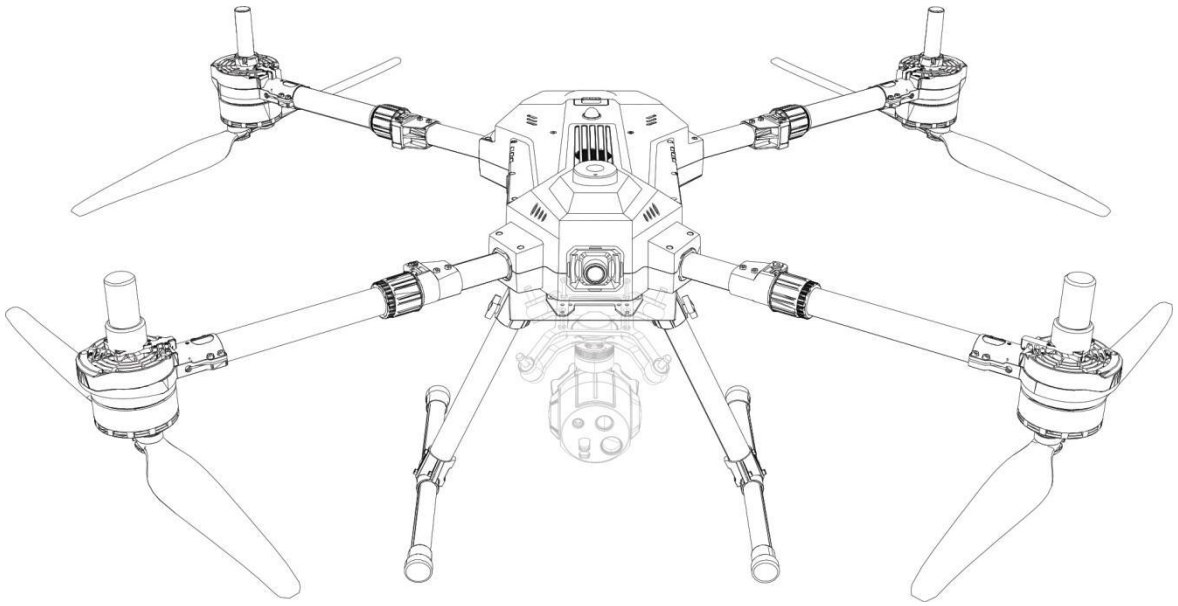
UniDrone E1000

Drone Platform

User Manual



Reebot Robotics (Shenzhen) Co., Ltd.

https://reebot.com/en/

Thank you for purchasing a Reebot product.

The UniDrone E1000 is an industrial-grade multirotor drone designed for application scenarios such as high-altitude cleaning, emergency rescue, and inspection.

For flight safety and to ensure a good product experience, please read this user manual carefully before assembly. This manual can help you resolve most questions that arise during use. You can also visit the product-related pages on Reebot's official website (**https://reebot.com/en/**), call the Reebot official after-sales service center (**+86 400-097-0971**), or send an email to **info@reebot.com** to consult Reebot engineers directly about product knowledge and to report product issues.

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Real-Name Registration Notice

1. Users who operate aircraft in mainland China must comply with the relevant provisions of national laws and regulations on the real-name registration of civil unmanned aircraft, including but not limited to:

Article 10, Chapter II of the "Interim Regulations on the Flight Management of Unmanned Aircraft":

Owners of civil unmanned aircraft shall complete real-name registration in accordance with the law. The specific measures shall be formulated by the civil aviation authority under the State Council in conjunction with the relevant departments.

Article 92.205(a) of the "Rules for the Operation Safety Management of Civil Unmanned Aircraft":

The owner of a civil unmanned aircraft shall complete real-name registration on the Comprehensive Management Platform for Civil Unmanned Aircraft as required, and may activate and use the civil unmanned aircraft only after obtaining the registration mark.

2. According to the "Interim Regulations on the Flight Management of Unmanned Aircraft", where a civil unmanned aircraft conducts flight activities without real-name registration, the public security authority shall order correction and may impose a fine of up to RMB 200; if the circumstances are serious, a fine of not less than RMB 2,000 but not more than RMB 20,000 shall be imposed.

3. Users who operate aircraft in mainland China can complete real-name registration in either of the following ways:

• Download the UOM App from a mobile app store;

• Visit https://uom.caac.gov.cn using a personal computer browser.

After completing account registration and logging in, you can apply for real-name registration for your aircraft.

4. Before reselling a civil unmanned aircraft (or any other action involving a change of ownership), the owner shall deactivate and cancel the real-name registration; otherwise, the owner may face civil legal risks such as tort liability and commercial disputes. If illegal activities are involved, the owner shall also cooperate with the investigation in accordance with the law and bear the corresponding legal consequences (including criminal liability).

Manual Version Update Record

Version	Release Date	Update Content
1.0	Aug 2026	Initial version

Contents

Reading Guide

Icons and Symbols

When reading this user manual, please pay special attention to the content marked with the following symbols.

Symbol	Meaning
Danger	Hazardous operations that are highly likely to cause personal injury
Warning	Operations that may cause personal injury
Caution	Be careful not to cause unnecessary property damage through non-compliant operations
Prohibited Actions	Actions that are prohibited
Mandatory Actions	Actions that must be performed
Precautions	Matters requiring attention

Safety

The UniDrone E1000 is designed and manufactured for professional application scenarios, and all necessary commissioning has been completed before delivery. Do not disassemble or modify its structure by yourself. The UniDrone E1000 has a precision structure, and operators are required to have certain basic skills. Please operate it safely and in a standardized manner in accordance with the corresponding laws and regulations. Reebot assumes no liability for any unnecessary product damage, economic loss to the user or others, or even personal injury caused by any non-standard, unreasonable, or irresponsible operation of this product. Minors must use this product under the on-site supervision and guidance of professionals. Reebot products are designed for commercial scenarios; it is prohibited to use Reebot products for military purposes. Without Reebot's permission, it is prohibited to disassemble or modify this product without authorization.

To jointly maintain flight safety and help you make better use of this product's features, please pay special attention to the following:

- Do not use Reebot products to operate aircraft, vehicles, or models in crowded places (squares, parks, etc.), places with many obstacles (streets, parking lots, etc.), places with strong magnetic fields or signal interference sources (high-voltage power lines, railway lines, radar stations, etc.), or other areas that may cause unnecessary economic losses or even personal injury.
- During operation, never cover the ground unit antennas or otherwise block signal transmission.
- The tip of the ground unit's standard omnidirectional antenna is the part with the weakest signal transmission. During operation, avoid pointing it at your aircraft, vehicle, or model.

- Do not use Reebot products to operate aircraft, vehicles, or models when you are fatigued, drunk, or physically unwell.
- Without special operation permission, do not use Reebot products to operate aircraft, vehicles, or models in rainy, nighttime, or strong-wind environments.
- Never cut off the ground unit power supply in advance while the engines or motors on your aircraft, vehicle, or model are still running.
- To ensure flight safety, check before takeoff whether the propeller blades, motor rotation directions, and the connections of all components are secure, and at the same time ensure an effective connection with the link.
- For flight safety, keep the aircraft within your visual line of sight when operating it for takeoff, and ensure that there are no pedestrians, animals, obstacles, etc. around the drone during flight and landing.
- During operation, be sure to return from the system parameter settings page to the main page.
- Before starting operations, be sure to check the remote controller battery level and the drone power supply voltage.
- When finishing operations, power off the drone first, and then power off the remote controller.
- Before setting ground unit parameters, be sure to power off the engines and motors to prevent accidental startup.
- Before starting operations, be sure to configure the failsafe function on the drone.
- Before starting operations, turn on the remote controller first and keep the throttle at the lowest position or within the throttle dead zone, and then supply power to the drone.

Equipment Storage, Carrying, and Recycling

When your Reebot product is idle, when you carry it out for operations, or when the product has reached the end of its service life, please pay special attention to the following:

> **Danger:** When Reebot products are idle, keep them away from areas that are easily accessible to children. Avoid placing Reebot products in environments that are too hot (above 50 °C) or too cold (below -20 °C).

> **Caution:** Avoid placing Reebot products in humid or dusty/sandy environments. When carrying or transporting Reebot products, avoid operations that may damage components, such as vibration or impact.

Chapter 1 Product Overview

1.1 Product Introduction

The UniDrone E1000 (hereinafter referred to as the E1000) is a multirotor drone platform built for industrial-grade complex missions. With a maximum payload capacity of 10 kg and a maximum unloaded endurance of 55 minutes, it achieves a better balance between heavy-load operation capability and deployment flexibility, and can be widely used in industrial scenarios such as inspection, emergency rescue, environmental monitoring, high-altitude cleaning, and logistics transportation.

The E1000 adopts a dual-IMU redundant flight controller and is equipped with 360° horizontal omnidirectional laser obstacle avoidance, a high-definition FPV flight camera, and night-flight lights, further improving flight safety, environmental awareness, and recognizability during nighttime operations. The flight platform supports gimbal cameras compatible with multiple protocols, including MAVLink, S.Bus, UART, and network serial protocols. It can carry up to two payloads simultaneously and provides abundant interface resources to meet the access and function expansion needs of various types of industrial payloads.

Used together with the handheld ground station and the UniGCS ground station software, the E1000 enables integrated operations such as flight control, mission planning, route management, payload control, and video transmission display. The handheld ground station features a 7-inch 1080P high-definition, high-brightness touchscreen with a display brightness of up to 1600 nits, and integrates 2.4 GHz / 5.8 GHz dual-band communication and high-definition video transmission capabilities. Flight and mission information can be viewed clearly even in strong-light environments, bringing industrial users a more intuitive, efficient, and stable operating experience.

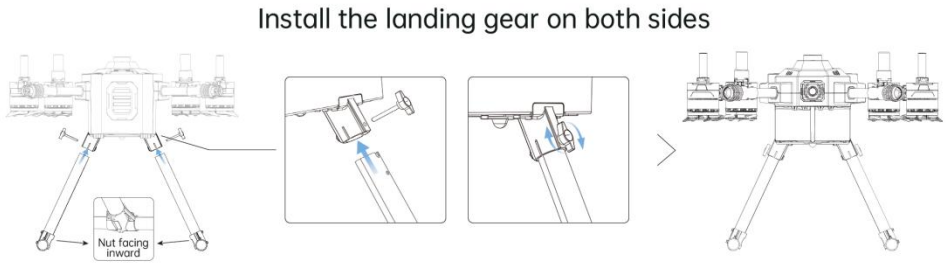
1.2 Features

The E1000 adopts a highly reliable dual-IMU redundant design and a multi-frequency link system, and the airframe is made of engineering plastics and carbon fiber materials to ensure flight safety to the greatest extent. The high-definition FPV flight camera and the 360° laser obstacle avoidance radar make flying safer for users. The airframe protection rating reaches IP54, allowing efficient mission execution even in rainy conditions. The built-in RTK module enables centimeter-level positioning and heading, and the built-in remote identification module provides real-time detection, alerts you to surrounding aircraft, and broadcasts the corresponding information of your own aircraft to ensure flight safety.

1.3 System Assembly

1.3.1 Installing the Landing Gear

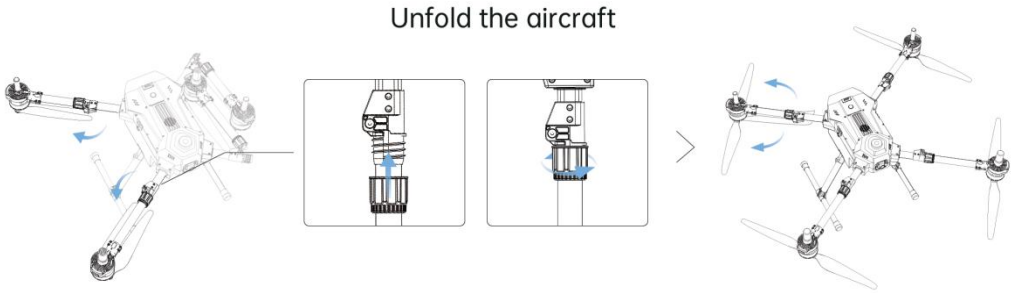
1. Align the landing gear with the landing gear mounts and install them into the airframe. Note: The landing gear nuts face inward.



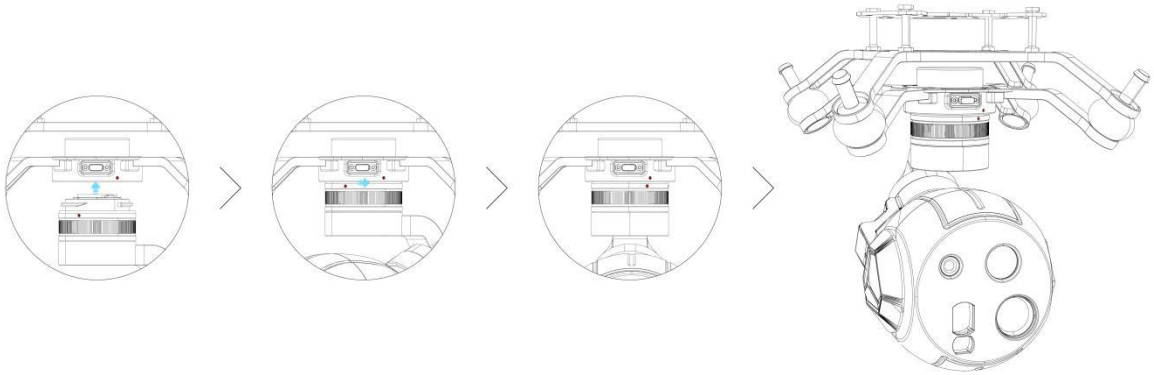
2. Place the airframe on a level surface, insert the T-shaped thumb screws, and tighten them clockwise.

1.3.2 Unfolding the Arms and Propellers

Unfold the four arms of the rotorcraft and tighten the arm fastening kits. Then unfold the propeller blades straight.

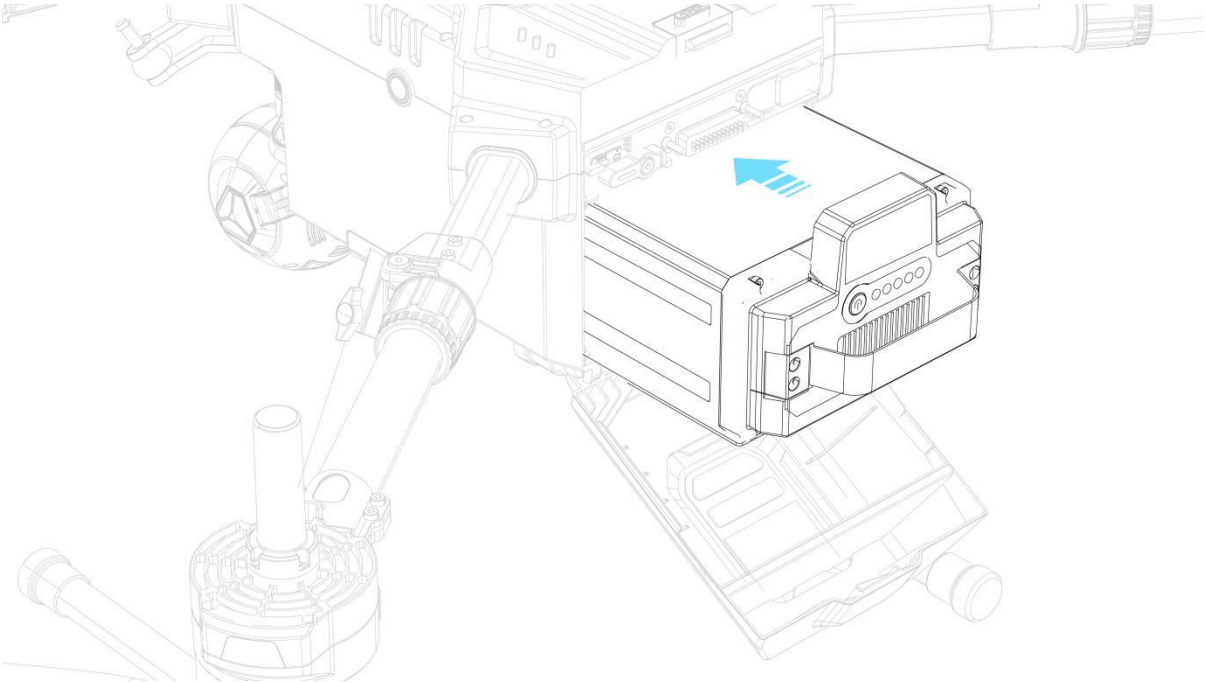


1.3.3 Installing the Gimbal Camera



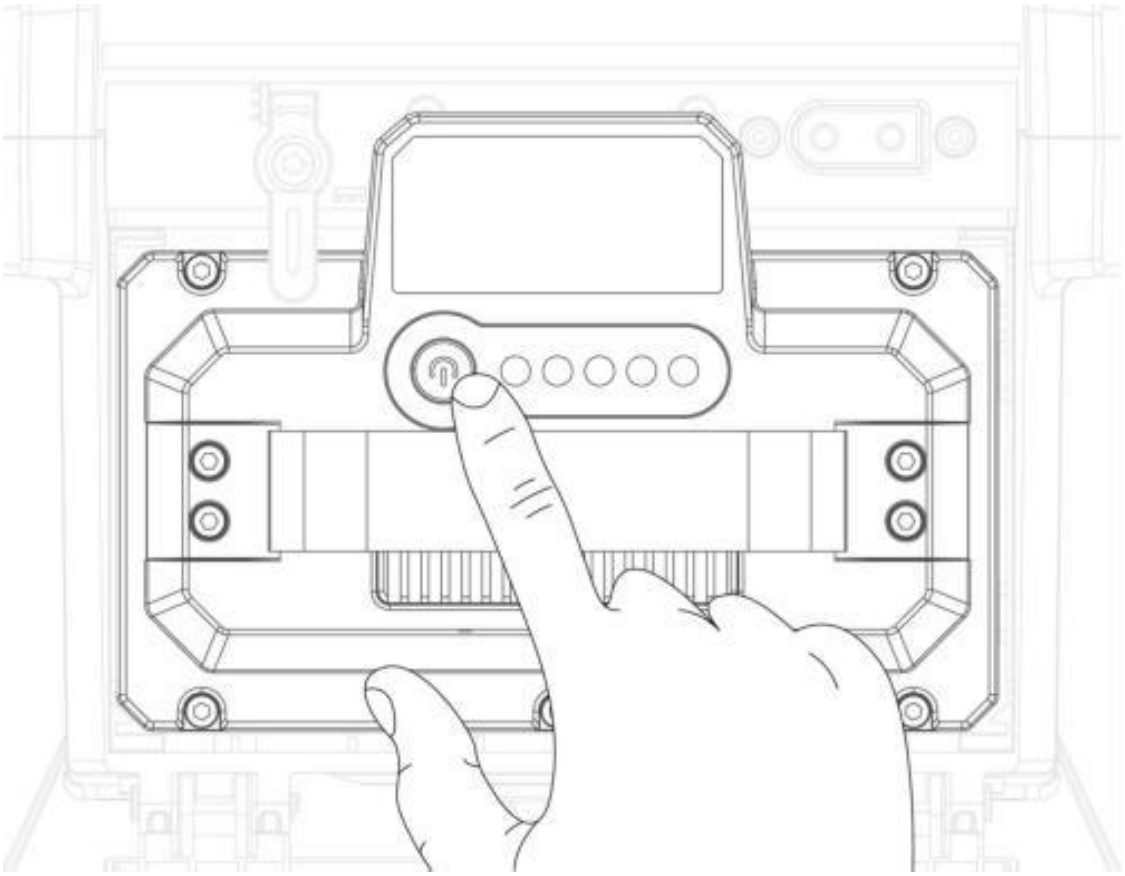
1.3.4 Installing the Intelligent Flight Battery

Insert the intelligent flight battery as shown in the figure.



Check the battery level: short-press the battery level button once.

Power on: short-press the smart power button once, then long-press it within 3 seconds to turn the power on/off.



Chapter 2 Flight Safety

2.1 Flight Environment Requirements

1. Do not fly in severe weather, such as strong wind (wind speed greater than 12 m/s). When flying in the rain, be sure to follow the requirements stated in the IP54 protection rating description.

2. Make sure the aircraft takes off from an open, unobstructed, and flat ground, away from surrounding buildings, trees, crowds, water surfaces, etc. Please keep the flight within visual line of sight. If beyond-visual-line-of-sight (BVLOS) flight is required, make sure the aircraft is in good condition and the user has the corresponding qualifications, and confirm before flight whether the flight complies with local regulatory requirements for BVLOS flight.

3. Do not take off from the surface of a moving object (such as a moving car or boat).

4. Avoid sandy or dusty road surfaces during takeoff and landing, otherwise the service life of the motors will be affected.

2.2 Wireless Communication Requirements

1. Make sure the aircraft antennas are intact, without damage or detachment.

2. Make sure to operate the aircraft in an open area or on high ground. Tall steel-reinforced buildings, mountains, rocks, and woods may block the aircraft's GNSS and video transmission signals.

3. Since other wireless devices may interfere with the remote controller, it is recommended to turn off nearby high-power radio equipment and stay away from strong-interference devices such as base stations when using the remote controller to control the aircraft.

4. Be extremely cautious when flying near electromagnetic interference sources, and continuously observe whether the video feed in the UniGCS Pro App stutters and whether the video transmission signal strength is weak. Electromagnetic interference sources include but are not limited to: high-voltage power lines, high-voltage transmission stations, mobile phone base stations, and television broadcast signal towers.

Chapter 3 Automatic Return to Launch

The aircraft has an automatic return-to-launch (RTL) function, which is mainly divided into RTL, low-battery RTL, and failsafe RTL according to the triggering method. If the home point was successfully recorded before takeoff and the GNSS signal is good, the aircraft will automatically return to the home point and land when the user actively initiates RTL, when the aircraft's low battery triggers intelligent low-battery RTL, or when the loss of communication signal between the remote controller and the aircraft triggers failsafe RTL. During automatic RTL, the user cannot adjust the nose direction, nor control the aircraft to fly left or right.

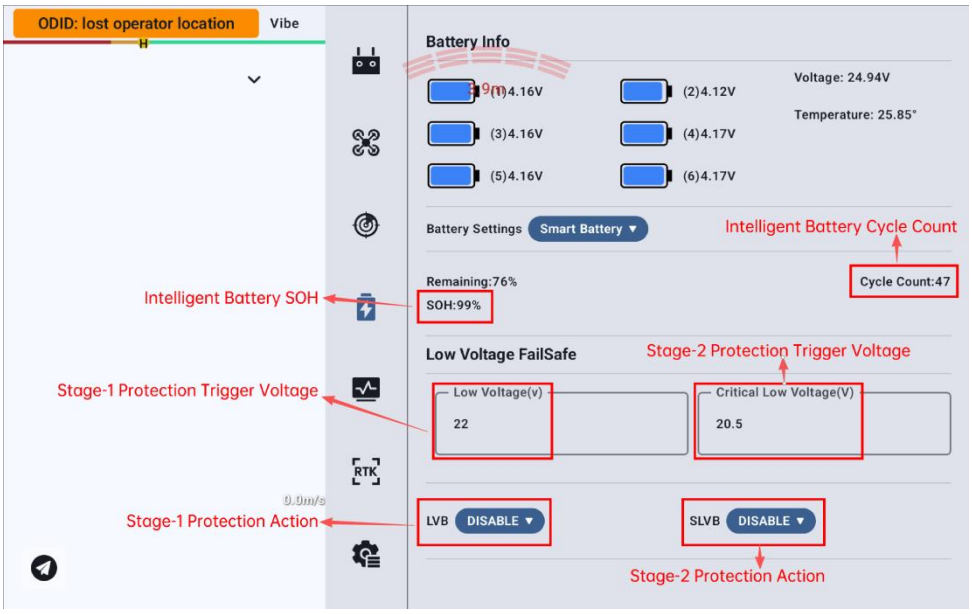
3.1 Manual RTL

Manual RTL can be initiated by pressing the RTL button on the remote controller. The heading is not controllable during RTL. During RTL, after short-pressing the RTL button on the remote controller once or exiting RTL by switching to another mode, the user can regain control of the aircraft.

RTL process:

1. The aircraft records the home point.
2. The RTL condition is triggered (triggered by the user with the remote controller or by low battery of the aircraft).
3. The aircraft confirms the home point and automatically adjusts the nose direction.
4. The aircraft automatically flies above the home point and enters the landing protection process, during which the aircraft lands directly or hovers.

3.2 Low-Battery RTL



To prevent unnecessary danger caused by insufficient battery power, the aircraft will determine whether to trigger the low-battery protection behavior according to the configured protection voltage. If the user makes no selection within 10 seconds, the aircraft will automatically enter RTL after 10 seconds. During

RTL, you can short-press the RTL button on the remote controller once or switch to another flight mode to cancel RTL.

Low-battery RTL occurs only once during the same flight. If the user cancels the low-battery RTL reminder and continues flying, the aircraft may run out of power on its way back and be forced to land, resulting in the loss or crash of the aircraft.

If the aircraft continues to fly with low battery, when the configured second-stage protection voltage is triggered, the aircraft will trigger the configured landing behavior. During landing, the user can control the aircraft to move left or right and choose a suitable place to land, and can also cancel the aircraft's continuous descent behavior by switching the flight mode.

Options (RTL function configuration)

RTL altitude:

Set to zero to return at the current altitude.

