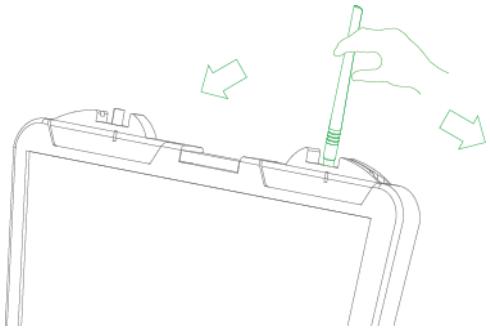


Figure 10-3

10.4 Airborne Equipment FAQ and Its Solutions

Recorded video loss (including it fails to copy the data from SD card)

Check the aircraft version, please contact the manufacturer if the version is too low.

Note

- **This manual is for reference only. Slight difference may be found in the user interface.**
- **All the designs and software here are subject to change without prior written notice.**
- **All trademarks and registered trademarks are the properties of their respective owners.**
- **If there is any uncertainty or controversy, please refer to the final explanation of us.**
- **Please visit our website or contact your local service engineer for more information.**

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