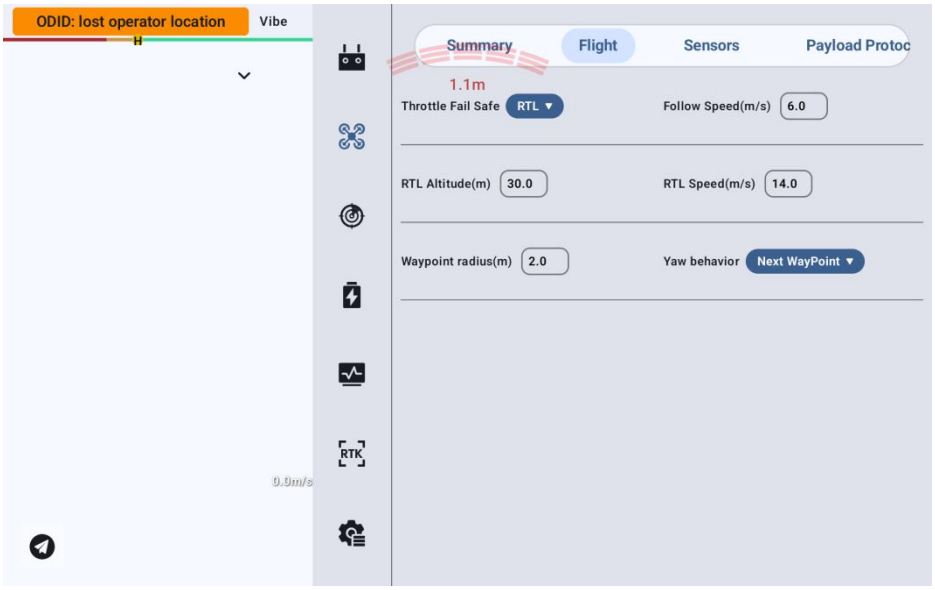
The default return altitude is 100 m.

To use RTL, GPS positioning is required so that the "home" point or takeoff position is established before unlocking and takeoff. Landing and then unlocking the aircraft again will reset the "home" point, which is a great feature when flying at a flying field.

If you obtain positioning for the first time while in flight, the "home" point will be set to the position at the moment of positioning.

Once the aircraft reaches the "home" point, it will first enter hover mode and then land.

To stop the automatic landing, simply use the control switch to change the mode and clear the landing timer, and normal flight will resume.



Note: The RTL altitude must be higher than the ambient height of the flight site.

3.3 Failsafe RTL

When the radio failsafe protection is triggered, the drone will perform the corresponding action according to the pre-configured failsafe strategy, including no action, immediate landing, RTL (return to launch), or SmartRTL (smart return to launch). In addition, an automatic route mission can be configured to continue executing in the event of a radio failure without triggering the failsafe; if the drone has already entered the landing phase, it will maintain the current landing process until completion.

The radio failsafe protection will not be triggered in the following cases:

- If the multirotor is already locked, the failsafe will not be executed.
- If the multirotor is unlocked but has already landed, it will be locked immediately.
- If the multirotor is in Stabilize or Acro mode, is unlocked, and maintains minimum throttle output, it will be locked immediately.

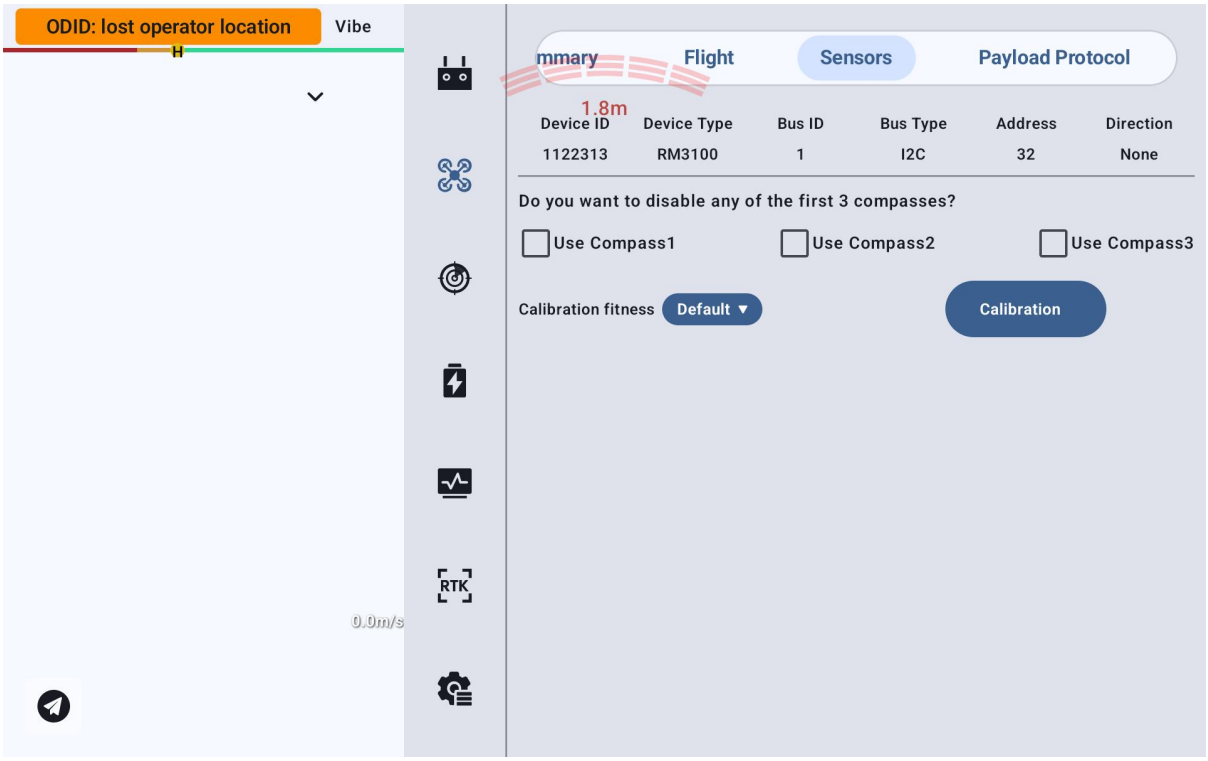
Note: After the radio failsafe protection is cleared (i.e., the remote controller transmitter and the receiver re-establish communication), the UniDrone E1000 will maintain the current failsafe state and will not automatically resume the flight mode that was active before the failsafe protection was triggered. For example, when the drone triggers the radio failsafe protection in position-hold hover mode and automatically switches to RTL (return to launch) mode, the drone will continue to execute RTL even if the remote controller transmitter and the receiver re-establish communication. If the pilot wants to take over the flight again and resume position-hold hover mode, the pilot needs to switch to another flight mode with the remote controller first, and then switch back to position-hold hover mode.

Chapter 4 Compass Calibration

Note: Do not calibrate in areas with strong magnetic fields or near large pieces of metal, such as magnetic mines, parking lots, or building areas with underground steel reinforcement. Do not carry ferromagnetic objects, such as mobile phones, during calibration.

4.1 Compass Calibration with the UniGCS Ground Station

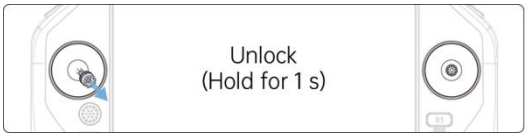
1. Open the compass calibration interface in the order shown.
2. Click Calibrate.
3. Lift the drone and rotate it in different directions so that each side (front, back, left, right, top, and bottom) points down toward the earth for a few seconds, until the compass progress bar finishes loading.
4. Restart the aircraft.

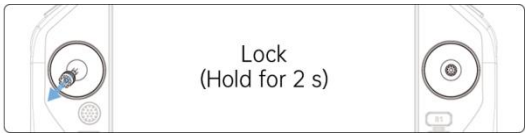


Note: If the calibration fails: you will hear a failure tone, the green bar may reset to the left, and the calibration routine may restart (depending on the ground station). If you still cannot calibrate the compass after multiple attempts, click the "Cancel" button, change the calibration difficulty drop-down list to a more relaxed setting, and then try again.

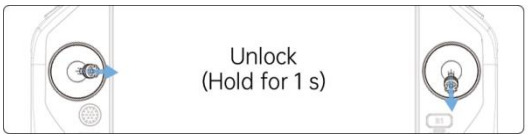
Chapter 5 Manually Starting / Stopping the Motors

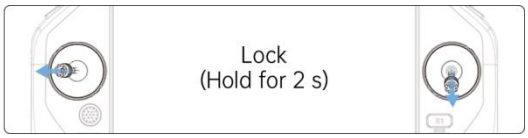
5.1 Mode 2 / Left Throttle (Current Default)



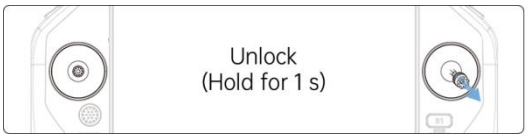


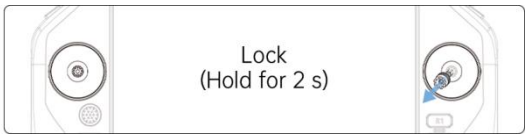
5.2 Mode 1 / Right Throttle





5.3 Mode 3 / Right Throttle (Mode 2 Mirror)





Chapter 6 Basic Flight

6.1 Basic Flight Overview

1. Place the aircraft on flat, open ground, with the tail of the drone facing the operator.
2. Turn on the remote controller and the aircraft in sequence.
3. Run the UniGCS App and enter the flight interface.
4. Wait for the aircraft to pass the self-check.
5. Perform the corresponding stick action to start the motors. Slowly push the throttle stick upward to let the aircraft take off smoothly.
6. When descent is needed, slowly pull the throttle stick down to make the aircraft descend slowly onto flat ground.
7. After landing, pull the throttle stick to the lowest position, wait for the drone to enter idle speed, and keep it locked until the motors stop.
8. After shutdown, turn off the aircraft and the remote controller in sequence.

6.2 Useful Functions

6.2.1 One-Tap Takeoff

Pull the throttle stick to the lowest position, tap the "One-Tap Takeoff" button, and long-press the "Takeoff" icon for 2 seconds:

Note: Do not operate indoors or in crowds.

6.2.2 One-Tap Landing

Tap the "One-Tap Landing" button and long-press the "Landing" icon for 2 seconds; the drone will perform a vertical landing.

Chapter 7 Pre-Flight Checklist

7.1 Pre-Flight Checklist

1. The remote controller and the aircraft batteries are fully charged, and the aircraft battery is properly installed and locked in place.

2. Make sure the aircraft propellers are securely installed, free of damage or deformation, that the motors and propellers are clean and free of foreign objects, that the propellers and arms are fully unfolded, and that the arm sleeves and landing gear are all locked.

3. The firmware of all devices is the latest version from the official website.

4. Make sure the lenses of the FPV flight camera and the gimbal camera, as well as the lens of the LiDAR, are free of foreign objects, dirt, or fingerprints, and are not blocked by payloads on the airframe or external accessories.

5. Make sure the remote controller antennas are unfolded.

6. Turn on the remote controller and the aircraft, make sure the flight mode switch is in Loiter mode, and check that the remote controller status indicator is solid green. Make sure the link (pairing) status between the aircraft and the remote controller is normal and that you have control of the aircraft.

7. Place the aircraft outdoors on flat, open ground, make sure there are no obstacles, buildings, trees, etc. around, and the pilot stands 5 m away from the aircraft facing its tail.

8. If multiple aircraft operate at the same time, please divide the airspace to avoid mid-air collisions.

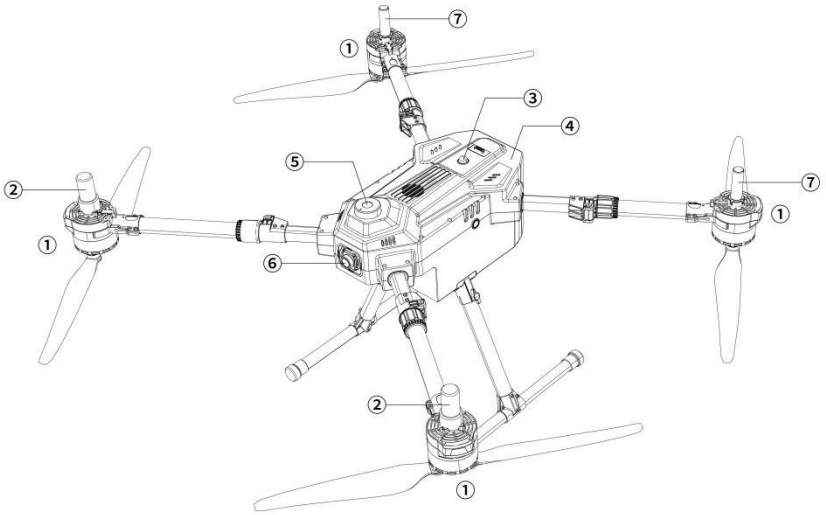
7.2 Safe Operation

- Do not approach rotating propellers and motors. Before approaching, confirm that the drone motors are locked.
- Before takeoff, make sure the power battery and the remote controller are sufficiently charged, and during flight make sure there is enough power for the return to launch.
- Fly away from crowds and take safety precautions.
- Non-professional technical personnel must not disassemble the aircraft or modify the aircraft design, firmware programs, or parameter configurations without authorization; otherwise, serious losses will result.

Chapter 8 Aircraft

The aircraft of the UniDrone E1000 mainly consists of a flight control system, a communication system, an image processing system, a power system, and a battery system. This chapter describes the functions of each component of the aircraft in detail.

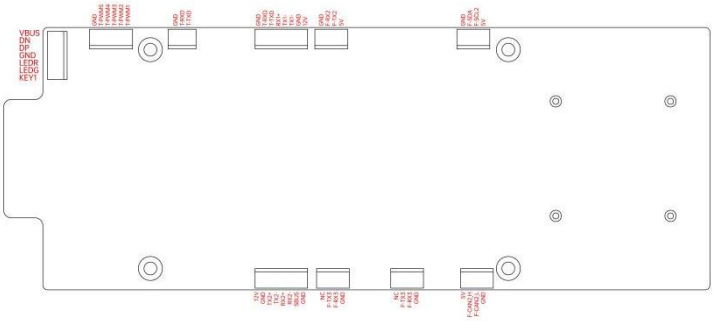
8.1 Getting to Know the Aircraft



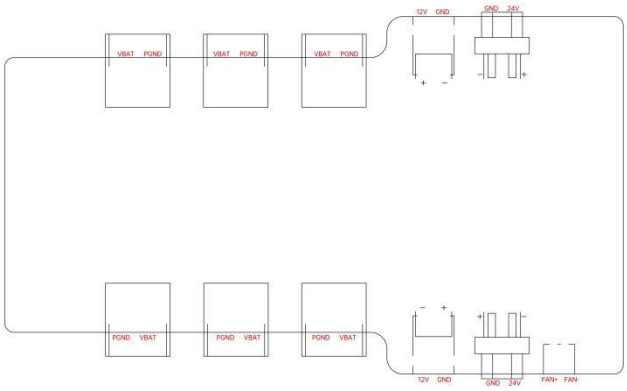
① Propulsion System
② RTK Positioning & Heading Antennas
③ Strobe Light
④ Intelligent Flight Battery
⑤ 360° Horizontal LiDAR
⑥ FPV Camera
⑦ 2.4 GHz / 5.8 GHz Dual-Band Integrated Antenna

8.1.1 Interface Definitions

UniDrone E1000 Main Control Board



UniDrone E1000 Power Distribution Board



8.2 FPV Flight Camera

The UniDrone E1000 is equipped with a 1080p ultra-wide-angle FPV camera. The pod/gimbal view and the flight view can be switched freely, making flight safer.

FPV field of view (FOV): horizontal 113°, vertical 77°, diagonal 122°

FPV camera pitch angle: 68°

FPV camera modes: pitch-lock mode / pitch-follow mode

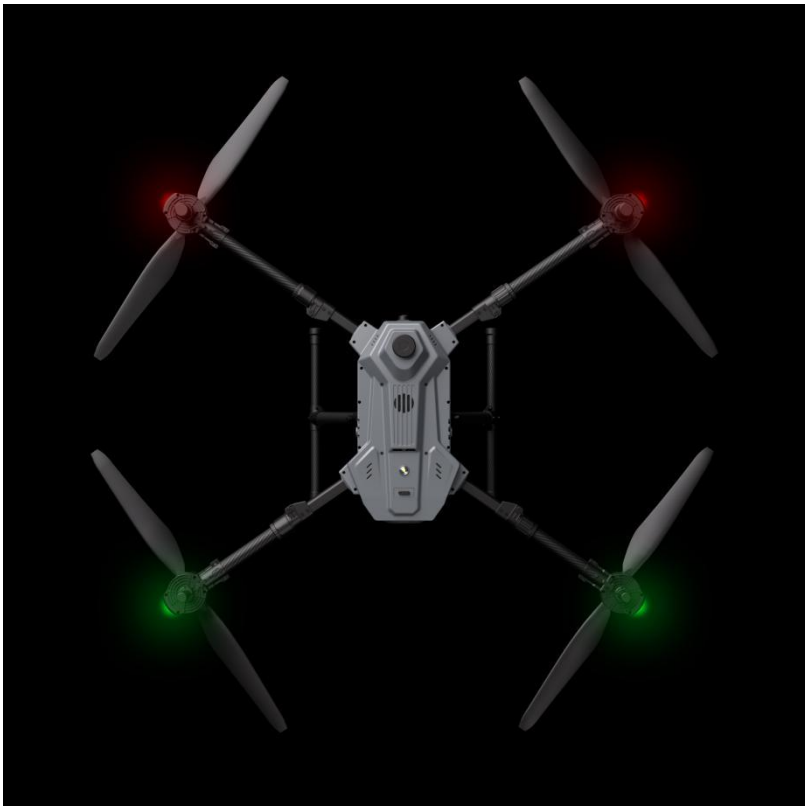
8.3 Propellers

The propeller blades adopt a large-pitch design and an excellent aerodynamic design, which ensures higher efficiency while providing greater thrust. They are made of carbon-fiber nylon composite material, which is corrosion-resistant and easy to maintain.

> **Note:** Since the propeller blades are thin and sharp, please handle them with care to avoid accidental cuts.

8.4 Aircraft Power System Indicators

Heading lights: the red light indicates the nose direction of the E1000, and the green light indicates the tail direction of the E1000. The navigation lights stay solid on.



The power indicator colors are defined as shown in the following table:

State	Abnormal Information	Buzzer	Indicator	Suggested Action
Self-check	Overvoltage / undervoltage	No beeping	Yellow flashing	Overvoltage: one short beep; Undervoltage: two short beeps. Check the power supply voltage
	Operational amplifier abnormality	No beeping	Yellow flashing	Two long beeps and three short beeps. Contact technical support
	MOS short circuit	No beeping	Yellow flashing	Two long beeps and two short beeps. Contact technical support
	Motor phase loss	No beeping	Yellow flashing	Two long beeps and one short beep. Check whether the motor rotation is stuck
	Throttle loss	One short beep	Yellow flashing	One long beep. Check whether the throttle harness is damaged and whether the connected device outputs the corresponding signal
	Throttle not returning to zero	Rapid short beeps	Yellow flashing	One long beep and one short beep. Check the throttle travel of the flight controller and the remote controller
Running	Throttle loss	One short beep	Yellow flashing	One long beep. The harness is loose or damaged, or the connected device has no signal output
	Throttle stall	No beeping	Yellow flashing	One long beep and four short beeps. Check whether there are foreign objects in the motor
	MOS over-temperature	No beeping	Yellow flashing	One long beep and two short beeps. Check whether the payload is within the recommended range
	Capacitor over-temperature	No beeping	Yellow flashing	One long beep and three short beeps. Check whether the payload is within the recommended range
	Full throttle (100%)	No beeping	Yellow solid on until the throttle leaves full-throttle state, then returns to normal color	Not in the recommended thrust range; the indicator returns to normal color after leaving the full-throttle state
ESC firmware upgrade	No firmware	No beeping	White solid on	Connect the tuning software and upgrade the firmware
	Firmware upgrade failed	No beeping	White solid on	Make sure the power system works properly and the harness is connected normally, then try flashing the firmware again
	Firmware upgrading	No beeping	White flashing	Firmware is upgrading; it returns to normal after a successful upgrade

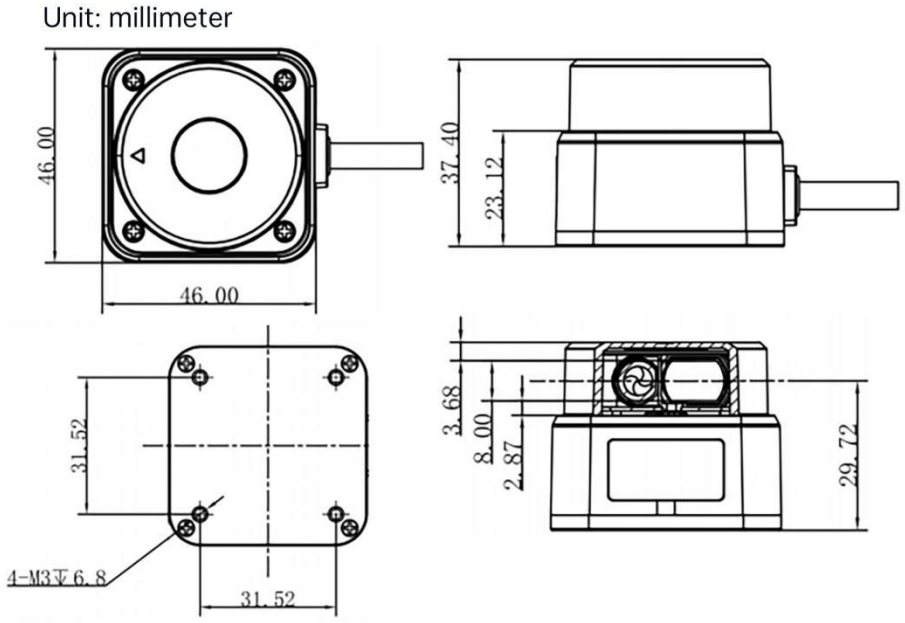
8.5 Gimbal Camera

The UniDrone E1000 supports the full range of Reebot and SIYI gimbal payload combinations: the Reebot mini quad-sensor AI pod UniPod MT11, the SIYI quad-sensor pod ZT30, the SIYI mini dual-sensor pod ZT6, the SIYI optical pods ZR30 and ZR10, and the SIYI gimbal camera A8 mini.

> **Note:** When using top-mounted or dual-gimbal payloads, the corresponding gimbal assembly is required. Please refer to the appendix for installation details. For the specific use of the gimbal camera, please refer to the user manual of the corresponding product.

8.6 Obstacle Avoidance System

The UniDrone E1000 is equipped with 360° laser obstacle avoidance, with an effective detection range of 30 m and an effective braking speed of 12 m/s.



Physical parameters of the device:

Item	Specification
Model	LDS-E210-R
Laser wavelength	905 nm ± 15 nm
Detection range	0.1–40 m @ 90% reflectivity; 0.1–15 m @ 10% reflectivity
Laser divergence angle	10.3 ± 0.5 mrad
Laser horizontal parallelism	0° ± 0.3°
Rotation direction	Clockwise/counterclockwise configurable (default: counterclockwise)
Scanning area	360°
Scanning rate	10 Hz, 15 Hz, 20 Hz

Item	Specification
Angular resolution	0.2°, 0.3°, 0.4°
Measurement rate	18,000 measurements/s
Ranging accuracy	±25 mm (±25 mm within 15 m under 10%–90% reflectivity, 90% confidence)
Distance resolution	1mm
Light spot	17 mm × 104 mm (10 m)
Interface type	UART 3.3 V serial port
Power consumption	< 2.5 W
Output	Raw data (distance, angle, energy)
Ambient light resistance	100 kLux
Power supply	5.1 ± 0.2 V DC
Operating temperature	-10 °C to 55 °C
Storage temperature	-30 °C to 70 °C
Protection rating	IP65
Dimensions	46 mm × 46 mm × 38 mm (L × W × H)

8.7 Aircraft RTK

The aircraft integrates an RTK module, which enables single-module dual-antenna heading and supports full-constellation, full-frequency high-precision positioning with BeiDou, GPS, GLONASS, Galileo, and QZSS, greatly improving positioning accuracy and reliability. It also delivers excellent anti-interference performance in complex electromagnetic environments, providing high-precision control response for the drone system and enabling precise operations.

Base station end:

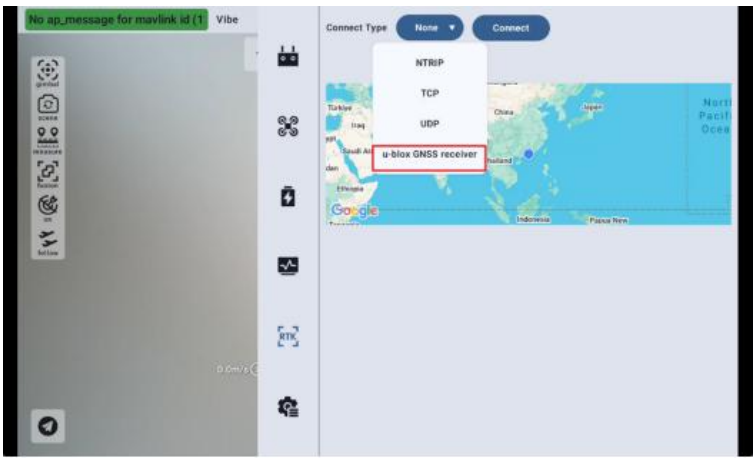
Refer to the figure below: fix the RTK base station end and the mushroom-head antenna on a tripod and connect the antenna feeder.

Note: The tripod should be prepared by the user. Make sure there are no obstructions or interference sources around the RTK antenna to avoid affecting the convergence time and positioning accuracy.

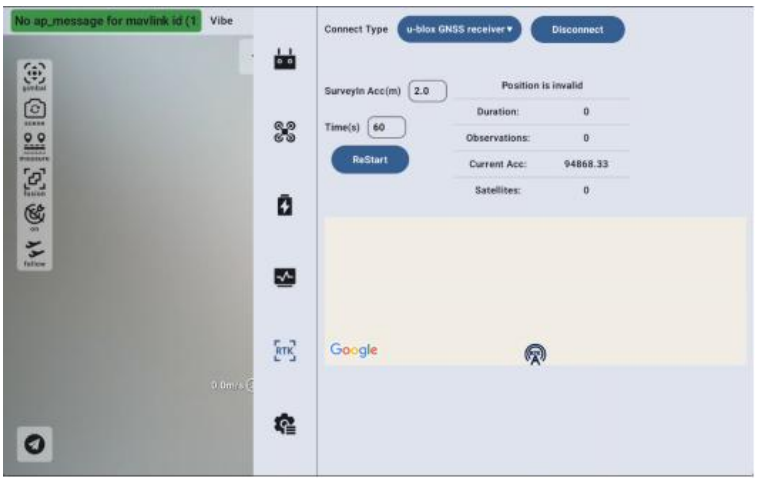
Traditional RTK:

1. Hardware connection: use a USB cable to connect the RTK base station end to the USB port on the top of the remote controller.

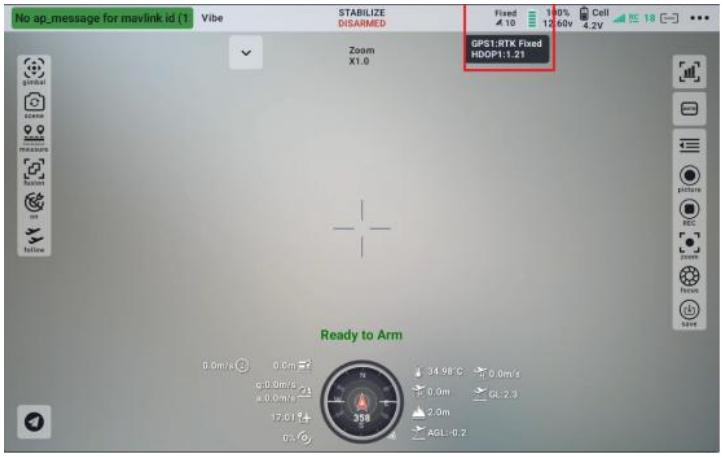
2. Connection method: click "Connection Method"; the program will automatically recognize and display the "u-blox GNSS receiver" option. Select this option.



3. Connect: after setting the position accuracy and observation time as needed, click "Connect" to complete the operation.



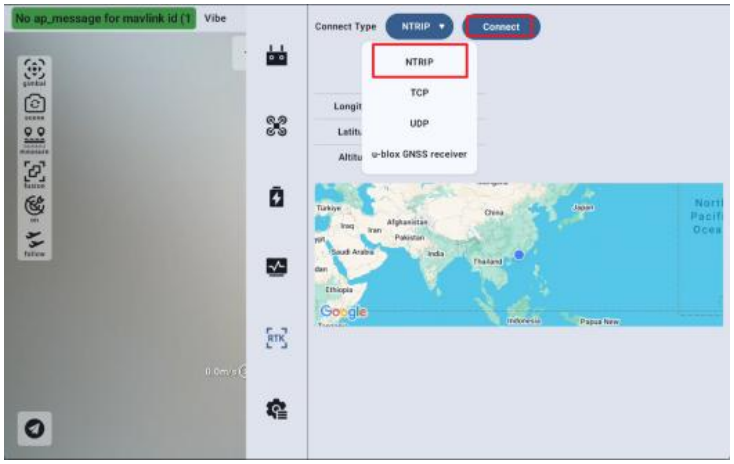
4. Conditions of use: wait until the GPS status in the positioning information of the top status bar shows "RTK FIX"; the function can then be used normally.



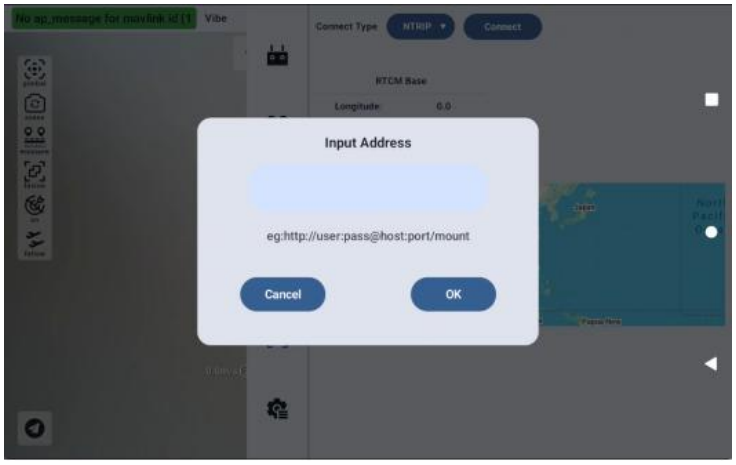
Note: After the base station end is positioned successfully, it is strictly forbidden to move the base station!

Network RTK:

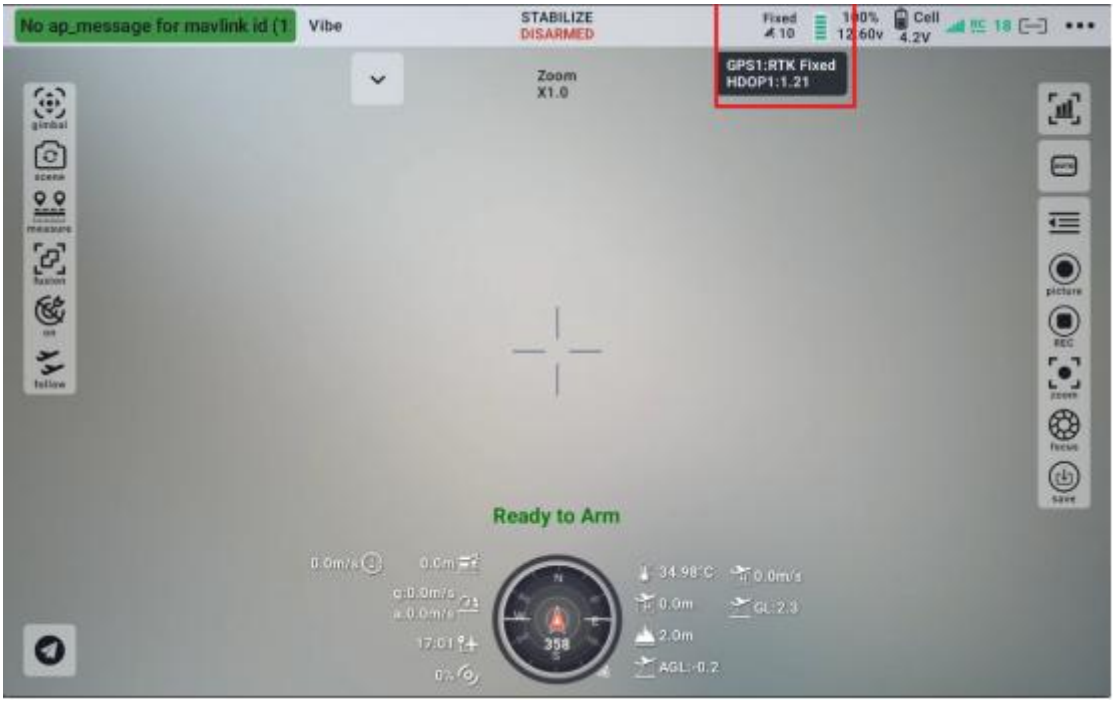
1. Connection preparation: make sure the device is connected to the network, and select "NTRIP" in "Connection Method".



2. Connect: click "Connect", enter the NTRIP URL link, and click "Confirm".



3. Conditions of use: the function can be used normally when the GPS status in the positioning information of the top status bar shows "RTK FIX".



Note: Positioning accuracy is affected by device performance and the environment. Whether "RTK FIX" can be reached is subject to actual conditions.

8.8 Remote Identification

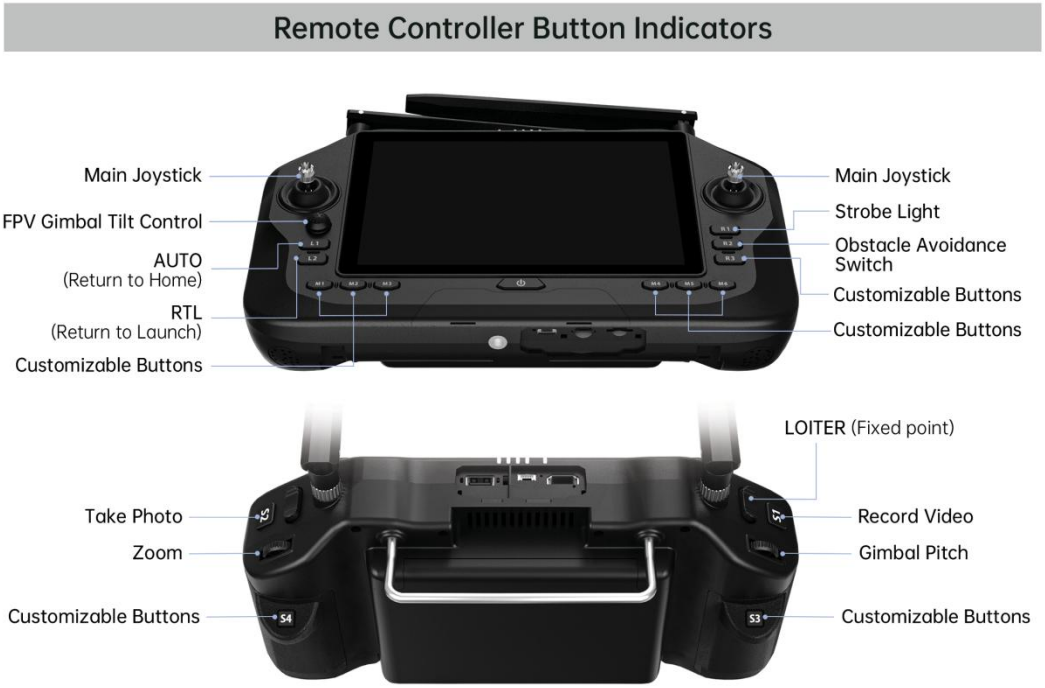
8.8.1 Wi-Fi Broadcast Remote Identification

Item	Specification
Broadcast protocol	WiFiBeacon
Trigger conditions for starting and ending remote identification broadcast messages (broadcast operating interval)	Start: the drone is powered on and the self-check is completed; End: the drone is powered off
Broadcast frequency band or channel	Channel 6
Broadcast frequency	10 times per second
Message data update rate	Once per second
Abnormal status indication method	A remote identification module disconnection alert is shown in the upper left corner of UniGCS
Emergency status of the unmanned aircraft and its triggering method	Emergency status: low battery – battery failure; Triggering method: battery level below the set threshold
Abnormal status of unmanned aircraft remote identification and its triggering method	Abnormal status: the remote identification module stops working; Triggering method: the remote identification module is powered off

8.8.2 Network Remote Identification

Item	Value or Description	Remarks
Trigger conditions for starting and ending remote identification	The drone connects to the flight controller and the remote controller is connected to the network	Triggered after the drone takes off, and stops being triggered after the drone lands
Reporting frequency	Once per second	
Message data update rate	Once per second	
Abnormal status indication method	A remote identification module disconnection alert is shown in the upper left corner of UniGCS	
Emergency status of the unmanned aircraft and its triggering method	Emergency status: low battery – battery failure; Triggering method: voltage below the protection voltage value	
Remote identification status of the unmanned aircraft and its triggering method	Abnormal status: the remote identification module stops working; Triggering method: disconnect the remote identification module	

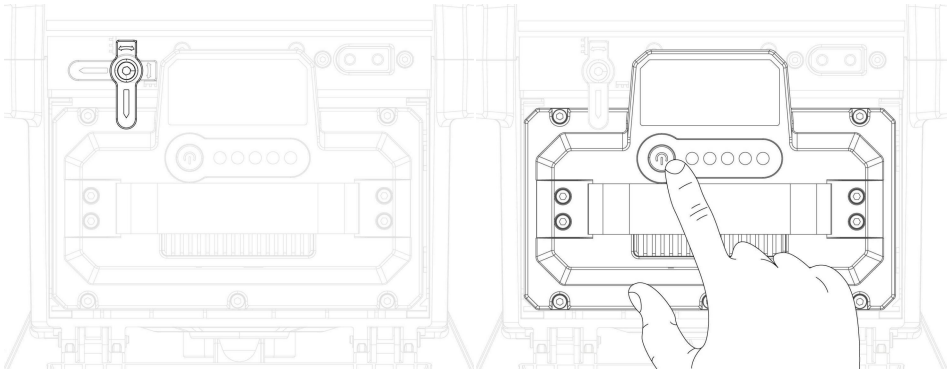
Chapter 9 Remote Controller



9.1 Takeoff

1. Turn on the drone remote controller and position the remote controller antennas correctly.

2. Install the battery and make sure the intelligent battery retainer (limit stopper) is open (short-press + long-press the intelligent battery to power on).



3. Toggle the drone mode lever, confirm that the flight mode is correct, and then switch the mode to position-hold hover mode. Pull the throttle stick down to the lowest position and pull the direction stick to the far right, and wait for the drone to unlock.

4. Keep the throttle stick above the middle position, and the aircraft will rise vertically to take off. Keep the throttle stick at the middle position and the drone will maintain its altitude; at the same time, when the pitch and roll sticks are kept at the middle position, the drone will hover in the air and hold its position.

5. If you need the aircraft to execute a route mission (the route mission must be written before flight), you can switch the flight mode to AUTO mode. The aircraft will climb automatically and execute the route mission without manual intervention.

6. Fully automatic route operation:

7. After the route is uploaded, click the takeoff command and the aircraft will rise to the default altitude (10 m).

Note: After the drone automatically unlocks and climbs to the specified altitude, click the AUTO button and the drone will automatically execute the route mission. In fully automatic flight mode, return and landing require no manual intervention.

9.2 Common Flight Modes

Loiter (Position Hold Mode): Loiter mode maintains the aircraft's current altitude, position, and heading.

ALT HOLD (Altitude Hold Mode): In Alt Hold mode, the aircraft maintains its altitude while you can control pitch, roll, and yaw. Alt Hold mode is the basis of many modes, such as Loiter and Sport.

Stabilize (Attitude Mode): Multirotor attitude mode. Both altitude and attitude are controlled by the remote controller sticks, and you need to control the drone's attitude in real time (however, the aircraft can maintain attitude balance when the sticks are not moved).

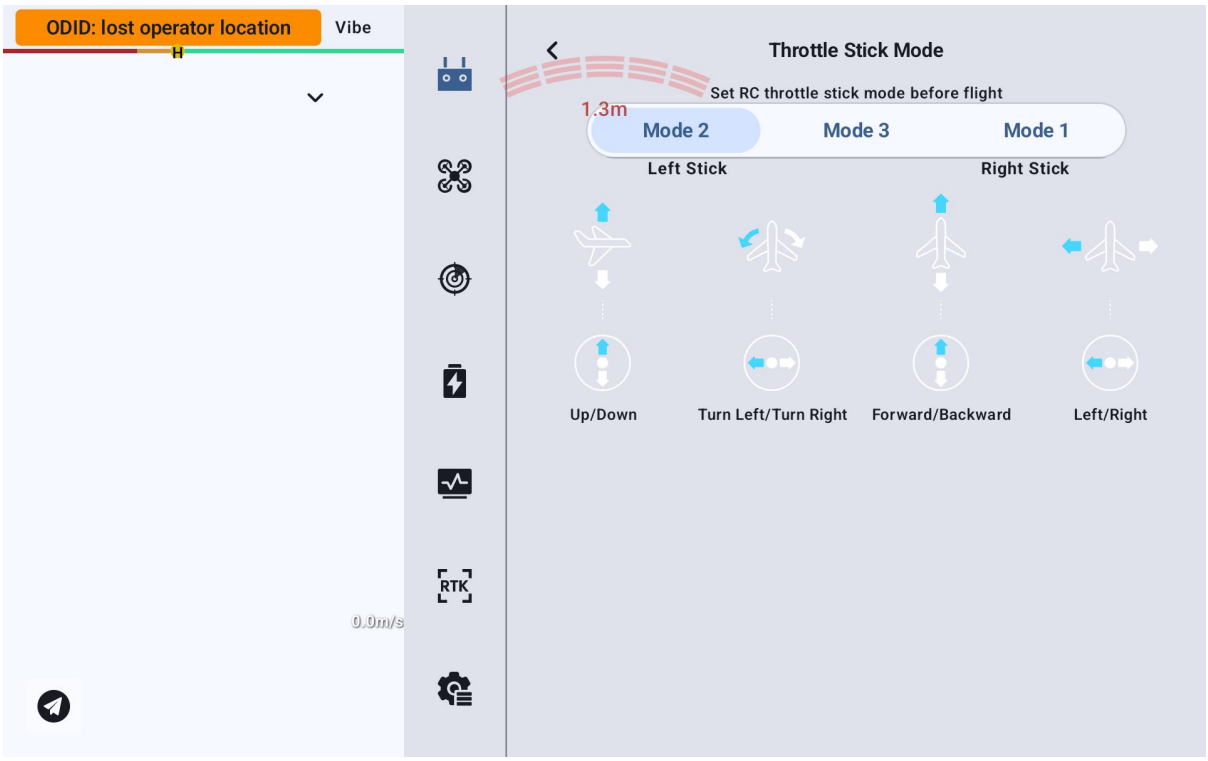
Note: This mode has no position-hold or altitude-hold function and requires certain technical skills from the pilot. It is recommended to use it only after the drone's GPS fails.

PosHold (Hover Angle Control Mode): PosHold mode is similar to Loiter mode; both maintain the current altitude, position, and heading. The difference is that in PosHold mode the sticks directly control the aircraft's deflection angle.

Guided (Guided Mode): This mode uses the data link and the ground station to guide the aircraft's position in real time. Guided mode is not a basic mode; it is formed by switching among several other modes. When the aircraft reaches the target point, it will hover above the target point.

9.3 Stick Modes

The UniRC 7 supports switching among "Mode 1 (Japanese hand)", "Mode 2 (American hand)", and "Mode 3 (Chinese hand)".



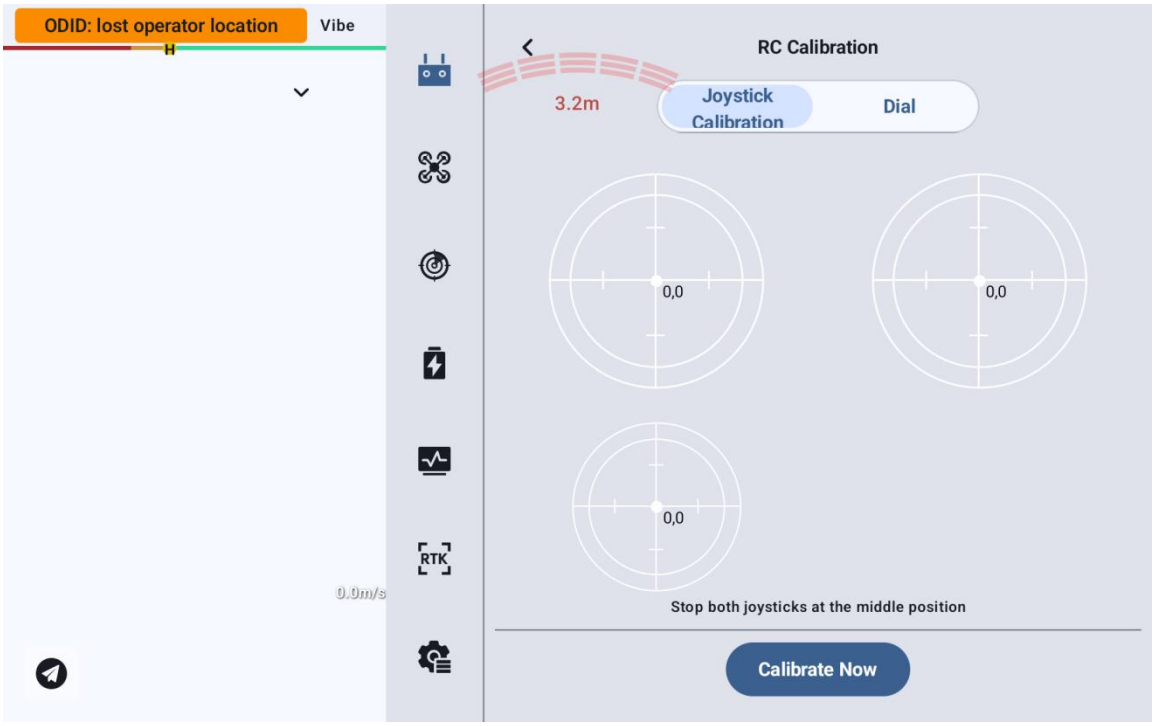
9.4 Remote Controller Calibration

The remote controller calibration function helps the user calibrate the neutral positions and maximum limits of the handheld ground station's joysticks and dials.

Calibrating the joysticks regularly helps maintain the output accuracy of the joystick channels.

9.4.1 Joystick Calibration Steps

1. Before joystick calibration, make sure the left and right joysticks of the handheld ground station rest naturally without displacement caused by external force.
2. In the "Joystick Calibration" menu, click "Start Calibration" to enter the following interface:



3. As prompted, if the joystick is resting naturally but the joystick channel output value is not 0, the joystick travel center has drifted. Do not touch the joystick at this time; wait for the travel center calibration to complete.

4. When the prompt shown in the figure below appears, the travel center calibration is complete. Next, calibrate the maximum limits. As prompted on the interface, push each joystick to the maximum limit in each direction in turn.

Up: 0, 100

Down: 0, -100

Left: -100, 0

Right: 100, 0

Then click "Finish Calibration".

5. The "Joystick Calibration" menu shows that the calibration succeeded.

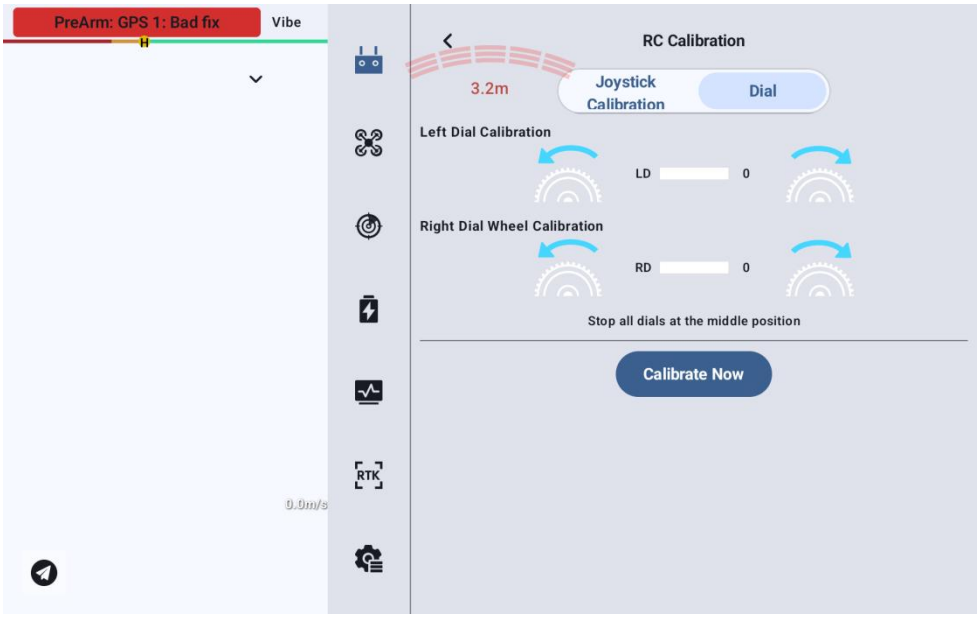
Note: When the joystick does not return to the center when resting naturally (the channel output value is not 0), or when it cannot output the maximum or minimum value (-100, 100) at the extreme stick positions, joystick calibration should be performed immediately.

9.4.2 Dial Calibration Steps

1. Before dial calibration, make sure the left and right dials of the handheld ground station rest naturally without displacement caused by external force.

2. In the "Dial Calibration" menu, click "Start Calibration" to enter the following interface:

3. As prompted, if the dial is resting naturally but the dial channel output value is not 0, the dial travel center has drifted. Do not touch the dial at this time; wait for the travel center calibration to complete.



4. When the prompt shown in the figure below appears, the travel center calibration is complete. Next, calibrate the maximum limits. As prompted on the interface, push each dial to the maximum limit in each direction in turn.

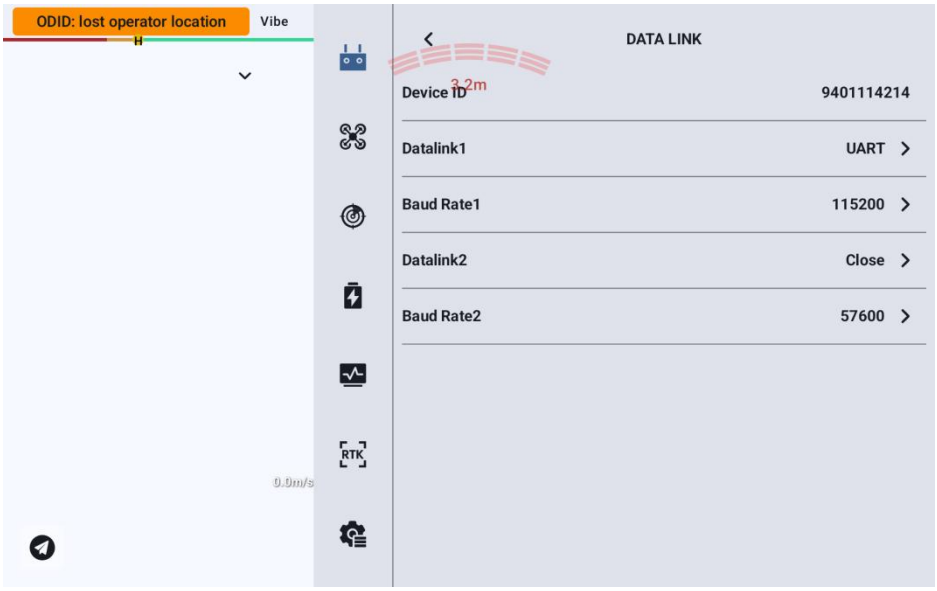
Left: -100

Right: 100

4. The "Dial Calibration" menu returns to the initial interface, and the calibration is complete.

9.4.3 Data Link Settings

The data link settings menu allows the user to identify the device number of the handheld ground station, set the data link connection method, and set a specific serial port baud rate.



About data link settings

Device: displays the serial number of the Bluetooth module integrated in the handheld ground station. It will be recognized as the corresponding Bluetooth name during Bluetooth linking (pairing). This serial number is unique to each ground unit.

Data Link 1: the data link connection method for the device connected to the TELEM 1 port of the drone end.

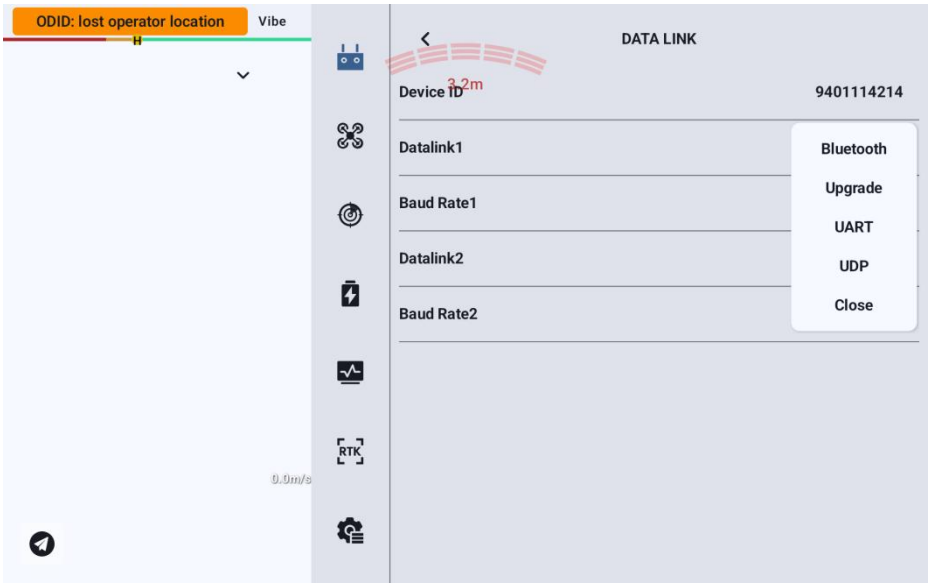
Serial Port Baud Rate 1: should be set to the serial port baud rate corresponding to the device connected to the TELEM 1 port of the drone end.

Data Link 2: the data link connection method for the device connected to the TELEM 2 port of the drone end.

Serial Port Baud Rate 2: should be set to the serial port baud rate corresponding to the device connected to the TELEM 2 port of the drone end.

Data link connection methods

The data link connection methods available on the UniRC 7 handheld ground station are: Bluetooth, Upgrade, UART serial port, and UDP.



UART serial port: data link communication through the UART serial port built into the ground unit.

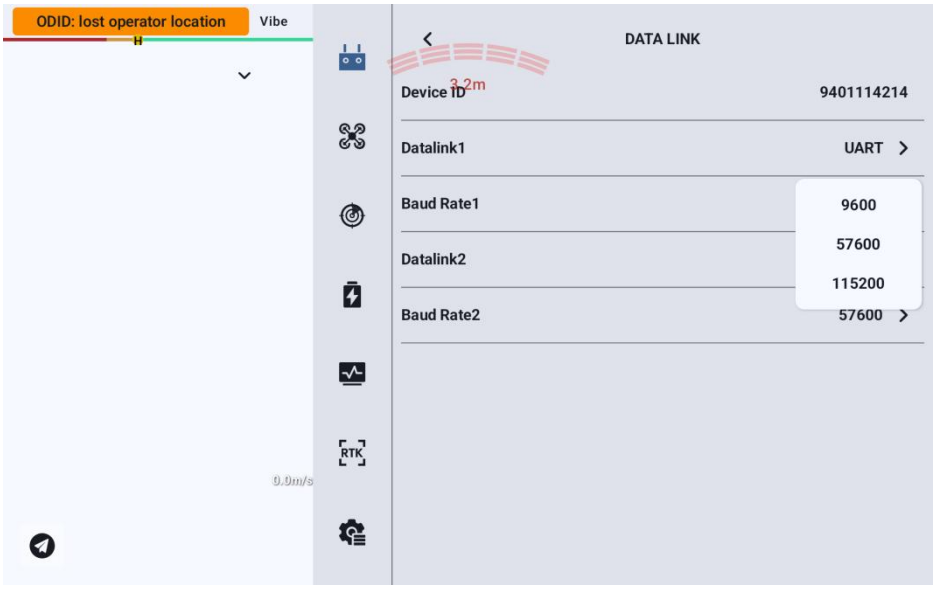
Bluetooth: data link communication through the Bluetooth wireless connection built into the ground unit (supports most ground station software, and also supports data link communication with external devices, such as Windows ground station software).

Upgrade: establishes data link communication with external devices, such as Windows ground station software, through the Type-C port at the bottom of the handheld ground station.

UDP: data link communication through a UDP network protocol connection.

Serial port baud rate

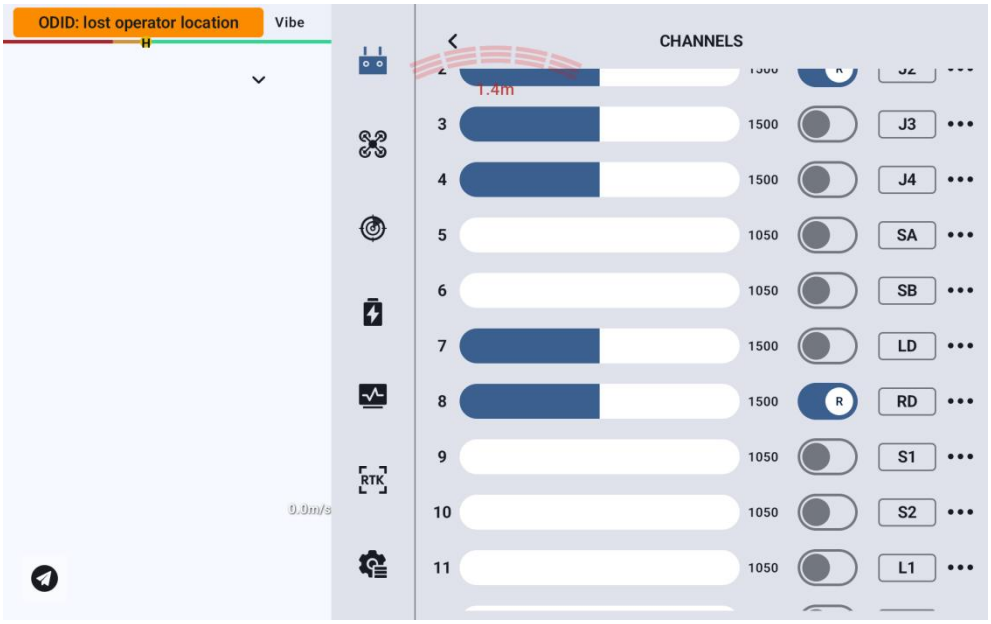
Please manually select the matching serial port baud rate setting.



Note: Before changing the serial port baud rate, make sure the ground unit and the drone end have been linked (paired) successfully; otherwise, the setting will not take effect.

9.4.4 Channel Settings

With the channel settings function, the user can set the servo travel, travel center, servo reversal, and channel mapping of each channel of the handheld ground station.



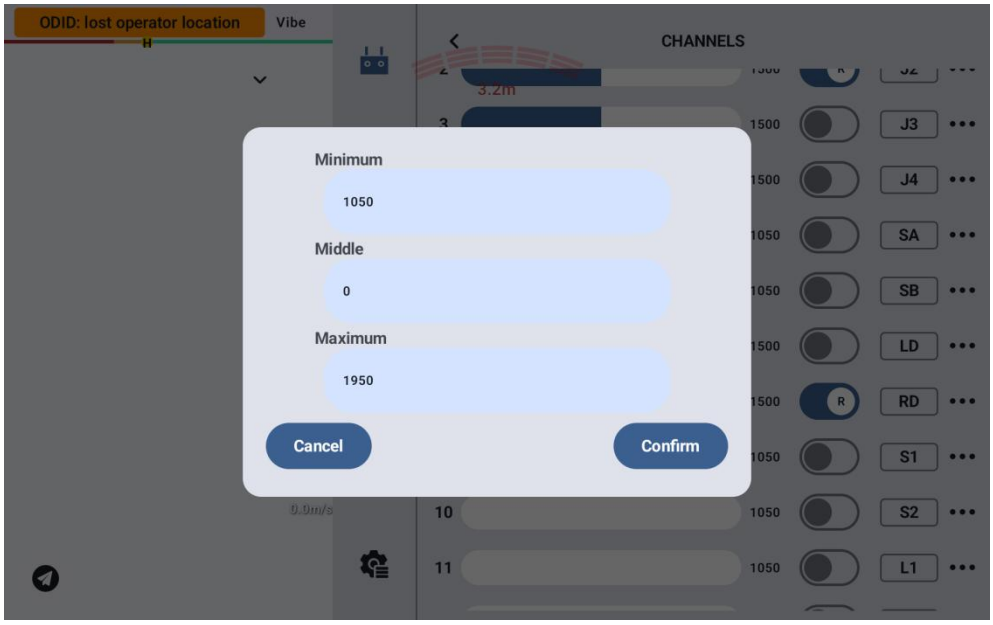
Servo travel

The default travel range of the UniRC 7 handheld ground station is 1050 to 1950.

Select the target channel and enter the desired travel value to complete the change.

Travel center: the default channel travel is 1500.

Select the target channel and enter the desired travel center change value to complete the change.

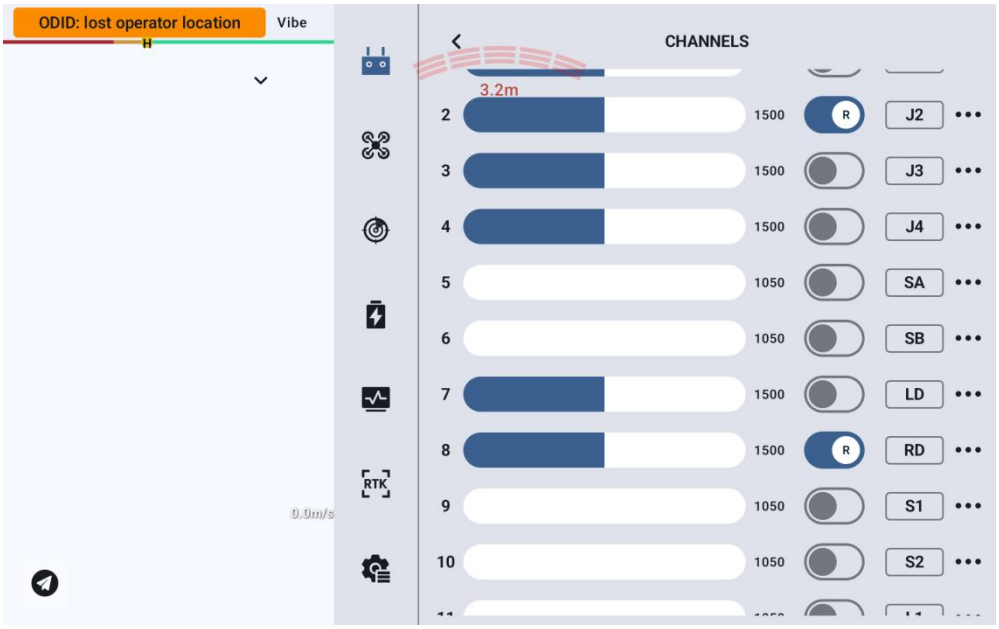


Note: The range of the travel center is ±500. For example, to set the travel center to 1700, set the travel center to +200; to set the travel center to 1300, set the travel center to -200.

Servo reversal

The servo reversal function is used to reverse the output direction of the channel travel.

Select the target channel and click the corresponding servo forward/reverse switch to set the servo to forward or reverse.



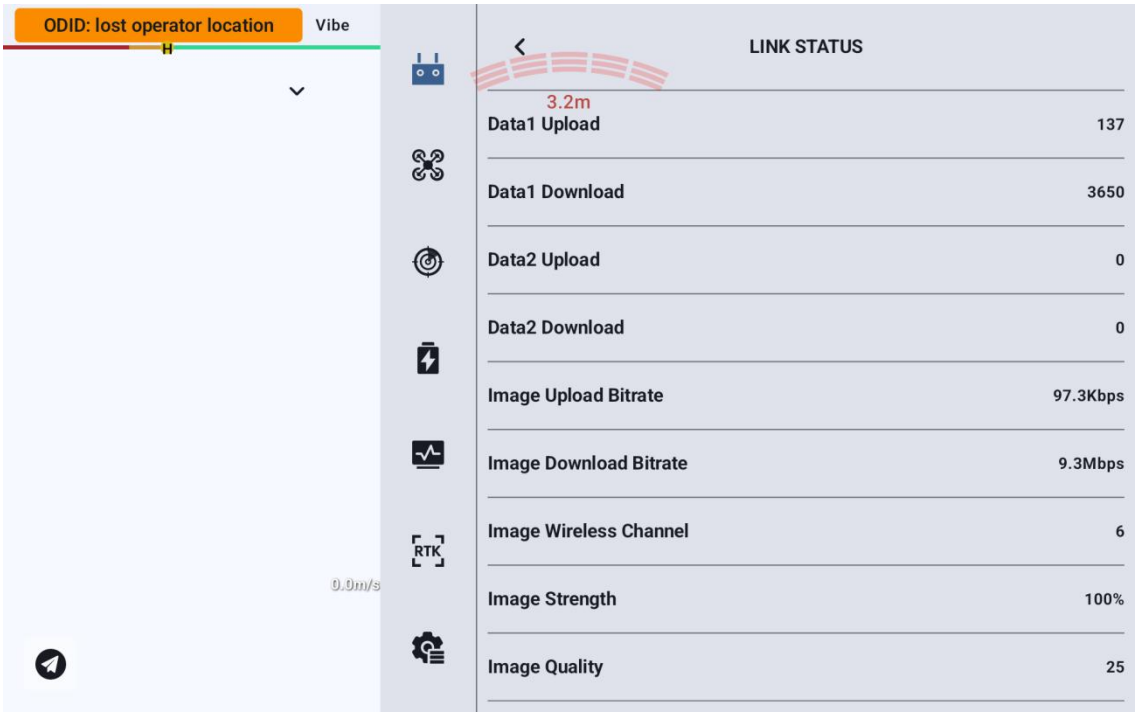
Channel mapping

The UniRC 7 handheld ground station supports a total of 26 physical channels and 16 communication channels, and allows the user to freely define the mapping relationships between physical buttons, switches, joysticks, and communication channels through the channel mapping function.

Select the target channel, click the channel mapping button, and a switch list pops up. Select the desired switch to complete the connection.

9.4.5 Link Information

The wireless communication quality is intuitively displayed by showing the link working status information in real time.



About link information

Packet loss rate: the number of data packets that fail to return to the ground unit per second.

Valid packets: the number of data packets successfully transmitted back to the ground unit per second.

Data link uplink: the amount of data uploaded to the drone end per second (bytes).

Data link downlink: the amount of data downloaded from the drone end per second (bytes).

Video transmission uplink bitrate: the amount of data sent per second on the video transmission uplink.

Video transmission downlink bitrate: the amount of data received per second on the video transmission downlink.

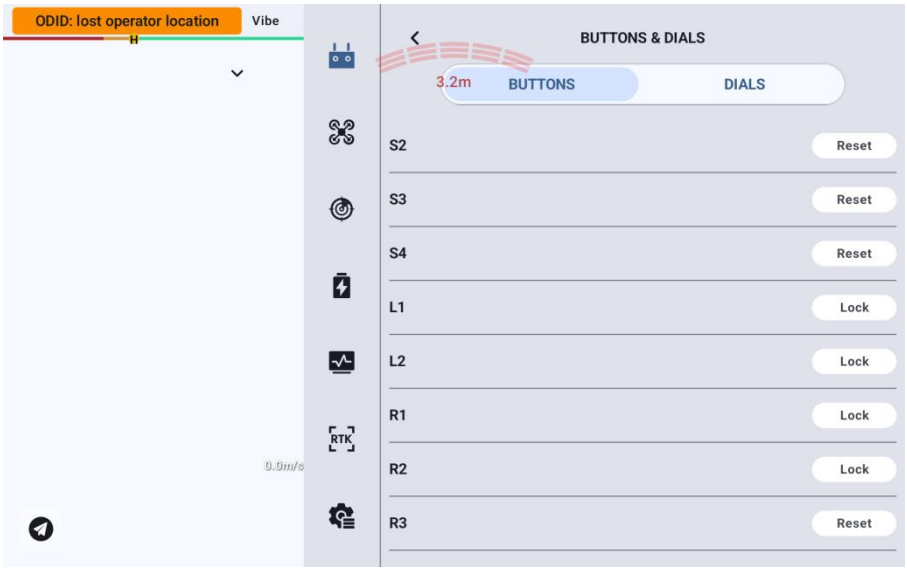
Video transmission wireless channel: the operating frequency point of the link under the current operating frequency.

Signal strength: the strength of the radio waves for communication between the ground station and the drone end.

Signal quality: the reliability and stability of the signals transmitted between the ground station and the drone end.

9.4.6 Button and Dial Settings

The UniRC 7 handheld ground station supports setting the working modes of buttons and dials.



Button settings

This function allows you to set the working mode of the buttons.

About button working modes

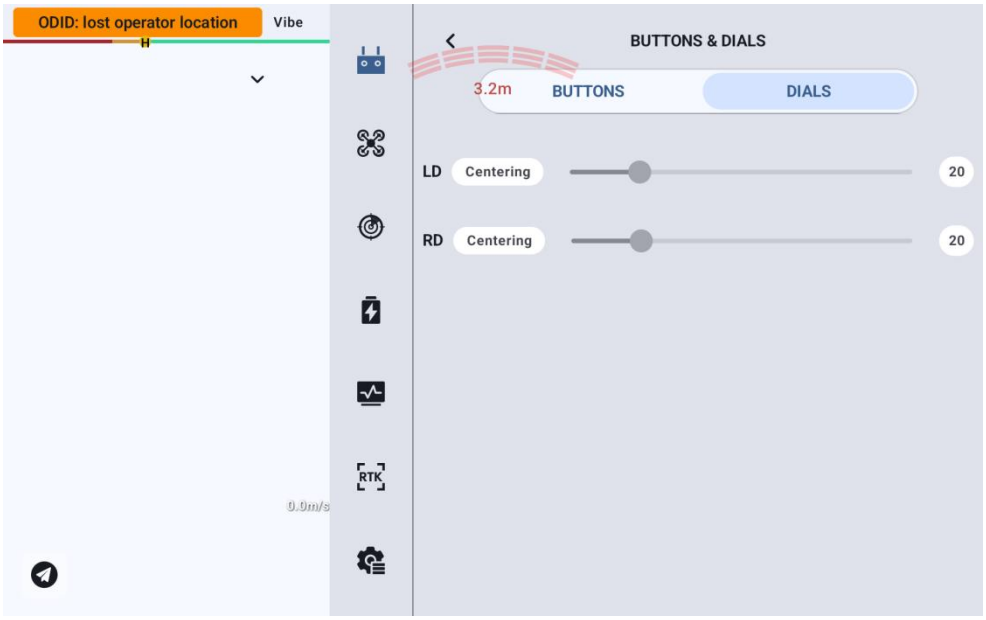
Self-locking: after a self-locking button is pressed, the button springs back, but its channel keeps outputting a value of 1950; when pressed again, the channel output becomes 1050.

Three-position switch: in this mode, the button has three positions, similar to a three-position switch. A short press switches the channel output value between 1950 and 1050, and a long press sets the channel output value to 1500.

Momentary (non-self-locking): when the button is pressed, the channel has output; when released, the channel output returns to zero.

Dial settings

This function allows you to set the working modes of the left and right dials LD and RD.



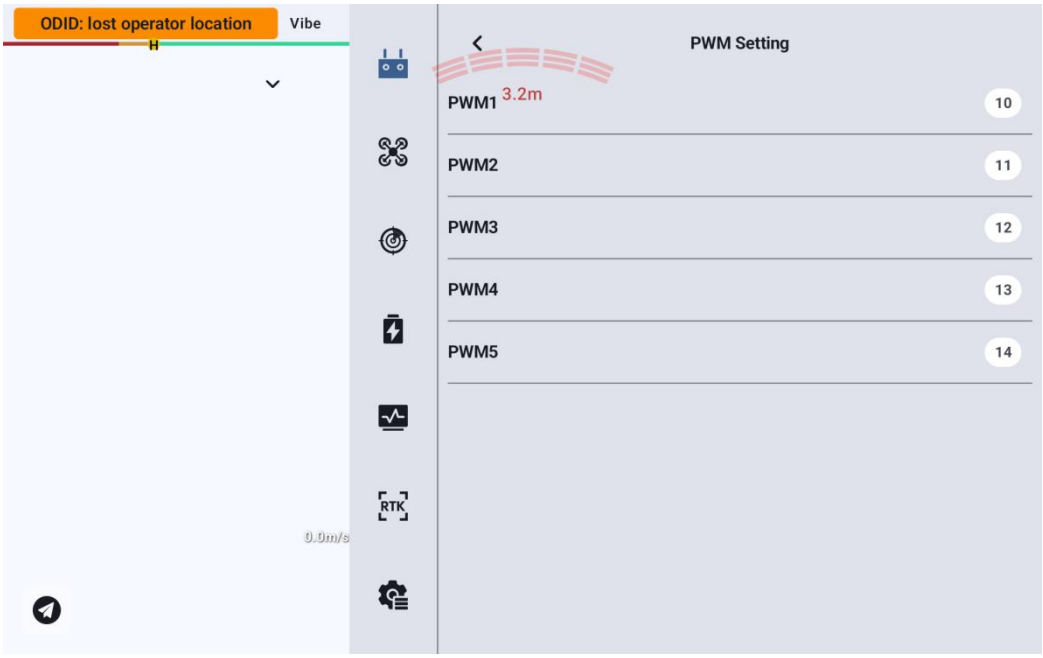
About dial working modes

Auto-centering: in "auto-centering" mode, when the dial is pushed and released, the dial output value returns to the initial value (channel midpoint).

Non-auto-centering: in "non-auto-centering" mode, when the dial is pushed and released, the dial output value stays at the current channel output value and does not return.

9.4.7 Receiver Settings

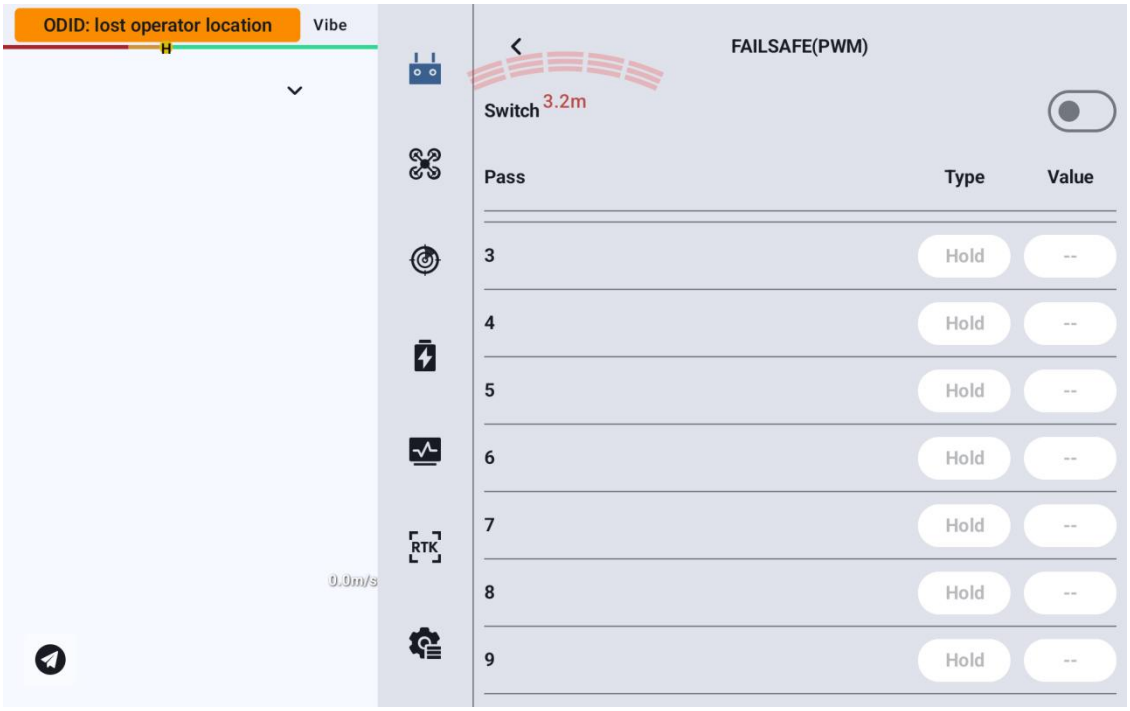
Match the five channels of the drone end PWM interface with the corresponding link communication channels.



9.4.8 Failsafe

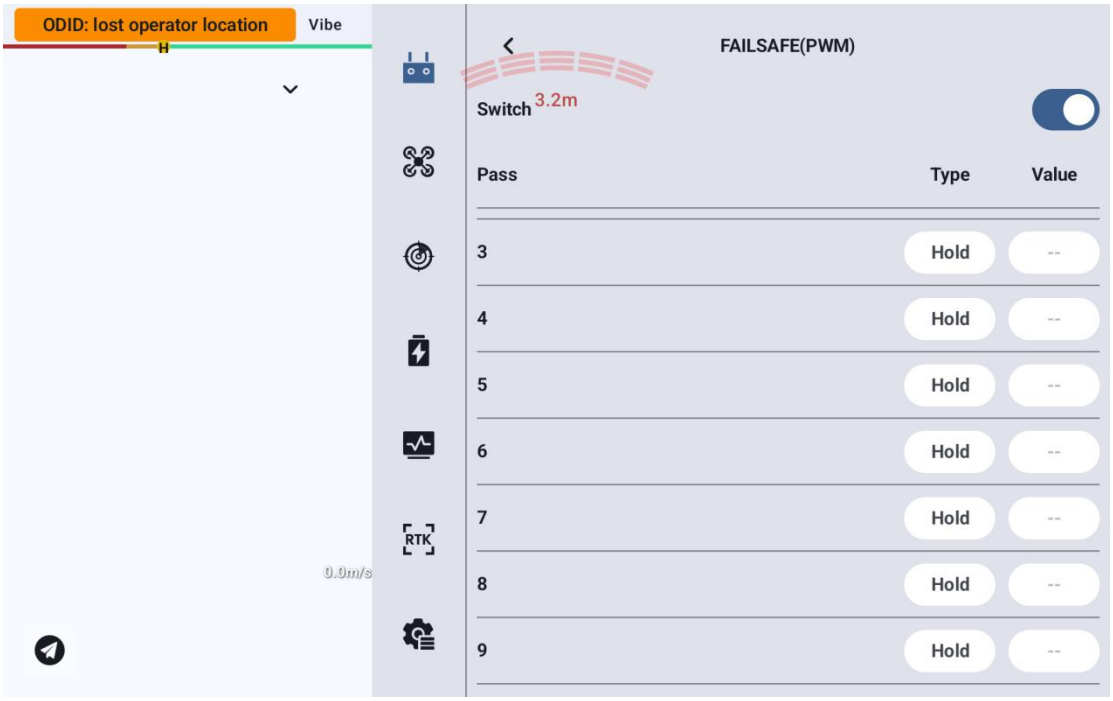
After the ground unit and the drone end are linked (paired) for the first time, be sure to configure the failsafe function.

Failsafe means that when the connection between the ground unit and the drone end is lost, the drone end PWM continues to output the preset channel values to avoid a crash to the greatest extent.



Please follow the steps below to configure the failsafe function for your handheld ground station:

1. Make sure the ground unit has been linked (paired) with the drone end.
2. Enter the "Failsafe" menu; the following interface is displayed:



3. The failsafe function is off by default. The numbers on the left represent the communication channels. When no failsafe output channel value is set, the channel output value displays "Hold" by default.

4. If you need a channel to output a specific value, first turn on the failsafe switch, then click the "Hold" button after the corresponding channel to enter the "Custom" state, and then enter the desired travel value.

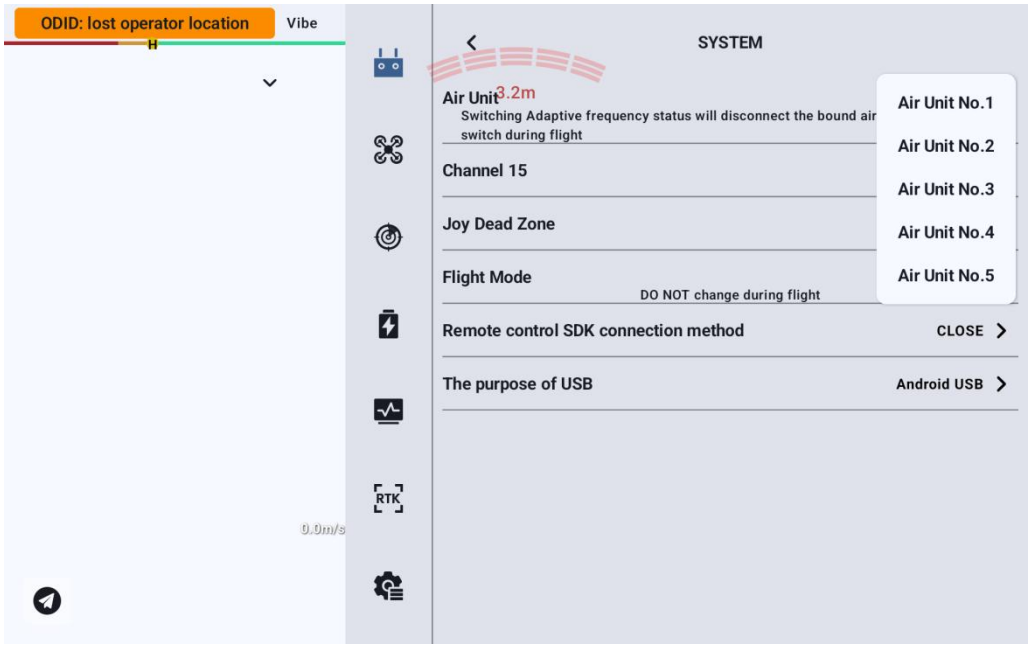
5. After the setting is completed, when the link loses connection, the channel will output the configured travel value.

Note: If the flight controller used with your handheld ground station communicates via the S.Bus protocol, you do not need to set failsafe on the ground unit (unless the flight controller specifically requires a certain channel to hold a value upon signal loss to trigger failsafe entry into return to launch). You only need to set the corresponding protection measures in the flight controller ground station software. The S.Bus communication protocol contains a failsafe flag bit that tells the flight controller which situations count as signal loss.

9.4.9 System Settings

Multiple drone ends

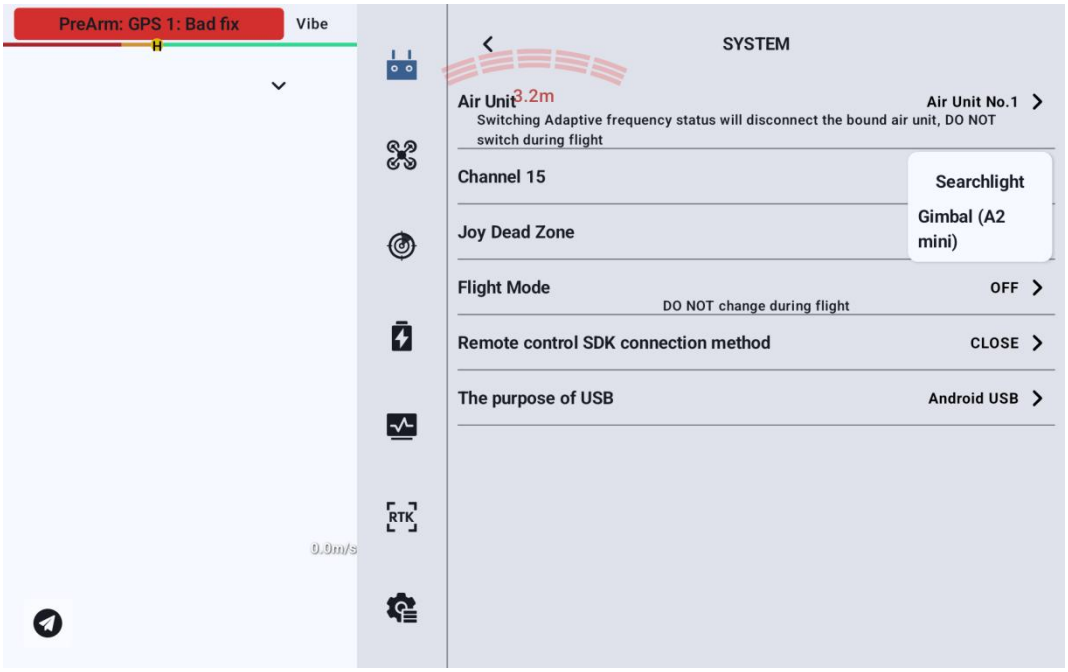
The multiple drone ends function supports saving multiple groups of drone end linking (pairing) information and corresponding channel setting data on the same ground unit. In this way, after each drone end is linked (paired) with the ground unit for the first time, the user can switch between them without linking again.



Danger: It is forbidden to switch the drone end during flight. Switching the drone end during flight will cause the link to lose control!

Channel 15

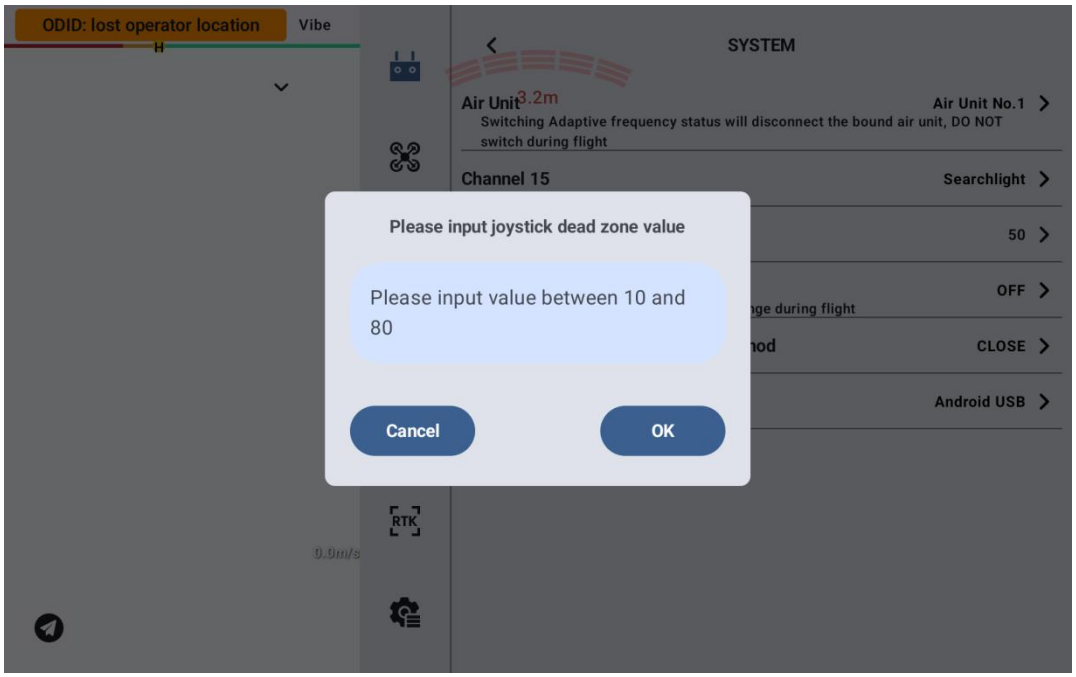
Switch the control of communication channel 15 to the searchlight switch of the tri-proof camera or the pitch rotation of the A2 mini gimbal.



Note: Channel 15 corresponds to the device connected to the LAN 1 port of the drone end, and channel 16 corresponds to the device connected to the LAN 2 port of the drone end. Channel 16 defaults to the searchlight.

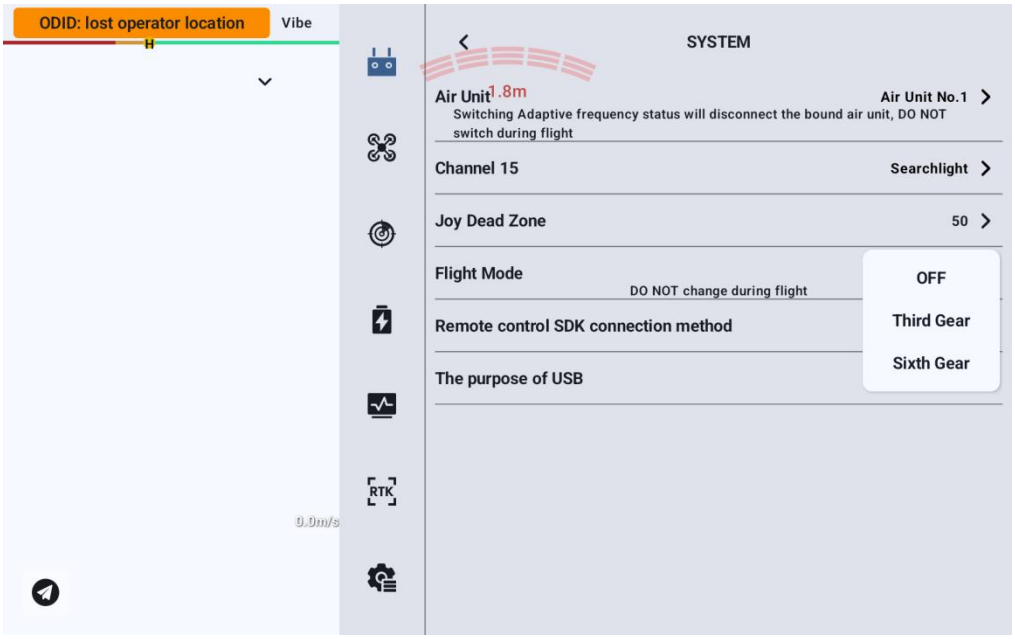
Joystick dead zone

Adjust the joystick dead zone to adapt to different control feels.



Flight channel

The flight channel can be set to 3-position mode, 6-position mode, or off.



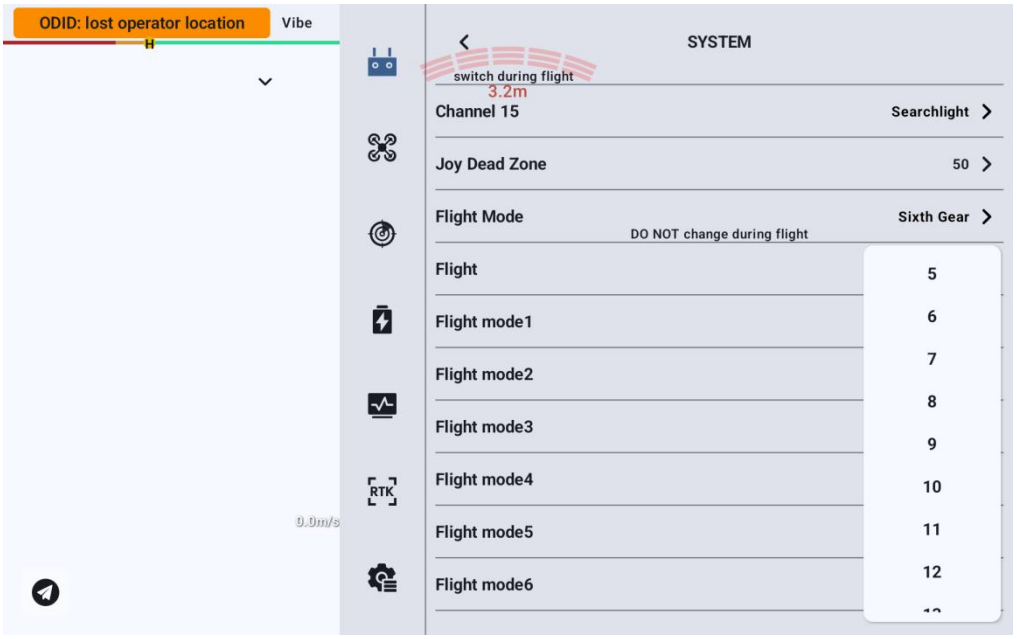
Off: turns off the flight mode function.

3-position mode: buttons M1–M3 are mapped to one channel. Pressing M1 sets the channel output to 1050, pressing M2 sets it to 1500, and pressing M3 sets it to 1950.

6-position mode: buttons M1–M6 are mapped to one channel. Pressing M1 sets the channel output to 1000, M2 to 1250, M3 to 1425, M4 to 1575, M5 to 1700, and M6 to 2000.

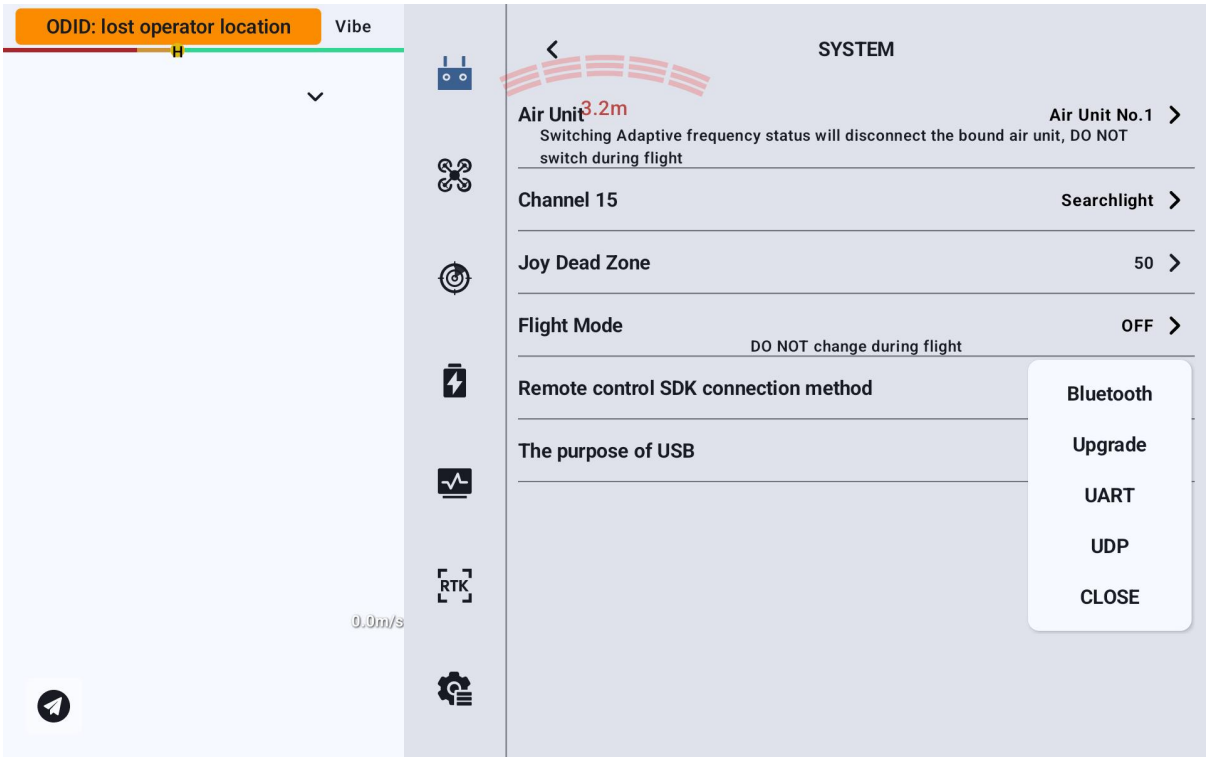
Flight channel:

the communication channels to which the flight modes are mapped are shown below:



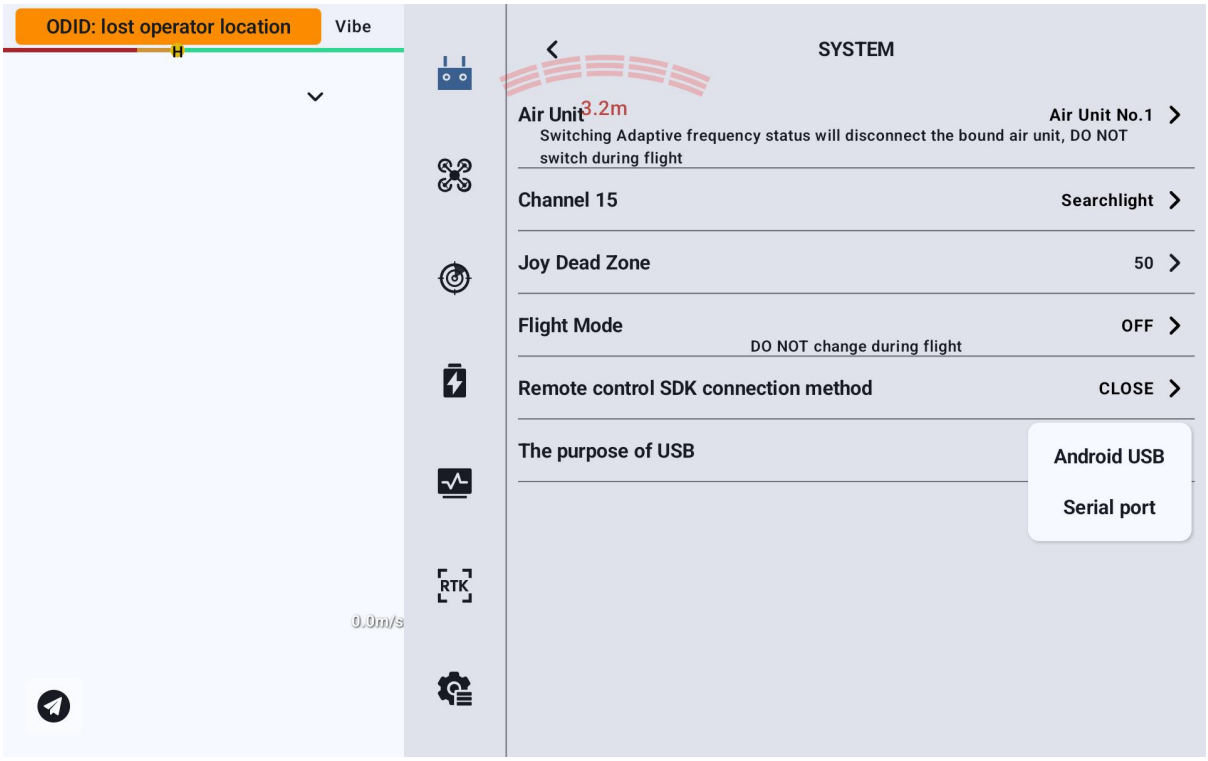
Remote controller SDK connection method

The connection method by which the user connects the link to their own network and ground station through the SDK.



Purpose of the remote controller USB

The user can manually switch the working mode of the remote controller's internal USB.



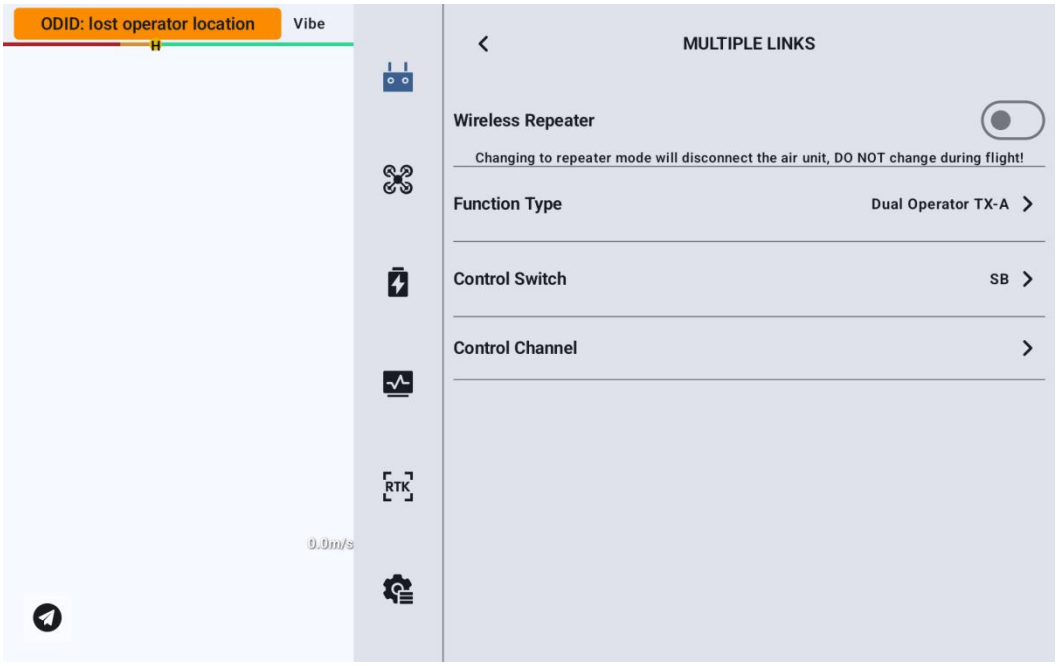
9.4.10 Multi-Device Interconnection

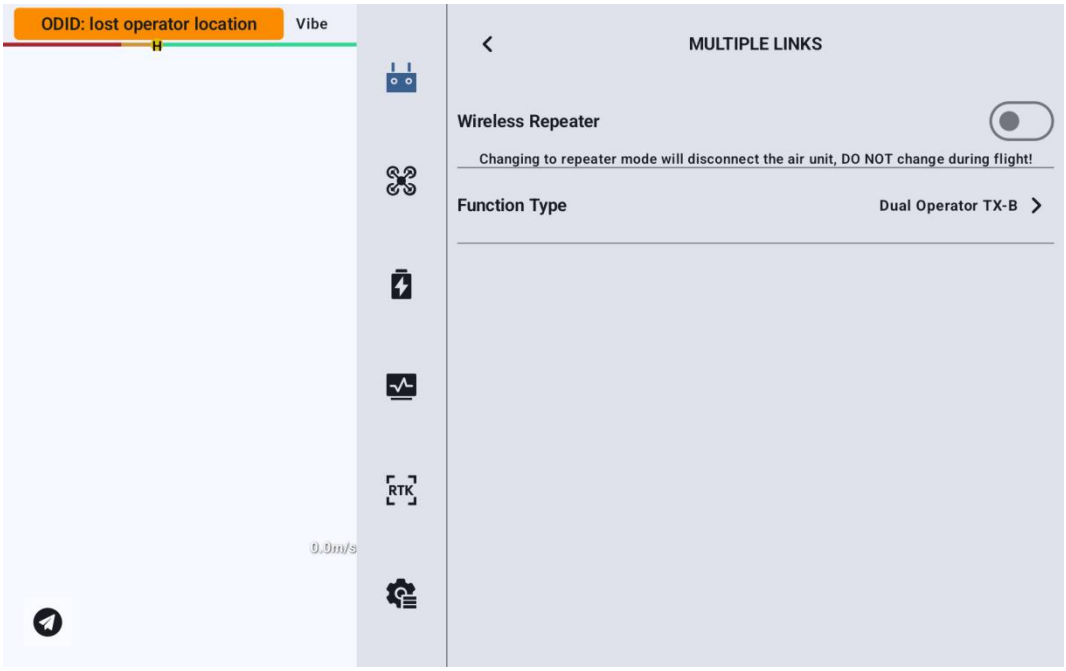
One-aircraft dual-control mode

1. First, set the function type of the master ground unit to "One-Aircraft Dual-Control – Master", and link (pair) the master ground unit with the drone end.

2. Then, set the function type of the slave ground unit to "One-Aircraft Dual-Control – Slave", and link (pair) the slave ground unit with the drone end.

3. After linking is completed, the master can use the master control switch to hand over the control authority of the control channels that are set as the slave's control channels to the slave (control authority switching is controlled only by the master control switch).

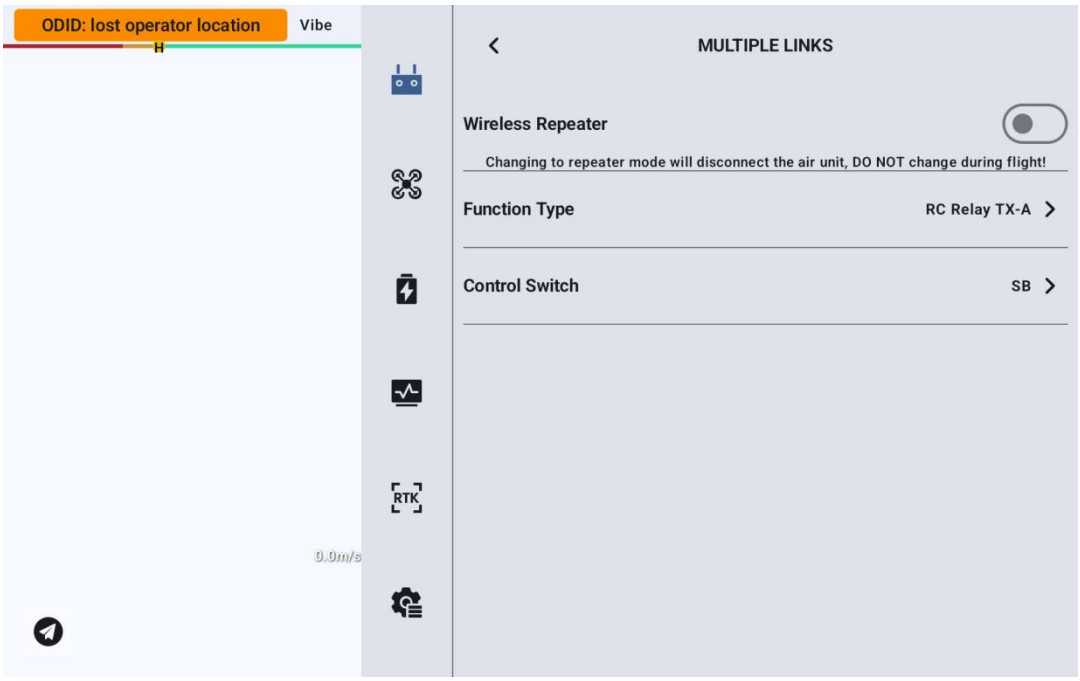


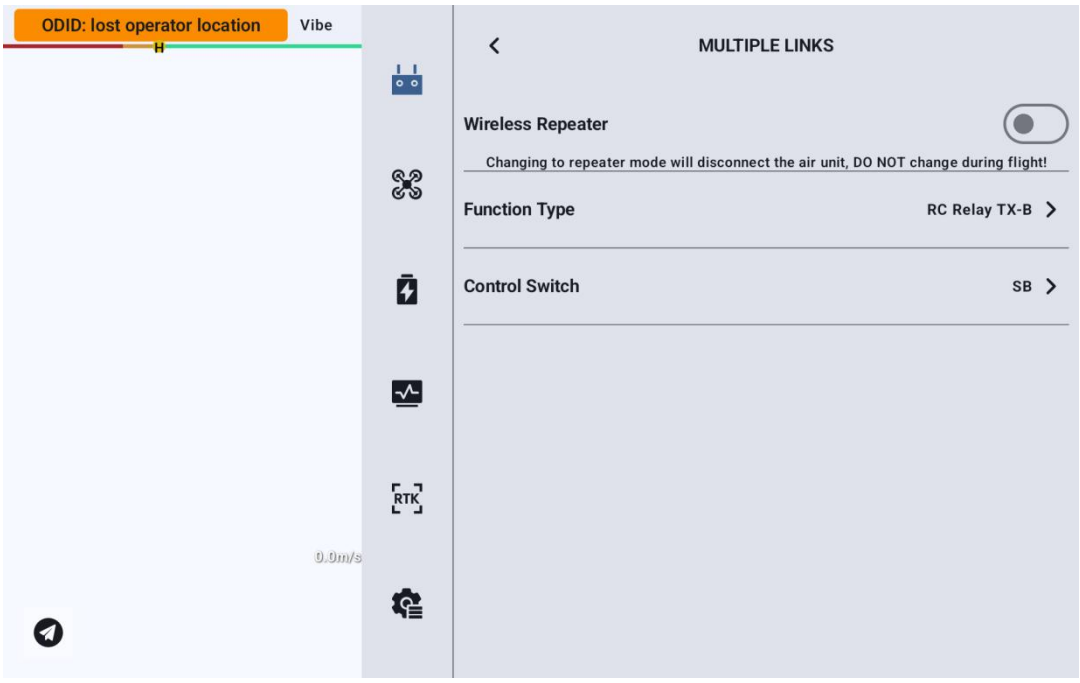


Remote controller relay mode

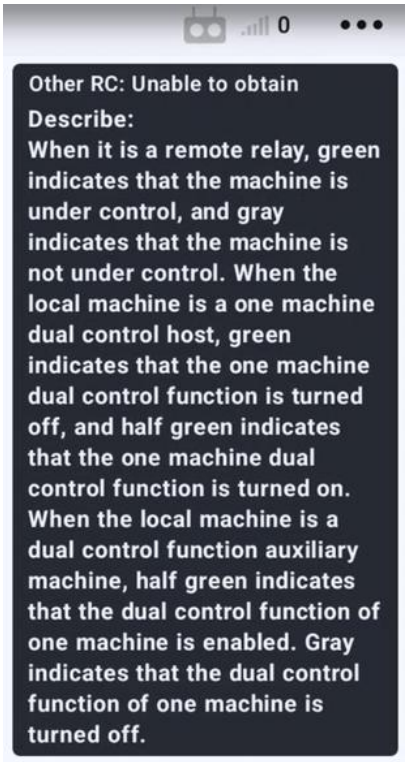
1. First, set the function type of the master ground unit to "RC Relay – Master", and link (pair) the master ground unit with the drone end.

2. Then, set the function type of the slave ground unit to "RC Relay – Slave", and link (pair) the slave ground unit with the drone end.





3. Linking with the drone end: after linking is completed, control authority is given to the master first. The master can use the master control switch to hand over full control authority to the slave. After control authority is switched to the slave, the slave can use the slave control switch to hand full control authority back to the master. If either the master or the slave disconnects, control authority is automatically switched to the other party.



4. Control status information can be viewed by clicking the green remote controller icon in the upper right corner of the UniGCS App main interface.

Notes on multi-device interconnection

1. After switching the multi-device interconnection mode, linking (pairing) is forced to be performed again;

2. The relay function is under development and is not supported yet;

3. In RC relay mode and one-aircraft dual-control mode, the slave is forbidden to set the data link baud rate, PWM, failsafe, channel 15 mode, and video transmission downlink bandwidth;

4. Multi-device interconnection forbids setting the video transmission mode; the mode is fixed to bitrate enhancement mode;

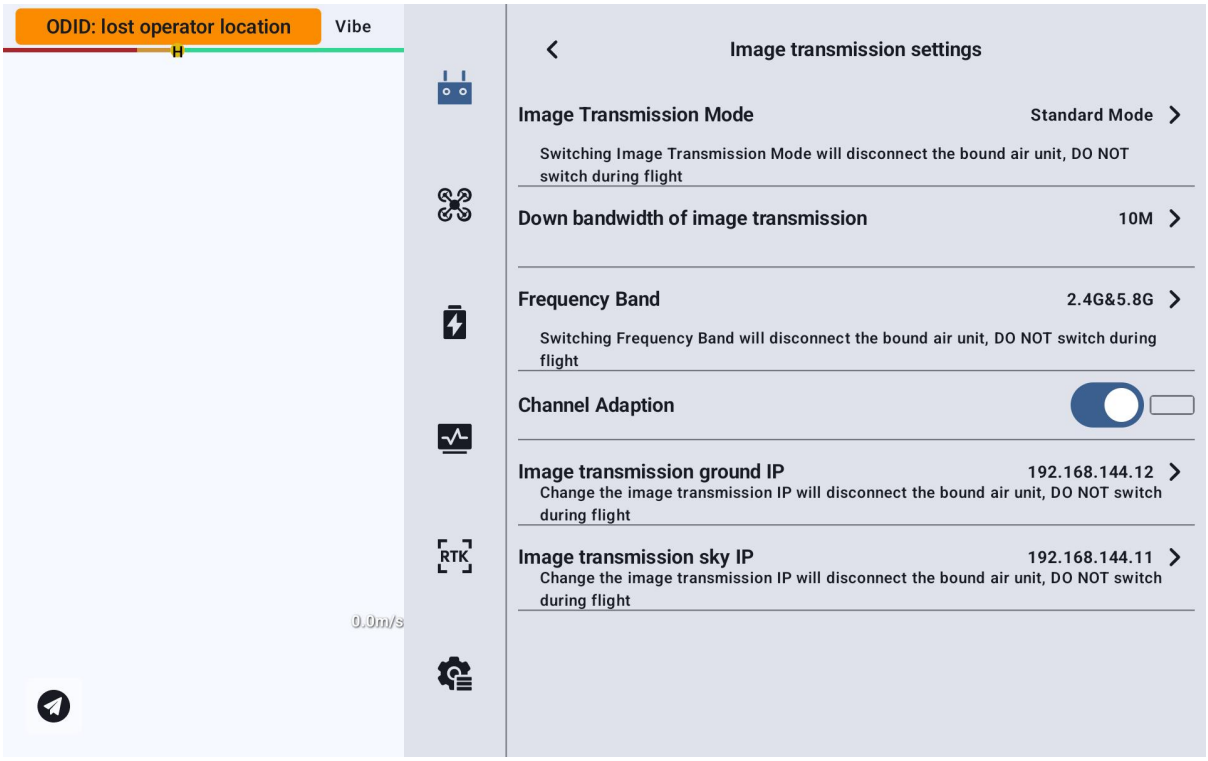
5. Multi-device interconnection does not support wireless channel setting for now; it is fixed to adaptive wireless channel mode;

6. If the UniGCS App is used for dual-control dual-video output, the master's video transmission downlink bandwidth needs to be set to 20M, and the camera address of the second video output for dual control should be filled in with the RTSP address;

7. In RC relay mode and one-aircraft dual-control mode, the frequency band configuration must be performed synchronously on the master and the slave. Wireless relay does not support frequency band setting for now; the frequency band is determined by the frequency band of the ground unit at the time of linking;

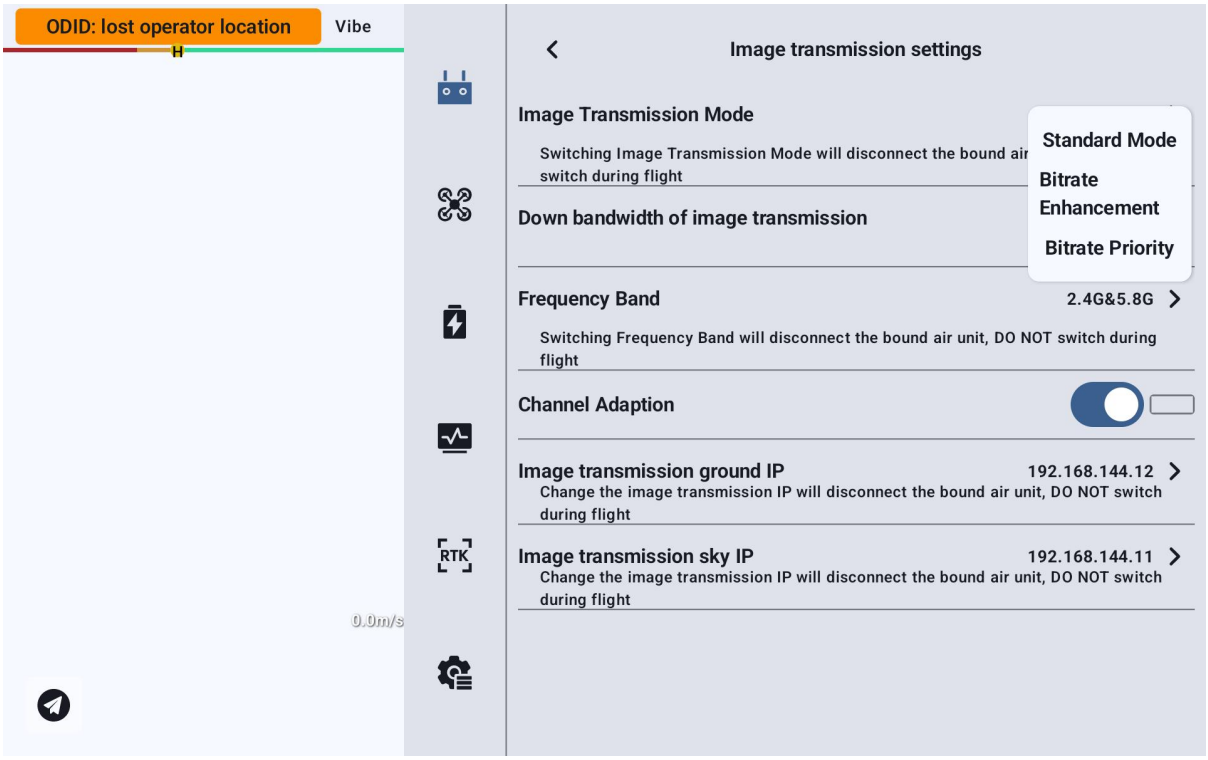
8. In RC relay mode and one-aircraft dual-control mode, the slave's video transmission IP is 192.168.144.13, and the master's video transmission IP is 192.168.144.12.

9.4.11 Video Transmission Settings



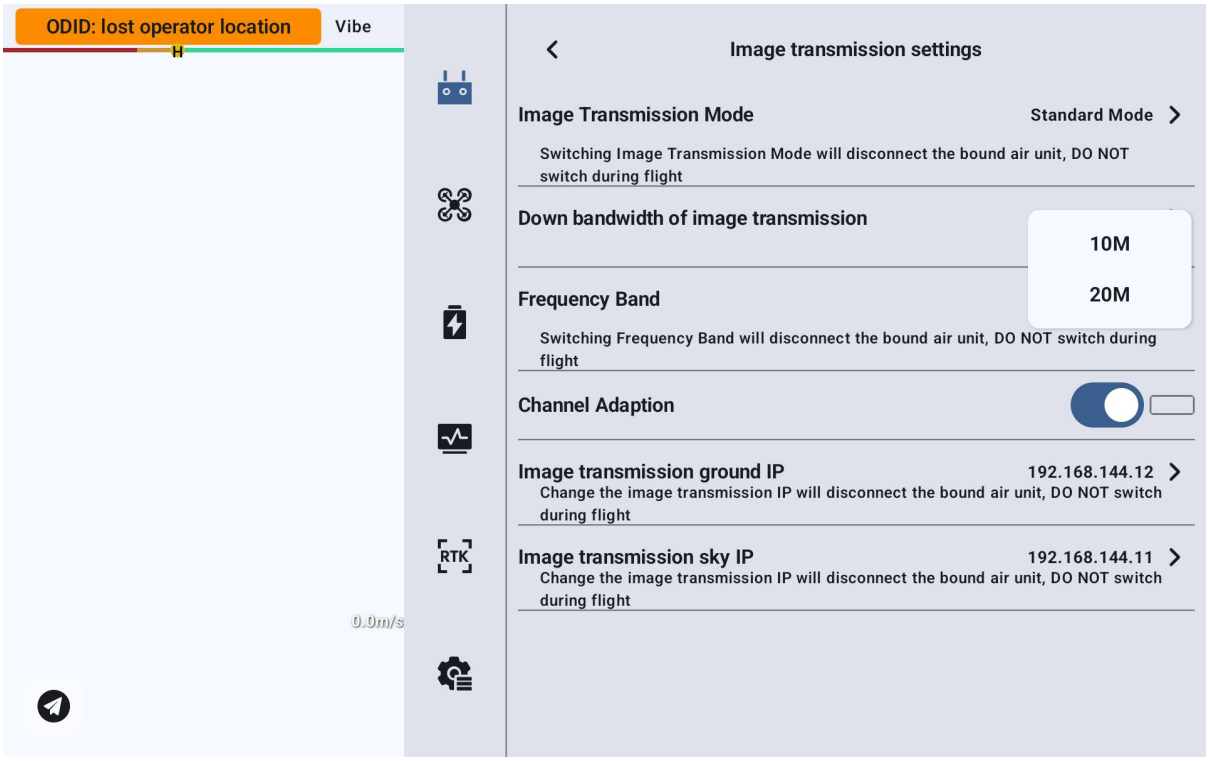
Video transmission mode

Change the bitrate mode of video transmission:



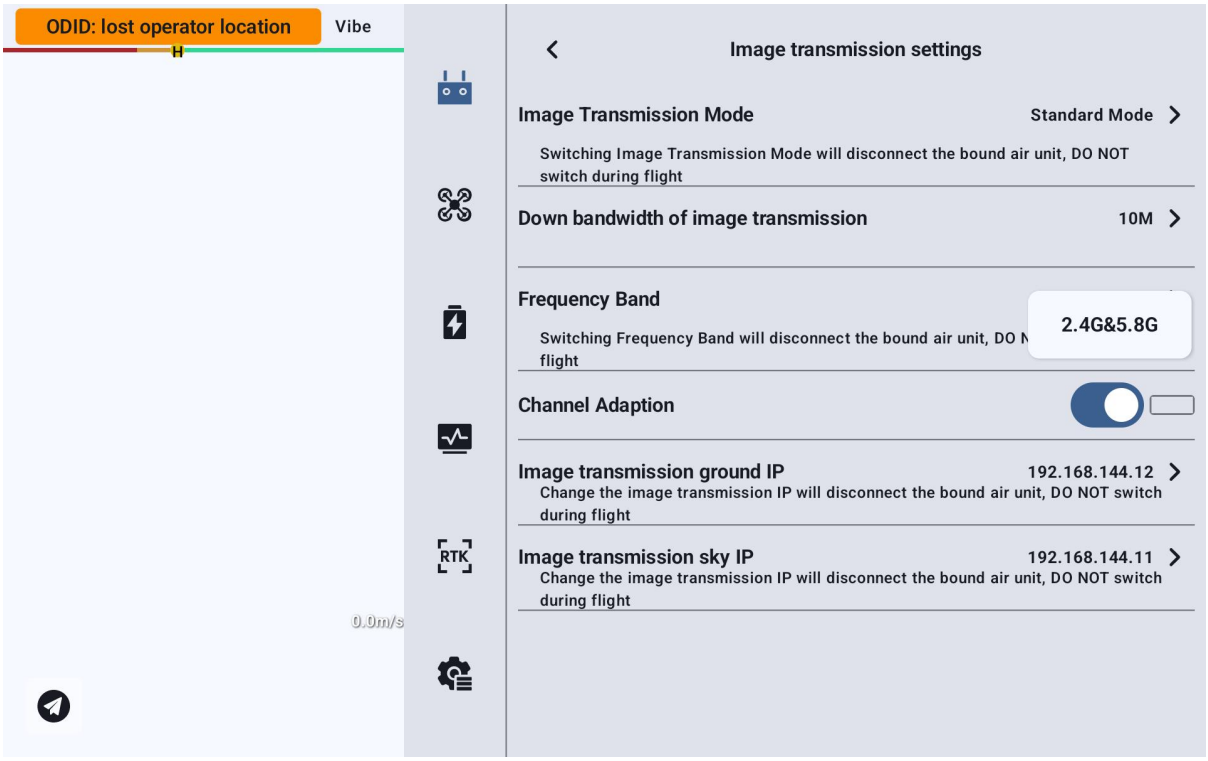
Video transmission downlink bandwidth

The maximum downlink bandwidth of video transmission can be switched:



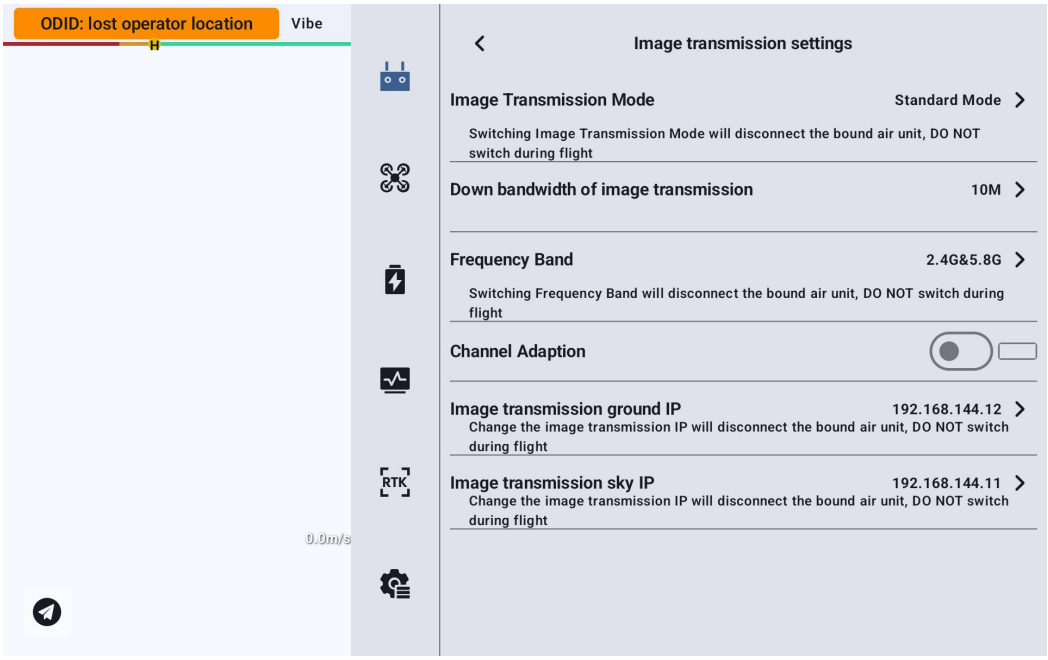
Operating frequency band

The frequency band of the remote controller is fixed to 2.4G & 5.8G:

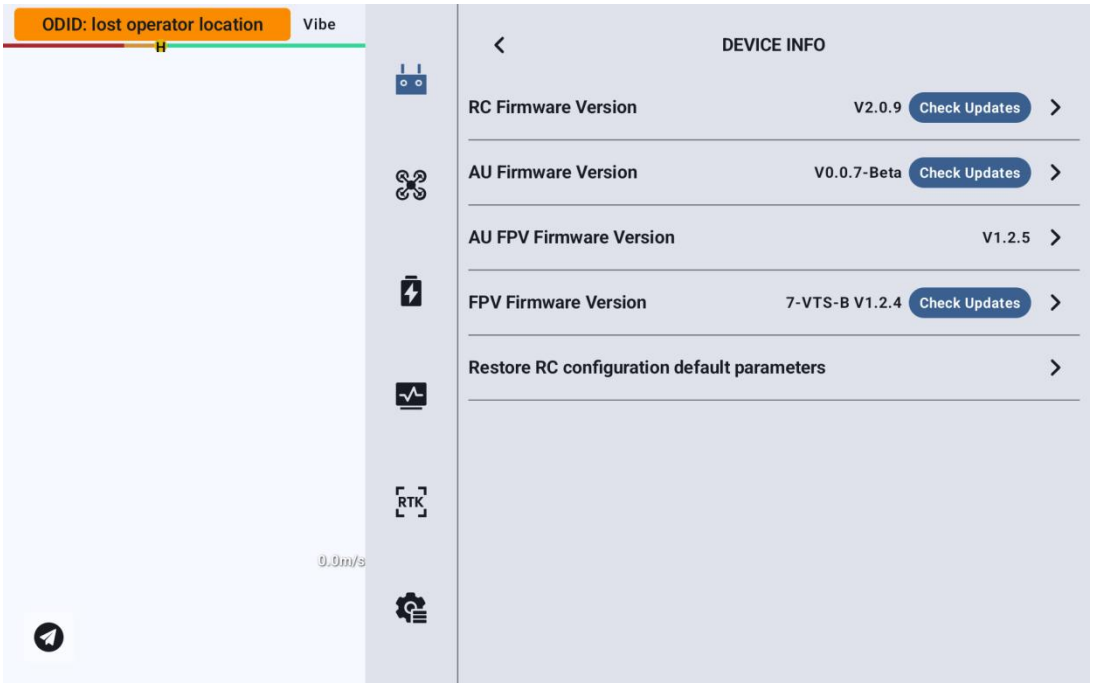


Adaptive wireless channel

In environments with complex electromagnetic interference or noisy wireless signals, when this function is enabled, the link will automatically search for the wireless channel with the lowest interference when establishing a connection, so as to achieve the most favorable conditions for wireless communication. After the adaptive wireless channel is turned off, the wireless channel can be manually selected between 1 and 32.



Device information



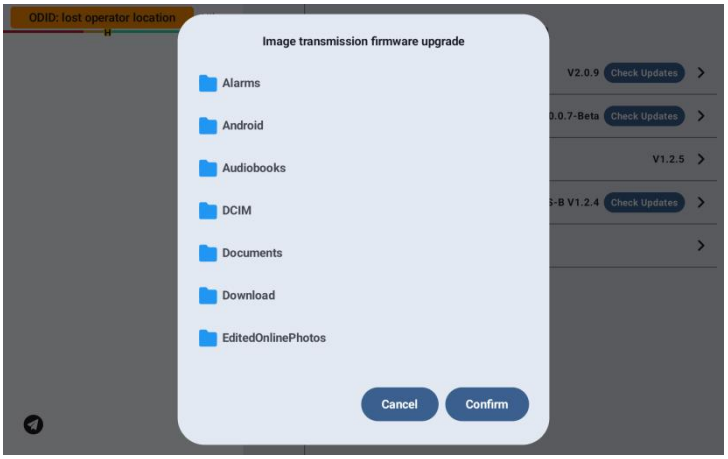
Remote controller firmware version: the current firmware version information of the remote controller main board.

Drone end firmware version: the current firmware version information of the drone end.

Drone end video transmission firmware version: the current firmware version information of the drone end video transmission module.

Video transmission firmware version: the current firmware version information of the remote controller video transmission module.

Click the video transmission firmware version to manually select a local video transmission firmware version to upgrade the video transmission firmware of the drone end and the remote controller.

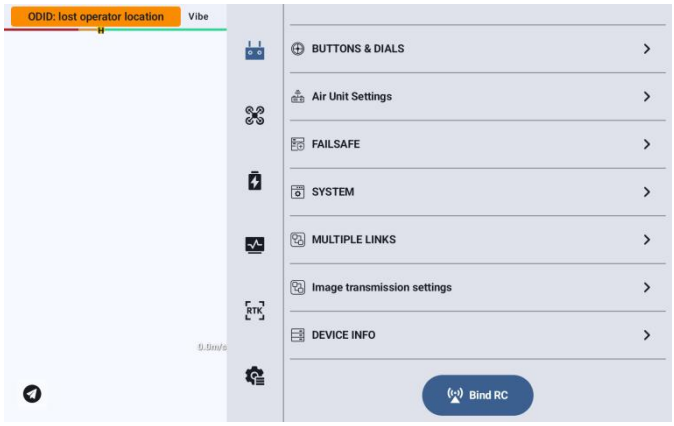


Note: The video transmission module firmware of the drone end and the ground unit must be of the same version before they can communicate.

Linking (pairing)

Please follow the steps below to link (pair) the ground unit and the drone end:

1. Open the remote controller settings menu in "UniGCS" and click "Remote Controller Linking";
2. The ground unit status indicator enters the red fast-flashing state, the "Linking" menu displays "Linking", and the handheld ground station starts beeping;
3. Then press the drone end linking button for 2 seconds; the drone end status indicator also enters the red fast-flashing state;
4. Wait for about 5 to 10 seconds. When the status indicators of both the ground unit and the drone end turn solid green, the linking is successful.

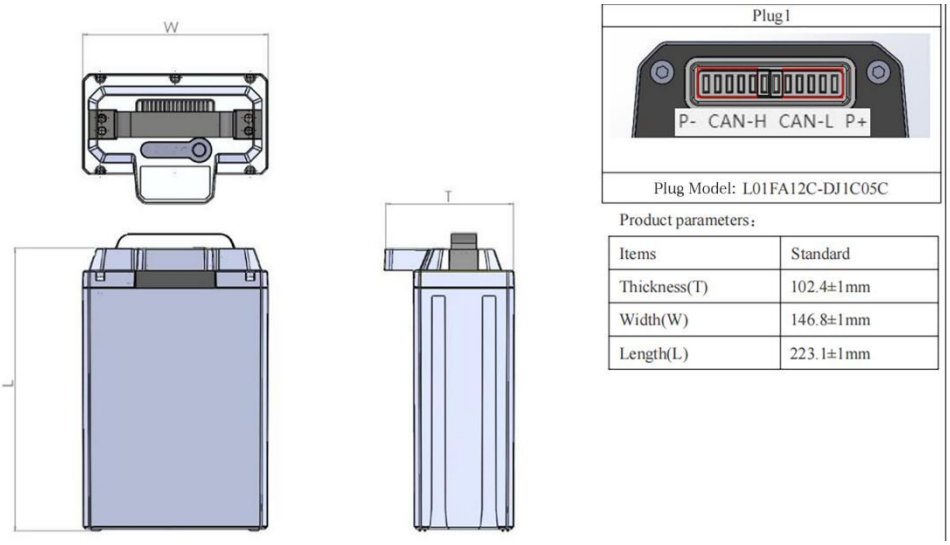


Chapter 10 Intelligent Flight Battery

The intelligent flight battery uses high-voltage 4.4 V lithium cobalt oxide cells and provides abundant power for the aircraft with an advanced battery management system. Before first use, be sure to fully charge the intelligent flight battery.

1. Intelligent battery storage voltage: 45.6 V to 46.8 V (3.8 V to 3.9 V per cell);
2. Nominal voltage: 46.2 V (3.85 V per cell);
3. General minimum discharge voltage: 40 V;
4. Discharge: standard discharge current 0.5C;
5. Maximum continuous discharge current: 90 A;
6. Instantaneous peak discharge current: 210 A;
7. Charging time: the intelligent battery only supports slow-charge mode. From 0% to 100%, the charging time is about 78 minutes (measured in an experimental environment at 25 °C).10.1 Product Specifications

10.1.1 Battery Diagram



10.1.2 Main Technical Parameters

Battery pack characteristics:

NO.	Items	Standard		Remarks
1	Capacity	Pack Nominal Capacity/Typ	19000mAh	Standard 0.5C discharge to cut-off voltage
		Pack Rated Capacity Min	18000mAh	
2	Nominal voltage	46.2V		
3	Voltage as of Shipment	45.6V ~ 46.8V (50% ~ 60% SOC)		
4	Maximum Charging Voltage	52.8V/set		
5	Discharge Cut-off Voltage	36.0V/set (Flight cut-off voltage: 40.0V)		
6	Charging Current	Standard	0.5C	

NO.	Items	Standard		Remarks
		Rapid	19.0A	
	Discharging Current	Standard	0.5C	
		Max Continuous	90A	Not at fully discharged state
		Peak Instantaneous	210A	＜1s
7	Standard Charging Method	Charge at constant current with standard charging current until maximum voltage is reached, then switch to constant voltage charging. Terminate charging when the charging current drops below 0.02C.		
8	Rapid Charging Method	Charge at constant current with rapid charging current until maximum voltage is reached, then switch to constant voltage charging. Terminate charging when the charging current drops below 0.02C.		
9	Maximum Charging Current	19.0A		
10	Internal Impedance	Max: 60mΩ		
11	Energy	877.8Wh (Energy at flight cut-off voltage: 825.3Wh)		
12	Weight	About 3620g		
13	Operating Temperature	Charge：0°C ~ +45°C		Do not operate outside the specified temperature range
		Discharge：-10°C ~ +60°C		
14	Storage Temperature	0°C ~ +25°C		Refer o 6.0 for details

10.2 System Working Modes

Mode	Description
Working mode	MOS discharge mode: first short-press the button and the LEDs show the battery level; then long-press the button until the 4 green LEDs light up in sequence; the LEDs then indicate the current battery level and the battery enters discharge mode. Charging mode: after the charger is connected, the charging MOS tube turns on and the charging port accepts input.
Low-power mode	In power-off state, the battery enters sleep after 10 seconds; in power-on state, it enters sleep after 120 minutes. Entering sleep turns off the output.

Button functions & battery level indication

LED status indication:

Battery level indication:

Current Level	LED1	LED2	LED3	LED4
0%–12%	Flashing	Off	Off	Off
13%–24%	On	Off	Off	Off
25%–37%	On	Flashing	Off	Off

Current Level	LED1	LED2	LED3	LED4
38%–49%	On	On	Off	Off
50%–62%	On	On	Flashing	Off
63%–74%	On	On	On	Off
75%–87%	On	On	On	Flashing
88%–100%	On	On	On	On

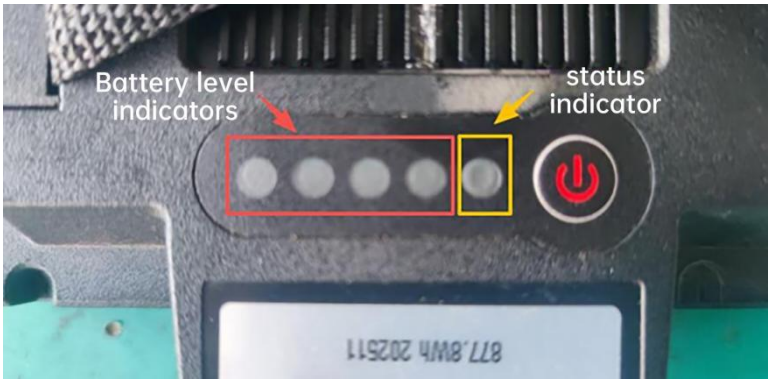
Charging indication:

Current Level	LED1	LED2	LED3	LED4
0%–12%	Flashing	Flashing	Flashing	Flashing
13%–37%	On	Flashing	Flashing	Flashing
38%–62%	On	On	Flashing	Flashing
63%–94%	On	On	On	Flashing
95%–100%	On	On	On	On

Remaining service life (SOH) indication:

SOH	LED1	LED2	LED3	LED4
88%–100%	On	On	On	On
75%–87%	On	On	On	Flashing
63%–74%	On	On	On	Off
50%–62%	On	On	Flashing	Off
38%–49%	On	On	Off	Off
25%–37%	On	Flashing	Off	Off
13%–24%	On	Off	Off	Off
0%–12%	Flashing	Off	Off	Off

Other indications:



When the battery is powered on or the charger is plugged in, the battery status indicator stays solid on (it does not light up in case of an abnormal fault).

Button functions:

1. **Battery level check:** short-press the button; the LEDs show the current battery level and turn off after 3 seconds.

2. **Power on:** first short-press the button and the LEDs show the battery level; then long-press the button until the 4 green LEDs light up in sequence; the LEDs then indicate the current battery level and power-on is complete.

3. **Power off:** first short-press the button, then long-press the button; the 4 green LEDs turn off in sequence from fully lit, and power-off is complete.

LED abnormal warning indications:

Battery Status	LED Indication	Abnormal Warning Content	Resolution	Remarks
Power-off state	LED1, 2, 3, 4 flashing	Cell voltage difference greater than 1100 mV	Return to factory for repair	In power-off state, the LED warns and power-on is prohibited
	LED2 flashing	Single cell voltage below 3000 mV or undervoltage	Charge	
	LED4 flashing	Discharge over-temperature warning	Cool down to normal temperature	
	LED1, LED4 flashing	Discharge low-temperature warning	Return to normal temperature	
Discharge state	LED2 flashing	Undervoltage warning	Upload to the flight controller; handled by the operator	In discharge state, the warning LED flashes and the warning information is uploaded
	LED3 flashing	Over-current warning		
	LED4 flashing	Discharge over-temperature warning		
	LED1, LED4 flashing	Discharge low-temperature warning		
Charging state	LED1 flashing	Overvoltage warning	Disconnect the charger	In charging state, the warning LED flashes and charging stops at the same time
	5 LEDs flashing	Excessive cell voltage difference	Return to factory for repair	
	LED3 flashing	Charging over-current warning	Replace the charger	
	LED4 flashing	Charging over-temperature warning	Cool down to normal temperature	
	LED1, LED4 flashing	Charging low-temperature warning	Return to normal temperature	

10.3 Battery Storage and Transportation

Items		Requirement
Storage temperature	Short period less than 1 Year	0°C ~ +25°C
	Short period less than 3 months	0°C ~ +35°C
	Short period less than 1 month	0°C ~ +45°C

Items	Requirement
Humidity	65±20%RH
Voltage	45.6V ~ 46.8V
Maintenance instructions	1. Battery must be refreshed at least every 3 months (the battery is fully charged, discharged to cut-off voltage, and then charged to 70%). 2. For long-term storage, battery capacity should not be less than 60%, and refresh every 3 months. Battery is not guaranteed if not recharged at least every 3 months and causing severe battery drain.

10.4 Other Matters

1. Prevent internal short circuits of the battery: use sufficient insulating material to protect the wiring.

2. It is strictly forbidden to disassemble the cells: disassembling the cells may cause an internal short circuit, which in turn may cause swelling, fire, and other problems.

3. Polymer lithium batteries theoretically have no flowing electrolyte, but in case electrolyte leaks and contacts the skin, eyes, or other parts of the body, immediately rinse the electrolyte off with clean water and seek medical attention.

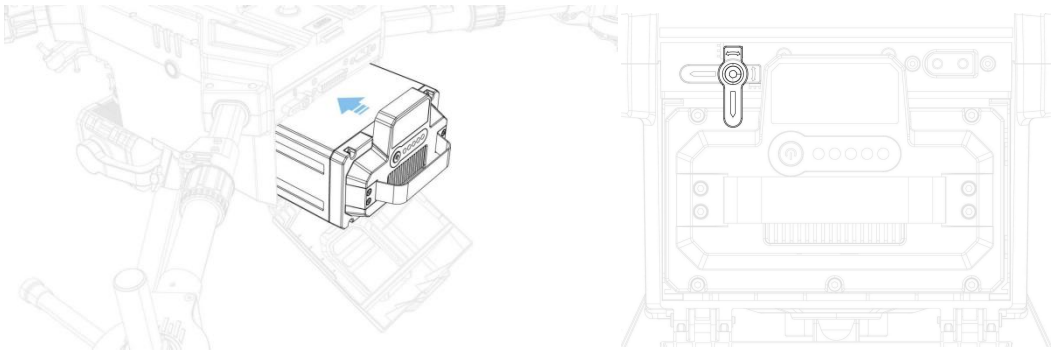
4. Under no circumstances should the cells be burned or thrown into fire; otherwise the cells will burn, which is very dangerous and must be absolutely prohibited.

5. Do not soak the cells in liquids, such as fresh water, sea water, or beverages (juice, coffee).

6. Cell replacement should be completed by the cell supplier or the equipment supplier; users must not replace cells by themselves.

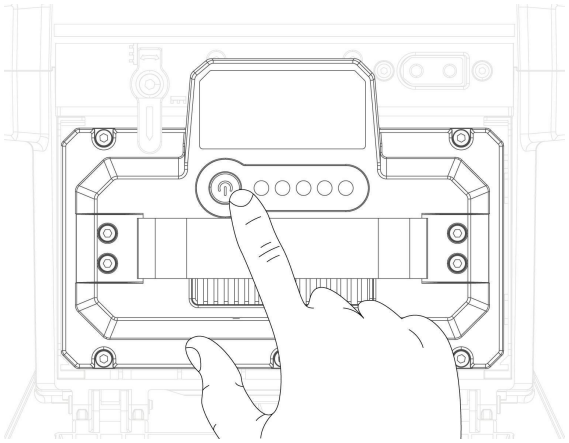
7. Do not use damaged cells: cells may be damaged by impact during transportation. If any abnormal characteristics are found in a cell, such as damaged plastic edge sealing, a damaged casing, the smell of electrolyte gas, or electrolyte leakage, the cell must not be used. Batteries with electrolyte leakage or emitting an electrolyte smell should be kept away from fire sources to avoid fire.

10.5 Installing the Battery



Turning the battery on/off: the battery must be installed on the aircraft before it can be turned on or off.

Turning the battery on/off: first short-press the aircraft power button once, then long-press the power button within 3 seconds. When the battery is on, the aircraft power button is solid green, and the battery level indicators show the current battery level.



Checking the battery level: when the power is off, short-press the battery level check button once to view the current battery level.

10.6 Battery Operation Instructions

10.6.1 Charging

Charging current: must not exceed the maximum charging current specified in the specification sheet.

Charging voltage: must not exceed the maximum limit voltage specified in the specification sheet.

Charging temperature: the battery charging environment temperature must comply with the temperature range in the specification sheet.

Charging mode: charge with constant current first and then constant voltage. Charging in the reversed manner is prohibited. Reversed charging will bring danger.

10.6.2 Discharging

Discharge current: the battery discharge current must not exceed the maximum discharge current specified in the specification sheet. Discharging with excessive current can easily cause battery heating and capacity attenuation.

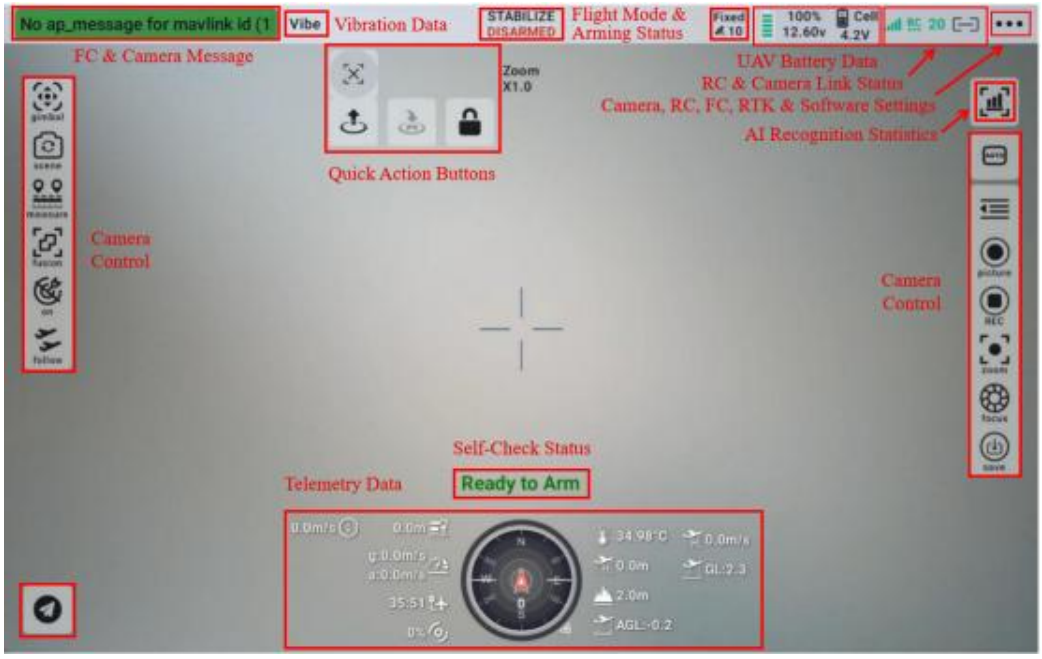
Discharge temperature: the battery discharge temperature must comply with the temperature range in the specification sheet.

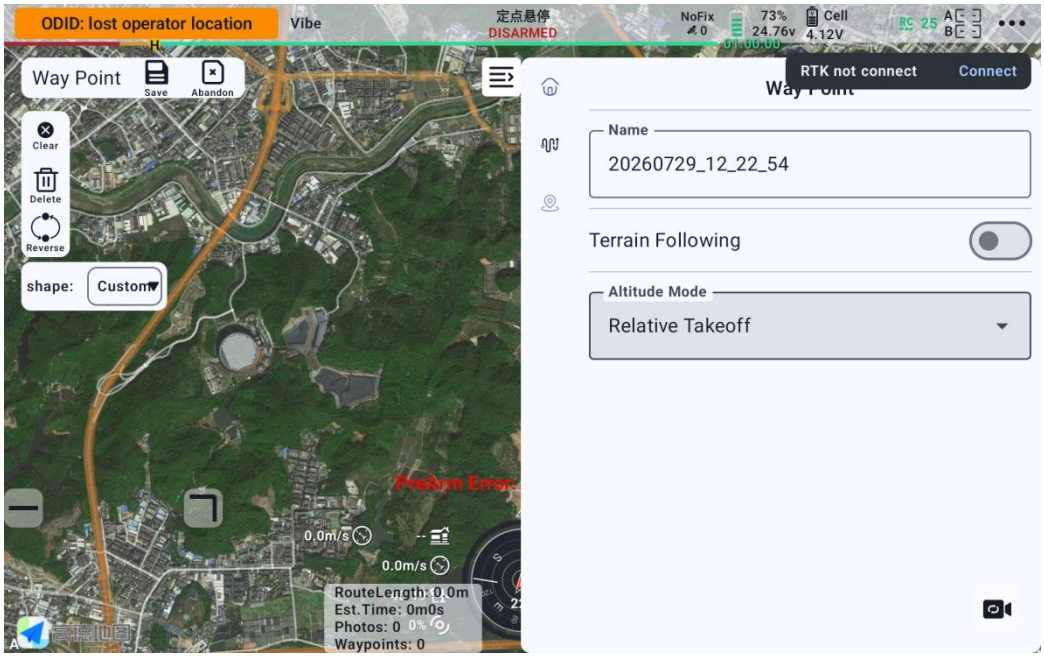
Over-discharge: short-term overcharge or over-discharge does not affect the use of the battery, but long-term over-discharge will affect the battery's function and may even cause battery failure/permanent death. In addition, the battery itself also self-discharges (consumes its own power). The way to prevent battery over-discharge is to keep a certain capacity in the battery.

Storing the battery: the battery should be stored within the temperature range specified in the product specification sheet. For long-term storage of an unused battery, it is recommended to keep the battery capacity above 50% and to moderately charge and discharge it once every 3 months.

Chapter 11 UniGCS App

11.1 Flight Interface and Map Interface

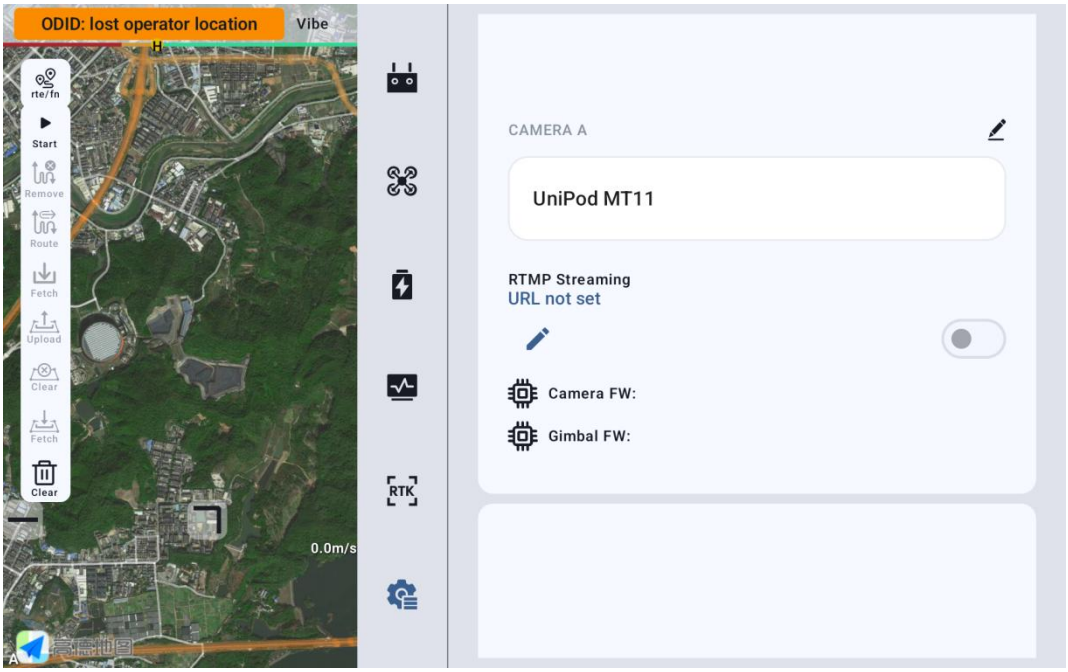




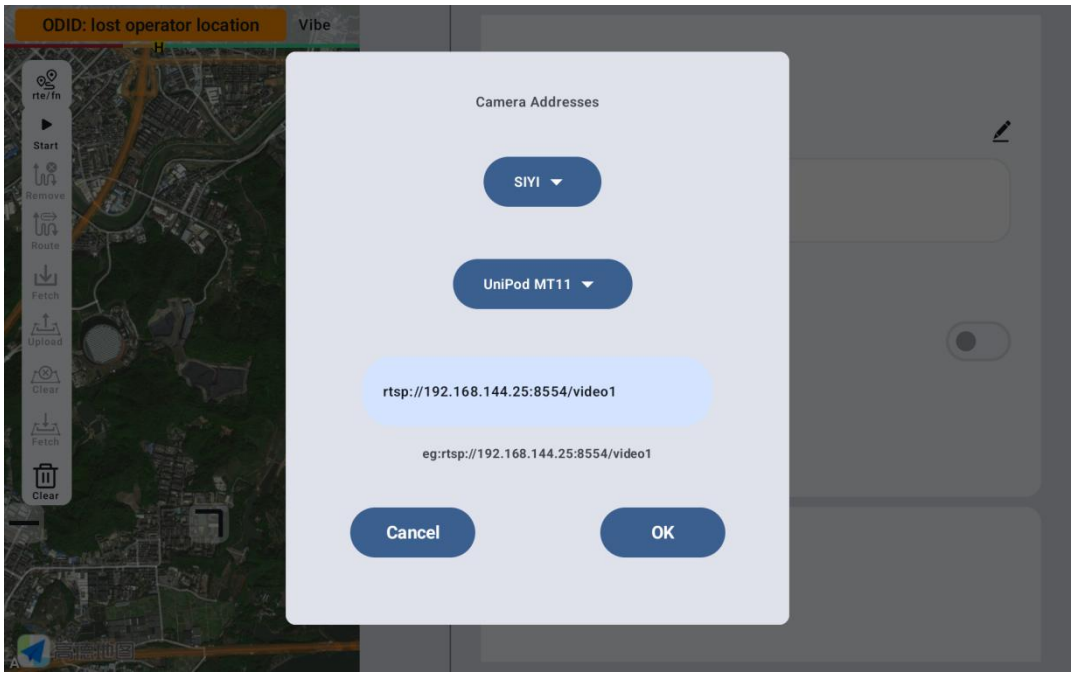
11.2 Gimbal Settings

11.2.1 Connecting the Gimbal

After connecting the gimbal to the Ethernet (LAN) port of the drone end, select the gimbal in use in Camera A or Camera B.



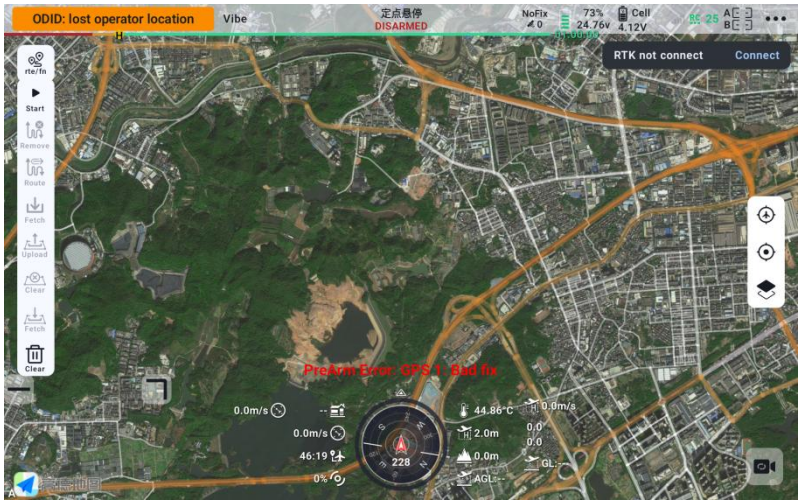
You can also choose to manually enter the RTSP address to connect.



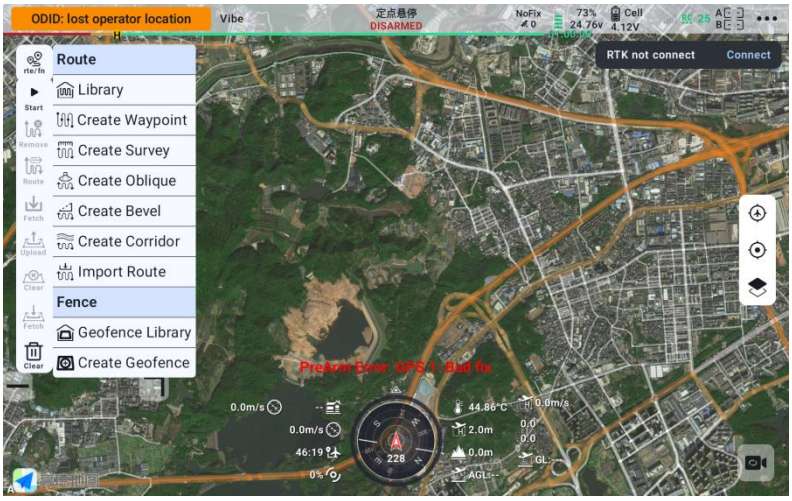
Note: When two gimbals are connected at the same time, the IP address of one of the gimbals needs to be changed to one that does not end in 25. When connecting, choose to manually enter the RTSP address to connect.

11.3 Route Planning

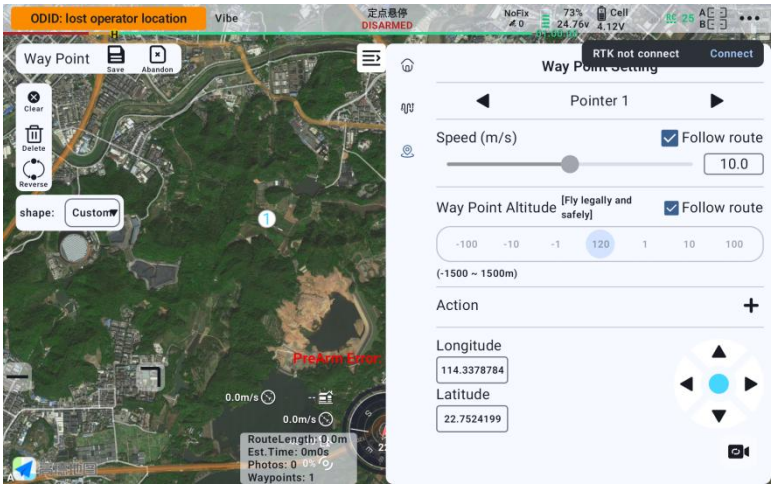
1. Click the icon to enter the route planning interface;
2. Choose to create a new route or use a route from the route library, and write the route;



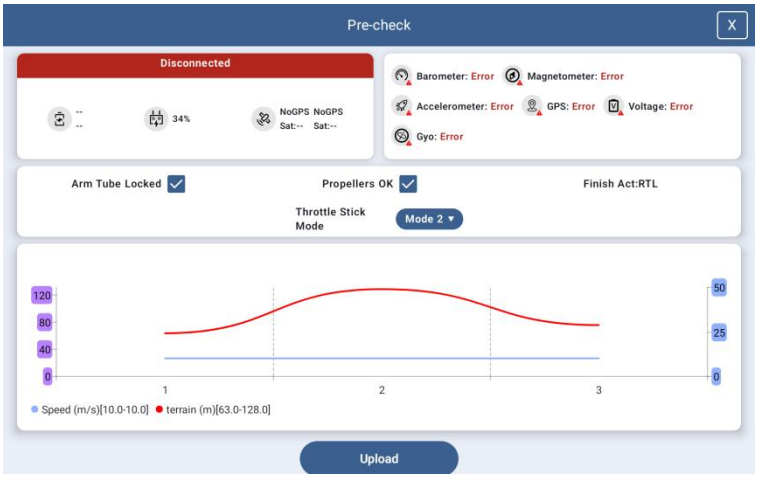
3. After drawing the route, save the route information;



4. Enter the flight check interface, carefully review the relevant content, and check the check items;



5. Check the route information and upload the route;



6. Wait for the route upload to complete, and click Execute Mission;

7. Manually unlock the aircraft, and the drone will automatically execute the route mission;

8. After the mission waypoints end, add appropriate waypoints to guide the aircraft back to the landing point along a safe path.

Note: For the RTL altitude, pay attention to the height of the environment or buildings along the return route. If the altitude cannot be increased, add waypoints to bypass the obstacles.

11.4 No-Fly Zones

Please use the UniGCS ground station software and comply with relevant laws and rules, including but not limited to:

1. Comply with flight restriction and no-fly regulations: before flying, please check and learn the latest no-fly and flight-restriction information through the local official unmanned aircraft management platform, and comply with the relevant regulations.

2. Comply with real-name registration and flight information reporting regulations: according to laws and regulations, you need to complete real-name registration on the Integrated Comprehensive Supervision and Service Platform for Unmanned Aircraft (UOM for short). When in use, flight dynamic data must be reported online, and the reporting function must not be turned off during operation.

3. Comply with other legal provisions: before flying, be sure to understand and comply with the local laws and regulations on unmanned aircraft flight in detail.

Chapter 12 After-Sales Service and Warranty

Please visit Reebot Robotics at http://reebot.com/en/index.php?id=support for the latest after-sales and warranty information.

Chapter 13 Appendix

13.1 UniDrone E1000 Technical Specifications

Aircraft

Item	Specification
Empty weight (excluding battery)	6.2 kg
Unloaded weight (including intelligent battery)	10 kg
Unfolded dimensions (excluding propellers)	L857 × W750 × H435 mm
Folded dimensions (excluding propellers)	L520 × W445 × H435 mm
Wheelbase	1025 mm
Arm folding method	Horizontal folding
Maximum payload	Recommended maximum payload 6 kg; extreme payload 10 kg (maximum horizontal flight speed ≤ 12 m/s)
Maximum ascent speed	4 m/s
Maximum descent speed	2 m/s
Maximum horizontal flight speed	20 m/s (≤ 12 m/s with 10 kg payload)
Maximum flight altitude	5000 m
IP protection rating	IP54
Maximum wind resistance speed	11.5 m/s
Operating temperature	-20 °C to 50 °C
Operating voltage	12S, maximum voltage 52.8 V
Strobe light frequency	1.5 Hz
FPV field of view (FOV)	Horizontal 113°, vertical 77°, diagonal 122°
FPV pitch rotation angle	68°
FPV resolution	1080p
FPV modes	Pitch-lock mode / pitch-follow mode
Payload interface	Type-C × 2
Mounting positions	Front, bottom, and top of the airframe
Pouch battery power port	Amass AS150U (female socket, male pin)
Battery compartment dimensions	L205 × W144 × H78 mm
Battery dual mode	Supports intelligent battery or 12S LiHV pouch battery
Obstacle avoidance type	360° horizontal omnidirectional LiDAR obstacle avoidance
Radar detection range	0.1–40 m @ 90% reflectivity; 0.1–15 m @ 10% reflectivity
LiDAR ambient light resistance	100 kLux
Laser horizontal parallelism	0° ± 0.3°
Laser wavelength	905 nm ± 15 nm
RTK positioning accuracy	Single point: horizontal 1.5 m / vertical 2.5 m; DGPS (assisted positioning): horizontal 0.4 m + 1 PPM / vertical 0.8 m + 1 PPM; RTK: horizontal 0.8 cm + 1 PPM / vertical 1.5 cm + 1 PPM
RTK heading	Heading accuracy 0.2°

Endurance Performance

Item	Specification
Unloaded endurance	55 min
Endurance with UniPod MT11 pod	49 min
Endurance at recommended maximum payload (6 kg)	25 min
Endurance at maximum takeoff weight of 20 kg	18 min

Remote Controller

Item	Specification
Maximum effective signal range (no interference, no obstruction)	35 km
Maximum effective signal range (with interference)	Suburban, flight altitude 120 m, low obstruction, medium interference: 10–15 km; over the sea, flight altitude 120 m, no obstruction, low interference: 30–35 km
Display	7-inch touchscreen LCD, 1080P, 1600 nits
Weight	1.46 kg
GNSS	GPS/GLONASS/BeiDou/Galileo/QZSS
Built-in battery capacity	13,400 mAh
Operating time	About 8 hours
IP protection rating	IP54
Wi-Fi protocol	Wi-Fi 5
Bluetooth	BT 5.0
Operating frequency	2.400 GHz – 2.476 GHz; 5.725 GHz – 5.829 GHz
Storage	4 GB + 64 GB
Antennas	Foldable detachable antennas × 2, built-in antennas × 2
Physical channels	Buttons × 16, large joysticks × 2, small joystick × 1, dials × 2, three-position switches × 2
Charging time	About 4.5 h
Charging method	PD 30 W
Others	One-aircraft dual-control, RC relay, communication relay

Power System

Item	Specification
Propeller size	24 inch
ESC control form	FOC control

Intelligent Battery

Item	Specification
Capacity	19 Ah
Single cell voltage	4.4 V
Nominal voltage	46.2 V
Full voltage	52.8 V
Discharge current	Standard: 9500 mA (0.5C); maximum discharge current: 90 A; instantaneous maximum current: 210 A (16.3C) ≤ 1 s
Charging current	15 A
Weight	3.906 kg
Charging environment temperature	0 to 45 °C
Discharging environment temperature	-10 to 60 °C
Discharge rate	Instantaneous maximum current: 210 A
Charging cable	AS150U, connected to the charger
Cycle count	≥ 500

Intelligent Battery Charger

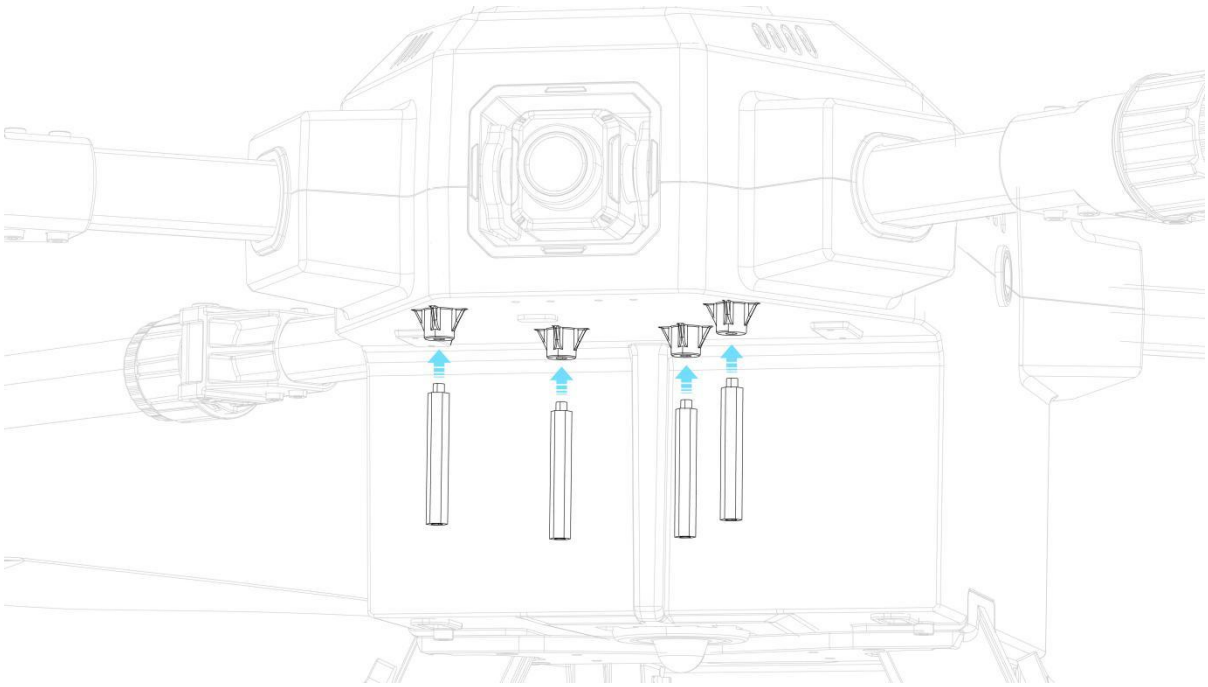
Item	Specification
Empty case weight (including packaging)	7.6 kg
Supported batteries	B19 intelligent battery & LiHV pouch battery (6–14S)
Operating environment temperature	0 °C to 40 °C
Input	100–240 V (AC)
Output	AC: 180–240 V, maximum power 3000 W; AC: 100–180 V, maximum power 1500 W
Number of charging channels	4
Charging time	The intelligent battery only supports slow-charge mode. From 0% to 100%, the charging time is about 78 minutes. Charging time measured in an experimental environment at 25 °C.

13.2 Using the Belly-Mounted Dual-Gimbal Assembly

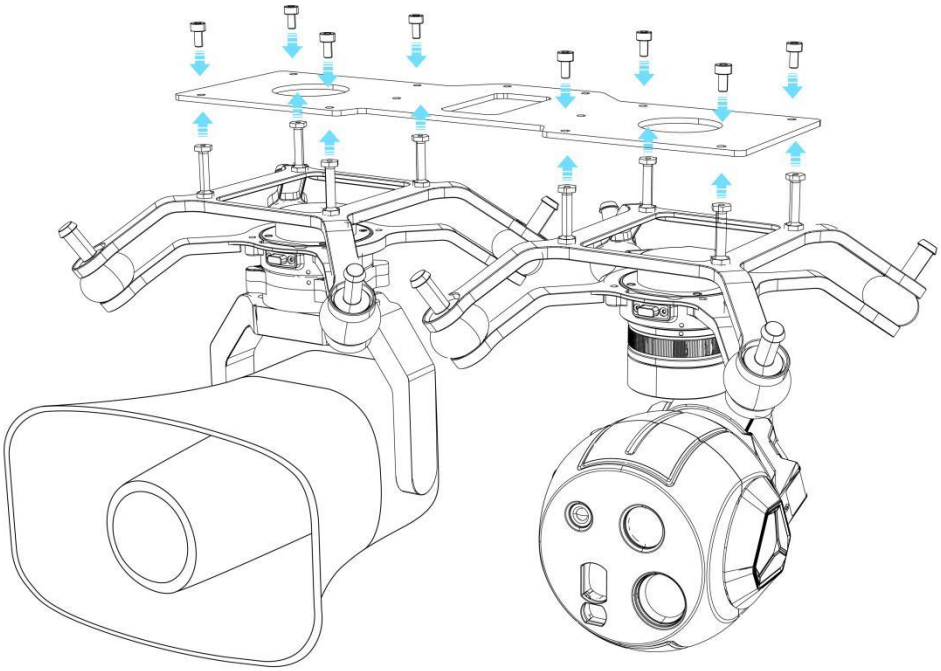
The belly-mounted dual-gimbal assembly is used to install gimbal cameras on the front of the UniDrone E1000 aircraft airframe.

Installation steps:

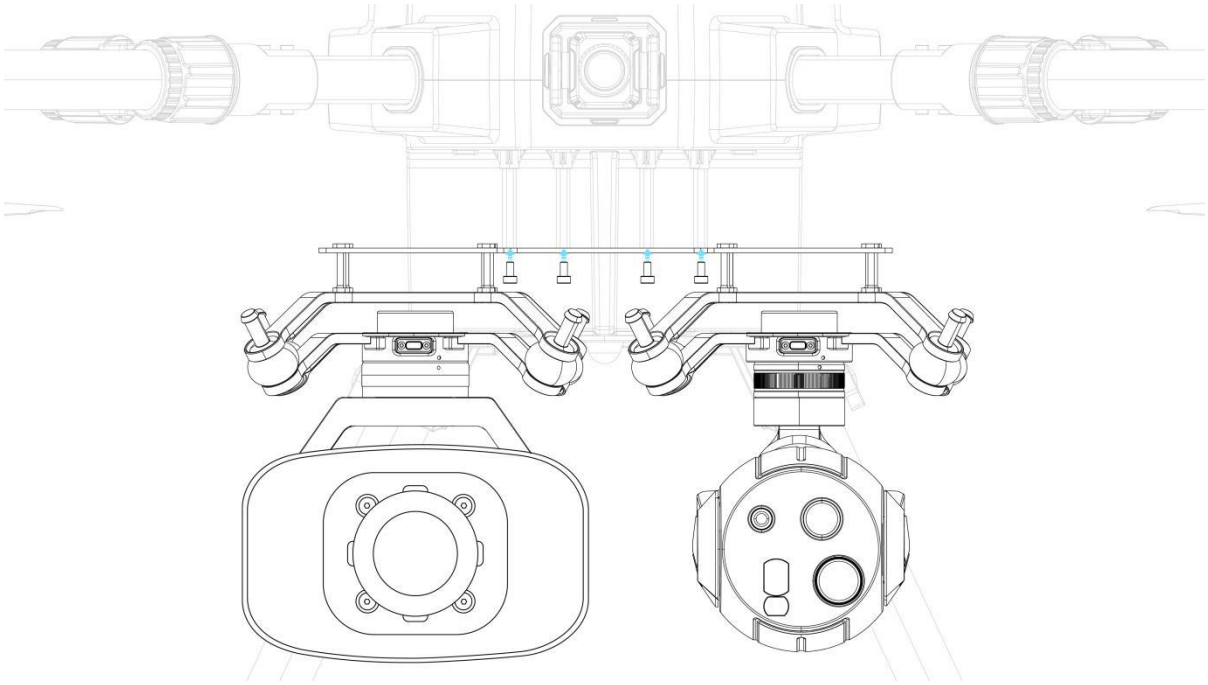
1. Install the studs into the holes at the front of the airframe:



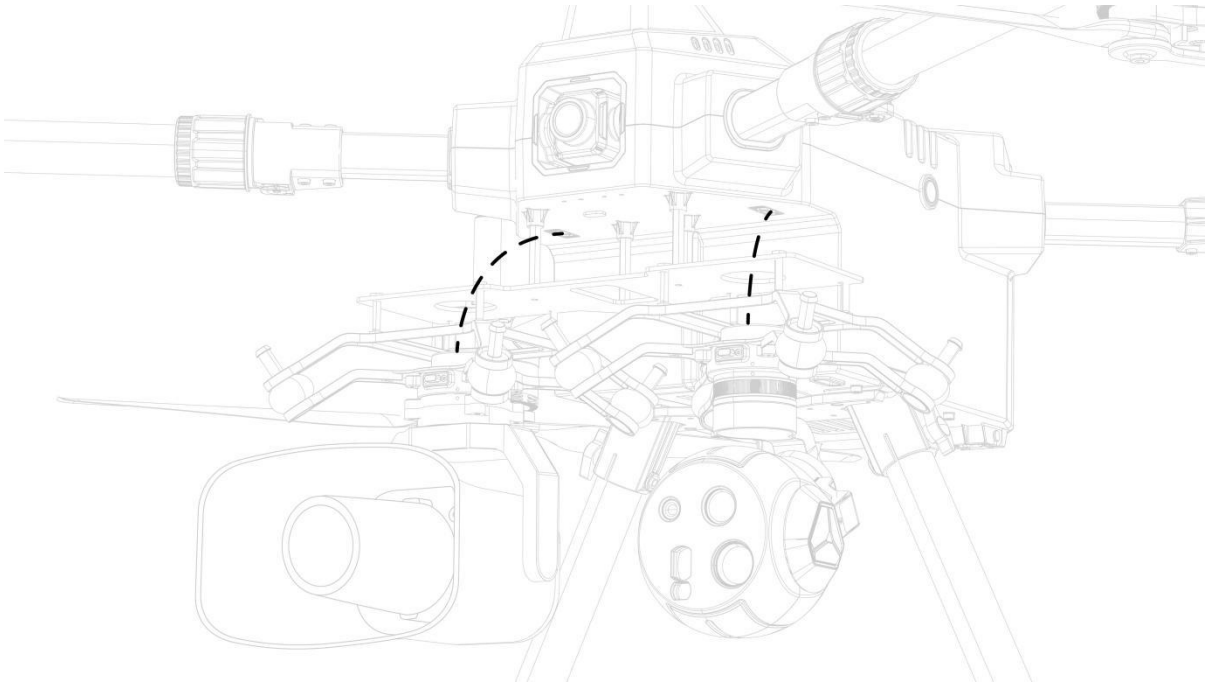
2. Fix the optical pod to the expansion board;



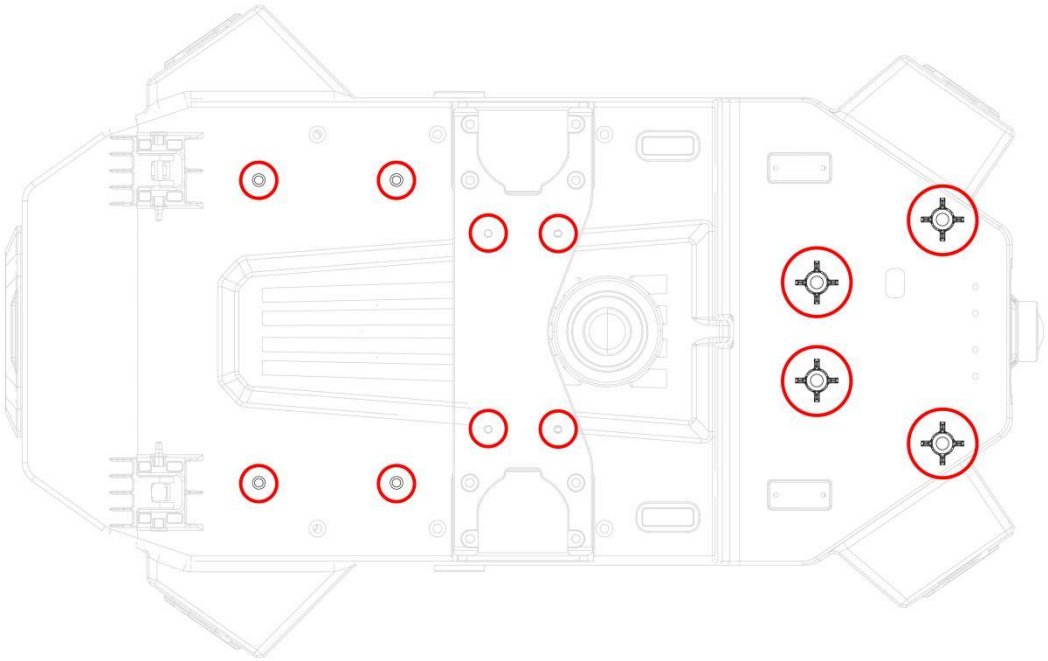
3. Fix the expansion board to the studs;



4. Plug the cables into the airframe interfaces.



13.3 Expansion Screw Holes



Note: All screws used here are M3 size.

